

REVISIONS  
9/16/24 - SLS - REVISION: UPDATED LETTING DATE.

**PROJECT No: BP10-R040**

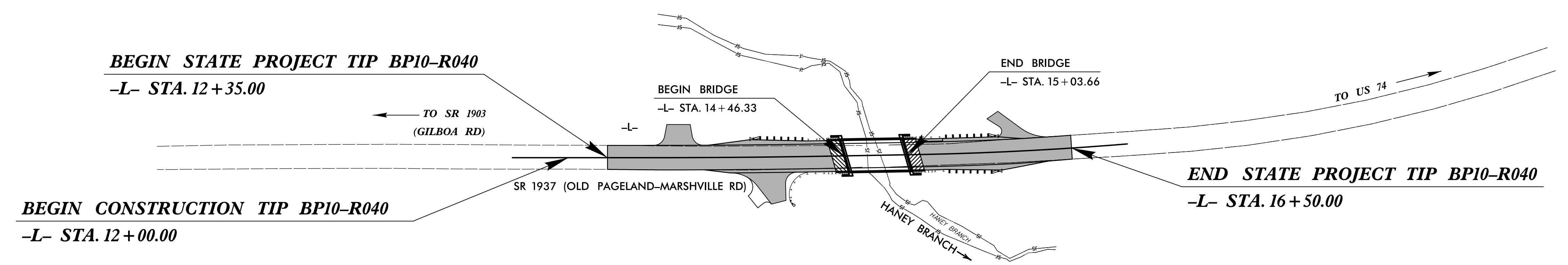
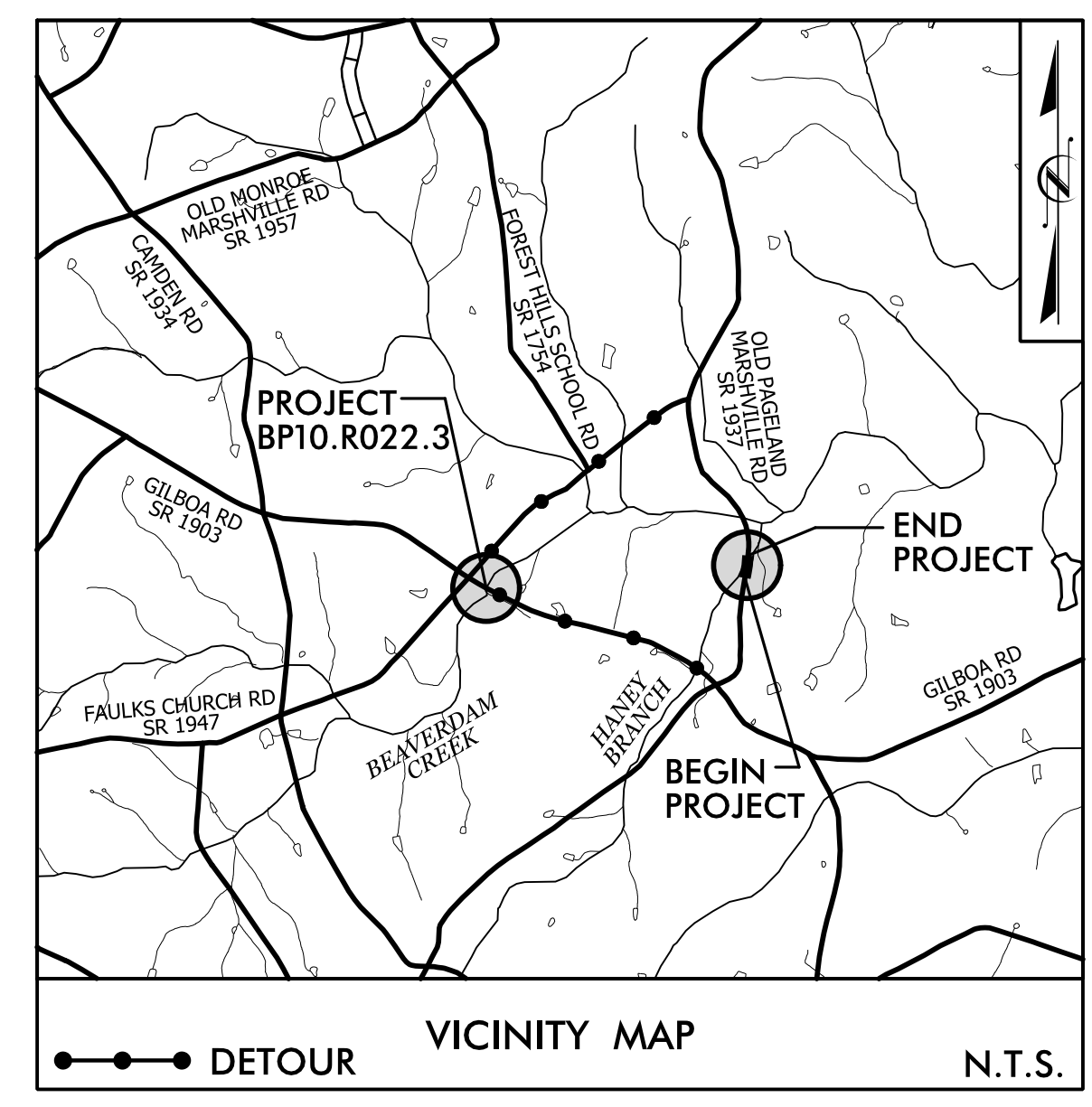
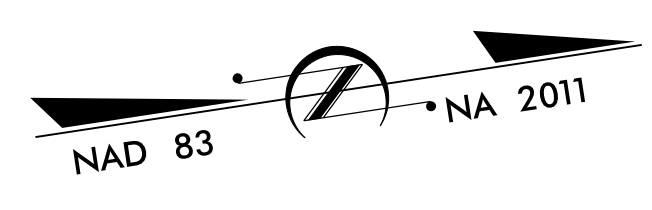
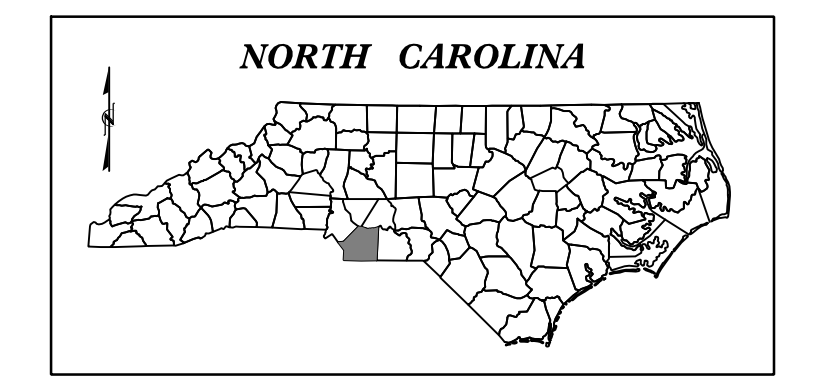
**CONTRACT: DJ00523**

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**UNION COUNTY**

**LOCATION: BRIDGE #93 OVER HANEY BRANCH  
ON SR 1937 (OLD PAGELAND-MARSHVILLE RD)**  
**TYPE OF WORK: GRADING, PAVING, DRAINAGE, & STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	<b>BP10-R040</b>	<b>1</b>	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
BP10.R040.1		P.E.	
BP10.R040.2		ROW & UTILITY	
BP10.R040.3		CONSTRUCTION	



**STRUCTURE**

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

**DESIGN DATA**

ADT 2024 = 940  
ADT 2044 = 1880  
DHV = N/A  
D = N/A  
T = 6%  
V = 55 MPH

FUNC. CLASSIFICATION:  
MINOR COLLECTOR  
SUB REGIONAL TIER

**PROJECT LENGTH**

LENGTH OF ROADWAY PROJECT TIP BP10-R040 = 0.068 MILES  
LENGTH OF STRUCTURE PROJECT TIP BP10-R040 = 0.011 MILES  
TOTAL LENGTH OF PROJECT TIP BP10-R040 = 0.079 MILES

NCDOT CONTACT: YANWEI MA, PE  
Division Bridge Manager

PLANS PREPARED FOR THE NCDOT BY:

**stv** STV Engineers, Inc.  
900 West Trade St., Suite 715  
Charlotte, NC 28202  
NC License Number F-0991

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
JANUARY 18, 2023

LETTING DATE:  
OCTOBER 2, 2024

JASON T. GRISCOM, PE  
PROJECT ENGINEER

SPENCER G. HENSLEY, PE  
PROJECT DESIGNER

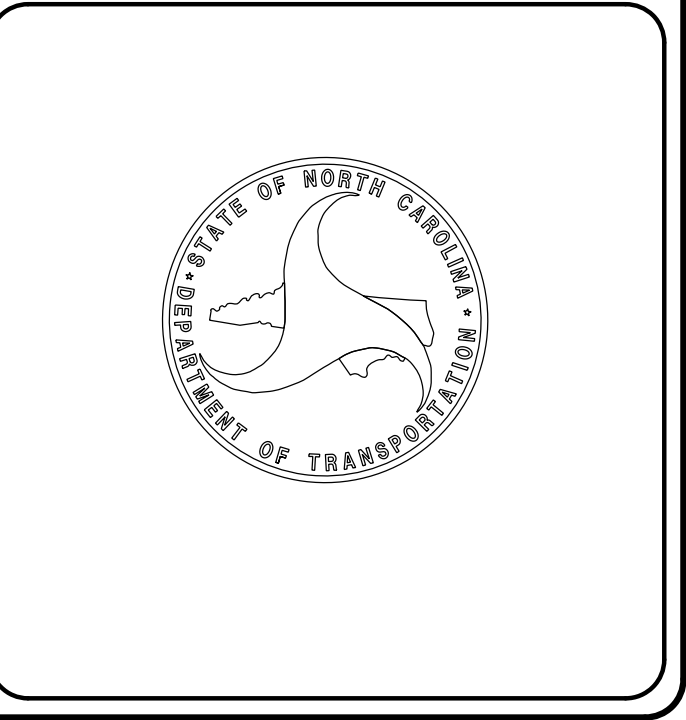
STRUCTURES ENGINEER

9/16/2024

SEAL 029429

JASON T. GRISCOM  
ENGINEER

Signed by: Jason Griscorn  
SIGNATURE: P.E.



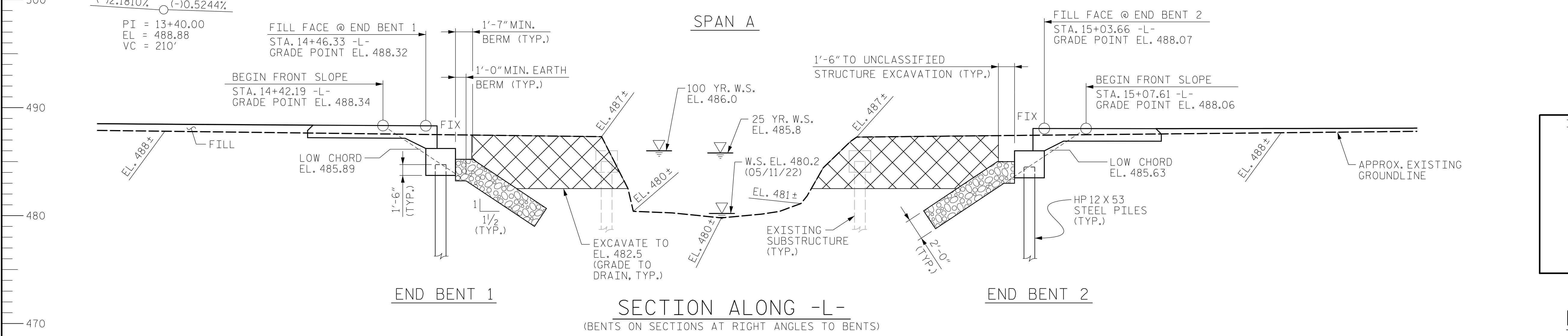


### VERTICAL CURVE DATA -L-

(-)-2.1810% (-)-0.5244%  
PI = 13+40.00  
EL = 488.88  
VC = 210'

### VERTICAL CURVE DATA -L-

(-)-0.5244% (+)-2.1176%  
PI = 15+65.00  
EL = 487.70  
VC = 170'



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

### HYDRAULIC DATA

DESIGN DISCHARGE: 480 CFS  
 FREQUENCY OF DESIGN FLOOD: 25 YRS.  
 DESIGN HIGH WATER ELEVATION: 485.8  
 DRAINAGE AREA: 0.9 SQ. MI.  
 BASE DISCHARGE (Q100): 681 C.F.S.  
 BASE HIGH WATER ELEVATION: 486.0

### OVERTOPPING DATA

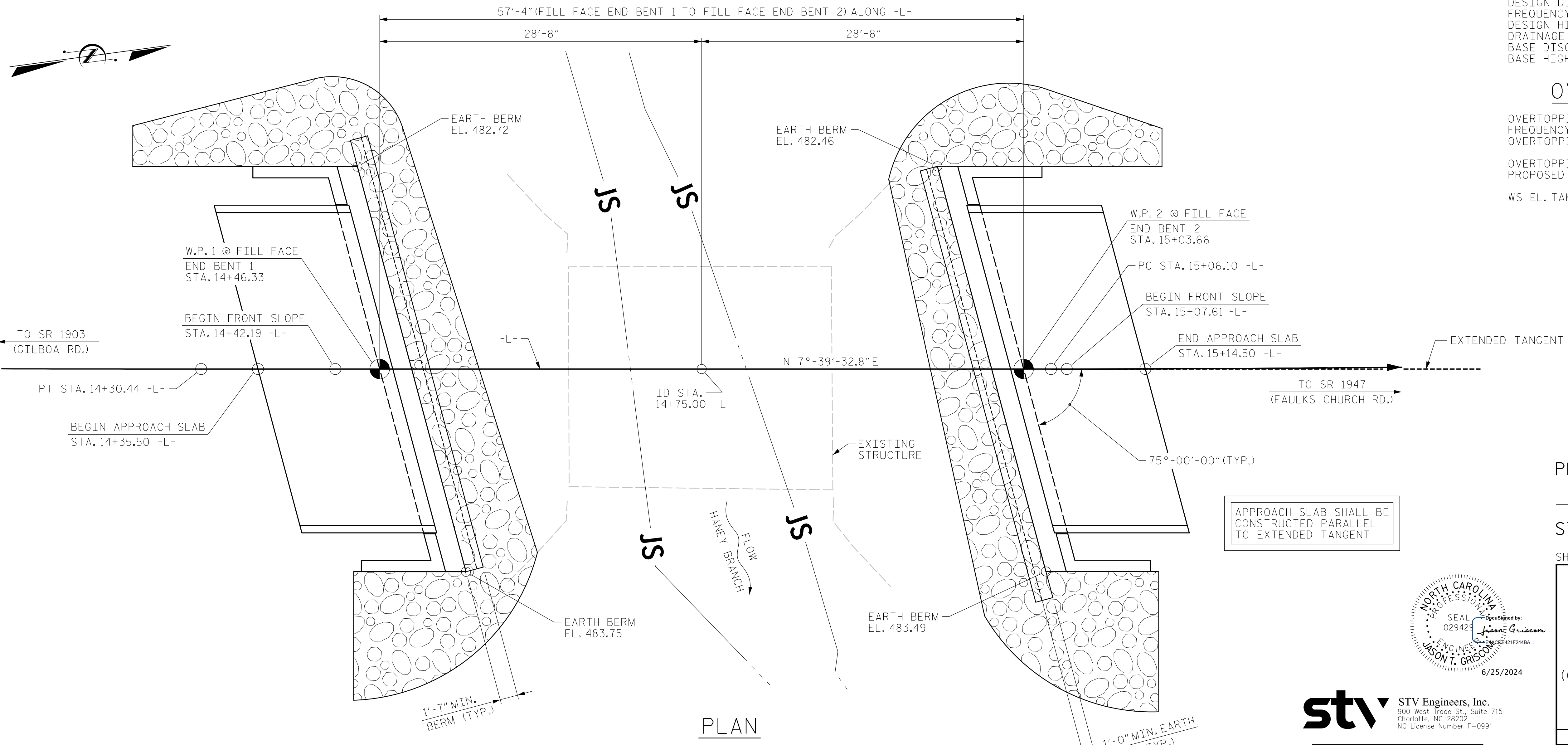
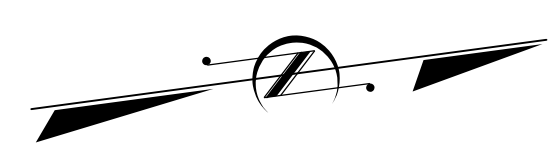
OVERTOPPING DISCHARGE: 1,300 C.F.S.  
 FREQUENCY OF OVERTOPPING: 500+ YRS.  
 OVERTOPPING FLOOD ELEVATION: 488.1

OVERTOPPING OCCURS @ STA. 15+13.74 -L- ON PROPOSED ROADWAY APPROACH

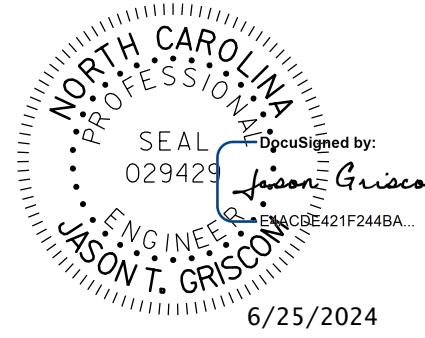
WS EL. TAKEN @ RIVER STATION 961

### HORIZONTAL CURVE DATA -L-

PI = 16+67.02  
 $\Delta = 6^\circ-08'-26.8''$  (LT.)  
 $D = 1^\circ-54'-35.5''$   
 $L = 321.53'$   
 $T = 160.92'$   
 $R = 3,000.00'$



APPROACH SLAB SHALL BE CONSTRUCTED PARALLEL TO EXTENDED TANGENT



STV Engineers, Inc. 900 West Trade St., Suite 715 Charlotte, NC 28202 NC License Number F-0991

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PROJECT NO. BP10-R040  
 UNION COUNTY  
 STATION: 14+75.00 -L-  
 SHEET 1 OF 3 REPLACES BRIDGE NO. 093

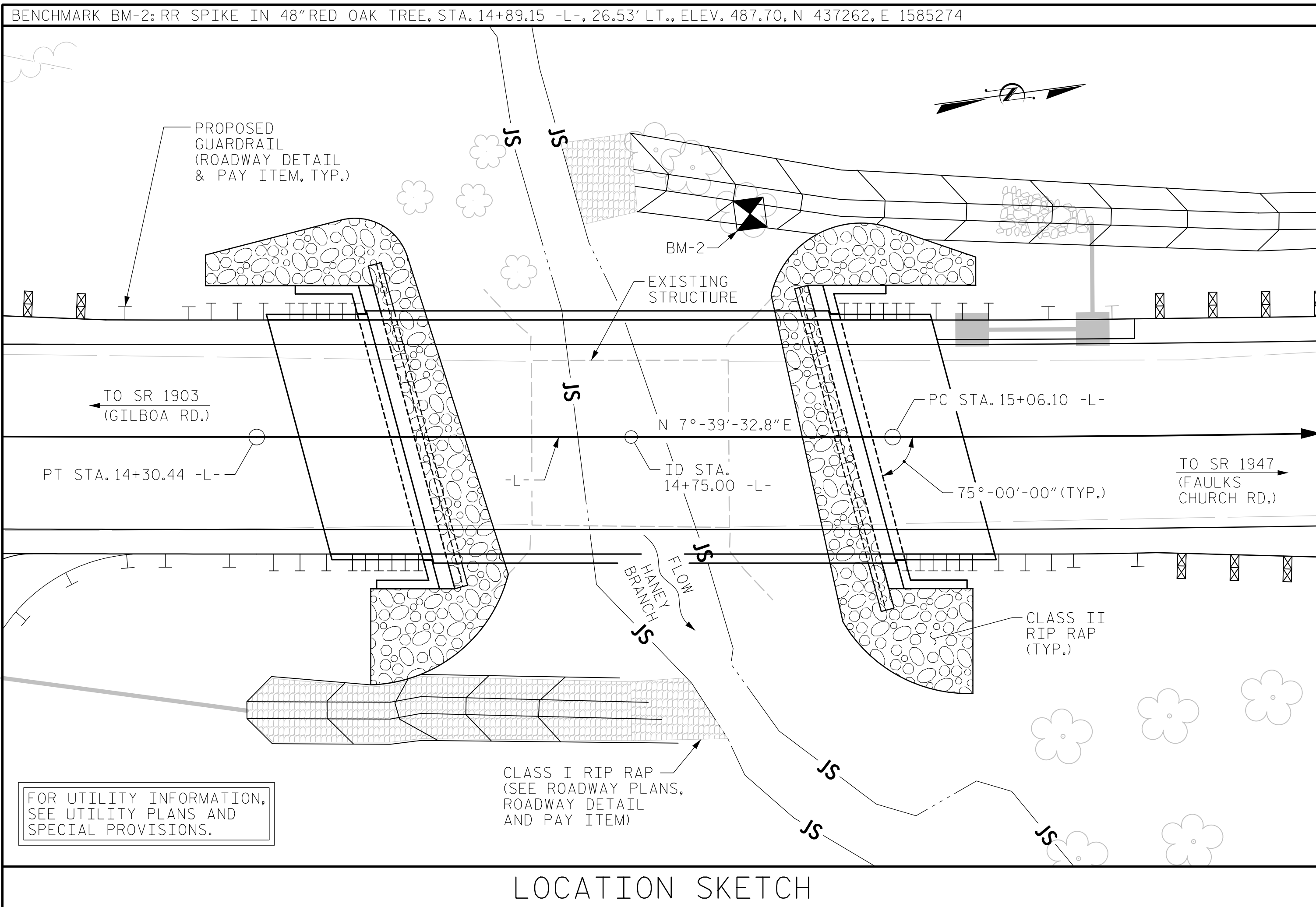
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON SR 1937  
 (OLD PAGELAND-MARSHVILLE RD.)  
 OVER HANEY BRANCH BETWEEN  
 SR 1903 AND SR 1947

REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

TOTAL SHEETS: 14

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DRAWN BY : SGH DATE : 11-22  
 CHECKED BY : MLO DATE : 11-22  
 DESIGN ENGINEER OF RECORD : J.GRISCOM DATE : 2-24



### GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE "STANDARD NOTES" SHEET.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE EXISTING STRUCTURE CONSISTING OF (1) 23'-10" SPAN WITH TIMBER DECK WITH AN ASPHALT WEARING SURFACE ON W16X36 STEEL I-BEAMS WITH A CLEAR ROADWAY OF 21'-2" AND SUPPORTED BY TIMBER CAPS AND TIMBER PILES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 14+75.00 -L-".

