



S-154 over Murrells Inlet Creek



S-154 over Murrells Inlet Creek



S-31 over Tod Swamp



S-31 over Tod Swamp



S-31 over Tod Swamp

TECHNICAL PROPOSAL

Bridge Package 18 | *Design-Build Project* in Horry County, South Carolina

Contract ID 2662300

October 3, 2024

Greg Tuttle
Cape Romain Contractors
843.884.5167 (O), 843.514.9850 (M)
greg@caperomaincontractors.com



&





4.1 | TECHNICAL PROPOSAL

Technical Proposal Narrative



&



1 | PROJECT DELIVERY & APPROACH

A. Project Delivery & Approach

The Cape Romain/Neel-Schaffer Team's approach to delivering this project involves using our specialists to collaboratively develop the most optimal bridge solutions for these unique sites. Each site has its own unique characteristics and requires different approaches, as described below.

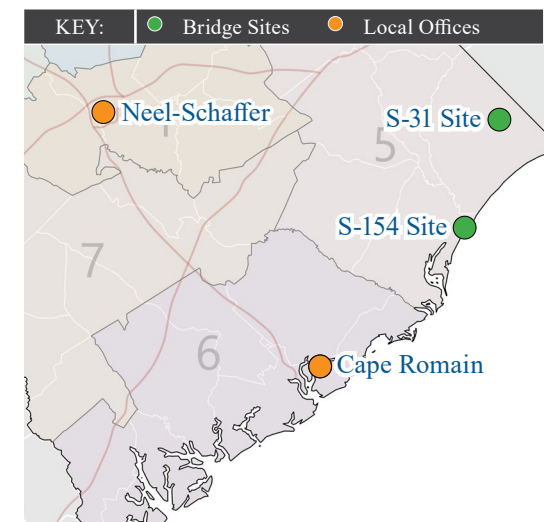
The **S-154 over Murrells Inlet Creek Bridge Rehabilitation** will include replacing the superstructure and installing a Cathodic Protection System on the existing substructure elements. **Our innovative FATCs will save time and money, while providing a more efficient Cathodic Protection System.**

- Reduction in labor and materials on the cofferdams while also allowing crews to work on two (2) substructure units concurrently using access from the ends of the bridge to work areas within the cofferdams.
- Using GFRP for the supplemental reinforcement on the pile jackets will eliminate the risk of electrical shorts that could occur with steel reinforcement. The GFRP also ensures that all protection from the galvanic cathodic protection system is directed to the original reinforcement, making it more efficient and providing a longer service life for the bridge.

The **S-31 over Tod Swamp Bridge Replacement** will include full replacement of the bridge. We worked collaboratively to explore multiple structure options. This was an iterative process with our H&H, Bridge, Roadway & Geotechnical designers working together with Cape Romain to develop the optimum solution while meeting all the project criteria.

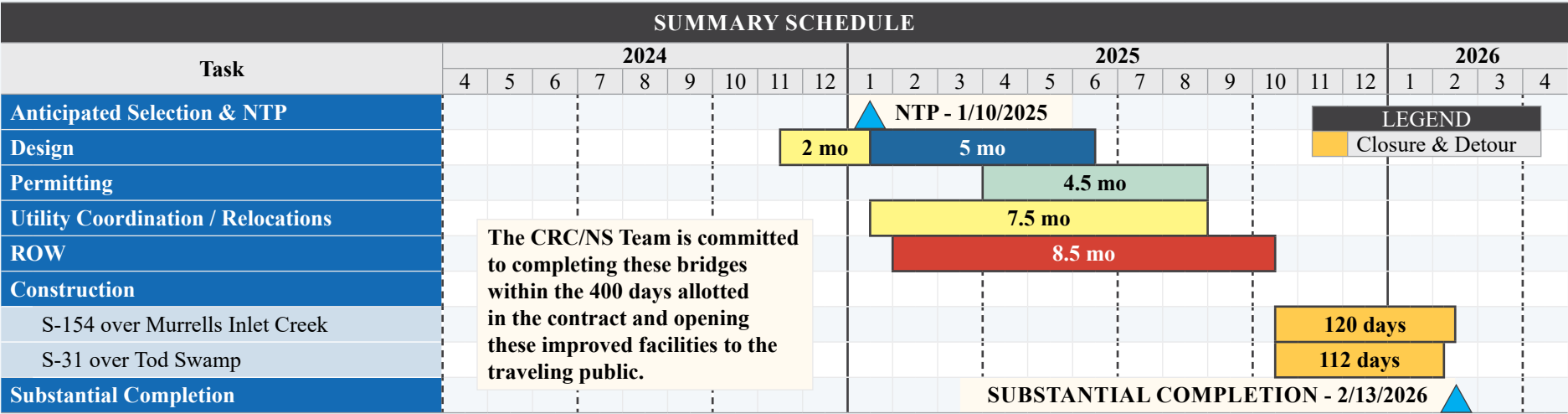
- We evaluated multiple options and submitted multiple FATCs.
- **Our FATC 4, using a 66.5-foot-long bridge, was determined to be the optimal solution, resulting in reductions in bridge length, roadway length, ROW, environmental impacts, and utility impacts.**

Cape Romain Contractors will have a local project office in Horry County to serve as the main operations center for the Team. This local project office will be used for regular in-person design/construction team meetings with SCDOT, utility coordination meetings, and other field meetings to resolve issues quickly. Cape Romain will use its 75 years of experience building bridges in the SC Lowcountry to successfully complete these projects for SCDOT.



The overall sequence for design and construction is shown below in our Summary Schedule. A more detailed CPM Schedule is provided in

[Appendix A.3](#). The road and bridge closure durations shown in these schedules are based on the reduced durations in our FATCs.



B. Approach to Design

Our integrated design approach began with a half-day workshop involving all key members of the Cape Romain/Neel-Schaffer Team.

Prior to the workshop, our H&H group conducted a preliminary hydraulic analysis on options for the S-31 site. During the workshop, we brainstormed together to determine the most viable FATCs for this site.

We also reviewed the Cathodic Protection details for the S-154 over Murrells Inlet Creek Bridge Rehabilitation. Using the design and

construction experience of the team, we brainstormed ideas to optimize the both design and construction. During the workshop, we developed concepts for FATC 2 on cofferdams and FATC 3 for the use of GFRP in the pile jackets.

We then refined these FATC concepts and submitted several FATCs. More details on our design approach for the key elements are provided in the following pages.

Hydraulic Design for S-31 over Tod Swamp

Design analysis will follow the 10-step Level 2 (Procedures for Riverine Bridges) per section 1.3.1 in the SCDOT “Requirements for Hydraulic Design Studies” published on May 26, 2009 and requirements listed in Hydraulic Design Bulletin No. 2019-04. The proposed bridge replacement is located within an effective FEMA Special Flood Hazard Area designated as Zone AE without Floodway. Neel-Schaffer will purchase/obtain the original/effective flood study computer model from FEMA. If the model is not available, we will create one using HEC-RAS software. An analysis of the hydrologic/hydraulic characteristics of the existing and proposed S-31 bridge will be performed using the one-dimensional computer program HEC-RAS, which will conform to all hydraulic design requirements listed in the SCDOT “Requirements for Hydraulic Design Studies” and applicable Hydraulic Design Bulletins. A conceptual-level analysis has been conducted at the project location using HEC-RAS software. Our FATC 4 utilizes a 66.5-foot-long, single-span bridge, which is a more efficient structure than the 80-foot-long structure shown in the conceptual plans. The hydrologic data used for our

preliminary analyses was acquired from FEMA Flood Insurance Study (FIS) 45051CV003B (December 16th, 2021). The FEMA FIS included discharges for Tod Swamp with a drainage area of 3.44 square miles. An updated hydraulic model was prepared using existing bridge as-builts and LiDAR data to determine preliminary hydraulic requirements of the proposed bridge, the results of which are shown in the table below. Based on our preliminary analyses, our team is confident that the proposed 66.5-foot-long bridge can feasibly be designed to cause no impacts or increases to the Zone AE Base Flood Elevations for Tod Swamp. Therefore, **a “No-Impact Certification” is achievable for this project.** We anticipate needing a design variance due to the top elevation of the abutment endrolls being lower than the design high water (25-year) elevation. However, the abutment endrolls will be armored with Class B riprap, and the riprap will extend to 2.0 feet higher than the design high water elevation along the embankment behind the wingwalls.

The H&H data for Tod Swamp is provided in the table below. Refer to [Appendix C \(Approved Formal ATCs\)](#) for more detailed H&H analysis information regarding the bridge configuration optimization.

TOD SWAMP EXISTING AND PROPOSED BRIDGE HYDRAULIC DATA								
Version	Structure	FEMA Flood Zone	Minimums		Flood Elevation		25 Year Freeboard	100 Year Backwater
			Low Chord Elev.	Rdwy. Grade	25 Year	100 Year		
Existing	Existing Triple Span - 15’ each - 45’ total	Zone AE	22.60 ft	23.42 ft	19.55 ft	20.78 ft	3.05 ft	0.20 ft
Proposed	Single Span - 66.5’	Zone AE	22.60 ft	26.85 ft	19.53 ft	20.73 ft	3.07 ft	0.15 ft

Bridge & Roadway Design

We have made further refinements to the bridge and roadway design for both sites in accordance with the design criteria in Exhibit 4 and the refinements to the design based on implementation of our FATCs.

With the refinements to the design via our FATCs we were able to reduce:

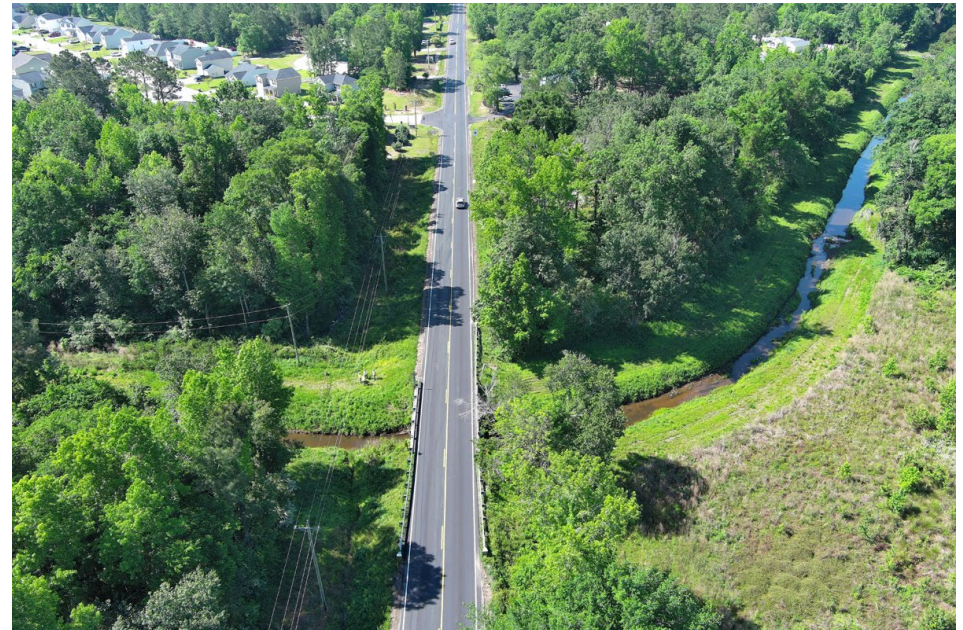
- Bridge lengths for Package 18 by 9%.
- Roadway length for Package 18 by 11%.
- ROW acreage for Package 18 by 46%.
- Number of ROW parcels for Package 18 by 40%.

The Table below provides details on the reductions to Roadway Lengths and ROW required for both sites.

ROADWAY DESIGN & ROW SUMMARY						
Bridge Site	Approach Roadway Length (ft)			ROW Required (Ac)		
	SCDOT Concept	CR/N-S Concept	Difference	SCDOT Concept	CR/N-S Concept	Difference
S-31	1100.00	815.00	-285.00	2.09	1.12	-0.97
S-154	318.12	445.66	127.54	0.00	0.00	0.00
Totals	1418.12	1260.66	-157.46	2.09	1.12	-0.97



S-154 over Murrells Inlet Creek Bridge: Bridge Rehabilitation using Cathodic Protection to extend the service life of bridge



S-31 over Tod Swamp:
Bridge Replacement will utilize 66.5' span to reduce impacts

Cathodic Protection Systems Design

Our Cathodic Protection System design will comply with the requirements of NACE SP0216-2023 (Galvanic Cathodic Protection of Reinforcing Steel in Atmospherically Exposed Concrete Structures) and the performance will meet requirements of AMPP SP21520-2023 (Acceptance Criteria for Cathodic Protection of Steel in Concrete Structures).

3ePlus has quickly utilized their expertise to enhance the Cathodic Protection System via our FATC 3 to use glass fiber reinforced polymer (GFRP) reinforcement for the supplemental reinforcing steel cage of galvanic cathodic protection pile jackets on S-154 over Murrells Inlet Creek.

- GFRP **eliminates the risk of electrical shorts** between the pile jacket's zinc mesh anode and the GFRP reinforcement since the GFRP is non-metallic.
- The GFRP also creates a barrier between the exposed original steel reinforcement in repair cavities and the jacket's zinc mesh anode.
- **GFRP is more effective for supplemental reinforcement** - all the protection from the galvanic cathodic protection system will be directed to the original reinforcement.

Geotechnical Design

Preliminary geotechnical tasks have been completed by SCDOT. The current foundation design for S-31 over Tod Swamp - encompassing types, sizes, and depths - is based on a limited set of subsurface data which includes a minimum one soil boring near each end of the bridge. Our team will conduct additional borings to supplement the preliminary data and in accordance with the guidelines set forth in GDM to enhance our understanding of the subsurface conditions. This approach will help mitigate potential construction challenges, ultimately reducing schedule and quantity risk.

C. Proposed Design Submittal Process & Anticipated Deliverables

Our design submittal packages, as shown in the table to the right, will be in accordance with RFP Exhibit 4z and all the SCDOT submittal requirements and standards. We will provide the submittals listed in the table above for each bridge separately. By incorporating our approved FATC 1, we will eliminate the Preliminary Roadway Submittals, allowing us to begin permitting and ROW Acquisition approximately one month earlier.

Submittal	Description
1	Preliminary Bridge Plans Submittal
2	Right-of-Way Plans Submittal
3	Final Roadway Plans Submittal
4	Final Bridge Plans Submittal
5	RFC Plans Submittal (Bridge & Roadway)

All our submittals will undergo rigorous Quality Control and Constructability Reviews prior to submission to SCDOT. This will streamline the review process using our Design Quality Management Plan (DQMP), which has been successfully implemented on numerous Design-Build Projects to ensure the quality of all design deliverables. The submittals will be assembled for each bridge site to facilitate complete and efficient reviews by SCDOT. Our Design Submittals will follow the sequence shown on [Page 2](#) and in our CPM schedule in [Appendix A.3](#).

We anticipate accelerating the design process by utilizing the preliminary design work accomplished during the procurement phase. The table below summarizes the current status of the design.

DESIGN TASKS COMPLETED		
Discipline	Tasks Completed To-Date	Overall % Complete
All	Preliminary Field Inspections, Workshop to brainstorm & explore ATCs, Submitted FATCs, QC of Preliminary Design Work	100%
Roadway	Typical Section, Proposed Profile, Proposed Cross Sections & Construction Limits, Identified New Right-of-Way	50%
Bridge	Layout to satisfy RFP criteria, Determined Superstructure Type, Determined Substructure Type/ Configuration, Preliminary Bridge Design,	40%
H&H	Design - Calculated Drainage Areas & Discharges, Completed HEC-RAS Model Analysis (for Natural, Existing & Proposed Conditions), Plotted Triple Profile	60%
	Roadway Drainage/Erosion Control Permit Package	60%
	Scour Calculations & FEMA No-Rise Modeling	60%
Geotechnical	Accessed Borings provided by SCDOT, Selected Foundation Types, Estimated Preliminary Pile Depths	40%

2 | INNOVATION & ADDED VALUE

Based on the implementation of our FATCs and other design refinements, we have provided innovation and added value to SCDOT through our FATCs, which were developed to save time and money.

We have implemented two FATCs for the S-154 over Murrells Inlet Creek site:

- **FATC 2** involves modifications to the cofferdam layouts to save material and labor. This also enables the cathodic protection work to be accomplished more efficiently by allowing work from land on two substructure elements at a time. **The cost savings for FATC 2 is \$85,000.**
- **FATC 3** involves the use of GFRP as supplemental reinforcement in the pile jackets to provide a more effective cathodic protection system and increase the service life of the piles.

Our primary cost-saving FATC at the S-31 over Tod Swamp site was **FATC 4**, which reduced the bridge length from 80 feet to 66.5 feet. The primary savings are related to reduced bridge and roadway length and a reduction of ROW impacts by four parcels. The cost savings for the S-31 site are further described below:

- Reduced bridge length by 17%.
- Shortened roadway length by 26%.
- Reduced ROW for by 46%, with the total number of parcels

impacted reduced from 10 to 6 (a 40% reduction).

- Shortened bridge/roadway closures by one week.
- **Reduced cost by \$77,000 based on these design refinements.**

A. Ability to Meet Schedule

Cape Romain Contractors is a SC Lowcountry bridge specialist with the expertise needed to expedite the schedule and successfully accomplish SCDOT's D-B Bridge Package 18.

- **Cape Romain's experience building the first bridge in SC with GFRP means we have no learning curve on GFRP, which will expedite the schedule.**



Beresford Creek Bridge, Charleston, SC
First Bridge in SC with all GFRP Reinforcement

- **Cape Romain and 3ePlus both have extensive experience with the design, installation, and testing of cathodic protection systems in corrosive marine environments. With no learning curve, we can expedite this work and ensure it is done right to successfully extend the life of this bridge.**



Pile Jackets in FL Keys designed by 3ePlus.



Pile Jackets on Ft Sumter Dock Rehabilitation installed by Cape Romain

Cape Romain is committed to performing the work on both bridges simultaneously. **Constructing two bridges at the same time for this contract is well within Cape Romain Contractors' capabilities.**

Neel-Schaffer is committed to achieving the design as shown in our proposed CPM Schedule in [Appendix A.3](#). **Our preconstruction design activities for both sites will be completed within five months from NTP.** We are dedicated to achieving this schedule and will begin design work at our risk prior to the official NTP by SCDOT. Neel-Schaffer has resources experienced in delivering Design-Build projects with a track record of completing projects on time, which will be a benefit the successful and timely completion of SCDOT's D-B Bridge Package 18.

B. Avoiding/Minimizing Impacts to Utilities

We have performed preliminary coordination with several of the affected utility owners in an attempt to eliminate or minimize impacts, better understand schedule considerations, and expedite the process if we are the successful team.

- Our cofferdam layout reduced the conflicts with the Grand Strand Sewer line on the S-154 site from six to one, but they will still relocate the line under contract to eliminate the remaining conflict.
- Santee Cooper is receptive to extending the de-energizing of their OH electric lines at the S-154 site to allow time for sheet pile installation and other bridge construction. They require more specific details on the time of year to avoid de-energizing during hurricane season and maintain the ability to backfeed customers if necessary. Based on our schedule, we think this is feasible.
- On the S-31 site, we coordinated with Horry Electric and determined that their power poles will have up to 5 feet of additional fill, and they have indicated these could remain in place.
- It is our understanding that the water line at the S-31 site will be relocated in contract and the sewer line is outside the project limits.
- We also understand the Horry Telephone lines attached to the bridge at the S-31 site are abandoned (this needs to be confirmed in writing) and that the fiber location is being resolved.

C. Avoiding/Minimizing Impacts to ROW

As noted above, **we reduced ROW by 46%** and we decreased the number of parcels impacted from 10 to 6.

- **Impacts were eliminated on the following parcels:**
 - **Parcel 19:** Mexican Restaurant on west side of S-31.
 - **Parcels 4, 10 & 11:** East side of S-31 (Red Bluff Road).
- **Impacts to Parcel 15** (with a mobile home) were **significantly reduced**. The proposed ROW on the SCDOT Concept was less than 10 feet from the home. With our FATC 4, the ROW is now over 40 feet from the home.

D. Minimizing Impacts to Traffic

Our refinements to the design for the S-31 over Tod Swamp bridge will also benefit the traveling public during construction. Our proposed design has shifted the beginning construction location to just north of the entrance into the subdivision on the east side of Red Bluff Road and the Mexican Restaurant on the west side of Red Bluff Road. This will benefit local traffic in the vicinity of the project while also providing a safer work zone and cost savings on MOT.

Our FATC 4 includes a one-week reduction in the road and bridge closure, and this will provide a corresponding reduction in impacts to traffic by opening the new S-31 bridge faster.

E. Approach to Minimizing Environmental Impacts

Upon receipt of the NTP, biologists from Three Oaks Engineering will complete the necessary fieldwork to flag the limits of jurisdictional waters of the United States (WOTUS) within the construction limits at both bridge sites and gather pertinent data for the completion of Jurisdictional Determination Requests. Jurisdictional features will be identified using the 1987 US Army Corps of Engineers (USACE) Wetlands Delineation Manual. USACE Regional Supplements and data forms will also be used to evaluate hydrophytic vegetation, hydric soil indicators, and hydrological indicators at each site.

The Critical Area at S-154 over Murrells Inlet Creek has been surveyed and approved by SC Department of Environmental Services' (SCDES) Ocean & Coastal Resource Management (OCRM). However, delineation approval by the US Army Corps of Engineers (USACE) will need to be obtained. A Regional General Permit 4 for bridge replacements will be required from the USACE, and a Critical Area Permit will be required from OCRM. Because there are no commercial saltwater mitigation banks that service this area, the required credits for unavoidable impacts will be deducted from SCDOT's Huspa Creek mitigation bank.

Impacts to freshwater jurisdictional features at S-31 over Tod Swamp will also require a Regional General Permit 4 from the USACE. The

bridge is in the Primary Service Area of the Carter Stilley Wetland and Stream Mitigation Bank, located approximately 5 miles from the S-31 bridge. The required mitigation credits will be purchased from this bank. Tod Swamp is a Section 408 stream, therefore, USACE coordination and approval will be required prior to construction.

Each of these bridges have potentially time consuming permitting and approval aspects (i.e., Critical Area Permit at S-154 and Section 408 approval at S-31). Based on our experience, the key to meeting permitting deadlines is early regulatory agency coordination, which our Team proposes to begin upon receipt of the NTP. Early agency coordination will be conducted through SCDOT's Environmental Services Office (ESO). Permit requests will be submitted to the regulatory agencies as soon as practicable during the design phase of the projects.



4.1 | TECHNICAL PROPOSAL

Appendix A.1. | Conceptual Roadway Plans

Appendix A | Conceptual Plans



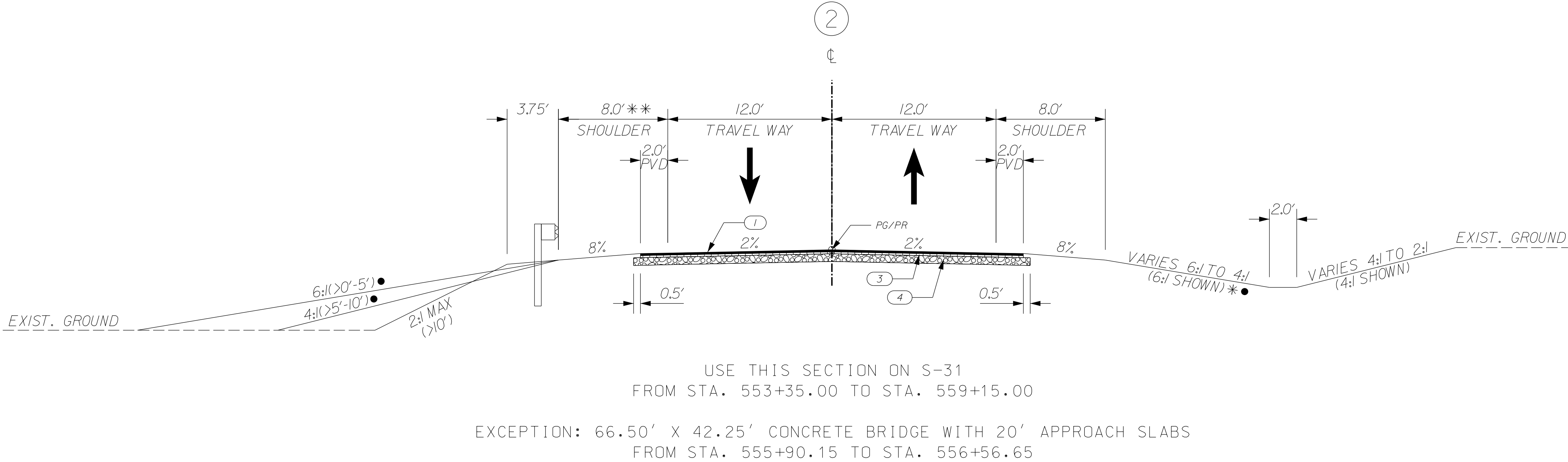
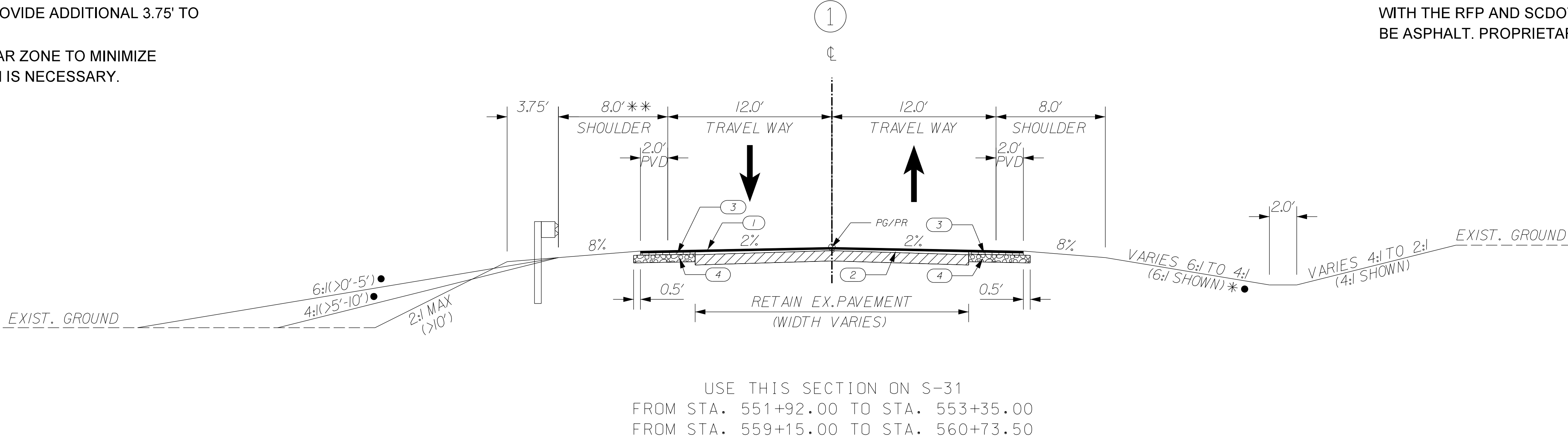
&



TYPICAL SECTION OF IMPROVEMENT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
COLUMBIA, SC

- * THIS SLOPE MAY VARY BETWEEN A MINIMUM SLOPE OF 12.5H:1V TO A MAXIMUM SLOPE OF 4H:1V. WHERE A DEEPER DITCH THAN PROVIDED BY A 4H:1V SLOPE IS NECESSARY FOR DRAINAGE PURPOSES, CONTINUE THE 4H:1V SLOPE UNTIL THE NECESSARY DEPTH HAS BEEN OBTAINED.
- ** WHEN MASH GUARDRAIL IS USED, PROVIDE ADDITIONAL 3.75' TO SHOULDER HINGE.
- SLOPES MAY BE HINGED AT THE CLEAR ZONE TO MINIMIZE DISTURBANCE OR IF A DEEPER DITCH IS NECESSARY.

- NOTES:
1. SEE SCDOT STD. DWG. SECTION 805 FOR GUARDRAIL DETAILS & ADDITIONAL GRADING REQUIREMENTS AT LEADING END TREATMENTS.
 2. PROVIDE NON-MOW STRIP UNDER GUARDRAIL IN ACCORDANCE WITH THE RFP AND SCDOT STANDARD DRAWINGS. THE NON-MOW STRIP SHALL BE ASPHALT. PROPRIETARY NON-MOW STRIP MATERIAL IS NOT ALLOWED.



