



South Carolina Department of Transportation

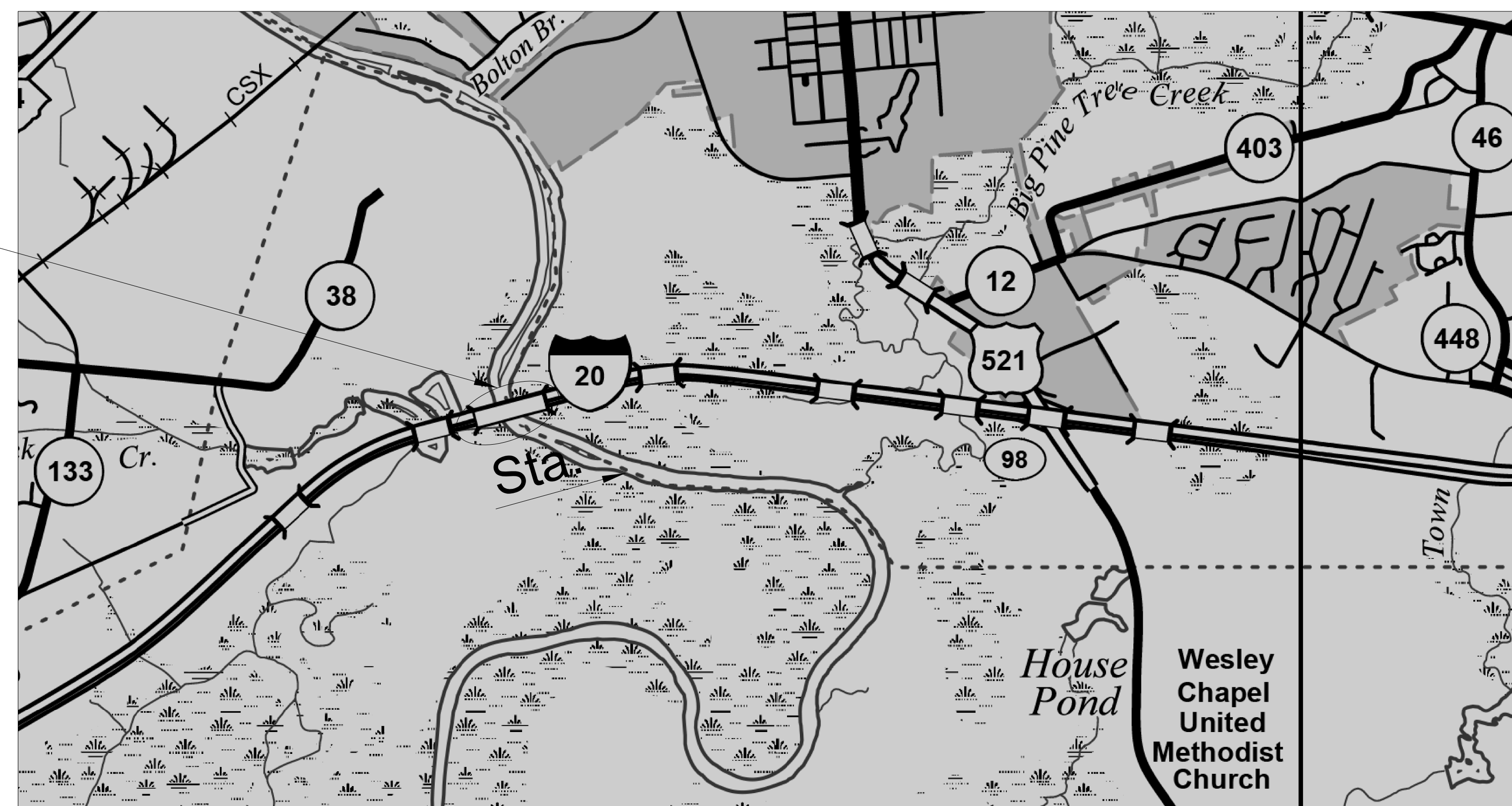


# PROPOSED PLANS FOR KERSHAW COUNTY CONTRACT ID 2847360 I-20 OVER WATEREE RIVER TWIN BRIDGES REPLACEMENT

## INDEX OF SHEETS

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SITE LOCATION



Approximate Location of Bridge is

Latitude 34° 13' 03" N  
Longitude 80° 37' 48" W

LAYOUT

### TRAFFIC DATA

2025	ADT	42,754	V.P.D.
2045	ADT	57,583	V.P.D.
	TRUCKS	21	%

NET LENGTH OF ROADWAY	-	-	0.290	MILES
NET LENGTH OF BRIDGES	-	-	0.287	MILES
NET LENGTH OF PROJECT	-	-	0.577	MILES
LENGTH OF EXCEPTIONS	-	-	-	MILES
GROSS LENGTH OF PROJECT	-	-	0.577	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 FINAL LETTING.

PLANS PREPARED BY:



ENGINEER OF RECORD

## CONCEPTUAL PLANS

FOR CONSTRUCTION : \_\_\_\_\_ DATE \_\_\_\_\_

**MATERIAL & WORKMANSHIP**

Provide all material and workmanship in accordance with the South Carolina Department of Transportation 2007 Standard Specifications for Highway Construction, unless otherwise specified on the Plans or in the Special Provisions.

**COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS**

Generally, in case of discrepancy, this General Notes sheet governs over the Standard Specifications but the remainder of the plans govern over notes on this sheet and Special Provisions govern over all. See Subsection 105.4 of the Standard Specifications.

**WATER ELEVATIONS**

The water elevations shown in the plans are for information only and the actual water elevation during construction may vary depending on weather conditions and seasonal fluctuations.

**COMPLETION DATES**

On inside face of right side barrier parapet/railing at beginning of bridge and on left side barrier parapet/railing at end of bridge, place year of completion adjacent to guardrail attachment. Place this completion date so that it will not be covered by the guardrail connector when it is installed. Recess numbers in the concrete using numbers fabricated from reusable/durable material that is approved by the RCE. Provide numbers in accordance with SCDOT Standard Drawing No. 702-305-00.

**REINFORCING STEEL**

Fabricate reinforcing bars in accordance with the current C.R.S.I. Manual of Standard Practice except for ties, stirrups, and welded hoops.

Provide all ties and stirrups with 135° hooks that have extensions no less than the larger of ten bar diameters or six inches. This 135° hook requirement does not apply to stirrups extending from prestressed concrete beams.

The fabrication tolerance for out-to-out dimension of welded hoop diameter is ± 1/2 inch.

Do not use lap splices in column and shaft reinforcing steel.

Reinforcing steel in bridge deck shall be galvanized in accordance with the RFP specifications.

**PRESTRESSED CONCRETE BEAMS**

Beam lengths given are based on horizontal span only. Increase lengths to correct for concrete shrinkage, concrete shortening when the strands are cut, and for beams being on a grade.

All overhang brackets in the top flange of exterior beams shall be galvanized in accordance with AASHTO M 111, AASHTO M 232, or ASTM F 2329 as appropriate and shall be detailed accordingly in the shop plans.

**CONCRETE**

Provide the class of concrete as noted in the contract documents. For cast-in-place structural elements, use Class 4000 concrete where the class of concrete is not specified in the contract documents.

When holes are cast in beams to accommodate falsework, fill the holes with a non-shrink structural grout suitable for overhead repairs after falsework is removed.

After erection of the beams and prior to the erection of the deck slab falsework, measure beam cambers. Compare the measured beam cambers to the values shown on the Plans to aid in determining if field adjustments are needed. Submit beam camber measurements and any proposed field adjustments to the RCE for approval. All cost of performing this work is considered incidental to the Contract and no additional compensation is allowed for the performance of this work.

Payment for concrete in slab is based on theoretical plan quantity. No adjustment is made for variation in camber.

Chamfer all exposed edges 3/4" unless otherwise noted.

The minimum acceptable concrete cover for reinforcing steel is 1/2" less than the plan dimensions when required by reinforcing bar fabrication tolerances.

Cast build-ups and shear keys on bent caps monolithic with the cap unless indicated otherwise in these plans. Construct the top of each build-up level.

