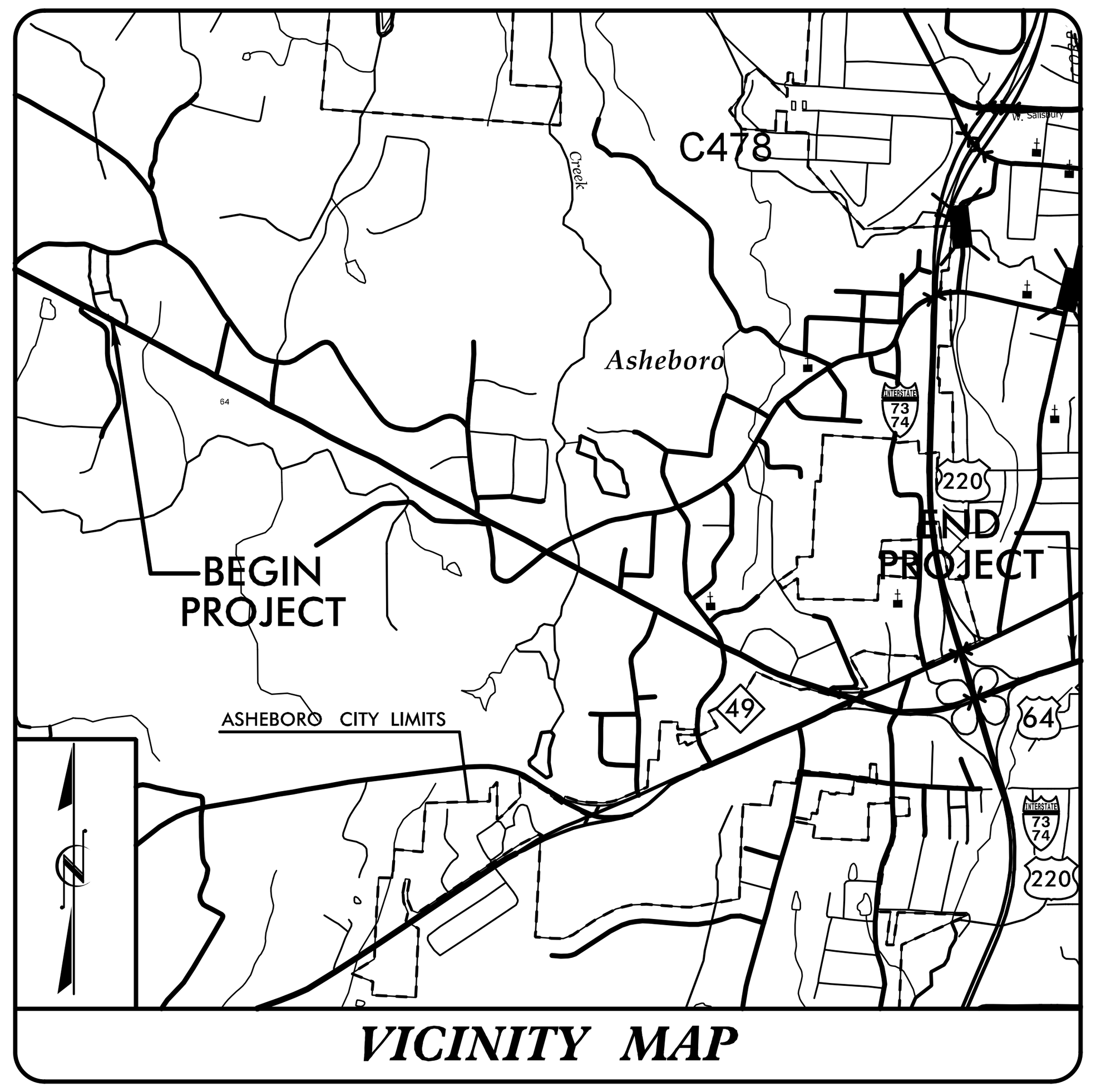
09/08/99

TIP PROJECT: U-5813

CONTRACT: C204843

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Plan Sheet Symbols



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5813	S-0	

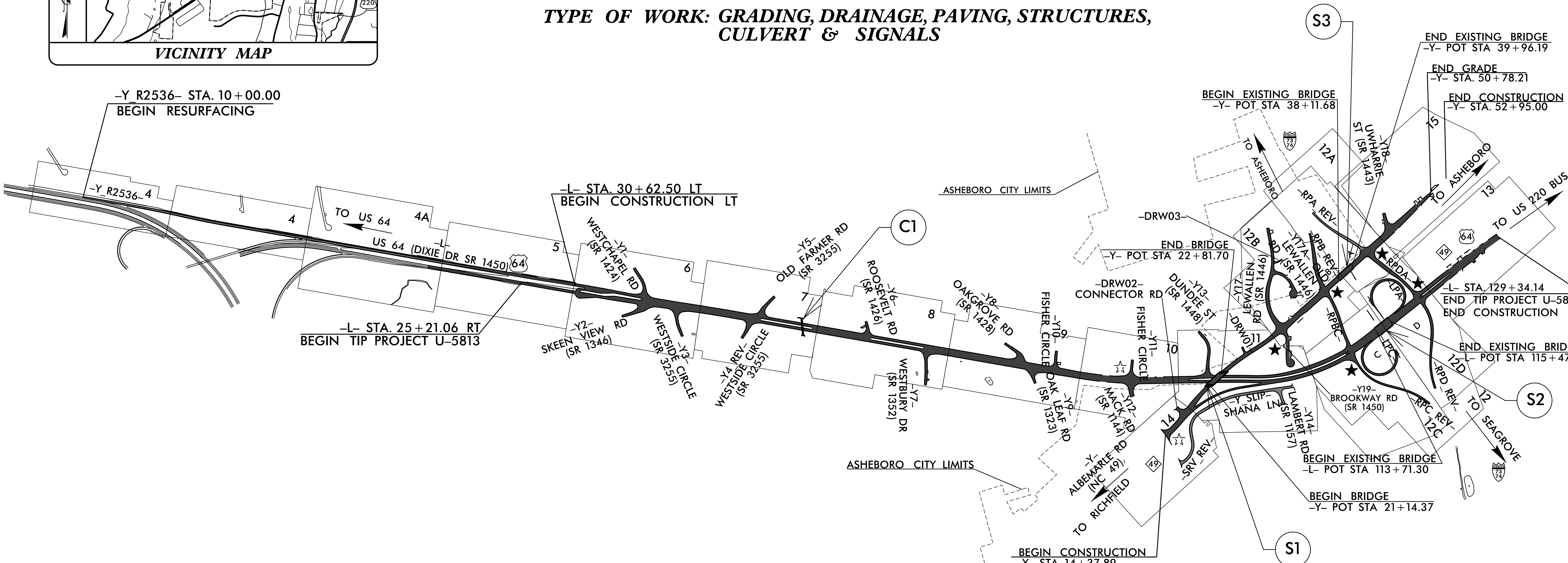
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
44385.1.3		PE
44385.2.3	NHP-0064(206)	ROW
44385.2.4	NHP-0064(206)	UTILITY
44385.3.3	NHP-0064(206)	CONSTRUCTION

LOCATION: ASHEBORO BYPASS TO EAST OF I-73 /I-74 /US 220 IN ASHEBORO. WIDEN TO MULTILANES, RECONSTRUCT INTERCHANGE AT NC 49, MODIFY INTERCHANGE AT I-73 / I-74 /US 220 AND REPLACE BRIDGE 750171 OVER US 64 AND NC 49.

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERT & SIGNALS

NAD 83/NA 2011

☆ EXISTING SIGNAL
★ PROPOSED SIGNAL



STRUCTURES

A PORTION OF THIS PROJECT IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2024 = 32,900
ADT 2044 = 36,500
K = 8%
D = 55%
T = 4% *
V = 60 MPH / 50 MPH (C&G)
* TTST = 3% DUAL 1%
FUNC CLASS = PRINCIPAL ARTERIAL STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5813	=	1.939 MILES
LENGTH EXISTING STUCTURE TIP PROJECT U-5813	=	0.033 MILES
TOTAL LENGTH TIP PROJECT U-5813	=	1.972 MILES

TOTAL LENGTH BASED ON -L- CENTERLINE AND RIGHT SIDE BEGIN CONSTRUCTION

PREPARED IN THE OFFICE OF:
HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554
FOR NCDOT

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 15, 2021

LETTING DATE:
JULY 16, 2024

J. MATTHEW PICKENS, PE
PROJECT ENGINEER

ANDREW J. McOMBER, PE
PROJECT DESIGN ENGINEER

TERRY FARR, PE
NCDOT CONTACT

STRUCTURES ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS 5/8/2024

David W. Hawkins
A9ED7524B855487...

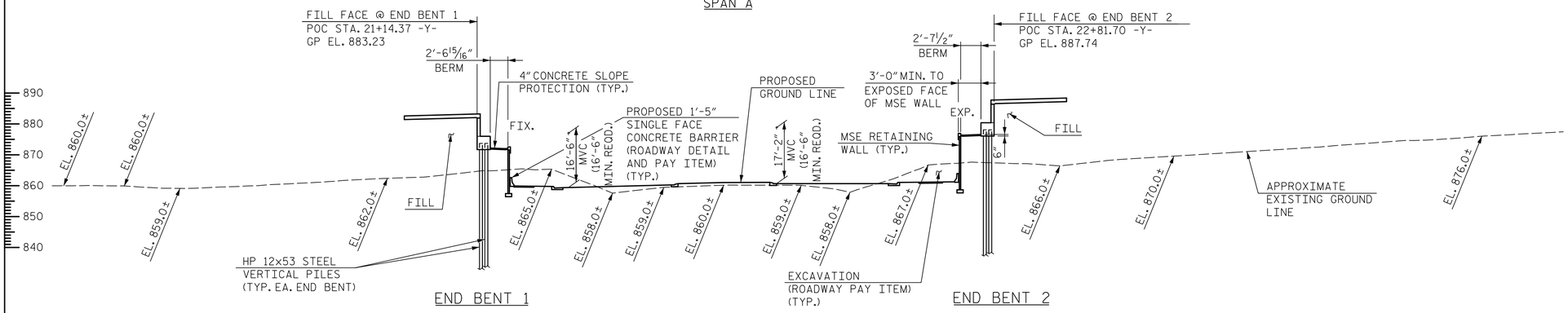
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

F.A. PROJECT NO.: NHP-0064(206)

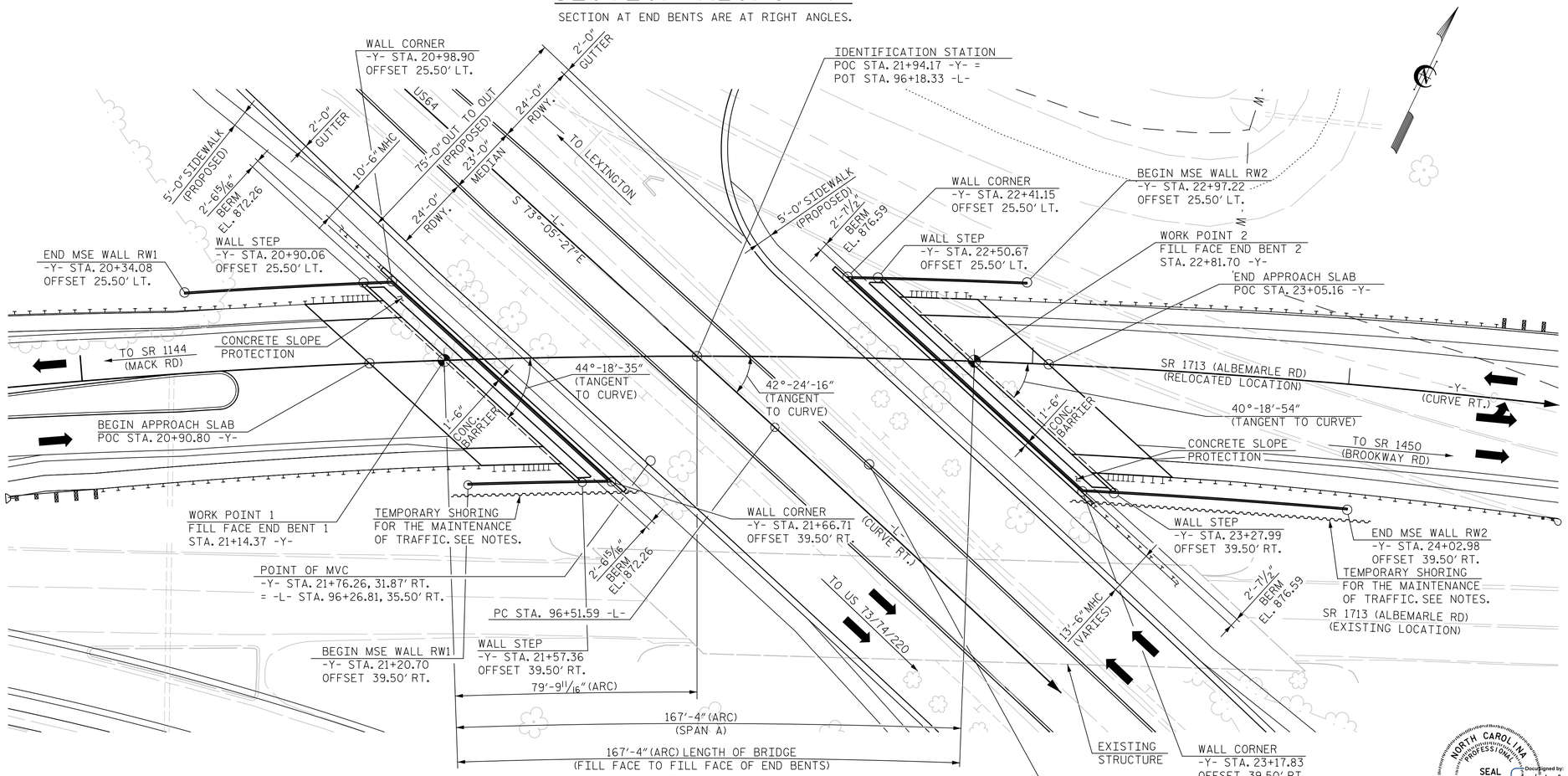
20+00 +20 +40 +60 +80 21+00 +20 +40 +60 +80 22+00 +20 +40 +60 +80 23+00 +20 +40 +60 +80 24+00 +20 +40 +60

SPAN A



SECTION ALONG -Y-

SECTION AT END BENTS ARE AT RIGHT ANGLES.



PLAN

NOTES: END BENTS ARE PARALLEL TO EACH OTHER AND PARALLEL TO -L- TANGENT.

US64 WB OFFSET TO MSE WALL OF 15'-0" IS DUE TO STOPPING SIGHT DISTANCE REQUIREMENTS.

PILES IN PLAN NOT SHOWN FOR CLARITY.

NOTES

FOR GENERAL NOTES, SEE SHEET 4 OF 5.

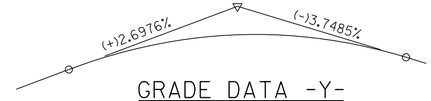
CURVE DATA -Y-

PI STA 22+19.21
Δ = 22°-16'-49.0"(RT)
D = 2°-23'-14"
L = 933.27'
T = 472.61'
R = 2,400.00'
SE = 0.03

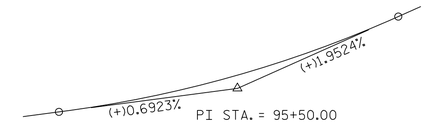
CURVE DATA -L-

PI STA. 98+32.07
Δ = 2°-32'-14.0"(RT)
D = 0°-42'-11"
L = 360.90'
T = 180.48'
R = 8,150.00'
SE = NC

PI STA. = 25+25.00
ELEV. = 894.30
V.C. = 325'



GRADE DATA -Y-



PI STA. = 95+50.00
ELEV. = 859.25
V.C. = 250'

GRADE DATA -L-

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y- = POT 96+18.33 -L-

SHEET 1 OF 5 REPLACES BRIDGE NO. 750171

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

Docusigned by: Paul J. Barber 1BDB1B57368741E...

7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	1/22
CHECKED BY	S. SULLIVAN	DATE	1/22
ENGINEER OF RECORD	P. BARBER	DATE	1/22

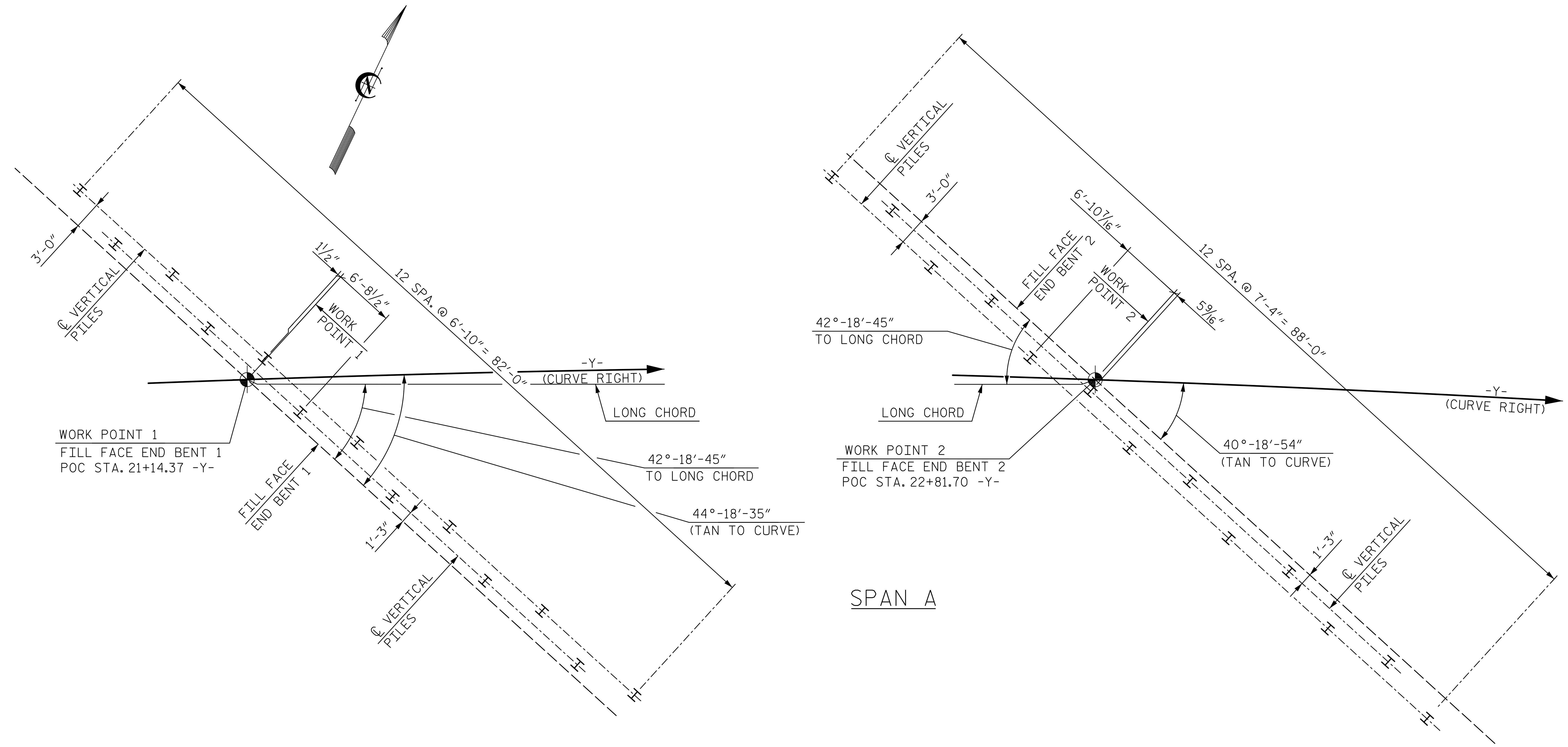
DWG. NO. 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE OVER US64 ON SR 1713 (ALBEMARLE RD) BETWEEN SR 1144 (MACK RD) AND SR 1450 (BROOKWAY RD)

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-1
1			3			TOTAL SHEETS
2			4			34

3/8/2022 8:04:43 AM
J:\401_001_US813_SWL_0001_001_750171.dgn



END BENT 1 END BENT 2

FOUNDATION LAYOUT

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

INSTALL PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A MINIMUM ELEVATION OF 10 FEET BELOW THE TOP OF THE RETAINING WALL LEVELING PAD.

DRILLED-IN PILES ARE REQUIRED FOR END BENT NO. 1 AND END BENT NO. 2. EXCAVATE HOLES AT PILE LOCATIONS TO A MINIMUM ELEVATION OF 10 FEET BELOW THE TOP OF THE RETAINING WALL LEVELING PAD. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

CONCRETE OR GROUT IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 1 AND END BENT NO. 2.

INSTALL PILES AT END BENT NO. 1 AND END BENT NO. 2 BEFORE CONSTRUCTING RETAINING WALLS.

DO NOT DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 IF BOTTOM OF PILE EXCAVATION IS IN HARD ROCK. IF PILE DRIVING IS REQUIRED, DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 195 TONS PER PILE.

IF PILE DRIVING IS REQUIRED, STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 1 AND END BENT NO. 2. FOR STEEL PILE POINTS SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

THE QUANTITY SHOWN FOR PILE EXCAVATION IS BASED ON INSTALLING DRILLED-IN PILES BEFORE CONSTRUCTING RETAINING WALLS AT END BENTS. IF THE CONTRACTOR CHOOSES TO CONSTRUCT THE RETAINING WALLS BEFORE INSTALLING DRILLED-IN PILES AT END BENTS, THE QUANTITY FOR PILE EXCAVATION WILL BE MEASURED FROM THE GROUND LINE AT THE TIME OF END BENT CONSTRUCTION.

NOTES:

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO END BENT CONTROL LINES AND FILL FACES.

FOR FOUNDATION ELEVATIONS AND DETAILS, SEE END BENT SHEETS.

ALL PILE DIMENSIONS ARE TO CENTERS OF PILES AT BOTTOM OF END BENTS.

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 2 OF 5

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

DocuSigned by: Paul J. Barber 18DF1B57368741E... 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	1/22
CHECKED BY	S. SULLIVAN	DATE	1/22
ENGINEER OF RECORD	P. BARBER	DATE	1/22

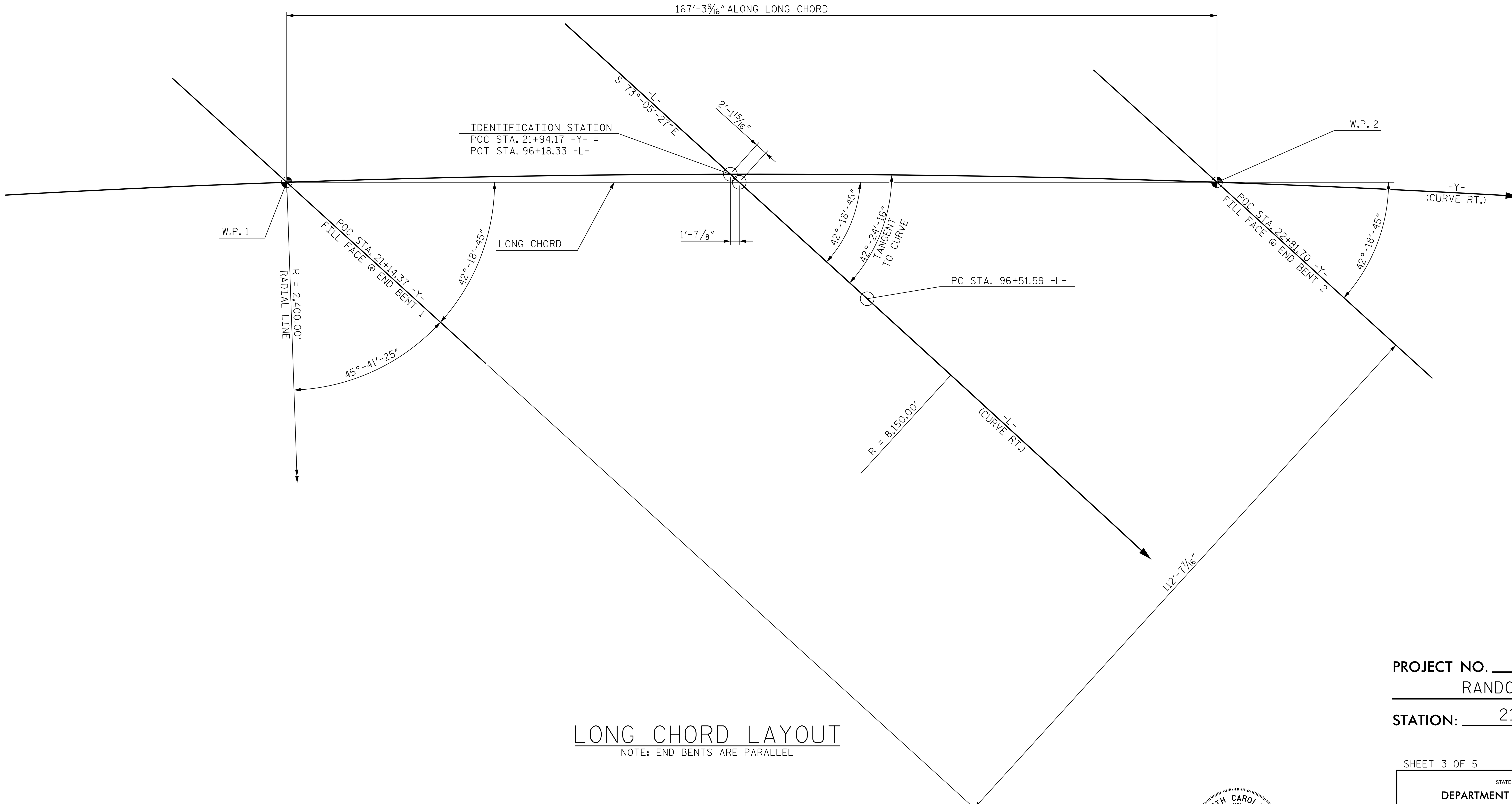
DWG. NO. 2

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

SHEET NO. S-2

TOTAL SHEETS 34

3/8/2022
8:04:50 AM
...\401_003_U5813_SMU_GD02_002_750171.dgn



LONG CHORD LAYOUT

NOTE: END BENTS ARE PARALLEL

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LONG CHORD

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
DocuSigned by: Paul J. Barber
7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	1/20
CHECKED BY	S. SULLIVAN	DATE	11/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

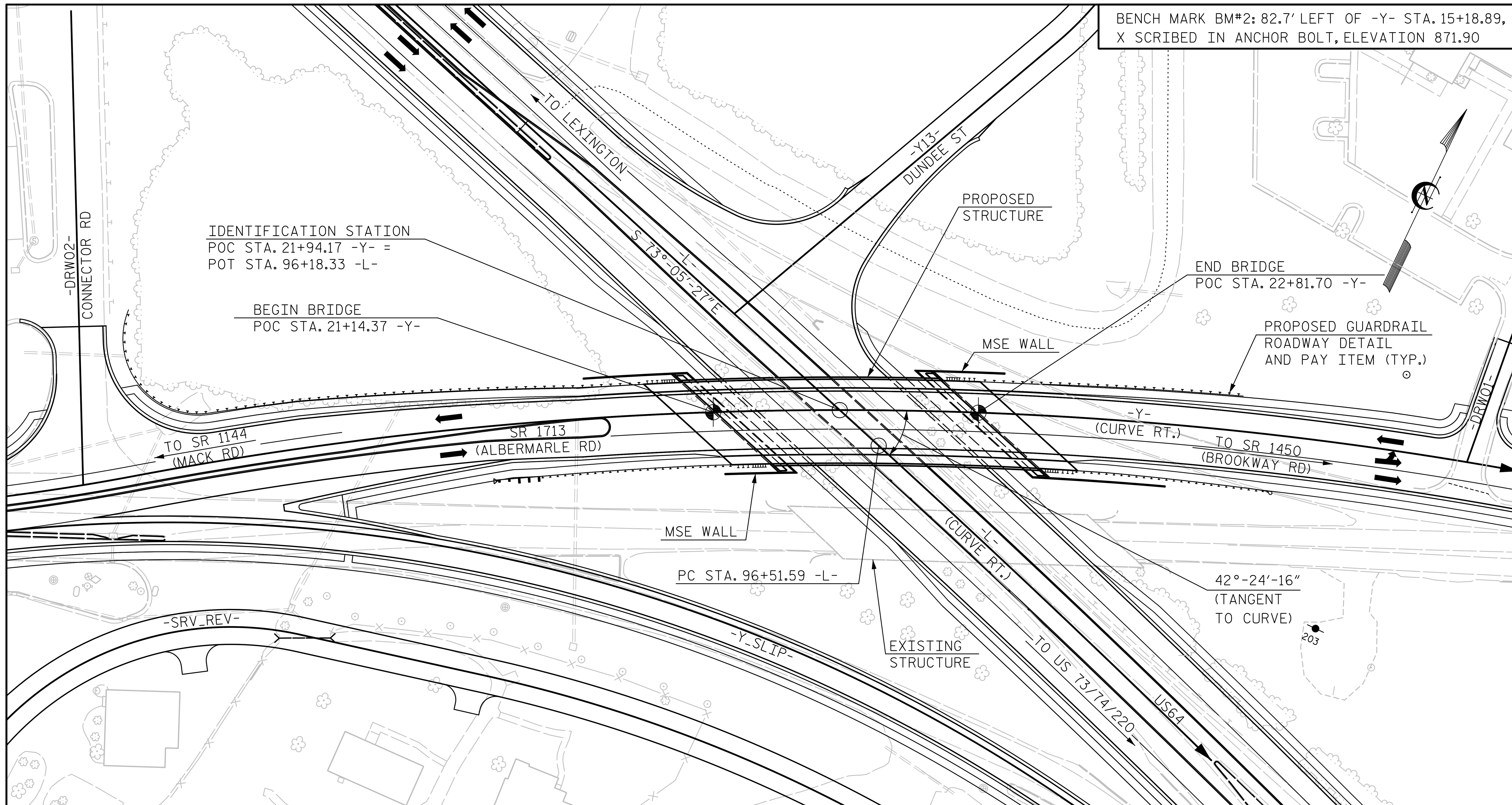
DWG. NO. 3

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

SHEET NO. S-3

TOTAL SHEETS 34

3/8/2022
8:04:56 AM
...\401_005_U5813_SMU_GD03_003_750171.dgn



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT POC STA. 21+94.17 -Y-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	DYNAMIC PILE TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPR. SLABS, POC STA. 21+94.17 -Y-
	LUMP SUM	LUMP SUM	L.F.	L.F.	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM
SUPERSTRUCTURE	———	———	———	———	———	9,129	8,254	———	LUMP SUM
END BENT 1	———	———	45	85	———	———	———	79.0	———
END BENT 2	———	———	83	48	———	———	———	85.7	———
TOTAL	LUMP SUM	LUMP SUM	128	133	1	9,129	8,254	164.7	LUMP SUM

TOTAL BILL OF MATERIAL

	REINFORCING STEEL	APPROX. 430,500 LBS STRUCTURAL STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		STEEL PILE POINTS	THREE BAR METAL RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS
	LBS.	LUMP SUM	EACH	NO.	L.F.	EACH	L.F.	SQ. YD.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	———	LUMP SUM	———	—	——	———	312.1	———	LUMP SUM	LUMP SUM
END BENT 1	13,896	———	13	13	390	13	———	28.0	———	———
END BENT 2	14,922	———	13	13	390	13	———	31.0	———	———
TOTAL	28,818	LUMP SUM	26	26	780	26	312.1	59.0	LUMP SUM	LUMP SUM

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

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.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

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

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

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 POC STA. 21+94.17 -Y-".

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.

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.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 3 SPANS AT 68'-10", 67'-0" AND 55'-6" WITH A REINFORCED CONCRETE DECK ON STEEL I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 26'-4" ON REINFORCED CONCRETE END BENT 1 ON PILES AND REINFORCED CONCRETE POST AND BEAM END BENT 2 ON SPREAD FOOTINGS AND REINFORCED CONCRETE POST AND BEAM INTERIOR BENTS ON SPREAD FOOTINGS LOCATED ON THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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.

WORK SHALL NOT BE STARTED ON THIS BRIDGE UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

PROJECT NO. U-5813

RANDOLPH **COUNTY**

STATION: 21+94.17 -Y-

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 051219 SEAN R. SULLIVAN
DocuSigned by: Sean R. Sullivan
4/9/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH, GENERAL NOTES & TOTAL BILL OF MATERIAL

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	1/22
CHECKED BY	S. SULLIVAN	DATE	1/22
ENGINEER OF RECORD	S. SULLIVAN	DATE	4/24

DWG. NO. 4

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

SHEET NO. S-4

TOTAL SHEETS 34

4/9/2024
10:46:47 AM

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	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)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.24	--	1.75	--	1.24	A	ER	29.2	--	1.26	A	EL	151.0	1.30	--	2.01	A	EL	85.5	1 2
		HL-93 (OPERATING)	N/A	--	1.61	--	1.35	--	1.61	A	ER	29.2	--	1.63	A	EL	151.0	1.00	--	2.62	A	EL	85.5	1
		HS-20 (INVENTORY)	36.00	2	1.90	68.2	1.75	--	1.93	A	ER	29.2	--	1.90	A	I	0.0	1.30	--	3.15	A	EL	85.5	1
		HS-20 (OPERATING)	36.00	--	2.46	88.5	1.35	--	2.50	A	ER	29.2	--	2.46	A	I	0.0	1.00	--	4.09	A	EL	85.5	1
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	5.58	75.3	1.40	--	5.96	A	ER	29.2	--	5.58	A	I	0.0	1.30	--	7.91	A	EL	85.5	1
		SNGARBS2	20.000	--	4.01	80.2	1.40	--	4.19	A	ER	29.2	--	4.01	A	I	0.0	1.30	--	5.48	A	EL	85.5	1
		SNAGRIS2	22.000	--	3.74	82.2	1.40	--	3.86	A	ER	29.2	--	3.74	A	I	0.0	1.30	--	5.03	A	EL	85.5	1
		SNCOTTS3	27.250	--	2.78	75.9	1.40	--	2.96	A	ER	29.2	--	2.78	A	I	161.3	1.30	--	3.87	A	EL	85.5	1
		SNAGGRS4	34.925	--	2.30	80.3	1.40	--	2.40	A	ER	29.2	--	2.30	A	I	161.3	1.30	--	3.12	A	EL	85.5	1
		SNS5A	35.550	--	2.28	81.2	1.40	--	2.36	A	ER	29.2	--	2.28	A	I	161.3	1.30	--	3.07	A	EL	85.5	1
		SNS6A	39.950	--	2.08	83.2	1.40	--	2.13	A	ER	29.2	--	2.08	A	I	161.3	1.30	--	2.77	A	EL	85.5	1
		SNS7B	42.000	--	2.04	85.6	1.40	--	2.04	A	ER	29.2	--	2.05	A	I	161.3	1.30	--	2.64	A	EL	85.5	1
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	2.56	84.6	1.40	--	2.62	A	ER	29.2	--	2.56	A	I	161.3	1.30	--	3.40	A	EL	85.5	1
		TNT4A	33.075	--	2.48	81.9	1.40	--	2.56	A	ER	29.2	--	2.48	A	I	161.3	1.30	--	3.34	A	EL	85.5	1
		TNT6A	41.600	--	2.12	88.1	1.40	--	2.12	A	ER	29.2	--	2.17	A	I	161.3	1.30	--	2.72	A	EL	85.5	1
		TNT7A	42.000	--	2.08	87.3	1.40	--	2.08	A	ER	29.2	--	2.11	A	I	161.3	1.30	--	2.69	A	EL	85.5	1
		TNT7B	42.000	--	2.03	85.4	1.40	--	2.07	A	ER	29.2	--	2.03	A	I	161.3	1.30	--	2.71	A	EL	85.5	1
		TNAGRIT4	43.000	--	1.98	85.3	1.40	--	2.01	A	ER	29.2	--	1.98	A	I	161.3	1.30	--	2.63	A	EL	85.5	1
		TNAGT5A	45.000	--	1.97	88.5	1.40	--	1.97	A	ER	29.2	--	1.97	A	EL	151.0	1.30	--	2.52	A	EL	85.5	1
		TNAGT5B	45.000	3	1.88	84.7	1.40	--	1.91	A	ER	29.2	--	1.88	A	I	161.3	1.30	--	2.49	A	EL	85.5	1
EMERGENCY VEHICLE (EV)		EV2	28.750	--	3.03	87.1	1.30	--	3.15	A	ER	29.2	--	3.03	A	I	0.0	1.30	--	3.84	A	EL	85.5	1
		EV3	45.000	4	2.02	90.9	1.30	--	2.10	A	ER	29.2	--	2.02	A	I	161.3	1.30	--	2.55	A	EL	85.5	1
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75	--	4.65																		

LOAD FACTORS:

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

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE II LIMIT STATES.

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1. THE LIVE LOAD DISTRIBUTION WAS BASED ON A REFINED METHOD OF ANALYSIS. LIVE LOAD DISTRIBUTION FACTORS VARY ALONG THE LENGTH OF THE SPAN AND WITH EACH VEHICLE.
2. CONTROLLING RATING FACTOR FOR HL-93 (INVENTORY) IS LOCATED AT FIELD SPLICE LOCATION.
3.
4.

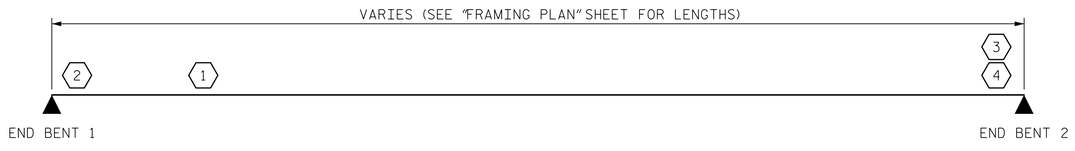
(#) CONTROLLING LOAD RATING

- (1) DESIGN LOAD RATING (HL-93) **
- (2) DESIGN LOAD RATING (HS-20) **
- (3) LEGAL LOAD RATING **
- (4) EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 051219 SEAN R. SULLIVAN
DocuSigned by: Sean R. Sullivan 4/9/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 1/22
CHECKED BY Z. REINEKE DATE 1/22
ENGINEER OF RECORD S. SULLIVAN DATE 4/24
DWG. NO. 5

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-5
1			3			TOTAL SHEETS
2			4			34

STD. NO. LRFR3

ASSEMBLED BY : M. WRIGHT DATE : 1/22
CHECKED BY : Z. REINEKE DATE : 1/22
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

4/9/2024 10:46:50 AM
\\dwk00\proj\projects\67753 - NCDOT 2016 P&DU-5813 (Design\Structures\OGW\Bridge\401_009_U5813_SMU_6005_005_75017.dgn

NOTES:

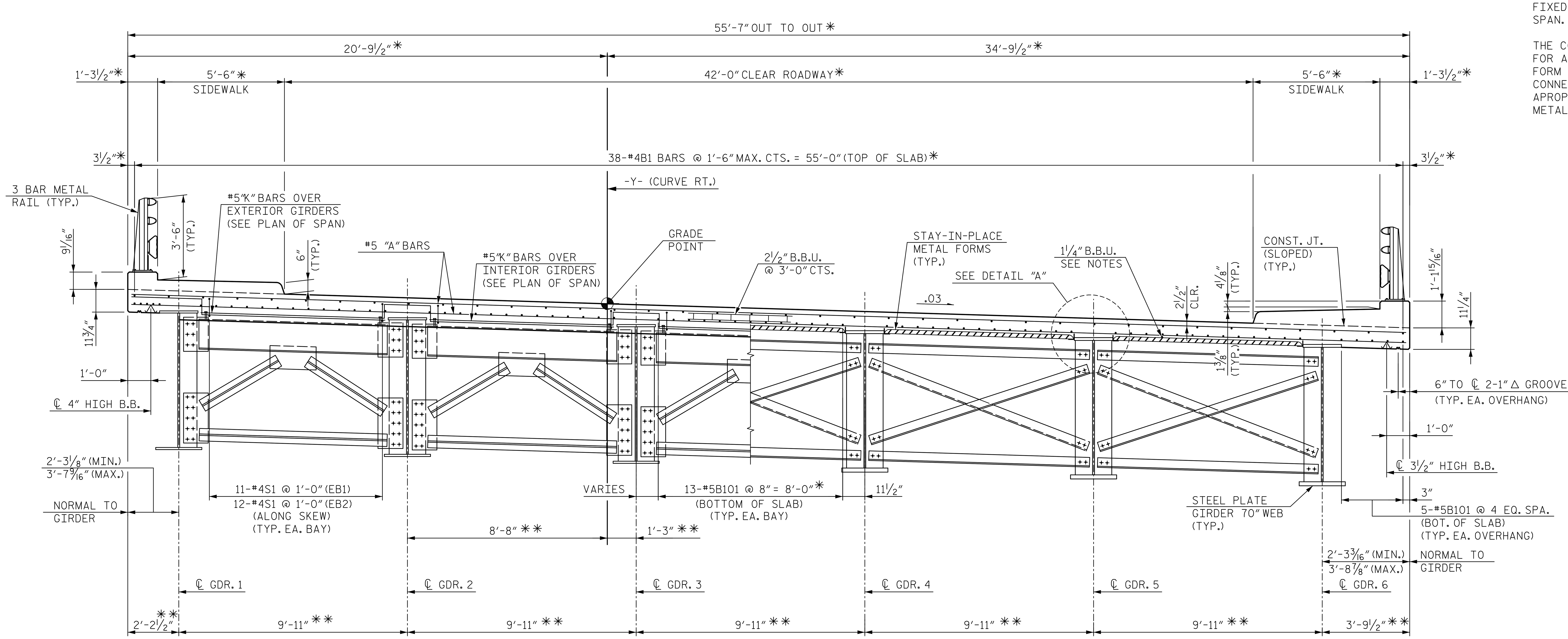
ALL HORIZONTAL DIMENSIONS SHOWN NORMAL TO ℄ SURVEY UNLESS NOTED OTHERWISE.

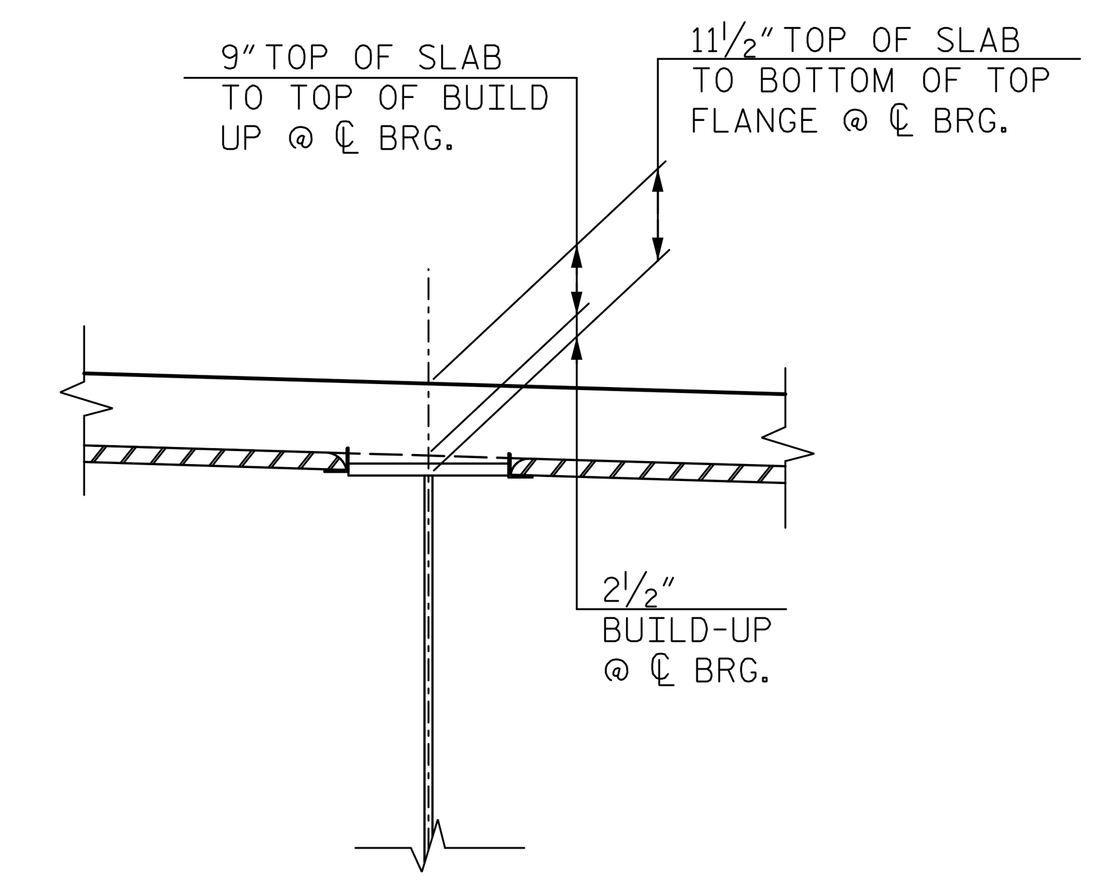
PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

DIRECTION OF CASTING DECK CONCRETE SHALL BE FROM THE FIXED BEARING END TOWARD THE EXPANSION BEARING END OF SPAN.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM/GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR METAL STAY-IN-PLACE FORM WORKING DRAWINGS.





DETAIL A

BRIDGE TYPICAL SECTION

NOTES: GIRDER CENTERLINE LAYOUT WAS ESTABLISHED BY CHORDS THROUGH INTERSECTIONS OF CONCENTRIC ARCS OFFSET FROM -Y- AND FILL FACE OF END BENTS.

* RADIAL DIMENSIONS

** RADIAL TO GIRDER CONCENTRIC ARCS AT CONTROL LINES

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

DocuSigned by: Paul J. Barber 7/11/2022

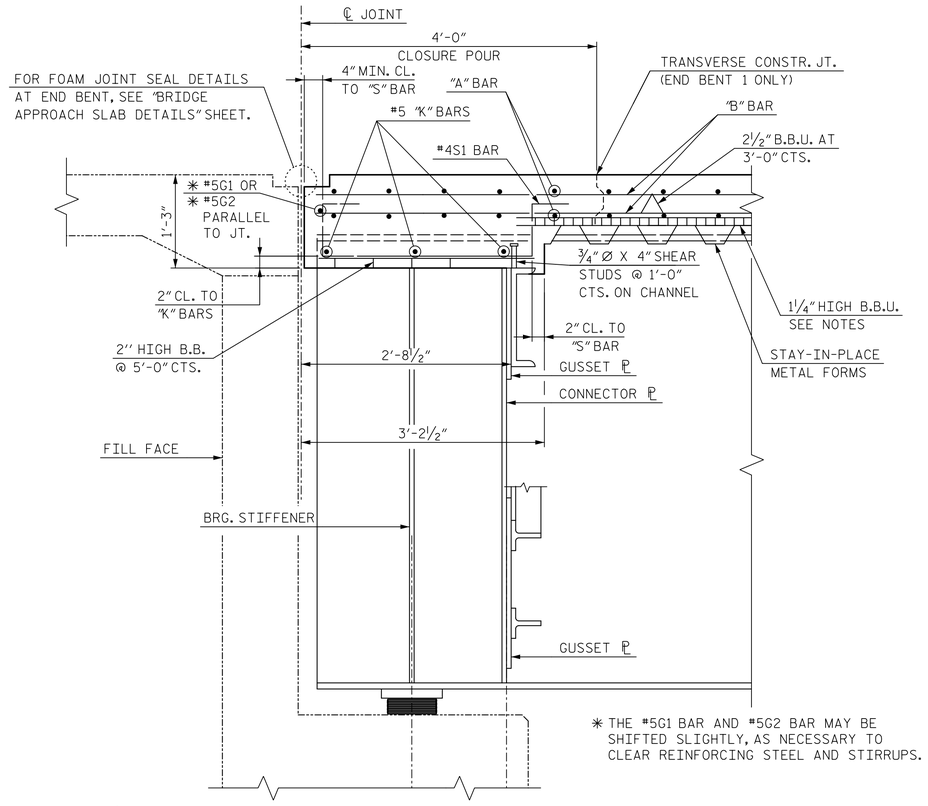
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	7/21	DWG. NO. 6
CHECKED BY	Z. REINEKE	DATE	7/21	
ENGINEER OF RECORD	P. BARBER	DATE	1/22	

REVISIONS								SHEET NO.
NO.	BY	DATE		NO.	BY	DATE		S-6
1				3				TOTAL SHEETS
2				4				34

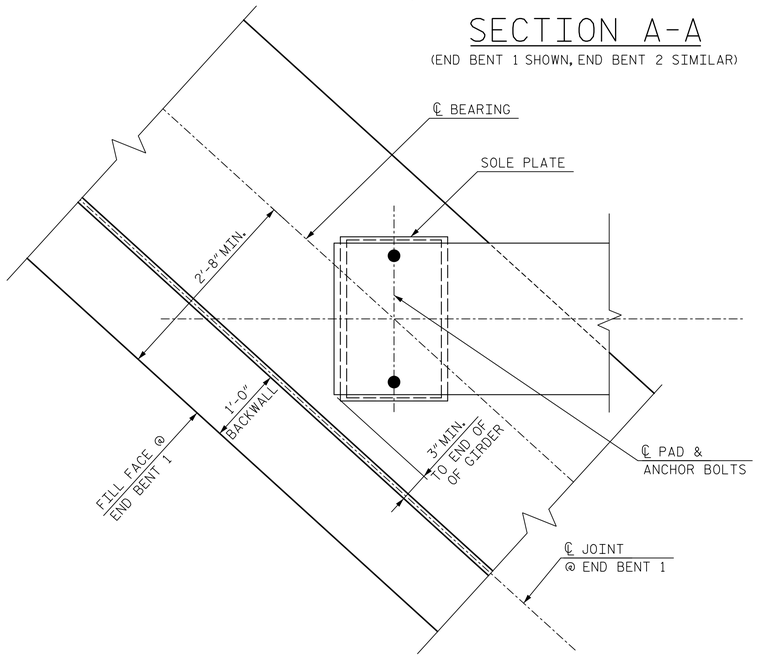
3/8/2022 8:05:15 AM ...\401_011_U5813_SMU_TS01_006_TS01T1.dgn



* THE #5G1 BAR AND #5G2 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

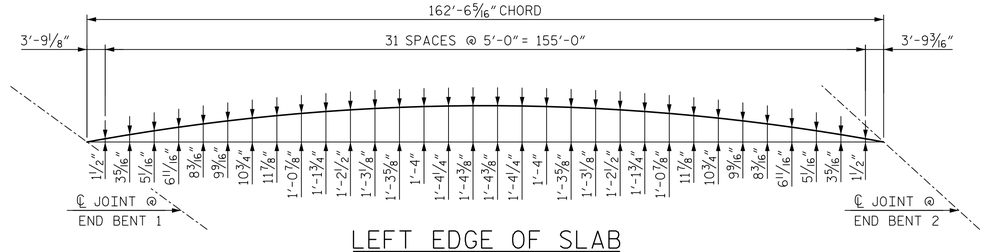
SECTION A-A

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



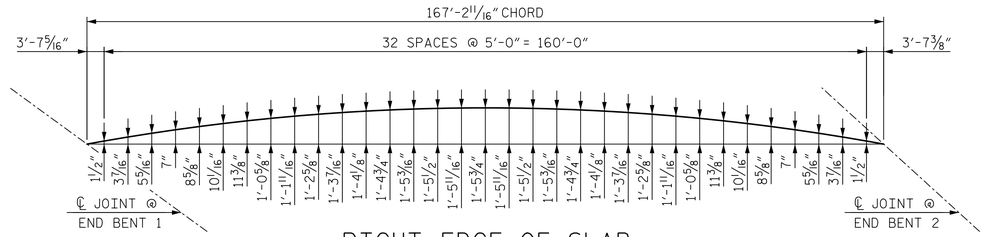
PLAN AT END BENT

END BENT 1 SHOWN, END BENT 2 SIMILAR



LEFT EDGE OF SLAB

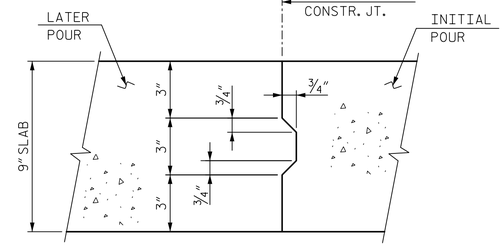
(R = 2,420'-9½")



RIGHT EDGE OF SLAB

(R = 2,365'-2½")

ARC OFFSETS SPAN A



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

TRANSVERSE CONSTRUCTION JOINT

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

Docusigned by: Paul J. Barber 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 7/21
CHECKED BY Z. REINEKE DATE 7/21
ENGINEER OF RECORD P. BARBER DATE 1/22

DWG. NO. 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-7
1			3			TOTAL SHEETS
2			4			34

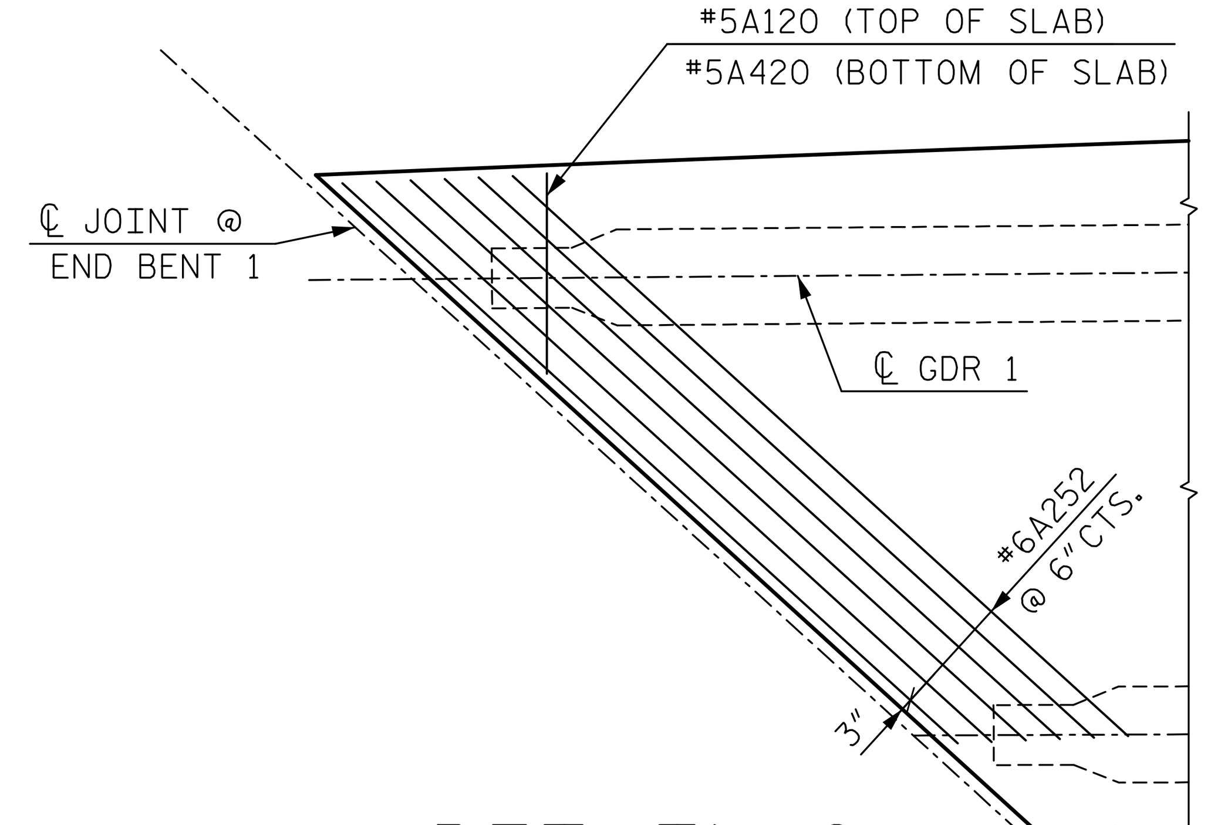
3/8/2022
80523 AM
...\407\015_U5813_SMU_TS02_007_750171.dgn

NOTES:
FOR SECTION A-A, SEE "TYPICAL SECTIONS" SHEETS.

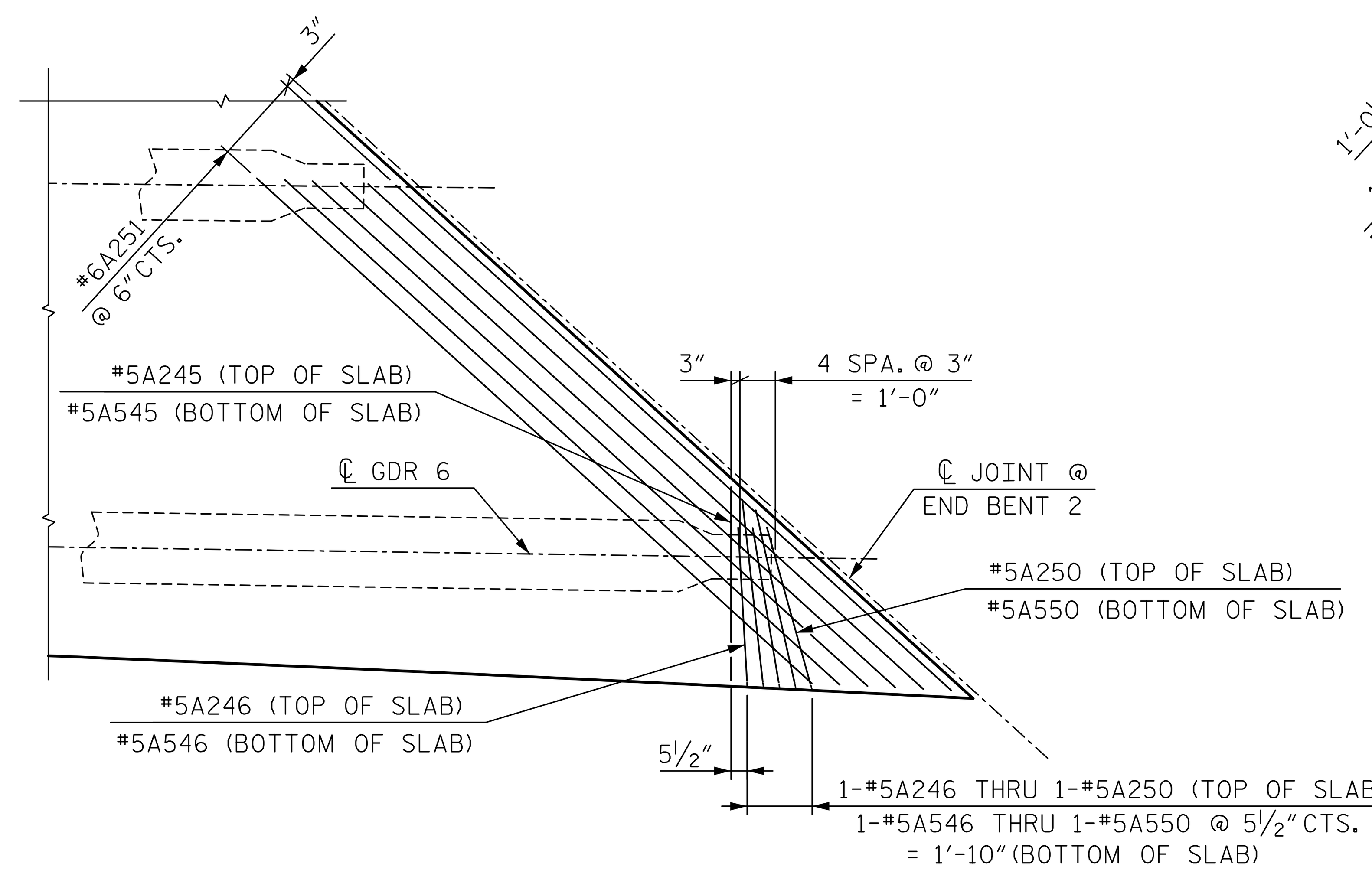
FOR SIDEWALK DIMENSIONS, REINFORCING AND JOINT SPACING, SEE "SIDEWALK DETAILS" AND "RAIL POST SPACING AND END OF RAIL DETAILS" SHEETS.

TRANSVERSE SLAB STEEL SHALL BE PLACED NORMAL TO CHORD.