LEGEND

1		HOT MIX ASPHALT SURFACE COURSE TYPE B (200 LBS/SY)
2		HOT MIX ASPHALT SURFACE COURSE TYPE E FOR BUILD-UP (0-1.5") HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B FOR BUILD-UP (>1.5")
3		HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B (200 LBS/SY)
4		HOT MIX ASPHALT BASE COURSE TYPE A (750 LBS/SY)

		ROUTE NO./ ROAD	FUNCTIONAL CLASSIFICATION	DESIGN SPEED (MPH)	FROM STA.	TO STA.	PAVEMENT DESIGN	CONCEPTUAL PLANS NOT FOR CONSTRUCTION	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION COLUMBIA, SC
		S-31	RURAL MAJOR COLLECTOR	60	551+92.00	560+73.50			S-31 BRIDGE REPLACEMENT OVER TOD SWAMP
									TYPICAL SECTION SHEET
									SCALE: 1" = NTS
									SHEET NO. 3

William.axson
I:\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Roadway\SS1_Todd_Swamp\Dgn\Plan Sheets\005B_P041157_Reference_Data_Sheet.dgn
10/1/2024

FED. RD. DW. NO.		STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3		SC	HORRY	P041157	S-31	5B

BROWNS HOLLOW CT					
Beginning chain BROWNS description =====					
Point 12	N	762,195.14 E	2,655,476.26 Sta	10+00.00	
Course from 12 to PC BROWNSHOLLLOWA N 77° 16' 58.84" W Dist 159.10					
Curve Data *-----*					
Curve BROWNSHOLLLOWA					
P.I. Station	12+25.19 N	762,244.71 E	2,655,256.59		
Delta	= 67° 03' 54.47" (RT)				
Degree	= 57° 27' 20.65"				
Tangent	= 66.09				
Length	= 116.72				
Radius	= 99.72				
External	= 19.91				
Long Chord	= 110.17				
Mid. Ord.	= 16.60				
P.C. Station	11+59.10 N	762,230.16 E	2,655,321.05		
P.T. Station	12+75.83 N	762,309.75 E	2,655,244.87		
C.C.	N 762,327.44 E	2,655,343.01			
Back	= N 77° 16' 58.84" W				
Ahead	= N 10° 13' 04.38" W				
Chord Bear	= N 43° 45' 01.61" W				
Course from PT BROWNSHOLLLOWA to 17 N 10° 13' 04.38" W Dist 18.03					
Point 17	N	762,327.49 E	2,655,241.67 Sta	12+93.86	
=====					
Ending chain BROWNS description					

OUTFALL DITCH 1					
Beginning chain OFD1 description =====					
Point 26	N	764,054.90 E	2,655,464.35 Sta	10+00.00	
Course from 26 to 27 S 13° 50' 17.68" W Dist 72.71					
Point 27	N	763,984.30 E	2,655,446.96 Sta	10+72.71	
Course from 27 to 28 S 73° 40' 13.90" E Dist 427.29					
Point 28	N	763,864.16 E	2,655,857.01 Sta	15+00.00	
=====					
Ending chain OFD1 description					

OUTFALL DITCH 2					
Beginning chain OFD2 description =====					
Point 29	N	763,860.34 E	2,655,437.48 Sta	10+00.00	
Course from 29 to 30 S 76° 15' 12.79" E Dist 105.71					
Point 30	N	763,835.22 E	2,655,540.16 Sta	11+05.71	
Course from 30 to 31 N 13° 27' 52.98" E Dist 92.24					
Point 31	N	763,924.92 E	2,655,561.64 Sta	11+97.95	
Course from 31 to 32 S 73° 38' 32.01" E Dist 302.05					
Point 32	N	763,839.86 E	2,655,851.46 Sta	15+00.00	
=====					
Ending chain OFD2 description					



OUTFALL DITCH 3					
Beginning chain OFD3 description =====					
Point 33	N	763,542.77 E	2,655,289.44 Sta	10+00.00	
Course from 33 to 34 N 86° 04' 45.58" E Dist 392.86					
Point 34	N	763,569.63 E	2,655,681.39 Sta	13+92.86	
Course from 34 to 35 S 86° 29' 06.69" E Dist 107.14					
Point 35	N	763,563.06 E	2,655,788.32 Sta	15+00.00	
=====					
Ending chain OFD3 description					

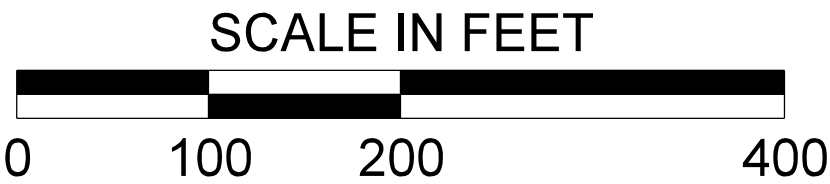
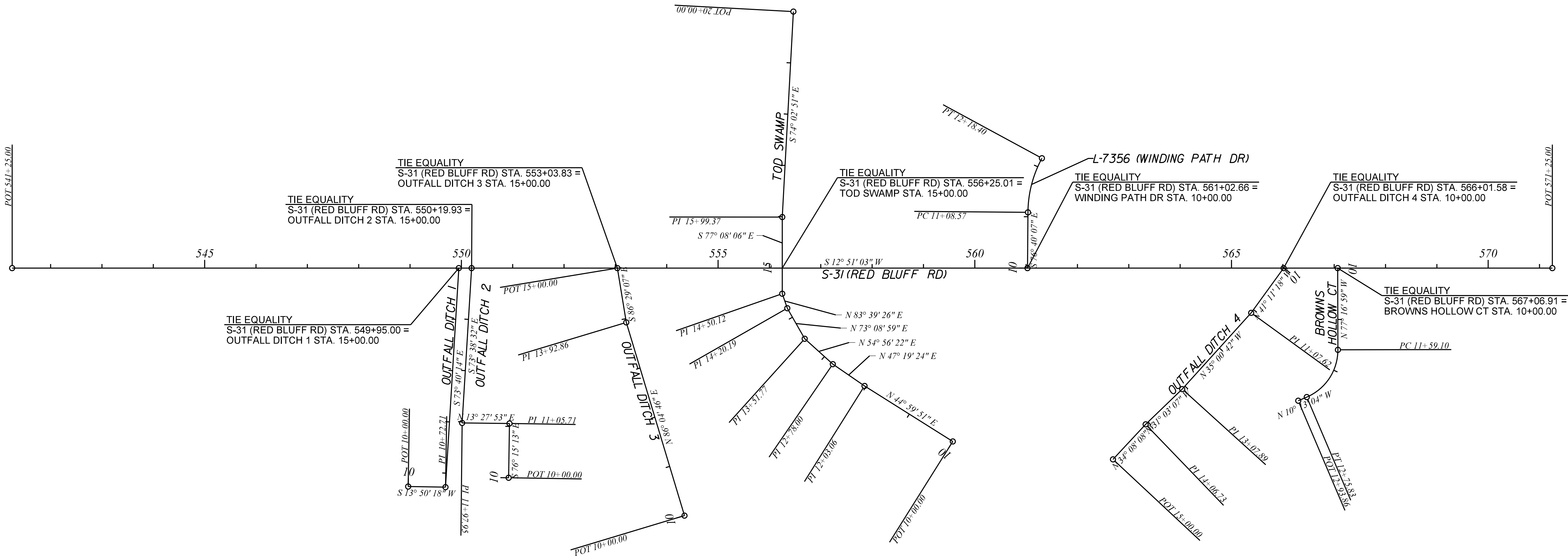
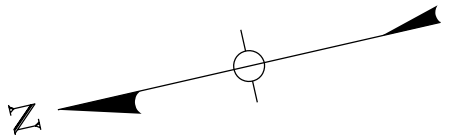
OUTFALL DITCH 4					
Beginning chain OFD4 description =====					
Point 36	N	762,297.82 E	2,655,499.68 Sta	10+00.00	
Course from 36 to 37 N 41° 11' 18.24" W Dist 107.62					
Point 37	N	762,378.81 E	2,655,428.81 Sta	11+07.62	
Course from 37 to 38 N 35° 00' 41.84" W Dist 200.27					
Point 38	N	762,542.84 E	2,655,313.91 Sta	13+07.89	
Course from 38 to 39 N 31° 03' 06.86" W Dist 98.84					
Point 39	N	762,627.52 E	2,655,262.92 Sta	14+06.73	
Course from 39 to 40 N 34° 08' 07.87" W Dist 93.27					
Point 40	N	762,704.72 E	2,655,210.59 Sta	15+00.00	
=====					
Ending chain OFD4 description					

S-31 (RED BLUFF RD)					
Beginning chain S31 description =====					
Point 5	N	764,712.37 E	2,656,050.51 Sta	541+25.00	
Course from 5 to 6 S 12° 51' 03.43" W Dist 3,000.00					
Point 6	N	761,787.51 E	2,655,383.26 Sta	571+25.00	
=====					
Ending chain S31 description					

TOD SWAMP					
Beginning chain TODDSWAMP description =====					
Point 18	N	763,001.14 E	2,655,313.98 Sta	10+00.00	
Course from 18 to 19 N 44° 59' 51.24" E Dist 203.06					
Point 19	N	763,144.73 E	2,655,457.55 Sta	12+03.06	
Course from 19 to 20 N 47° 19' 24.23" E Dist 74.95					
Point 20	N	763,195.53 E	2,655,512.65 Sta	12+78.00	
Course from 20 to 21 N 54° 56' 22.33" E Dist 73.77					
Point 21	N	763,237.90 E	2,655,573.04 Sta	13+51.77	
Course from 21 to 22 N 73° 08' 58.74" E Dist 68.42					
Point 22	N	763,257.74 E	2,655,638.52 Sta	14+20.19	
Course from 22 to 23 N 83° 39' 25.64" E Dist 29.92					
Point 23	N	763,261.04 E	2,655,668.26 Sta	14+50.12	
Course from 23 to 24 S 77° 08' 05.70" E Dist 149.25					
Point 24	N	763,227.81 E	2,655,813.77 Sta	15+99.37	
Course from 24 to 25 S 74° 02' 51.37" E Dist 400.63					
Point 25	N	763,117.70 E	2,656,198.97 Sta	20+00.00	
=====					
Ending chain TODDSWAMP description					

L-7356 (WINDING PATH DR)					
Beginning chain WINDINGPATH description =====					
Point 7	N	762,784.24 E	2,655,610.65 Sta	10+00.00	
Course from 7 to PC WINDINGPATHA S 76° 40' 06.94" E Dist 108.57					
Curve Data *-----*					
Curve WINDINGPATHA					
P.I. Station	11+64.61 N	762,746.29 E	2,655,770.82		
Delta	= 27° 58' 02.20" (RT)				
Degree	= 25° 27' 53.21"				
Tangent	= 56.03				
Length	= 109.83				
Radius	= 225.00				
External	= 6.87				
Long Chord	= 108.74				
Mid. Ord.	= 6.67				
P.C. Station	11+08.57 N	762,759.21 E	2,655,716.30		
P.T. Station	12+18.40 N	762,709.31 E	2,655,812.91		
C.C.	N 762,540.27 E	2,655,664.41			
Back	= S 76° 40' 06.94" E				
Ahead	= S 48° 42' 04.74" E				
Chord Bear	= S 62° 41' 05.84" E				
=====					
Ending chain WINDINGPATH description					

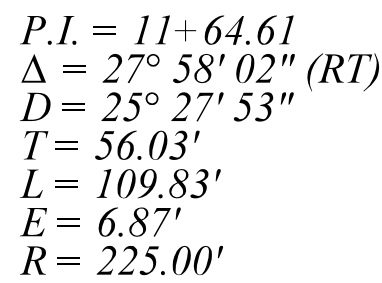
 	CONCEPTUAL PLANS NOT FOR CONSTRUCTION	5				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION COLUMBIA, SC	
		4					
		3					S-31 BRIDGE REPLACEMENT OVER TOD SWAMP
		2					
		1					
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	SCALE: 1" = NTS	SHEET NO. 5B		



CONCEPTUAL PLANS
NOT FOR CONSTRUCTION

5			
4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION COLUMBIA, SC	
S-31 BRIDGE REPLACEMENT OVER TOD SWAMP	
REFERENCE DATA SHEET	
SCALE: 1" = 100'	SHEET NO. 5C



5			
4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION

PLAN & PROFILE SHEET

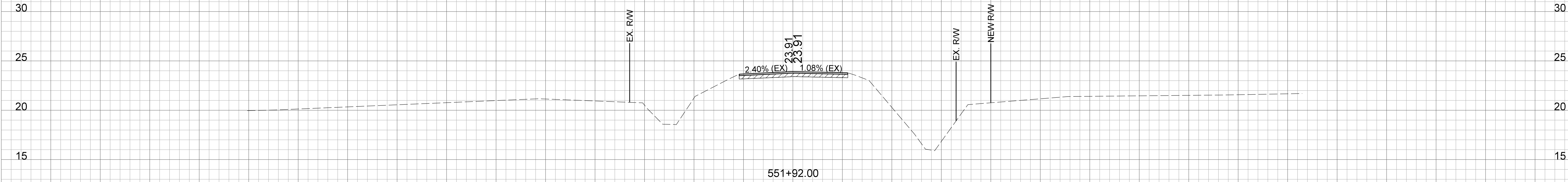
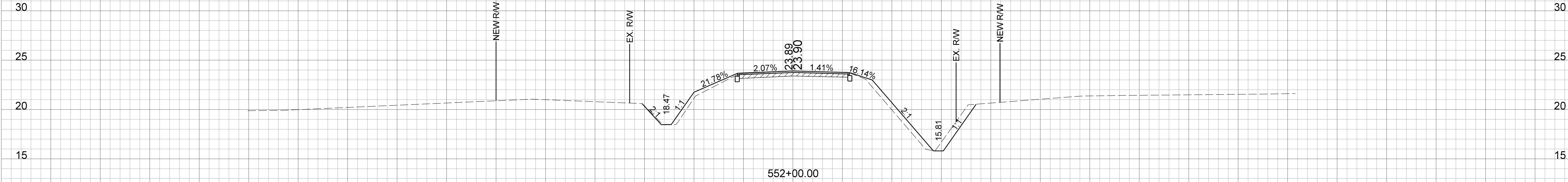
SCALE: 1" = 50'H, 10'V

William Axson
\\fs1\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Roadway\SS1_Todd_Swamp\Drawn\Plan Sheets\PO41157_dx_SS1_sheets.dgn
10/12/2024

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	PO41157	S-31	X1

S-31

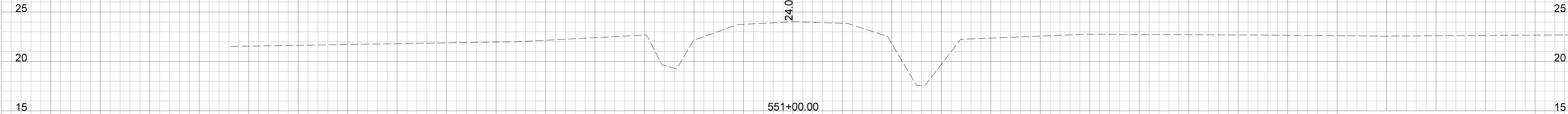
160 140 120 100 80 60 40 20 0 20 40 60 80 100 120



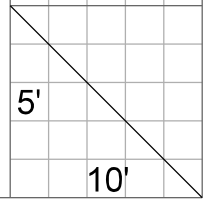
BEGIN LT CROSS SLOPE TRANSITION
STA. 551+92.00

BEGIN CONSTRUCTION
STA. 551+92.00

BEGIN RT CROSS SLOPE TRANSITION
STA. 551+92.00



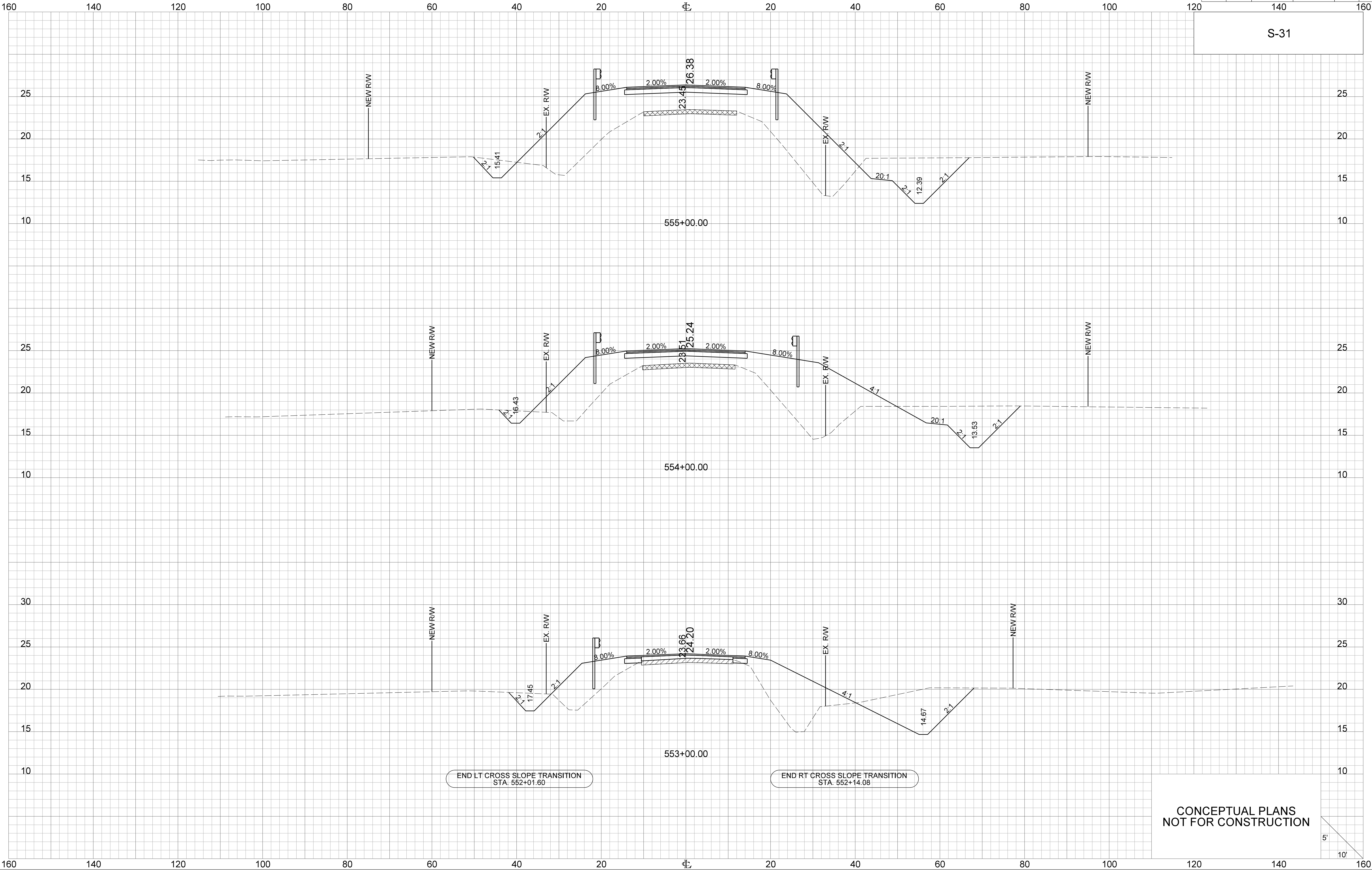
CONCEPTUAL PLANS
NOT FOR CONSTRUCTION



160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160

William axson
\\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Roadway\SS1_Todd_Swamp\Drawn\Plan Sheets\PO41157_ax_SS1_sheets.dgn
10/12/2024

FED. RD. RW. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	PO41157	S-31	X2

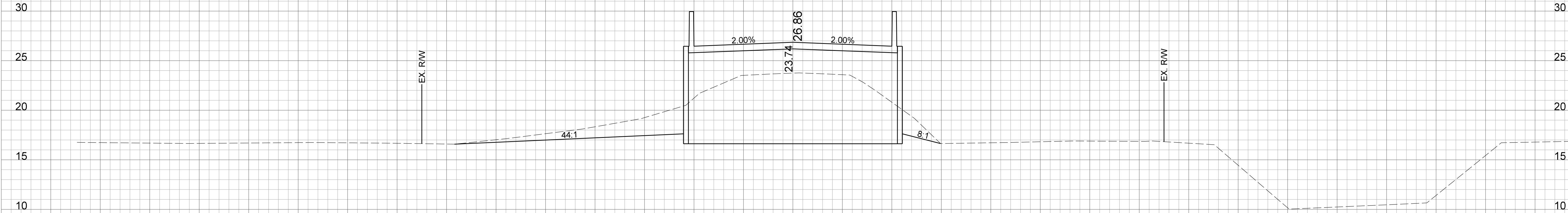


William axson
Y:\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Roadway\SS1_Todd_Swamp\Drawn\Plan Sheets\PO41157_dx_SS1_sheets.dgn
10/12/2024

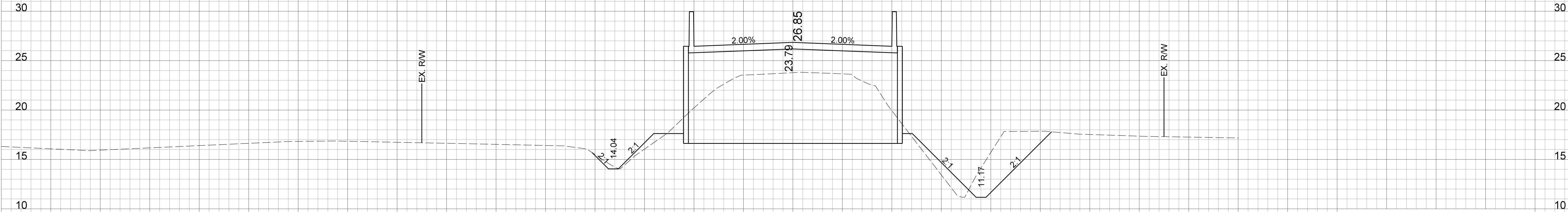
FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	PO41157	S-31	X3

S-31

160 140 120 100 80 60 40 20 0 20 40 60 80 100 120



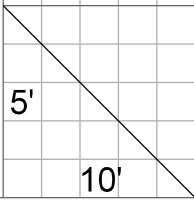
556+56.65
END BRIDGE
STA. 556+56.65
CROSS SECTION SHOWN FOR REFERENCE ONLY
(SEE BRIDGE PLANS FOR DETAILS)



555+90.15
BEGIN BRIDGE
STA. 555+90.15
CROSS SECTION SHOWN FOR REFERENCE ONLY
(SEE BRIDGE PLANS FOR DETAILS)

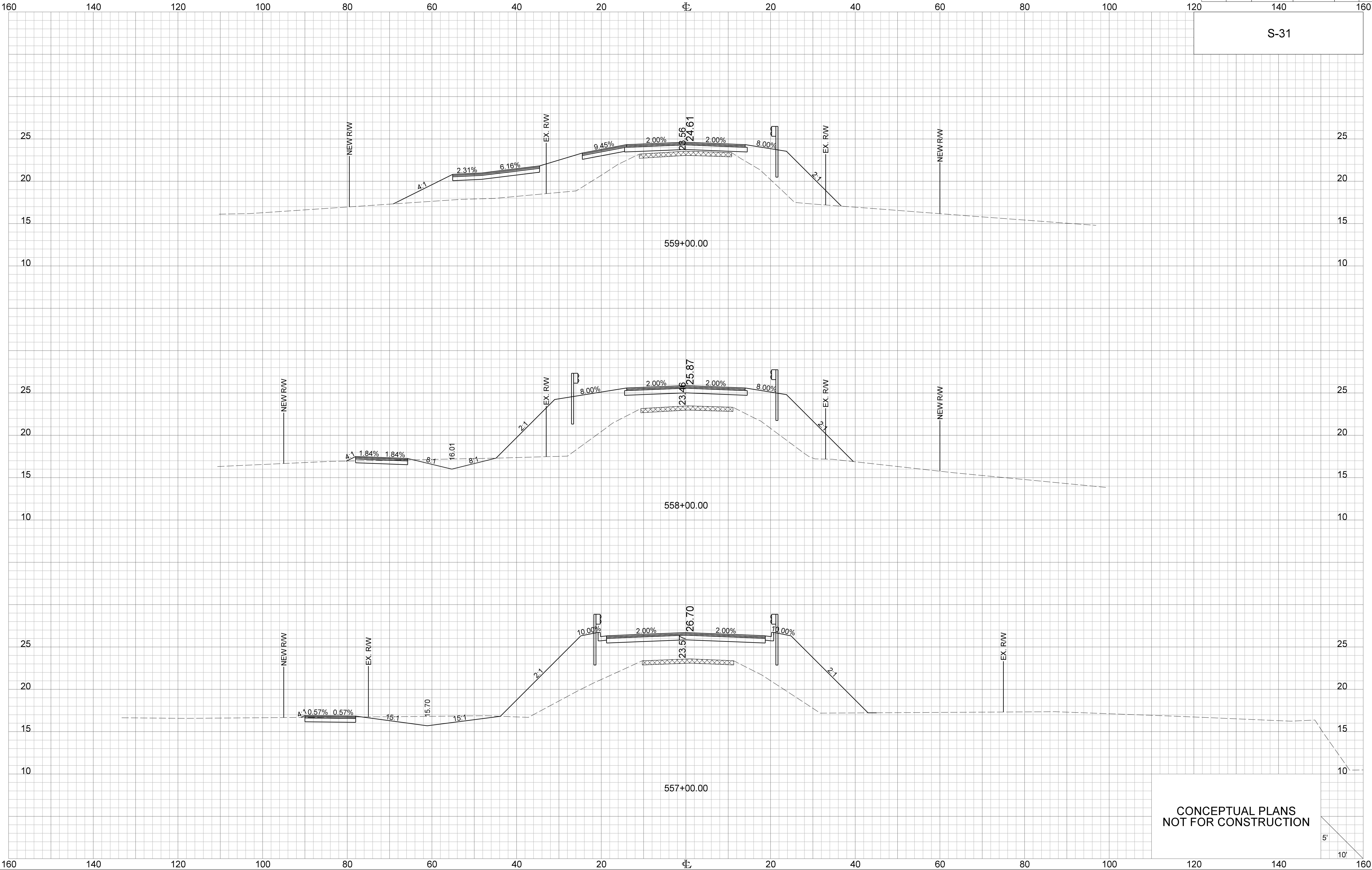
160 140 120 100 80 60 40 20 0 20 40 60 80 100 120

CONCEPTUAL PLANS
NOT FOR CONSTRUCTION



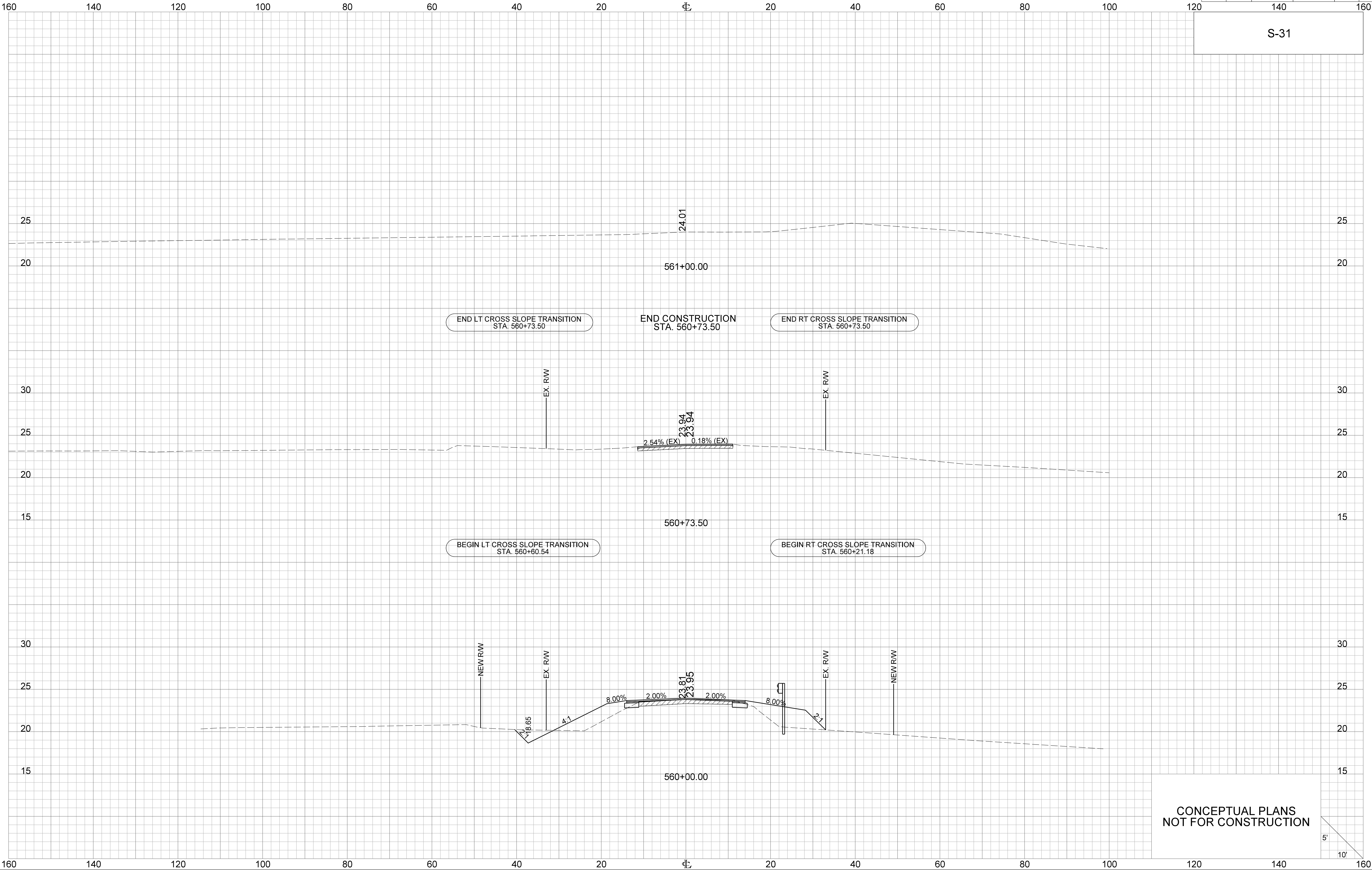
William Axson
\\fs1\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Roadway\SS1_Todd_Swamp\Drawn\Plan Sheets\PO41157_ax_SS1_sheets.dgn
10/12/2024

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	PO41157	S-31	X4



William Axson
\\fs1\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Roadway\SS1_Totd\Swamp\Dgn\Plan Sheets\PO41157_dk_SS1_sheets.dgn
10/12/2024

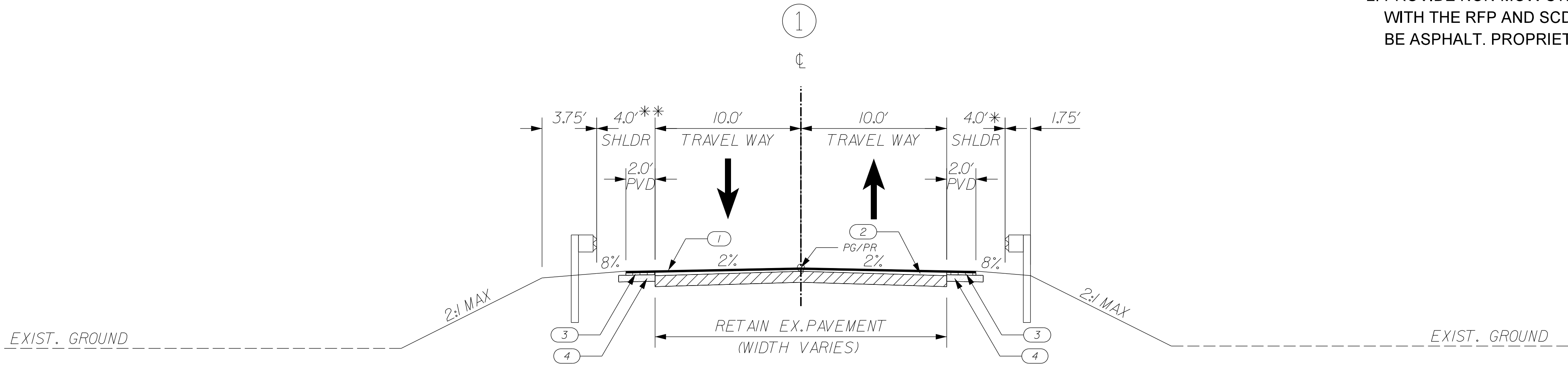
FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	PO41157	S-31	X5



TYPICAL SECTION OF IMPROVEMENT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
COLUMBIA, SC

* WHEN MGS3CS GUARDRAIL IS USED, PROVIDE ADDITIONAL 1.75' TO SHOULDER HINGE.
** WHEN MASH GUARDRAIL IS USED, PROVIDE ADDITIONAL 3.75' TO SHOULDER HINGE.

NOTES:
1. SEE SCDOT STD. DWG. SECTION 805 FOR GUARDRAIL DETAILS & ADDITIONAL GRADING REQUIREMENTS AT LEADING END TREATMENTS.
2. PROVIDE NON-MOW STRIP UNDER GUARDRAIL IN ACCORDANCE WITH THE RFP AND SCDOT STANDARD DRAWINGS. THE NON-MOW STRIP SHALL BE ASPHALT. PROPRIETARY NON-MOW STRIP MATERIAL IS NOT ALLOWED.