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA (ON SHEET 1 OF 3) SHALL BE EXCAVATED FOR A DISTANCE FROM THE CENTERLINE OF ROADWAY OF 50'± (LEFT) AND 44'± (RIGHT) TO EL. 482.5± AT END BENT 1, 50'± (LEFT) AND 40'± (RIGHT) TO EL. 482.5± AT END BENT 2, AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

AT THE CONTRACTOR'S OPTION, PRESTRESSED CONCRETE END BENT CAPS MAY BE SUBSTITUTED IN PLACE OF THE CAST-IN-PLACE CAPS. THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER TO RECEIVE REVISED PLANS AND DETAILS FROM THE STRUCTURES MANAGEMENT UNIT. THE REDESIGN AND ANY ADDITIONAL MATERIALS NEEDED WILL BE AT NO ADDITIONAL COST TO THE CONTRACTOR.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES".

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

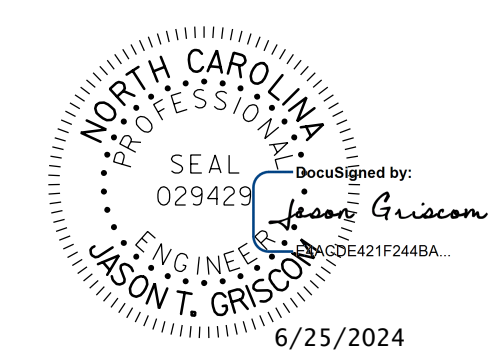
FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

LOCATION SKETCH

### TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STA. 14+75.00 -L-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLABS		
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	CU. YD.	LUMP SUM	LBS.	EA.	NO.	LIN. FT.	LIN. FT.	SO. YDS.	LUMP SUM	NO.	LIN. FT.	
SUPERSTRUCTURE															10	550.0	
END BENT 1			22.5	27.5		13.4		2,027	5	5	60.0		90	100			
END BENT 2			12.5	37.5		13.4		2,027	5	5	60.0		90	100			
TOTAL	LUMP SUM	LUMP SUM	35.0	65.0	LUMP SUM	26.8	LUMP SUM	4,054	10	10	120.0	110.0	180	200	LUMP SUM	10	550.0

PROJECT NO. BP10-R040  
 \_\_\_\_\_ UNION \_\_\_\_\_ COUNTY  
 STATION: 14+75.00 -L-  
 SHEET 3 OF 3



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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
**GENERAL DRAWING**  
 FOR BRIDGE ON SR 1937  
 (OLD PAGELAND-MARSHVILLE RD.)  
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REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
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TOTAL SHEETS: 14

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 CHECKED BY : MLO DATE : 11-22  
 DESIGN ENGINEER OF RECORD : J. GRISCOM DATE : 2-24

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## LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LOAD TYPE	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						LIVELOAD FACTORS	MOMENT				SHEAR				LIVELOAD FACTORS	MOMENT								
							DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD	HL-93(Inv)	N/A	①	1.065	--	1.75	0.27	1.25	55'	EL	26.982	0.616	1.12	55'	EL	5.396	0.80	0.27	<b>1.07</b>	55'	EL	<b>26.982</b>		
	HL-93(Opr)	N/A	--	1.452	--	1.35	0.27	1.61	55'	EL	26.982	0.616	1.45	55'	EL	5.396	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	②	1.335	48.043	1.75	0.27	1.56	55'	EL	26.982	0.616	1.34	55'	EL	5.396	0.80	0.27	<b>1.33</b>	55'	EL	<b>26.982</b>		
	HS-20(Opr)	36.000	--	1.734	62.425	1.35	0.27	2.02	55'	EL	26.982	0.616	1.73	55'	EL	5.396	N/A	--	--	--	--	--		
LEGAL LOAD	SINGLE VEHICLE SV	SNSH	13.500	--	2.802	37.83	1.4	0.27	4.09	55'	EL	26.982	0.616	3.81	55'	EL	5.396	0.80	0.27	2.80	55'	EL	26.982	
		SNGARBS2	20.000	--	2.175	43.506	1.4	0.27	3.18	55'	EL	26.982	0.616	2.76	55'	EL	5.396	0.80	0.27	2.18	55'	EL	26.982	
		SNAGRIS2	22.000	--	2.099	46.173	1.4	0.27	3.07	55'	EL	26.982	0.616	2.58	55'	EL	5.396	0.80	0.27	2.10	55'	EL	26.982	
		SNCOTTS3	27.250	--	1.397	38.065	1.4	0.27	2.04	55'	EL	26.982	0.616	1.91	55'	EL	5.396	0.80	0.27	1.40	55'	EL	26.982	
		SNAGGRS4	34.925	--	1.2	41.922	1.4	0.27	1.75	55'	EL	26.982	0.616	1.62	55'	EL	5.396	0.80	0.27	1.20	55'	EL	26.982	
		SNS5A	35.550	--	1.172	41.648	1.4	0.27	1.71	55'	EL	26.982	0.616	1.66	55'	EL	5.396	0.80	0.27	1.17	55'	EL	26.982	
		SNS6A	39.950	--	1.089	43.514	1.4	0.27	1.59	55'	EL	26.982	0.616	1.53	55'	EL	5.396	0.80	0.27	1.09	55'	EL	26.982	
		SNS7B	42.000	--	1.038	43.587	1.4	0.27	1.52	55'	EL	26.982	0.616	1.53	55'	EL	5.396	0.80	0.27	1.04	55'	EL	26.982	
		TNAGRIT3	33.000	--	1.333	43.973	1.4	0.27	1.95	55'	EL	26.982	0.616	1.81	55'	EL	5.396	0.80	0.27	1.33	55'	EL	26.982	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT4A	33.075	--	1.342	44.4	1.4	0.27	1.96	55'	EL	26.982	0.616	1.75	55'	EL	5.396	0.80	0.27	1.34	55'	EL	26.982	
		TNT6A	41.600	--	1.112	46.252	1.4	0.27	1.62	55'	EL	26.982	0.616	1.67	55'	EL	5.396	0.80	0.27	1.11	55'	EL	26.982	
		TNT7A	42.000	--	1.125	47.255	1.4	0.27	1.64	55'	EL	26.982	0.616	1.56	55'	EL	5.396	0.80	0.27	1.13	55'	EL	26.982	
		TNT7B	42.000	--	1.174	49.318	1.4	0.27	1.72	55'	EL	26.982	0.616	1.47	55'	EL	5.396	0.80	0.27	1.17	55'	EL	26.982	
		TNAGRIT4	43.000	--	1.111	47.786	1.4	0.27	1.62	55'	EL	26.982	0.616	1.42	55'	EL	5.396	0.80	0.27	1.11	55'	EL	26.982	
		TNAGT5A	45.000	--	1.041	46.851	1.4	0.27	1.52	55'	EL	26.982	0.616	1.44	55'	EL	5.396	0.80	0.27	1.04	55'	EL	26.982	
		TNAGT5B	45.000	③	1.023	46.02	1.4	0.27	1.49	55'	EL	26.982	0.616	1.35	55'	EL	5.396	0.80	0.27	<b>1.02</b>	55'	EL	<b>26.982</b>	
		EV2	28.750	--	1.631	46.889	1.3	0.27	2.40	55'	EL	26.982	0.616	2.07	55'	EL	5.396	0.80	0.27	1.63	55'	EL	26.982	
		EV3	43.000	④	1.058	45.500	1.3	0.27	1.56	55'	EL	26.982	0.616	1.40	55'	EL	5.396	0.80	0.27	1.06	55'	EL	26.982	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.  
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

⑥ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING \*\*

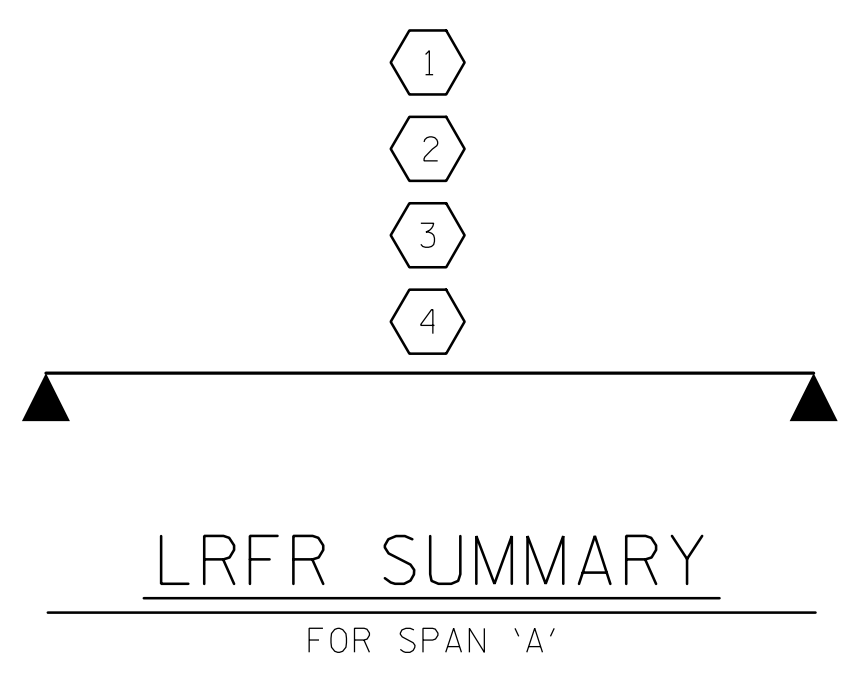
④ EMERGENCY VEHICLE LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

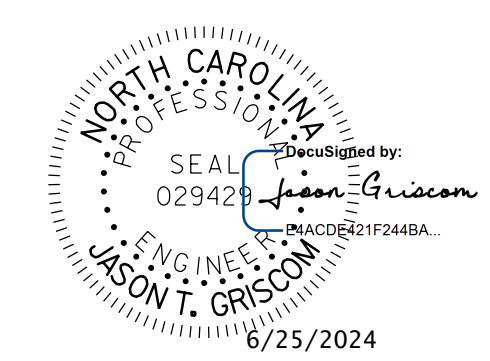
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GIRDER LOCATION

I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER



PROJECT NO. BP10-R040  
UNION COUNTY  
 STATION: 14+75.00 -L-



**stv** STV Engineers, Inc.  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
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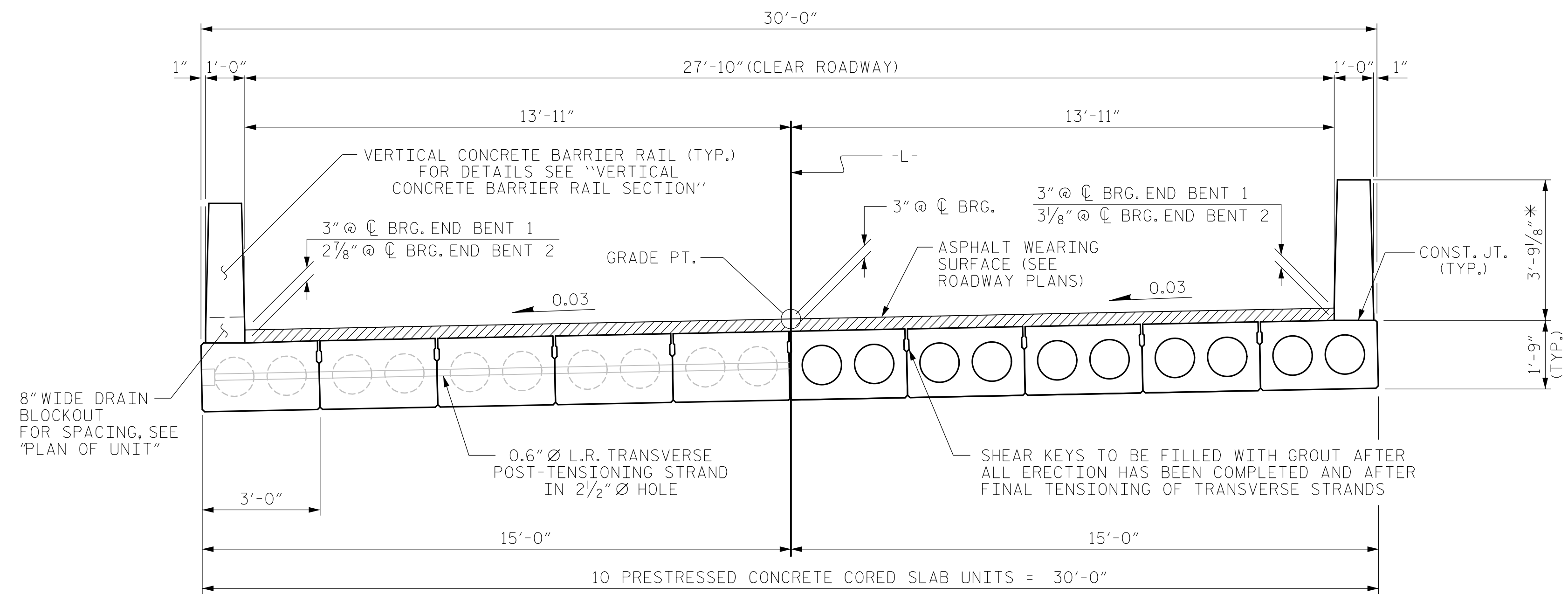
DOCUMENT NOT CONSIDERED  
 FINAL UNLESS ALL  
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 LRFR SUMMARY FOR  
 55' CORED SLAB UNIT  
 75° SKEW  
 (NON-INTERSTATE TRAFFIC)

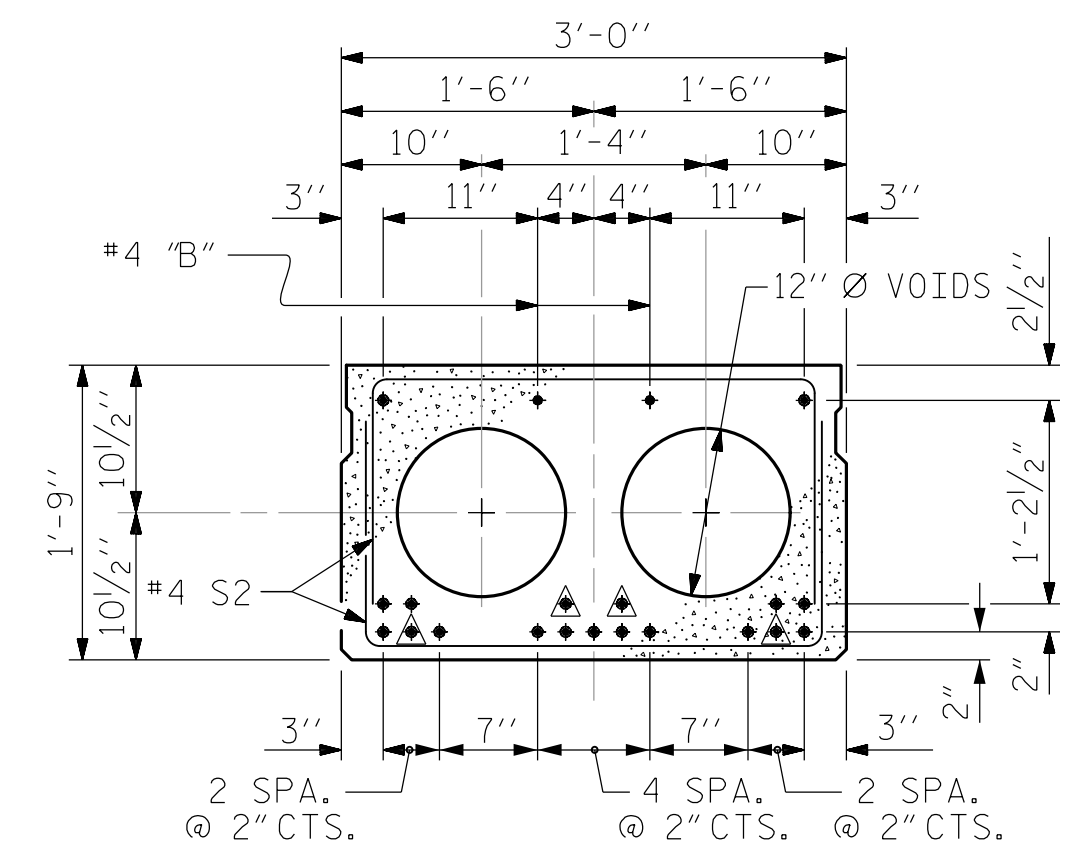
REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

ASSEMBLED BY : JWJ DATE : 10-22  
 CHECKED BY : MLO DATE : 10-22  
 DESIGN ENGINEER OF RECORD : J. GRISCOM DATE : 2-24  
 DRAWN BY : CVC 6/10 REV. 11/12/08RR MAA/GM  
 CHECKED BY : DNS 6/10 REV. 10/1/11 MAA/GM  
 REV. 04/23 BNB/AAI



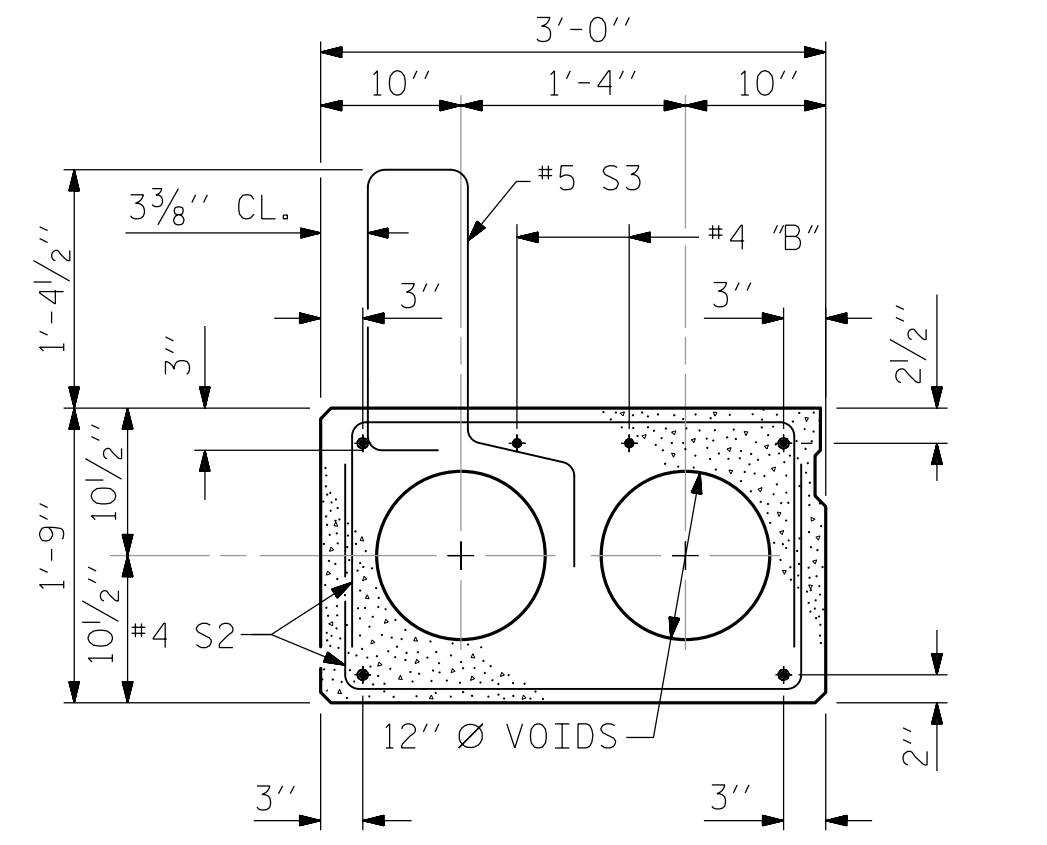
HALF SECTION AT INTERMEDIATE DIAPHRAGMS  
**TYPICAL SECTION**  
 HALF SECTION THROUGH VOIDS

\* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.