**GRINDING & TEXTURING CONCRETE DECKS**

For bridge stage construction projects, grind and texture the bridge decks as necessary near the stage longitudinal construction joints in order to meet the longitudinal and transverse rideability and rolling straightedge requirements of the Contract.

Prior to casting any closure pour, grinding, or texturing, make profile line surveys (2 to 6 as determined by the RCE) of each stage of the bridge decks. Make one of these profile line surveys for each stage along the edge of the deck adjacent to the closure pour. Compare the surveys within each stage and compare the surveys of each stage to surveys of the adjacent stage to aid in determining the amount of grinding and texturing needed to meet the rideability and rolling straightedge requirements. Submit all grinding and texturing procedures, plotted survey profiles, and proposed grinding depths to the RCE for approval. Maintain a final cover of 2" minimum over the bridge deck reinforcing steel.

Follow the above procedures for all stages of the work. For all surveys performed on the same bridge, use identical stations for survey shots in order to facilitate survey comparisons. All costs for performing, evaluating, and submitting the surveys are considered incidental to the Contract and no additional compensation is allowed for the performance of this work.

Payment for grinding and texturing concrete bridge decks at the junction of new and existing bridge deck slabs is determined in accordance with Subsection 702.6 of the Standard Specifications. No payment is made for grinding and texturing of new bridge decks to correct irregularities and excessive deviations.

**ALLOWANCE FOR DEAD LOAD DEFLECTION & SETTLEMENT**

In setting forms for structural steel or prestressed concrete beam spans, apply an allowance to the design finished grade to compensate for computed dead load deflections.

Prior to making deck pours on any stage construction work, and bridge widening projects, consider and make adjustments as necessary for partially loaded beams adjacent to closure pour areas. Verify that any proposed adjustment on partially loaded beams does not create a change in the deck thickness or a reduction in the concrete cover over the reinforcing steel. Welded studs on steel beams and reinforcing steel extending up out of prestressed beams shall meet the requirements for a composite section (extend up into the deck past the bottom mat of reinforcing steel) regardless of any adjustments.

In setting falsework for reinforced concrete spans, make an allowance for the deflection of the falsework, for any settlement of the falsework, for the instantaneous dead load deflection of the span, and for the long-time dead load deflection of the span such that on removal of the falsework the top of the structure shall conform to theoretical finished grade plus the allowance for long-time deflection.

For instantaneous and long-time dead load deflection, use a camber of 1/8" for concrete flat slab spans 22 feet in length, 3/16" for concrete flat slab spans 30 feet in length, and 3/8" for concrete flat slab spans 40 feet in length, unless otherwise directed by the RCE. Adjust these cambers as necessary to allow for falsework deflection, falsework settlement, and vertical curve ordinates.

**PERMANENT STEEL BRIDGE DECK FORMS**

Permanent stay-in-place steel bridge deck forms for concrete deck slabs may be used at the Contractor's option.

Notify the Department and the Fabricator of the beams if using this option so that shop plans can be properly detailed.

**DRIVEN PILE FOUNDATIONS**

Where piles occur in fill, place fill before driving piles.

Where prestressed concrete piles are to be driven through fill, install piles in pre-bored holes extending to the original ground. For square prestressed concrete piles, bore holes having a minimum diameter of 1.25 times the nominal pile size. Include all cost of pre-boring fills for pile installation in the unit price bid for the piles.

**EXCAVATION FOR END BENTS**

Include all cost of excavation necessary to construct end bents and to remove material under superstructure to an elevation twelve inches below tops of end bent caps, in the unit price bid for class of concrete specified in the Plans.

If a concrete footing is used for the end bent, the excavation below that included for the cap and berm in the above paragraph is paid for at the unit price bid for excavation. Include excavation above this in the unit price bid for class of concrete specified in the Plans.

**STRUCTURAL STEEL**

Layout dimensions and standard lengths of beams shown are horizontal dimensions which must be increased when bridge is on a grade.

When holes are placed in webs to accommodate falsework, install high strength bolts in the holes after falsework is removed.

Notify the Department of the name and address of the Fabricator of the structural steel as soon as the Fabricator has been given the contract to fabricate so that the inspection procedure can be set up.

Do not field or shop weld erection hardware to the structural steel members.

Make all bolted connections with 7/8" dia. ASTM F3125, Grade A325 bolts unless otherwise indicated.

Generally, holes for 7/8" dia. bolts shall be 15/16" dia. However, for straight girder spans, oversized holes, 3/16" larger than bolt dia. may be used in diaphragms and/or crossframes and their connection plates provided hardened washers are installed over oversize holes in the outer ply of the material gripped. Hardened washers are required under DTIs on oversized holes. In every case install a hardened washer under the element turned for each bolt of a bolted connection. Indicate on the Shop Plans which holes are to be oversize and where hardened washers are required. No additional payment is made for the costs associated with the use of oversize holes and furnishing additional hardened washers as necessary.

**PAINT FOR STRUCTURAL STEEL**

Paint structural steel in accordance with Section 710 of the Standard Specifications.

**BEARING ASSEMBLIES**

If bearing assemblies support weathering steel beams or girders, fabricate bearing assembly components from weathering steel and paint them using the NS2 Paint System. Galvanize all other bearing assemblies in accordance with AASHTO M 111, AASHTO M 232, or ASTM F 2329 as applicable.

After the required field welding of painted bearing assemblies, field repair the weld areas and/or any damaged areas to the paint in accordance with Subsection 710.4.2 of the Standard Specifications. After the required field welding of galvanized bearing assemblies, field repair the weld areas and/or damaged areas of the galvanized coating in accordance with ASTM A 780.

Include all cost of furnishing and installing steel bearing assembly components in the lump sum price bid for structural steel if a bid item for structural steel is included in the project. Otherwise, include the cost in the unit price bid for prestressed beams.

**ANCHOR BOLTS**

Galvanize all components of anchor bolt assemblies in accordance with AASHTO M 232 or ASTM F 2329 as applicable. The weight of anchor bolt assemblies is included in the bent quantities for reinforcing steel. Include all costs of furnishing and installing anchor bolt assemblies in the unit price bid for reinforcing steel.

**ORIENTATION IN RELATION TO STATIONING**

Left and right sides, where referred to in these plans, are in relation to direction of stationing.

**FINAL FINISH OF EXPOSED CONCRETE SURFACES**

Apply the final surface finish on the bridge(s) only to the following checked and designated bridge areas:

- A) Entire surface of all barrier rails, parapet walls, approach slab curbs, concrete utility supports, and wing walls; outside vertical edge of bridge deck slabs and sidewalks.
- B) Outside face of exterior prestressed girders.
- C) Entire surface of designated substructure units, except top of bent caps and piers.
- All Units
- Designated Units:
- D) No final surface finish required.

**SPECIFICATIONS**

AASHTO 2017 LRFD Bridge Design Specifications, 8th Edition.

ANSI/AASHTO/AWS D1.5 Bridge Welding Code (Latest Edition) with additions and revisions as stated in the Standard Specifications.

**DESIGN DATA**

Load and Resistance Factor Design (LRFD) Method

Live Load: AASHTO HL-93 Loading

The top 1/4" of all concrete slabs is considered as a wearing surface and is not included in the slab depth used for the calculation of section properties.

All bolted connections, except for steel diaphragm members used with prestressed concrete beams, are designed as slip-critical connections having Class "B" contact surfaces.

An extra dead load of 0.016 KSF is incorporated into the design of this structure to accommodate the use of steel stay-in-place forms.

An extra dead load of 0.015 KSF is incorporated into the design of this structure as an allowance for a future wearing surface.

