

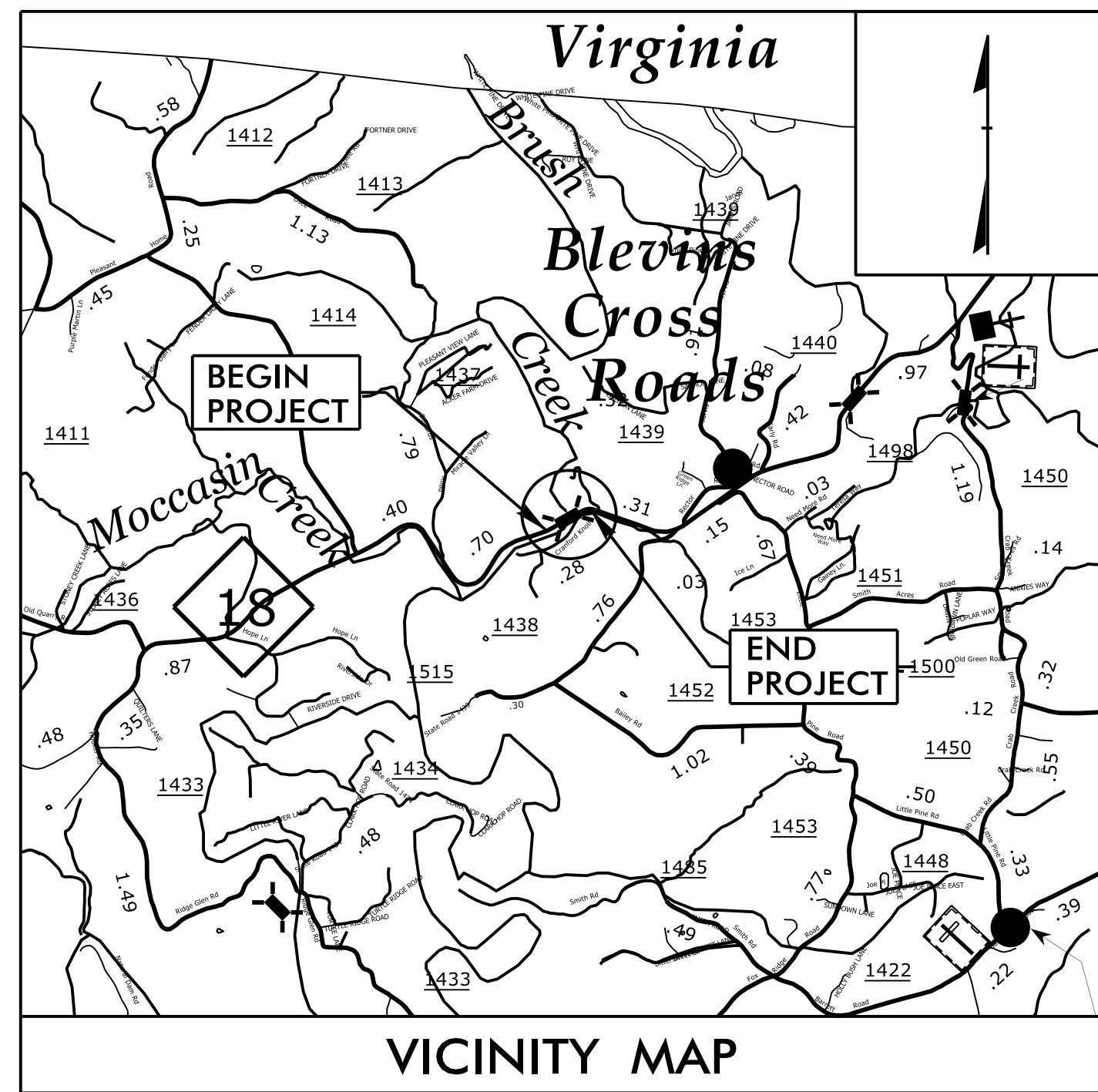
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CONTRACT: C204255 TIP PROJECT: B-5388

STRUCTURE



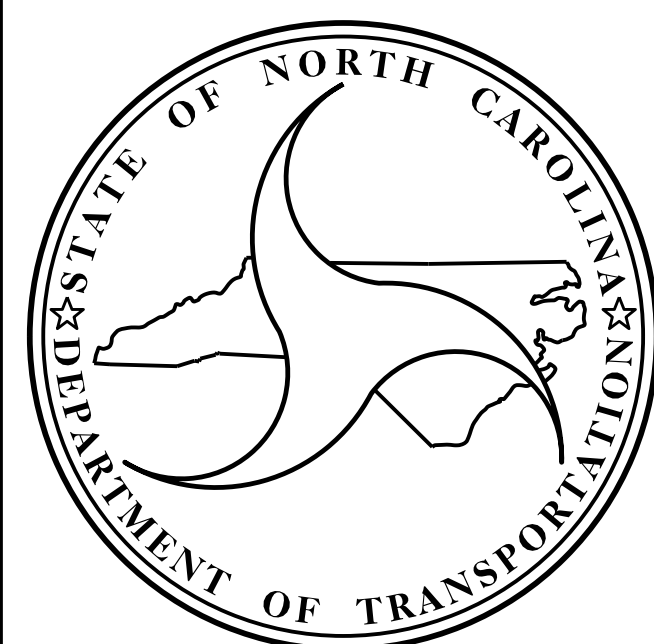
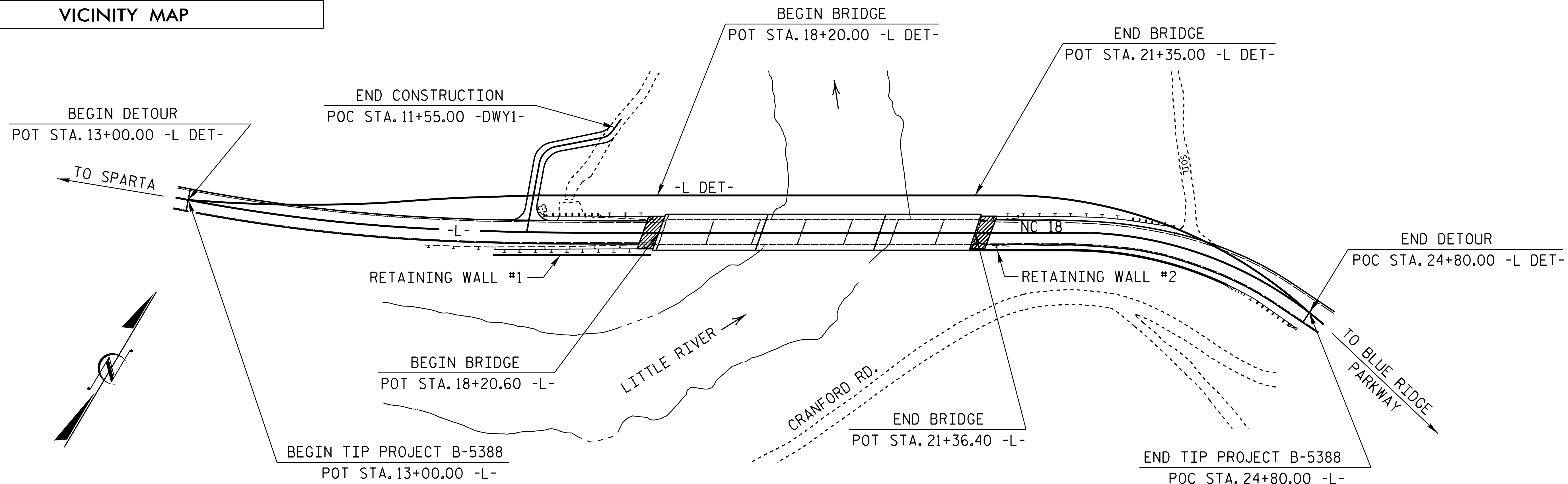
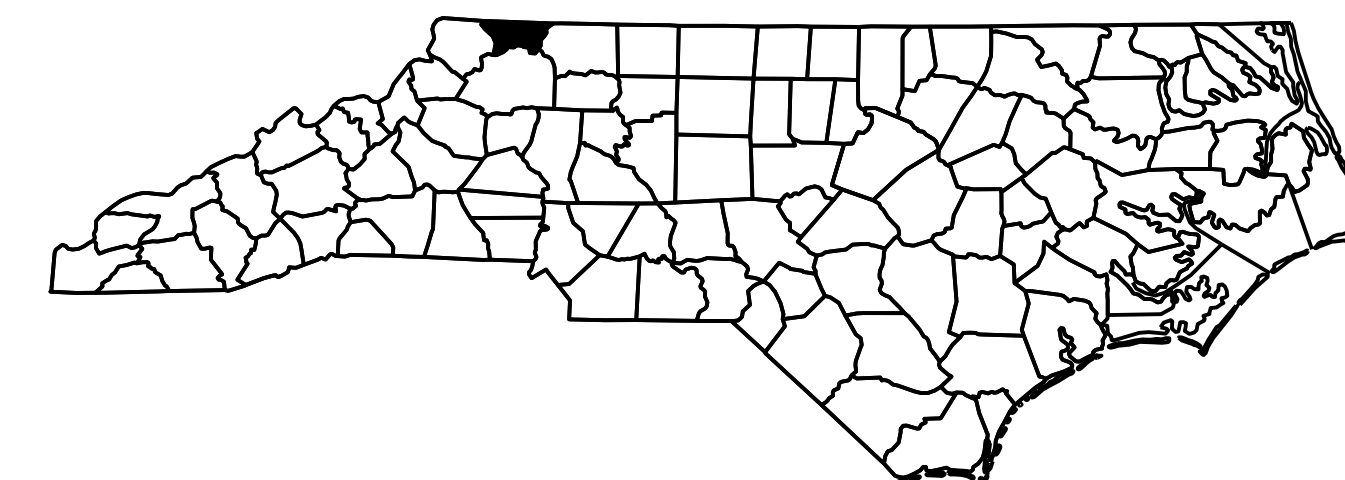
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ALLEGHANY COUNTY

LOCATION: REPLACE BRIDGE 21 OVER LITTLE RIVER ON NC 18

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5388	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
46103.1.1	N/A	P. E.	
46103.2.1	N/A	ROW/UTIL.	
46103.3.1	N/A	CONST.	



DESIGN DATA
 ADT 2020 = 1,650
 ADT 2040 = 2,000
 K = 60 %
 D = 10 %
 T = 6 % *
 V = 50 MPH
 * TTST 1% + DUAL 5%
 FUNC. CLASS. = MAJOR COLLECTOR
 REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5388 = 0.160 MILE
 LENGTH STRUCTURE TIP PROJECT B-5388 = 0.063 MILE
 TOTAL LENGTH TIP PROJECT B-5388 = 0.223 MILE

Prepared In the Office of:
DIVISION OF HIGHWAYS
 STRUCTURES MANAGEMENT UNIT
 1000 BIRCH RIDGE DR.
 RALEIGH, N.C. 27610

2018 STANDARD SPECIFICATIONS

LETTING DATE : DECEMBER 18, 2018

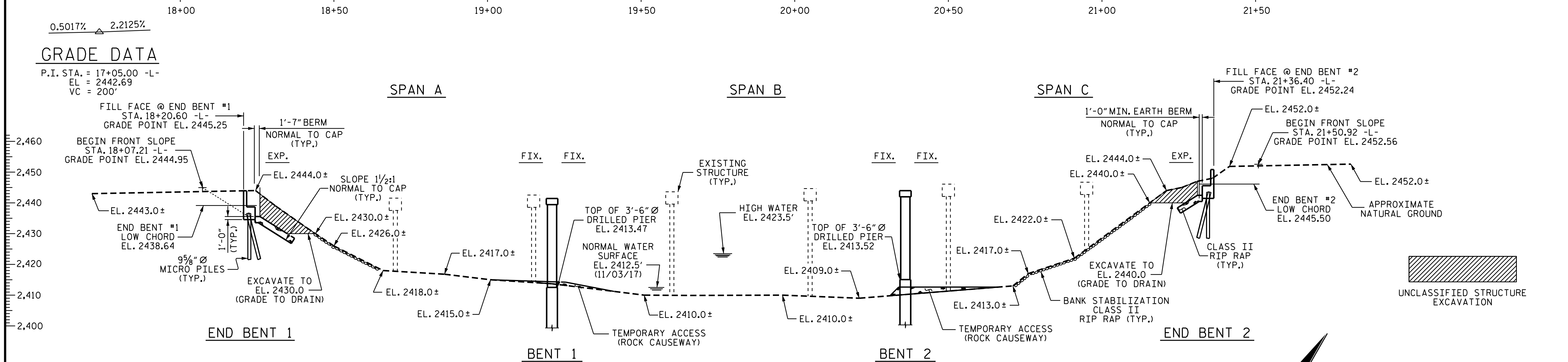
A. KEITH PASCHAL, P.E.
PROJECT ENGINEER

AMBER M. LEE, P.E.
PROJECT DESIGN ENGINEER

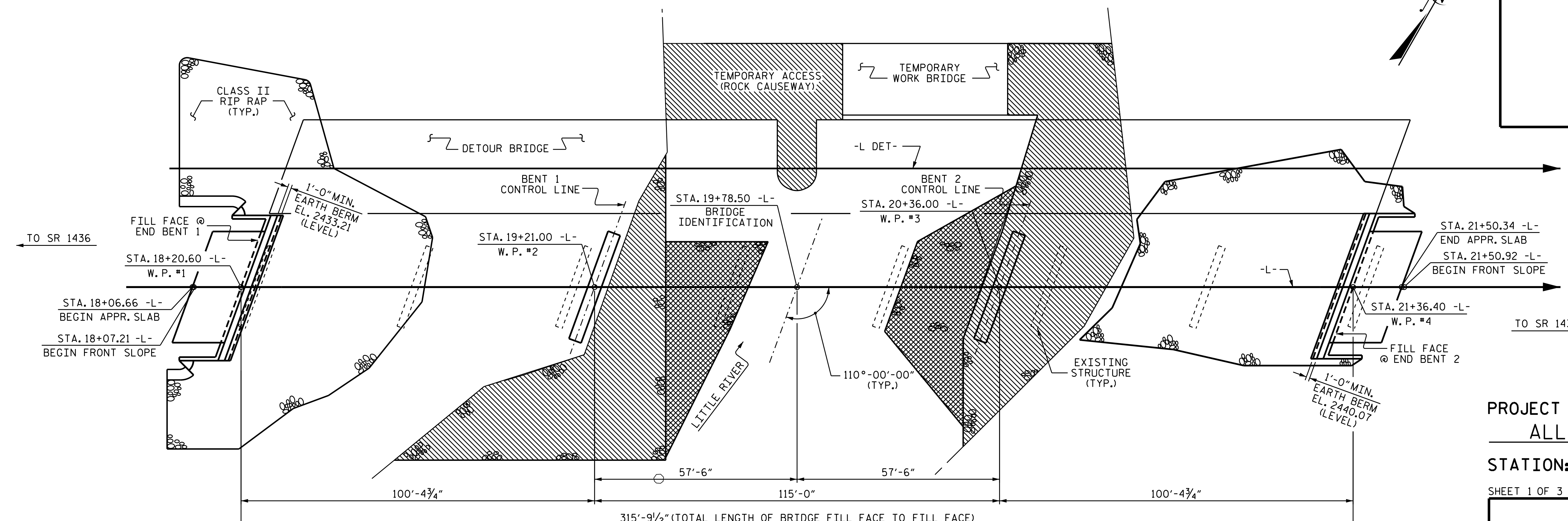
0.5017% 2.2125%

GRADE DATA

P.I. STA. = 17+05.00 -L-
EL. = 2442.69
VC = 200'



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



PROJECT NO. B-5388
ALLEGHANY COUNTY
STATION: 19+78.50 -L-
SHEET 1 OF 3 REPLACES BRIDGE NO. 021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
LITTLE RIVER
ON NC 18 BETWEEN
SR 1436 AND SR 1439

PROFESSIONAL ENGINEER SEAL
NORTH CAROLINA
SEAL 22005
ENGINEER
KEITH PASCHAL

PROFESSIONAL ENGINEER SEAL
NORTH CAROLINA
SEAL 031021
ENGINEER
AMBER W. LEE

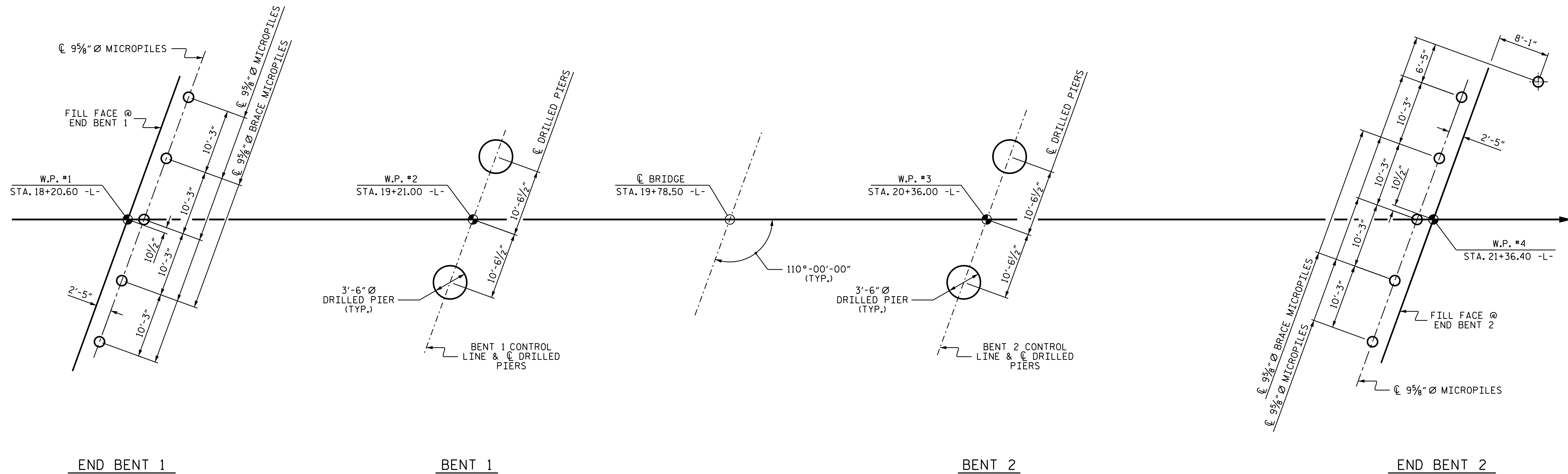
DocuSigned by:
A. Keith Paschal
11/13/2018

DocuSigned by:
Amber W. Lee
11/13/2018

DRAWN BY : A. SORSENGINH DATE : 7/2018
CHECKED BY : H. LOCKLEAR DATE : 9/2018
DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2018

REVISIONS						SHEET NO. S-1 TOTAL SHEETS 39
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES & DRILLED PIERS.

NOTES

FOR MICROPILES, SEE MICROPILES SPECIAL PROVISION.

DESIGN BOND LENGTH FOR MICROPILES AT END BENT 1 FOR A FACTORED RESISTANCE OF 165 TONS PER PILE.

INSTALL REINFORCING CASINGS FOR MICROPILES AT END BENT 1 TO A TIP ELEVATION NO HIGHER THAN 2398.5 FT. AND WITH A PENETRATION OF AT LEAST 10 FT. INTO ROCK WHICH IS DEFINED AS CONTINUOUS INTACT NATURAL MATERIAL.

USE REINFORCING CASINGS WITH YIELD STRENGTHS OF AT LEAST 45 KSI AND A MINIMUM O.D. 9 5/8" WITH MINIMUM WALL THICKNESS OF 0.5 IN FOR MICROPILES AT END BENT 1.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 2,397.5 FT. WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 7 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 550 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 130 TSF.

PERMANENT STEEL CASING IS REQUIRED FOR DRILLED PIERS AT BENT 1. DO NOT EXTEND CASING BELOW ELEVATION 2,404.5 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

THE SCOUR CRITICAL ELEVATION FOR BENT 1 IS ELEVATION 2,403.5 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 2,400.5 FT. WITH THE REQUIRED TIP RESISTANCE AND A PENETRATION OF AT LEAST 7 FT. INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 550 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 260 TSF.

PERMANENT STEEL CASING IS REQUIRED FOR DRILLED PIERS AT BENT 2. DO NOT EXTEND CASING BELOW ELEVATION 2,407.5 FT. WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

THE SCOUR CRITICAL ELEVATION FOR BENT 2 IS ELEVATION 2,406.5 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DESIGN BOND LENGTH FOR MICROPILES AT END BENT 2 FOR A FACTORED RESISTANCE OF 165 TONS PER PILE.

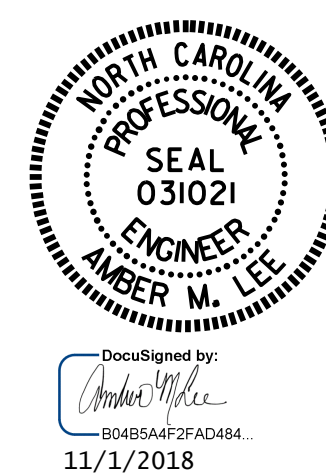
INSTALL REINFORCING CASINGS FOR MICROPILES AT END BENT 2 TO A TIP ELEVATION NO HIGHER THAN 2415.0 FT. AND WITH A PENETRATION OF AT LEAST 10 FT. INTO ROCK WHICH IS DEFINED AS CONTINUOUS INTACT NATURAL MATERIAL.

USE REINFORCING CASINGS WITH YIELD STRENGTHS OF AT LEAST 45 KSI AND A MINIMUM O.D. 9 5/8" WITH MINIMUM WALL THICKNESS OF 0.5 IN FOR MICROPILES AT END BENT 2.

DRAWN BY : A. SORSENGINH DATE : 7/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018

01-NOV-2018 11:23
 R:\Structures\Final Plans\400.005.B5388.SMU.FL.002.020021.dgn
 omlee

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED



PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

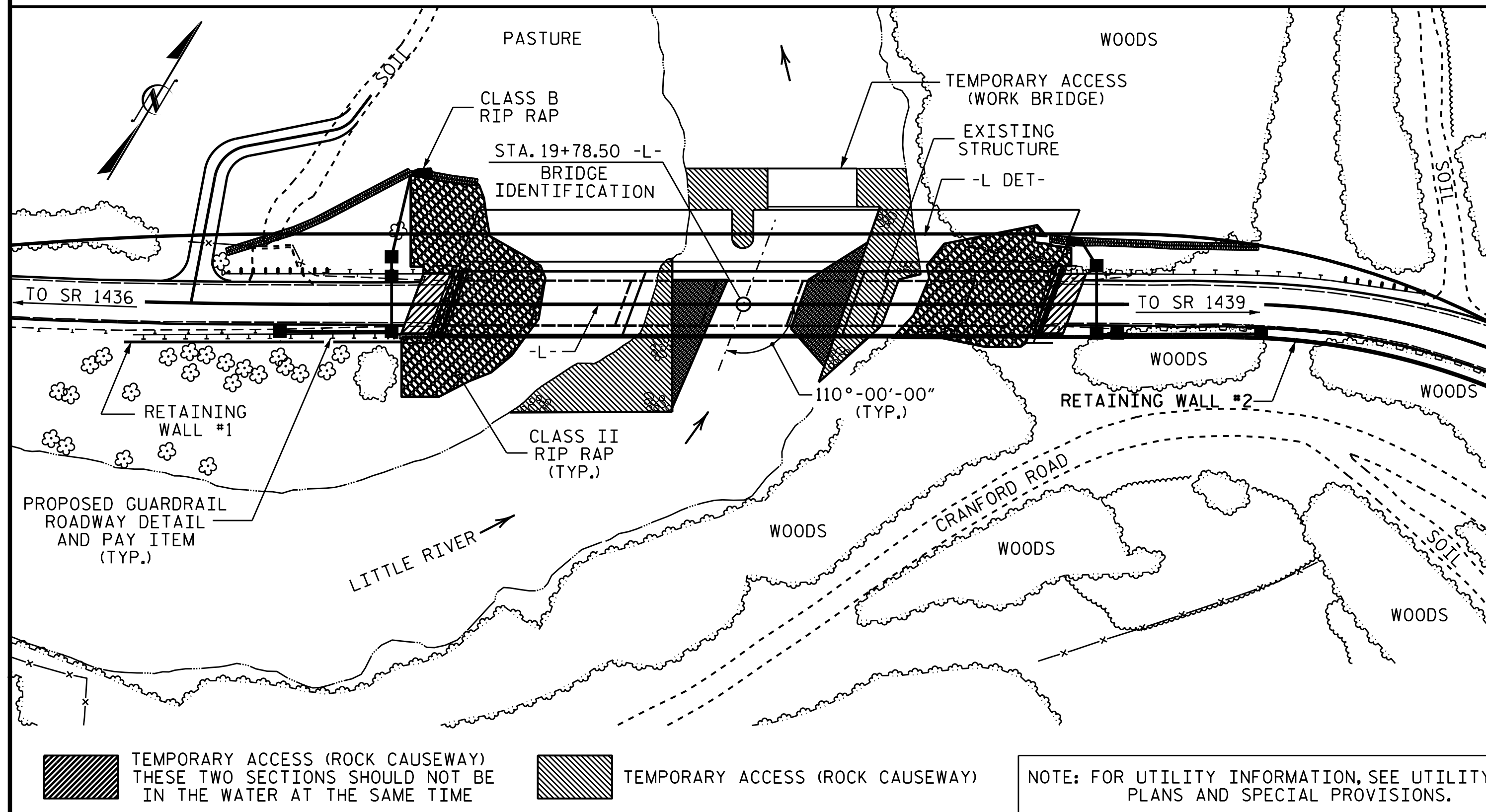
SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER
 LITTLE RIVER
 ON NC 18 BETWEEN
 SR 1436 AND SR 1439

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			39

BENCHMARK 1: CHISELED X IN ROCK, 86.0' LEFT OF STA. 17+52.00 -L-, EL. 2449.88



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE = 12,900 CFS.
 FREQUENCY OF DESIGN FLOOD = 50 YRS.
 DESIGN HIGH WATER ELEVATION = 2,422.4
 DRAINAGE AREA = 98.6 SQ. MI.
 BASE DISCHARGE (Q100) = 15,200 CFS.
 BASE HIGH WATER ELEVATION = 2,423.5

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 84,900 CFS.
 FREQUENCY OF OVERTOPPING FLOOD = 500 + YRS.
 OVERTOPPING FLOOD ELEVATION = 2,440.9
 @ STA. 13+15.00 -L-

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE	CONSTRUCTION MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	3'-6" Ø DRILLED PIERS IN SOIL	3'-6" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EA.	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO. LIN. FT.
SUPERSTRUCTURE			LUMP SUM							10,841	9,931		LUMP SUM			12 1239.50
END BENT 1									LUMP SUM			42.3		5331		
BENT 1					18.0	14.00	18.00					40.8		13635	1641	
BENT 2					12.5	14.00	12.00					42.1		13099	1639	
END BENT 2									LUMP SUM			47.3		5900		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	30.5	28.00	30.00	1	LUMP SUM	10,841	9,931	172.5	LUMP SUM	37965	3280	12 1239.50

TOTAL BILL OF MATERIAL

	TWO BAR METAL RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	FOAM JOINT SEALS	9 5/8" Ø MICROPILES
	LIN. FT.	LIN. FT.	TONS	SQ. YDS	LUMP SUM	LUMP SUM	EA.
SUPERSTRUCTURE	611.13	641.97			LUMP SUM	LUMP SUM	
END BENT 1			908	1010			5
BENT 1							
BENT 2							
END BENT 2			1230	1365			6
TOTAL	611.13	641.97	2138	2375	LUMP SUM	LUMP SUM	11

DRAWN BY: A. SORSENGINH DATE: 7/2018
 CHECKED BY: H. LOCKLEAR DATE: 9/2018

NOTES

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 THE EXISTING STRUCTURE CONSISTING OF 7 SPANS 1 @ 45'-3", 5 @ 45'-0", 1 @ 45'-3" WITH AN ASPHALT WEARING SURFACE OVER REINFORCED CONCRETE FLOOR ON 4 LINES OF A STEEL I-BEAMS SYSTEM SUPERSTRUCTURE AND A CLEAR ROADWAY WIDTH OF 24'-0" ON A SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE SPILL THRU ABUTMENTS. THE INTERIOR BENTS CONSIST OF REINFORCED CONCRETE POST AND BEAM AND LOCATED AT THE PROPOSED STRUCTURE LOCATION SHALL BE REMOVED.

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 30 FT. LEFT OF -L- AND 35 FT. RIGHT OF -L- AT END BENT 1 AND 25 FT. LEFT OF -L- AND 25 FT. RIGHT OF -L- 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.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

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 19+78.50 -L-.

FOR TEMPORARY ROCK CAUSEWAY STAGING, SEE PERMIT DRAWINGS.

THE CONTRACTOR CAN NOT PLACE OR REMOVE TEMPORARY ROCK CAUSEWAY IN THE STREAM FROM AUGUST TO NOVEMBER.

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.
 FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS, SEE SPECIAL PROVISIONS.
 FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
 ALL FALSEWORK AND FORMS FOR THE CAST-IN-PLACE DECK SLAB CONTINUOUS UNIT SHALL REMAIN IN PLACE UNTIL THE ENTIRE UNIT IS CAST AND CURED.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 19+78.50 -L-.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE CLOSE PROXIMITY OF TEMPORARY SHORING TO THE PROPOSED END BENTS. SHORING MUST BE INSTALLED ACCURATELY IN ACCORDANCE WITH TRAFFIC CONTROL PLANS.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 19+77.50 -LDET- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

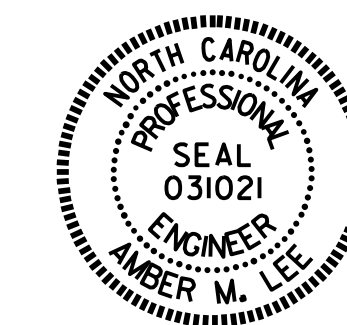
NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR AASHTO LRFD TEST LEVEL (L-3) CRASH TEST CRITERIA. FOR CONSTRUCTION MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISION.

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 3 OF 3



DocuSigned by:
 Amber M. Lee
 50485A4F2FAD484
 11/13/2018

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOR BRIDGE OVER
 LITTLE RIVER
 ON NC 18 BETWEEN
 SR 1436 AND SR 1439

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOAD FACTORS:

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

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

LEVEL	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			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.01	--	1.75	0.867	1.23	A	EL	48.22	0.914	1.22	A	EL	38.58	0.80	0.867	1.01	A	EL	48.22		
	HL-93(OPr)	N/A	--	1.59	--	1.35	0.867	1.60	A	EL	48.22	0.914	1.59	A	EL	38.58	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.01	50.411	1.75	0.867	1.70	A	EL	48.22	0.914	1.49	A	EL	38.58	0.80	0.867	1.01	A	EL	48.22		
	HS-20(OPr)	36.000	--	1.94	50.411	1.35	0.867	2.21	A	EL	48.22	0.914	1.94	A	EL	38.58	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.31	44.682	1.4	0.867	5.03	A	EL	48.22	0.914	4.37	A	EL	38.58	0.80	0.867	3.31	A	EL	48.22	
		SNGARBS2	20.000	--	2.40	48.033	1.4	0.867	3.65	A	EL	48.22	0.914	3.13	A	EL	38.58	0.80	0.867	2.40	A	EL	48.22	
		SNAGRIS2	22.000	--	2.25	49.460	1.4	0.867	3.41	A	EL	48.22	0.914	2.92	A	EL	38.58	0.80	0.867	2.25	A	EL	48.22	
		SNCOTTS3	27.250	--	1.65	44.830	1.4	0.867	2.50	A	EL	48.22	0.914	2.19	A	EL	38.58	0.80	0.867	1.65	A	EL	48.22	
		SNAGGRS4	34.925	--	1.35	47.143	1.4	0.867	2.05	A	EL	48.22	0.914	1.83	A	EL	38.58	0.80	0.867	1.35	A	EL	48.22	
		SNS5A	35.550	--	1.32	46.985	1.4	0.867	2.01	A	EL	48.22	0.914	1.86	A	EL	38.58	0.80	0.867	1.32	A	EL	48.22	
		SNS6A	39.950	--	1.20	48.037	1.4	0.867	1.83	A	EL	48.22	0.914	1.71	A	EL	38.58	0.80	0.867	1.20	A	EL	48.22	
	TTST	SNS7B	42.000	--	1.15	48.077	1.4	0.867	1.74	A	EL	48.22	0.914	1.68	A	EL	38.58	0.80	0.867	1.15	A	EL	48.22	
		TNAGRIT3	33.000	--	1.46	48.289	1.4	0.867	2.23	A	EL	48.22	0.914	2.02	A	EL	38.58	0.80	0.867	1.46	A	EL	48.22	
		TNT4A	33.075	--	1.46	48.521	1.4	0.867	2.23	A	EL	48.22	0.914	1.97	A	EL	38.58	0.80	0.867	1.46	A	EL	48.22	
		TNT6A	41.600	--	1.19	49.501	1.4	0.867	1.81	A	EL	48.22	0.914	1.81	A	EL	38.58	0.80	0.867	1.19	A	EL	48.22	
		TNT7A	42.000	--	1.19	50.015	1.4	0.867	1.81	A	EL	48.22	0.914	1.77	A	EL	38.58	0.80	0.867	1.19	A	EL	48.22	
		TNT7B	42.000	--	1.22	51.227	1.4	0.867	1.86	A	EL	48.22	0.914	1.64	A	EL	38.58	0.80	0.867	1.22	A	EL	48.22	
		TNAGRIT4	43.000	--	1.17	50.283	1.4	0.867	1.78	A	EL	48.22	0.914	1.58	A	EL	38.58	0.80	0.867	1.17	A	EL	48.22	
TNAGT5A	45.000	--	1.11	49.809	1.4	0.867	1.68	A	EL	48.22	0.914	1.58	A	EL	38.58	0.80	0.867	1.11	A	EL	48.22			
TNAGT5B	45.000	3	1.10	49.380	1.4	0.867	1.67	A	EL	48.22	0.914	1.50	A	EL	38.58	0.80	0.867	1.10	A	EL	48.22			

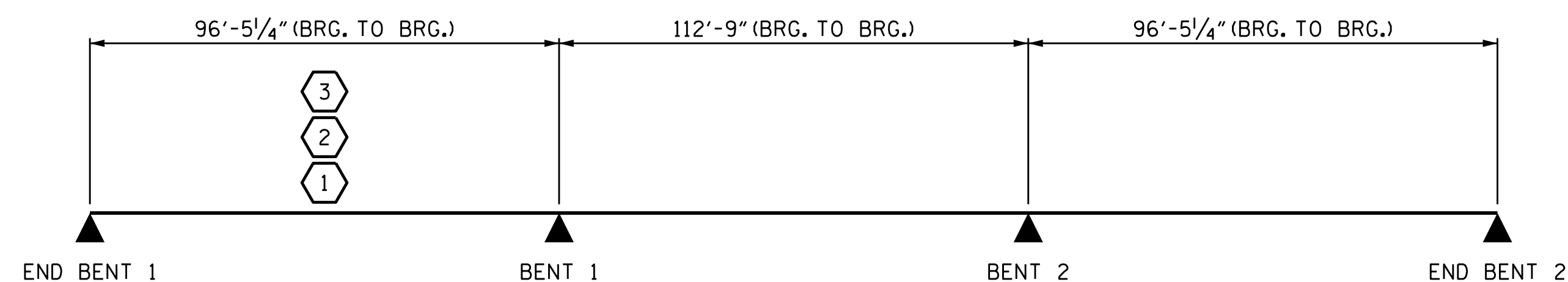
NOTES:

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:

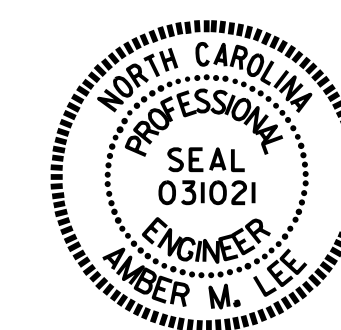
- 1.
- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	
GIRDER LOCATION	
I - INTERIOR GIRDER EL - EXTERIOR LEFT GIRDER ER - EXTERIOR RIGHT GIRDER	



LRFR SUMMARY

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 PRESTRESSED
 CONCRETE GIRDERS
 (NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : A. SORSENGINH	DATE : 7/2018
CHECKED BY : H. LOCKLEAR	DATE : 9/2018
DRAWN BY : MAA	1/08
CHECKED BY : GM/DI	2/08
REV. 11/12/08RR	MAA/GM
REV. 10/17/11	MAA/GM

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			39

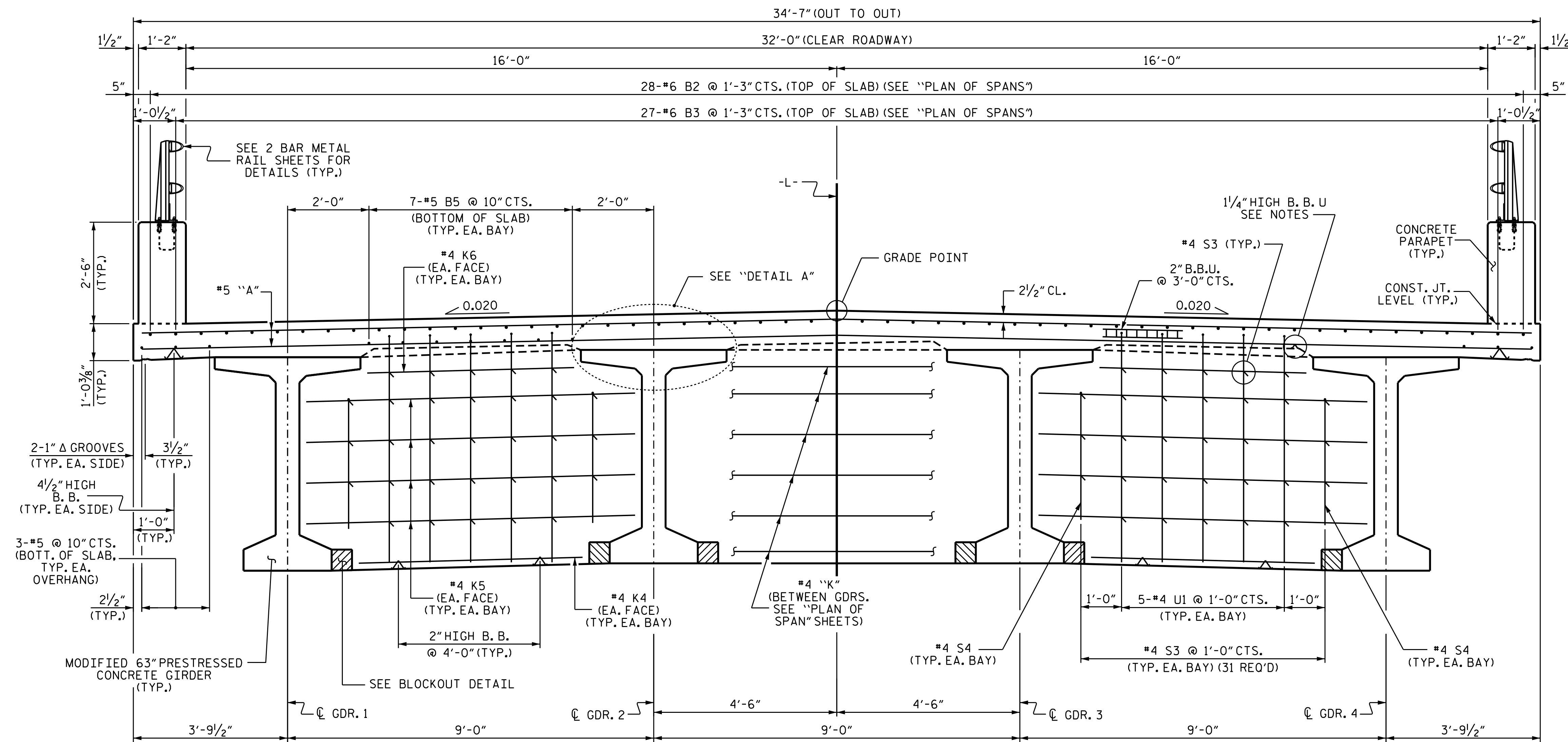
NOTES

PROVIDE 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

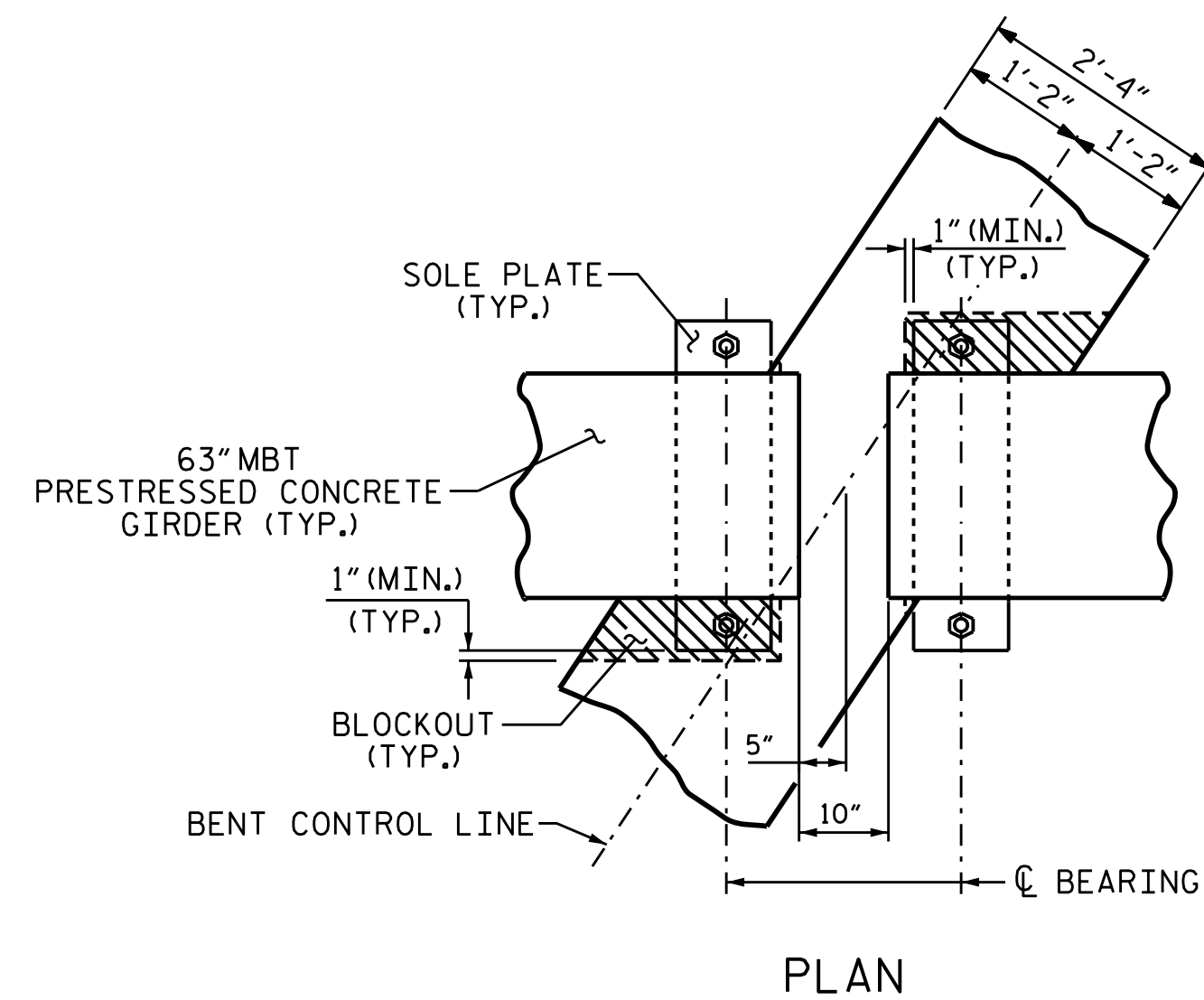
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

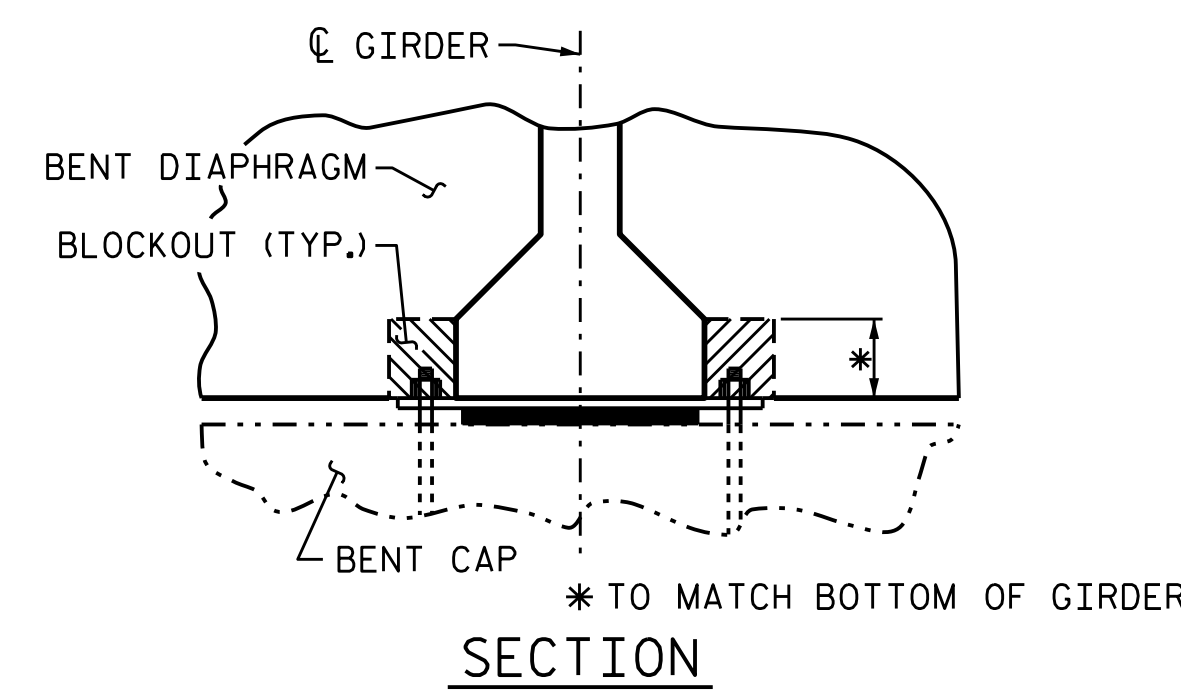
#5 "G" BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



TYPICAL SECTION @ BENT DIAPHRAGM

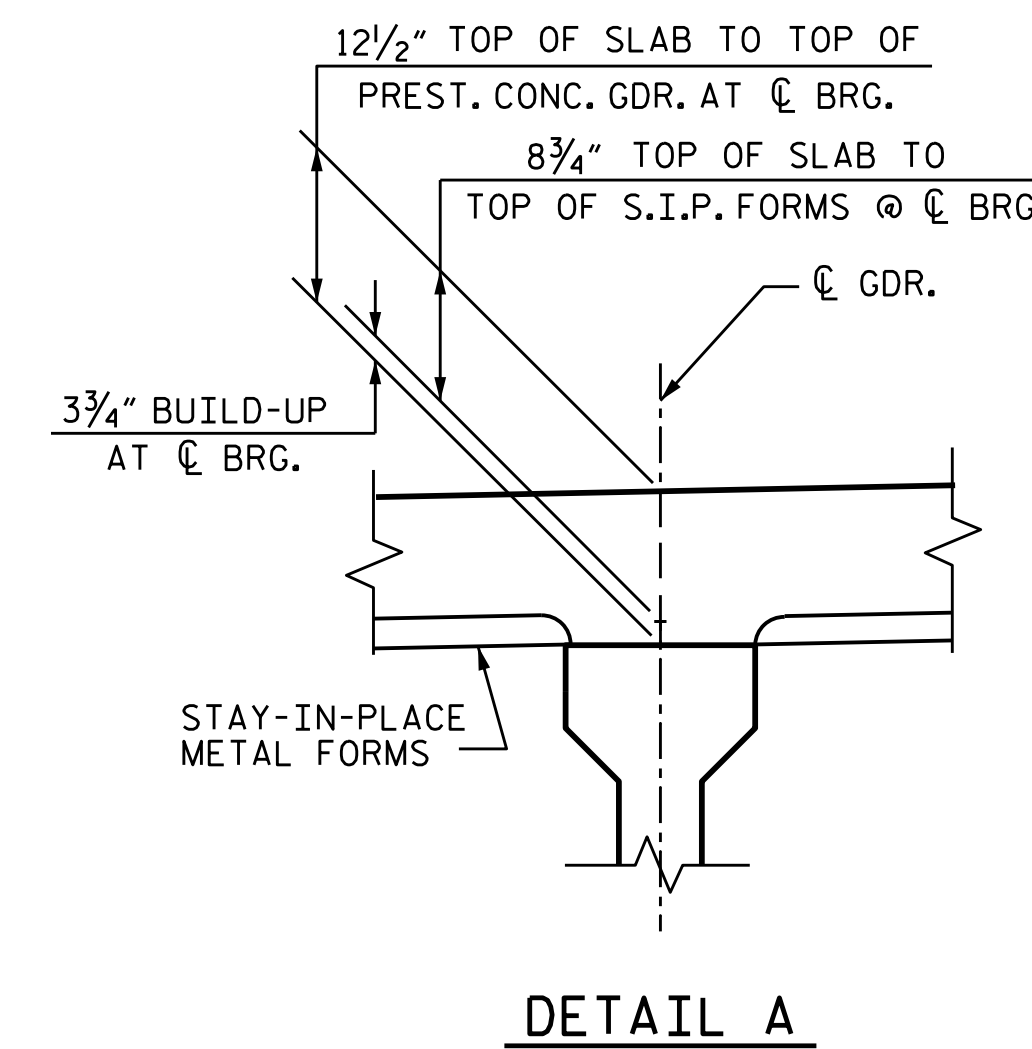


PLAN



SECTION

BENT DIAPHRAGM BLOCK-OUT DETAIL



DETAIL A

DRAWN BY : A. SORSENGINH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DESIGN ENGINEER OF RECORD : A. SORSENGINH DATE : 9/2018

01-NOV-2018 11:23
 R:\Structures\Final Plans\400.013.B5388.SMU.TS.006.020021.dgn
 amlee

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED



DocuSigned by:
 Amber M. Lee
 B04B5A8F2FAD484
 11/1/2018

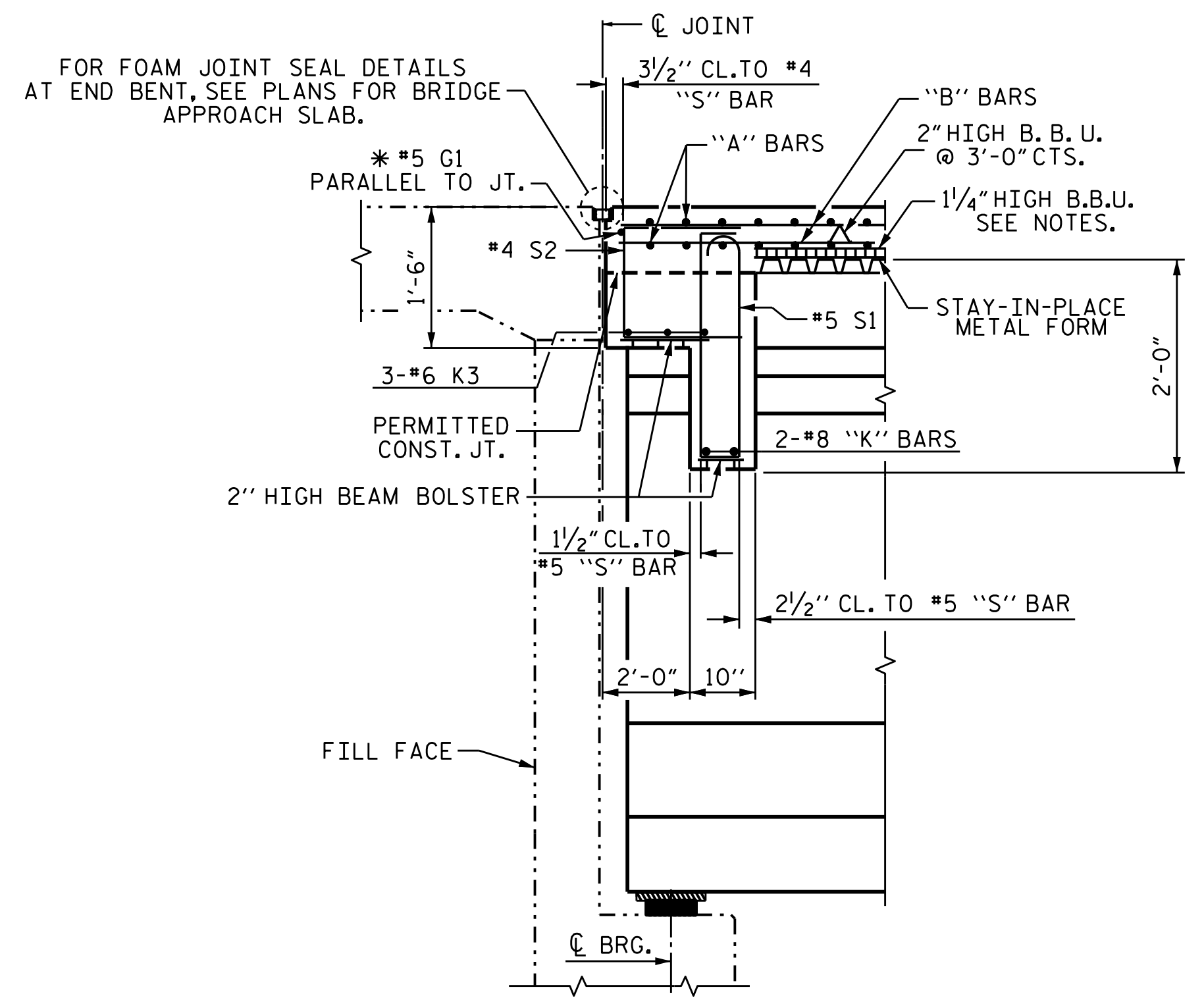
PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

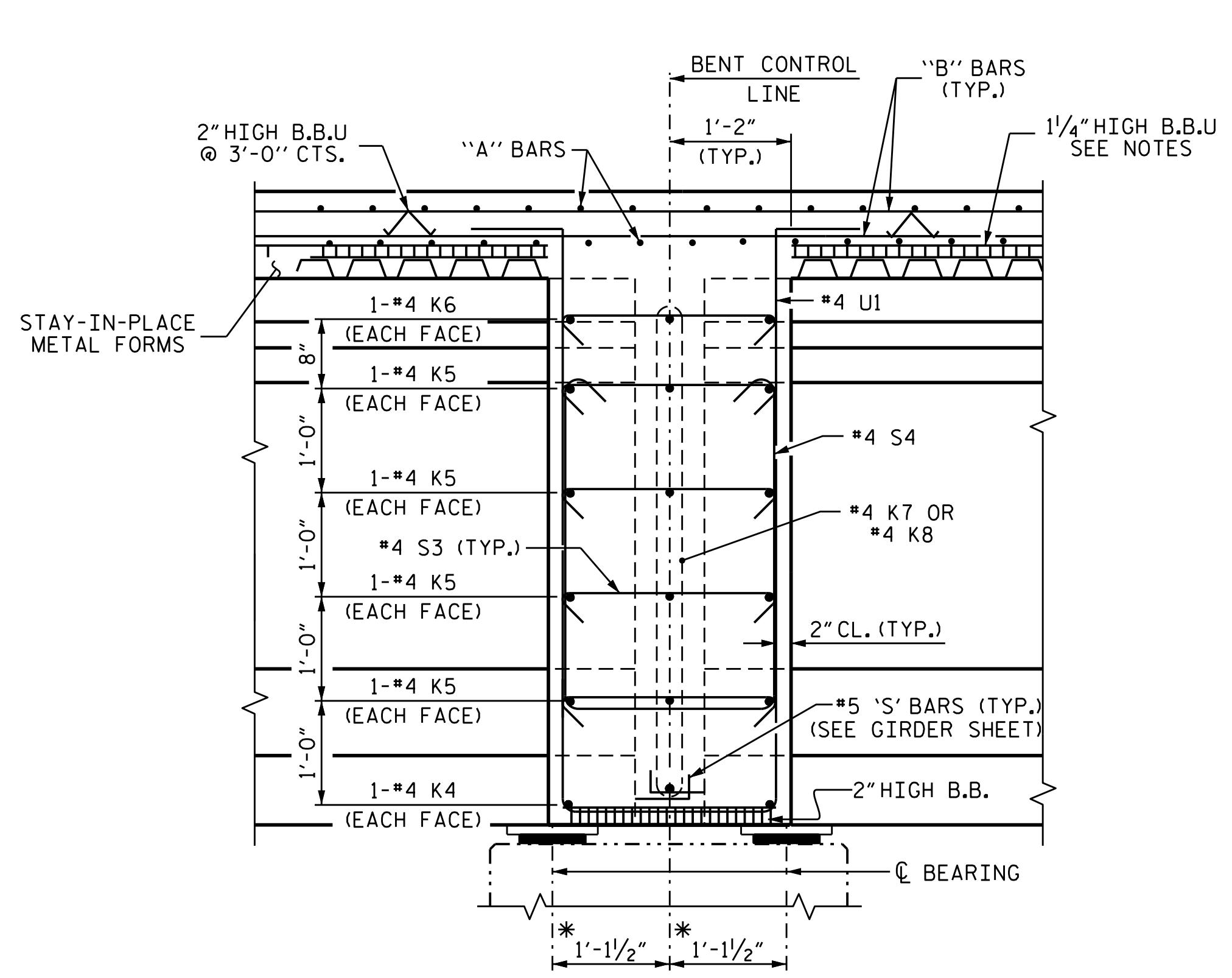
**SUPERSTRUCTURE
 TYPICAL SECTION**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			39



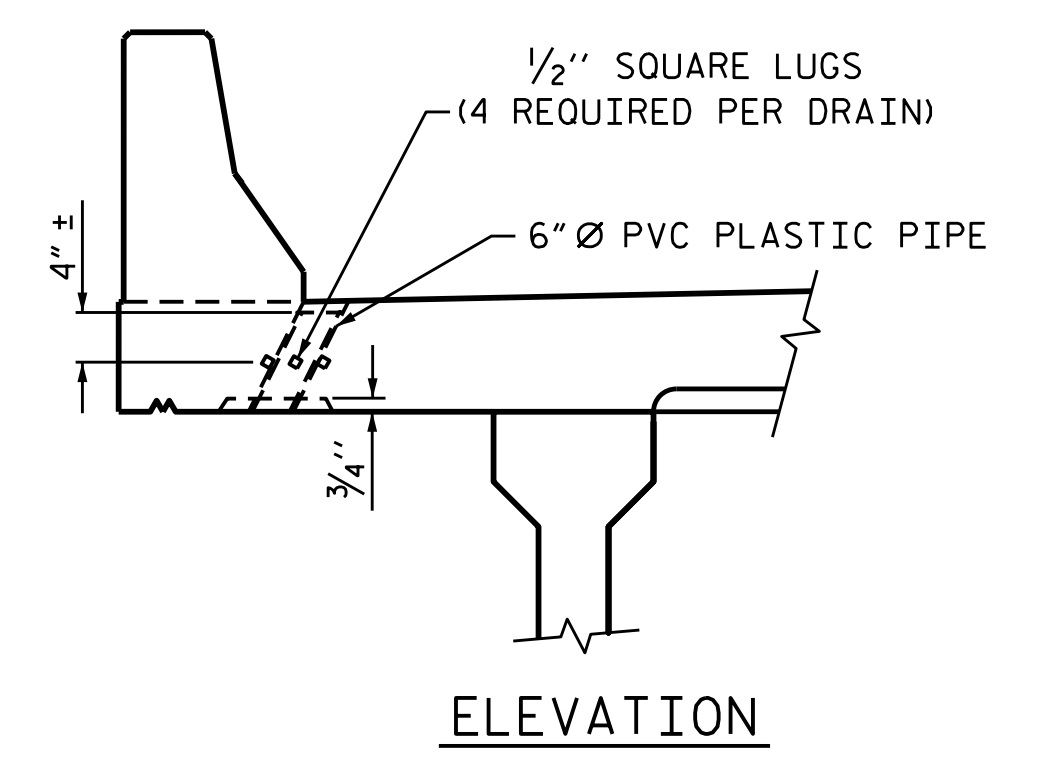
**SECTION THROUGH
END BENT DIAPHRAGM**

* #5 G1 BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

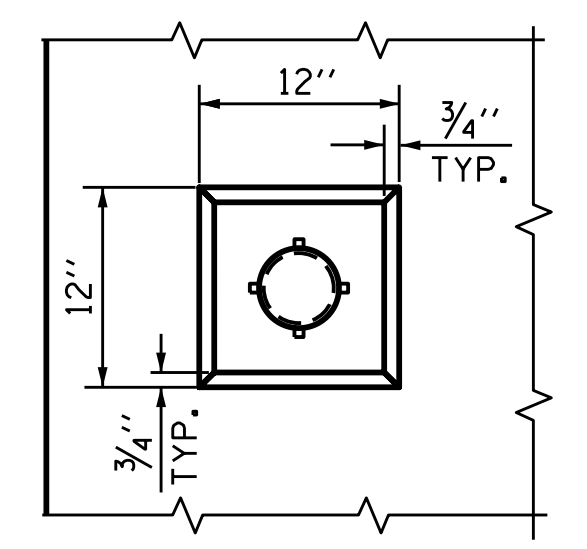


**SECTION THROUGH
BENT DIAPHRAGM**

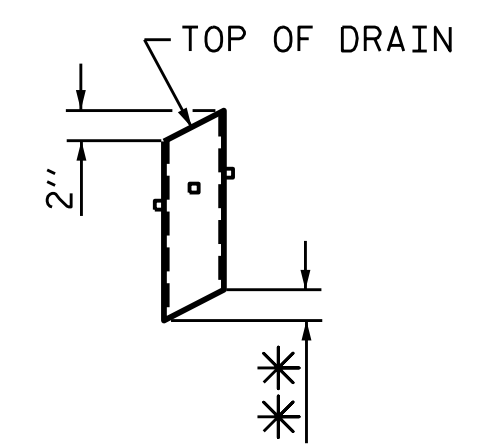
* ALONG $\text{\textcircled{C}}$ GIRDER



ELEVATION



PLAN OF RECESS

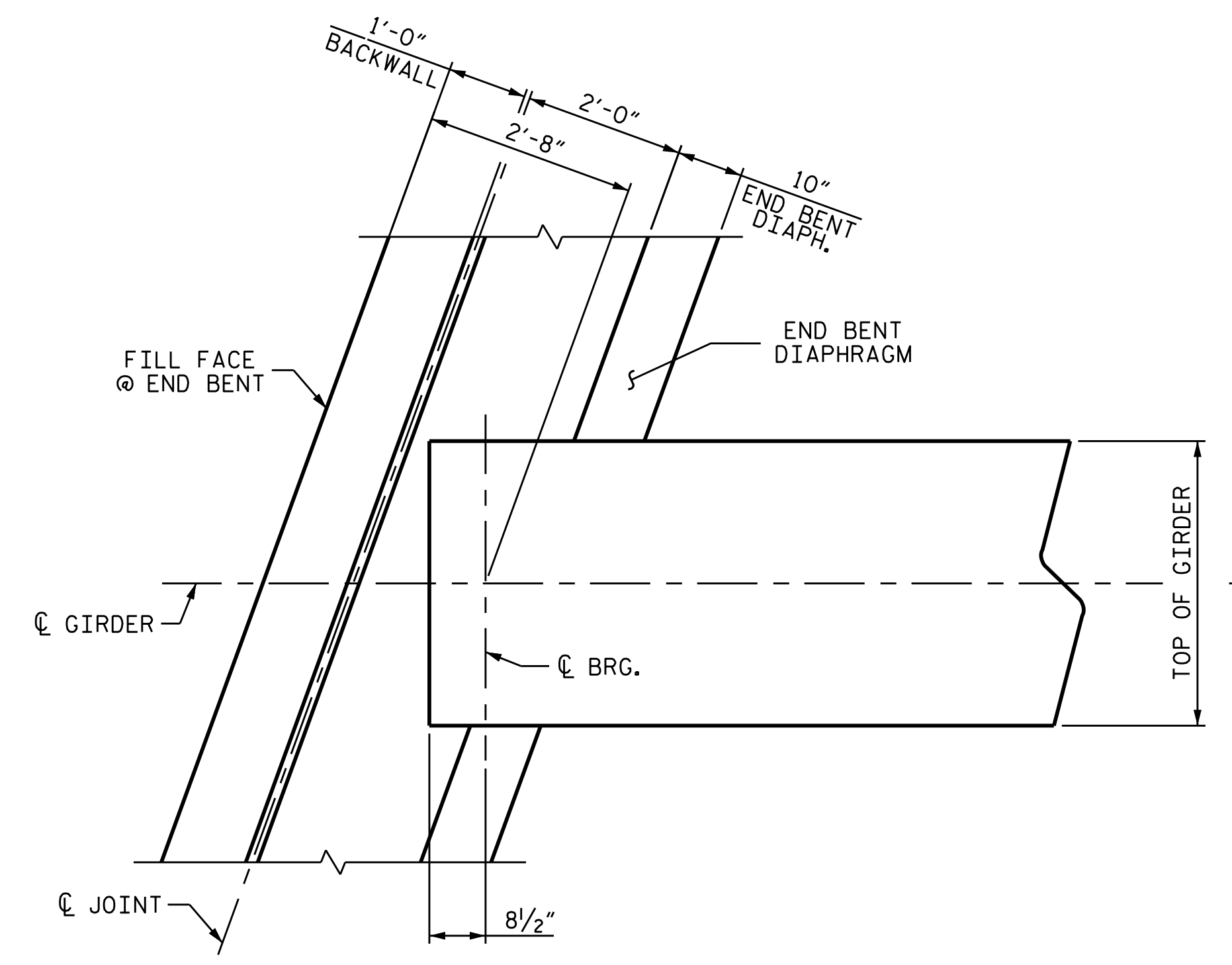


* * TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (20 DRAINS REQUIRED)