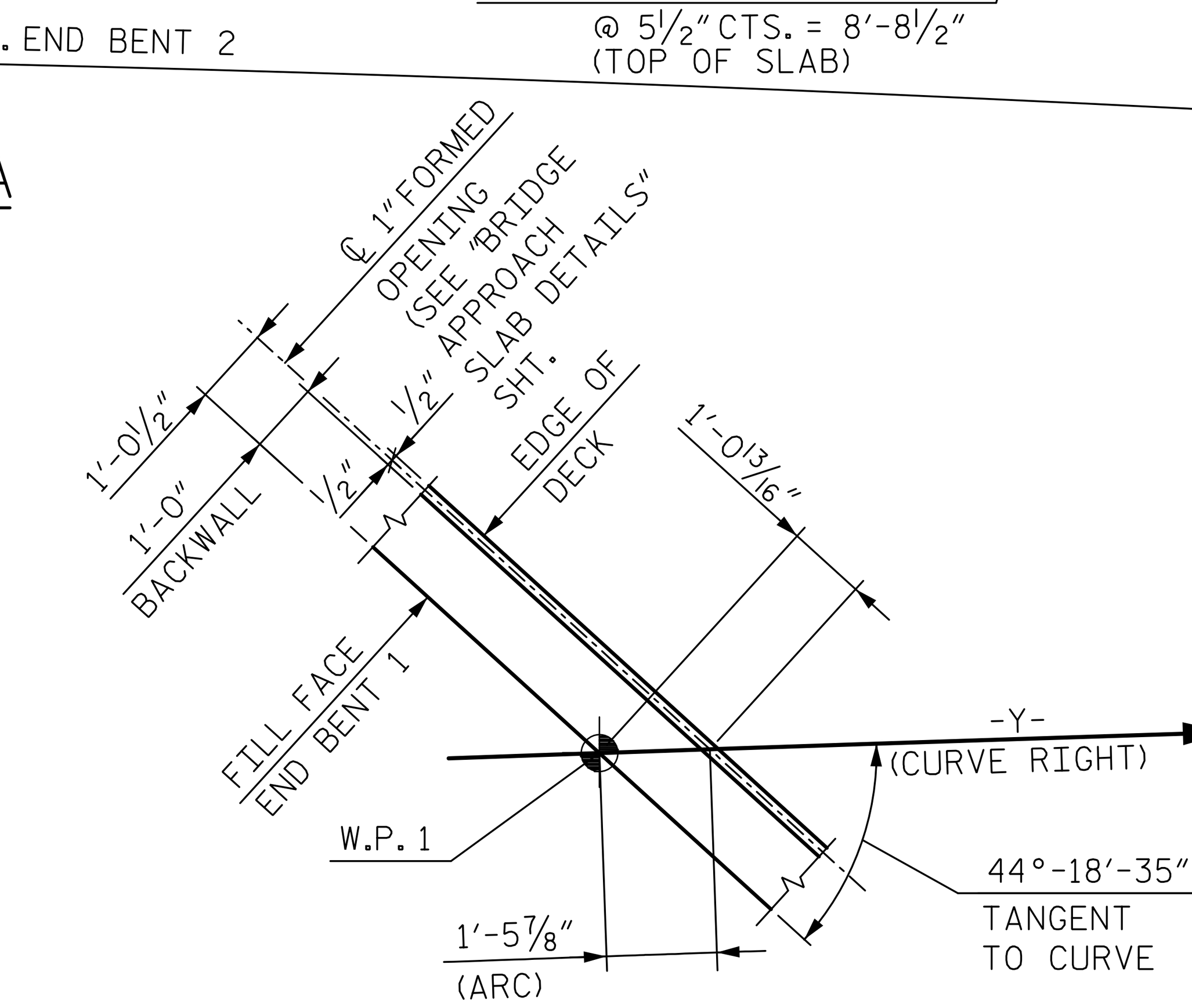
PLAN OF SPAN A



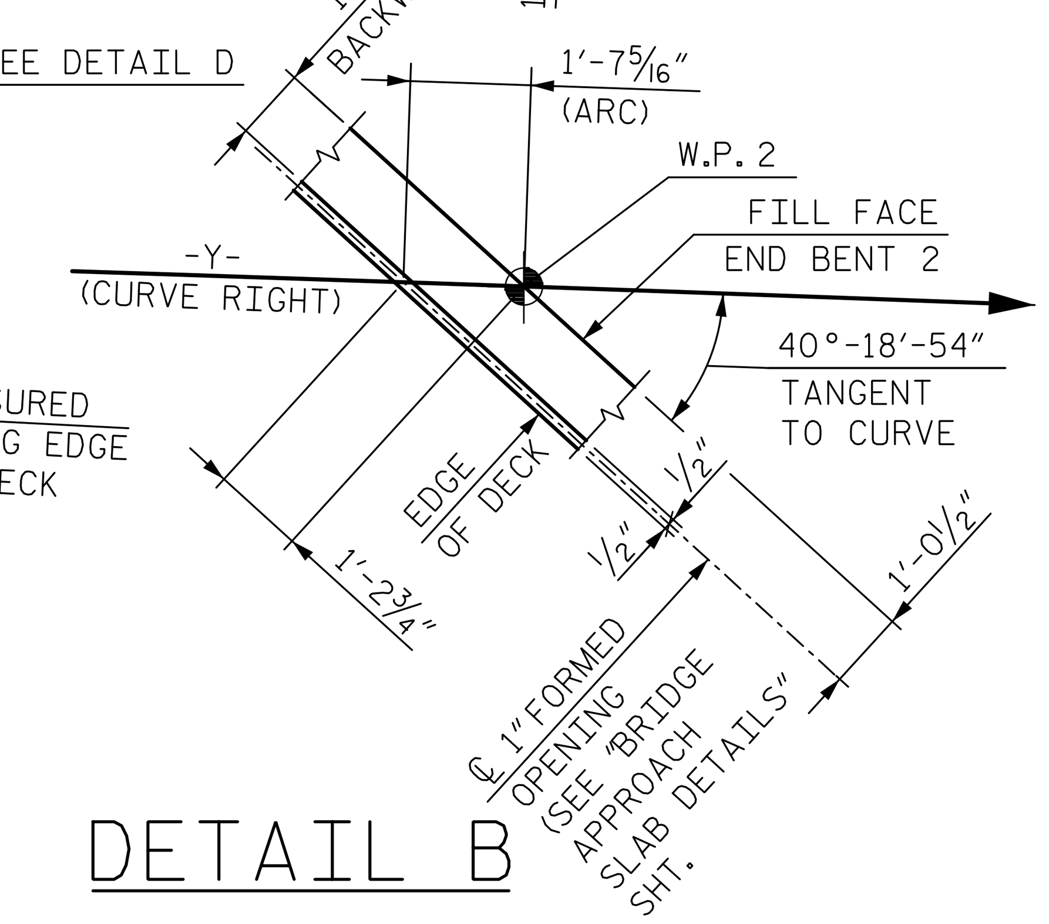
DETAIL C



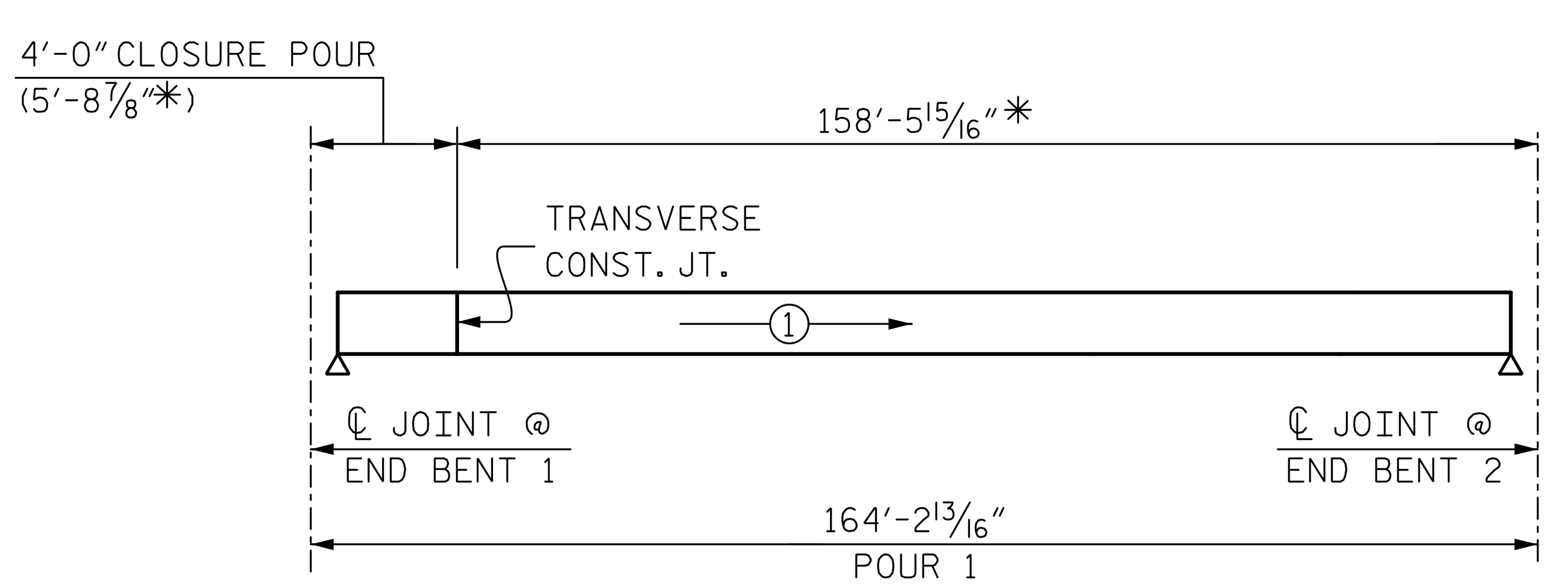
DETAIL D



DETAIL A



DETAIL B



POURING SEQUENCE

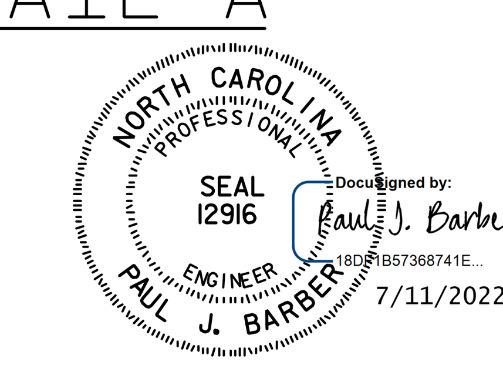
NOTES: IF THE CONTRACTOR CHOOSES TO REVERSE THE DIRECTION OF POUR #1, THE 4'-0" CLOSURE POUR SHALL BE MOVED TO END BENT 2.

* MEASURED ALONG -Y-

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	7/21
CHECKED BY	Z. REINEKE	DATE	7/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 8

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

SHEET NO. S-8

TOTAL SHEETS 34

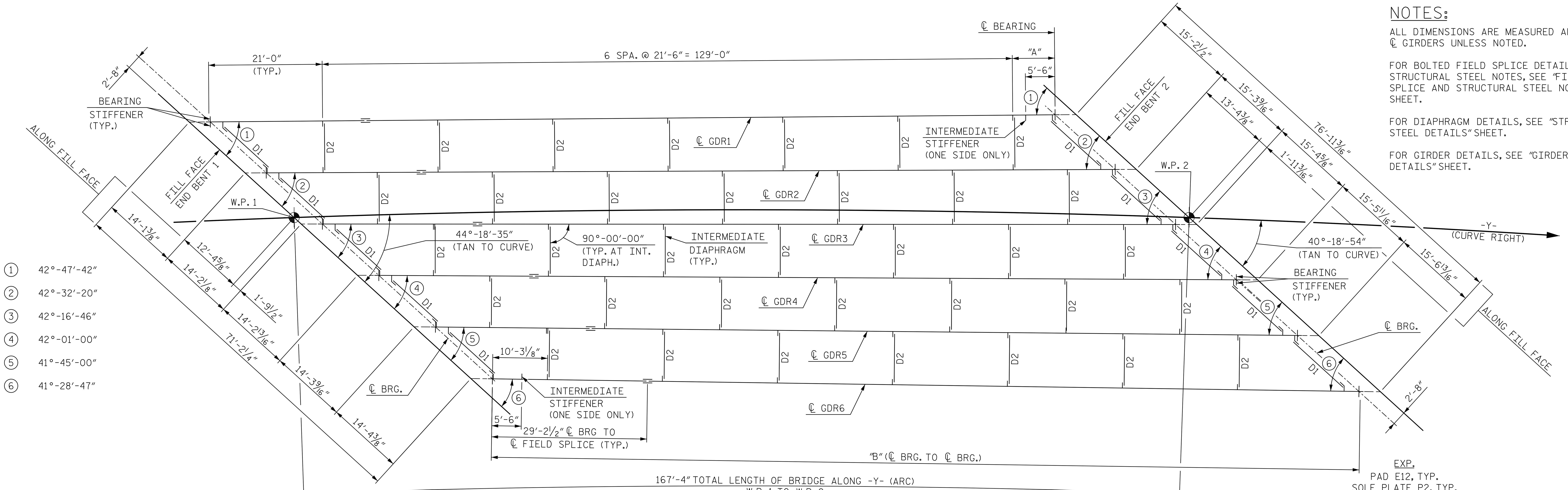
NOTES:

ALL DIMENSIONS ARE MEASURED ALONG ℄ GIRDERS UNLESS NOTED.

FOR BOLTED FIELD SPLICE DETAILS AND STRUCTURAL STEEL NOTES, SEE "FIELD SPLICE AND STRUCTURAL STEEL NOTES" SHEET.

FOR DIAPHRAGM DETAILS, SEE "STRUCTURAL STEEL DETAILS" SHEET.

FOR GIRDER DETAILS, SEE "GIRDER DETAILS" SHEET.



FIX.
PAD E11, TYP.
SOLE PLATE P1, TYP.

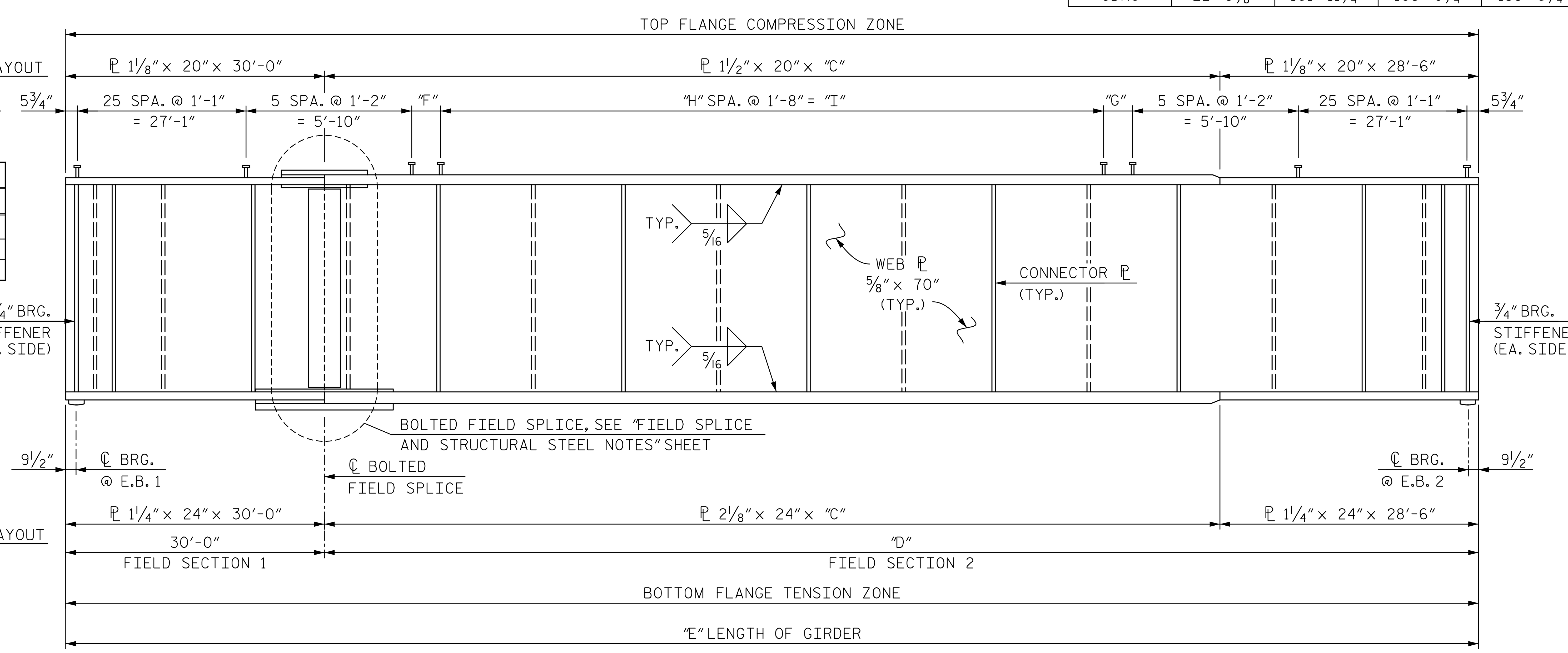
SPAN A

FRAMING PLAN

DIMENSION TABLE									
GIRDER	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"
GDR1	7'-11 1/16"	157'-11 1/16"	101'-0 1/16"	129'-6 1/16"	159'-6 1/16"	1'-4 5/16"	1'-4 1/4"	54	90'-0"
GDR2	8'-8 1/4"	158'-8 1/4"	101'-9 1/4"	130'-3 1/4"	160'-3 1/4"	1'-9"	1'-8 3/4"	54	90'-0"
GDR3	9'-5 3/4"	159'-5 3/4"	102'-6 3/4"	131'-0 3/4"	161'-0 3/4"	1'-3 1/2"	1'-3 3/4"	55	91'-8"
GDR4	10'-3 7/16"	160'-3 7/16"	103'-4 7/16"	131'-10 7/16"	161'-10 7/16"	1'-8 1/2"	1'-8 7/16"	55	91'-8"
GDR5	11'-1 7/16"	161'-1 7/16"	104'-2 7/16"	132'-8 7/16"	162'-8 7/16"	1'-3 1/2"	1'-3 7/16"	56	93'-4"
GDR6	22'-8 5/8"	161'-11 3/4"	105'-0 3/4"	133'-6 3/4"	163'-6 3/4"	1'-8 3/4"	1'-8 3/4"	56	93'-4"

SHEAR CONNECTOR QUANTITIES		
GIRDERS	ROWS ✱	TOTAL ✱
GDR1 - GDR2	120	360
GDR3 - GDR4	121	363
GDR5 - GDR6	122	366

✱ NUMBER OF SHEAR CONNECTOR ROWS AND TOTAL SHEAR CONNECTORS PER GIRDER.



TYPICAL GIRDER ELEVATION

(INTERIOR GIRDER SHOWN, EXTERIOR GIRDER SIMILAR)
(INTERMEDIATE STIFFENERS & DIAPHRAGM CONNECTOR PLATES NOT SHOWN)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
DocuSigned by: Paul J. Barber
7/11/2022

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	2/20
CHECKED BY	S. SULLIVAN	DATE	10/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 9

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

SHEET NO. S-9
TOTAL SHEETS 34

3/8/2022
8:05:40 AM
...\401_017_U5813_SMU_FP_009_75017.dgn

NOTES:

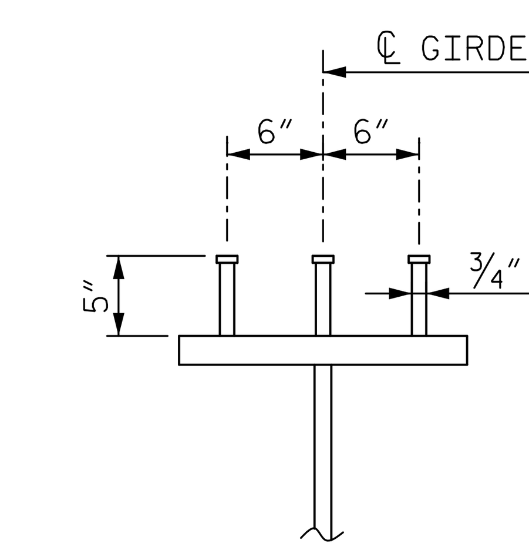
FOR STRUCTURAL STEEL NOTES, SEE "FIELD SPLICE AND STRUCTURAL STEEL NOTES" SHEET.

ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL UNLESS NOTED OTHERWISE.

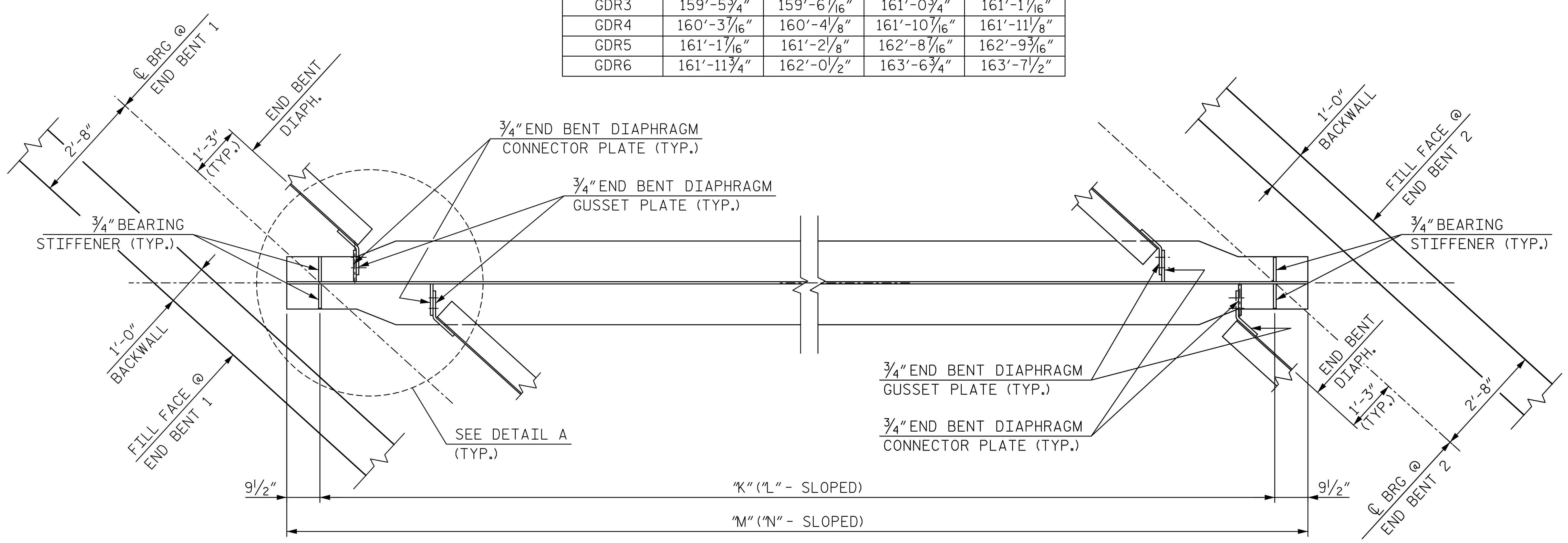
STUDS MAY BE MOVED SLIGHTLY TO AVOID BOLTS IN FLANGE SPLICE AT BOLTED FIELD SPLICE.

GIRDER DIMENSION TABLE

GIRDER	"K"	"L"	"M"	"N"
GDR1	157'-11 1/16"	157'-11 3/4"	159'-6 1/16"	159'-6 3/4"
GDR2	158'-8 1/4"	158'-8 15/16"	160'-3 1/4"	160'-3 15/16"
GDR3	159'-5 3/4"	159'-6 7/16"	161'-0 3/4"	161'-1 7/16"
GDR4	160'-3 7/16"	160'-4 1/8"	161'-10 7/16"	161'-11 1/8"
GDR5	161'-1 7/16"	161'-2 1/8"	162'-8 7/16"	162'-9 3/16"
GDR6	161'-11 3/4"	162'-0 1/2"	163'-6 3/4"	163'-7 1/2"



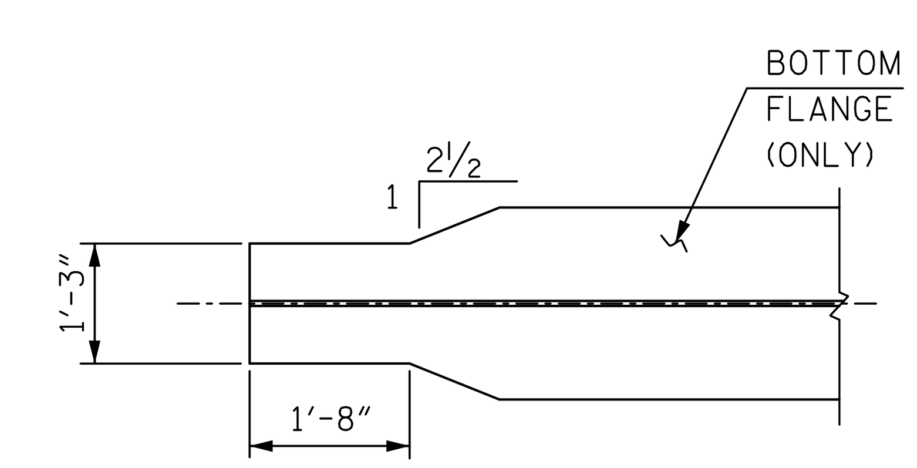
GIRDER - SHEAR CONNECTOR DETAIL



@ END BENT 1

@ END BENT 2

BOTTOM FLANGE GIRDER END DETAILS

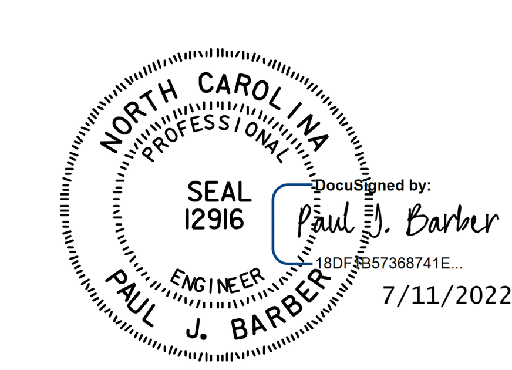


DETAIL A

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GIRDER DETAILS

HNTB

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	10/21
CHECKED BY	S. SULLIVAN	DATE	10/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 10

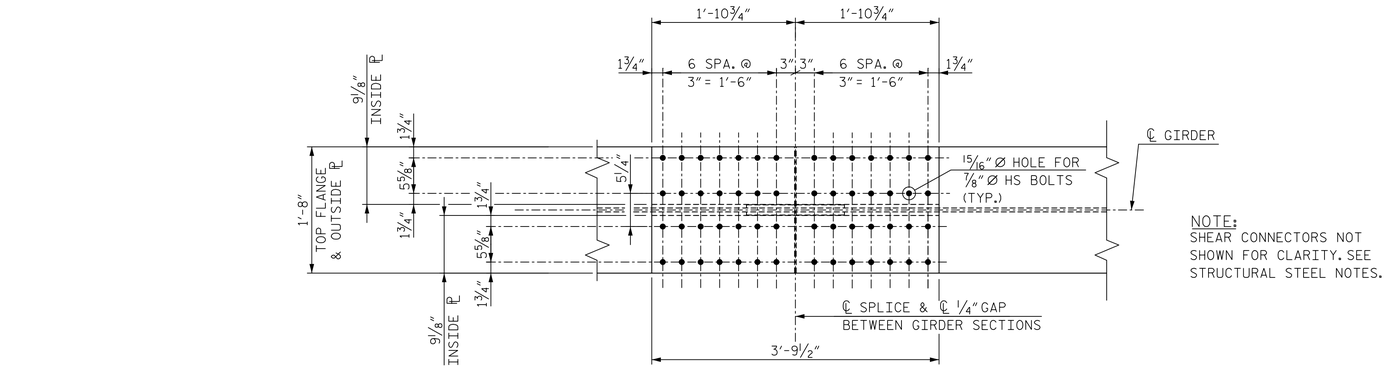
REVISIONS

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

SHEET NO. S-10

TOTAL SHEETS 34

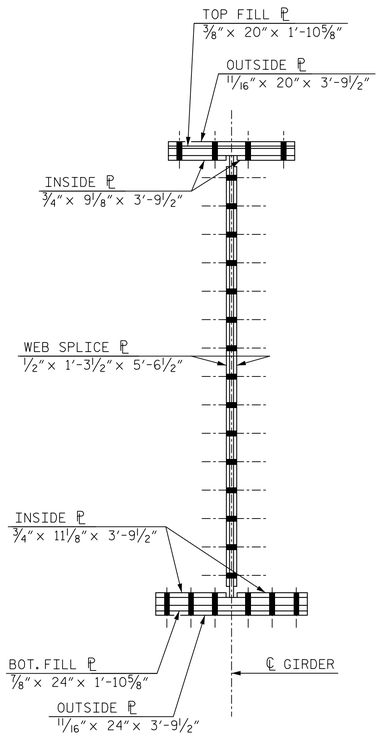
3/8/2022
8:05:50 AM
...\401_019_U5813_SMU_G1_010_75017 1.dgn



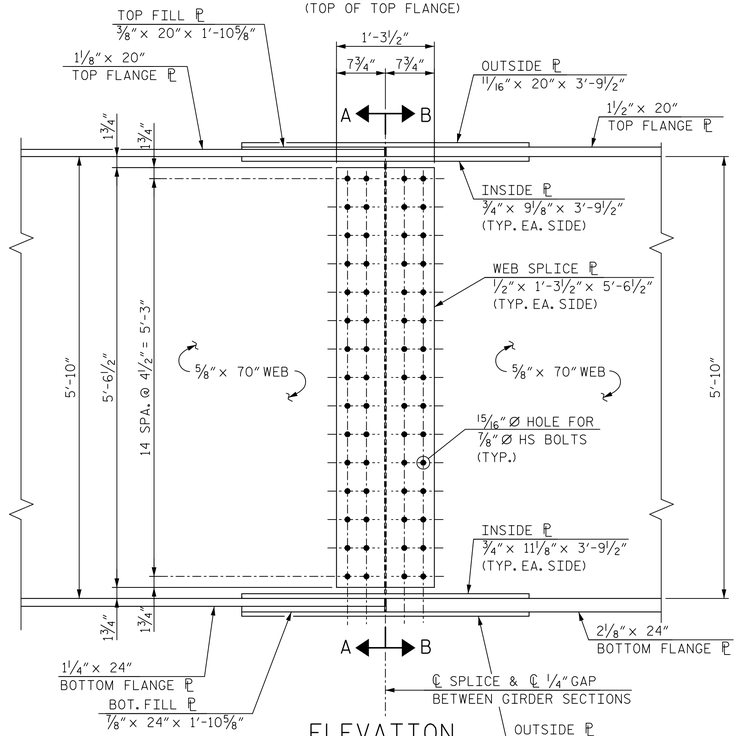
PLAN

(TOP OF TOP FLANGE)

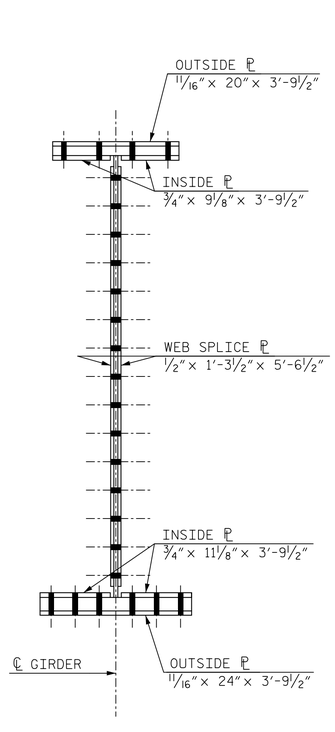
NOTE:
SHEAR CONNECTORS NOT SHOWN FOR CLARITY. SEE STRUCTURAL STEEL NOTES.



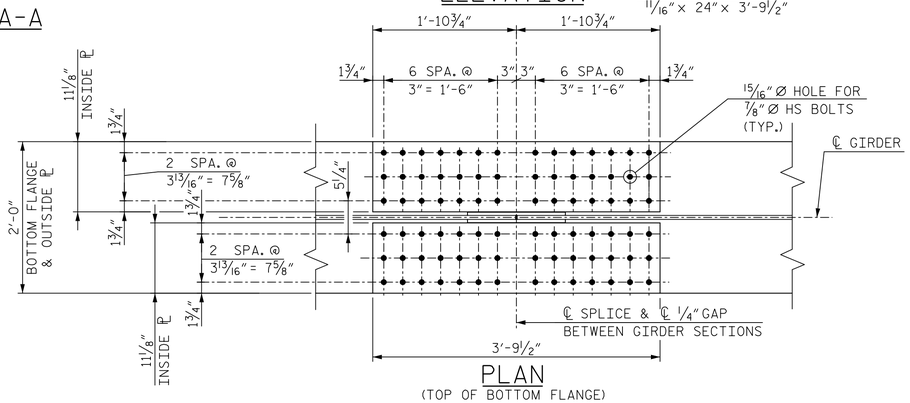
SECTION A-A



ELEVATION



SECTION B-B



PLAN

(TOP OF BOTTOM FLANGE)

BOLTED FIELD SPLICE

STRUCTURAL STEEL NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE ⅞" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES AND WEB SPLICE PLATES (IF USED) FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50W.

PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, 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.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

ENDS OF GIRDERS SHALL BE PLUMB.

FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. GIRDERS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

STRUCTURAL STEEL ERECTION SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

Docusigned by: Paul J. Barber 1BD58573687414E...

7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	1/22
CHECKED BY	Z. REINEKE	DATE	1/22
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 11

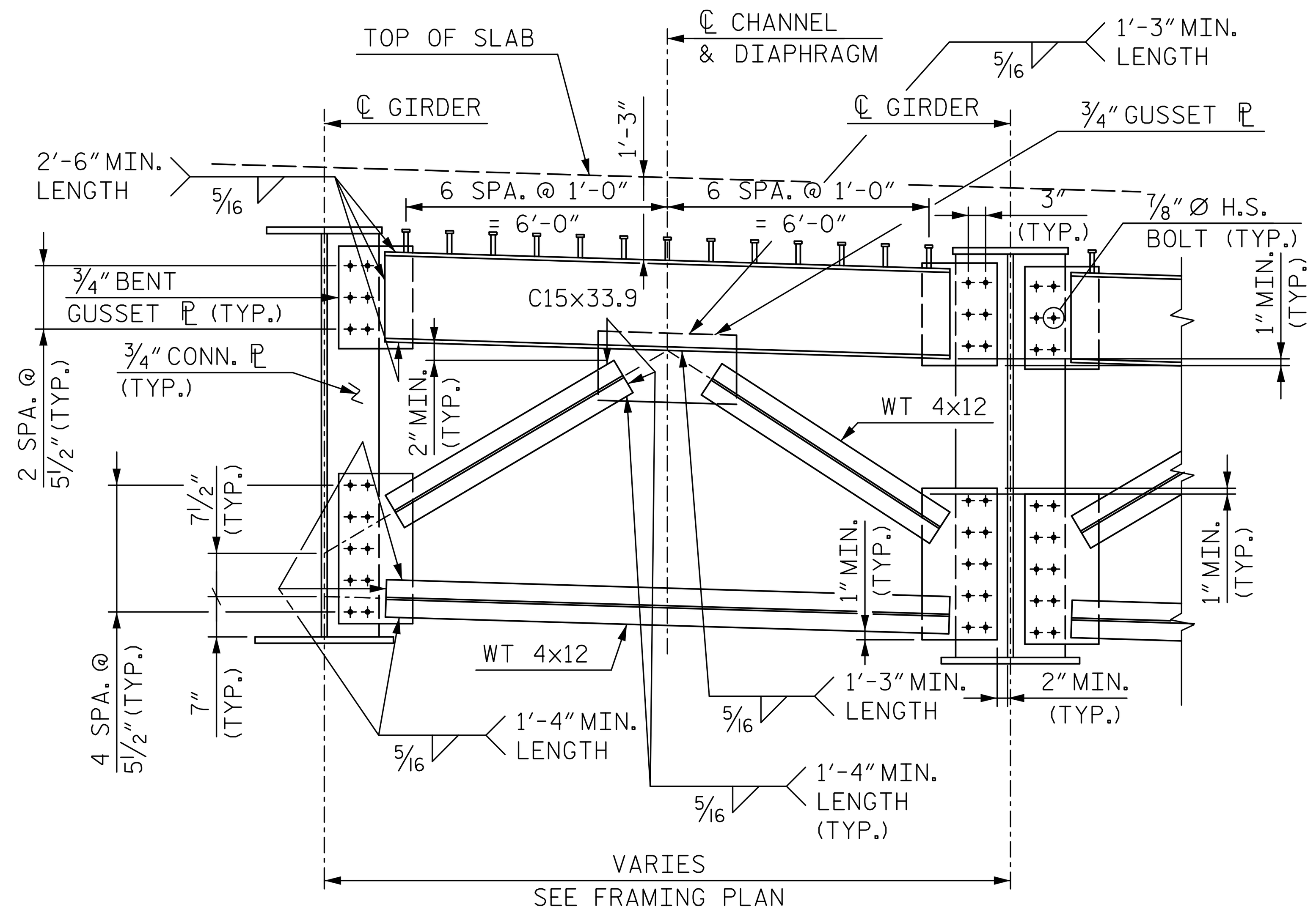
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FIELD SPLICE AND STRUCTURAL STEEL NOTES

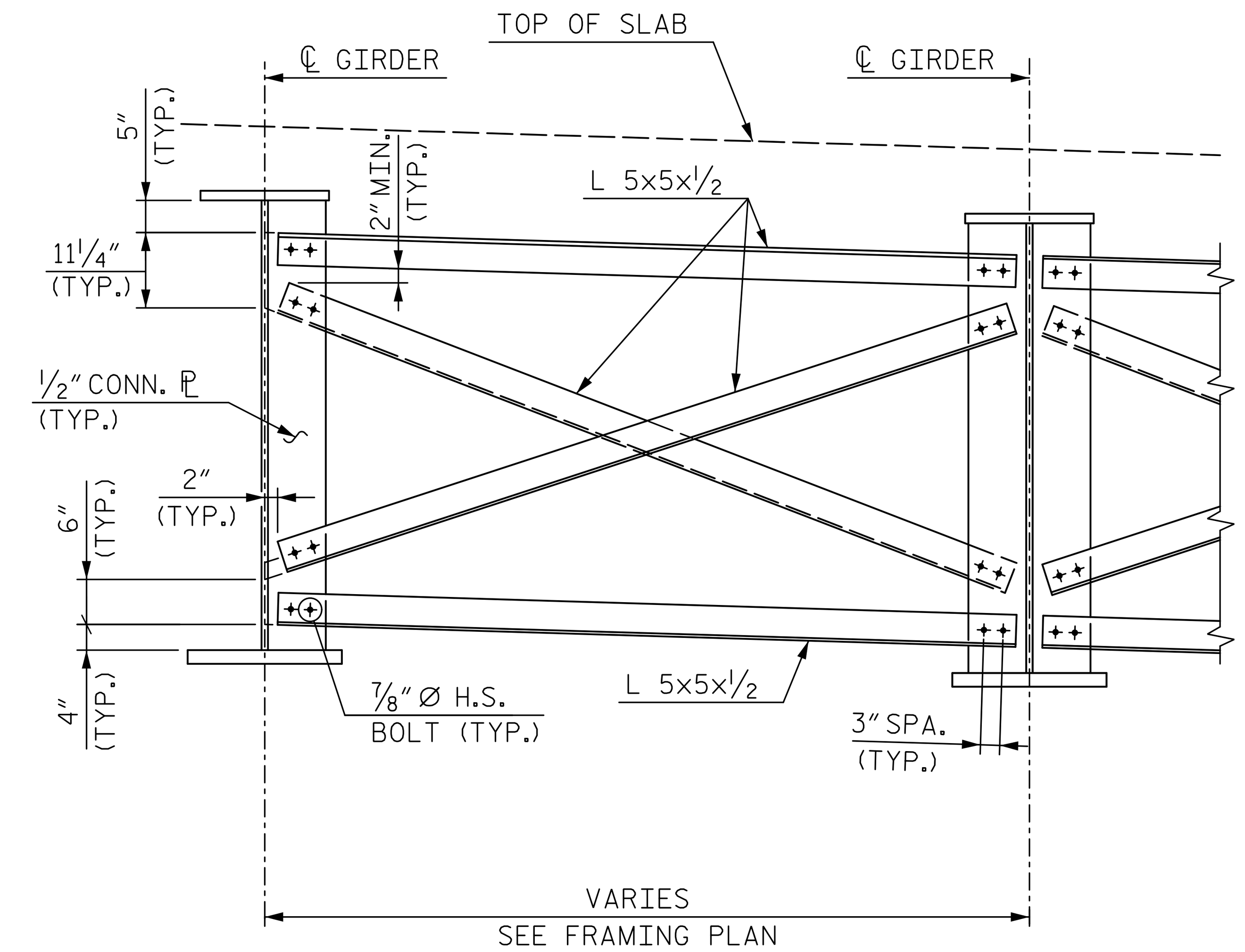
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-11
1			3			TOTAL SHEETS
2			4			34

3/8/2022
8:05:56 AM
...\401_021_U5813_SWU_02_011_750117.dgn

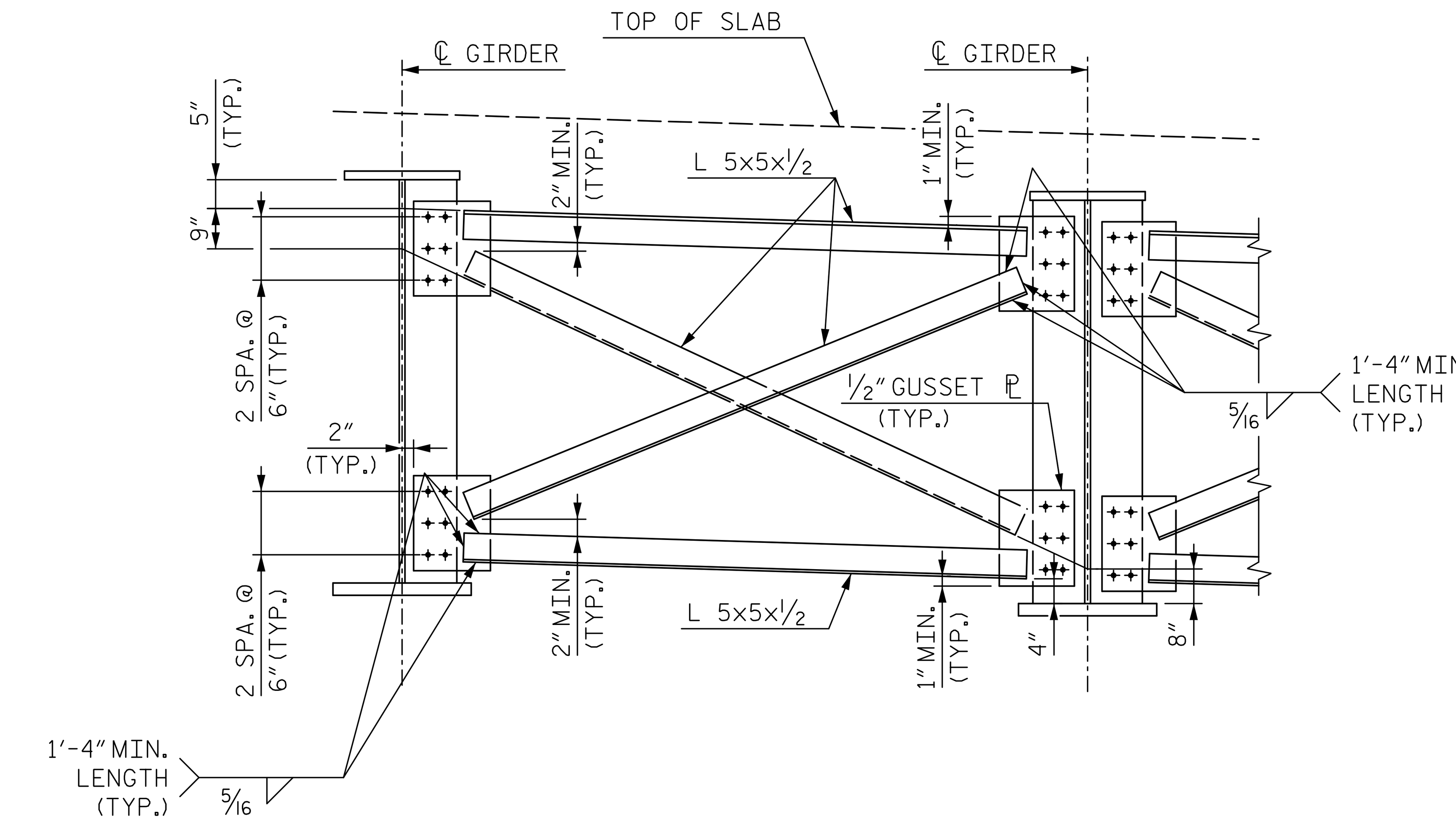


END BENT DIAPHRAGM (D1)

END BENT 1 SHOWN, END BENT 2 SIMILAR.

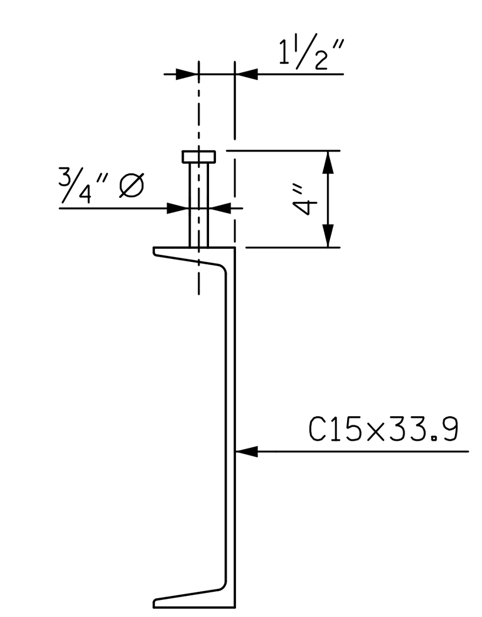


INTERMEDIATE DIAPHRAGM (D2)

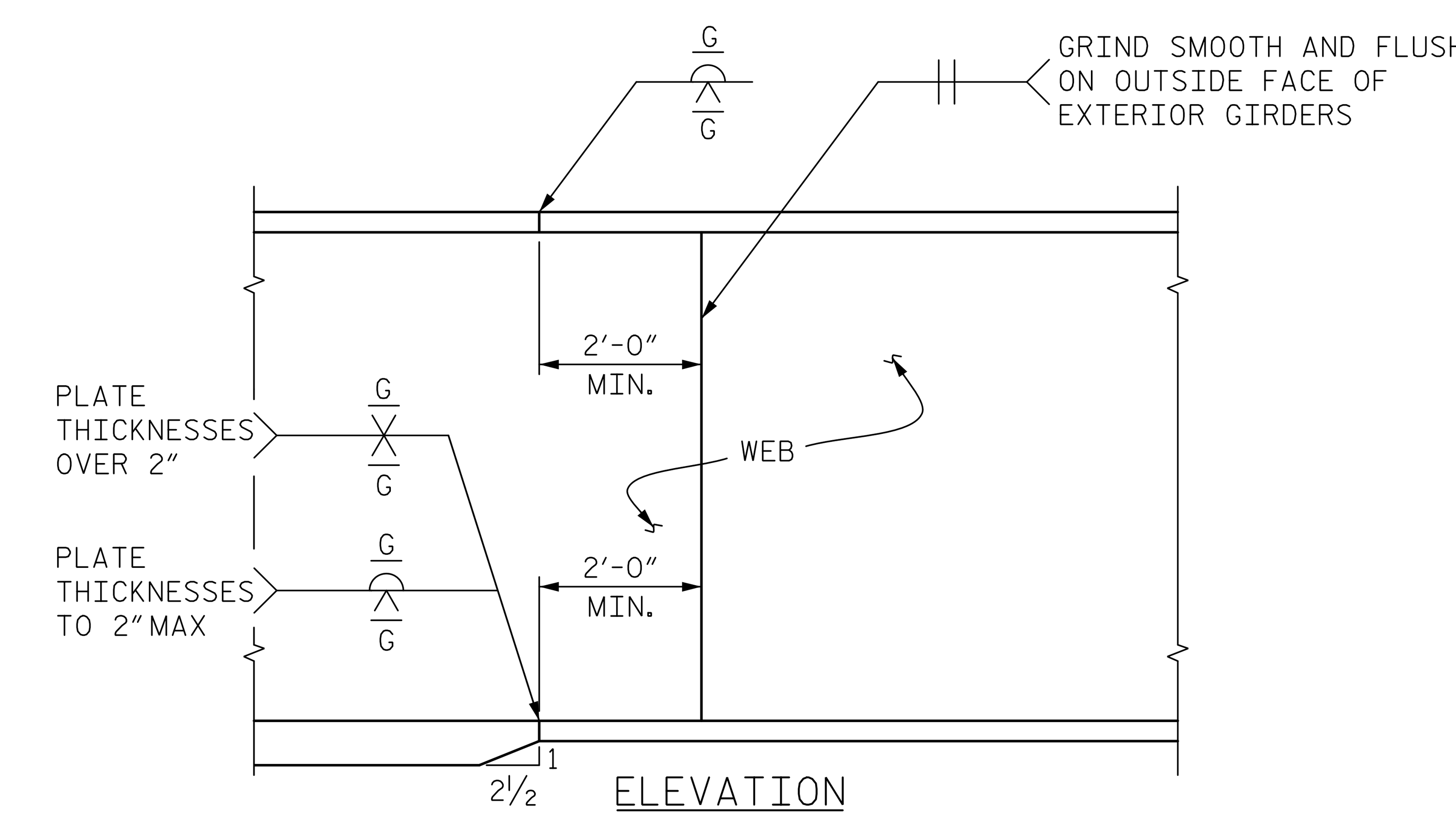


OPTIONAL INTERMEDIATE DIAPHRAGM (D2)

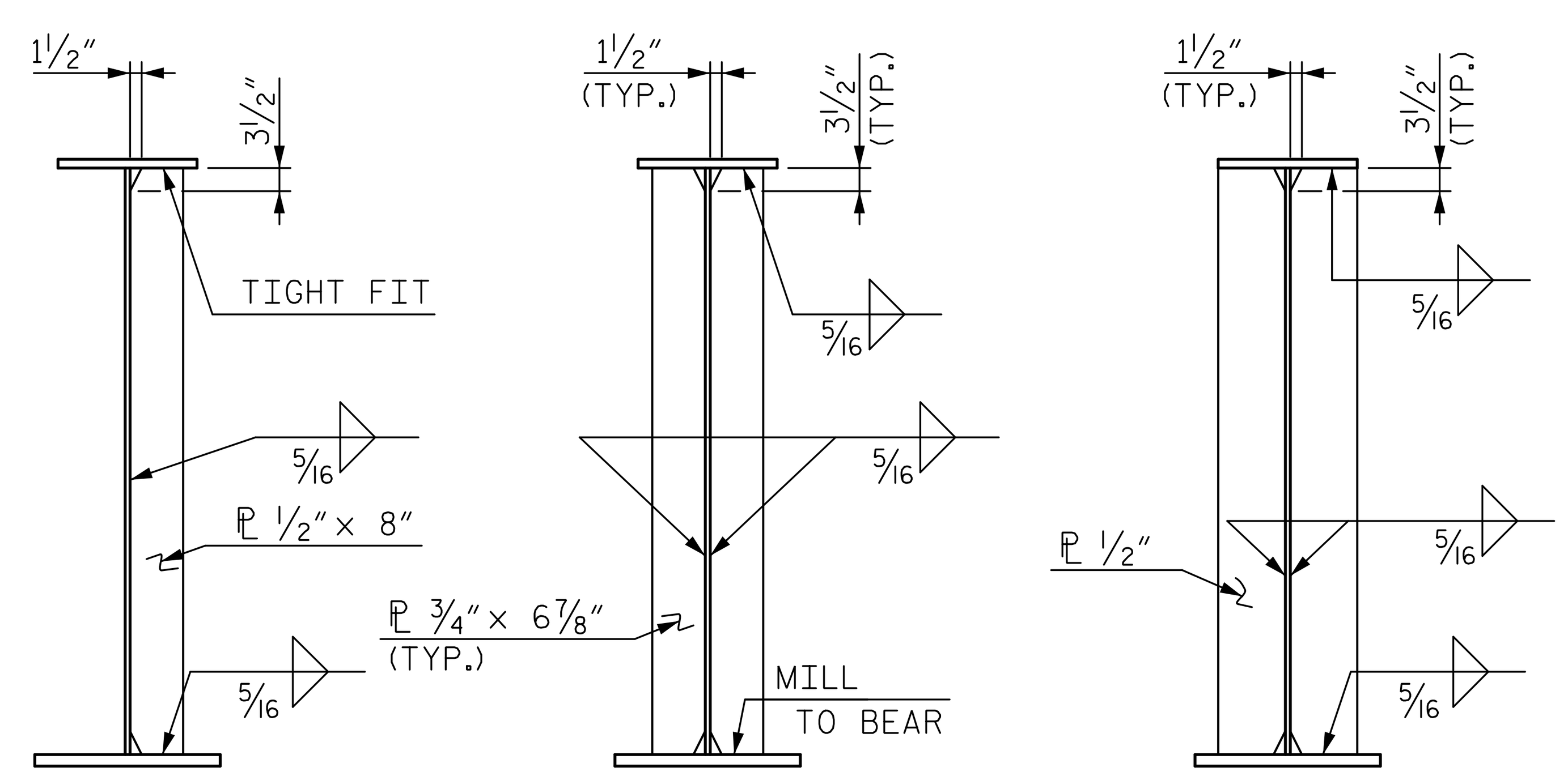
AT THE CONTRACTOR'S OPTION, THE DIAPHRAGM WITH THE WELDED GUSSET PLATES MAY BE USED IN LIEU OF THE DIAPHRAGM WITH THE BOLTED ANGLES AT NO ADDITIONAL COST TO THE DEPARTMENT.



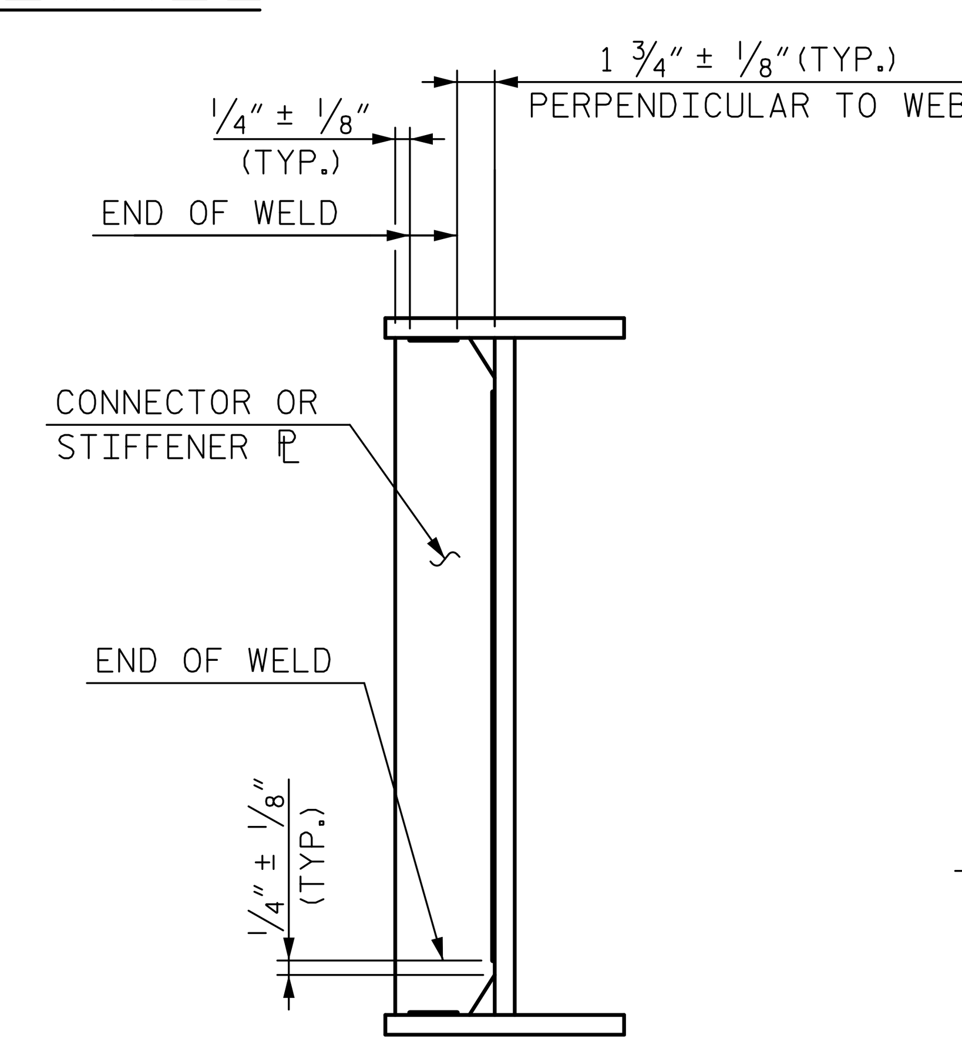
CHANNEL - SHEAR STUD DETAIL



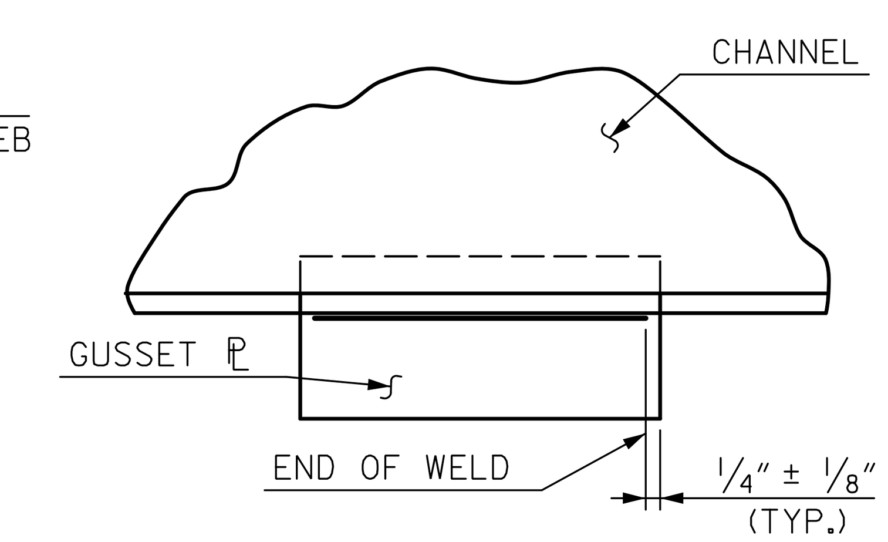
TYPICAL FLANGE AND WEB BUTT JOINT



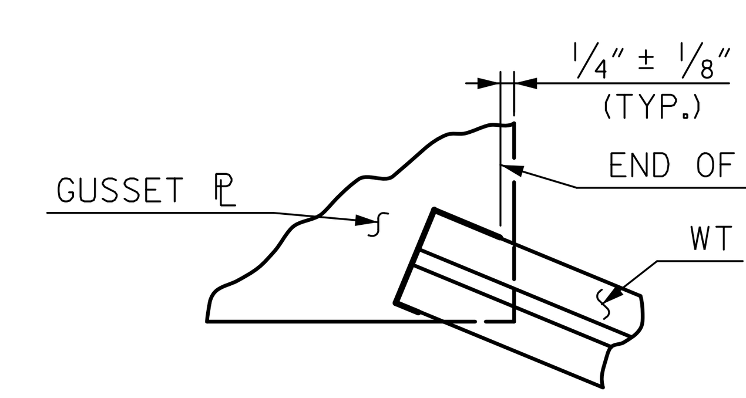
STIFFENER & CONNECTOR ℙ DETAILS



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS



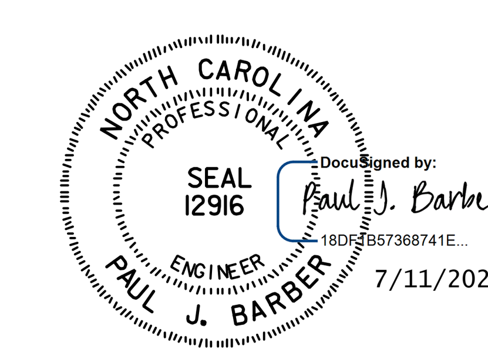
TYPICAL GUESSET PLATE CONNECTION



TYPICAL "TEE" TO GUSSET PLATE CONNECTION

WELD TERMINATION DETAILS

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 2/20
CHECKED BY S. SULLIVAN DATE 10/21
ENGINEER OF RECORD P. BARBER DATE 1/22
DWG. NO. 12

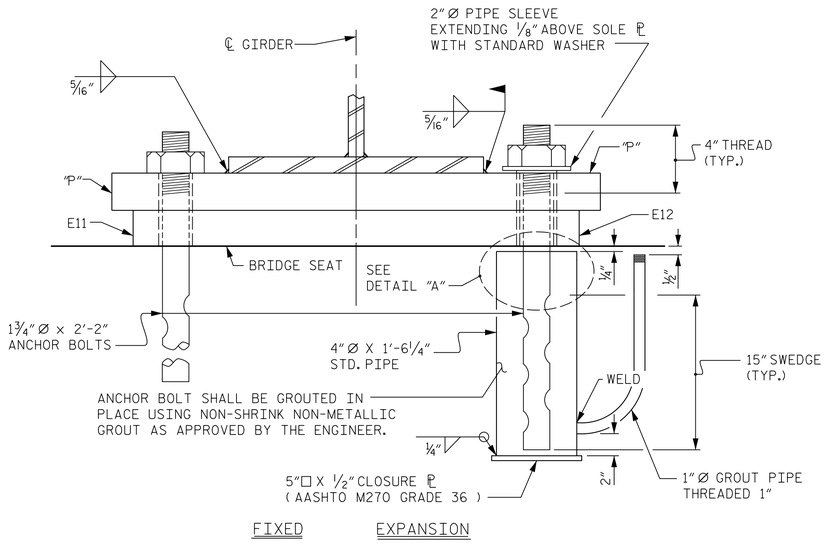
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

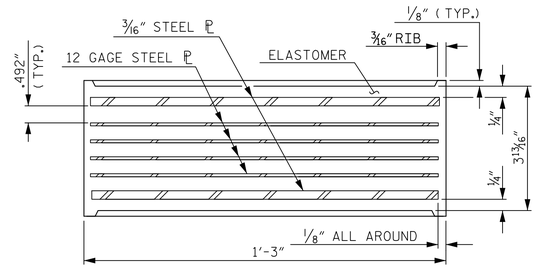
STRUCTURAL STEEL DETAILS

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

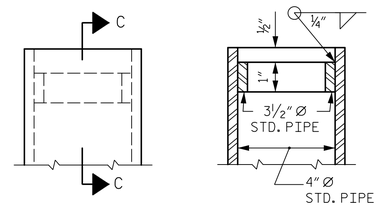
SHEET NO. S-12
TOTAL SHEETS 34



END VIEW

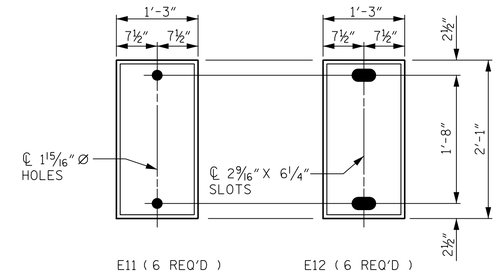


TYPICAL SECTION OF ELASTOMERIC BEARINGS



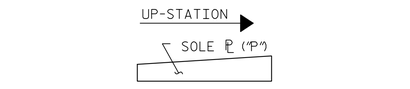
SECTION C-C

DETAIL "A"

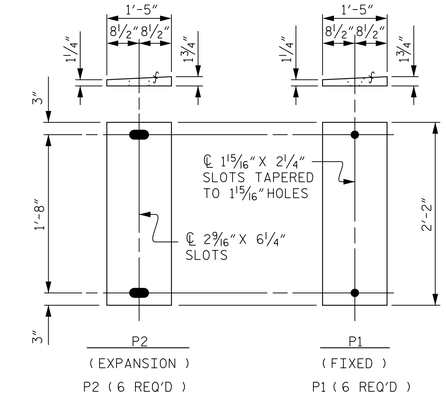


PLAN VIEW OF ELASTOMERIC BEARING

TYPE VI



SOLE ℙ PLACEMENT DETAIL



SOLE PLATE DETAILS ("P")

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE VI	360 K

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½" 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.

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR PAINTED STRUCTURAL STEEL (EXCLUDING AASHTO M270 GRADE 50W), SOLE PLATES, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, 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.

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 STANDARD SPECIFICATIONS.

THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THE EXPANSION ASSEMBLY NEED NOT BE GALVANIZED.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED THEN THE ANCHOR BOLTS AND ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60°F.