USE THIS SECTION ON S-154
FROM STA. 32+87.92 TO STA. 38+02.58
(NO PAVING FROM STA. 32+87.92 TO STA. 33+55.00
& FROM STA. 36+30.00 TO STA. 38+02.58)

EXCEPTION: 69.00' X 30.33' CONCRETE BRIDGE WITH 20' APPROACH SLABS
FROM STA. 34+92.00 TO STA. 35+61.00

LEGEND

- 1 HOT MIX ASPHALT SURFACE COURSE TYPE C (175 LBS/SY)
- 2 HOT MIX ASPHALT SURFACE COURSE TYPE E FOR BUILD-UP (0-1.5")
HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B FOR BUILD-UP (>1.5")
- 3 HOT MIX ASPHALT INTERMEDIATE COURSE TYPE C (200 LBS/SY)
- 4 SHOULDER WIDENING MATERIAL (600 LBS/SY)



ROUTE NO./ ROAD	FUNCTIONAL CLASSIFICATION	DESIGN SPEED (MPH)	FROM STA.	TO STA.
S-154	URBAN MAJOR COLLECTOR	35	32+87.92	38+02.58

PAVEMENT DESIGN

CONCEPTUAL PLANS
NOT FOR CONSTRUCTION

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
COLUMBIA, SC

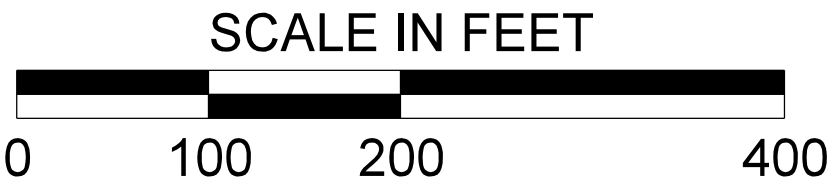
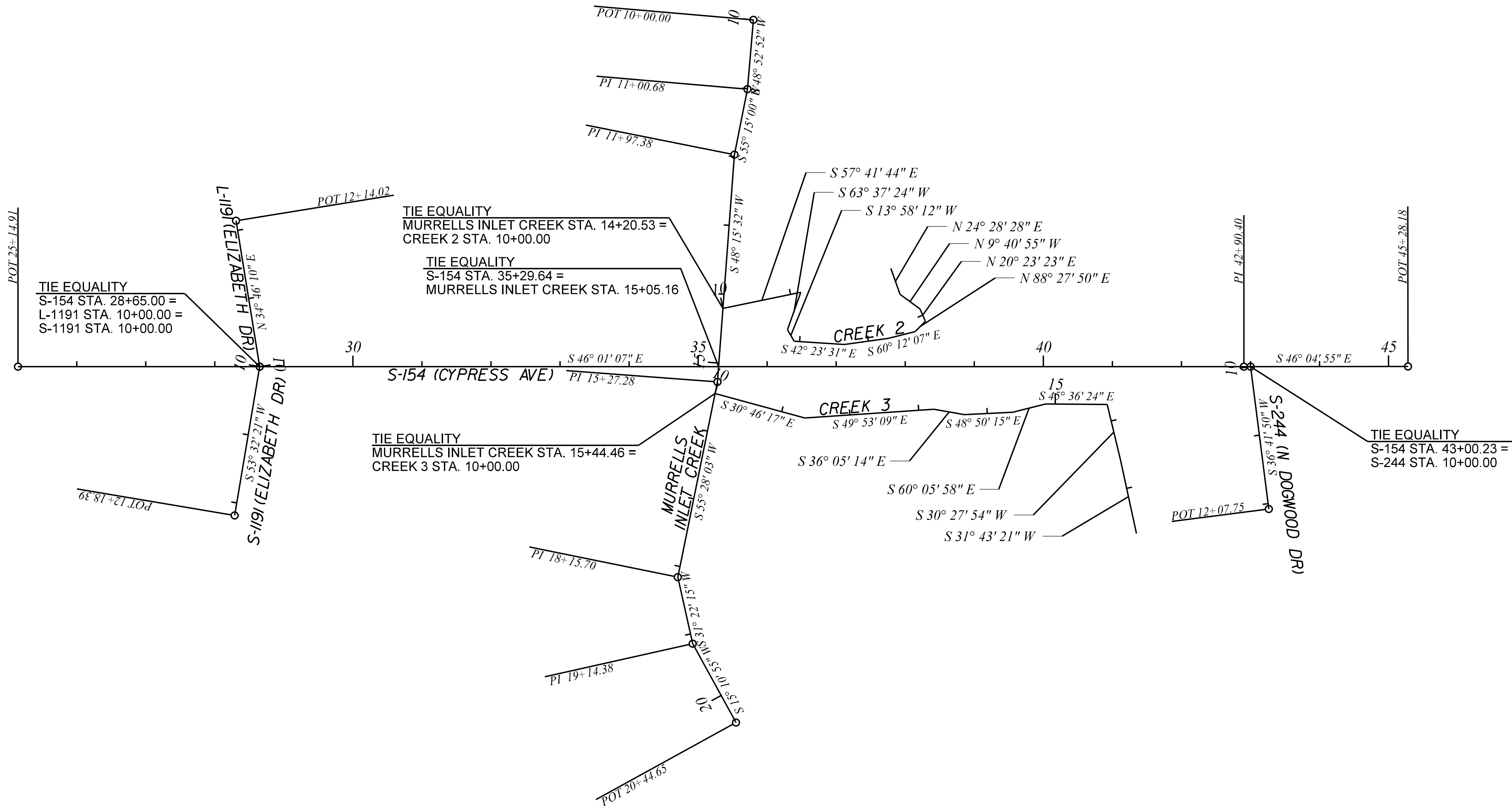
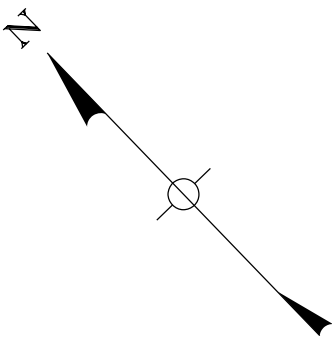
S-154
BRIDGE REHABILITATION
OVER MURRELLS INLET CREEK

TYPICAL SECTION SHEET

SCALE: 1" = NTS

SHEET NO. 3

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	P041158	S-154	5C



CONCEPTUAL PLANS
NOT FOR CONSTRUCTION

5			
4			
3			
2			
1			
REV. NO.	BY	DATE	DESCRIPTION OF REVISION

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
COLUMBIA, SC

S-154
BRIDGE REHABILITATION
OVER MURRELLS INLET CREEK

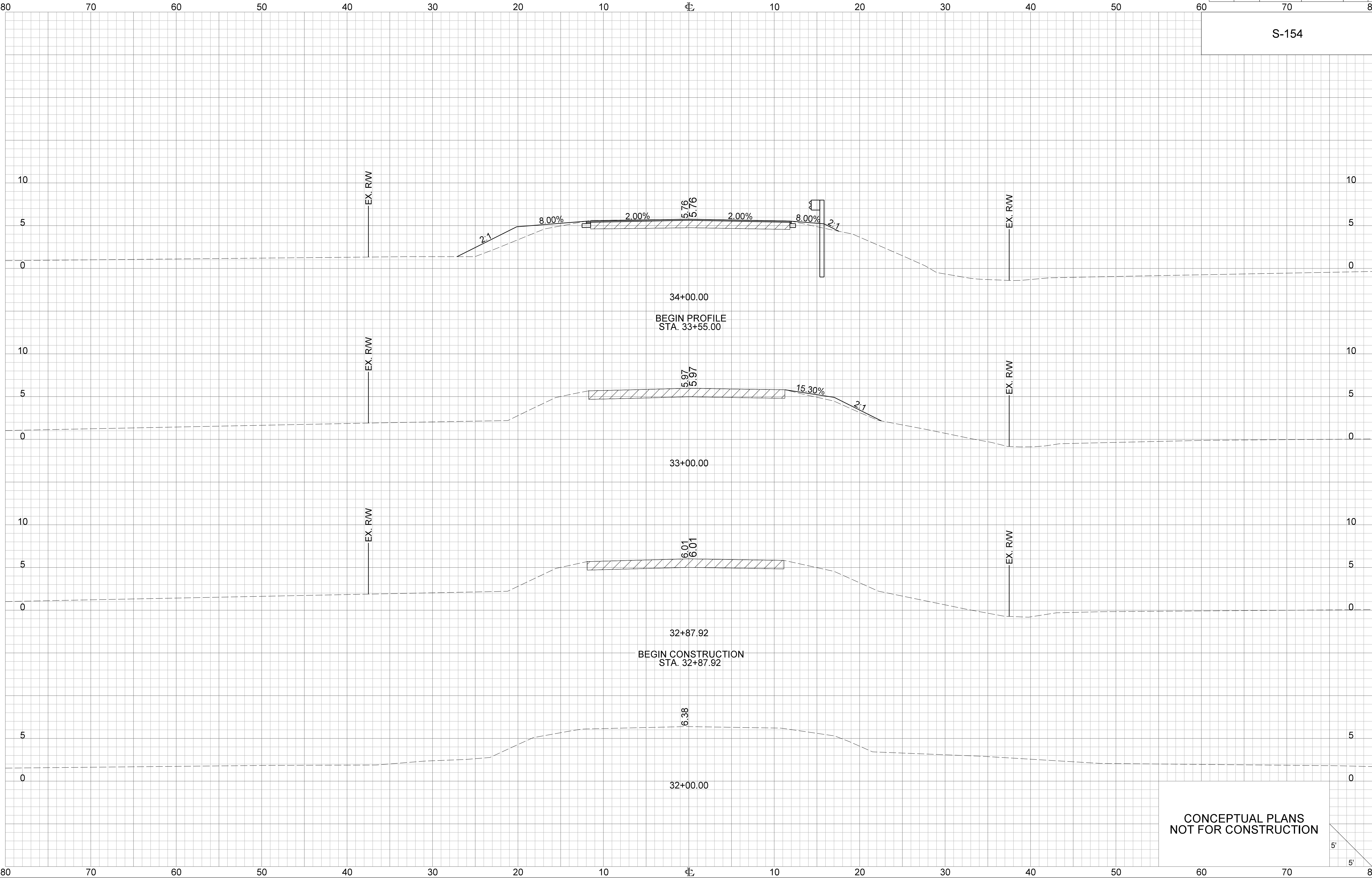
REFERENCE DATA SHEET

SCALE: 1" = 100'

SHEET NO. 5C

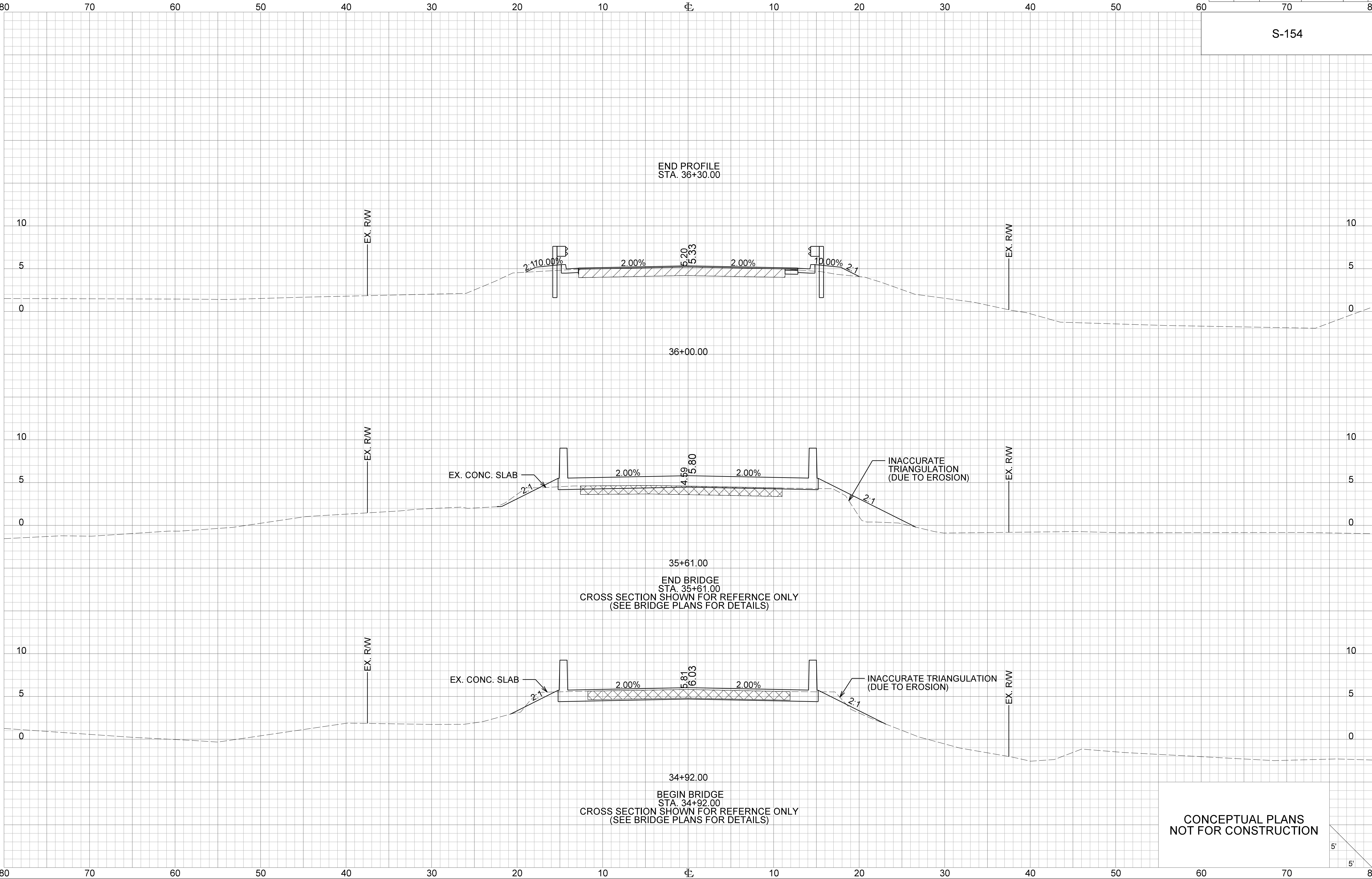
FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	PD41158	S-154	X1

S-154

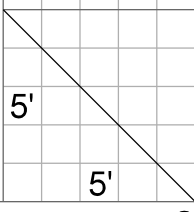


FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	PD41158	S-154	X2

S-154

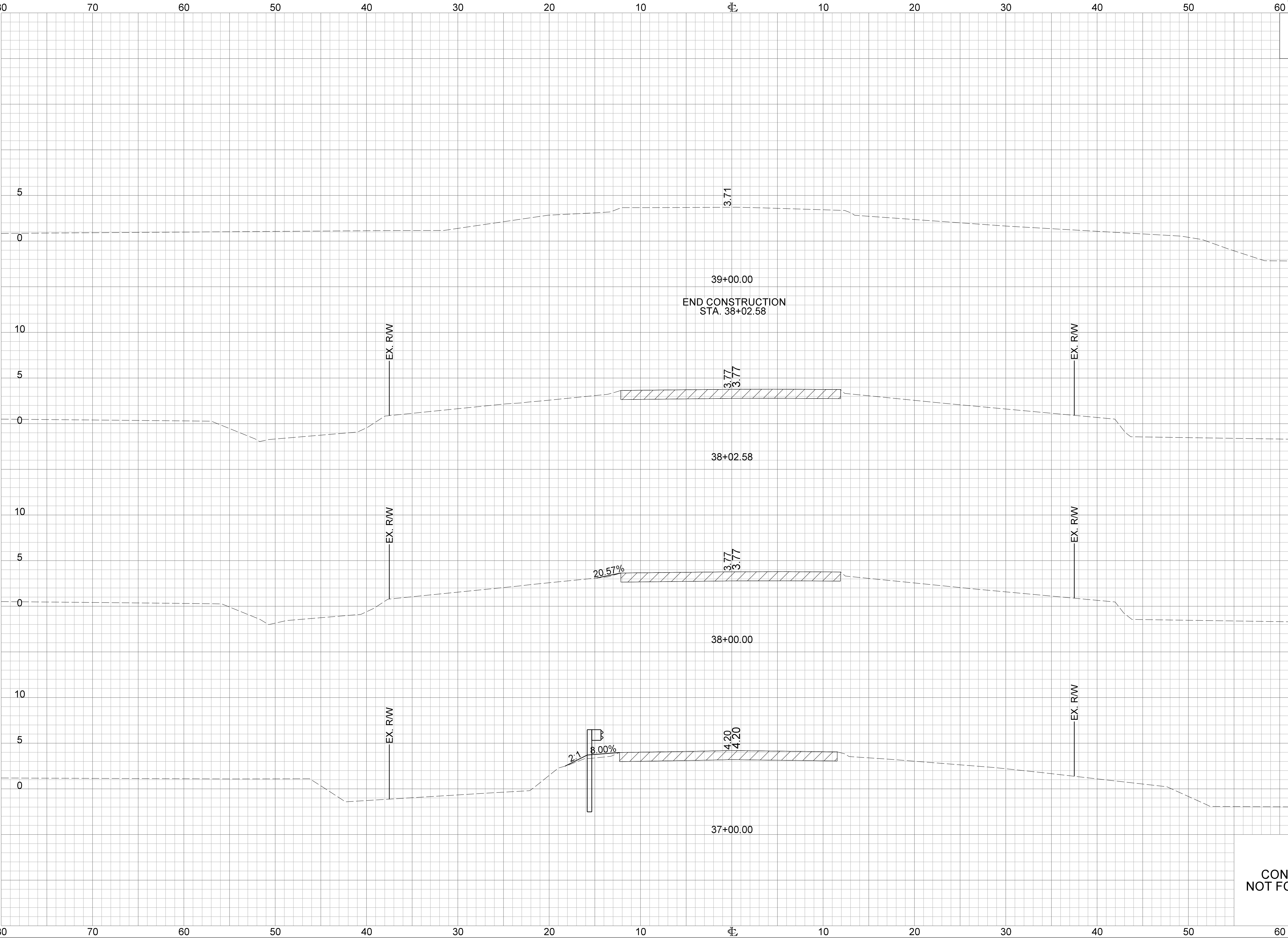


CONCEPTUAL PLANS
NOT FOR CONSTRUCTION



FED. RD. DIST. NO.	STATE	COUNTY	PROJECT ID	ROUTE NO.	SHEET NO.
3	SC	HORRY	P041158	S-154	X3

S-154



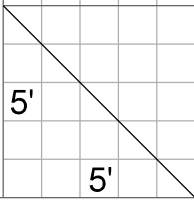
39+00.00
END CONSTRUCTION
STA. 38+02.58

38+02.58

38+00.00

37+00.00

CONCEPTUAL PLANS
NOT FOR CONSTRUCTION





4.1 | TECHNICAL PROPOSAL

Appendix A.2. | Conceptual Bridge Plans

Appendix A | Conceptual Plans



&



- INDEX OF SHEETS
- 1. TITLE SHEET
 - 2. BRIDGE PLAN AND PROFILE
 - 3. END BENTS 1 & 2
 - 4. SUPERSTRUCTURE TYPICAL SECTION



PROPOSED PLANS
FOR
HORRY COUNTY
PROJECT ID P041157
STATE ROUTE S-26-31 (RED BLUFF RD)
REPLACE BRIDGE OVER TOD SWAMP



SITE LOCATION — LAYOUT

Approximate Location of Bridge is
Latitude 33°-54'-44" N
Longitude 78°-50'-18" W

3 DAYS BEFORE DIGGING IN
SOUTH CAROLINA
CALL 811
SOUTH CAROLINA 811 (SC811)
WWW.SC811.COM
ALL UTILITIES MAY NOT BE A MEMBER OF SC811

ASSET ID NOT ASSIGNED

TRAFFIC DATA			
2025	ADT	6400	V.P.D.
2045*	ADT	12000*	V.P.D.
TRUCKS 4 %			
*DESIGN TRAFFIC DATA			

NET LENGTH OF ROADWAY	0.000	MILES
NET LENGTH OF BRIDGES	0.012	MILES
NET LENGTH OF PROJECT	0.012	MILES
LENGTH OF EXCEPTIONS	0.000	MILES
GROSS LENGTH OF PROJECT	0.012	MILES

NOTE: EXCEPT AS MAY OTHERWISE BE SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIALS AND WORKMANSHIP ON THIS PROJECT SHALL CONFORM TO THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2007 EDITION) AND THE STANDARD DRAWINGS FOR ROAD CONSTRUCTION IN EFFECT AT THE TIME OF LETTING.



ENGINEER OF RECORD
**CONCEPTUAL
PLANS
NOT FOR
CONSTRUCTION**

FOR CONSTRUCTION : _____
DATE _____

CADD FILE INFORMATION 12/05/05 PM
PLOTTED DATE: 9/30/2024
FILE NAME: Y:\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Structures\S31_Todd_Swamp\06N\p0411571s.dgn

REVIEWED	DR.	MBN	JTW	9/24
		BY	CHK	DATE

Y:\Marketing\Proposals\2024\East\SCDOT - DB - Bridge Package - 1B - Cape Roman Contractors\Design - Data Structures\S3_I_Todd_Swamp\0619\04157\badagnid
rowena.rachel



① PILES SHALL BE EMBEDDED A MINIMUM OF 2'-0" INTO THE BENT CAP.

1

2

3

4

5

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.	RRS	JTW	09-24
DES.			
	BY	CHK.	DATE





NEEL-SCHAFFER
Solutions you can build upon

END BENTS 1 & 2
S-26-31 (RED BLUFF ROAD) BRIDGE
REPLACEMENT OVER TOD SWAMP

	COUNTY	HORRY
--	--------	-------

ROUTE S-26-31



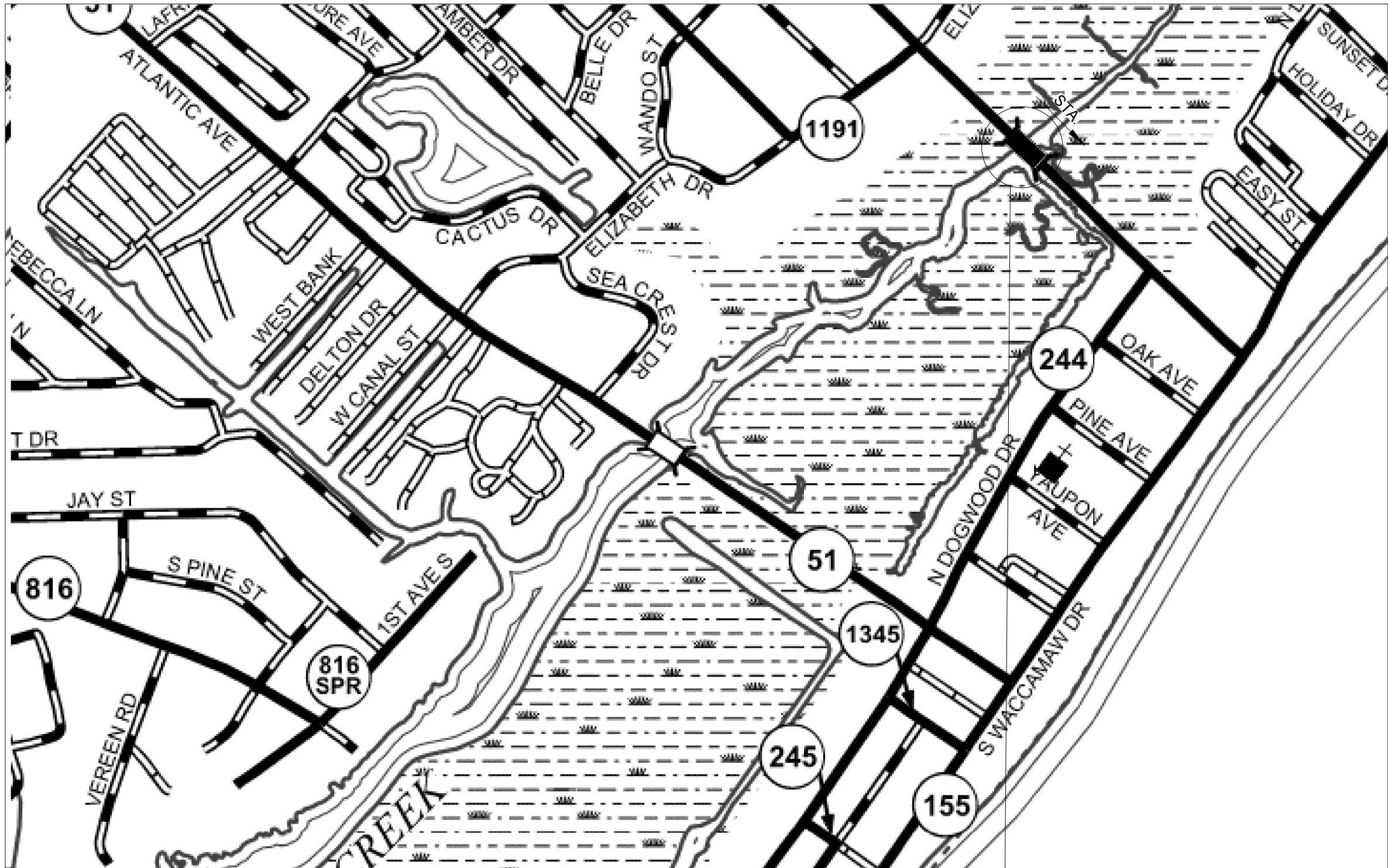
PREPARED BY   NEEL-SCHAFER <i>Solutions you can build upon</i>	
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
SUPERSTRUCTURE TYPICAL SECTION S-26-31 (RED BLUFF ROAD) BRIDGE REPLACEMENT OVER TOD SWAMP	
COUNTY Horry	ROUTE S-26-31

INDEX OF SHEETS

1. TITLE SHEET
2. BRIDGE PLAN AND PROFILE
3. SUPERSTRUCTURE TYPICAL SECTION
4. GALVANIC CATHODIC PROTECTION SYSTEM DETAILS (SHEET 1 OF 2)
5. GALVANIC CATHODIC PROTECTION SYSTEM DETAILS (SHEET 2 OF 2)



PROPOSED PLANS
FOR
HORRY COUNTY
PROJECT ID P041158
STATE ROUTE S-26-154 (CYPRESS AVE)
REHABILITATE BRIDGE OVER MURRELLS INLET CREEK



LAYOUT

SITE LOCATION

Approximate Location of Bridge is
Latitude 33°-35'-01" N
Longitude 78°-59'-53" W

3 DAYS BEFORE DIGGING IN
SOUTH CAROLINA
CALL 811
SOUTH CAROLINA 811 (SC811)
WWW.SC811.COM
ALL UTILITIES MAY NOT BE A MEMBER OF SC811

ASSET ID 9211

TRAFFIC DATA

2025 ADT 2200 V.P.D.
2045* ADT 3200* V.P.D.
TRUCKS 2 %
*DESIGN TRAFFIC DATA

NET LENGTH OF ROADWAY	0.000	MILES
NET LENGTH OF BRIDGES	0.013	MILES
NET LENGTH OF PROJECT	0.013	MILES
LENGTH OF EXCEPTIONS	0.000	MILES
GROSS LENGTH OF PROJECT	0.013	MILES

NOTE: EXCEPT AS MAY OTHERWISE BE SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIALS AND WORKMANSHIP ON THIS PROJECT SHALL CONFORM TO THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2007 EDITION) AND THE STANDARD DRAWINGS FOR ROAD CONSTRUCTION IN EFFECT AT THE TIME OF LETTING.

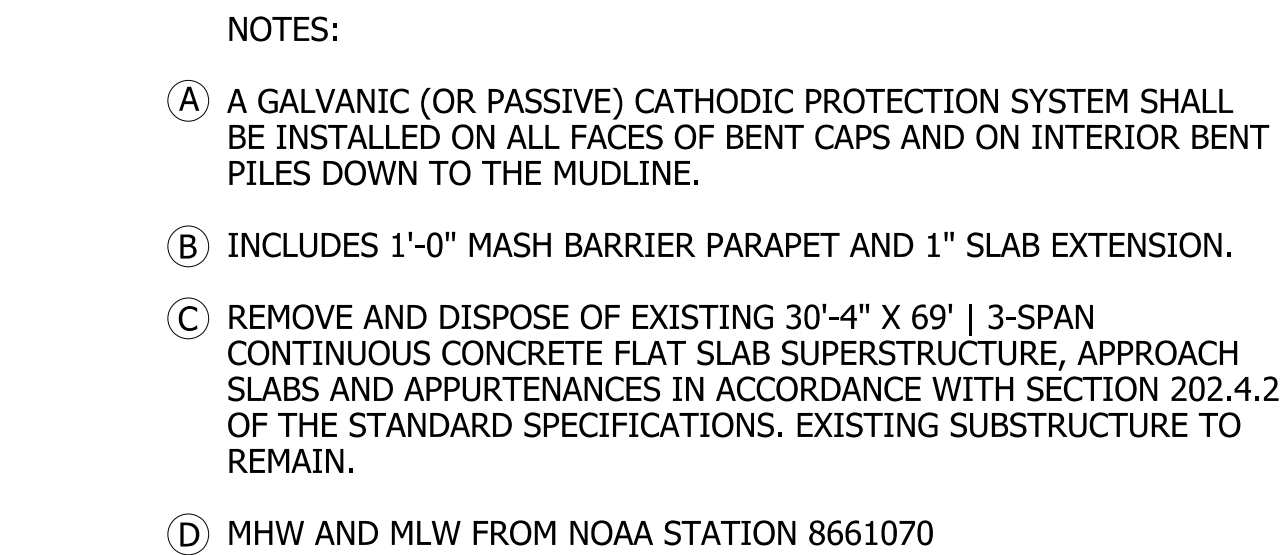


ENGINEER OF RECORD
**CONCEPTUAL
PLANS
NOT FOR
CONSTRUCTION**

FOR CONSTRUCTION : _____
DATE _____

CADD FILE INFORMATION 3/13/22 PM
PLOTTED DATE: 9/27/2024
FILE NAME: r:\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Structures\S154_Murrells_Inlet_Creek\DWG\01458158.dgn

REVIEWED	DR.	MBN	JTW	9/24
		BY	CHK	DATE



VERTICAL CURVE DATA

0% -1.45%

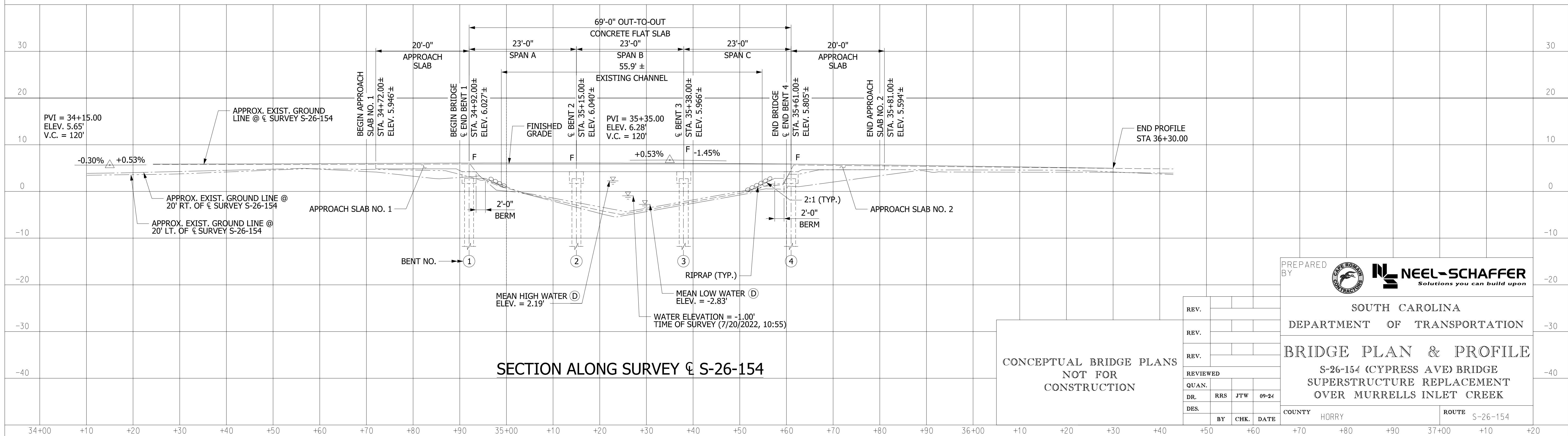
CP 1
ELEVATION = 9.77'
N 643362.90 E 2608804.76
PSC 1

CP 2
ELEVATION = 5.22'
N 642724.45 E 2609514.86
PSC 2

CP 3
ELEVATION = 4.16'
N 641966.02 E 2610253.95
PSC 3



PLAN



CONCEPTUAL BRIDGE PLANS
NOT FOR
CONSTRUCTION

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.	RRS	JTW	09-24
DES.			
	BY	CHK.	DATE

PRE
BY

NEEL-SCHAFFER
Solutions you can build upon

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BRIDGE PLAN & PROFILE

S-26-154 (CYPRESS AVE) BRIDGE SUPERSTRUCTURE REPLACEMENT OVER MURRELLS INLET CREEK

COUNTY Horry

ROUTE S-26-154





FLAT SLABS SHALL BE REINFORCED WITH GLASS FIBRE REINFORCED POLYMER (GFRP) REINFORCEMENT BARS.