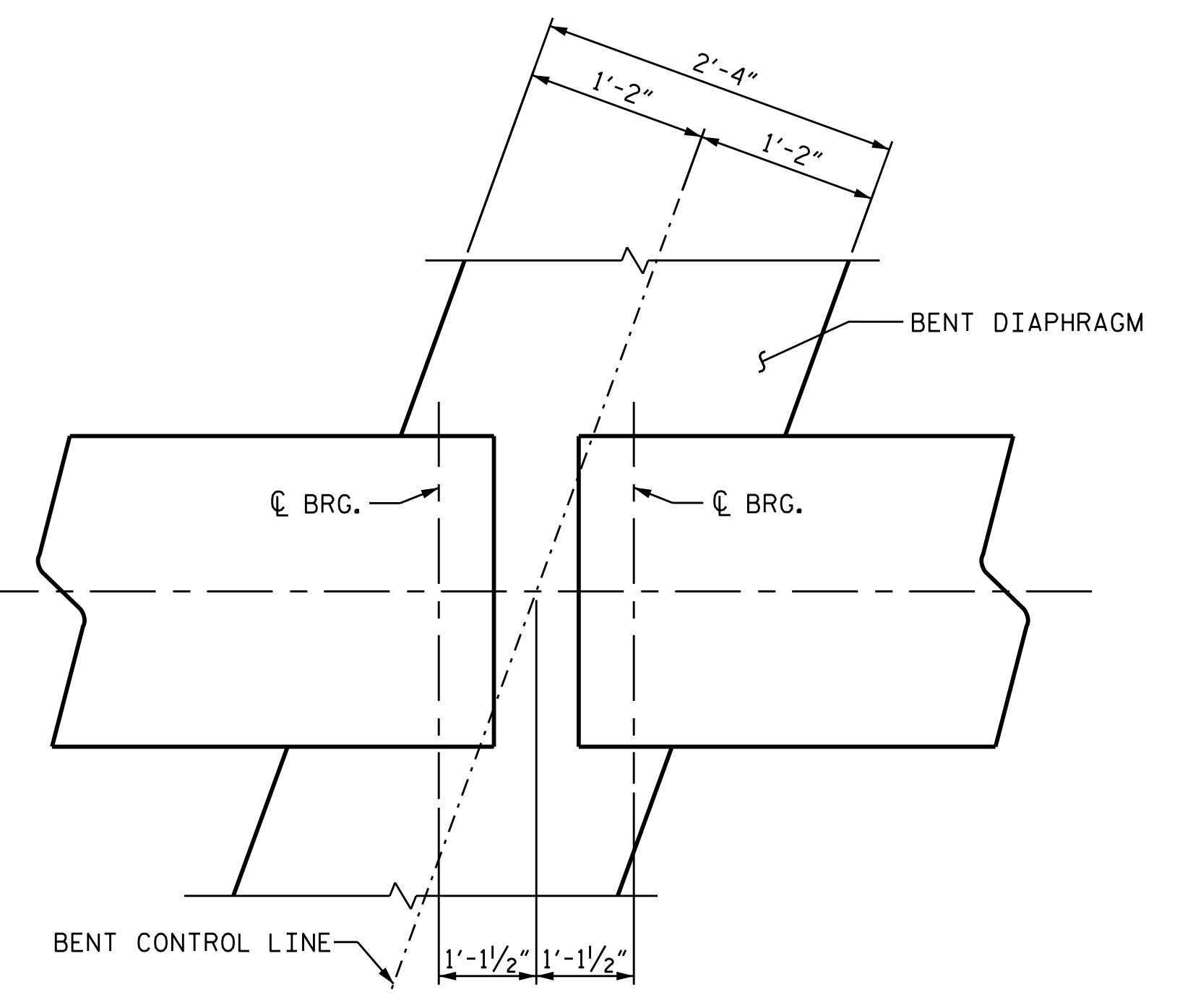
PIPE DETAIL

TOP OF FLOOR DRAINS TO BE SET $\frac{3}{8}$ " BELOW SURFACE OF SLAB.
 4 - $\frac{1}{2}$ " SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.
 THE 6" $\text{\textcircled{D}}$ PVC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

DRAIN DETAILS



END BENT DIAPHRAGM



BENT DIAPHRAGM

PLAN

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 3 OF 3

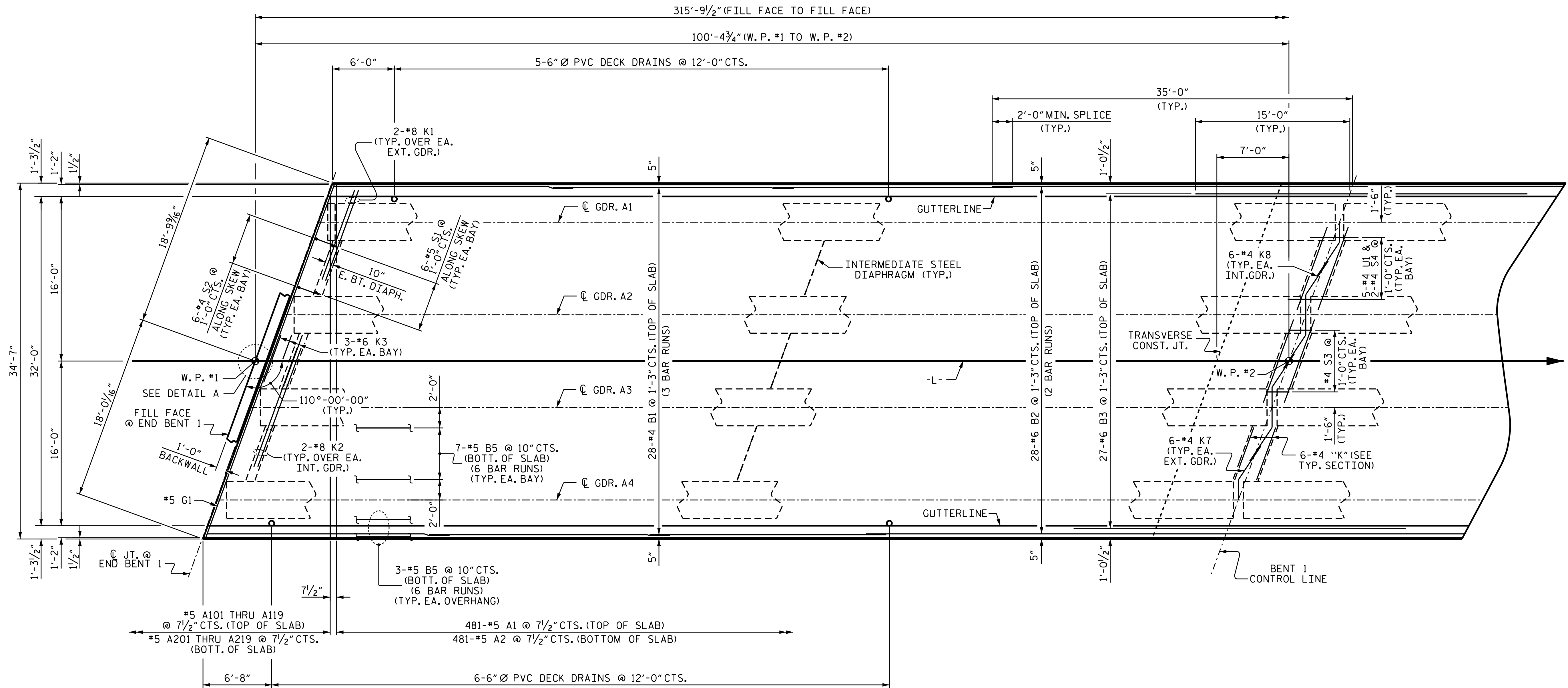


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION

DRAWN BY : A. SORSENGINH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2018

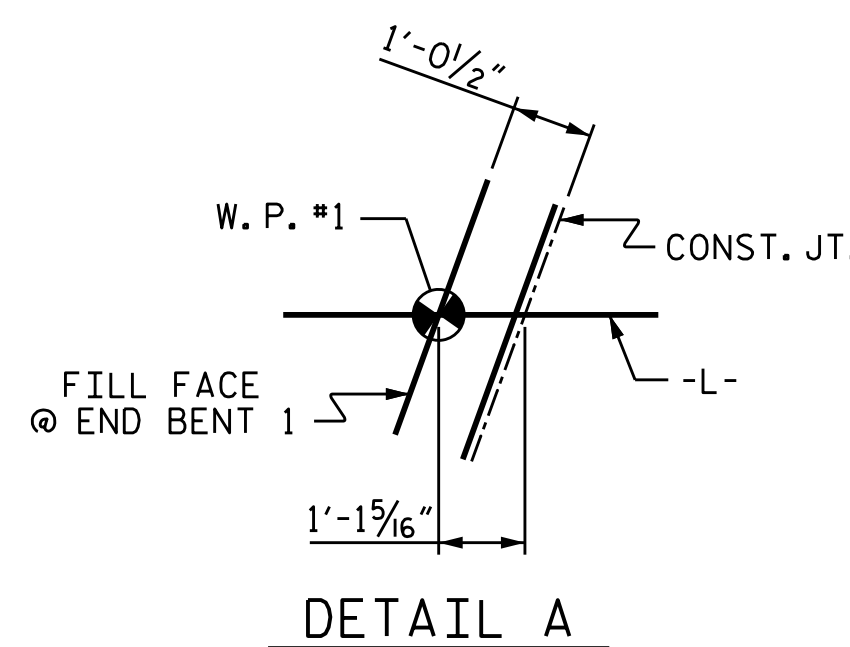
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			38



PLAN OF SPAN A

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET.



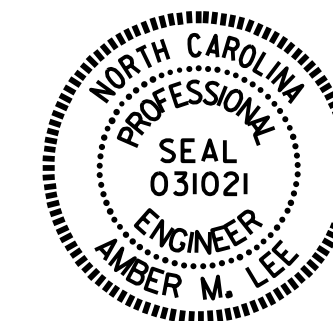
DETAIL A

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PLAN OF SPAN A

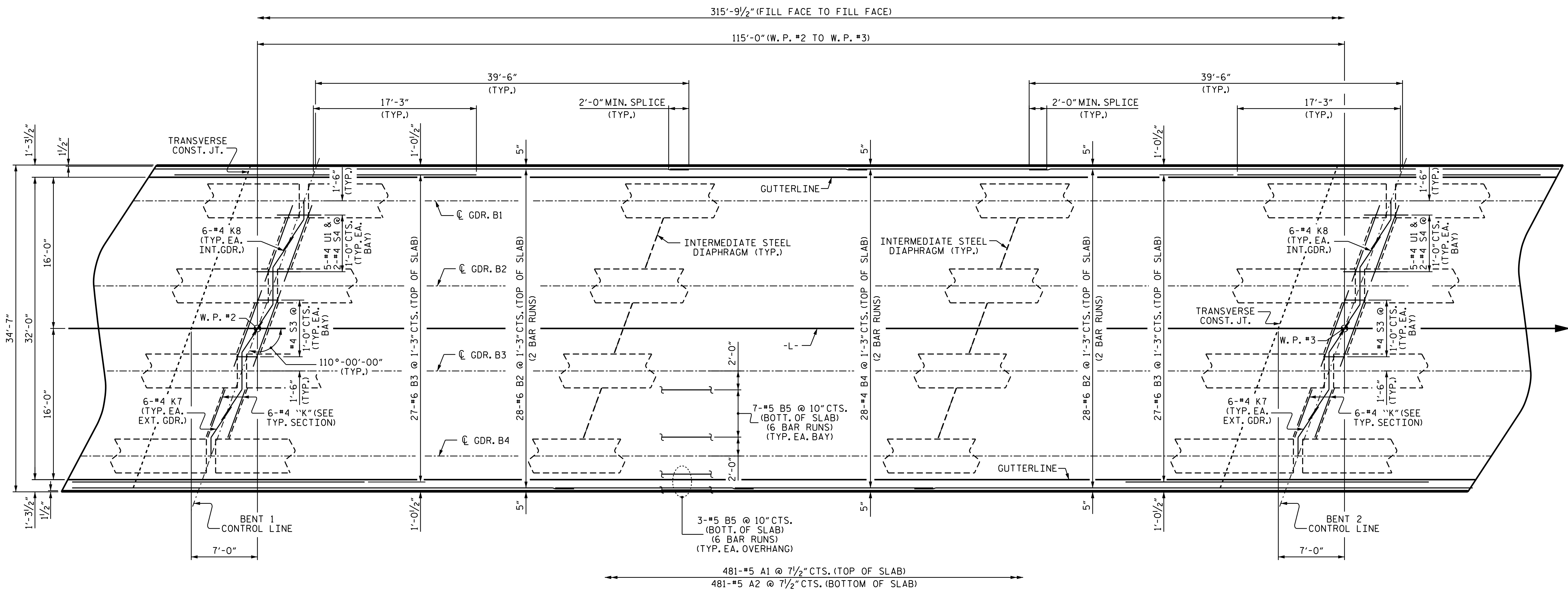


DocuSigned by:
 Amber M. Lee
 B04B5A82FAD484
 11/1/2018

DRAWN BY : A. SORSENGINH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2018

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			39



PLAN OF SPAN B

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET.

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 3



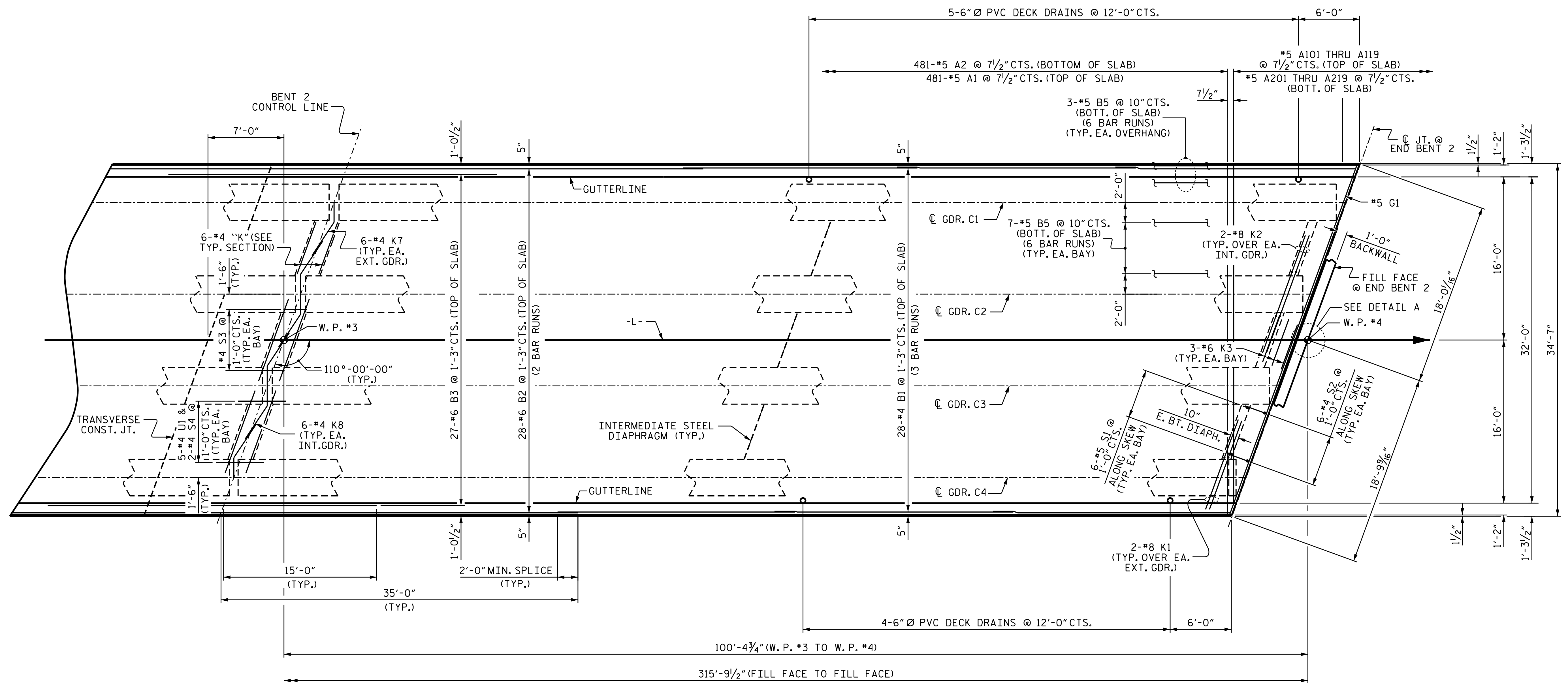
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PLAN OF SPAN B

DRAWN BY : A. SORSENGINH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2018

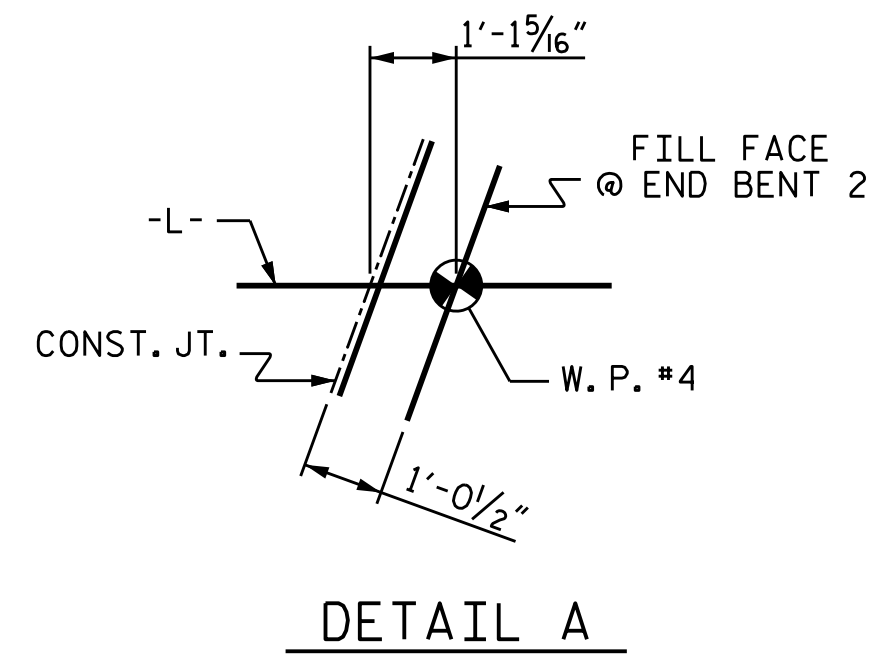
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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			39



PLAN OF SPAN C

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET.



PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 3 OF 3



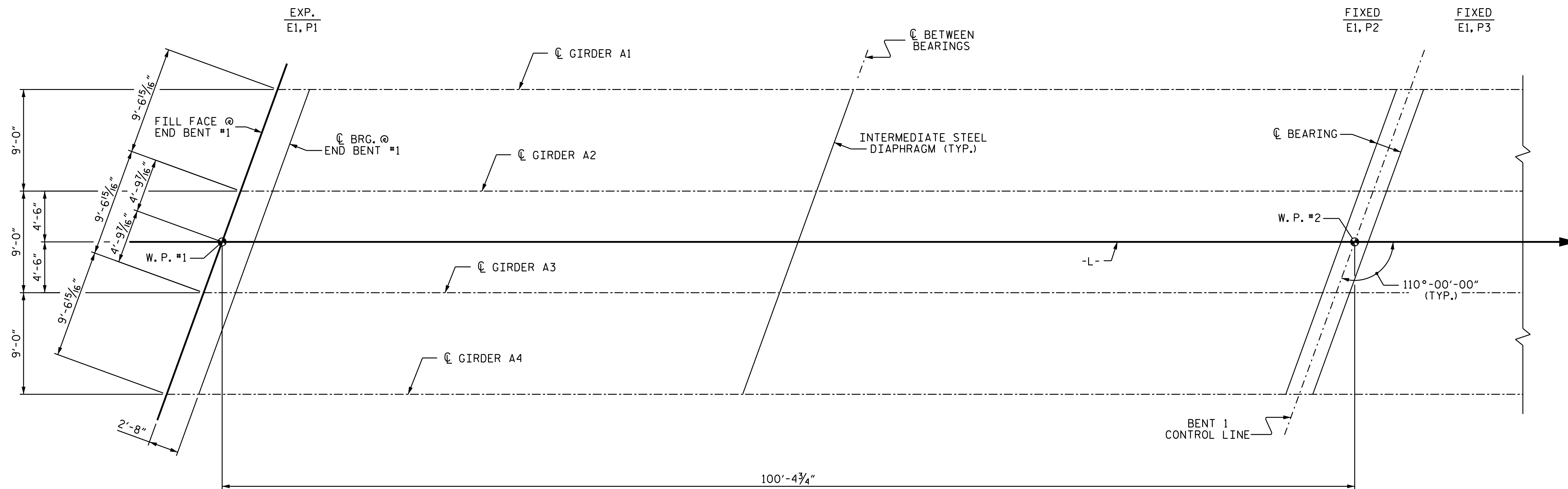
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PLAN OF SPAN C

DRAWN BY : A. SORSENGINH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2018

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			39

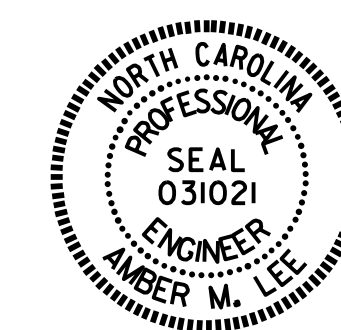
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FRAMING PLAN - SPAN A

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 1 OF 3



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 B04B5A4F2FAD484
 11/1/2018

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

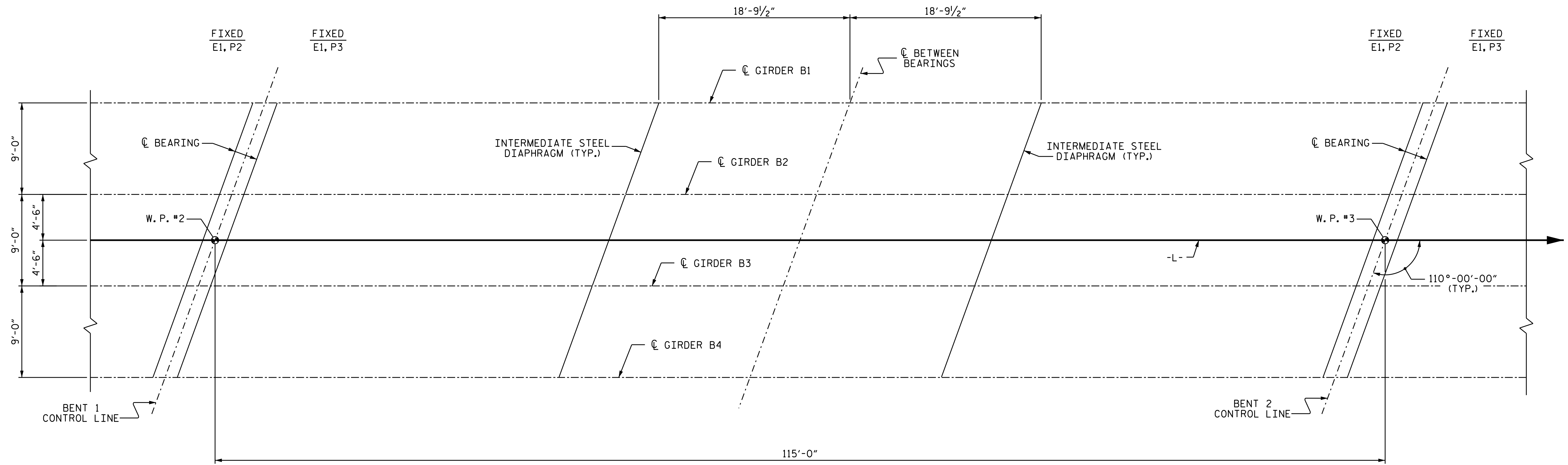
SUPERSTRUCTURE
 FRAMING PLAN
 SPAN A

DRAWN BY : A. SORSENGINH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2018

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 amlee

DOCUMENT NOT CONSIDERED
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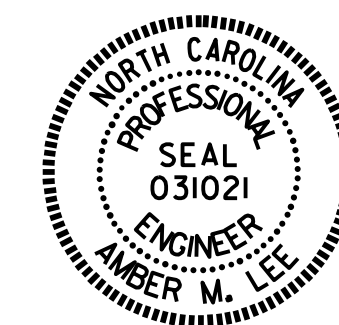
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			39



FRAMING PLAN - SPAN B

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 3



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 B04B5A8F2FAD484
 11/1/2018

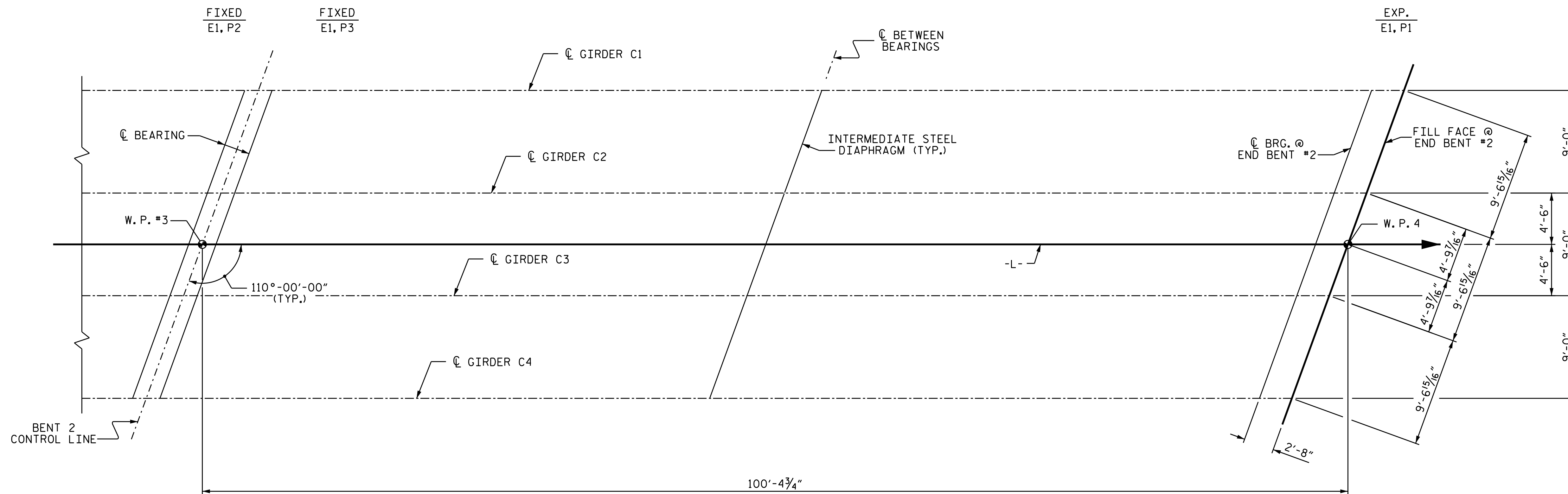
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 FRAMING PLAN
 SPAN B

DRAWN BY : A. SORSENGINH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2018

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			39



FRAMING PLAN - SPAN C

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 3 OF 3



DocuSigned by:
 Amber M. Lee
 B04B5A4F2FAD484
 11/1/2018

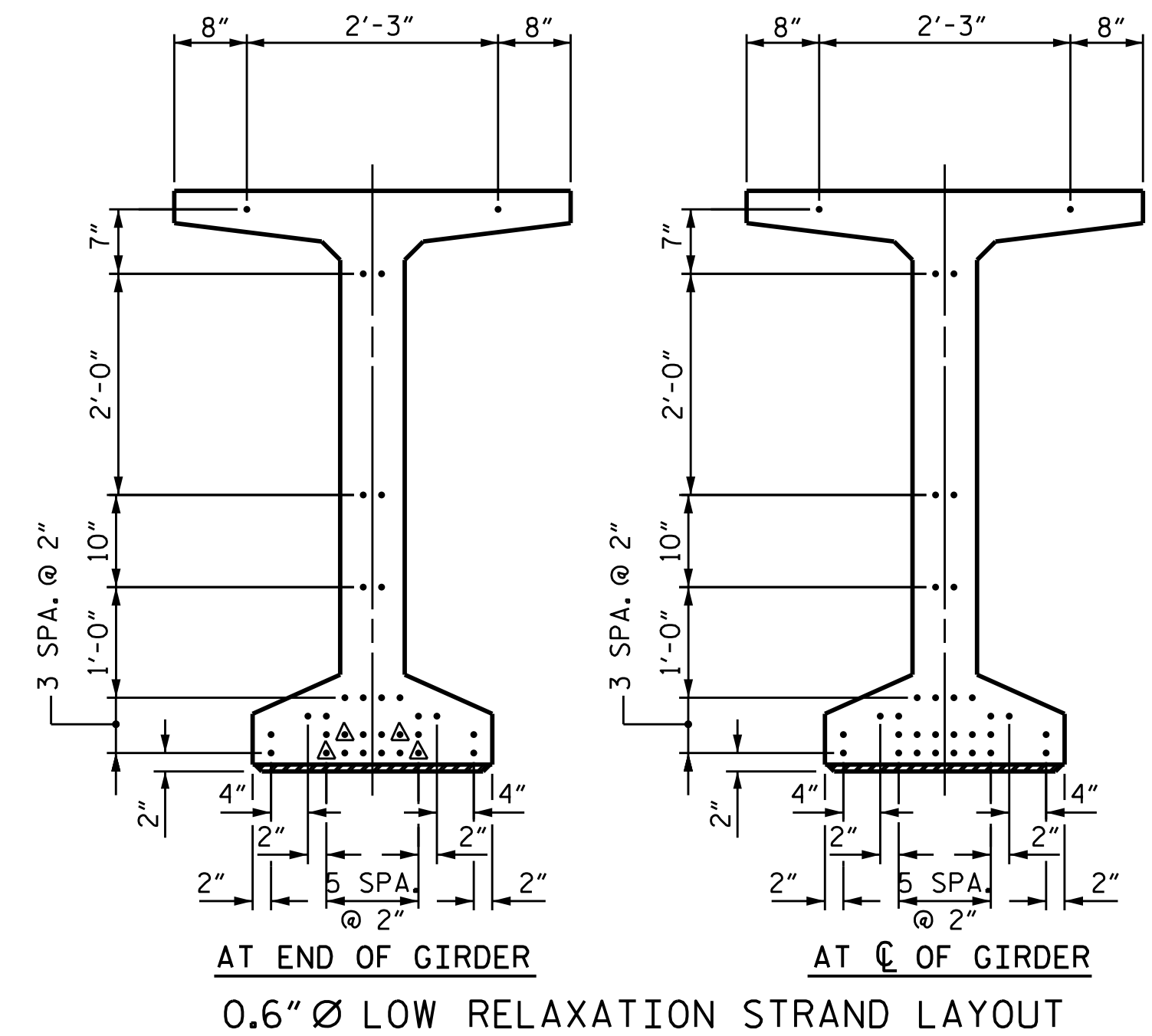
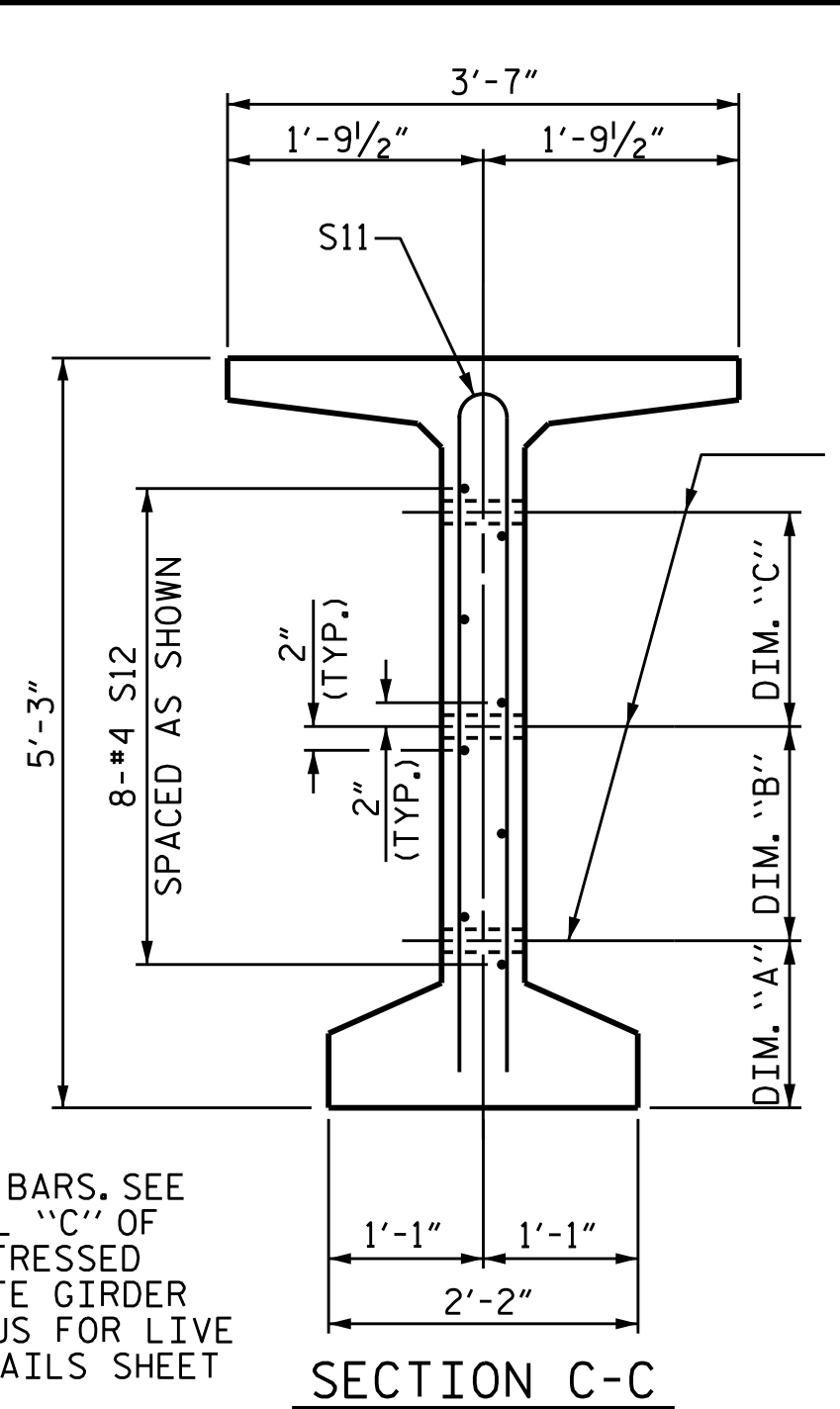
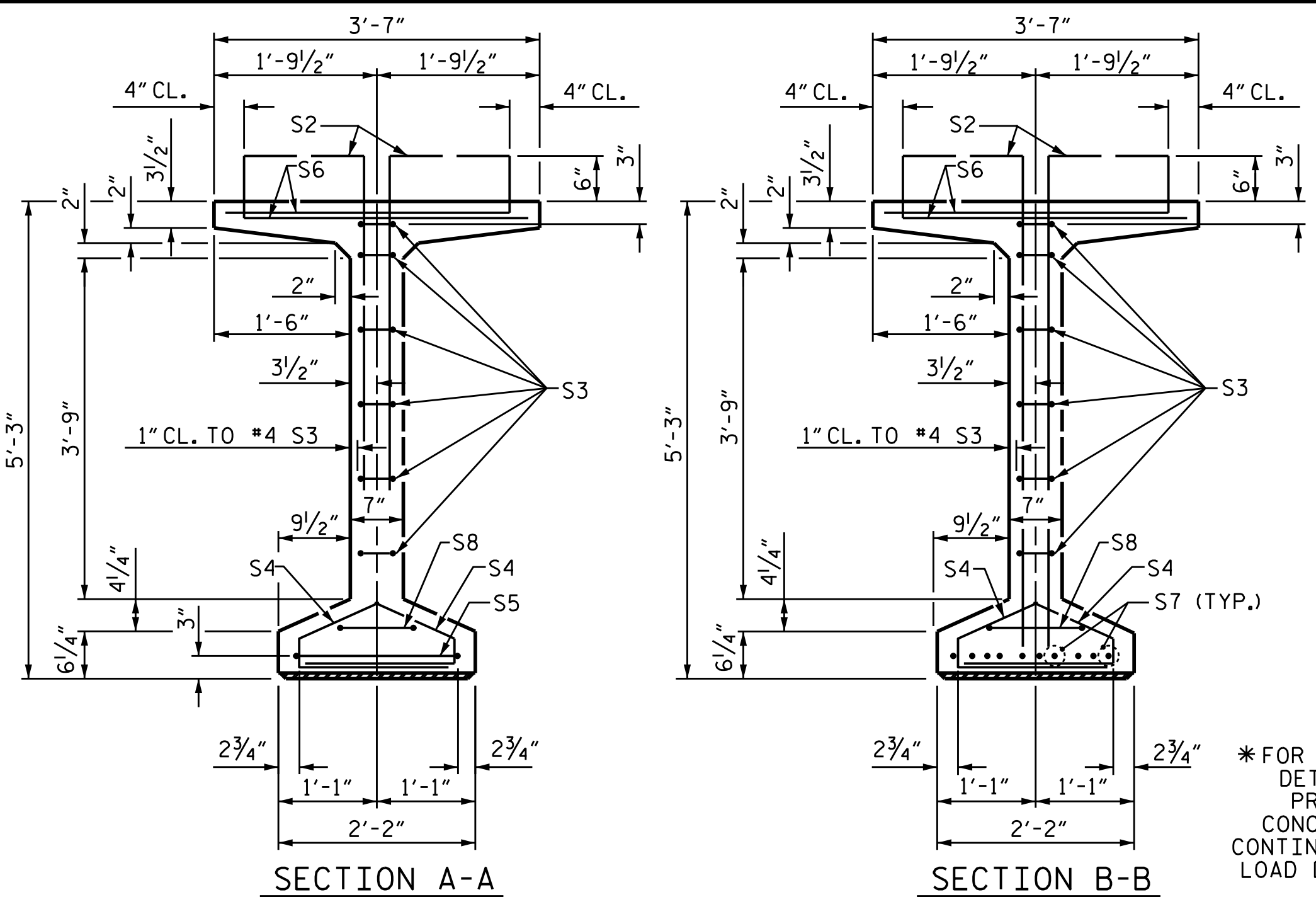
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 FRAMING PLAN
 SPAN C

DRAWN BY : A. SORSENGINH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DESIGN ENGINEER OF RECORD: A. SORSENGINH DATE : 9/2018

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

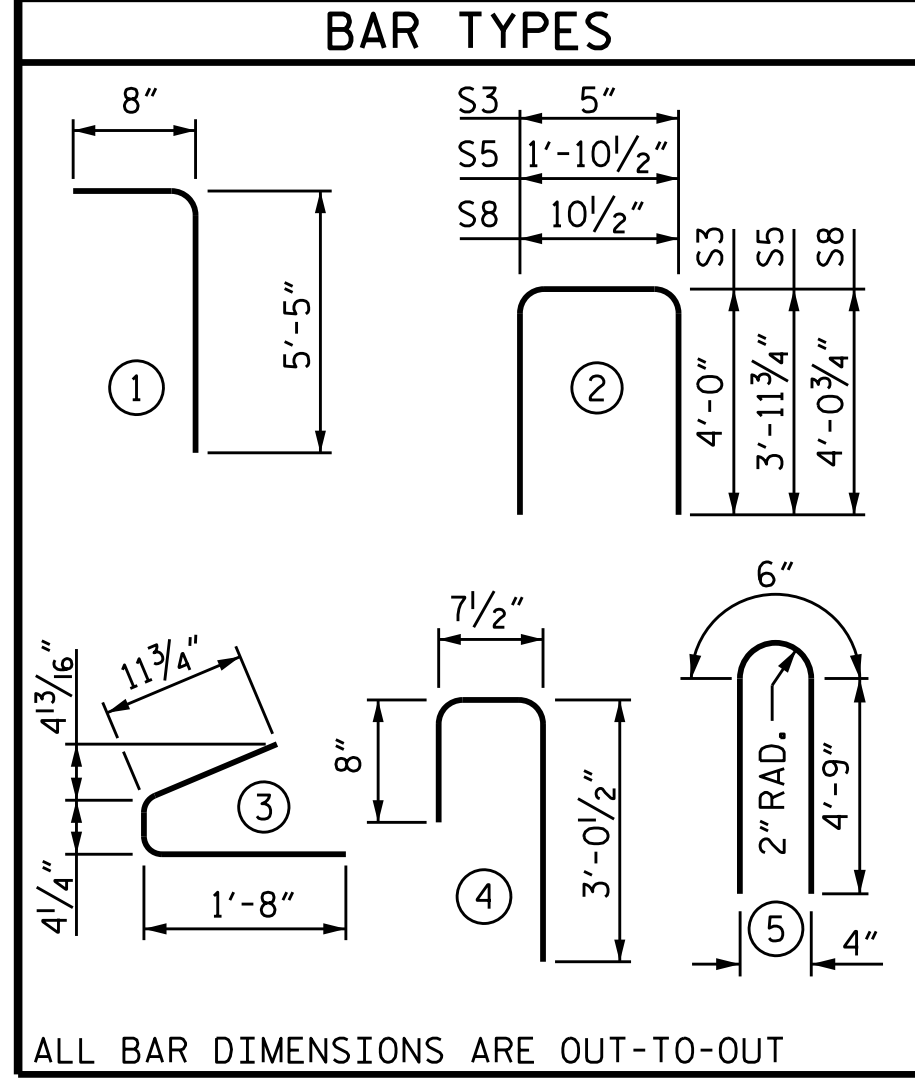
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			39



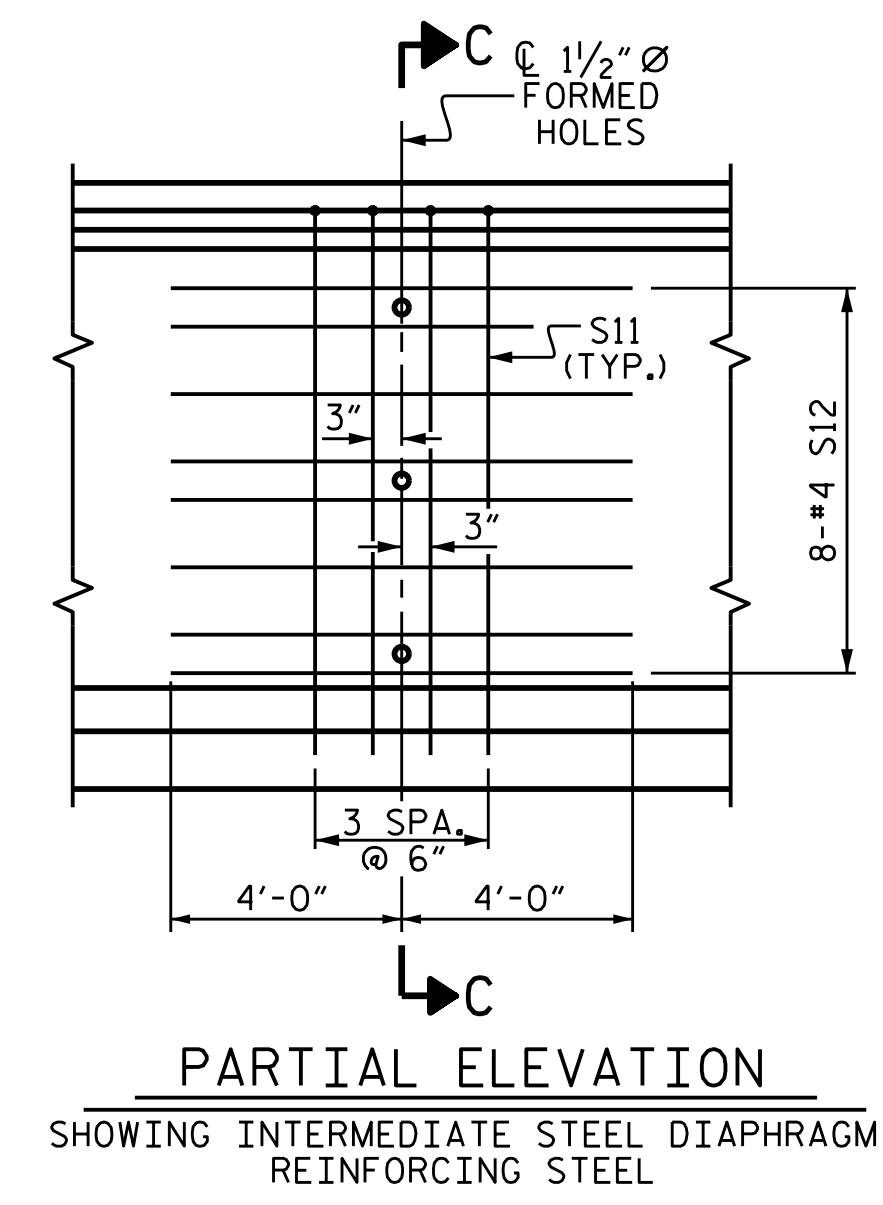
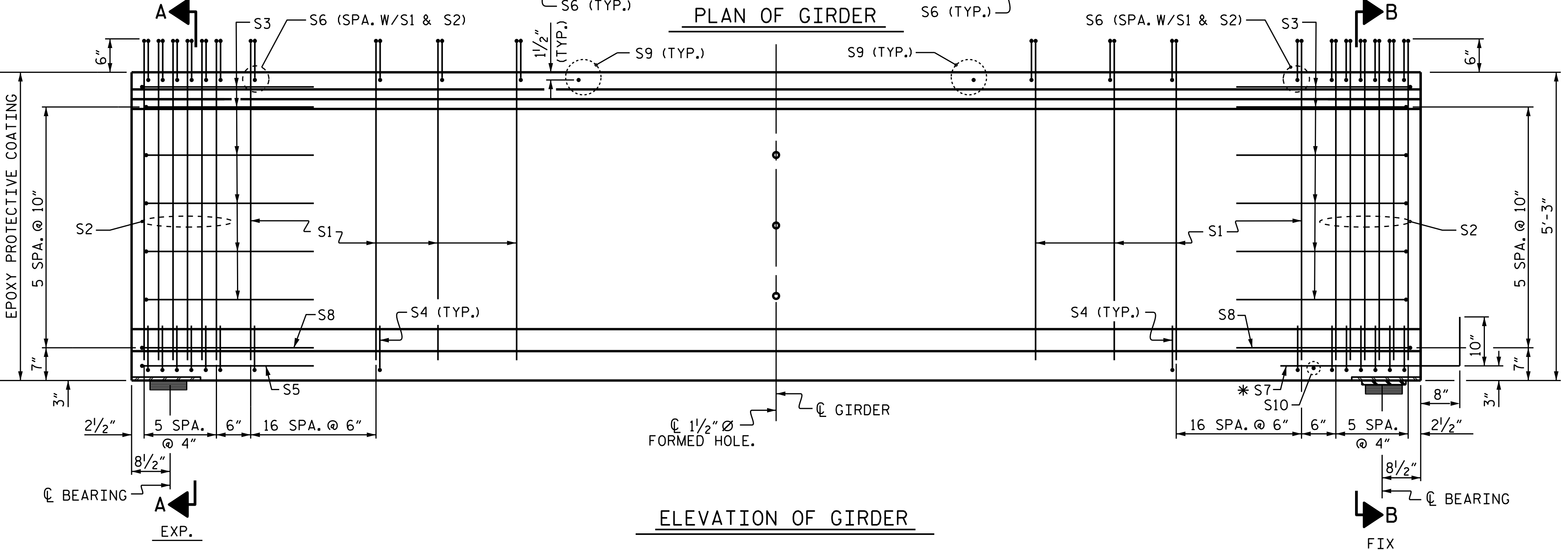
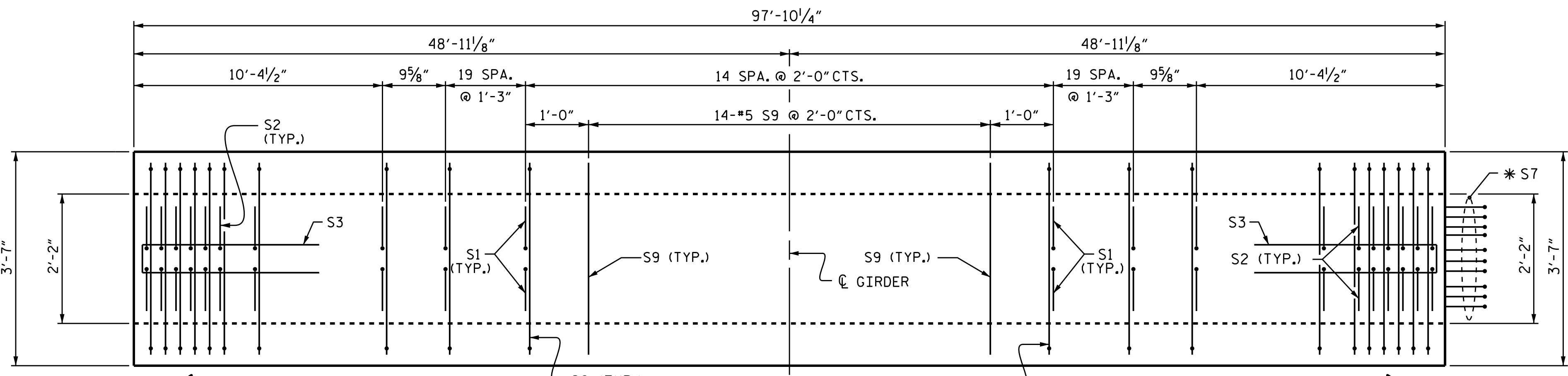
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	174	#4	1	6'-1"	707	
S2	24	#5	1	6'-1"	152	
S3	12	#4	2	8'-5"	67	
S4	92	#4	3	3'-0"	184	
S5	1	#5	2	9'-10"	10	
S6	198	#5	4	4'-4"	895	
*S7	10	#5	STR	3'-8"	38	
S8	2	#5	2	9'-0"	19	
S9	14	#5	STR	3'-3"	47	
S10	1	#3	STR	1'-10"	1	
S11	4	#5	5	10'-0"	42	
S12	8	#4	STR	8'-0"	43	

* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



DEBONDING LEGEND
 ● FULLY BONDED STRANDS
 ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

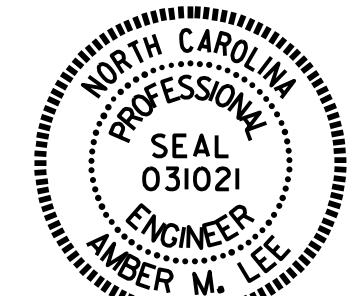


QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	7,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
2,205	19.4	32

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	97'-10 1/4"	391'-5"

PROJECT NO. B-5388
 ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

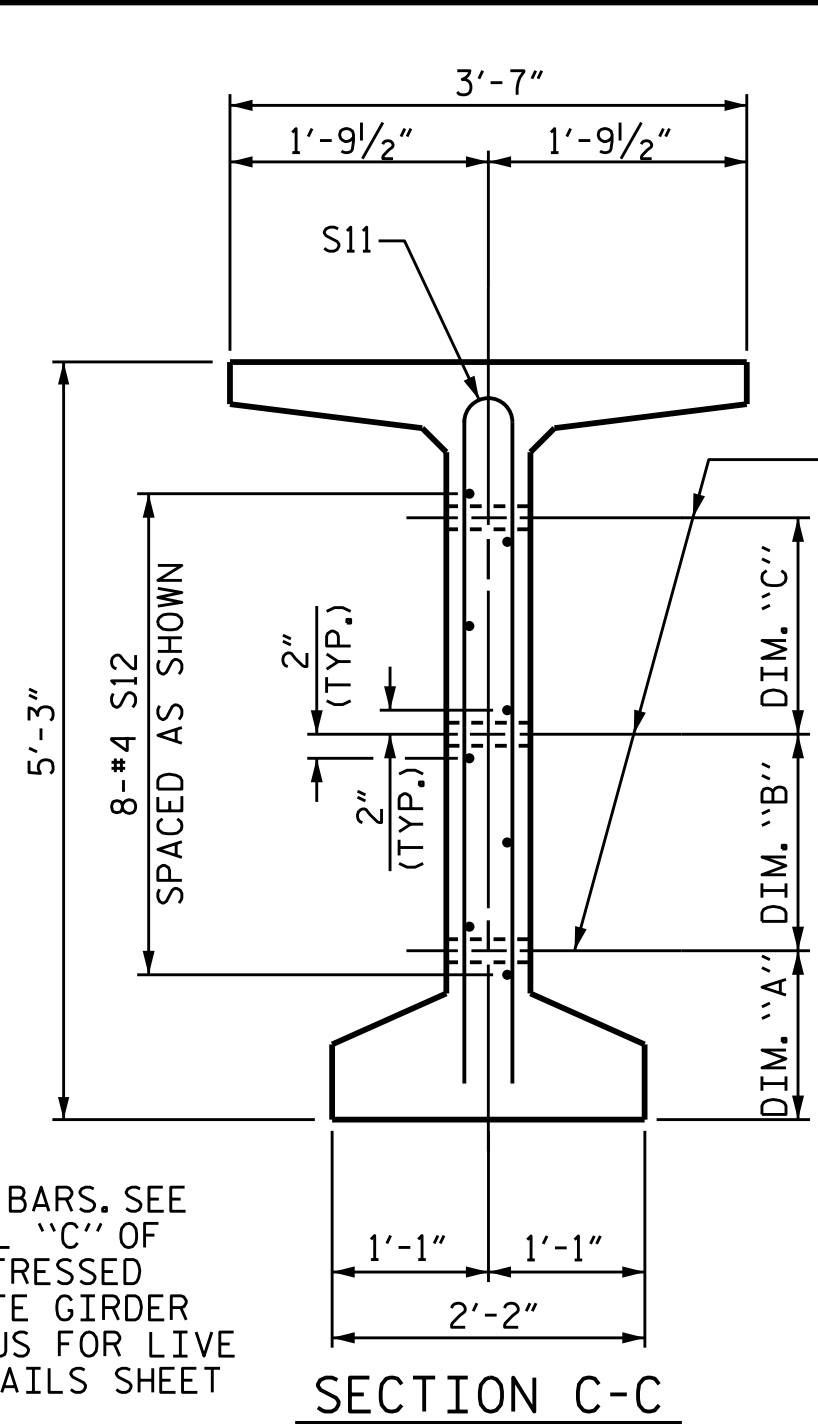
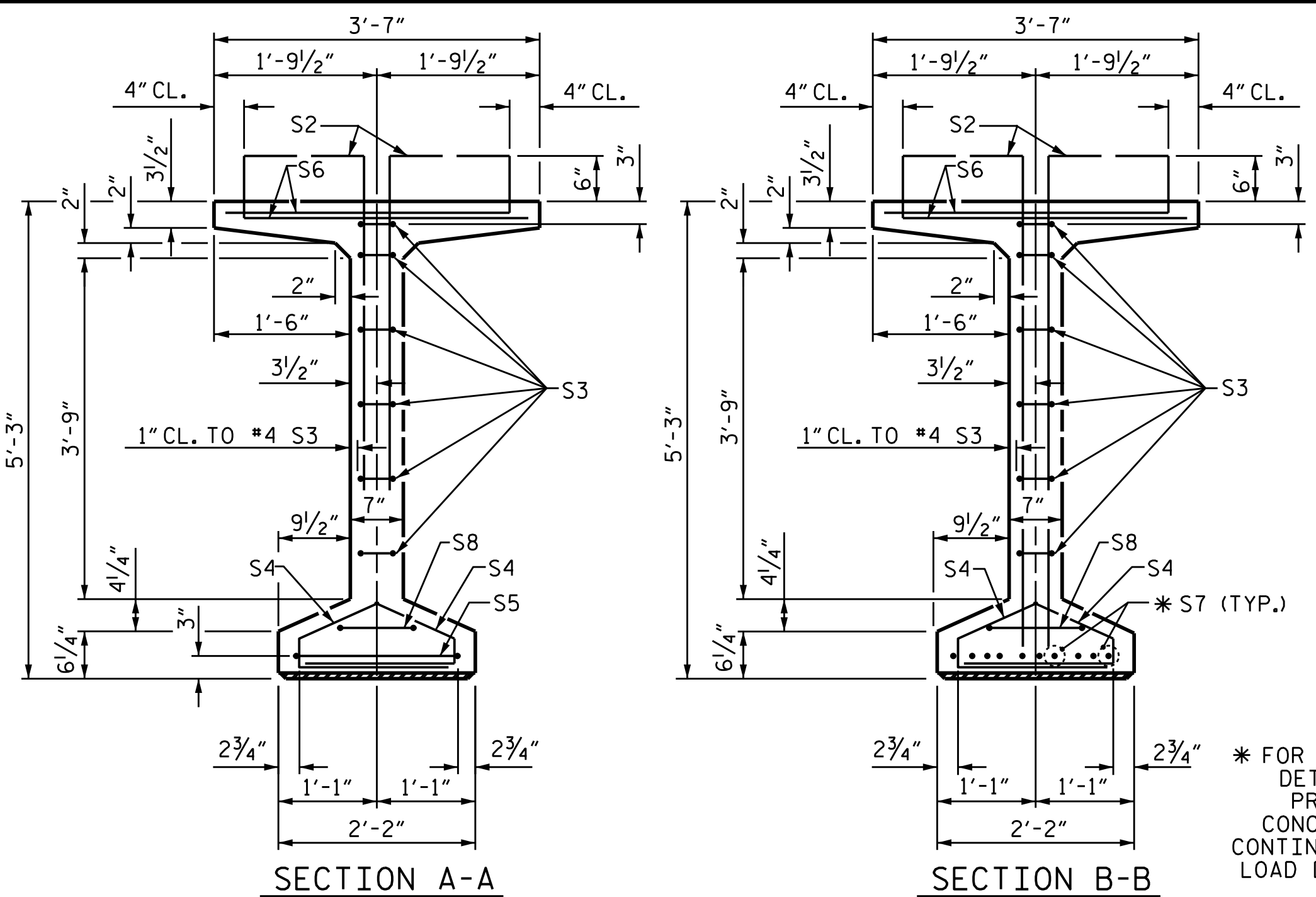
SHEET 1 OF 5
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 63" PRESTRESSED CONCRETE
 MODIFIED BULB TEE
 CONTINUOUS FOR LIVE LOAD
 (SPAN A)



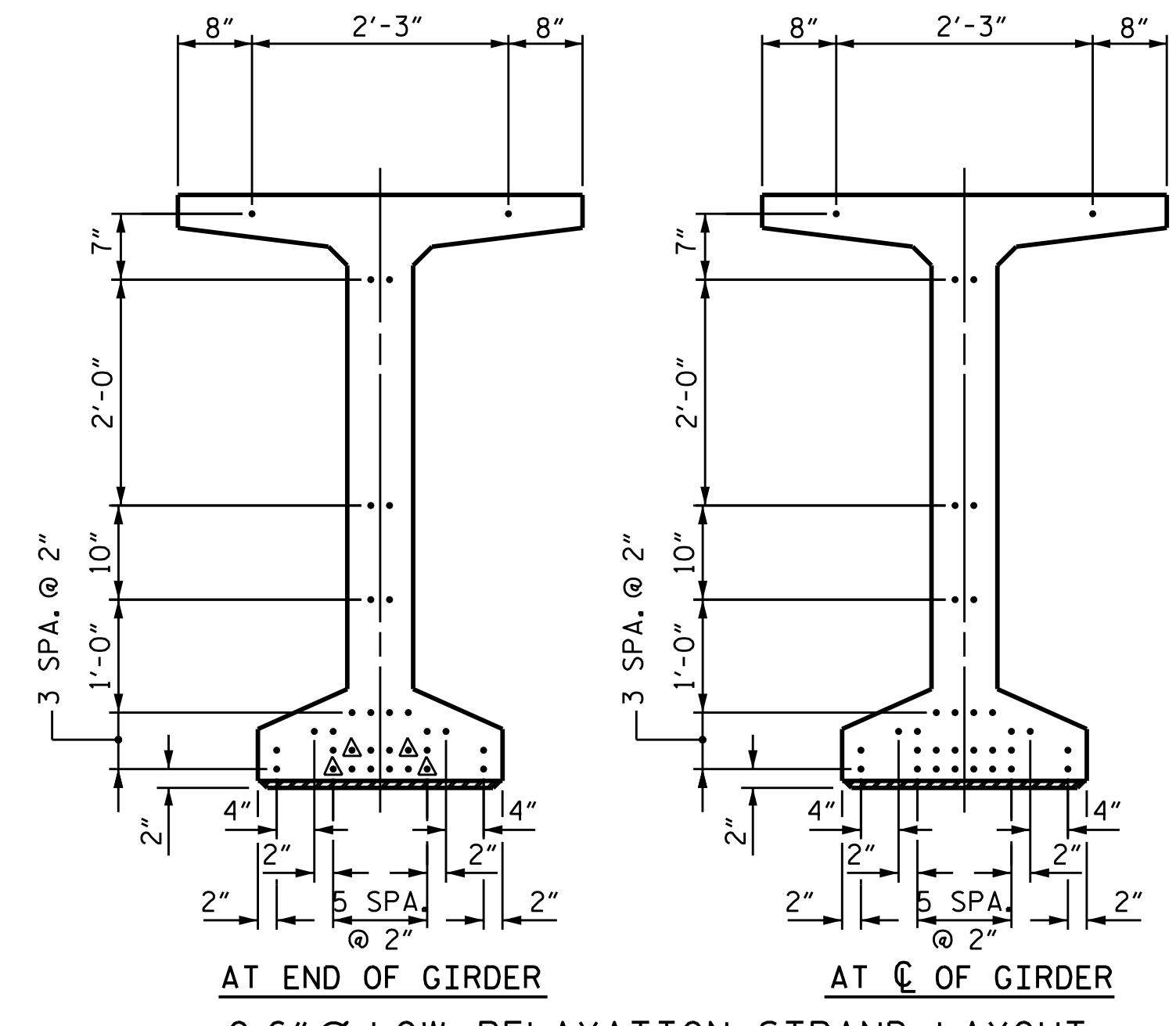
ASSEMBLED BY: A. SORSENGINH	DATE: 8/2018
CHECKED BY: H. LOCKLEAR	DATE: 9/2018
DRAWN BY: EEM 2/6/97	REV. 6/13 MAA/GM
CHECKED BY: VAP 2/6/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			39



1/2" Ø FORMED HOLE. SEE ELEVATION FOR LOCATION. FOR DIM. "A", "B" & "C" SEE "INTERMEDIATE STEEL DIAPHRAGM" SHEET.)