Seismic Design is in accordance with the 2008 SCDOT "Seismic Design Specifications for Highway Bridges", Version 2.0, with the following parameters:

- Seismic Design Category: C
- Analysis Method: Multimode Spectral
- Operational Classification: I

PGA (FEE):	0.20 g
S <sub>05</sub> (FEE):	0.35 g
S <sub>01</sub> (FEE):	0.12 g
PGA (SEE):	0.46 g
S <sub>05</sub> (SEE):	0.78 g
S <sub>01</sub> (SEE):	0.35 g

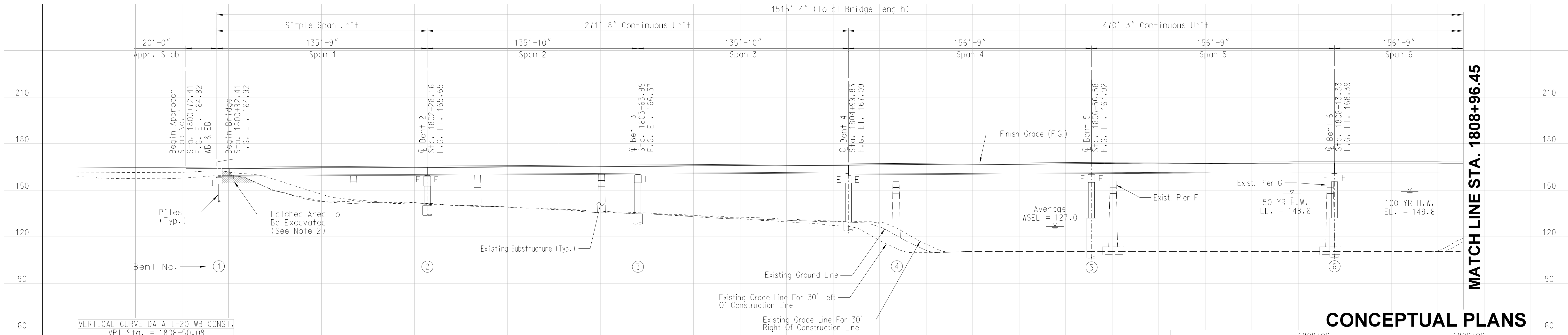
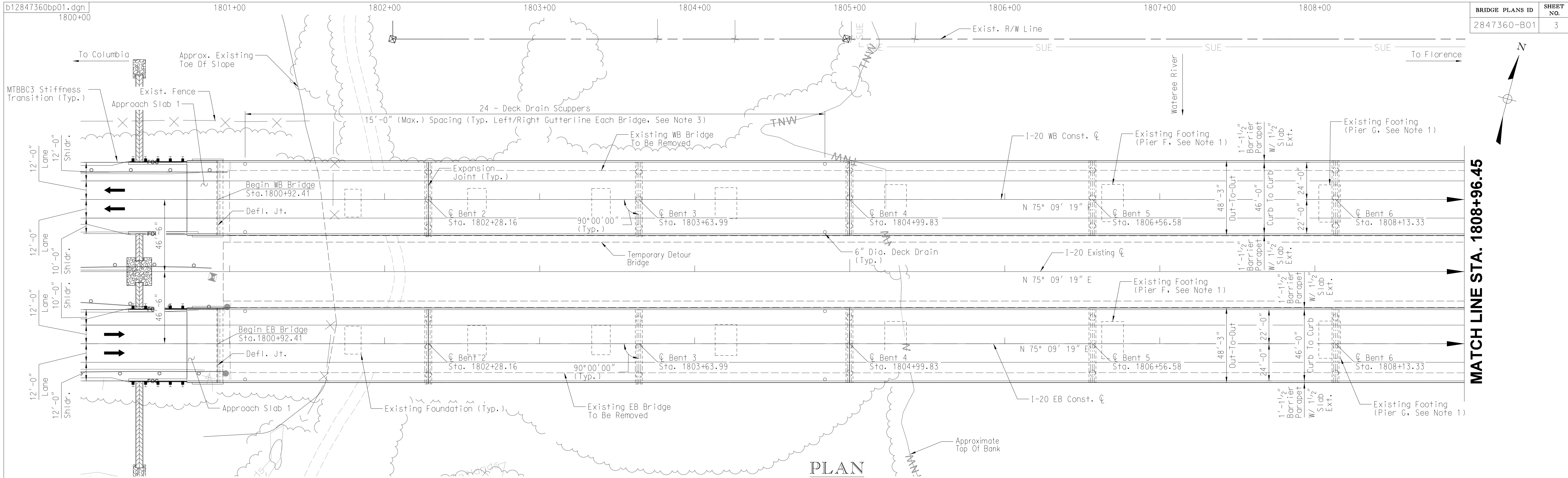
FEE Acceleration Design Response Spectrum Data				
Period (Sec)	S <sub>a</sub> (g)	Period (Sec)	S <sub>a</sub> (g)	
0.00	0.201	0.64	0.180	
0.01	0.226	0.80	0.144	
0.02	0.252	0.95	0.121	
0.03	0.277	1.11	0.103	
0.04	0.303	1.27	0.091	
0.05	0.329	1.43	0.081	
T <sub>0</sub>	0.06	0.354	1.58	0.073
0.09	0.354	1.74	0.066	
0.11	0.354	1.90	0.061	
0.13	0.354	2.06	0.056	
0.15	0.354	2.21	0.052	
0.17	0.354	2.37	0.049	
0.19	0.354	2.53	0.046	
0.22	0.354	2.69	0.043	
0.24	0.354	2.84	0.040	
0.26	0.354	3.00	0.038	
0.28	0.354			
0.30	0.354			
T <sub>s</sub>	0.32	0.354		
0.48	0.239			

SEE Acceleration Design Response Spectrum Data				
Period (Sec)	S <sub>a</sub> (g)	Period (Sec)	S <sub>a</sub> (g)	
0.00	0.459	0.71	0.492	
0.01	0.527	0.86	0.405	
0.03	0.596	1.01	0.343	
0.04	0.664	1.16	0.298	
0.05	0.733	1.32	0.264	
0.07	0.801	1.47	0.236	
T <sub>0</sub>	0.08	0.870	1.62	0.214
0.11	0.870	1.78	0.195	
0.13	0.870	1.93	0.180	
0.16	0.870	2.08	0.167	
0.19	0.870	2.24	0.155	
0.21	0.870	2.39	0.145	
0.24	0.870	2.54	0.137	
0.27	0.870	2.69	0.129	
0.29	0.870	2.85	0.122	
0.32	0.870	3.00	0.116	
0.35	0.870			
0.37	0.870			
T <sub>s</sub>	0.40	0.870		
0.55	0.629			