2. AFTER CENTERING THE ELASTOMERIC BEARING SLOTS AND ANCHOR BOLTS, THE ANCHOR BOLTS SHALL BE GROUTED.

THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

NORTH CAROLINA PROFESSIONAL SEAL 051219 ENGINEER SEAN R. SULLIVAN

DocuSigned by: Sean R. Sullivan 9/9/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	1/22
CHECKED BY	S. SULLIVAN	DATE	1/22
ENGINEER OF RECORD	S. SULLIVAN	DATE	4/24

DWG. NO. 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
(STEEL SUPERSTRUCTURE)

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-13
1			3			TOTAL SHEETS
2			4			34

STD. NO. EB2

ASSEMBLED BY : M. WRIGHT		DATE : 1/22	
CHECKED BY : S. SULLIVAN		DATE : 1/22	
DRAWN BY : JMB	11/87	REV. 6/13	AAC/MAA
CHECKED BY : ARB	11/87	REV. 12/17	MAA/THC
		REV. 10/21	BNB/AAI

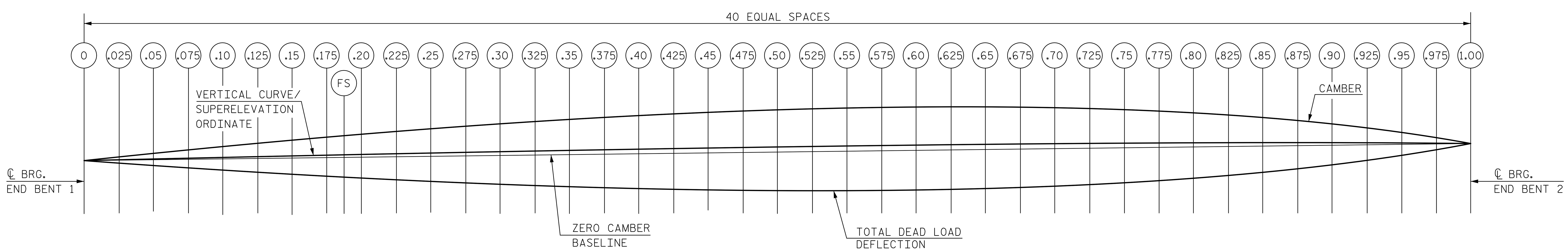
4/9/2024 10:46:54 AM
\\cdw001\projects\67753 - NCDOT 2016 P&DU-5813 (Design\Structures\DGN\Bridge#01_025.U5813_SMU_B01_013_750171.dgn

DEAD LOAD DEFLECTION & CAMBER SCHEDULE - GIRDER 1

FORTIETH POINTS	SPAN A																				
	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	FS	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.000	0.014	0.028	0.041	0.054	0.067	0.079	0.090	0.095	0.101	0.111	0.120	0.129	0.137	0.144	0.150	0.155	0.159	0.163	0.165	0.167
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.000	0.036	0.071	0.105	0.138	0.170	0.200	0.229	0.242	0.256	0.282	0.306	0.327	0.347	0.365	0.381	0.394	0.405	0.414	0.420	0.424
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.008	0.016	0.023	0.030	0.037	0.044	0.050	0.052	0.055	0.060	0.065	0.070	0.073	0.077	0.080	0.082	0.084	0.086	0.087	0.087
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.058	0.115	0.169	0.222	0.273	0.322	0.368	0.390	0.412	0.453	0.491	0.526	0.557	0.585	0.610	0.631	0.648	0.662	0.672	0.677
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.000	0.004	0.007	0.011	0.014	0.017	0.020	0.022	0.023	0.025	0.027	0.029	0.031	0.032	0.034	0.035	0.036	0.037	0.038	0.038	0.039
REQUIRED CAMBER ↑	0	5/8	1 5/16	1 7/8	2 1/2	3 1/16	3 5/8	4 1/8	4 3/8	4 5/8	5 1/8	5 9/16	5 15/16	6 5/16	6 5/8	6 7/8	7 1/8	7 5/16	7 1/2	7 5/8	7 11/16
FORTIETH POINTS	SPAN A																				
	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.167	0.167	0.165	0.163	0.160	0.155	0.150	0.144	0.137	0.129	0.121	0.111	0.101	0.090	0.079	0.067	0.054	0.041	0.028	0.014	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.425	0.424	0.420	0.414	0.406	0.395	0.382	0.367	0.349	0.329	0.308	0.284	0.258	0.231	0.202	0.171	0.139	0.106	0.072	0.036	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.087	0.087	0.086	0.084	0.082	0.080	0.077	0.074	0.070	0.066	0.062	0.057	0.052	0.046	0.041	0.034	0.028	0.021	0.014	0.007	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.679	0.677	0.671	0.662	0.648	0.631	0.610	0.585	0.557	0.525	0.490	0.452	0.411	0.368	0.321	0.273	0.222	0.169	0.114	0.058	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.039	0.039	0.038	0.038	0.037	0.036	0.035	0.034	0.032	0.031	0.029	0.027	0.025	0.022	0.020	0.017	0.014	0.011	0.007	0.004	0.000
REQUIRED CAMBER ↑	7 11/16	7 11/16	7 5/8	7 1/2	7 5/16	7 1/8	6 7/8	6 5/8	6 5/16	5 15/16	5 9/16	5 1/8	4 5/8	4 1/8	3 5/8	3 1/16	2 1/2	1 7/8	1 1/4	5/8	0

DEAD LOAD DEFLECTION & CAMBER SCHEDULE - GIRDER 2

FORTIETH POINTS	SPAN A																				
	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	FS	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.000	0.014	0.027	0.040	0.053	0.065	0.077	0.088	0.093	0.099	0.109	0.118	0.126	0.134	0.140	0.146	0.152	0.156	0.159	0.161	0.163
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.000	0.035	0.068	0.101	0.133	0.164	0.193	0.221	0.233	0.247	0.272	0.294	0.315	0.334	0.351	0.366	0.379	0.389	0.398	0.403	0.407
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.006	0.011	0.016	0.021	0.026	0.031	0.035	0.037	0.039	0.043	0.046	0.049	0.051	0.054	0.056	0.057	0.058	0.059	0.059	0.059
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.054	0.107	0.158	0.208	0.255	0.301	0.344	0.362	0.385	0.423	0.458	0.490	0.520	0.546	0.568	0.588	0.603	0.616	0.624	0.629
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.000	0.004	0.007	0.011	0.014	0.017	0.020	0.023	0.024	0.025	0.027	0.029	0.031	0.033	0.034	0.036	0.037	0.038	0.038	0.039	0.039
REQUIRED CAMBER ↑	0	5/8	1 3/16	1 3/4	2 5/16	2 7/8	3 3/8	3 7/8	4 1/16	4 5/16	4 3/4	5 1/8	5 1/2	5 13/16	6 1/8	6 3/8	6 5/8	6 13/16	6 15/16	7	7 1/16
FORTIETH POINTS	SPAN A																				
	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.163	0.163	0.161	0.159	0.156	0.151	0.146	0.140	0.134	0.126	0.118	0.108	0.099	0.088	0.077	0.065	0.053	0.040	0.027	0.014	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.408	0.407	0.403	0.398	0.390	0.379	0.366	0.352	0.335	0.316	0.295	0.272	0.247	0.221	0.193	0.164	0.133	0.101	0.069	0.035	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.059	0.058	0.057	0.056	0.054	0.053	0.050	0.048	0.045	0.042	0.039	0.035	0.032	0.028	0.024	0.020	0.016	0.012	0.008	0.004	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.631	0.628	0.622	0.613	0.600	0.583	0.563	0.540	0.513	0.484	0.451	0.416	0.378	0.337	0.294	0.249	0.202	0.154	0.104	0.052	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.039	0.039	0.039	0.038	0.038	0.037	0.036	0.034	0.033	0.031	0.029	0.027	0.025	0.023	0.020	0.017	0.014	0.011	0.007	0.004	0.000
REQUIRED CAMBER ↑	7 1/8	7 1/16	7	6 7/8	6 3/4	6 9/16	6 5/16	6 1/16	5 3/4	5 7/16	5 1/16	4 11/16	4 1/4	3 3/4	3 5/16	2 13/16	2 1/4	1 11/16	1 3/16	9/16	0



SCHEMATIC DEFLECTION AND CAMBER ORDINATES

(F.S. = FIELD SPLICE)

NOTES:

SLOPE FOR THE ZERO CAMBER BASELINE VARIES.

ALL VALUES SHOWN IN FEET (DECIMAL FORM), EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTIONAL FORM).

FORTIETH POINTS ARE TAKEN FROM ℄ BEARING TO ℄ BEARING.

SEAL 12916 NORTH CAROLINA PROFESSIONAL ENGINEER PAUL J. BARBER

DocuSigned by: Paul J. Barber 7/11/2022

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GIRDER CAMBER AND DEFLECTIONS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 12/21
CHECKED BY Z. REINEKE DATE 12/21
ENGINEER OF RECORD P. BARBER DATE 1/22

DWG. NO. 14

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

SHEET NO. S-14

TOTAL SHEETS 34

3/8/2022 8:06:12 AM ...\401_027_U5813_SMU_DL_014_75017.dgn

DEAD LOAD DEFLECTION & CAMBER SCHEDULE - GIRDER 3

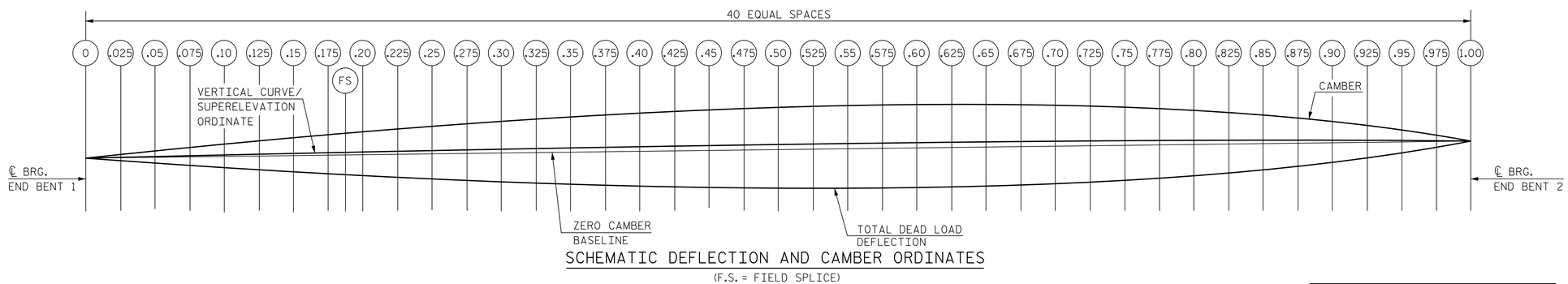
FORTIETH POINTS	SPAN A																					
	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	FS	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.000	0.014	0.027	0.040	0.053	0.065	0.077	0.088	0.093	0.099	0.109	0.118	0.126	0.134	0.141	0.147	0.152	0.156	0.160	0.162	0.163
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.000	0.034	0.068	0.100	0.132	0.162	0.191	0.219	0.230	0.245	0.269	0.292	0.313	0.332	0.349	0.364	0.376	0.387	0.395	0.401	0.404
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.004	0.008	0.012	0.015	0.019	0.022	0.026	0.027	0.029	0.031	0.034	0.036	0.038	0.040	0.042	0.043	0.044	0.045	0.045	0.045
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.052	0.103	0.153	0.201	0.247	0.291	0.333	0.349	0.373	0.410	0.444	0.476	0.504	0.530	0.552	0.571	0.587	0.599	0.608	0.613
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.000	0.004	0.008	0.011	0.014	0.017	0.020	0.023	0.024	0.025	0.028	0.030	0.032	0.033	0.035	0.036	0.037	0.038	0.039	0.039	0.040
REQUIRED CAMBER ↑	0	9/16	1 1/8	1 11/16	2 1/4	2 3/4	3 1/4	3 3/4	3 7/8	4 3/16	4 9/16	5	5 5/16	5 5/8	5 15/16	6 3/16	6 7/16	6 9/16	6 3/4	6 13/16	6 7/8

FORTIETH POINTS	SPAN A																				
	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.164	0.163	0.162	0.160	0.156	0.152	0.147	0.141	0.134	0.127	0.118	0.109	0.099	0.089	0.077	0.066	0.053	0.041	0.027	0.014	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.406	0.405	0.401	0.396	0.388	0.377	0.365	0.350	0.334	0.315	0.294	0.271	0.247	0.221	0.193	0.164	0.133	0.101	0.069	0.035	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.045	0.045	0.044	0.044	0.042	0.041	0.040	0.038	0.036	0.033	0.031	0.028	0.026	0.023	0.020	0.017	0.013	0.010	0.007	0.003	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.615	0.613	0.608	0.599	0.586	0.571	0.551	0.529	0.503	0.475	0.443	0.409	0.372	0.332	0.290	0.246	0.200	0.152	0.103	0.052	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.040	0.040	0.039	0.039	0.038	0.037	0.036	0.035	0.033	0.032	0.030	0.028	0.025	0.023	0.020	0.017	0.014	0.011	0.008	0.004	0.000
REQUIRED CAMBER ↑	6 7/8	6 7/8	6 13/16	6 11/16	6 9/16	6 3/8	6 3/16	5 15/16	5 5/8	5 5/16	4 15/16	4 9/16	4 1/8	3 11/16	3 1/4	2 3/4	2 1/4	1 11/16	1 1/8	9/16	0

DEAD LOAD DEFLECTION & CAMBER SCHEDULE - GIRDER 4

FORTIETH POINTS	SPAN A																					
	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	FS	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.000	0.014	0.028	0.041	0.054	0.067	0.079	0.090	0.094	0.101	0.111	0.120	0.129	0.137	0.144	0.150	0.155	0.159	0.163	0.165	0.167
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.000	0.035	0.068	0.101	0.133	0.164	0.193	0.221	0.230	0.247	0.272	0.295	0.315	0.335	0.352	0.367	0.379	0.390	0.398	0.404	0.408
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.003	0.007	0.010	0.014	0.017	0.020	0.023	0.025	0.026	0.029	0.032	0.034	0.037	0.039	0.041	0.042	0.044	0.045	0.046	0.046
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.052	0.103	0.153	0.201	0.247	0.292	0.334	0.349	0.374	0.412	0.447	0.479	0.508	0.534	0.557	0.577	0.593	0.606	0.615	0.621
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.000	0.004	0.008	0.011	0.015	0.018	0.021	0.023	0.024	0.026	0.028	0.030	0.032	0.034	0.035	0.037	0.038	0.039	0.039	0.040	0.040
REQUIRED CAMBER ↑	0	9/16	1 1/8	1 11/16	2 1/4	2 3/4	3 1/4	3 3/4	3 7/8	4 3/16	4 5/8	5	5 3/8	5 11/16	6	6 1/4	6 7/16	6 5/8	6 13/16	6 7/8	6 15/16

FORTIETH POINTS	SPAN A																				
	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.167	0.167	0.165	0.163	0.159	0.155	0.150	0.144	0.137	0.129	0.121	0.111	0.101	0.090	0.079	0.067	0.054	0.041	0.028	0.014	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.409	0.408	0.405	0.399	0.391	0.380	0.368	0.353	0.336	0.317	0.296	0.273	0.249	0.222	0.195	0.165	0.134	0.102	0.069	0.035	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.047	0.047	0.047	0.046	0.046	0.044	0.043	0.042	0.040	0.038	0.035	0.032	0.030	0.026	0.023	0.020	0.016	0.012	0.008	0.004	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.623	0.622	0.617	0.608	0.596	0.580	0.561	0.539	0.513	0.484	0.452	0.417	0.380	0.339	0.297	0.252	0.205	0.156	0.105	0.053	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.040	0.040	0.040	0.039	0.039	0.038	0.037	0.035	0.034	0.032	0.030	0.028	0.026	0.023	0.021	0.018	0.015	0.011	0.008	0.004	0.000
REQUIRED CAMBER ↑	7	7	6 15/16	6 13/16	6 11/16	6 1/2	6 5/16	6 1/16	5 3/4	5 7/16	5 1/16	4 11/16	4 1/4	3 13/16	3 5/16	2 13/16	2 5/16	1 3/4	1 3/16	9/16	0



SCHEMATIC DEFLECTION AND CAMBER ORDINATES

(F.S. = FIELD SPLICE)

NOTES:

SLOPE FOR THE ZERO CAMBER BASELINE VARIES.

ALL VALUES SHOWN IN FEET (DECIMAL FORM), EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTIONAL FORM).

FORTIETH POINTS ARE TAKEN FROM ℄ BEARING TO ℄ BEARING.

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

DocuSigned by: Paul J. Barber 185F8B57368741E...

7/11/2022

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GIRDER CAMBER AND DEFLECTIONS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 12/21
CHECKED BY Z. REINEKE DATE 12/21
ENGINEER OF RECORD P. BARBER DATE 1/22

DWG. NO. 15

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-15
1			3			TOTAL SHEETS
2			4			34

3/8/2022
8:06:17 AM
...\401_023_U5813_SMU_DL_015_750171.dgn

DEAD LOAD DEFLECTION & CAMBER SCHEDULE - GIRDER 5

FORTIETH POINTS	SPAN A																				
	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	FS	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.000	0.014	0.029	0.043	0.056	0.069	0.081	0.093	0.097	0.104	0.115	0.124	0.133	0.141	0.149	0.155	0.160	0.165	0.168	0.171	0.173
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.000	0.035	0.070	0.103	0.135	0.166	0.196	0.224	0.233	0.251	0.276	0.300	0.321	0.340	0.358	0.373	0.386	0.397	0.405	0.411	0.415
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.004	0.009	0.013	0.017	0.022	0.026	0.030	0.031	0.034	0.038	0.042	0.045	0.048	0.051	0.054	0.056	0.059	0.060	0.062	0.063
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.054	0.107	0.159	0.209	0.257	0.303	0.348	0.361	0.389	0.429	0.466	0.499	0.530	0.558	0.582	0.603	0.620	0.634	0.644	0.651
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.000	0.004	0.008	0.011	0.015	0.018	0.021	0.024	0.024	0.026	0.029	0.031	0.033	0.034	0.036	0.037	0.038	0.039	0.040	0.041	0.041
REQUIRED CAMBER ↑	0	5/8	1 3/16	1 3/4	2 5/16	2 7/8	3 3/8	3 7/8	4 1/16	4 3/8	4 13/16	5 3/16	5 5/8	5 15/16	6 1/4	6 9/16	6 3/4	7	7 1/8	7 1/4	7 5/16
FORTIETH POINTS	SPAN A																				
	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.173	0.173	0.171	0.169	0.165	0.161	0.156	0.149	0.142	0.134	0.125	0.115	0.105	0.094	0.082	0.070	0.057	0.043	0.029	0.015	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.416	0.415	0.412	0.406	0.398	0.387	0.374	0.359	0.342	0.323	0.301	0.278	0.253	0.226	0.198	0.168	0.137	0.104	0.070	0.036	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.064	0.064	0.064	0.063	0.063	0.061	0.060	0.058	0.055	0.052	0.049	0.046	0.042	0.037	0.033	0.028	0.023	0.018	0.012	0.006	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.653	0.652	0.647	0.638	0.626	0.609	0.590	0.566	0.539	0.509	0.476	0.439	0.400	0.358	0.313	0.266	0.216	0.165	0.111	0.056	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.041	0.041	0.041	0.040	0.039	0.038	0.037	0.036	0.034	0.033	0.031	0.029	0.026	0.024	0.021	0.018	0.015	0.011	0.008	0.004	0.000
REQUIRED CAMBER ↑	7 3/8	7 5/16	7 1/4	7 3/16	7 1/16	6 7/8	6 5/8	6 3/8	6 1/16	5 3/4	5 5/16	4 15/16	4 1/2	4	3 1/2	3	2 7/16	1 13/16	1 1/4	5/8	0

DEAD LOAD DEFLECTION & CAMBER SCHEDULE - GIRDER 6

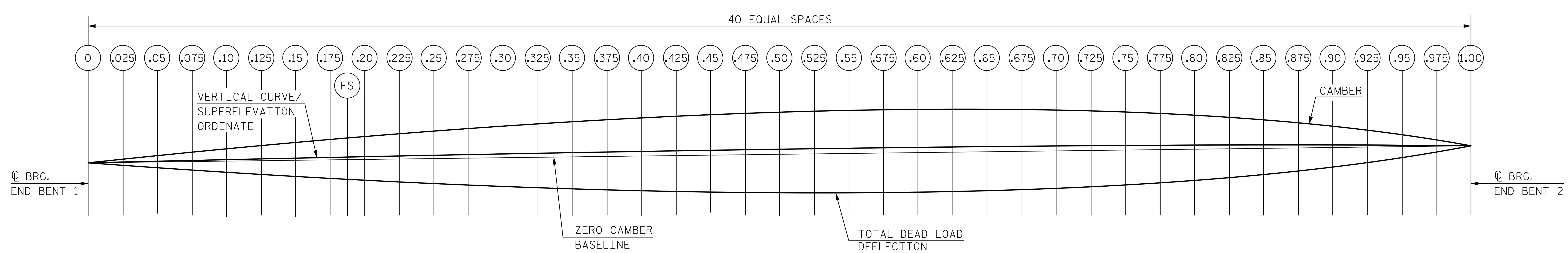
FORTIETH POINTS	SPAN A																				
	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	FS	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.000	0.016	0.031	0.046	0.060	0.074	0.087	0.100	0.103	0.112	0.123	0.133	0.143	0.152	0.159	0.166	0.172	0.176	0.180	0.182	0.184
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.000	0.037	0.073	0.108	0.142	0.175	0.206	0.236	0.244	0.264	0.290	0.314	0.336	0.356	0.374	0.390	0.403	0.414	0.423	0.429	0.432
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.000	0.008	0.015	0.023	0.030	0.037	0.043	0.049	0.051	0.055	0.061	0.066	0.071	0.075	0.079	0.083	0.086	0.088	0.090	0.092	0.093
TOTAL DEAD LOAD DEFLECTION ↓	0.000	0.060	0.119	0.177	0.232	0.286	0.337	0.385	0.398	0.431	0.474	0.514	0.550	0.583	0.613	0.638	0.660	0.679	0.693	0.703	0.709
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.000	0.004	0.008	0.012	0.015	0.018	0.021	0.024	0.025	0.027	0.029	0.031	0.033	0.035	0.036	0.038	0.039	0.040	0.041	0.041	0.041
REQUIRED CAMBER ↑	0	11/16	1 5/16	2	2 5/8	3 3/16	3 13/16	4 5/16	4 1/2	4 7/8	5 5/16	5 13/16	6 3/16	6 9/16	6 15/16	7 3/16	7 7/16	7 11/16	7 13/16	7 15/16	8
FORTIETH POINTS	SPAN A																				
	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLECTION DUE TO WEIGHT OF STEEL ↓	0.184	0.184	0.182	0.179	0.175	0.171	0.165	0.158	0.150	0.142	0.132	0.122	0.111	0.099	0.086	0.073	0.059	0.045	0.031	0.015	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ↓	0.433	0.432	0.428	0.422	0.413	0.402	0.388	0.373	0.354	0.334	0.312	0.288	0.262	0.234	0.205	0.174	0.141	0.107	0.073	0.037	0.000
DEFLECTION DUE TO WEIGHT OF RAIL ↓	0.093	0.093	0.093	0.092	0.090	0.088	0.086	0.082	0.079	0.075	0.070	0.065	0.059	0.053	0.047	0.040	0.033	0.025	0.017	0.009	0.000
TOTAL DEAD LOAD DEFLECTION ↓	0.711	0.709	0.703	0.693	0.679	0.661	0.639	0.613	0.583	0.550	0.514	0.474	0.432	0.386	0.337	0.286	0.233	0.178	0.120	0.061	0.000
VERTICAL CURVE ORDINATE ↑	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE ↑	0.042	0.041	0.041	0.041	0.040	0.039	0.038	0.036	0.035	0.033	0.031	0.029	0.027	0.024	0.021	0.018	0.015	0.012	0.008	0.004	0.000
REQUIRED CAMBER ↑	8 1/16	8	7 15/16	7 13/16	7 11/16	7 7/16	7 3/16	6 15/16	6 9/16	6 3/16	5 13/16	5 3/8	4 7/8	4 5/16	3 13/16	3 1/4	2 5/8	2	1 3/8	11/16	0

NOTES:

SLOPE FOR THE ZERO CAMBER BASELINE VARIES.

ALL VALUES SHOWN IN FEET (DECIMAL FORM), EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTIONAL FORM).

FORTIETH POINTS ARE TAKEN FROM ℄ BEARING TO ℄ BEARING.



SCHEMATIC DEFLECTION AND CAMBER ORDINATES

(F.S. = FIELD SPLICE)

SEAL 12916 — NORTH CAROLINA PROFESSIONAL ENGINEER — PAUL J. BARBER

DocuSigned by: Paul J. Barber 7/11/2022

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GIRDER CAMBER AND DEFLECTIONS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	12/21
CHECKED BY	Z. REINEKE	DATE	12/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

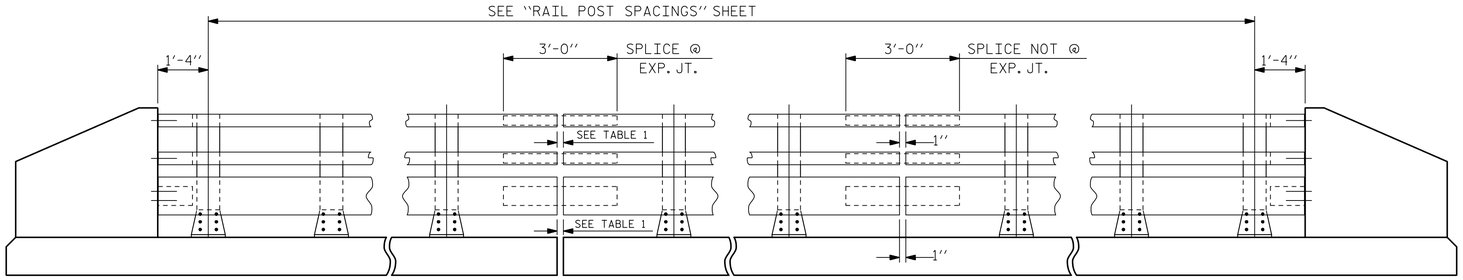
DWG. NO. 16

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

SHEET NO. S-16

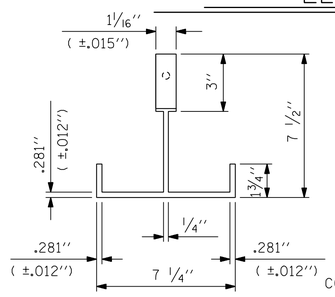
TOTAL SHEETS 34

3/8/2022
8:06:22 AM
...\401_031_U5813_SMU_DL_016_75017.dgn

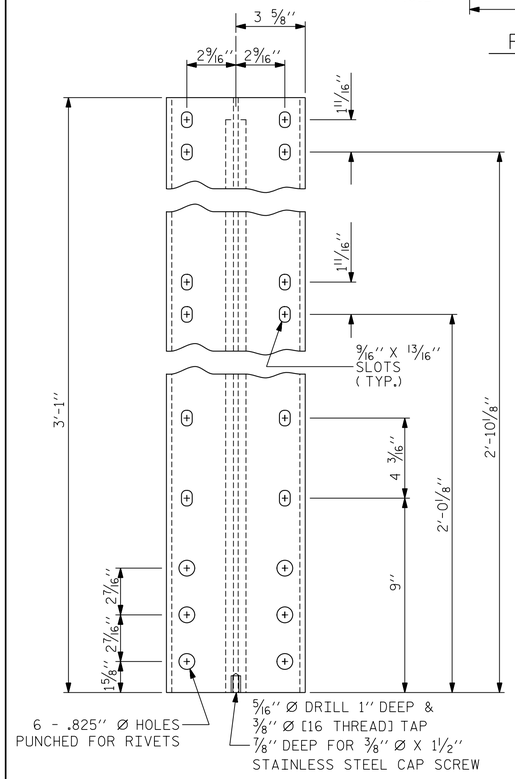


NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

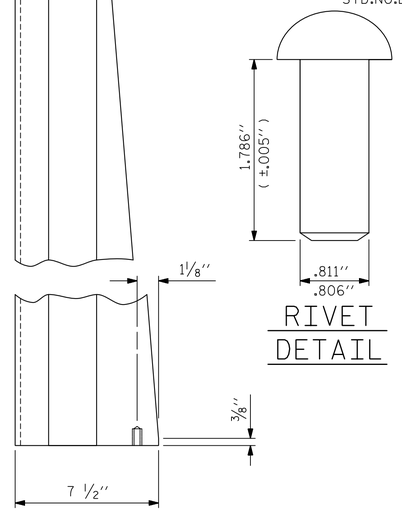
ELEVATION



PLAN

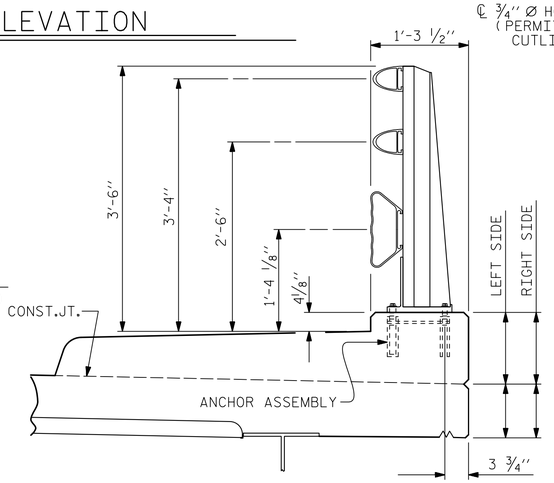


FRONT ELEVATION



SIDE ELEVATION

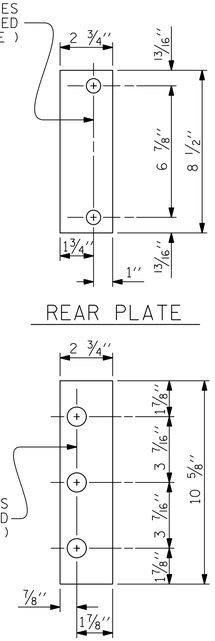
DETAILS OF POST



SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6

RIVET DETAIL

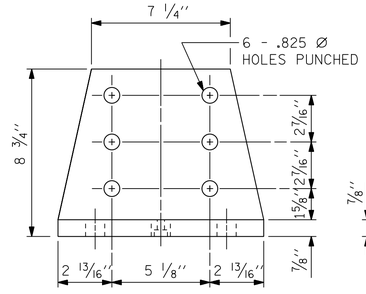


REAR PLATE

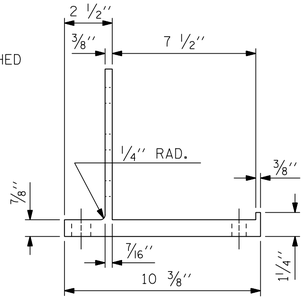
FRONT PLATE

SHIM DETAILS

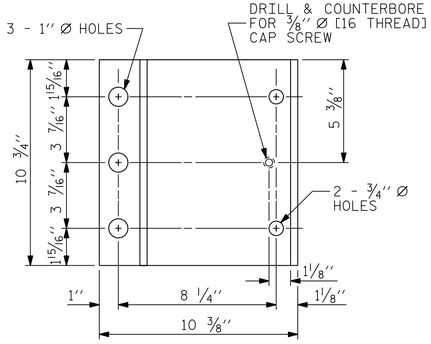
NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



FRONT ELEVATION



SIDE ELEVATION



PLAN

POST BASE DETAILS

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.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 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. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS FOR RAIL ATTACHMENT 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 REMAIN 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.

PAY LENGTH = 312.1 LIN.FT.

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
DocuSigned by: Paul J. Barber 18DF1B57368741E...
7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

ASSEMBLED BY : M. WRIGHT	DATE : 2/20		
CHECKED BY : Z. REINEKE	DATE : 10/21		
DRAWN BY : JMB 1/88	REV. 5/1/06	TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

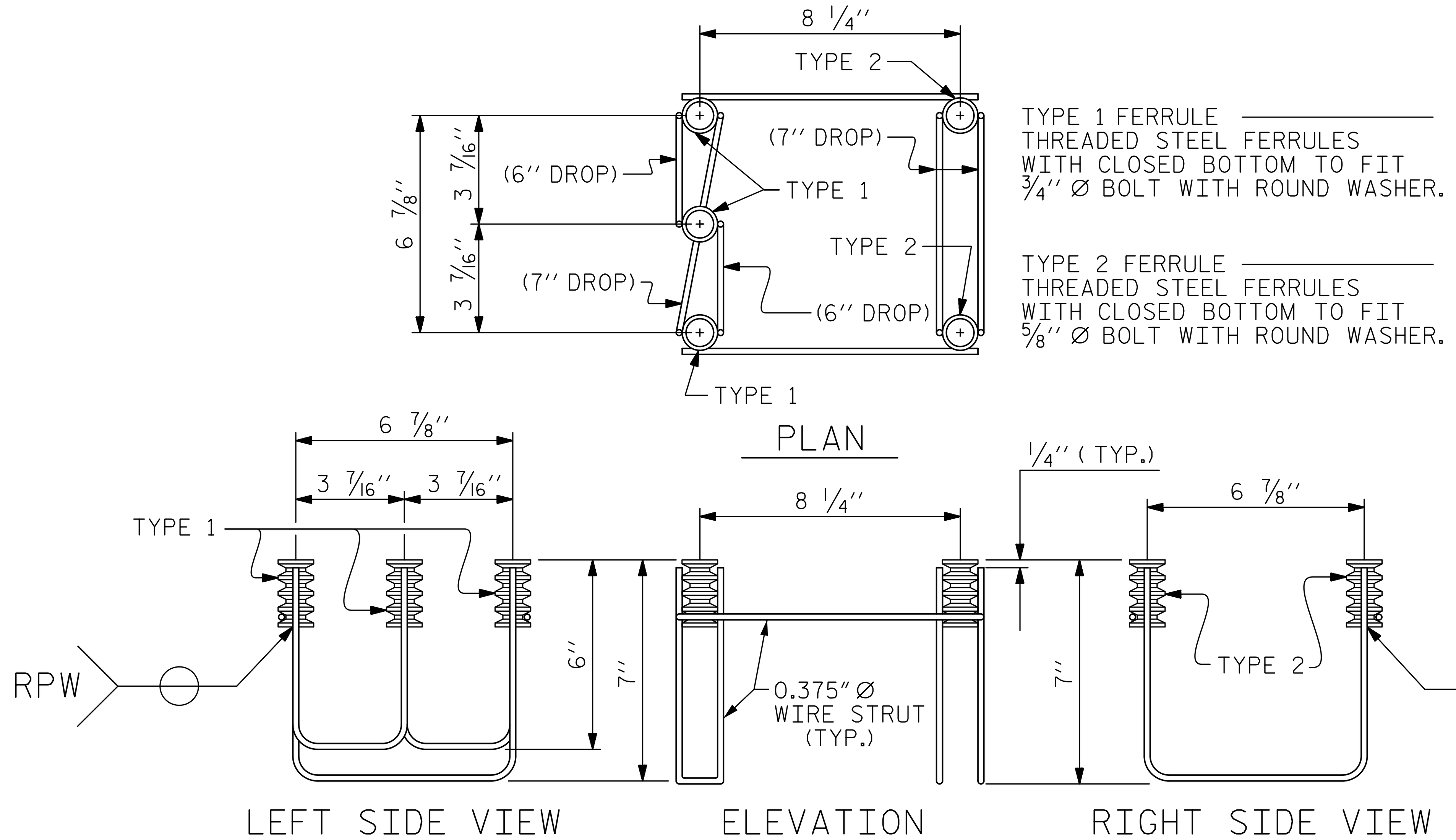
DRAWN BY	M. WRIGHT	DATE	2/20
CHECKED BY	Z. REINEKE	DATE	10/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 17

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-17
1			3			TOTAL SHEETS
2			4			34

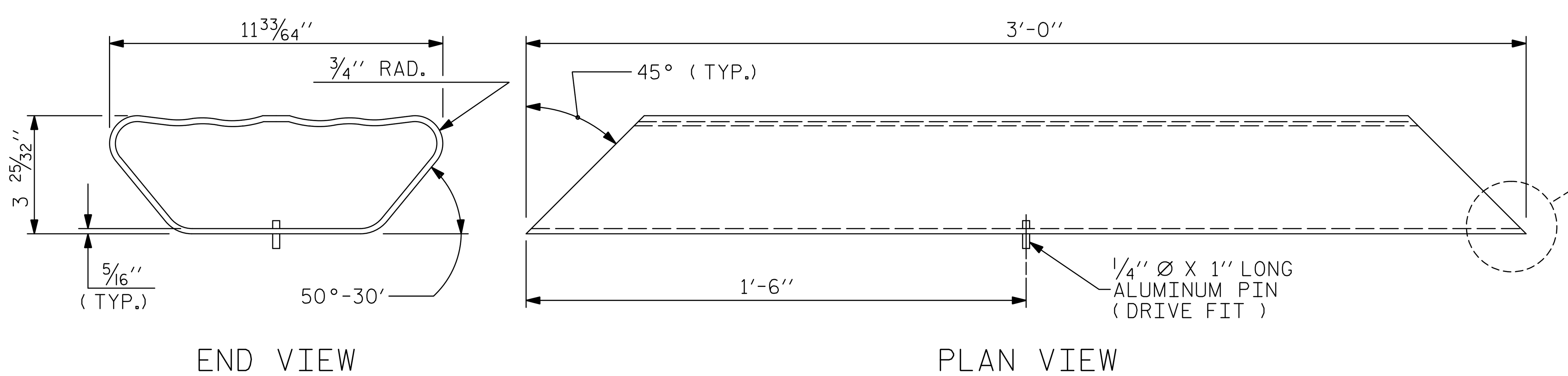
STD. NO. BMR5

3/8/2022 8:06:27 AM
J:\407\1.053_U5813_SMU_3MR01.017_750117.dgn



5-BOLT METAL RAIL ANCHOR ASSEMBLY

(54 ASSEMBLIES REQUIRED)



BOTTOM RAIL EXPANSION BAR

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 AND 1 3/4″ FOR 5/8″ FERRULES.

B. 3 - 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.

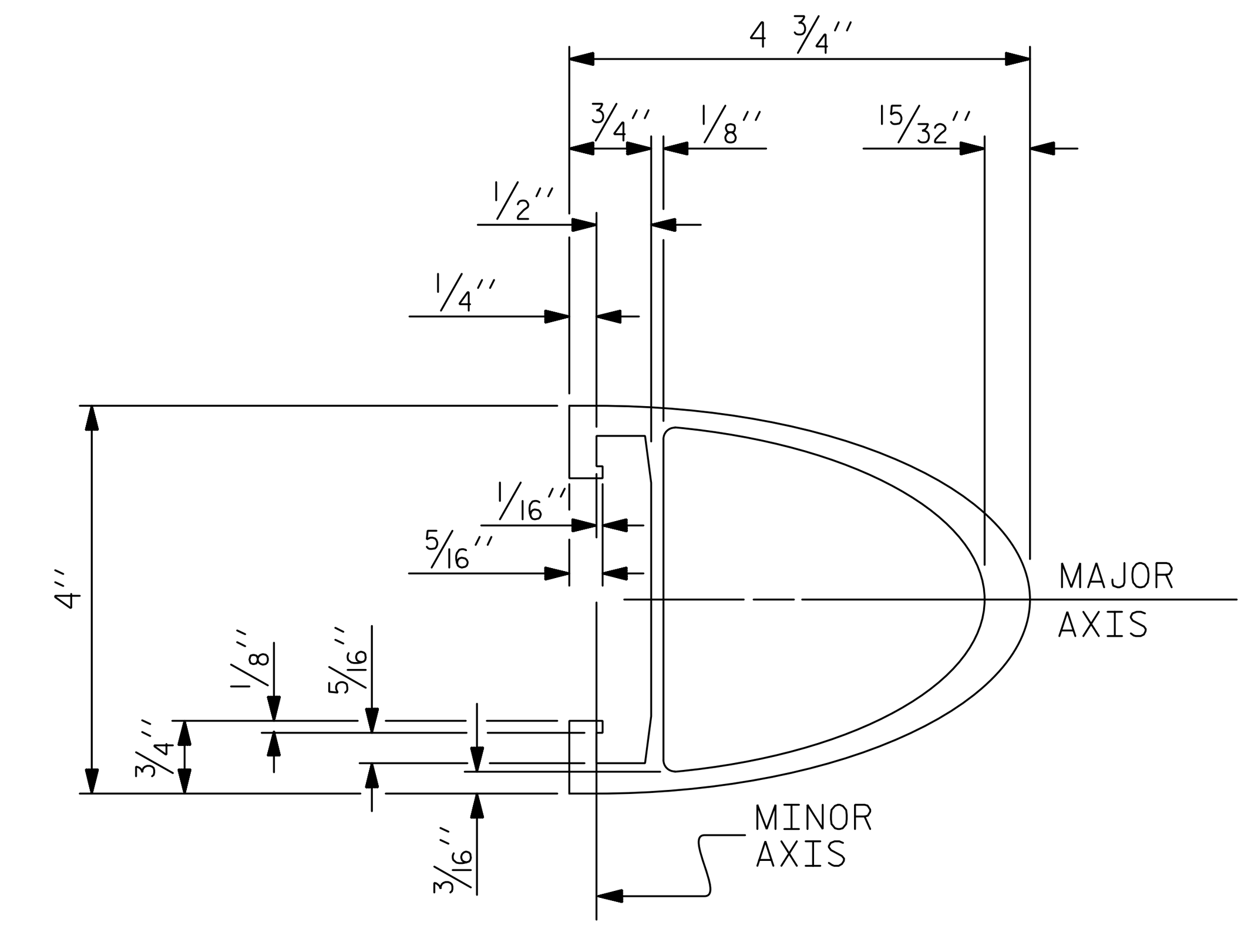
C. 2 - 5/8″ Ø X 2 1/4″ BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8″ Ø X 2 1/4″ GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

D. 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.

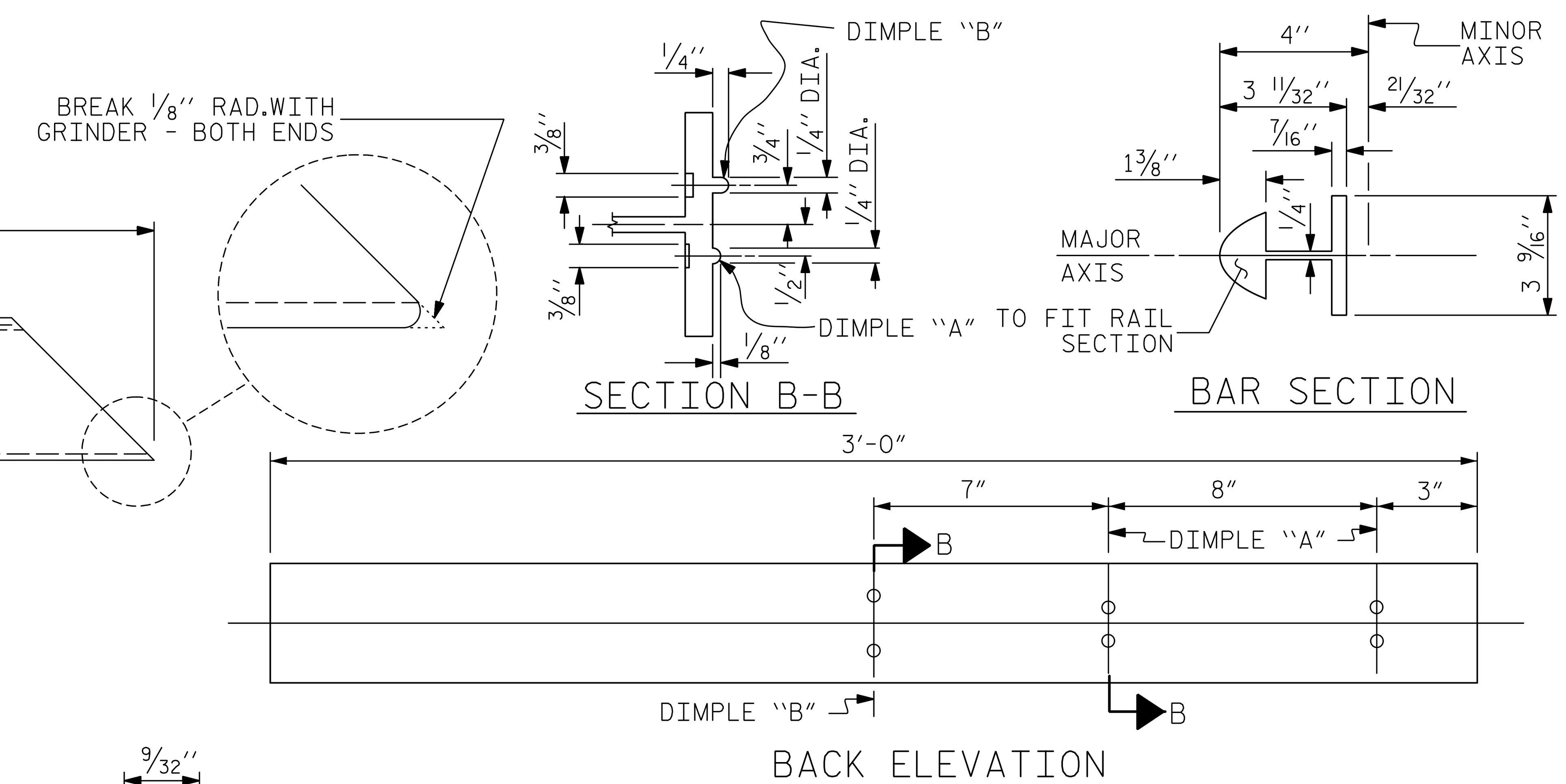
E. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

F. 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.

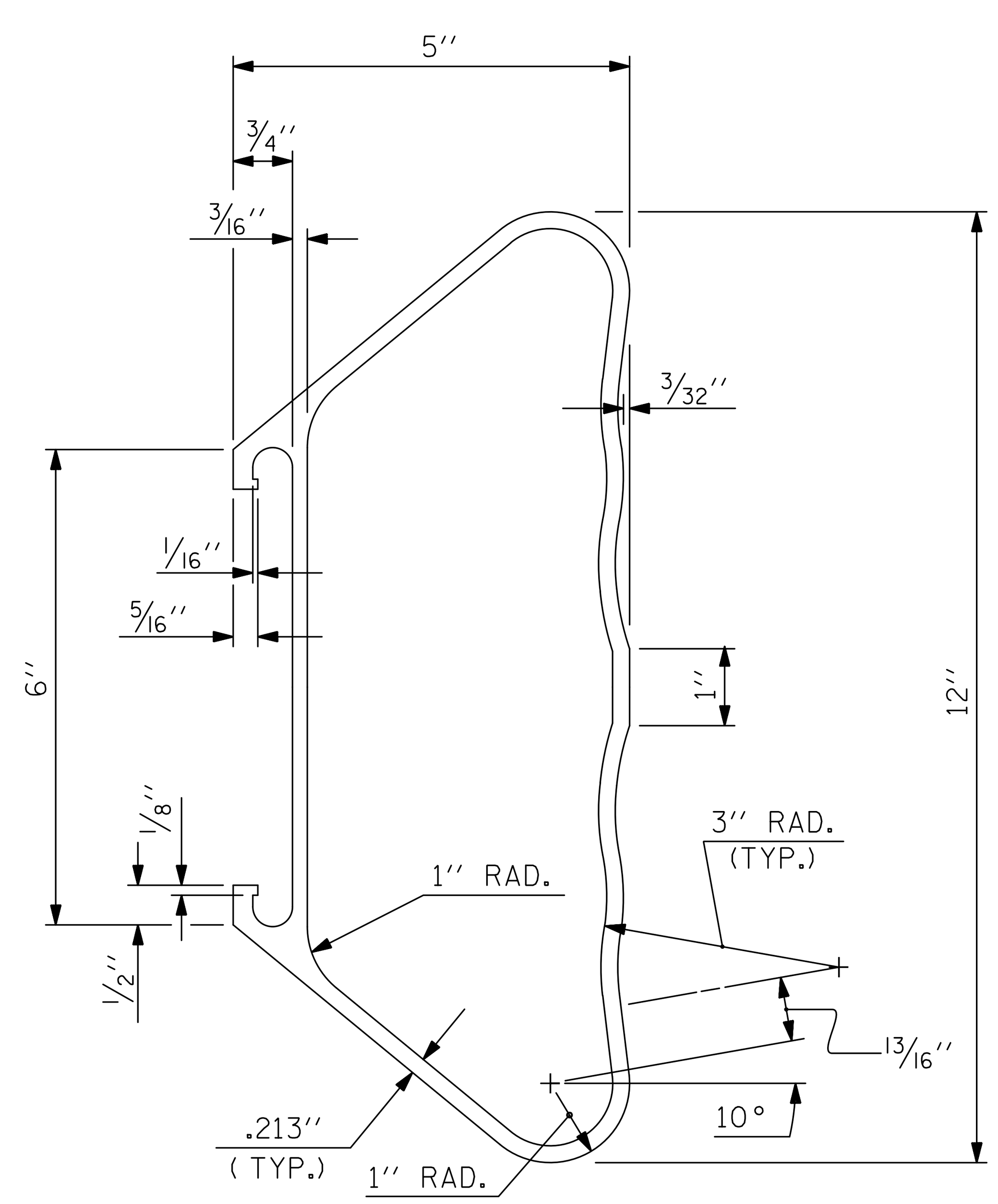
G. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



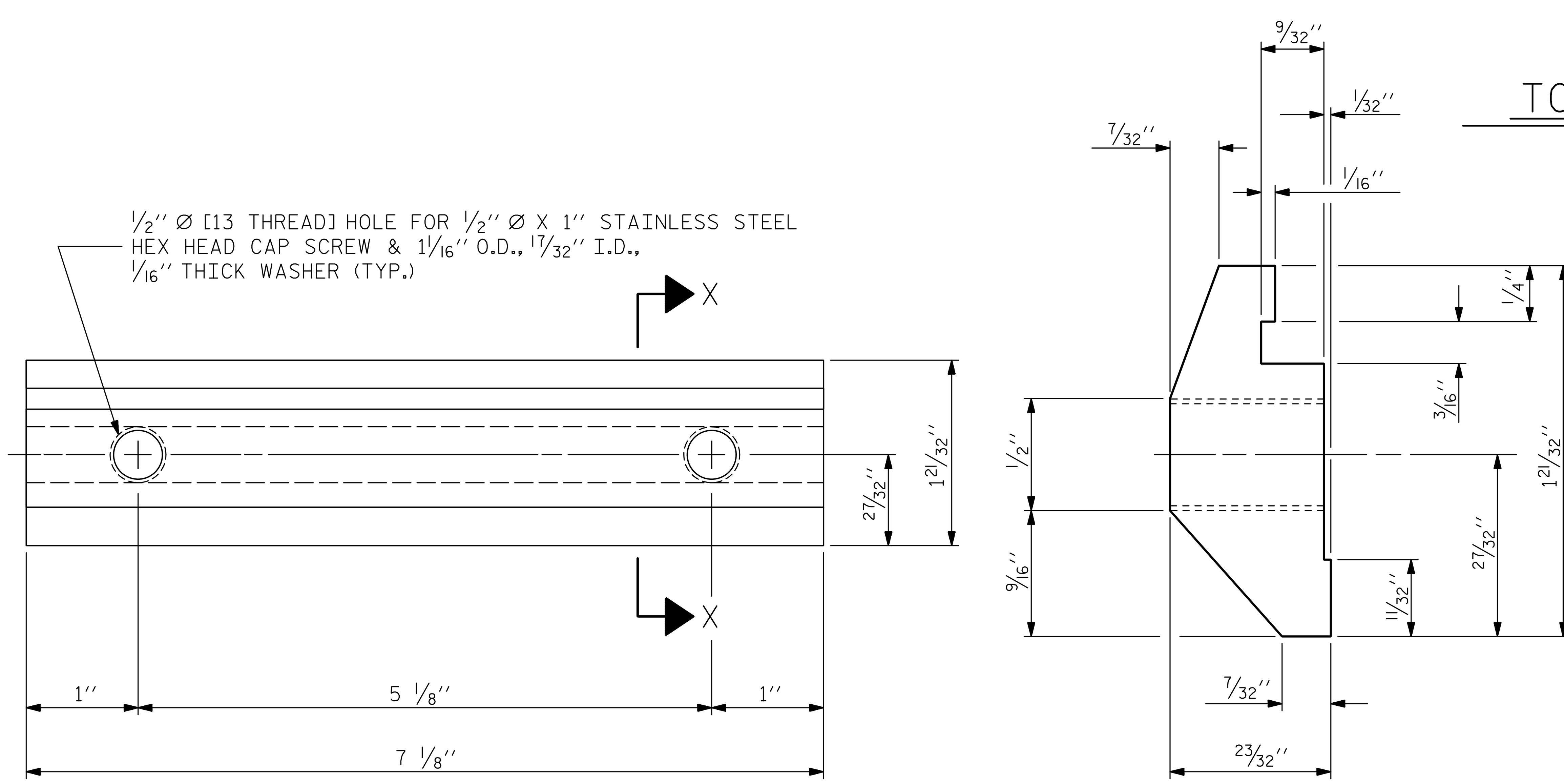
TOP & MIDDLE RAIL SECTION



TOP & MIDDLE RAIL EXPANSION BAR

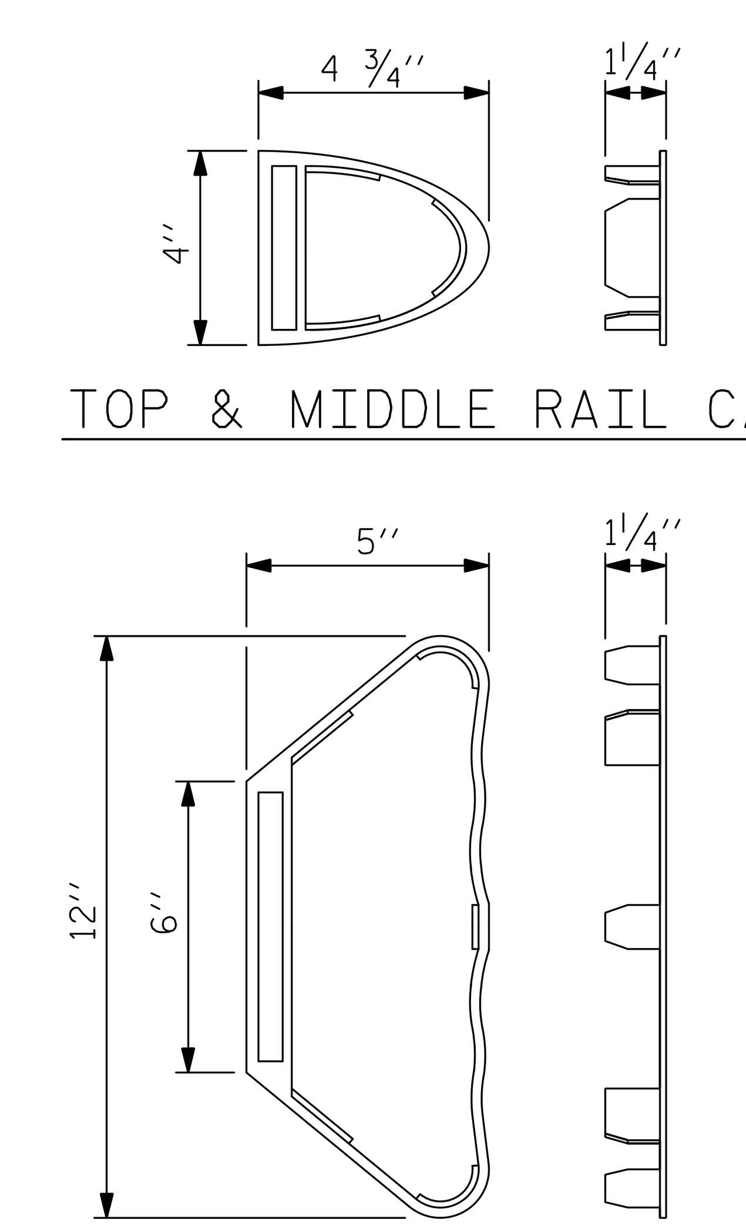


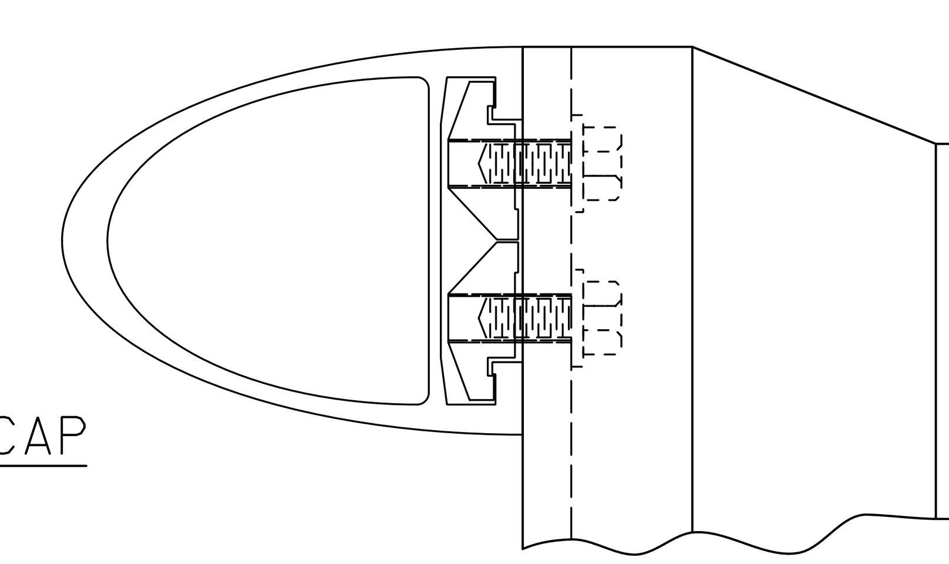
BOTTOM RAIL SECTION



CLAMP BAR DETAIL

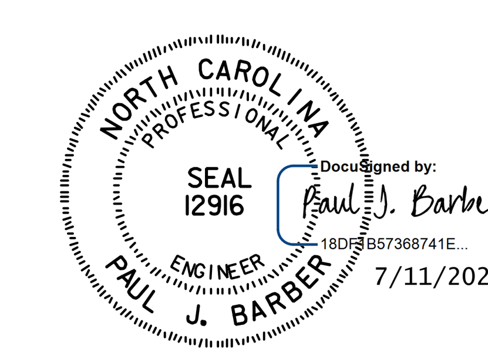
(6 REQUIRED PER POST)





CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

ASSEMBLED BY : M. WRIGHT	DATE : 2/20
CHECKED BY : Z. REINEKE	DATE : 10/21

DRAWN BY : JMB 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	2/20
CHECKED BY	Z. REINEKE	DATE	10/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 18

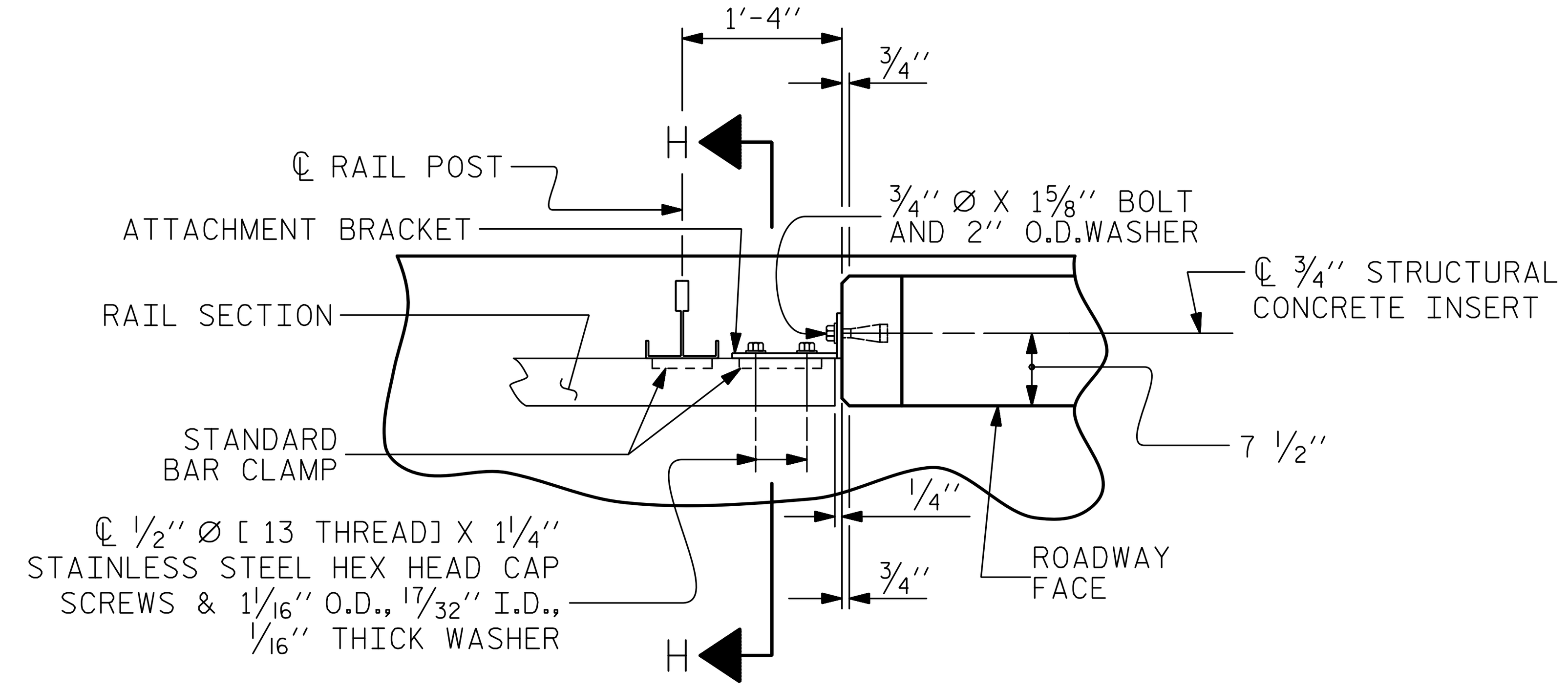
REVISIONS

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

SHEET NO. S-18
TOTAL SHEETS 34

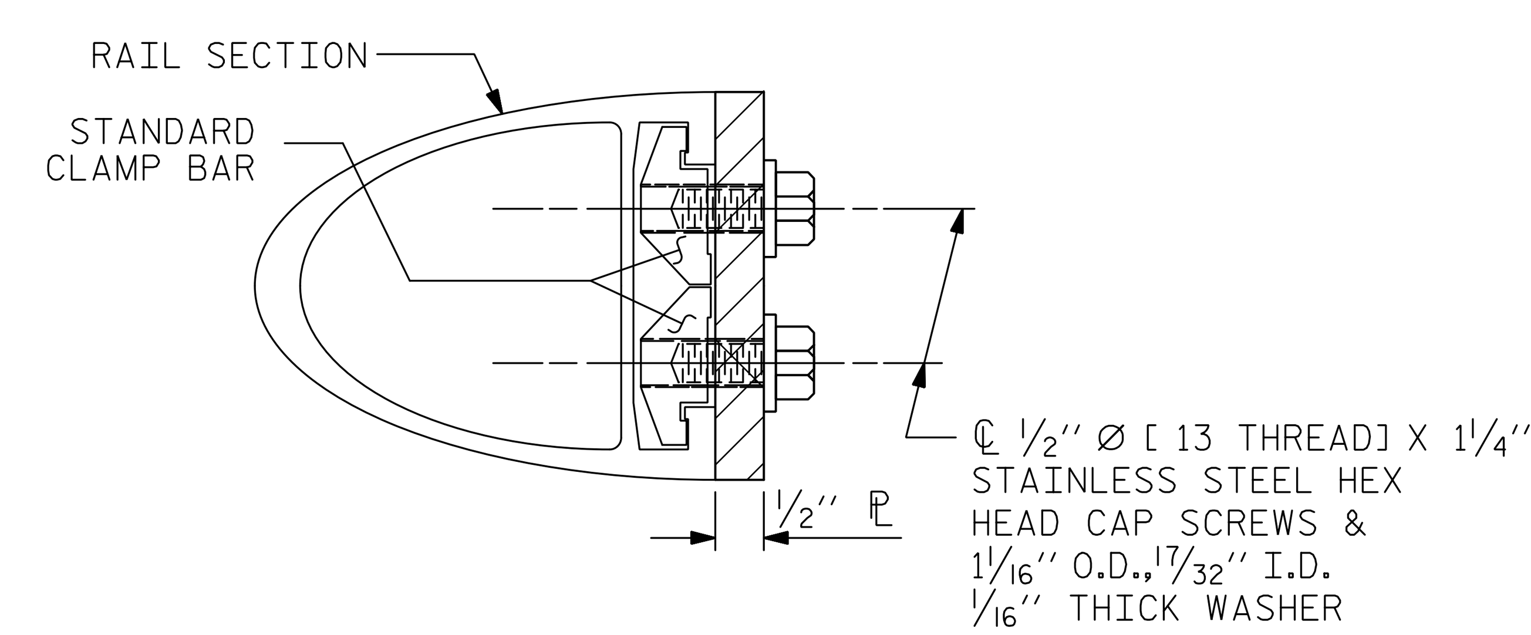
STD. NO. BMR6

3/8/2022
8:06:51 AM
...\401_035_U5813_SMU_3MR02_018_75017.dgn



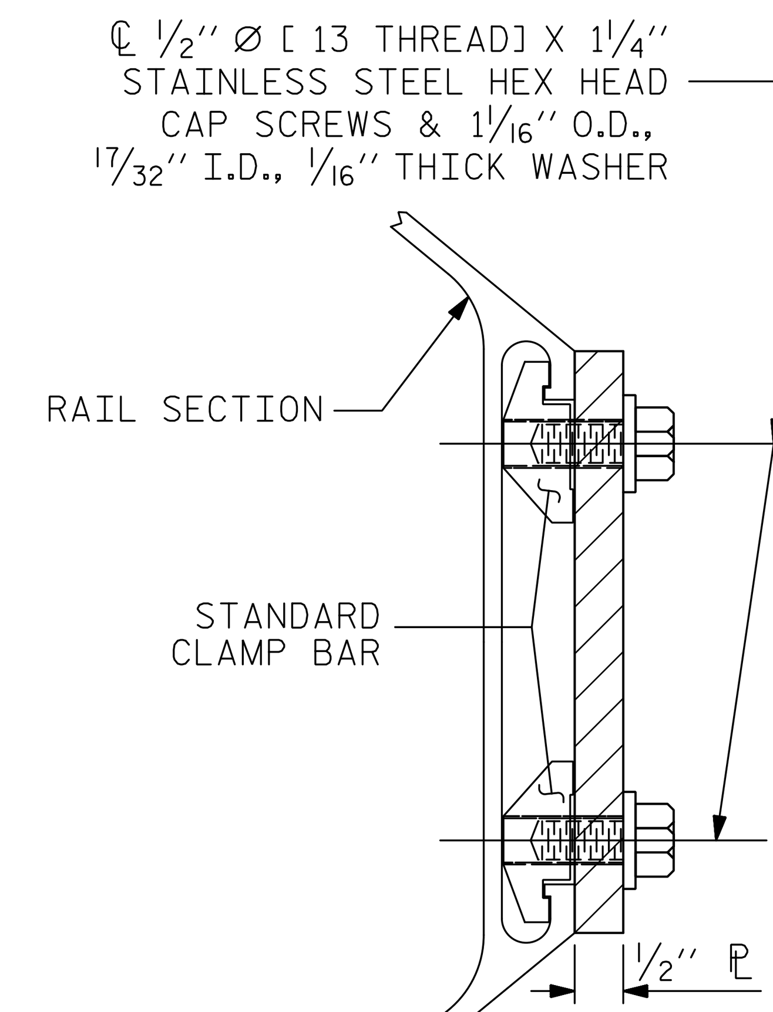
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2'' ℄ NOT SHOWN FOR CLARITY)



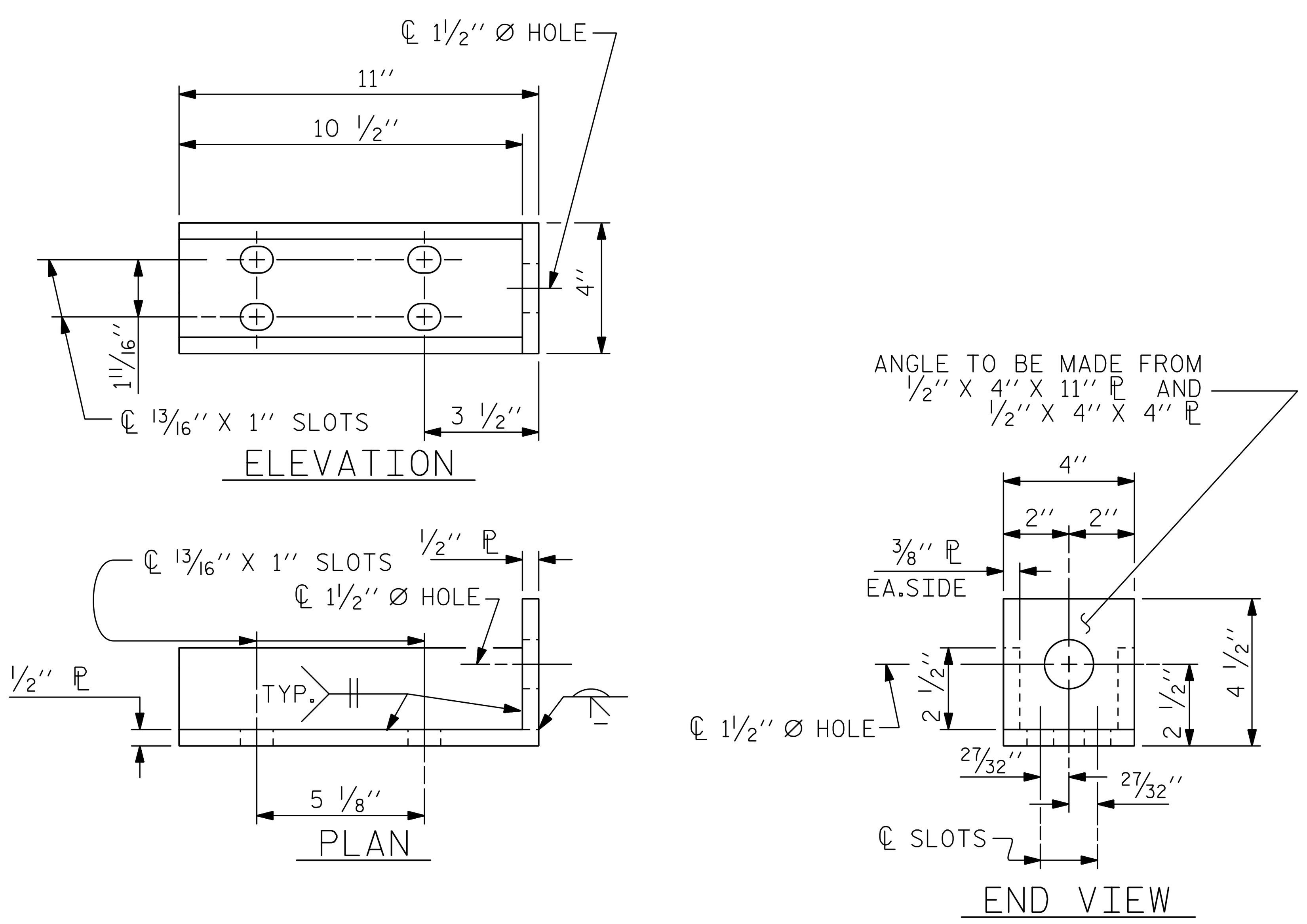
SECTION H-H

(FOR TOP & MIDDLE RAIL)



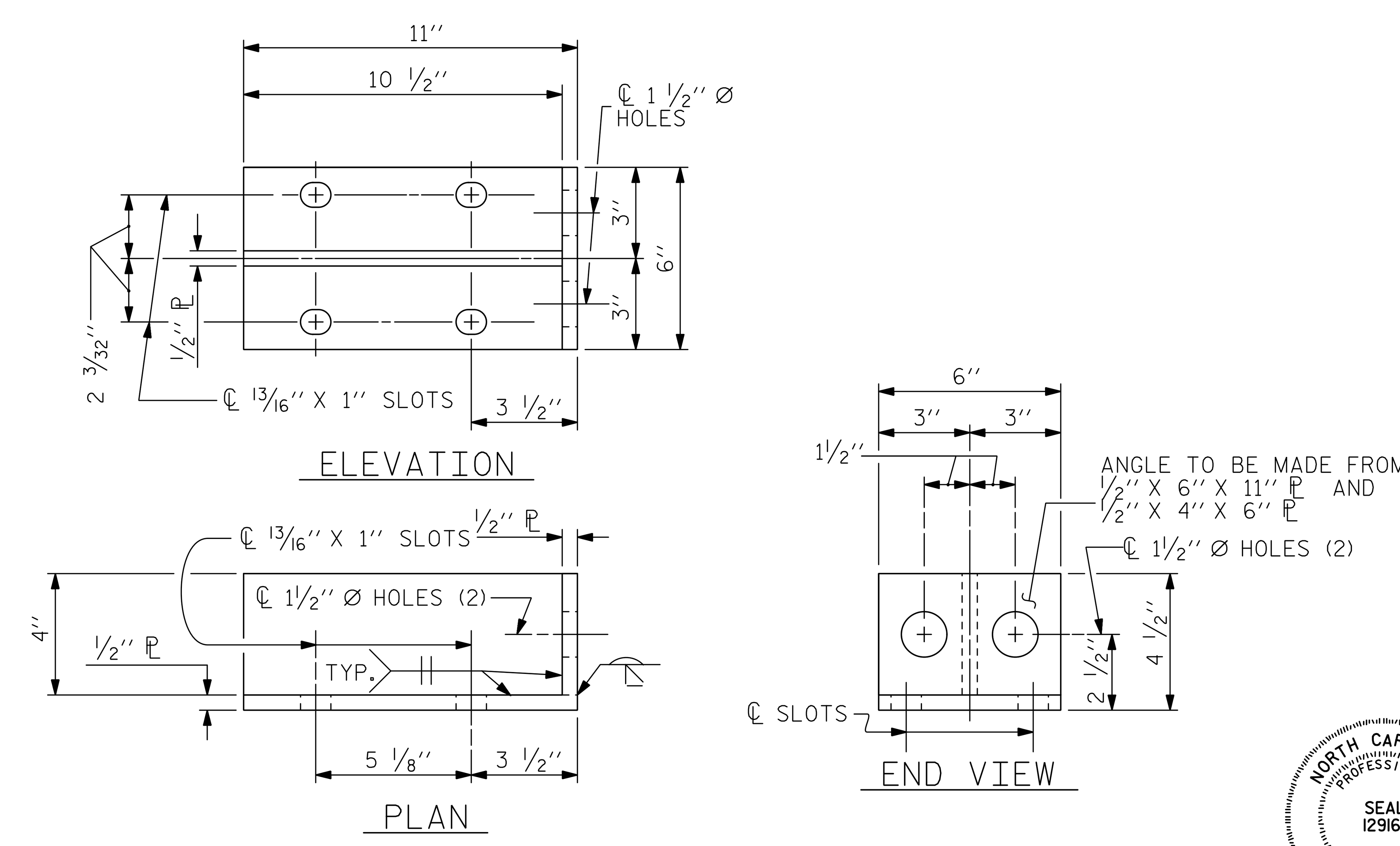
SECTION H-H

(FOR BOTTOM RAIL)



DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

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'' Ø X 1 5/8'' BOLT WITH 2'' O.D. WASHER IN PLACE. THE 3/4'' Ø 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. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

D. STANDARD CLAMP BARS (STD. No. BMR6).

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 3 BAR METAL RAIL.