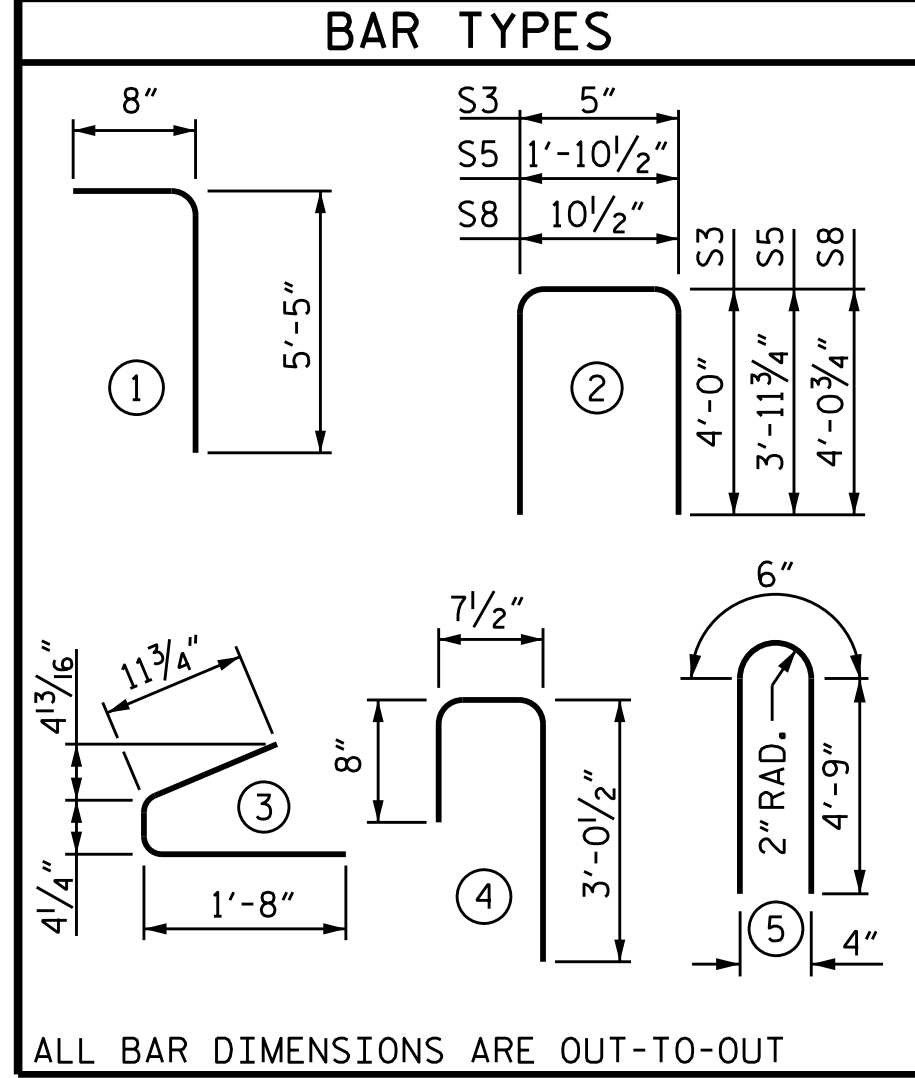
AT END OF GIRDER AT C/ OF GIRDER
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND
● FULLY BONDED STRANDS
▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

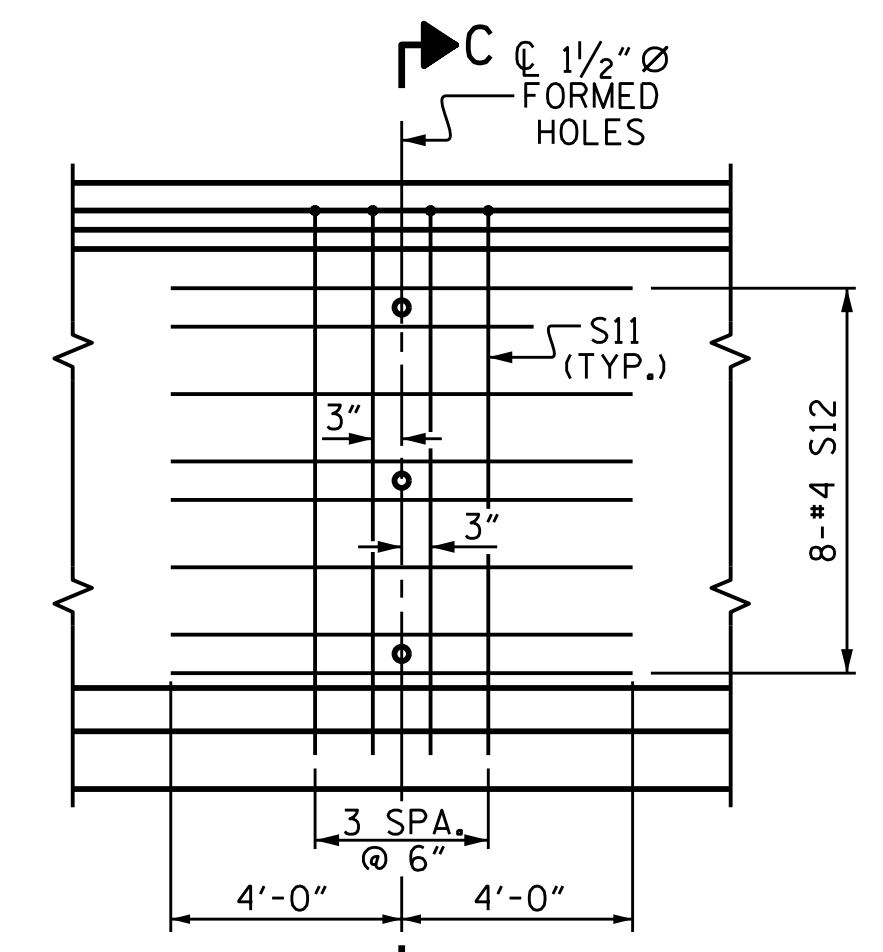
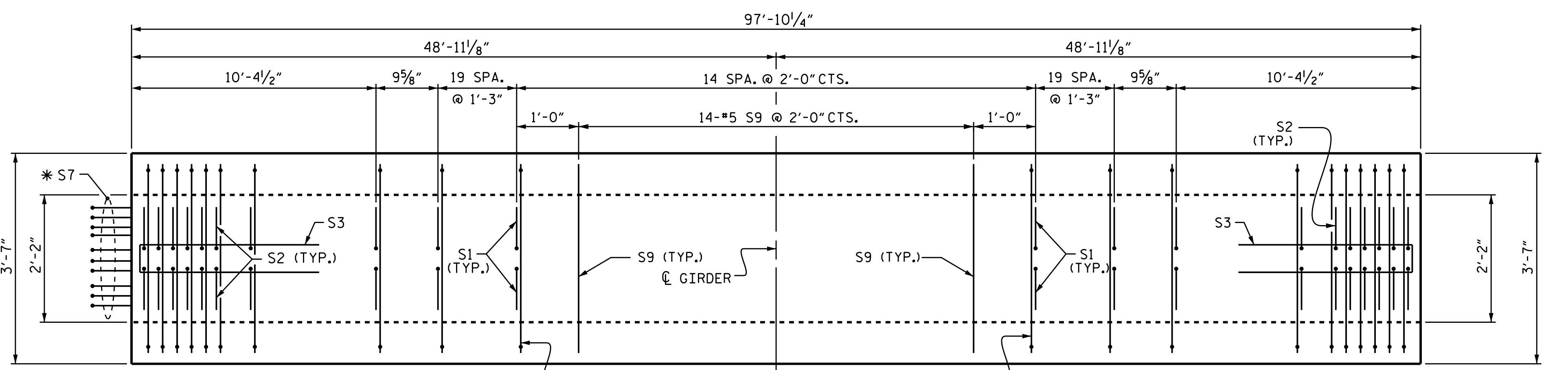
REINFORCING STEEL FOR ONE GDR						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	174	#4	1	6'-1"	707	
S2	24	#5	1	6'-1"	152	
S3	12	#4	2	8'-5"	67	
S4	92	#4	3	3'-0"	184	
S5	1	#5	2	9'-10"	10	
S6	198	#5	4	4'-4"	895	
*S7	10	#5	STR	3'-8"	38	
S8	2	#5	2	9'-0"	19	
S9	14	#5	STR	3'-3"	47	
S10	1	#3	STR	1'-10"	1	
S11	4	#5	5	10'-0"	42	
S12	8	#4	STR	8'-0"	43	

* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

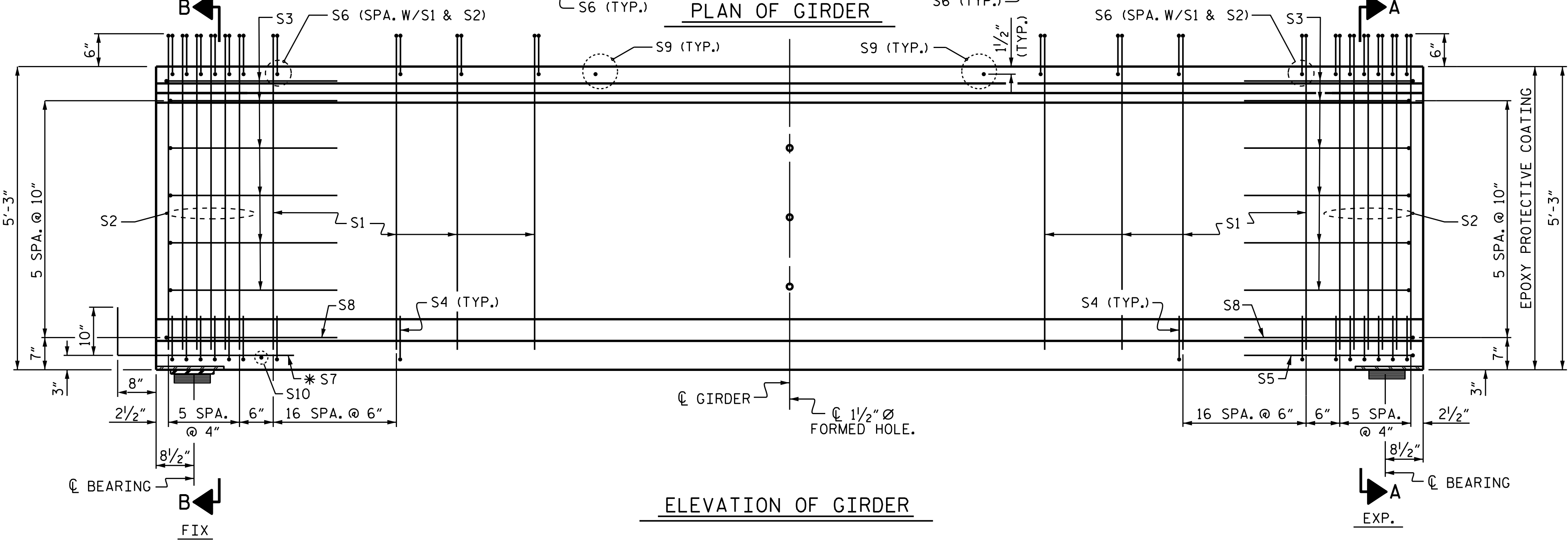


QUANTITIES FOR ONE GIRDER		
REINFORCING STEEL	7,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
2,205	19.4	32

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	97'-10 1/4"	391'-5"



SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL



PROJECT NO. B-5388
ALLEGHANY COUNTY
STATION: 19+78.50 -L-

SHEET 3 OF 5
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
63" PRESTRESSED CONCRETE
MODIFIED BULB TEE
CONTINUOUS FOR LIVE LOAD
(SPAN C)



ASSEMBLED BY : A. SORSENGINH	DATE : 8/2018
CHECKED BY : H. LOCKLEAR	DATE : 9/2018
DRAWN BY : EEM 2/6/97	REV. 6/13 MAA/GM
CHECKED BY : VAP 2/6/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO. S-16
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 39
2			4			

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

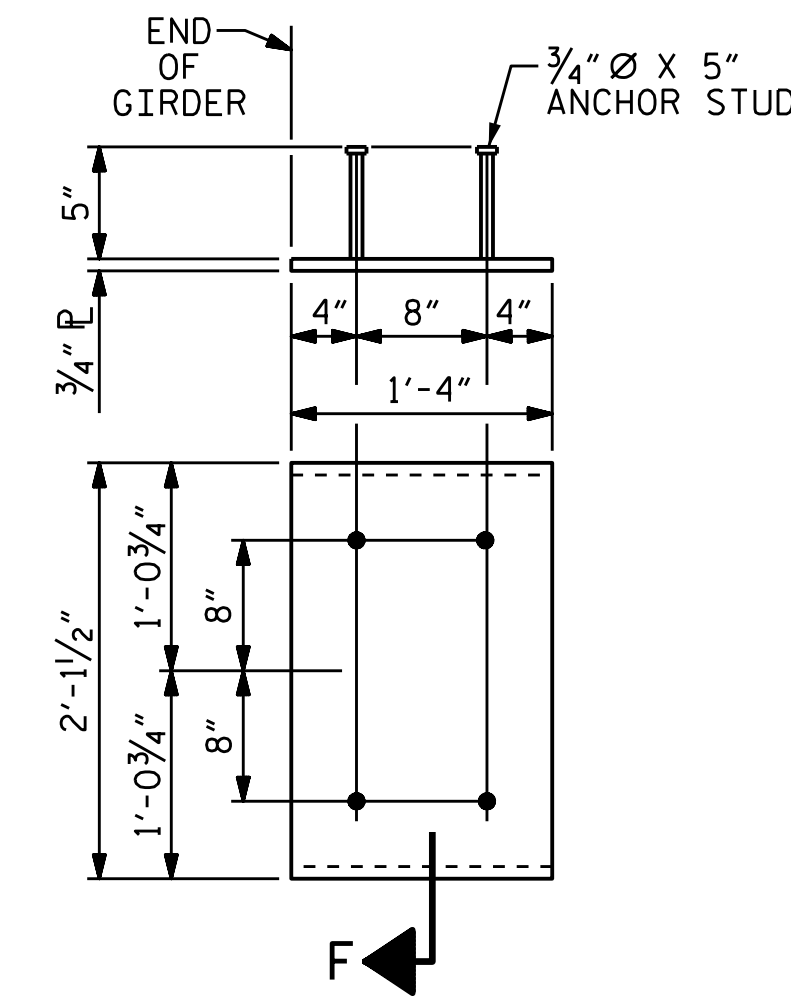
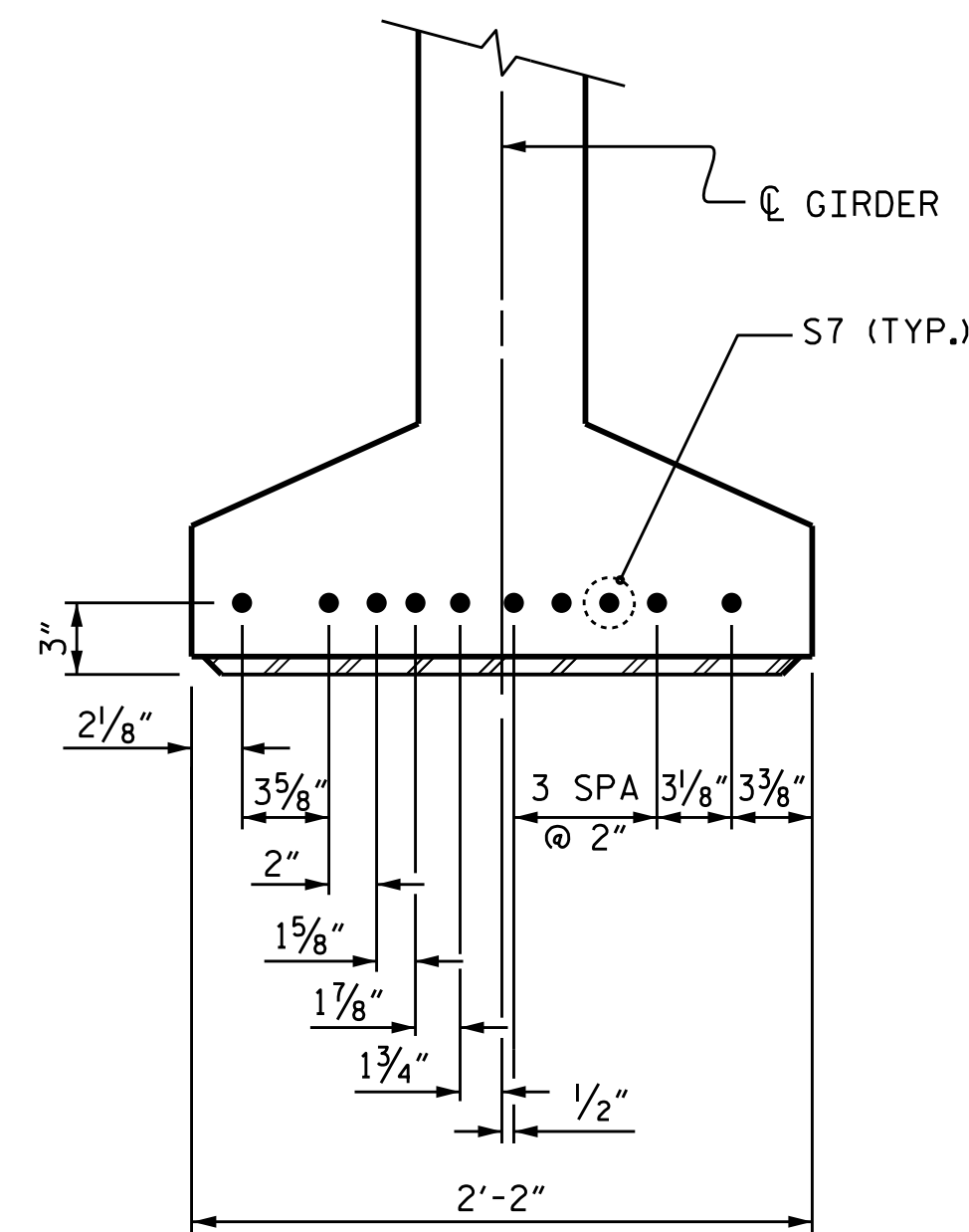
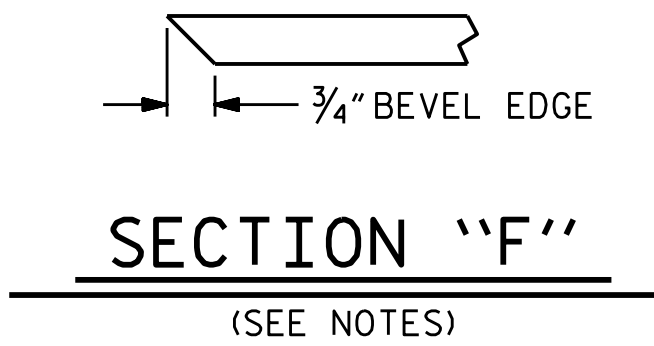
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5,700 PSI. FOR SPANS A & C AND 7,500 PSI FOR SPAN B.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

A 2" X 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.



DEAD LOAD DEFLECTION TABLE FOR SPAN A OR C																						
0.6" Ø LOW RELAXATION	GIRDERS 1 & 4											GIRDERS 2 & 3										
TENTH POINTS	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	CL BRG.	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	0.000	0.051	0.096	0.131	0.153	0.161	0.153	0.131	0.096	0.051	0.000	0.000	0.051	0.096	0.131	0.153	0.161	0.153	0.131	0.096	0.051	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	0.034	0.064	0.087	0.102	0.107	0.102	0.087	0.064	0.034	0.000	0.000	0.035	0.066	0.091	0.106	0.112	0.106	0.091	0.066	0.035	0.000
FINAL CAMBER	0	3/16"	3/8"	1/2"	5/8"	5/8"	5/8"	1/2"	3/8"	3/16"	0	0	3/16"	3/8"	1/2"	9/16"	9/16"	9/16"	1/2"	3/8"	3/16"	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																					
0.6" Ø LOW RELAXATION	GIRDERS 1 & 4																				
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	0
CAMBER (GIRDER ALONE IN PLACE)	0.000	0.042	0.083	0.122	0.157	0.189	0.215	0.237	0.252	0.262	0.265	0.262	0.252	0.237	0.215	0.189	0.157	0.122	0.083	0.042	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	0.030	0.056	0.086	0.111	0.133	0.152	0.167	0.177	0.184	0.186	0.184	0.177	0.167	0.152	0.133	0.111	0.086	0.056	0.030	0.000
FINAL CAMBER	0	1/8"	5/16"	7/16"	9/16"	11/16"	3/4"	13/16"	7/8"	15/16"	15/16"	15/16"	7/8"	13/16"	3/4"	11/16"	9/16"	7/16"	5/16"	1/8"	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																					
0.6" Ø LOW RELAXATION	GIRDERS 2 & 3																				
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.7	.75	.8	.85	.9	.95	0
CAMBER (GIRDER ALONE IN PLACE)	0.000	0.042	0.083	0.122	0.157	0.189	0.215	0.237	0.252	0.262	0.265	0.262	0.252	0.237	0.215	0.189	0.157	0.122	0.083	0.042	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	0.031	0.061	0.089	0.115	0.138	0.156	0.173	0.184	0.191	0.194	0.191	0.184	0.173	0.156	0.138	0.115	0.089	0.061	0.031	0.000
FINAL CAMBER	0	1/8"	1/4"	3/8"	1/2"	5/8"	11/16"	3/4"	13/16"	7/8"	7/8"	7/8"	13/16"	3/4"	11/16"	5/8"	1/2"	3/8"	1/4"	1/8"	0

* INCLUDES FUTURE WEARING SURFACE
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. B-5388
ALLEGHANY COUNTY
STATION: 19+78.50 -L-

SHEET 4 OF 5



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS

ASSEMBLED BY : A. SORSENGINH DATE : 8/2018
CHECKED BY : H. LOCKLEAR DATE : 9/2018
DRAWN BY : ELR 11/91
CHECKED BY : GRP 11/91

REV. 1/15 MAA/TMC
REV. 2/15 MAA/TMC
REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			39

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

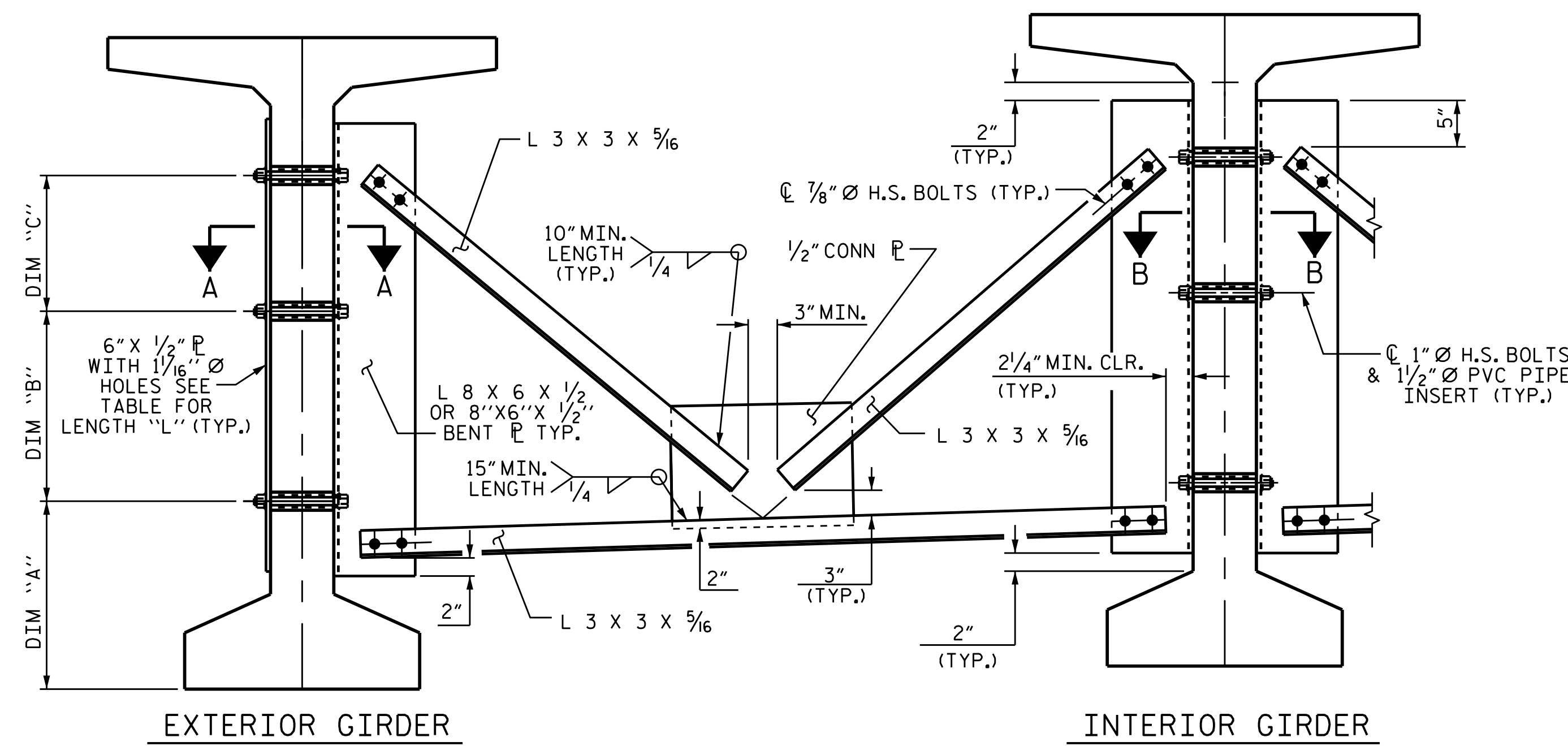
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

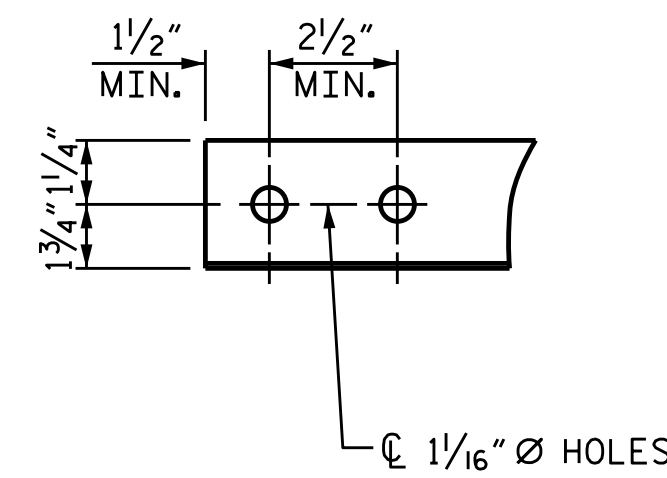
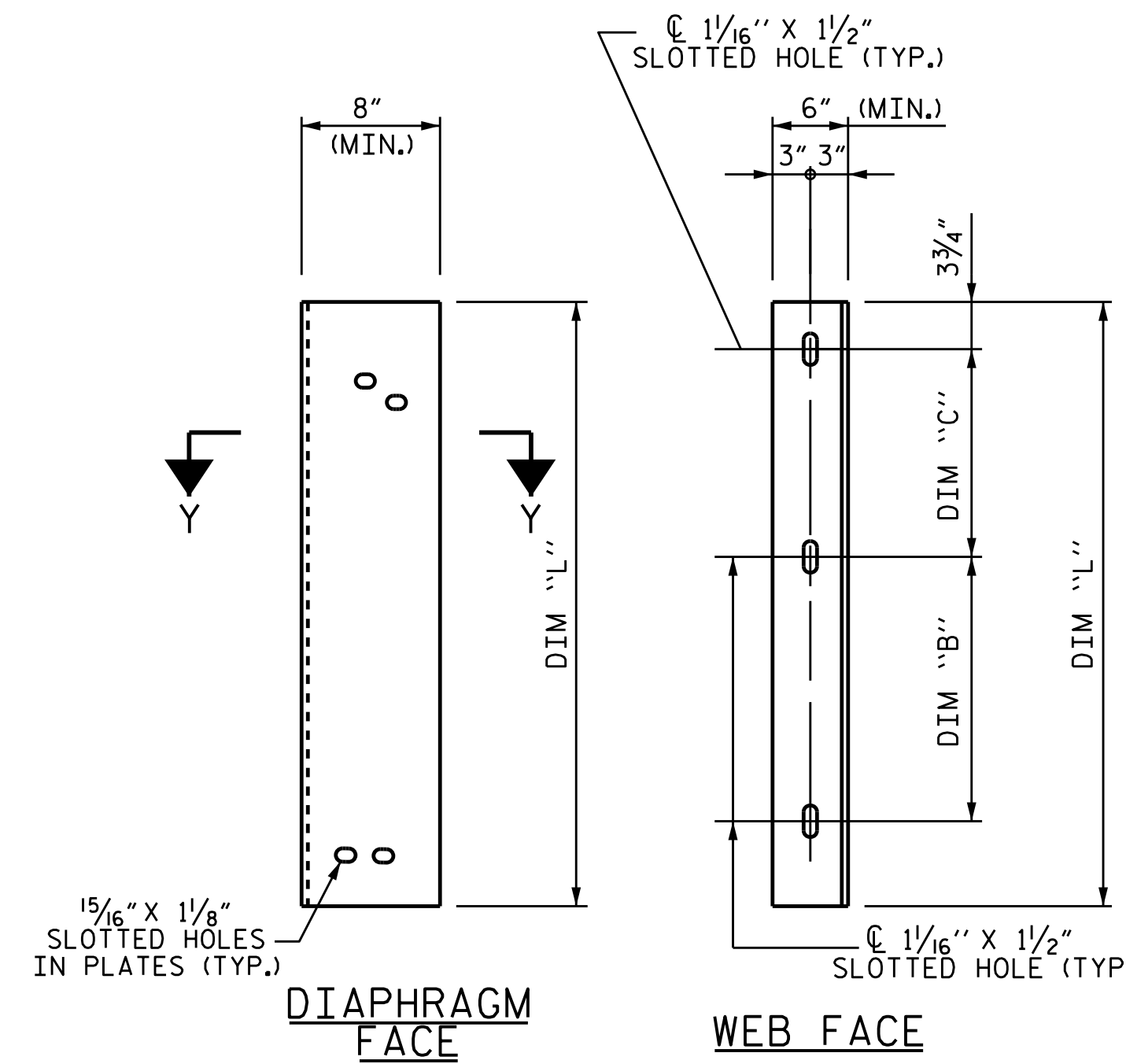
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



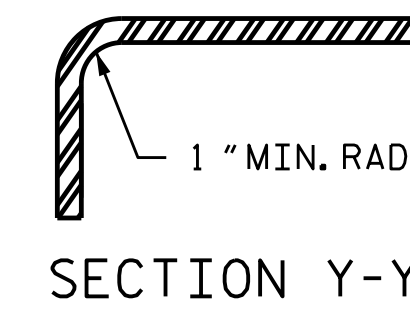
PART SECTION AT INTERMEDIATE DIAPHRAGM

(63" BULB TEE BULB TEE GIRDER SHOWN)



ANGLE END

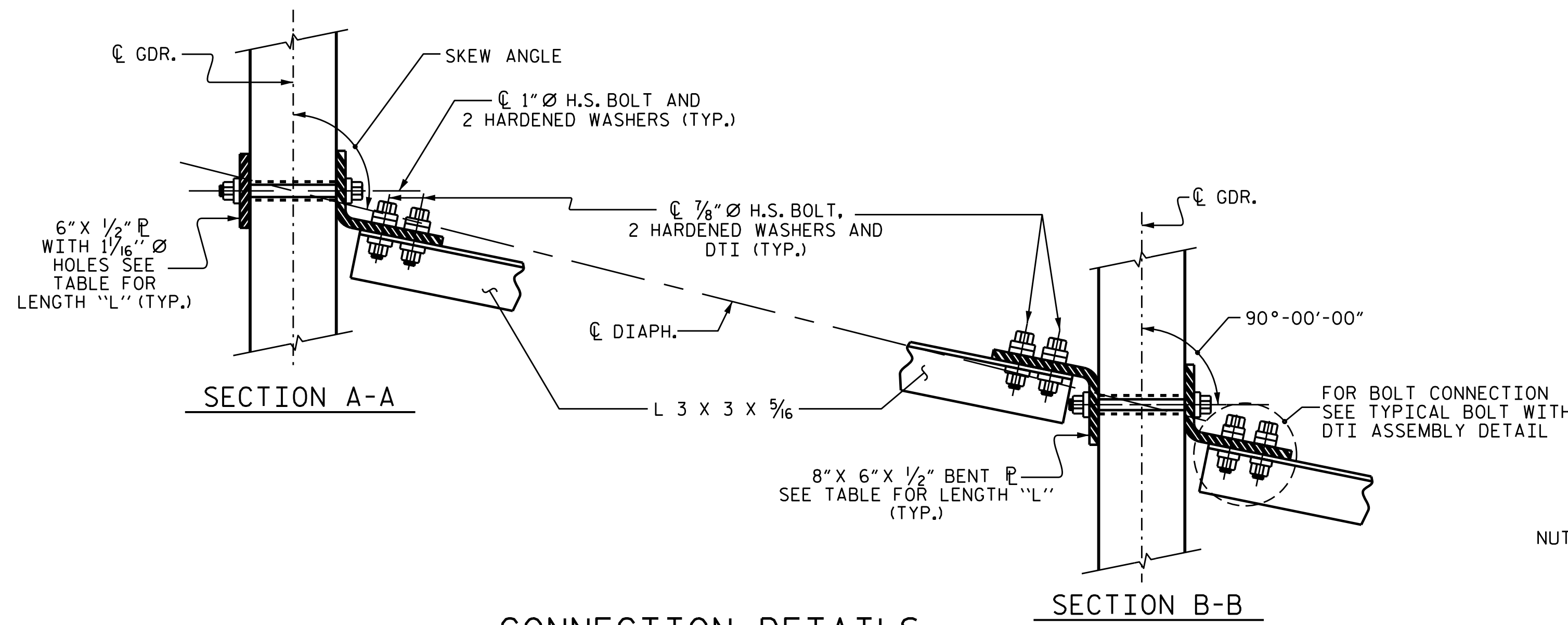
(L 3 X 3 X 5/16)



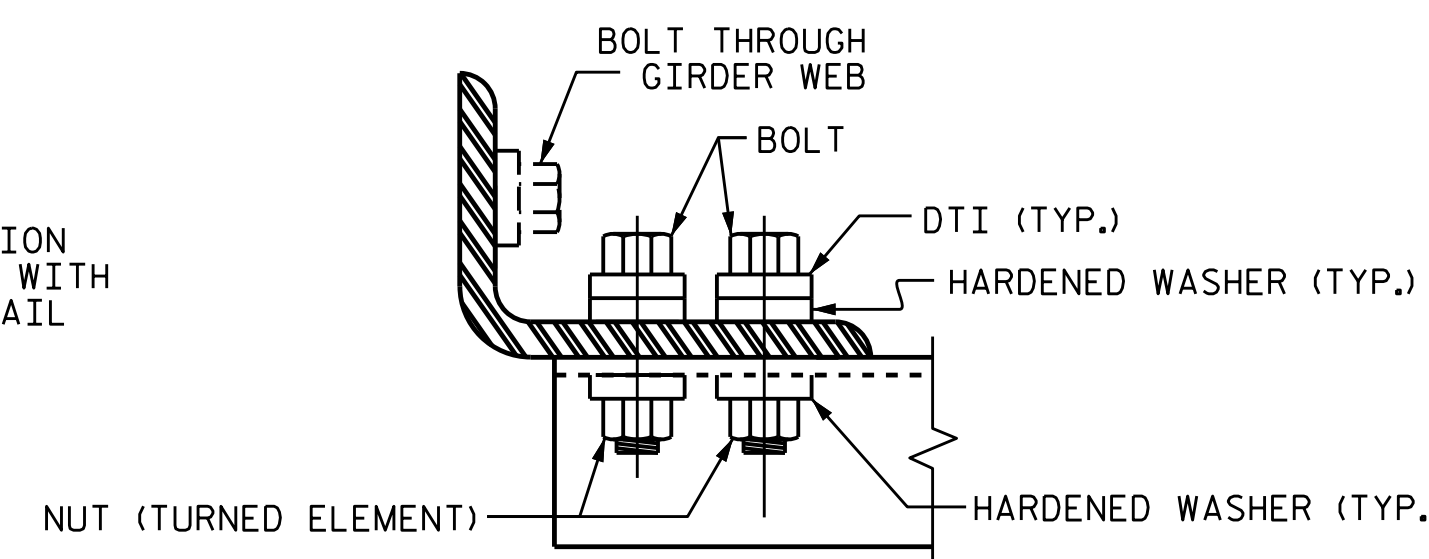
CONNECTOR PLATE DETAIL

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63" BULB TEE	1'-4"	1'-5"	1'-4 3/4"	3'-5"



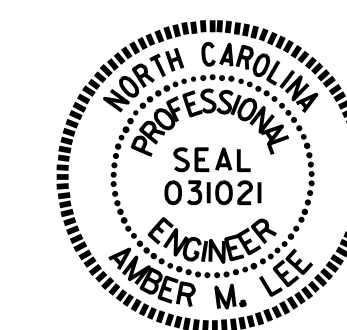
CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.5 -L-

SHEET 5 OF 5



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : A. SORSENGIH DATE : 8/2018
 CHECKED BY : H. LOCKLEAR DATE : 9/2018
 DRAWN BY : RWW 11/09 REV. 10/11/11 MAA/GM
 CHECKED BY : GM 11/09 REV. 12/17 MAA/THC

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

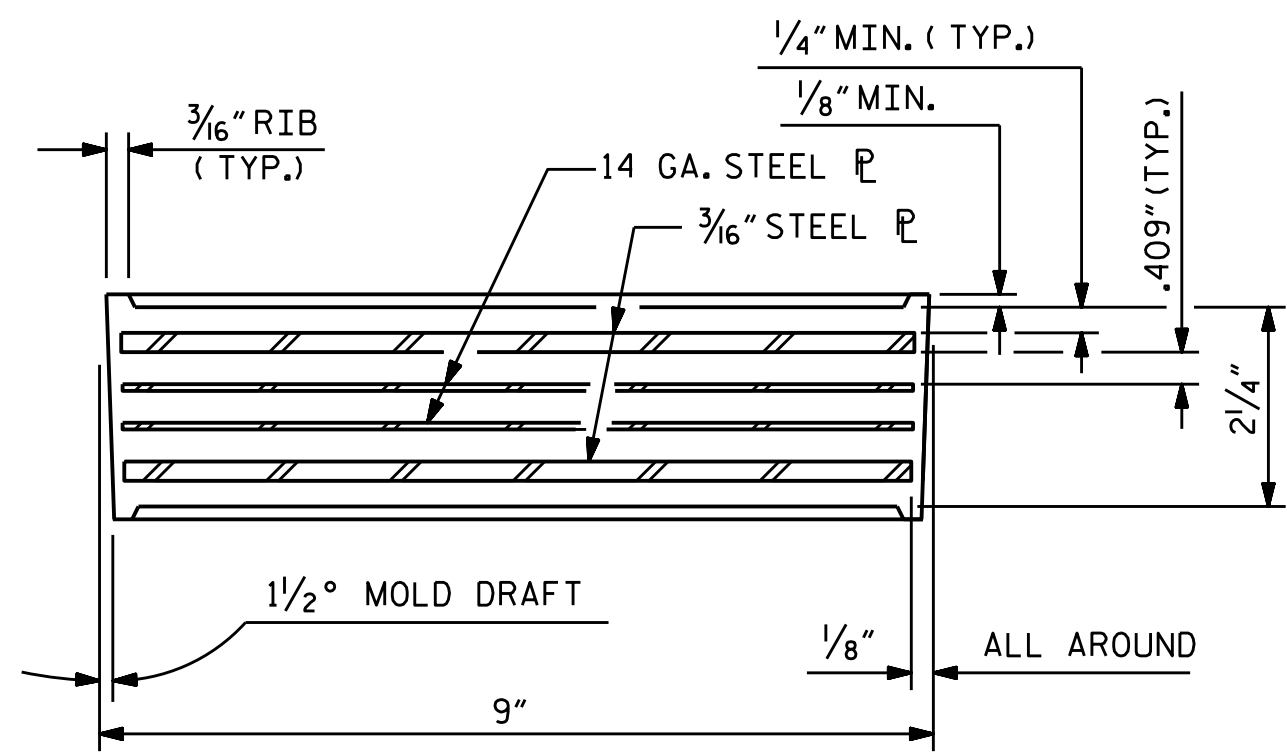
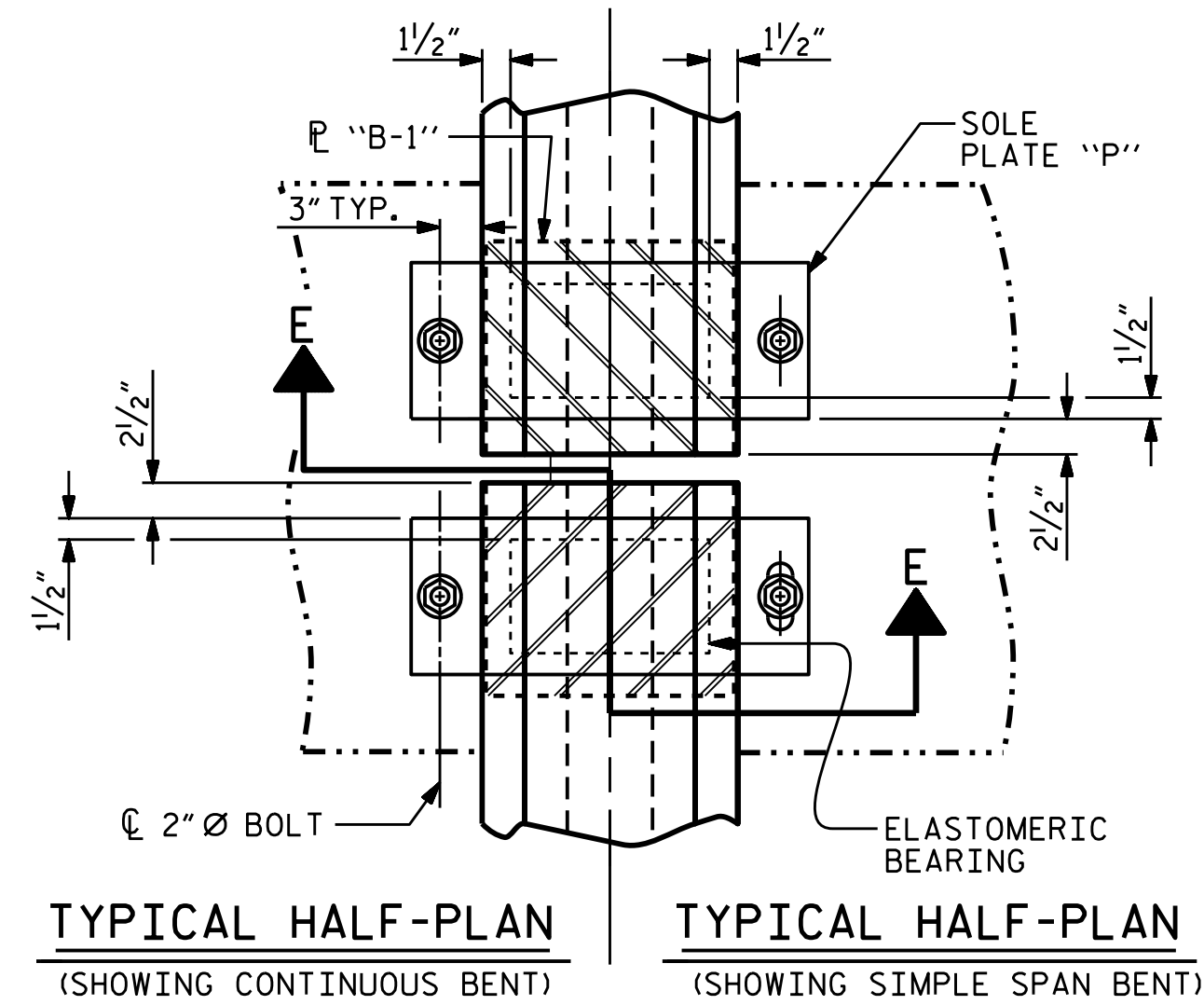
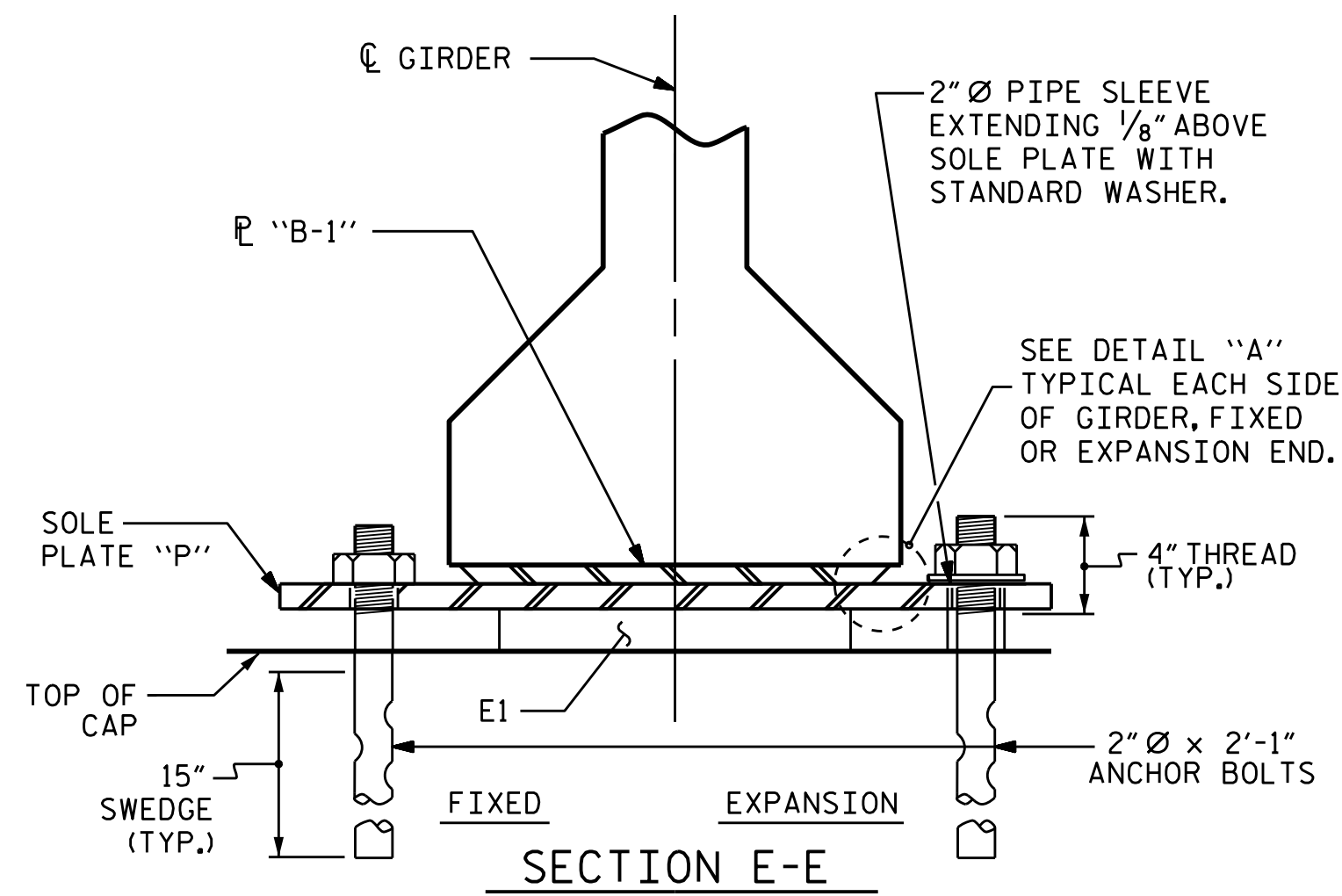
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

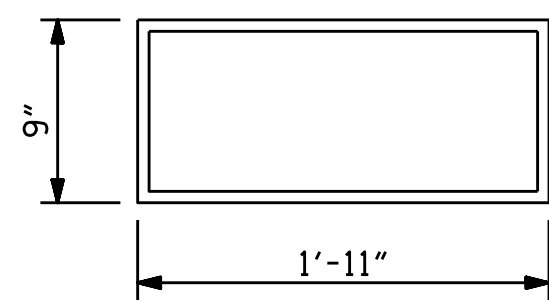
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



TYPICAL SECTION OF ELASTOMERIC BEARINGS

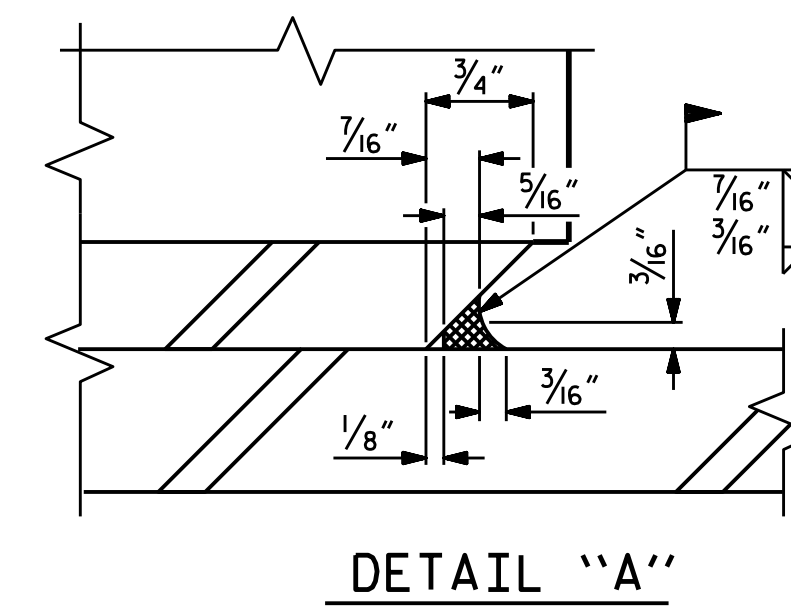


E1 (24 REQ'D)

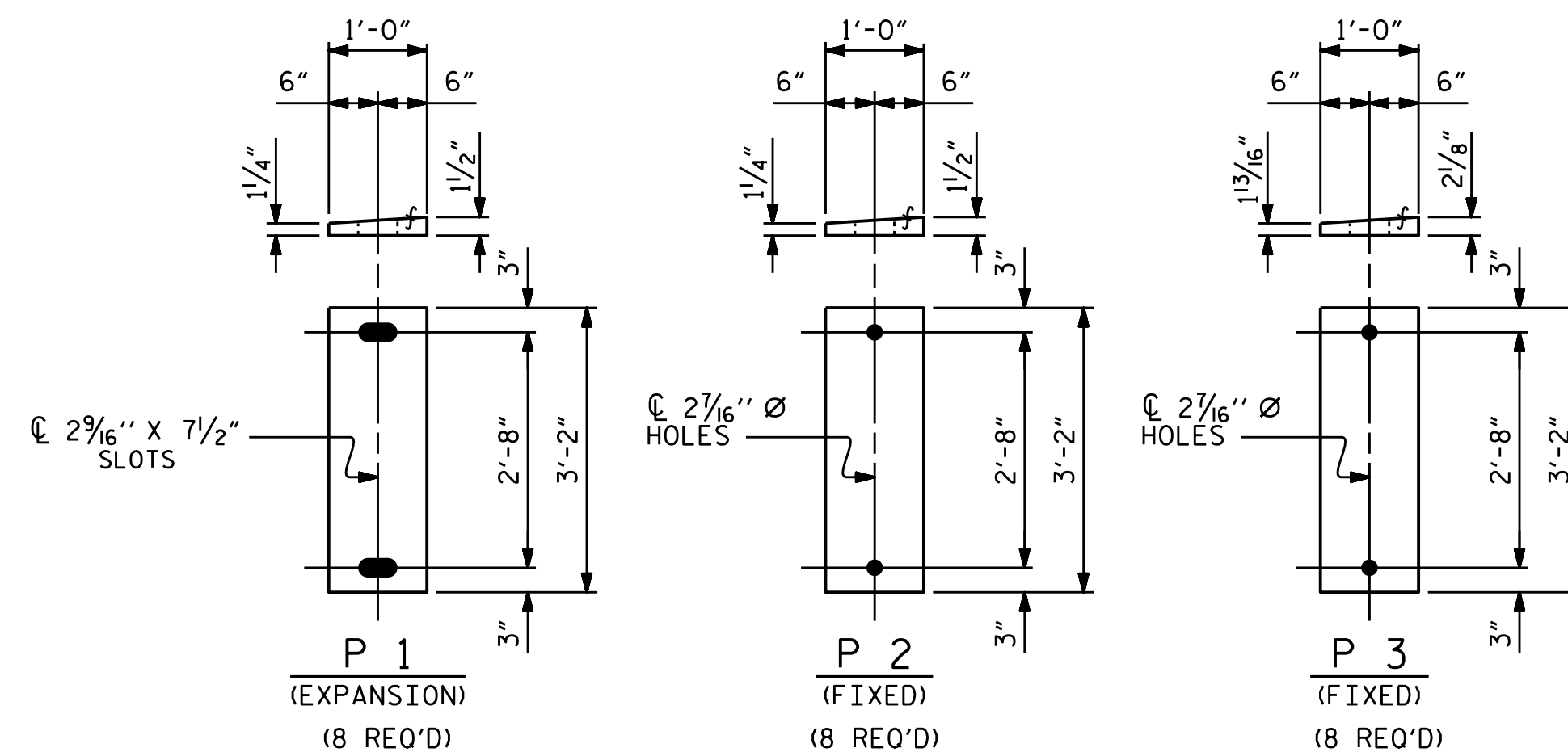
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 k

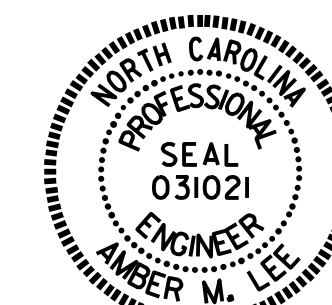


DETAIL "A"



SOLE PLATE DETAILS ("P")

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ALLEGHANY COUNTY
 STATION: 19+78.50 -L-



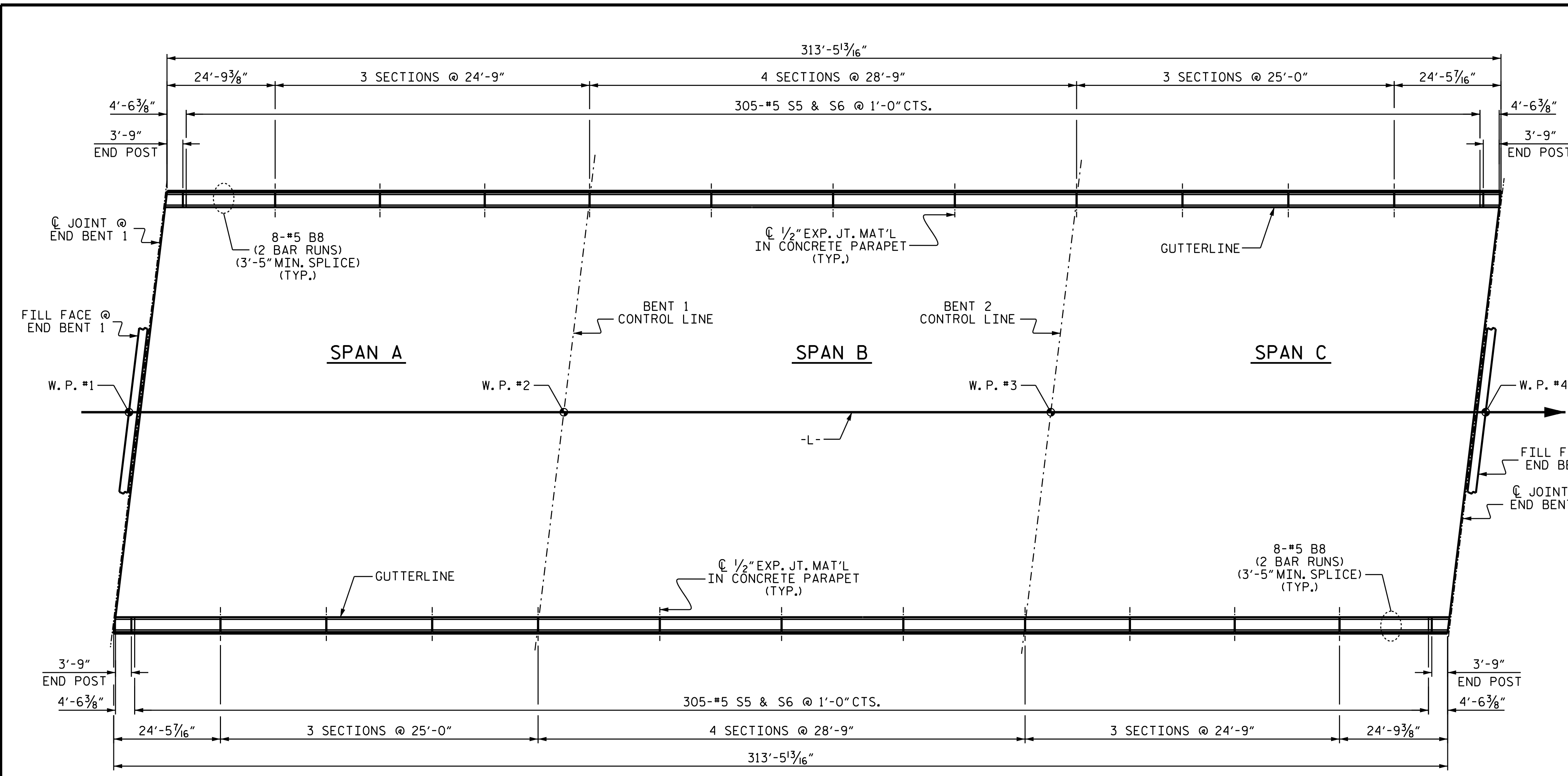
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ELASTOMERIC BEARING
 DETAILS
 PRESTRESSED CONCRETE GIRDER
 SUPERSTRUCTURE

ASSEMBLED BY :	A. SORSENGINH	DATE :	8/2018
CHECKED BY :	H. LOCKLEAR	DATE :	9/2018
DRAWN BY :	EEM	2/97	REV. 6/13
CHECKED BY :	VAP	2/97	REV. 1/15
			REV. 12/17

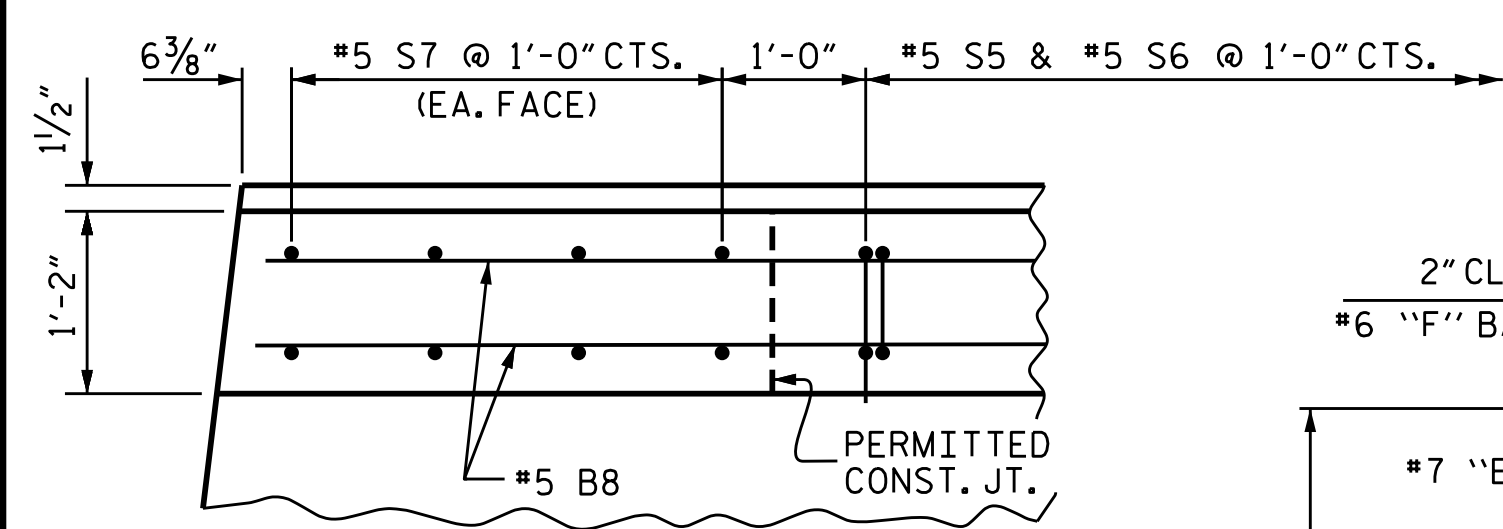
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