Values determined from: Three-Point Method

**CONCEPTUAL PLANS**

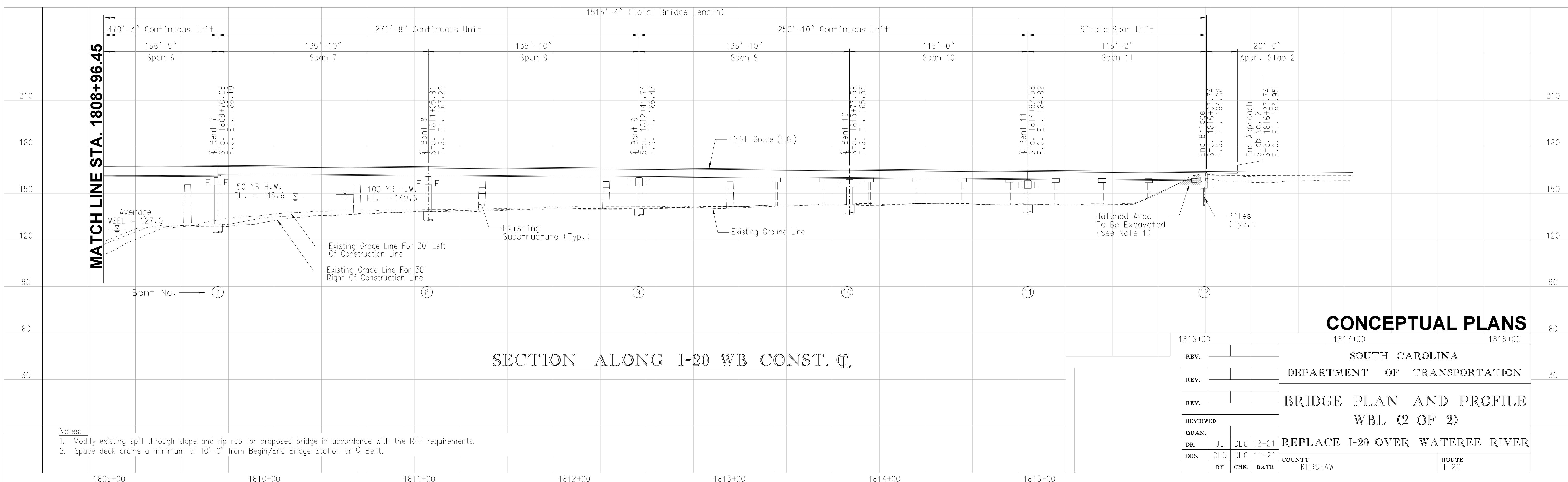
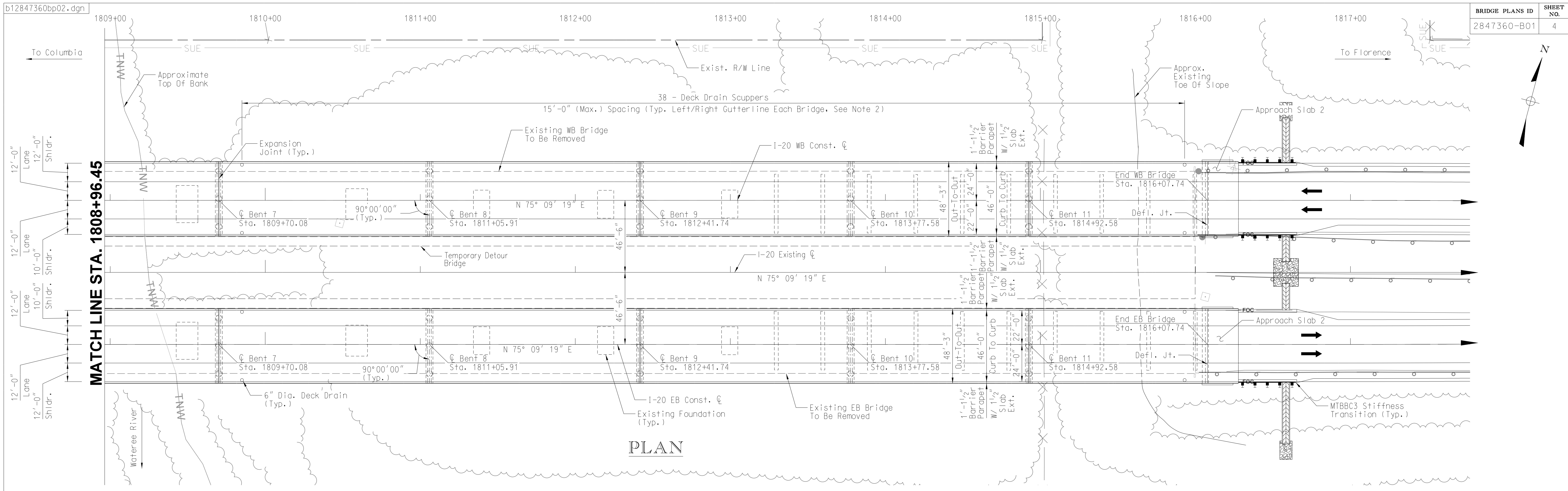
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REV.					
REV.					
REVIEWED					
QUAN.					GENERAL NOTES
DR.	JL	DLC	12-21		
DES.	CLG	DLC	11-21		
BY	CHK.	DATE			
					REPLACE I-20 OVER WATeree RIVER
					COUNTY KERSHAW
					ROUTE 1-20



REV.					SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION		
REV.					BRIDGE PLAN AND PROFILE WBL (1 OF 2)		
REV.					REPLACE I-20 OVER WATEREE RIVER		
QUAN.					COUNTY KERSHAW		
DR.	JL	DLC	12-21	ROUTE 1-20			
DES.	CLG	DLC	11-21				
BY	CHK.	DATE					

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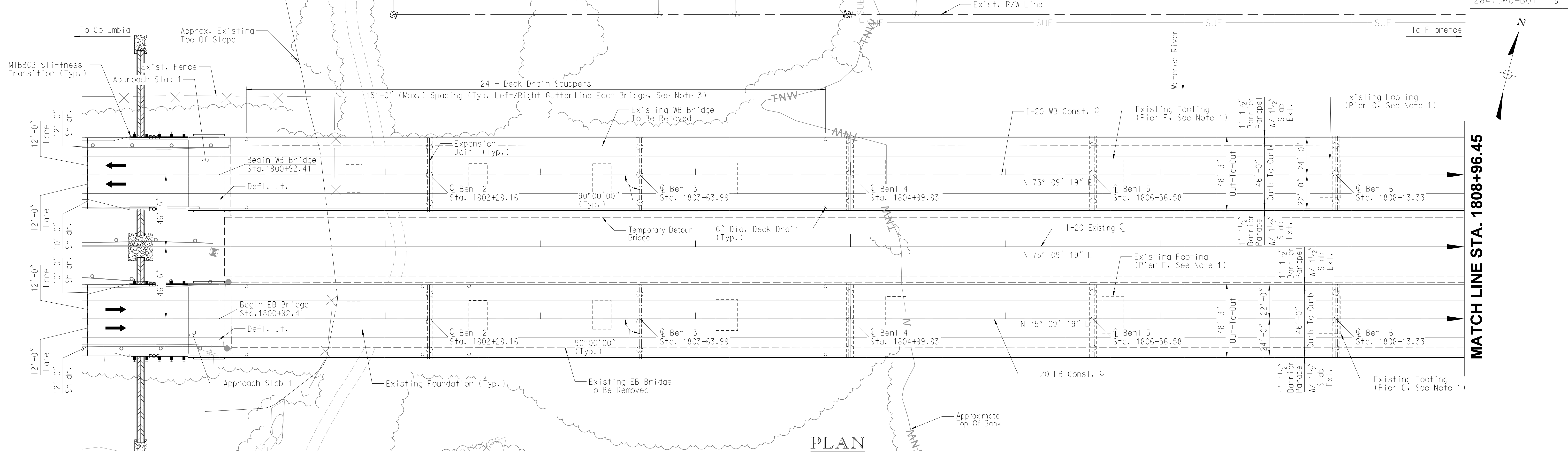




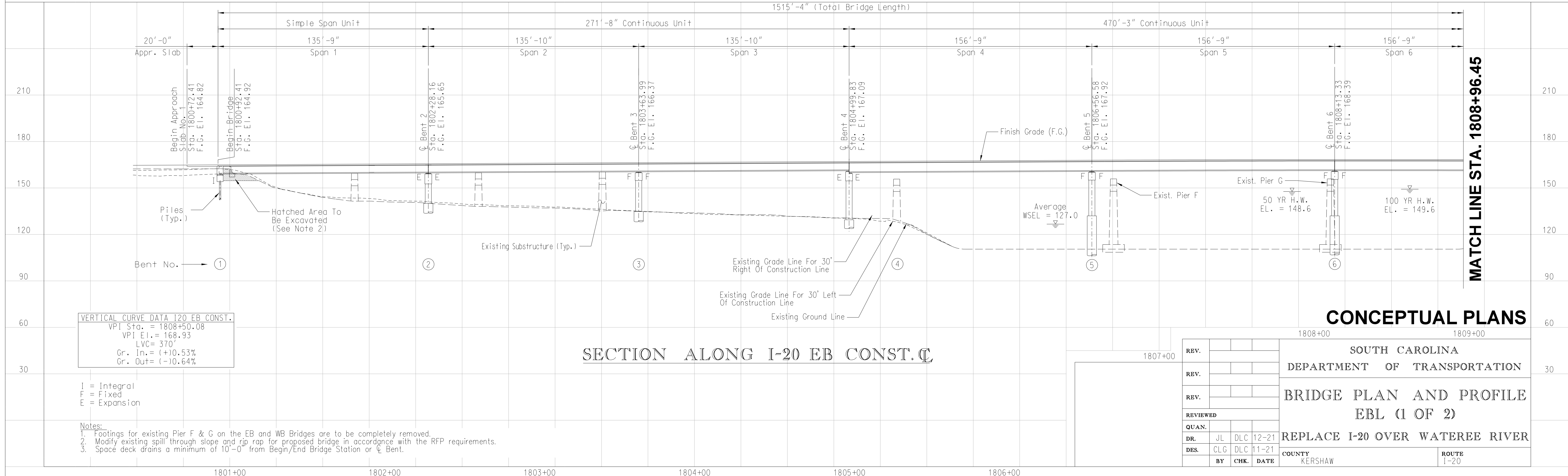
Notes:  
 1. Modify existing spill through slope and rip rap for proposed bridge in accordance with the RFP requirements.  
 2. Space deck drains a minimum of 10'-0" from Begin/End Bridge Station or CL Bent.