**INTERIOR SLAB SECTION**  
 (19 STRANDS REQUIRED)

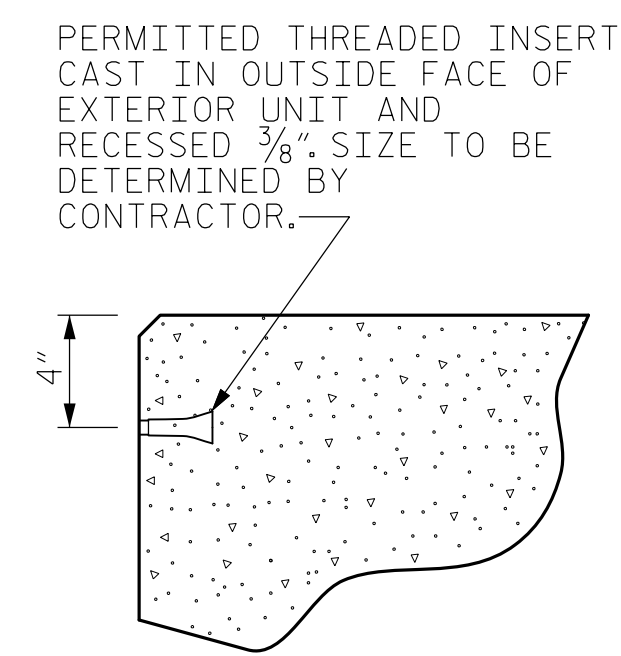
**0.6" Ø LOW RELAXATION STRAND LAYOUT**



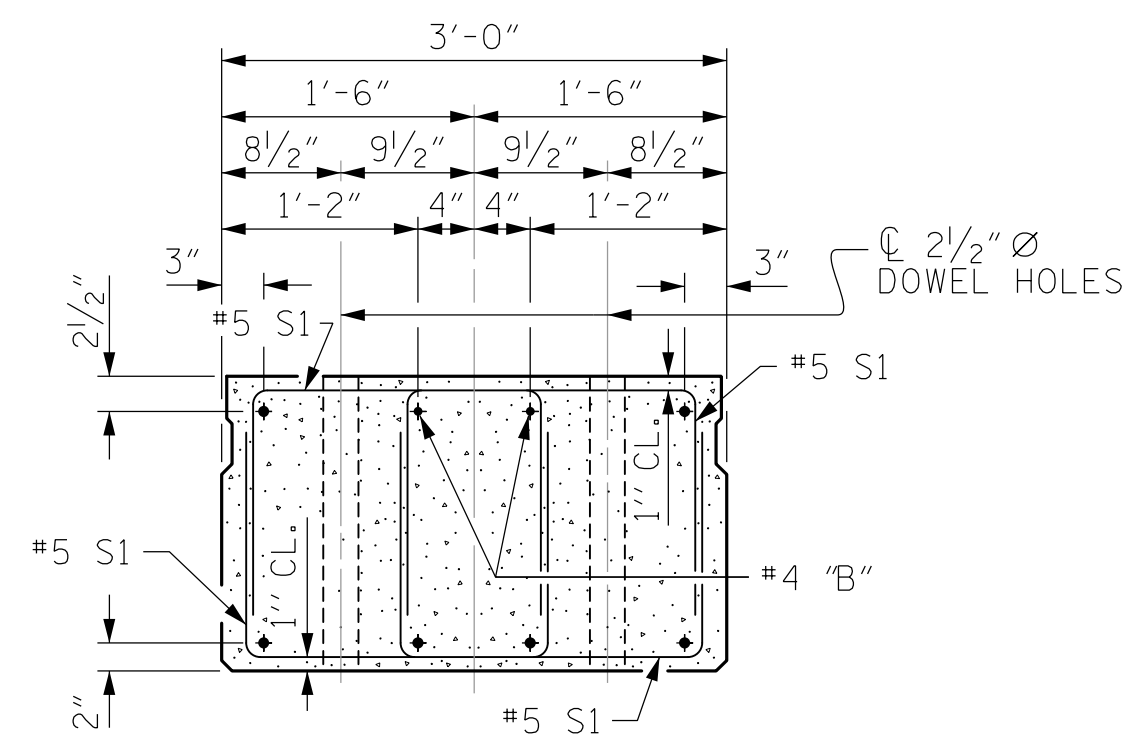
**EXT. SLAB SECTION**  
 (FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

⊗ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

**DEBONDING LEGEND**

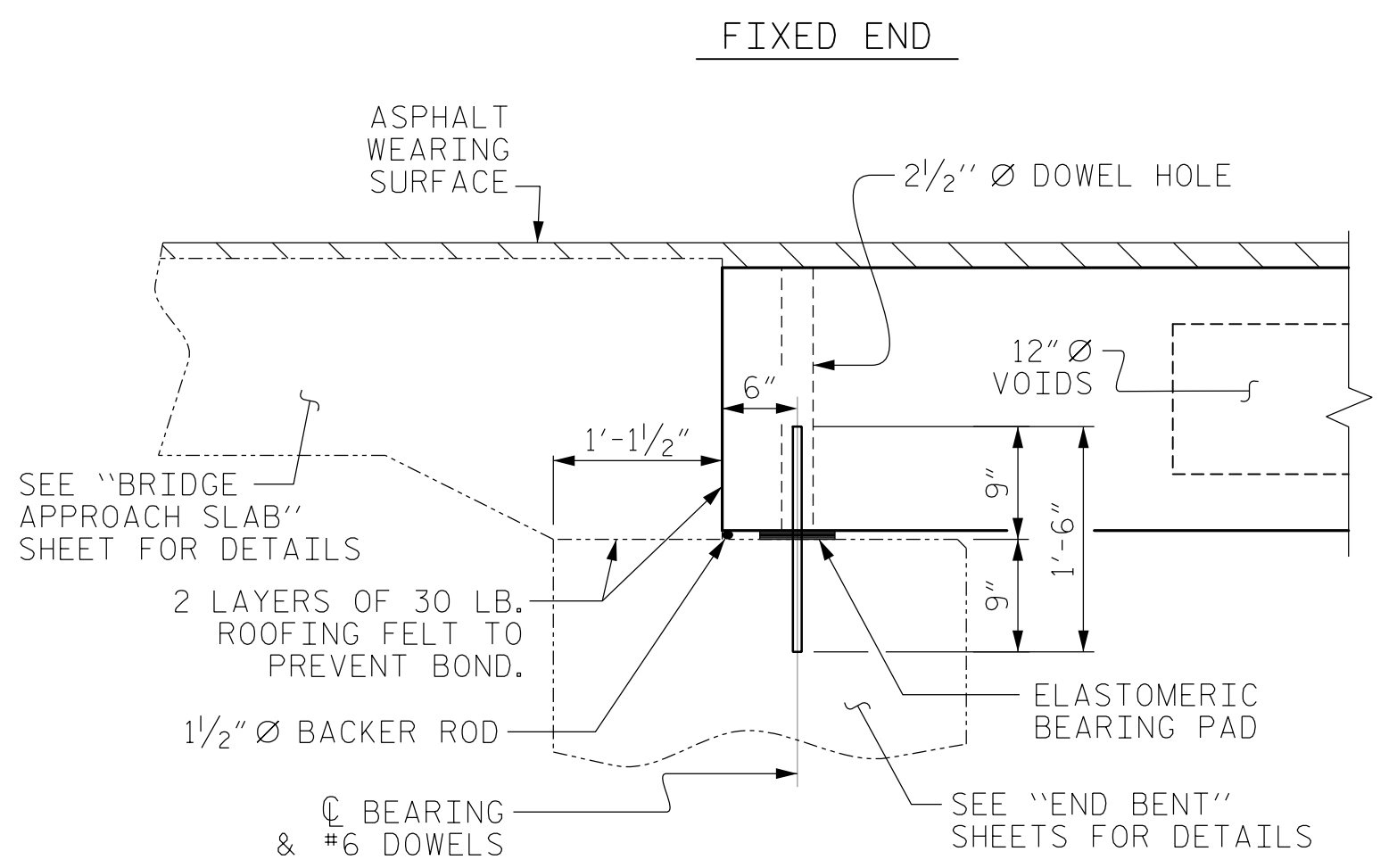


**THREADED INSERT DETAIL**

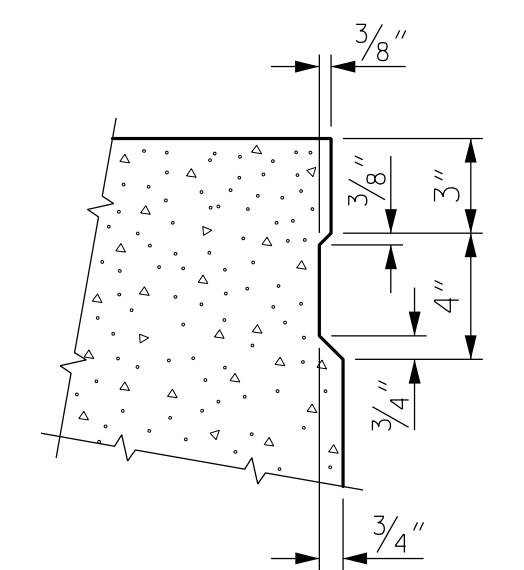


**END ELEVATION**

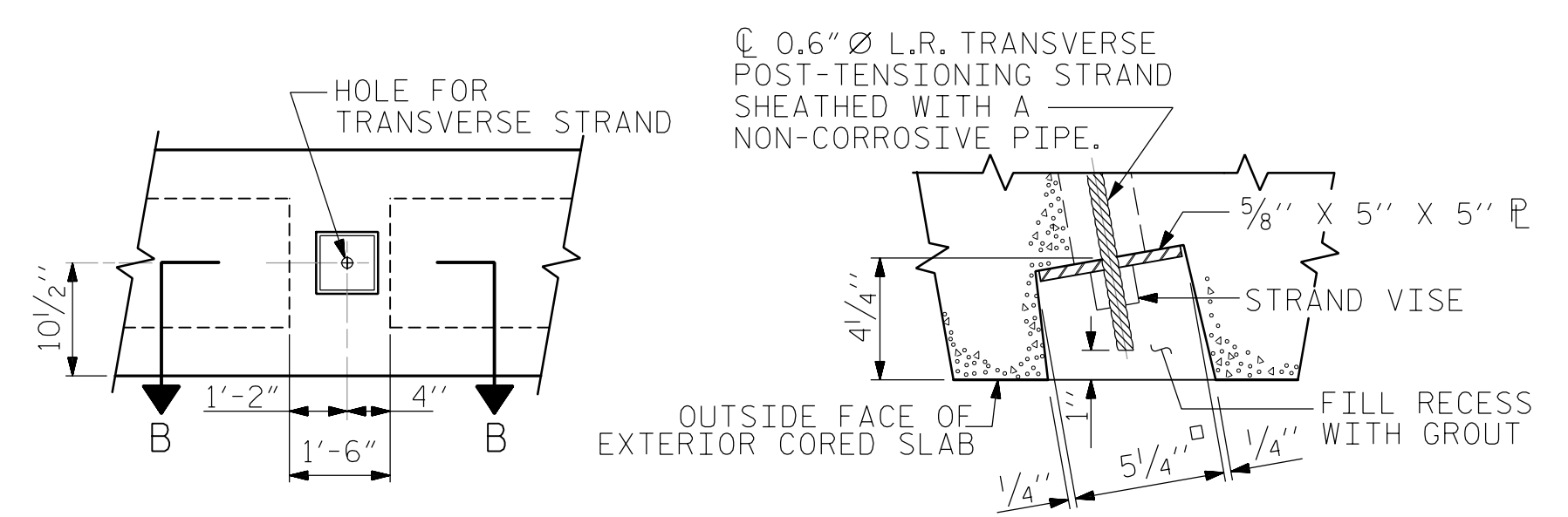
SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



**SECTION AT END BENT**



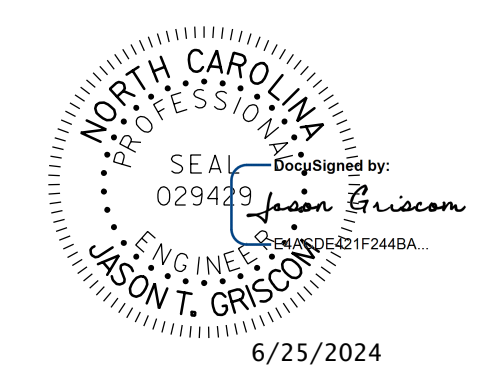
**SHEAR KEY DETAIL**  
 NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



**ELEVATION VIEW**  
**SECTION B-B**  
**GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS**

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ASSEMBLED BY : J.W.J.	DATE : 10-22
CHECKED BY : M.L.O.	DATE : 10-22
DESIGN ENGINEER OF RECORD : J. GRISCOM	DATE : 2-24
DRAWN BY : DGE 5/09	REV. 8/14
CHECKED BY : BCH 6/09	MAA/TMG



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 Charlotte, NC 28202  
 NC License Number F-0991

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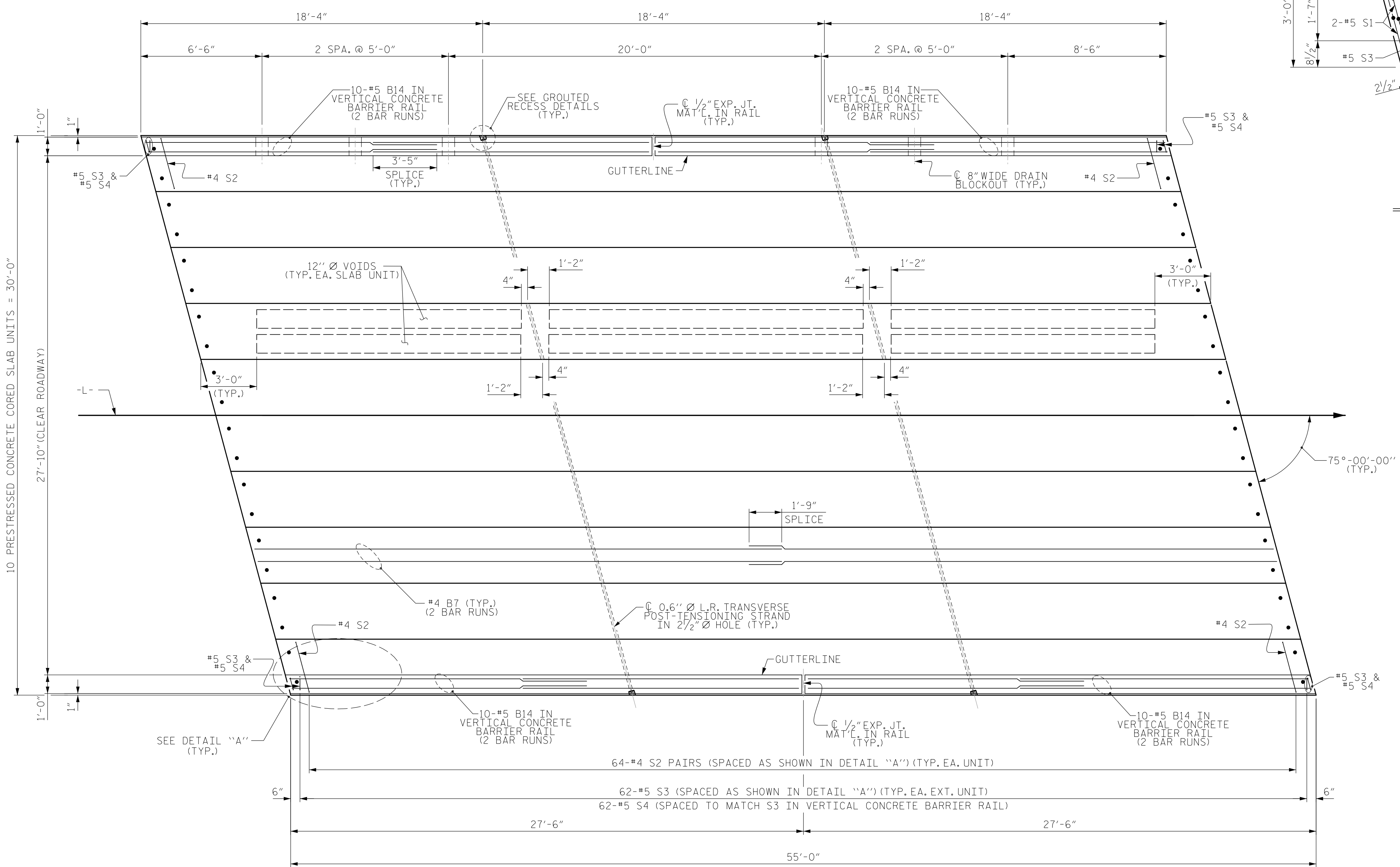
PROJECT NO. BP10-R040  
UNION COUNTY  
 STATION: 14+75.00 -L-  
 SHEET 1 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 1'-9"  
 PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 75° SKEW

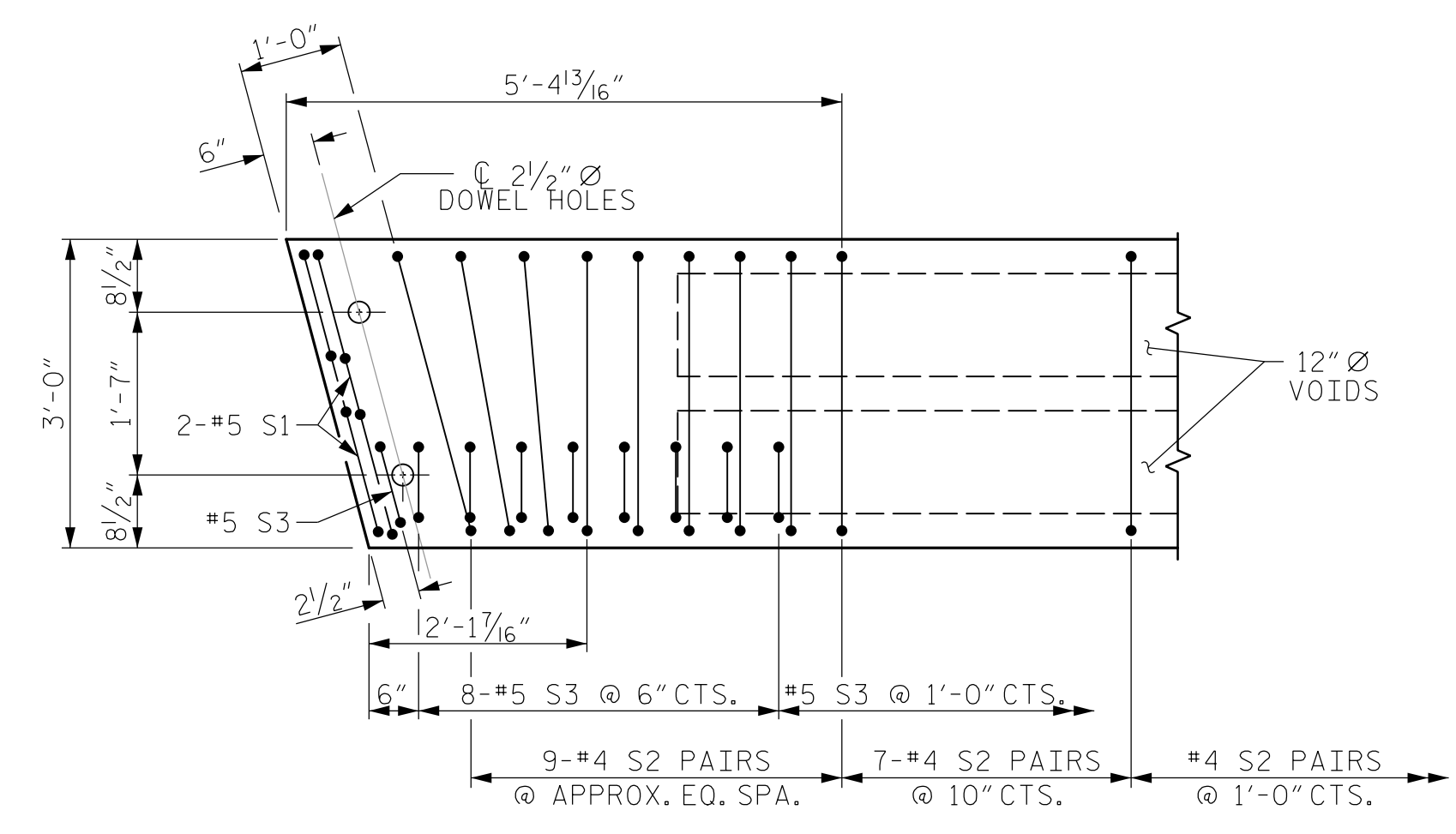
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NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

S-5
TOTAL SHEETS 14

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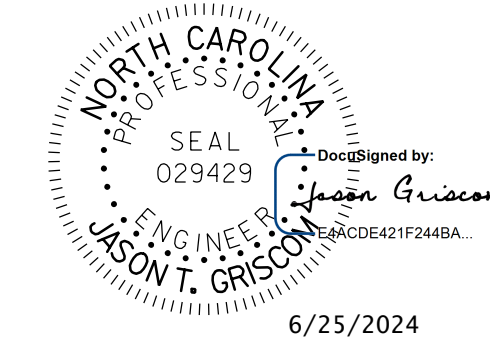


PLAN OF UNIT



DETAIL "A"  
 (SIMILAR EACH END OF UNIT)  
 NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PROJECT NO. BP10-R040  
UNION COUNTY  
 STATION: 14+75.00 -L-  
 SHEET 2 OF 3



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 PLAN OF 55' UNIT  
 27'-10" CLEAR ROADWAY  
 75° SKEW

ASSEMBLED BY : J.W.J.	DATE : 10-22
CHECKED BY : M.L.O.	DATE : 10-22
DESIGN ENGINEER OF RECORD : J. GRISCOM	DATE : 2-24
DRAWN BY : DGE 5/09	REV. 12/5/11 MAA/AAC
CHECKED BY : BCH 6/09	REV. 8/14 MAA/IMG

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1			3			TOTAL SHEETS 14
2			4			





NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

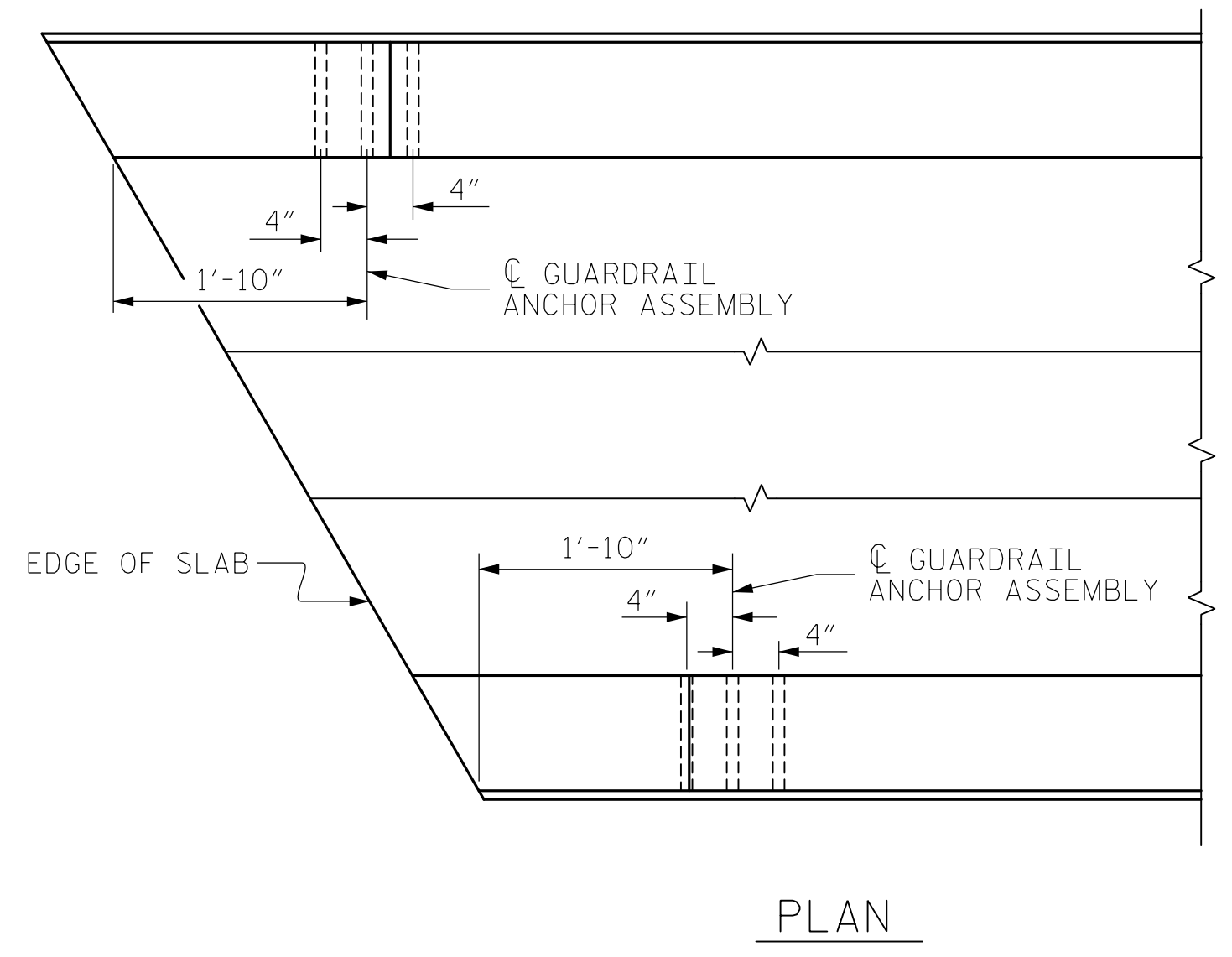
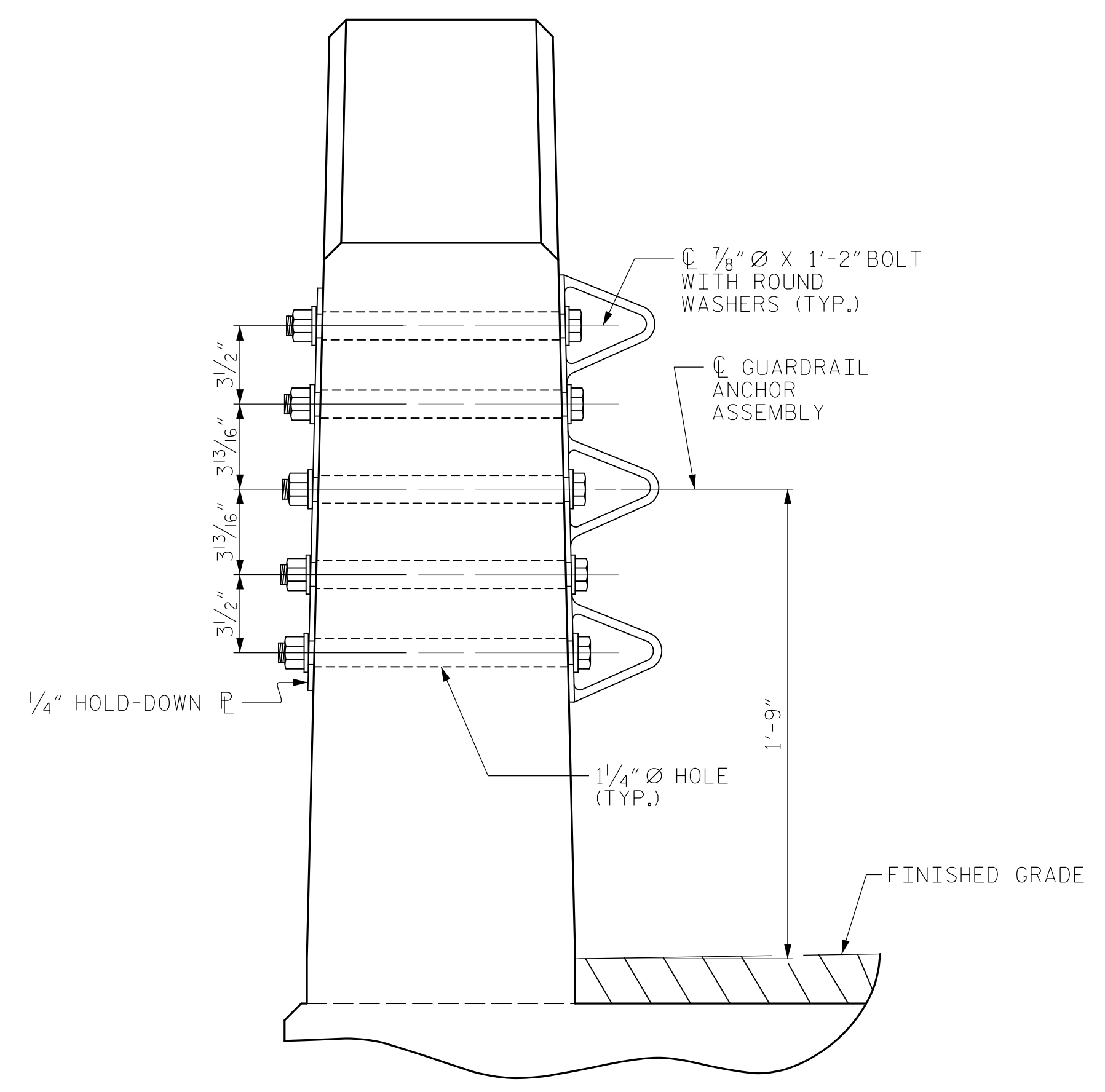
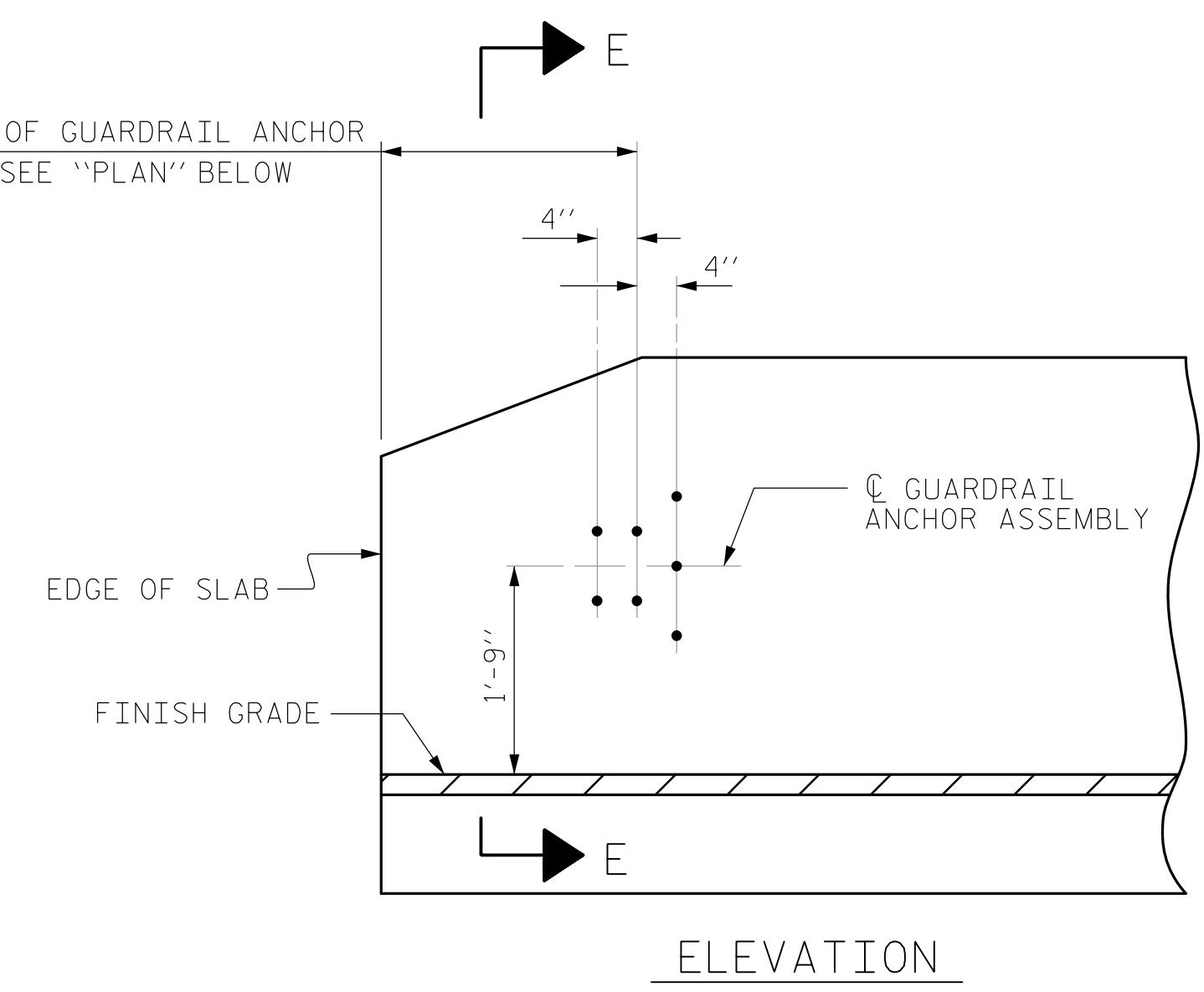
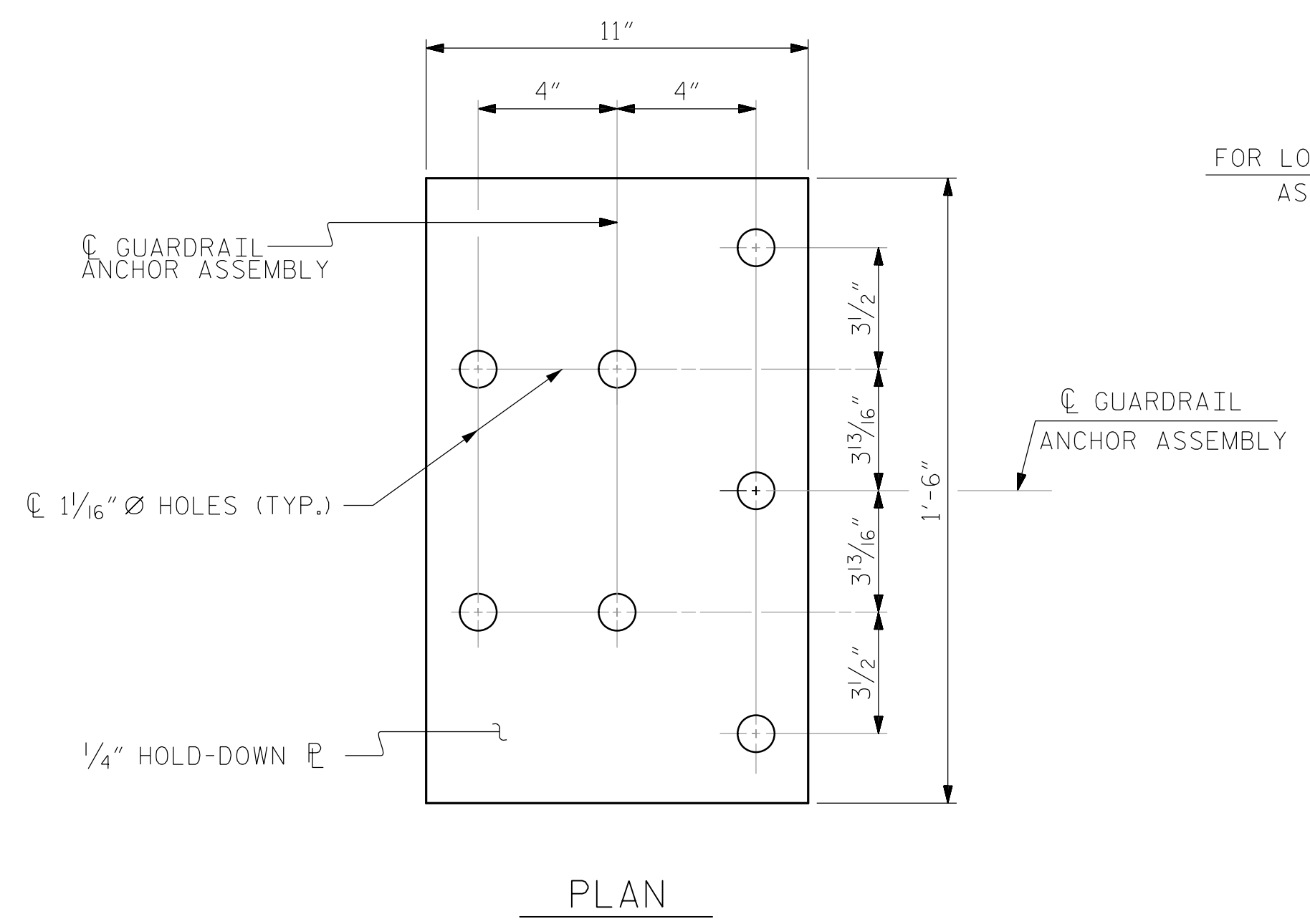
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

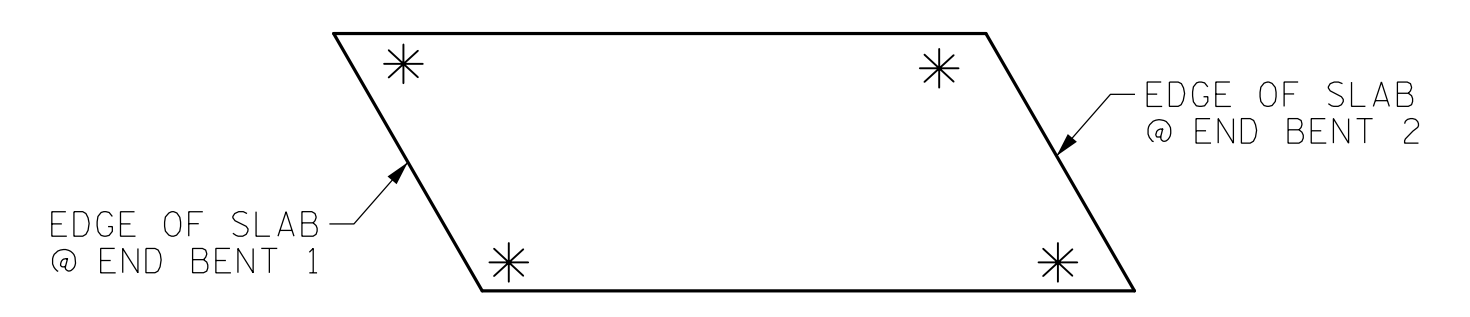
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

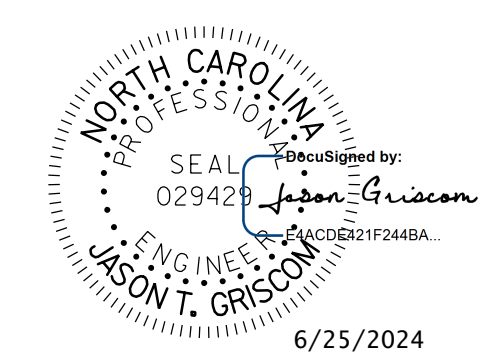
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



LOCATION OF ANCHORS FOR GUARDRAIL  
END BENT #1 SHOWN, END BENT #2 SIMILAR.



PROJECT NO. BP10-R040  
UNION COUNTY  
 STATION: 14+75.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 GUARDRAIL ANCHORAGE  
 DETAILS FOR  
 VERTICAL CONCRETE  
 BARRIER RAIL

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2			4		

TOTAL SHEETS: 14

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ASSEMBLED BY : J.W.J.	DATE : 10-22
CHECKED BY : M.L.O.	DATE : 10-22
DESIGN ENGINEER OF RECORD : J. GRISCOM	DATE : 2-24
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

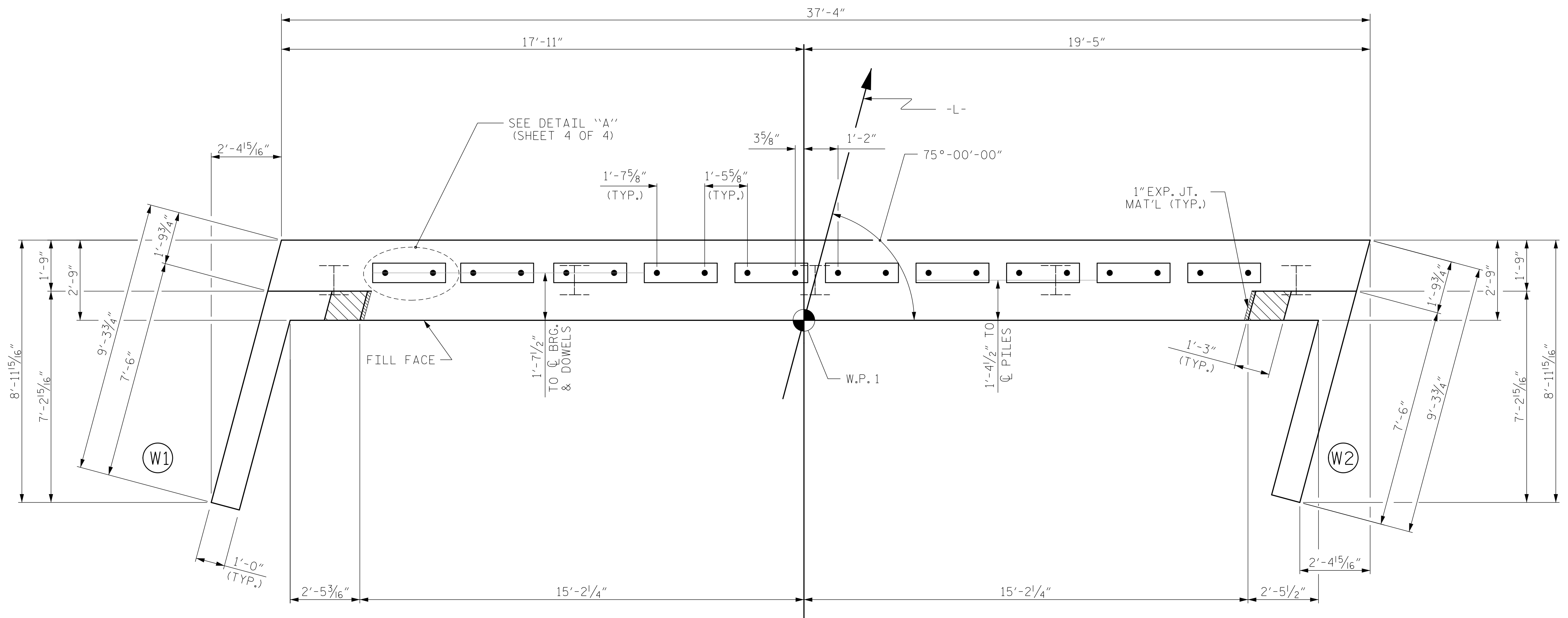
### NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

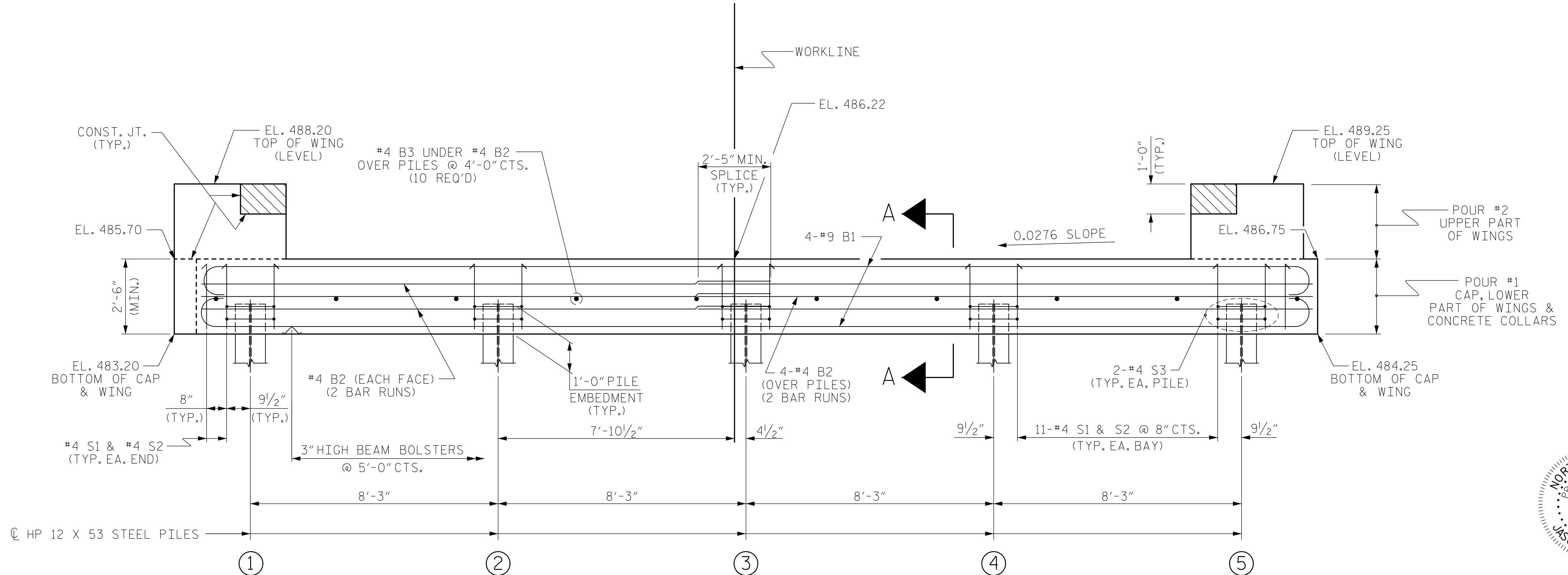
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.