GLASS FIBRE REINFORCED POLYMER (GFRP) REINFORCEMENT BARS SHALL MEET THE REQUIREMENTS OF SCDOT SUPPLEMENTAL TECHNICAL SPECIFICATION SC-M-703.

FLAT SLAB TOP REINFORCEMENT SHALL HAVE A MINIMUM CLEAR COVER OF 2½" BOTTOM REINFORCEMENT SHALL HAVE A MINIMUM CLEAR COVER OF 2" .

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.	RRS	JTW	09-24
DES.			
	BY	CHK.	DATE

PREPARED BY   NEEL-SCHAFFER <i>Solutions you can build upon</i>	
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION SUPERSTRUCTURE TYPICAL SECTION	
S-26-154 (CYPRESS AVE) BRIDGE SUPERSTRUCTURE REPLACEMENT OVER MURRELLS INLET CREEK	
COUNTY HORRY	ROUTE S-26-154

Y:\Marketing\Proposals\2024\East\SC00T_DB Bridge Package 18 Cape Remain Contractors\Design Data\Structures\S154_Murrells_Inlet_Creek\041158.dgn 10/11/2024 11:54:04 AM \$\$USER\$\$

NOTES:

REPAIRS ARE REQUIRED DUE TO CORROSION OF THE STEEL REINFORCEMENT WITHIN THE CONCRETE MEMBERS. PROJECT SCOPE OF WORK INCLUDES THE FOLLOWING:

- INTERIOR BENT PILES: GALVANIC JACKET CATHODIC PROTECTION SYSTEM
- END BENT AND INTERIOR BENT CAPS: GALVANIC EMBEDDED CATHODIC PROTECTION ANODES
- ACCESS FOR INSPECTIONS: PROVIDE ACCESS TO THE WORK AREAS FOR INSPECTION BY OWNER, OWNER'S ENGINEER AND OWNER'S REPRESENTATIVES.

THE OVERALL INTENT OF THE PROJECT IS TO MITIGATE FUTURE CORROSION-DRIVEN DETERIORATION THROUGH INSTALLATION OF GALVANIC CATHODIC PROTECTION JACKETS AND ANODES. CONCRETE PREPARATION AND REPAIR WORK ARE REQUIRED PRIOR TO INSTALLATION OF THE GALVANIC CATHODIC PROTECTION SYSTEM.

BULK ZINC ANODES SHALL NOT BE USED.

CHLORIDE CONTENT, REINFORCING STEEL COVER AND OTHER DETAILS OF EXISTING SUBSTRUCTURE CONDITIONS CAN BE FOUND IN THE "CYPRESS AVENUE OVER MURRELLS INLET CREEK (S-26-154) BRIDGE REHABILITATION-SUBSTRUCTURE EVALUATION" REPORT.

GALVANIC CATHODIC PROTECTION SYSTEM SPECIFICATIONS:

1. SUMMARY DESCRIPTION

INTERIOR BENT PILES - THE PILES SHALL BE PROTECTED WITH A GALVANIC JACKET CATHODIC PROTECTION SYSTEM. GALVANIC JACKETS SHALL COVER THE ENTIRE HEIGHT OF THE PILES FROM THE UNDERSIDE OF THE CAP TO THE MUDLINE. GALVANIC JACKETS SHALL BE BASED ON EXPANDED ZINC MESH ANODE SECURED TO THE INSIDE OF THE JACKETS.

END BENT AND INTERIOR BENT CAPS - THE END BENT AND INTERIOR BENT CAPS SHALL BE PROTECTED BY EMBEDDED GALVANIC CATHODIC PROTECTION ANODES. THE EMBEDDED ANODES SHALL BE SINGLE-STAGE OR TWO-STAGE CYLINDRICAL GALVANIC ANODES INSTALLED IN HOLES DRILLED INTO THE BENT CAP OR DISTRIBUTED GALVANIC ANODES INSTALLED IN SLOTS CUT INTO THE SURFACE OF THE BENT CAP.

2. DESIGN BASIS

NACE SP0216-2023 GALVANIC CATHODIC PROTECTION OF REINFORCING STEEL IN ATMOSPHERICALLY EXPOSED CONCRETE STRUCTURES

PERFORMANCE REQUIREMENTS

- COMPLY WITH AMPP SP21520-2023 ACCEPTANCE CRITERIA FOR CATHODIC PROTECTION OF STEEL IN CONCRETE STRUCTURES
 - DESIGN SERVICE LIFE OF THE GALVANIC CATHODIC PROTECTION SHALL BE 25 YEARS.
3. SUBMITTALS

QUALIFICATIONS

- SYSTEM DESIGNER
- QUALITY CONTROL PERSONNEL

GALVANIC CP SYSTEM DESIGN. INCLUDE AT MINIMUM:

- DESIGN CRITERIA
- CALCULATIONS
- SHOP DRAWINGS (INCLUDING STEEL CONNECTION DETAILS)
- PRODUCT DATA
- INSTALLATION PROCEDURE
- MONITORING STATION PLAN

QUALITY CONTROL PLAN

COMPLETED QUALITY CONTROL CHECKLISTS AND TEST REPORTS FOR GALVANIC SYSTEM INSTALLATION

COMMISSIONING REPORT, INCLUDING RECOMMENDED MONITORING AND MAINTENANCE ACTIVITIES AND SCHEDULES

AS-BUILT RECORD DRAWINGS

4. QUALITY CONTROL/QUALITY ASSURANCE

DESIGN SHALL BE COMPLETED BY A CATHODIC PROTECTION SPECIALIST (CPS) HAVING THE FOLLOWING QUALIFICATIONS:

- ASSOCIATION FOR MATERIALS PROTECTION AND PERFORMANCE (AMPP) CERTIFICATION OF CATHODIC PROTECTION SPECIALIST (CP-4).
- A REGISTERED PROFESSIONAL ENGINEER WITH A MINIMUM OF FIVE YEARS OF VERIFIABLE EXPERIENCE DESIGNING, INSTALLING AND TESTING GALVANIC CP SYSTEMS TO PROTECT STEEL REINFORCED CONCRETE STRUCTURES.
- A CORROSION ENGINEERING PRACTITIONER WITH AT LEAST 10 YEARS OF VERIFIABLE EXPERIENCE DESIGNING, INSTALLING AND TESTING GALVANIC CP SYSTEMS TO PROTECT REINFORCED CONCRETE STRUCTURES.

THE CPS SHALL DEVELOP A QUALITY CONTROL PLAN THAT ADDRESSES METHODS AND FREQUENCY OF QC TESTING, INCLUDING:

- METHODS FOR LOCATING EXISTING STEEL
- TESTING AND ESTABLISHING ELECTRICAL CONTINUITY OF EXISTING REINFORCING
- ANODE CONDITIONING AND INSTALLATION
- ANODE WIRING CONNECTIVITY TESTING AND PROTECTION
- STAFF RESPONSIBLE FOR QC AND PLANNED SITE VISIT FREQUENCY

NO CP WORK WILL BE ALLOWED IF, AT ANY TIME, AN APPROVED CPS IS NOT ACTIVE OR OTHERWISE INVOLVED IN THE PROJECT.

A TECHNICIAN WITH AMPP CERTIFICATION OF CP TECHNICIAN (CP-2) WITH A MINIMUM OF FIVE VERIFIABLE PROJECT EXPERIENCES IN THE LAST FIVE YEARS IN CP MAY PERFORM FIELD MEASUREMENTS ON BEHALF OF THE CPS.

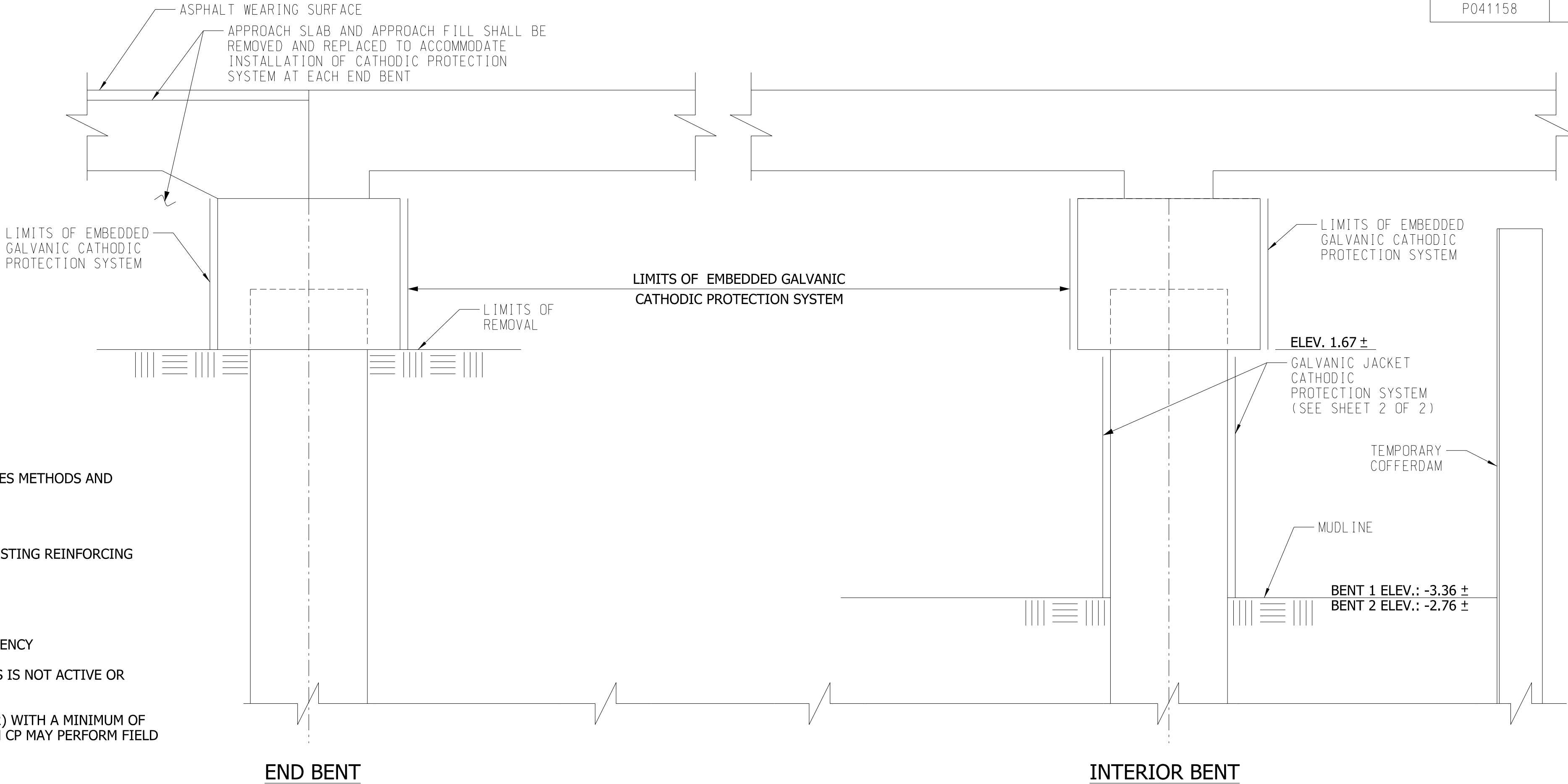
5. SYSTEM REQUIREMENTS

GALVANIC JACKET CATHODIC PROTECTION SYSTEM

- THE JACKETS SHALL COMPLETELY COVER THE CONCRETE SURFACE OF THE PILES. THE JACKETS SHALL BE FIBERGLASS REINFORCED PLASTIC AND HAVE INTERLOCKING JOINTS ALONG OPPOSITE SIDES AND BETWEEN VERTICALLY SEGMENTED SECTIONS. JACKET DIMENSIONS SHALL PROVIDE A CONSISTENT THICKNESS ANNULUS BETWEEN INSIDE OF THE JACKET FORM AND THE ORIGINAL SURFACE CONTOURS OF THE PILES.
- FILL MATERIAL - THE JACKET FILL MATERIAL SHALL BE PORTLAND CEMENT-BASED AND HAVE A MAXIMUM RESISTIVITY OF 15,000 OHM-CM OR PASS A MINIMUM OF 1500 COULOMBS WHEN TESTED ACCORDING TO ASTM C1202 AT AN AGE OF 28 DAYS OR MORE IN A SATURATED CONDITION. A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI IS REQUIRED. THE JACKETS SHALL BE COMPLETELY FILLED AND FREE OF VOIDS.
- PREPARATION PRIOR TO JACKET INSTALLATION - ON TREATED ELEMENTS, ALL DELAMINATED CONCRETE SHALL BE REMOVED, EXPOSED STEEL CLEANED OF LOOSE CORROSION PRODUCT, AND CONCRETE SURFACES CLEANED OF STAINING, DEBRIS, AND SURFACE CONTAMINANTS THAT INHIBIT BONDING OF JACKET FILL MATERIAL.
- JACKET FILL MATERIAL SHALL BE PUMPED FROM PORT STARTING AT BOTTOM OF JACKET. PUMPING PORTS SHALL BE NO MORE THAN 4'-0" APART AND ON OPPOSITE FACES. SEAL PORTS BY CUTTING PORTS FLUSH WITH JACKET AND SEAL WITH EPOXY OR USING A CAP.
- RINSE PILE AND STEEL CAGE WITH FRESH WATER AND DEWATER FORM PRIOR TO PLACEMENT OF JACKET FILL MATERIAL.

GALVANIC EMBEDDED CATHODIC PROTECTION ANODES

- PERFORM CONCRETE REMOVAL AS REQUIRED FOR ANODE PLACEMENT WITHIN THE ELEMENT AND FOR INSTALLATION OF ELECTRICAL CONNECTION. PROVIDE ADEQUATE CLEARANCE FOR PLACEMENT OF THE ANODE AND INSTALLATION OF ELECTRICAL CONNECTIONS. DO NOT CUT EXISTING REINFORCING.
 - EMBEDDING MATERIAL - THE ANODE EMBEDDING MATERIAL SHALL HAVE A MAXIMUM RESISTIVITY OF 15,000 OHM-CM OR PASS A MINIMUM OF 1500 COULOMBS WHEN TESTED ACCORDING TO ASTM C1202 AT AN AGE OF 28 DAYS OR MORE IN A SATURATED CONDITION.
- ANODE-TO-REINFORCING STEEL CONNECTIONS
- VERIFY ELECTRICAL CONTINUITY OF ALL STEEL REINFORCEMENT, INCLUDE REINFORCING STEEL, SPIRAL, STIRRUPS, AND STRANDS, PRIOR TO INSTALLING ANODES. WHERE CONTINUITY IS NOT PRESENT, ESTABLISH CONTINUITY BETWEEN ALL STEEL REINFORCEMENT.
 - IN NON-INSTRUMENTED ZONES, THE ANODE WIRES SHALL BE MECHANICALLY CONNECTED TO AN EXPOSED SECTION OF EMBEDDED STEEL REINFORCEMENT TO ESTABLISH ELECTRICAL CONNECTION. BRAZING OR SOLDERING CONNECTIONS TO STRAND IS PROHIBITED. COAT CONNECTIONS WITH 100% SOLIDS EPOXY. PROVIDE REDUNDANT (AT LEAST 2) ANODE-TO-REINFORCING STEEL CONNECTIONS.



END BENT

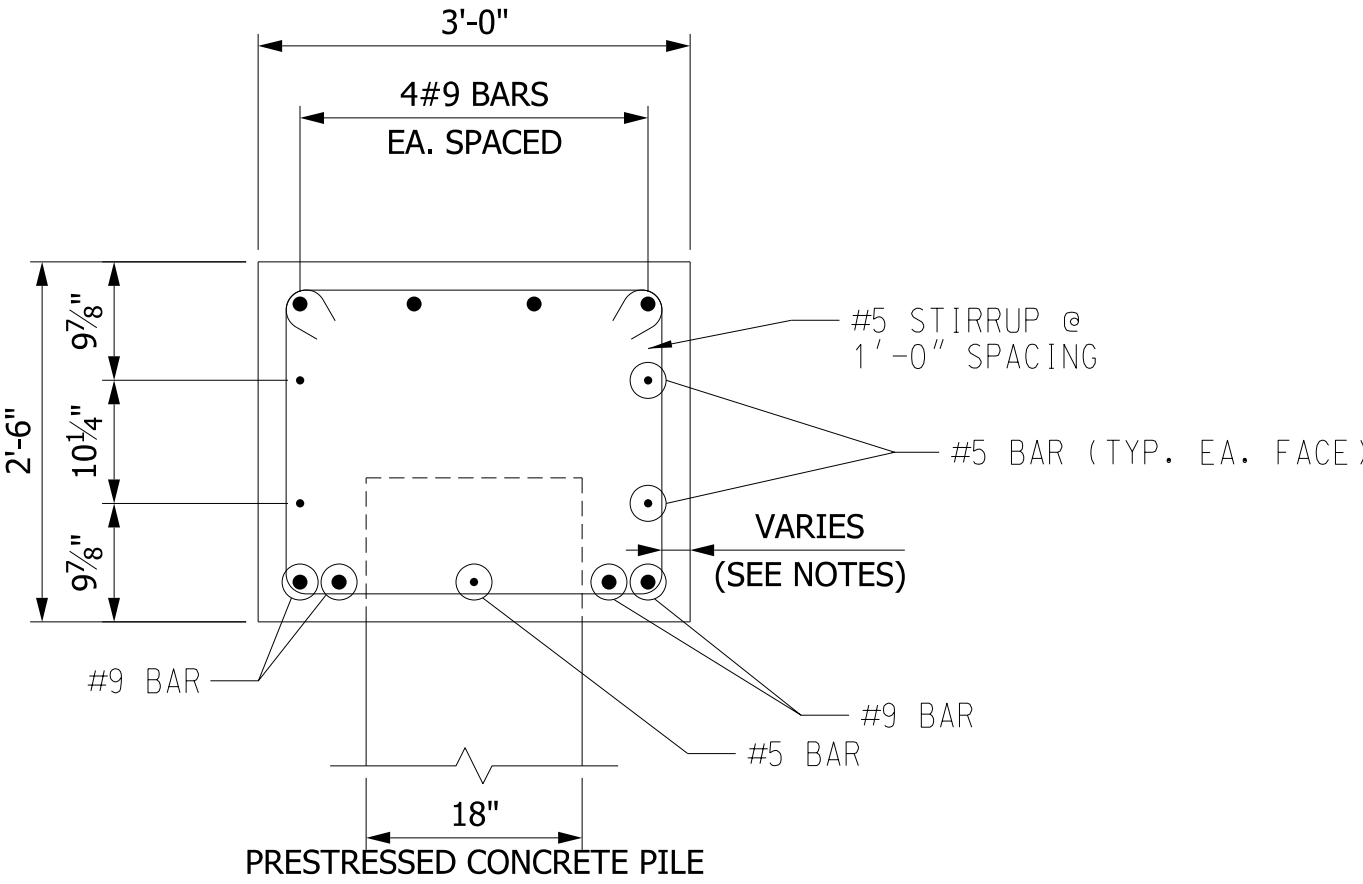
INTERIOR BENT

ELEVATION VIEW

6. INSTRUMENTATION AND COMMISSIONING

INSTALL AN INSTRUMENTED ZONE AT ONE BENT CAP AND ONE PILE FOR MONITORING. ONE EMBEDDED PERMANENT SILVER/SILVER-CHLORIDE REFERENCE ELECTRODE SHALL BE INSTALLED AT EACH INSTRUMENTED ZONE. THE REFERENCE ELECTRODE SHALL BE LOCATED IN THE MOST ANODIC LOCATIONS FOR ELEMENT BASED ON A CORROSION POTENTIAL SURVEY PERFORMED BY THE CONTRACTOR. LEAD WIRES TO THE ANODE AND TO THE REINFORCING STEEL (2 EACH MINIMUM) SHALL BE CONNECTED BY SWITCHED CONNECTION AT A JUNCTION BOX TO BE INSTALLED AT A LOCATION TO BE DETERMINED BY THE ENGINEER. THE JUNCTION BOX SHALL BE A NEMA 4X OUTDOOR ELECTRICAL ENCLOSURE AND INCLUDE LEAD WIRES TO THE EMBEDDED REFERENCE ELECTRODES, TO THE ANODE, AND TO THE REINFORCING STEEL; A SHUNT RESISTOR TO SUPPORT CURRENT MEASUREMENT; AND A WATER-RESISTANT SWITCH. LEAD WIRES SHALL BE PROTECTED IN NON-CORRODING CONDUIT. CONNECTION TO THE REINFORCING STEEL IN THE INSTRUMENTED ZONES SHALL BE MECHANICAL AND COATED WITH 100% SOLIDS EPOXY. BRAZING OR SOLDERING CONNECTIONS TO STRAND IS PROHIBITED. NO SHORTS BETWEEN THE ANODE AND THE REINFORCING STEEL AT A LOCATION OTHER THAN THE JUNCTION BOX SHALL BE ALLOWED.

AT COMPLETION OF INSTALLATION OF CP SYSTEMS, COMMISSION THE SYSTEMS AND PREPARE AND SUBMIT A COMMISSIONING REPORT DEMONSTRATING COMPLIANCE WITH PERFORMANCE REQUIREMENTS. THE COMMISSIONING REPORT SHALL INCLUDE FOR EACH INSTRUMENTED ZONE: CONTINUITY TESTING AND CORRECTION (AS REQUIRED), ANODE-TO-STEEL RESISTANCE, REFERENCE ELECTRODE-TO-STEEL RESISTANCE, INITIAL CURRENT, STATIC NATIVE POTENTIAL, AND THE ENERGIZED ON AND INSTANT-OFF POTENTIALS FOR EACH INSTRUMENTED ZONE. REPORTING SHALL INCLUDE RESULTS AND INTERPRETATION RELATIVE TO CRITERIA GIVEN IN THE REFERENCE STANDARD. THE COMMISSIONING REPORT SHALL BE SUBMITTED BY THE CONTRACTOR'S ENGINEER AND SHALL BE SIGNED AND SEALED BY AN ENGINEER LICENSED IN THE STATE OF SOUTH CAROLINA.



EXISTING END BENT / INT. BENT CAP SECTION VIEW

CONCEPTUAL BRIDGE PLANS
NOT FOR
CONSTRUCTION

REV.		
REV.		
REV.		
REVIEWED		
QUAN.		
DR.	RRS	JTW 09-24
DES.		
BY	CHK.	DATE

PREPARED BY

**NEEL-SCHAFER**
Solutions you can build upon

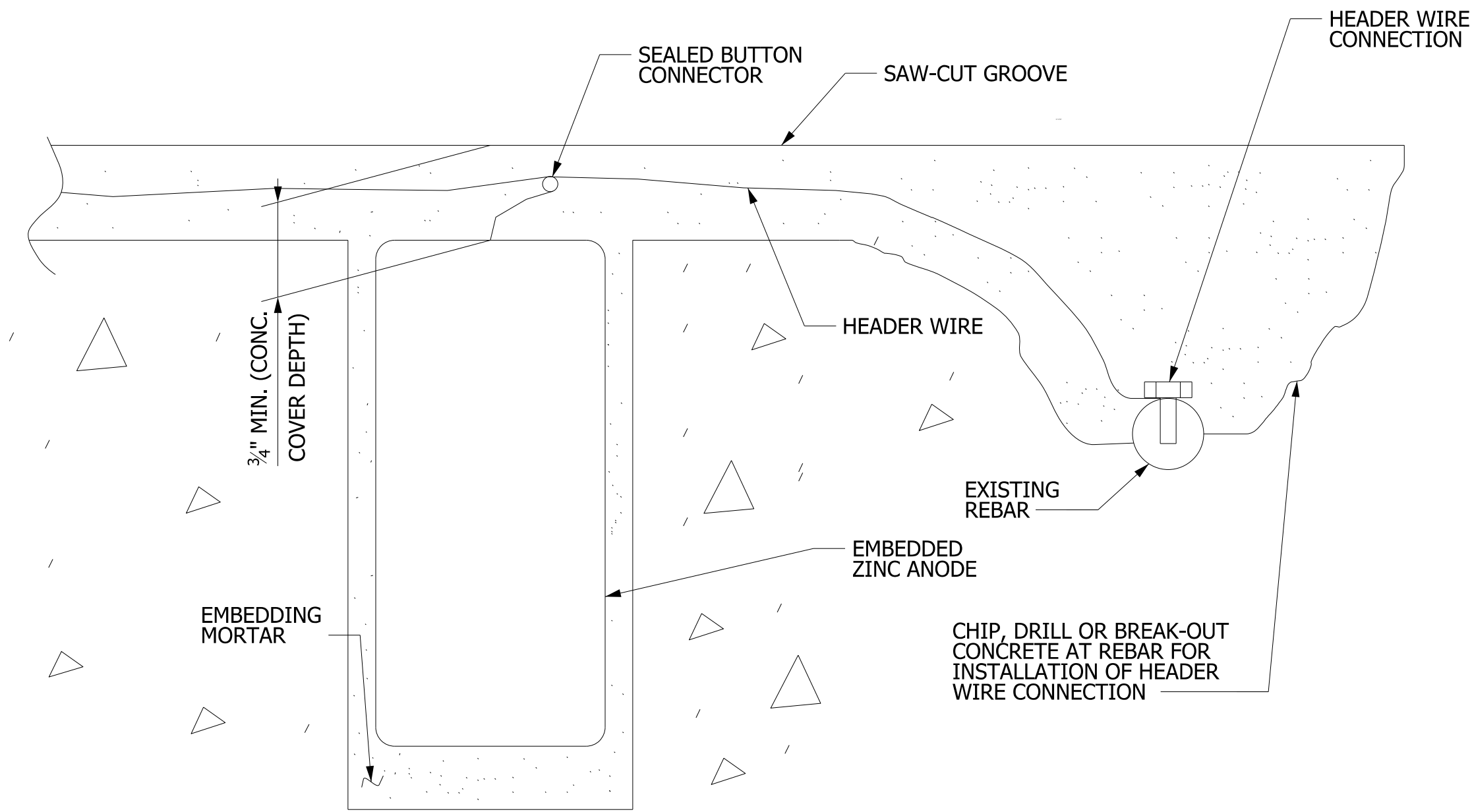
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

GALVANIC CATHODIC PROTECTION
SYSTEM DETAILS (SHEET 1 OF 2)

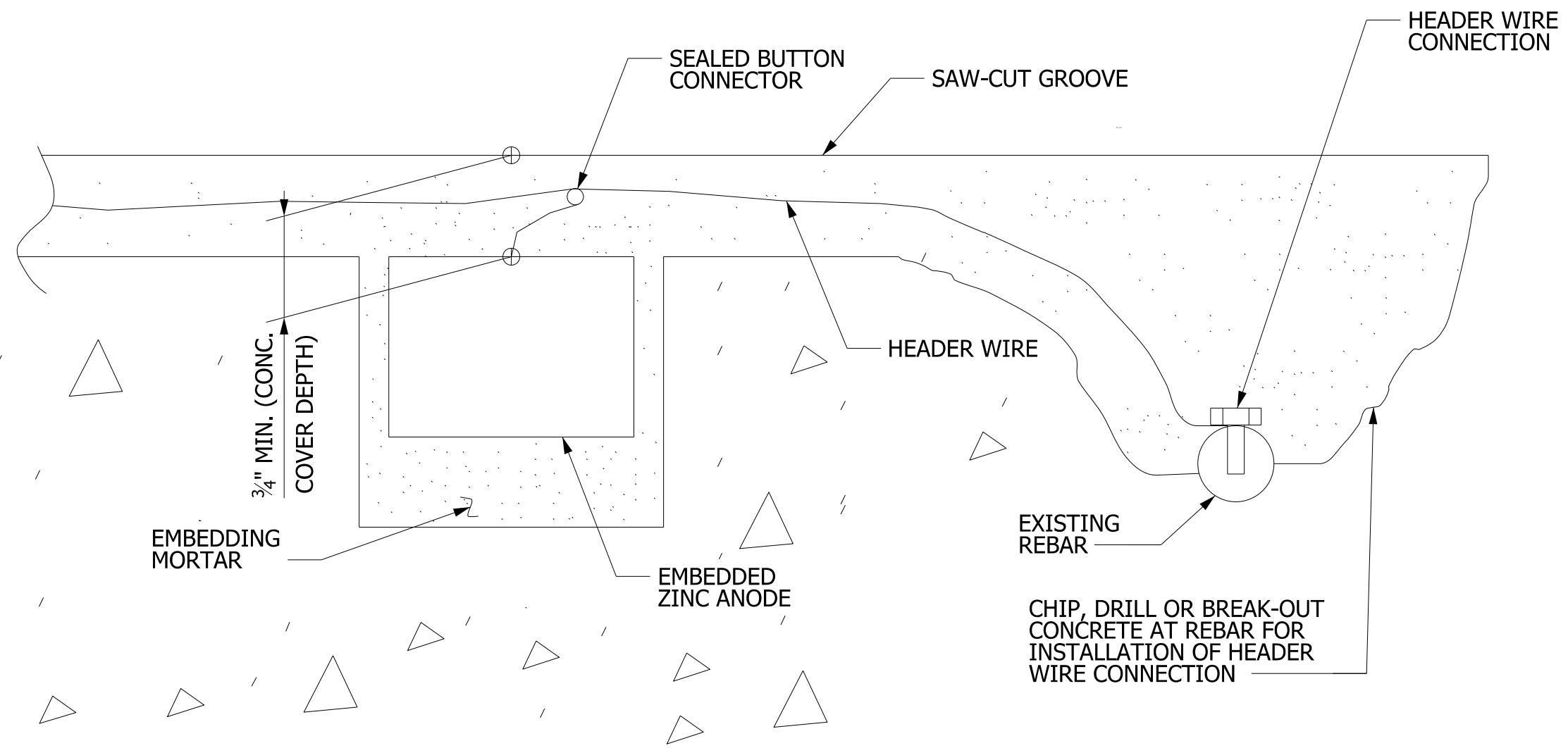
S-26-154 (CYPRESS AVE) BRIDGE SUPERSTRUCTURE
REPLACEMENT OVER MURRELLS INLET CREEK