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'' Ø X 1 5/8'' BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4'' Ø X 6 1/2'' BOLT AND 2'' O.D.WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4'' Ø X 1 5/8'' BOLT SHALL APPLY TO THE 3/4'' Ø X 6 1/2'' BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

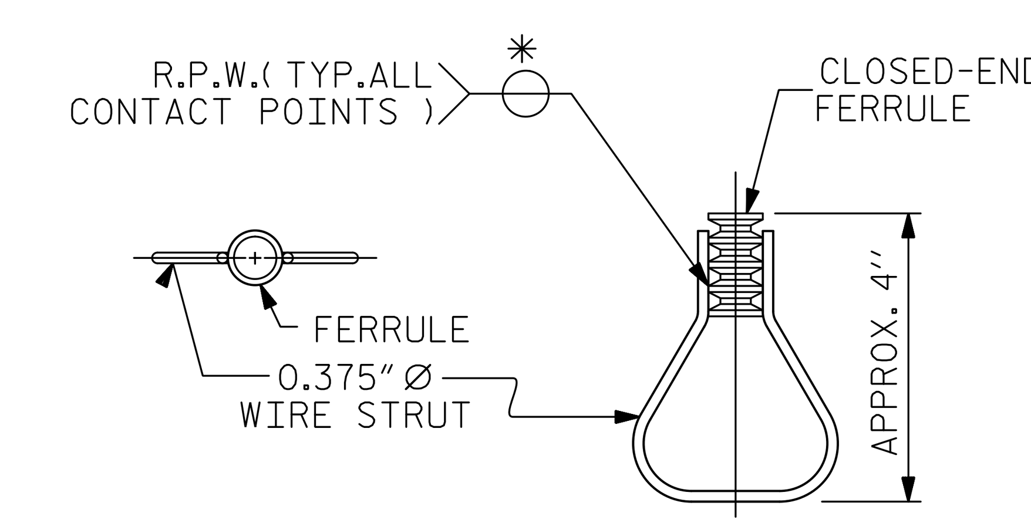
STRUCTURAL CONCRETE INSERT

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'' Ø X 1 5/8'' BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø 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'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-5813

RANDOLPH **COUNTY**

STATION: 21+94.17 -Y-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
DocuSigned by: Paul J. Barber
7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	2/20
CHECKED BY	Z. REINEKE	DATE	10/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 19

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

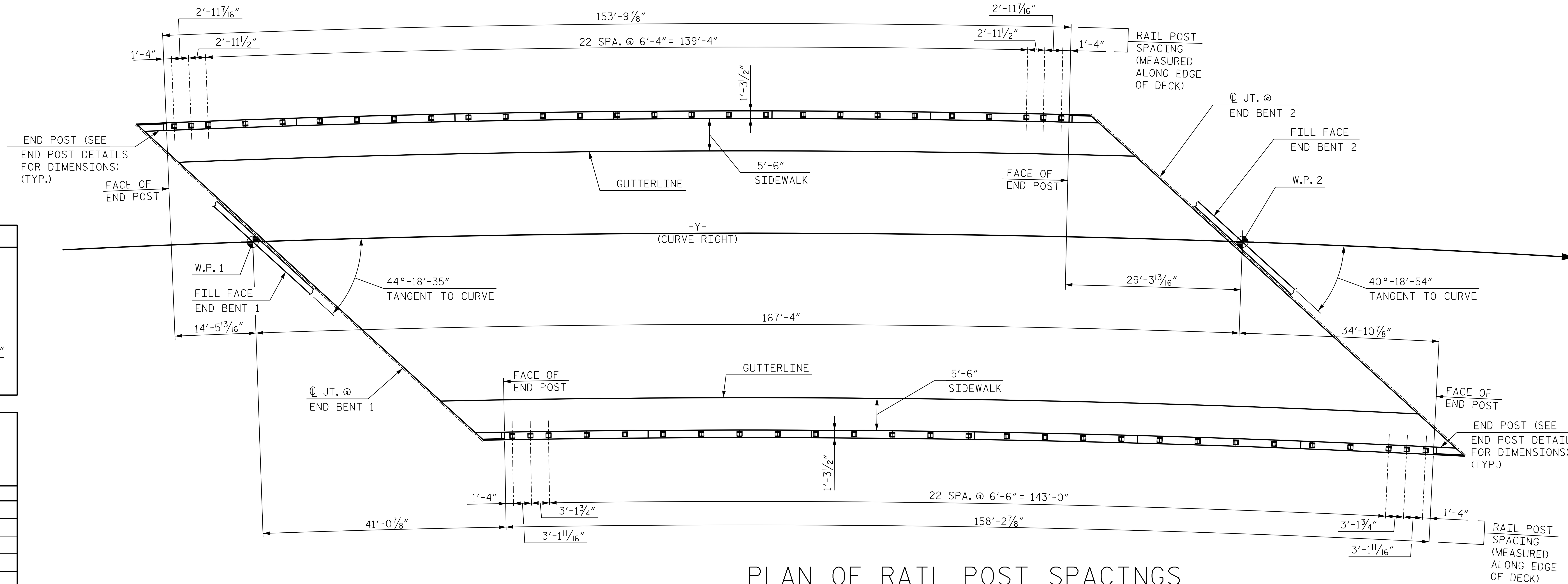
SHEET NO. S-19

TOTAL SHEETS 34

ASSEMBLED BY : M. WRIGHT		DATE : 2/20	
CHECKED BY : Z. REINEKE		DATE : 10/21	
DRAWN BY : JMB 1/88	REV. 5/1/06	TLA/GM	
CHECKED BY : GGH 1/88	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

STD. NO. BMR7

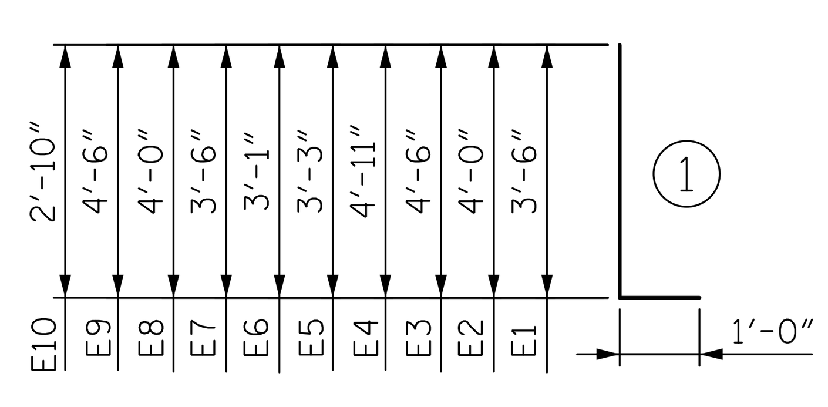
3/8/2022
8:06:56 AM
..._V401_03T_U5813_SMU_3MR03_019_750171.dgn



PLAN OF RAIL POST SPACINGS

NOTE: POST CENTERLINE SHALL NOT BE LOCATED LESS THAN 1'-0" FROM CONTRACTION JOINT IN SIDEWALK AND PARAPET. FOR OTHER CONTRACTION JOINT REQUIREMENTS, SEE "SIDEWALK DETAILS" SHEET.

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE END POST AT END BENT 1 LEFT OR END BENT 2 LEFT

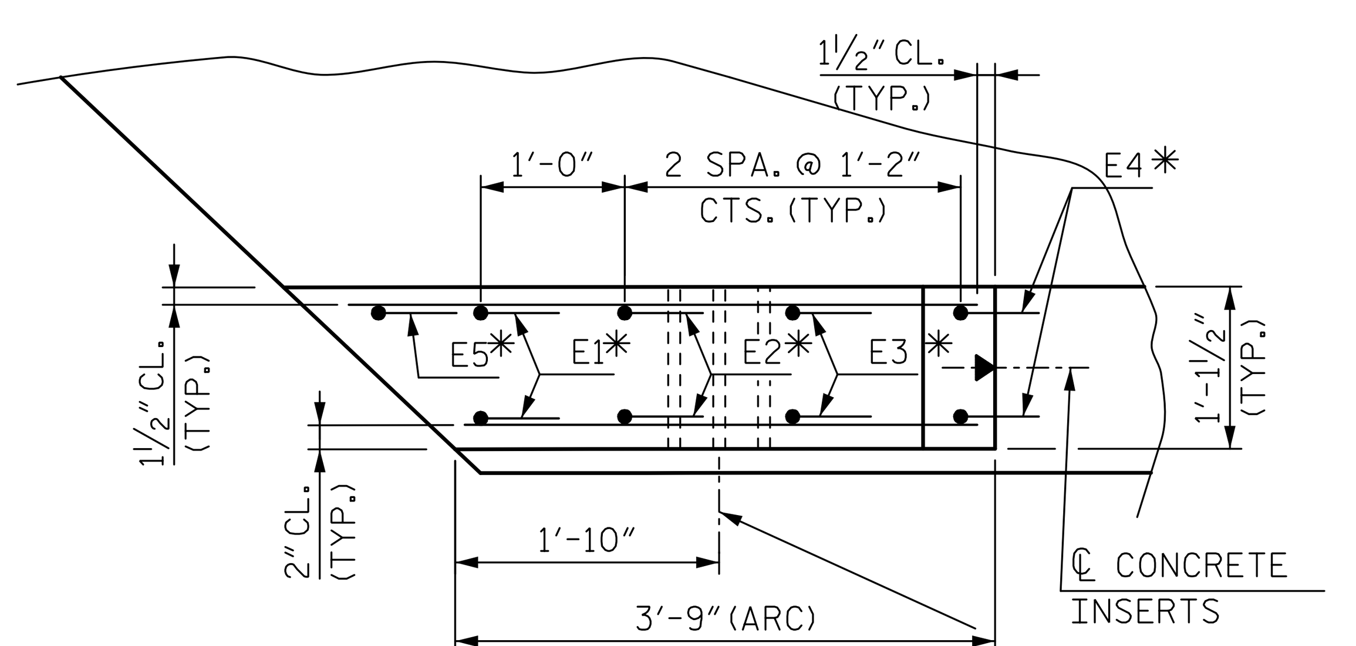
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
E6	2	#7	1	4'-1"	17
E7	2	#7	1	4'-6"	18
E8	2	#7	1	5'-0"	20
E9	2	#7	1	5'-6"	22
E10	1	#7	1	3'-10"	8
F1	2	#6	STR	1'-9"	5
F2	2	#6	STR	3'-3"	10
F3	2	#6	STR	4'-3"	13
F4	1	#6	STR	4'-3"	6
F5	2	#6	STR	3'-6"	11
F6	1	#6	STR	3'-5"	5

EPOXY COATED REINFORCING STEEL	135 LBS.
CLASS AA CONCRETE	0.5 CU. YDS.

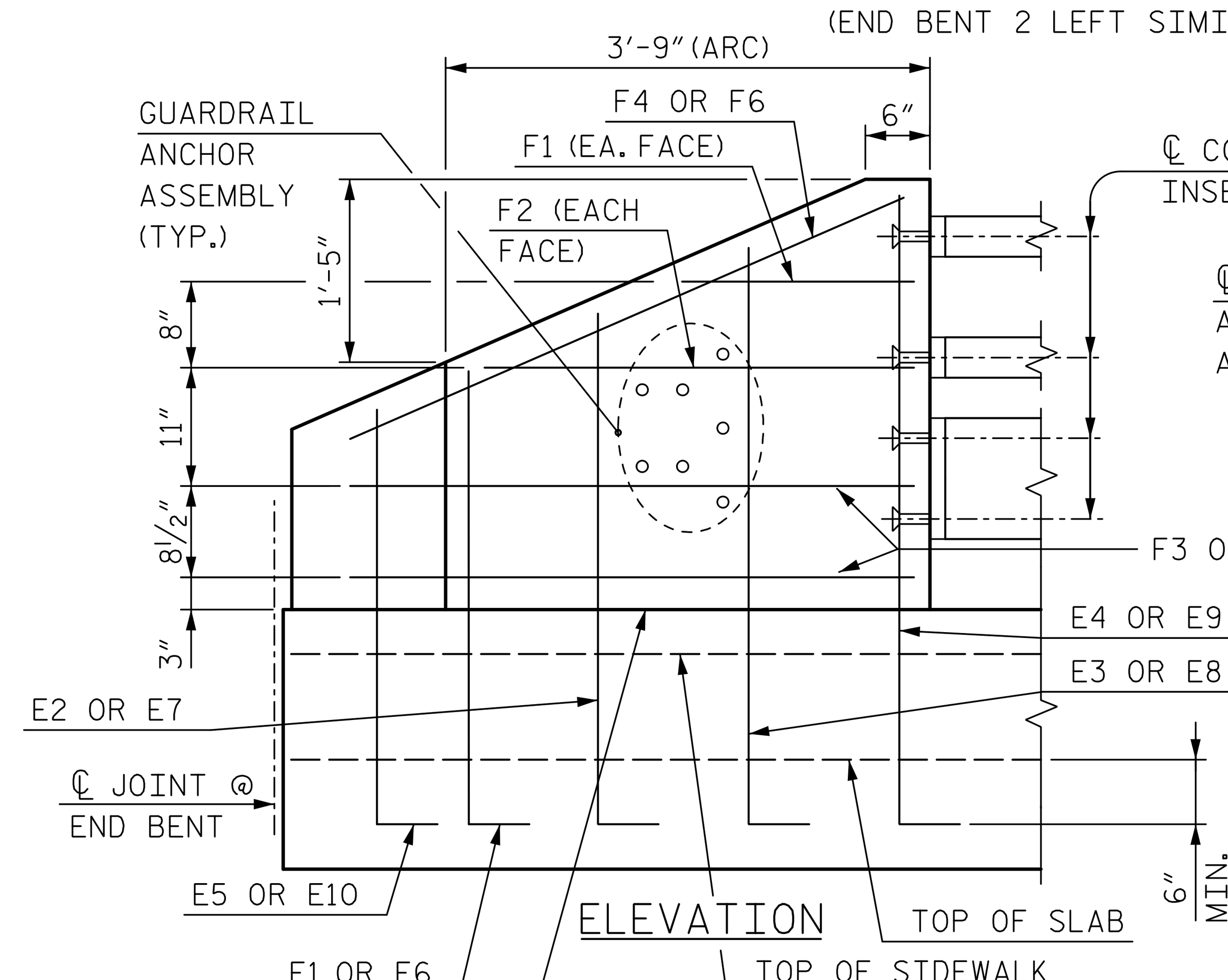
BILL OF MATERIAL FOR ONE END POST AT END BENT 1 RIGHT OR END BENT 2 RIGHT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
E1	2	#7	1	4'-6"	18
E2	2	#7	1	5'-0"	20
E3	2	#7	1	5'-6"	22
E4	2	#7	1	5'-11"	24
E5	1	#7	1	4'-3"	9
F1	2	#6	STR	1'-9"	5
F2	2	#6	STR	3'-3"	10
F3	2	#6	STR	4'-3"	13
F4	1	#6	STR	4'-3"	6
F5	2	#6	STR	3'-6"	11
F6	1	#6	STR	3'-5"	5

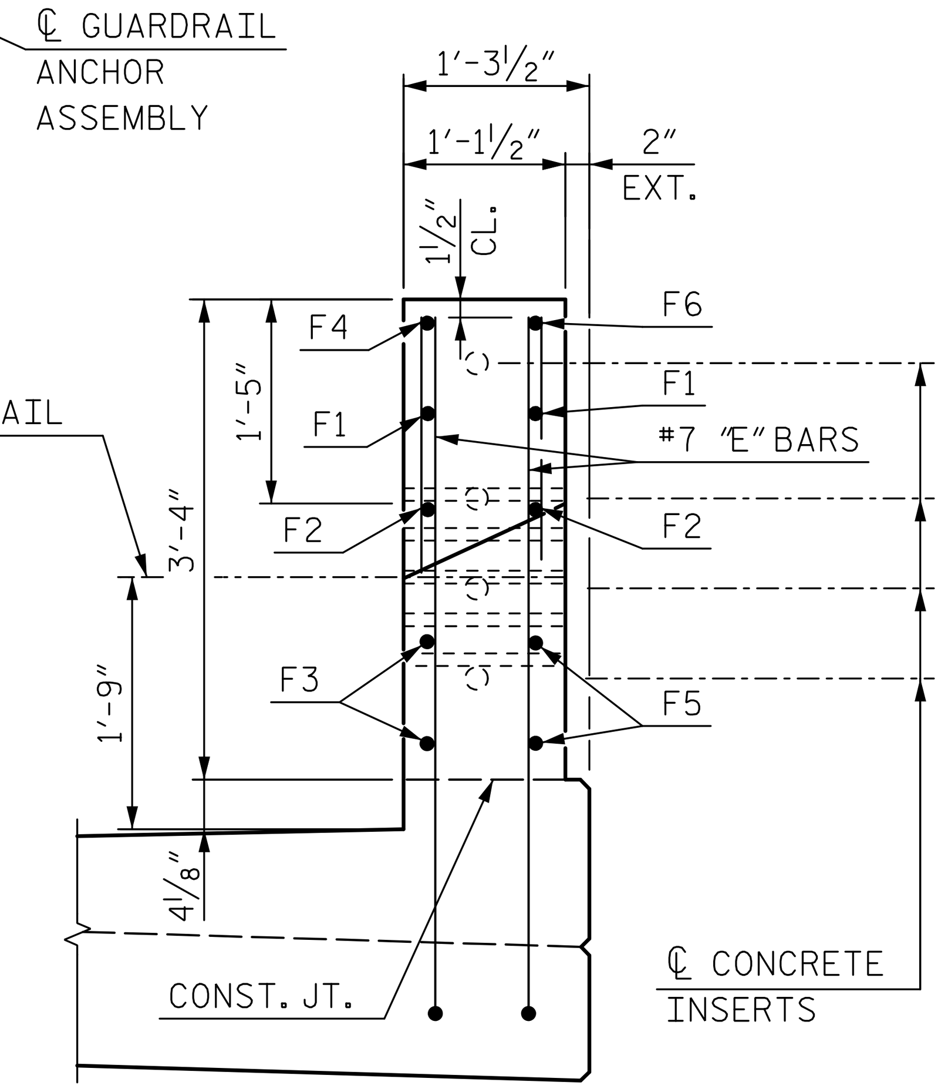
EPOXY COATED REINFORCING STEEL	143 LBS.
CLASS AA CONCRETE	0.5 CU. YDS.



PLAN
(END BENT 1 RIGHT END POST SHOWN)
(END BENT 2 LEFT SIMILAR)



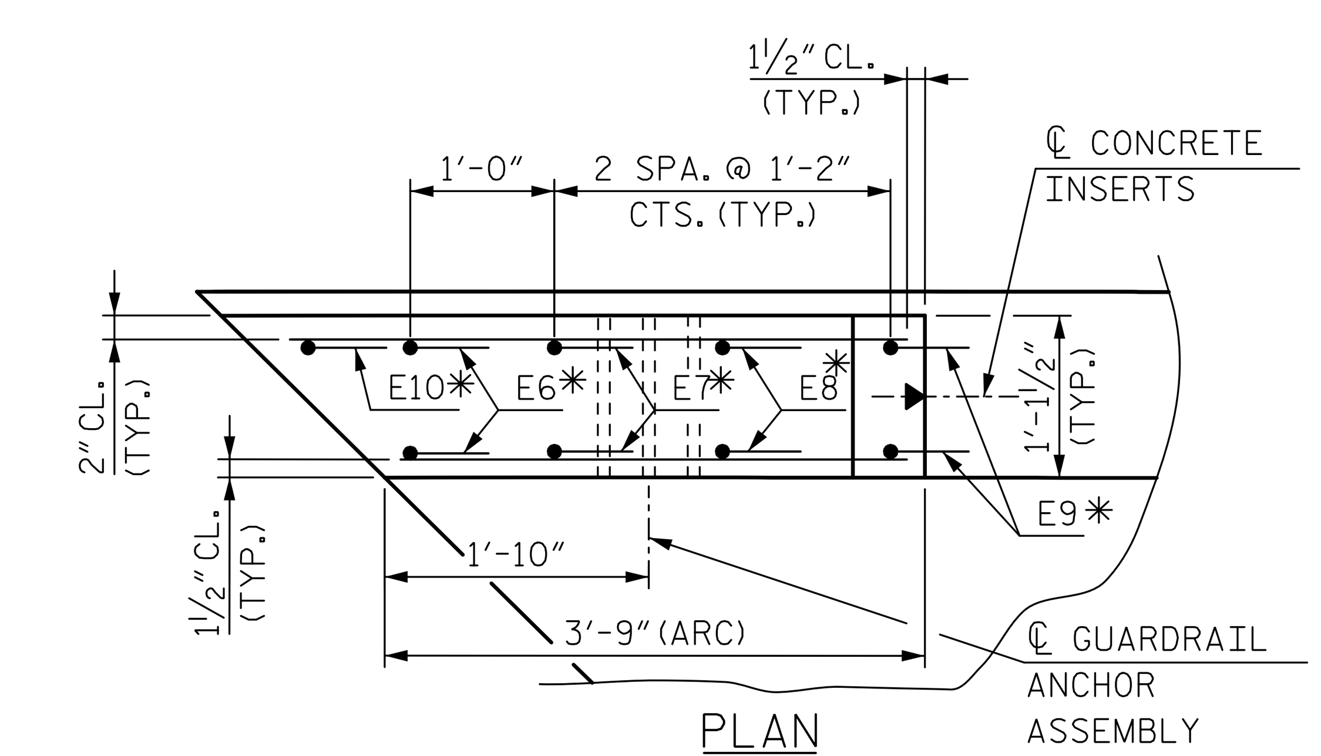
ELEVATION



END VIEW

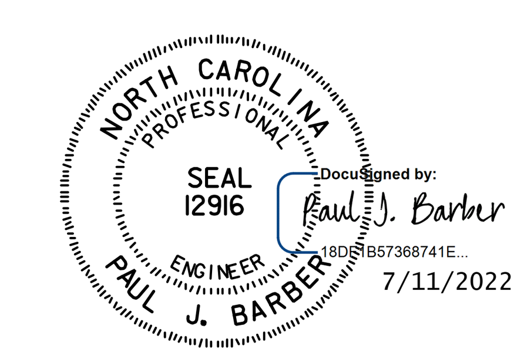
END POST DETAILS

* BARS E1 TO E5 IN RIGHT END POSTS.
BARS E6 TO E10 IN LEFT END POSTS.



PLAN
(END BENT 1 LEFT END POST SHOWN)
(END BENT 2 RIGHT END POST SIMILAR)

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

RAIL POST SPACING AND END OF RAIL DETAILS

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

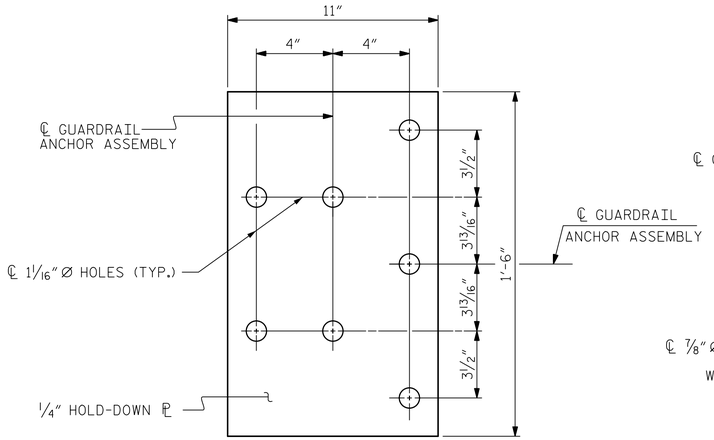
DRAWN BY	M. WRIGHT	DATE	10/21
CHECKED BY	Z. REINEKE	DATE	10/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 20

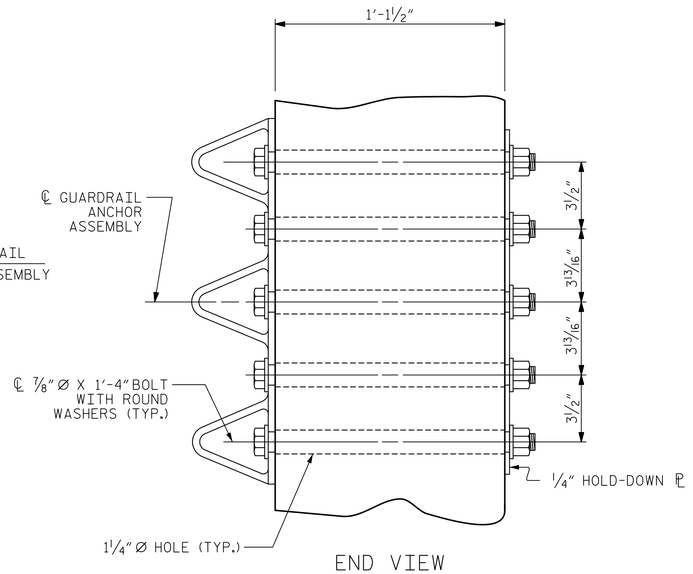
REVISIONS

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

SHEET NO. S-20
TOTAL SHEETS 34



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

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.

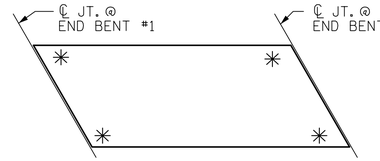
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

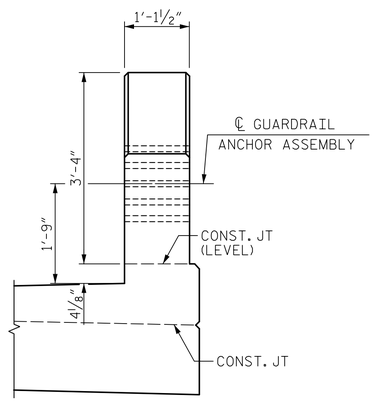
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.

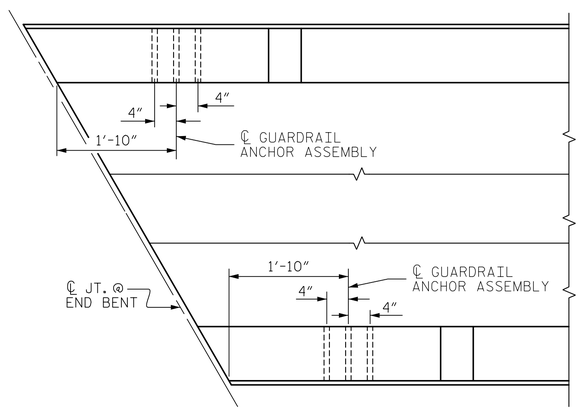


SKETCH SHOWING POINTS OF ATTACHMENT

✳ LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(THREE BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
Docusigned by: Paul J. Barber 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	1/20
CHECKED BY	Z. REINEKE	DATE	10/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 21

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-21
1			3			TOTAL SHEETS
2			4			34

STD. NO. GRA3

ASSEMBLED BY : M. WRIGHT		DATE : 1/20	
CHECKED BY : Z. REINEKE		DATE : 10/21	
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

3/8/2022
8:06:50 AM
...\401_Civil_U5813_SMU_GR_021_750171.dgn

NOTES:

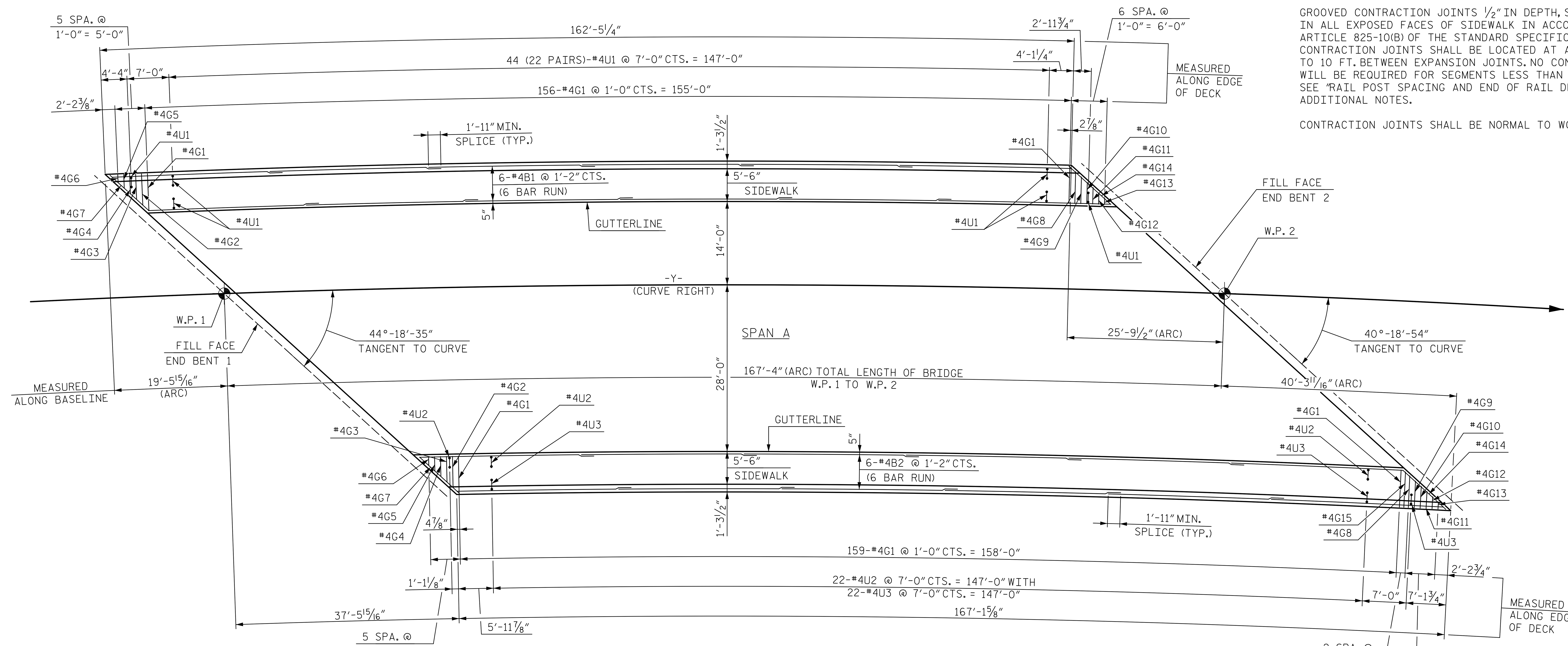
ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

PAYMENT FOR THE SIDEWALK SHALL BE INCLUDED IN THE SQUARE FEET PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

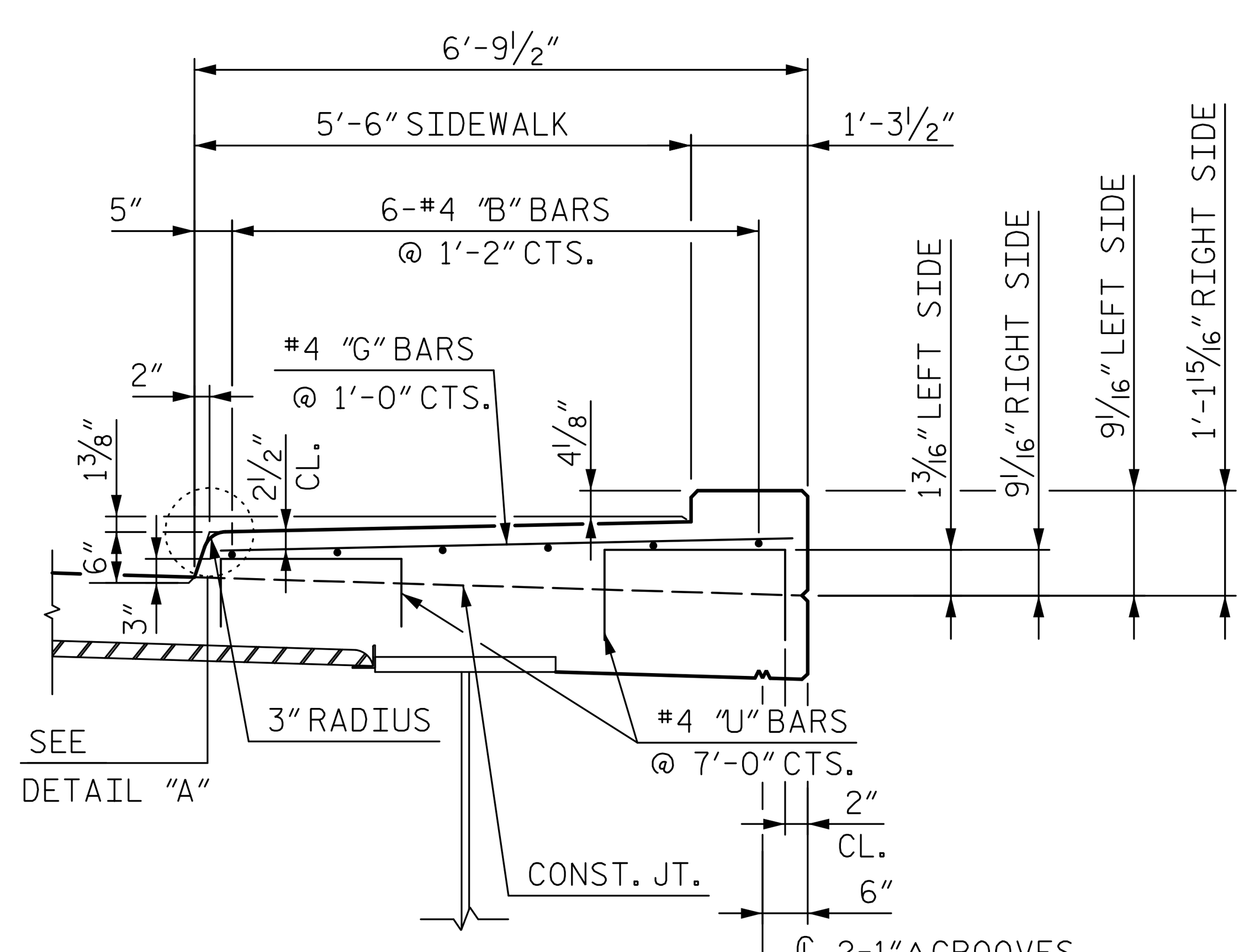
FOR SIDEWALK COVER PLATE DETAILS AT END BENTS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.

GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH. SEE "RAIL POST SPACING AND END OF RAIL DETAILS" SHEET FOR ADDITIONAL NOTES.

CONTRACTION JOINTS SHALL BE NORMAL TO WORKLINE.



PLAN OF SIDEWALK

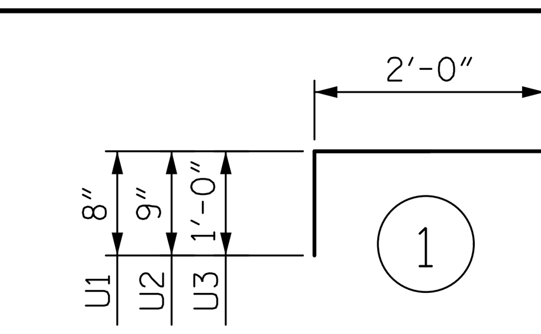


SECTION THRU SIDEWALK

REINFORCING BAR SCHEDULE

EPOXY COATED					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
B1	36	4	STR	28'-11"	695
B2	36	4	STR	29'-6"	709
G1	315	4	STR	6'-4"	1,333
G2	2	4	STR	5'-3"	7
G3	2	4	STR	4'-3"	6
G4	2	4	STR	3'-3"	4
G5	2	4	STR	2'-3"	3
G6	2	4	STR	1'-3"	2
G7	2	4	STR	8'-10"	12
G8	2	4	STR	5'-4"	7
G9	2	4	STR	4'-6"	6
G10	2	4	STR	3'-7"	5
G11	2	4	STR	2'-9"	4
G12	2	4	STR	1'-10"	2
G13	2	4	STR	1'-0"	1
G14	2	4	STR	9'-6"	13
G15	1	4	STR	5'-11"	4
U1	46	4	1	3'-4"	102
U2	23	4	1	3'-6"	54
U3	23	4	1	4'-0"	61
EPOXY COATED TOTAL:					3,030

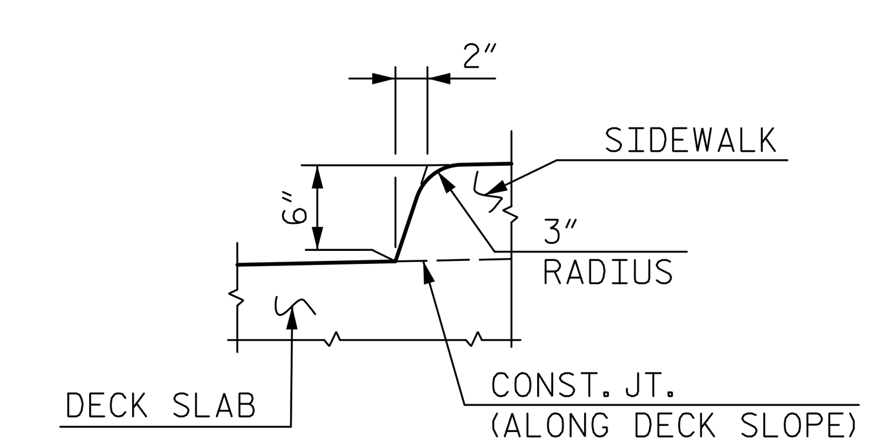
BAR TYPES



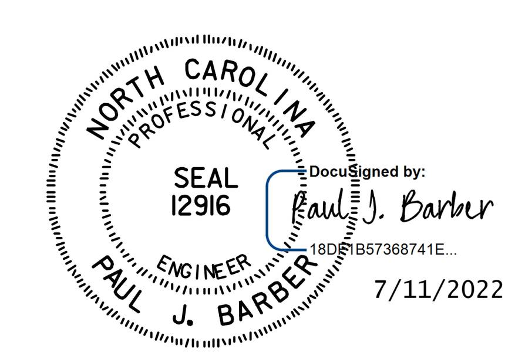
ALL BAR DIMENSIONS ARE OUT TO OUT

SIDEWALK BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)
SIDEWALK	52.7	3,030
TOTALS	52.7	3,030



DETAIL "A"



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	2/20
CHECKED BY	Z. REINEKE	DATE	11/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 22

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

SHEET NO. S-22
TOTAL SHEETS 34

REINFORCING BAR SCHEDULE

EPOXY COATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A1	225	5	STR	55'-3"	12,966
A2	1	5	STR	55'-0"	57
A3	1	5	STR	54'-7"	57
A4	1	5	STR	54'-1"	56
A5	1	5	STR	53'-8"	56
A6	1	5	STR	53'-3"	56
A7	1	5	STR	52'-10"	55
A8	1	5	STR	52'-5"	55
A9	1	5	STR	52'-0"	54
A10	1	5	STR	51'-6"	54
A11	1	5	STR	51'-1"	53
A12	1	5	STR	50'-8"	53
A13	1	5	STR	50'-3"	52
A14	1	5	STR	49'-10"	52
A15	1	5	STR	49'-4"	51
A16	1	5	STR	48'-11"	51
A17	1	5	STR	48'-6"	51
A18	1	5	STR	48'-1"	50
A19	1	5	STR	47'-8"	50
A20	1	5	STR	47'-3"	49
A21	1	5	STR	46'-9"	49
A22	1	5	STR	46'-4"	48
A23	1	5	STR	45'-11"	48
A24	1	5	STR	45'-6"	47
A25	1	5	STR	45'-1"	47
A26	1	5	STR	44'-8"	47
A27	1	5	STR	44'-2"	46
A28	1	5	STR	43'-9"	46
A29	1	5	STR	43'-4"	45
A30	1	5	STR	42'-11"	45
A31	1	5	STR	42'-6"	44
A32	1	5	STR	42'-1"	44
A33	1	5	STR	41'-7"	43
A34	1	5	STR	41'-2"	43
A35	1	5	STR	40'-9"	43
A36	1	5	STR	40'-4"	42
A37	1	5	STR	39'-11"	42
A38	1	5	STR	39'-6"	41
A39	1	5	STR	39'-0"	41
A40	1	5	STR	38'-7"	40
A41	1	5	STR	38'-2"	40
A42	1	5	STR	37'-9"	39
A43	1	5	STR	37'-4"	39
A44	1	5	STR	36'-11"	39
A45	1	5	STR	36'-5"	38
A46	1	5	STR	36'-0"	38
A47	1	5	STR	35'-7"	37
A48	1	5	STR	35'-2"	37
A49	1	5	STR	34'-9"	36
A50	1	5	STR	34'-3"	36
A51	1	5	STR	33'-10"	35
A52	1	5	STR	33'-5"	35
A53	1	5	STR	33'-0"	34
A54	1	5	STR	32'-7"	34
A55	1	5	STR	32'-2"	34
A56	1	5	STR	31'-8"	33
A57	1	5	STR	31'-3"	33
A58	1	5	STR	30'-10"	32
A59	1	5	STR	30'-5"	32
A60	1	5	STR	30'-0"	31
A61	1	5	STR	29'-7"	31
A62	1	5	STR	29'-1"	30
A63	1	5	STR	28'-8"	30
A64	1	5	STR	28'-3"	29
A65	1	5	STR	27'-10"	29
A66	1	5	STR	27'-5"	29
A67	1	5	STR	27'-0"	28
A68	1	5	STR	26'-6"	28
A69	1	5	STR	26'-1"	27
A70	1	5	STR	25'-8"	27
A71	1	5	STR	25'-3"	26
A72	1	5	STR	24'-10"	26

REINFORCING BAR SCHEDULE

EPOXY COATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A73	1	5	STR	24'-5"	25
A74	1	5	STR	23'-11"	25
A75	1	5	STR	23'-6"	25
A76	1	5	STR	23'-1"	24
A77	1	5	STR	22'-8"	24
A78	1	5	STR	22'-3"	23
A79	1	5	STR	21'-10"	23
A80	1	5	STR	21'-4"	22
A81	1	5	STR	20'-11"	22
A82	1	5	STR	20'-6"	21
A83	1	5	STR	20'-1"	21
A84	1	5	STR	19'-8"	21
A85	1	5	STR	19'-3"	20
A86	1	5	STR	18'-9"	20
A87	1	5	STR	18'-4"	19
A88	1	5	STR	17'-11"	19
A89	1	5	STR	17'-6"	18
A90	1	5	STR	17'-1"	18
A91	1	5	STR	16'-7"	17
A92	1	5	STR	16'-2"	17
A93	1	5	STR	15'-9"	16
A94	1	5	STR	15'-4"	16
A95	1	5	STR	14'-11"	16
A96	1	5	STR	14'-6"	15
A97	1	5	STR	14'-0"	15
A98	1	5	STR	13'-7"	14
A99	1	5	STR	13'-2"	14
A100	1	5	STR	12'-9"	13
A101	1	5	STR	12'-4"	13
A102	1	5	STR	11'-11"	12
A103	1	5	STR	11'-5"	12
A104	1	5	STR	11'-0"	11
A105	1	5	STR	10'-7"	11
A106	1	5	STR	10'-2"	11
A107	1	5	STR	9'-9"	10
A108	1	5	STR	9'-4"	10
A109	1	5	STR	8'-10"	9
A110	1	5	STR	8'-5"	9
A111	1	5	STR	8'-0"	8
A112	1	5	STR	7'-7"	8
A113	1	5	STR	7'-2"	7
A114	1	5	STR	6'-9"	7
A115	1	5	STR	6'-3"	7
A116	1	5	STR	5'-10"	6
A117	1	5	STR	5'-5"	6
A118	1	5	STR	5'-0"	5
A119	1	5	STR	4'-7"	5
A120	1	5	STR	4'-2"	4
A121	1	5	STR	55'-1"	57
A122	1	5	STR	54'-8"	57
A123	1	5	STR	54'-3"	57
A124	1	5	STR	53'-10"	56
A125	1	5	STR	53'-5"	56
A126	1	5	STR	53'-0"	55
A127	1	5	STR	52'-8"	55
A128	1	5	STR	52'-3"	54
A129	1	5	STR	51'-10"	54
A130	1	5	STR	51'-5"	54
A131	1	5	STR	51'-0"	53
A132	1	5	STR	50'-7"	53
A133	1	5	STR	50'-2"	52
A134	1	5	STR	49'-10"	52
A135	1	5	STR	49'-5"	52
A136	1	5	STR	49'-0"	51
A137	1	5	STR	48'-7"	51
A138	1	5	STR	48'-2"	50
A139	1	5	STR	47'-9"	50
A140	1	5	STR	47'-4"	49
A141	1	5	STR	47'-0"	49
A142	1	5	STR	46'-7"	49
A143	1	5	STR	46'-2"	48
A144	1	5	STR	45'-9"	48

REINFORCING BAR SCHEDULE

EPOXY COATED

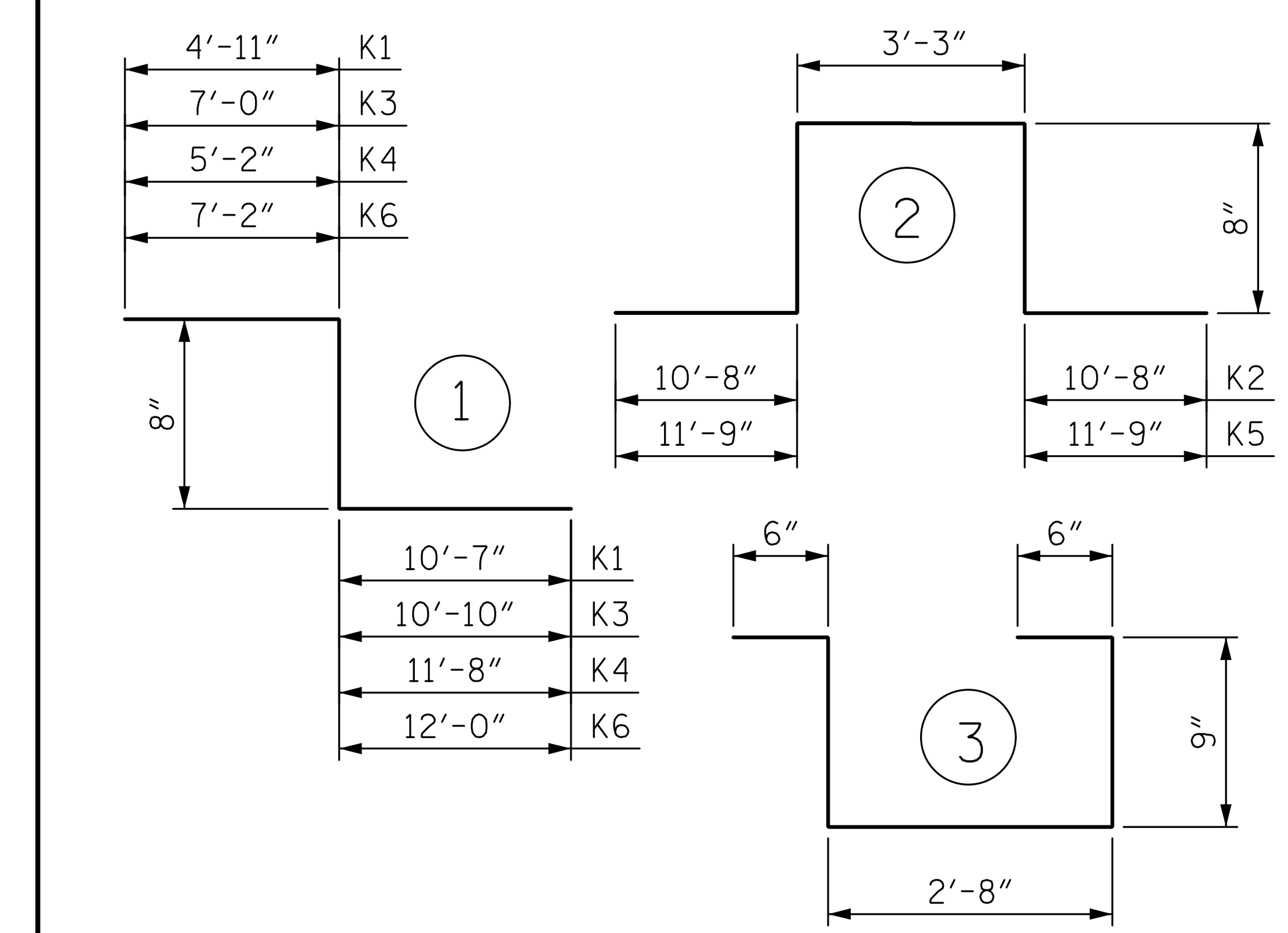
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A145	1	5	STR	45'-4"	47
A146	1	5	STR	44'-11"	47
A147	1	5	STR	44'-6"	46
A148	1	5	STR	44'-2"	46
A149	1	5	STR	43'-9"	46
A150	1	5	STR	43'-4"	45
A151	1	5	STR	42'-11"	45
A152	1	5	STR	42'-6"	44
A153	1	5	STR	42'-1"	44
A154	1	5	STR	41'-9"	44
A155	1	5	STR	41'-4"	43
A156	1	5	STR	40'-11"	43
A157	1	5	STR	40'-6"	42
A158	1	5	STR	40'-1"	42
A159	1	5	STR	39'-8"	41
A160	1	5	STR	39'-4"	41
A161	1	5	STR	38'-11"	41
A162	1	5	STR	38'-6"	40
A163	1	5	STR	38'-1"	40
A164	1	5	STR	37'-8"	39
A165	1	5	STR	37'-4"	39
A166	1	5	STR	36'-11"	39
A167	1	5	STR	36'-6"	38
A168	1	5	STR	36'-1"	38
A169	1	5	STR	35'-8"	37
A170	1	5	STR	35'-3"	37
A171	1	5	STR	34'-11"	36
A172	1	5	STR	34'-6"	36
A173	1	5	STR	34'-1"	36
A174	1	5	STR	33'-8"	35
A175	1	5	STR	33'-3"	35
A176	1	5	STR	32'-10"	34
A177	1	5	STR	32'-6"	34
A178	1	5	STR	32'-1"	33
A179	1	5	STR	31'-8"	33
A180	1	5	STR	31'-3"	33
A181	1	5	STR	30'-10"	32
A182	1	5	STR	30'-6"	32
A183	1	5	STR	30'-1"	31
A184	1	5	STR	29'-8"	31
A185	1	5	STR	29'-3"	31
A186	1	5	STR	28'-10"	30
A187	1	5	STR	28'-6"	30
A188	1	5	STR	28'-1"	29
A189	1	5	STR	27'-8"	29
A190	1	5	STR	27'-3"	28
A191	1	5	STR	26'-10"	28
A192	1	5	STR	26'-6"	28
A193	1	5	STR	26'-1"	27
A194	1	5	STR	25'-8"	27
A195	1	5	STR	25'-3"	26
A196	1	5	STR	24'-10"	26
A197	1	5	STR	24'-6"	26
A198	1	5	STR	24'-1"	25
A199	1	5	STR	23'-8"	25
A200	1	5	STR	23'-3"	24
A201	1	5	STR	22'-11"	24
A202	1	5	STR	22'-6"	23
A203	1	5	STR	22'-1"	23
A204	1	5	STR	21'-8"	23
A205	1	5	STR	21'-3"	22
A206	1	5	STR	20'-11"	22
A207	1	5	STR	20'-6"	21
A208	1	5	STR	20'-1"	21
A209	1	5	STR	19'-8"	21
A200	1	5	STR	19'-4"	20
A211	1	5	STR	18'-11"	20
A212	1	5	STR	18'-6"	19
A213	1	5	STR	18'-1"	19
A214	1	5	STR	17'-8"	18
A215	1	5	STR	17'-4"	18
A216	1	5	STR	16'-11"	18

REINFORCING BAR SCHEDULE

EPOXY COATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A217	1	5	STR	16'-6"	17
A218	1	5	STR	16'-1"	17
A219	1	5	STR	15'-9"	16
A220	1	5	STR	15'-4"	16
A221	1	5	STR	14'-11"	16
A222	1	5	STR	14'-6"	15
A223	1	5	STR	14'-1"	15
A224	1	5	STR	13'-9"	14
A225	1	5	STR	13'-4"	14
A226	2	5	STR	12'-11"	27
A227	2	5	STR	12'-6"	26
A228	2	5	STR	12'-2"	25
A229	2	5	STR	11'-9"	25
A230	2	5	STR	11'-4"	24
A231	2	5	STR	10'-11"	23
A232	2	5	STR	10'-7"	22
A233	2	5	STR	10'-2"	21
A234	2	5	STR	9'-9"	20
A235	2	5	STR	9'-4"	19
A236	2	5	STR	9'-0"	19
A237	2	5	STR	8'-7"	18
A238	2	5	STR	8'-2"	17
A239	2	5	STR	7'-9"	16
A240	2	5	STR	7'-5"	15
A241	2	5	STR	7'-0"	15
A242	2	5	STR	6'-7"	14
A243	2	5	STR	6'-2"	13
A244	2	5	STR	5'-10"	12
A245	2	5	STR	5'-5"	11
A246	1	5	STR	4'-4"	5
A247	1	5	STR	5'-2"	5
A248	1	5	STR	4'-5"	5
A249	1	5	STR	5'-0"	5
A250	1	5	STR	4'-7"	5
A251	6	6	STR	21'-2"	191
A252	6	6	STR	17'-4"	156
A253	329	5	STR	13'-6"	4,632
B1	190	4	STR	34'-11"	4,432
G1	2	5	STR	40'-11"	85
G2	2	5	STR	44'-1"	92
K1	3	5	1	16'-2"	51
K2	12	5	2	25'-11"	324
K3	3	5	1	18'-6"	58
K4	3	5	1	17'-6"	55
K5	12	5	2	28'-1"	351
K6	3	5	1	19'-10"	62
S1	115	4	3	5'-2"	397
EPOXY COATED REINFORCING STEEL TOTAL:					31,666

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	294.9	33,946	31,666
TOTALS**	294.9	33,946	31,666

** QUANTITIES FOR 3 BAR METAL RAIL ARE NOT INCLUDED

NOTE: CONCRETE IN CLOSURE POUR IS INCLUDED IN POUR 1 QUANTITY.

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,873	SQ.FT.
BRIDGE DECK	6,381	SQ.FT.
TOTAL	8,254	SQ.FT.