### PLAN



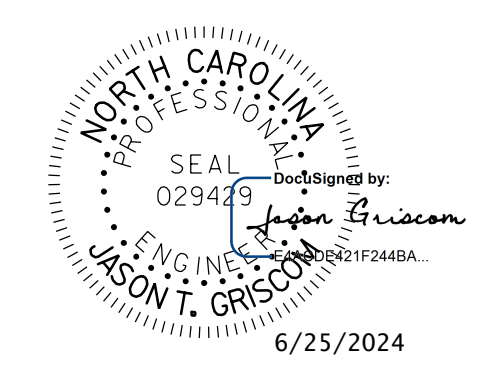
### ELEVATION

TOP OF PILE ELEVATIONS	
①	484.28
②	484.51
③	484.74
④	484.97
⑤	485.19

PROJECT NO. BP10-R040  
UNION COUNTY  
 STATION: 14+75.00 -L-  
 SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1



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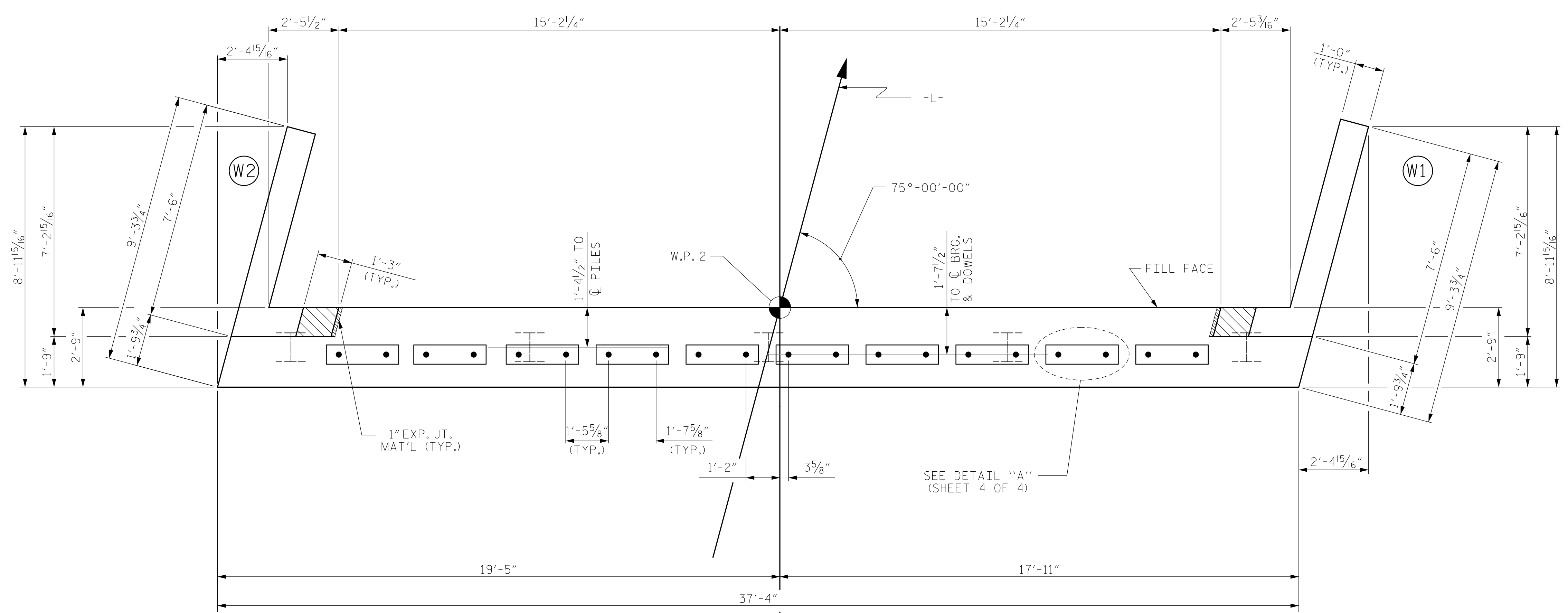
WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

ASSEMBLED BY : J.W.J.	DATE : 10-22
CHECKED BY : M.L.O.	DATE : 10-22
DESIGN ENGINEER OF RECORD : J. GRISCOM	DATE : 2-24
DRAWN BY : DGE 01/10	REV. 4/15 MAA/TMG
CHECKED BY : MKT 01/10	

REVISIONS				SHEET NO.		
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS 14
2			4			

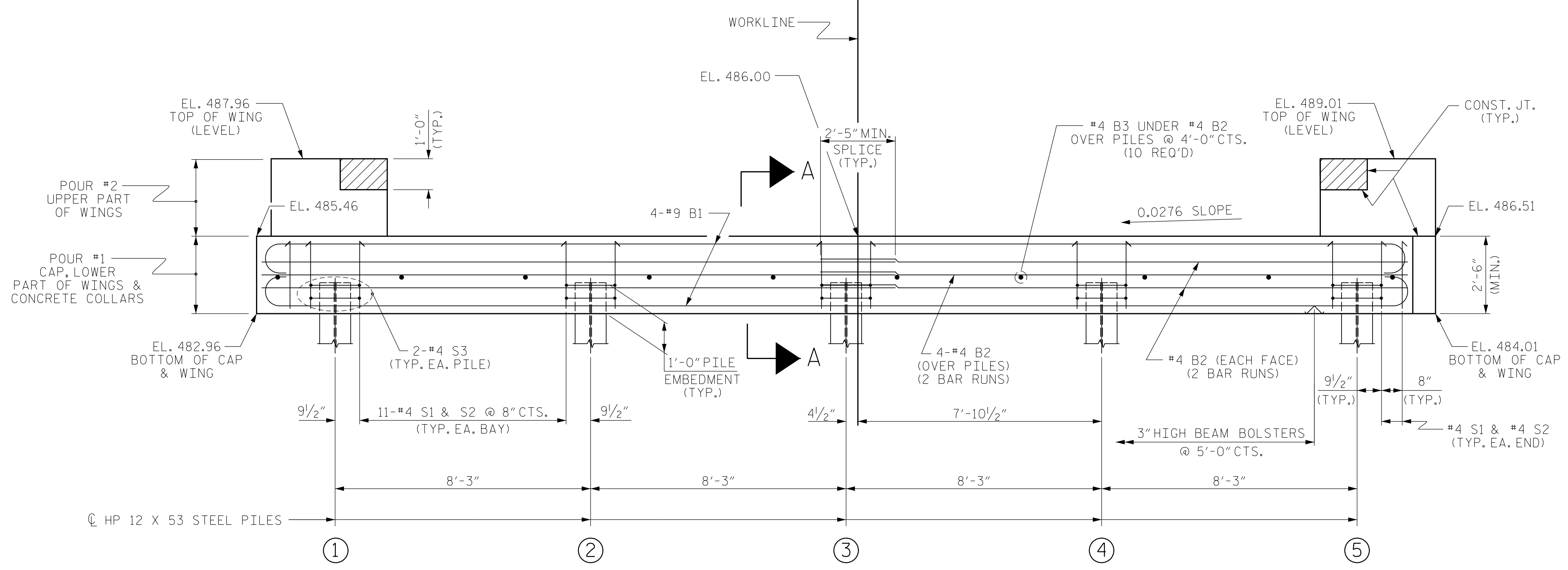
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.  
 FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.  
 FOR WING DETAILS, SEE SHEET 3 OF 4.



PLAN

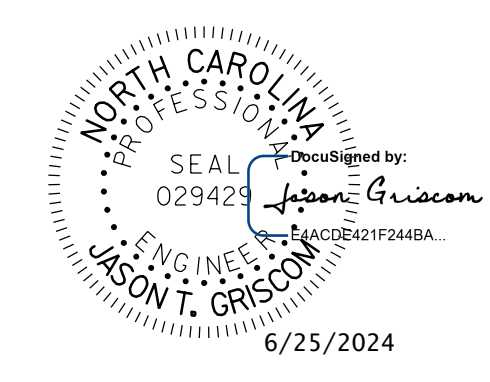
TOP OF PILE ELEVATIONS	
①	484.04
②	484.27
③	484.50
④	484.73
⑤	484.96



ELEVATION

WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. BP10-R040  
 \_\_\_\_\_ UNION \_\_\_\_\_ COUNTY  
 STATION: 14+75.00 -L-  
 SHEET 2 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 2



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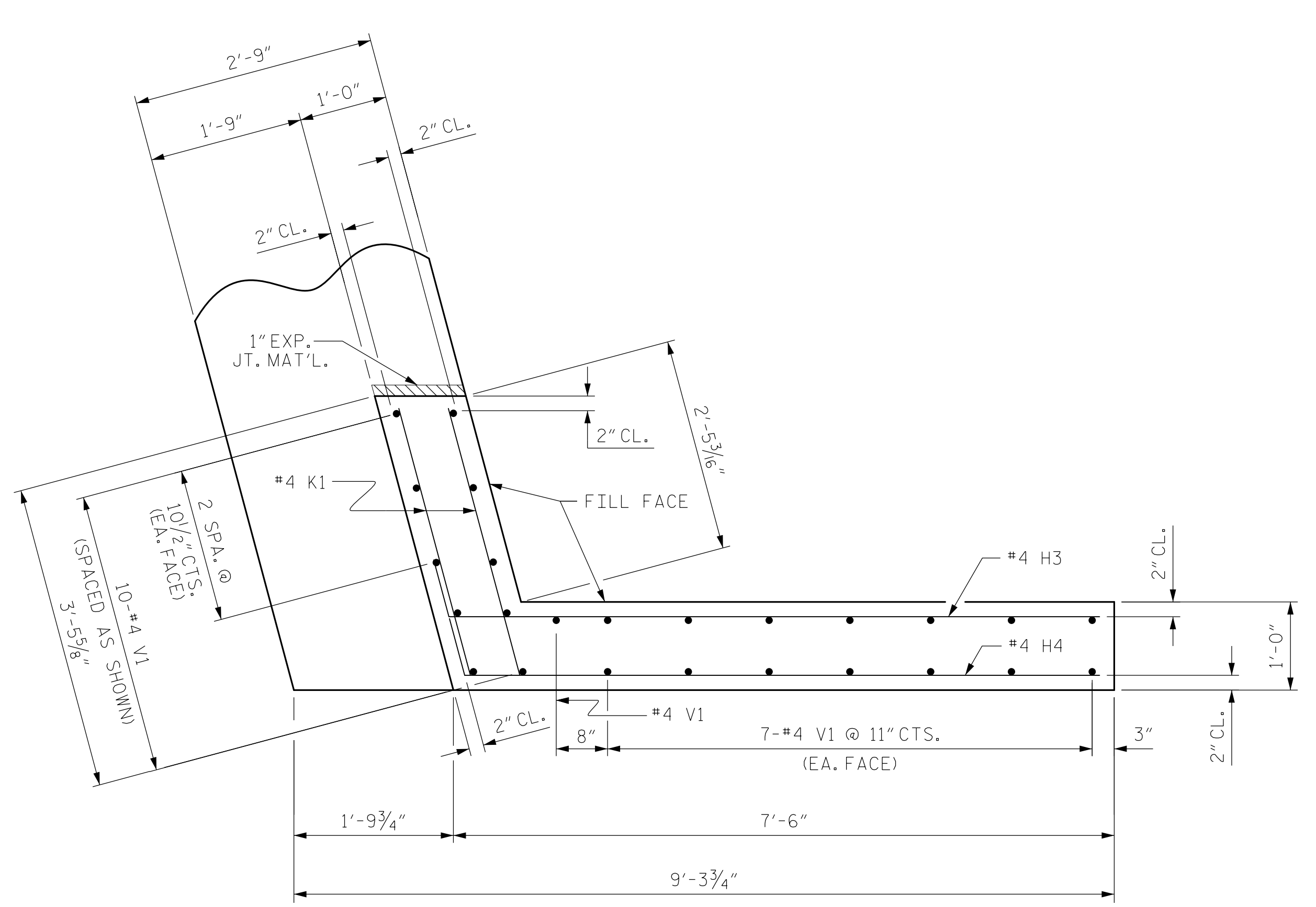
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NO.	BY:	DATE:	NO.	DATE:
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2			4	

S-10  
 TOTAL SHEETS 14

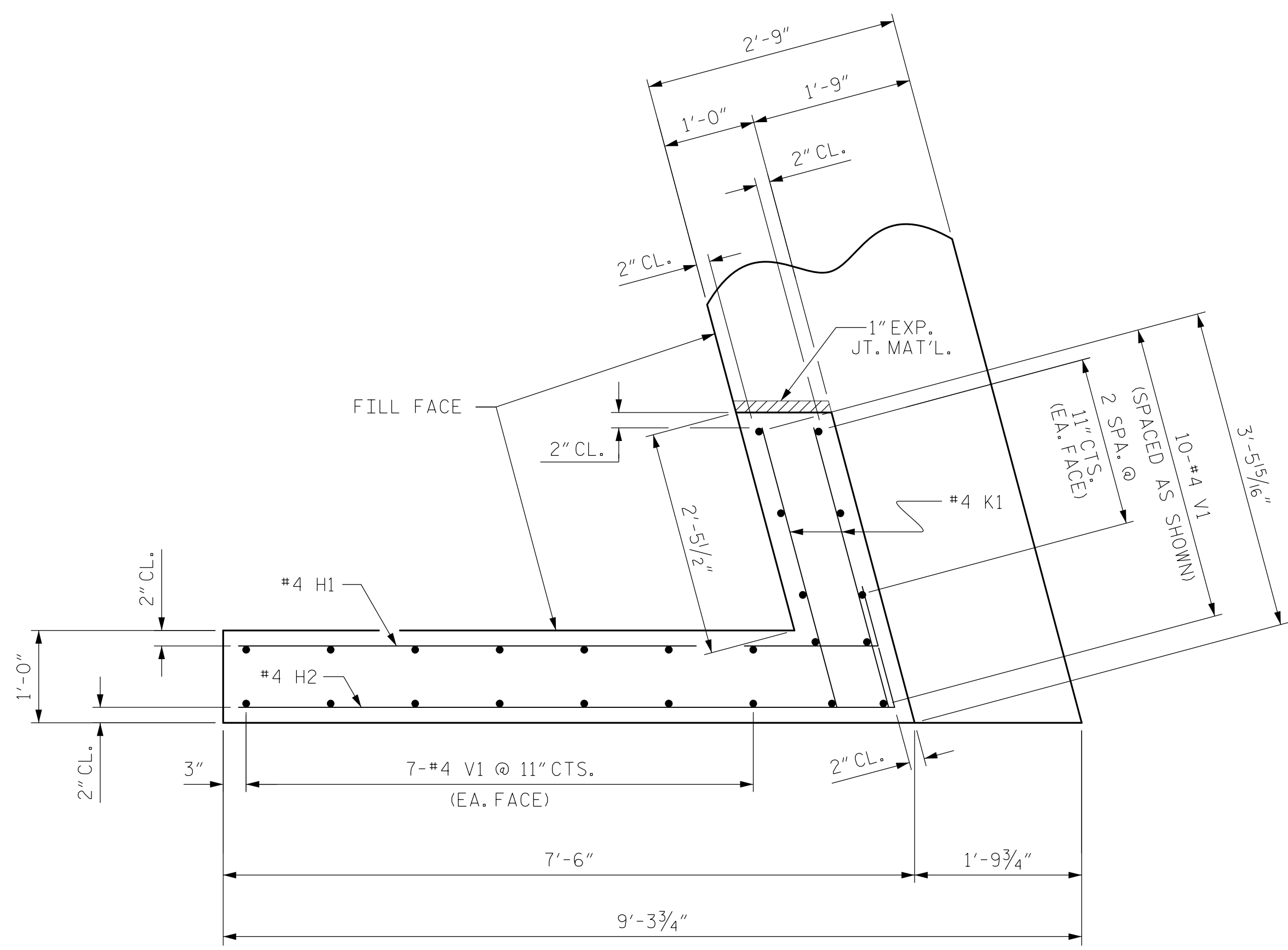
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ASSEMBLED BY : J.W.J.	DATE : 10-22
CHECKED BY : M.L.O.	DATE : 10-22
DESIGN ENGINEER OF RECORD : J. GRISCOM	DATE : 2-24
DRAWN BY : DGE 01/10	REV. 4/15 MAA/TMG
CHECKED BY : MKT 01/10	

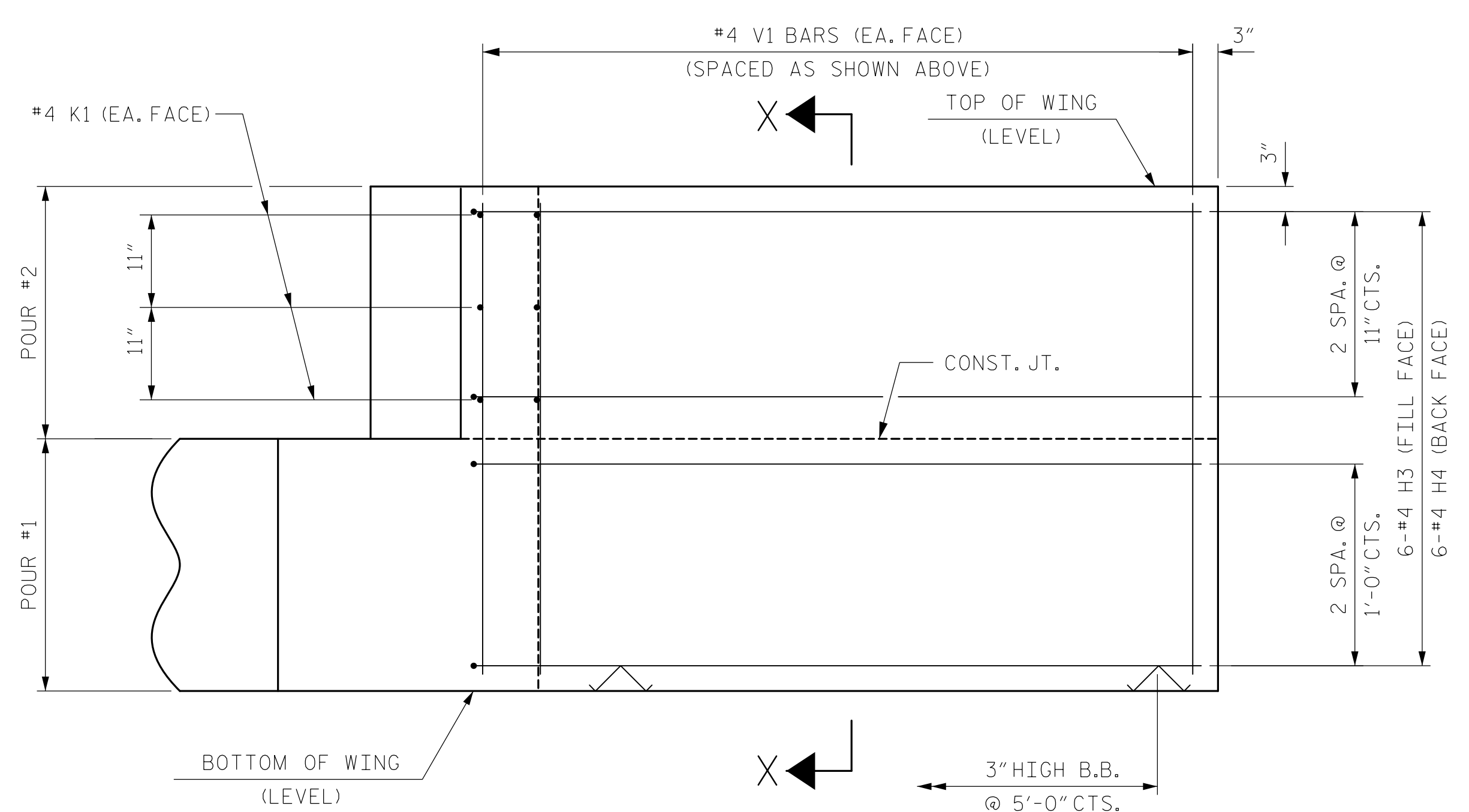
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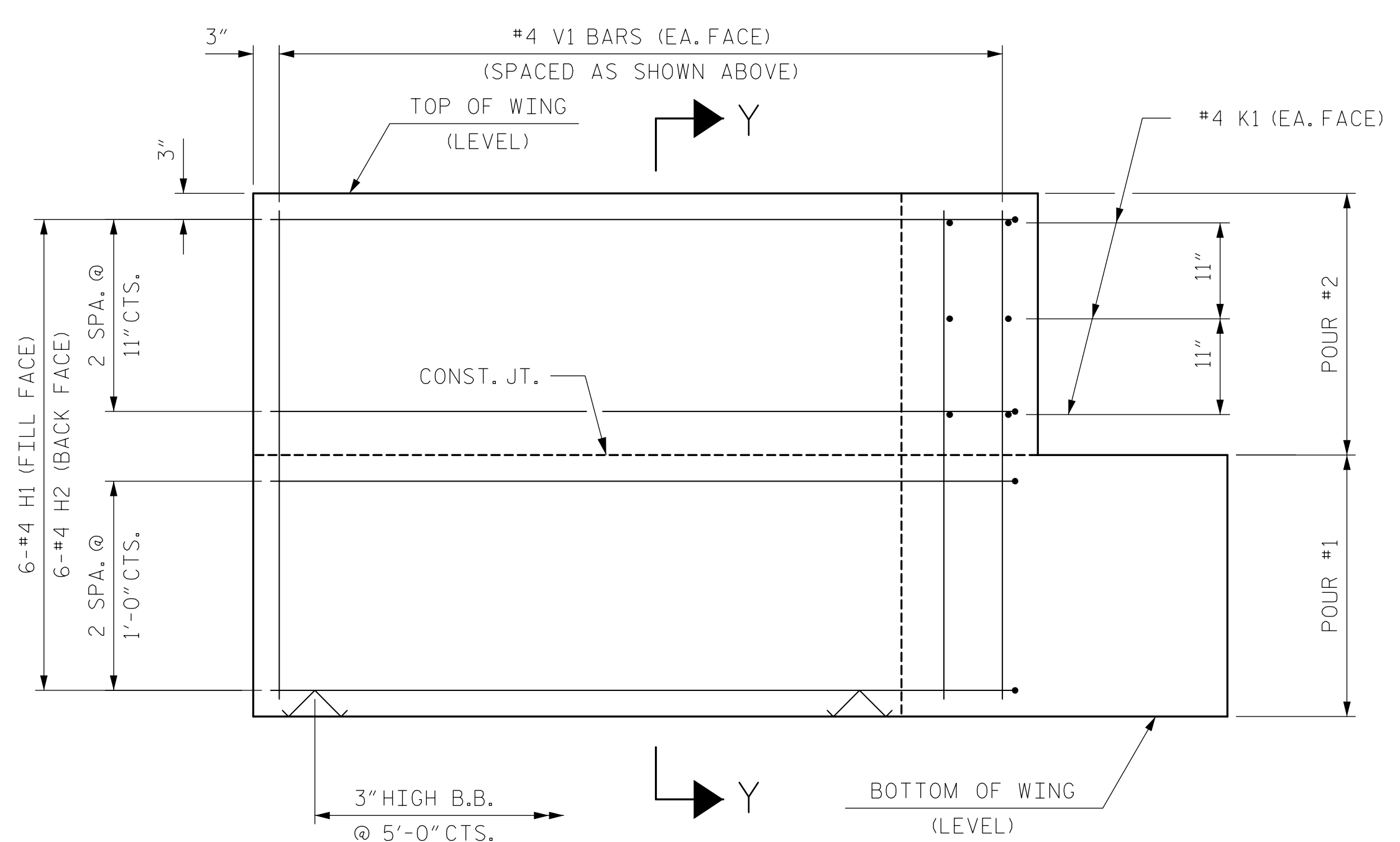
PLAN OF WING (W1)