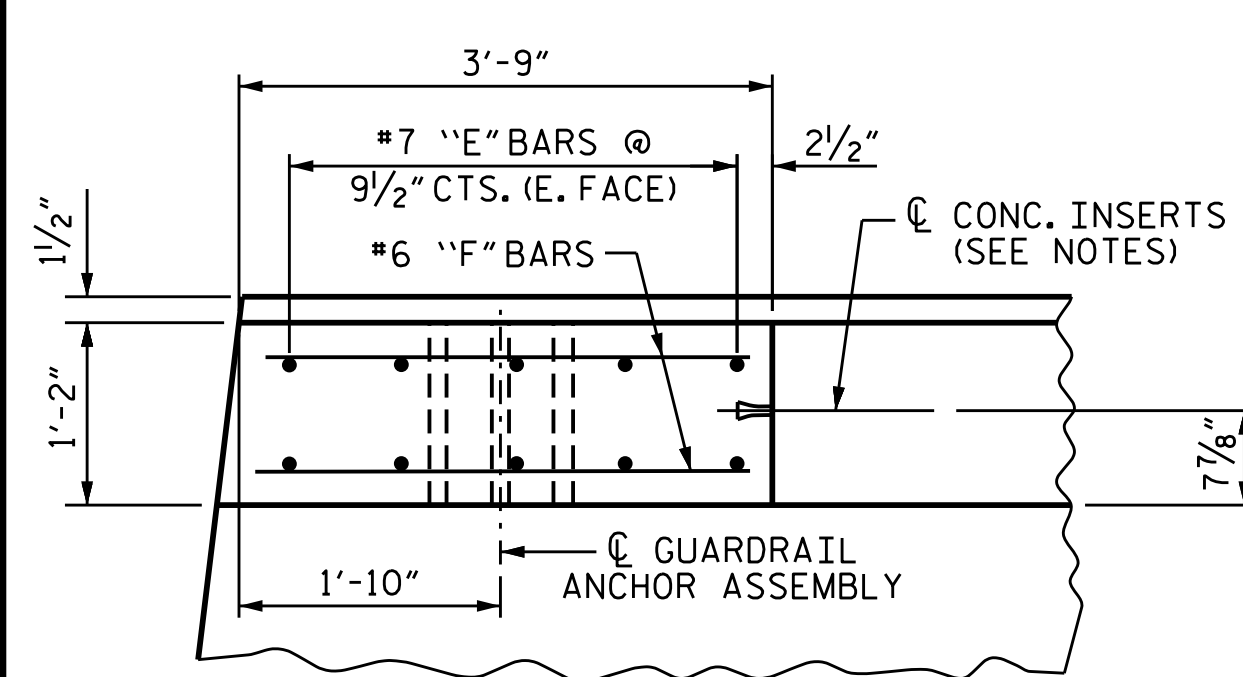
BAR TYPES		BILL OF MATERIAL					
		FOR CONCRETE PARAPET & END POSTS ONLY					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
* B8	384	#5	STR	15'-11"	6375		
* E1	8	#7	STR	2'-7"	42		
* E2	8	#7	STR	3'-1"	50		
* E3	8	#7	STR	3'-7"	59		
* E4	8	#7	STR	4'-1"	67		
* E5	8	#7	STR	4'-6"	74		
* F1	8	#6	STR	1'-9"	21		
* F2	8	#6	STR	3'-0"	36		
* F3	4	#6	STR	3'-9"	23		
* F4	4	#6	STR	4'-1"	25		
* S5	610	#5	1	6'-10"	4348		
* S6	610	#5	2	5'-6"	3499		
* S7	32	#5	STR	2'-10"	95		
* EPOXY COATED REINFORCING STEEL				14,714 LBS.			
CLASS AA CONCRETE				69.0 CU. YDS.			
1'-2" X 2'-6" CONCRETE PARAPET				626.97 LIN. FT.			
* THESE BARS ARE EPOXY COATED							



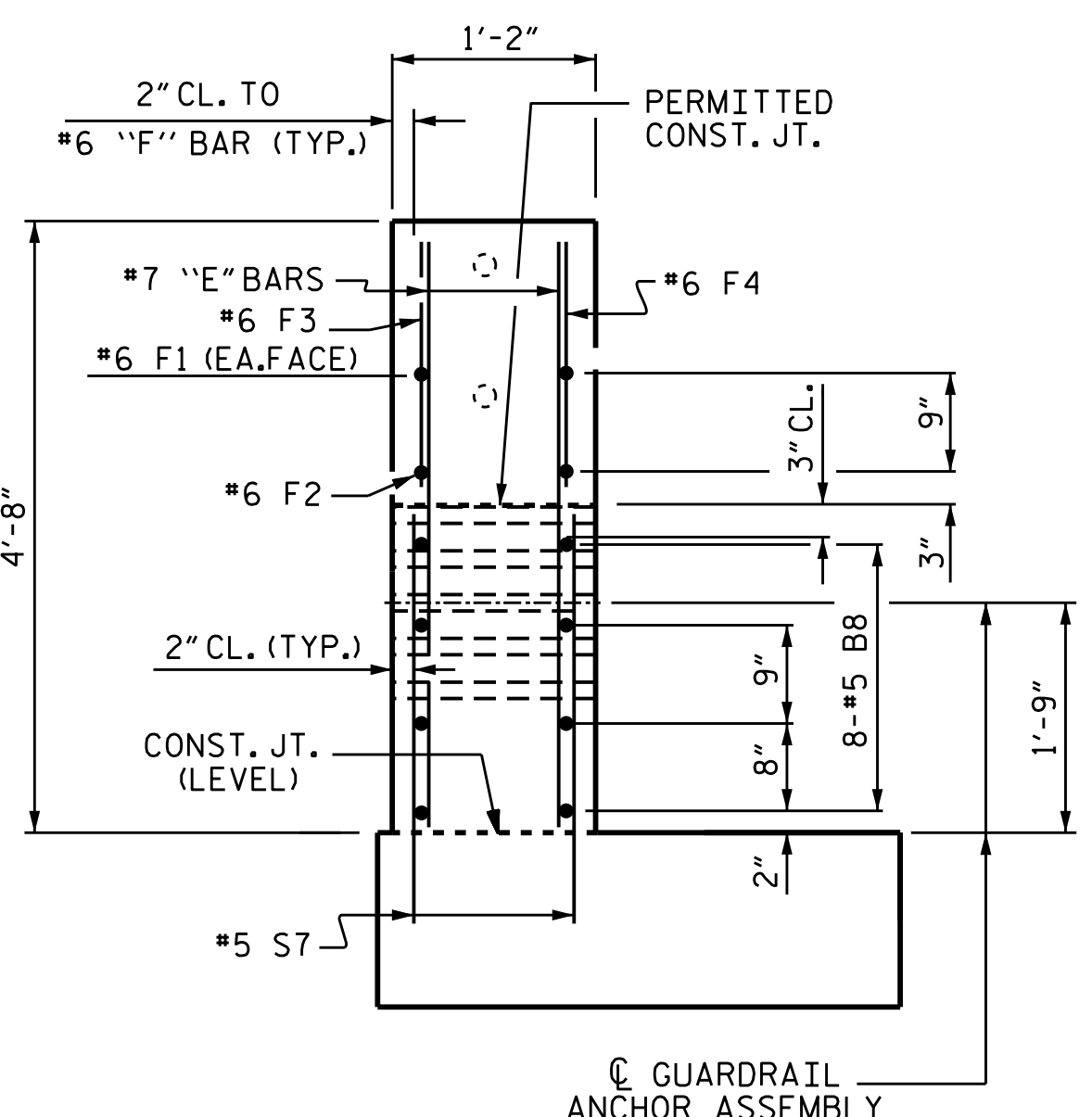
PLAN OF PARAPET



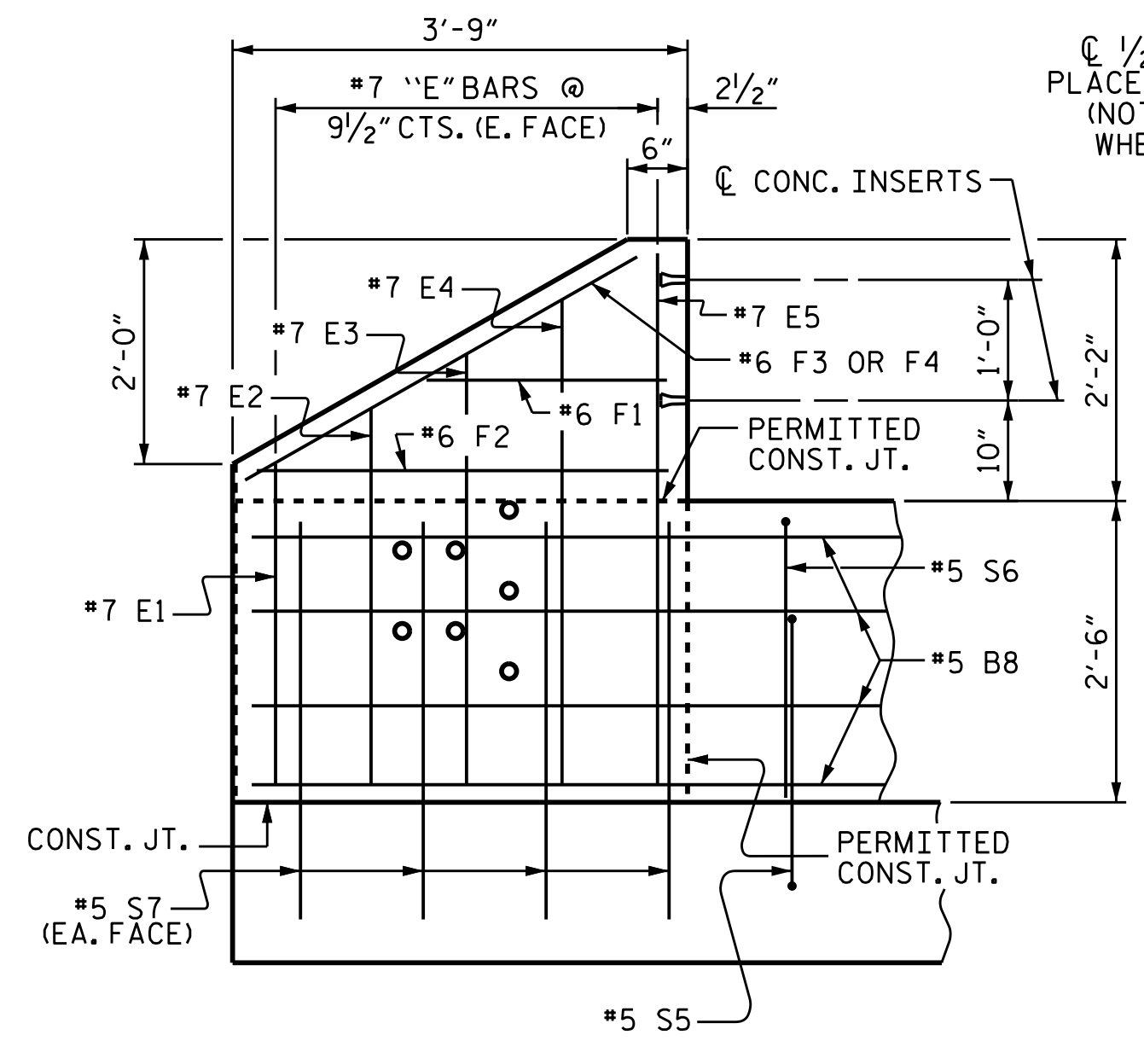
PLAN OF PARAPET



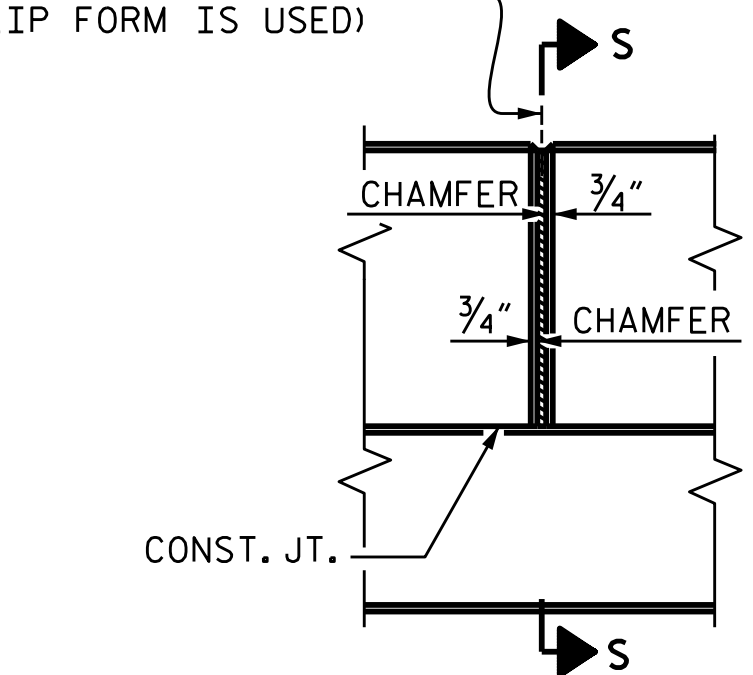
PLAN OF END POST



END VIEW



ELEVATION



ELEVATION AT EXPANSION JOINTS

NOTES

- CONCRETE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.
- THE #5 S6 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN PARAPET.
- THE #5 S7 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S7 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
- FOR DETAILS OF CONCRETE INSERTS IN END POSTS. SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.
- FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET.
- GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. B-5388
 ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 1 OF 4

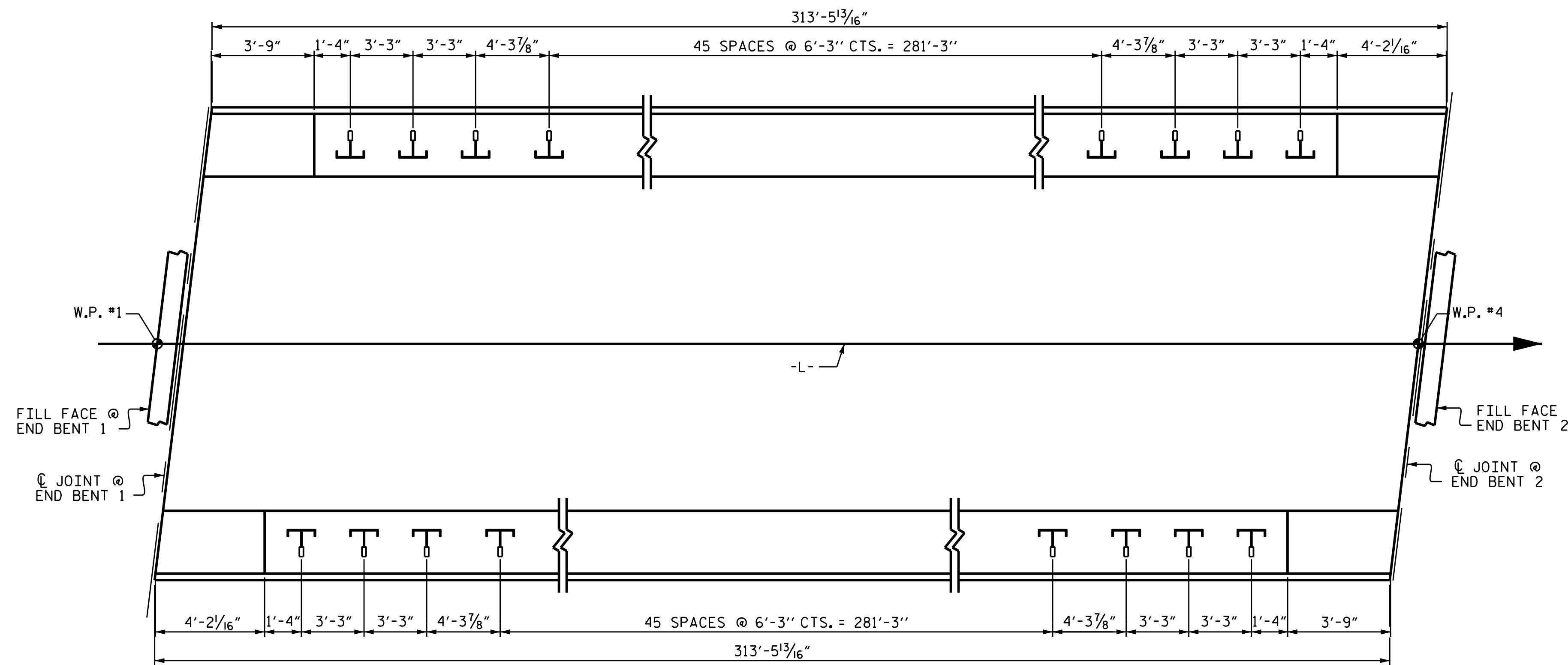


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

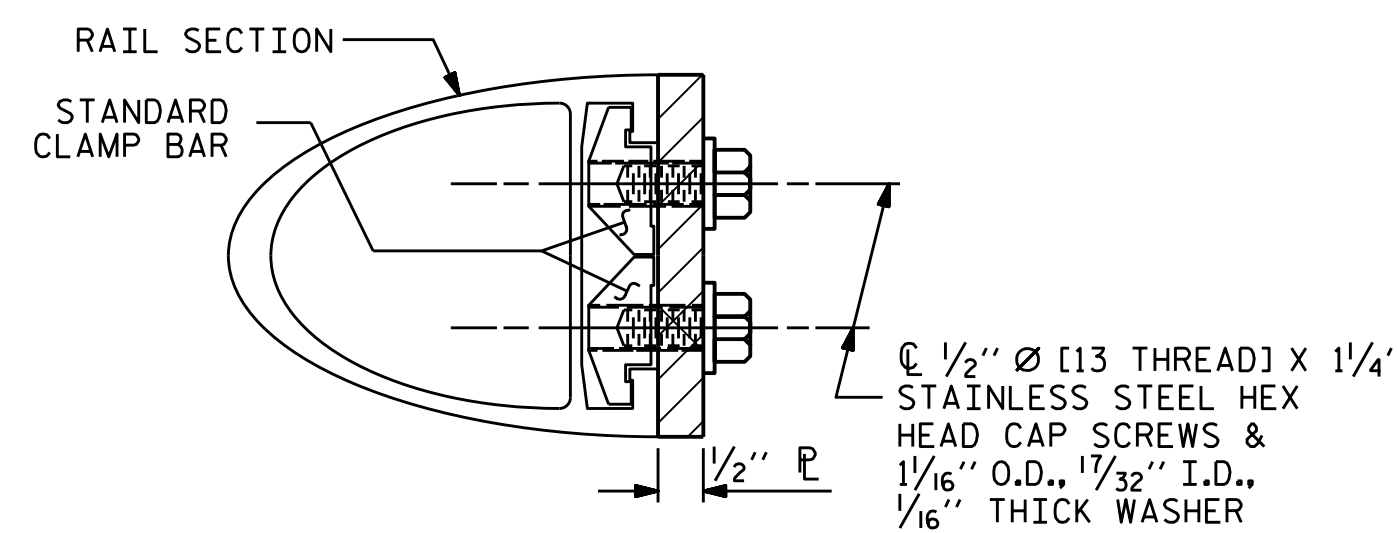
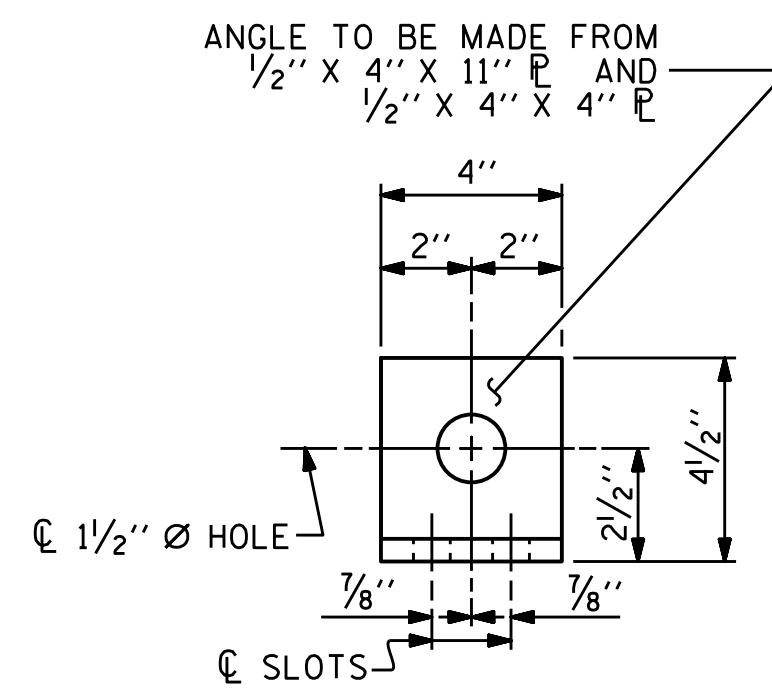
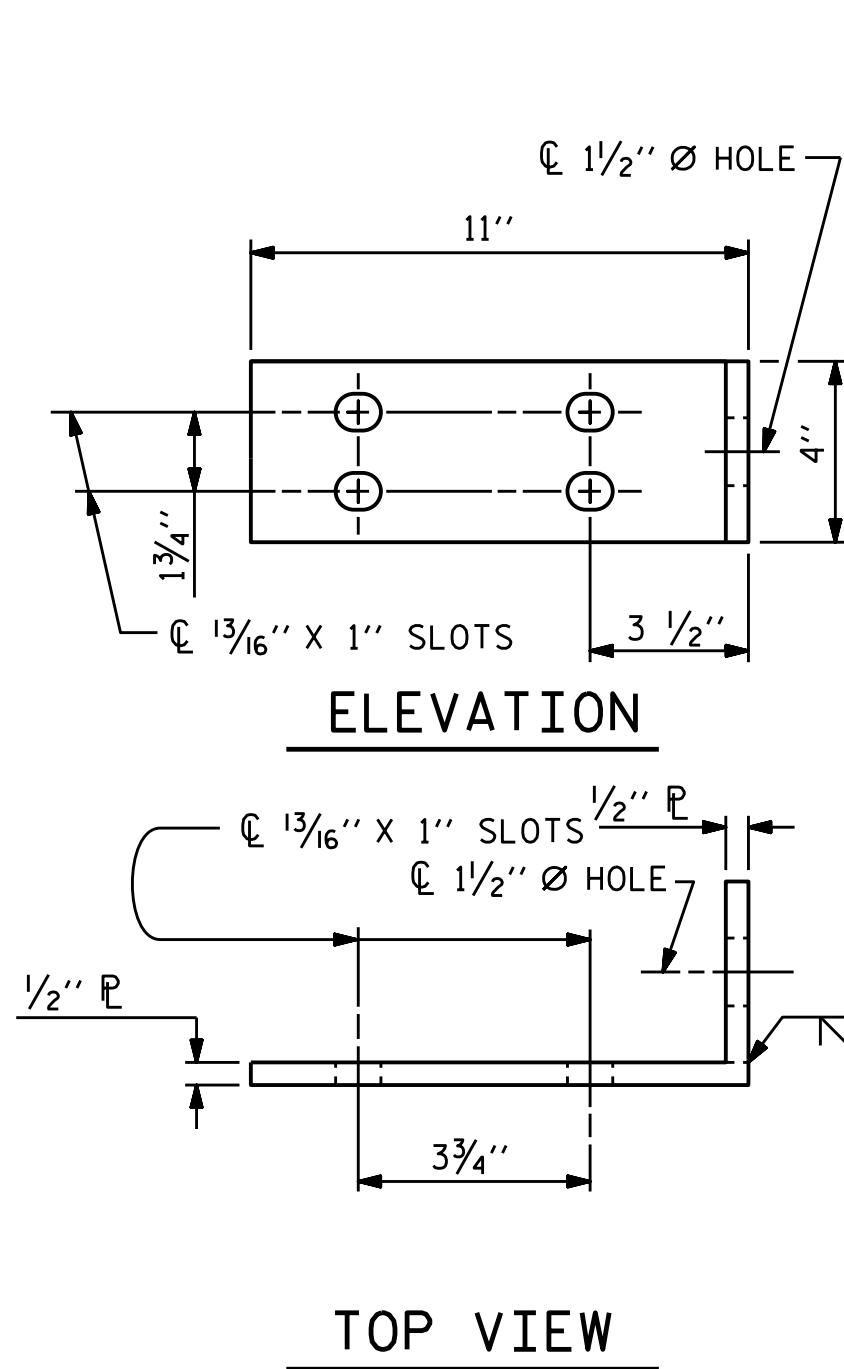
1'-2" X 2'-6" CONCRETE PARAPET DETAILS

DRAWN BY: A. SORSENGINH DATE: 8/2018
 CHECKED BY: H. LOCKLEAR DATE: 9/2018

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			39

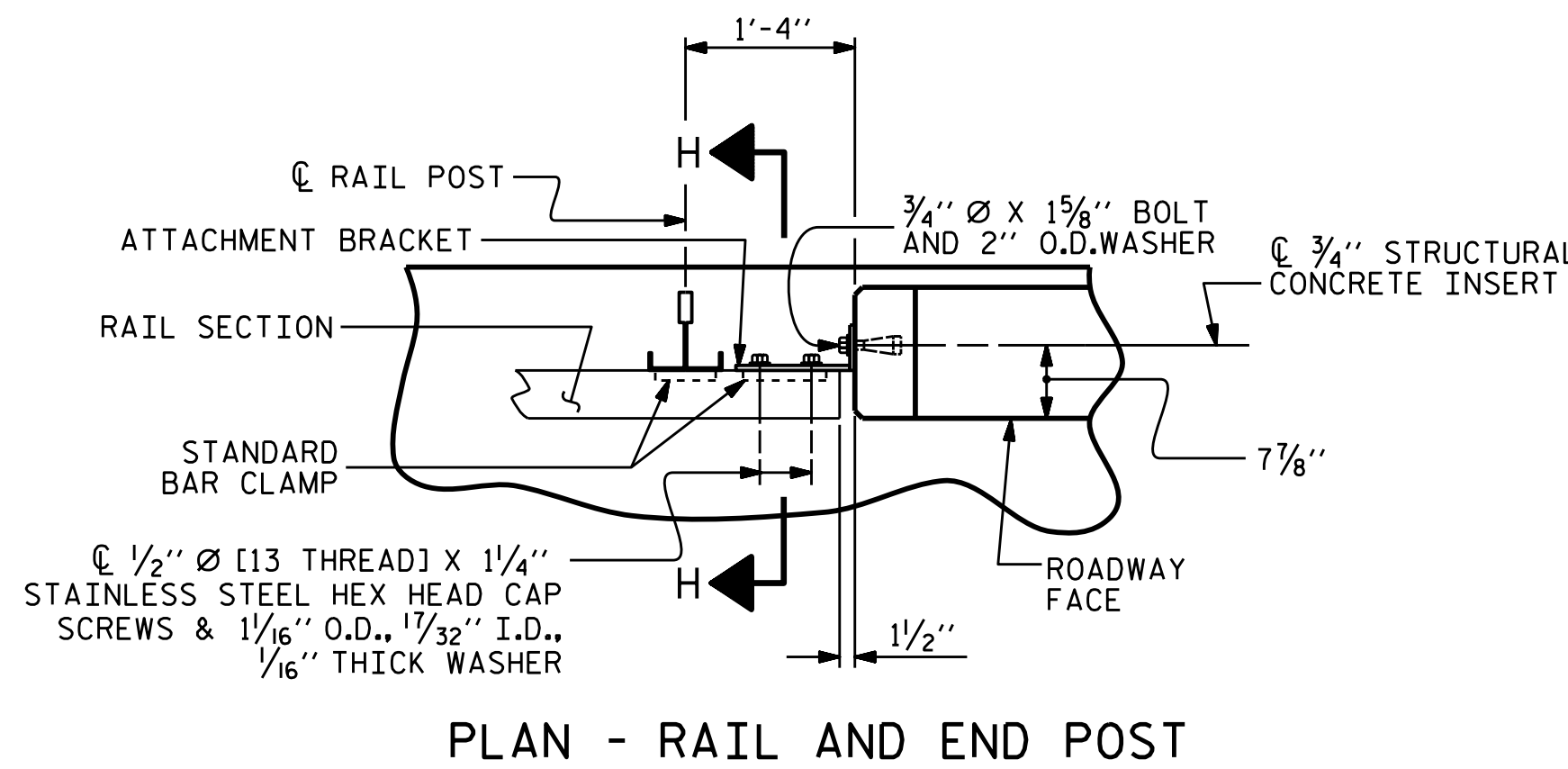


PLAN OF RAIL POST SPACINGS



FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST



- NOTES**
STRUCTURAL CONCRETE INSERT
- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
 - A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2\".
 - B. 1 - 3/4\" \varnothing X 1 5/8\" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4\" \varnothing X 1 5/8\" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16\" \varnothing WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

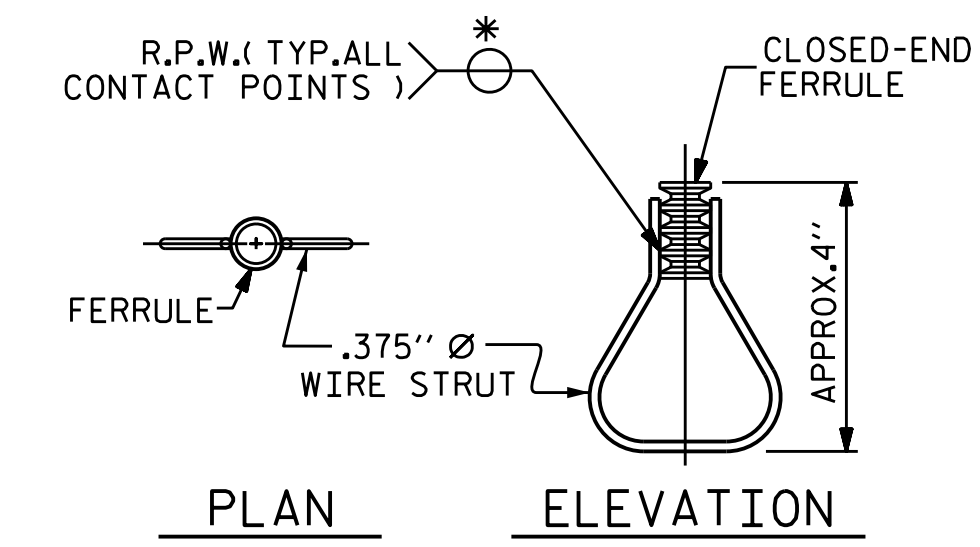
- NOTES**
METAL RAIL TO END POST CONNECTION
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
 - A. 1/2\" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - B. 3/4\" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4\" \varnothing X 1 5/8\" BOLT WITH 2\" O.D. WASHER IN PLACE. THE 3/4\" \varnothing X 1 5/8\" BOLT SHALL HAVE N. C. THREADS.
 - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.
 - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 - E. 1/2\" \varnothing PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE 3/4\" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4\" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2\" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4\" \varnothing X 1 5/8\" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4\" \varnothing X 6 1/2\" BOLT AND 2\" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4\" \varnothing X 1 5/8\" BOLT SHALL APPLY TO THE 3/4\" \varnothing X 6 1/2\" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

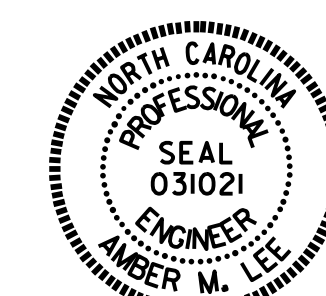


STRUCTURAL CONCRETE INSERT

* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 4

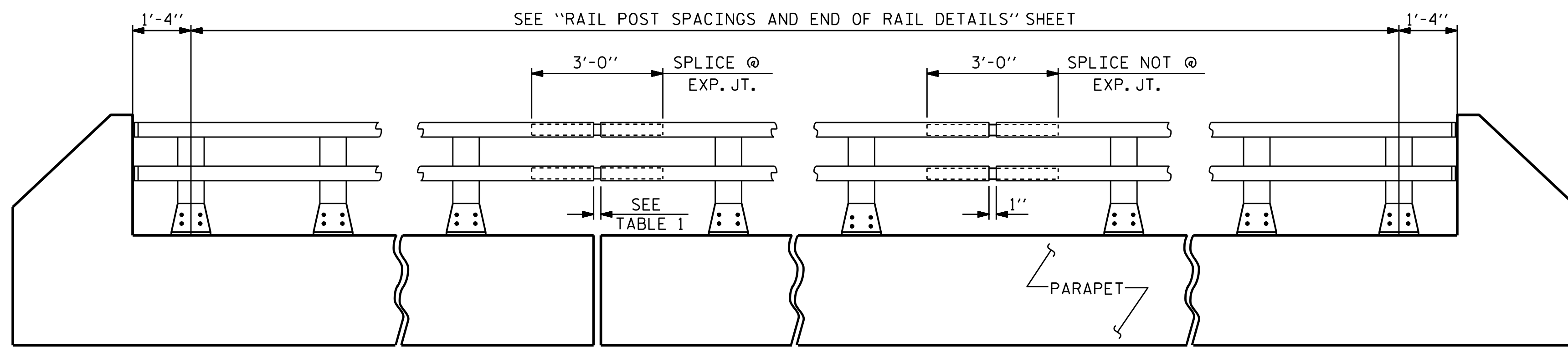


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RAIL POST SPACINGS
 AND
 END OF RAIL DETAILS

ASSEMBLED BY : A. SORSENGINH	DATE : 8/2018
CHECKED BY : H. LOCKLEAR	DATE : 9/2018
DRAWN BY : FCJ 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

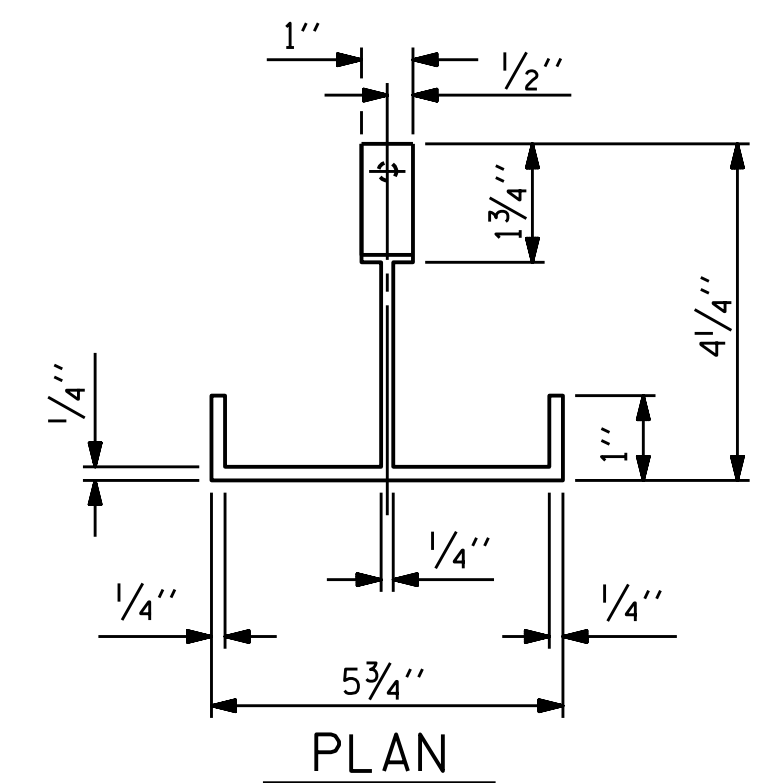
ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

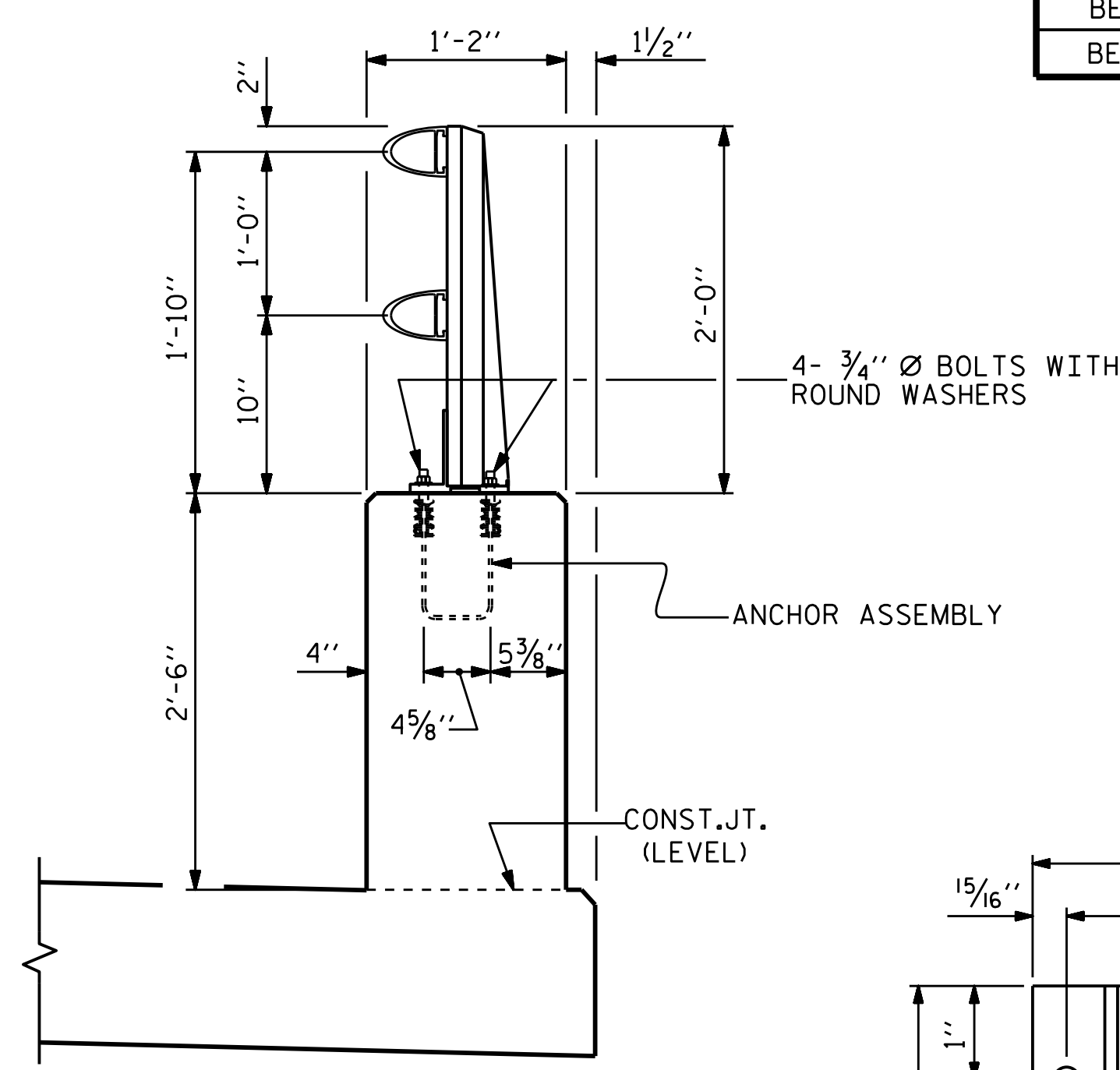
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 611.13 LIN. FT.

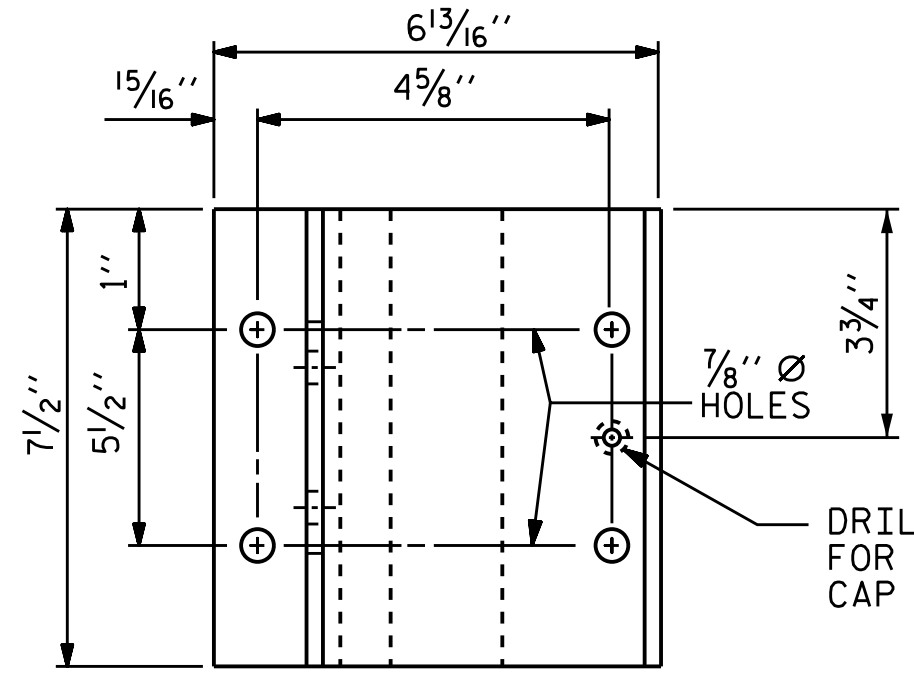
C. EXP. JT. @	RAIL OPENING
BENT 1	1"
BENT 2	1"



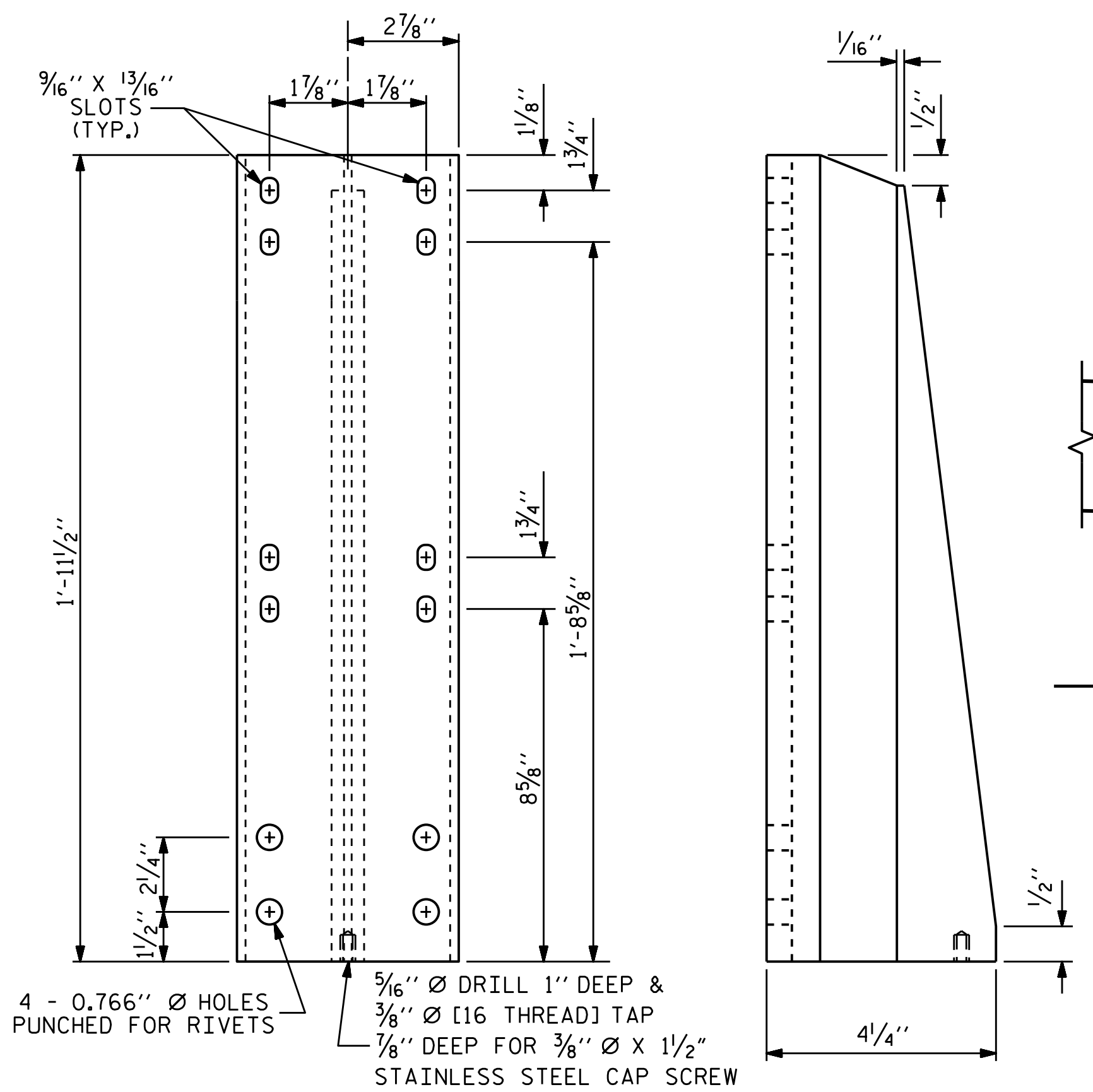
PLAN



SECTION THRU PARAPET AND RAIL



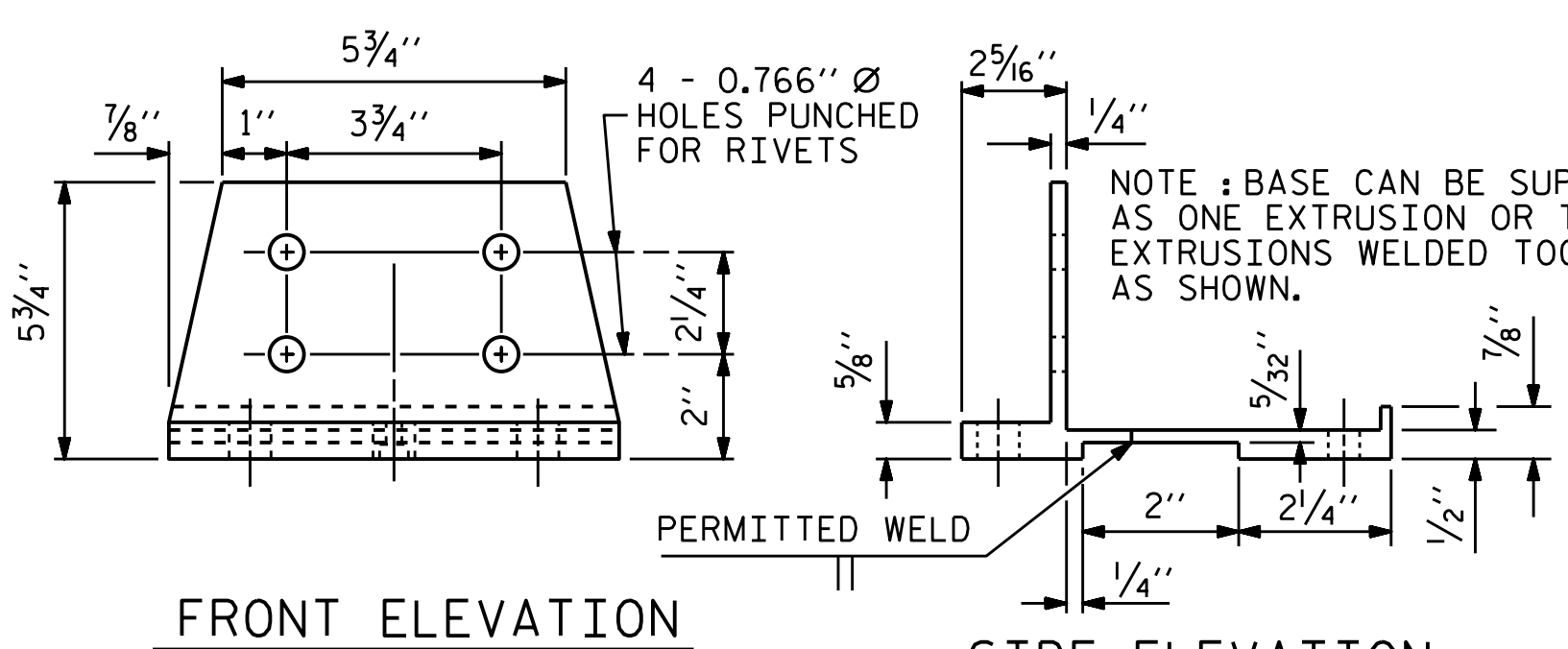
PLAN



FRONT ELEVATION

SIDE ELEVATION

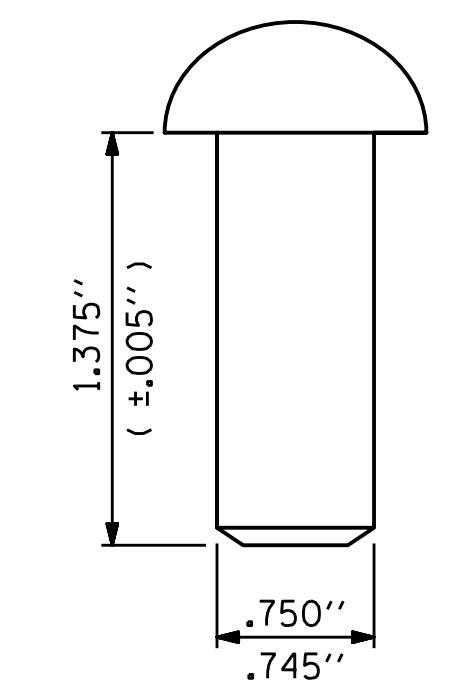
DETAILS OF POST



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



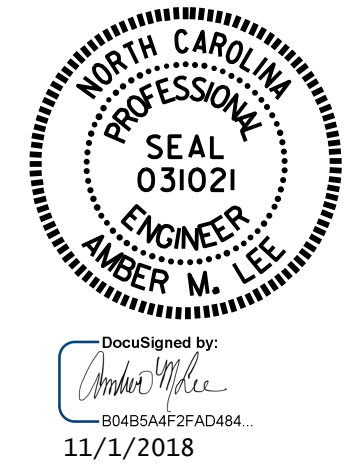
RIVET DETAIL

ASSEMBLED BY : A. SORSENGINH	DATE : 8/2018
CHECKED BY : H. LOCKLEAR	DATE : 9/2018
DRAWN BY : EEM 6/94	REV. 10/1/11 MAA/GM
CHECKED BY : RCW 6/94	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 3 OF 4



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
2 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.	S-22
TOTAL SHEETS	39

NOTES

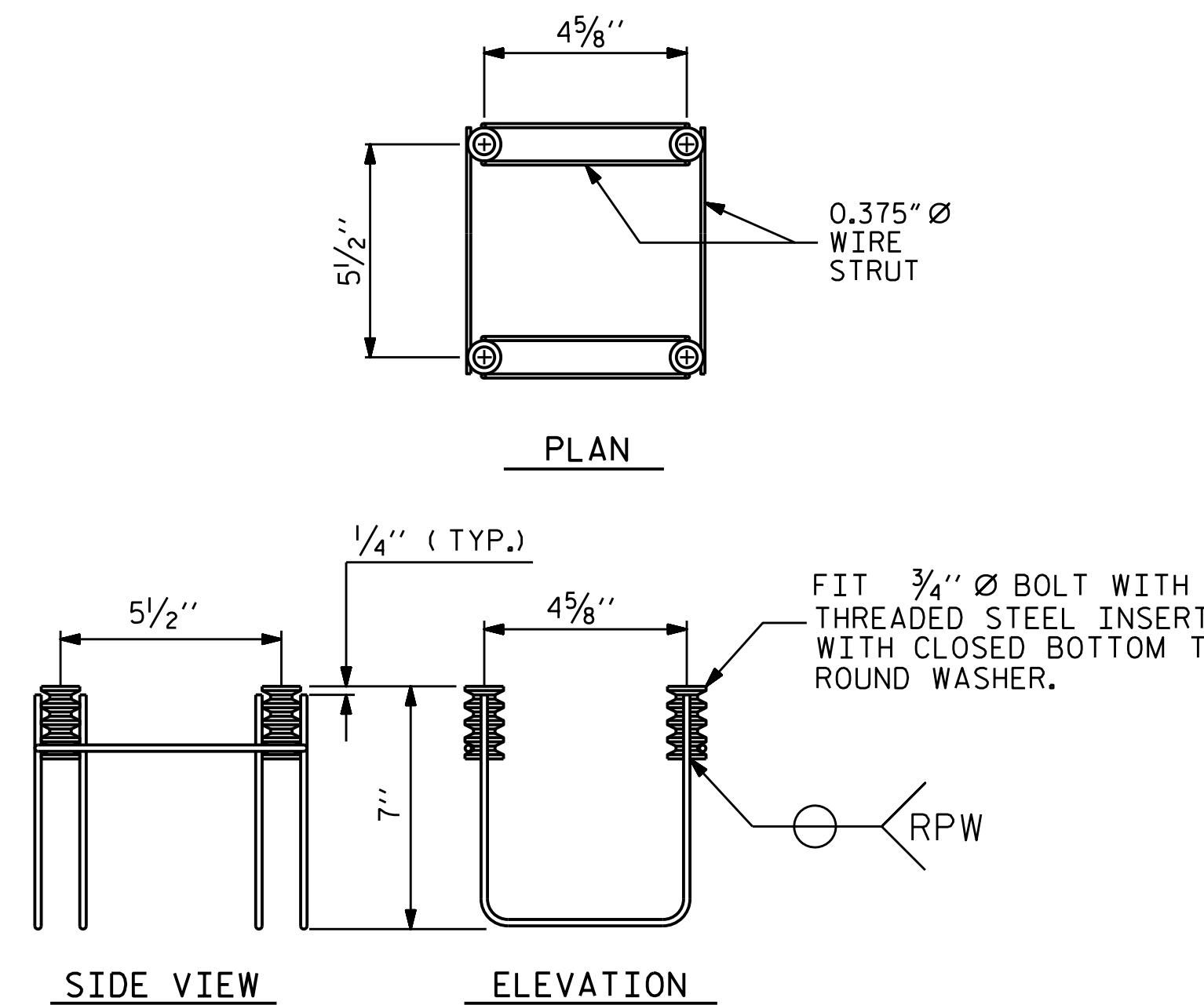
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS 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.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

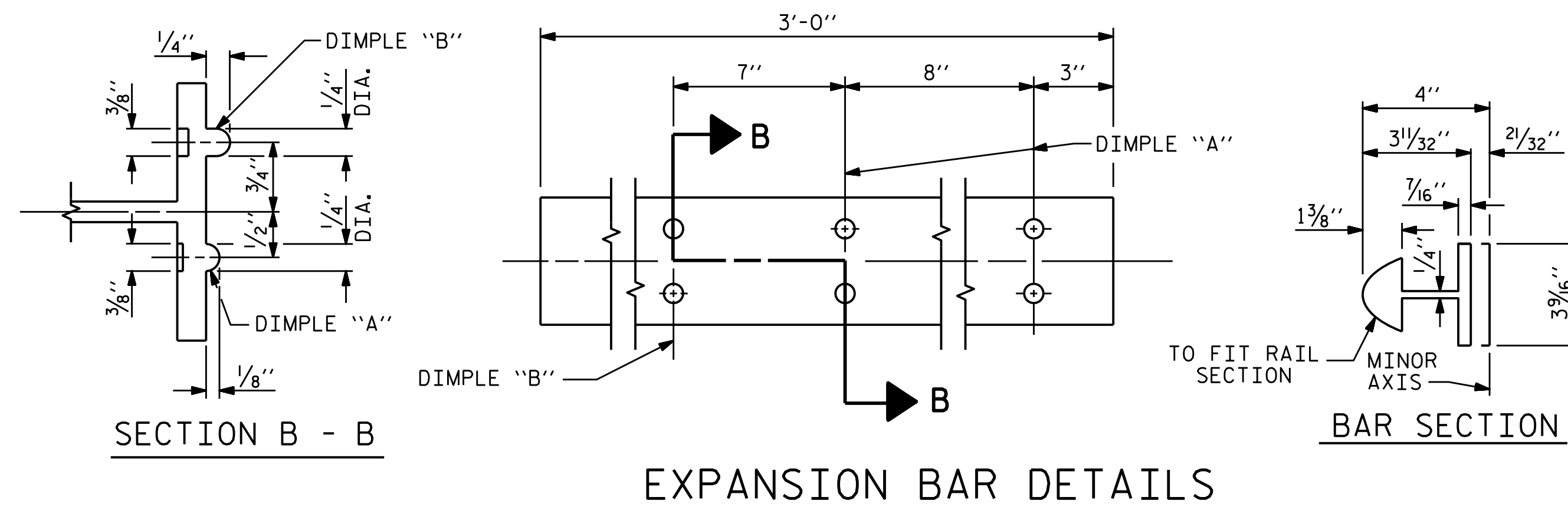
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

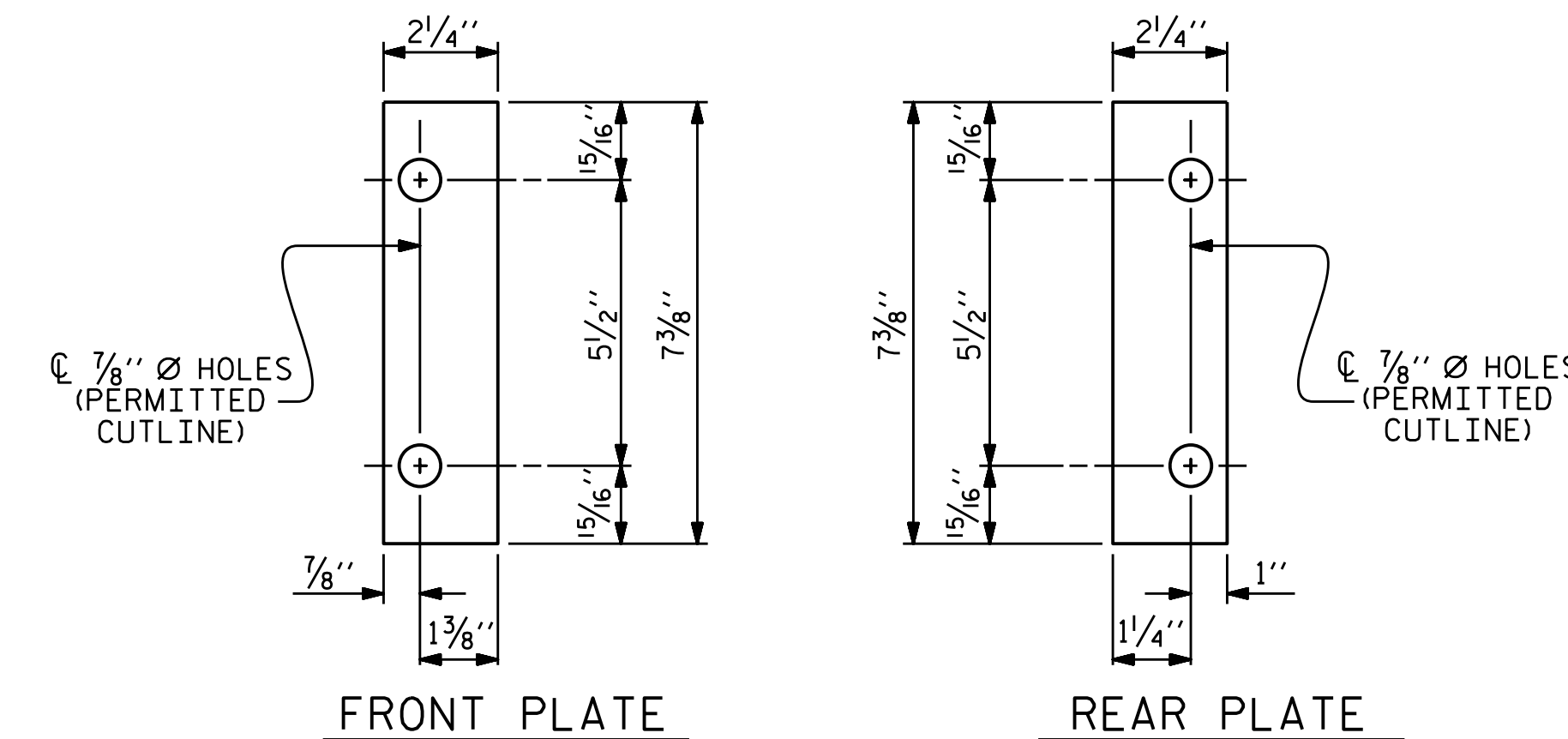


4-BOLT METAL RAIL ANCHOR ASSEMBLY

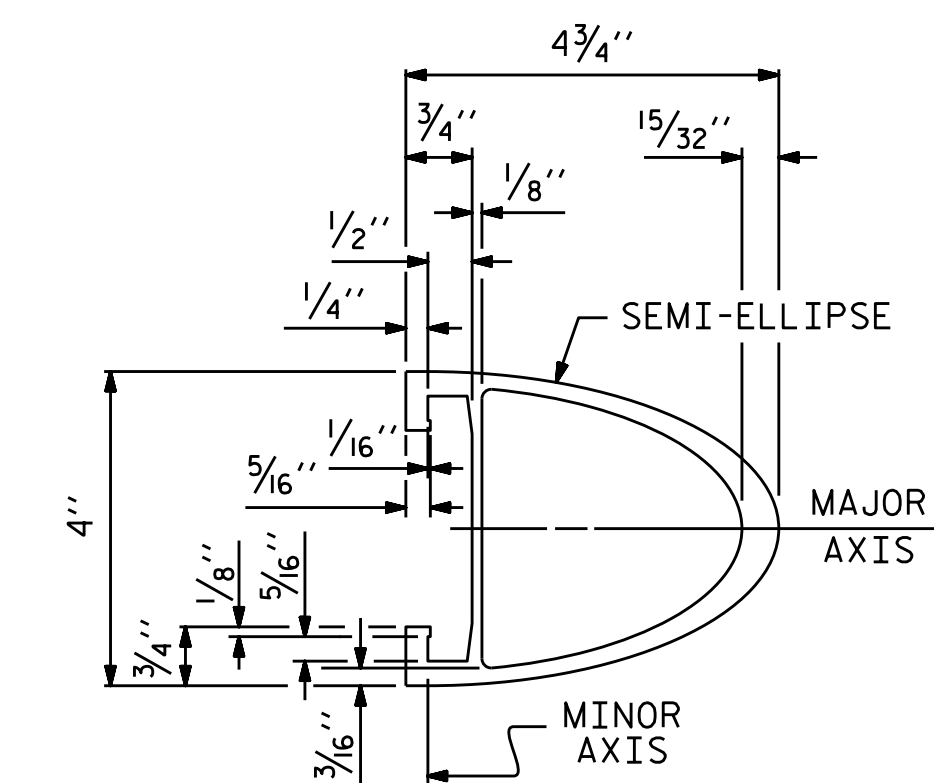
(104 ASSEMBLIES REQUIRED)



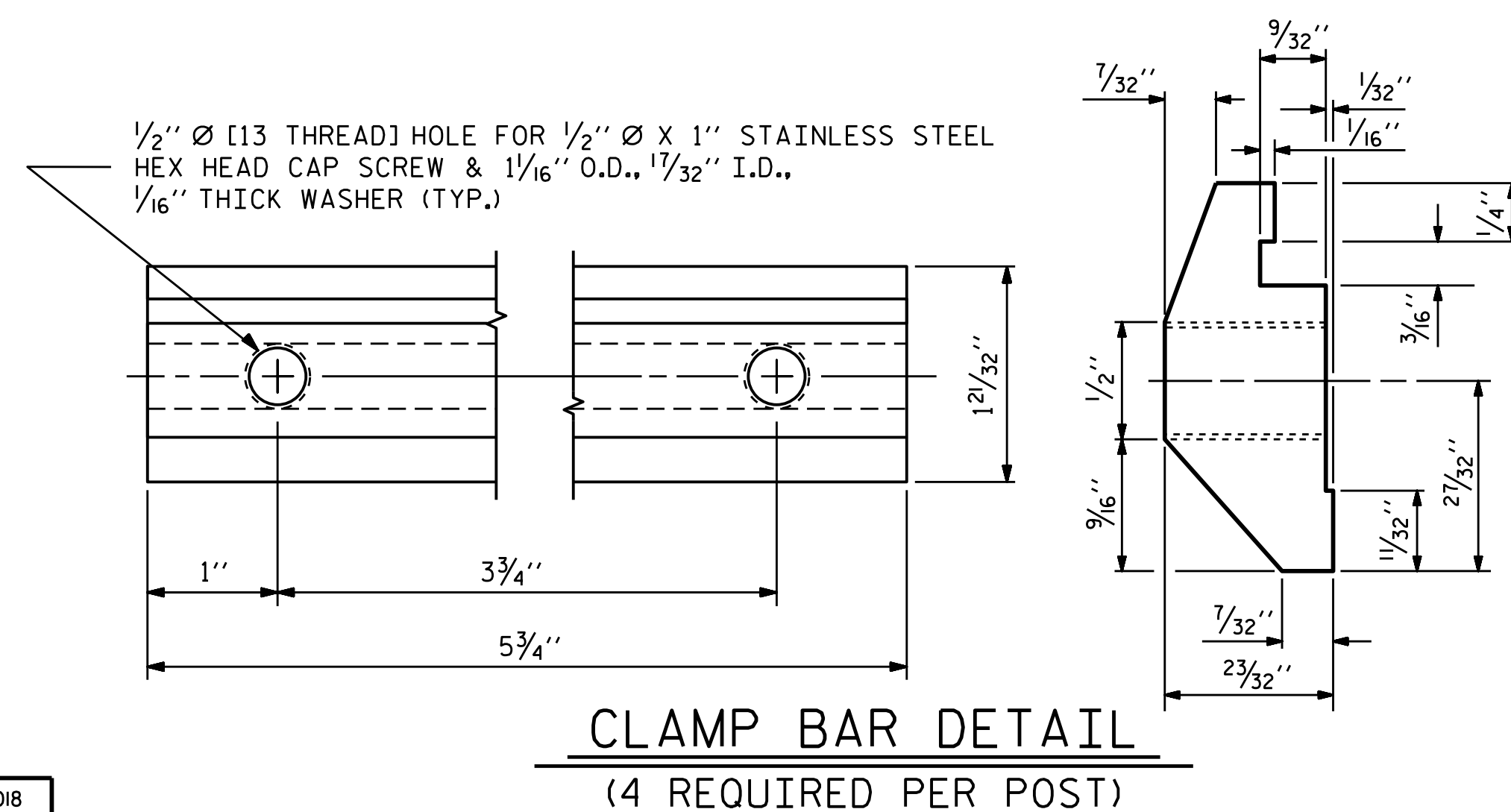
EXPANSION BAR DETAILS



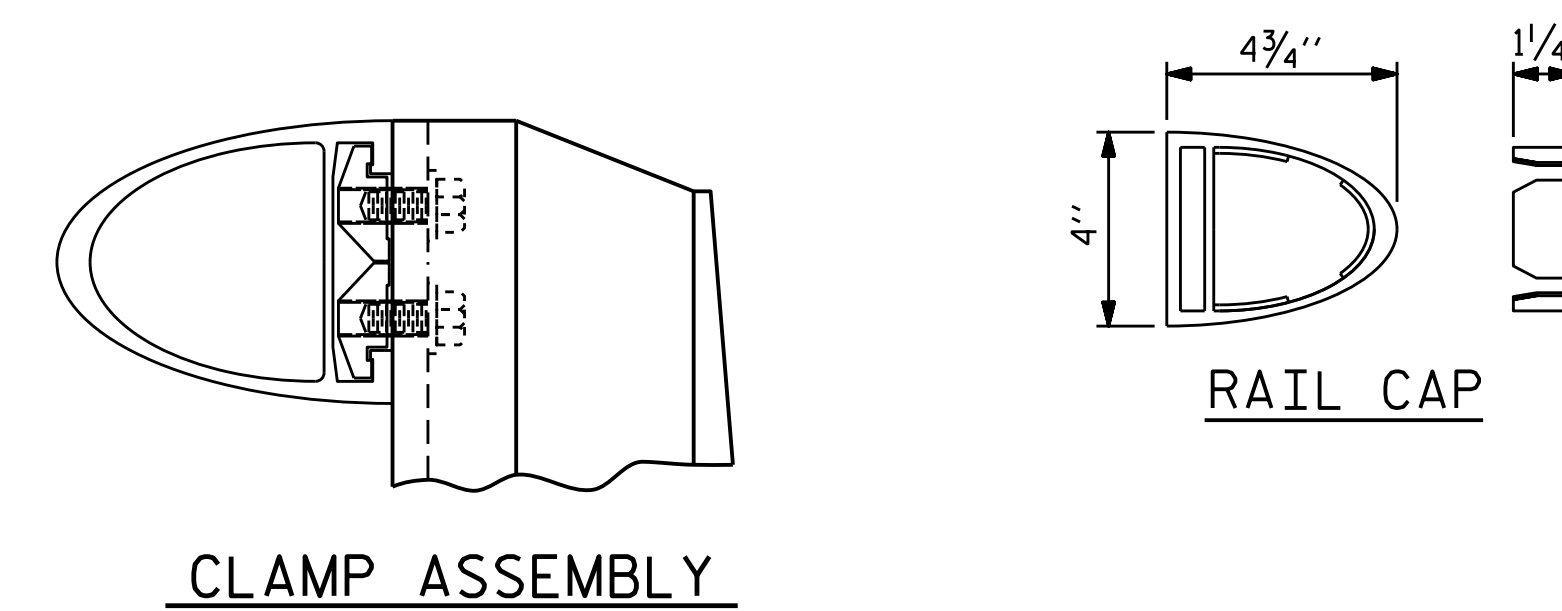
SHIM DETAILS



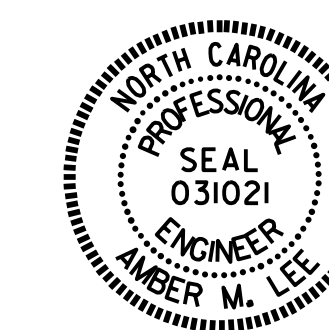
RAIL SECTION



CLAMP BAR DETAIL
(4 REQUIRED PER POST)



CLAMP ASSEMBLY



DocuSigned by:
Amber M. Lee
B0B5A8F2FAD484
11/1/2018

PROJECT NO. B-5388
ALLEGHANY COUNTY
STATION: 19+78.50 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
2 BAR METAL RAIL

ASSEMBLED BY :	A. SORSENGIH	DATE :	8/2018
CHECKED BY :	H. LOCKLEAR	DATE :	9/2018
DRAWN BY :	EEM 6/94	REV. 5/1/06R	KMM/GM
CHECKED BY :	RCW 6/94	REV. 10/1/11	MAA/GM
		REV. 12/17	MAA/THC

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			39

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.