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

DocuSigned by: Paul J. Barber 18D9B57368741E... 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	12/21
CHECKED BY	Z. REINEKE	DATE	1/22
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 23

REVISIONS

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

SHEET NO. S-23

TOTAL SHEETS 34

ASSEMBLED BY : M. WRIGHT		DATE : 12/21	
CHECKED BY : Z. REINEKE		DATE : 1/22	
DRAWN BY : JMB 5/87	REV. 10/1/11	MAA/GM	
CHECKED BY : SJD 9/87	REV. 12/17	MAA/THC	
	REV. 06/19	BNB/THC	

3/8/2022 8:07:03 AM ...\401_045_U5813_SMU_BM01_023_750171.dgn

STD. NO. BOM1

REINFORCING BAR SCHEDULE

UNCOATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A301	225	5	STR	55'-3"	12,966
A302	1	5	STR	55'-0"	57
A303	1	5	STR	54'-7"	57
A304	1	5	STR	54'-1"	56
A305	1	5	STR	53'-8"	56
A306	1	5	STR	53'-3"	56
A307	1	5	STR	52'-10"	55
A308	1	5	STR	52'-5"	55
A309	1	5	STR	52'-0"	54
A310	1	5	STR	51'-6"	54
A311	1	5	STR	51'-1"	53
A312	1	5	STR	50'-8"	53
A313	1	5	STR	50'-3"	52
A314	1	5	STR	49'-10"	52
A315	1	5	STR	49'-4"	51
A316	1	5	STR	48'-11"	51
A317	1	5	STR	48'-6"	51
A318	1	5	STR	48'-1"	50
A319	1	5	STR	47'-8"	50
A320	1	5	STR	47'-3"	49
A321	1	5	STR	46'-9"	49
A322	1	5	STR	46'-4"	48
A323	1	5	STR	45'-11"	48
A324	1	5	STR	45'-6"	47
A325	1	5	STR	45'-1"	47
A326	1	5	STR	44'-8"	47
A327	1	5	STR	44'-2"	46
A328	1	5	STR	43'-9"	46
A329	1	5	STR	43'-4"	45
A330	1	5	STR	42'-11"	45
A331	1	5	STR	42'-6"	44
A332	1	5	STR	42'-1"	44
A333	1	5	STR	41'-7"	43
A334	1	5	STR	41'-2"	43
A335	1	5	STR	40'-9"	43
A336	1	5	STR	40'-4"	42
A337	1	5	STR	39'-11"	42
A338	1	5	STR	39'-6"	41
A339	1	5	STR	39'-0"	41
A340	1	5	STR	38'-7"	40
A341	1	5	STR	38'-2"	40
A342	1	5	STR	37'-9"	39
A343	1	5	STR	37'-4"	39
A344	1	5	STR	36'-11"	39
A345	1	5	STR	36'-5"	38
A346	1	5	STR	36'-0"	38
A347	1	5	STR	35'-7"	37
A348	1	5	STR	35'-2"	37
A349	1	5	STR	34'-9"	36
A350	1	5	STR	34'-3"	36
A351	1	5	STR	33'-10"	35
A352	1	5	STR	33'-5"	35
A353	1	5	STR	33'-0"	34

REINFORCING BAR SCHEDULE

UNCOATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A354	1	5	STR	32'-7"	34
A355	1	5	STR	32'-2"	34
A356	1	5	STR	31'-8"	33
A357	1	5	STR	31'-3"	33
A358	1	5	STR	30'-10"	32
A359	1	5	STR	30'-5"	32
A360	1	5	STR	30'-0"	31
A361	1	5	STR	29'-7"	31
A362	1	5	STR	29'-1"	30
A363	1	5	STR	28'-8"	30
A364	1	5	STR	28'-3"	29
A365	1	5	STR	27'-10"	29
A366	1	5	STR	27'-5"	29
A367	1	5	STR	27'-0"	28
A368	1	5	STR	26'-6"	28
A369	1	5	STR	26'-1"	27
A370	1	5	STR	25'-8"	27
A371	1	5	STR	25'-3"	26
A372	1	5	STR	24'-10"	26
A373	1	5	STR	24'-5"	25
A374	1	5	STR	23'-11"	25
A375	1	5	STR	23'-6"	25
A376	1	5	STR	23'-1"	24
A377	1	5	STR	22'-8"	24
A378	1	5	STR	22'-3"	23
A379	1	5	STR	21'-10"	23
A380	1	5	STR	21'-4"	22
A381	1	5	STR	20'-11"	22
A382	1	5	STR	20'-6"	21
A383	1	5	STR	20'-1"	21
A384	1	5	STR	19'-8"	21
A385	1	5	STR	19'-3"	20
A386	1	5	STR	18'-9"	20
A387	1	5	STR	18'-4"	19
A388	1	5	STR	17'-11"	19
A389	1	5	STR	17'-6"	18
A390	1	5	STR	17'-1"	18
A391	1	5	STR	16'-7"	17
A392	1	5	STR	16'-2"	17
A393	1	5	STR	15'-9"	16
A394	1	5	STR	15'-4"	16
A395	1	5	STR	14'-11"	16
A396	1	5	STR	14'-6"	15
A397	1	5	STR	14'-0"	15
A398	1	5	STR	13'-7"	14
A399	1	5	STR	13'-2"	14
A400	1	5	STR	12'-9"	13
A401	1	5	STR	12'-4"	13
A402	1	5	STR	11'-11"	12
A403	1	5	STR	11'-5"	12
A404	1	5	STR	11'-0"	11
A405	1	5	STR	10'-7"	11
A406	1	5	STR	10'-2"	11

REINFORCING BAR SCHEDULE

UNCOATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A407	1	5	STR	9'-9"	10
A408	1	5	STR	9'-4"	10
A409	1	5	STR	8'-10"	9
A410	1	5	STR	8'-5"	9
A411	1	5	STR	8'-0"	8
A412	1	5	STR	7'-7"	8
A413	1	5	STR	7'-2"	7
A414	1	5	STR	6'-9"	7
A415	1	5	STR	6'-3"	7
A416	1	5	STR	5'-10"	6
A417	1	5	STR	5'-5"	6
A418	1	5	STR	5'-0"	5
A419	1	5	STR	4'-7"	5
A420	1	5	STR	4'-2"	4
A421	1	5	STR	55'-1"	57
A422	1	5	STR	54'-8"	57
A423	1	5	STR	54'-3"	57
A424	1	5	STR	53'-10"	56
A425	1	5	STR	53'-5"	56
A426	1	5	STR	53'-0"	55
A427	1	5	STR	52'-8"	55
A428	1	5	STR	52'-3"	54
A429	1	5	STR	51'-10"	54
A430	1	5	STR	51'-5"	54
A431	1	5	STR	51'-0"	53
A432	1	5	STR	50'-7"	53
A433	1	5	STR	50'-2"	52
A434	1	5	STR	49'-10"	52
A435	1	5	STR	49'-5"	52
A436	1	5	STR	49'-0"	51
A437	1	5	STR	48'-7"	51
A438	1	5	STR	48'-2"	50
A439	1	5	STR	47'-9"	50
A440	1	5	STR	47'-4"	49
A441	1	5	STR	47'-0"	49
A442	1	5	STR	46'-7"	49
A443	1	5	STR	46'-2"	48
A444	1	5	STR	45'-9"	48
A445	1	5	STR	45'-4"	47
A446	1	5	STR	44'-11"	47
A447	1	5	STR	44'-6"	46
A448	1	5	STR	44'-2"	46
A449	1	5	STR	43'-9"	46
A450	1	5	STR	43'-4"	45
A451	1	5	STR	42'-11"	45
A452	1	5	STR	42'-6"	44
A453	1	5	STR	42'-1"	44
A454	1	5	STR	41'-9"	44
A455	1	5	STR	41'-4"	43
A456	1	5	STR	40'-11"	43
A457	1	5	STR	40'-6"	42
A458	1	5	STR	40'-1"	42
A459	1	5	STR	39'-8"	41

REINFORCING BAR SCHEDULE

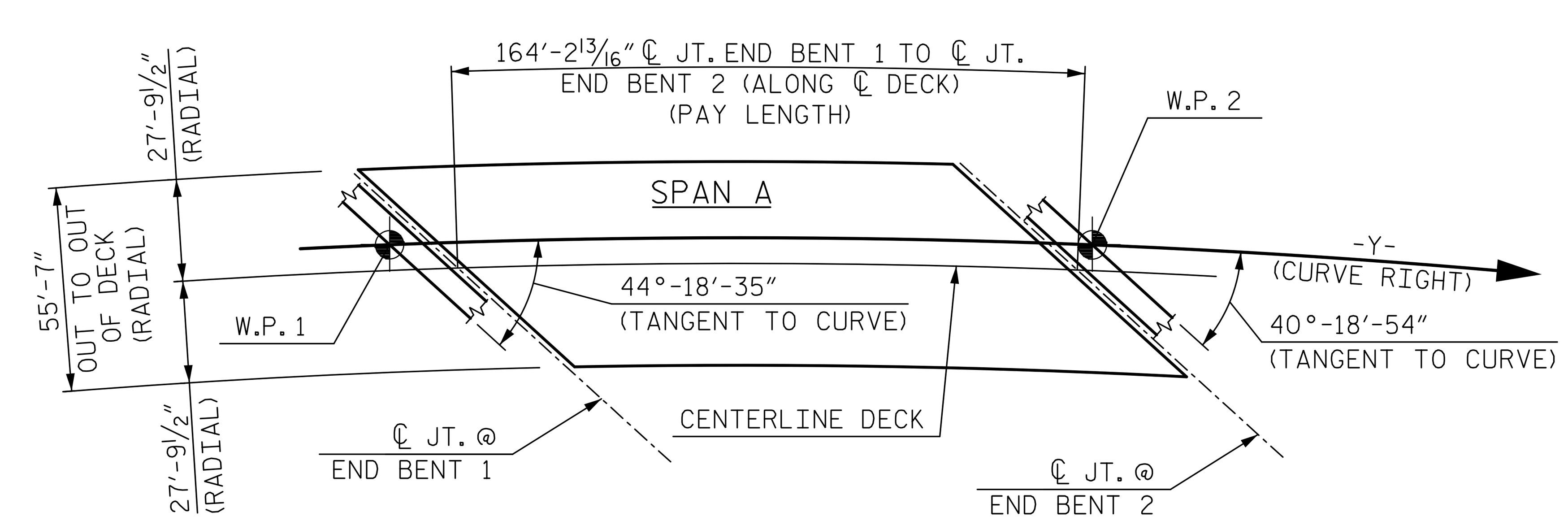
UNCOATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A460	1	5	STR	39'-4"	41
A461	1	5	STR	38'-11"	41
A462	1	5	STR	38'-6"	40
A463	1	5	STR	38'-1"	40
A464	1	5	STR	37'-8"	39
A465	1	5	STR	37'-4"	39
A466	1	5	STR	36'-11"	39
A467	1	5	STR	36'-6"	38
A468	1	5	STR	36'-1"	38
A469	1	5	STR	35'-8"	37
A470	1	5	STR	35'-3"	37
A471	1	5	STR	34'-11"	36
A472	1	5	STR	34'-6"	36
A473	1	5	STR	34'-1"	36
A474	1	5	STR	33'-8"	35
A475	1	5	STR	33'-3"	35
A476	1	5	STR	32'-10"	34
A477	1	5	STR	32'-6"	34
A478	1	5	STR	32'-1"	33
A479	1	5	STR	31'-8"	33
A480	1	5	STR	31'-3"	33
A481	1	5	STR	30'-10"	32
A482	1	5	STR	30'-6"	32
A483	1	5	STR	30'-1"	31
A484	1	5	STR	29'-8"	31
A485	1	5	STR	29'-3"	31
A486	1	5	STR	28'-10"	30
A487	1	5	STR	28'-6"	30
A488	1	5	STR	28'-1"	29
A489	1	5	STR	27'-8"	29
A490	1	5	STR	27'-3"	28
A491	1	5	STR	26'-10"	28
A492	1	5	STR	26'-6"	28
A493	1	5	STR	26'-1"	27
A494	1	5	STR	25'-8"	27
A495	1	5	STR	25'-3"	26
A496	1	5	STR	24'-10"	26
A497	1	5	STR	24'-6"	26
A498	1	5	STR	24'-1"	25
A499	1	5	STR	23'-8"	25
A500	1	5	STR	23'-3"	24
A501	1	5	STR	22'-11"	24
A502	1	5	STR	22'-6"	23
A503	1	5	STR	22'-1"	23
A504	1	5	STR	21'-8"	23
A505	1	5	STR	21'-3"	22
A506	1	5	STR	20'-11"	22
A507	1	5	STR	20'-6"	21
A508	1	5	STR	20'-1"	21
A509	1	5	STR	19'-8"	21
A510	1	5	STR	19'-4"	20
A511	1	5	STR	18'-11"	20
A512	1	5	STR	18'-6"	19

REINFORCING BAR SCHEDULE

UNCOATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A513	1	5	STR	18'-1"	19
A514	1	5	STR	17'-8"	18
A515	1	5	STR	17'-4"	18
A516	1	5	STR	16'-11"	18
A517	1	5	STR	16'-6"	17
A518	1	5	STR	16'-1"	17
A519	1	5	STR	15'-9"	16
A520	1	5	STR	15'-4"	16
A521	1	5	STR	14'-11"	16
A522	1	5	STR	14'-6"	15
A523	1	5	STR	14'-1"	15
A524	1	5	STR	13'-9"	14
A525	1	5	STR	13'-4"	14
A526	1	5	STR	12'-11"	13
A527	1	5	STR	12'-6"	13
A528	1	5	STR	12'-2"	13
A529	1	5	STR	11'-9"	12
A530	1	5	STR	11'-4"	12
A531	1	5	STR	10'-11"	11
A532	1	5	STR	10'-7"	11
A533	1	5	STR	10'-2"	11
A534	1	5	STR	9'-9"	10
A535	1	5	STR	9'-4"	10
A536	1	5	STR	9'-0"	9
A537	1	5	STR	8'-7"	9
A538	1	5	STR	8'-2"	9
A539	1	5	STR	7'-9"	8
A540	1	5	STR	7'-5"	8
A541	1	5	STR	7'-0"	7
A542	1	5	STR	6'-7"	7
A543	1	5	STR	6'-2"	6
A544	1	5	STR	5'-10"	6
A545	1	5	STR	5'-5"	6
A546	1	5	STR	4'-4"	5
A547	1	5	STR	5'-2"	5
A548	1	5	STR	4'-5"	5
A549	1	5	STR	5'-0"	5
A550	1	5	STR	4'-7"	5
B101	225	5	STR	56'-11"	13,357
				REINFORCING STEEL TOTAL:	33,946



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 9,129)

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
DocuSigned by: Paul J. Barber
7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	12/21
CHECKED BY	Z. REINEKE	DATE	1/22
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 24

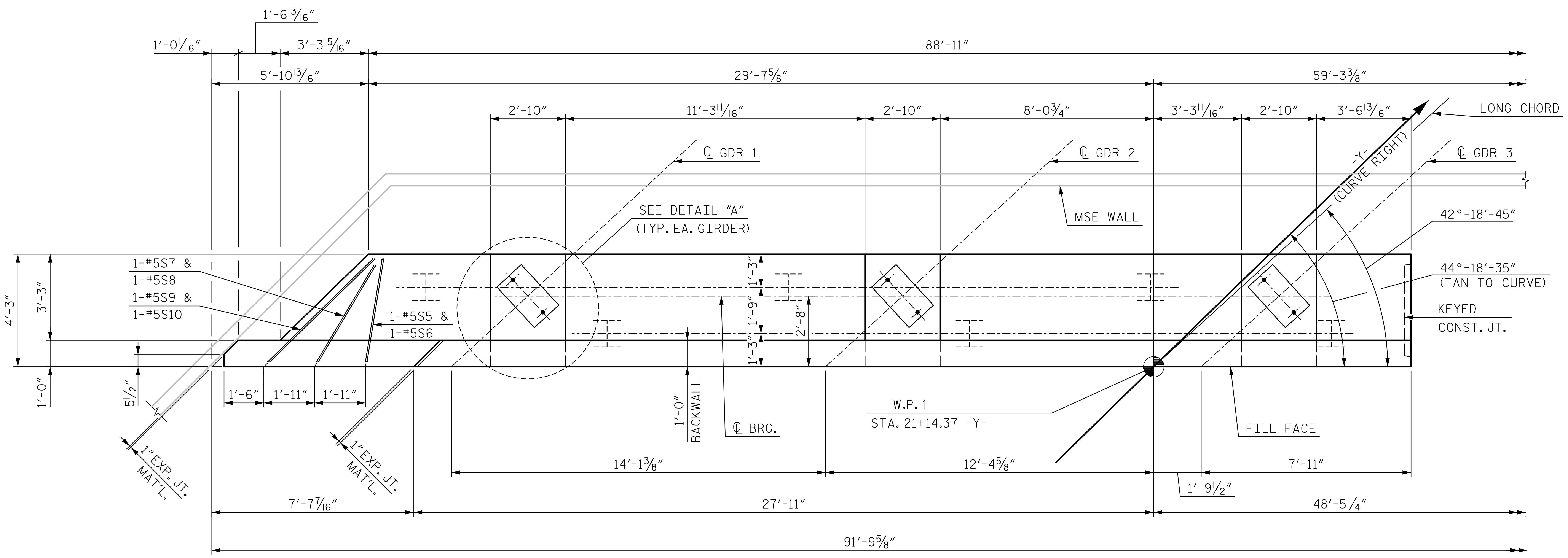
REVISIONS						
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

SHEET NO. S-24
TOTAL SHEETS 34

ASSEMBLED BY : M. WRIGHT	DATE : 12/21	
CHECKED BY : Z. REINEKE	DATE : 1/22	
DRAWN BY : JMB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY : SJD 9/87	REV. 12/17	MAA/THC
	REV. 06/19	BNB/THC

3/8/2022 8:07:59 AM _W01_041_U5813_SMU_BM02_024_750171.dgn

STD. NO. BOM1



PLAN

NOTES:

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR SECTION A-A, SEE SHEET 3 OF 3.

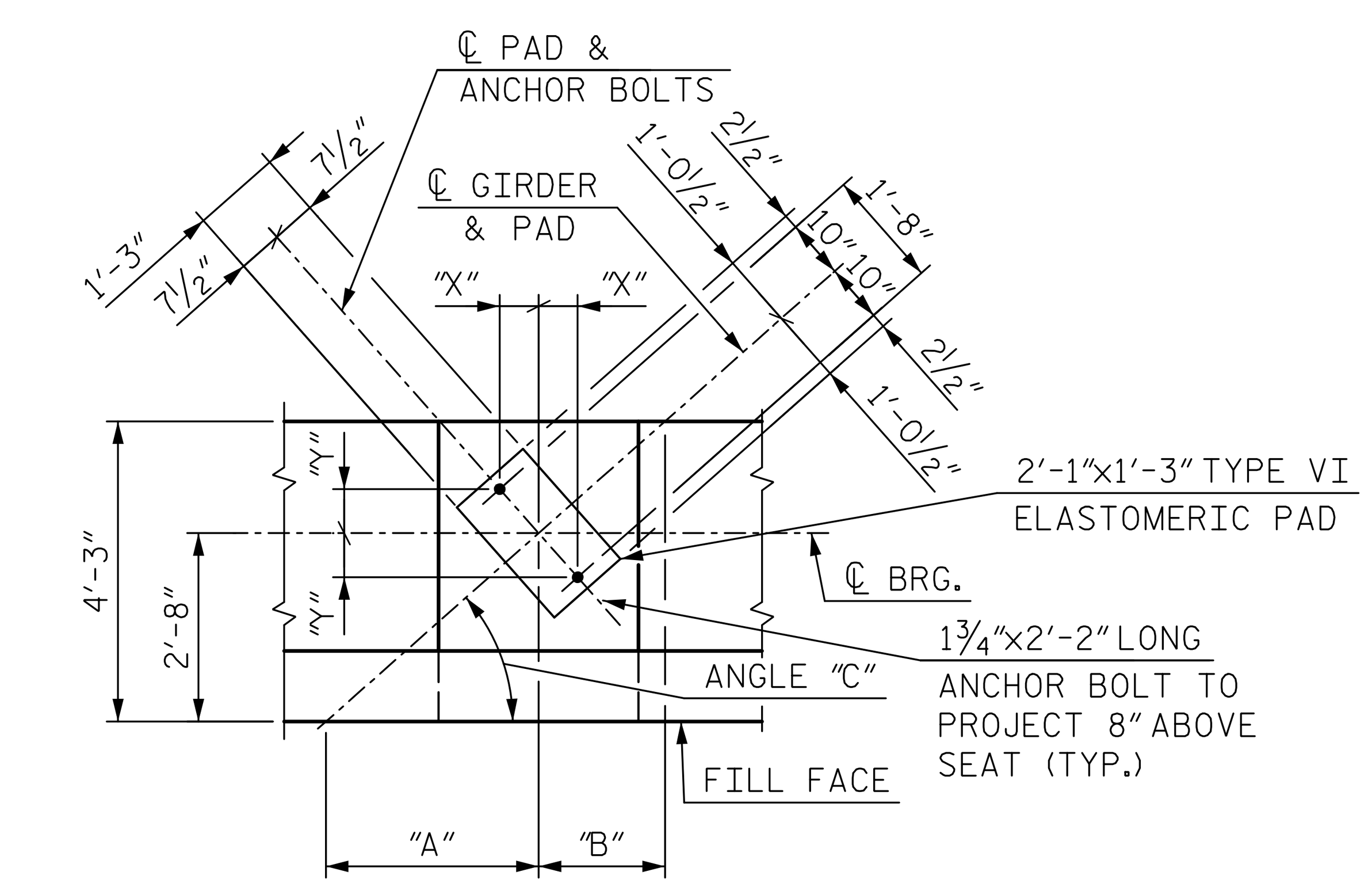
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT 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%.

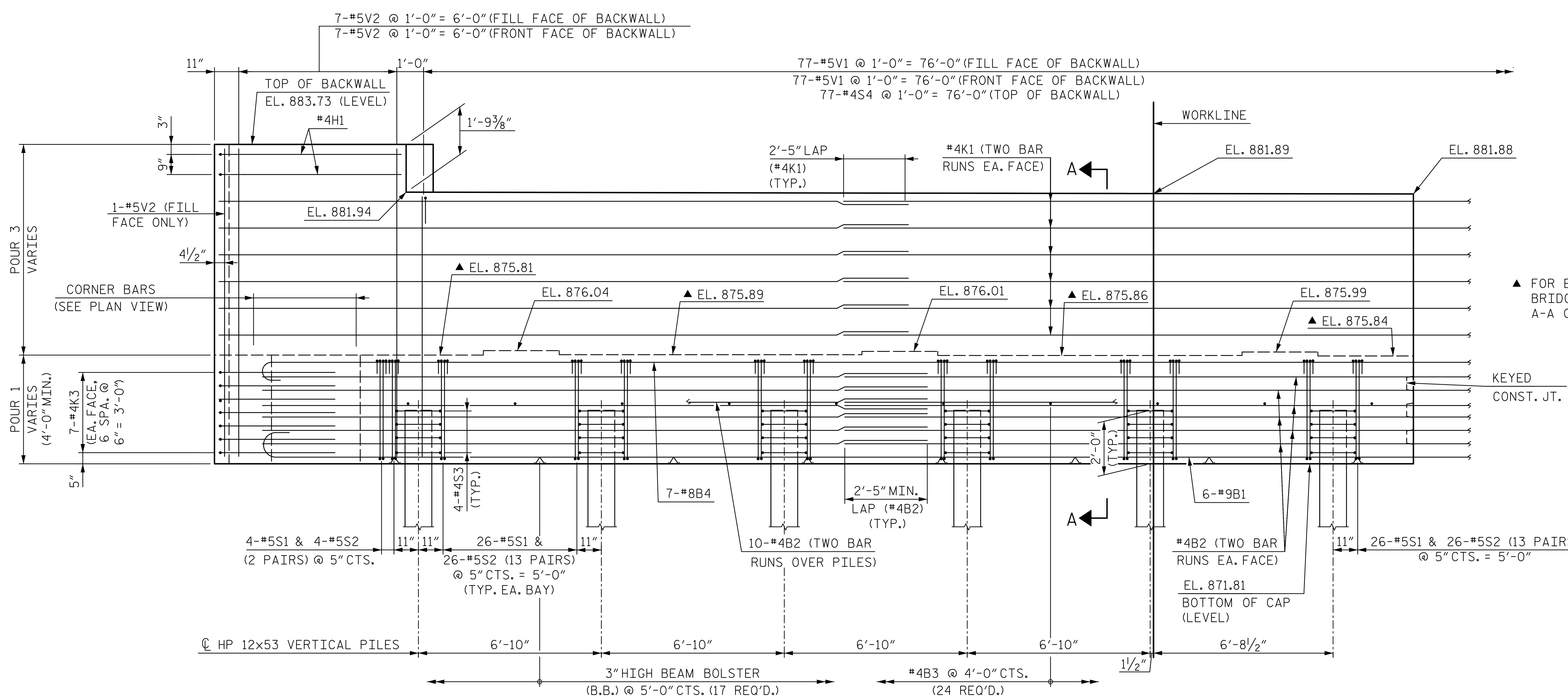
FOR KEYED CONSTRUCTION JOINT, SEE SHEET 2 OF 3.



GIRDER	"A"	"B"	ANGLE "C"	"X"	"Y"
GDR1	2'-10 9/16"	1'-8 1/2"	42°-47'-42"	6 13/16"	7 5/16"
GDR2	2'-10 7/8"	1'-8 11/16"	42°-32'-20"	6 3/4"	7 3/8"
GDR3	2'-11 3/16"	1'-8 7/8"	42°-16'-46"	6 3/4"	7 3/8"
GDR4	2'-11 1/2"	1'-9 1/16"	42°-01'-00"	6 11/16"	7 7/16"
GDR5	2'-11 7/8"	1'-9 5/16"	41°-45'-00"	6 11/16"	7 7/16"
GDR6	3'-0 3/16"	1'-9 1/2"	41°-28'-47"	6 5/8"	7 1/2"

DETAIL A

▲ FOR ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A ON SHEET 3 OF 3.



ELEVATION

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
DocuSigned by: Paul J. Barber 180F867368741E... 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

HNTB

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	7/21
CHECKED BY	S. SULLIVAN	DATE	7/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 25

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

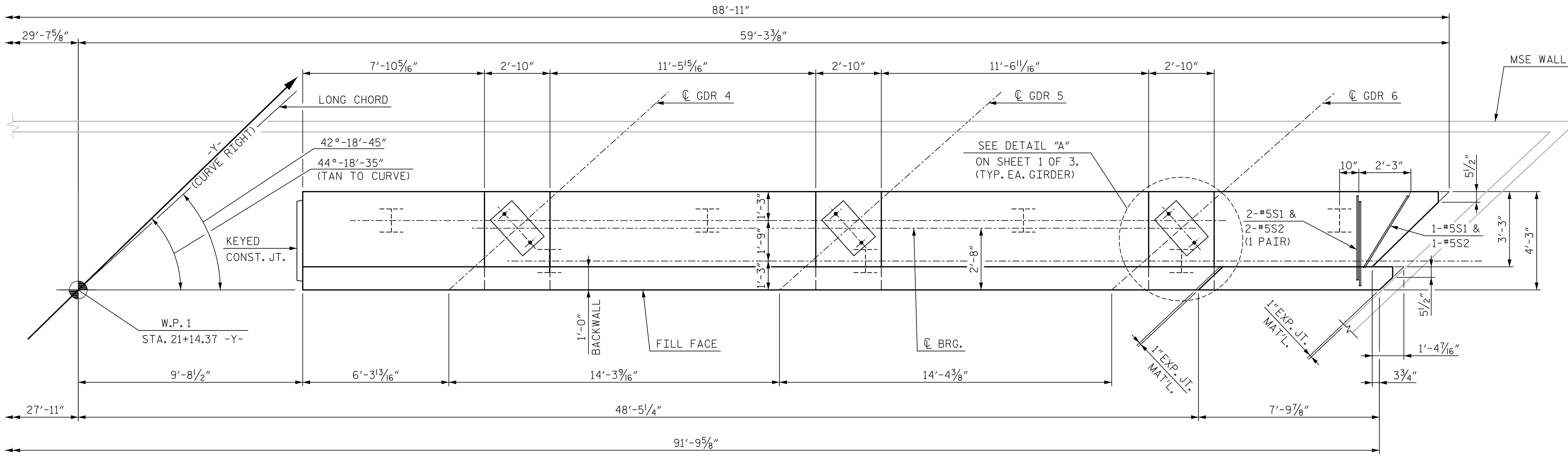
SHEET NO. S-25

TOTAL SHEETS 34

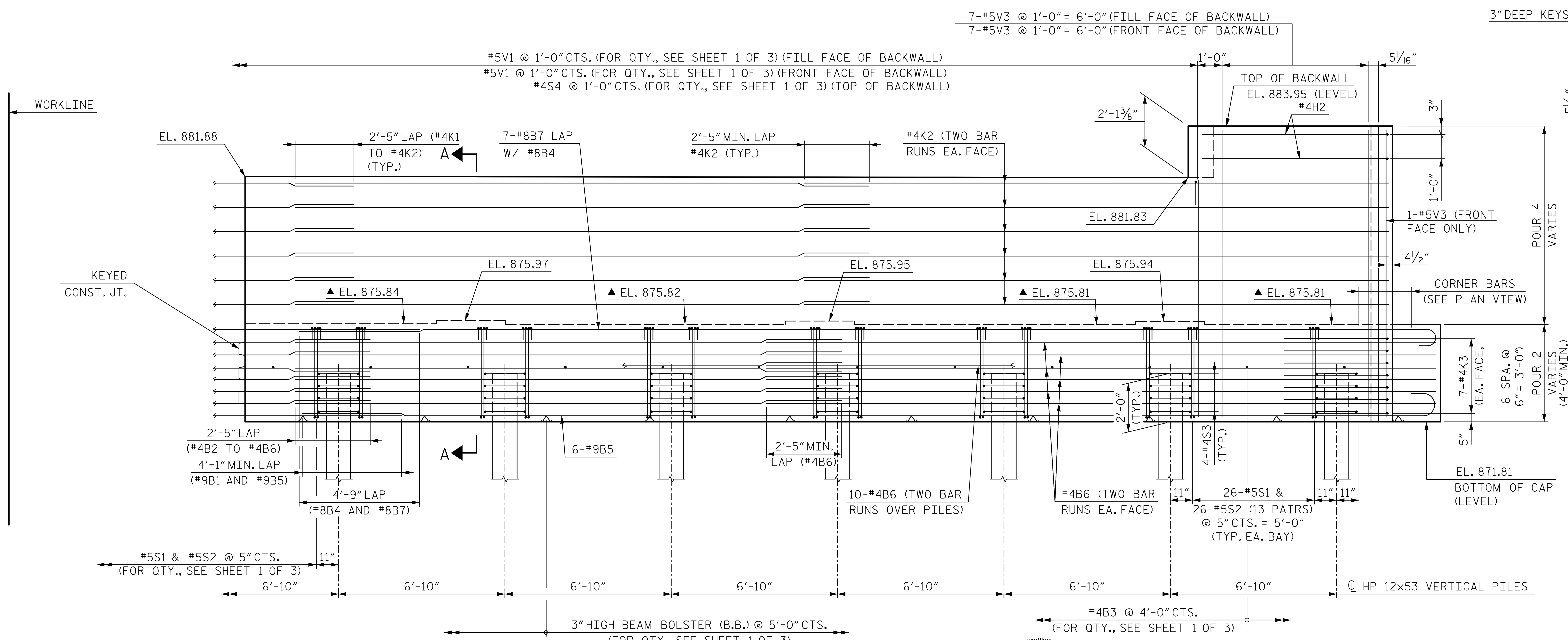
3/8/2022
8:07:16 AM
...\401_049_U5813_SMU_E01_025_750171.dgn

NOTES:

FOR NOTES, SEE SHEET 1 OF 3.

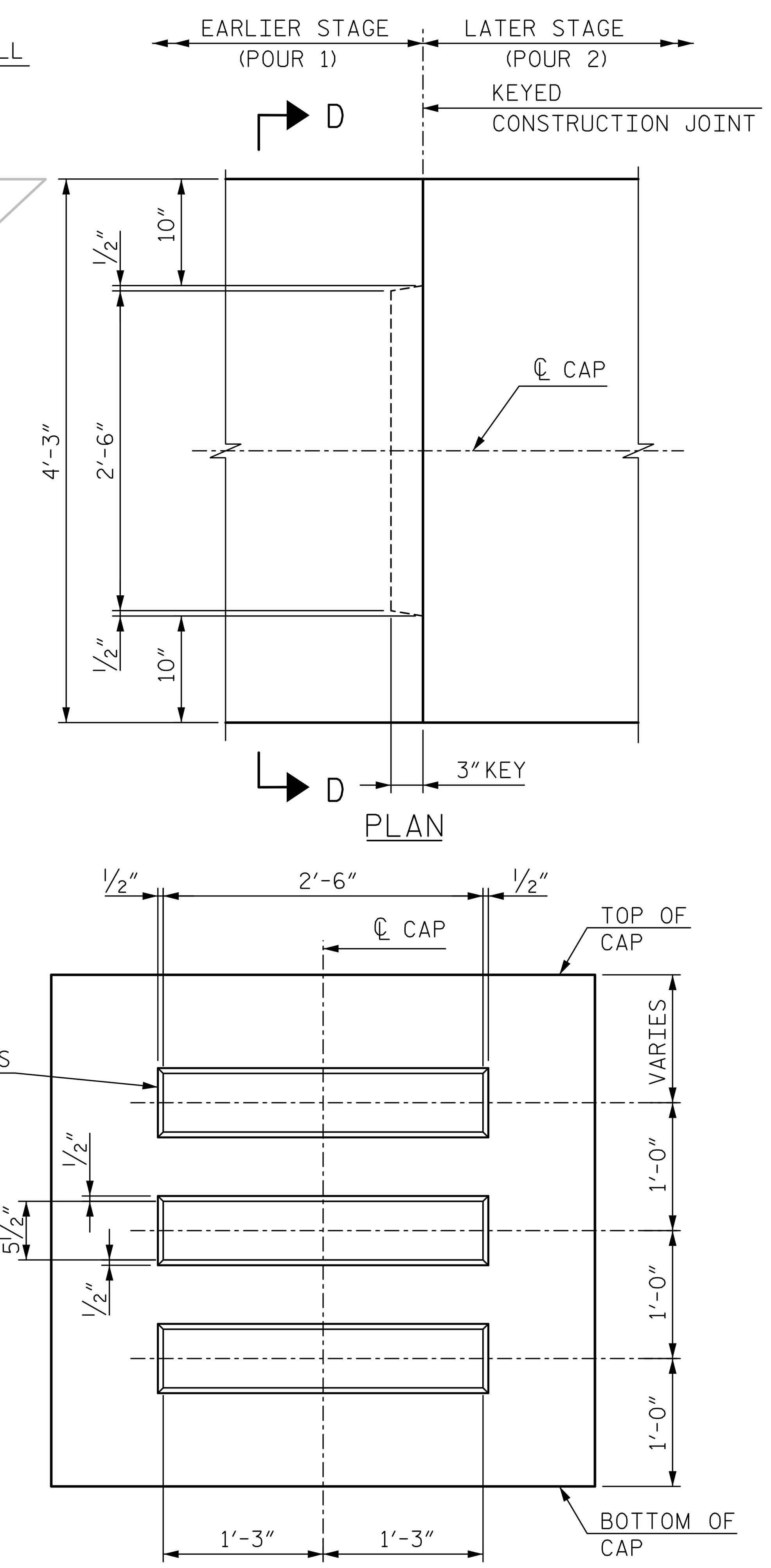


PLAN



▲ FOR ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A ON SHEET 3 OF 3.

ELEVATION



SECTION D-D

KEYED CONSTRUCTION JOINT DETAILS

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

DocuSigned by: Paul J. Barber
7/11/2022

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

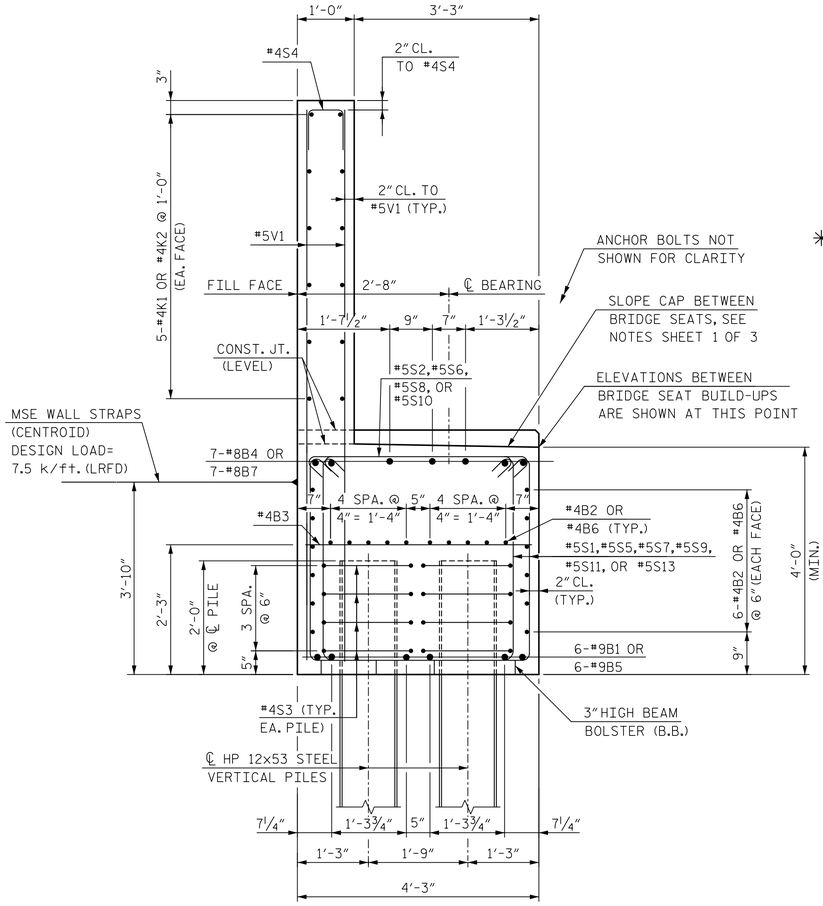
DRAWN BY	M. WRIGHT	DATE	7/21
CHECKED BY	S. SULLIVAN	DATE	7/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

DWG. NO. 26

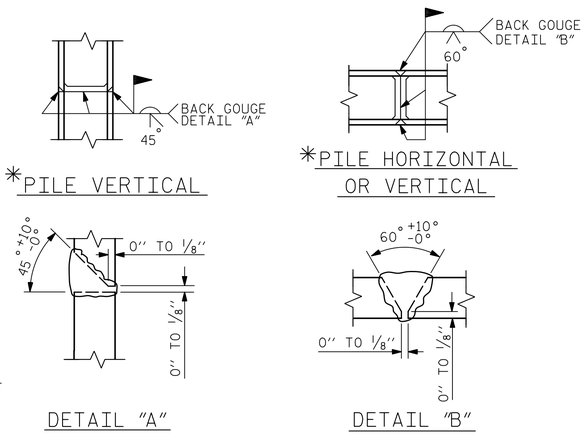
REVISIONS						
NO.	BY	DATE	NO.	BY	DATE	
1			3			
2			4			

SHEET NO. S-26
TOTAL SHEETS 34

3/8/2022
8:07:23 AM
...\401_051_U5813_SMU_E02_026_750171.dgn



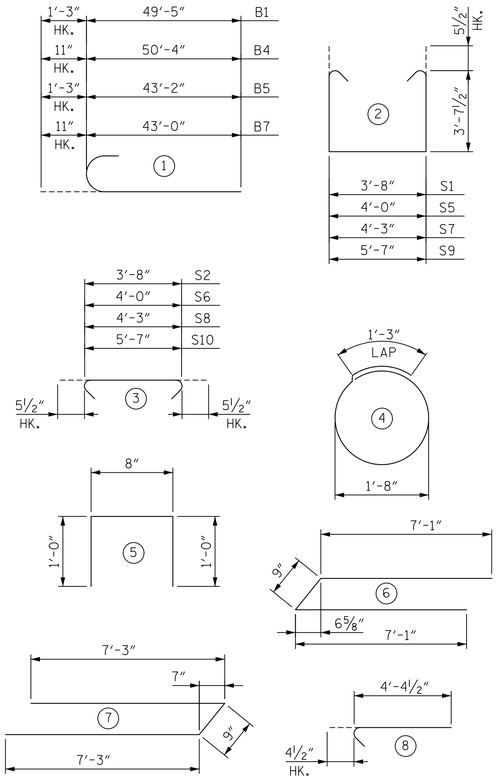
SECTION A-A



✳ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

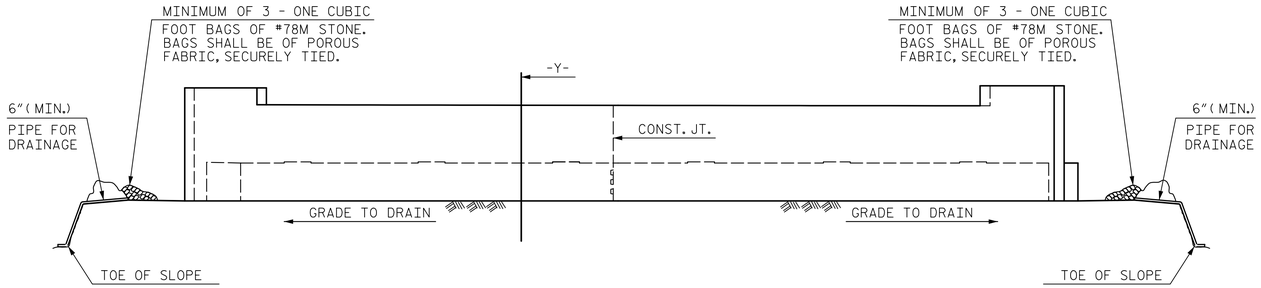
BILL OF REINFORCING

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	9	1	50'-8"	1,034
B2	44	4	STR	24'-11"	732
B3	24	4	STR	3'-11"	63
B4	7	8	1	51'-3"	958
B5	6	9	1	44'-5"	906
B6	44	4	STR	23'-1"	678
B7	7	8	1	43'-11"	821
H1	2	4	6	14'-11"	20
H2	2	4	7	15'-3"	20
K1	24	4	STR	25'-9"	413
K2	24	4	STR	23'-7"	378
K3	28	4	8	4'-9"	89
S1	319	5	2	11'-10"	3,937
S2	319	5	3	4'-7"	1,525
S3	52	4	4	6'-6"	226
S4	77	4	5	2'-8"	137
S5	1	5	2	12'-2"	13
S6	1	5	3	4'-11"	5
S7	1	5	2	12'-5"	13
S8	1	5	3	5'-2"	5
S9	1	5	2	13'-9"	14
S10	1	5	3	6'-6"	7
V1	154	5	STR	9'-7"	1,539
V2	15	5	STR	11'-6"	180
V3	15	5	STR	11'-8"	183

QUANTITIES

REINFORCING STEEL	LBS.	13,896
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP	CU. YDS.	25.3
POUR 2 - CAP	CU. YDS.	31.9
POUR 3 - BACKWALL	CU. YDS.	8.5
POUR 4 - BACKWALL	CU. YDS.	13.3
TOTAL	CU. YDS.	79.0
HP 12x53 STEEL PILES	NO.	13
	LIN. FT.	390
PILE EXCAVATION IN SOIL	LIN. FT.	45
PILE EXCAVATION NOT IN SOIL	LIN. FT.	85



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 1

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

Digitally signed by: Paul J. Barber 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 10/21
CHECKED BY S. SULLIVAN DATE 11/21
ENGINEER OF RECORD P. BARBER DATE 1/22

DWG. NO. 27

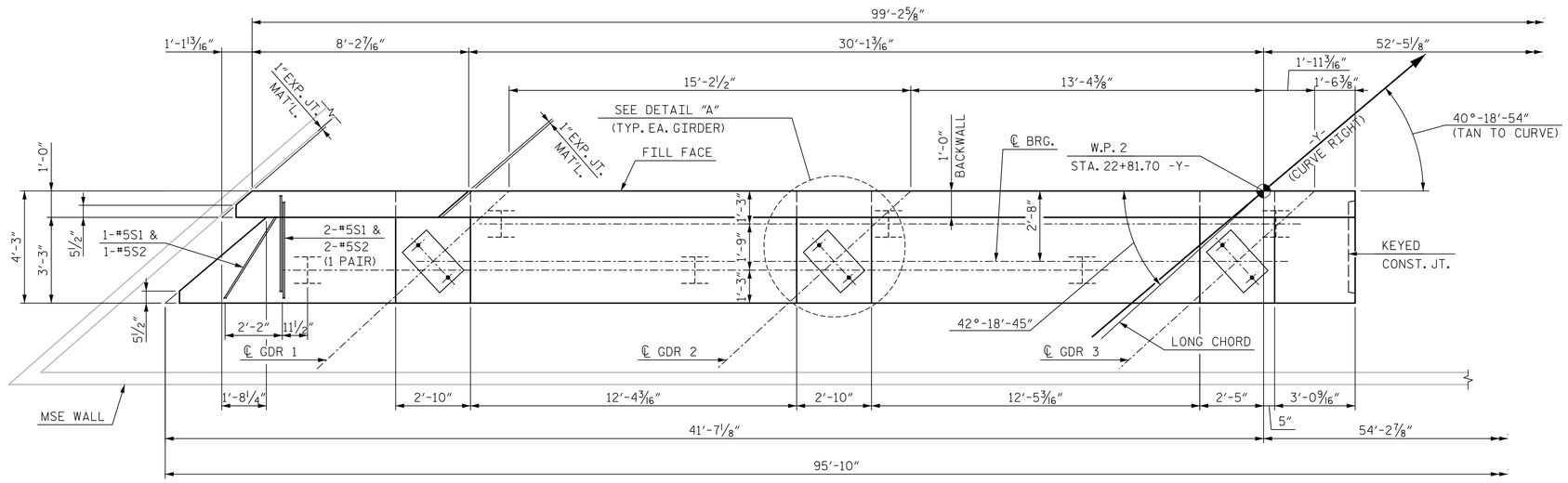
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

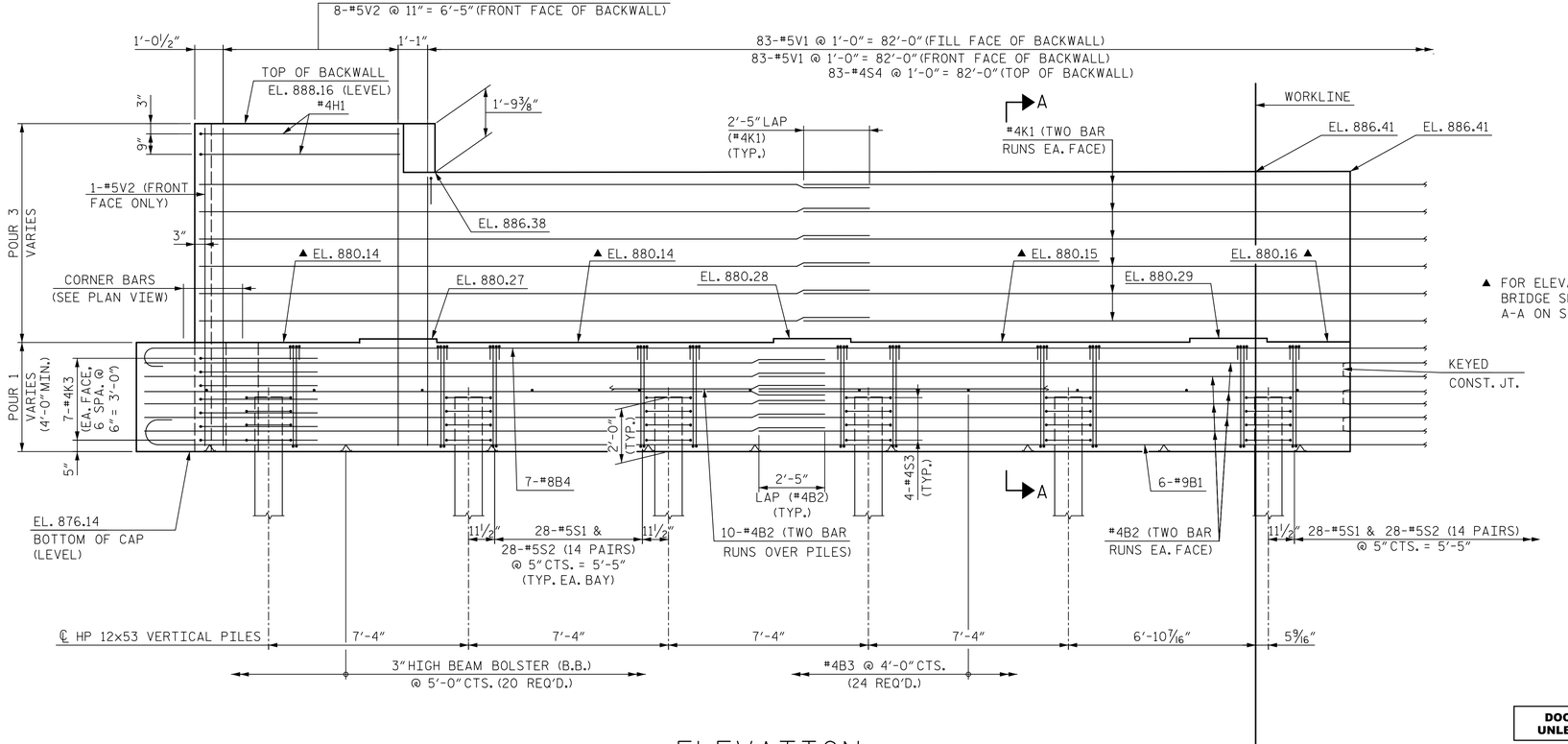
END BENT 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-27
1			3			TOTAL SHEETS
2			4			34

3/8/2022
8:07:31 AM
...\401_053_05B13_SMU_E03_027_750171.dgn



PLAN



ELEVATION

▲ FOR ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A ON SHEET 3 OF 3.

NOTES:

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR SECTION A-A, SEE SHEET 3 OF 3.

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

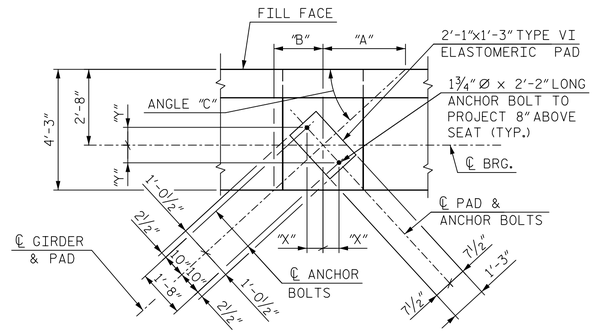
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT 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%.

FOR PIPE INSERTS, SEE "ELASTOMERIC BEARING PAD DETAILS" SHEET.

FOR KEYED CONSTRUCTION JOINT, SEE SHEET 2 OF 3.



GIRDER	"A"	"B"	ANGLE "C"	"X"	"Y"
GDR1	2'-10 9/16"	1'-8 1/2"	42°-47'-42"	6 13/16"	7 5/16"
GDR2	2'-10 7/8"	1'-8 11/16"	42°-32'-20"	6 3/4"	7 3/8"
GDR3	2'-11 3/16"	1'-8 7/8"	42°-16'-46"	6 7/4"	7 3/8"
GDR4	2'-11 1/2"	1'-9 1/16"	42°-01'-00"	6 11/16"	7 7/16"
GDR5	2'-11 7/8"	1'-9 5/16"	41°-45'-00"	6 11/16"	7 7/16"
GDR6	3'-0 3/16"	1'-9 1/2"	41°-28'-47"	6 5/8"	7 1/2"

DETAIL A

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

DocuSigned by: Paul J. Barber 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 1/22
CHECKED BY S. SULLIVAN DATE 1/22
ENGINEER OF RECORD P. BARBER DATE 1/22

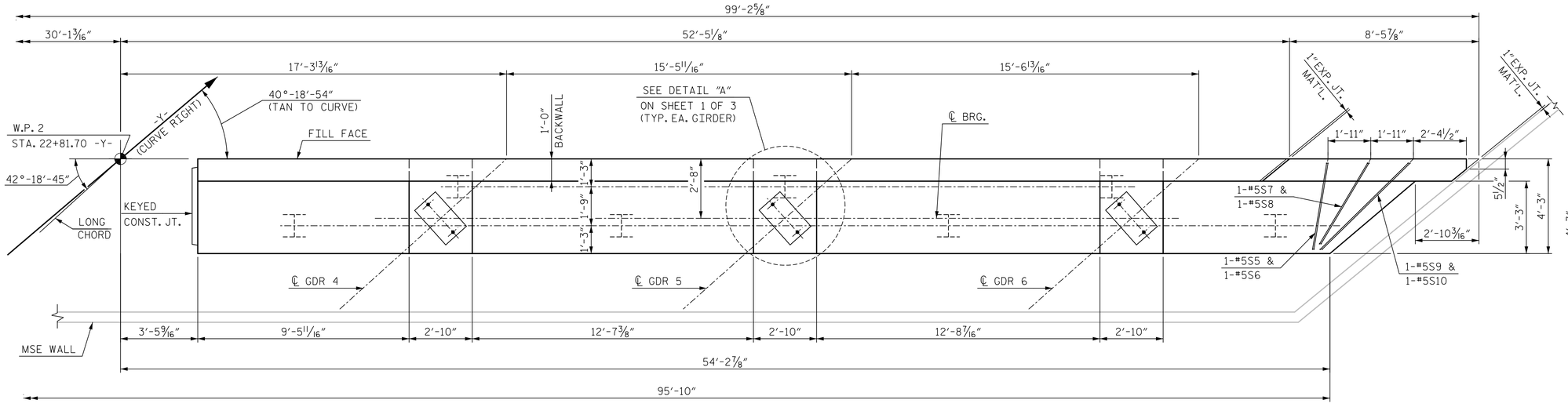
DWG. NO. 28

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-28
1			3			TOTAL SHEETS
2			4			34

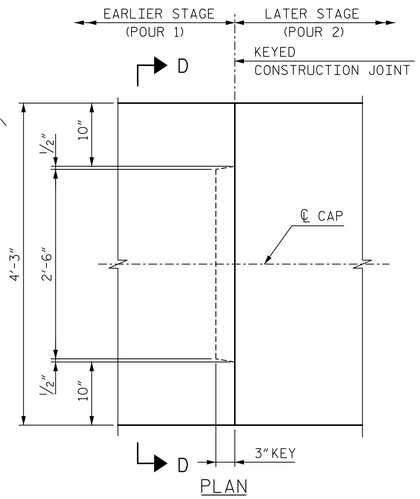
3/9/2022
8:27:30 AM
...\401.055.JJ58 13_SMU_E04_028_750171.dgn

NOTES:

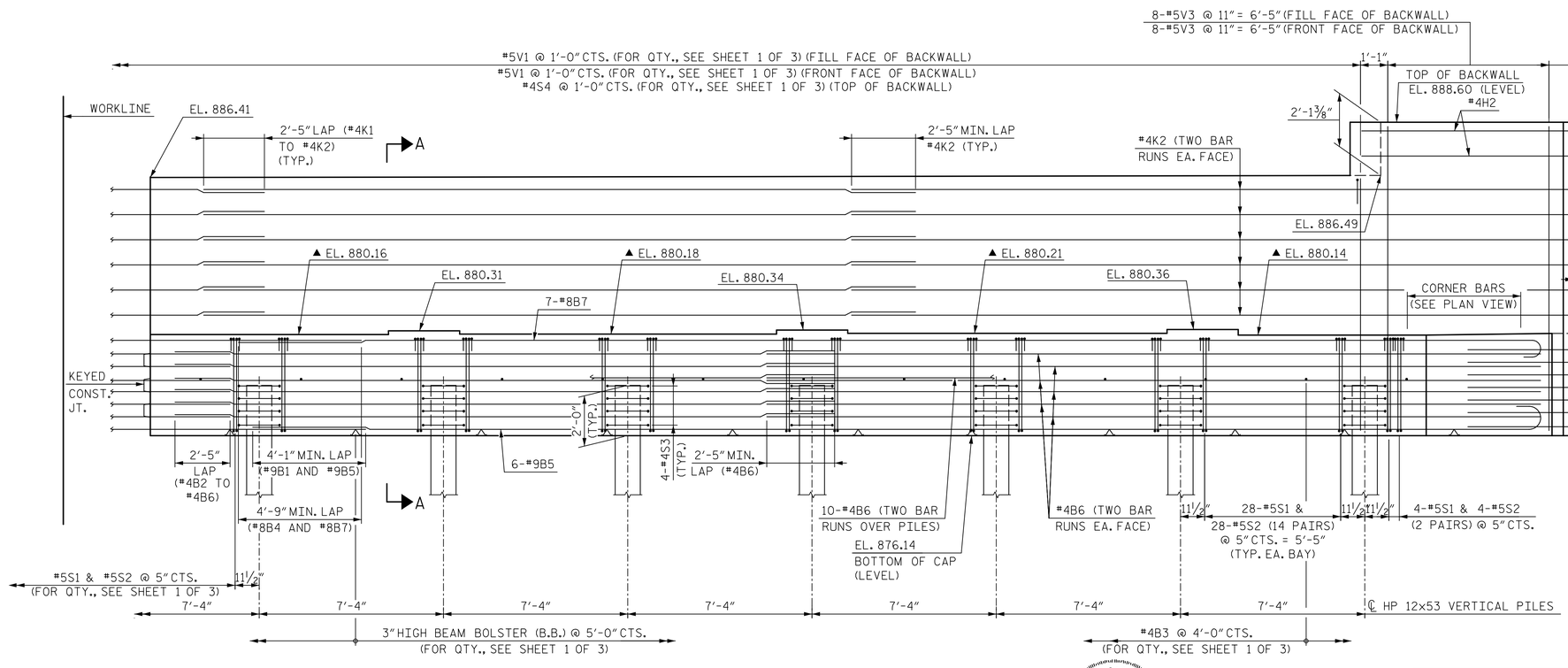
FOR NOTES, SEE SHEET 1 OF 3.



PLAN

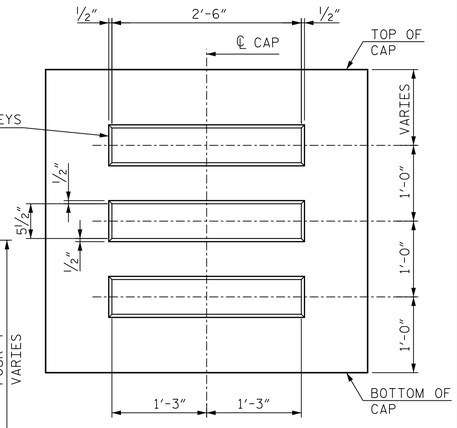


PLAN



▲ FOR ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A ON SHEET 3 OF 3.

ELEVATION



SECTION D-D

KEYED CONSTRUCTION JOINT DETAILS

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

DocuSigned by: Paul J. Barber 18D8185736874IE...
7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

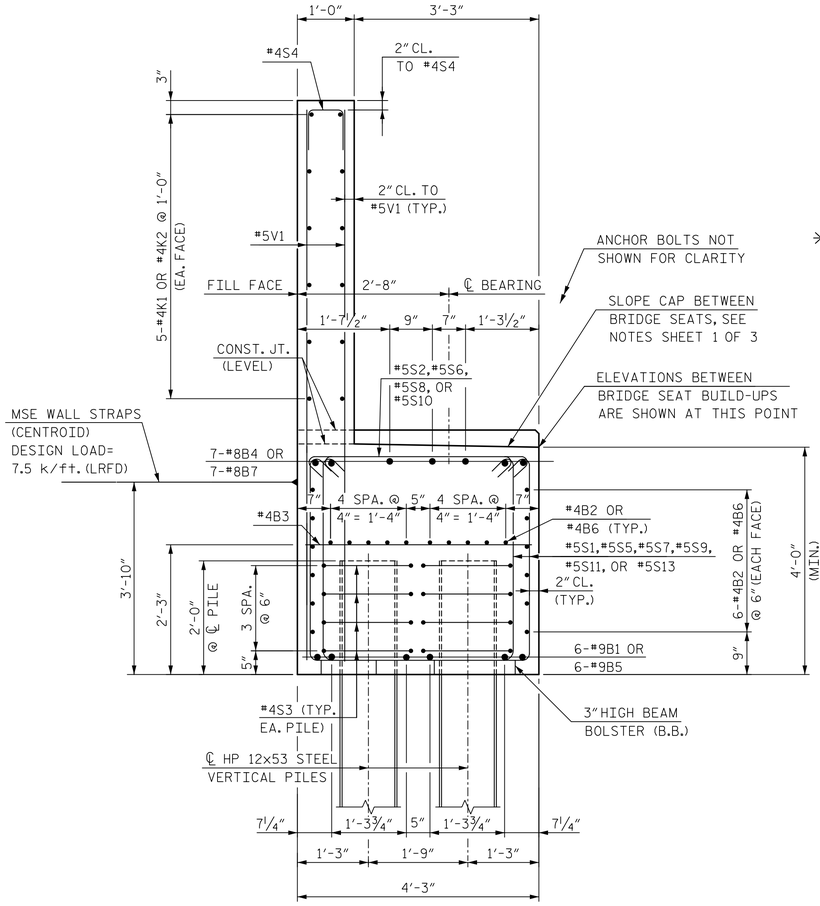
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	1/22
CHECKED BY	S. SULLIVAN	DATE	1/22
ENGINEER OF RECORD	P. BARBER	DATE	1/22

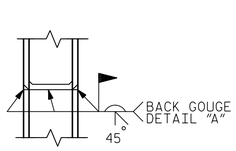
DWG. NO. 29

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-29
1			3			TOTAL SHEETS
2			4			34

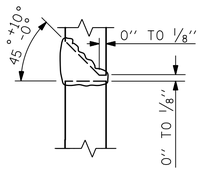
3/8/2022
8:07:46 AM
U-5813_L05_US613_SMU_E05_029_75017.dgn



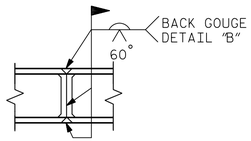
SECTION A-A



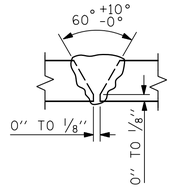
✳PILE VERTICAL



DETAIL "A"



✳PILE HORIZONTAL OR VERTICAL

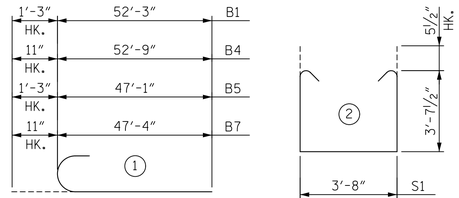


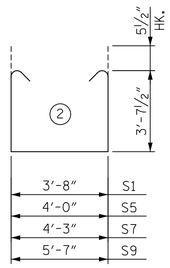
DETAIL "B"

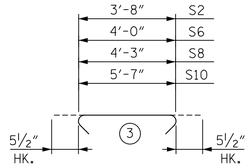
✳ POSITION OF PILE DURING WELDING.