COUNTY HORRY

ROUTE S-26-154



SECTION VIEW EMBEDDED ZINC ANODE OPTION

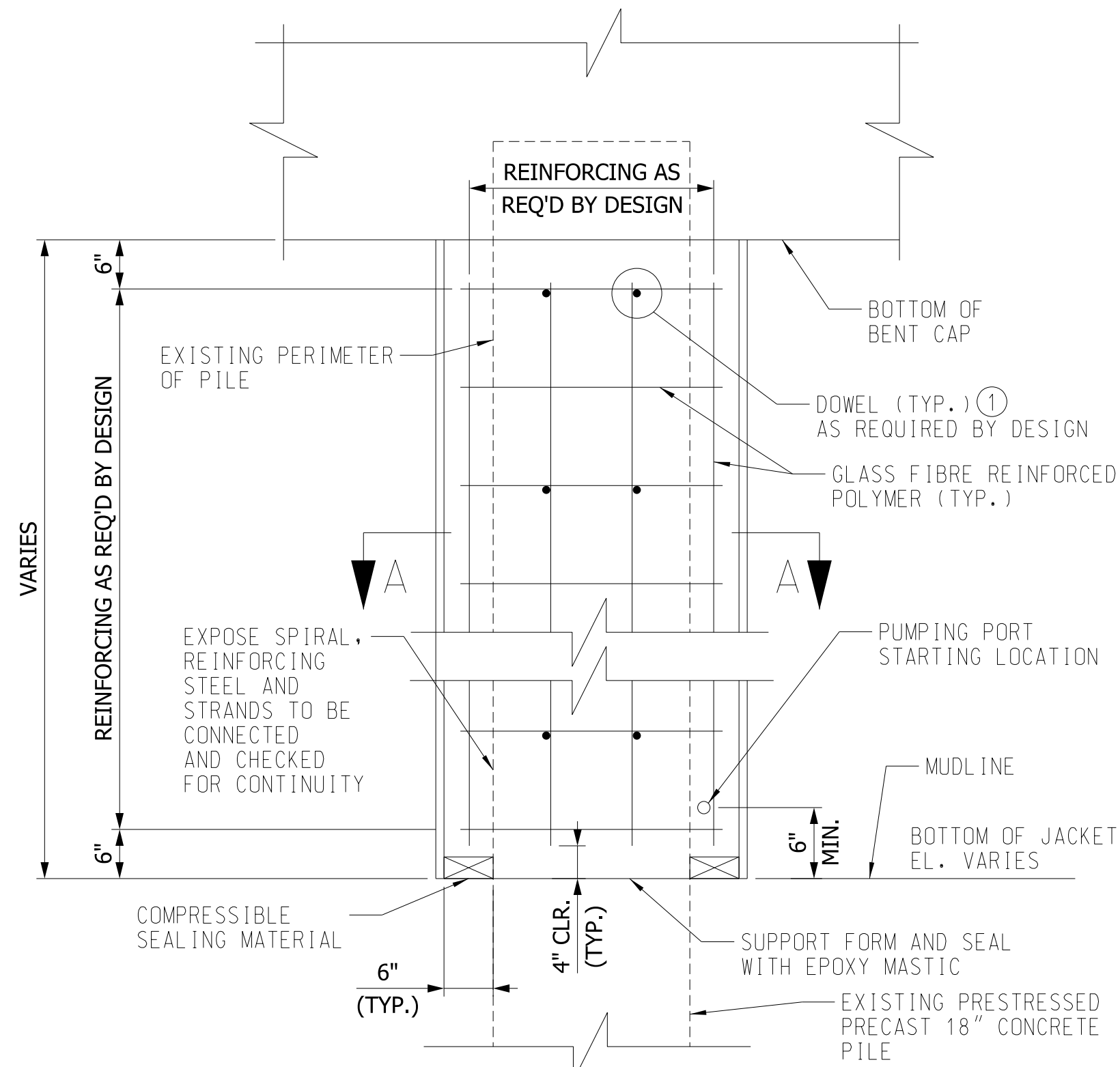


SECTION VIEW EMBEDDED CONTINUOUS ZINC ANODE OPTION

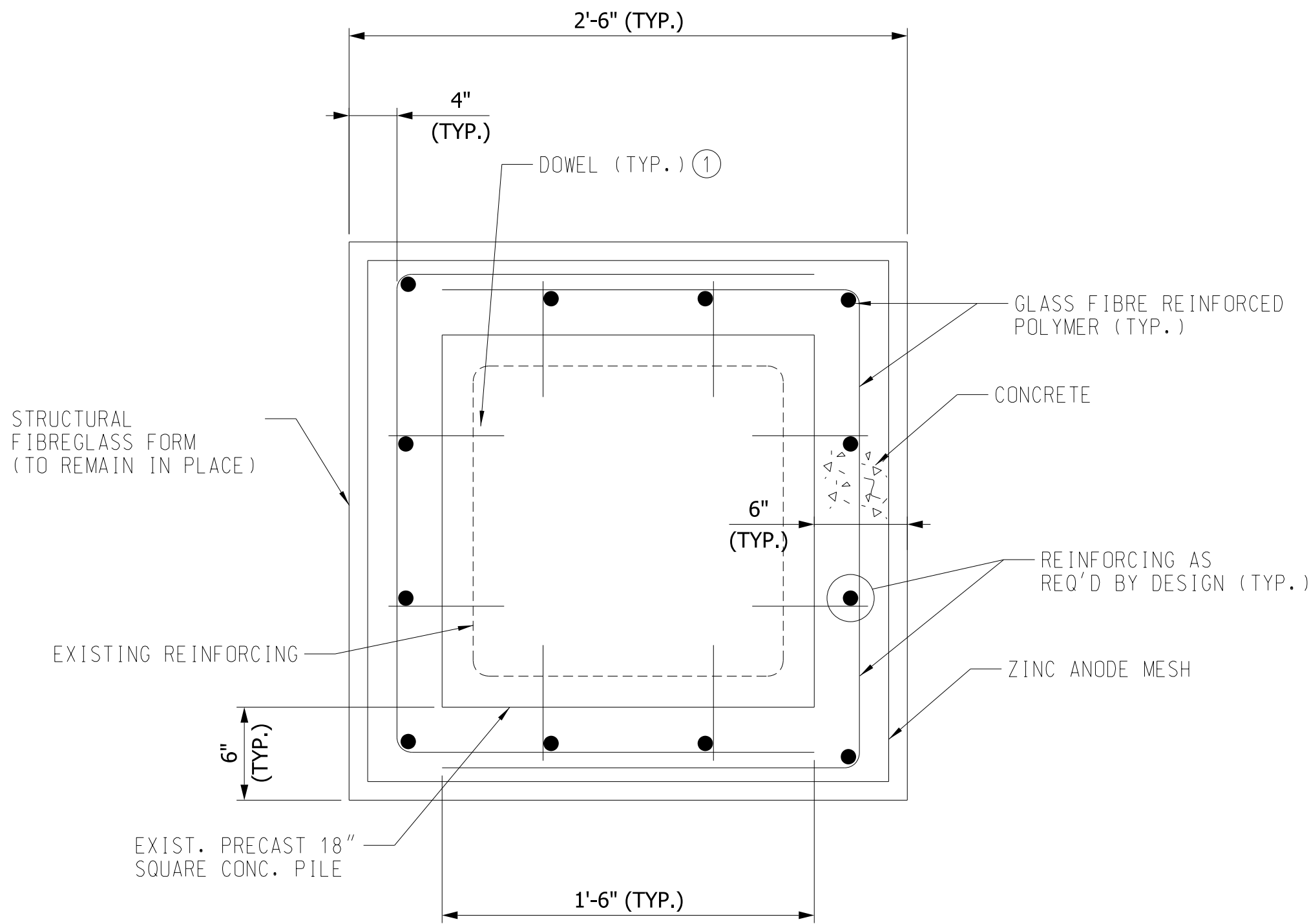
NOTES:

1. OPTION SELECTED WILL BE BASED ON REINFORCEMENT CONCRETE COVER AND FIELD CONDITONS.
2. CONNECT BOTH ENDS OF EACH LINE ANODE CORRESPONDING TO A HEADER WIRE PARALLEL CIRCUIT TO CONTROL CIRCUIT RESISTANCE.
3. LIMIT NUMBER OF POINT ANODES CONNECTED IN SERIES FOR EACH HEADER WIRE TO CONTROL CIRCUIT RESISTANCE.

① DOWELS SHALL BE GLASS FIBRE REINFORCED POLYMER (GFRP).



STRUCTURAL CATHODIC PROTECTION
INTEGRAL PILE JACKET





SECTION A-A
ZINC MESH ANODE

CONCEPTUAL BRIDGE PLANS
NOT FOR
CONSTRUCTION

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.	RRS	JTW	09-24
DES.			
BY		CHK.	DATE

PREPARED BY

**NEEL-SCHAFER**
Solutions you can build upon

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

GALVANIC CATHODIC PROTECTION
SYSTEM DETAILS (SHEET 2 OF 2)

S-26-154 (CYPRESS AVE) BRIDGE SUPERSTRUCTURE
REPLACEMENT OVER MURRELLS INLET CREEK

COUNTY HORRY

ROUTE S-26-154



4.1 | TECHNICAL PROPOSAL

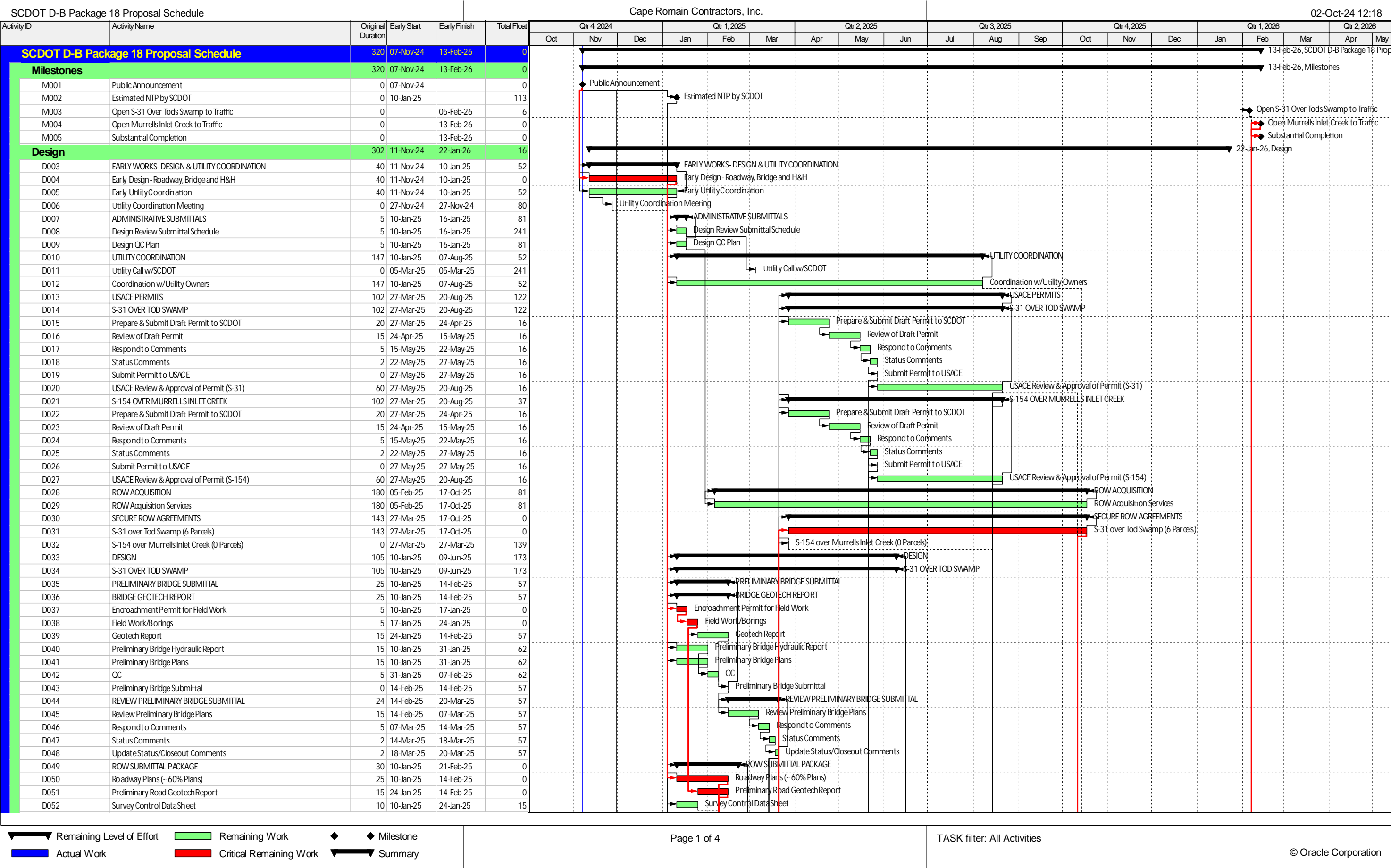
Appendix A.3. | CPM Schedule

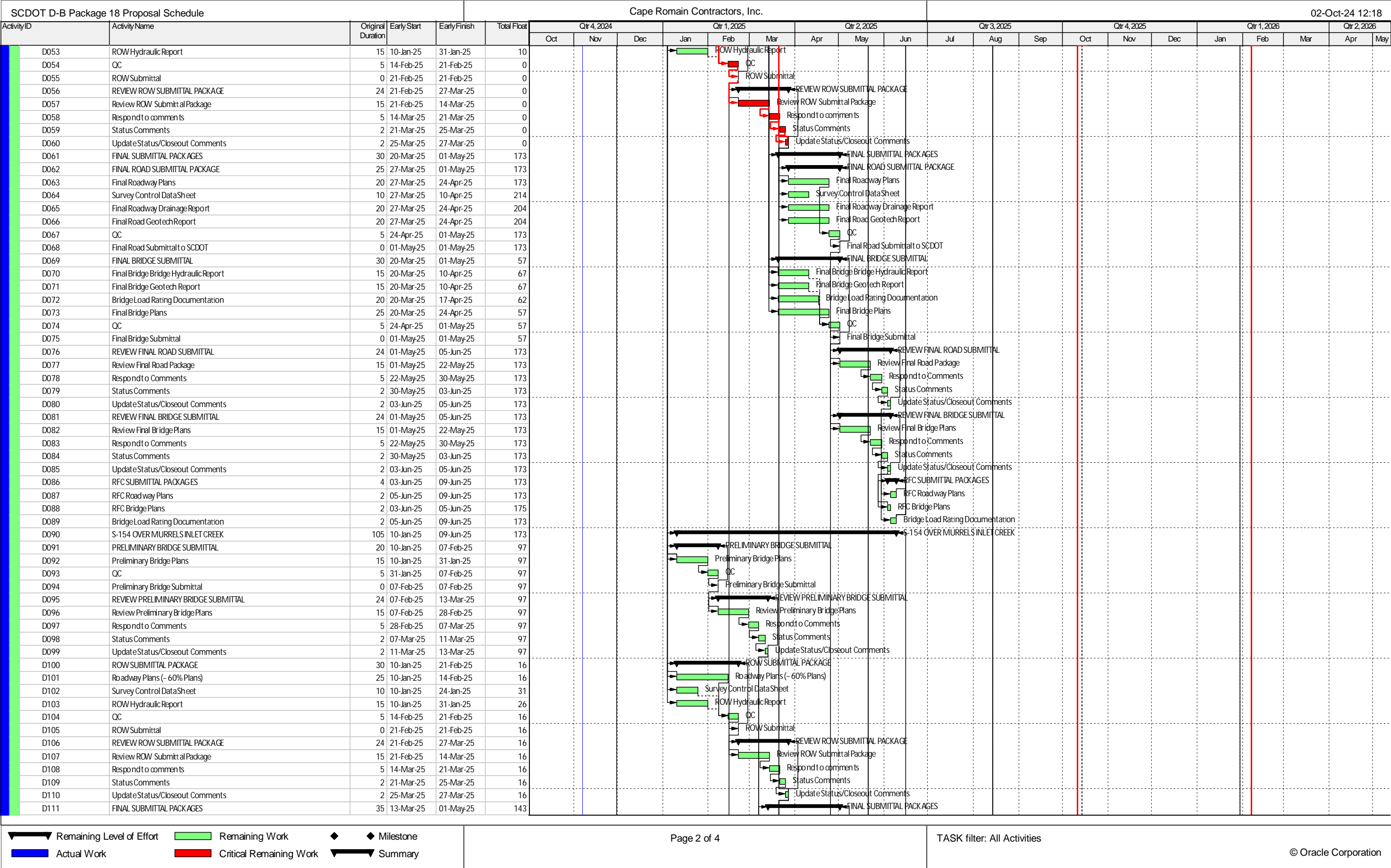
Appendix A | Conceptual Plans

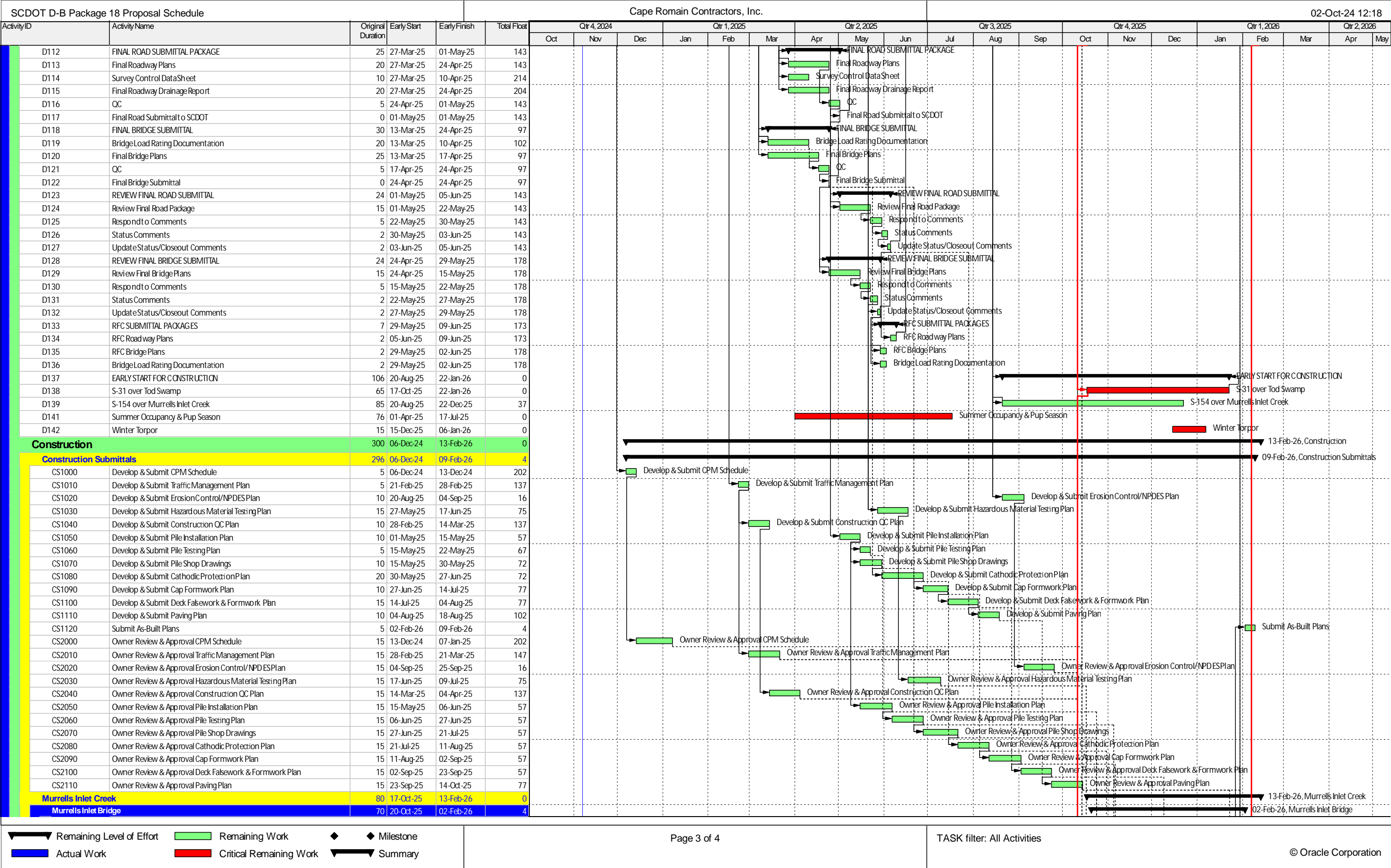


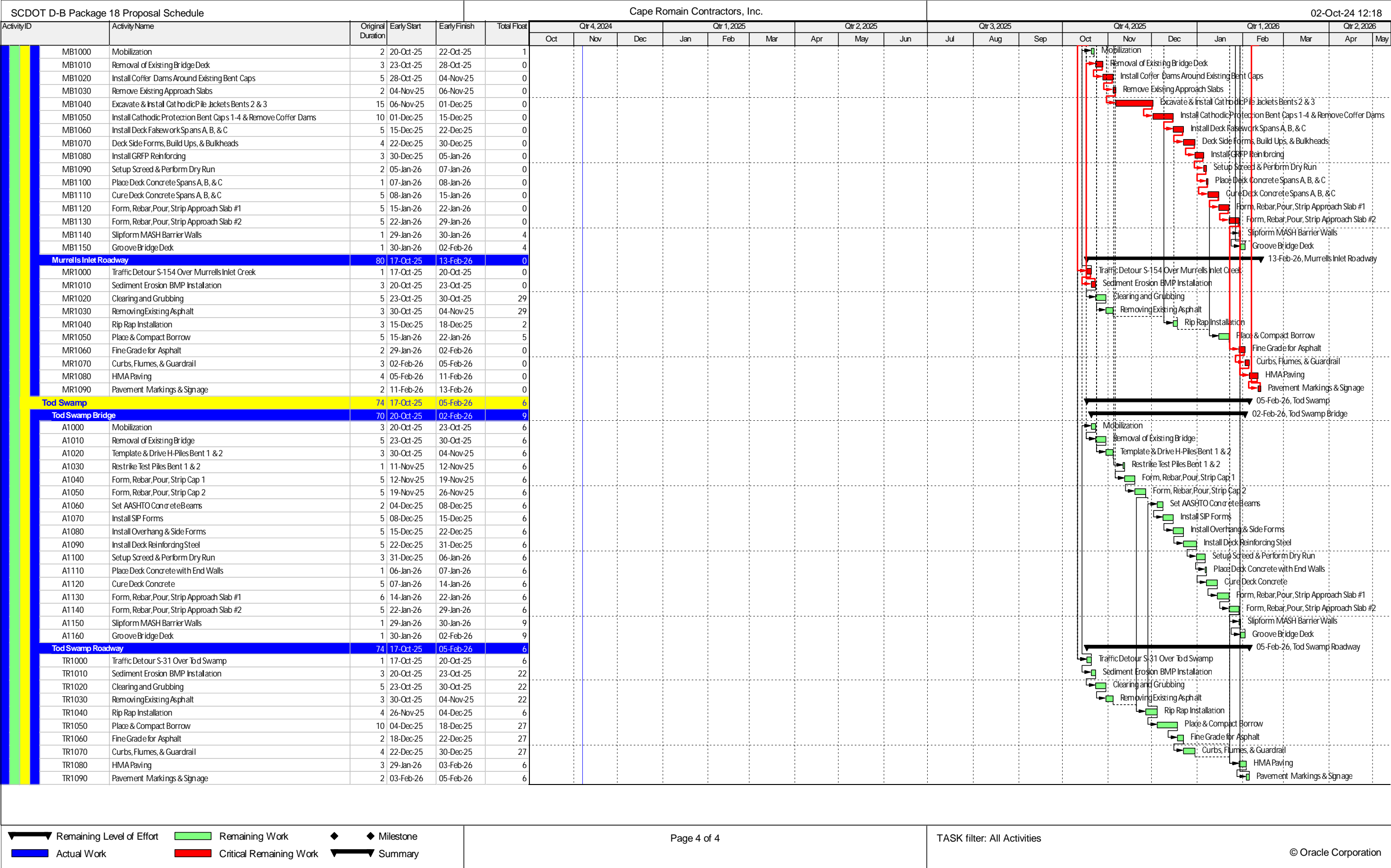
&

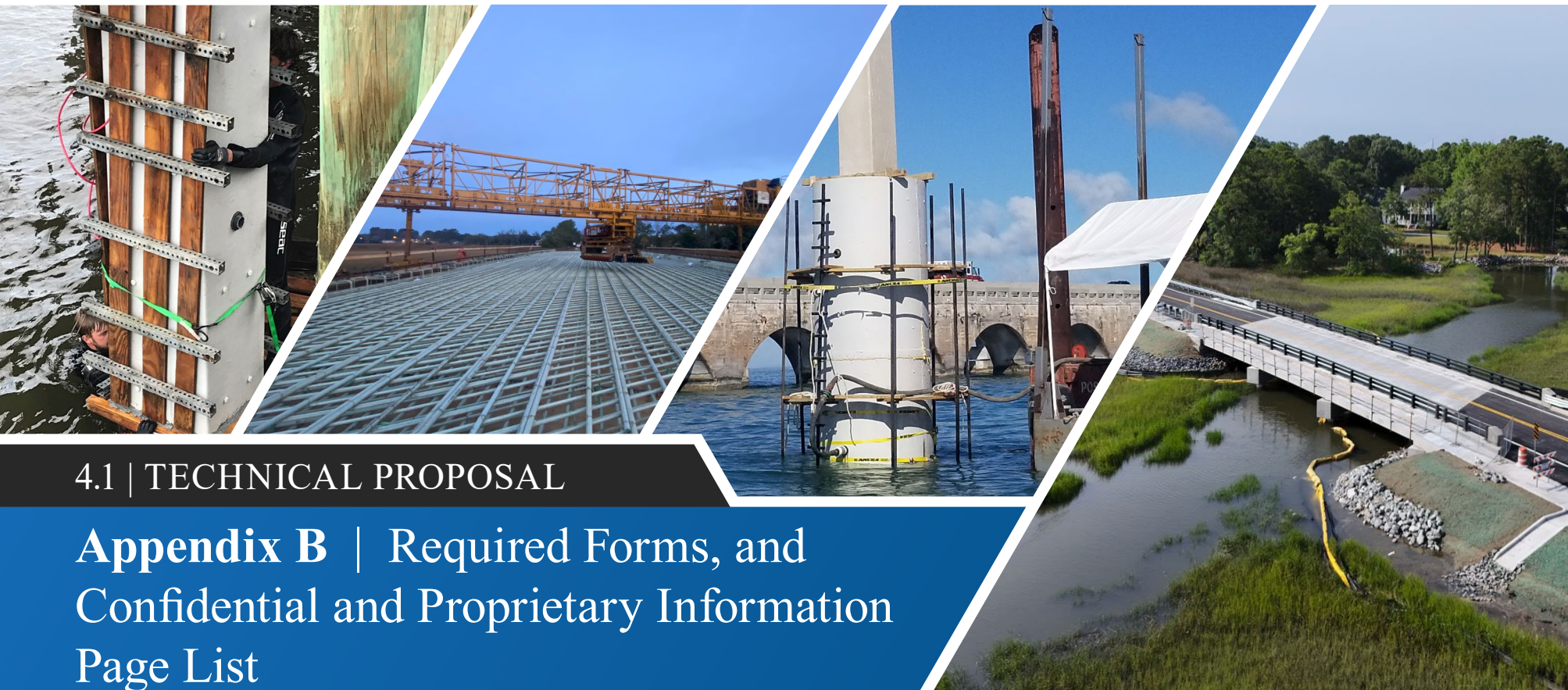












4.1 | TECHNICAL PROPOSAL

Appendix B | Required Forms, and Confidential and Proprietary Information Page List



&



A | STIPEND ACKNOWLEDGMENT FORM

12. STIPEND ACKNOWLEDGEMENT FORM

Stipend Acknowledgement Form

Bridge Package 18 Horry County

Proposer: CAPE ROMAIN CONTRACTORS, INC

ADDRESS: 612 CAPE ROMAIN RD WANDO, SC 29492

The undersigned Proposer, hereby:

☐

Waives the stipend for this Project.

☒

Accepts the stipend for this Project.

By accepting the stipend for this Project, Proposer agrees:

- 1) to execute and include the Stipend Agreement in Article XIII of the RFP with its RFP response;
- 2) to submit an invoice with FEIN number for the stipend amount to the SCDOT POC after SCDOT's posting of the Notice of Award on SCDOT's Design-Build Website.;
- 3) to transfer all rights to its Work Product used to develop the Proposal as of the date of this acknowledgement. "Work Product" means all submittals, including ATCs, ideas, innovations, solutions, methods, processes, design concepts, materials, electronic files, marked up drawings, cross sections, quantity lists and intellectual property, made by Proposer during the RFP process, including the Proposal, exchange of information during the pre-Proposal and post-Proposal period.

SCDOT will pay the stipend to each eligible unsuccessful Proposer, who has signed a Stipend Agreement, within ninety (90) days after execution of the Contract or the decision to not award a contract.

9/16/24
Date


Proposer

E GREG TUTTLE
Print Name

13. STIPEND AGREEMENT

STIPEND AGREEMENT

Project ID: 2662300

Bridge Package 18

Horry County

THIS STIPEND AGREEMENT (the "Agreement") is made and entered into as of the 16 day of SEP, 2024, by and between the SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION (hereinafter "SCDOT"), and CAPE ROMAIN CONTRACTORS ("Proposer"), with reference to the following facts:

SCDOT issued a Request for Proposal ("RFP") for design and construction of the above-referenced Design-Build Project ("Project"), pursuant to procurement authority granted in Section 57-5-1625 of the S.C. Code of Laws, 1976, as amended. The RFP provided for payment of stipends as provided herein. Capitalized terms used, but not defined, have the meanings ascribed in the RFP.

NOW, THEREFORE, Proposer hereby agrees as follows:

1. Work Product.

1.1 Proposer shall prepare and submit a responsible and responsive Technical Proposal and Cost Proposal that conforms in all material respects to the requirements and provisions of the RFP, as determined by SCDOT, and are timely received by SCDOT in accordance with the RFP Milestone Schedule.

1.2 By signing this Stipend Agreement, Proposer agrees to transfer full and complete ownership to SCDOT of all Work Product. The Work Product (as defined below) shall become the property of SCDOT without restriction or limitation on its use, without further compensation or consideration, and can be used in connection with this Project or any future projects by SCDOT. Neither Proposer nor any of its team members shall copyright any of the material developed under this Agreement.

1.3 The term "Work Product" shall mean the Proposal and all material, electronic files, marked up drawings, cross sections, quantity lists, submittals, alternative technical concepts (ATC), ideas, innovations, solutions, methods, processes, design concepts, Trade Secrets or confidential information, and intellectual property, made by or produced for Proposer in the development and submission of the Technical and Cost Proposal, including exchanges of information during the pre-Proposal and post-Proposal period.

2. Compensation and Payment.

2.1 A stipend to Proposer for the Work Product described herein shall be \$20,000.00 and is payable to Proposer that was determined to be responsible and (1) submitted a responsive Technical Proposal and responsive Cost Proposal to the RFP which is not selected for award of this Project, or (2) was awarded the Contract but the Contract was terminated by SCDOT for convenience after the Submittal of Proposal Due Date (See Final RFP Milestone schedule) but prior to the Notice to Proceed #1. Responsibility of Proposers and responsiveness of the Technical Proposal and Cost Proposal will be determined by SCDOT as a condition of payment.

2.2 SCDOT will pay the stipend to Proposer as follows, subject (as applicable) to the following conditions:

- (a) Proposer has submitted this signed Stipend Agreement, unchanged with its response to the RFP.
- (b) After posting of the Notice of Award on SCDOT's Design-Build Website, Proposer has submitted to SCDOT an invoice, with FEIN Number, for the Stipend amount.
- (c) After execution of the Contract or the decision not to award a contract, SCDOT will pay the invoice for the stipend amount to the unsuccessful Proposer meeting the criteria of Section 2.1 within 90 calendar days of receipt of the invoice from Proposer.
- (d) If the procurement is suspended or cancelled prior to the Proposal Due Date (see FINAL RFP Milestone schedule), no stipend will be paid to Proposer.
- (e) After the submittal of Proposals, but prior to award, if the procurement is cancelled, all Proposers that provide a responsive Technical Proposal and Cost Proposal to the final RFP and submitted a signed Stipend Agreement with their RFP shall receive the stipend.
- (f) In the event of a Best and Final Offer, only one stipend will be paid to each Proposer that executed a Stipend Agreement and met the other criteria and conditions herein.
- (g) No stipends will be paid for submitting RFQ responses.
- (h) No stipends will be paid to a Proposer who withdraws at any time from this procurement.

2.3 Acceptance by the Proposer of payment of the stipend amount from SCDOT shall constitute a waiver by Proposer of any and all right, equitable or otherwise, to bring any claim in connection with this procurement, procurement process, award of the Contract, or cancellation of this procurement.

2.4 The Proposer awarded the contract shall be not eligible to receive a stipend.

2.5 If Proposer elects to waive payment of the stipend, SCDOT will not use the ideas or information contained in that Proposer's Proposal for this Project. However, the Proposer's Proposal will be subject to the South Carolina Freedom of Information Act.