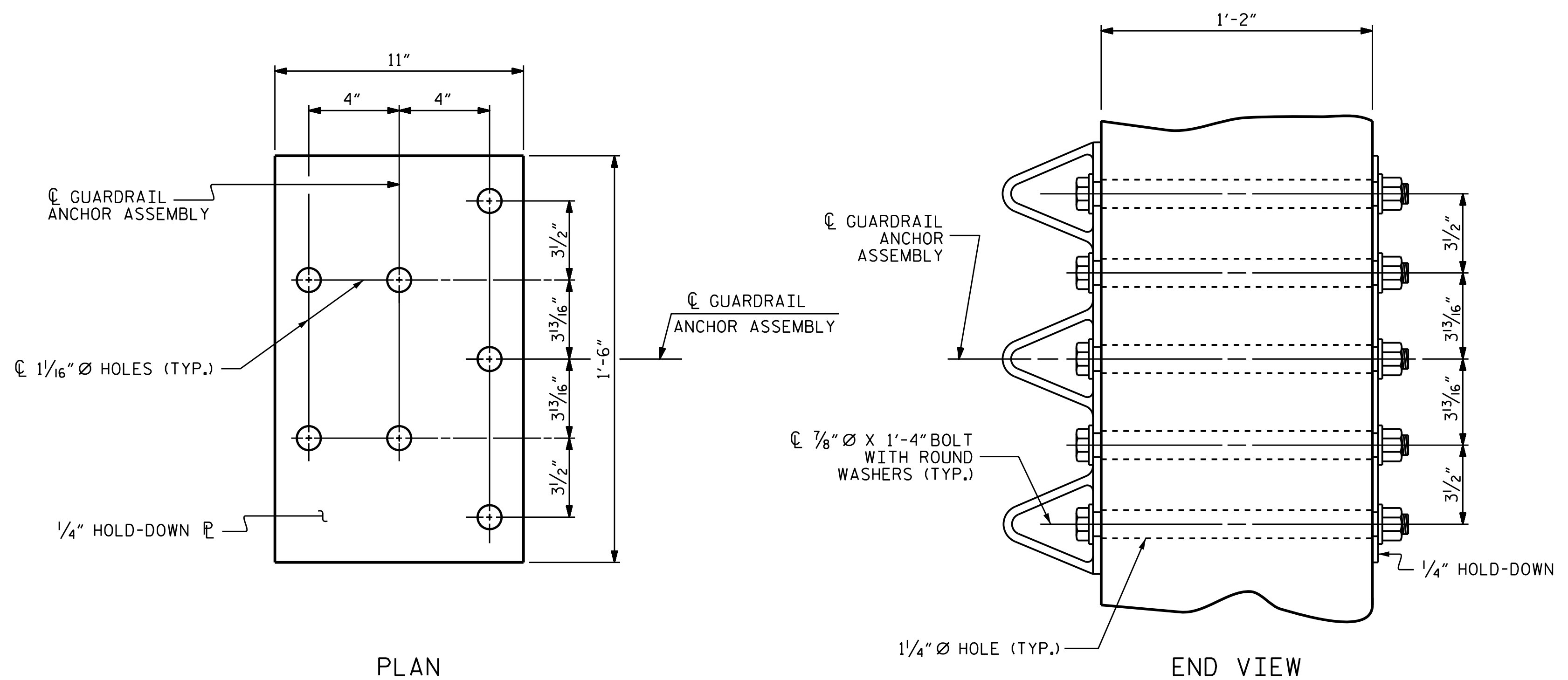
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

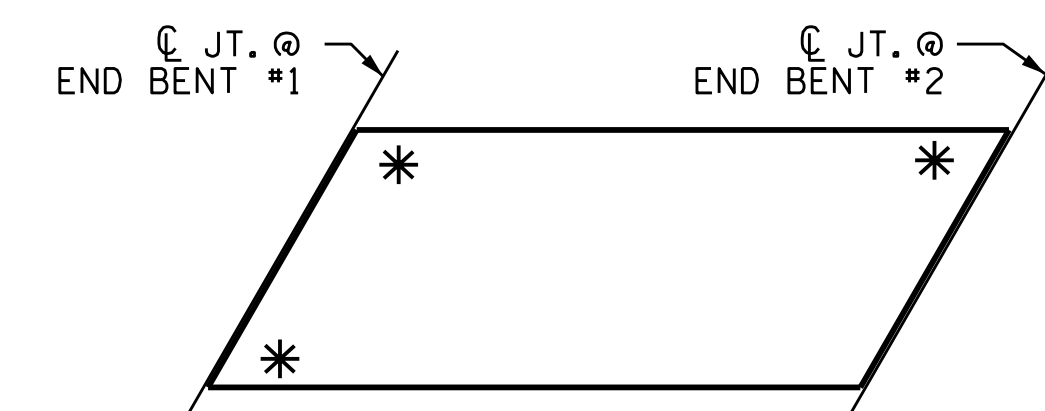
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST 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.

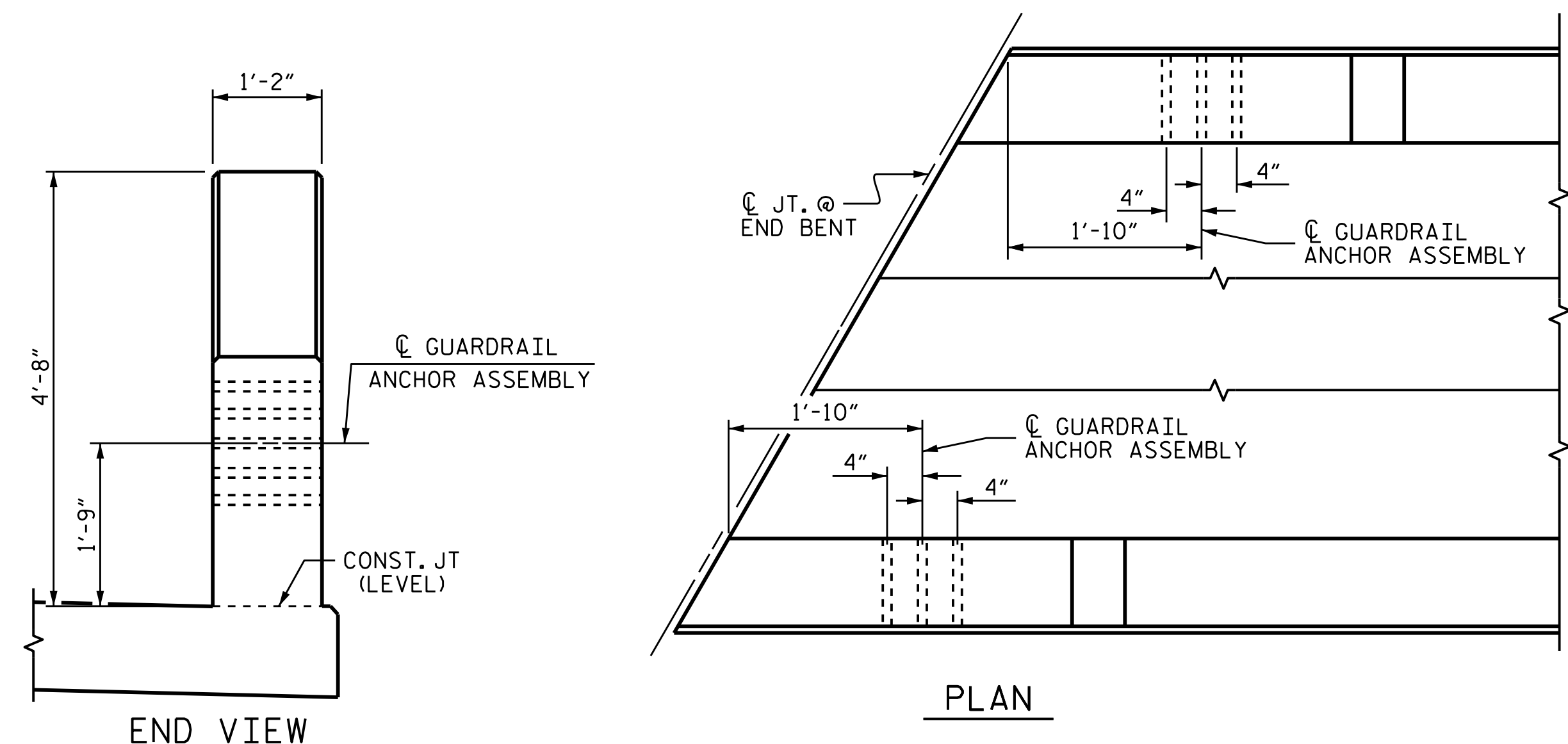


GUARDRAIL ANCHOR ASSEMBLY DETAILS



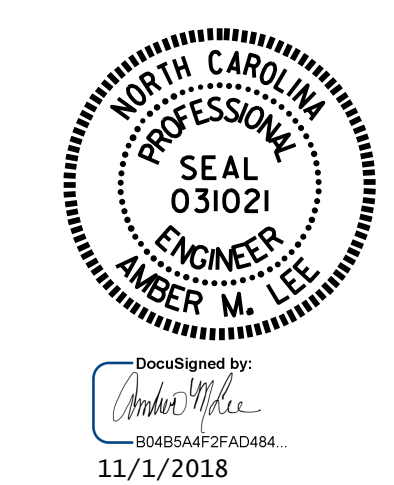
SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

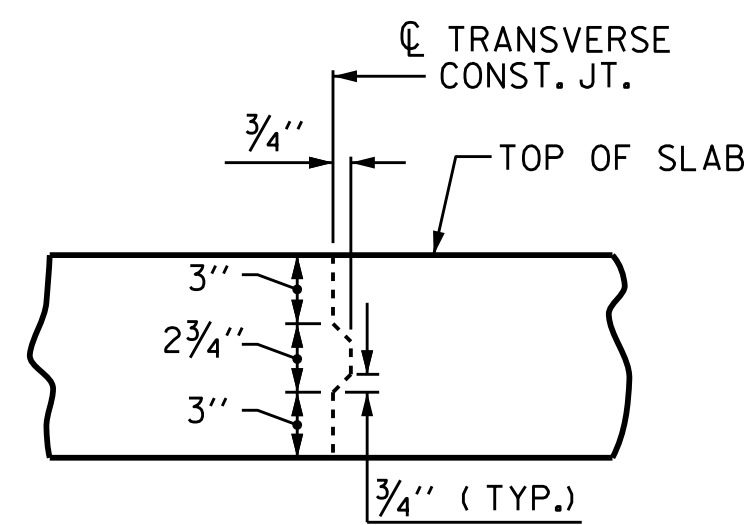


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 GUARDRAIL ANCHORAGE
 DETAILS
 FOR METAL RAILS

ASSEMBLED BY :	A. SORSENGIH	DATE :	8/2018
CHECKED BY :	H. LOCKLEAR	DATE :	9/2018
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

NO.	BY:	DATE:	REVISIONS			SHEET NO.
			NO.	BY:	DATE:	
1			3			S-24
2			4			TOTAL SHEETS 39

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



TRANSVERSE CONSTRUCTION JOINT DETAIL

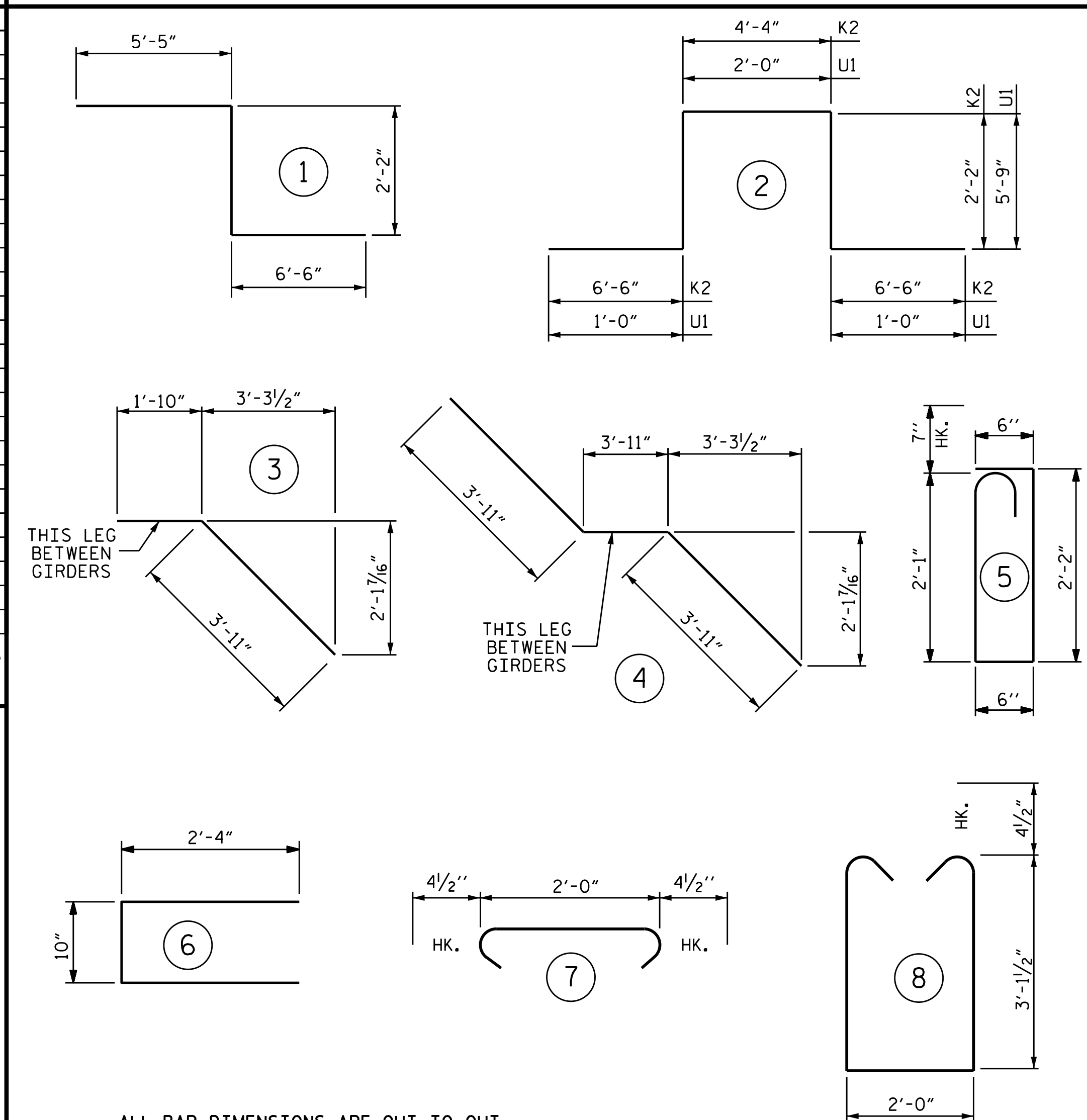
NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT

REINFORCING BAR SCHEDULE SPANS A THRU C

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	481	#5	STR	34'-3"	17,183	*A115	2	#5	STR	9'-3"	19	*B1	168	#4	STR	23'-5"	2628
A2	481	#5	STR	34'-3"	17,183	*A116	2	#5	STR	7'-6"	16	*B2	112	#6	STR	38'-9"	6519
*A101	2	#5	STR	33'-3"	69	*A117	2	#5	STR	5'-9"	12	*B3	54	#6	STR	32'-3"	2616
*A102	2	#5	STR	31'-6"	66	*A118	2	#5	STR	4'-1"	9	*B4	56	#4	STR	21'-0"	786
*A103	2	#5	STR	29'-10"	62	*A119	2	#5	STR	2'-4"	5	B5	162	#5	STR	54'-4"	9180
*A104	2	#5	STR	28'-1"	59	A201	2	#5	STR	33'-3"	69	*G1	2	#5	STR	36'-5"	76
*A105	2	#5	STR	26'-5"	55	A202	2	#5	STR	31'-6"	66						
*A106	2	#5	STR	24'-8"	51	A203	2	#5	STR	29'-10"	62	*K1	8	#8	1	14'-1"	301
*A107	2	#5	STR	22'-11"	48	A204	2	#5	STR	28'-1"	59	*K2	8	#8	2	21'-8"	463
*A108	2	#5	STR	21'-3"	44	A205	2	#5	STR	26'-5"	55	*K3	18	#6	STR	5'-7"	151
*A109	2	#5	STR	19'-6"	41	A206	2	#5	STR	24'-8"	51	K4	12	#4	STR	5'-11"	47
*A110	2	#5	STR	17'-10"	37	A207	2	#5	STR	22'-11"	48	K5	48	#4	STR	8'-6"	273
*A111	2	#5	STR	16'-1"	34	A208	2	#5	STR	21'-3"	44	K6	12	#4	STR	5'-6"	44
*A112	2	#5	STR	14'-4"	30	A209	2	#5	STR	19'-6"	41	K7	24	#4	3	5'-9"	92
*A113	2	#5	STR	12'-8"	26	A210	2	#5	STR	17'-10"	37	K8	24	#4	4	11'-9"	188
*A114	2	#5	STR	10'-11"	23	A211	2	#5	STR	16'-1"	34						
						A212	2	#5	STR	14'-4"	30	*S1	36	#5	5	5'-10"	219
						A213	2	#5	STR	12'-8"	26	*S2	36	#4	6	5'-6"	132
						A214	2	#5	STR	10'-11"	23	S3	186	#4	7	2'-9"	342
						A215	2	#5	STR	9'-3"	19	S4	12	#4	8	9'-0"	72
						A216	2	#5	STR	7'-6"	16						
						A217	2	#5	STR	5'-9"	12	U1	30	#4	2	15'-6"	311
						A218	2	#5	STR	4'-1"	9						
						A219	2	#5	STR	2'-4"	5						

REINFORCING STEEL = 28,437 LBS.
* EPOXY COATED REINF. STEEL = 31,780 LBS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

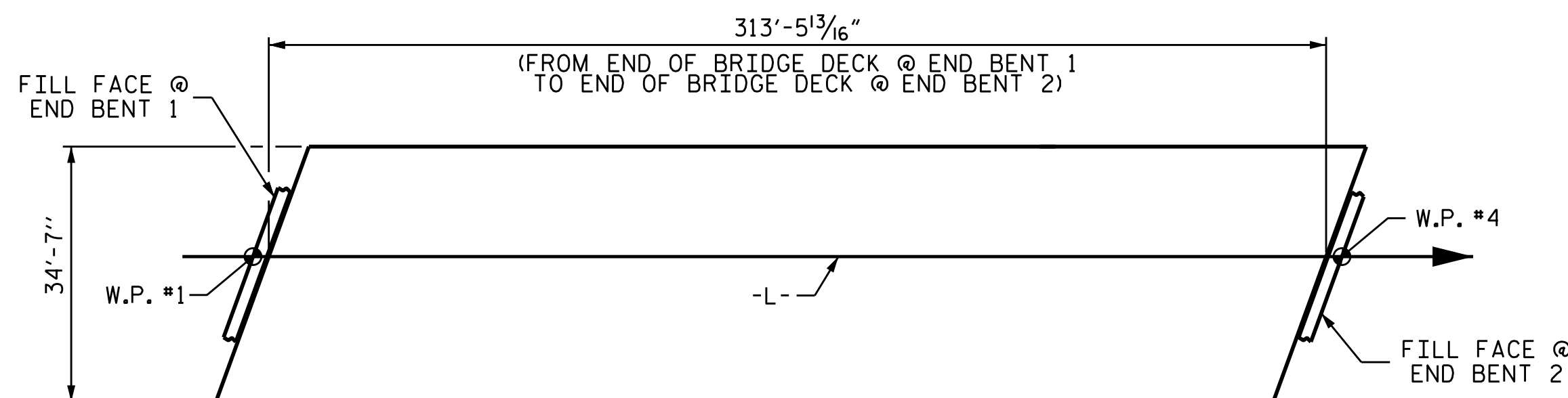
GROOVING BRIDGE FLOORS

APPROACH SLABS	850 SQ.FT.
BRIDGE DECK	9,081 SQ.FT.
TOTAL	9,931 SQ.FT.

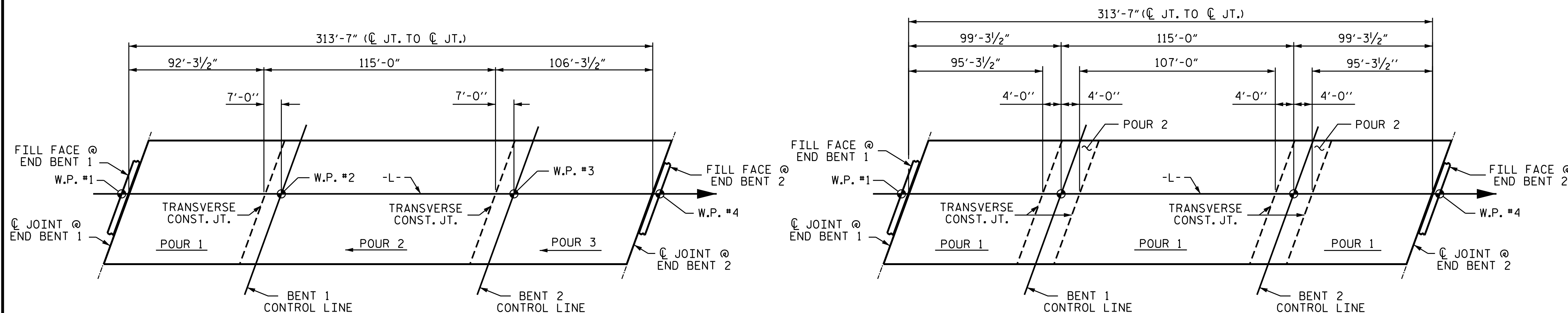
SUPERSTRUCTURE BILL OF MATERIAL

SPAN A, B, AND C	CLASS AA CONCRETE		REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)	(LBS.)
POUR #1	115.3		28,437	31,780
POUR #2	152.7			
POUR #3	145.2			
TOTALS **	413.2		28,437	31,780

** QUANTITIES FOR PARAPET IS NOT INCLUDED



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10,841)



POURING SEQUENCE

OPTIONAL POURING SEQUENCE

POUR #2 CANNOT BE STARTED UNTIL BOTH ADJACENT #1 POURS REACH A MINIMUM OF 3000 PSI.

ASSEMBLED BY : A. SORSENGNH DATE : 9/2018
CHECKED BY : H. LOCKLEAR DATE : 9/2018

DRAWN BY : JMB 5/87
CHECKED BY : SJD 9/87

REV. 6/1/94 EEM/GRP
REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-5388
ALLEGHANY COUNTY
STATION: 19+78.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**SUPERSTRUCTURE
BILL OF MATERIAL**

REVISIONS						SHEET NO. S-25
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 39
2			4			

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

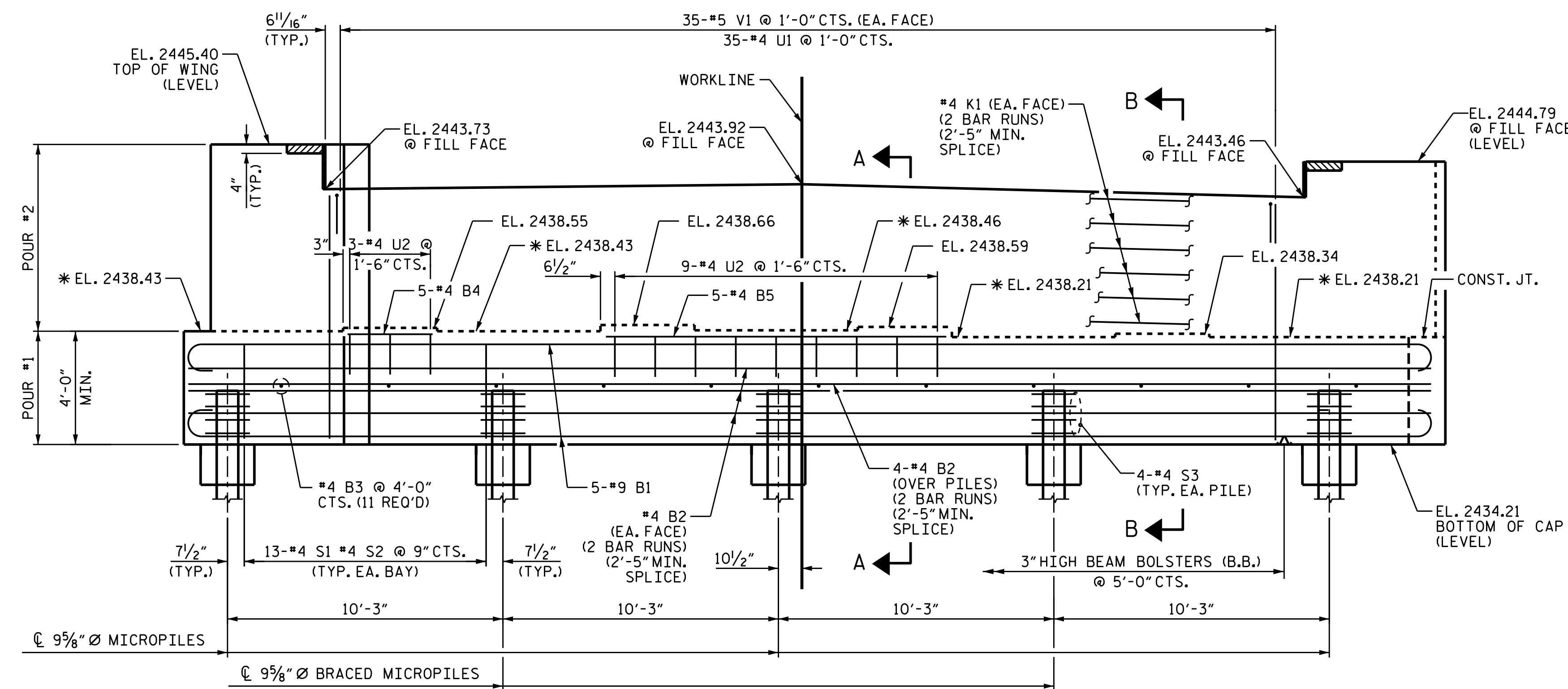
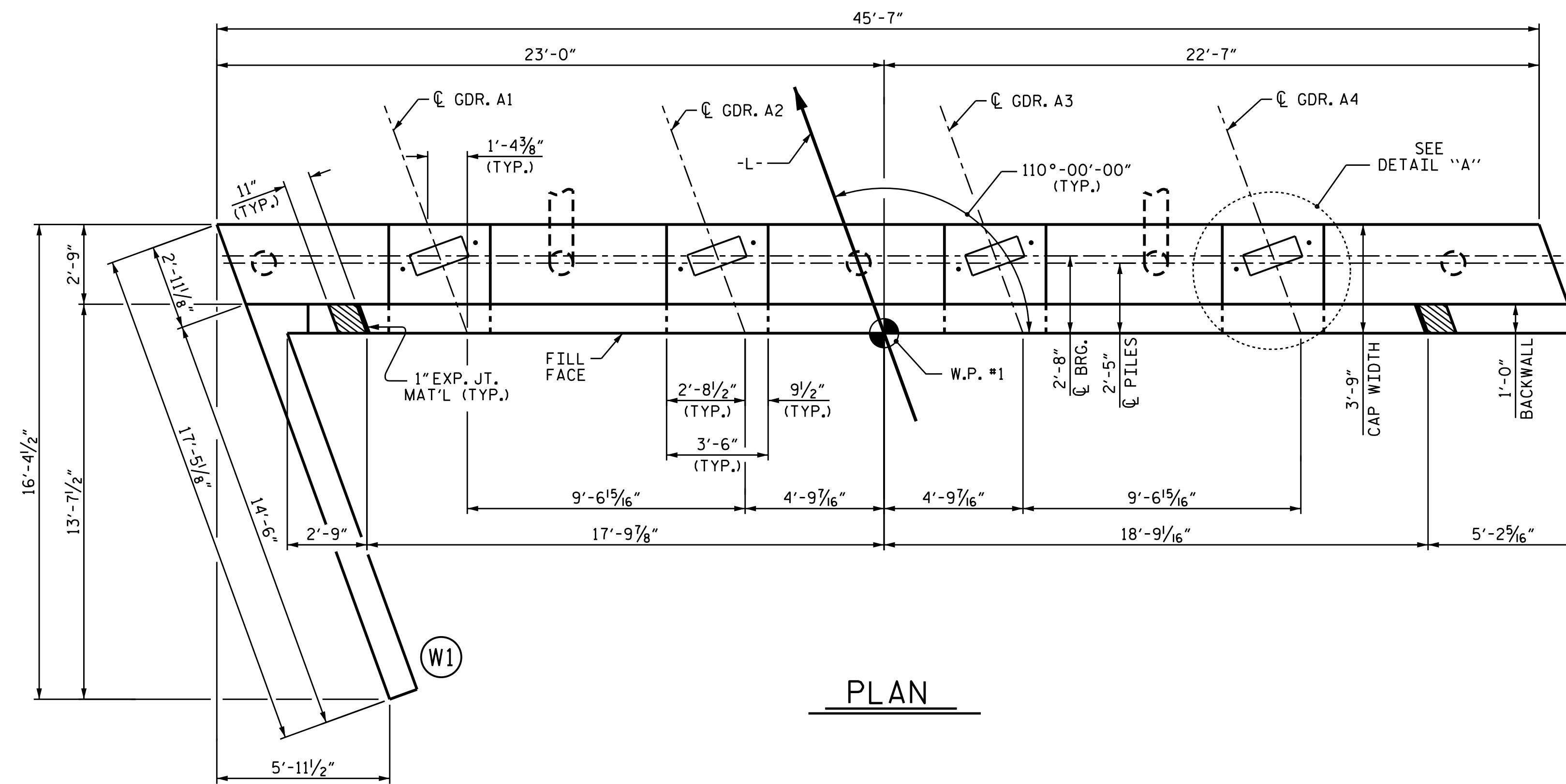
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREA OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

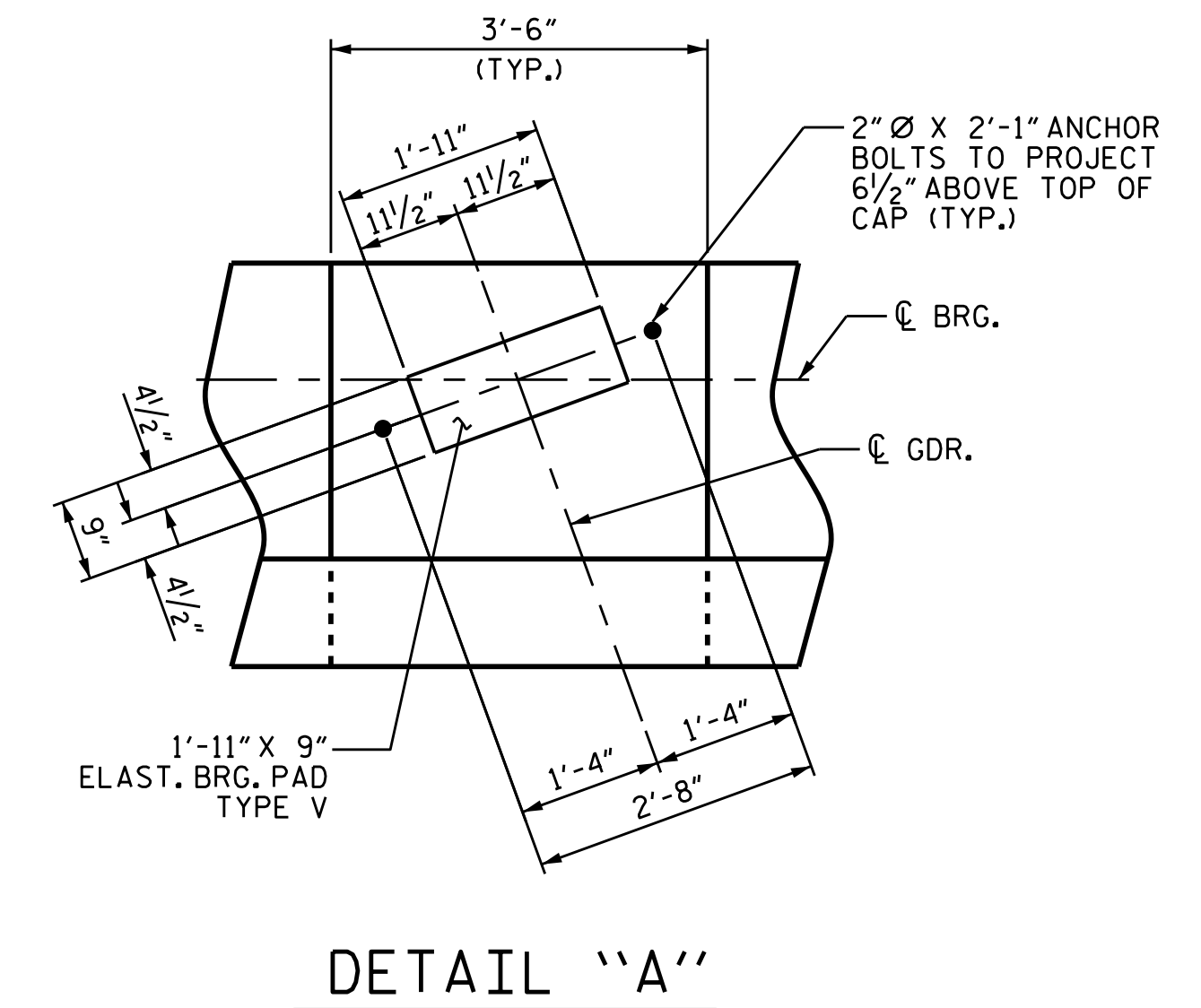
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.

FOR MICROPILES, SEE GEOTECHNICAL SPECIAL PROVISIONS.

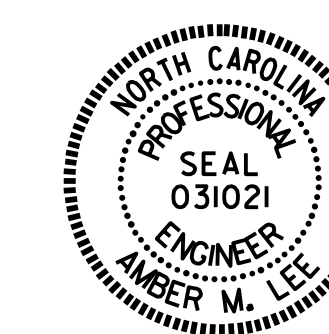


* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A & B-B, SHEET 3 OF 3.



PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 1 OF 3



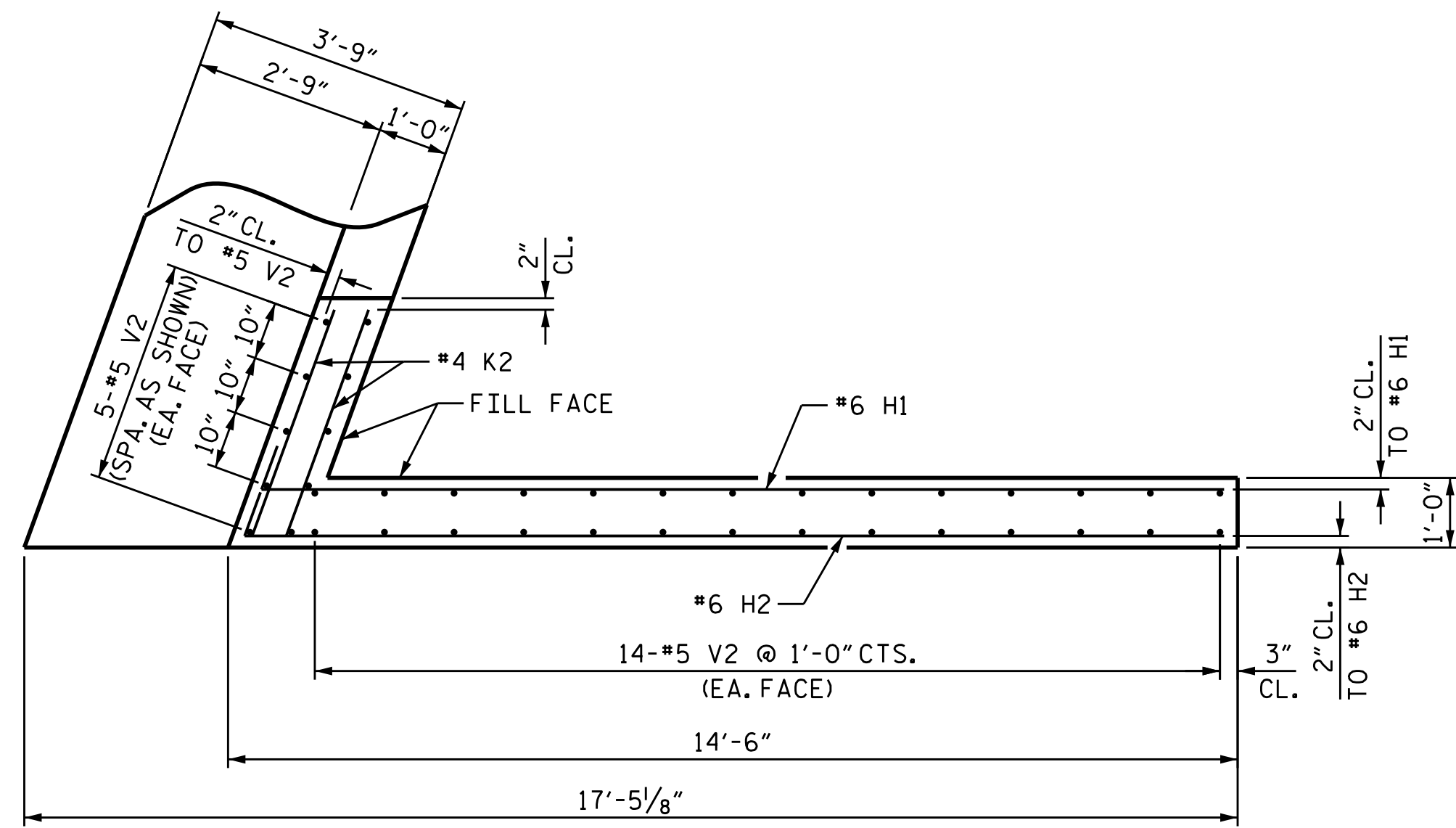
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END BENT 1

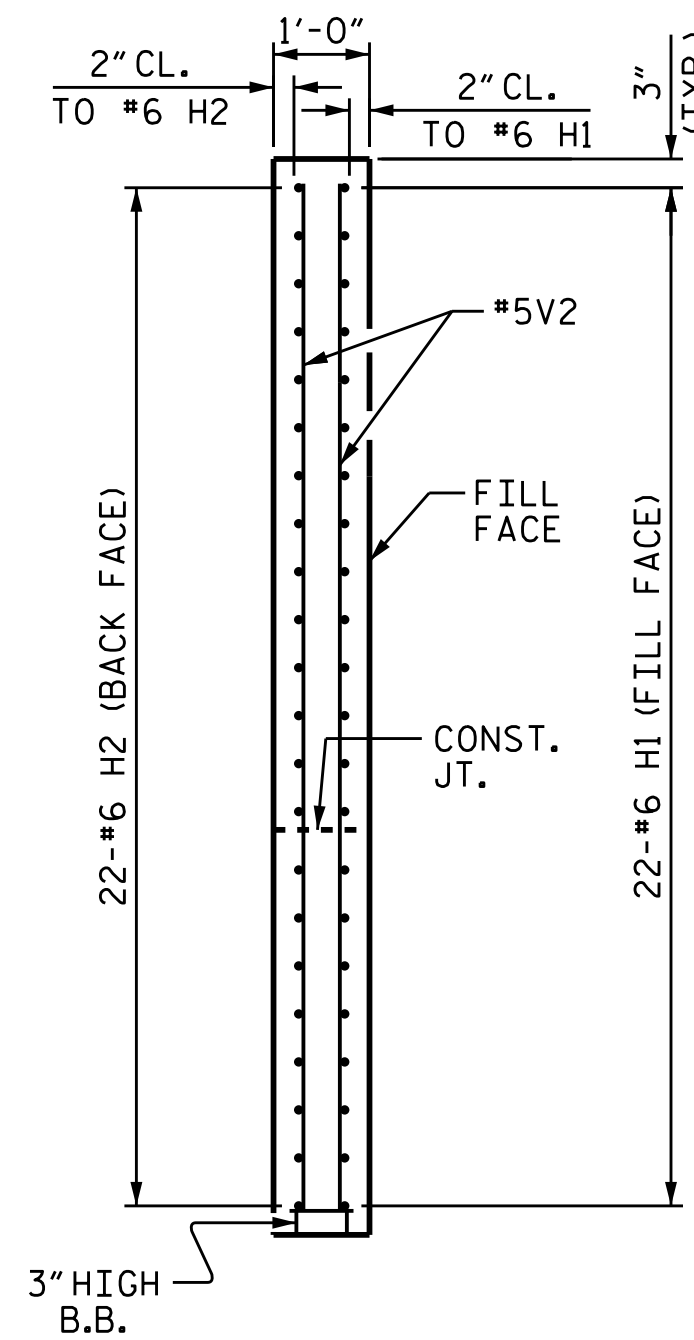
DRAWN BY : M. G. SHAIKH DATE : 09/2018
 CHECKED BY : H. A. LOCKLEAR DATE : 09/2018
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 09/2018

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 FINAL UNLESS ALL
 SIGNATURES COMPLETED

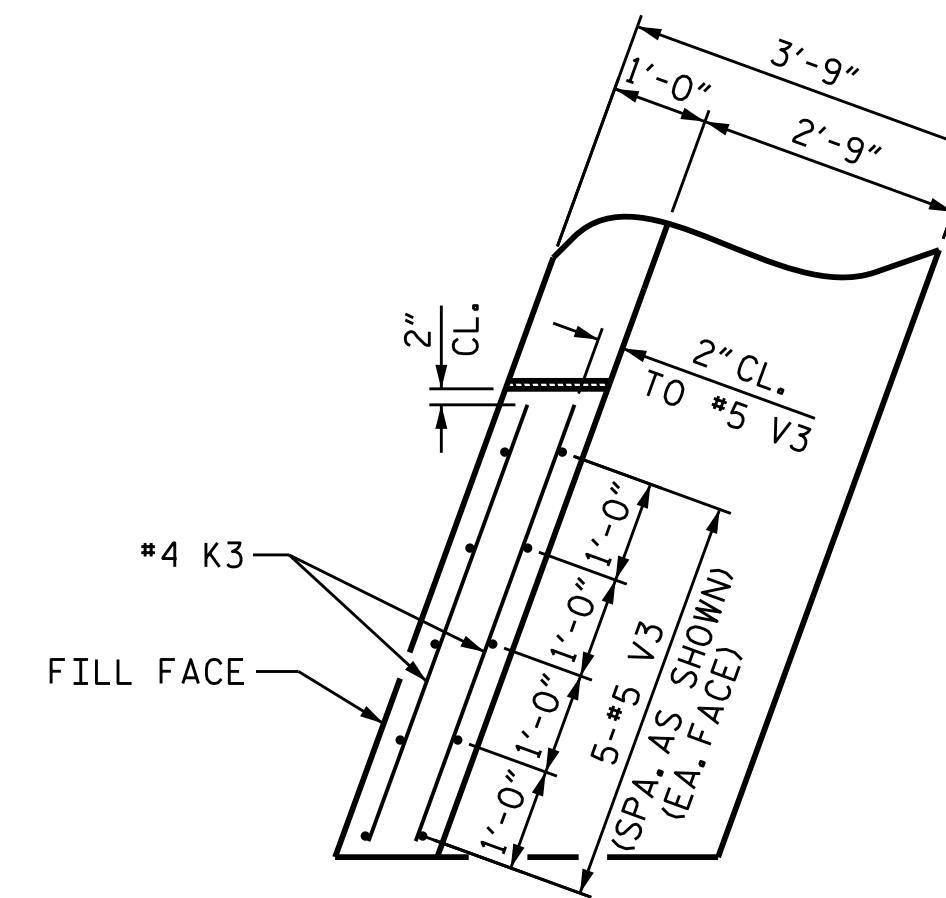
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			39



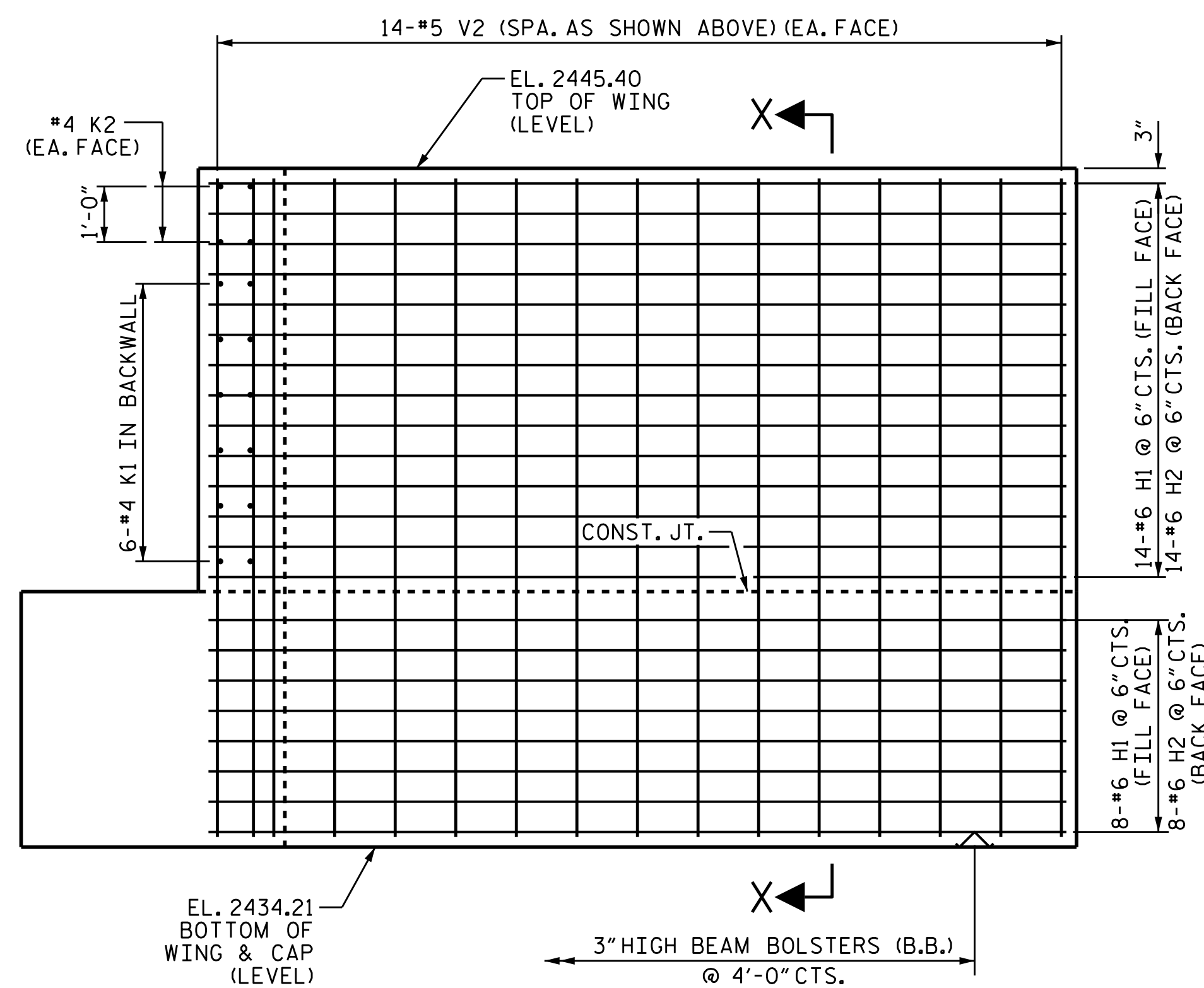
PLAN OF LEFT WING - W1



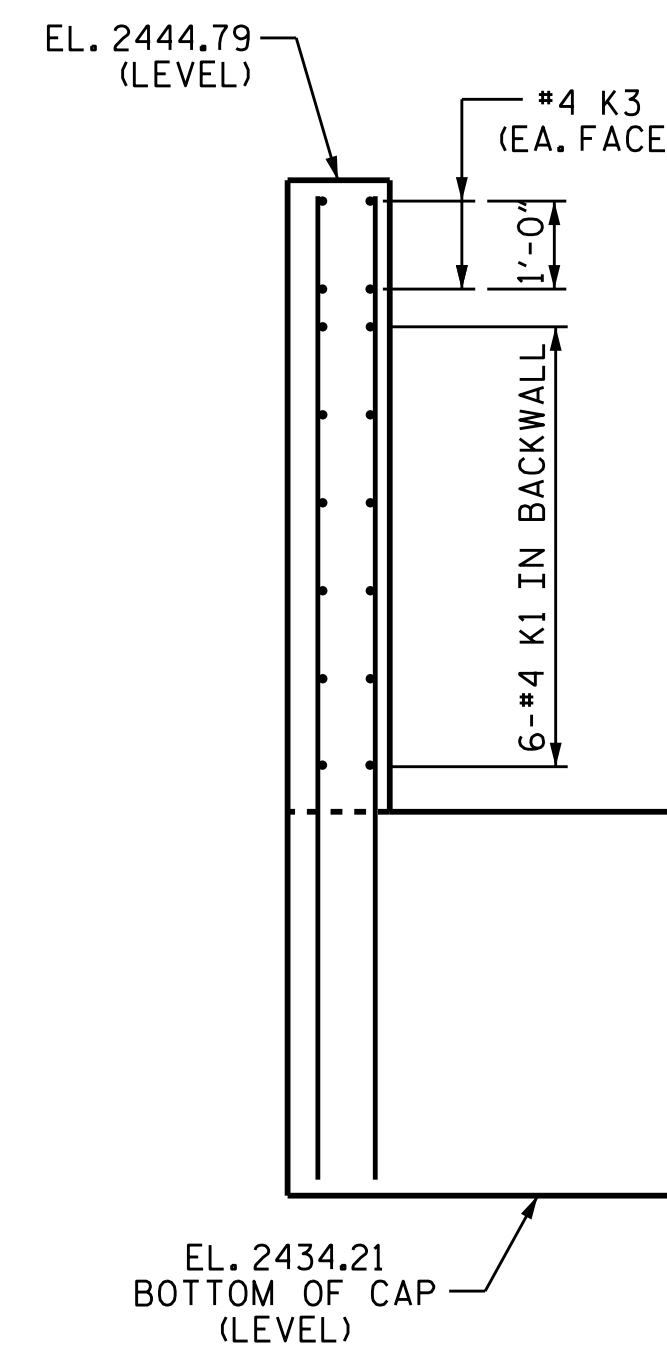
SECTION X-X



PLAN OF RIGHT SIDE



ELEVATION OF LEFT WING - W1



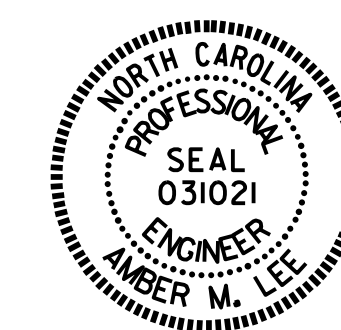
ELEVATION OF RIGHT SIDE

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END BENT 1



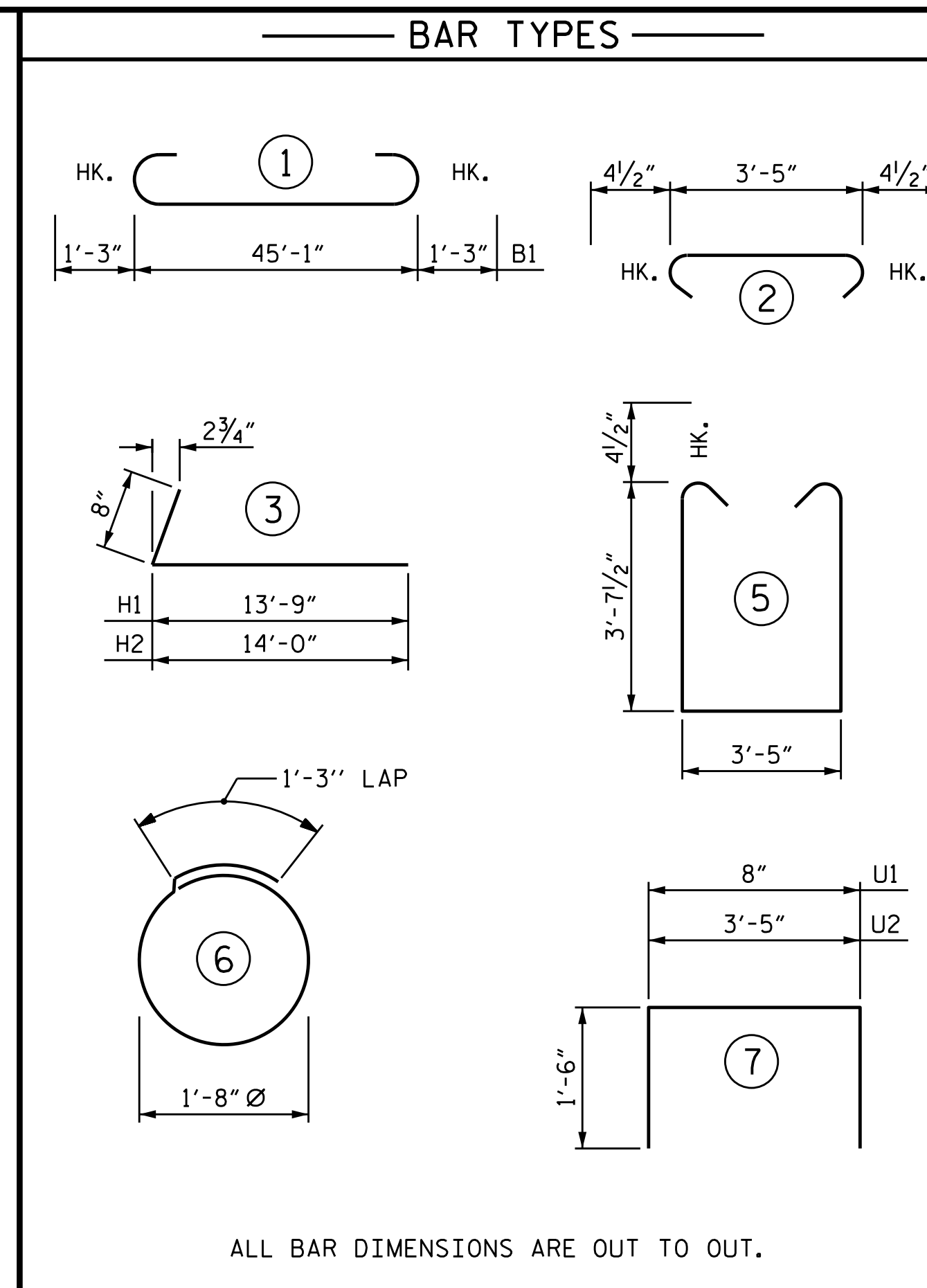
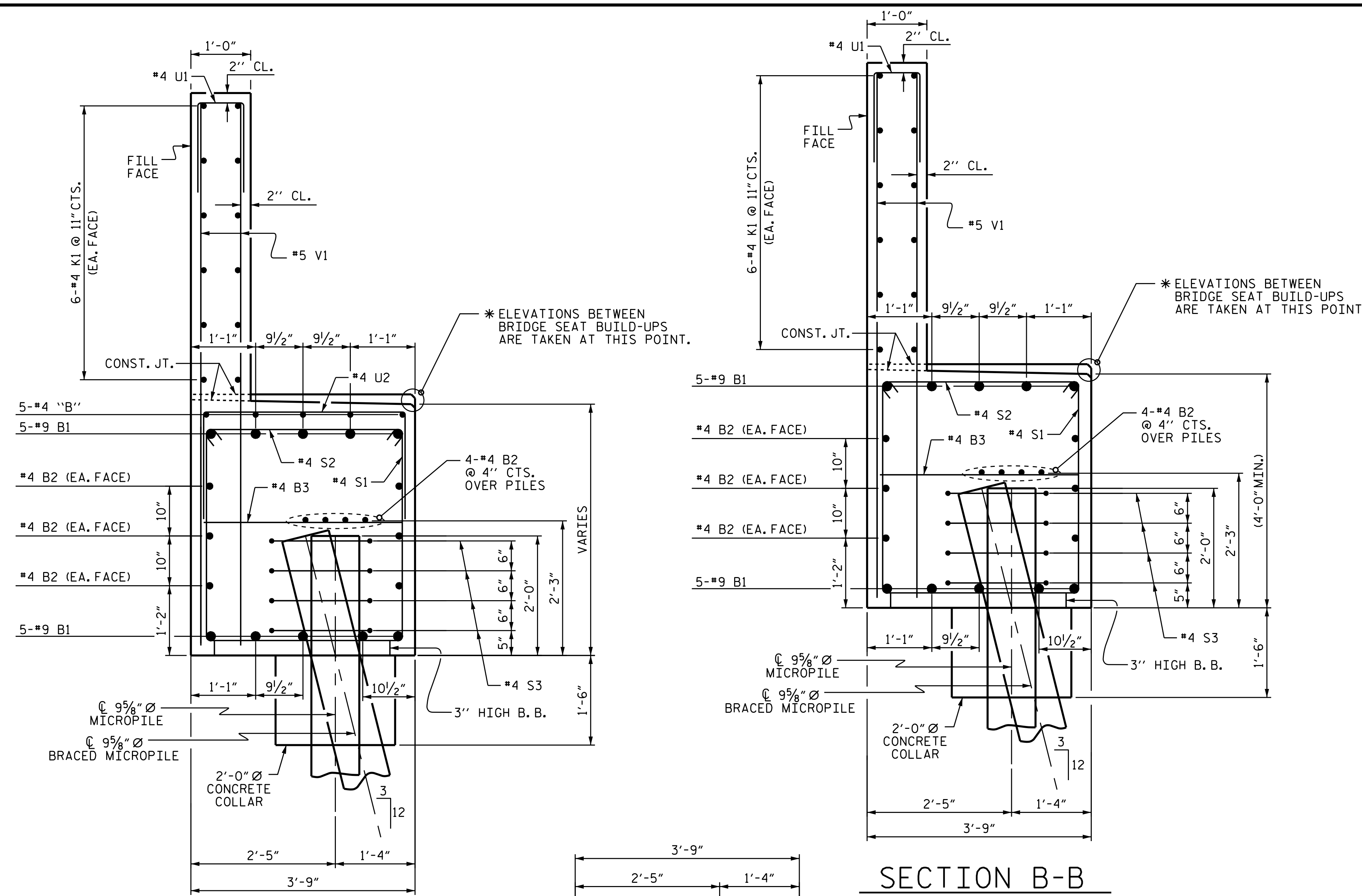
DocuSigned by:
 Amber M. Lee
 B04B5A8F2FAD484
 11/1/2018