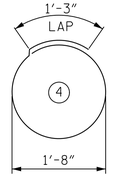
PILE SPLICE DETAILS

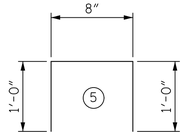
BAR TYPES

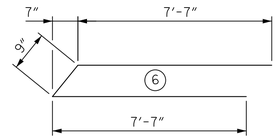


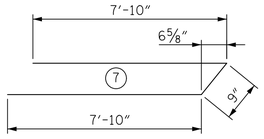


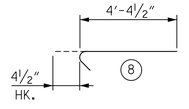












ALL BAR DIMENSIONS ARE OUT TO OUT

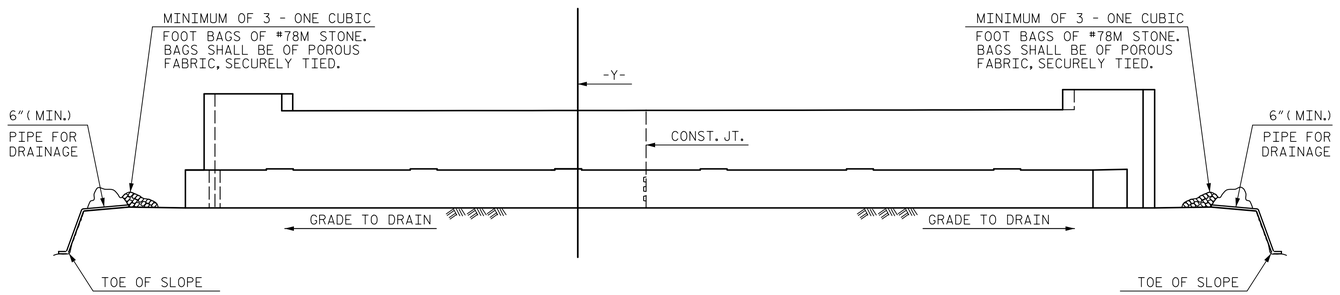
BILL OF REINFORCING

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	9	1	53'-6"	1,091
B2	44	4	STR	25'-1"	737
B3	24	4	STR	3'-11"	63
B4	7	8	1	53'-8"	1,003
B5	6	9	1	48'-4"	986
B6	44	4	STR	26'-3"	772
B7	7	8	1	48'-3"	902
H1	2	4	6	15'-11"	21
H2	2	4	7	16'-5"	22
K1	24	4	STR	24'-7"	394
K2	24	4	STR	28'-4"	454
K3	28	4	8	4'-9"	89
S1	343	5	2	11'-10"	4,233
S2	343	5	3	4'-7"	1,640
S3	52	4	4	6'-6"	226
S4	82	4	5	2'-8"	146
S5	1	5	2	12'-2"	13
S6	1	5	3	4'-11"	5
S7	1	5	2	12'-5"	13
S8	1	5	3	5'-2"	5
S9	1	5	2	13'-9"	14
S10	1	5	3	6'-6"	7
V1	164	5	STR	9'-9"	1,668
V2	17	5	STR	11'-7"	205
V3	17	5	STR	12'-0"	213

QUANTITIES

REINFORCING STEEL	LBS.	14,922
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP	CU. YDS.	29.0
POUR 2 - CAP	CU. YDS.	32.4
POUR 3 - BACKWALL	CU. YDS.	10.3
POUR 4 - BACKWALL	CU. YDS.	14.0
TOTAL	CU. YDS.	85.7
HP 12x53 STEEL PILES	NO.	13
	LIN. FT.	390
PILE EXCAVATION IN SOIL	LIN. FT.	83
PILE EXCAVATION NOT IN SOIL	LIN. FT.	48



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 2

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

Docusigned by: Paul J. Barber 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 1/22
CHECKED BY S. SULLIVAN DATE 1/22
ENGINEER OF RECORD P. BARBER DATE 1/22

DWG. NO. 30

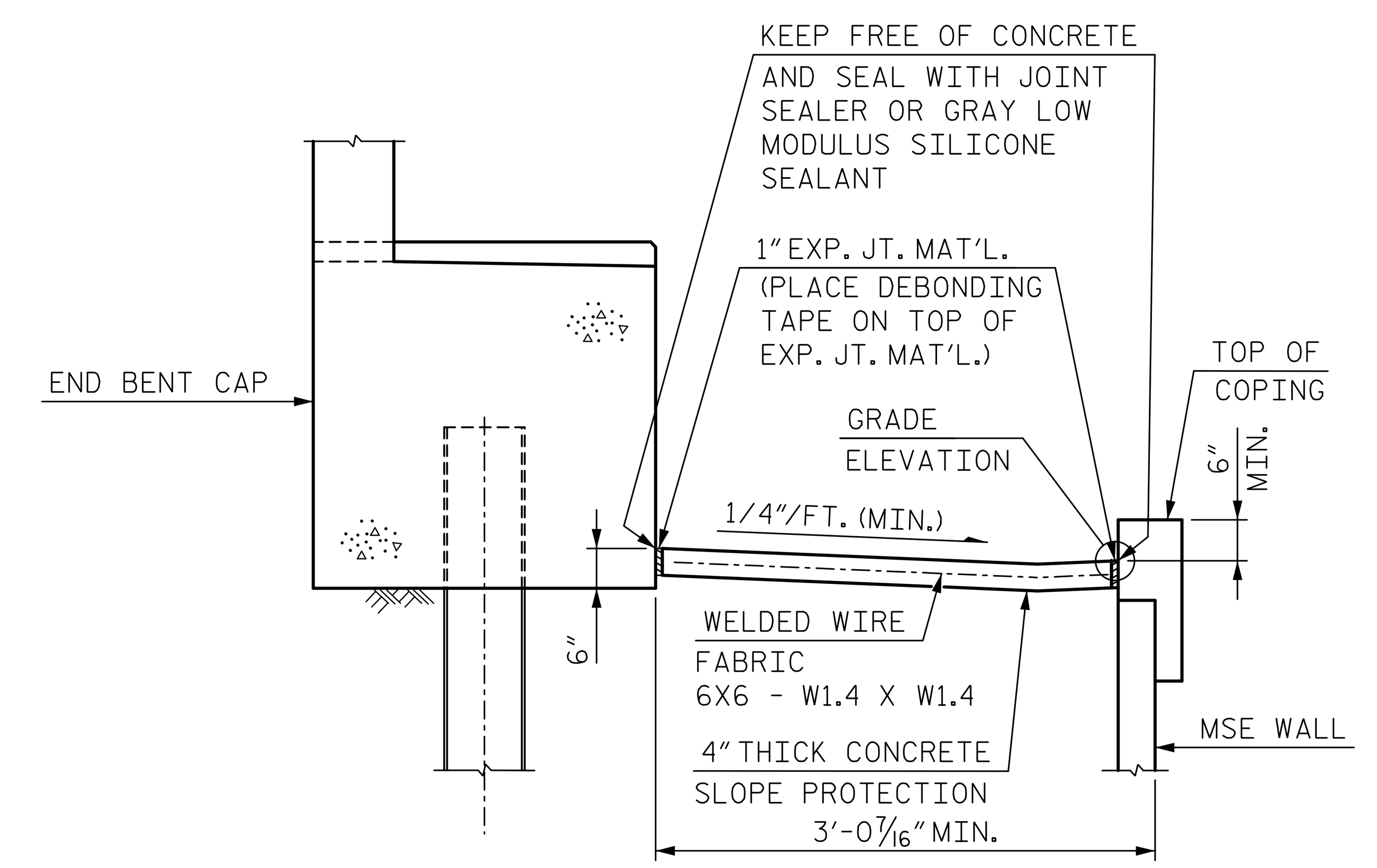
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-30
1			3			TOTAL SHEETS
2			4			34

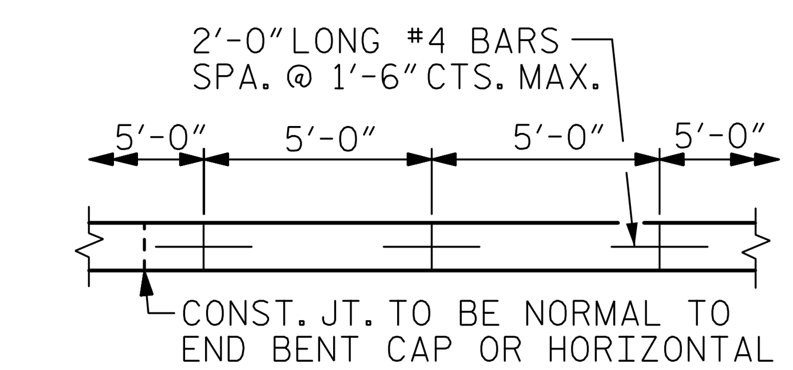
3/8/2022
8:07:53 AM
...\401_059_US613_SWU_E06_030_750171.dgn



SECTION A-A

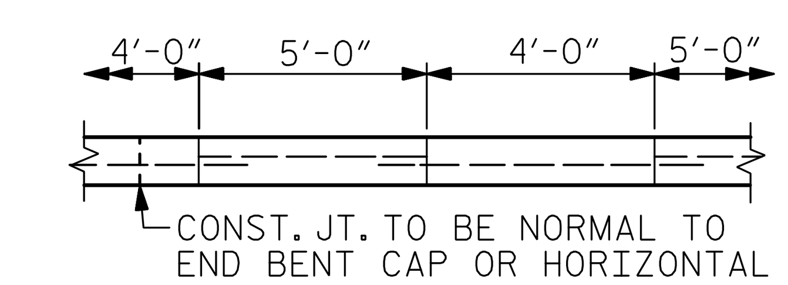
NOTES:

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



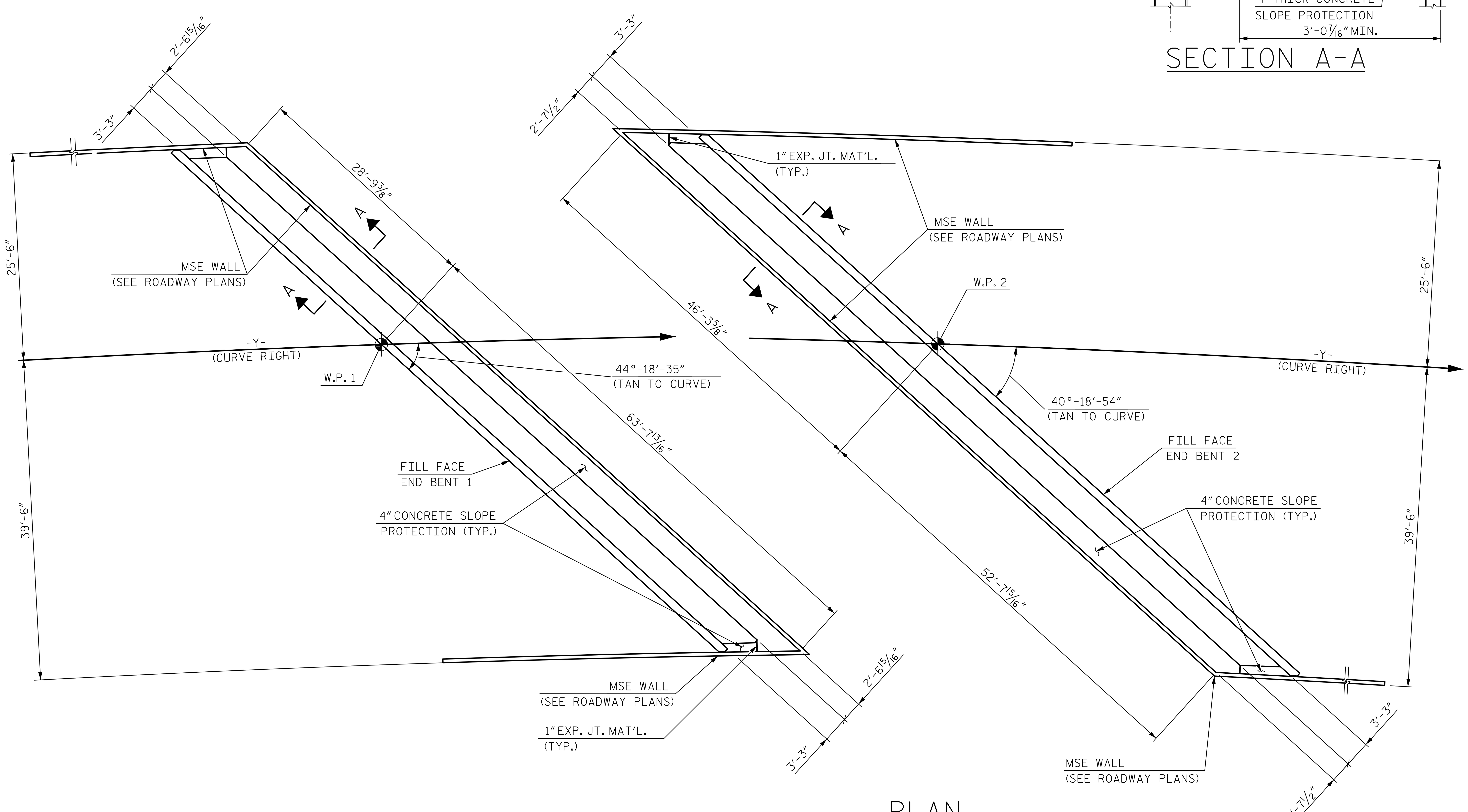
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL



PLAN

BRIDGE @ STA. 21+94.17 -Y-	4" INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	28	56
END BENT 2	31	61

✳ QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

DocuSigned by: Paul J. Barber 7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	2/20
CHECKED BY	Z. REINEKE	DATE	11/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

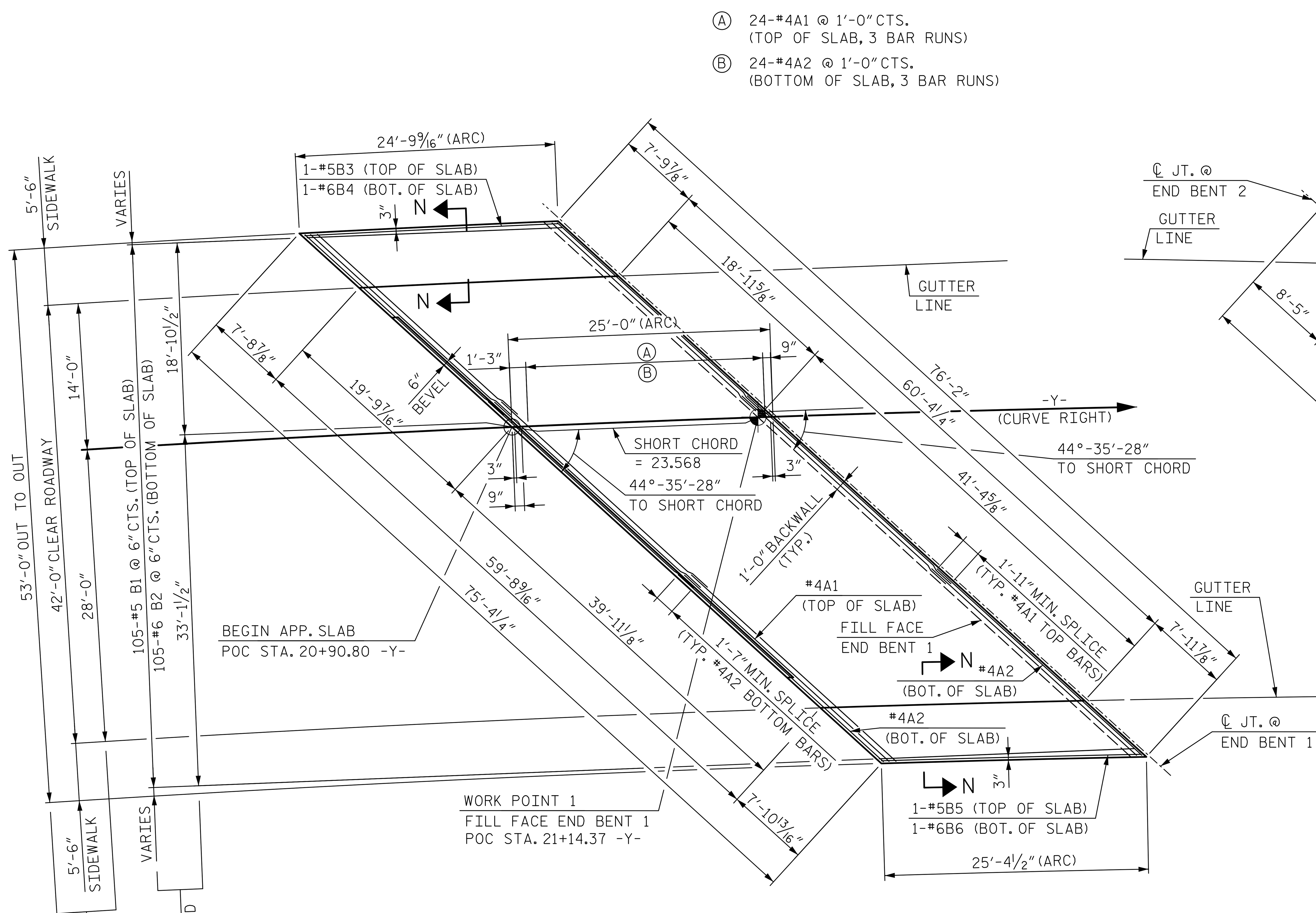
DWG. NO. 31

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

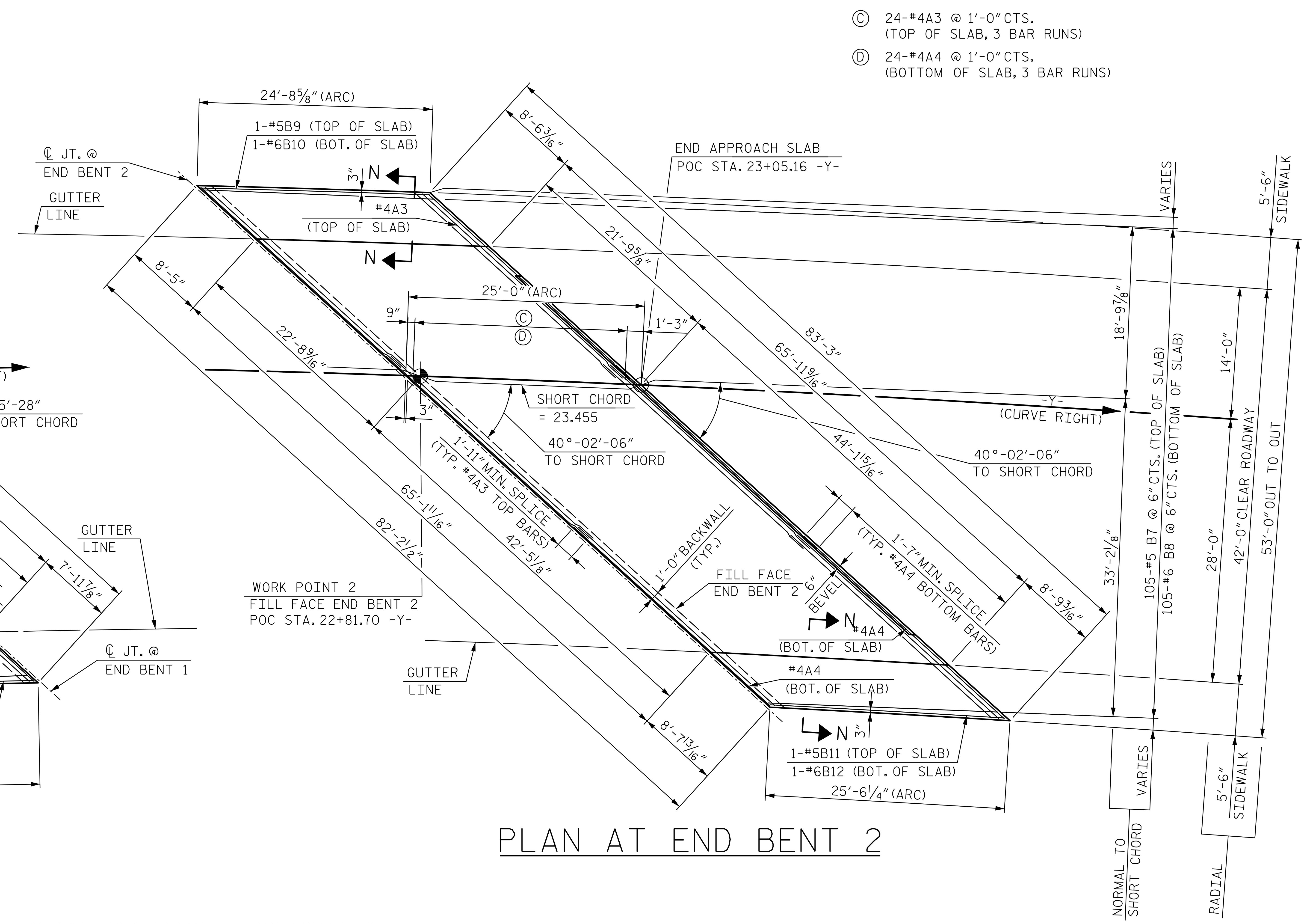
SHEET NO. S-31

TOTAL SHEETS 34

3/8/2022
8:08:22 AM
...\401_061_U5813_SMU_SP_031_75017.dgn



PLAN AT END BENT 1



PLAN AT END BENT 2

NOTE: SIDEWALK REINFORCEMENT NOT SHOWN IN PLAN.
REFER TO "BRIDGE APPROACH SLAB DETAILS" SHEET.

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB
FOR FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
DocuSigned by: Paul J. Barber
7/11/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	2/20
CHECKED BY	Z. REINEKE	DATE	7/21
ENGINEER OF RECORD	P. BARBER	DATE	1/22

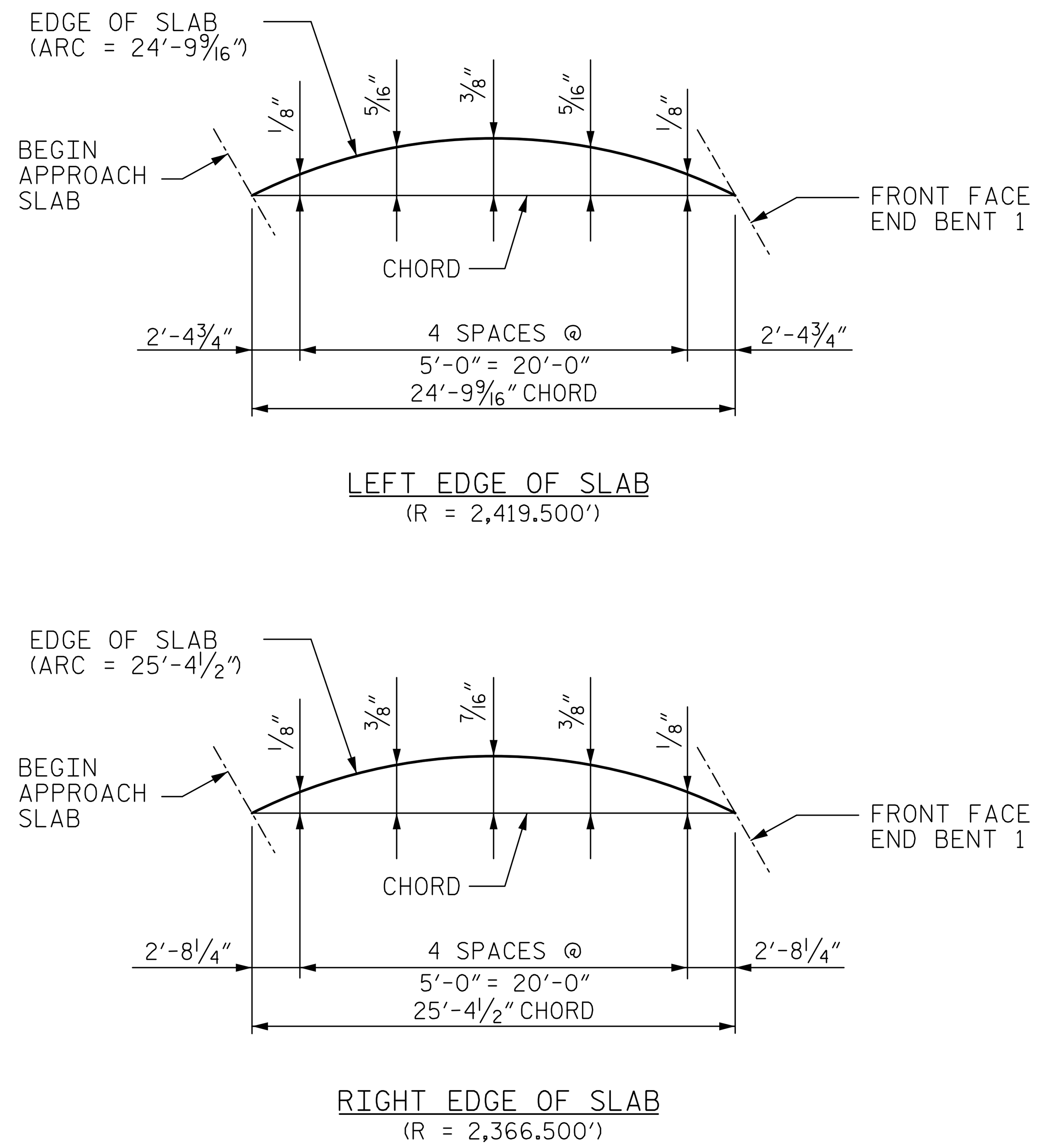
DWG. NO. 32

REVISIONS

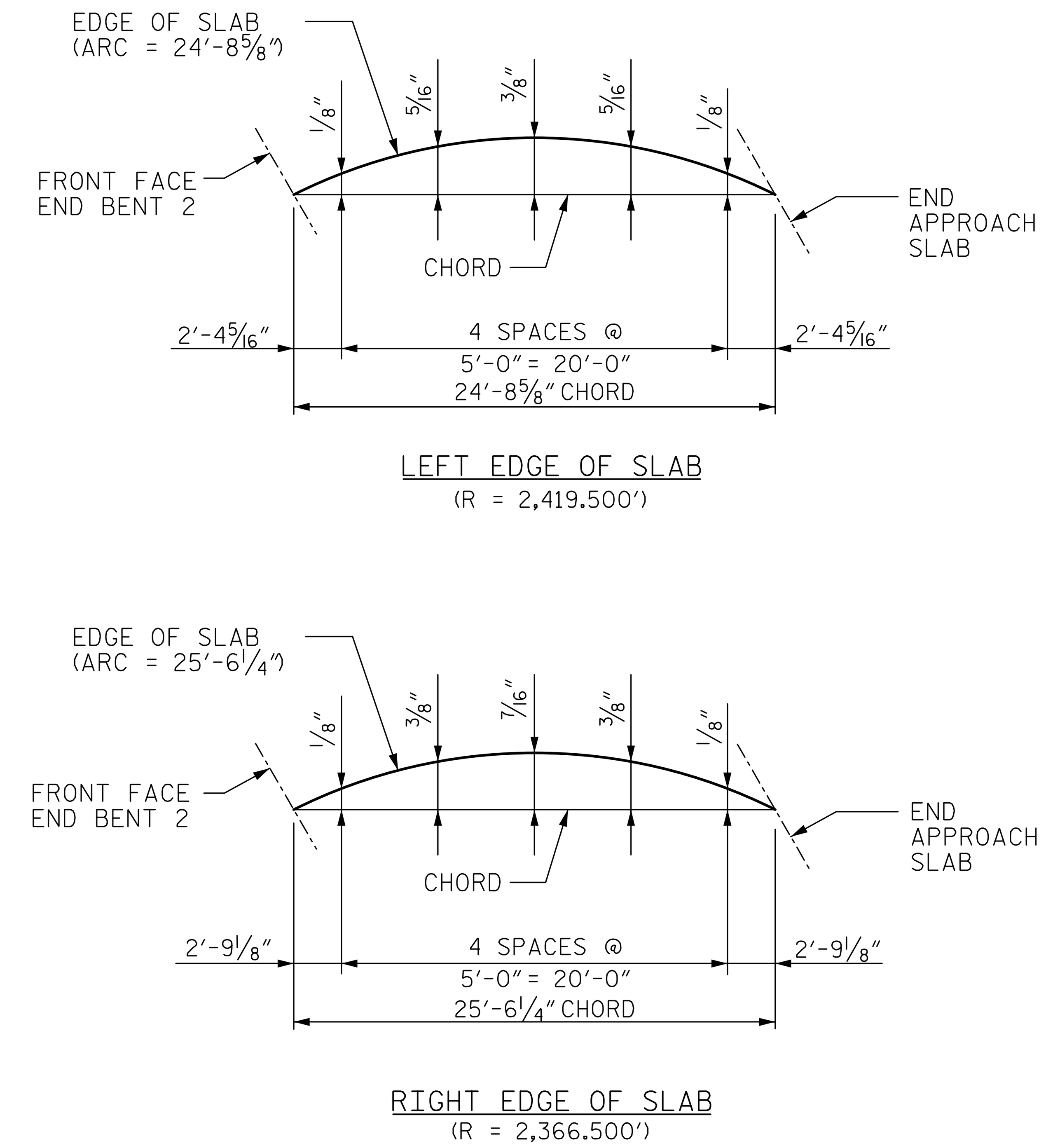
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S-32
TOTAL SHEETS 34

3/8/2022 8:26:29 AM ...\401_063_U5813_SMU_AS01_032_750171.dgn



CURVE OFFSETS - APPROACH SLAB AT END BENT 1



CURVE OFFSETS - APPROACH SLAB AT END BENT 2

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 OR 4A IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

THE JOINT IN THE DECK AND APPROACH SLAB SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

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 PAYMENT FOR SIDEWALK ON APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR "BRIDGE APPROACH SLABS, STATION 21+94.17 -Y-.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

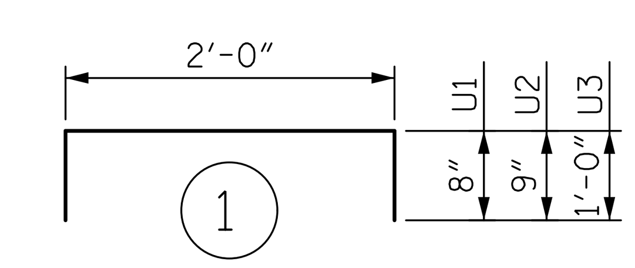
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

SPLICE LENGTHS

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

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

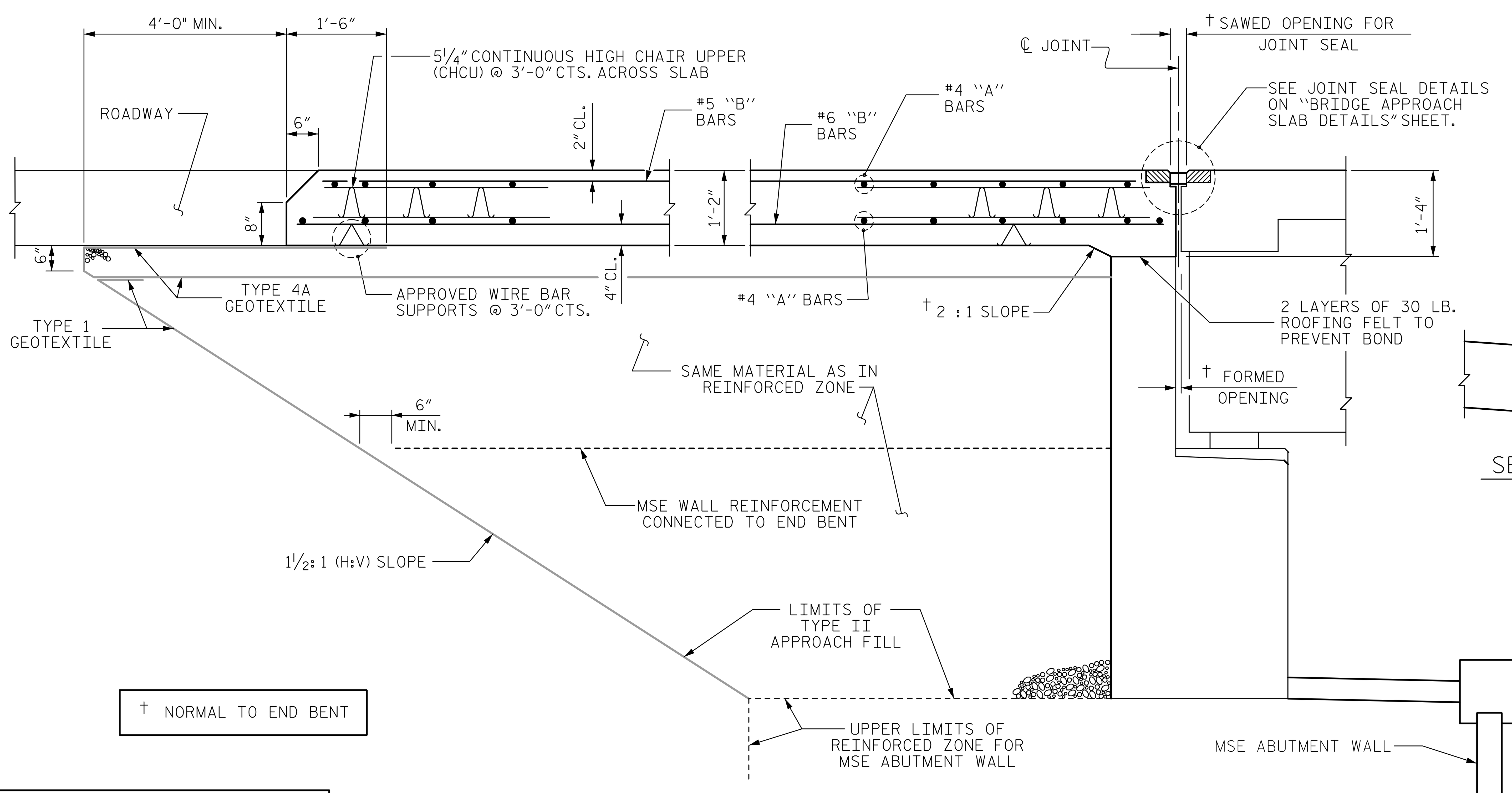
BILL OF MATERIAL

APPROACH SLAB AT END BENT 1

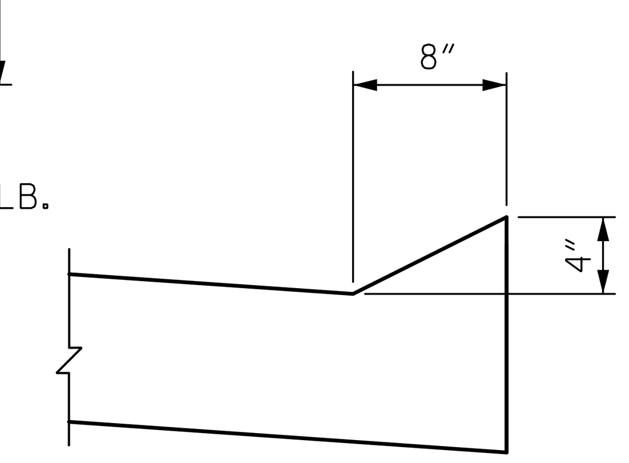
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	75	#4	STR	26'-6"	1,328
A2	78	#4	STR	26'-4"	1,372
* B1	105	#5	STR	23'-3"	2,546
B2	105	#6	STR	24'-5"	3,851
* B3	1	#5	STR	24'-3"	25
B4	1	#6	STR	24'-3"	36
* B5	1	#5	STR	24'-9"	26
B6	1	#6	STR	24'-9"	37
* B13	4	#4	STR	24'-3"	65
* B14	4	#4	STR	24'-9"	66
* G1	24	#4	STR	7'-1"	114
* G2	25	#4	STR	7'-3"	121
* U1	10	#4	1	3'-4"	22
* U2	5	#4	1	3'-6"	12
* U3	5	#4	1	4'-0"	13
REINFORCING STEEL				LBS.	5,296
* EPOXY COATED REINFORCING STEEL				LBS.	4,338
CLASS AA CONCRETE				C. Y.	59.0

APPROACH SLAB AT END BENT 2

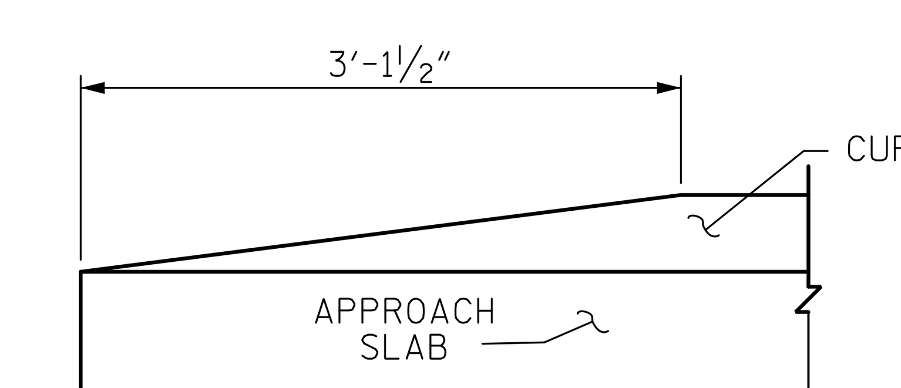
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A3	75	#4	STR	28'-10"	1,445
A4	78	#4	STR	28'-8"	1,494
* B7	105	#5	STR	23'-1"	2,528
B8	105	#6	STR	24'-4"	3,838
* B9	1	#5	STR	24'-1"	25
B10	1	#6	STR	24'-1"	36
* B11	1	#5	STR	24'-10"	26
B12	1	#6	STR	24'-10"	37
* B15	4	#4	STR	24'-1"	64
* B16	4	#4	STR	24'-10"	66
* G3	24	#4	STR	7'-8"	123
* G4	25	#4	STR	8'-0"	134
* U1	10	#4	1	3'-4"	22
* U2	5	#4	1	3'-6"	12
* U3	5	#4	1	4'-0"	13
REINFORCING STEEL				LBS.	5,405
* EPOXY COATED REINFORCING STEEL				LBS.	4,458
CLASS AA CONCRETE				C. Y.	58.7



SECTION THRU SLAB
(TYPE II - REINFORCED APPROACH FILL)



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

PROJECT NO. U-5813
RANDOLPH COUNTY
STATION: 21+94.17 -Y-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

SEAL 051219 — NORTH CAROLINA PROFESSIONAL ENGINEER — SEAN R. SULLIVAN
DocuSigned by: Sean R. Sullivan 4/9/2024

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	7/21
CHECKED BY	Z. REINEKE	DATE	7/21
ENGINEER OF RECORD	S. SULLIVAN	DATE	4/24

DWG. NO. 33

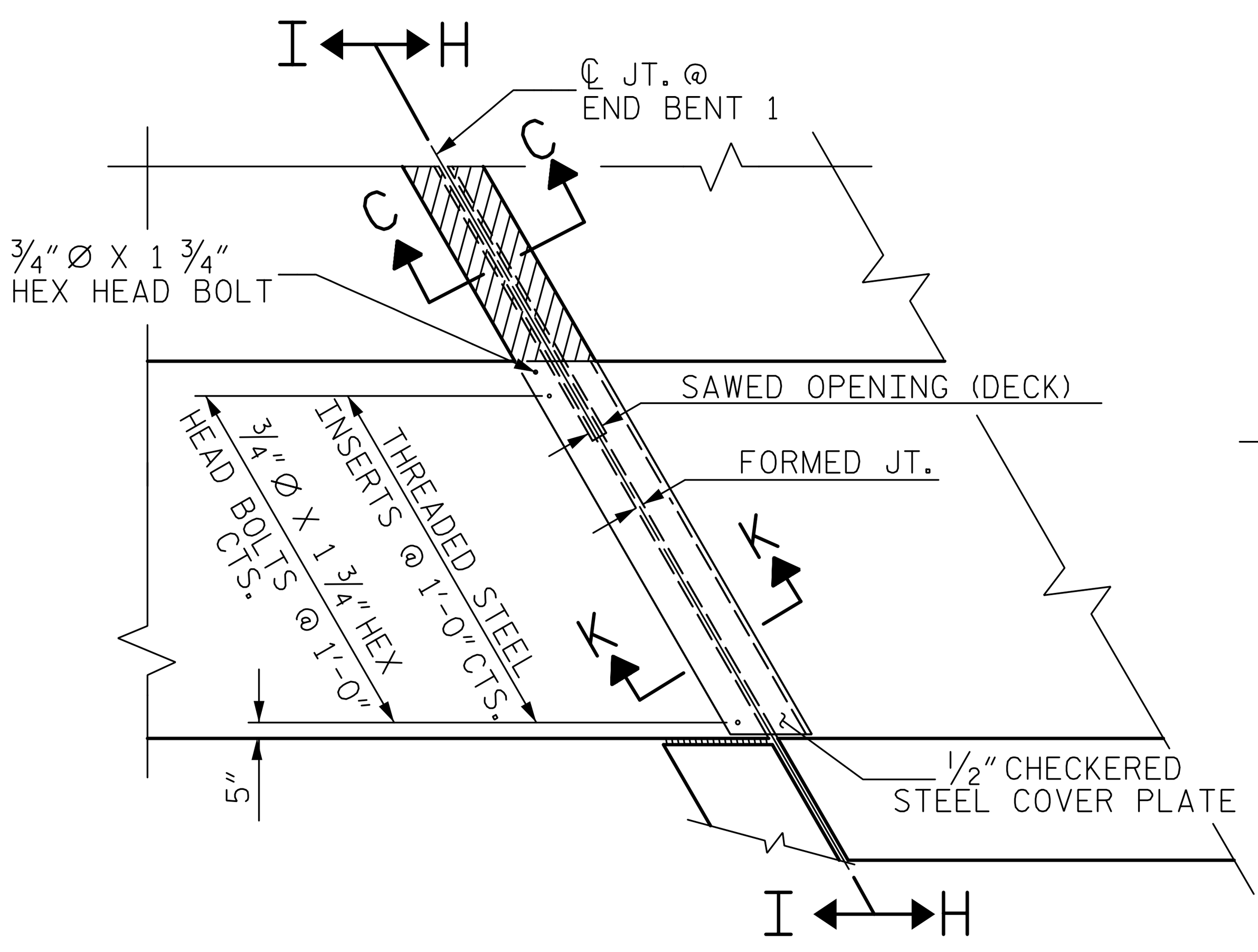
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S-33
TOTAL SHEETS 34

ASSEMBLED BY : M. WRIGHT DATE : 7/21
CHECKED BY : Z. REINEKE DATE : 7/21

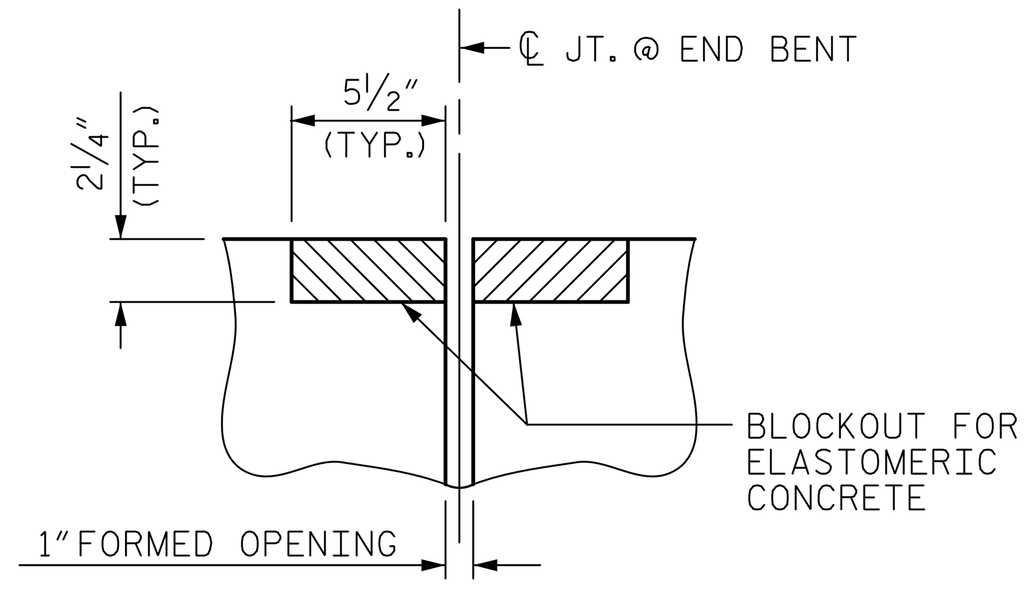
DRAWN BY : EEM 3/95	REV. 6/13	MAA/GM
CHECKED BY : VAP 3/95	REV. 12/17	MAA/THC
	REV. 06/19	BNB/THC

STD. NO. BAS2



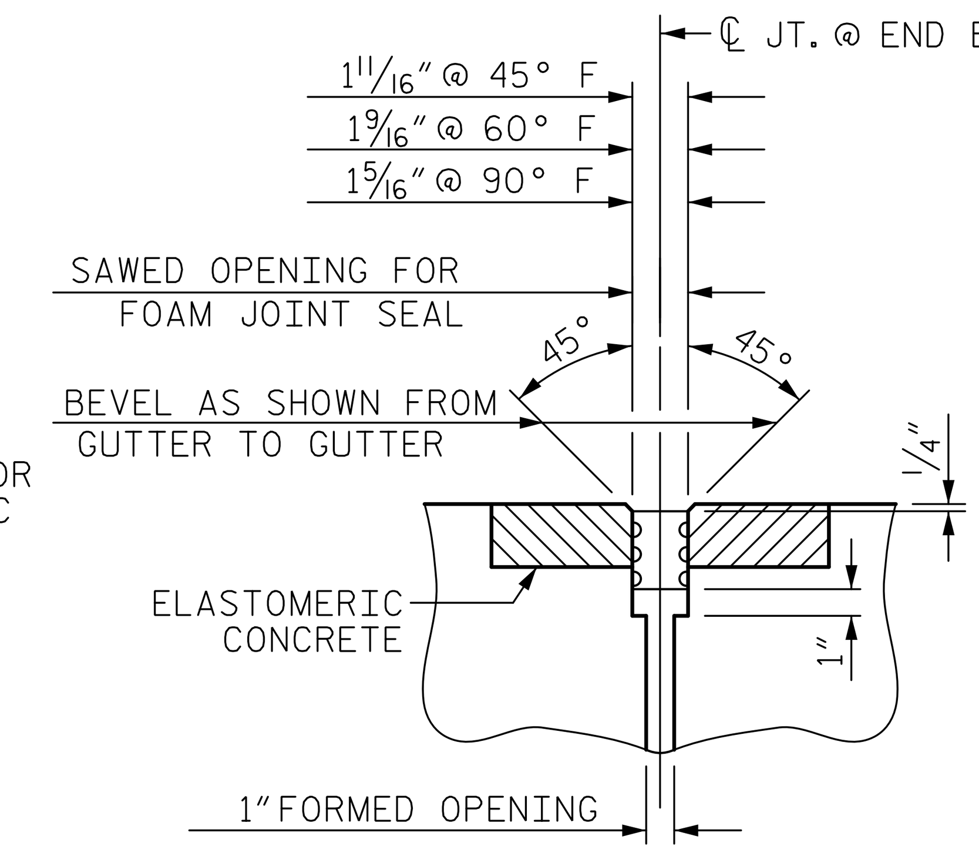
PLAN VIEW OF FOAM

JOINT SEAL @ END BENT FOR SIDEWALK



SECTION C-C

FOAM JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

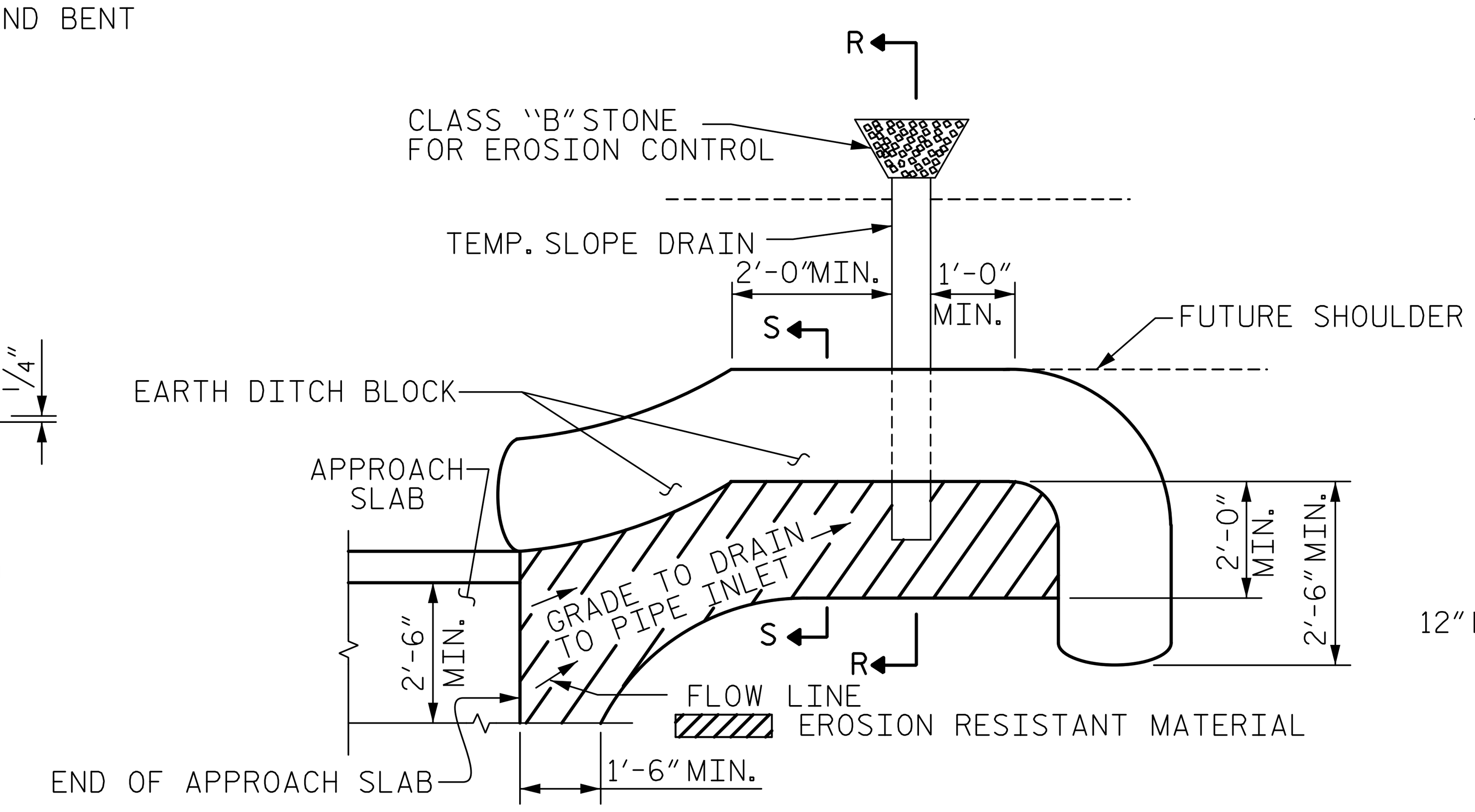


SECTION C-C

FOAM JOINT SEAL (EXPANSION)

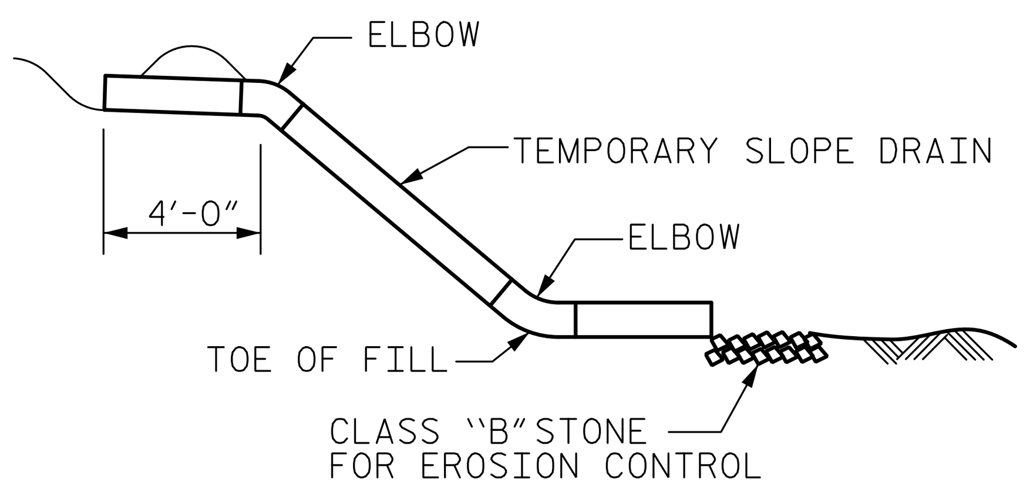
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE ✱ (CU. FT.)
1	10.3
2	11.2
TOTAL	21.5

✱ BASED ON THE MINIMUM BLOCKOUT SHOWN.

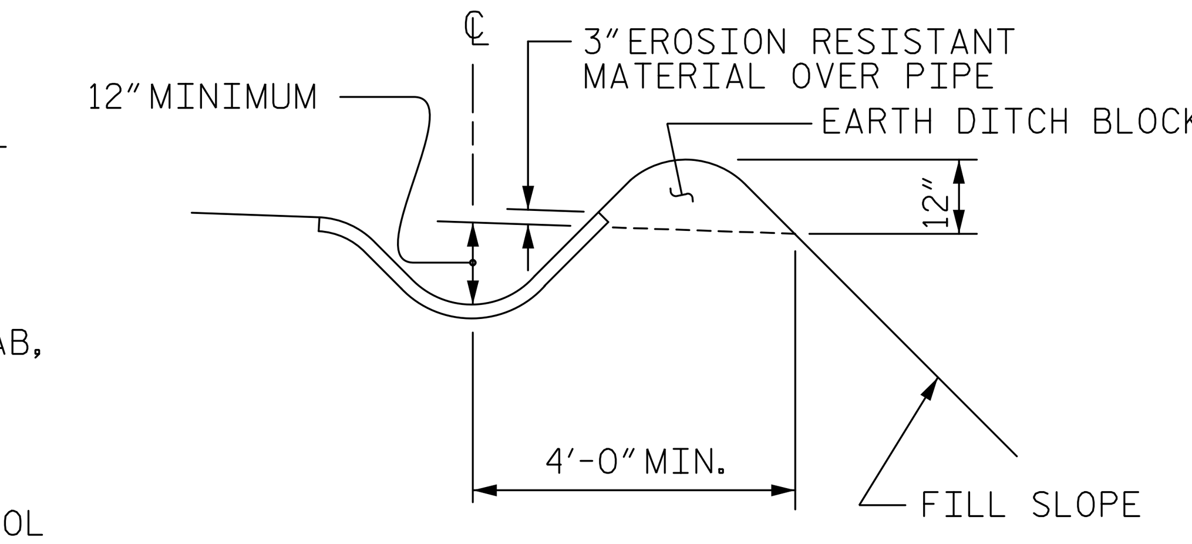


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW



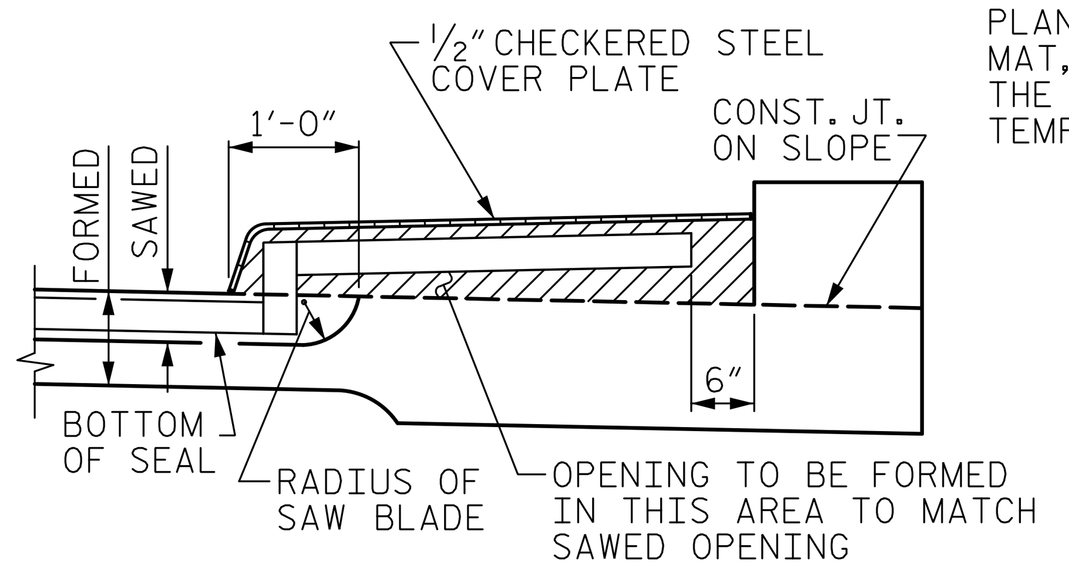
SECTION R-R



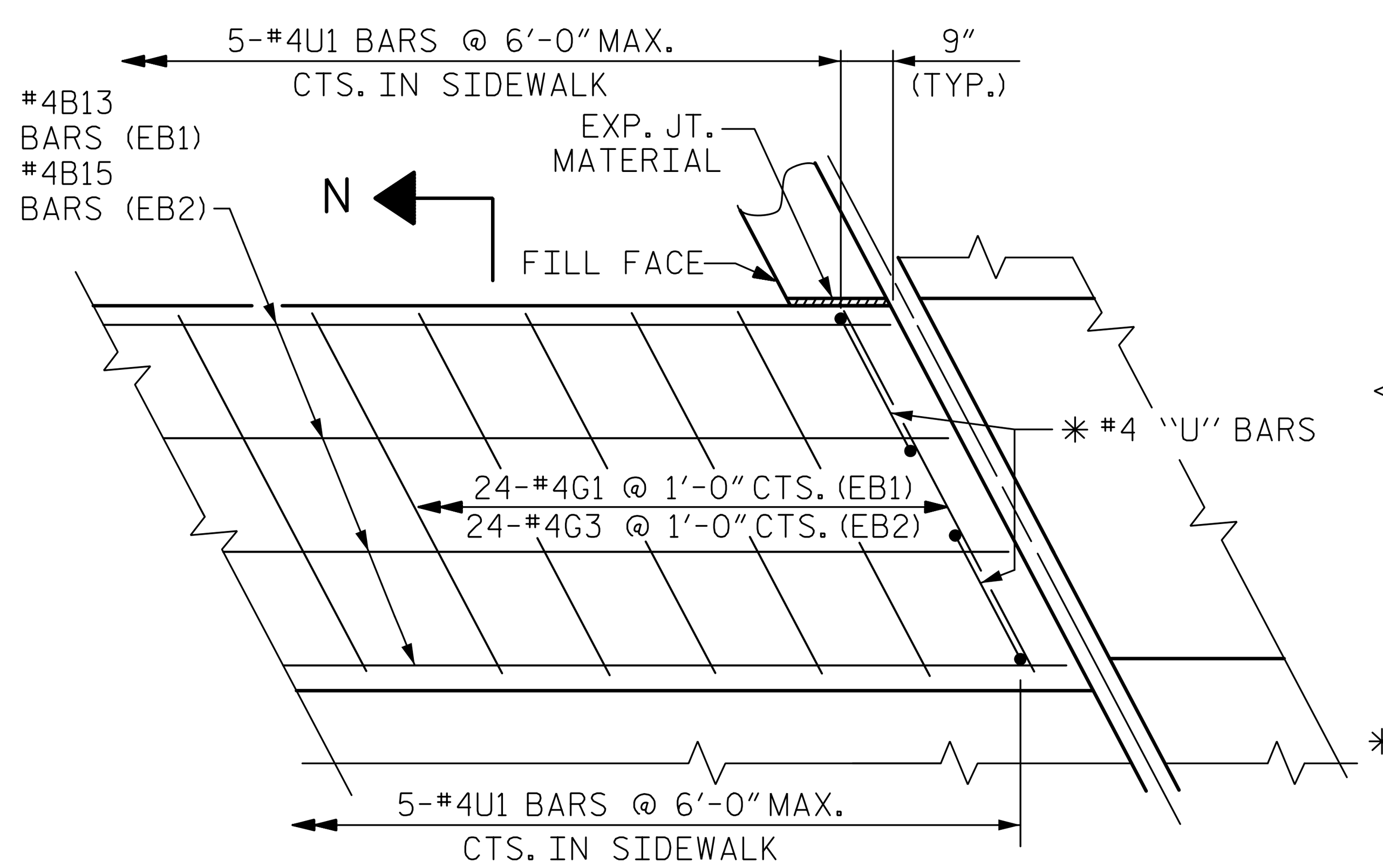
SECTION S-S

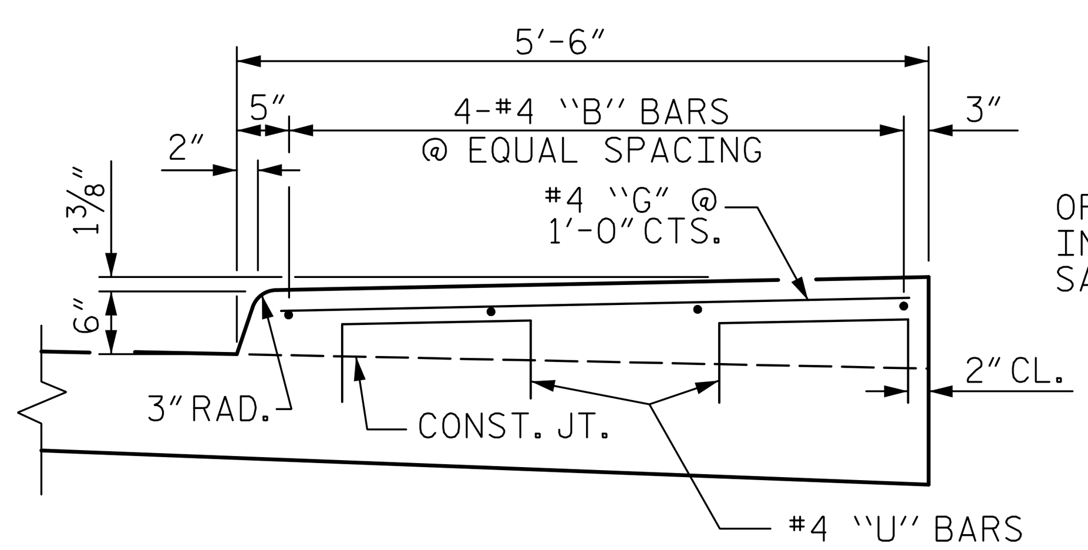
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