### CONCEPTUAL PLANS

REV.					SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
REV.						
REV.						
REVIEWED						
QUAN.					BRIDGE PLAN AND PROFILE WBL (2 OF 2) REPLACE I-20 OVER WATEREE RIVER	
DR.	JL	DLC	12-21			
DES.	CLG	DLC	11-21			
BY	CHK.	DATE				
					COUNTY	ROUTE
					KERSHAW	I-20



PLAN



SECTION ALONG I-20 EB CONST. CL

**VERTICAL CURVE DATA 120 EB CONST.**

VP1 Sta.	= 1808+50.08
VP1 E.L.	= 168.93
LVC	= 370'
Gr. In.	= (+)10.53%
Gr. Out	= (-)10.64%

I = Integral  
 F = Fixed  
 E = Expansion

- Notes:
- Footings for existing Pier F & G on the EB and WB Bridges are to be completely removed.
  - Modify existing spill through slope and rip rap for proposed bridge in accordance with the RFP requirements.
  - Space deck drains a minimum of 10'-0" from Begin/End Bridge Station or  $\phi$  Bent.

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QUAN.									
DR.	CLG	DLC	12-21						
DES.	CLG	DLC	11-21						
BY	CHK.	DATE							

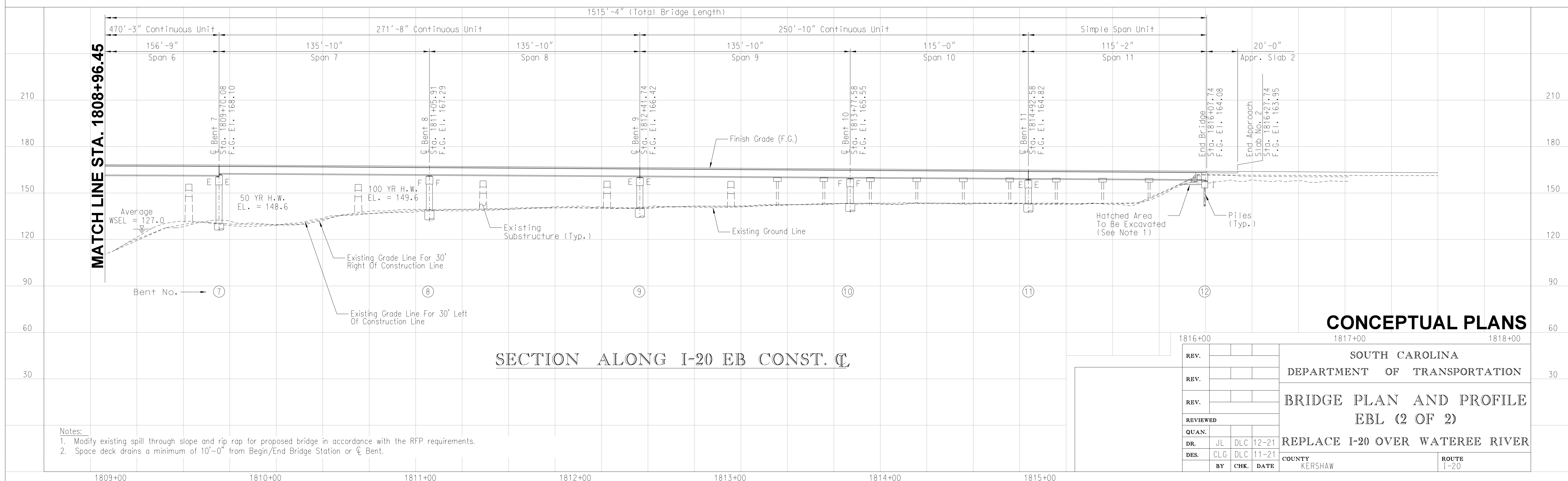
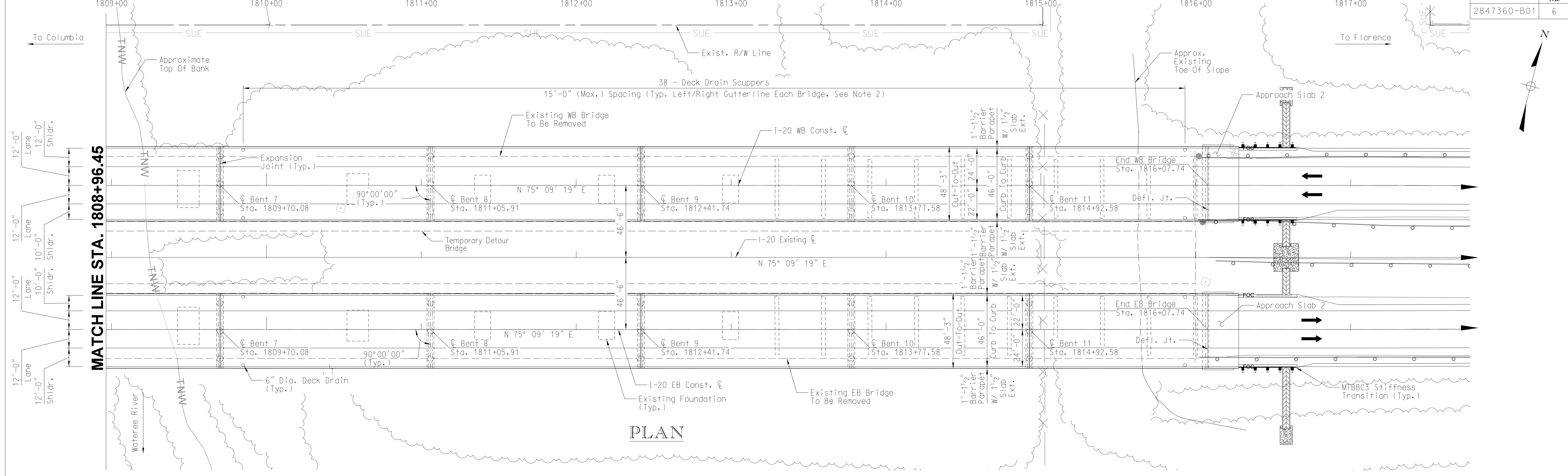
SOUTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION

BRIDGE PLAN AND PROFILE  
 EBL (1 OF 2)

REPLACE I-20 OVER WATERREE RIVER

COUNTY: KERSHAW ROUTE: 1-20

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SECTION ALONG I-20 EB CONST. C

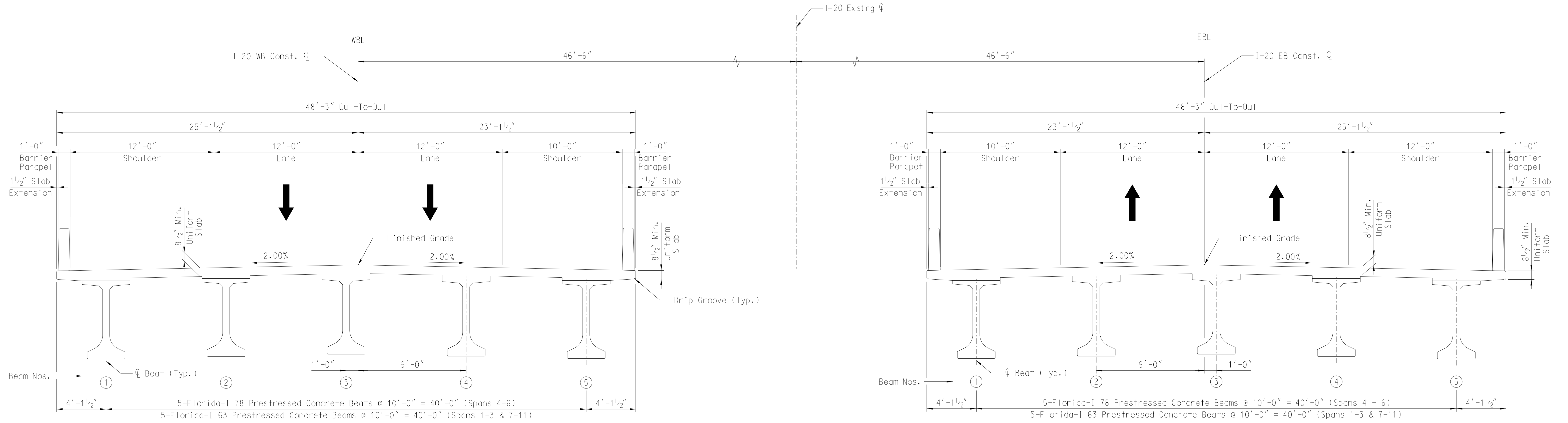
CONCEPTUAL PLANS

SOUTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
BRIDGE PLAN AND PROFILE  
EBL (2 OF 2)  
REPLACE I-20 OVER WATEREE RIVER