DRAWN BY : M. G. SHAIKH DATE : 09/2018
 CHECKED BY : H. A. LOCKLEAR DATE : 09/2018
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 09/2018

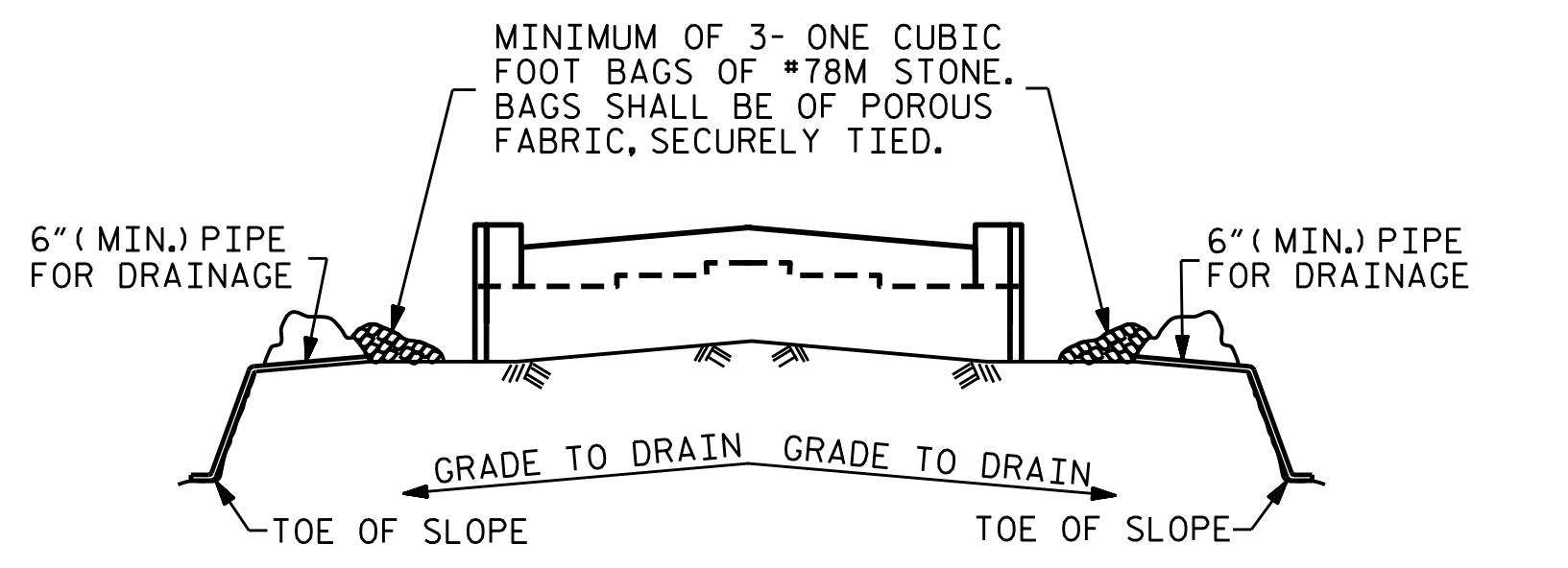
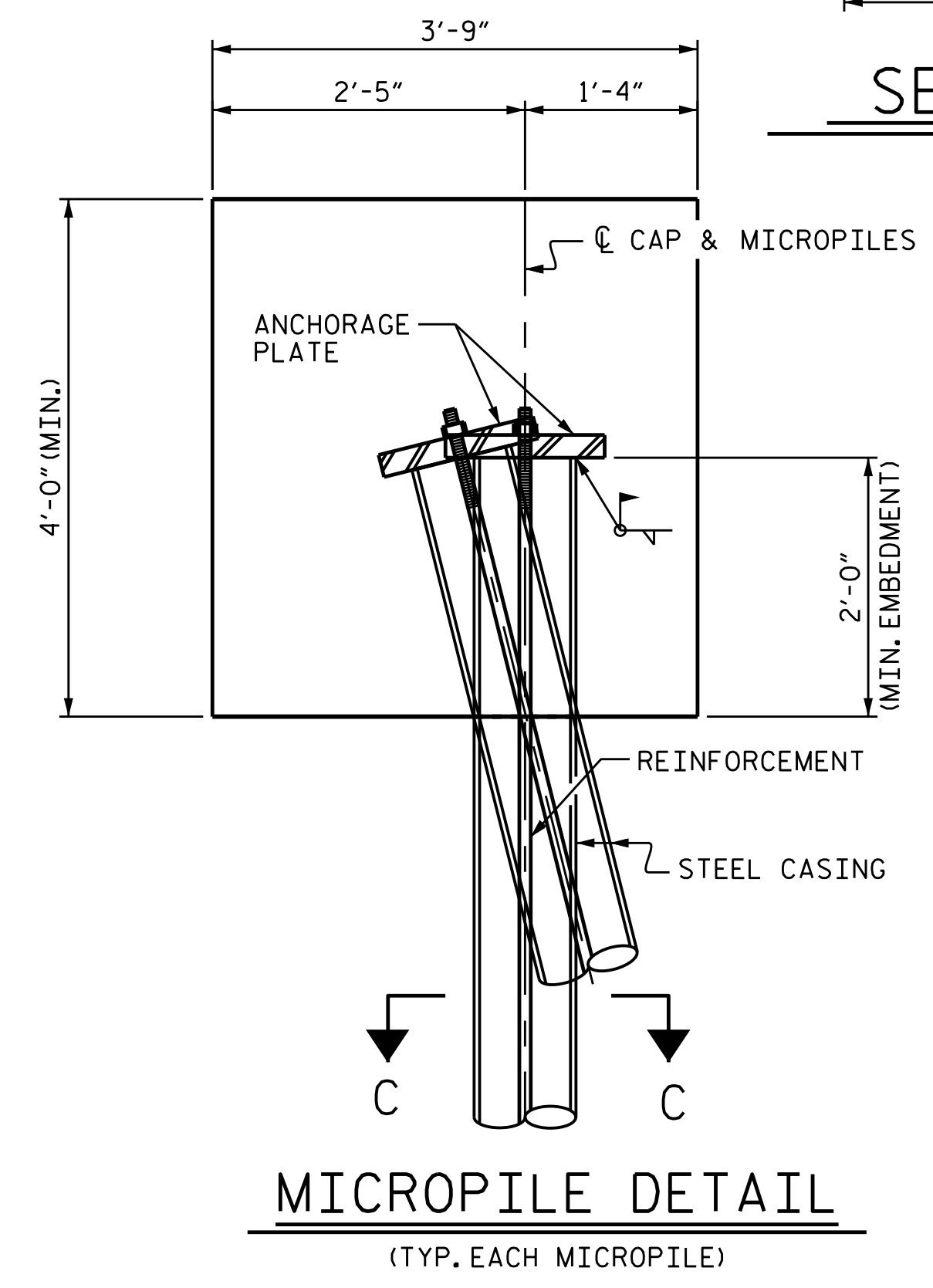
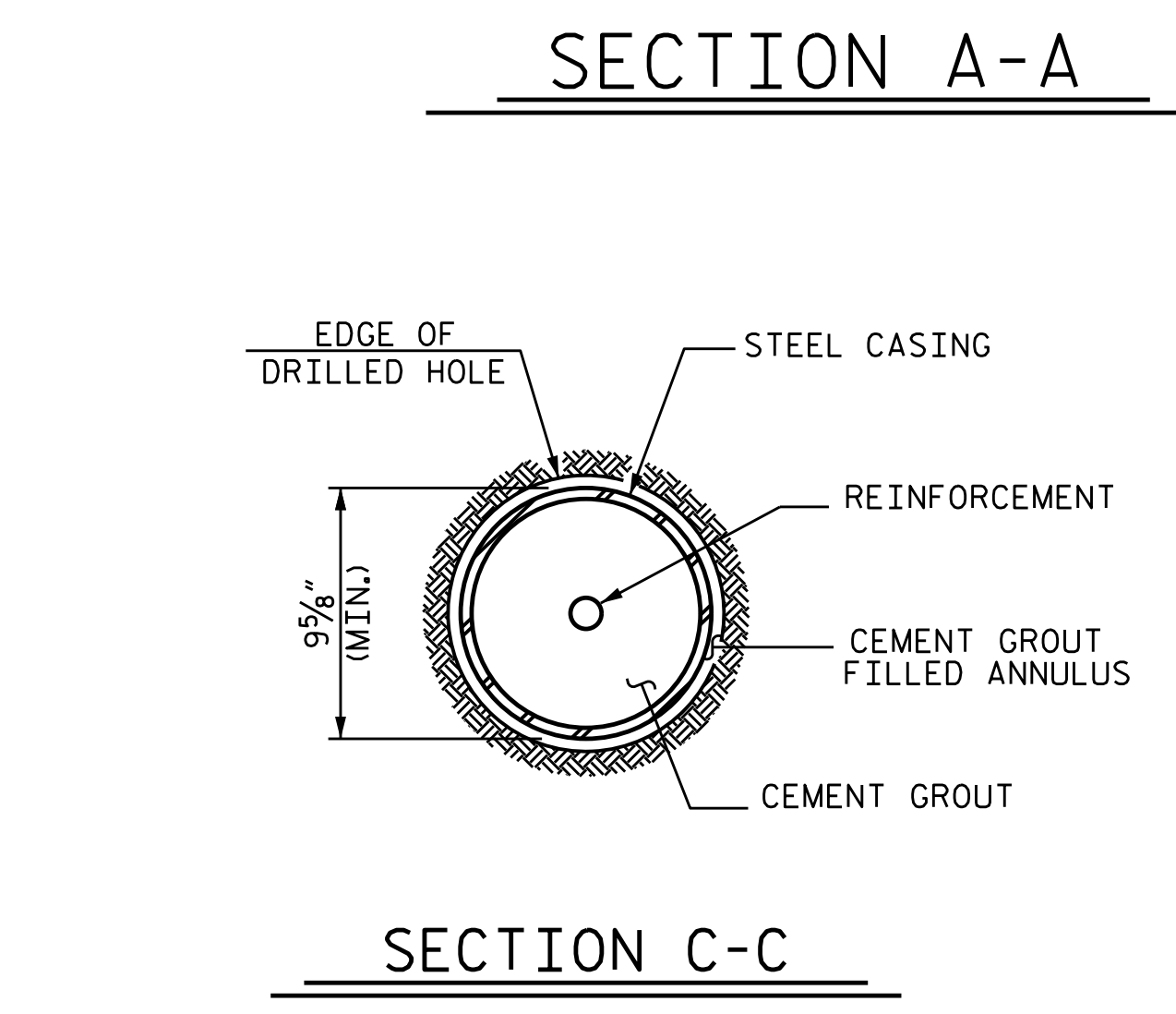
01-NOV-2018 11:24
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 amlee

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			39



BILL OF MATERIAL					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9		47'-7"	1618
B2	20	#4	STR	23'-10"	318
B3	11	#4	STR	3'-5"	25
B4	5	#4	STR	3'-2"	11
B5	5	#4	STR	12'-8"	42
H1	22	#6		14'-5"	476
H2	22	#6		14'-8"	485
K1	24	#4	STR	23'-10"	382
K2	4	#4	STR	3'-5"	9
K3	4	#4	STR	4'-10"	13
S1	52	#4		11'-5"	397
S2	52	#4		4'-2"	145
S3	20	#4		6'-6"	87
U1	35	#4		3'-8"	86
U2	12	#4		6'-5"	51
V1	70	#5	STR	8'-11"	651
V2	38	#5	STR	10'-10"	429
V3	10	#5	STR	10'-2"	106
REINFORCING STEEL				5331 LBS.	
CLASS A CONCRETE				(CU. YDS.)	
POUR 1				CAP, LOWER PART OF WING & COLLARS	
POUR 2				BACKWALL & UPPER PART OF WING	
TOTAL				42.3	
9 5/8" Ø MICROPILES NO. 5				188.8 LIN. FT.	



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 DETEIORATED 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.

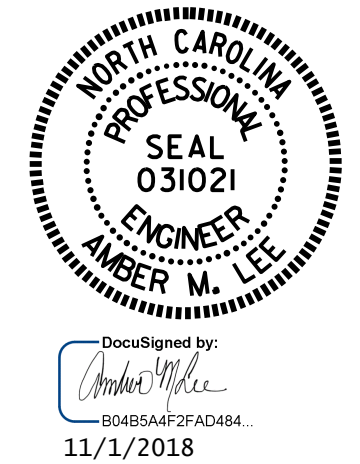
TEMPORARY DRAINAGE AT END BENT

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END BENT 1



DRAWN BY : M. G. SHAIKH DATE : 09/2018
 CHECKED BY : H. A. LOCKLEAR DATE : 09/2018
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 09/2018

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			39

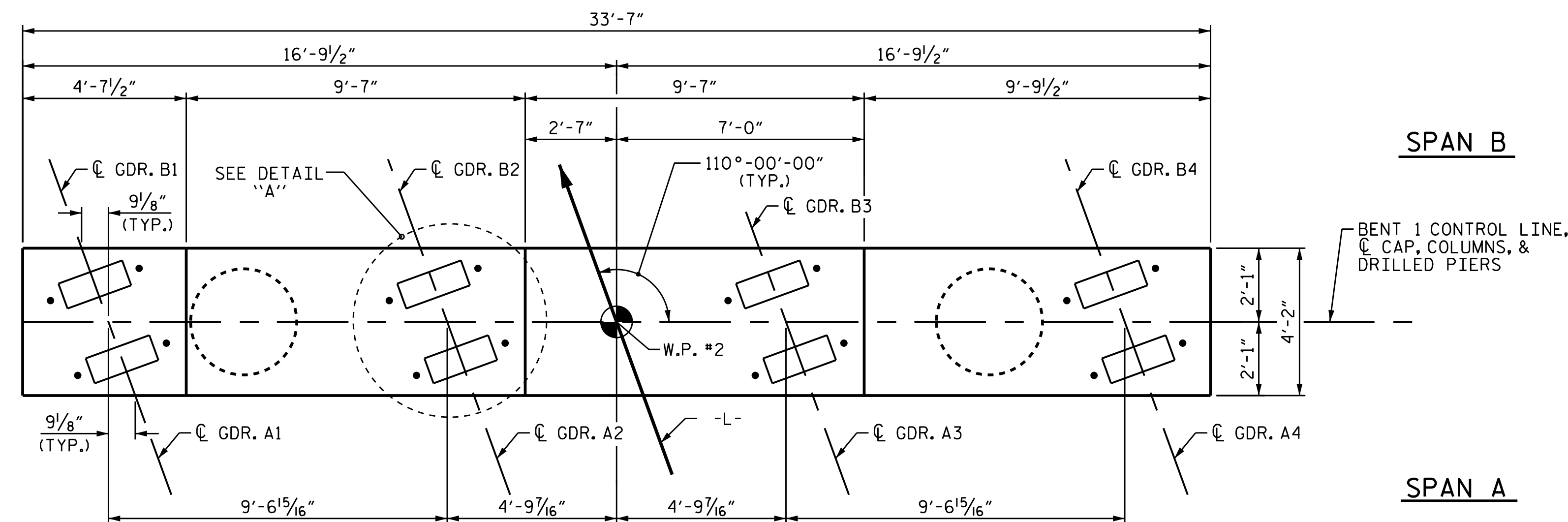
NOTES

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

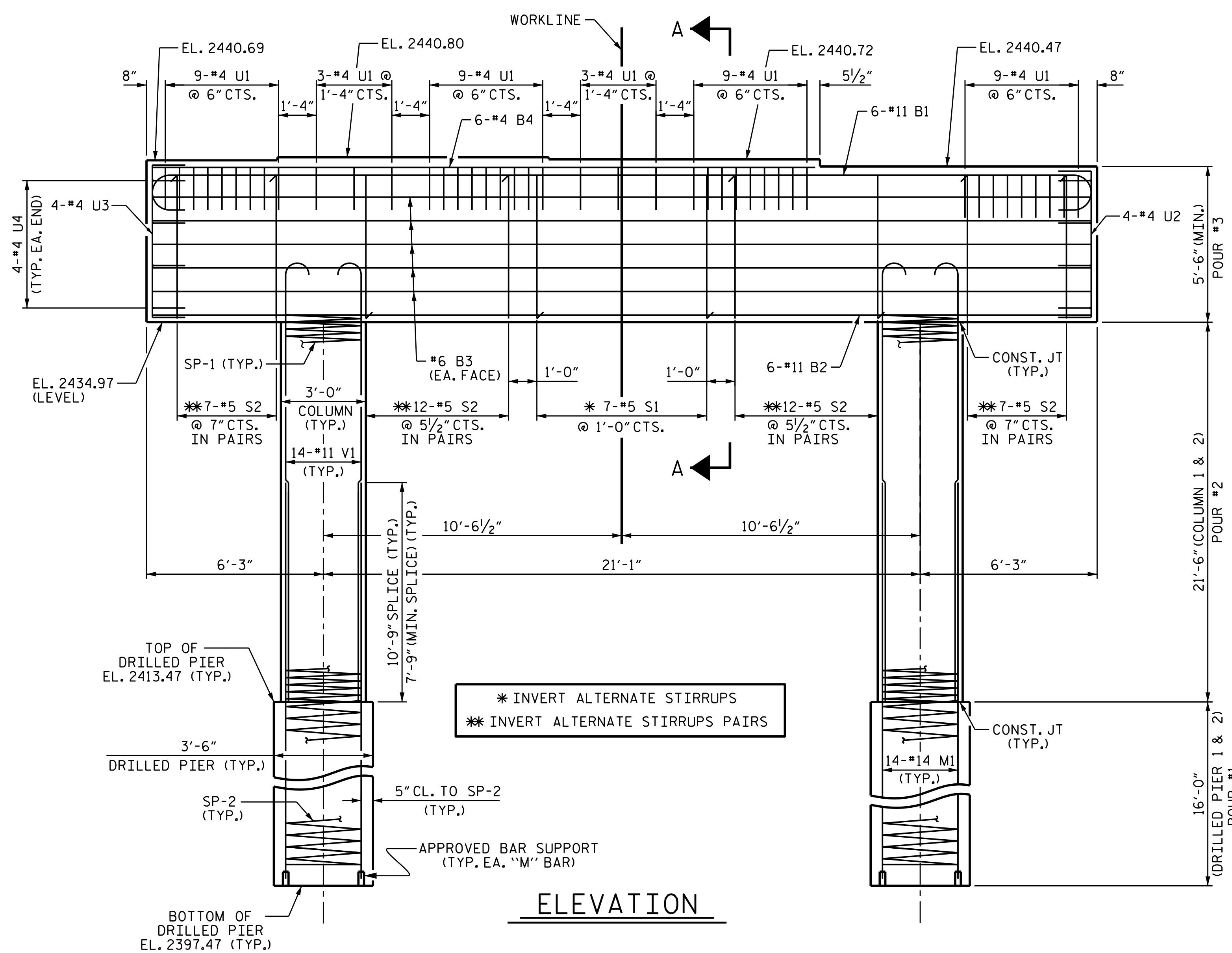
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

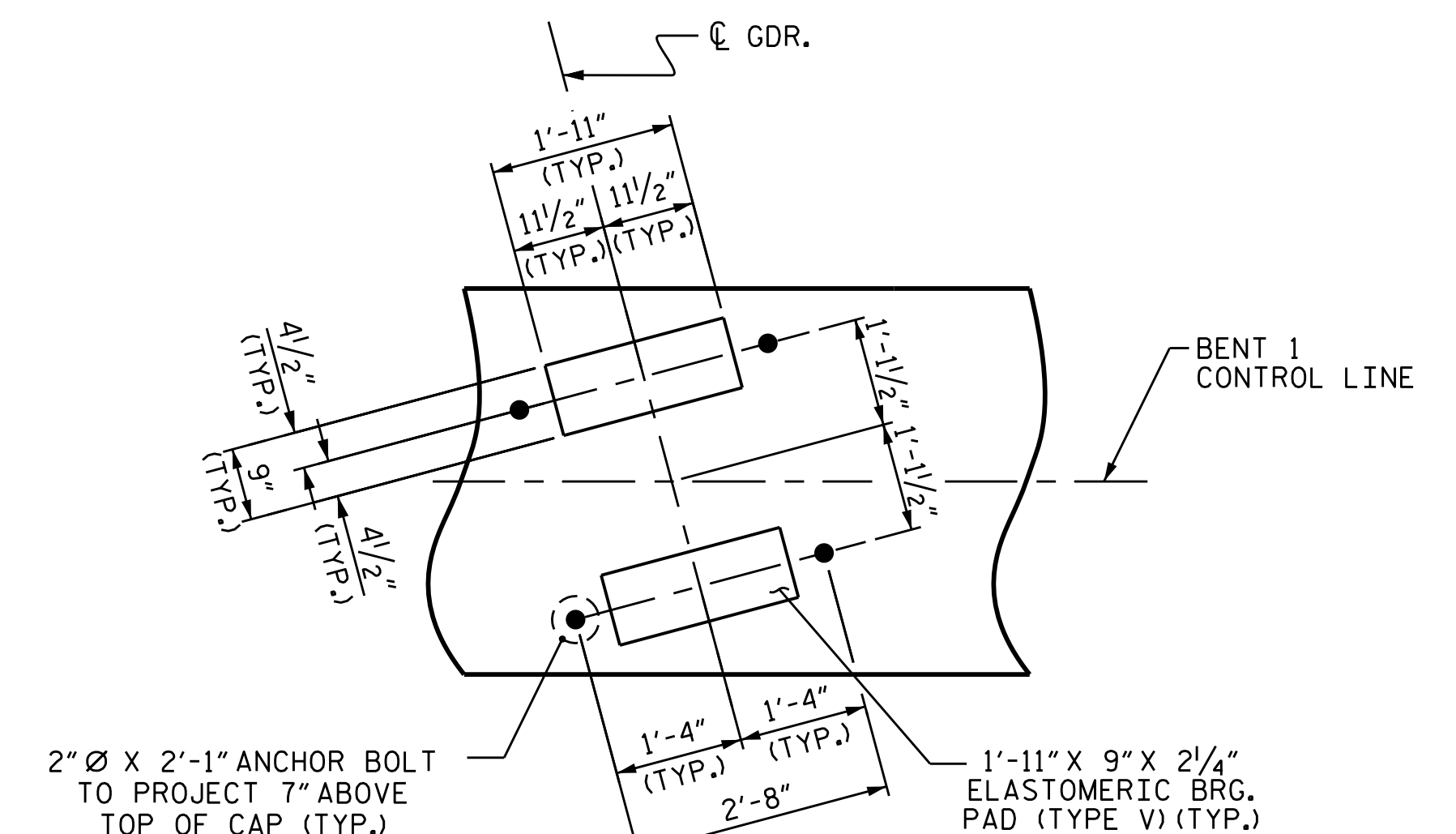
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.



PLAN



ELEVATION

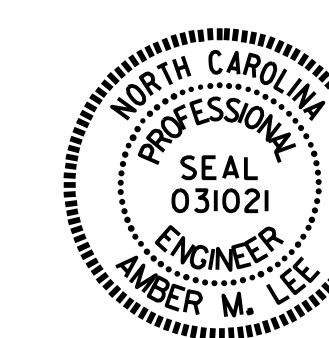


DETAIL "A"

TYP. EA. GDR.

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 1 OF 2

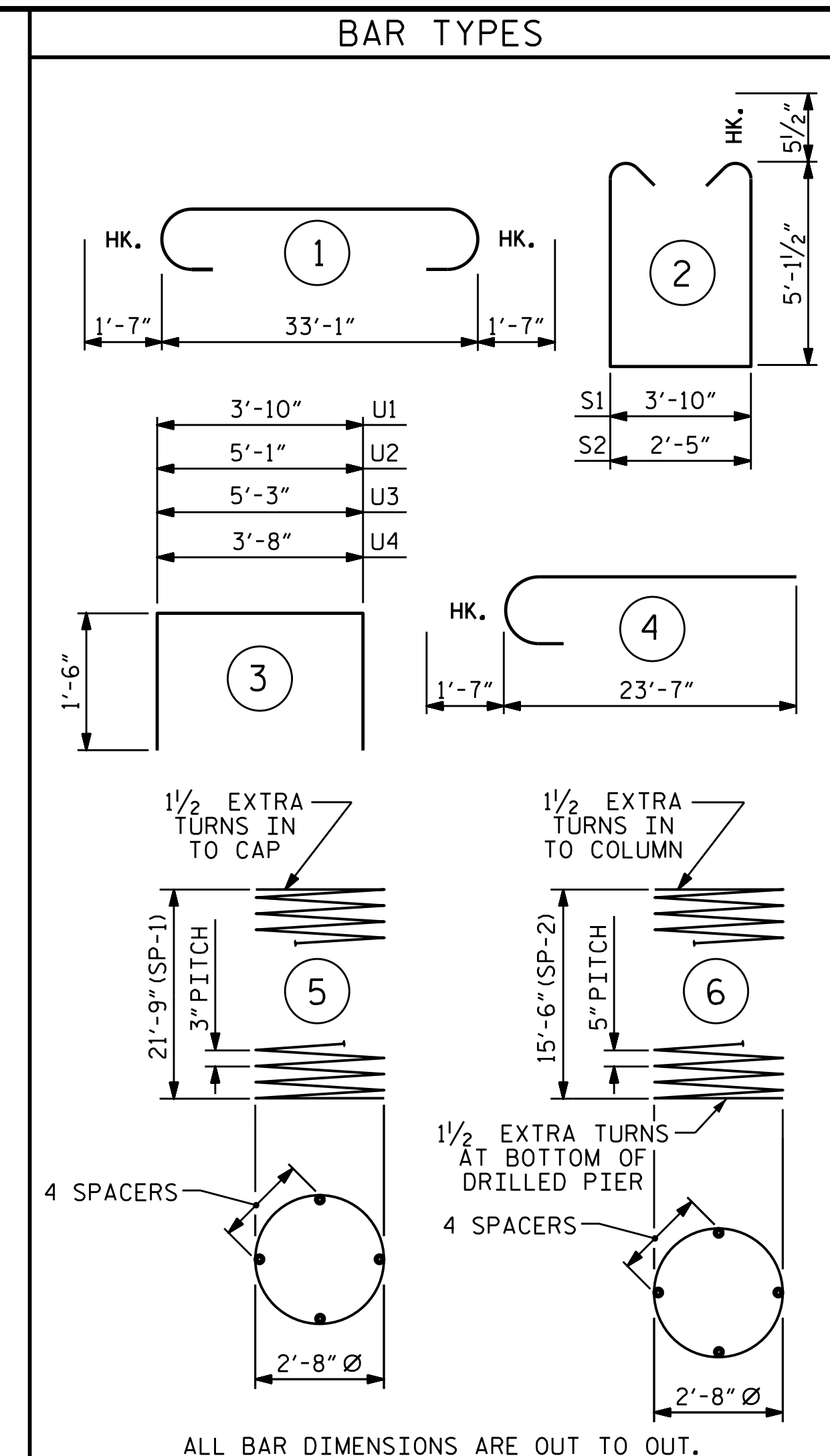
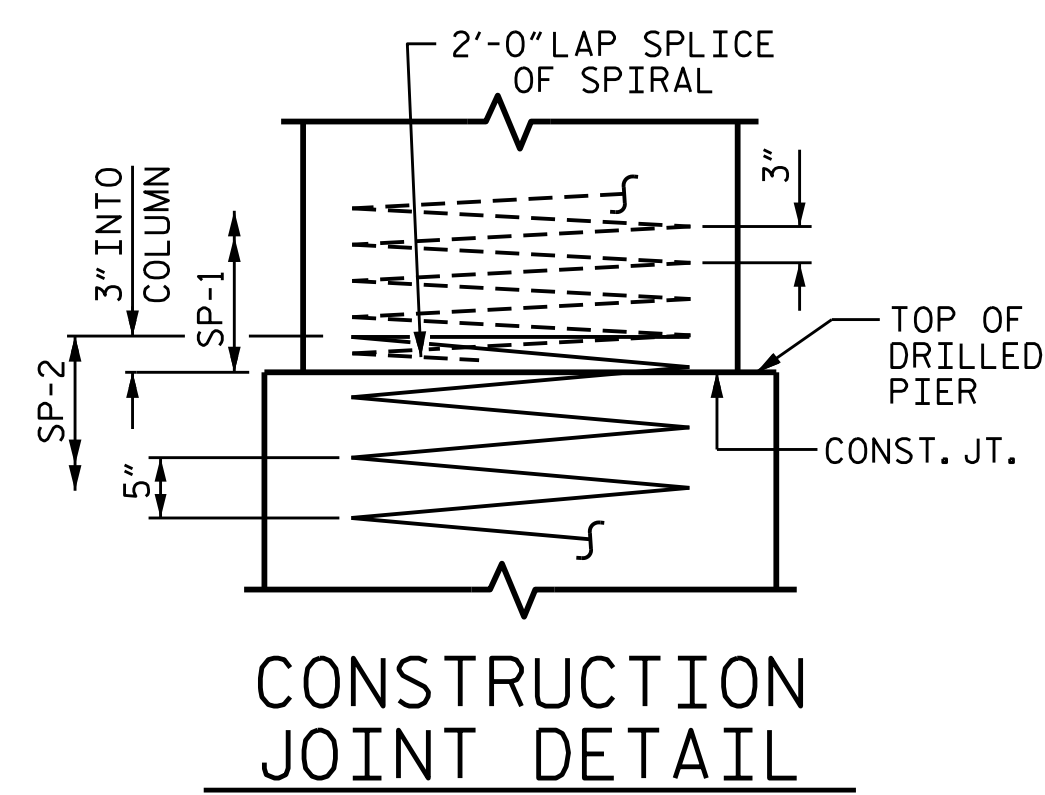
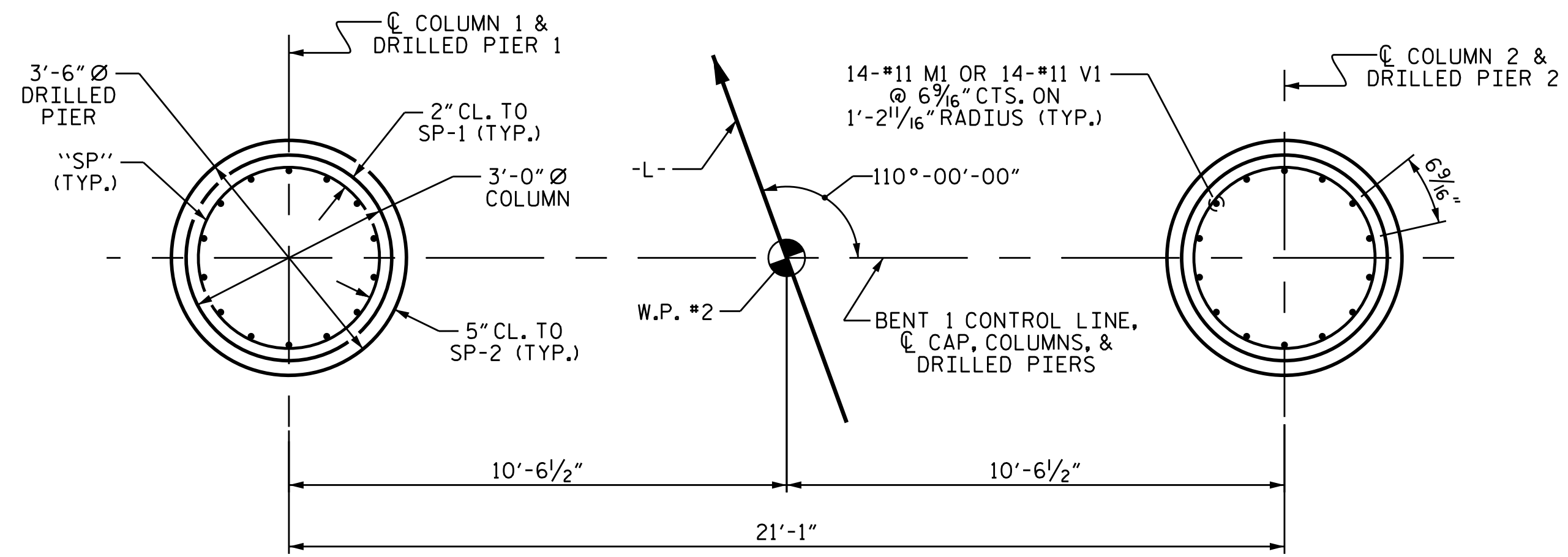


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 1

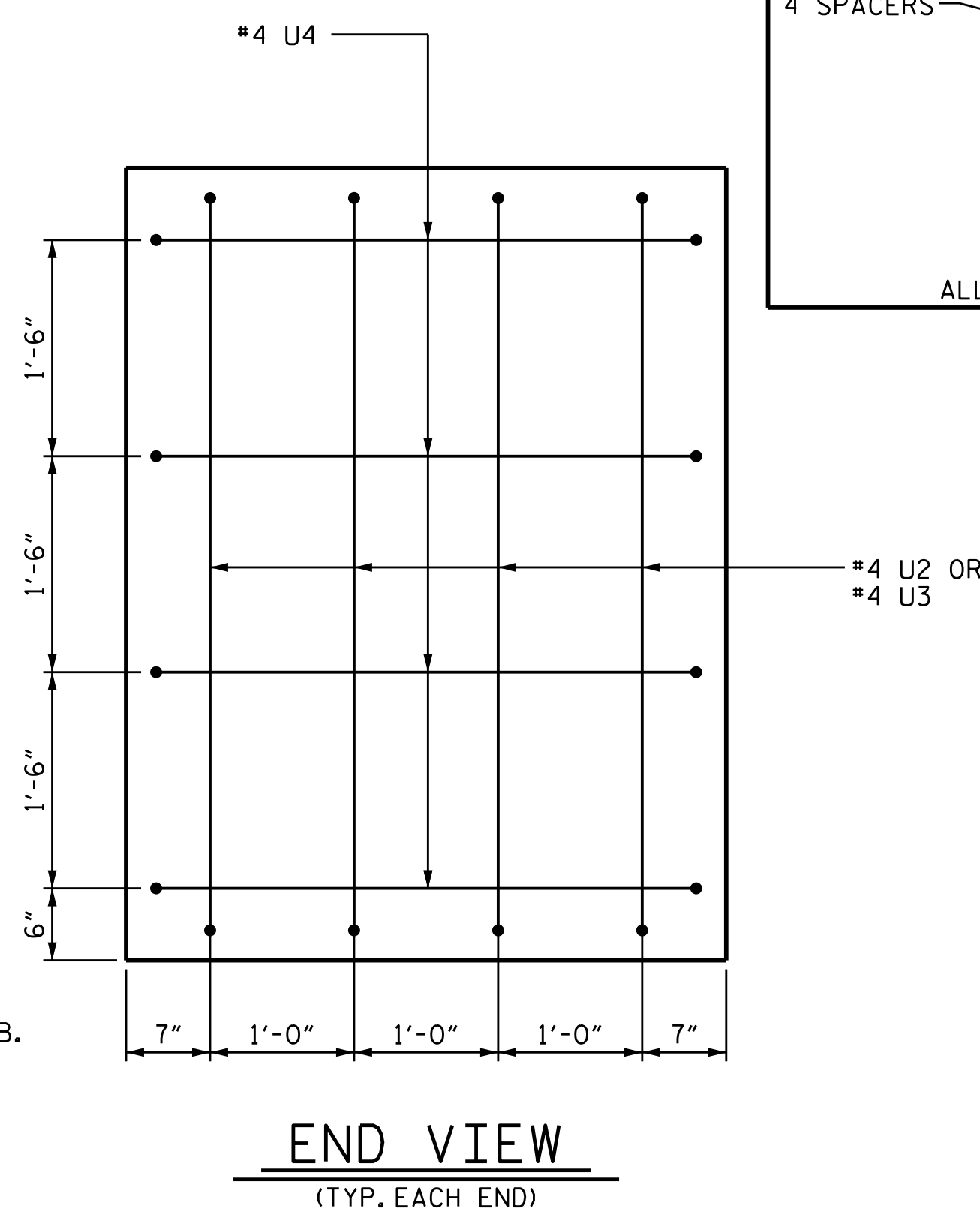
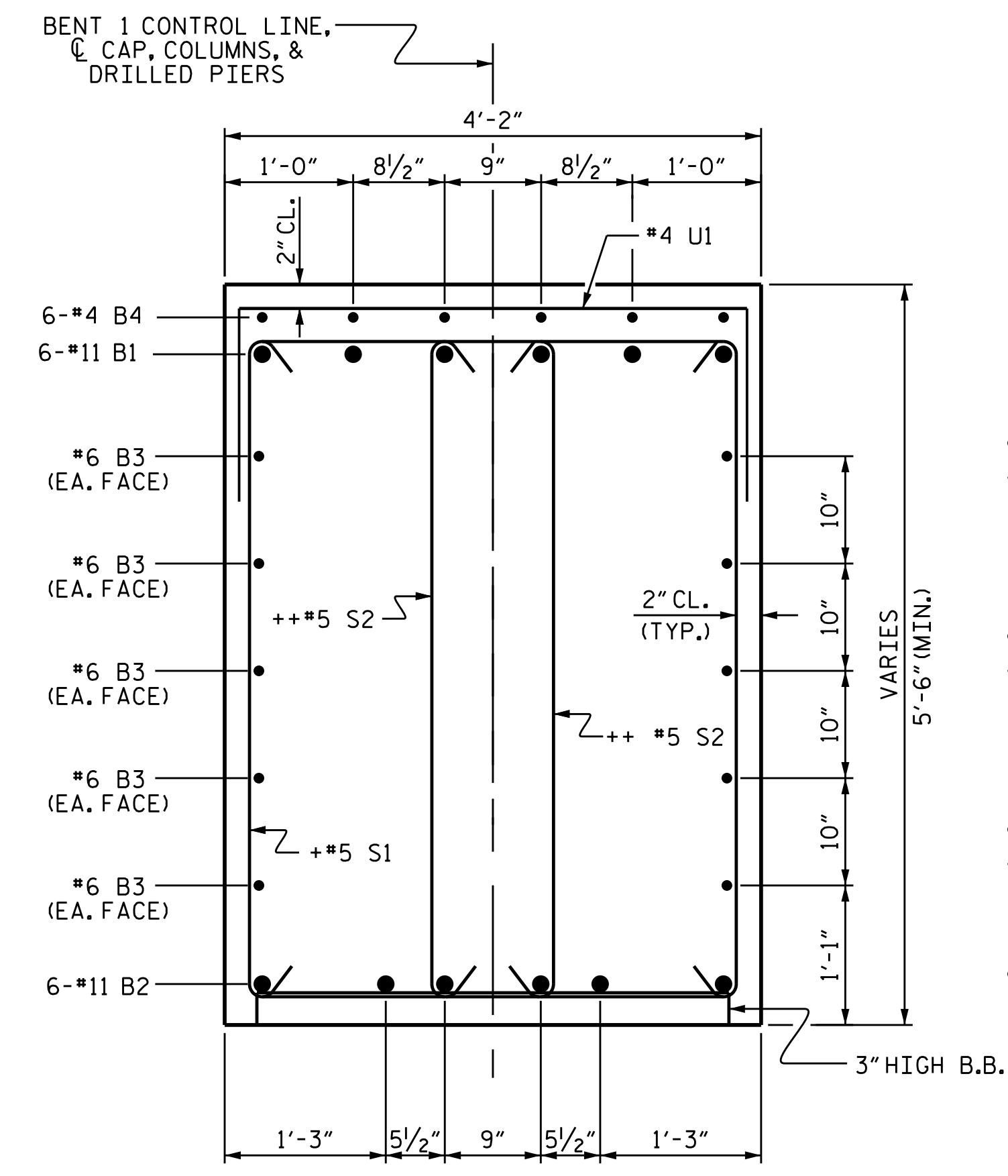
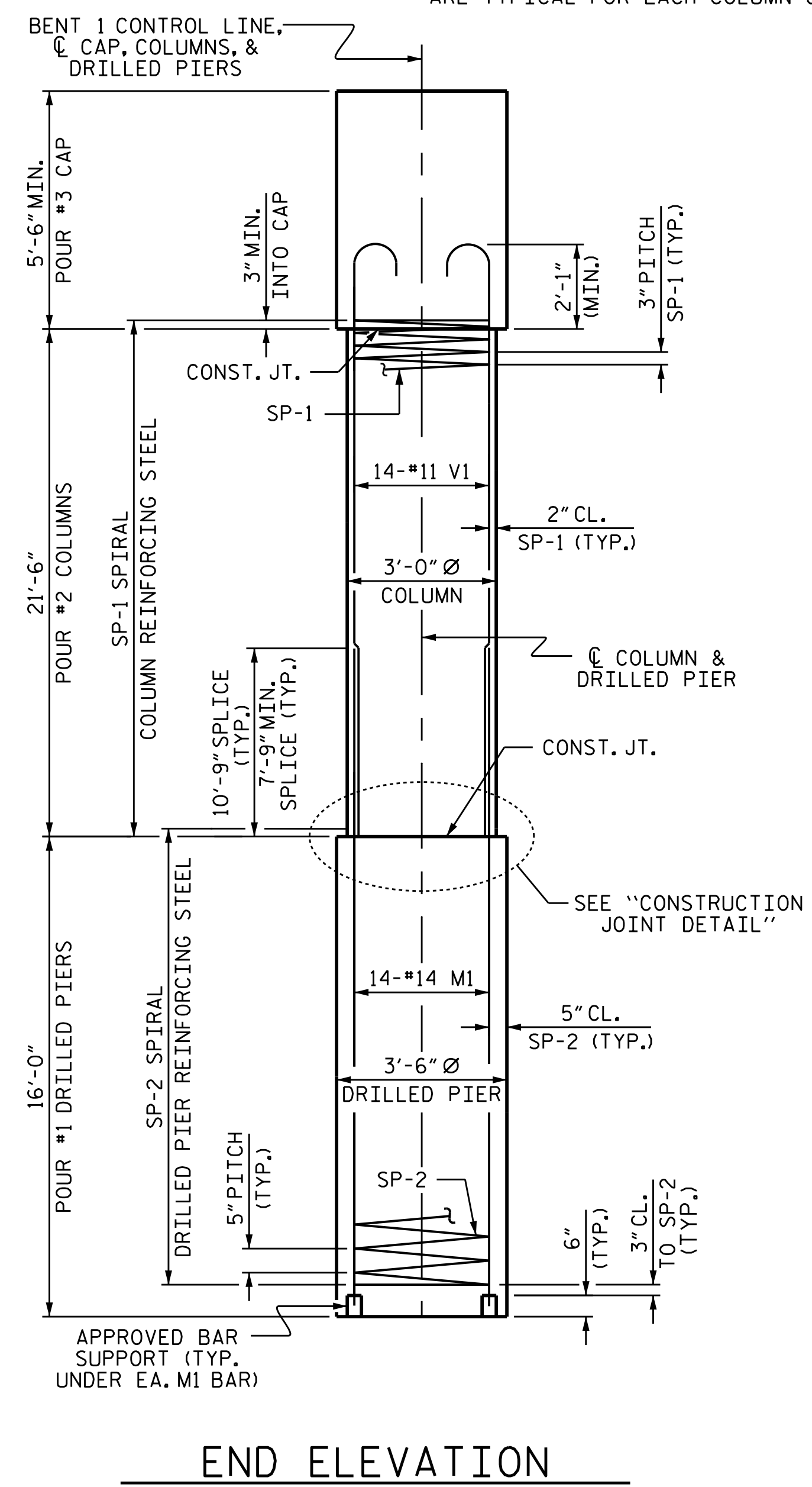
DRAWN BY : M. G. SHAIKH DATE : 08/2018
 CHECKED BY : H. A. LOCKLEAR DATE : 09/2018
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 09/2018

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 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			39



BILL OF MATERIAL					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	1	36'-3"	1156
B2	6	#11	STR	33'-3"	1060
B3	10	#6	STR	33'-3"	499
B4	6	#4	STR	23'-5"	94
M1	28	#14	STR	26'-6"	5623
S1	7	#5	2	15'-0"	110
S2	76	#5	2	13'-7"	1077
U1	42	#4	3	6'-10"	192
U2	4	#4	3	8'-1"	22
U3	4	#4	3	8'-3"	22
U4	8	#4	3	6'-8"	36
V1	28	#11	4	25'-2"	3744
REINFORCING STEEL					LBS. 13635
SP-1	2	*	5	730'-2"	976
SP-2	2	**	6	318'-9"	665
SPIRAL COLUMN REINFORCING STEEL					LBS. 1641
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE					
POUR #3 (CAP)				C.Y.	29.5
POUR #2 (COLUMNS)				C.Y.	11.3
TOTAL CLASS A CONCRETE				C.Y.	40.8
DRILLED PIER QUANTITIES					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				C.Y.	11.4
3'-6" Ø DRILLED PIERS IN SOIL				LIN. FT.	18.00
3'-6" Ø DRILLED PIERS NOT IN SOIL				LIN. FT.	14.00
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER				LIN. FT.	18.00
CSL TUBES				LIN. FT.	140



PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 1



DRAWN BY: M.G. SHAIKH DATE: 08/2018
 CHECKED BY: H.A. LOCKLEAR DATE: 09/2018
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 09/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			39

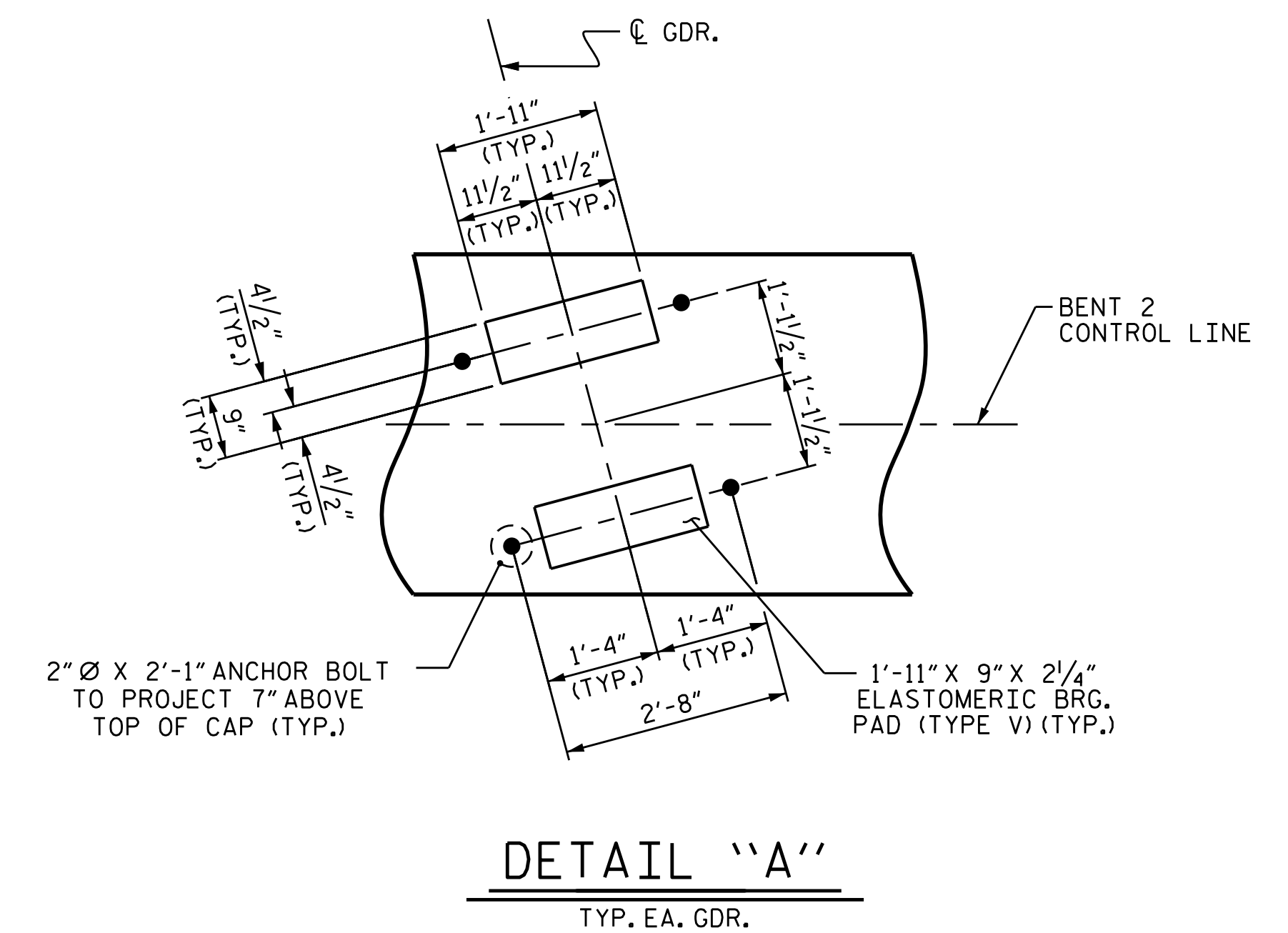
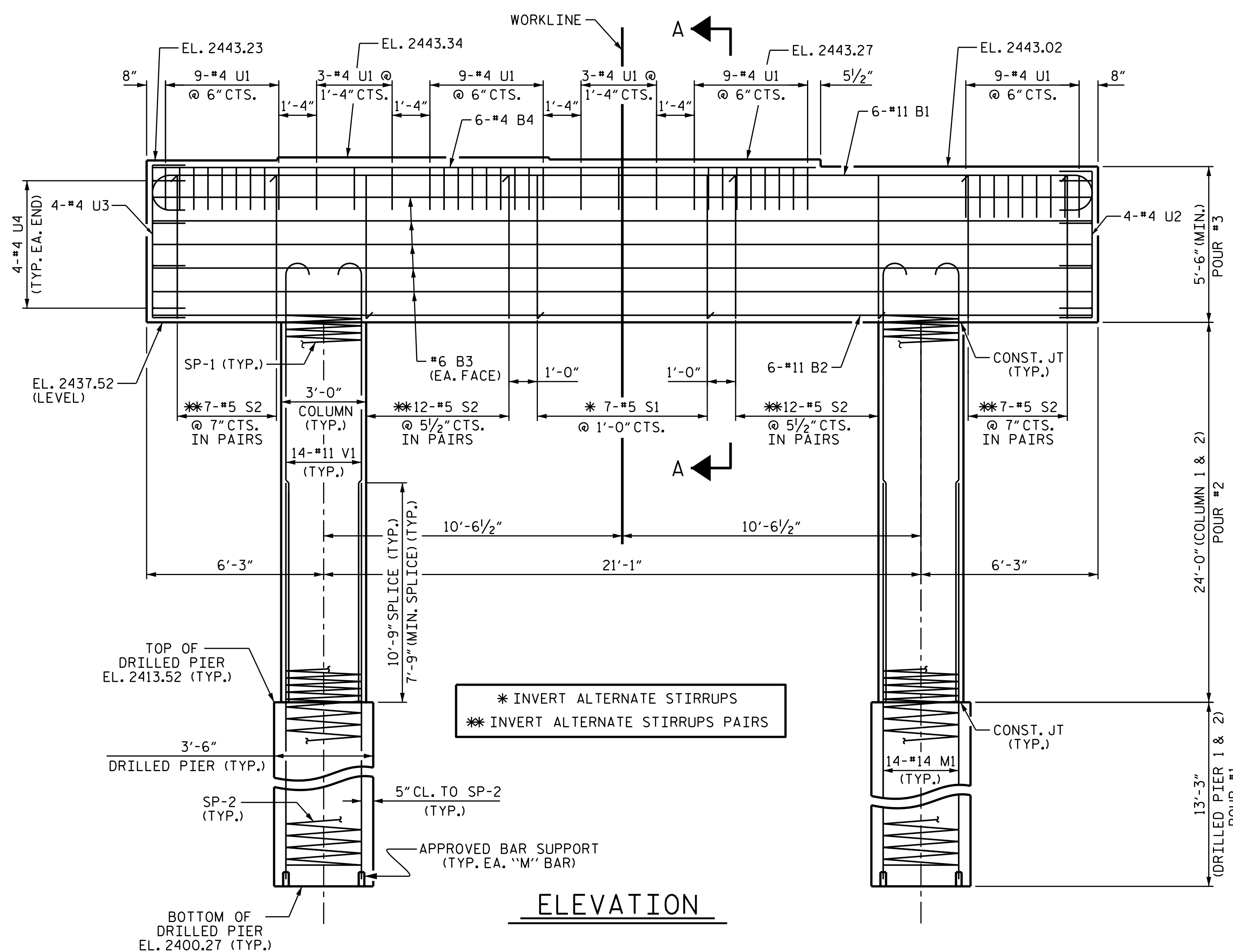
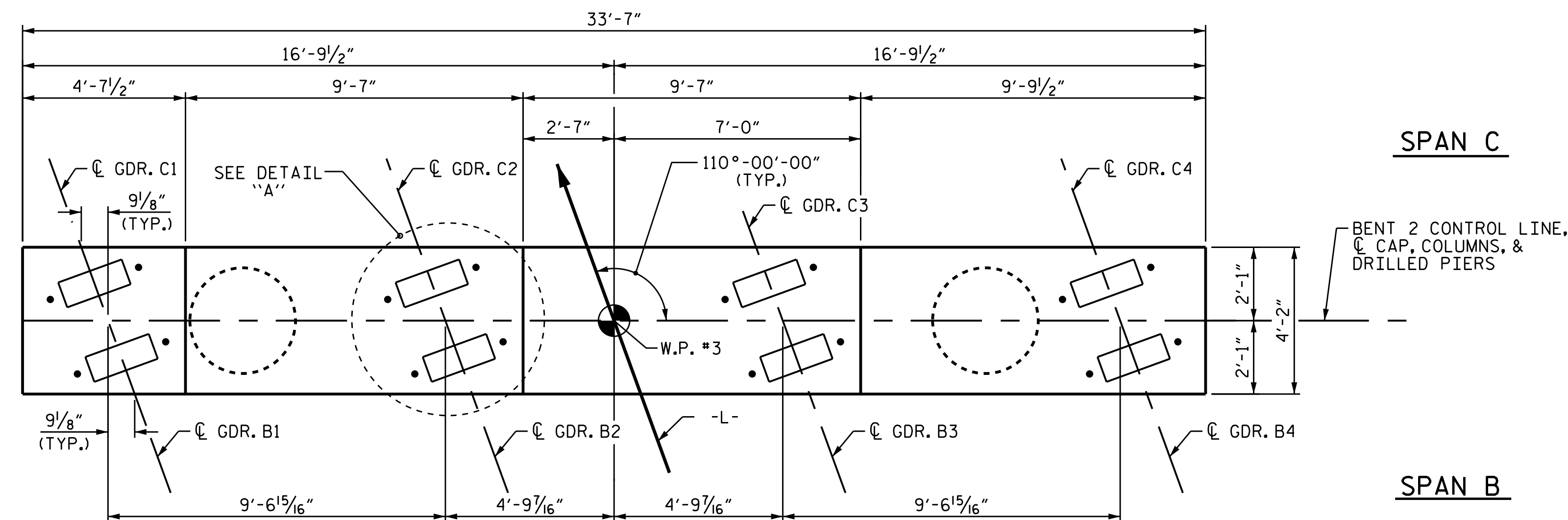
NOTES

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.



PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

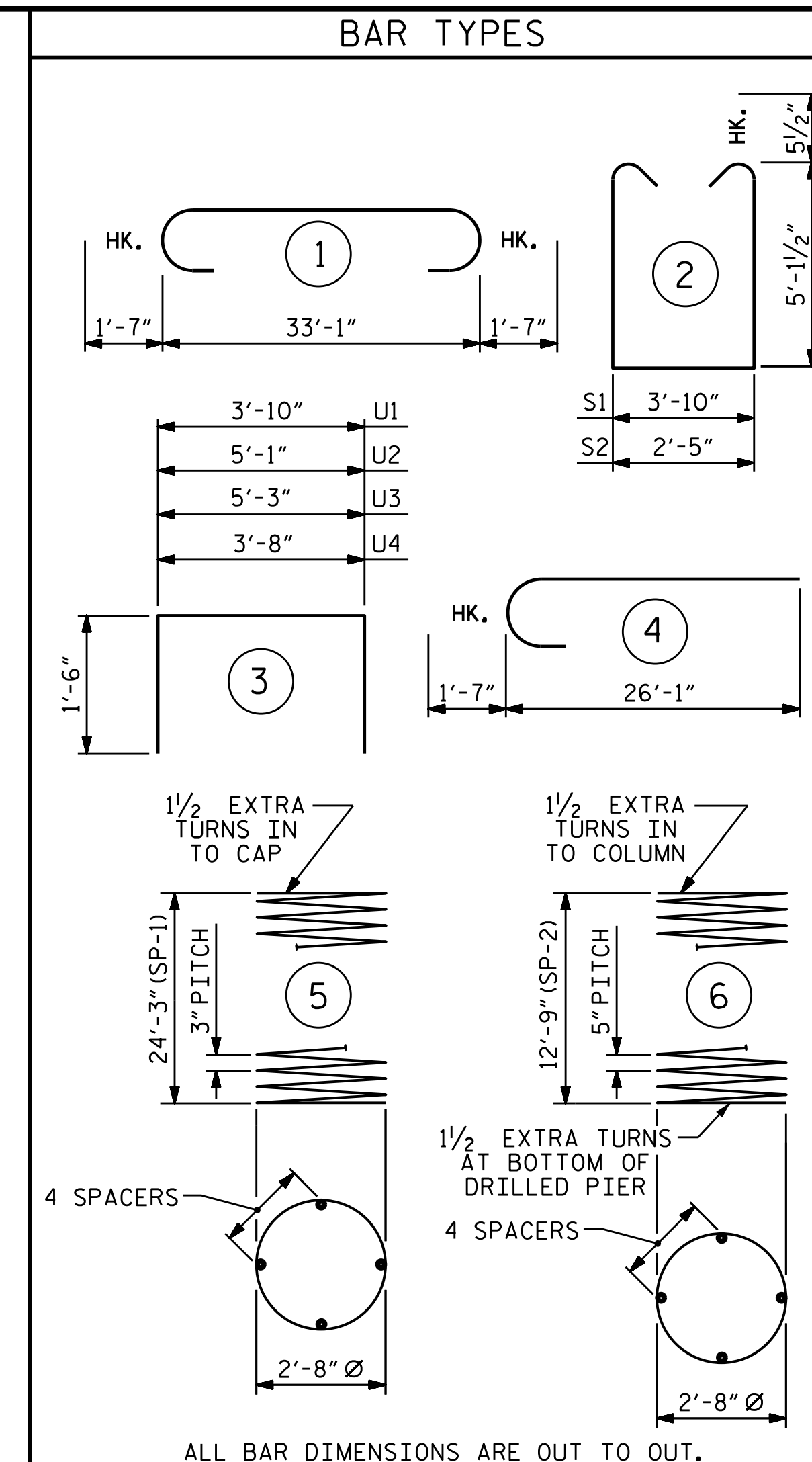
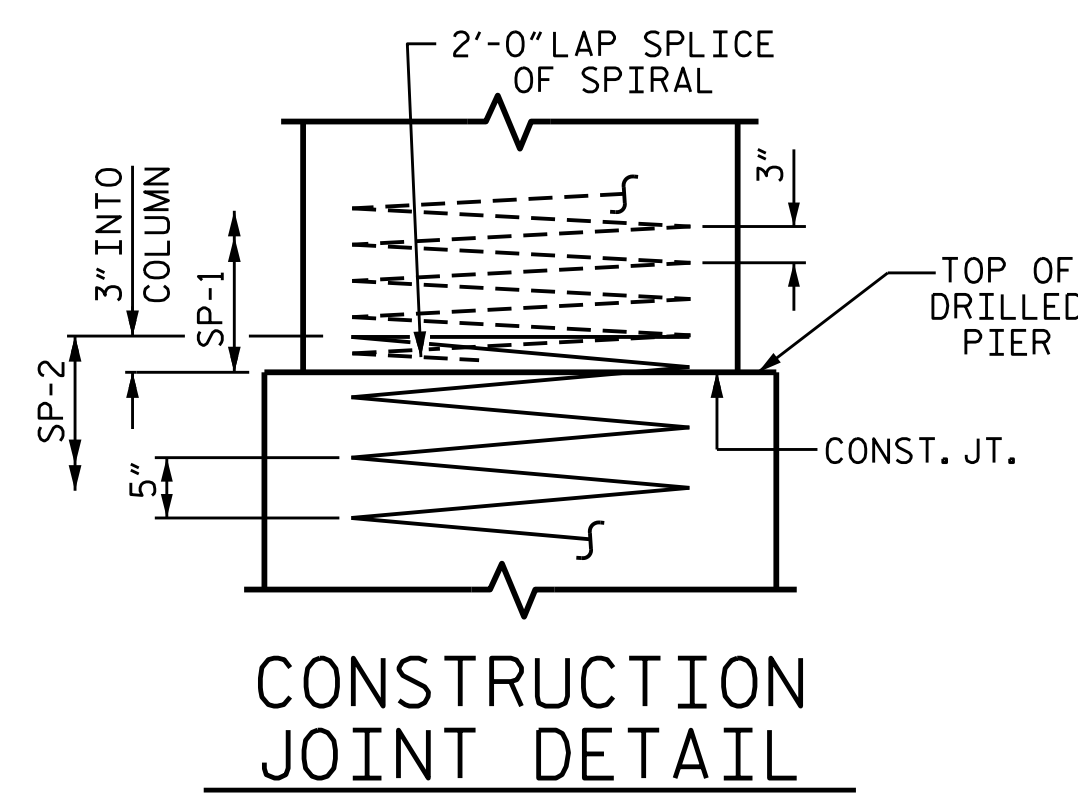
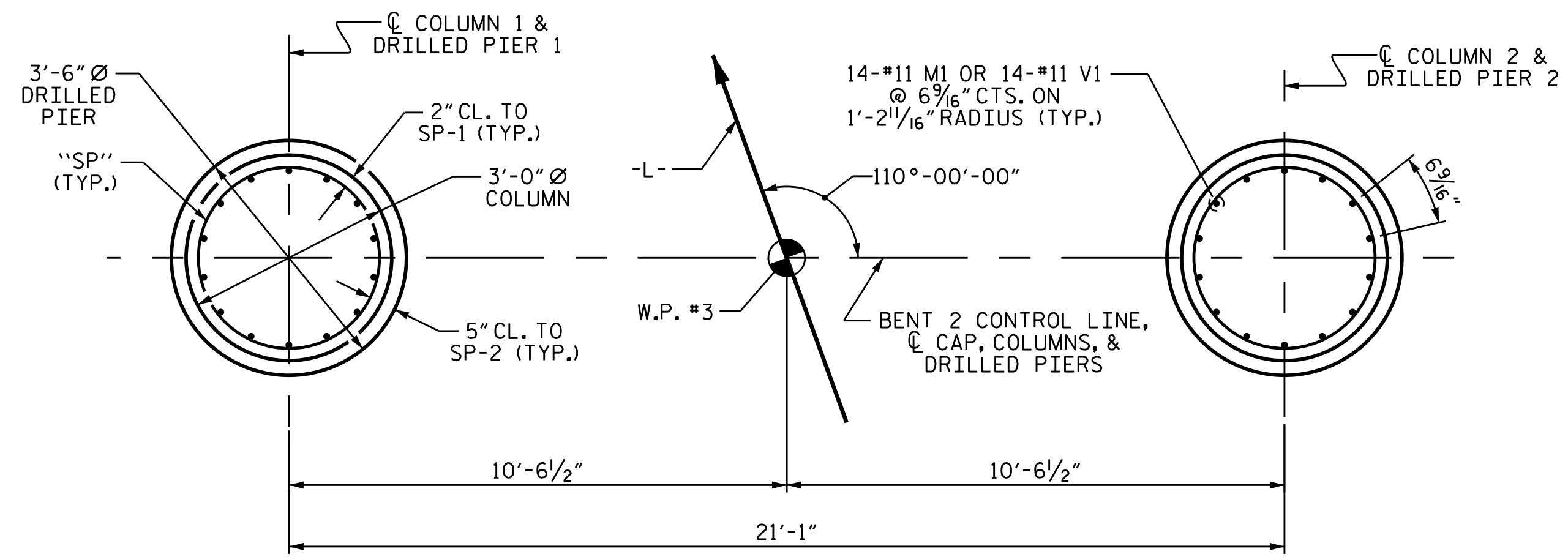
SUBSTRUCTURE
 BENT 2

DRAWN BY : M. G. SHAIKH DATE : 08/2018
 CHECKED BY : H. A. LOCKLEAR DATE : 09/2018
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 09/2018

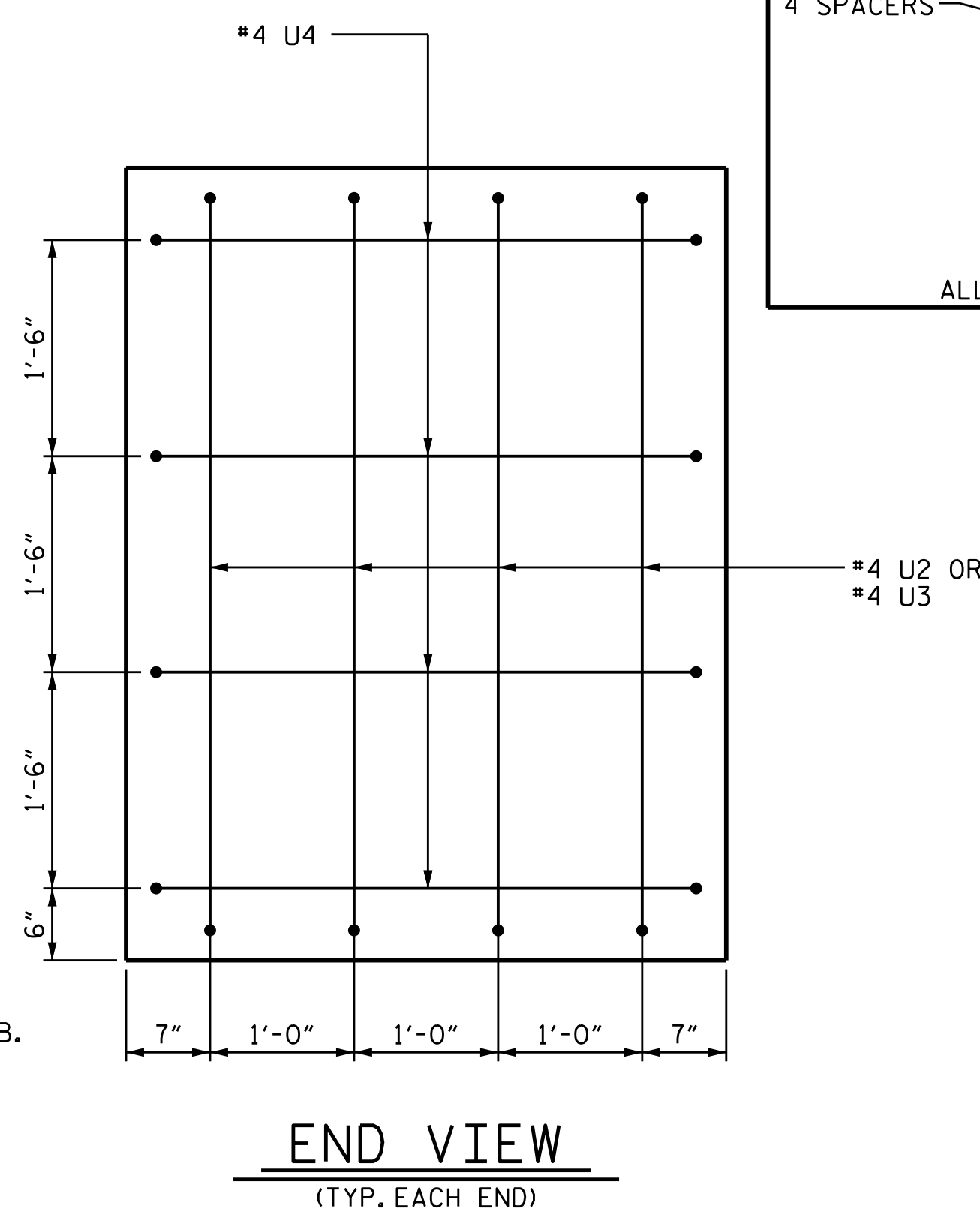
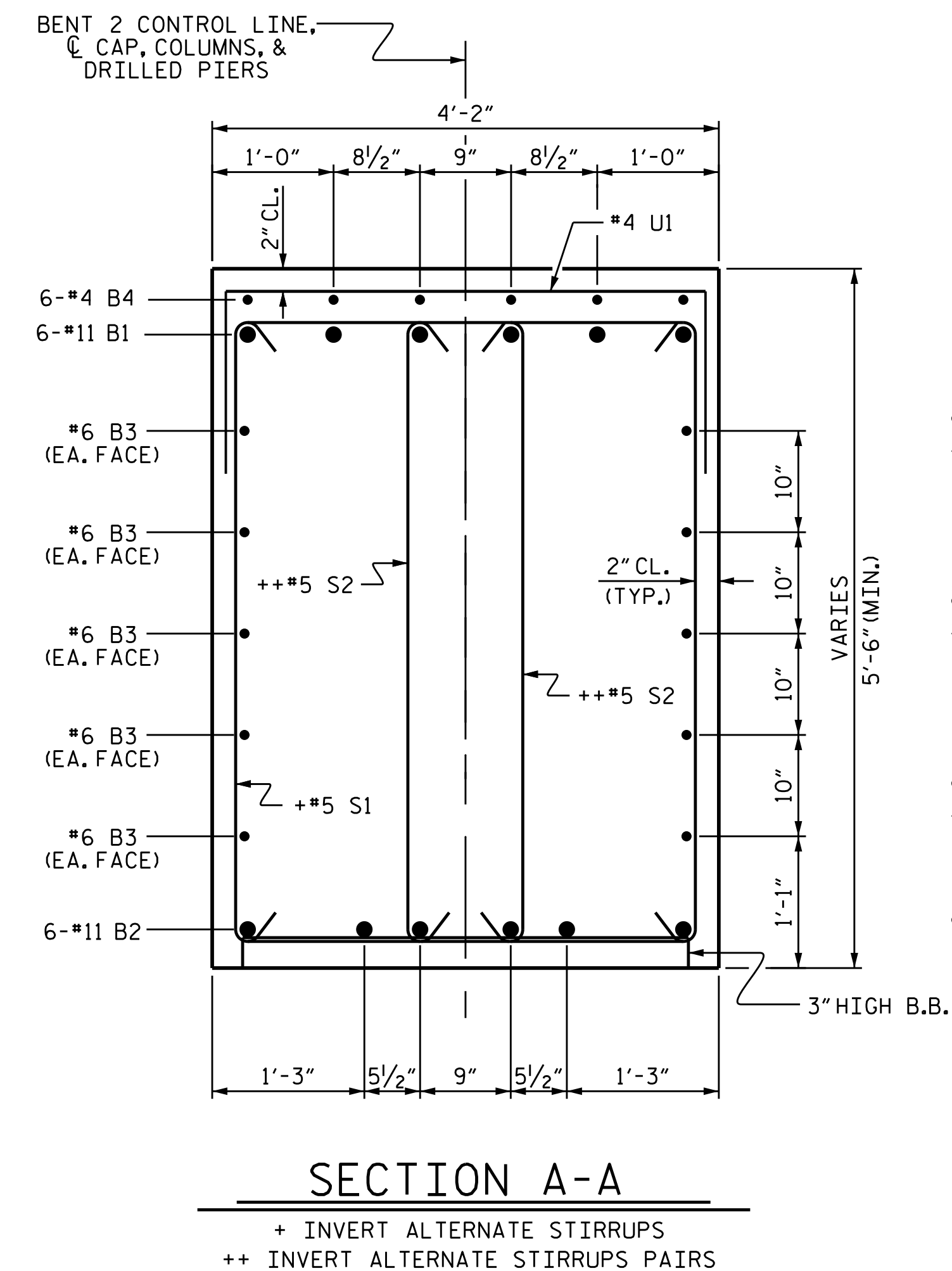
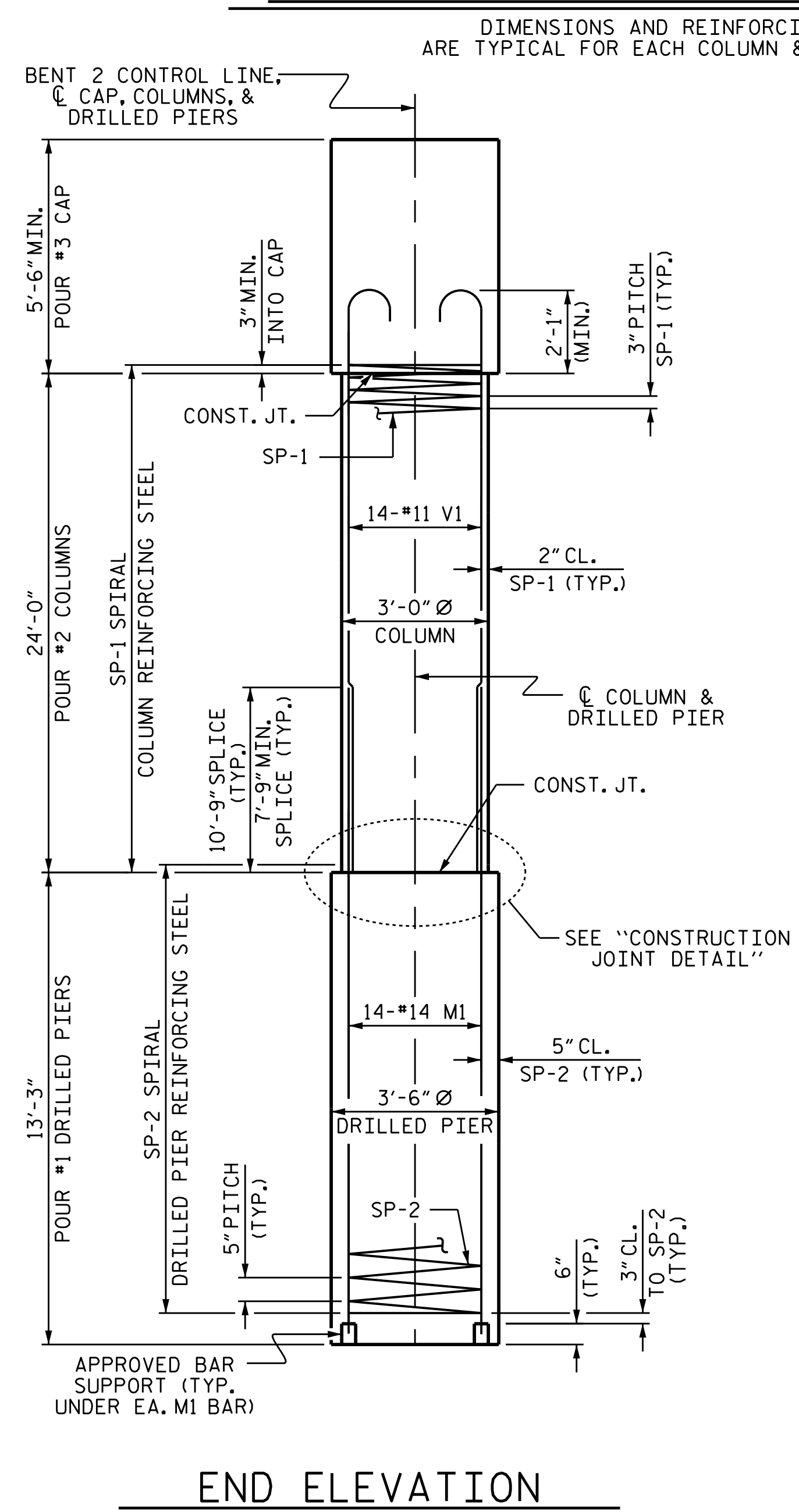
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DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			39



BILL OF MATERIAL					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#11	1	36'-3"	1156
B2	6	#11	STR	33'-3"	1060
B3	10	#6	STR	33'-3"	499
B4	6	#4	STR	23'-5"	94
M1	28	#14	STR	23'-9"	5087
S1	7	#5	2	15'-0"	110
S2	76	#5	2	13'-7"	1077
U1	42	#4	3	6'-10"	192
U2	4	#4	3	8'-1"	22
U3	4	#4	3	8'-3"	22
U4	8	#4	3	6'-8"	36
V1	28	#11	4	27'-8"	4116
REINFORCING STEEL					LBS. 13099
SP-1	2	*	5	812'-9"	1086
SP-2	2	**	6	265'-3"	553
SPIRAL COLUMN REINFORCING STEEL					LBS. 1639
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.					
** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.					
CLASS A CONCRETE					
POUR #3 (CAP)				C.Y.	29.5
POUR #2 (COLUMNS)				C.Y.	12.6
TOTAL CLASS A CONCRETE				C.Y.	42.1
DRILLED PIER QUANTITIES					
DRILLED PIER CONCRETE					
POUR #1 (DRILLED PIERS)				C.Y.	9.3
3'-6" Ø DRILLED PIERS IN SOIL				LIN. FT.	12.50
3'-6" Ø DRILLED PIERS NOT IN SOIL				LIN. FT.	14.00
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER				LIN. FT.	12.00
CSL TUBES				LIN. FT.	118



PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 BENT 2

DESIGNED BY: *Amber M. Lee*
 SEAL 031021
 ENGINEER
 AMBER M. LEE

DRAWN BY: M.G. SHAIKH DATE: 08/2018
 CHECKED BY: H.A. LOCKLEAR DATE: 09/2018
 DESIGN ENGINEER OF RECORD: H.A. LOCKLEAR DATE: 09/2018

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			39

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

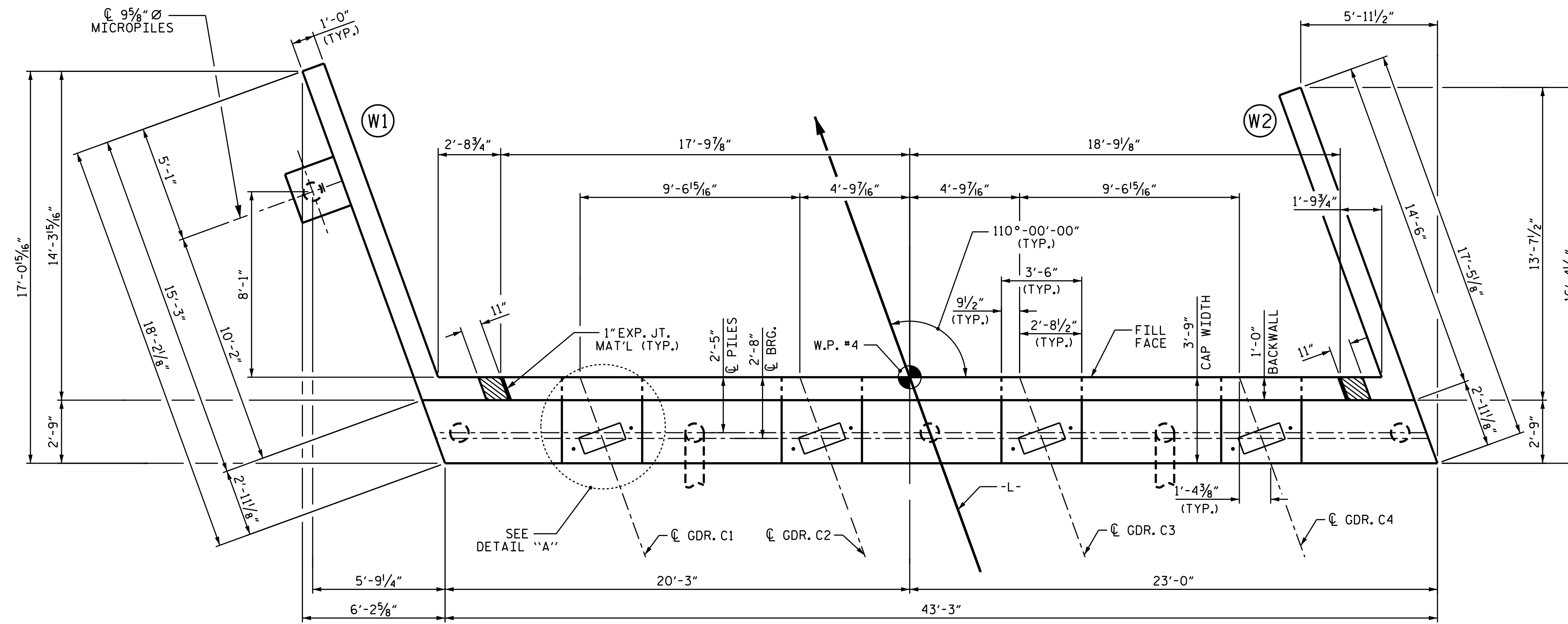
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREA OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

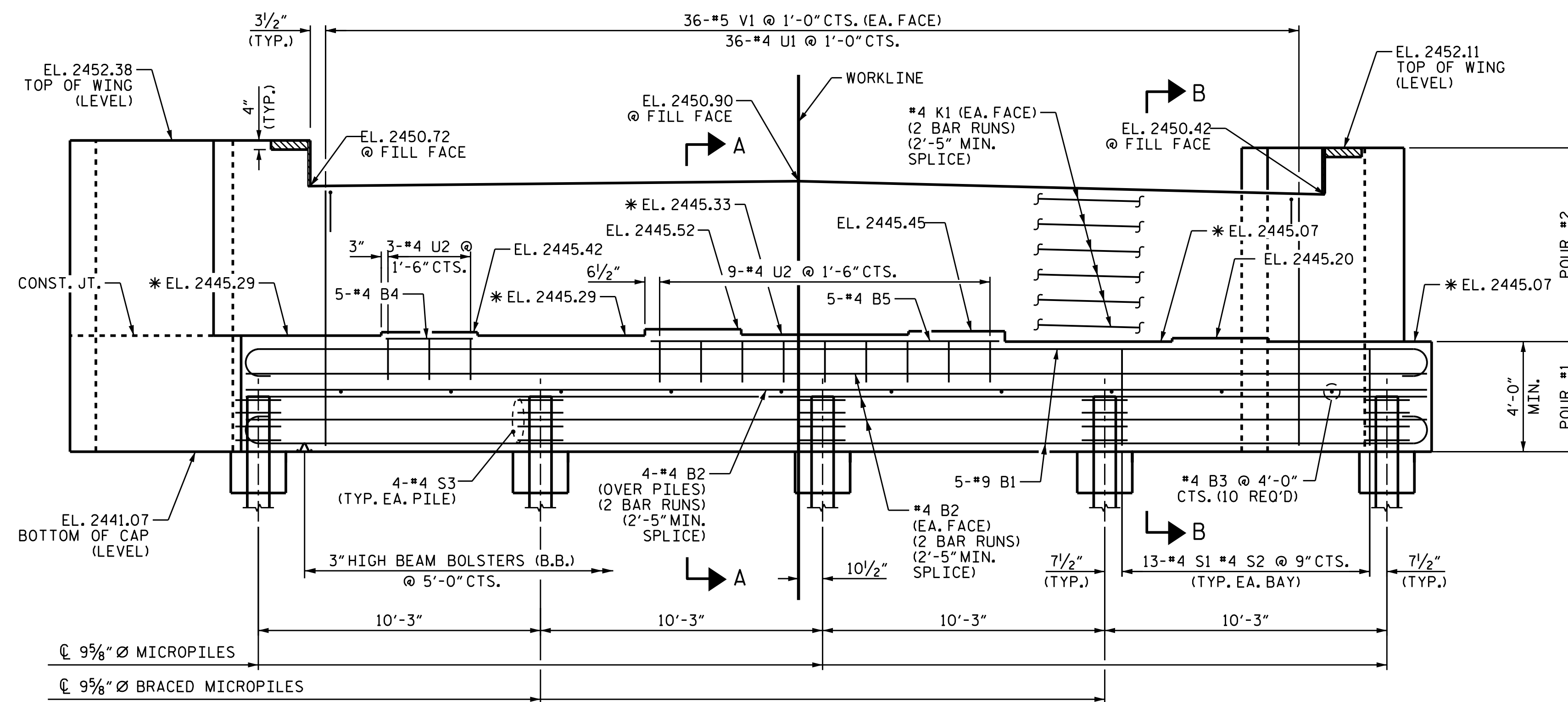
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE PARAPET AND END POST ARE CAST IF SLIP FORMING IS USED.

FOR MICROPILES, SEE GEOTECHNICAL SPECIAL PROVISIONS.



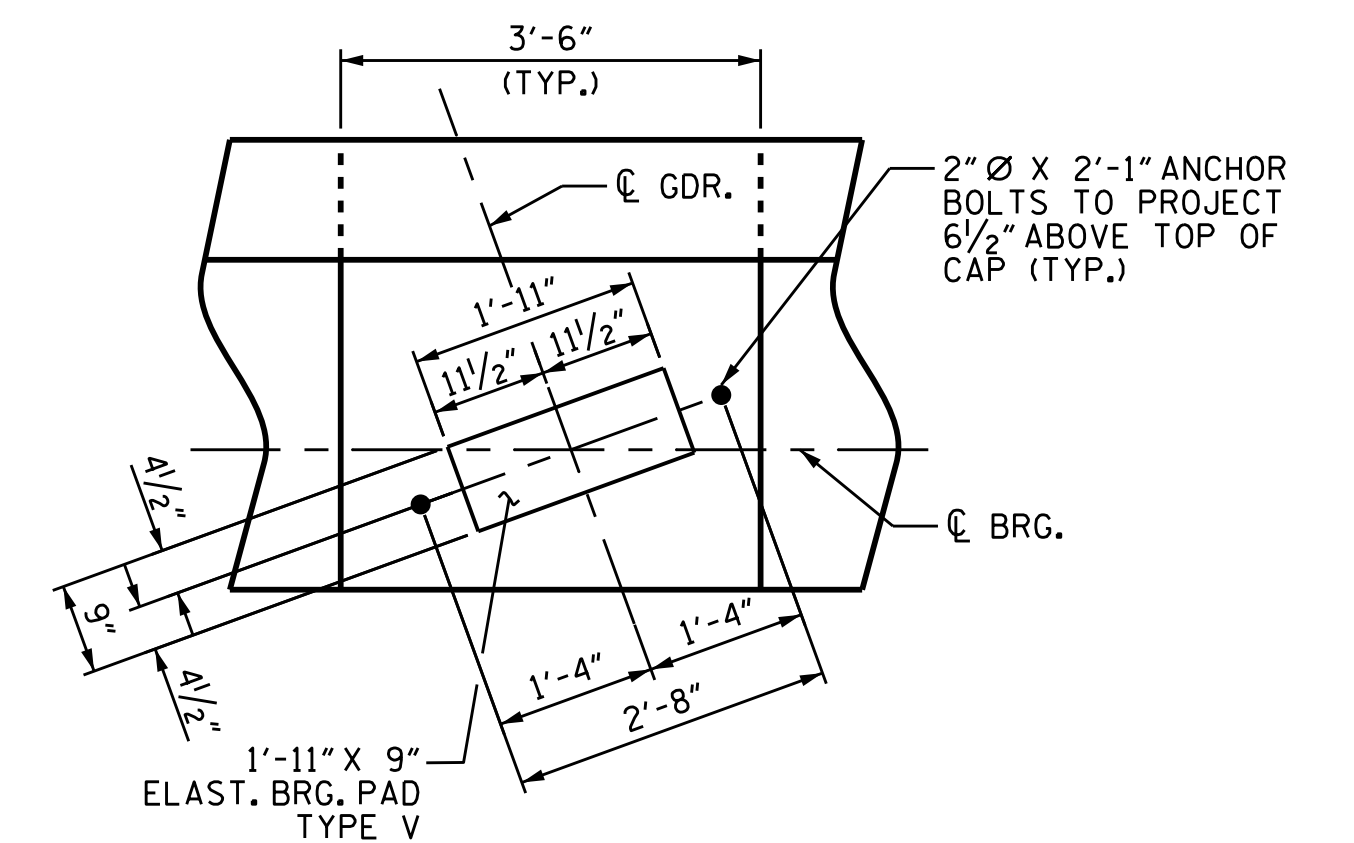
PLAN



ELEVATION

(FOR CLARITY BRACE PILE IN WING NOT SHOWN)

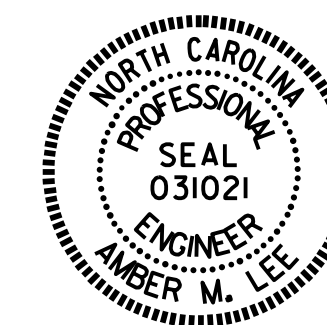
* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE SECTION A-A & B-B, SHEET 3 OF 3.



DETAIL "A"

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 1 OF 3



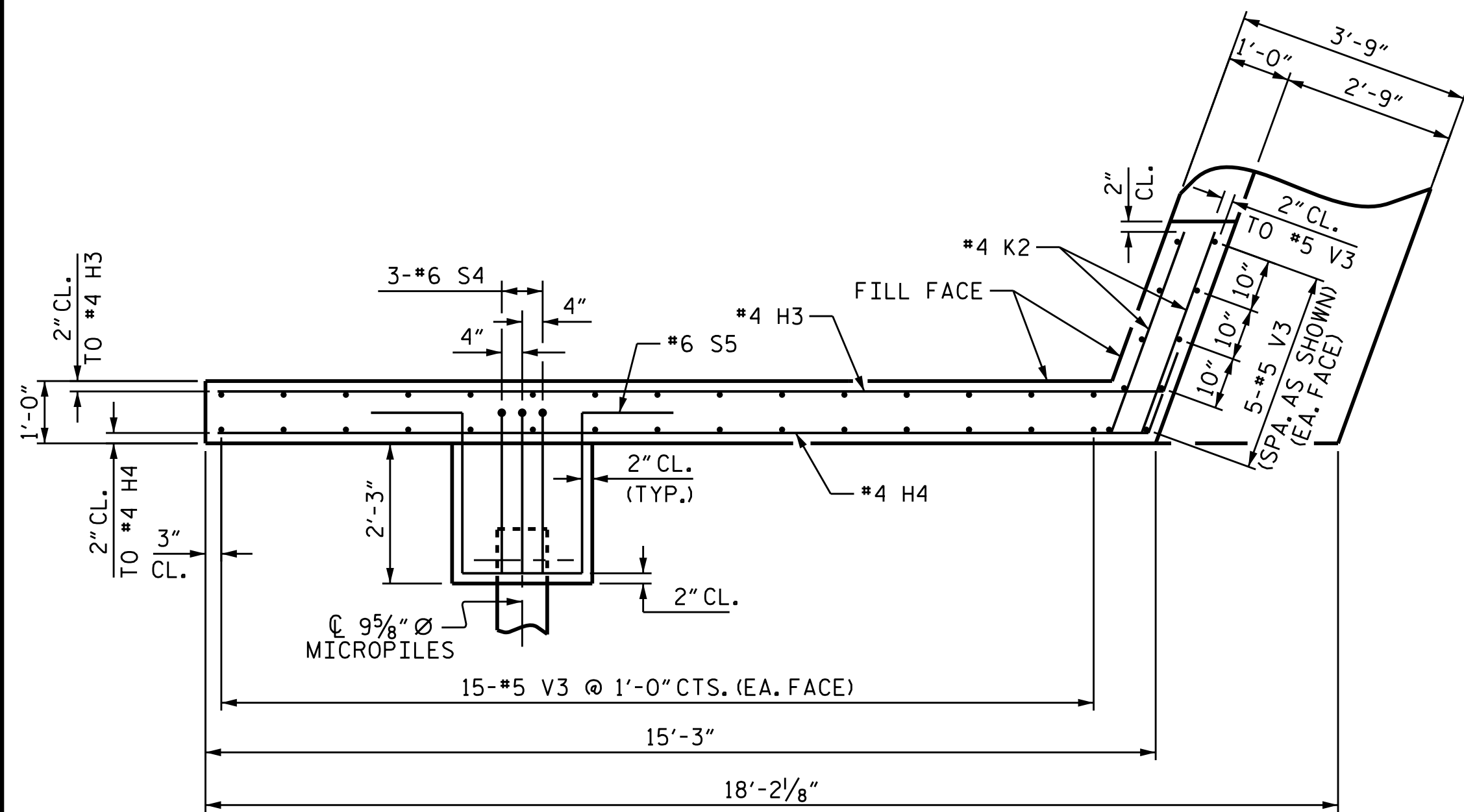
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END BENT 2

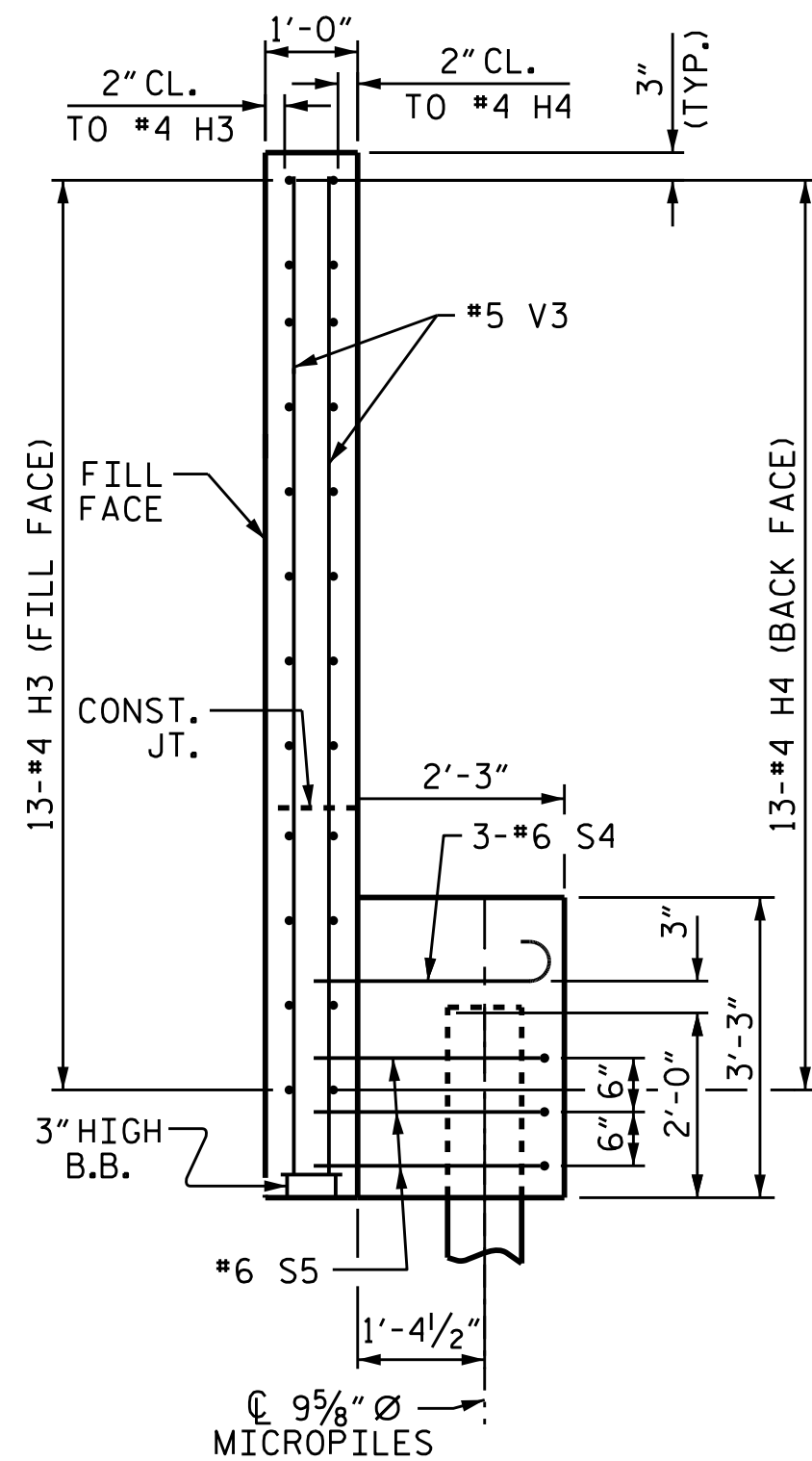
DRAWN BY : M. G. SHAIKH DATE : 09/2018
 CHECKED BY : H. A. LOCKLEAR DATE : 09/2018
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE : 09/2018

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

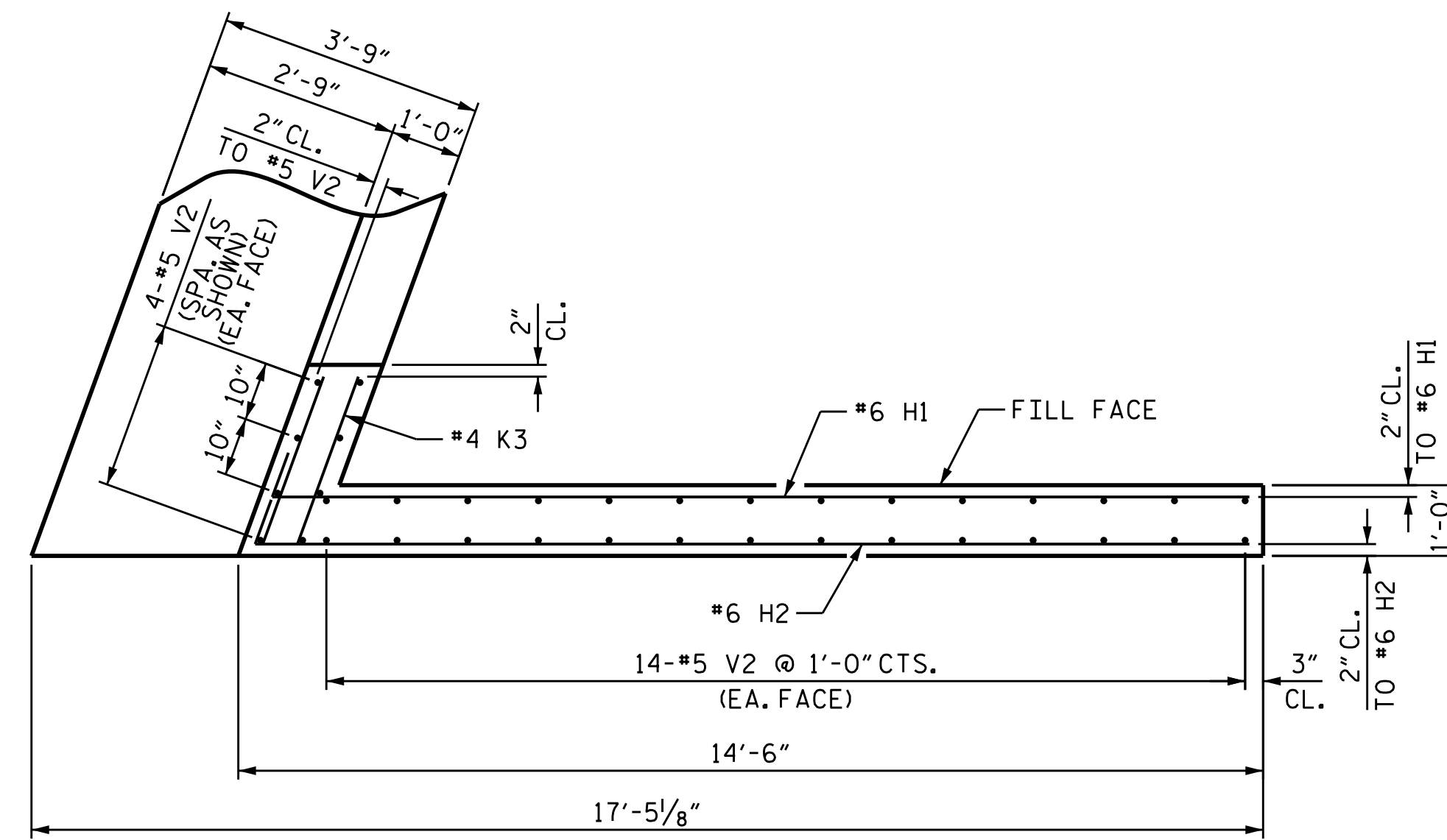
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			39



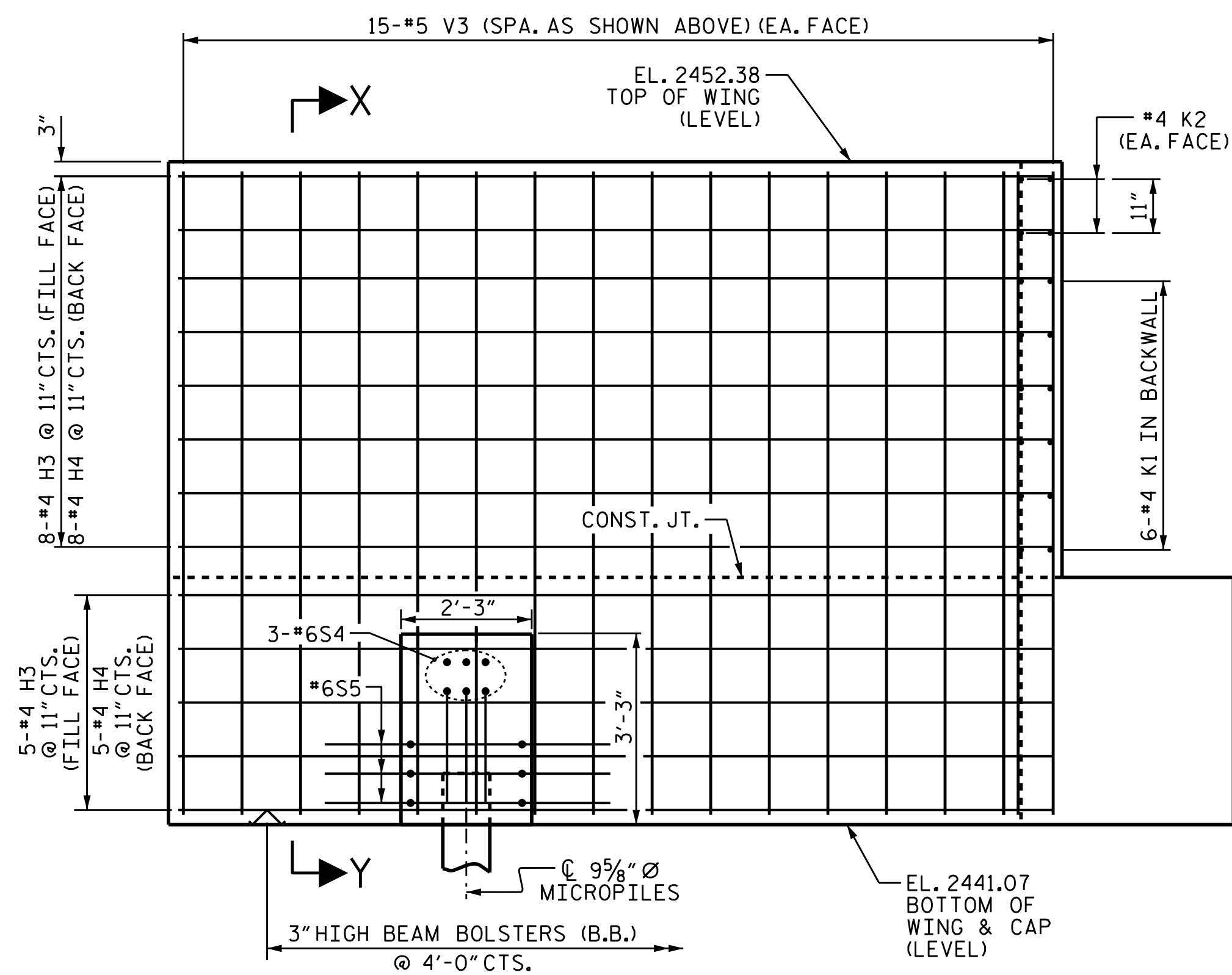
PLAN OF LEFT WING - W1



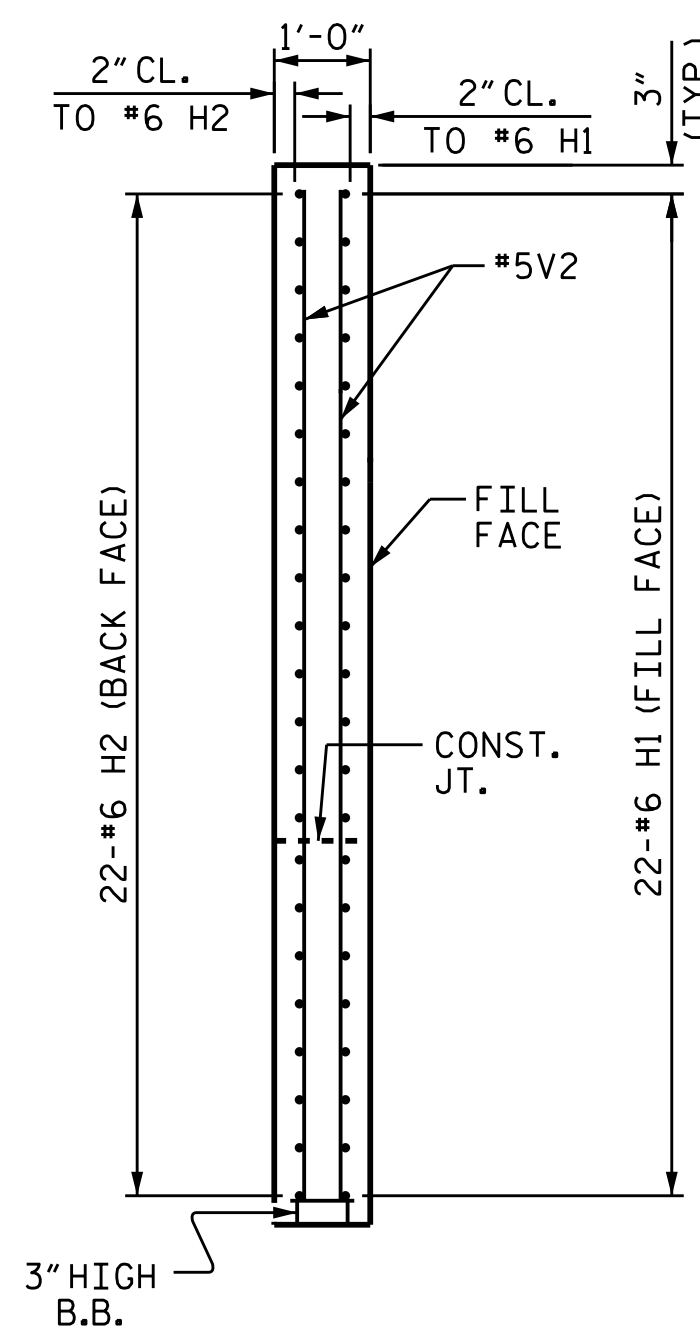
SECTION X-X



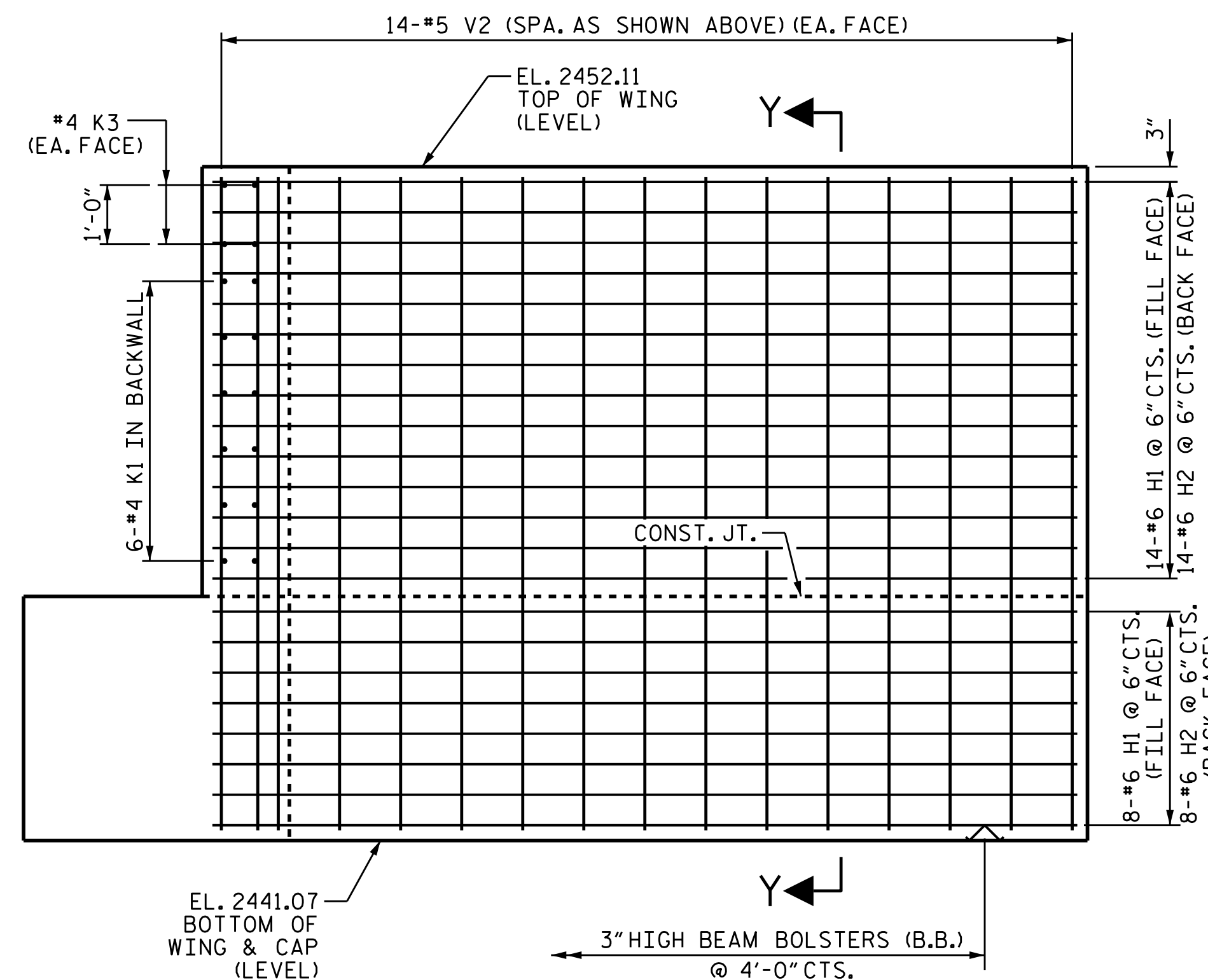
PLAN OF RIGHT WING - W2



ELEVATION OF LEFT WING - W1



SECTION Y-Y



ELEVATION OF RIGHT WING - W2

PROJECT NO. B-5388
 ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END BENT 2

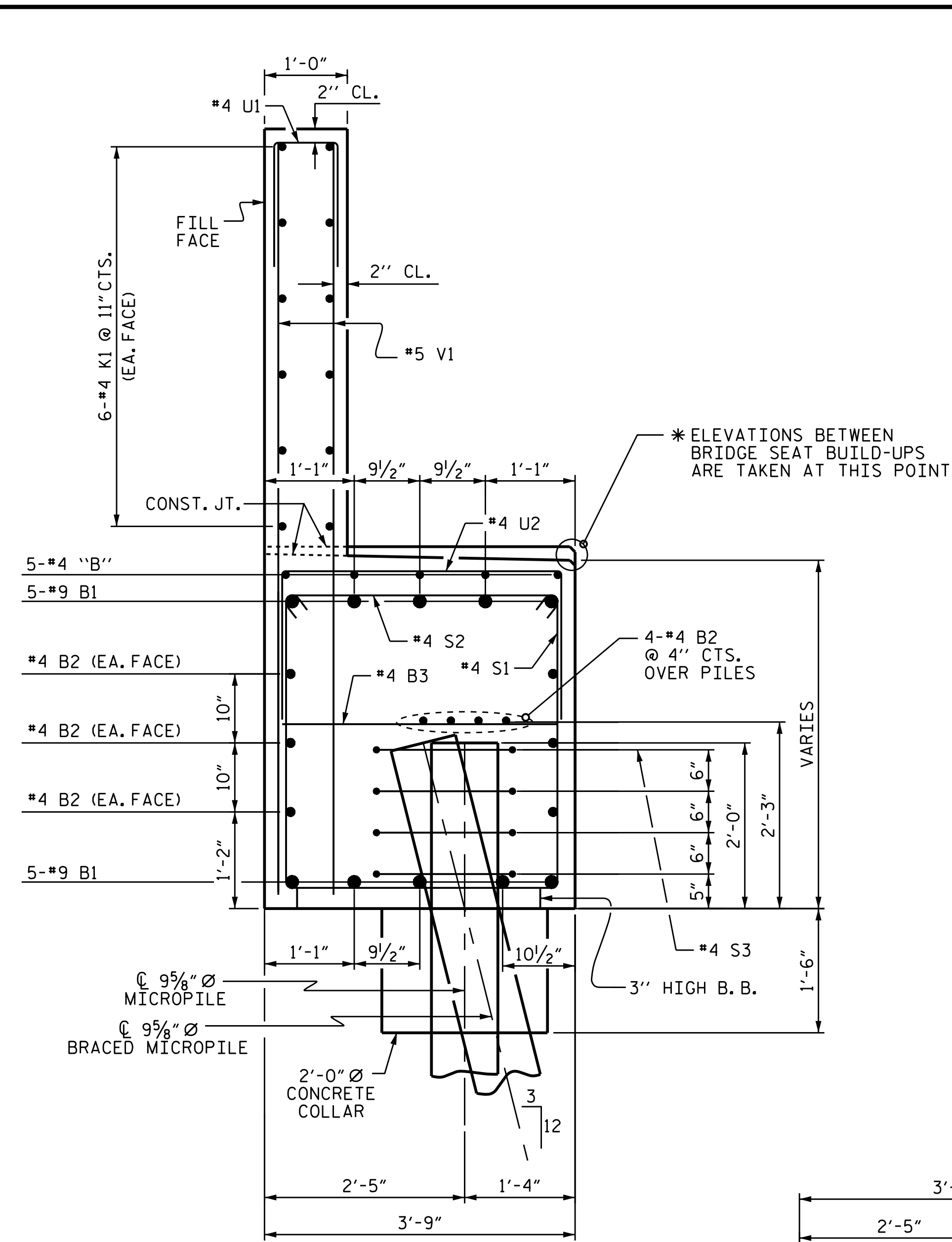


DocuSigned by:
 Amber M. Lee
 B04B5A8F2FAD484
 11/1/2018

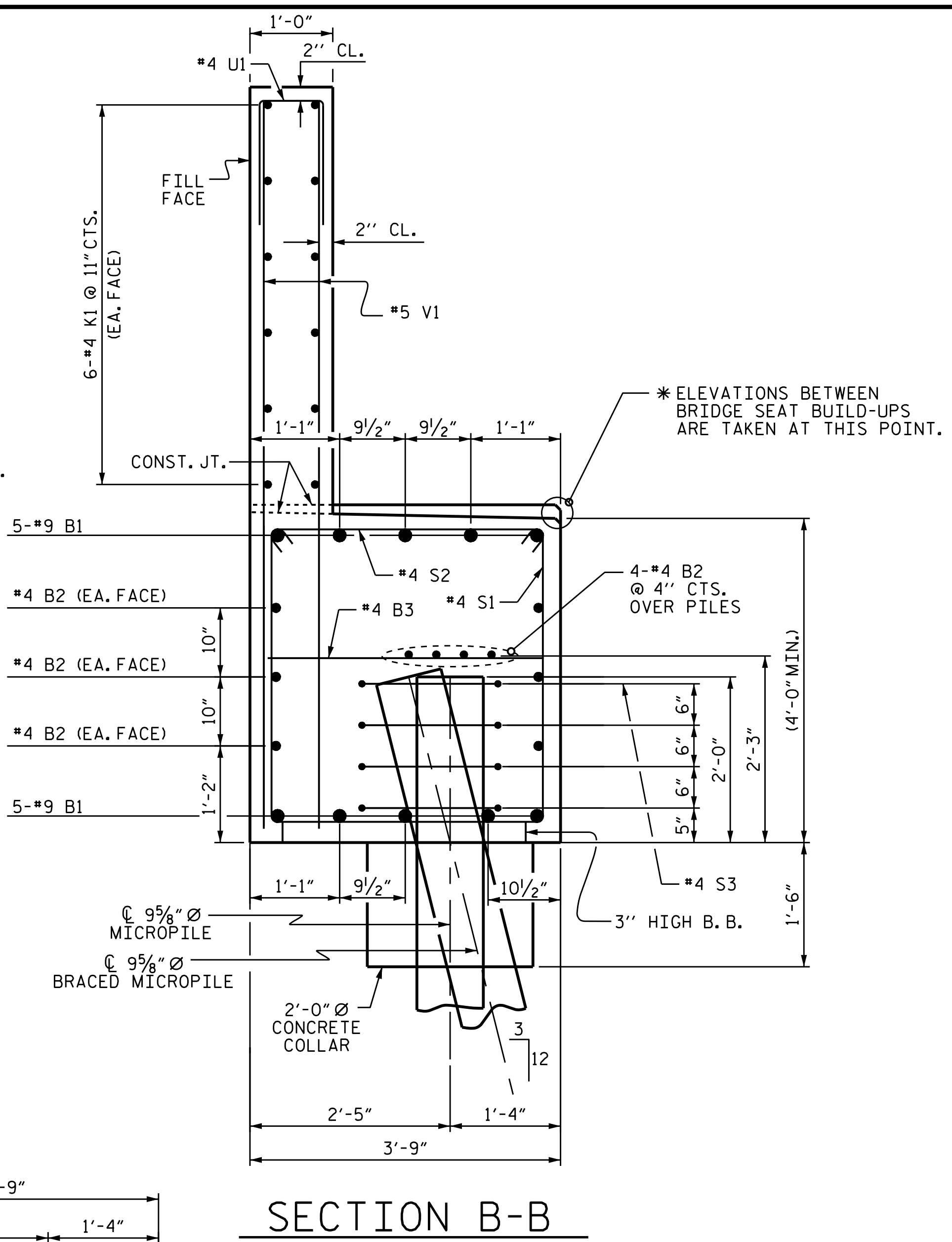
DRAWN BY: M. G. SHAIKH DATE: 09/2018
 CHECKED BY: H. A. LOCKLEAR DATE: 09/2018
 DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE: 09/2018

DOCUMENT NOT CONSIDERED
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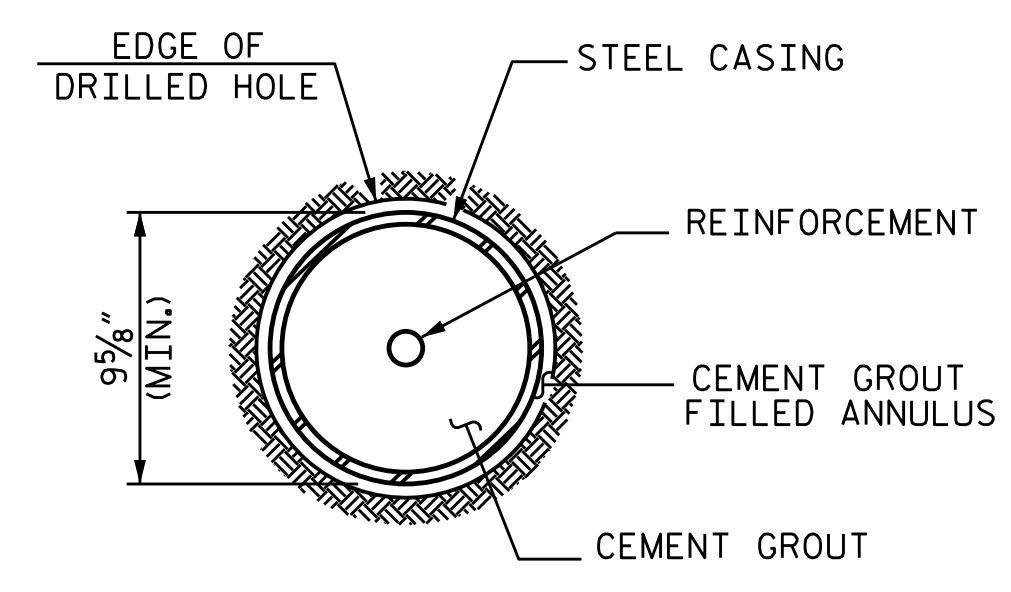
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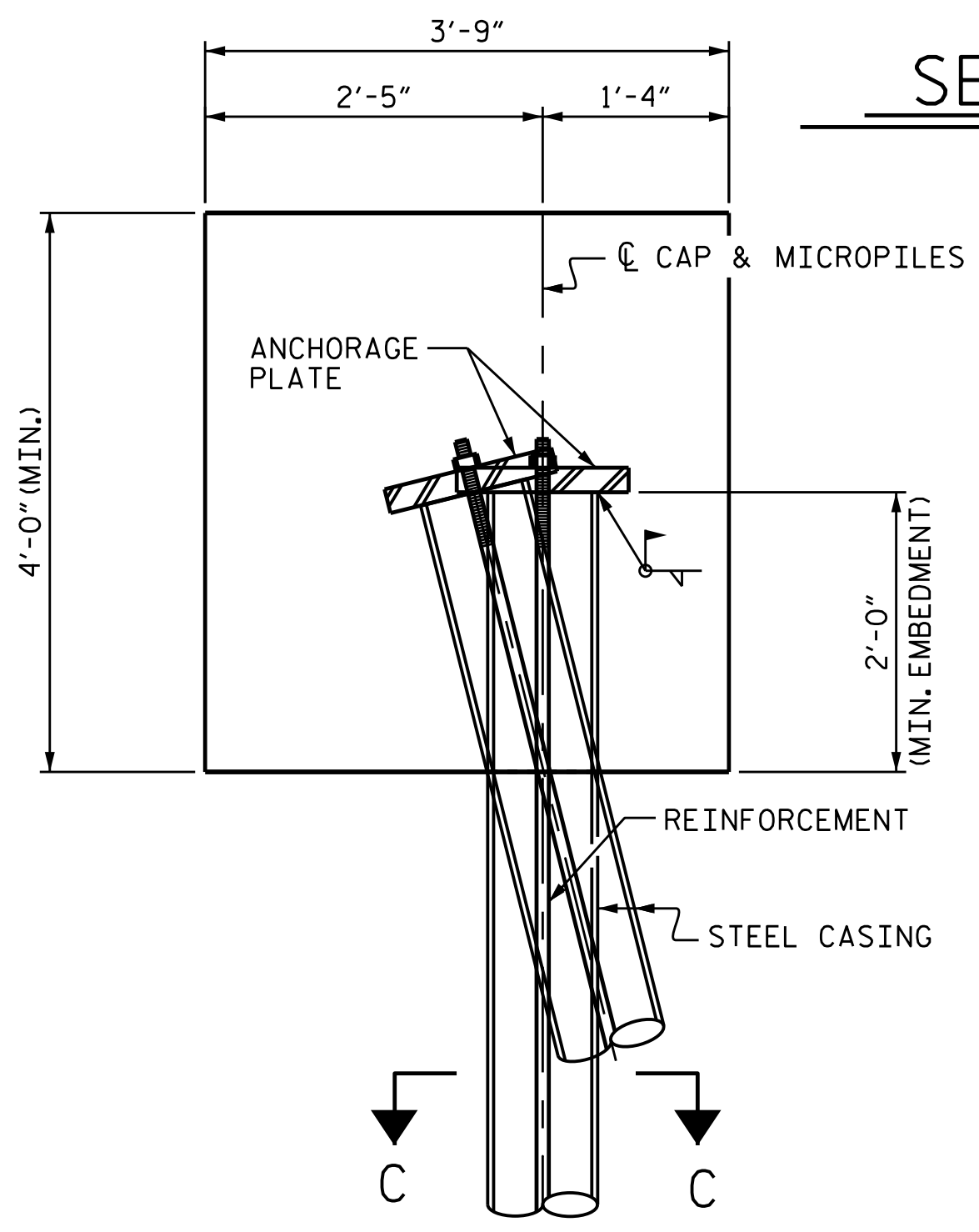
SECTION A-A



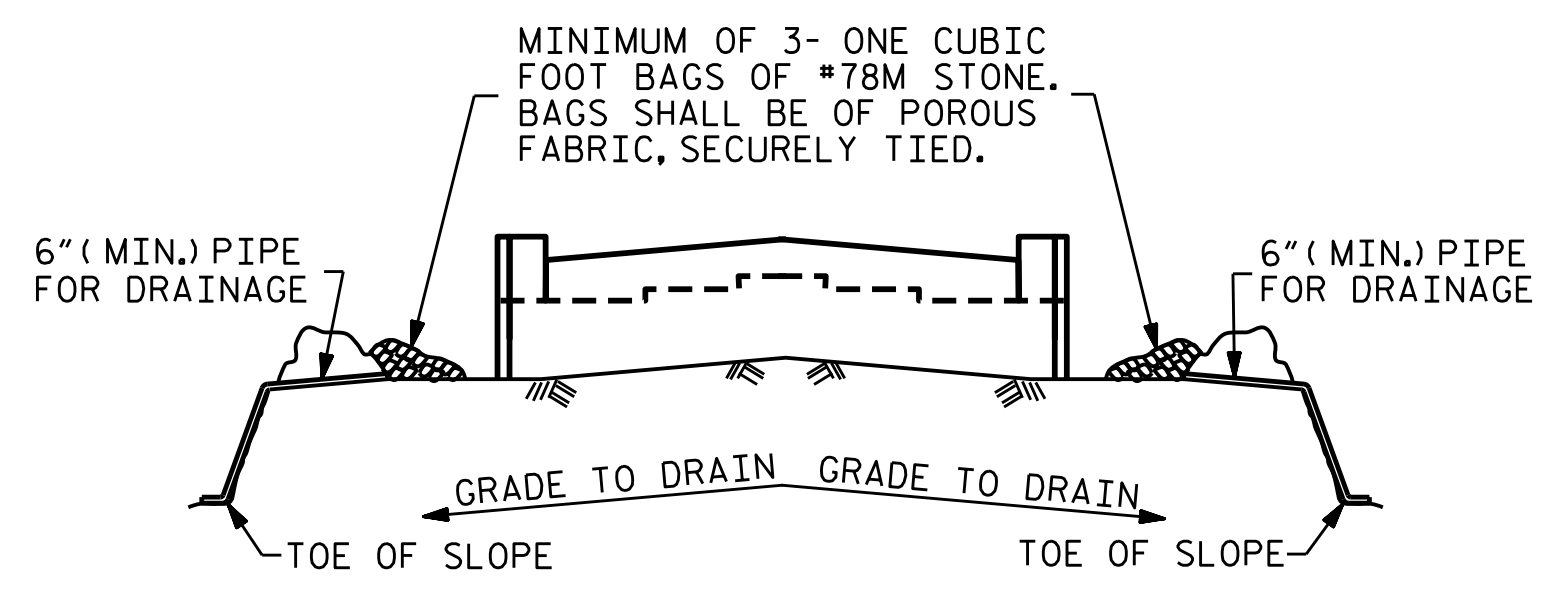
SECTION B-B



SECTION C-C



MICROPILE DETAIL
(TYP. EACH MICROPILE)

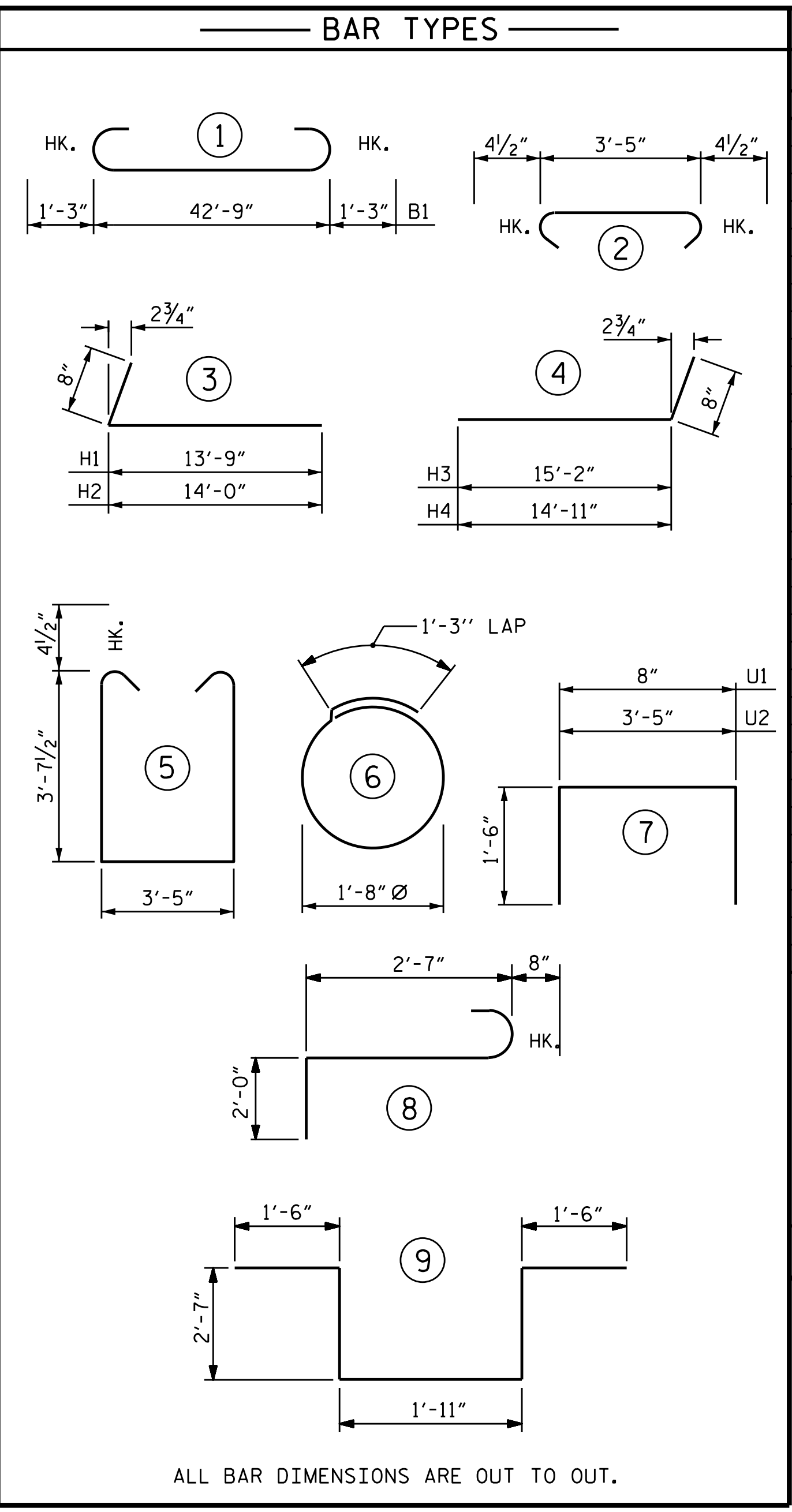


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL					
END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9		45'-3"	1539
B2	20	#4	STR	22'-8"	303
B3	10	#4	STR	3'-5"	23
B4	5	#4	STR	3'-2"	11
B5	5	#4	STR	12'-8"	42
H1	22	#6		14'-5"	476
H2	22	#6		14'-8"	485
H3	13	#4		15'-10"	138
H4	13	#4		15'-7"	135
K1	24	#4	STR	22'-8"	363
K2	4	#4	STR	3'-5"	9
K3	4	#4	STR	2'-6"	7
S1	52	#4		11'-5"	397
S2	52	#4		4'-2"	145
S3	20	#4		6'-6"	87
S4	3	#6		5'-3"	24
S5	3	#6		10'-1"	45
U1	36	#4		3'-8"	88
U2	12	#4		6'-5"	51
V1	72	#5	STR	9'-0"	676
V2	36	#5	STR	10'-8"	401
V3	40	#5	STR	10'-11"	455
REINFORCING STEEL					5900 LBS.
CLASS A CONCRETE (CU. YDS.)					
POUR 1					
CAP, LOWER PART OF WING & COLLARS					30.9
POUR 2					
BACKWALL & UPPER PART OF WING					16.4
TOTAL					47.3
9 5/8" Ø MICROPILES NO. 6					168.5 LIN. FT.