3. Indemnities.

3.1 Subject to the limitations contained in Section 3.2, Proposer shall indemnify, protect and hold harmless SCDOT and its directors, officers, employees and contractors from, and Proposer shall defend at its own expense, all claims, costs, expenses, liabilities, demands, or suits at law or equity arising, in whole or in part, from the negligence or willful misconduct of Proposer or any of its agents, officers, employees, representatives or subcontractors or breach of any of Proposer's obligations under this Agreement.

3.2 This indemnity shall not apply with respect to any claims, demands or suits arising from use of the Work Product by SCDOT.

4. Compliance With Laws.

4.1 Proposer shall comply with all federal, state, and local laws, ordinances, rules, and regulations applicable to the work performed or paid for under this Agreement and covenants and agrees that it and its employees shall be bound by the standards of conduct provided in applicable laws, ordinances, rules, and regulations as they relate to work performed under this Agreement. Proposer agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Agreement.

4.2 The Proposer agrees (a) not to discriminate in any manner against an employee or applicant for employment because of race, color, religion, creed, age, sex, marital status, national origin, ancestry or disability of a qualified individual with a disability; (b) to include a provision similar to that contained in subsection (a) in any subcontract; and (c) to post and to cause subcontractors to post in conspicuous places available to employees and applicants for employment, notices setting forth the substance of this clause.

5. Assignment.

Proposer shall not assign this Agreement without SCDOT's prior written consent. Any assignment of this Agreement without such consent shall be null and void.

6. Miscellaneous.

6.1 Proposer and SCDOT agree that Proposer, its team members, and their respective employees are not agents of SCDOT as a result of this Agreement.

6.2 This Agreement, together with the RFP, as amended from time to time, the provisions of which are incorporated herein by reference, embodies the entire agreement of the parties. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representation, or agreements, either oral or written, between the parties hereto.

6.3 It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the State of South Carolina, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

6.4 This Agreement shall be governed by and construed in accordance with the laws of the State of South Carolina.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

Witness:

Recommended:

Michael Pitts

SOUTH CAROLINA DEPARTMENT
OF TRANSPORTATION

By:

Jae Mattox
Alternative Delivery Engineer

Proposer:


ERIC G. TUTTLE

11. EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

(COMPLETE THIS SECTION FOR FEDERAL PROJECTS ONLY)
EQUAL EMPLOYMENT OPPORTUNITY PERFORMANCE

Select the Certification that applies to the PROPOSER:

Certification (1) ☒ or Certification (2) ☐

Select the appropriate responses in the applicable Certification:

Certification (1): Pursuant to 41 C.F.R. §60-1.7(b)(1), Previous Equal Employment Opportunity Performance Certification, as the Prospective Prime Contractor, I HEREBY CERTIFY THAT I:

- (a) HAVE ~~HAVE NOT~~ developed and filed an Affirmative Action Program pursuant to 41 C.F.R. §60-2 and/or 60-4;
- (b) HAVE ~~HAVE NOT~~ participated in a previous contract or subcontract subject to the equal opportunity clause;
- (c) HAVE ~~HAVE NOT~~ filed with the Joint Reporting Committee, the Director of Office of Federal Contract Compliance, or the Equal Employment Opportunity Commission, all reports due under the applicable filing requirements,

OR

Certification (2): I, HEREBY CERTIFY that as the Prospective Prime Contractor submitting this Proposal, (CLAIM / DO NOT CLAIM) exemption from the submission of the Standard Form 100 (EEO-1) due to the fact that it employs a total of less than fifty (50) employees under C.F.R. §60-1.7, or qualifies for an exempted status under 41 C.F.R. §60-1.5.

I FURTHER CERTIFY that the above Certification will be made part of any Subcontract Agreement, or other agreement involved with this project.

Executed on 9/16, 20 24.Signed: 

(Officer/PROPOSER)

Title: VICE PRESIDENTCompany: CAPE ROMAIN CONTRACTORSAddress: 612 CAPE ROMAIN RD WANDU, SC 29492

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b)(1)), and must be submitted by PROPOSERS only in connection with contracts which are subject to the equal opportunity clause. Contracts that are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally, only contracts of \$10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by Executive Orders or their implementing regulations.

Proposers, Primary Members, or proposed Subcontractors (any tier) and Consultants who have participated in a previous contract subject to the Executive Orders and have not filed the required reports shall note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

10. NON-COLLUSION CERTIFICATION

NON-COLLUSION CERTIFICATION

Project ID: 2662300

IN ACCORDANCE WITH THE PROVISIONS OF S.C. CODE ANN. §§ 39-3-10 ET. SEQ., 39-5-10 ET. SEQ., 15 U.S.C. §45; 23 C.F.R. §635.112(F); AND 28 U.S.C. §1746, I HEREBY ACKNOWLEDGE THAT I AM AN OFFICER OF THE PROPOSER FIRM AND, UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE UNITED STATES AND SOUTH CAROLINA, DECLARE, BY MY CERTIFICATION BELOW, THAT THE FOLLOWING IS TRUE AND CORRECT, AND FURTHER, THAT THIS JOINT-VENTURE, FIRM, PARTNERSHIP, ASSOCIATION OR CORPORATION, OR ANY OTHER LEGAL ENTITY HAS NOT, EITHER DIRECTLY OR INDIRECTLY, ENTERED INTO ANY AGREEMENT, PARTICIPATED IN ANY COLLUSION, OR OTHERWISE TAKEN ANY ACTION IN RESTRAINT OF FREE COMPETITIVE BIDDING IN CONNECTION WITH THE SUBMISSION OF A BID PROPOSAL ON THE ABOVE REFERENCED PROJECT.

BY CHECKING THIS BOX ☒, I CERTIFY THAT I HAVE READ, UNDERSTAND, ACCEPT, AND ACKNOWLEDGE ALL OF THE ABOVE STATEMENTS.

Executed on 9/16/24
(Date)

Signed: Eva G. [Signature]
CAPE ROMAIN CONTRACTORS
(Officer/Proposer)

VICE PRESIDENT
(Title)

612 CAPE ROMAIN RD
(Address)

WANDO, SC 29492

E | NOTICE OF RECEIPT OF ADDENDUM



South Carolina
Department of Transportation

NOTICE OF RECEIPT Bridge Package 18 Design-Build – Contract ID 2662300 Horry County

Addendum 1

The information in this addendum shall be made part of the contract documents. PROPOSERS are instructed to incorporate the information into the previously provided RFQ documents.

PROPOSERS are required to sign this document and enclose it with their Statement of Qualifications. Receipt of this signed document by The South Carolina Department of Transportation serves as confirmation that the PROPOSER has received and incorporated this Addendum into the contract documents.

Confirmation Statement:

I, the PROPOSER confirm that I have received this addendum package and have incorporated the information provided in the addendum into the contract documents.

A handwritten signature in blue ink, appearing to read "E. A. Tuttle", is written over a horizontal line.

PROPOSER's Signature

A handwritten date "9/16/24" in blue ink is written over a horizontal line.

Date

A handwritten printed name "E GREG TUTTLE" in blue ink is written over a horizontal line.

Printed Name

For: CAPE ROMAIN CONTRACTORS, INC

Design-Build Team Name



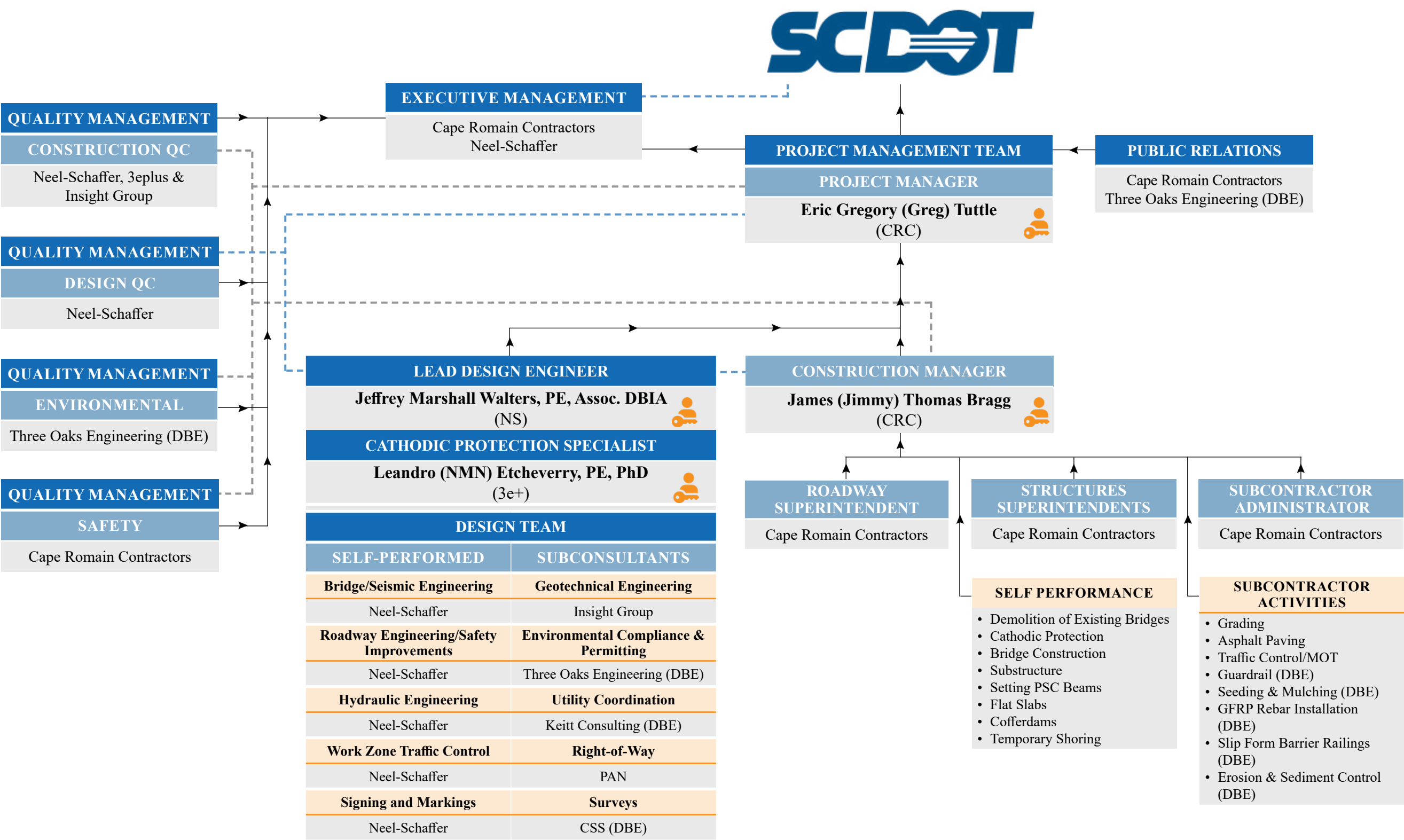
Post Office Box 191
Columbia, South Carolina 29202-0191

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

AN EQUAL OPPORTUNITY
AFFIRMATIVE ACTION EMPLOYER

F | UPDATED ORGANIZATION CHART & NOTARIZED STATEMENT OF AVAILABILITY OF KEY INDIVIDUALS

Organizational Chart | No Changes to Date



FIRM KEY/NAMES	
CRC	Cape Romain Contractors, Inc.
NS	Neel-Schaffer, Inc.
3e+	3eplus
TO	Three Oaks Engineering (DBE)
IG	Insight Group
KC	Keitt Consulting, LLC (DBE)
CSS	Construction Support Services (DBE)
PAN	Property Acquisitions and Negotiations, Inc.

KEY	
	Denotes Key Individual
	Direct Report
	Communication
(NMN)	No Middle Name



Cape Romain Contractors, Inc.

612 CAPE ROMAIN ROAD
WANDO, SC 29492

TELEPHONE: 843-884-5167
FAX: 843-884-0516

Ms. Renee Frazier
Office of Project Delivery
South Carolina Department of Transportation
955 Park Street, Room 101
Columbia, South Carolina 29202

Notarized Statement of Availability of Key Individuals for Contract Id 2662300 – SCDOT –
Design Build Package 18

Ms. Frazier,

Cape Romain Contractors confirms that, if selected for the above-referenced project, each Key Individual identified below and on the organizational chart submitted with the SOQ and Technical Proposal will be available, barring any unforeseen circumstances, at the earliest of the times and durations identified in the RFQ and RFP, until expiration of the Warranty Period, or such earlier date as the Contract is terminated or SCDOT releases, in writing, such Key Individual from this requirement.

- Eric Gregory (Greg) Tuttle, Project Manager
- James (Jimmy) Thomas Bragg, Construction Manager

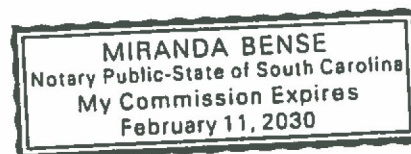
Sincerely,

Andrew G. DuPre
President
Cape Romain Contractors, Inc.

Eric Gregory Tuttle
Project Manager
Cape Romain Contractors, Inc.

Sworn and Subscribed before me this 16 day of 9, 2024.

County of Berkeley South Carolina



Notary Public, State of South Carolina My commission expires 2-11-2030



September 16, 2024

Ms. Renee Frazier
(Mr. Brian Gambrell, Mr. Michael Pitts)
Office of Project Delivery
(Office of Chief Counsel, Office of Alternative Delivery)
South Carolina Department of Transportation
955 Park Street, Room 101 (Room 302, 421)
Columbia, South Carolina 29202-0191

Notarized Statement of Availability of Key Individuals for Contract ID 2662300 | SCDOT | Design-Build Project Bridge Package 18

Ms. Frazier,

Neel-Schaffer, Inc. confirms that, if selected for the above referenced project, each Key Individual identified below and on the organizational chart submitted with the SOQ and Technical Proposal will be available, barring any unforeseen circumstances, at the earliest of the times and durations identified in the RFQ and RFP, until expiration of the Warranty Period, or such earlier date as the Contract is terminated or SCDOT releases, in writing, such Key Individual from this requirement.

Jeffrey Marshall Walters, PE, Assoc. DBIA, Lead Design Engineer

Signature: Philip Sandel
Philip Sandel
Neel-Schaffer
Operations Manager

Date: 9/16/2024

Notary Public

Signature: William K. Axson
Date: 09/16/2024

William K. Axson
Notary Public, State of South Carolina
My Commission Expires April 10, 2027

Signature: Eric A. Tuttle
Eric Gregory Tuttle
Cape Romain Contractors
Project Manager

Date: 10/1/2024

Notary Public

Signature: Miranda Bense
Date: 10-1-2024

MIRANDA BENSE
Notary Public-State of South Carolina
My Commission Expires
February 11, 2030

P: 803.929.3656 | F: 803.929.3662

1320 Main Street, Suite 510

Columbia, SC 29201

www.neel-schaffer.com

engineers | planners | surveyors | environmental scientists | landscape architects





INFRASTRUCTURE
REHABILITATION
SPECIALTY
SERVICES

3eplus, Inc.
11231 US Hwy 1 #277
North Palm Beach, Florida 33408
(561) 320-8287
3eplus.net

September 13, 2024

Ms. Renee Frazier
(Mr. Brian Gambrell, Mr. Michael Pitts)
Office of Project Delivery
(Office of Chief Counsel, Office of Alternative Delivery)
South Carolina Department of Transportation
955 Park Street, Room 101 (Room 302, 421)
Columbia, South Carolina 29202-0191

**NOTARIZED STATEMENT OF AVAILABILITY OF KEY INDIVIDUALS FOR CONTRACT ID
2662300 | SCDOT | DESIGN-BUILD PROJECT BRIDGE PACKAGE 18**

Ms. Frazier,

3eplus, Inc. confirms that, if selected for the above referenced project, each Key Individual identified below will be available, barring any unforeseen circumstances, at the earliest of the times and durations identified in the RFQ and RFP, until expiration of the Warranty Period, or such earlier date as the Contract is terminated or SCDOT releases, in writing, such Key Individual from this requirement.

Leandro Etcheverry, PE, PhD, Cathodic Protection Specialist

Signature: _____

Date: _____

9/13/2024

Leandro Etcheverry

3eplus, Inc.

President

Notary Public

Signature: _____

Date: _____

9/13/2024



Signature: _____

Date: _____

9/16/2024

Eric Gregory Tuttle

Cape Romain Contractors

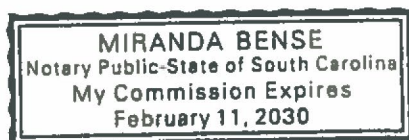
Project Manager

Notary Public

Signature: _____

Date: _____

9/16/2024



G | CONFIDENTIAL & PROPRIETARY INFORMATION PAGE LIST

The Team of Cape Romain Contractors (Lead Contractor), Neel-Schaffer, Inc. (Lead Designer) and 3eplus (Cathodic Protection) do not deem any of the information within this submittal as confidential or proprietary.



South Carolina Department of Transportation

Columbia, South Carolina

South Carolina Department

Of

Transportation

Prime Contractor

Prequalification Certificate

This Certifies that your company has complied with the rules and regulations of the Department and the State of South Carolina, and subject to the rules and regulations for a prime contractor, is declared eligible to submit a bid and be awarded any construction contract issued by the Department, subject to obtaining proper bonds and insurance acceptable to the Department and complying with all other statutory and contract requirements.

ALL BIDS SUBMITTED TO THE DEPARTMENT MUST BE IN THE NAME AS SHOWN BELOW.

VENDOR NAME

CAPE ROMAIN CONTRACTORS, INC.

Vendor ID:

1CA003

Date Issued:

April 17, 2024

Expiration Date:

May 31, 2025

Approved By:

A handwritten signature in black ink is written over a horizontal line. The signature is stylized and appears to be "D. Schaffer".

Prequalification and Contracts Coordinator

N/A - Our Team is not a partnership, limited partnership, joint venture, or other association.

J | QUALITY CREDIT MATRIX

Number	Description	Added Value/Benefits	Cost/Schedule Impacts	Self-imposed Assurance
1	FATC #1	Eliminate Preliminary Roadway Design Submittal	Reduced Schedule by approximately one (1) month.	
2	FATC #2	Modified cofferdam layout for S-154 over Murrells Inlet Creek	Reduced labor, materials & equipment Cost of \$85,000.	
3	FATC #3	Use of GFRP in Pile Jackets will improve efficiency of CP System and extend service life of piles.	Reduced maintenance cost over remaining life of bridge.	
4	FATC #4	S-31 - Reduced Bridge Length.	Reduced Bridge/Roadway Closure by 1 week and reduced cost \$77,000.	LD's of \$1,000/Day
5	ROW Reduction	Our FATCs and other design refinements have reduced ROW.	ROW Reduced from 2.07 Ac to 1.12 Ac. Total reduction of 0.97 Ac (47%). Reduction in ROW will reduce costs for SCDOT and save time on schedule.	
6	ROW Parcels Reduction	Our FATC 4 and other design refinements have reduced the number ROW Parcels.	The number of ROW parcels was reduced from 10 to 6. Total reduction of 40% as compared to SCDOT preliminary concept. Reduction in ROW parcels will reduce costs for SCDOT and save time on schedule.	
7	Elimination of construction at the intersection of S-31 (Red Bluff Rd.) & Winding Path Dr.	Reduced Traffic Impacts by implementation of our FATC 4 for the S-31 site moved the Begin Construction limits to the north of this intersection.	Reduced impact to traffic by eliminating construction in this intersection. Also enhances worker safety and reduced MOTcost.	
8	Reduced roadway and bridge closures by 1 week.	Our FATCs resulted in shortening the roadway/bridge closure by 1 week.	Reduced impact to traffic by reducing the roadway/bridge closure durations.	See FATC 4 above
Cost/Schedule Impacts – Describe the Cost in dollars and/or Schedule impacts in days associated with the feature (positive or negative).				
Self-imposed Assurance – Discuss any penalties or liquidated damages that will apply in the event the CONTRACTOR cannot implement the feature as described.				



4.1 | TECHNICAL PROPOSAL

Appendix C | Approved Formal ATCs



&



Formal ATCs - Final Determination

Date Received: 9/10/2024

Date Response Sent: 9/11/2024

Cape Romain			SCDOT		Final?
ATC No.	Primary Discipline	Concept	Response	Justification	
1	DM	Eliminating Preliminary Roadway Submittals	Approved		Yes
2	Structures	Cofferdams for Murrels Inlet Creek	Approved		Yes
3	Structures	GFRP for supplemental reinforcement for pile jackets for CPS	Approved		Yes
4	Structures	Reduce bridge length for S-31 (66.5 ft single span)	Approved		Yes
5	Structures	Reduce bridge length for S-31 (60 ft single span)	Not Approved		Yes
6	Pavement	Changes in driveway pavement design	Not an ATC		Yes



Formal Alternative Technical Concepts Submittal Form

Project: DB Bridge Package 18

Project ID: 2662300

ATC No.: 1

Priority: Med

Team: CapeRomainContractors/Neel-Schaffer

Date: 8/22/24

Description (required):

This ATC is to accelerate the design schedule by eliminating the Preliminary Roadway Submittal to expedite the overall project schedule by beginning the Right-of-Way Acquisition, Environmental Permitting and Utility Coordination & Relocations sooner. We propose to begin our Roadway Submittals with the Right-of-Way Submittal Package that will include the Road Geotechnical Report. By getting these Right-of-Way plans approved sooner, we can proceed with Right-of-Way Acquisition, Environmental Permitting and Utility Coordination/Relocations sooner to accelerate the overall project schedule.

Usage:

This ATC will be used for the Roadway Design Submittal packages for all sites. The Preliminary Bridge Plan Submittal Packages will be provided for all sites in accordance with the RFP requirements.

Deviations (required):

Exhibit 4z - Section 2.0 SUBMITTAL PACKAGES

Justification:

The Roadway Plans will be developed beyond the preliminary submittal level for the Technical Proposal. By eliminating the Preliminary Roadway Submittal, we eliminate the review process for those packages and will reduce the overall design & construction schedule. By getting our Right-of-Way plans approved sooner, we can begin Right-of-way Acquisition, Utility Coordination/Relocations, Environmental Permitting and construction quicker.

Schedule:

The overall design & construction schedule will be accelerated by beginning Right-of-way Acquisition, Utility Coordination, Environmental Permitting, Utility Coordination/Relocation and construction quicker.

Impacts:

There are no negative impacts associated with this ATC.

History:

Similar ATC's have been approved by SCDOT on DB Bridge Packages in the past.

Risks:

The Cape Romain/Neel-Schaffer Team assumes responsibility for any risks associated with design review comments.

Costs (required):

The cost savings for this ATC is based on time savings for the DB Team and for SCDOT by eliminating 2 review cycles (1 for each of the 2 sites). It will reduce overall contract time by accelerating the design & construction schedule.

Formal Alternative Technical Concepts Submittal Form

Project: DB Bridge Package 18

Project ID: 2662300

ATC No.: 1

Priority: Med

Team: CapeRomainContractors/Neel-Schaffer

Date:

Quality:

There will be no impact to quality or performance of the bridge/roadway with the implementation of this ATC.

Operations & Maintenance:

There is no negative impact to long term operations & maintenance anticipated with this ATC.

Formal Alternative Technical Concepts Submittal Form

Project: Bridge Package 18 Design Build Project

Project ID: 2662300

ATC No.: 2

Priority: High

Team: Cape Romain Contractors / Neel-Schaffer

Date: 8/26/24

Description (required):

Cofferdams for Murrells Inlet Creek

Usage:

Cape Romain Contractors and Neel-Schaffer propose to modify the existing coffercell layout indicated on the conceptual plan sheets for S-154 over Murrells Inlet Creek (in Attachment B - Supplemental Project Design Criteria).

Deviations (required):

The current plan calls for four individual coffercells that consist of approximately 324 LF of coffercell installation requiring 74 pair of rental sheet pile. The ATC proposes to construct a 3-sided coffercell to enclose 2 bents at a time. Cape Romain would re-use the "center" wall of the coffercell to construct the coffercell for the other two bents. The coffercells would be done in 2 phases. See attached drawing for proposed layout.

Justification:

By altering the coffercell plan and performing the work on 2 bents at a time in 2 phases, the center wall of the coffercell can be re-used and the coffer cell quantity reduced to 32 pairs of sheet pile. This will reduce the rental sheet pile tonnage. These 3 sided coffer cells will be easier to design and construct as well as giving more working room around the piles for cleaning and pile jacket installation.

Schedule:

The estimated schedule savings is 2 weeks

Impacts:

The coffercell change will not impact the width of channel obstructed. The re-designed coffercell will only impact 38 LF of the channel width compared to 42 LF by the SCDOT Concept plan design (reduced 10%). The footprint of area for the redesign is 1635 SF compared to 1585 SF per plan at any given time.

History:

Cape Romain has significant experience in design and construction of temporary cofferdams in tidal conditions that prompted the exploration into a redesigned system that did not require a closed cell.

Risks:

The redesign of the coffer cell decreases schedule risk to the project by easing the difficulty of construction for closing the coffercell and providing more room to work on the cathodic protection system.

Costs (required):

Estimated cost savings are \$85,000 for labor, equipment, and sheet pile rental.

Quality:

There are no impacts to quality of the final structure.



Formal Alternative Technical Concepts Submittal Form

Project: Bridge Package 18 Design Build Project

Project ID: 2662300

ATC No.: 2

Priority: High

Team: Cape Romain Contractors / Neel-Schaffer

Date: 8/26/24

Operations & Maintenance:

There are no impacts to operations and maintenance of the permanent structure.



THESE DRAWINGS AND THE DESIGN THEREON ARE THE PROPERTY OF CAPE ROYAL CONTRACTORS, INC. AND MAY NOT BE USED IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT, ANY INFRINGEMENT WILL BE SUBJECT TO LEGAL ACTION

These 3 sided coffer cells will be easier to design and construct as well as giving more working room around the piles for cleaning and pile jacket installation.

The plan view illustrates a bridge project with two main phases:

- PHASE 1 (1635 SF)**: Located on the left side of the diagram, it includes the area between the centerline and the first wing wall. It features a "BEGIN BRIDGE (A) & EXISTING END BENT 1 STA. 34+92.00±".
- PHASE 2 (1635 SF)**: Located on the right side, it includes the area between the second wing wall and the end bent. It features an "END BRIDGE (A) & EXISTING END BENT 4 STA. 35+61.00±".

Key features and dimensions include:

- Centerline and Roadway**: A central "28'-2" CLEAR ROADWAY" runs horizontally through the middle.
- Lanes and Shoulders**: On both sides of the roadway, there are "10'-0" LANE"s flanked by "4'-1" SHOULDER"s. A "3'-9" SHldr. BREAK" is indicated near the ends.
- Bridge Structure**: The bridge spans across "MURRELLS INLET CREEK". It consists of several bents and approach slabs. "APPROACH SLAB NO. 1" and "APPROACH SLAB NO. 2" are labeled at the ends.
- Dimensions**: Various lengths and widths are specified, such as "37'-8"" for the total bridge length, "30'-4"" for individual spans, and "14'-1"" for lane widths.
- Existing Infrastructure**: Labels indicate "EXISTING BRIDGE SUPERSTRUCTURE AND APPROACH SLABS TO BE REMOVED (C)" and "EXISTING END BENT 2 (A) STA. 35+15.00±".
- Proposed Modifications**: Notes include "TEMPORARY SHEET PILING FOR INSTALLATION OF CATHODIC PROTECTION SYSTEM (TYP., EA. INT. BENT)", "TEMPORARY COFFERDAM FOR INSTALLATION OF CATHODIC PROTECTION SYSTEM (TYP., EA. INT. BENT)", and "BRIDGE END DRAINAGE (TYP.) (AS REQUIRED BY FINAL DESIGN)".
- Orientation and Context**: Arrows point towards "TO GARDEN CITY" and "TO GARDEN CITY". A north arrow is located in the upper left corner.

PLAN

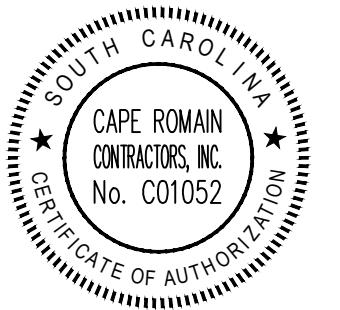
SCALE: 1/16" = 1' - 0"



STATE ROUTE S-26-154 (CYPRESS AVE)
REHABILITATE BRIDGE OVER
MURRELLS INLET CREEK
HORRY COUNTY, SOUTH CAROLINA

CAPE ROMAIN CONTRACTORS
612 Cape Romain Road
Wando, SC 29492
(843) 884-5167 Fax (843) 884-0516
www.caperomaincontractors.com

DRAWING: MURRELLS INLET SHEET PILE REDESIGN



JOB NO: P041158
DES: JCH
DWG: VSB
DATE: 08-26-2024

SHEET
RD 1

Formal Alternative Technical Concepts Submittal Form

Project: DB Bridge Package 18

Project ID: 2662300

ATC No.: 3

Priority: Med

Team: Cape Romain Contractors / Neel-Schaffer

Date: 8/26/24

Description (required):

Proposed use of GFRP for Supplemental Reinforcement for Pile Jackets for cathodic protection on S-154 over Murrells Inlet Creek.

Usage:

Proposed for Pile Jackets on S-154 over Murrells Inlet Creek.

Deviations (required):

The ATC involves the use of glass fiber reinforced polymer (GFRP) reinforcement for the supplemental reinforcing steel cage of galvanic cathodic protection pile jackets on S-154 over Murrells Inlet Creek. The Conceptual Bridge Rehabilitation Plans (in Attachment B - Supplemental Project Design Criteria), specifies plain (steel) reinforcement for the supplemental reinforcement cage of galvanic cathodic protection jackets on piles.

Justification:

The use of GFRP would eliminate the risk of electrical shorts between the jacket's zinc mesh anode and the reinforcement. There would not be a risk of establishing an electrical short between the supplemental reinforcement since the proposed supplemental reinforcement would be non-metallic. Also, the GFRP reinforcement creates a barrier between the exposed original reinforcement in repair cavities and the jacket's zinc mesh anode. Typically, repair cavities are filled concurrently and monolithically with the jacket's annulus.

Another benefit of using GFRP for the supplemental reinforcement is that all the protection from the galvanic cathodic protection system would be directed to the original reinforcement. When steel reinforcement is used for the supplemental reinforcement, a significant portion of the protection is diverted to the supplemental reinforcement.

Schedule:

No change or impact to schedule.

Impacts:

None.

History:

Recent jacket installations for the Florida Department of Transportation (largest owner of galvanic cathodic protection jackets) incorporate a GFRP supplemental reinforcement cage for structural jackets.

Risks:

None apparent

Costs (required):

No cost savings (or increase).

Formal Alternative Technical Concepts Submittal Form

Project: DB Bridge Package 18

Project ID: 2662300

ATC No.: 3

Priority: Med

Team: Cape Romain Contractors / Neel-Schaffer

Date: 8/26/24

Quality:

The use of GFRP:

Eliminates the risk of electrical shorts between the jacket's zinc mesh anode and the reinforcement since the proposed supplemental reinforcement would be non-metallic.

Creates a barrier between the exposed original reinforcement in repair cavities and the jacket's zinc mesh anode.

Is more effective since all the protection from the galvanic cathodic protection system would be directed to the original reinforcement.

Operations & Maintenance:

Operations and maintenance will be simplified since there will be two (as opposed to four) system negatives within the jackets' junction boxes.

Formal Alternative Technical Concepts Submittal Form

Project: DB Bridge Package 18

Project ID: 2662300

ATC No.: 4

Priority: High

Team: Cape Romain Contractors/Neel-Schaffer

Date: 9/10/24

Description (required):

This ATC seeks to reduce the bridge length for S-31 (Red Bluff Rd) over Tod Swamp in Horry County.