REV.				
REV.				
REV.				
REVIEWED				
QUAN.				
DR.	JL	DLC	12-21	
DES.	CLG	DLC	11-21	
BY	CHK.	DATE		

COUNTY KERSHAW ROUTE 1-20

- Notes:
1. Modify existing spill through slope and rip rap for proposed bridge in accordance with the RFP requirements.
  2. Space deck drains a minimum of 10'-0" from Begin/End Bridge Station or C.



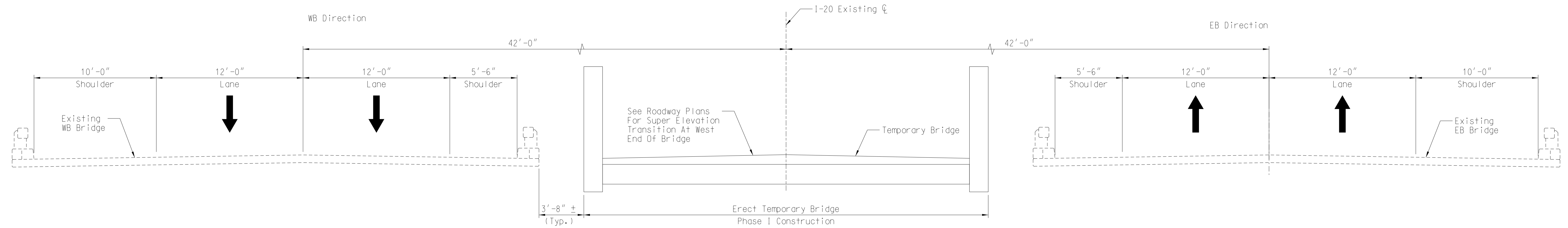
**TYPICAL SECTION**  
(Looking In The Direction Of Stationing)

NOTE:  
Steel Intermediate Diaphragm and Deck Drains not shown.

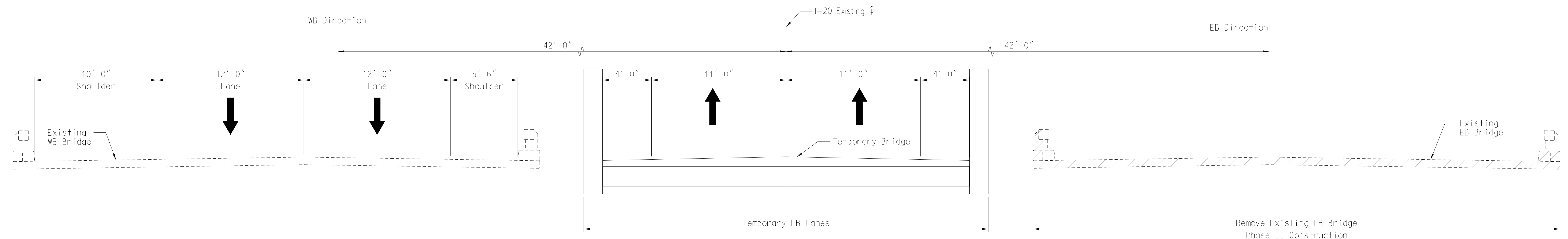
**CONCEPTUAL PLANS**

REV.					SOUTH CAROLINA	
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REV.					TYPICAL SECTION	
REVIEWED						REPLACE I-20 OVER WATEREE RIVER
QUAN.						
DR.	JL	CLG	12-21	COUNTY		ROUTE
DES.	VAS	DLC	11-21	KERSHAW		1-20
BY	CHK.	DATE				

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 4/25/2022



**PHASE I**  
(Looking In The Direction Of Stationing)

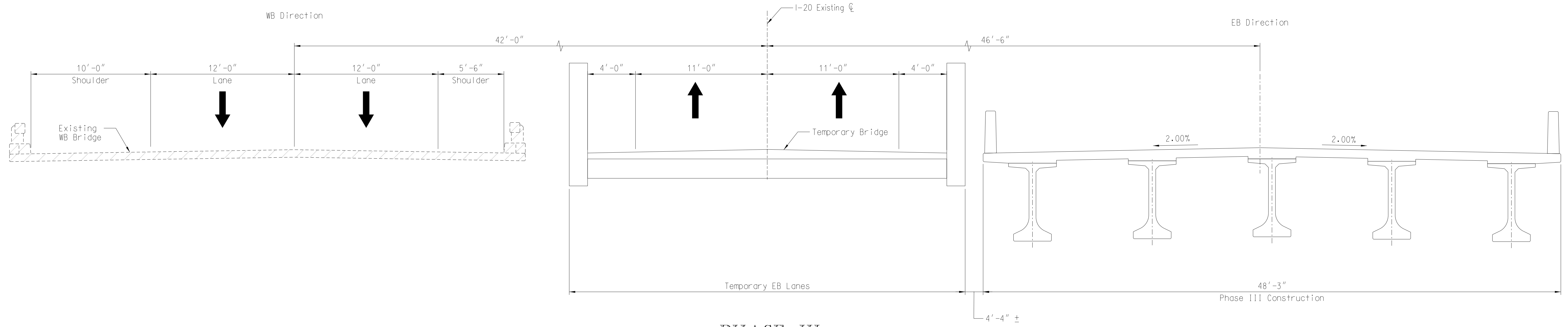


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(Looking In The Direction Of Stationing)

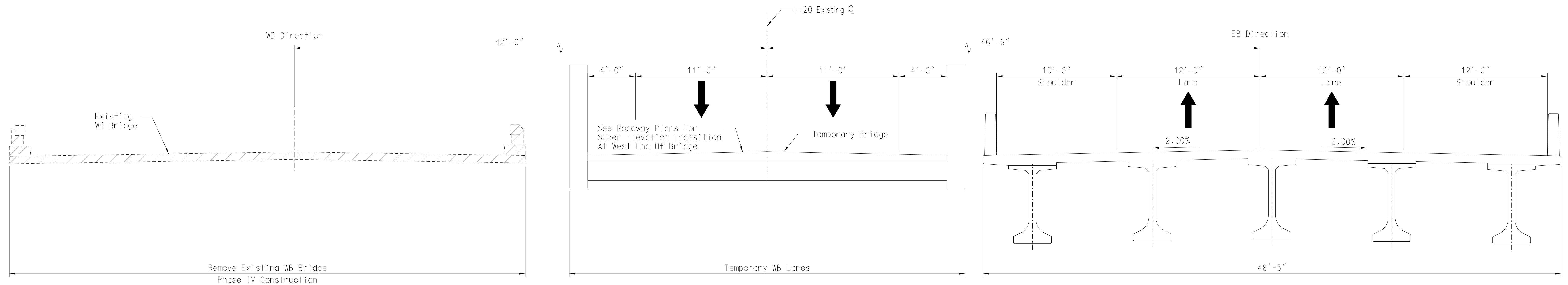
**CONCEPTUAL PLANS**

REV.				SOUTH CAROLINA			
REV.				DEPARTMENT OF TRANSPORTATION			
REV.				CONSTRUCTION SEQUENCE			
REVIEWED				(1 OF 3)			
QUAN.				REPLACE I-20 OVER WATEREE RIVER			
DR.	JL	DLC	12-21	COUNTY	KERSHAW		
DES.	CLG	DLC	11-21	ROUTE	1-20		
BY	CHK.	DATE					