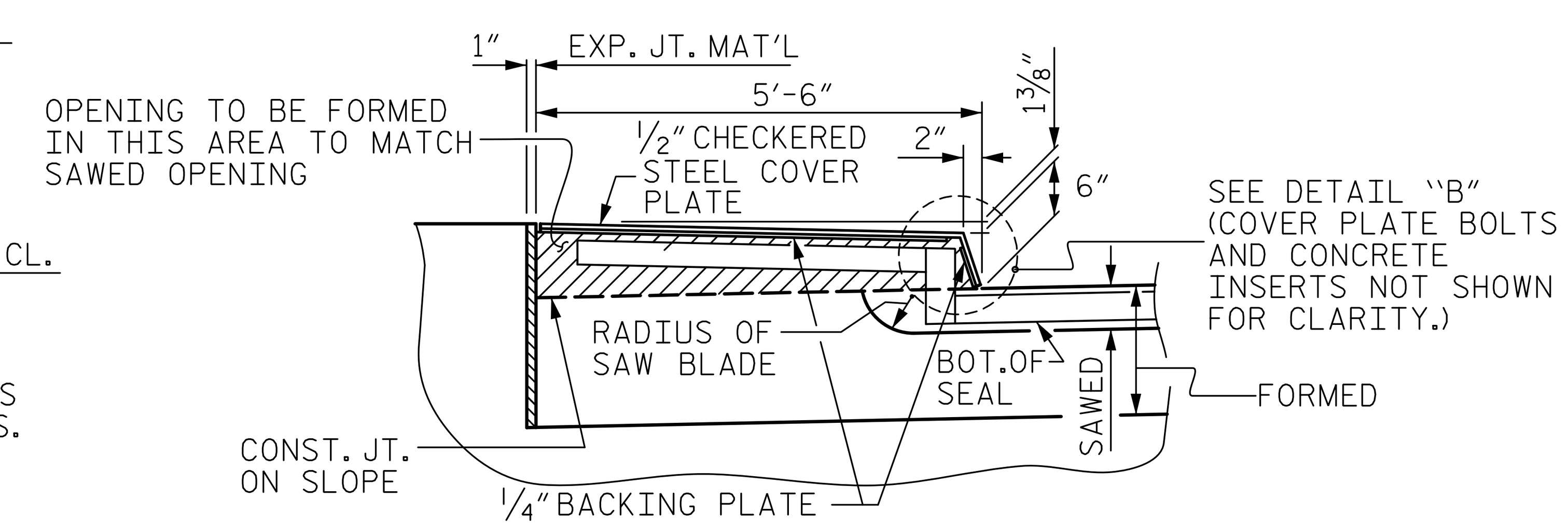
SECTION H-H



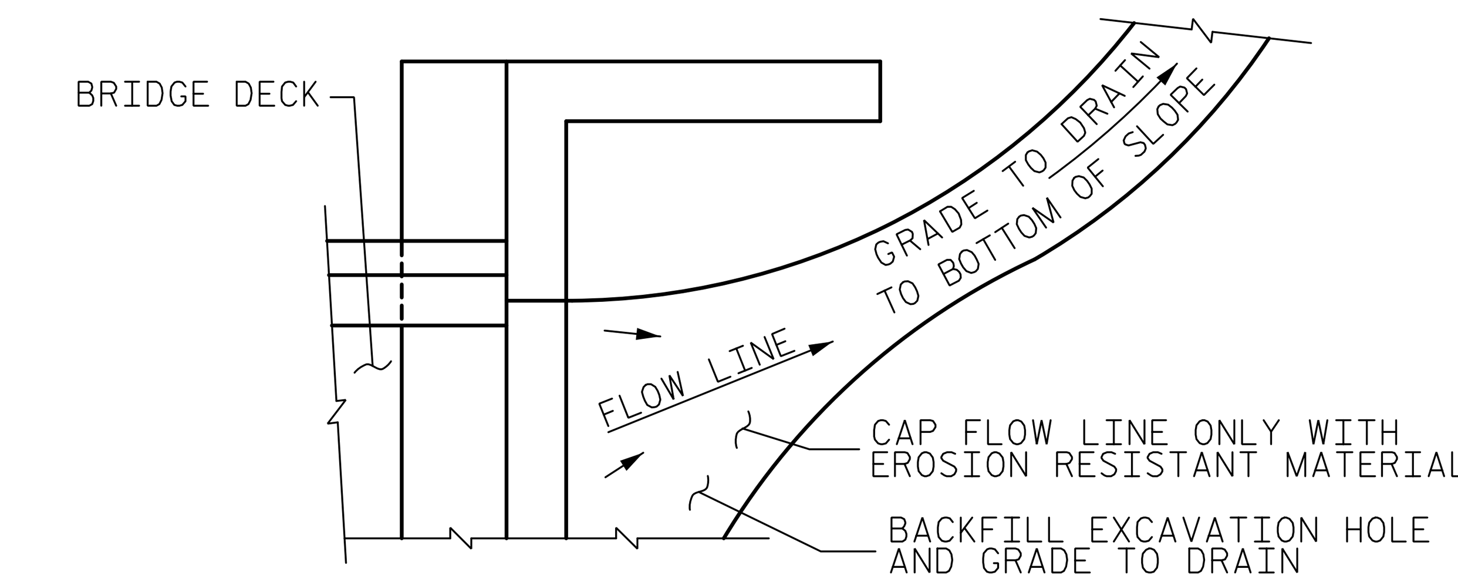


SECTION N-N

SIDEWALK DETAILS



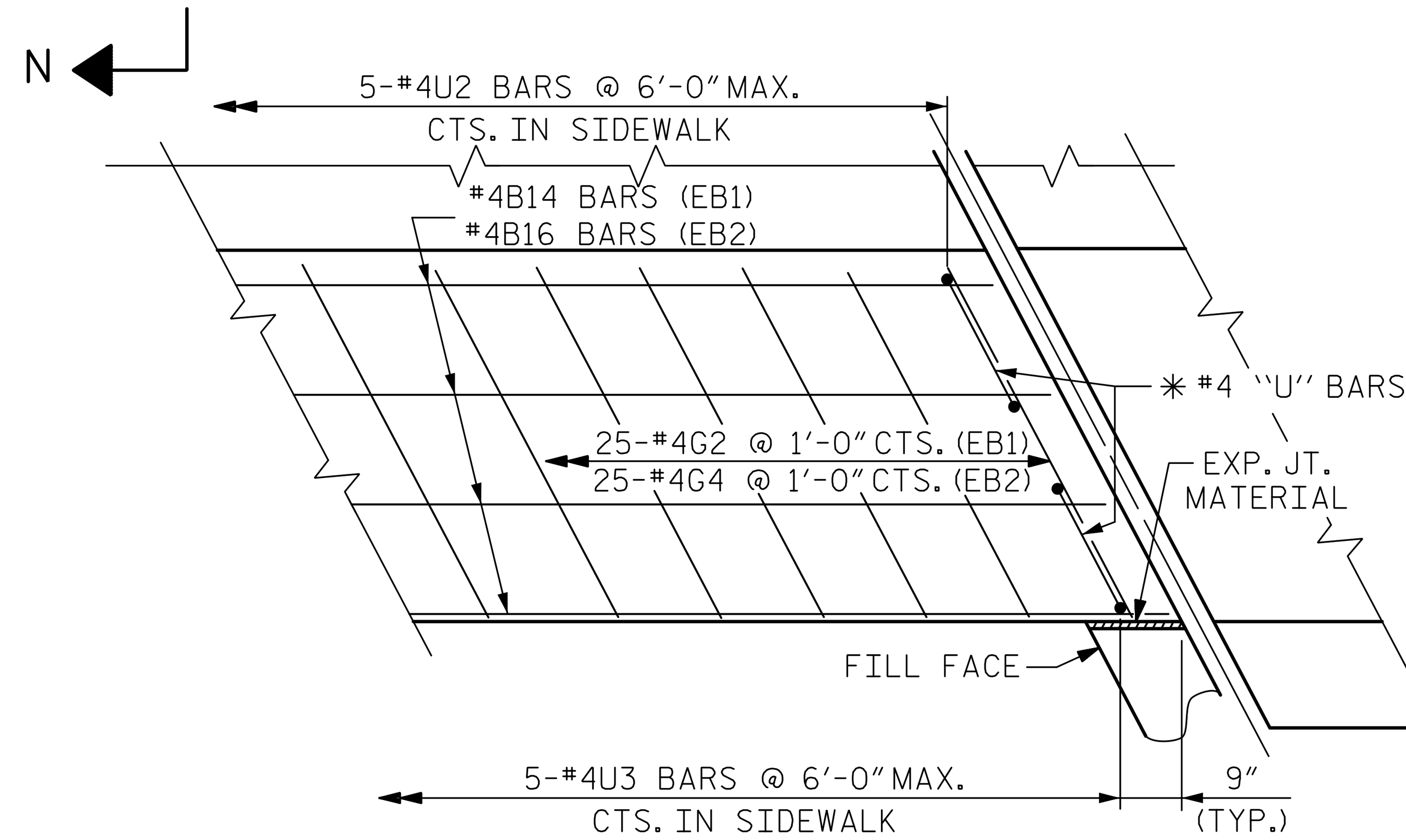
SECTION I-I



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

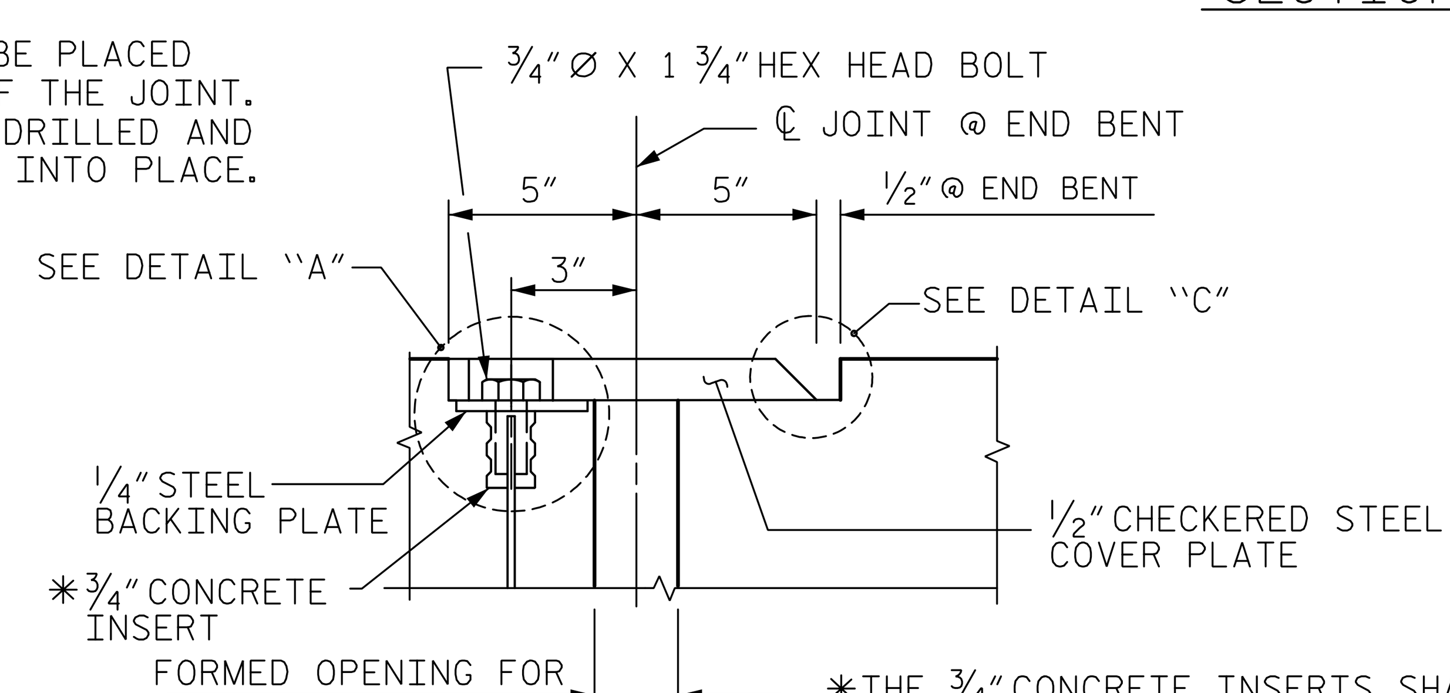
✱ THESE BARS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE DOWELS GROUTED INTO PLACE.



PLAN

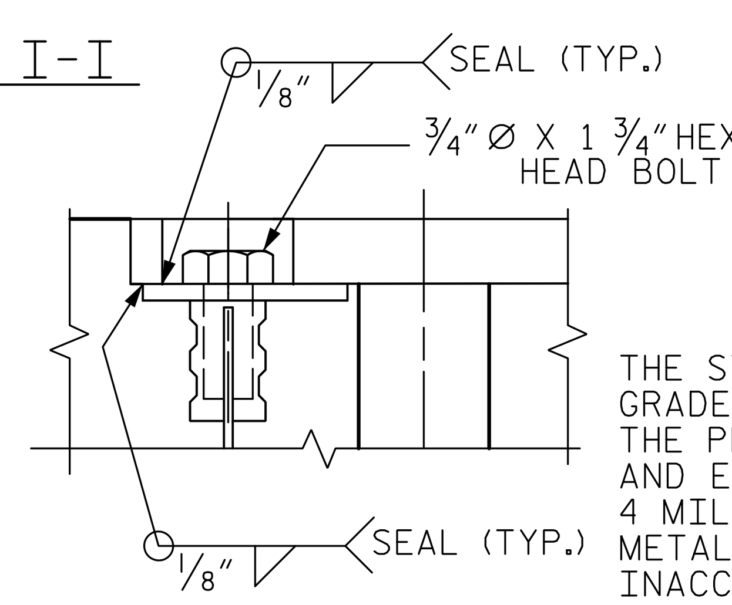
(END BENT 1 SHOWN. END BENT 2 SIMILAR)

DETAILS OF SIDEWALK ON APPROACH SLAB



SECTION K-K

✱ THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

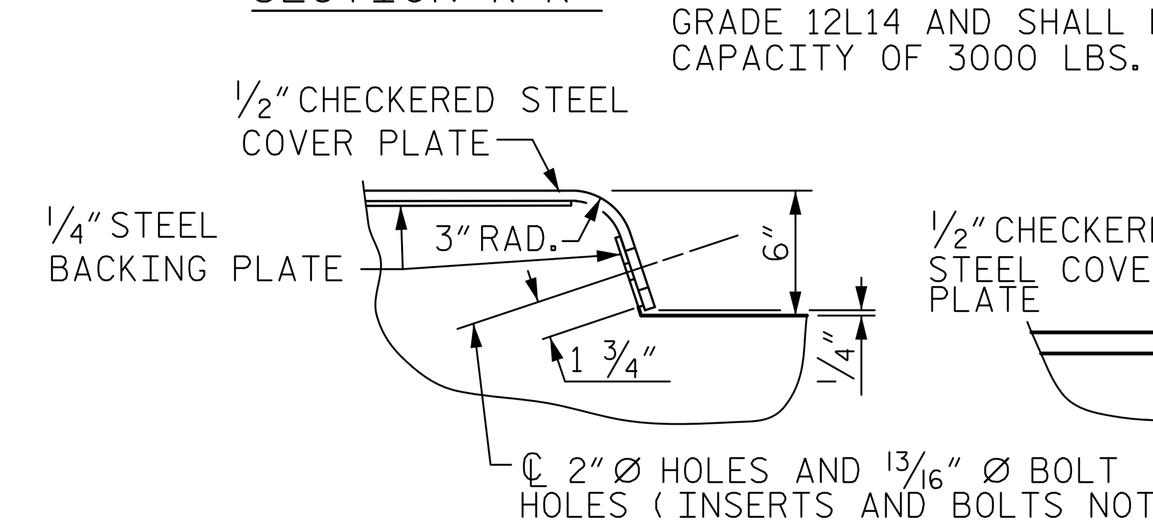


DETAIL "A"

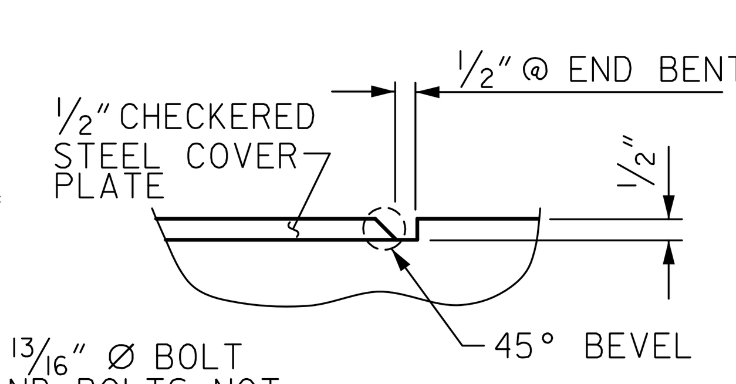
THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS INACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE ¾" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "FOAM JOINT SEALS".



DETAIL "B"



DETAIL "C"

JOINT SEAL DETAILS @ END BENT

PROJECT NO. U-5813

RANDOLPH COUNTY

STATION: 21+94.17 -Y-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER — DocuSigned by: Paul J. Barber — 7/11/2022

HNTB — HNTB NORTH CAROLINA, P.C. NC License No. C-1554, 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 7/21
CHECKED BY Z. REINEKE DATE 7/21
ENGINEER OF RECORD P. BARBER DATE XX/2X
DWG. NO. 34

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

SHEET NO. S-34
TOTAL SHEETS 34

ASSEMBLED BY : M. WRIGHT DATE : 7/21
CHECKED BY : Z. REINEKE DATE : 7/21

DRAWN BY : FCJ 11/88 REV. 6/13 MAA/GM
CHECKED BY : ARB 11/88 REV. 12/17 MAA/THC
REV. 5/18 MAA/THC

STD. NO. BAS4

3/8/2022 8:08:18 AM ...\401_067_U5813_SMU_AS03_034_750171.dgn

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.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	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 ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" 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 ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø 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 5/16" 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 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.

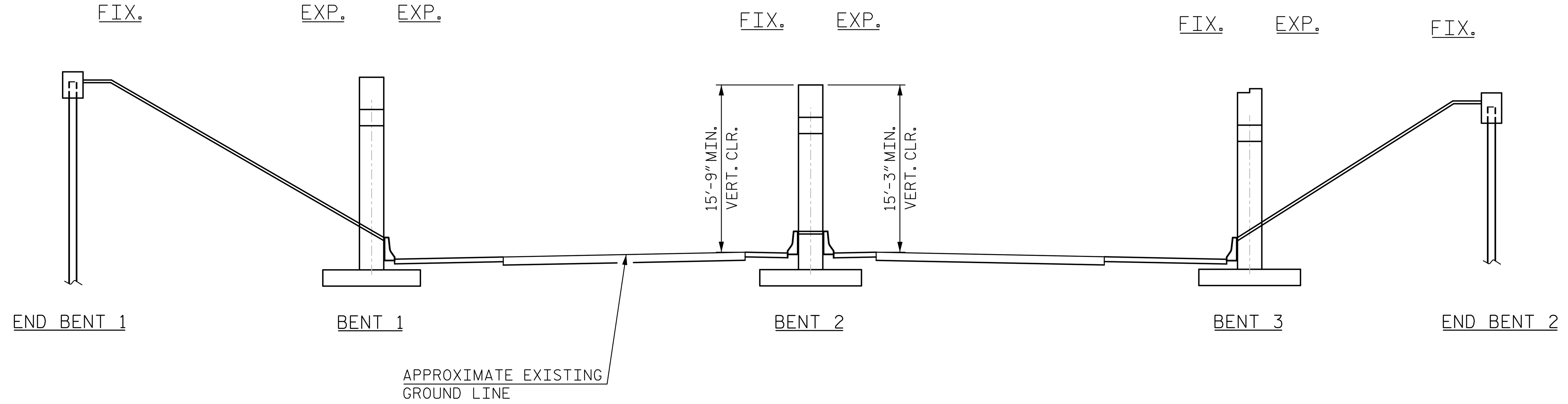
SPECIAL NOTES:

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.

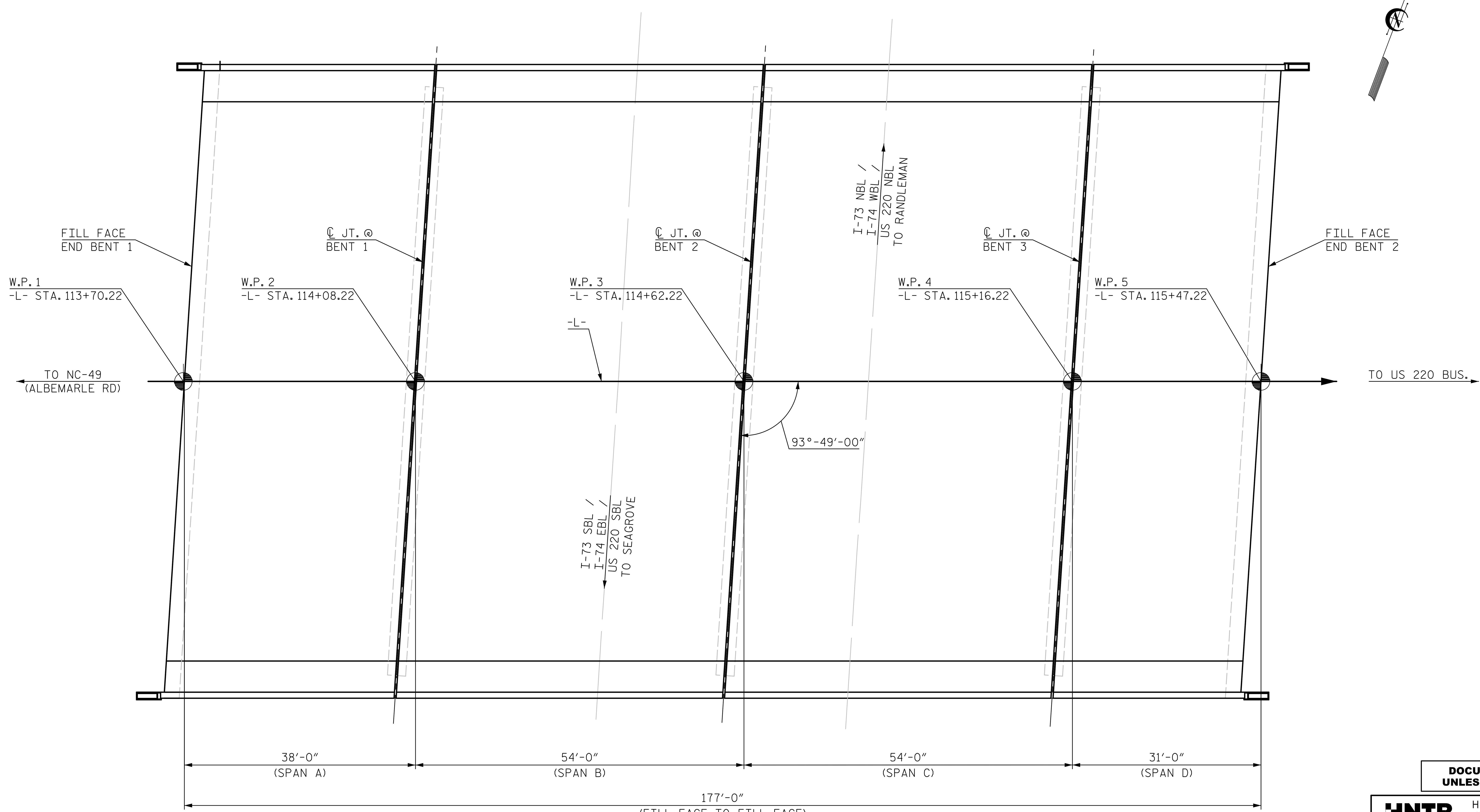
ENGLISH

JANUARY, 1990

REV. 6-16-95 EEM (V) RGW REV. 5-7-03 RWW (V) JTE REV. 10-1-11 MAA (V) GM
REV. 8-16-99 RWW (V) LES REV. 5-1-06 TLA (V) GM REV. 12-17 MAA (V) THC



SECTION ALONG -L-



NOTES:

GENERAL DRAWING INFORMATION IS TAKEN FROM THE ORIGINAL PLANS.

BRIDGE ORIENTATION CONFORMS TO THE EXISTING BRIDGE PLANS/ROUTINE INSPECTION.

SCOPE OF WORK:

REMOVE EXISTING MEDIAN TO ACCOMMODATE NEW TRAVEL LANE CONFIGURATION.

PARTIALLY REMOVE TOP OF BRIDGE DECK CONCRETE BY SCARIFICATION AND HYDRODEMOLITION METHODS.

OVERLAY PREPARED TOP OF BRIDGE DECK SECTIONS WITH VERY EARLY STRENGTH LATEX MODIFIED CONCRETE.

REMOVE AND REPLACE ELASTOMERIC CONCRETE JOINT HEADERS AND FOAM JOINT SEALS.

CONSTRUCT PROPOSED MEDIAN TO ACCOMMODATE NEW TRAVEL LANE CONFIGURATION.

GROOVE LMC BRIDGE DECK.

I HEREBY CERTIFY THAT THIS STRUCTURE WAS REHABILITATED ACCORDING TO THESE PLANS OR AS NOTED HEREIN.

RESIDENT ENGINEER DATE

PROJECT NO. U-5813

RANDOLPH COUNTY

BRIDGE NO. 750168

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON NC-49/US 64 OVER I-73/74, US 220 BETWEEN NC-49 (ALBEMARLE RD) AND US 220 BUS.

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

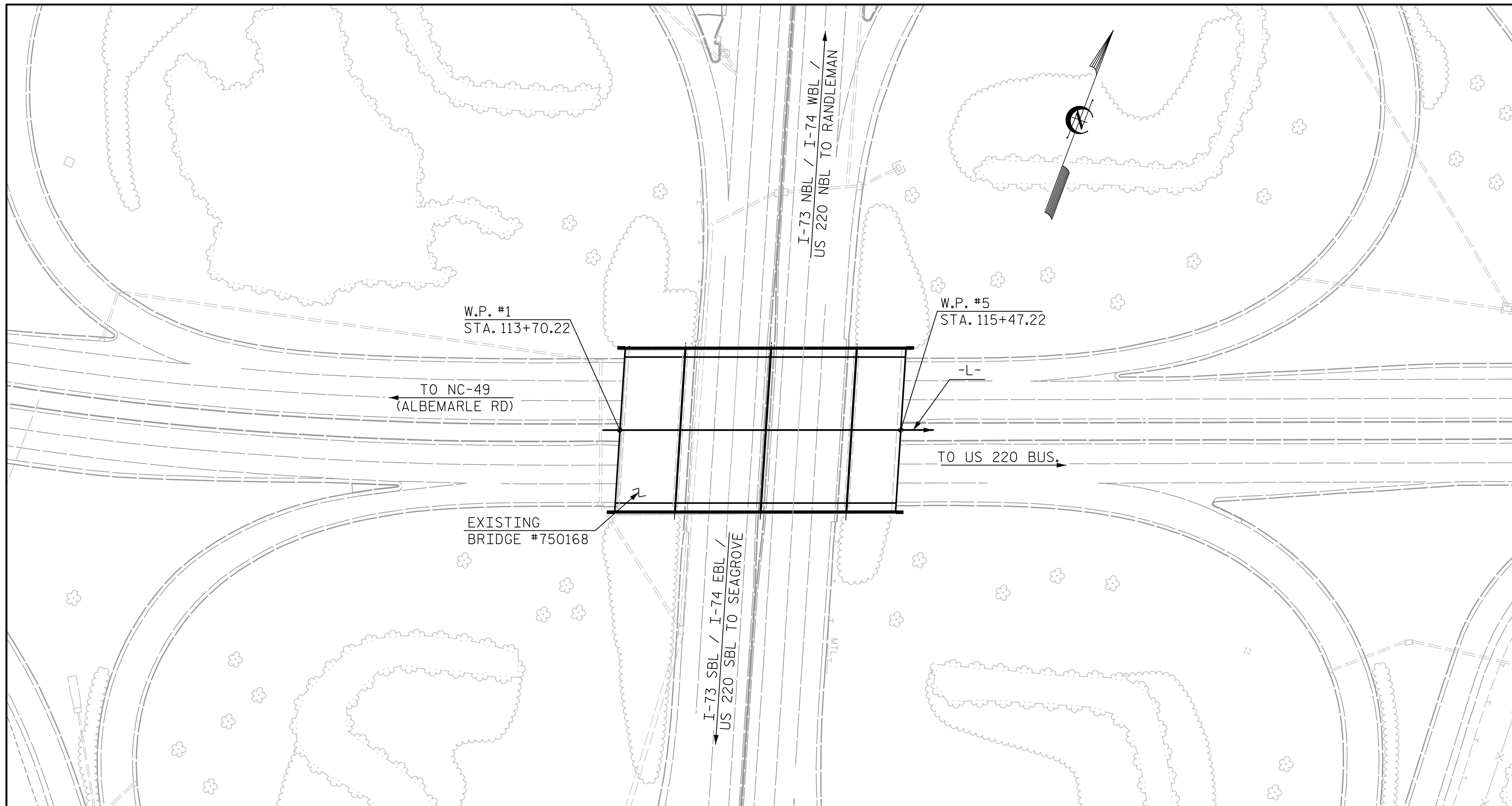
DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 1

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

SHEET NO. S2-1

TOTAL SHEETS 6



BRIDGE 750168 LOCATION SKETCH

BRIDGE COORDINATES		
BRIDGE NO.	LATITUDE	LONGITUDE
750168	35°-41′-09.05″	79°-49′-48.26″

TOTAL BILL OF MATERIAL

BRIDGE NO. 750168	GROOVING BRIDGE FLOORS	FOAM JOINT SEALS FOR PRESERVATION	BRIDGE JOINT DEMOLITION	ELASTOMERIC CONCRETE FOR PRESERVATION	CONCRETE MEDIAN REPLACEMENT	VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY	PLACING & FINISHING OF VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY	HYDRODEMOLITION OF BRIDGE DECK	SCARIFYING BRIDGE DECK
	SQ. FT.	LIN. FT	SQ. FT.	CU. FT.	SQ. YDS.	CU. YDS.	SQ. YDS.	SQ. YDS.	SQ. YDS.
TOTAL	1,839.7	312.9	276.6	57.6	48.5	11.3	232.0	236.0	236.0

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6′-2″
#4	7′-4″
#5	8′-6″
#6	9′-8″
#7	10′-10″
#8	12′-0″
#9	13′-2″
#10	14′-6″
#11	15′-10″

NOTES:

INFORMATION INDICATED ON THE LOCATION SKETCH SHALL BE CONSIDERED GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL CONFIRM, THROUGH OTHER SOURCES, SPECIFIC INFORMATION REGARDING BRIDGES, ROADWAYS, UTILITIES, THE SURROUNDING AREA, AND ANY OTHER ASPECTS THAT MAY BE NECESSARY TO PERFORM AND COMPLETE THE PROJECT.

EXISTING DIMENSIONS AND BRIDGE CONDITION ARE FROM THE BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL FIELD VERIFY THE INFORMATION SHOWN ON THE PLANS AND NOTIFY THE ENGINEER IF ACTUAL DIMENSIONS AND CONDITIONS DIFFER.

THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN WHAT IS SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL STATE AND FEDERAL SAFETY REQUIREMENTS.

FOR CONTROL OF TRAFFIC AND LIMITS ON PHASING OF CONSTRUCTION, SEE TRANSPORTATION MANAGEMENT PLANS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR FOAM JOINT SEALS FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR CONCRETE MEDIAN REPLACEMENT, SEE SPECIAL PROVISIONS.

ANY DAMAGE TO EXISTING REINFORCING STEEL, DURING CONTRACTOR'S OPERATIONS, SHALL BE REPAIRED AS DIRECTED BY THE ENGINEER AND PERFORMED AT NO ADDITIONAL COST TO THE DEPARTMENT.

PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL A COMPLETE SEQUENCE OF TASKS FOR EACH OPERATION AFFECTING THE BRIDGE SURFACE AND/OR TRAFFIC.

THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING JOINT OPENING PRIOR TO ORDERING JOINT SEAL MATERIAL. IF ACTUAL JOINT OPENING VARIES FROM THE OPENING INDICATED IN DETAIL BY MORE THAN 1/4″, NOTIFY ENGINEER. REVISION TO THE JOINT SEAL SIZE MIGHT BE NECESSARY.

THE EXISTING BRIDGE DECK SHALL BE REPAIRED AS SHOWN ON THE PLANS OR AS DETERMINED BY THE ENGINEER AFTER SCARIFICATION AND PRIOR TO THE SURFACE PREPARATION AND APPLICATION OF THE VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY. UNLESS OTHERWISE APPROVED, SUCH LOCATIONS SHALL BE REPAIRED WITH POLYMER CONCRETE.

WORK ON THE BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL BELOW. THE CONTRACTOR SHALL SUBMIT PLANS FOR CONSTRUCTION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS AND THE PROJECT SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE CONTRACTOR SHALL PERFORM ALL WORK WITH CARE SO THAT THE EXISTING STRUCTURE WHICH IS TO REMAIN IN PLACE WILL NOT BE DAMAGED. IF THE CONTRACTOR DAMAGES ANY PART OF THE EXISTING STRUCTURE WHICH IS TO REMAIN IN PLACE, THE DAMAGED AREA SHALL BE REPAIRED OR REPLACED IN A MANNER SATISFACTORY TO THE ENGINEER AT NO ADDITIONAL COST TO THE DEPARTMENT.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR BRIDGE JOINT DEMOLITION, SEE SPECIAL PROVISIONS.

FOR SCARIFYING BRIDGE DECK AND HYRODEMOLITION OF BRIDGE DECK, SEE 'LMC OVERLAY SURFACE PREPARATION' SPECIAL PROVISION.

FOR VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY AND PLACING AND FINISHING OF VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY, SEE "VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY" SPECIAL PROVISION.

PROJECT NO. U-5813

RANDOLPH COUNTY

BRIDGE NO. 750168

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	9/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON NC-49/US 64
OVER I-73/74, US 220
BETWEEN NC-49 (ALBEMARLE RD)
AND US 220 BUS.

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

SHEET NO. S2-2

TOTAL SHEETS 6

10/23/2023
1:25:14 PM
\\rdw00\projects\6753 - NCDOT 2016 P&D\U-5813 (Design)\Structures\Bridge Rehab\DGN\Bridge 16B\402_03_U5813_SMU_GP02_002_750168.dgn

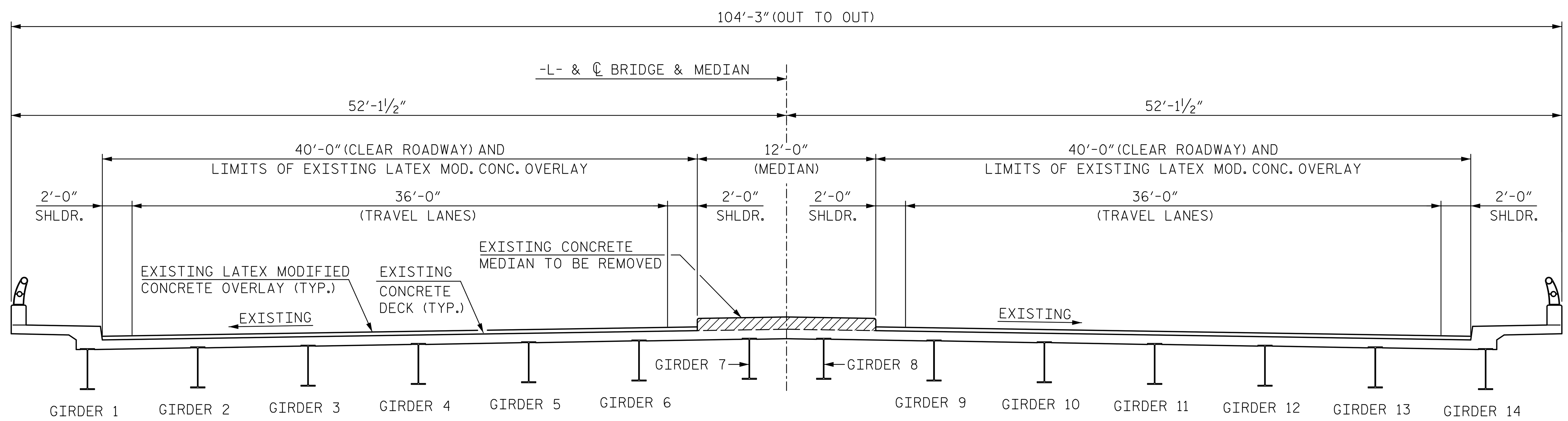
NOTES:

SEE TRANSPORTATION MANAGEMENT PLANS FOR LANE WIDTHS, SEQUENCING AND OTHER TRAFFIC CONTROL MEASURES FOR SURFACE PREPARATION AND PLACEMENT OF VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY SYSTEM.

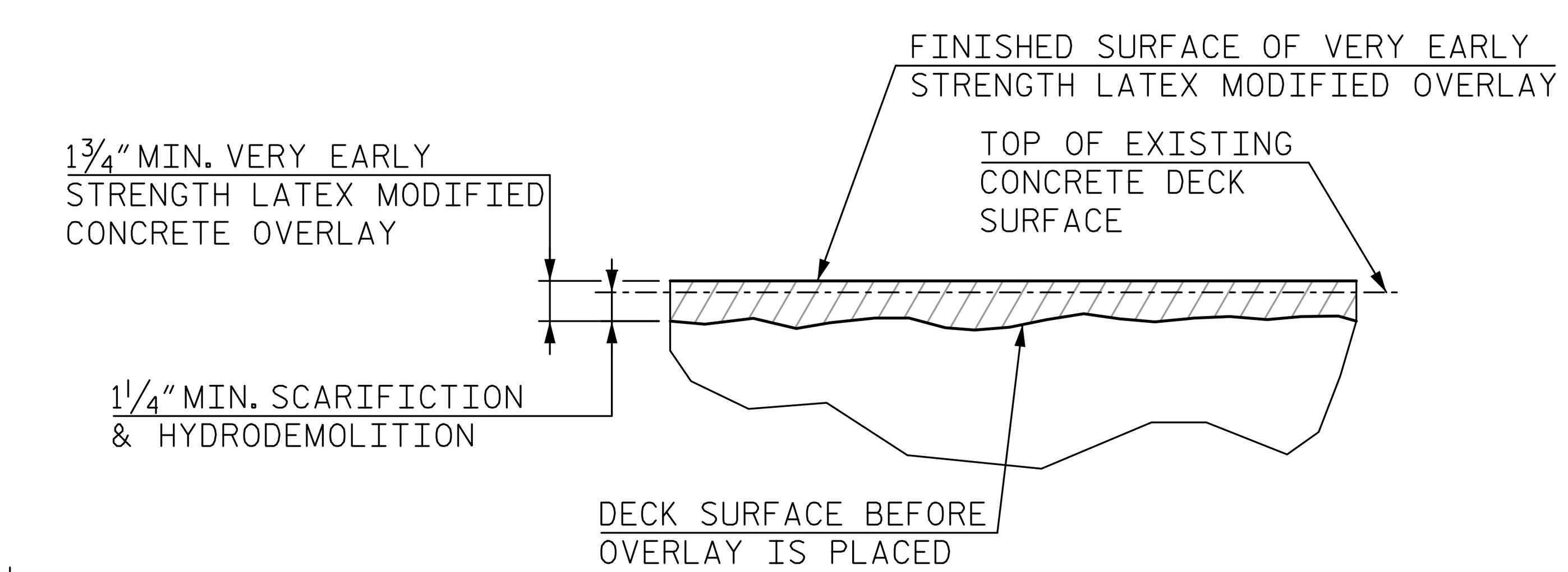
FOR REMOVING EXISTING MEDIAN AND PLACEMENT OF PROPOSED MEDIAN, SEE DETAIL "A" AND SPECIAL PROVISIONS.

CONCRETE FOR PROPOSED MEDIAN SHALL BE CLASS AA IN ACCORDANCE WITH SECTION 1000 OF THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL IN CONCRETE MEDIAN SHALL BE EPOXY COATED.

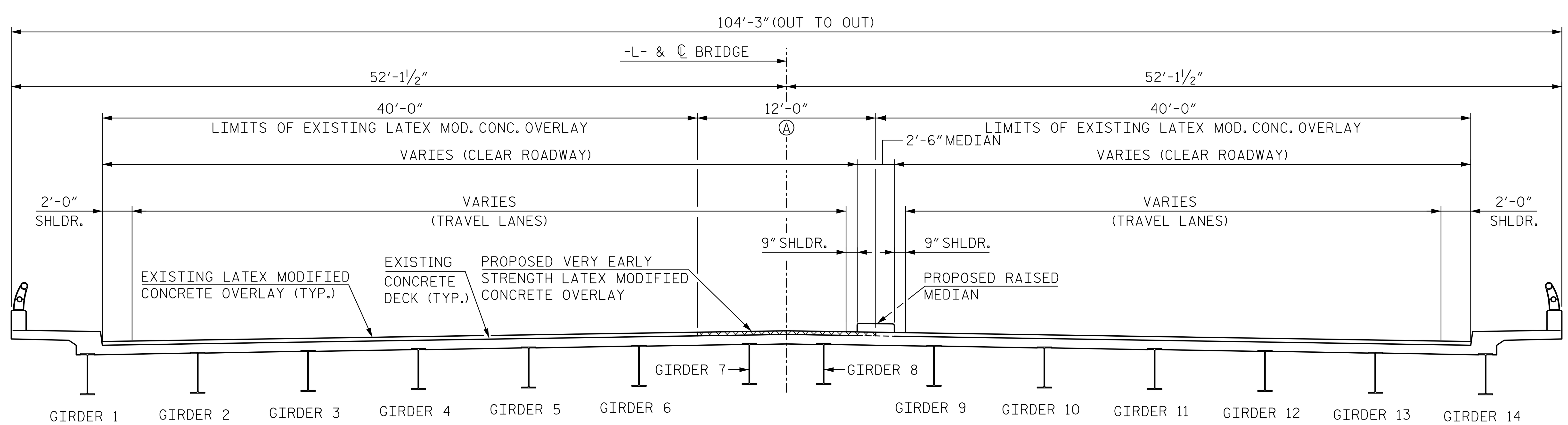


TYPICAL SECTION
(EXISTING) (LOOKING EAST)



DETAIL FOR VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY

(FINISHED SURFACE OF THE VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY IS APPROX. ¼" ABOVE THE SURFACE OF THE EXISTING CONCRETE DECK AND SHALL MATCH THE PROFILE OF THE EXISTING LATEX MODIFIED CONCRETE OVERLAY.)



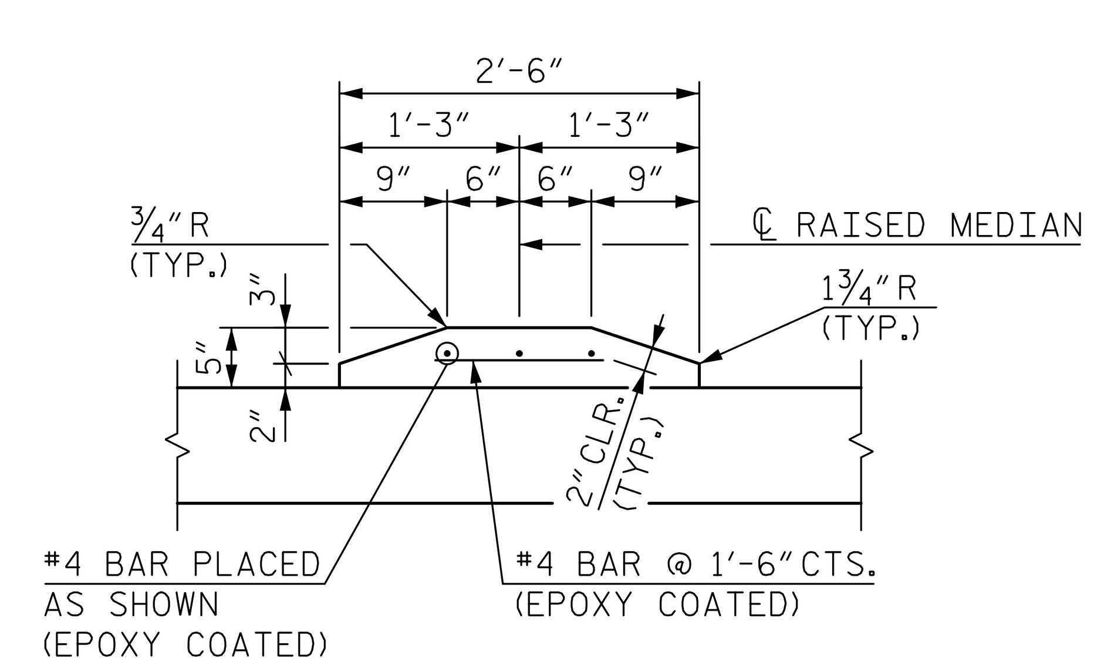
Ⓐ LIMITS OF SCARIFYING BRIDGE DECK AND HYDRODEMOLITION OF BRIDGE DECK AND PROPOSED VERY EARLY STRENGTH LATEX MOD. CONC. OVERLAY.

TYPICAL SECTION
(PROPOSED) (LOOKING EAST)

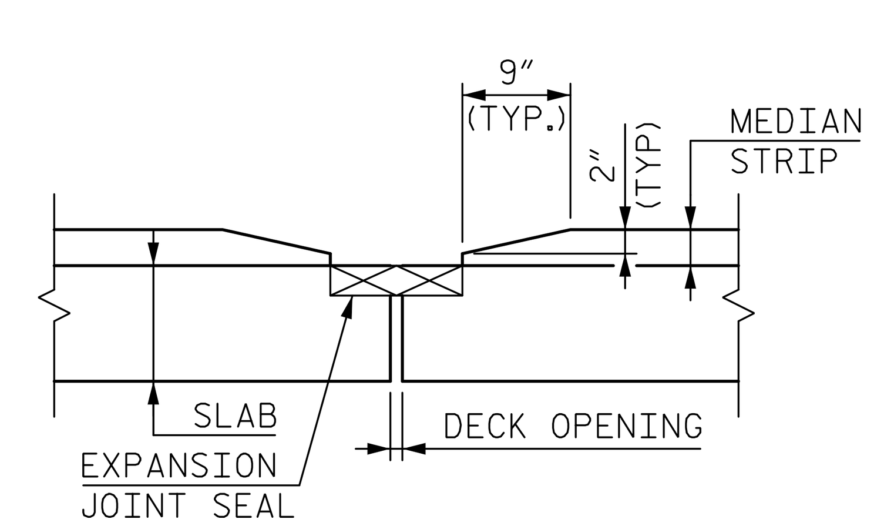
PROPOSED VERY EARLY STRENGTH LATEX MODIFIED CONCRETE OVERLAY

EXISTING CONCRETE MEDIAN TO BE REMOVED

SPLICE LENGTH TABLE	
#4 BAR	1'-11"



DETAIL "A"



DETAILS AT EXPANSION JOINT

PROJECT NO. U-5813

RANDOLPH COUNTY

BRIDGE NO. 750168

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	9/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 3

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

SHEET NO. S2-3

TOTAL SHEETS 6

10/23/2023
1:26:24 PM
\\rdw00\projects\67753 - NCDOT 2016 P&D\U-5813 (Design)\Structures\Bridge Rehab\DGN\Bridge 168\402_05_U5813_SMU_TS01_003_750168.dgn

NOTES:

FOR SECTION A-A AND SECTION B-B, SEE "JOINT DETAILS" SHEET.

PLAN OF SPANS A & B

JOINT DEMOLITION

MEDIAN DEMOLITION

PROJECT NO. U-5813

RANDOLPH COUNTY

BRIDGE NO. 750168

NORTH CAROLINA PROFESSIONAL SEAL 027812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins

10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

SUPERSTRUCTURE

DECK SURFACE REPAIR
SPAN A & B

HNTB

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	9/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 4

REVISIONS

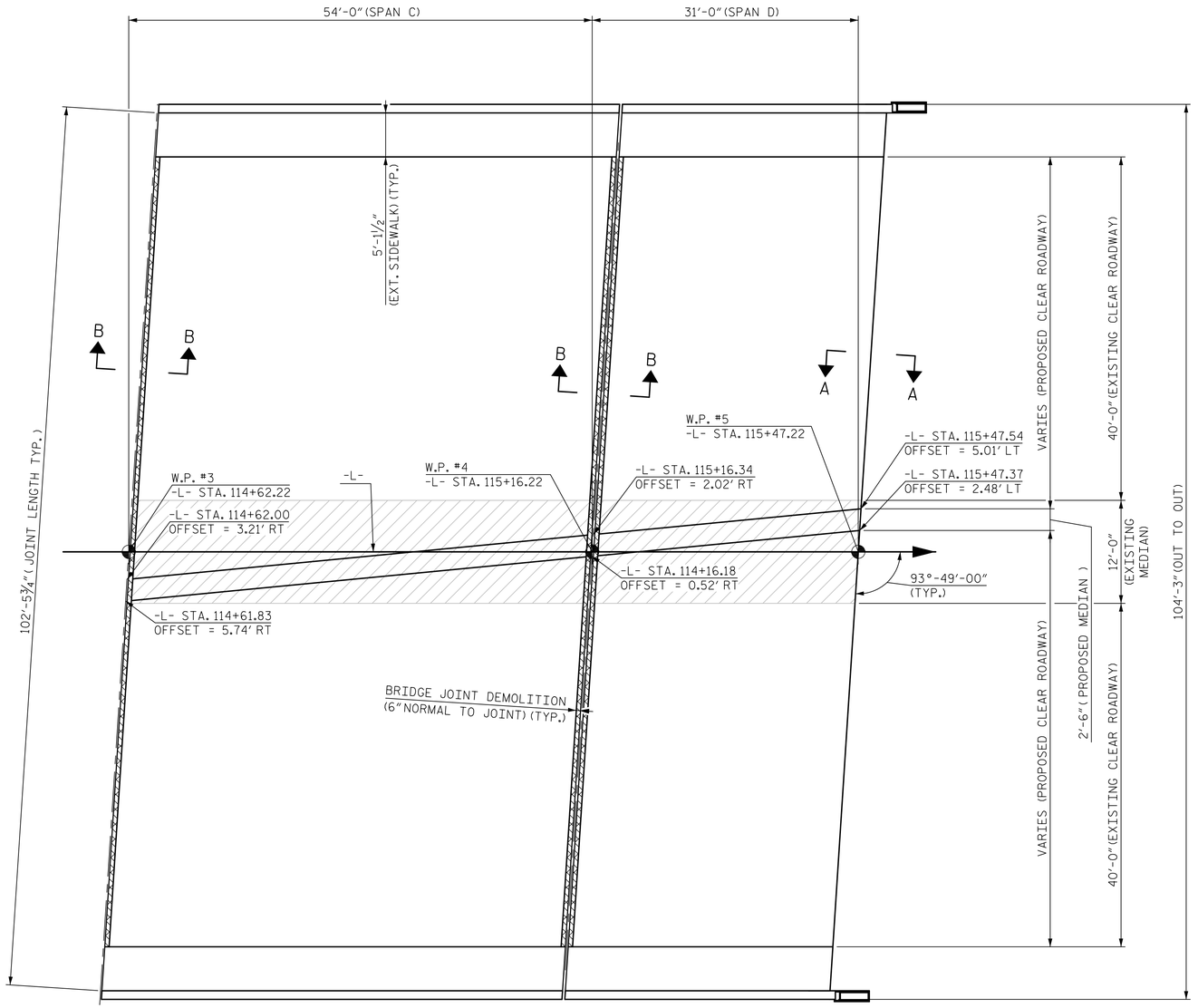
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S2-4

TOTAL SHEETS 6

NOTES:

FOR SECTION A-A AND SECTION B-B, SEE "JOINT DETAILS" SHEET.



PLAN OF SPANS C & D

JOINT DEMOLITION

MEDIAN DEMOLITION

PROJECT NO. U-5813

RANDOLPH **COUNTY**

BRIDGE NO. 750168

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/23
CHECKED BY N. HART DATE 9/23
ENGINEER OF RECORD D. HAWKINS DATE 9/23

DWG. NO. 5

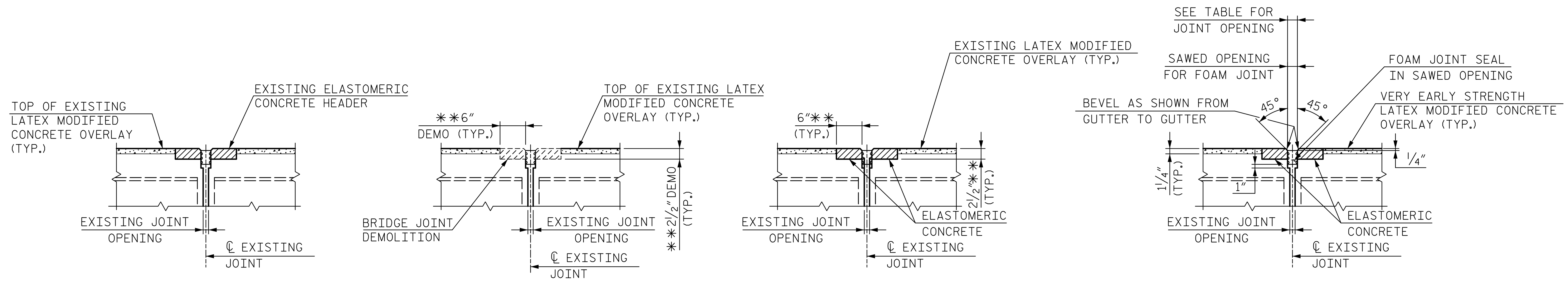
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DECK SURFACE REPAIR
SPAN C & D

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S2-5
1			3			TOTAL SHEETS
2			4			6

10/23/2023
12:26:06 PM
\\cowdor\projects\67753 - NCDOT 2016 P&DU-5813 (Design\Structures\Bridge Plans\DGN\Bridge 160402_09_U5813_SMU_502_005_750168.dgn



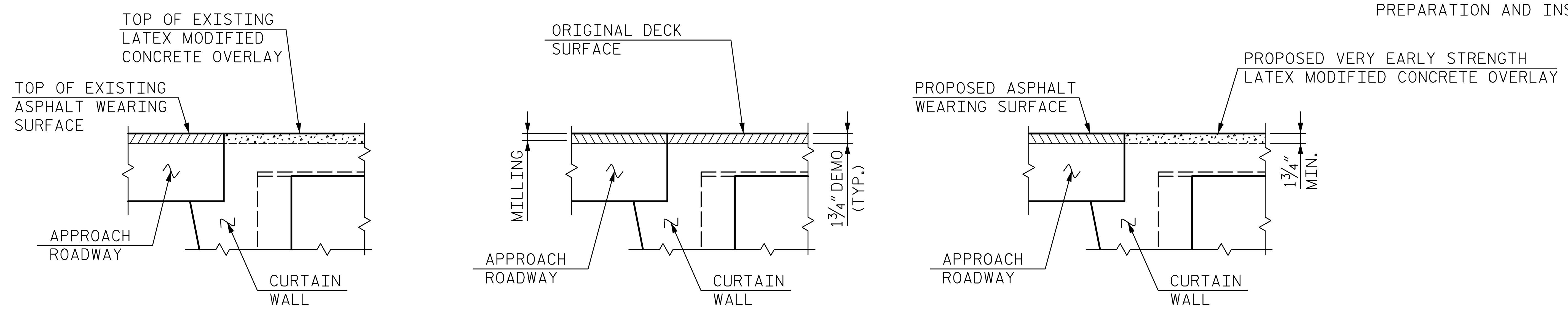
SECTION B-B
(EXISTING JOINT)

SECTION B-B
(MINIMUM EXISTING JOINT DEMOLITION)

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

SECTION B-B
(PROPOSED FOAM JOINT SEAL EXPANSION)

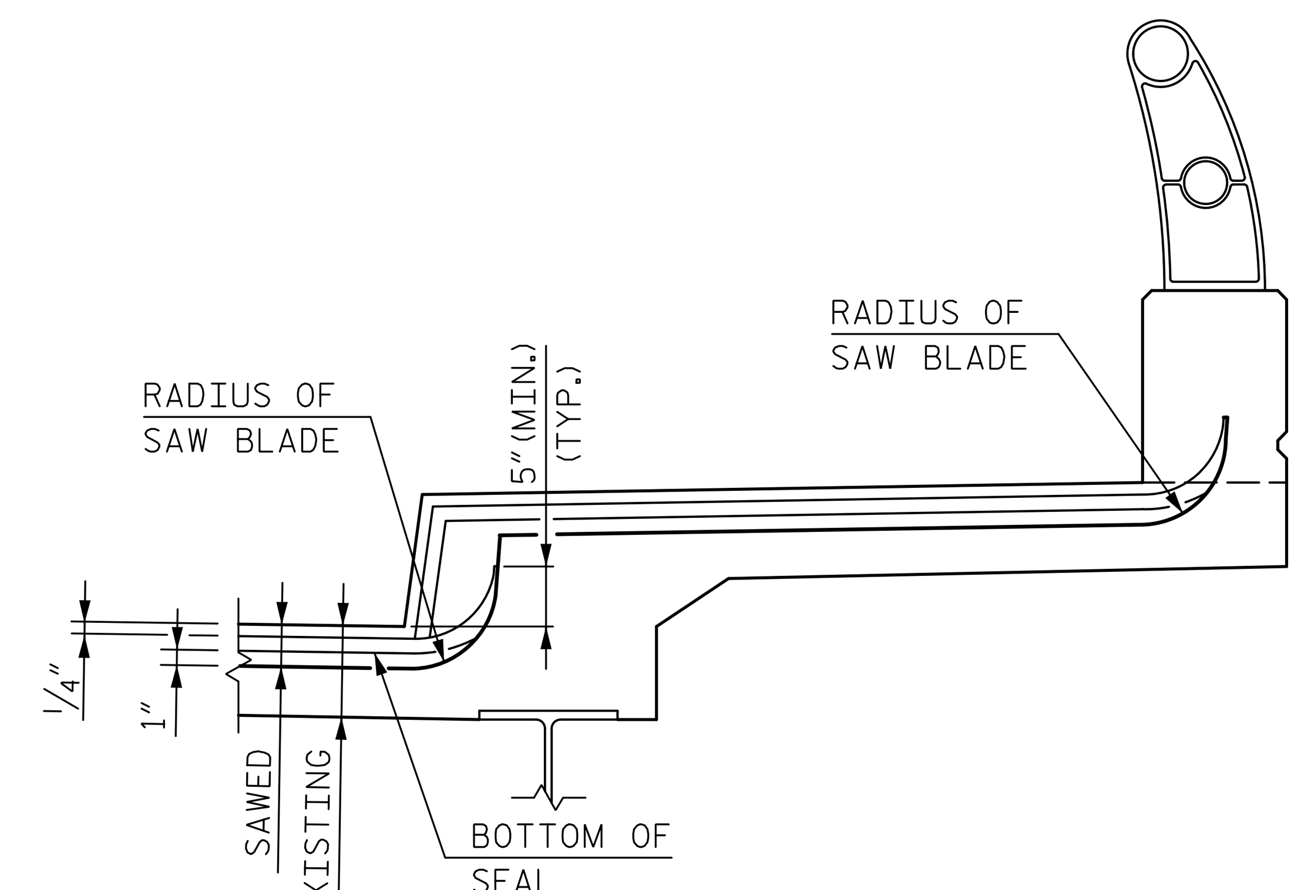
✱✱EXISTING ELASTOMERIC CONCRETE IN DECK TO BE REMOVED TO THE MINIMUM DIMENSIONS SHOWN AND TO THE EXTENT NECESSARY TO REMOVE ALL THE EXISTING JOINT HEADER MATERIAL PRIOR TO PREPARATION AND INSTALLATION OF NEW ELASTOMERIC CONCRETE.



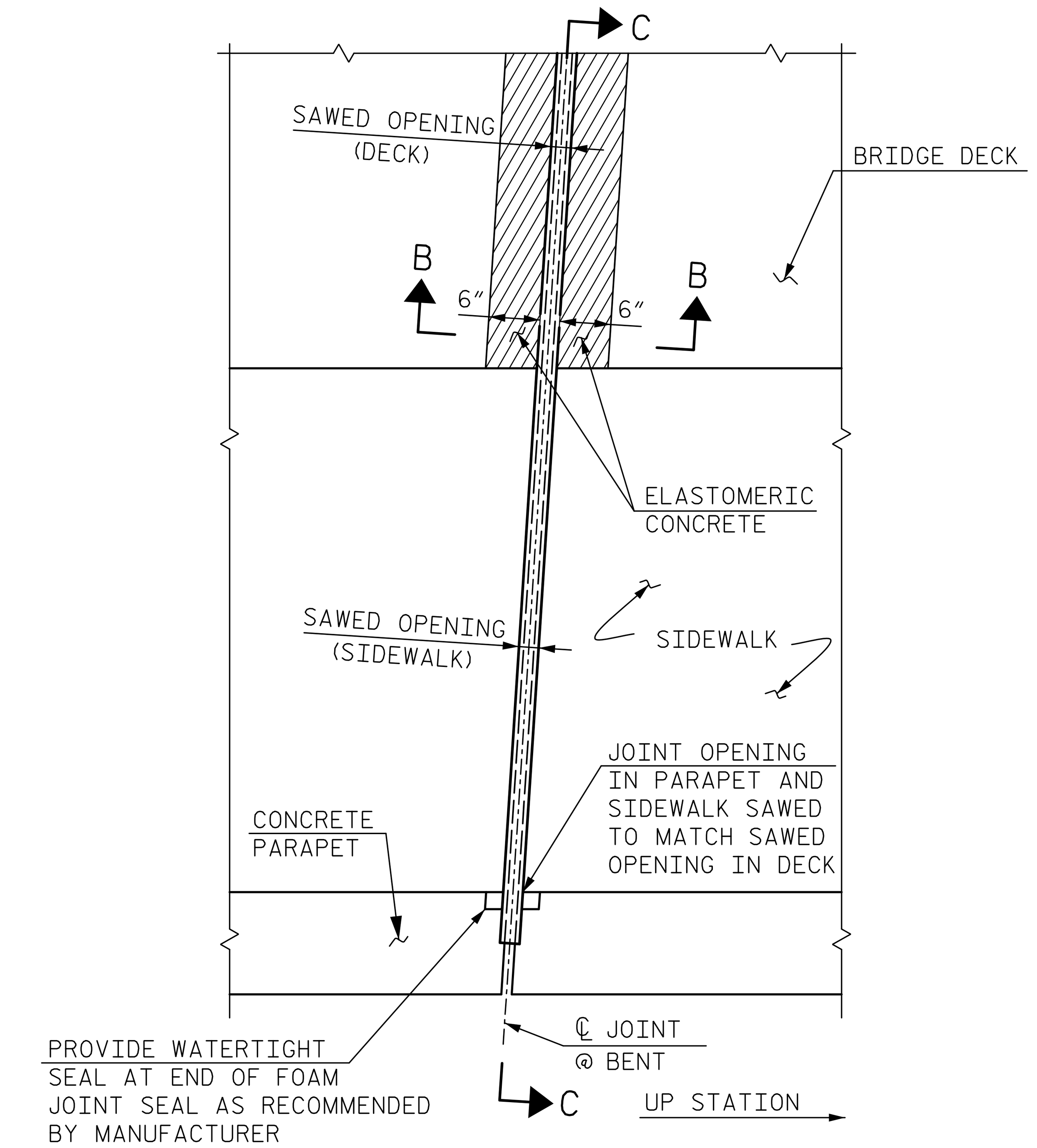
SECTION A-A
(EXISTING JOINT)

SECTION A-A
(MINIMUM EXISTING JOINT DEMOLITION)

SECTION A-A
(PROPOSED COLD JOINT)



SECTION C-C



PLAN
(RIGHT SIDE)

JOINT SEAL DETAILS AT BENT

NOTES:

THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING JOINT OPENING PRIOR TO ORDERING JOINT SEAL MATERIAL. IF ACTUAL JOINT OPENING VARIES FROM THE OPENING INDICATED IN DETAIL BY MORE THAN ¼", NOTIFY ENGINEER. REVISION TO THE JOINT SEAL SIZE MIGHT BE NECESSARY.

THE CONTRACTOR SHALL TAKE CARE DURING JOINT REHAB OPERATIONS NOT TO DROP ANY MATERIAL BELOW THE BRIDGE WITHOUT PROTECTIVE DEVICES BELOW TO CATCH THE MATERIAL. ANY MATERIAL THAT FALLS BELOW THE BRIDGE SHALL BE CONTAINED, REMOVED AND DISPOSED OF BY THE CONTRACTOR AT NO EXTRA COST TO THE DEPARTMENT. IF THE ENGINEER DETERMINES THAT THE PROTECTIVE DEVICES ARE NOT ADEQUATE OR NOT BEING EMPLOYED, THE WORK SHALL BE SUSPENDED UNTIL ADEQUATE PROTECTION IS PROVIDED.

THE CONTRACTOR WILL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINT.

THE INSTALLATION OF THE JOINT SEAL SHALL BE WATERTIGHT.

DURING THE JOINT INSTALLATION PROCEDURE, THE JOINT AND SURROUNDING AREA SHALL BE KEPT CLEAN AND FREE OF DEBRIS.

THE MANUFACTURER IS TO PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL FOR THE SIZE OF THE OPENING ON THE PLANS AND THAT ACCOMMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.

A MANUFACTURER'S CERTIFIED TRAINED REPRESENTATIVE SHALL BE PRESENT DURING THE INSTALLATION OF THE FIRST JOINT OF THE PROJECT, OR UNTIL THE ENGINEER IS SATISFIED WITH THE INSTALLATION PROCESS.

FINAL SURFACE OF THE JOINT DEMOLITION AREA PRIOR TO PLACEMENT OF CONCRETE REPAIR MATERIAL SHOULD BE REASONABLY FLAT AND LEVEL. ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF THE SURFACE PRIOR TO PLACEMENT OF REPAIR CONCRETE.

FOR FOAM JOINT SEALS FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOAM JOINTS SEALS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.

FOR ELASTOMERIC CONCRETE FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR BRIDGE JOINT DEMOLITION, SPECIAL PROVISIONS.