Usage:

Our team is proposing to use a 66.5 ft long single span bridge for S-31 over Tod Swamp.

Deviations (required):

This bridge length would deviate from the minimum bridge length of 80 ft required in Exhibit 4b - Structures Design Criteria, Section 2.1 .7 of the RFP.

Justification:

Based on our team's review of the site, the proposed bridge layout and the hydro model, we have determined that a 66.5 ft single span bridge would be feasible at this site. We are including the Bridge Hydraulic Analysis Report, Bridge Plan and Profile Drawing and Bridge Typical Section showing the superstructure depth and Roadway Plan & Profile for justification. The supporting information shows that with the 66.5 ft span, we meet the SCDOT's minimum abutment toe of fill setbacks to top of bank (10 ft) and the hydraulic requirements for bridge backwater, freeboard and no impact to Base Flood (100-year) Elevations. The Roadway length was also reduced from 1,100 ft (SCDOT Concept Plans) to 815 ft (Proposed ATC 4) providing further cost savings.

Schedule:

Approval of this ATC will allow a construction saving of 1 week based on the reduced bridge length.

Impacts:

This ATC will reduce required right-of-way, impacts to environmental resources and overall roadway length.

History:

Cape Romain Contractors and Neel-Schaffer, Inc. both have extensive experience in the design and construction of similar bridges using Type II AASHTO Girders of similar length.

Risks:

No risks for SCDOT or others are anticipated due to this ATC.

Costs (required):

This reduction in bridge length will provide a cost savings of \$77,000.

Quality:

There will be no impact to quality or performance of the bridge/roadway with the implementation of this ATC.

Formal Alternative Technical Concepts Submittal Form

Project: DB Bridge Package 18

Project ID: 2662300

ATC No.: 4

Priority: High

Team: Cape Romain Contracotrs/Neel-Schaffer

Date: 9/10/24

Operations & Maintenance:

There is no negative impact to long term operations & maintenance anticipated with this ATC. The shorter bridge will slightly reduce operation and maintenance costs over the life of the bridge/roadway.

S-31 (Red Bluff Road) Bridge over Tod Swamp

Bridge Hydraulic Analysis for Alternative Technical Concept (ATC 4)

The analysis presented in this document covers evaluation and comparison of bridge hydraulic performance of the original SCDOT proposed design and the ATC design option under consideration for the Red Bluff Road (S-31) bridge replacement over Tod Swamp. The evaluation was performed using HEC-RAS version 6.4.1 software.

I. INTRODUCTION

Neel-Schaffer (NS) performed a bridge hydraulic analysis for the bridge replacement of the bridge in Horry County along S-31 (Red Bluff Road) over Tod Swamp. A preliminary bridge analysis was completed by HNTB to determine the minimum bridge length provided in the Request for Proposals, the results of which were used to determine the minimum bridge length of 80'. Based on an independent preliminary hydraulic analysis, Neel-Schaffer proposes an Alternative Technical Concept 4, consisting of a 66.5' bridge length. All pertinent data and supporting documentation are provided below.

II. DESIGN CRITERIA

- The minimum low chord elevation shall be the 25-year (4.0% AEP) water surface elevation plus 2-ft of freeboard.
- The 100-year (1% AEP) should not overtop, while maintaining free-surface flow.
- "No Impact" if there is no increase in the 1% AEP flood and floodway profiles and there is no increase in floodway width at published and unpublished cross sections.
- The proposed bridge should not create more backwater than the existing bridge.
- Abutments: Provide a minimum of 10' abutment toe setback from the top of the channel bank.
- Design should not restrict channel from existing condition and bank protection is to be keyed in as to not cause scour. Channel dimensions should remain unimpacted with design since this is a Section 408 USACE project site.



III. MODEL UPDATES

The preliminary model was updated using the guidance of the latest HEC-RAS Hydraulic Reference Manual. Below is a list of updates that were completed by Neel-Schaffer during the preliminary hydraulic design process. All models and subsequent updates were run in HEC-RAS version 6.4.1.

- In the proposed condition models, the low cord elevation of the bridge was set to 22.60 FT (NAVD88), which matches the existing bridge's low chord elevation.
- In the proposed conditions models, a 2:1 sloping abutment was added. The width of the abutment was set to 2 feet.
- In the existing and proposed conditions models, ineffective flow locations and elevations were adjusted to 1:1 and 1.5:1 for contraction and expansion ratios, respectively.
- In the existing and proposed conditions models, the contraction and expansion coefficients were set to 0.3 & 0.5 at river station 9124, 9214 and 9242.

IV. CONCLUSION AND RESULTS

The HEC-RAS analysis showed that the 66.5-ft single span bridge meets the RFP hydraulic requirements. No adverse effects are present at the adjacent, upstream, and downstream properties due to the shortening of the bridge. No residential homes are in the floodplain within the limits of the study. The proposed 66.5-ft bridge design does not reduce channel dimensions or flow area; therefore, the existing Section 408 Permit will not need modification. Table 1 shows a summary of the updated hydraulic results compared to the preliminary RFP results for S-31 bridge.

Table 1: Summary of Results

Criteria	SCDOT RFP Existing Model*	SCDOT RFP Prelim. Proposed Model*	Neel-Schaffer Existing Model	Neel-Schaffer Revised Model
25-Year WSE (ft)	19.48	19.48	19.55	19.53
100-Year WSE (ft)	20.70	20.69	20.78	20.73
100-Year Backwater (ft)	0.25	0.04	0.37	0.15 **
25-Year Freeboard (ft)	3.12	3.49	3.05	3.07
Low Chord Elevation (ft)	22.60	22.97	22.60	22.60
Bridge Length (ft)	44.75	80	44.75	66.5
Span Arrangement	Single span	Single span	Single span	Single span

*All values were pulled from the Preliminary Hydraulic Analysis Report provided with the RFP.

**Backwater value taken from highest result location (XS 9242).

See Appendix B for bridge plan and profile showing that all setback requirements are met.



V. ATTACHMENTS

- Appendix A: Updated HEC-RAS Outputs
- Appendix B: Bridge Plan & Profile
- Appendix C: Roadway Plan & Profile



Appendix A:

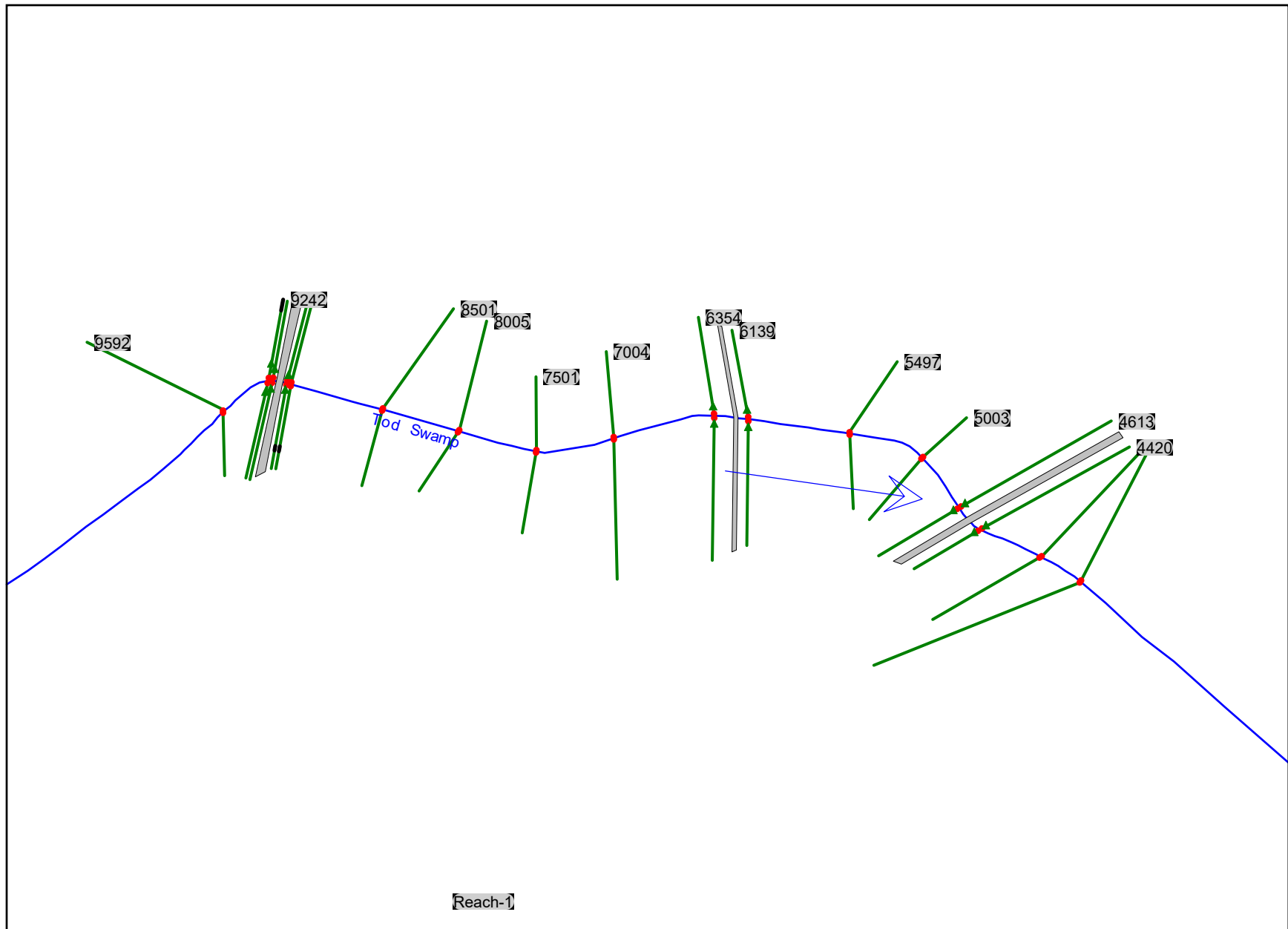
Natural, Existing, and Proposed Model

Updated HEC-RAS Outputs

for 25-year and 100-year Events

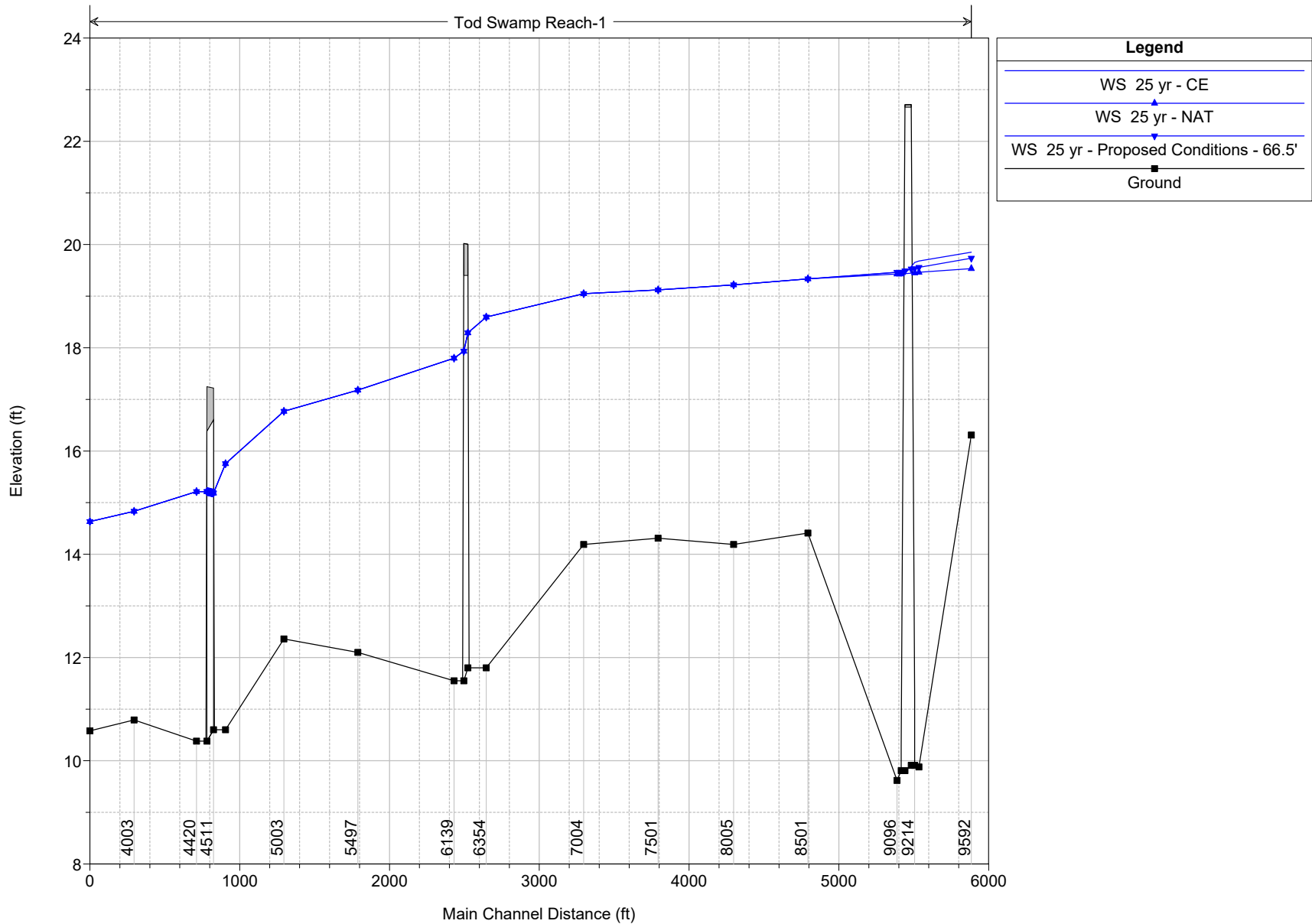
Proposed ATC 4 (66.5' Bridge)

Red Bluff S-31 Over Tod Swamp
HEC-RAS Schematic
Proposed ATC 4 (66.5' Bridge)



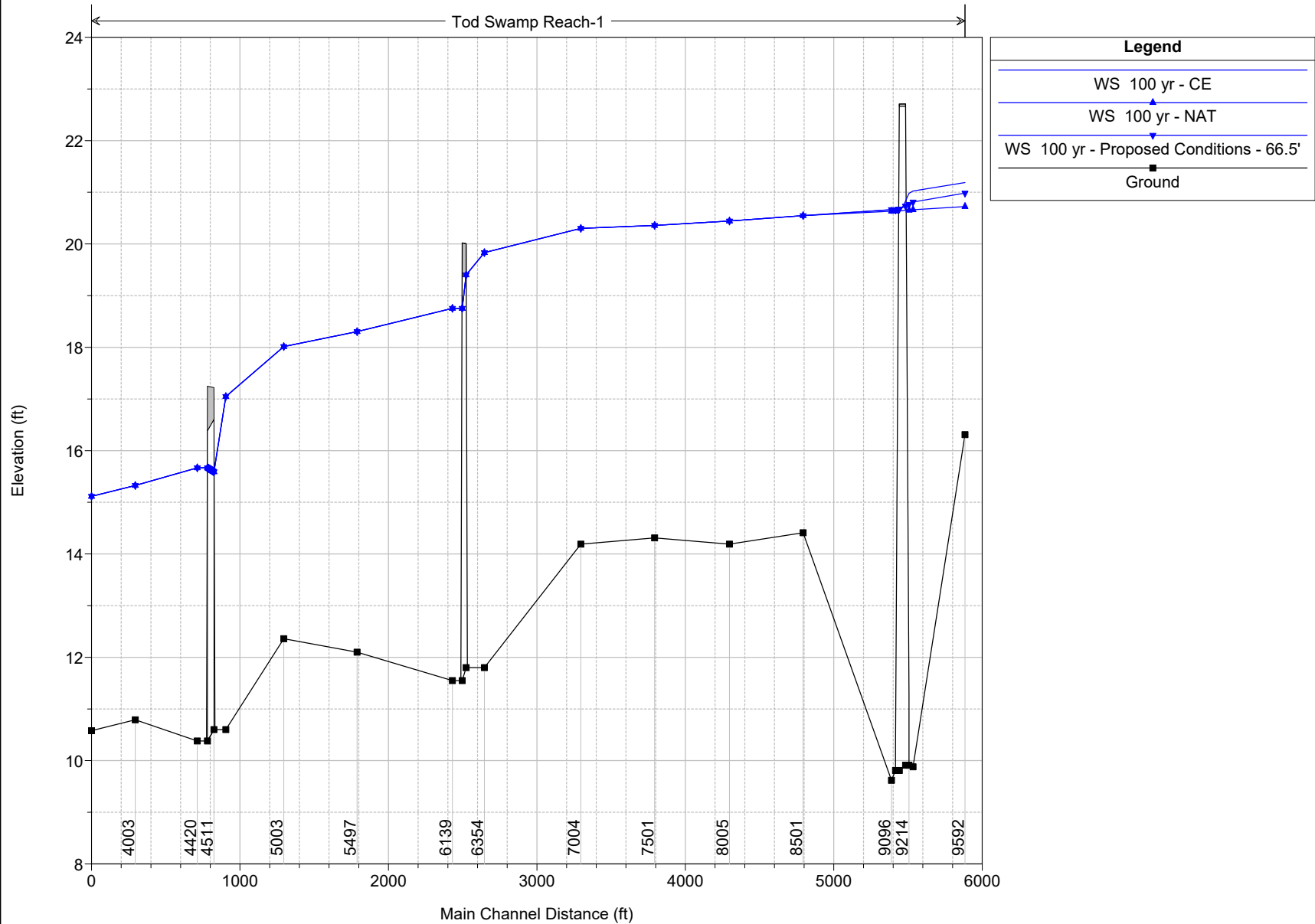
Red Bluff S-31 Over Tod Swamp - 25-Year Water Surface Profile Proposed ATC 4 (66.5' Bridge)

Tod Swamp Limited Detail Study Plan: 1) CE 8/8/2024 2) NAT 8/6/2024 3) Proposed Conditions - 66.5' 8/8/2024



Red Bluff S-31 Over Tod Swamp - 100-Year Water Surface Profile Proposed ATC 4 (66.5' Bridge)

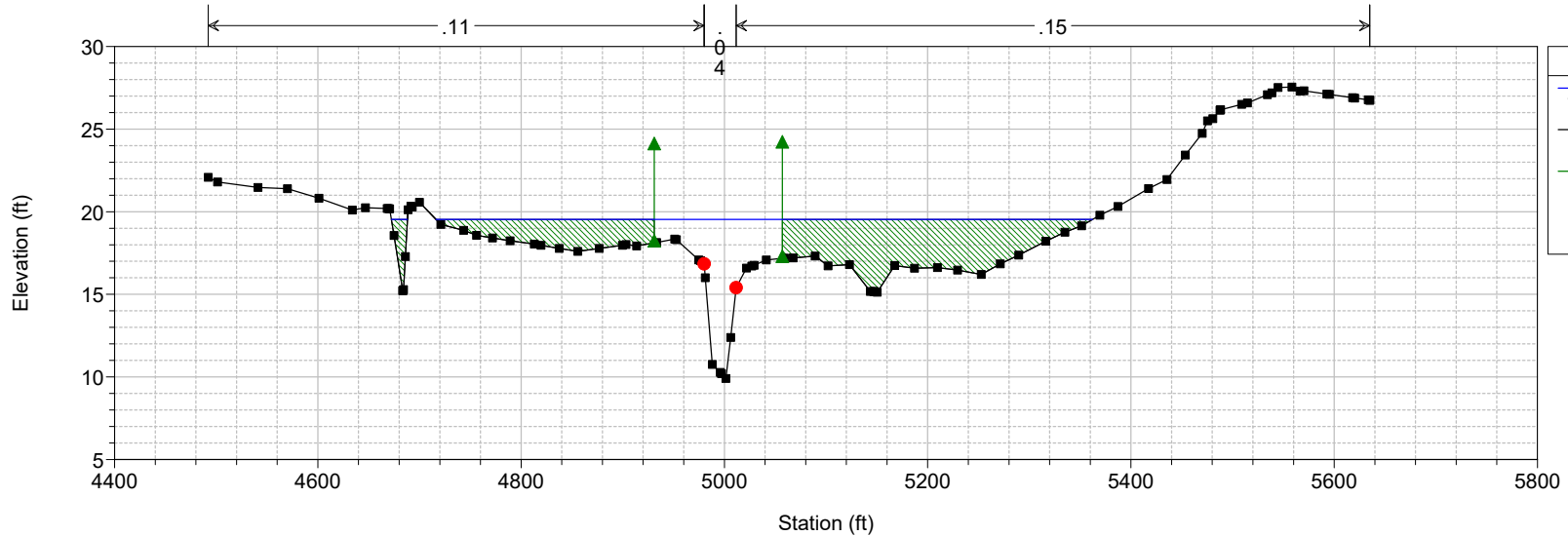
Tod Swamp Limited Detail Study Plan: 1) CE 8/8/2024 2) NAT 8/6/2024 3) Proposed Conditions - 66.5' 8/8/2024



Red Bluff S-31 Over Tod Swamp HEC-RAS 25-Year Upstream Cross Section and Bridge Section Proposed ATC 4 (66.5' Bridge)

Tod Swamp Limited Detail Study Plan: 1) Proposed Conditions - 66.5' 8/8/2024

River = Tod Swamp Reach = Reach-1 RS = 9214

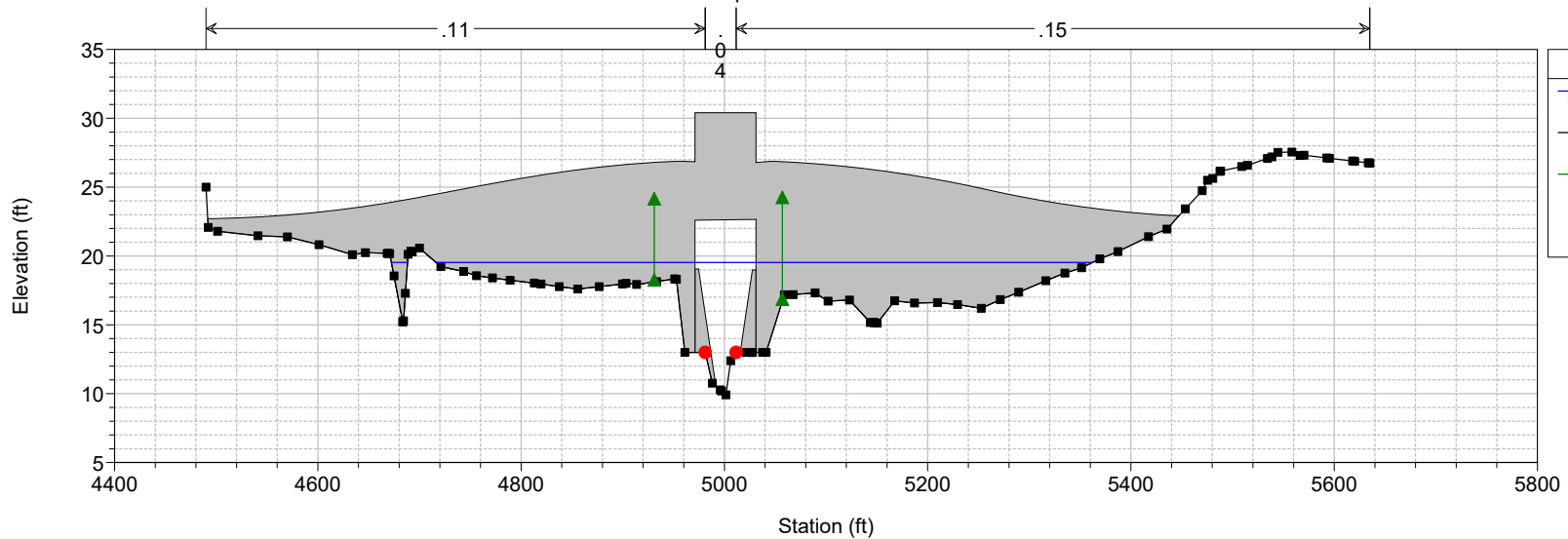


Legend

- WS 25 yr
- Ground
- Ineff
- Bank Sta

Tod Swamp Limited Detail Study Plan: 1) Proposed Conditions - 66.5' 8/8/2024

River = Tod Swamp Reach = Reach-1 RS = 9171 BR



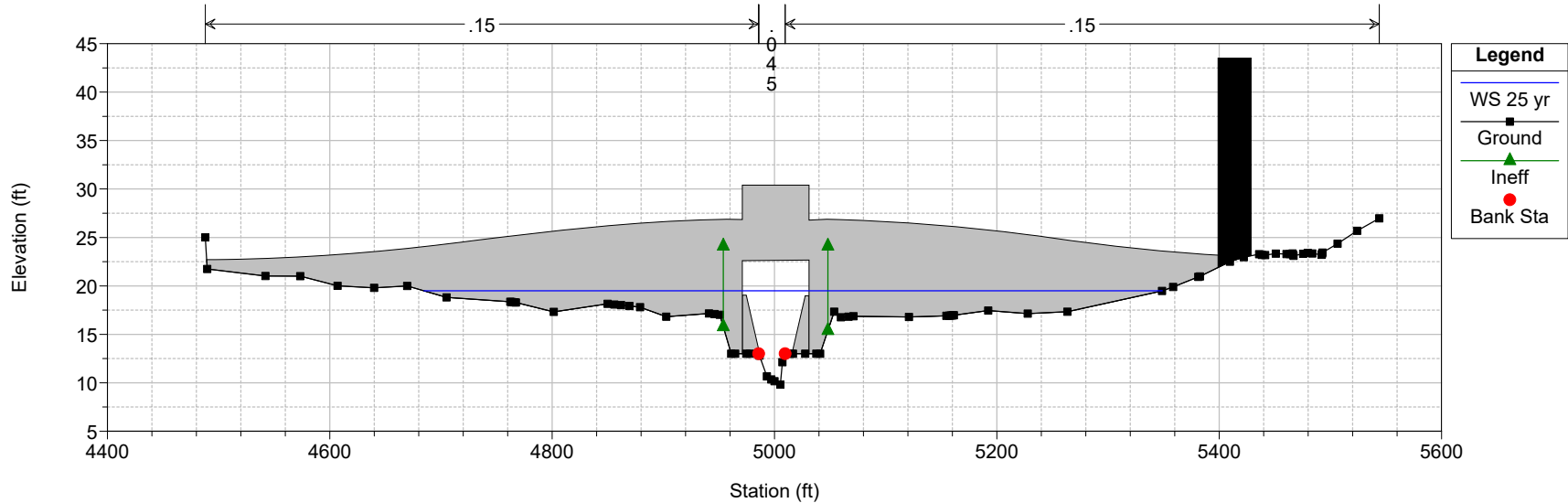
Legend

- WS 25 yr
- Ground
- Ineff
- Bank Sta

Red Bluff S-31 Over Tod Swamp HEC-RAS 25-Year Downstream Cross Section and Bridge Section Proposed ATC 4 (66.5' Bridge)

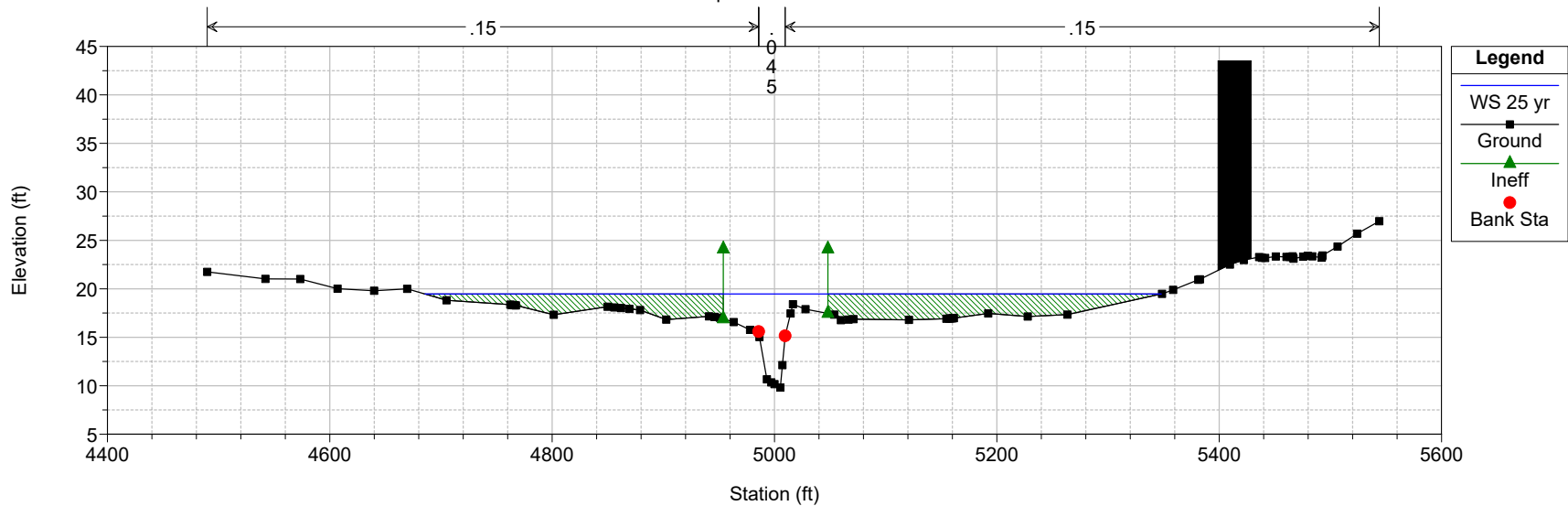
Tod Swamp Limited Detail Study Plan: 1) Proposed Conditions - 66.5' 8/8/2024