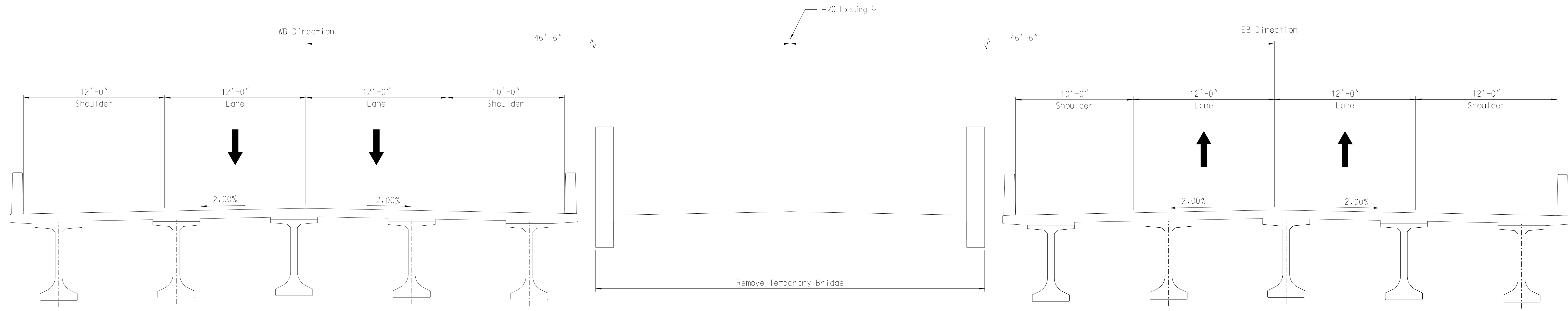
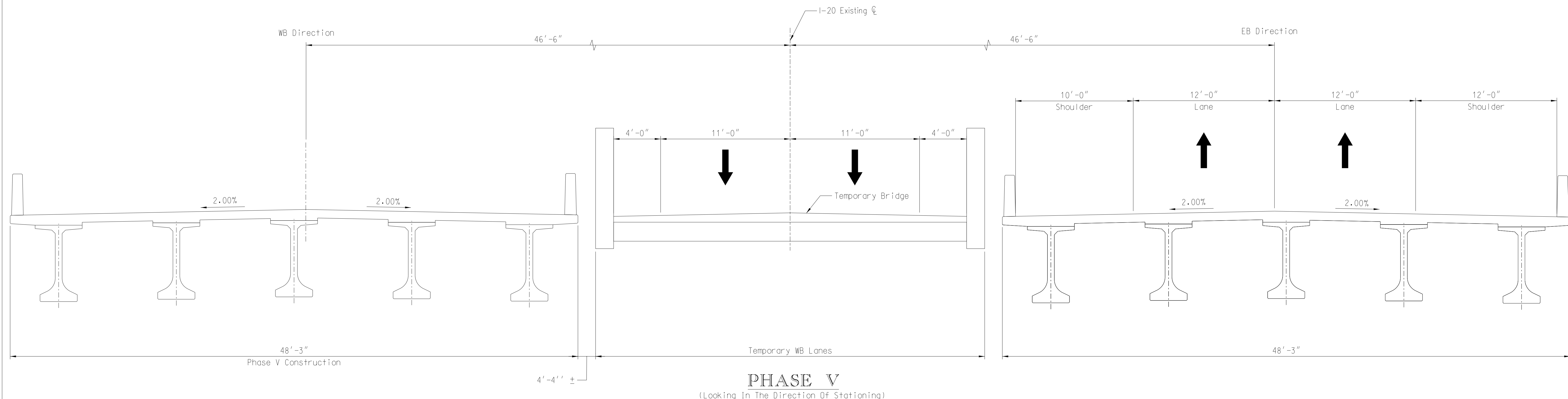
**PHASE III**  
(Looking In The Direction Of Stationing)



**PHASE IV**  
(Looking In The Direction Of Stationing)

**CONCEPTUAL PLANS**

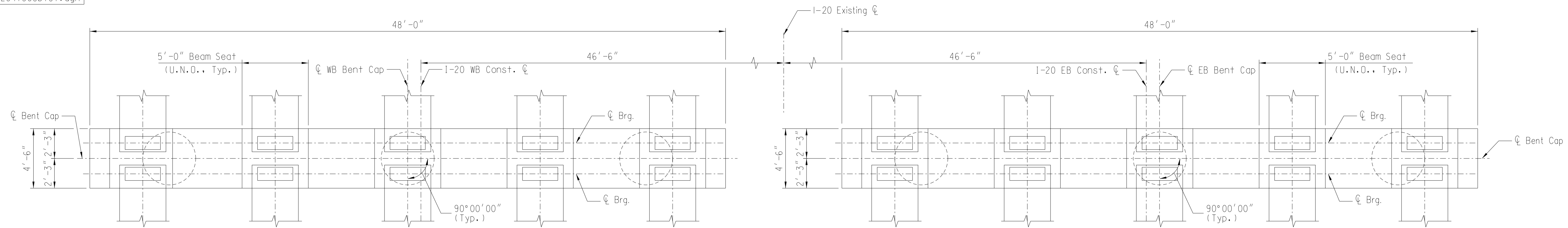
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REV.									CONSTRUCTION SEQUENCE (2 OF 3)			
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REVIEWED					REPLACE I-20 OVER WATEREE RIVER							
QUAN.												
DR.	JL	DLC	12-21		COUNTY	ROUTE						
DES.	CLG	DLC	11-21		KERSHAW	1-20						
BY	CHK.	DATE										



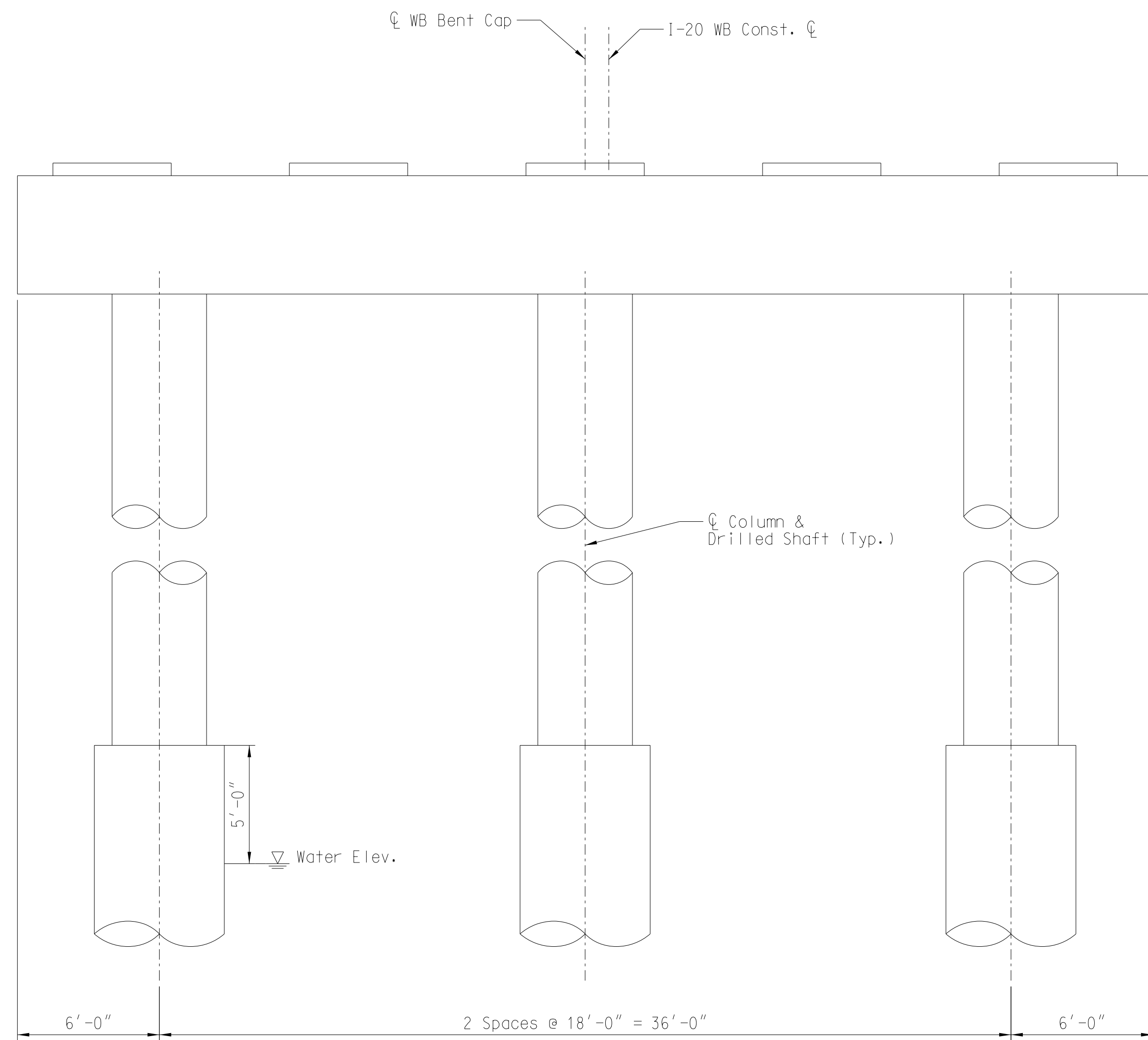
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DR.	JL	DLC	12-21		COUNTY		ROUTE	
DES.	CLG	DLC	11-21		KERSHAW		I-20	
BY	CHK.	DATE						