PLAN OF WING (W2)

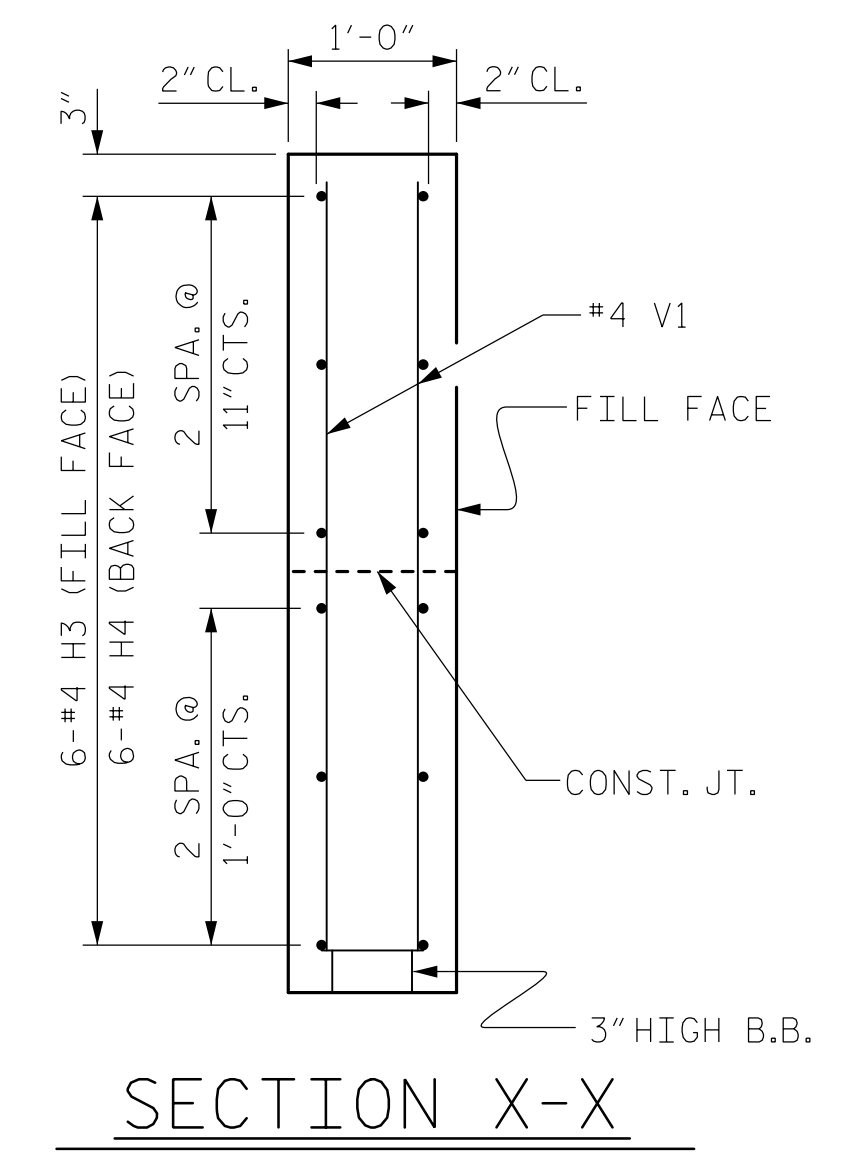


ELEVATION OF WING (W1)

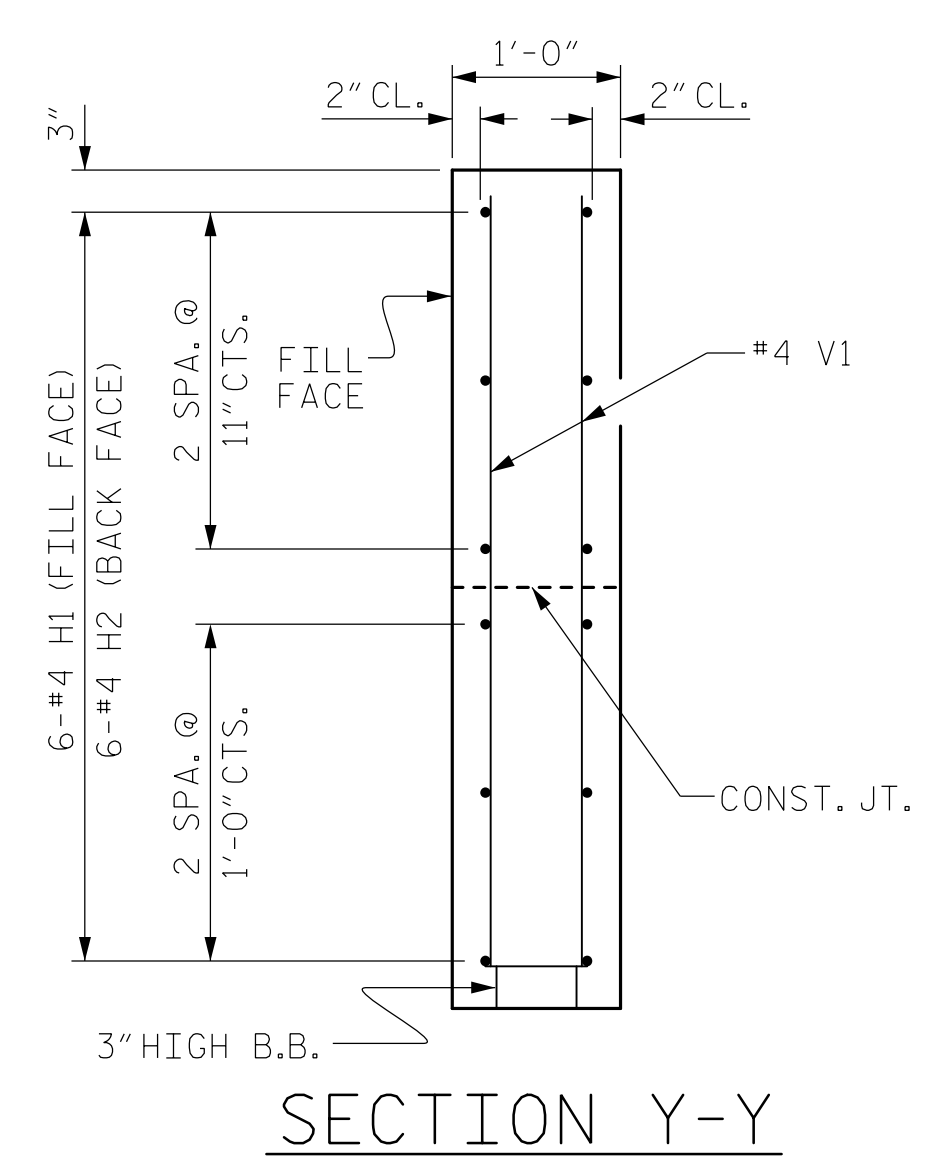


ELEVATION OF WING (W2)

WING DETAILS

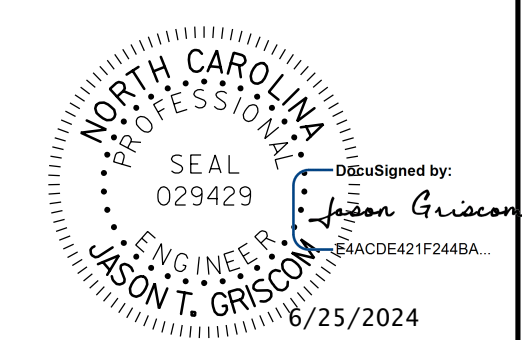


SECTION X-X



SECTION Y-Y

PROJECT NO. BP10-R040  
 UNION \_\_\_\_\_ COUNTY \_\_\_\_\_  
 STATION: 14+75.00 -L-  
 SHEET 3 OF 4



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT  
 WING DETAILS

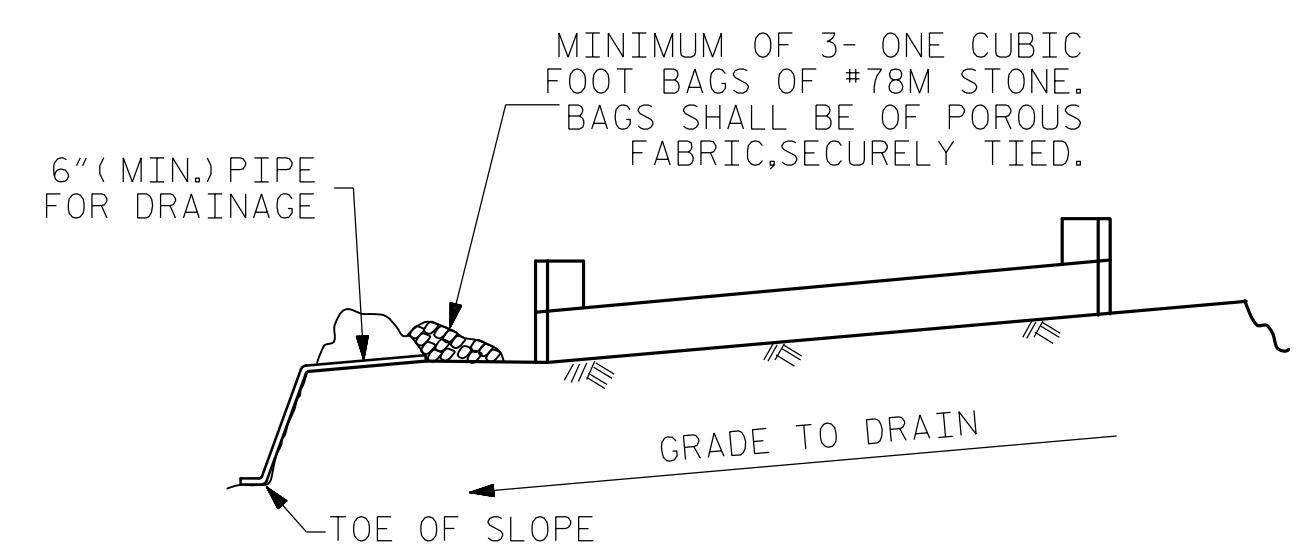
ASSEMBLED BY : J.W.J.	DATE : 10-22
CHECKED BY : M.L.O.	DATE : 10-22
DESIGN ENGINEER OF RECORD : J. GRISCOM	DATE : 2-24
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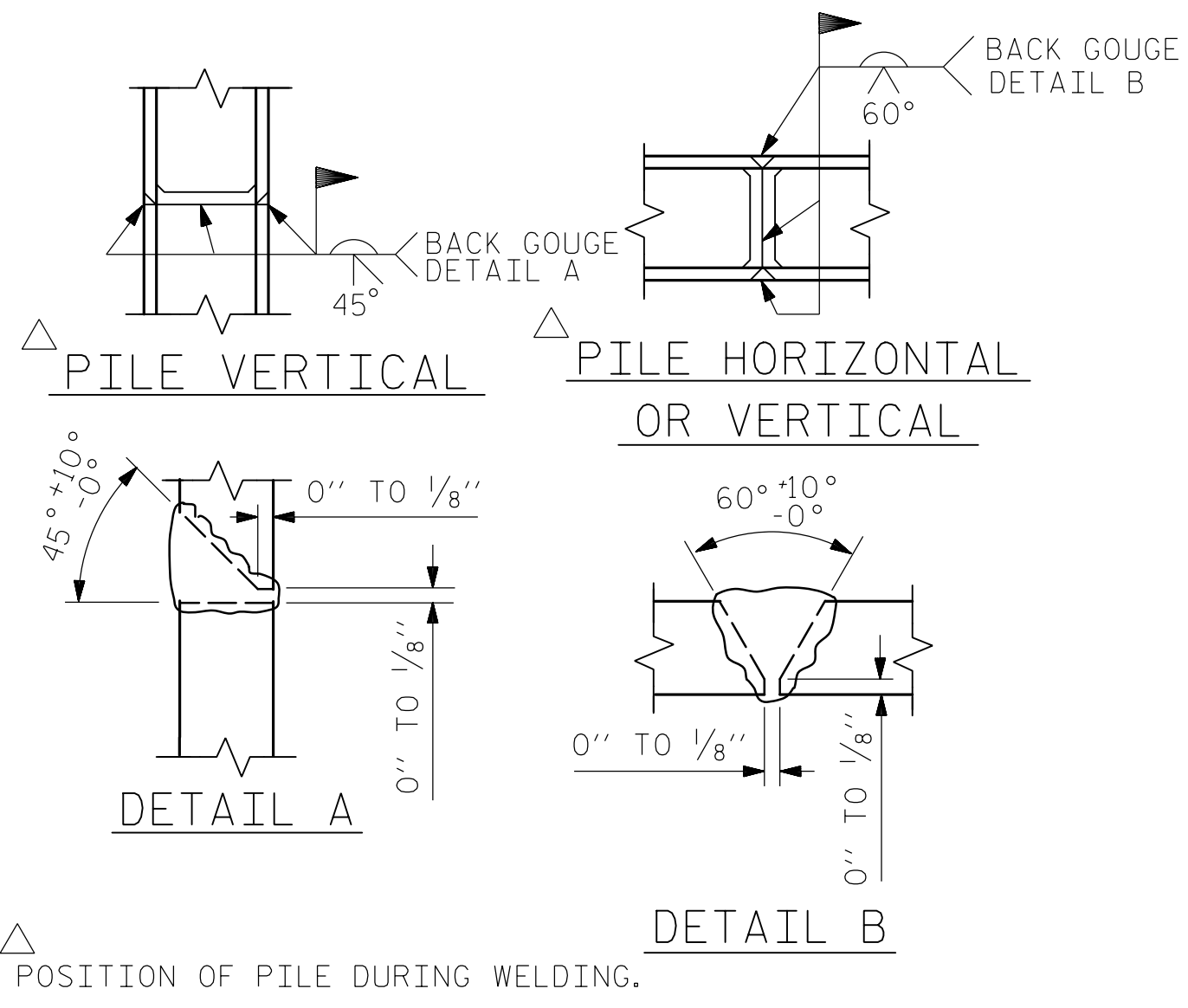


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

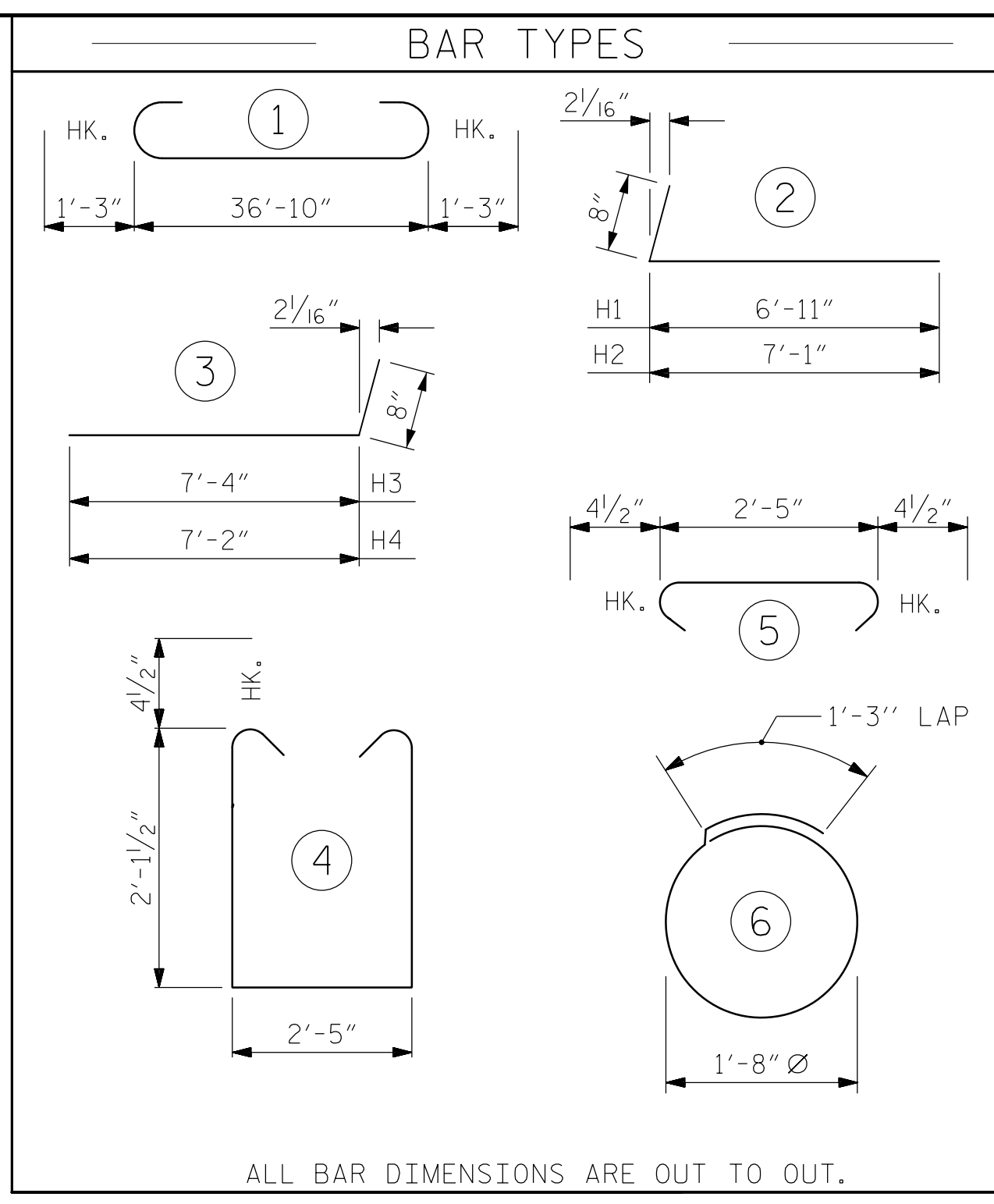
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