PROJECT NO. B-5388
ALLEGHANY COUNTY
STATION: 19+78.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 2

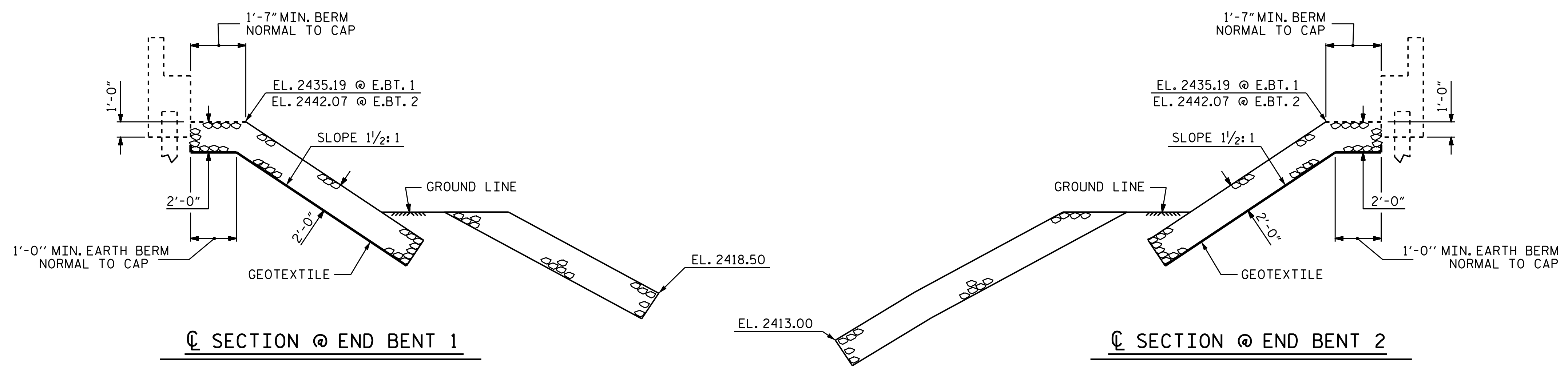
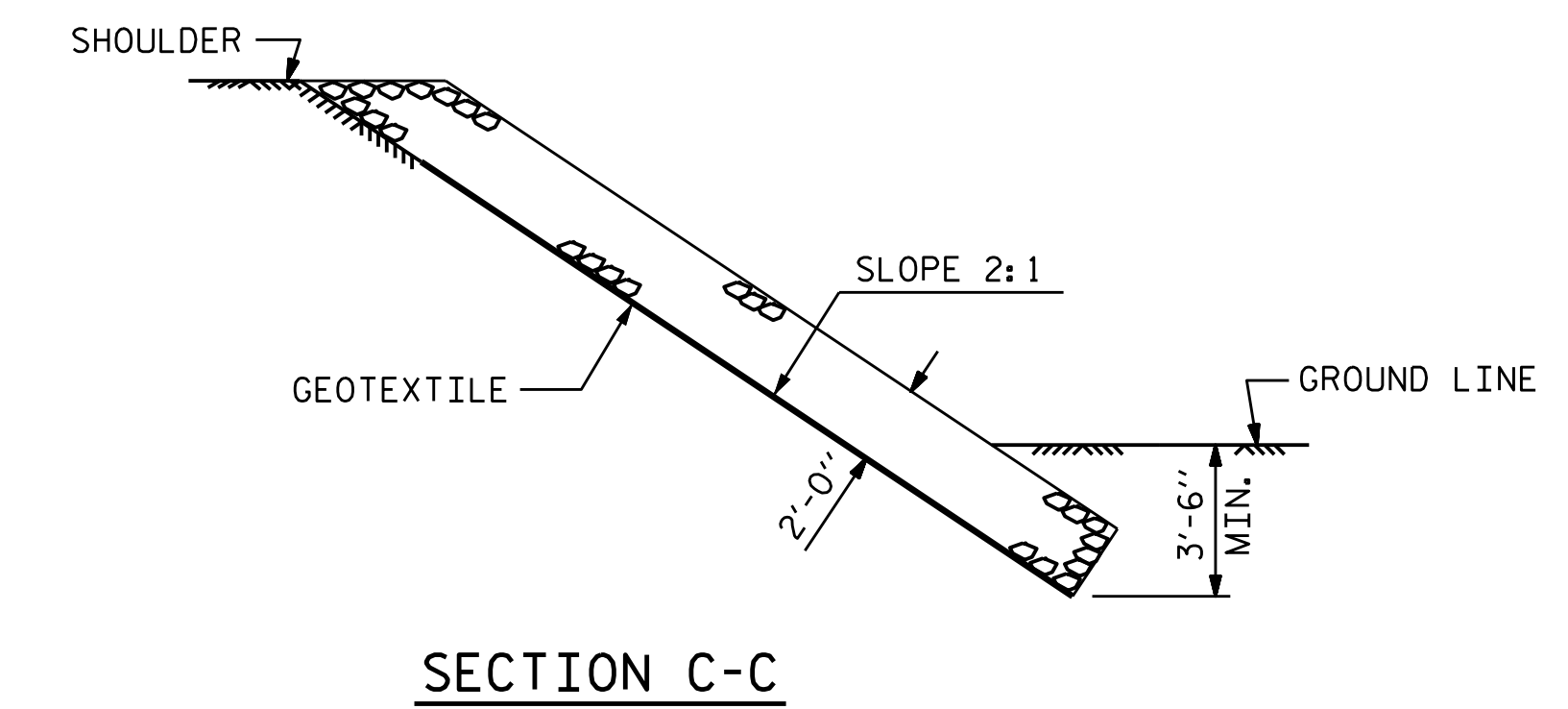
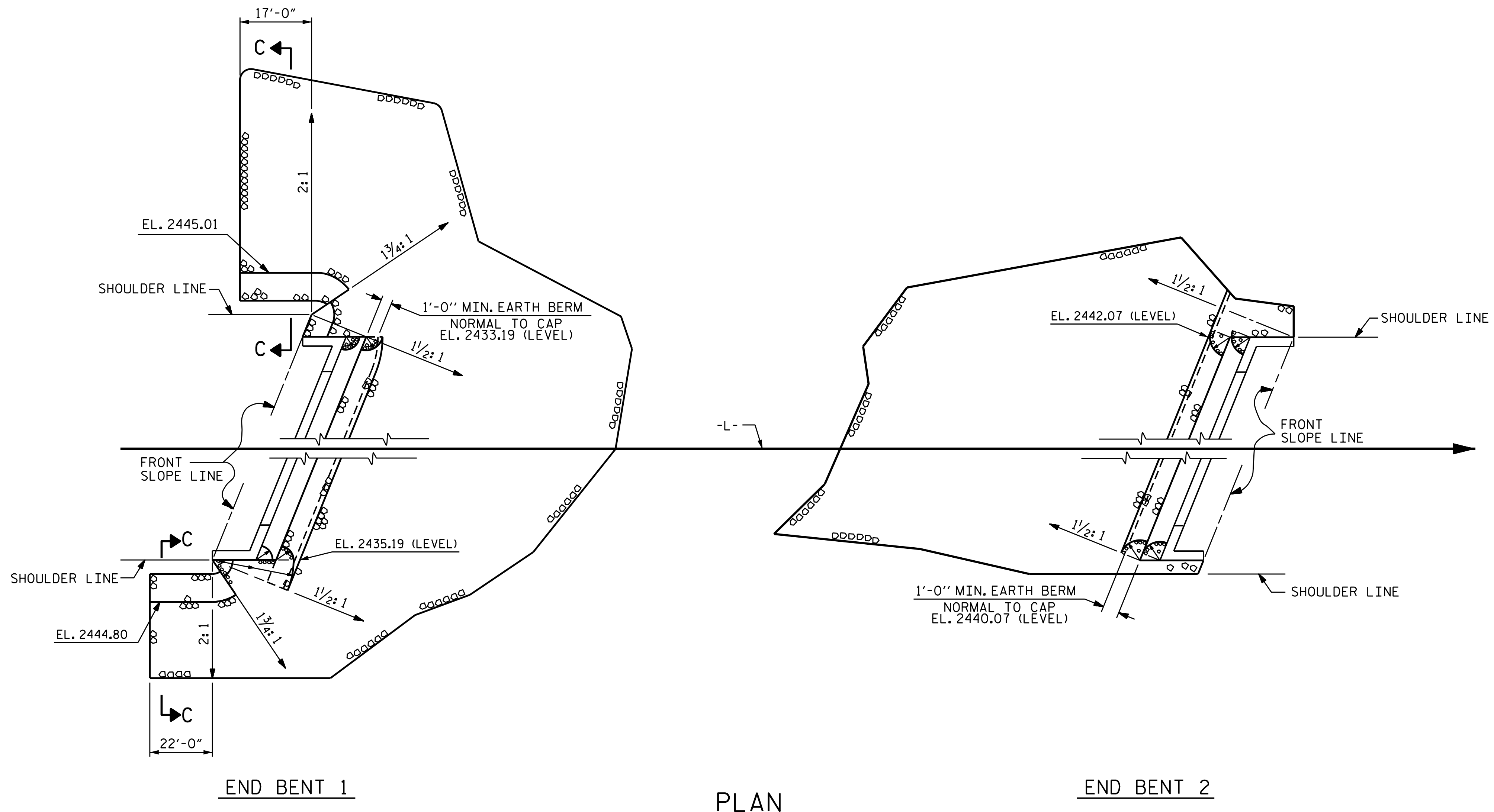


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NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
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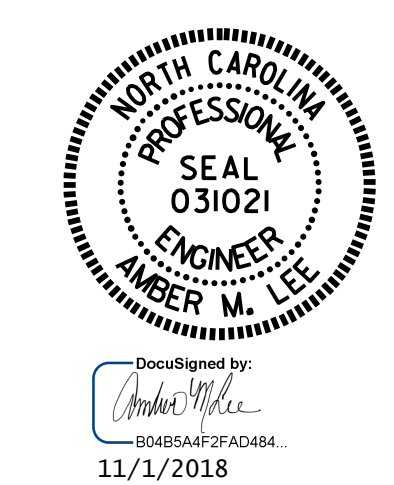
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY: M. G. SHAIKH DATE: 09/2018
CHECKED BY: H. A. LOCKLEAR DATE: 09/2018
DESIGN ENGINEER OF RECORD: H. A. LOCKLEAR DATE: 09/2018

ESTIMATED QUANTITIES		
BRIDGE @ STA. 19+78.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	908	1010
END BENT 2	1230	1365



PROJECT NO. B-5388
ALLEGHANY COUNTY
STATION: 19+78.50 -L-



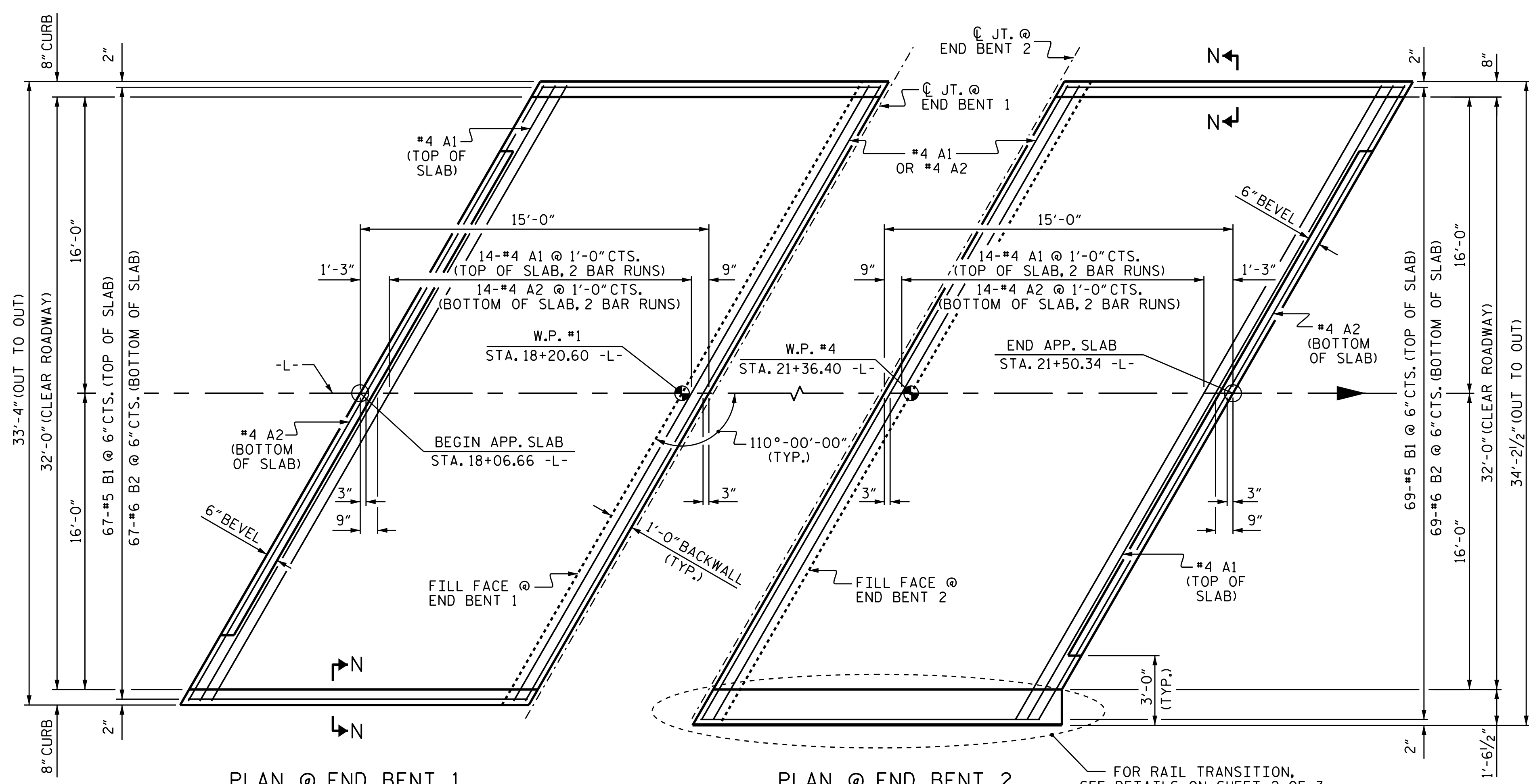
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

ASSEMBLED BY :	A. SORSENGINH	DATE :	9/2018
CHECKED BY :	M. G. SHAIKH	DATE :	9/2018
DRAWN BY :	REK 1/84	REV. 5/1/06R	TLA/GM
CHECKED BY :	RDU 1/84	REV. 10/1/11	MAA/GM
		REV. 12/21/11	MAA/GM

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED

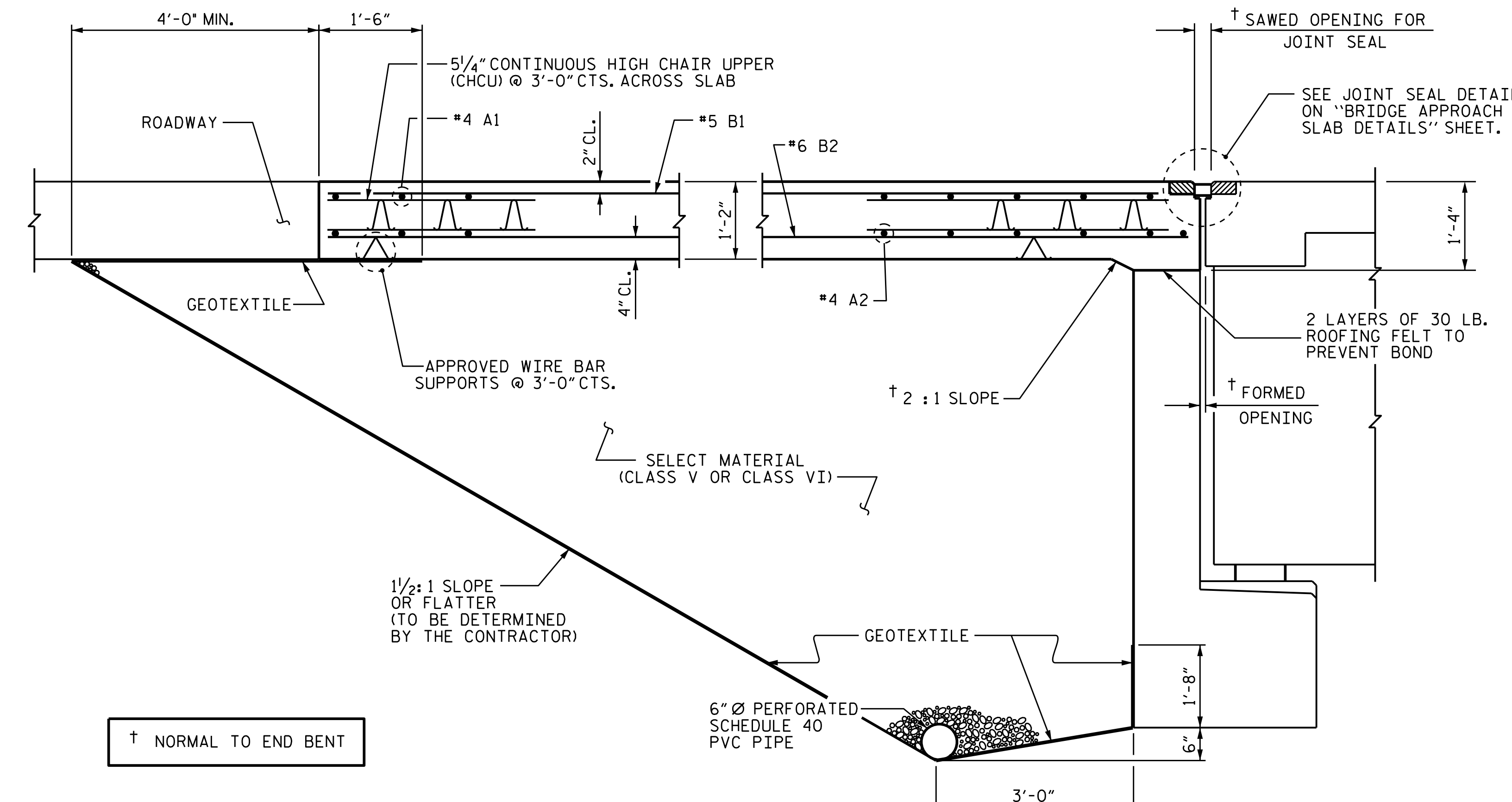
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			39



PLAN @ END BENT 1

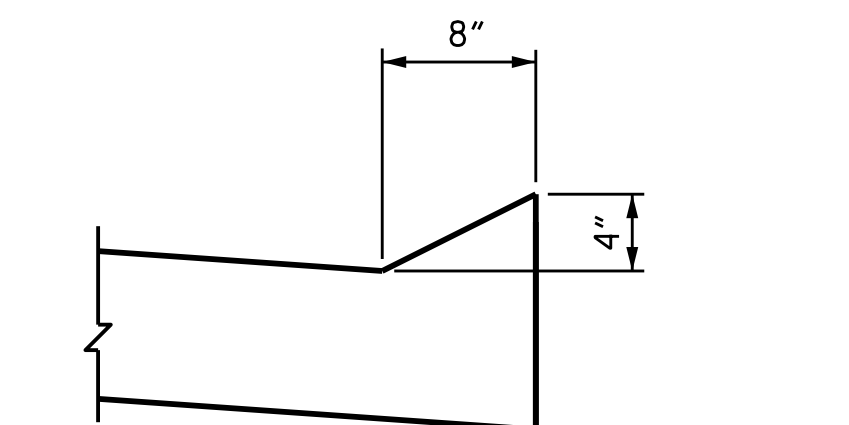
PLAN @ END BENT 2

FOR RAIL TRANSITION, SEE DETAILS ON SHEET 2 OF 3.

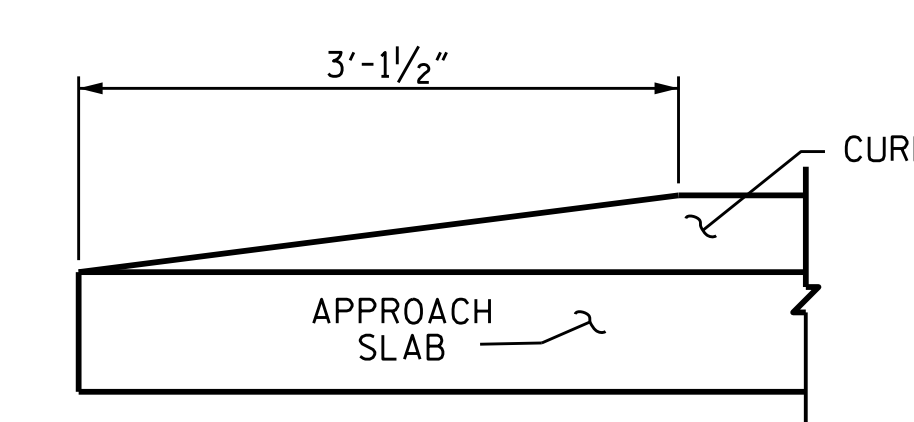


SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

- FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.
- GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- THE JOINT SHALL BE SAWS PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.
- FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- 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.
- THE #5 S1 & #5 S2 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S7 BARS IS 18.6 KIPS, FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
- WITH FOAM JOINT SEAL
- FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.
- THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".
- FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL					
APPROACH SLAB AT BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	32	#4	STR	19'-1"	408
A2	32	#4	STR	18'-11"	404
*B1	67	#5	STR	14'-3"	996
B2	67	#6	STR	14'-8"	1476
REINFORCING STEEL					1880
* EPOXY COATED REINFORCING STEEL					LBS. 1404
CLASS AA CONCRETE					C. Y. 23.4
APPROACH SLAB AT BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	32	#4	STR	19'-1"	408
A2	32	#4	STR	18'-11"	404
*B1	69	#5	STR	14'-3"	1026
B2	69	#6	STR	14'-8"	1520
REINFORCING STEEL					LBS. 1924
* EPOXY COATED REINFORCING STEEL					LBS. 1434
CLASS AA CONCRETE					C. Y. 23.9

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

ASSEMBLED BY :	M. G. SHAIKH	DATE :	8/2018
CHECKED BY :	A. SORSENGH	DATE :	9/2018
DRAWN BY :	EEM 3/95	REV. 12/21/11	MAA/GM
CHECKED BY :	VAP 3/95	REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC

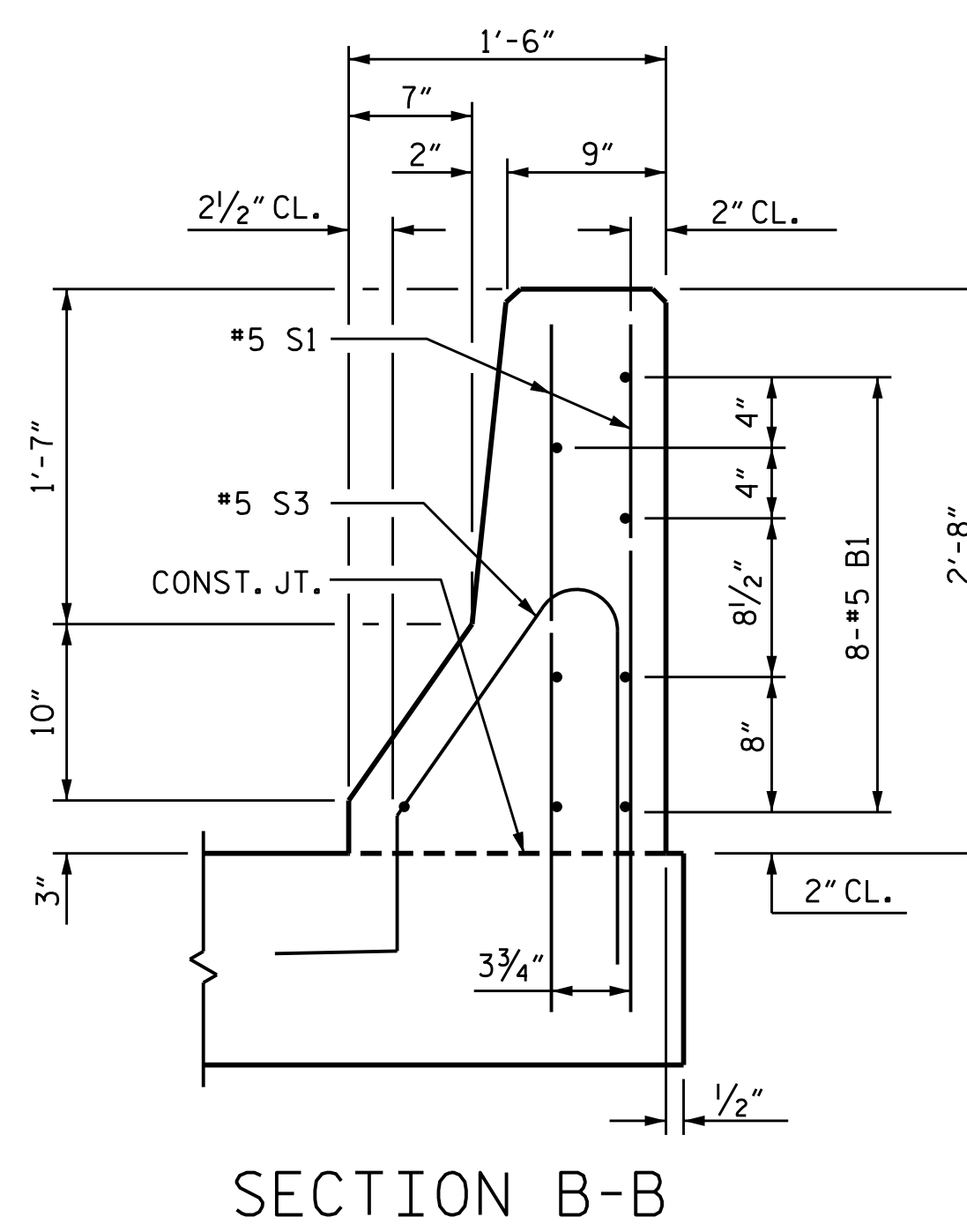
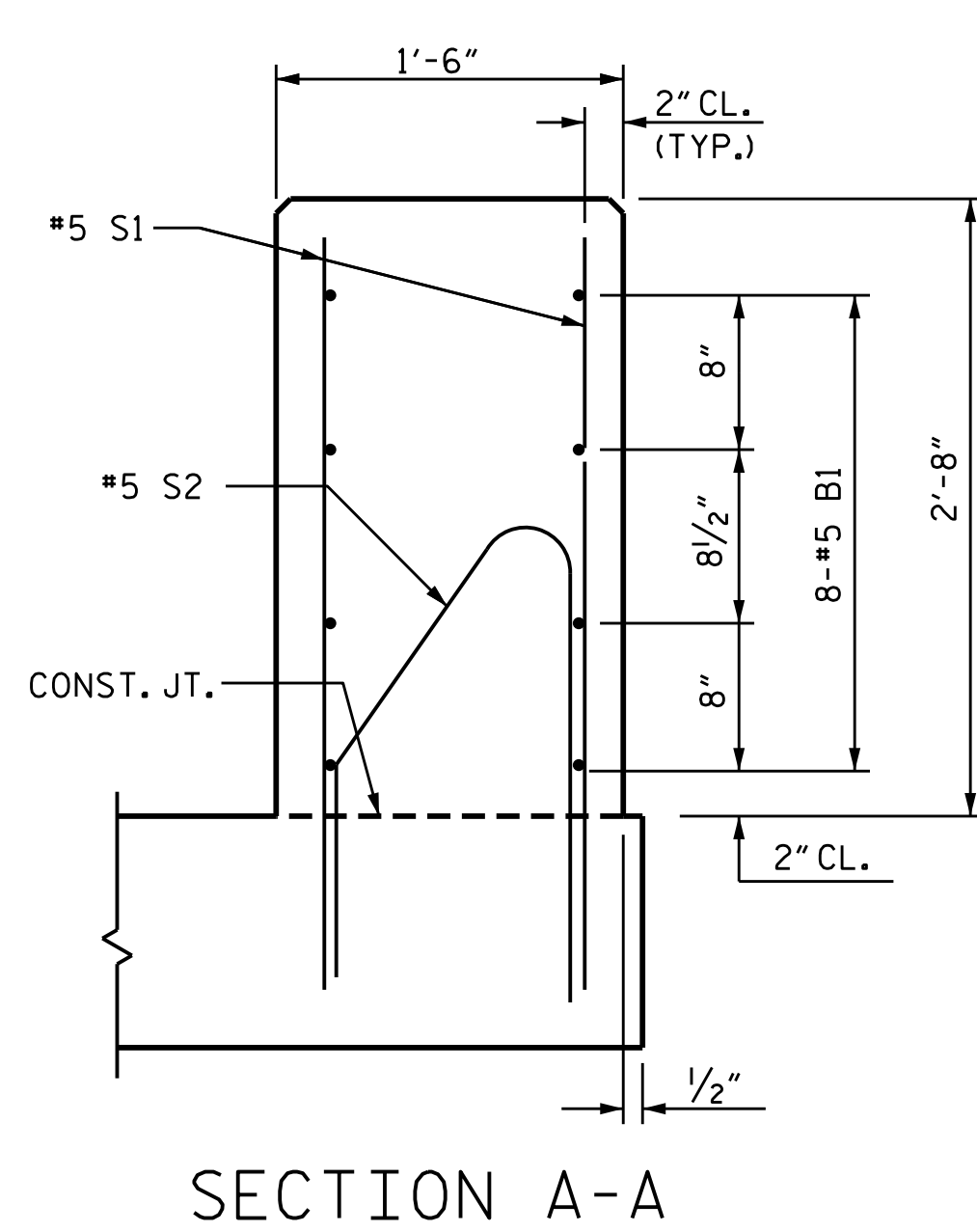
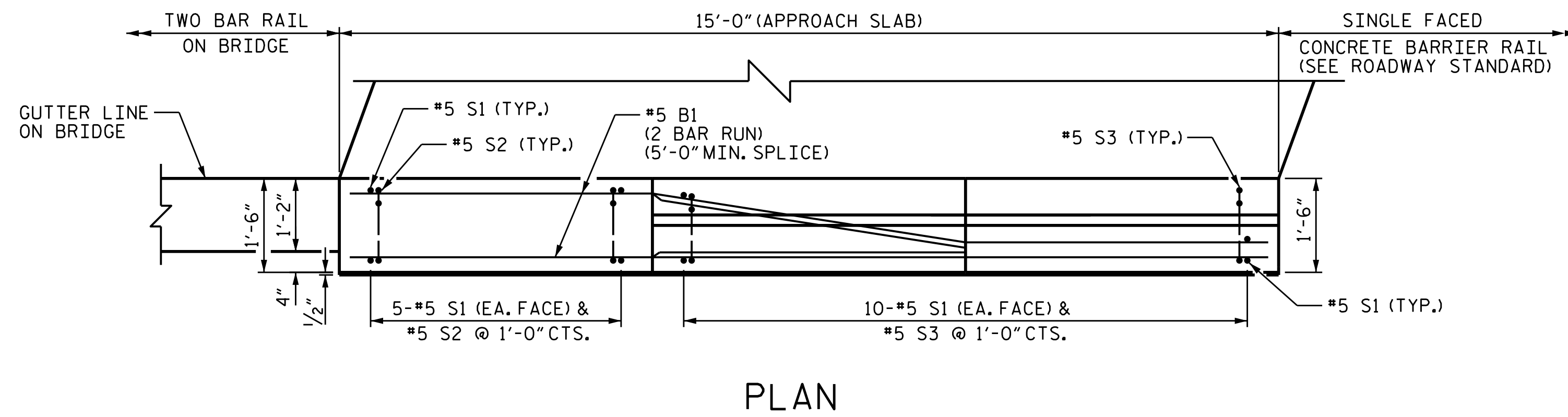
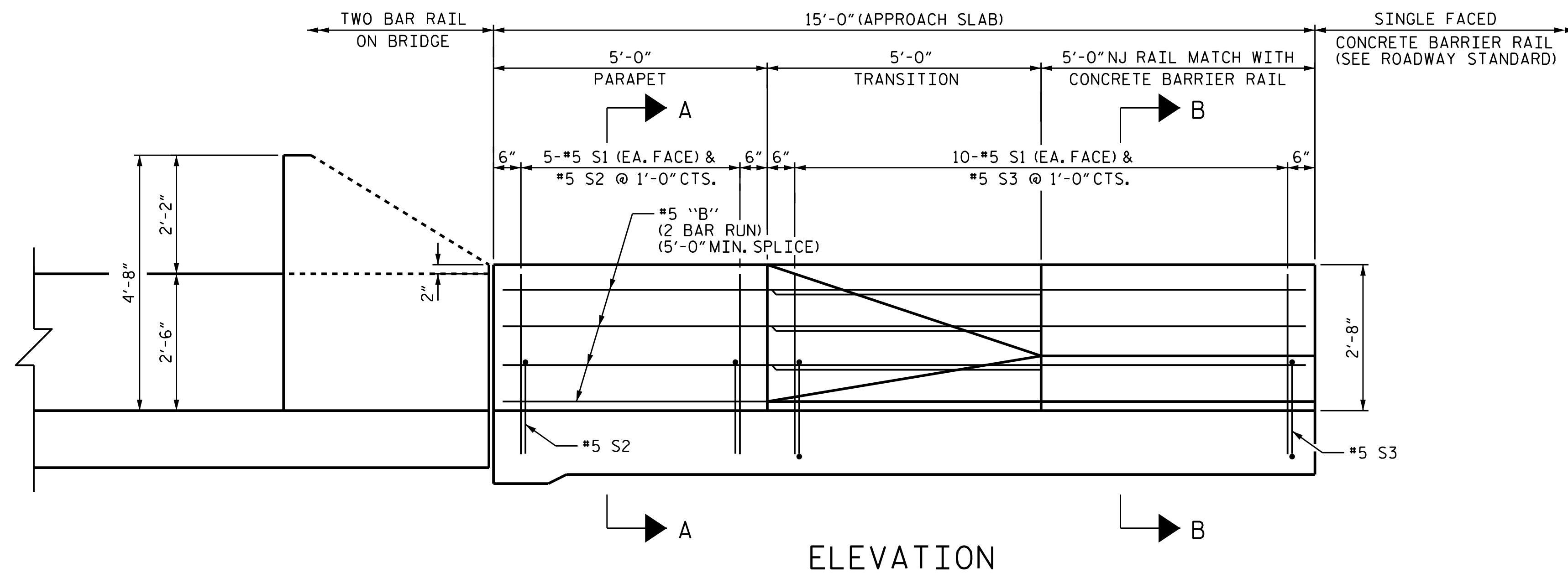
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			39



PROJECT NO. B-5388
 ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT

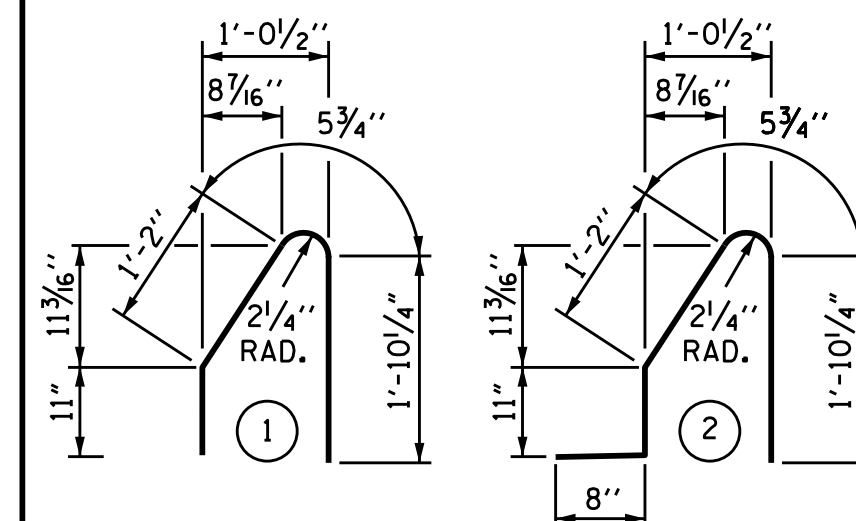
SHEET 1 OF 3



NOTES

THE COST OF THE APPROACH SLAB RAIL TRANSITION IS INCLUDED IN THE "1'-2" X 2'-6" CONCRETE PARAPET" PAY ITEM IN THE "TOTAL BILL OF MATERIAL."
 THE B1 BARS MAY BE FIELD BENT TO CONSTRUCT THE APPROACH SLAB RAIL TRANSITION.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	16	#5	STR	9'-10"	164
* S1	30	#5	STR	3'-3"	102
* S2	5	#5	1	4'-5"	23
* S3	10	#5	2	5'-1"	53
				* EPOXY COATED REINFORCING STEEL	342 LBS.
				CLASS AA CONCRETE	1.9 CU. YDS.

PROJECT NO. B-5388
ALLEGHANY COUNTY
 STATION: 19+78.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**APPROACH SLAB
 RAIL TRANSITION
 DETAILS**

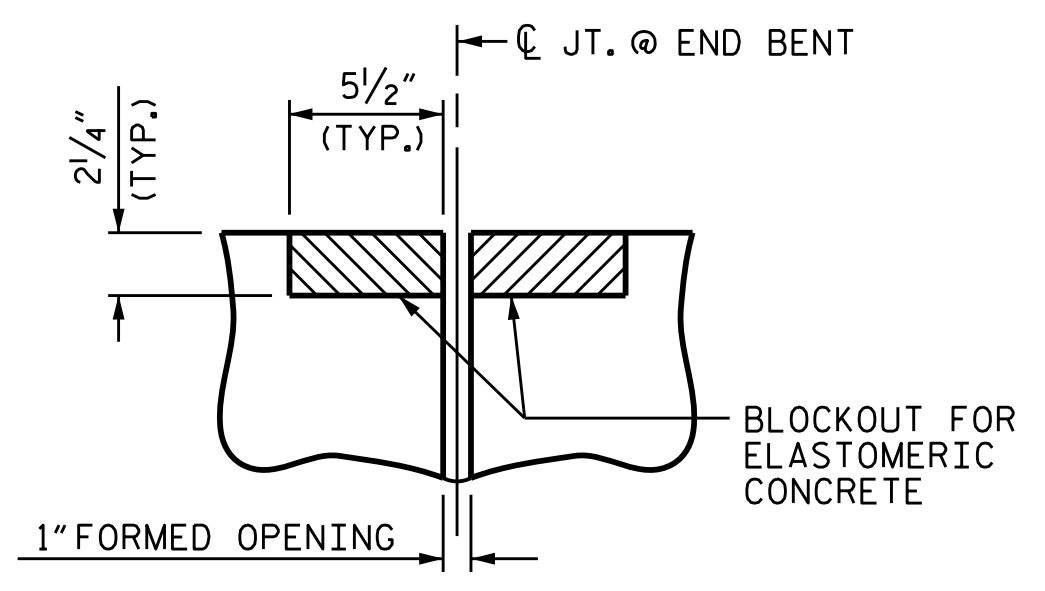


DocuSigned by:
 Amber M. Lee
 B04B5A4F2FAD484
 11/5/2018

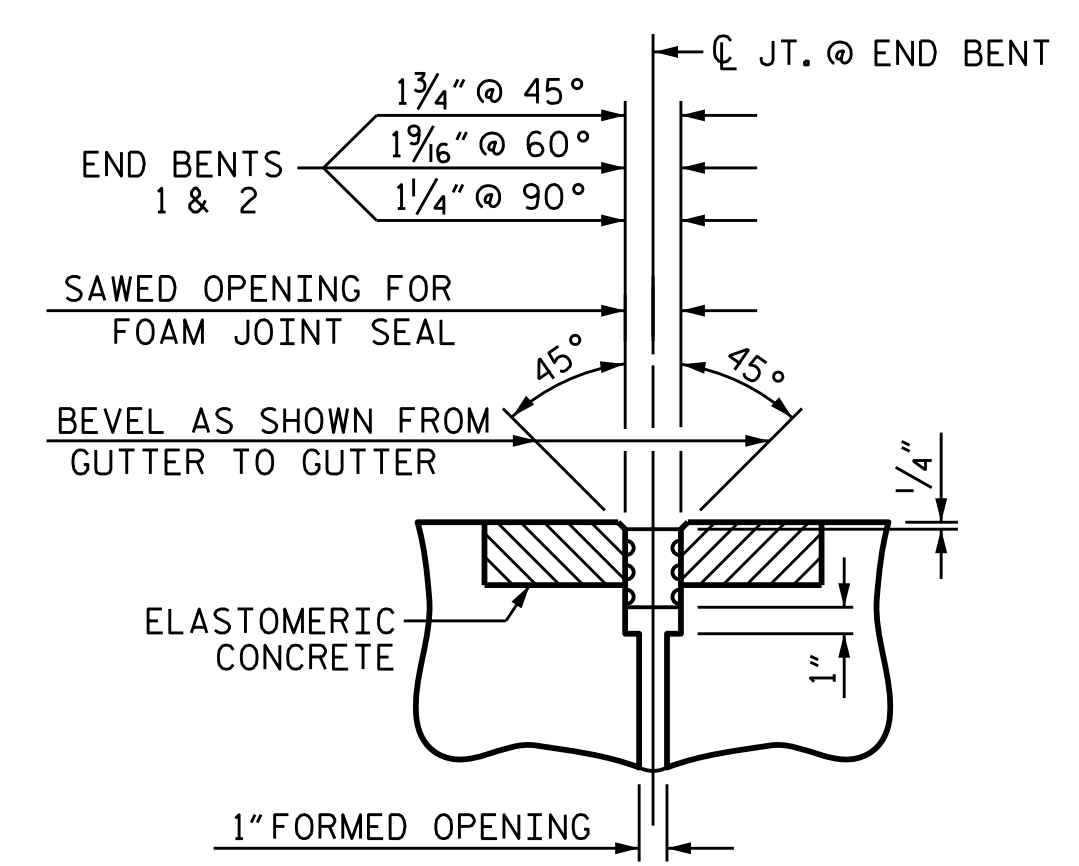
DRAWN BY : M. G. SHAIKH DATE : 10/2018
 CHECKED BY : H. A. LOCKLEAR DATE : 10/2018
 DESIGN ENGINEER OF RECORD: _____ DATE : _____

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1			3			TOTAL SHEETS
2			4			39



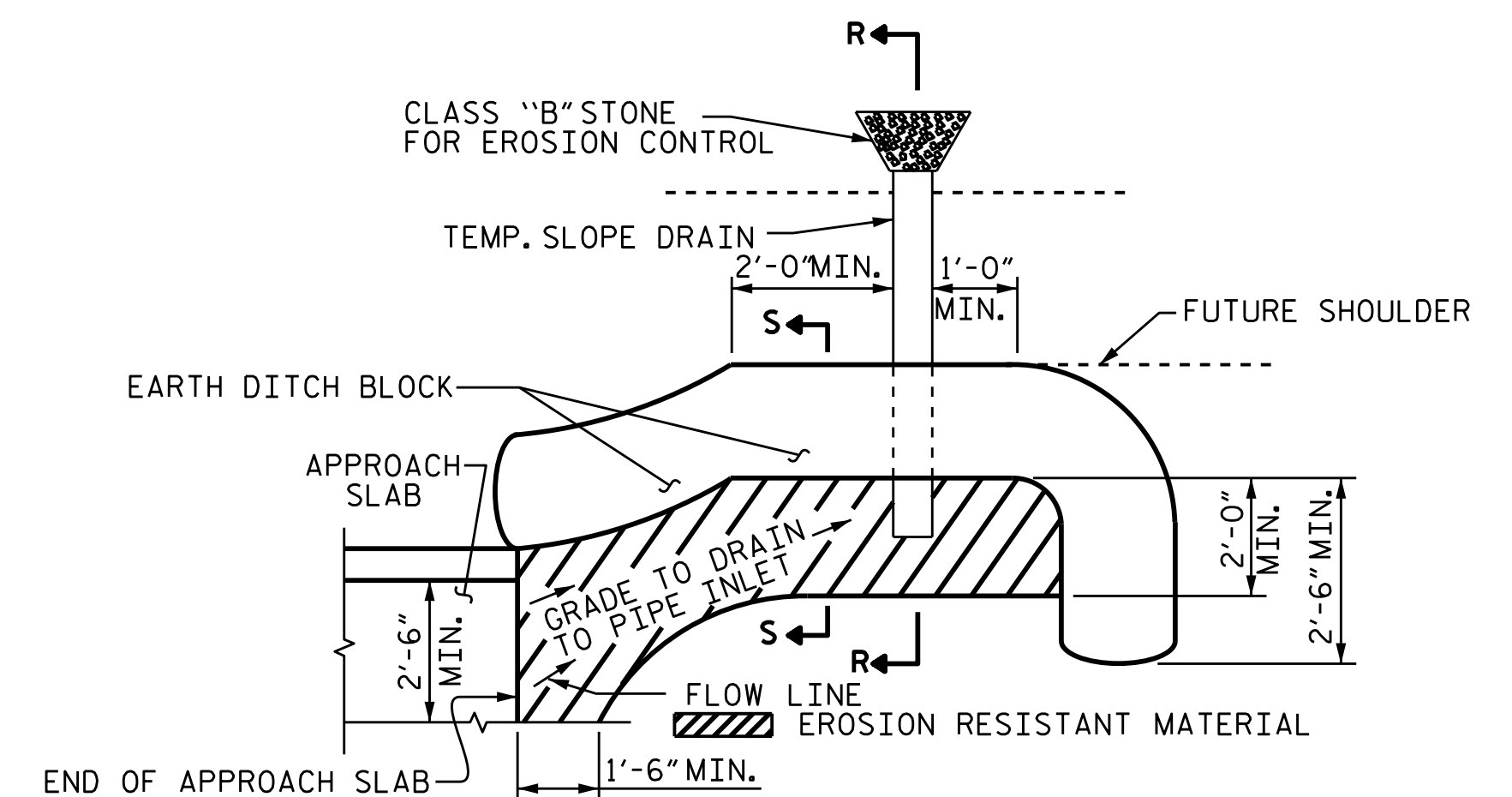
SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)



SECTION C-C
FOAM JOINT SEAL
(EXPANSION)

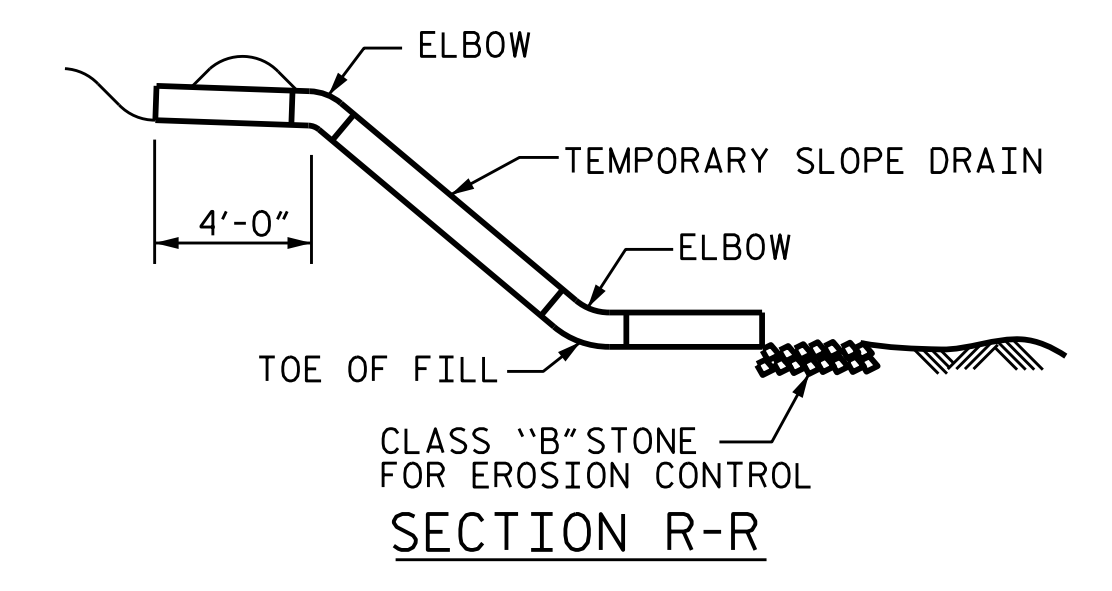
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	5.85
2	5.85
TOTAL	11.7

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

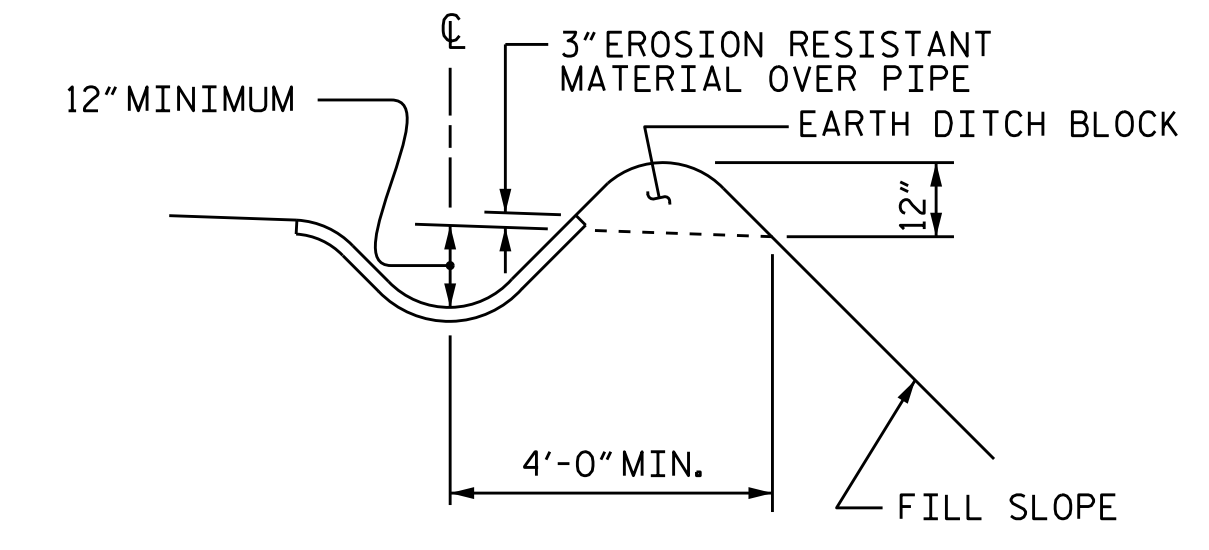


PLAN VIEW

NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2\"/>

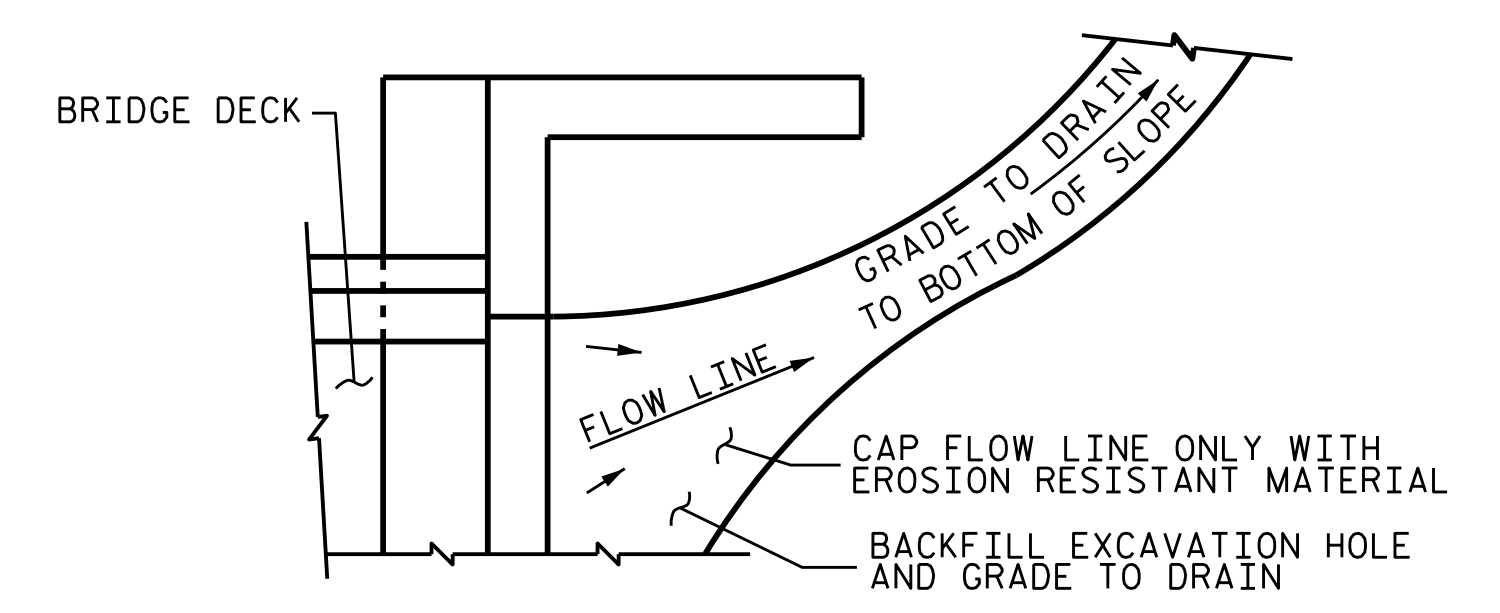


SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS
(TO BE USED WHEN SHOULDER BERM GUTTER IS 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

PROJECT NO. B-5388
ALLEGHANY COUNTY
STATION: 19+78.50 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH
SLAB DETAILS

ASSEMBLED BY : M. G. SHAIKH	DATE : 8/2018
CHECKED BY : A. SORSENGINH	DATE : 9/2018
DRAWN BY : EEM	3/95
CHECKED BY : VAP	3/95
REV. 12/21/11	MAA/GM
REV. 6/13	MAA/GM
REV. 12/17	MAA/THC

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			39

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	--	20,000 LBS. PER SQ. IN.
	--	27,000 LBS. PER SQ. IN.
	--	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	----	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$ " FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A $\frac{1}{4}$ " RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE $\frac{7}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY $\frac{1}{16}$ " INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

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