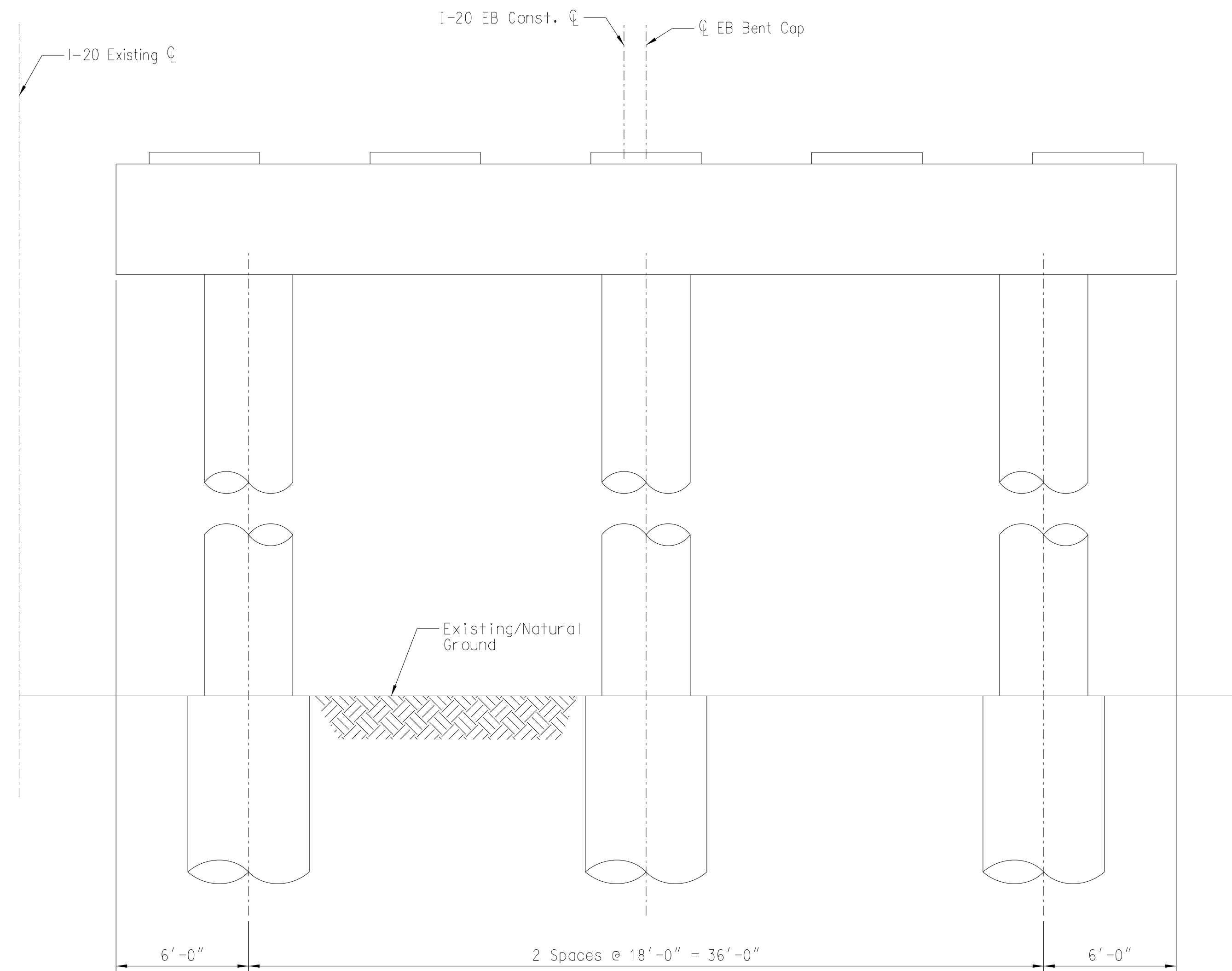
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5/2/2022



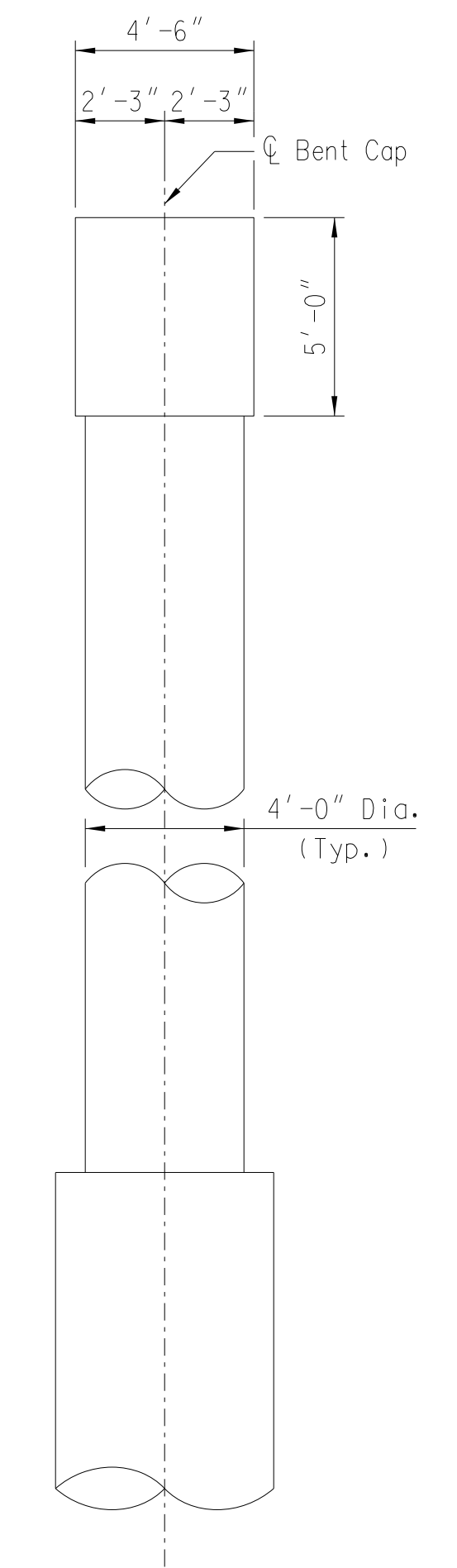
PLAN



HALF SECTION  
BENT IN RIVER



HALF SECTION  
BENT ON LAND



END ELEVATION

CONCEPTUAL PLANS

ELEVATION

REV.					SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
REV.					
REV.					
REVIEWED					
QUAN.					INTERIOR BENT PLAN AND ELEVATION REPLACE I-20 OVER WATEREE RIVER
DR.	JL	CLG	12-21		
DES.	VAS	MRA	11-21		
BY	CHK.	DATE			
					COUNTY KERSHAW
					ROUTE I-20