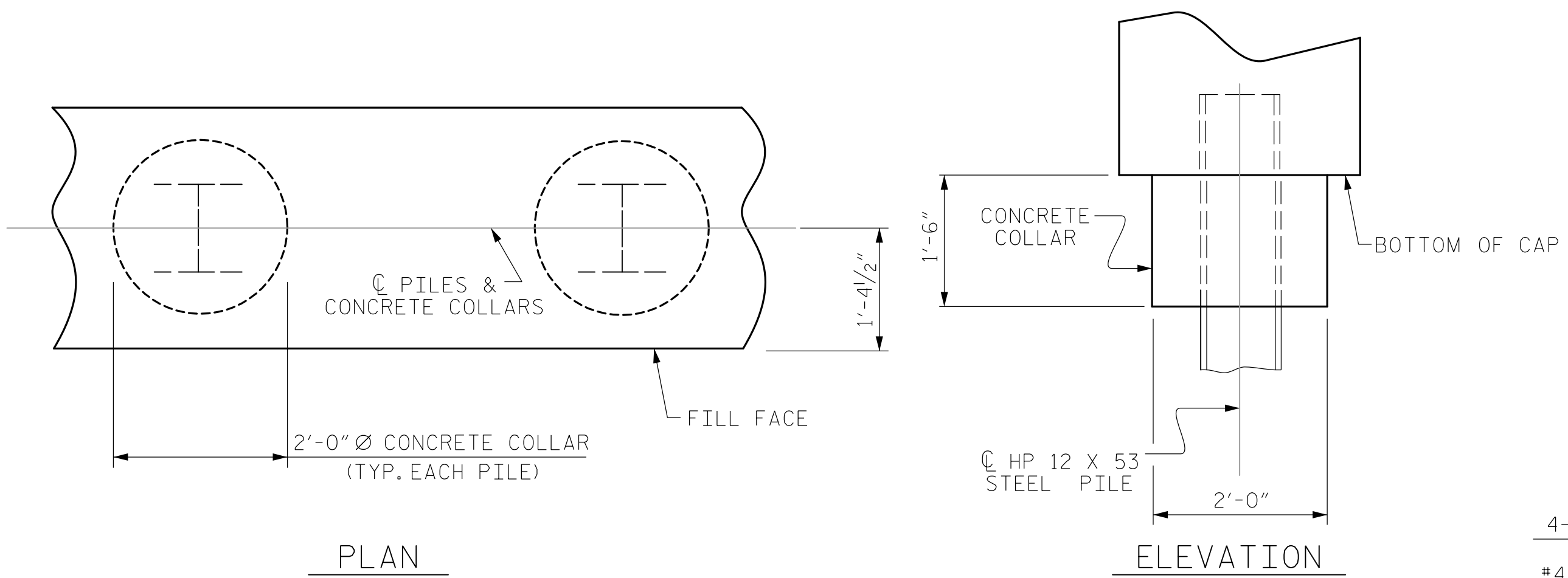
**TEMPORARY DRAINAGE AT END BENT**



**PILE SPLICE DETAILS**

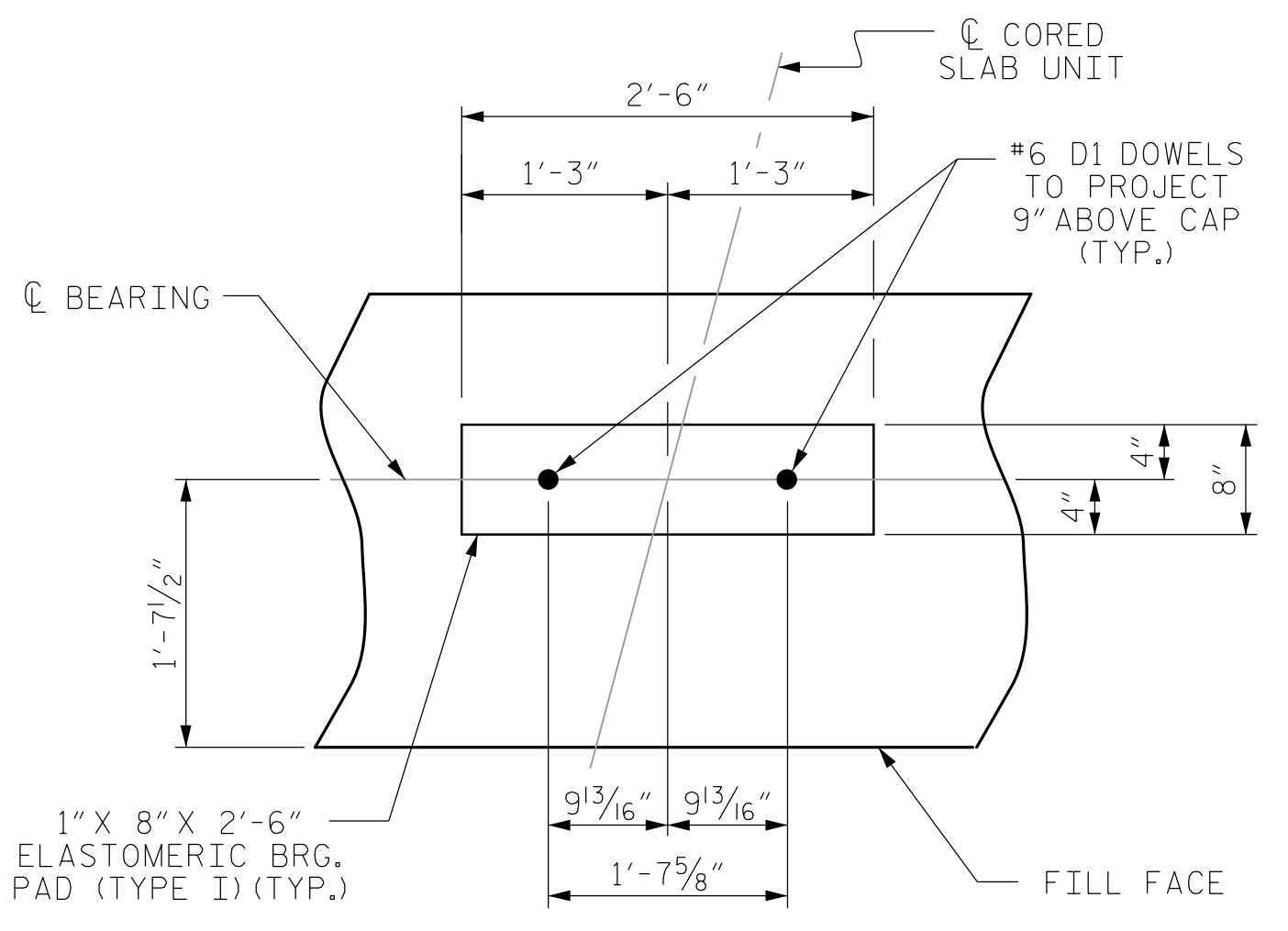
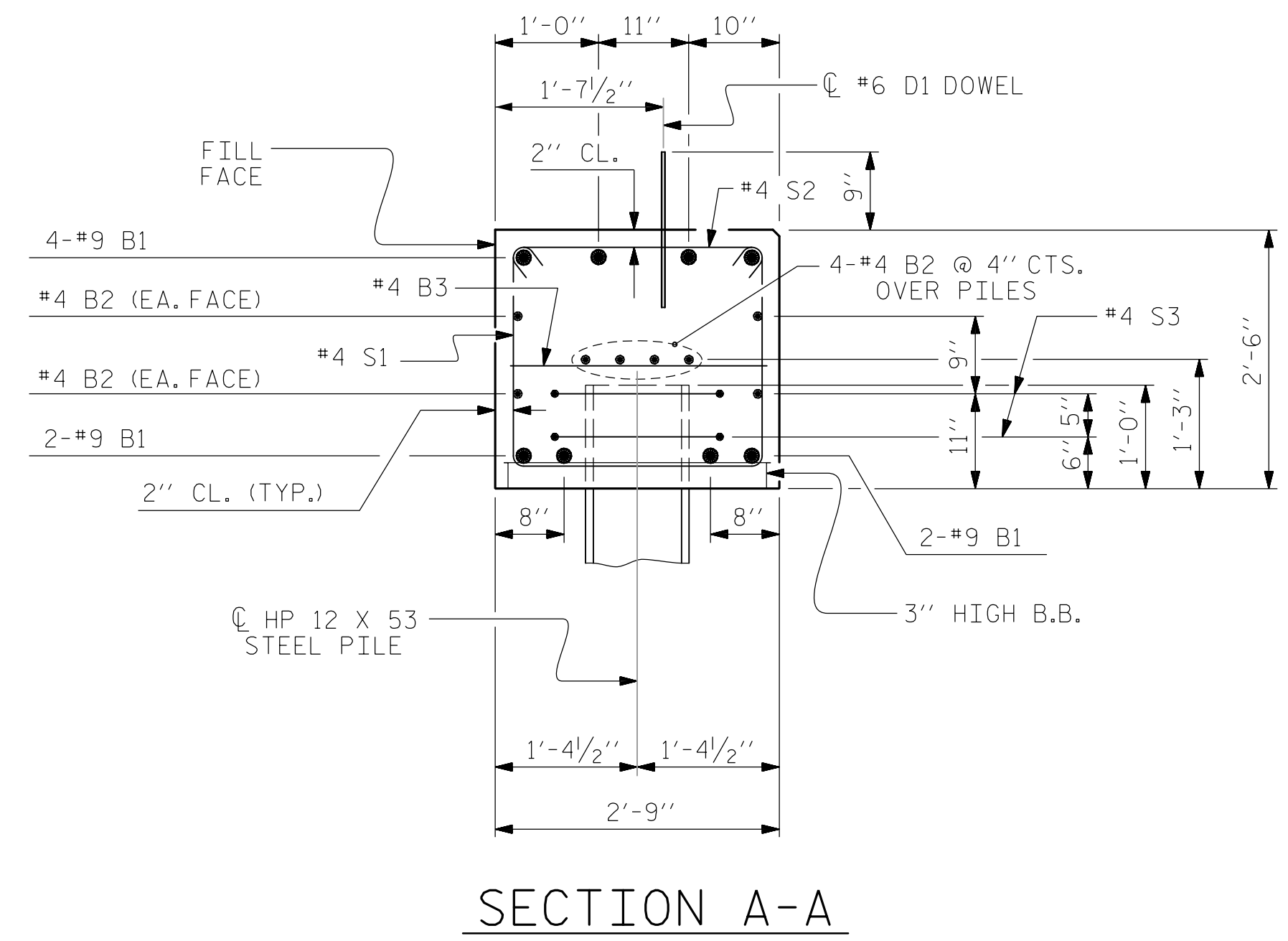


BILL OF MATERIAL FOR ONE END BENT						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	8	#9	1	39'-4"	1070	
B2	16	#4	STR	19'-9"	211	
B3		#4	STR	2'-5"	16	
D1		#6	STR	1'-6"	45	
H1	6	#4	2	7'-7"	30	
H2	6	#4	2	7'-9"	31	
H3	6	#4	3	8'-0"	32	
H4	6	#4	3	7'-10"	31	
K1	12	#4	STR	3'-1"	25	
S1		#4	4	7'-5"	238	
S2		#4	5	3'-2"	102	
S3		#4	6	6'-6"	43	
V1	49	#4	STR	4'-8"	153	
REINFORCING STEEL (FOR ONE END BENT)					2027 LBS.	
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)						
POUR #1	CAP, LOWER PART OF WINGS & COLLARS				11.6 C.Y.	
POUR #2	UPPER PART OF WINGS				1.8 C.Y.	
TOTAL CLASS A CONCRETE					13.4 C.Y.	



**CORROSION PROTECTION FOR STEEL PILES DETAIL**

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

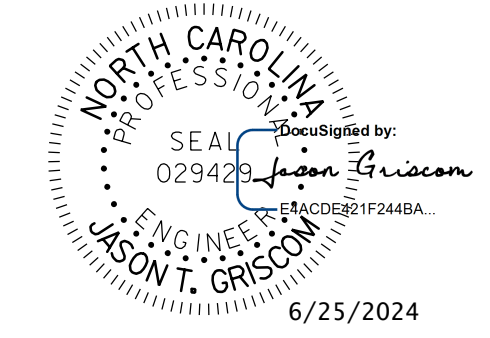


PROJECT NO. BP10-R040

                     UNION                      COUNTY

STATION: 14+75.00 -L-

SHEET 4 OF 4



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2  
DETAILS

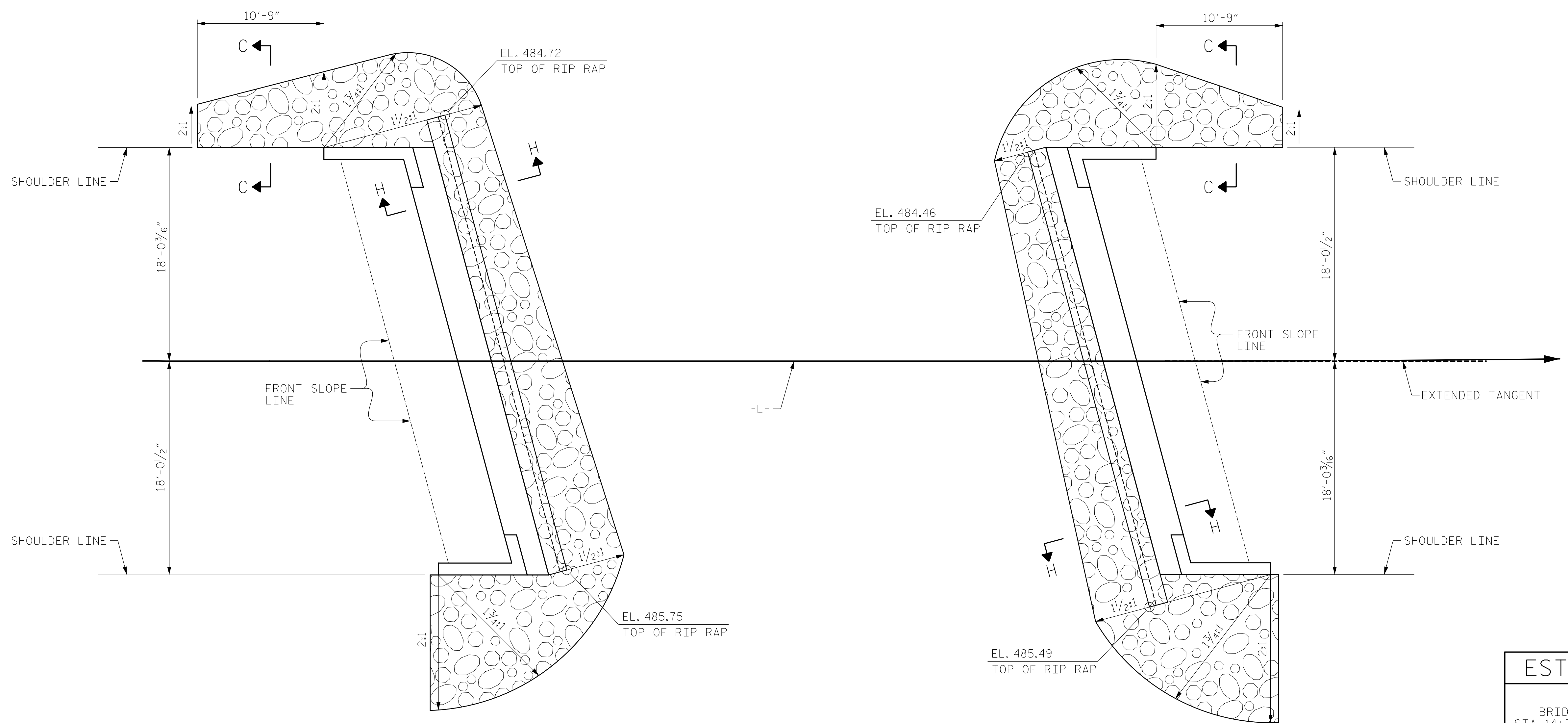
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NO.	BY:	DATE:	NO.	DATE:
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TOTAL SHEETS 14

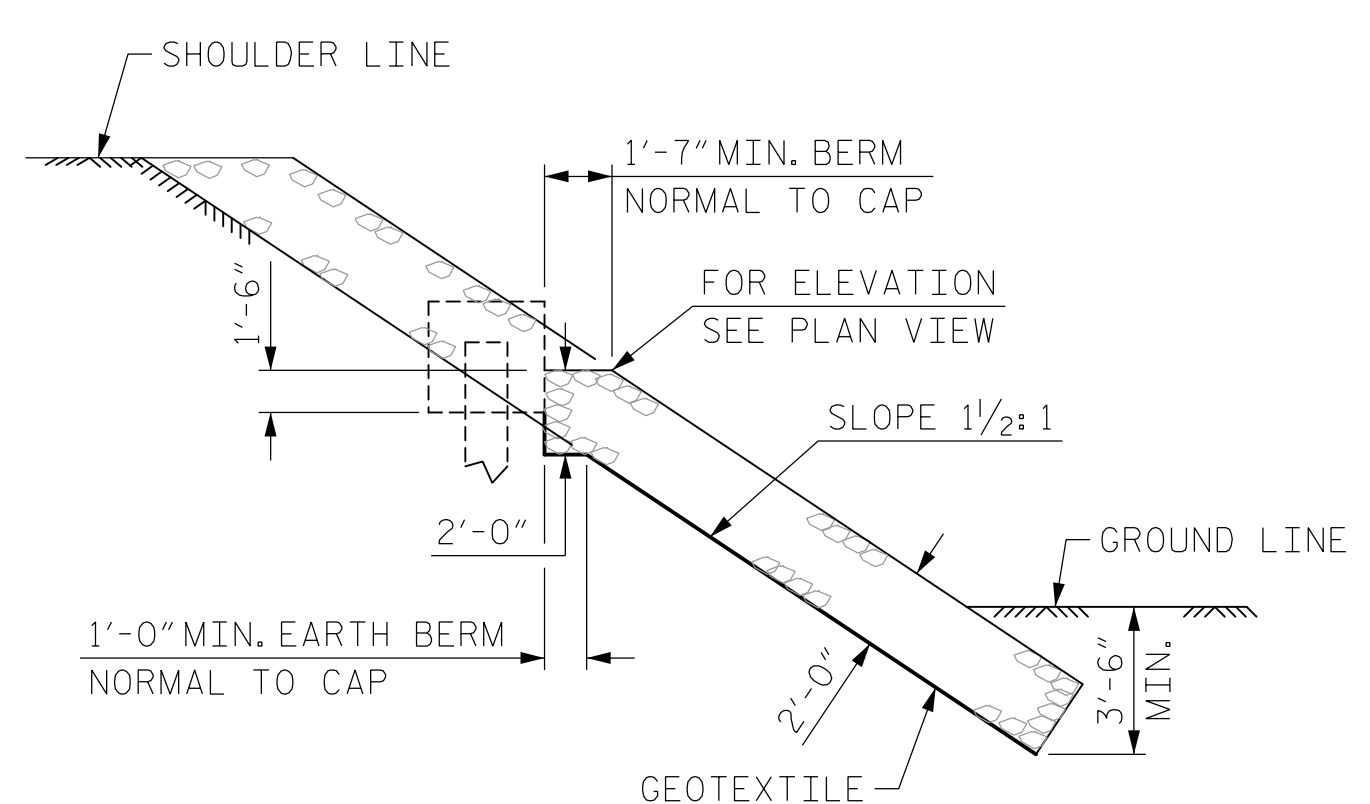
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ASSEMBLED BY : J.W.J.	DATE : 10-22
CHECKED BY : M.L.O.	DATE : 10-22
DESIGN ENGINEER OF RECORD : J. GRISCOM	DATE : 2-24
DRAWN BY : DGE 12/09	REV. 4/17
CHECKED BY : MKT 01/10	MAA/THC

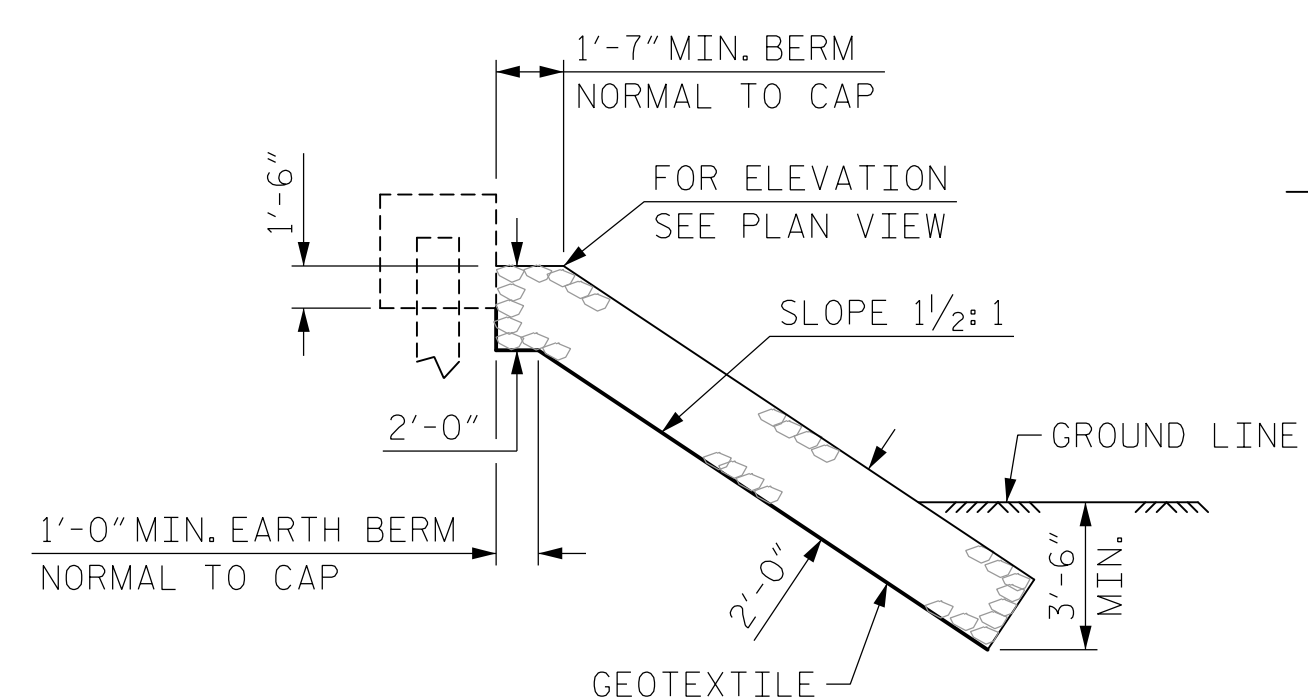
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ESTIMATED QUANTITIES		
BRIDGE @ STA. 14+75.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	90	100
END BENT 2	90	100