River = Tod Swamp Reach = Reach-1 RS = 9171 BR

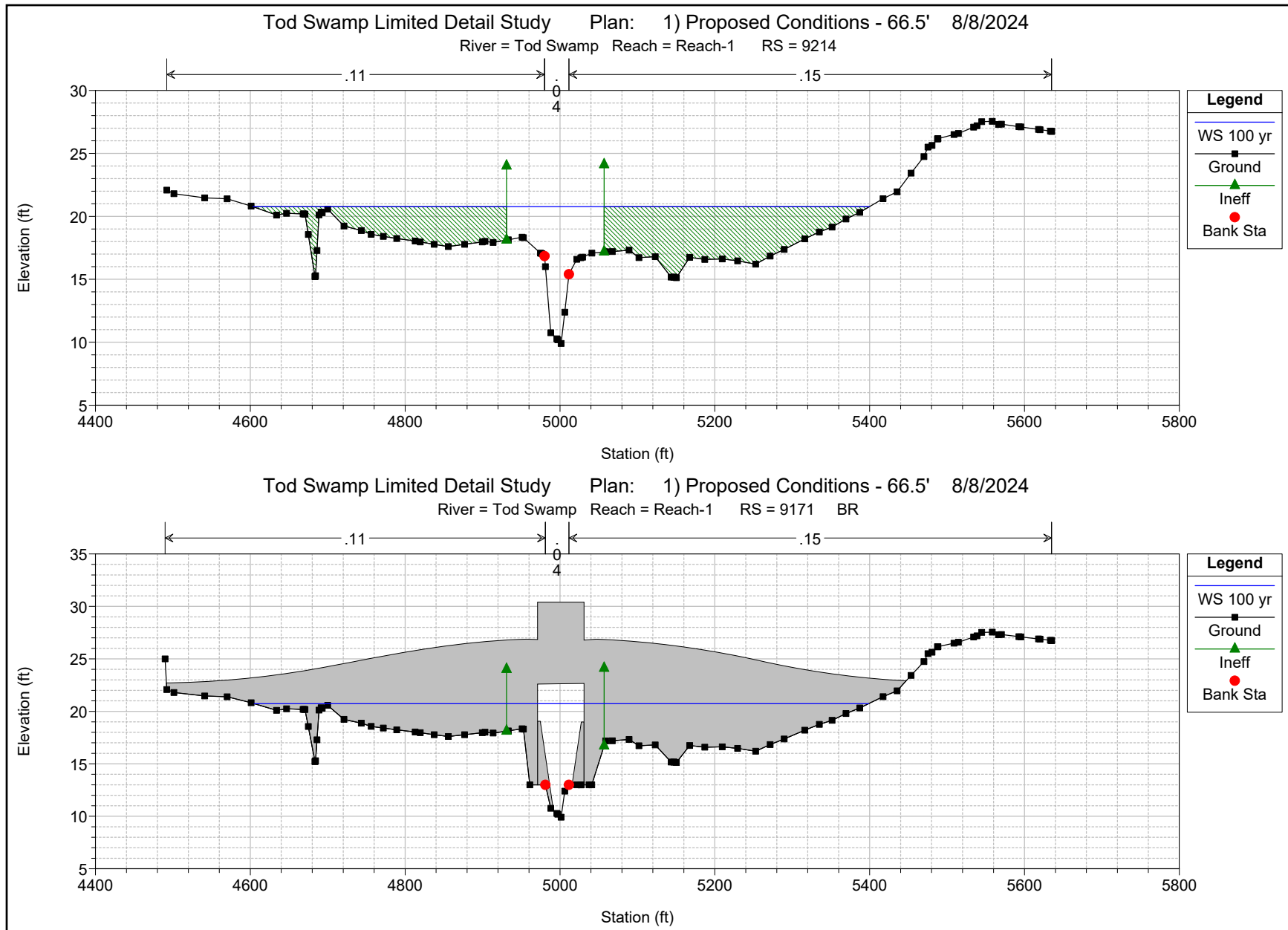


Tod Swamp Limited Detail Study Plan: 1) Proposed Conditions - 66.5' 8/8/2024

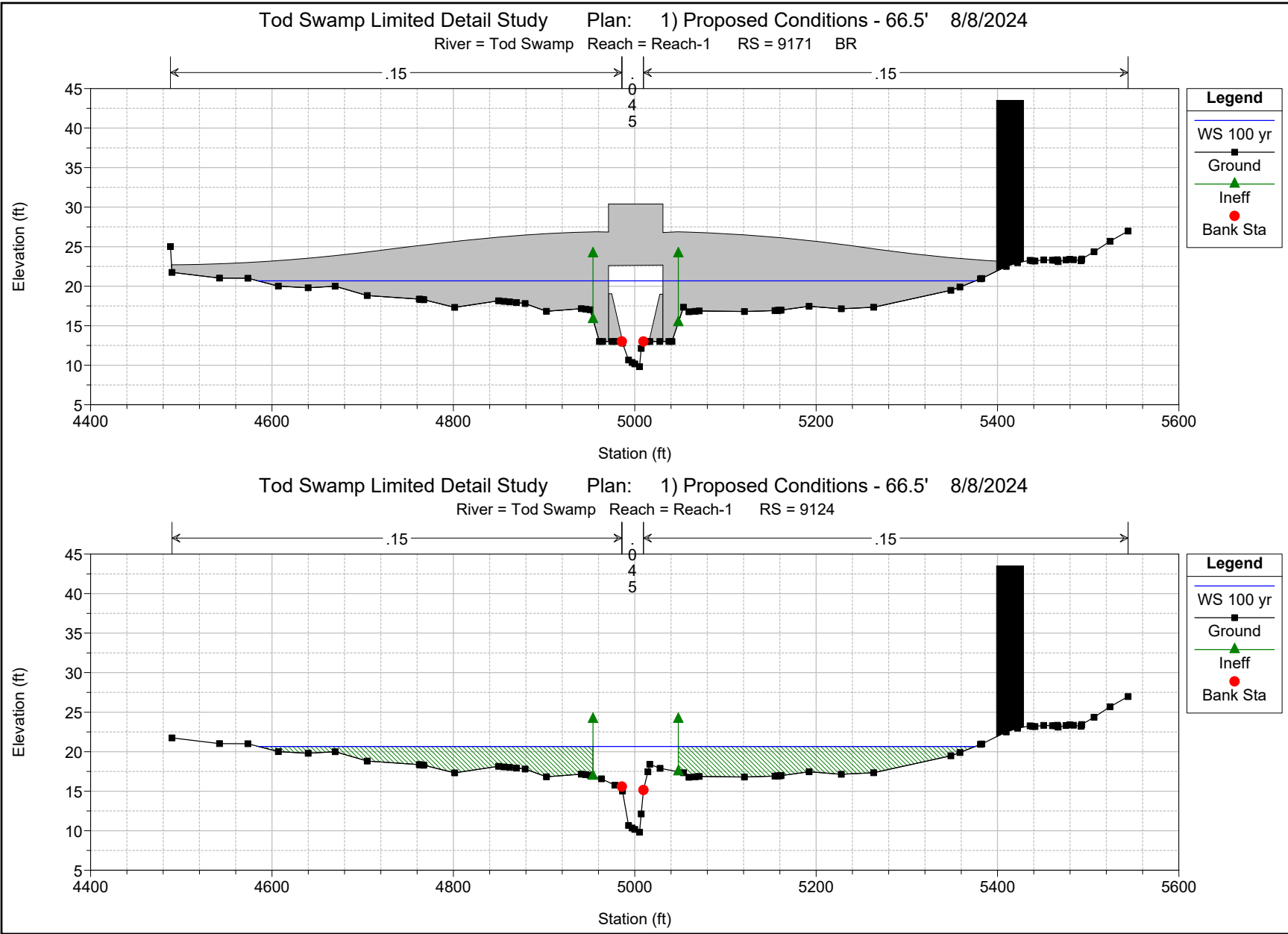
River = Tod Swamp Reach = Reach-1 RS = 9124



Red Bluff S-31 Over Tod Swamp
HEC-RAS 100-Year Upstream Cross Section and Bridge Section
Proposed ATC 4 (66.5' Bridge)



Red Bluff S-31 Over Tod Swamp HEC-RAS 100-Year Downstream Cross Section and Bridge Section Proposed ATC 4 (66.5' Bridge)



Red Bluff S-31 Over Tod Swamp

HEC-RAS 25-Year Output Summary Table

Proposed ATC 4 (66.5' Bridge)

HEC-RAS River: Tod Swamp Reach: Reach-1 Profile: 25 yr

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	3708	25 yr	CE	589.00	10.58	14.63	13.30	14.65	0.000720	1.92	1519.24	1141.73	0.17
Reach-1	3708	25 yr	NAT	589.00	10.58	14.63	13.30	14.65	0.000720	1.92	1519.24	1141.73	0.17
Reach-1	3708	25 yr	Proposed Conditions - 66.5'	589.00	10.58	14.63	13.30	14.65	0.000720	1.92	1519.24	1141.73	0.17
Reach-1	4003	25 yr	CE	589.00	10.79	14.83		14.84	0.000619	1.77	1479.54	899.47	0.16
Reach-1	4003	25 yr	NAT	589.00	10.79	14.83		14.84	0.000619	1.77	1479.54	899.47	0.16
Reach-1	4003	25 yr	Proposed Conditions - 66.5'	589.00	10.79	14.83		14.84	0.000619	1.77	1479.54	899.47	0.16
Reach-1	4420	25 yr	CE	589.00	10.38	15.21	13.24	15.60	0.005162	4.98	118.17	930.97	0.43
Reach-1	4420	25 yr	NAT	589.00	10.38	15.21	13.24	15.60	0.005162	4.98	118.17	930.97	0.43
Reach-1	4420	25 yr	Proposed Conditions - 66.5'	589.00	10.38	15.21	13.24	15.60	0.005162	4.98	118.17	930.97	0.43
Reach-1	4511		Culvert										
Reach-1	4613	25 yr	CE	589.00	10.60	15.75	13.46	16.08	0.003245	4.60	139.13	1089.28	0.39
Reach-1	4613	25 yr	NAT	589.00	10.60	15.75	13.46	16.08	0.003245	4.60	139.13	1089.28	0.39
Reach-1	4613	25 yr	Proposed Conditions - 66.5'	589.00	10.60	15.75	13.46	16.08	0.003245	4.60	139.13	1089.28	0.39
Reach-1	5003	25 yr	CE	589.00	12.36	16.77		16.80	0.000959	2.60	877.36	421.16	0.22
Reach-1	5003	25 yr	NAT	589.00	12.36	16.77		16.80	0.000959	2.60	877.36	421.16	0.22
Reach-1	5003	25 yr	Proposed Conditions - 66.5'	589.00	12.36	16.77		16.80	0.000959	2.60	877.36	421.16	0.22
Reach-1	5497	25 yr	CE	589.00	12.10	17.18		17.21	0.000723	2.48	1086.02	594.82	0.19
Reach-1	5497	25 yr	NAT	589.00	12.10	17.18		17.21	0.000723	2.48	1086.02	594.82	0.19
Reach-1	5497	25 yr	Proposed Conditions - 66.5'	589.00	12.10	17.18		17.21	0.000723	2.48	1086.02	594.82	0.19
Reach-1	6139	25 yr	CE	589.00	11.55	17.80	15.23	18.03	0.001963	4.05	224.01	516.81	0.32
Reach-1	6139	25 yr	NAT	589.00	11.55	17.80	15.23	18.03	0.001963	4.05	224.01	516.81	0.32
Reach-1	6139	25 yr	Proposed Conditions - 66.5'	589.00	11.55	17.80	15.23	18.03	0.001963	4.05	224.01	516.81	0.32
Reach-1	6218 BR D	25 yr	CE	589.00	11.55	17.93	15.27	18.25	0.004142	4.54	137.39	33.78	0.35
Reach-1	6218 BR D	25 yr	NAT	589.00	11.55	17.93	15.27	18.25	0.004142	4.54	137.39	33.78	0.35
Reach-1	6218 BR D	25 yr	Proposed Conditions - 66.5'	589.00	11.55	17.93	15.27	18.25	0.004142	4.54	137.39	33.78	0.35
Reach-1	6218 BR U	25 yr	CE	589.00	11.80	18.29	15.52	18.59	0.003881	4.43	142.76	35.07	0.34
Reach-1	6218 BR U	25 yr	NAT	589.00	11.80	18.29	15.52	18.59	0.003881	4.43	142.76	35.07	0.34
Reach-1	6218 BR U	25 yr	Proposed Conditions - 66.5'	589.00	11.80	18.29	15.52	18.59	0.003881	4.43	142.76	35.07	0.34
Reach-1	6354	25 yr	CE	589.00	11.80	18.60	15.48	18.78	0.001351	3.61	254.77	578.78	0.27
Reach-1	6354	25 yr	NAT	589.00	11.80	18.60	15.48	18.78	0.001351	3.61	254.77	578.78	0.27
Reach-1	6354	25 yr	Proposed Conditions - 66.5'	589.00	11.80	18.60	15.48	18.78	0.001351	3.61	254.77	578.78	0.27
Reach-1	7004	25 yr	CE	589.00	14.19	19.05		19.05	0.000148	1.09	2379.51	1031.01	0.09
Reach-1	7004	25 yr	NAT	589.00	14.19	19.05		19.05	0.000148	1.09	2379.51	1031.01	0.09
Reach-1	7004	25 yr	Proposed Conditions - 66.5'	589.00	14.19	19.05		19.05	0.000148	1.09	2379.51	1031.01	0.09
Reach-1	7501	25 yr	CE	589.00	14.31	19.12		19.13	0.000155	1.11	2065.92	681.30	0.09
Reach-1	7501	25 yr	NAT	589.00	14.31	19.12		19.13	0.000155	1.11	2065.92	681.30	0.09
Reach-1	7501	25 yr	Proposed Conditions - 66.5'	589.00	14.31	19.12		19.13	0.000155	1.11	2065.92	681.30	0.09
Reach-1	8005	25 yr	CE	589.00	14.19	19.22		19.23	0.000262	1.48	1541.77	519.36	0.12
Reach-1	8005	25 yr	NAT	589.00	14.19	19.22		19.23	0.000262	1.48	1541.77	519.36	0.12
Reach-1	8005	25 yr	Proposed Conditions - 66.5'	589.00	14.19	19.22		19.23	0.000262	1.48	1541.77	519.36	0.12
Reach-1	8501	25 yr	CE	589.00	14.41	19.33		19.34	0.000193	1.25	1954.72	721.89	0.10
Reach-1	8501	25 yr	NAT	589.00	14.41	19.33		19.34	0.000193	1.25	1954.72	721.89	0.10
Reach-1	8501	25 yr	Proposed Conditions - 66.5'	589.00	14.41	19.33		19.34	0.000193	1.25	1954.72	721.89	0.10
Reach-1	9096	25 yr	CE	589.00	9.62	19.46	13.78	19.54	0.000429	2.44	463.40	678.64	0.15
Reach-1	9096	25 yr	NAT	589.00	9.62	19.43		19.45	0.000165	1.51	1573.00	676.89	0.09
Reach-1	9096	25 yr	Proposed Conditions - 66.5'	589.00	9.62	19.46	13.78	19.53	0.000415	2.40	489.35	678.62	0.15
Reach-1	9124	25 yr	CE	589.00	9.81	19.46	13.96	19.56	0.000527	2.72	357.46	662.29	0.17
Reach-1	9124	25 yr	NAT	589.00	9.81	19.43		19.46	0.000217	1.74	1370.28	659.95	0.11
Reach-1	9124	25 yr	Proposed Conditions - 66.5'	589.00	9.81	19.46	13.96	19.56	0.000515	2.69	376.99	662.24	0.17
Reach-1	9171 BR D	25 yr	CE	589.00	9.81	19.46	14.15	19.62	0.002223	3.28	201.18	34.23	0.21
Reach-1	9171 BR D	25 yr	Proposed Conditions - 66.5'	589.00	9.81	19.49	13.76	19.57	0.000362	2.49	382.21	66.50	0.15
Reach-1	9171 BR U	25 yr	CE	589.00	9.91	19.55	14.21	19.68	0.001487	2.98	205.76	34.45	0.20
Reach-1	9171 BR U	25 yr	Proposed Conditions - 66.5'	589.00	9.91	19.53	13.54	19.59	0.000208	2.14	390.92	66.50	0.13
Reach-1	9214	25 yr	CE	589.00	9.91	19.65	13.69	19.72	0.000260	2.18	422.71	667.54	0.14
Reach-1	9214	25 yr	NAT	589.00	9.91	19.45		19.47	0.000122	1.46	1482.47	657.97	0.09
Reach-1	9214	25 yr	Proposed Conditions - 66.5'	589.00	9.91	19.53	13.69	19.60	0.000265	2.18	459.86	661.78	0.14
Reach-1	9242	25 yr	CE	589.00	9.88	19.68	13.24	19.73	0.000193	1.89	573.69	714.57	0.12
Reach-1	9242	25 yr	NAT	589.00	9.88	19.46		19.47	0.000082	1.21	1809.42	704.96	0.08
Reach-1	9242	25 yr	Proposed Conditions - 66.5'	589.00	9.88	19.56	13.24	19.60	0.000198	1.90	602.42	710.81	0.12
Reach-1	9592	25 yr	CE	589.00	16.31	19.85		19.86	0.000811	1.85	1471.27	1044.43	0.17
Reach-1	9592	25 yr	NAT	589.00	16.31	19.53		19.55	0.001647	2.47	1146.09	1008.87	0.24
Reach-1	9592	25 yr	Proposed Conditions - 66.5'	589.00	16.31	19.74		19.75	0.001016	2.02	1351.96	1019.40	0.19

Red Bluff S-31 Over Tod Swamp HEC-RAS

100-Year Output Summary Table

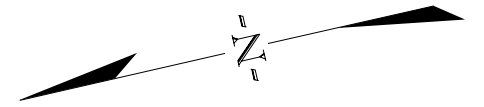
Proposed ATC 4 (66.5' Bridge)

HEC-RAS River: Tod Swamp Reach: Reach-1 Profile: 100 yr

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	3708	100 yr	CE	922.00	10.58	15.12	13.57	15.13	0.000720	2.07	2080.04	1182.50	0.17
Reach-1	3708	100 yr	NAT	922.00	10.58	15.12	13.57	15.13	0.000720	2.07	2080.04	1182.50	0.17
Reach-1	3708	100 yr	Proposed Conditions - 66.5'	922.00	10.58	15.12	13.57	15.13	0.000720	2.07	2080.04	1182.50	0.17
Reach-1	4003	100 yr	CE	922.00	10.79	15.33		15.34	0.000702	2.04	1935.58	951.81	0.17
Reach-1	4003	100 yr	NAT	922.00	10.79	15.33		15.34	0.000702	2.04	1935.58	951.81	0.17
Reach-1	4003	100 yr	Proposed Conditions - 66.5'	922.00	10.79	15.33		15.34	0.000702	2.04	1935.58	951.81	0.17
Reach-1	4420	100 yr	CE	922.00	10.38	15.67	14.18	16.42	0.008878	6.99	141.44	1003.08	0.58
Reach-1	4420	100 yr	NAT	922.00	10.38	15.67	14.18	16.42	0.008878	6.99	141.44	1003.08	0.58
Reach-1	4420	100 yr	Proposed Conditions - 66.5'	922.00	10.38	15.67	14.18	16.42	0.008878	6.99	141.44	1003.08	0.58
Reach-1	4511			Culvert									
Reach-1	4613	100 yr	CE	922.00	10.60	17.05	14.40	17.45	0.002987	5.24	247.03	1258.22	0.39
Reach-1	4613	100 yr	NAT	922.00	10.60	17.05	14.40	17.45	0.002987	5.24	247.03	1258.22	0.39
Reach-1	4613	100 yr	Proposed Conditions - 66.5'	922.00	10.60	17.05	14.40	17.45	0.002987	5.24	247.03	1258.22	0.39
Reach-1	5003	100 yr	CE	922.00	12.36	18.01		18.04	0.000669	2.56	1473.50	534.81	0.19
Reach-1	5003	100 yr	NAT	922.00	12.36	18.01		18.04	0.000669	2.56	1473.50	534.81	0.19
Reach-1	5003	100 yr	Proposed Conditions - 66.5'	922.00	12.36	18.01		18.04	0.000669	2.56	1473.50	534.81	0.19
Reach-1	5497	100 yr	CE	922.00	12.10	18.30		18.33	0.000502	2.36	1894.74	829.35	0.17
Reach-1	5497	100 yr	NAT	922.00	12.10	18.30		18.33	0.000502	2.36	1894.74	829.35	0.17
Reach-1	5497	100 yr	Proposed Conditions - 66.5'	922.00	12.10	18.30		18.33	0.000502	2.36	1894.74	829.35	0.17
Reach-1	6139	100 yr	CE	922.00	11.55	18.75	16.24	19.07	0.002252	4.89	328.56	893.96	0.35
Reach-1	6139	100 yr	NAT	922.00	11.55	18.75	16.24	19.07	0.002252	4.89	328.56	893.96	0.35
Reach-1	6139	100 yr	Proposed Conditions - 66.5'	922.00	11.55	18.75	16.24	19.07	0.002252	4.89	328.56	893.96	0.35
Reach-1	6218 BR D	100 yr	CE	922.00	11.55	18.75	16.29	19.07	0.006717	6.07	166.51	37.26	0.44
Reach-1	6218 BR D	100 yr	NAT	922.00	11.55	18.75	16.29	19.07	0.006717	6.07	166.51	37.26	0.44
Reach-1	6218 BR D	100 yr	Proposed Conditions - 66.5'	922.00	11.55	18.75	16.29	19.07	0.006717	6.07	166.51	37.26	0.44
Reach-1	6218 BR U	100 yr	CE	922.00	11.80	19.40	16.54	20.07	0.005574	5.64	184.44	40.00	0.39
Reach-1	6218 BR U	100 yr	NAT	922.00	11.80	19.40	16.54	20.07	0.005574	5.64	184.44	40.00	0.39
Reach-1	6218 BR U	100 yr	Proposed Conditions - 66.5'	922.00	11.80	19.40	16.54	20.07	0.005574	5.64	184.44	40.00	0.39
Reach-1	6354	100 yr	CE	922.00	11.80	19.83	16.49	20.07	0.001425	4.24	390.32	1096.34	0.29
Reach-1	6354	100 yr	NAT	922.00	11.80	19.83	16.49	20.07	0.001425	4.24	390.32	1096.34	0.29
Reach-1	6354	100 yr	Proposed Conditions - 66.5'	922.00	11.80	19.83	16.49	20.07	0.001425	4.24	390.32	1096.34	0.29
Reach-1	7004	100 yr	CE	922.00	14.19	20.30		20.30	0.000103	1.06	3796.67	1181.80	0.08
Reach-1	7004	100 yr	NAT	922.00	14.19	20.30		20.30	0.000103	1.06	3796.67	1181.80	0.08
Reach-1	7004	100 yr	Proposed Conditions - 66.5'	922.00	14.19	20.30		20.30	0.000103	1.06	3796.67	1181.80	0.08
Reach-1	7501	100 yr	CE	922.00	14.31	20.36		20.36	0.000134	1.20	2938.65	735.96	0.09
Reach-1	7501	100 yr	NAT	922.00	14.31	20.36		20.36	0.000134	1.20	2938.65	735.96	0.09
Reach-1	7501	100 yr	Proposed Conditions - 66.5'	922.00	14.31	20.36		20.36	0.000134	1.20	2938.65	735.96	0.09
Reach-1	8005	100 yr	CE	922.00	14.19	20.44		20.45	0.000240	1.64	2219.40	599.26	0.12
Reach-1	8005	100 yr	NAT	922.00	14.19	20.44		20.45	0.000240	1.64	2219.40	599.26	0.12
Reach-1	8005	100 yr	Proposed Conditions - 66.5'	922.00	14.19	20.44		20.45	0.000240	1.64	2219.40	599.26	0.12
Reach-1	8501	100 yr	CE	922.00	14.41	20.55		20.55	0.000171	1.36	2917.67	915.15	0.10
Reach-1	8501	100 yr	NAT	922.00	14.41	20.55		20.55	0.000171	1.36	2917.67	915.15	0.10
Reach-1	8501	100 yr	Proposed Conditions - 66.5'	922.00	14.41	20.55		20.55	0.000171	1.36	2917.67	915.15	0.10
Reach-1	9096	100 yr	CE	922.00	9.62	20.66	14.89	20.77	0.000565	3.07	606.61	838.65	0.18
Reach-1	9096	100 yr	NAT	922.00	9.62	20.63		20.65	0.000151	1.58	2499.46	836.13	0.09
Reach-1	9096	100 yr	Proposed Conditions - 66.5'	922.00	9.62	20.66	14.89	20.77	0.000539	3.00	644.97	838.73	0.17
Reach-1	9124	100 yr	CE	922.00	9.81	20.66	15.07	20.82	0.000721	3.49	466.55	790.06	0.20
Reach-1	9124	100 yr	NAT	922.00	9.81	20.64		20.66	0.000188	1.78	2252.44	788.84	0.10
Reach-1	9124	100 yr	Proposed Conditions - 66.5'	922.00	9.81	20.66	15.07	20.81	0.000693	3.42	497.24	790.11	0.20
Reach-1	9171 BR D	100 yr	CE	922.00	9.81	20.64	15.33	20.92	0.003684	4.39	243.25	37.38	0.26
Reach-1	9171 BR D	100 yr	Proposed Conditions - 66.5'	922.00	9.81	20.68	14.61	20.82	0.000545	3.34	461.08	66.50	0.19
Reach-1	9171 BR U	100 yr	CE	922.00	9.91	20.78	15.36	21.02	0.002262	3.91	250.48	37.78	0.24
Reach-1	9171 BR U	100 yr	Proposed Conditions - 66.5'	922.00	9.91	20.73	14.31	20.85	0.000312	2.87	471.28	66.50	0.16
Reach-1	9214	100 yr	CE	922.00	9.91	20.98	14.68	21.08	0.000333	2.74	564.70	813.13	0.16
Reach-1	9214	100 yr	NAT	922.00	9.91	20.65		20.67	0.000116	1.58	2334.66	787.62	0.09
Reach-1	9214	100 yr	Proposed Conditions - 66.5'	922.00	9.91	20.77	14.68	20.86	0.000339	2.72	623.65	796.12	0.16
Reach-1	9242	100 yr	CE	922.00	9.88	21.03	14.21	21.09	0.000234	2.31	793.01	833.65	0.13
Reach-1	9242	100 yr	NAT	922.00	9.88	20.66		20.67	0.000082	1.33	2714.10	806.90	0.08
Reach-1	9242	100 yr	Proposed Conditions - 66.5'	922.00	9.88	20.81	14.21	20.87	0.000242	2.31	837.33	817.83	0.14
Reach-1	9592	100 yr	CE	922.00	16.31	21.19		21.19	0.000245	1.26	2902.46	1092.97	0.10
Reach-1	9592	100 yr	NAT	922.00	16.31	20.72		20.73	0.000444	1.58	2398.25	1076.38	0.13
Reach-1	9592	100 yr	Proposed Conditions - 66.5'	922.00	16.31	20.98		20.99	0.000315	1.39	2678.12	1085.50	0.11

Appendix B:

Bridge Plan & Profile
Proposed ATC 4 (66.5' Bridge)



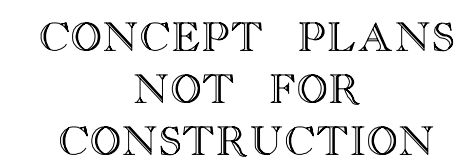
- (A) PROPOSED PROFILE SET SO THAT THE LOW CHORD SATISFIES THE HYDRAULIC REQUIREMENTS, SET FORTH BY THE RFP.
- (B) INCLUDES 1'-0" MASH BARRIER PARAPET AND 1½" SLAB EXTENSION.
- (C) REMOVE AND DISPOSE OF EXISTING 28'-0" x 45'-0" 3-SPAN SIMPLE CONCRETE SLAB BRIDGE AND APPURTENANCES IN ACCORDANCE WITH SECTION 202.4.2 OF THE STANDARD SPECIFICATIONS.

 = EXCAVATE HATCHED AREA

CP 2
ELEVATION = 23.150'
N 763746.91 E 2655814.51
#5 REBAR

Diagram illustrating the location of the survey line relative to the centerline of the road. The survey line is labeled "SURVEY S-26-31 (RED BLUFF RD)". The distance from the centerline to the survey line is indicated as 0.020 FT./FT. on both sides.

SUPERELEVATION SKETCH



REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
	BY	CHK.	DATE



NEEL-SCHAFFER
Solutions you can build upon

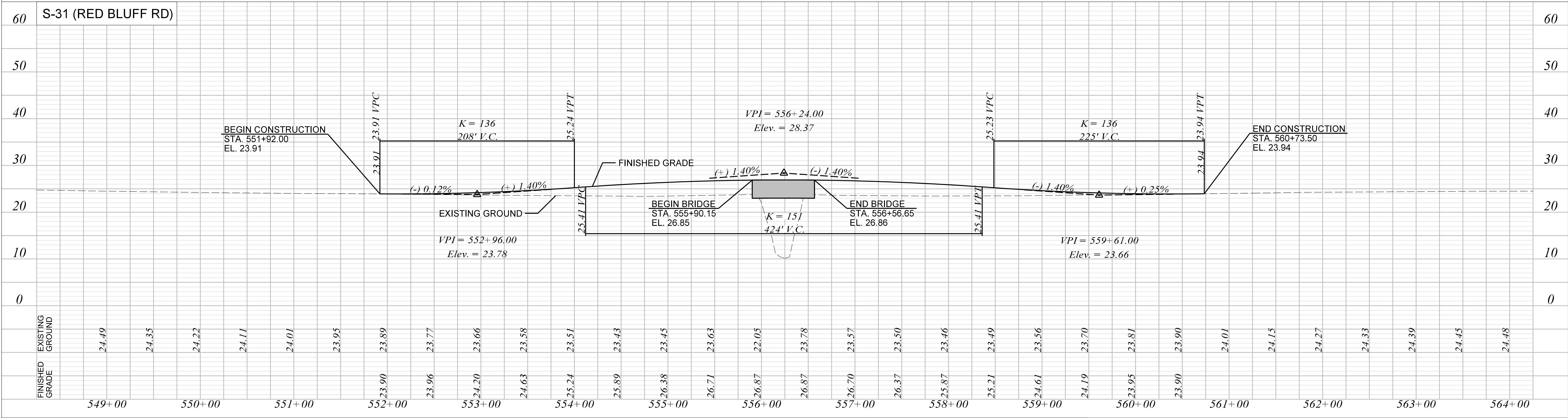
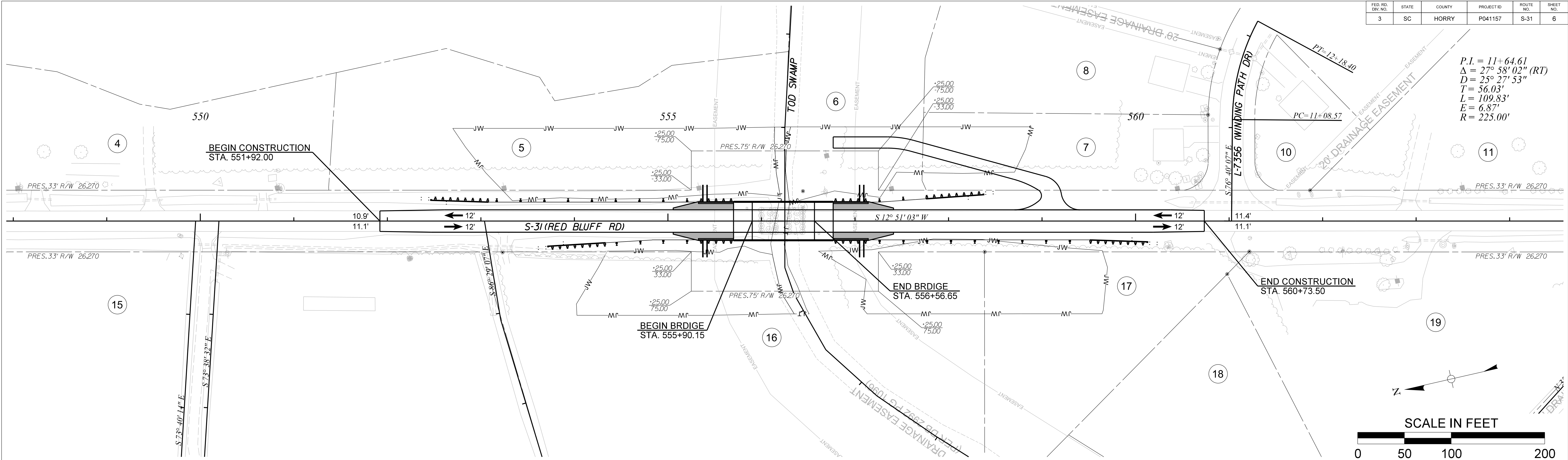
BRIDGE PLAN & PROFILE S-26-31 BRIDGE OVER TOD SWAMP 66'-6" SPAN

ROUTE S-26-31

Appendix C:

Roadway Plan & Profile
Proposed ATC 4 (66.5' Bridge)

William axson
\\Marketing\Proposals\2024\East\SCDOT DB Bridge Package 18_Cape Romain Contractors\Design Data\Roadway\SS1_Todd_Swamp\Drawn\Plan Sheets\006_P041157_Plan_66.dgn
8/19/2024



CONCEPTUAL PLANS
NOT FOR CONSTRUCTION

5				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION COLUMBIA, SC
4				
3				
2				S-31 BRIDGE REPLACEMENT OVER TOD SWAMP
1				
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	SCALE: 1" = 50'H, 10'V
				SHEET NO. 6