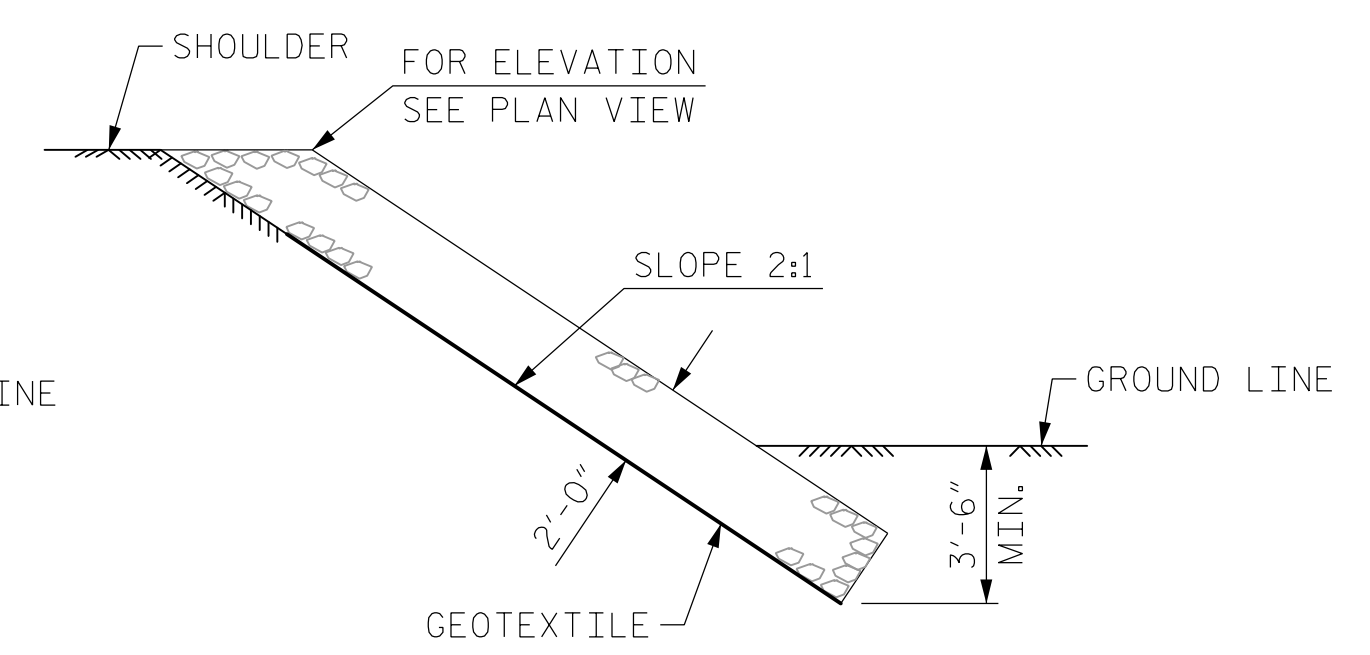


SECTION H-H



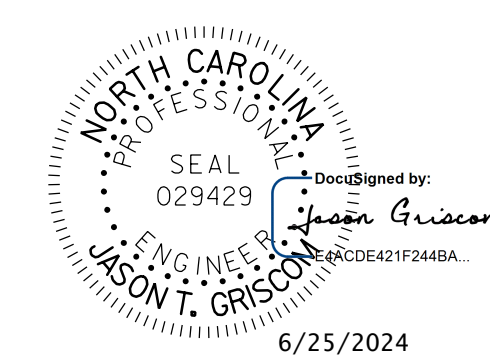
SECTION  
BERM RIP RAPPED

END BENT 1 SHOWN, END BENT 2 SIMILAR



SECTION C-C

PROJECT NO. BP10-R040  
 \_\_\_\_\_ UNION \_\_\_\_\_ COUNTY  
 STATION: 14+75.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

RIP RAP DETAILS

**stv** STV Engineers, Inc.  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
 NC License Number F-0991

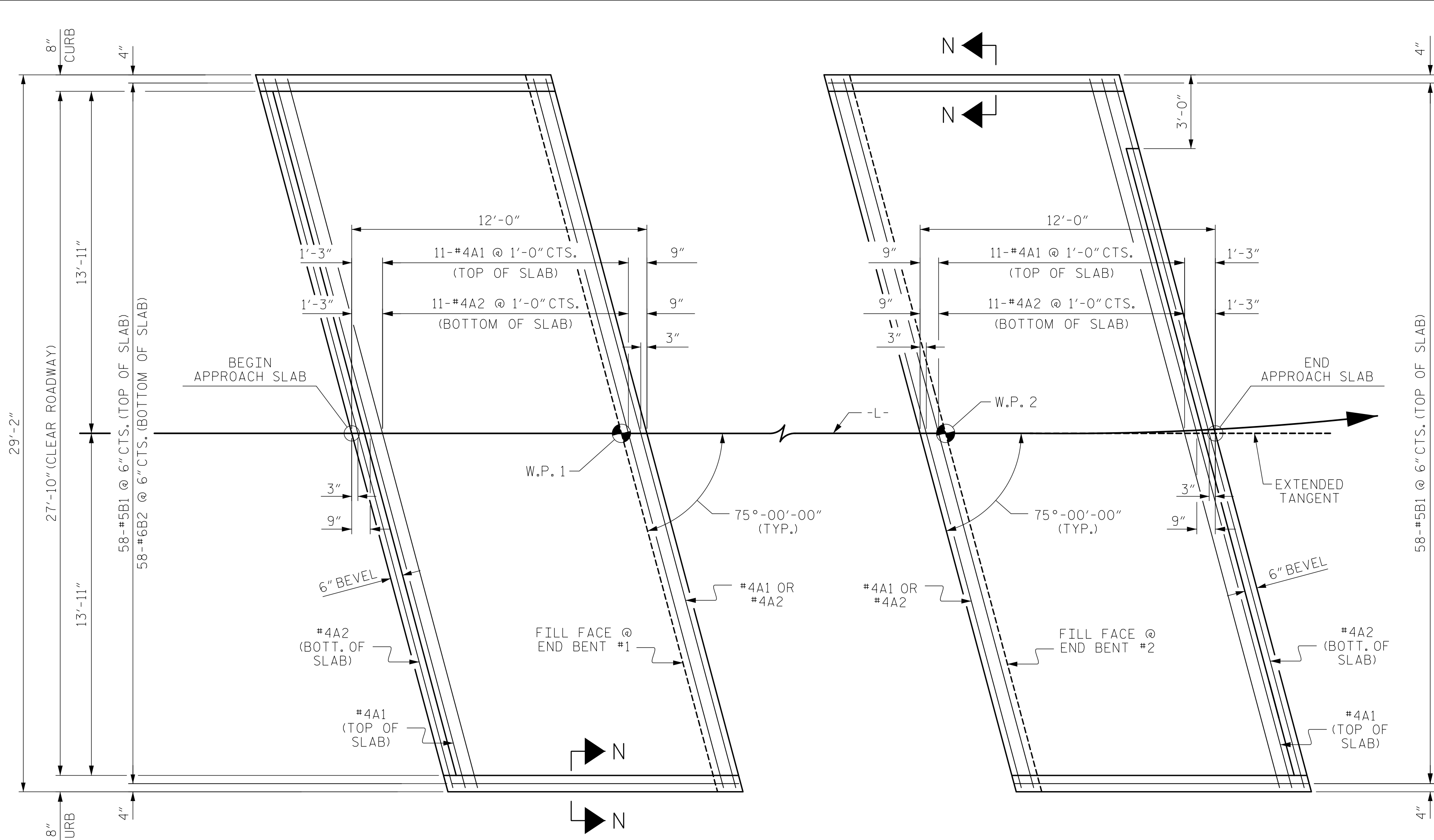
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2			4	

TOTAL SHEETS: 14

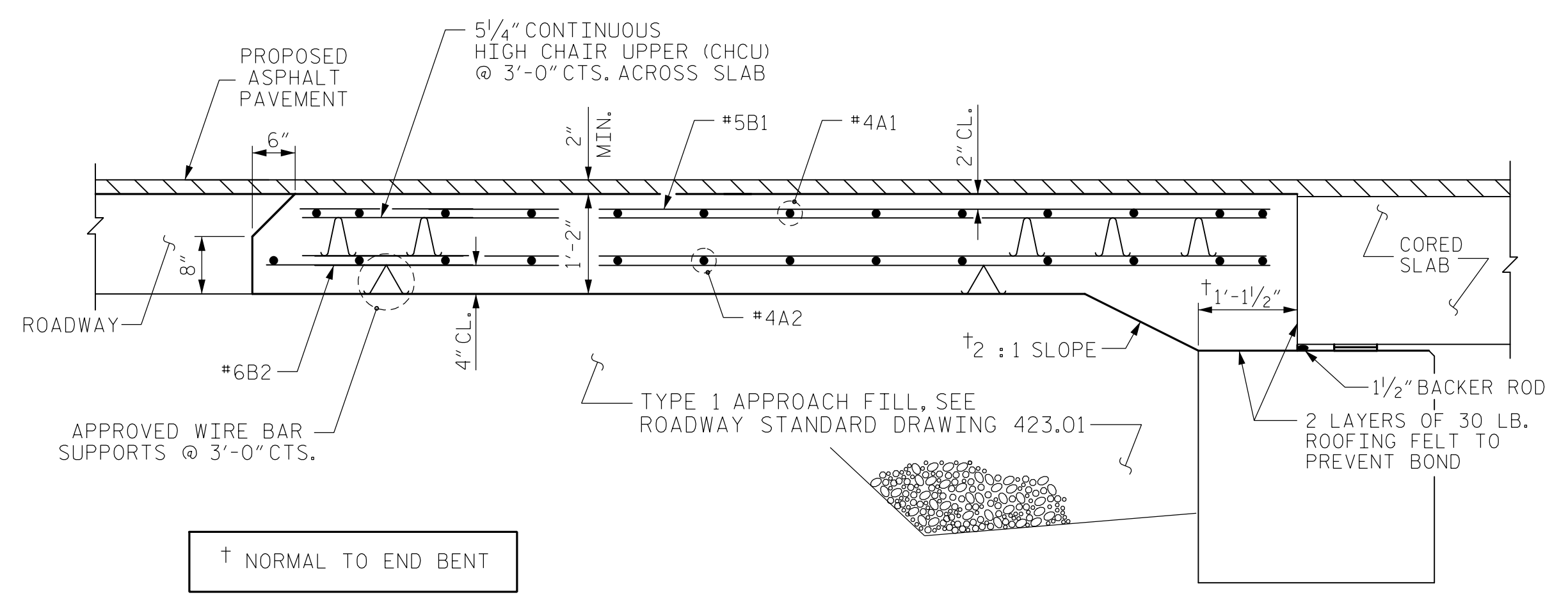
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 DESIGN ENGINEER OF RECORD : J. GRISCOM DATE : 2-24

6/17/2024 12:44:54 PM R:\Structures\ustation\Finals\401\_027\_BP10\_R040\_SML\_AS\_014\_890093.dgn

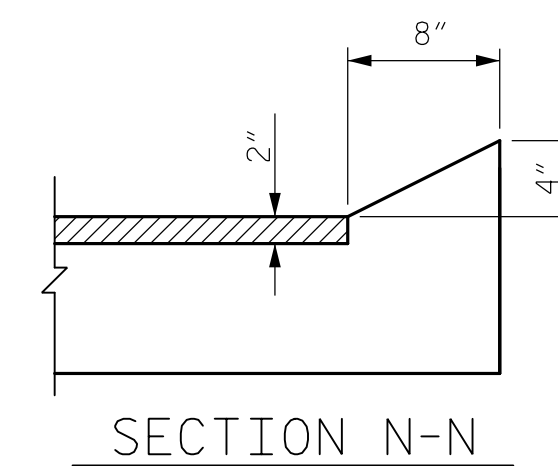


**PLAN @ END BENT #1**      **PLAN @ END BENT #2**  
 DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

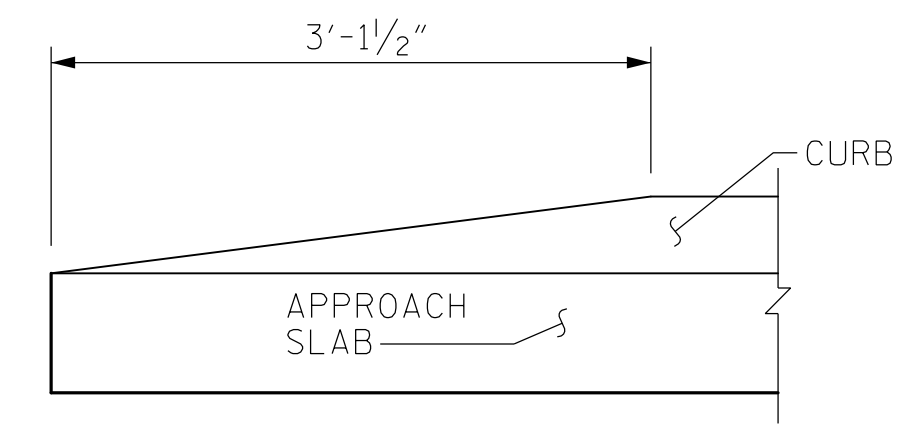
APPROACH SLAB SHALL BE CONSTRUCTED PARALLEL TO EXTENDED TANGENT



**SECTION THRU SLAB**



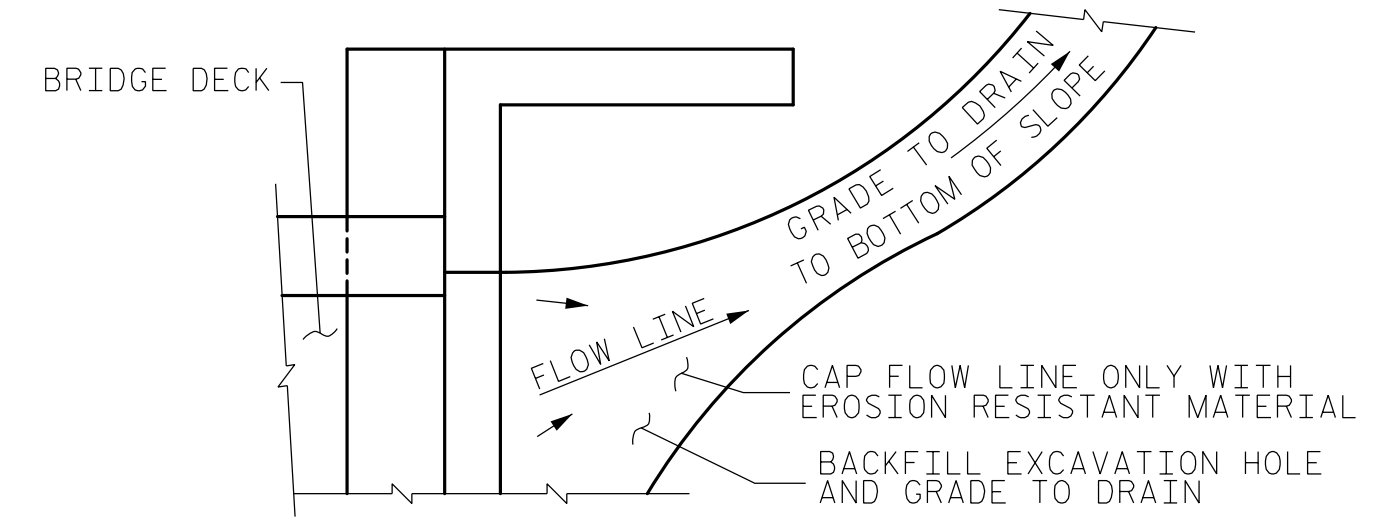
**SECTION N-N**



**CURB DETAILS**

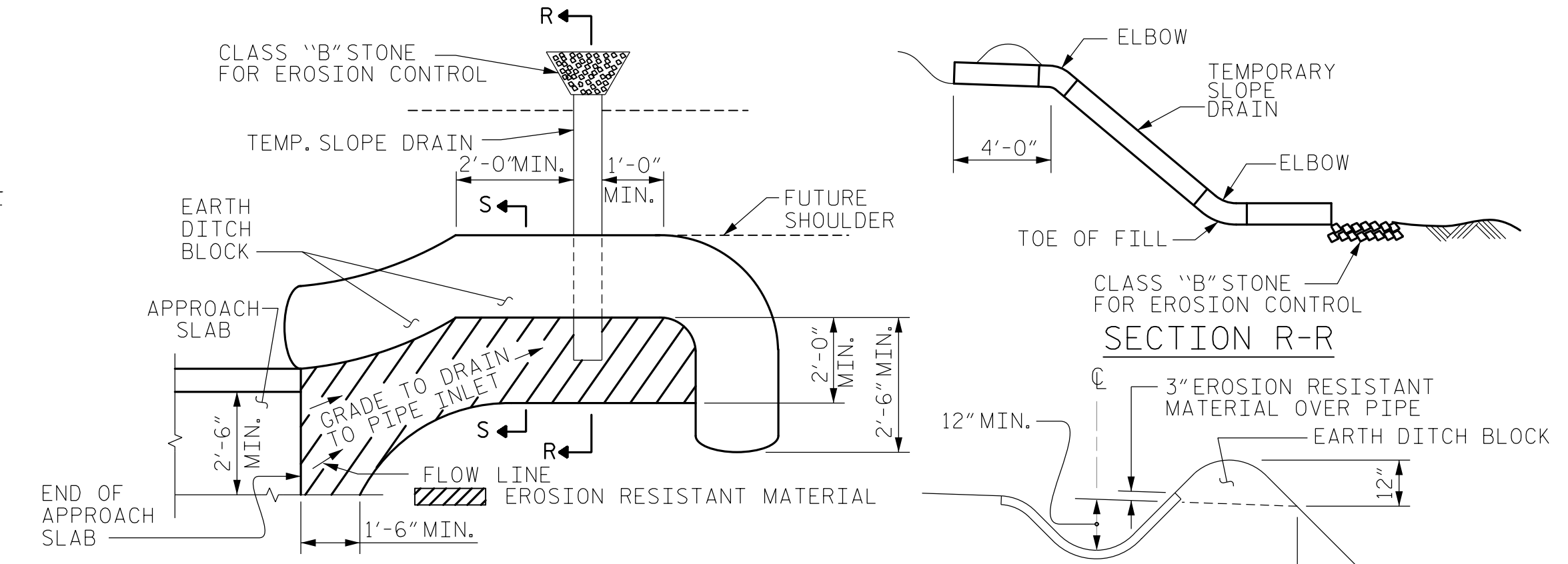
SPlice LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

**NOTES**  
 FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.  
 AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED, SEE ROADWAY PLANS.  
 APPROACH SLAB GROOVING IS NOT REQUIRED.



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

**TEMPORARY DRAINAGE DETAIL**



**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

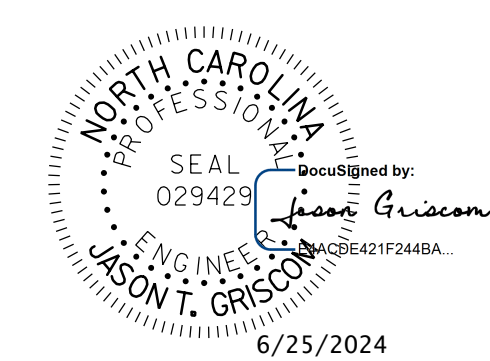
**BILL OF MATERIAL**

APPROACH SLAB AT EB #1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	13	#4	STR	29'-10"	259	
A2	13	#4	STR	29'-10"	259	
* B1	58	#5	STR	11'-1"	670	
B2	58	#6	STR	11'-7"	1009	
REINFORCING STEEL					LBS.	1268
* EPOXY COATED REINFORCING STEEL					LBS.	929
CLASS AA CONCRETE					C. Y.	16.7

**BILL OF MATERIAL**

APPROACH SLAB AT EB #2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	13	#4	STR	29'-10"	259	
A2	13	#4	STR	29'-10"	259	
* B1	58	#5	STR	11'-1"	670	
B2	58	#6	STR	11'-7"	1009	
REINFORCING STEEL					LBS.	1268
* EPOXY COATED REINFORCING STEEL					LBS.	929
CLASS AA CONCRETE					C. Y.	16.7

PROJECT NO. BP10-R040  
 UNION COUNTY  
 STATION: 14+75.00 -L-



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 (SUB-REGIONAL TIER)  
 75° SKEW

DRAWN BY : SGH	DATE : 11-22
CHECKED BY : MLO	DATE : 11-22
DESIGN ENGINEER OF RECORD : J. GRISCOM	DATE : 2-24
DRAWN BY : SHS/MAA 5-09	REV. 12-17 MAA/THC
CHECKED BY : BCH 5-09	REV. 08-19 BNB/THC

**STV** STV Engineers, Inc.  
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 Charlotte, NC 28202  
 NC License Number F-0991

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

TOTAL SHEETS: 14