PAYMENT FOR COLD JOINT AT FILL FACE END BENT 1 AND 2 SHALL BE INCLUDED IN THE UNIT COST FOR PLACING AND FINISHING OF LATEX MODIFIED CONCRETE OVERLAY.

SAWED JOINT OPENING TABLE

	SAWED JOINT OPENING (PERPENDICULAR TO JOINT)		
LOCATION	AT 45°	AT 60°	AT 90°
BENT 1	1¹¹⁄₁₆"	1⁹⁄₁₆"	1⅜"
BENT 2	1⅝"	1⁹⁄₁₆"	1⁷⁄₁₆"
BENT 3	1⅝"	1⁹⁄₁₆"	1½"

JOINT REPAIR QUANTITY TABLE

	ESTIMATE	ACTUAL
FOAM JOINT SEAL FOR PRESERVATION		
BENT 1	104.3 LIN. FT.	
BENT 2	104.3 LIN. FT.	
BENT 3	104.3 LIN. FT.	
TOTAL	312.9 LIN. FT.	
BRIDGE JOINT DEMOLITION		
BENT 1	92.2 SQ. FT.	
BENT 2	92.2 SQ. FT.	
BENT 3	92.2 SQ. FT.	
TOTAL	276.6 SQ. FT.	
ELASTOMERIC CONCRETE FOR PRESERVATION		
BENT 1	19.2 CU. FT.	
BENT 2	19.2 CU. FT.	
BENT 3	19.2 CU. FT.	
TOTAL	57.6 CU. FT.	

PROJECT NO. U-5813
RANDOLPH COUNTY
BRIDGE NO. 750168

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

JOINT DETAILS

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	9/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 6

REVISIONS

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

SHEET NO. S2-6
TOTAL SHEETS 6

NOTES:

GENERAL DRAWING INFORMATION IS TAKEN FROM THE ORIGINAL PLANS.

BRIDGE ORIENTATION CONFORMS TO THE EXISTING BRIDGE PLANS/ROUTINE INSPECTION.

SCOPE OF WORK:

REMOVE AND REPLACE ELASTOMERIC CONCRETE JOINT HEADERS AND FOAM JOINT SEALS.

REMOVE DEBRIS FROM TOP OF EXISTING END BENT AND BENT CAPS AND APPLY EPOXY COATING.

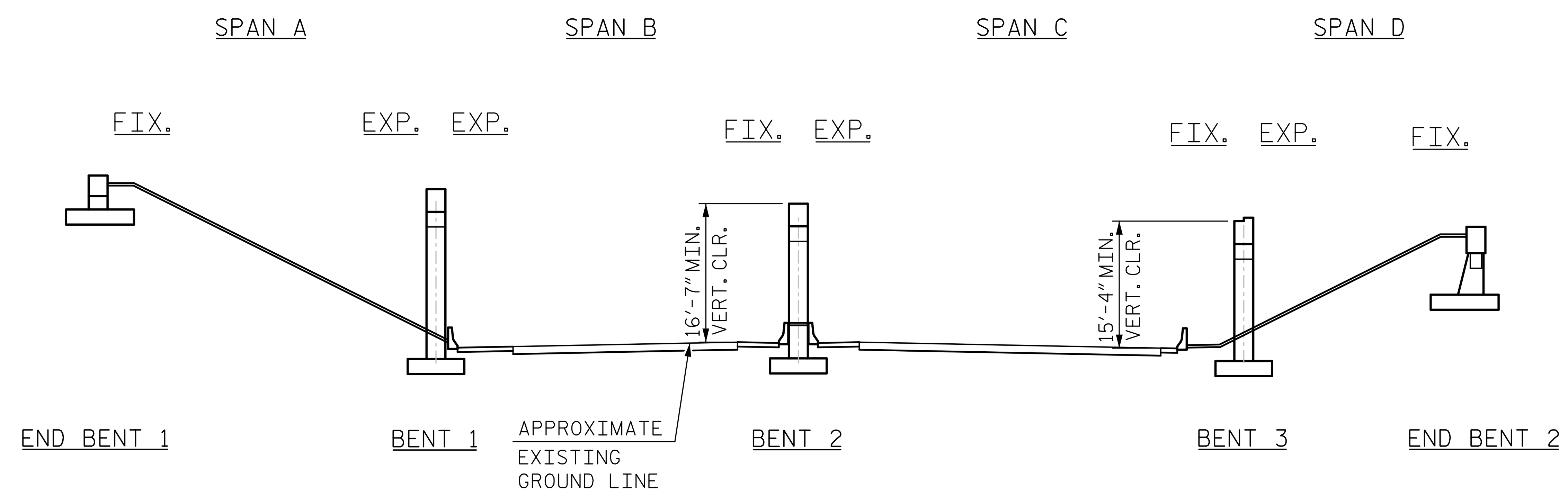
EPOXY RESIN INJECTION OF CONCRETE CRACKS.

REMOVE UNSOUND CONCRETE AND PROPERLY PREPARE EXISTING END BENT AND BENT AREAS FOR SHOTCRETE AND CONCRETE REPAIRS.

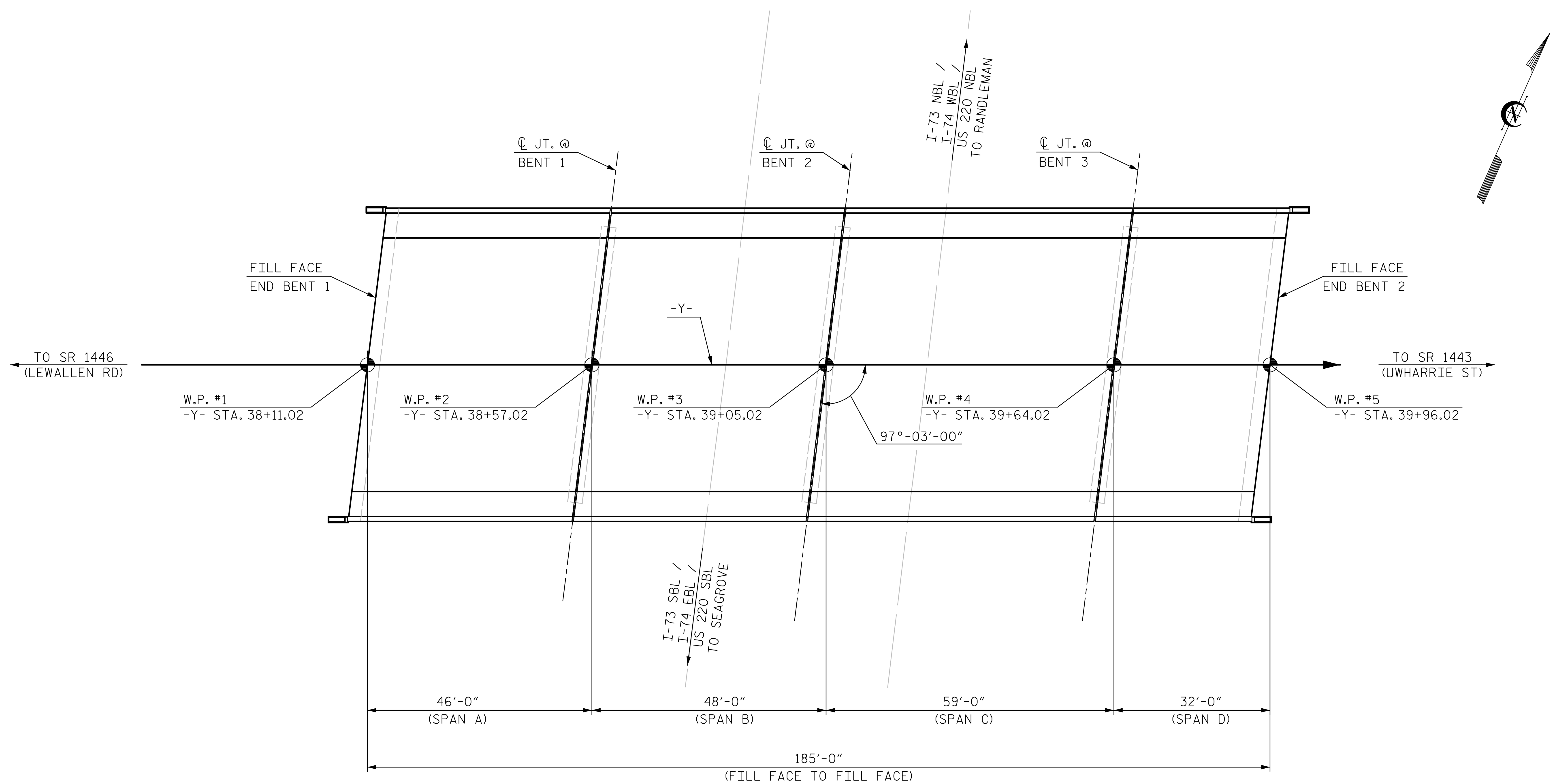
PROPERLY PREPARE SPALLED AREAS IN EXISTING END BENT AND BENT AND PERFORM SHOTCRETE AND CONCRETE REPAIRS.

I HEREBY CERTIFY THAT THIS STRUCTURE WAS REHABILITATED ACCORDING TO THESE PLANS OR AS NOTED HEREIN.

RESIDENT ENGINEER DATE



SECTION ALONG -Y-



PLAN

PROJECT NO. U-5813
RANDOLPH COUNTY
BRIDGE: 750177

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE ON NC-49/ ALBEMARLE RD OVER I-73/74, US 220 BETWEEN SR 1446 (LEWALLEN RD) AND SR 1443 (UWHARRIE ST)

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

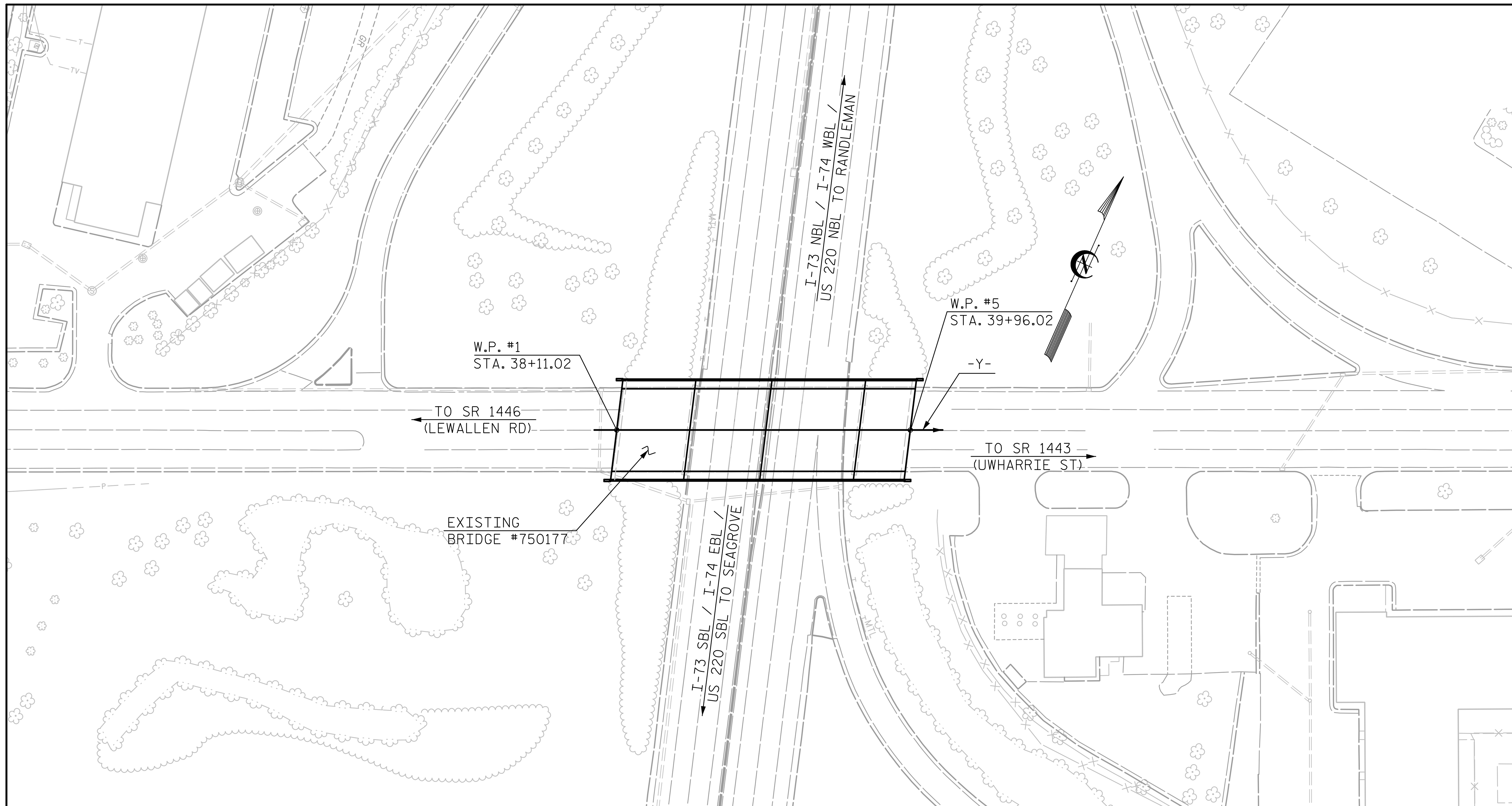
DWG. NO. 1

REVISIONS

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

SHEET NO. S3-1
TOTAL SHEETS 14

10/23/2023
1:32:14 PM
\\rdw00\proj\ets\GT753 - NCDOT 2016 P&D\U-5813 (Design)\Structures\Bridge Rehab\DGN\Bridge 177\403_01_U5813_SMU_GP01_001_750177.dgn



BRIDGE 750177 LOCATION SKETCH

NOTES:

INFORMATION INDICATED ON THE LOCATION SKETCH SHALL BE CONSIDERED GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL CONFIRM, THROUGH OTHER SOURCES, SPECIFIC INFORMATION REGARDING BRIDGES, ROADWAYS, UTILITIES, THE SURROUNDING AREA, AND ANY OTHER ASPECTS THAT MAY BE NECESSARY TO PERFORM AND COMPLETE THE PROJECT.

EXISTING DIMENSIONS AND BRIDGE CONDITION ARE FROM THE BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL FIELD VERIFY THE INFORMATION SHOWN ON THE PLANS AND NOTIFY THE ENGINEER IF ACTUAL DIMENSIONS AND CONDITIONS DIFFER.

THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN WHAT IS SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL STATE AND FEDERAL SAFETY REQUIREMENTS.

FOR CONTROL OF TRAFFIC AND LIMITS ON PHASING OF CONSTRUCTION, SEE TRANSPORTATION MANAGEMENT PLANS.

FOR FOAM JOINT SEALS FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING AND DEBRIS REMOVAL, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR BRIDGE JOINT DEMOLITION, SEE SPECIAL PROVISIONS.

ANY DAMAGE TO EXISTING REINFORCING STEEL, DURING CONTRACTOR'S OPERATIONS, SHALL BE REPAIRED AS DIRECTED BY THE ENGINEER AND PERFORMED AT NO ADDITIONAL COST TO THE DEPARTMENT.

PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL A COMPLETE SEQUENCE OF TASKS FOR EACH OPERATION AFFECTING THE BRIDGE SURFACE AND/OR TRAFFIC.

THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING JOINT OPENING PRIOR TO ORDERING JOINT SEAL MATERIAL. IF ACTUAL JOINT OPENING VARIES FROM THE OPENING INDICATED IN DETAIL BY MORE THAN 1/4" NOTIFY ENGINEER. REVISION TO THE JOINT SEAL SIZE MIGHT BE NECESSARY.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

WORK ON THE BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL BELOW. THE CONTRACTOR SHALL SUBMIT PLANS FOR CONSTRUCTION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS AND THE PROJECT SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE CONTRACTOR SHALL PERFORM ALL WORK WITH CARE SO THAT THE EXISTING STRUCTURE WHICH IS TO REMAIN IN PLACE WILL NOT BE DAMAGED. IF THE CONTRACTOR DAMAGES ANY PART OF THE EXISTING STRUCTURE WHICH IS TO REMAIN IN PLACE, THE DAMAGED AREA SHALL BE REPAIRED OR REPLACED IN A MANNER SATISFACTORY TO THE ENGINEER AT NO ADDITIONAL COST TO THE DEPARTMENT.

BRIDGE COORDINATES

BRIDGE NO.	LATITUDE	LONGITUDE
750177	35°-41'-15.63"	79°-49'-50.80"

TOTAL BILL OF MATERIAL

BRIDGE NO. 750177	FOAM JOINT SEALS FOR PRESERVATION	BRIDGE JOINT DEMOLITION	ELASTOMERIC CONCRETE FOR PRESERVATION	CONCRETE REPAIRS	SHOTCRETE REPAIRS	EPOXY RESIN INJECTION	EPOXY COATING
	LIN. FT	SQ. FT.	CU. FT.	CU. FT.	CU. FT.	LIN. FT	SQ. FT.
TOTAL	193.8	157.2	32.7	60.4	235.2	181.0	217.2

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

PROJECT NO. U-5813

RANDOLPH COUNTY

BRIDGE: 750177

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

DocuSigned by: David W. Hawkins A9ED7524B855487...

10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE ON NC-49/ ALBEMARLE RD OVER I-73/74, US 220 BETWEEN SR 1446 (LEWALLEN RD) AND SR 1443 (UWHARRIE ST)

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

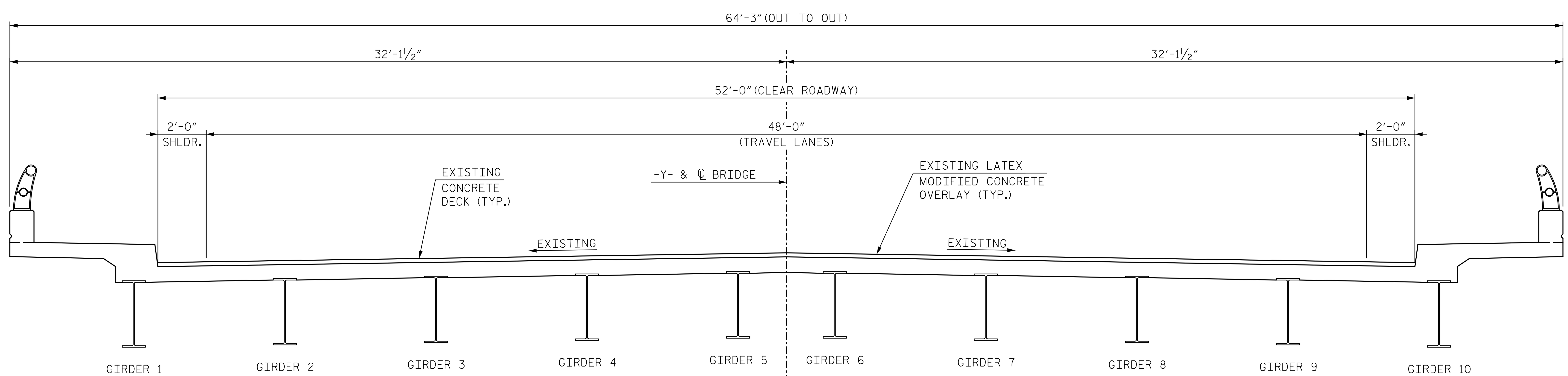
DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 2

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

SHEET NO. S3-2

TOTAL SHEETS 14



TYPICAL SECTION

(EXISTING) (LOOKING EAST)

PROJECT NO. U-5813

RANDOLPH **COUNTY**

BRIDGE: 750177

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins

10/24/2023

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

HNTB

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION

REVISIONS

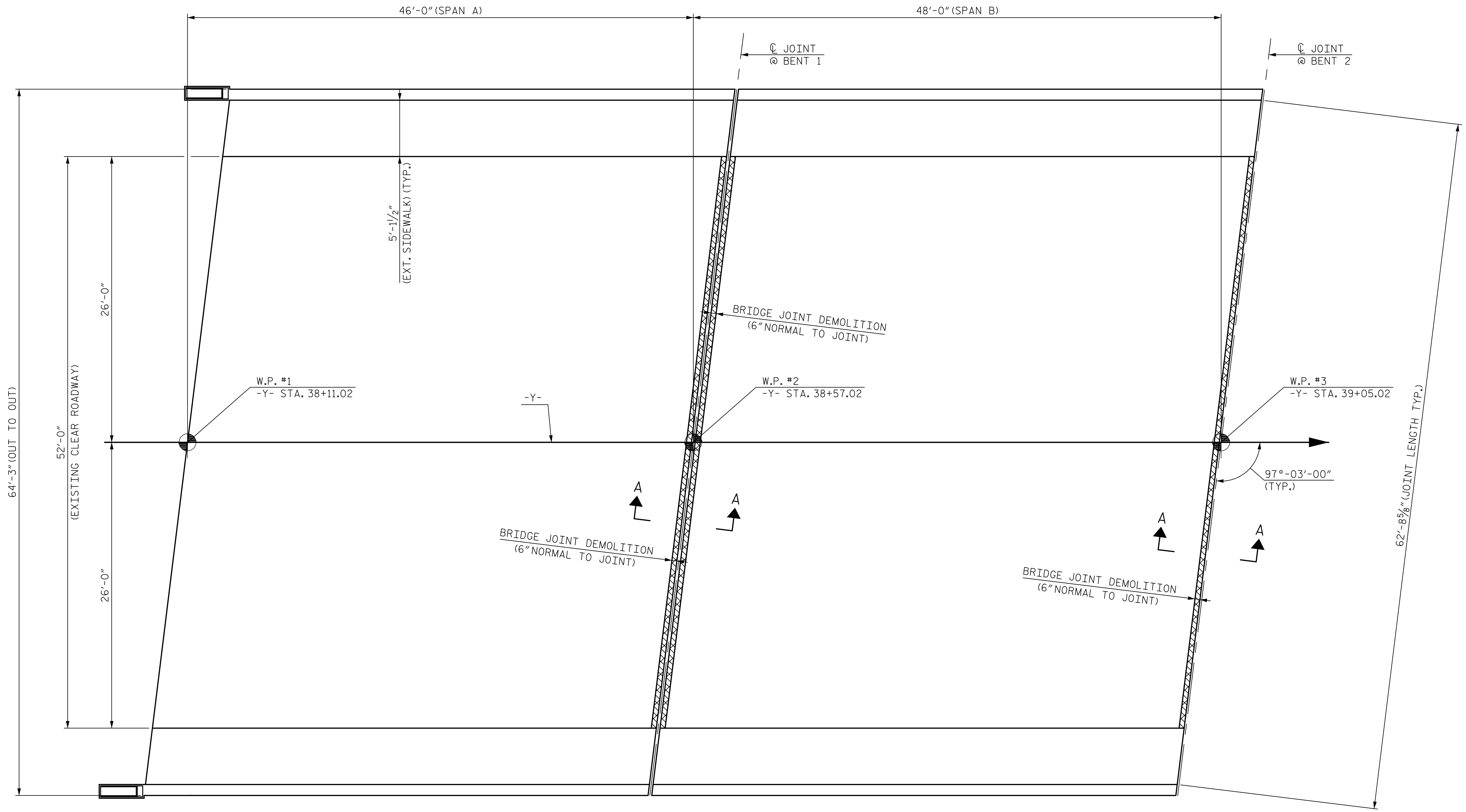
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S3-3

TOTAL SHEETS 14

10/23/2023
1:34:53 PM
\\rdwOO\projects\67753 - NCDOT 2016 P&D\U-5813 (Design)\Structures\Bridge Rehab\DGN\Bridge 177\403_05_U5813_SMU_TS01_003_750177.dgn

NOTES:
FOR SECTION A-A, SEE "JOINT DETAILS" SHEET.



JOINT DEMOLITION

PROJECT NO. U-5813
RANDOLPH COUNTY
BRIDGE: 750177

PLAN OF SPANS A & B

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DECK SURFACE REPAIR
SPAN A & B

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 4

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

SHEET NO. S3-4
TOTAL SHEETS 14

NOTES:
FOR SECTION A-A, SEE "JOINT DETAILS" SHEET.

PLAN OF SPANS C & D

JOINT DEMOLITION

PROJECT NO. U-5813
RANDOLPH COUNTY
BRIDGE: 750177

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

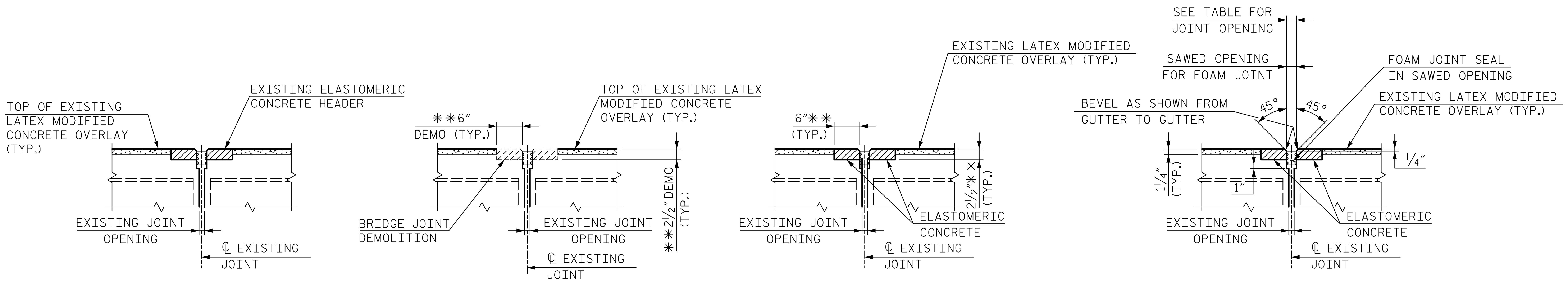
DWG. NO. 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
DECK SURFACE REPAIR
SPAN C & D

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

SHEET NO. S3-5
TOTAL SHEETS 14



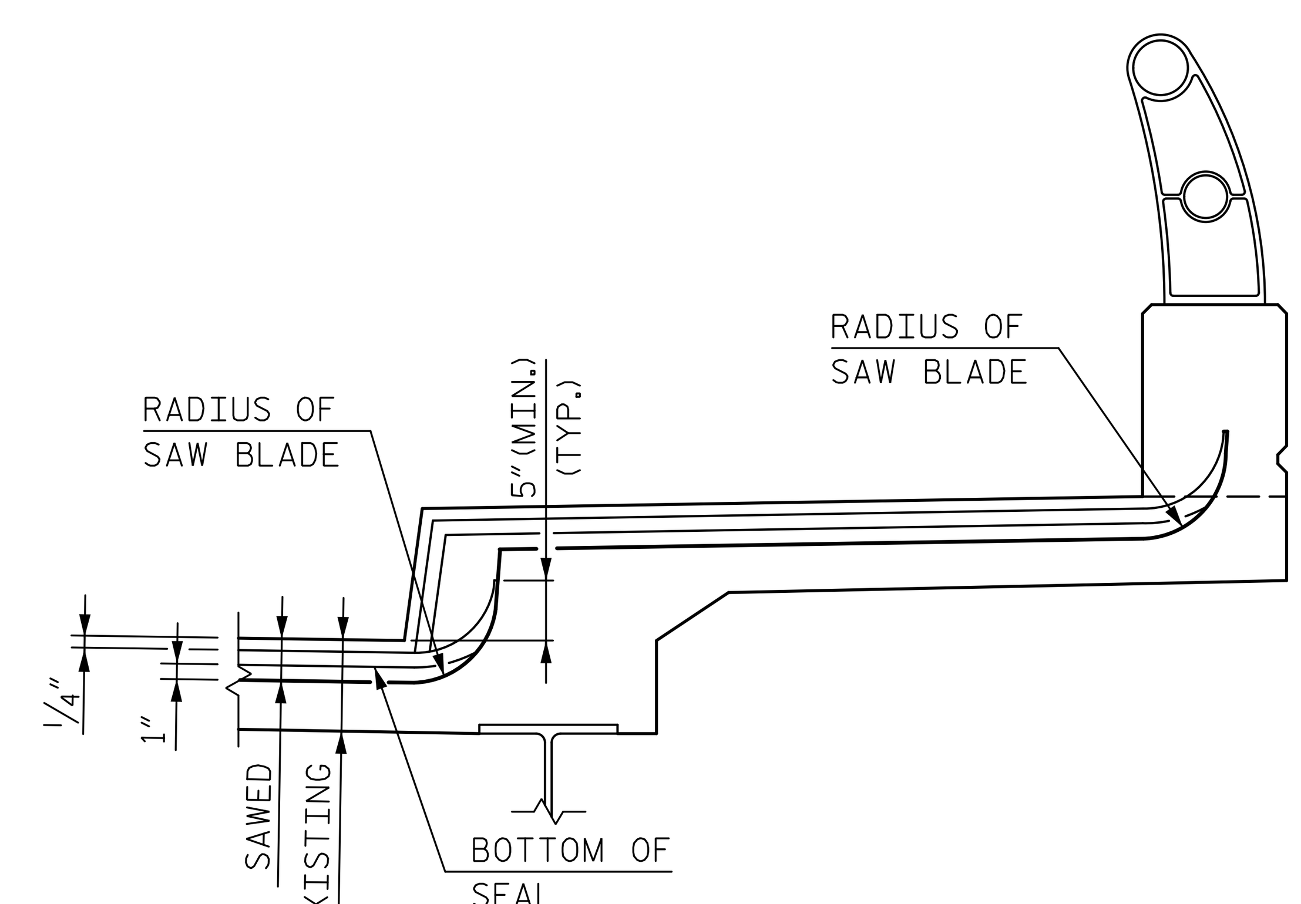
SECTION A-A
(EXISTING JOINT)

SECTION A-A
(MINIMUM EXISTING JOINT DEMOLITION)

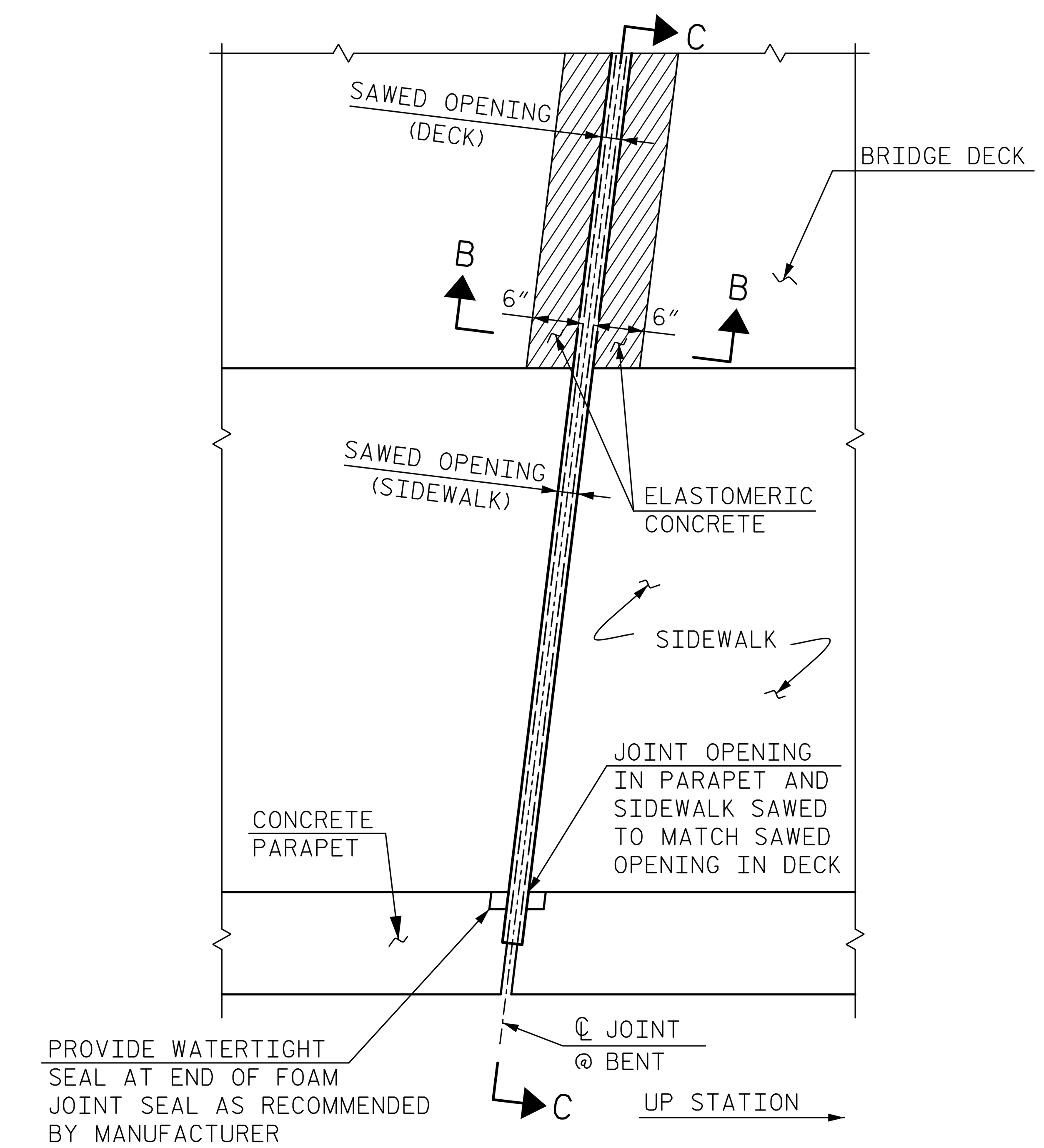
SECTION A-A
PROPOSED FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

SECTION A-A
(PROPOSED FOAM JOINT SEAL EXPANSION)

✱✱ EXISTING ELASTOMERIC CONCRETE IN DECK TO BE REMOVED TO THE MINIMUM DIMENSIONS SHOWN AND TO THE EXTENT NECESSARY TO REMOVE ALL THE EXISTING JOINT HEADER MATERIAL PRIOR TO PREPARATION AND INSTALLATION OF NEW ELASTOMERIC CONCRETE.



SECTION C-C



PLAN
(RIGHT SIDE)

JOINT SEAL DETAILS AT BENT

NOTES:

THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING JOINT OPENING PRIOR TO ORDERING JOINT SEAL MATERIAL. IF ACTUAL JOINT OPENING VARIES FROM THE OPENING INDICATED IN DETAIL BY MORE THAN ¼″, NOTIFY ENGINEER. REVISION TO THE JOINT SEAL SIZE MIGHT BE NECESSARY.

THE CONTRACTOR SHALL TAKE CARE DURING JOINT REHAB OPERATIONS NOT TO DROP ANY MATERIAL BELOW THE BRIDGE WITHOUT PROTECTIVE DEVICES BELOW TO CATCH THE MATERIAL. ANY MATERIAL THAT FALLS BELOW THE BRIDGE SHALL BE CONTAINED, REMOVED AND DISPOSED OF BY THE CONTRACTOR AT NO EXTRA COST TO THE DEPARTMENT. IF THE ENGINEER DETERMINES THAT THE PROTECTIVE DEVICES ARE NOT ADEQUATE OR NOT BEING EMPLOYED, THE WORK SHALL BE SUSPENDED UNTIL ADEQUATE PROTECTION IS PROVIDED.

THE CONTRACTOR WILL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINT.

THE INSTALLATION OF THE JOINT SEAL SHALL BE WATERTIGHT.

DURING THE JOINT INSTALLATION PROCEDURE, THE JOINT AND SURROUNDING AREA SHALL BE KEPT CLEAN AND FREE OF DEBRIS.

THE MANUFACTURER IS TO PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL FOR THE SIZE OF THE OPENING ON THE PLANS AND THAT ACCOMMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.

A MANUFACTURER'S CERTIFIED TRAINED REPRESENTATIVE SHALL BE PRESENT DURING THE INSTALLATION OF THE FIRST JOINT OF THE PROJECT, OR UNTIL THE ENGINEER IS SATISFIED WITH THE INSTALLATION PROCESS.

FINAL SURFACE OF THE JOINT DEMOLITION AREA PRIOR TO PLACEMENT OF CONCRETE REPAIR MATERIAL SHOULD BE REASONABLY FLAT AND LEVEL. ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF THE SURFACE PRIOR TO PLACEMENT OF REPAIR CONCRETE.

FOR FOAM JOINT SEALS FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOAM JOINTS SEALS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION.

FOR ELASTOMERIC CONCRETE FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR BRIDGE JOINT DEMOLITION, SPECIAL PROVISIONS.

JOINT REPAIR QUANTITY TABLE

	ESTIMATE	ACTUAL
FOAM JOINT SEAL FOR PRESERVATION		
BENT 1	64.6 LIN. FT.	
BENT 2	64.6 LIN. FT.	
BENT 3	64.6 LIN. FT.	
TOTAL	193.8 LIN. FT.	
BRIDGE JOINT DEMOLITION		
BENT 1	52.4 SQ. FT.	
BENT 2	52.4 SQ. FT.	
BENT 3	52.4 SQ. FT.	
TOTAL	157.2 SQ. FT.	
ELASTOMERIC CONCRETE FOR PRESERVATION		
BENT 1	10.9 CU. FT.	
BENT 2	10.9 CU. FT.	
BENT 3	10.9 CU. FT.	
TOTAL	32.7 CU. FT.	

SAWED JOINT OPENING TABLE

	SAWED JOINT OPENING (PERPENDICULAR TO JOINT)		
LOCATION	AT 45°	AT 60°	AT 90°
BENT 1	1 11/16″	1 9/16″	1 3/8″
BENT 2	1 5/8″	1 9/16″	1 7/16″
BENT 3	1 5/8″	1 9/16″	1 1/2″

PROJECT NO. U-5813
RANDOLPH COUNTY
BRIDGE: 750177

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

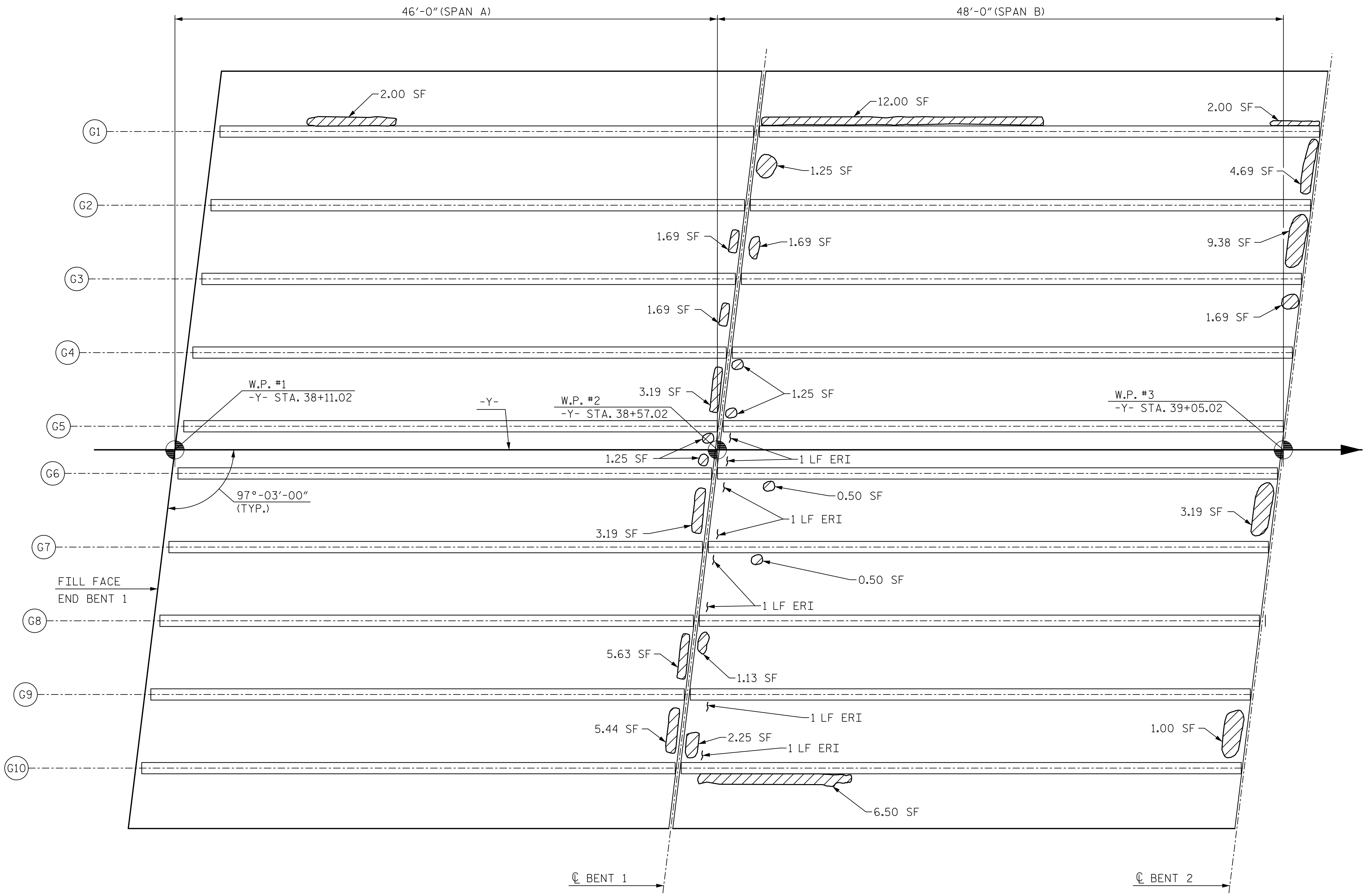
JOINT DETAILS

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 6

REVISIONS							
NO.	BY	DATE	NO.	BY	DATE	SHEET NO.	S3-6
1			3			TOTAL SHEETS	14
2			4				



PLAN OF SPANS A & B

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

CONTRACTOR SHALL SAWCUT TO A NOMINAL DEPTH OF ½" BUT REINFORCING STEEL SHALL NOT BE DAMAGED.

CONTRACTOR SHALL REMOVE SURFACE CONCRETE TO VERIFY THAT SAWCUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL.

FOR UNDERSIDE OF DECK REPAIRS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

AS-BUILT REPAIR QUANTITY TABLE

SPANS A & B	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
JOINT HEADERS	52.1	29.2		
UNDERSIDE OF DECK	23.5	11.5		
CONCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
UNDERSIDE OF DECK	0.0	0.0		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
UNDERSIDE OF DECK	8.0			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTAL AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION

CONCRETE REPAIR AREA

PROJECT NO. U-5813

RANDOLPH COUNTY

BRIDGE: 750177

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DECK UNDERSIDE REPAIR SPANS A & B

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

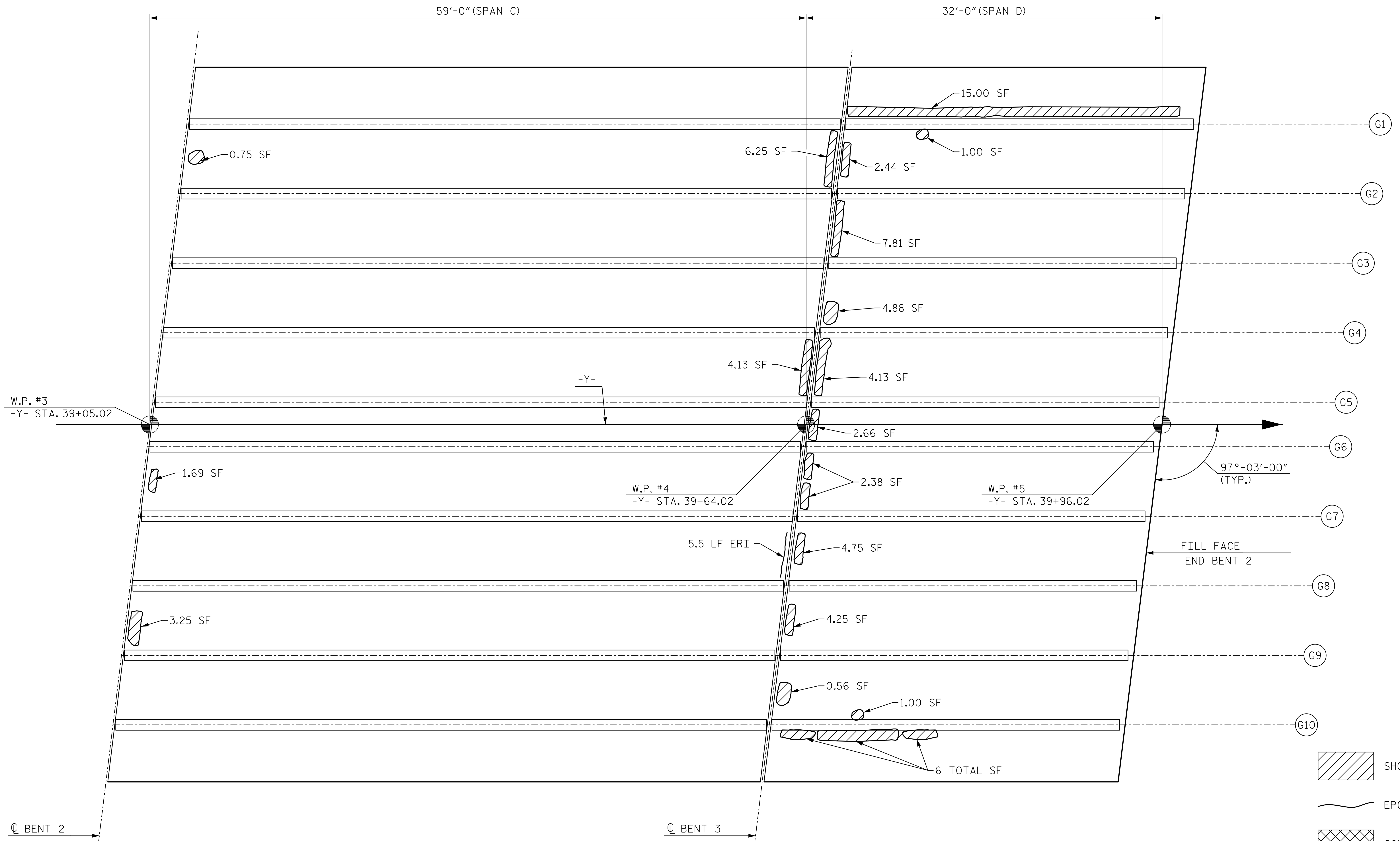
DWG. NO. 7

REVISIONS

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

SHEET NO. S3-7
TOTAL SHEETS 14

10/23/2023 1:37:18 PM \\rdw00\projects\61753 - NCDOT 2016 P&D\U-5813 (Design)\Structures\Bridge Rehab\DGN\Bridge 177\403_13_U5813_SMU_DSR01_007_750177.dgn



PLAN OF SPANS C & D

SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION

CONCRETE REPAIR AREA

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

CONTRACTOR SHALL SAWCUT TO A NOMINAL DEPTH OF ½" BUT REINFORCING STEEL SHALL NOT BE DAMAGED.

CONTRACTOR SHALL REMOVE SURFACE CONCRETE TO VERIFY THAT SAWCUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL.

FOR UNDERSIDE OF DECK REPAIRS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

AS-BUILT REPAIR QUANTITY TABLE

SPANS C & D	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
JOINT HEADERS	54.9	32.5		
UNDERSIDE OF DECK	23.0	11.5		
CONCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
UNDERSIDE OF DECK	0.0	0.0		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
UNDERSIDE OF DECK	5.5			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTAL AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

PROJECT NO. U-5813
RANDOLPH **COUNTY**
BRIDGE: 750177

NORTH CAROLINA PROFESSIONAL SEAL 027812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DECK UNDERSIDE
REPAIR
SPANS C & D

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/23
CHECKED BY N. HART DATE 8/23
ENGINEER OF RECORD D. HAWKINS DATE 9/23
DWG. NO. 8

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

SHEET NO. S3-8
TOTAL SHEETS 14

AS-BUILT REPAIR QUANTITY TABLE

END BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	0.0	0.0		
CURTAIN WALL	74.1	37.1		
WING	0.0	0.0		
CONCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CURTAIN WALL	0.0			
CAP	126.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF CAP	87.4			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTAL AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE BEARINGS. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

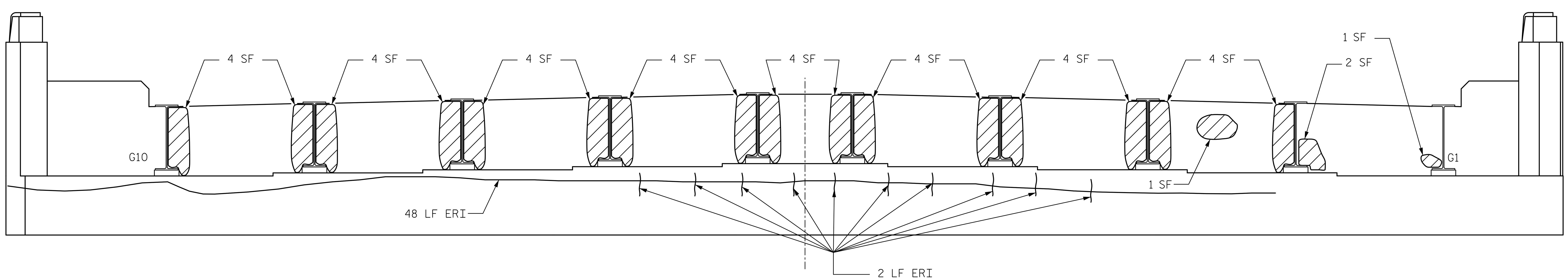
FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

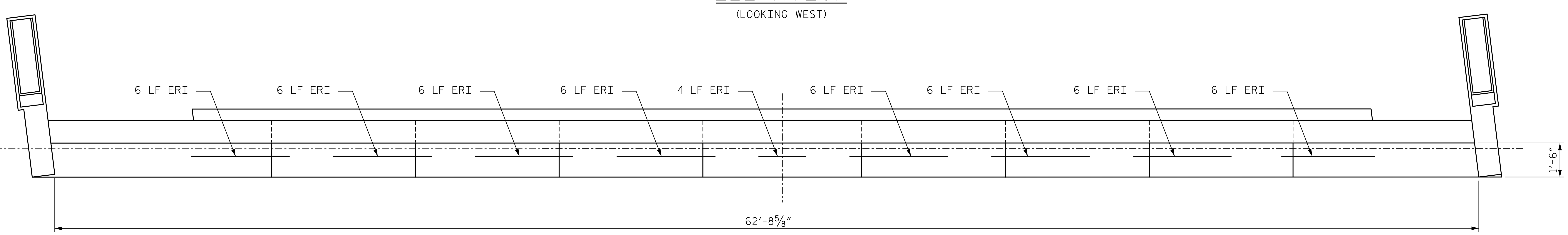


ELEVATION
(LOOKING WEST)

SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION

CONCRETE REPAIR AREA



PLAN

PROJECT NO. U-5813
RANDOLPH COUNTY
BRIDGE: 750177

SHEET 1 OF 5

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

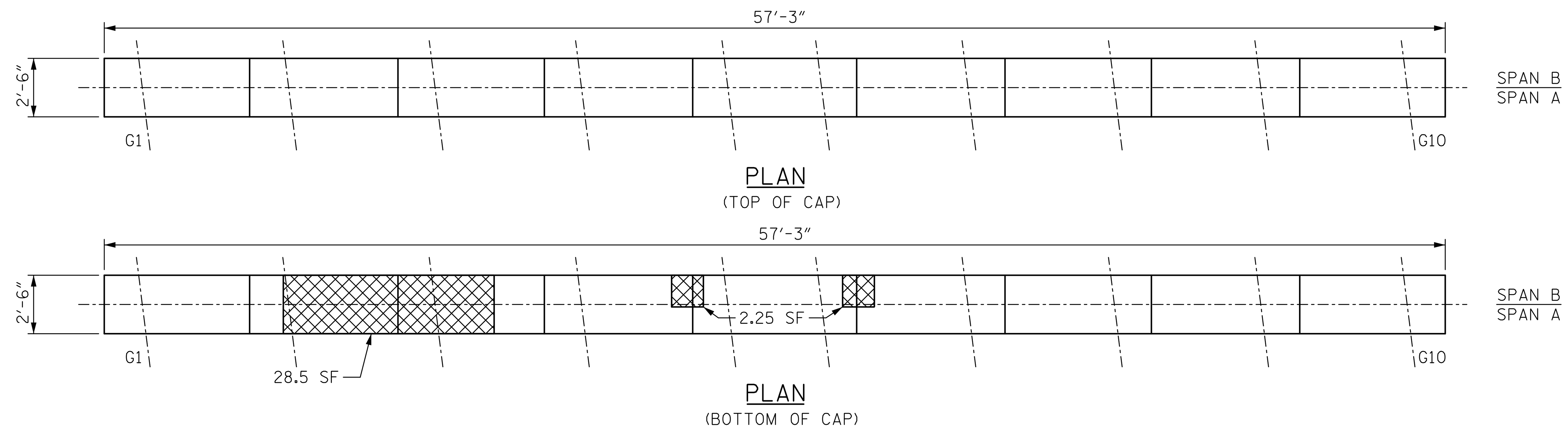
HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

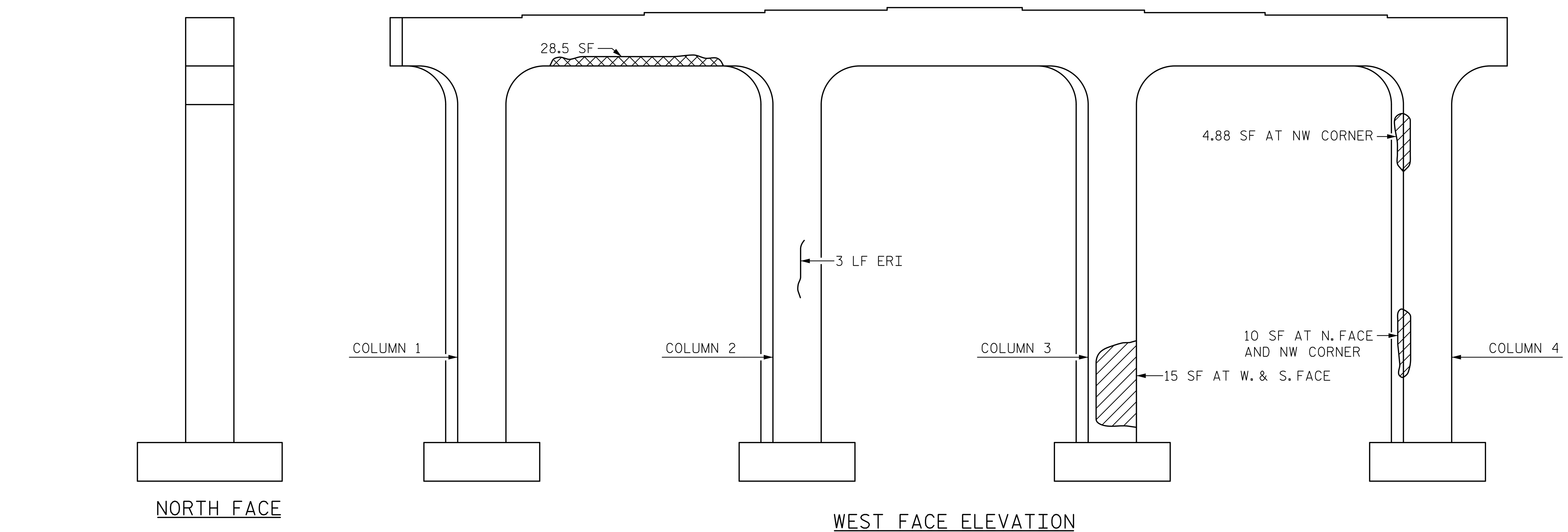
DRAWN BY M. WRIGHT DATE 8/23
CHECKED BY N. HART DATE 8/23
ENGINEER OF RECORD D. HAWKINS DATE 9/23
DWG. NO. 9

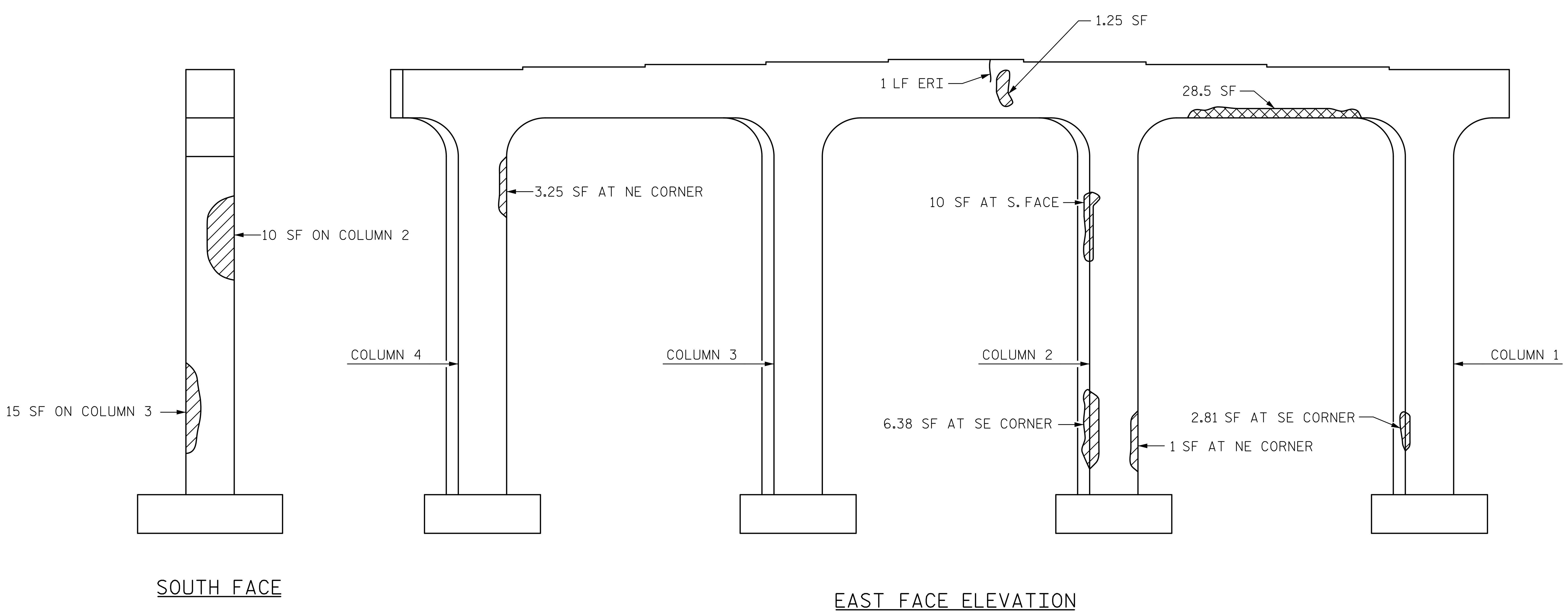
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE REPAIR
END BENT 1

REVISIONS								SHEET NO.
NO.	BY	DATE		NO.	BY	DATE		S3-9
1				3				TOTAL SHEETS
2				4				14







NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE BEARINGS. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

AS-BUILT REPAIR QUANTITY TABLE

BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	1.3	0.3		
COLUMN	53.6	67.6		
CONCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	33.0	45.0		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
COLUMN	3.0			
CAP	1.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF CAP	129.8			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTAL AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION

CONCRETE REPAIR AREA

PROJECT NO. U-5813

RANDOLPH COUNTY

BRIDGE: 750177

SHEET 2 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE REPAIR

BENT 1

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

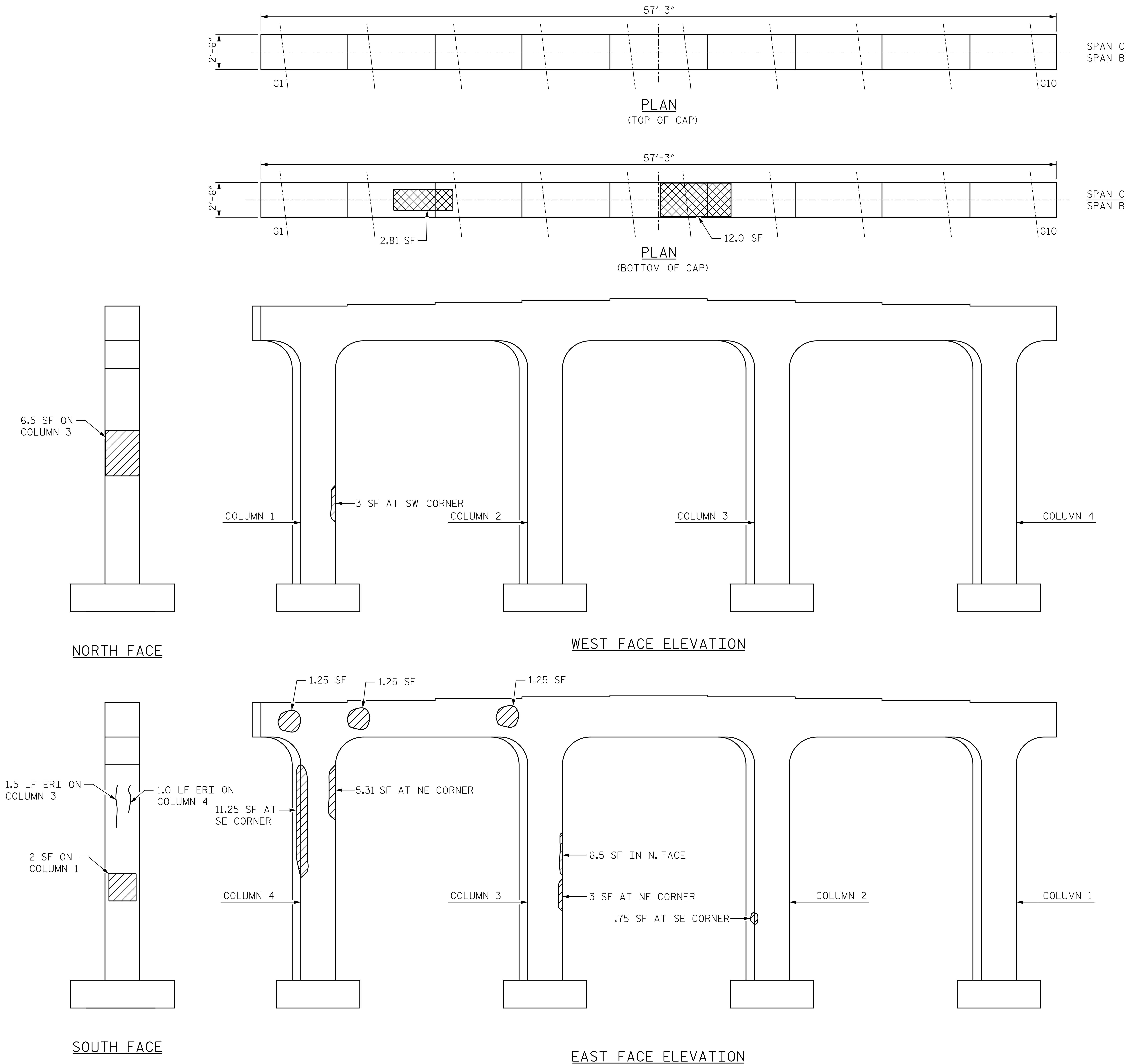
DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 10

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

SHEET NO. S3-10

TOTAL SHEETS 14



NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

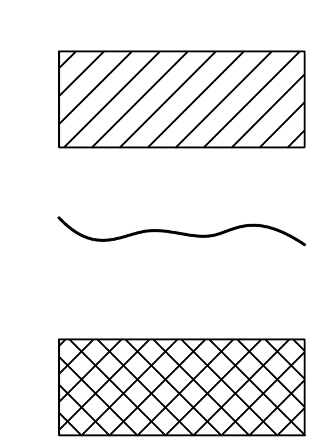
FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE BEARINGS. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

AS-BUILT REPAIR QUANTITY TABLE

BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	3.8	0.9		
COLUMN	31.8	24.4		
CONCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	14.8	7.4		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
COLUMN	2.5			
CAP	0.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF CAP	129.8			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTAL AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.



PROJECT NO. U-5813
RANDOLPH COUNTY
BRIDGE: 750177

SHEET 3 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE REPAIR
BENT 2

HNTB
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

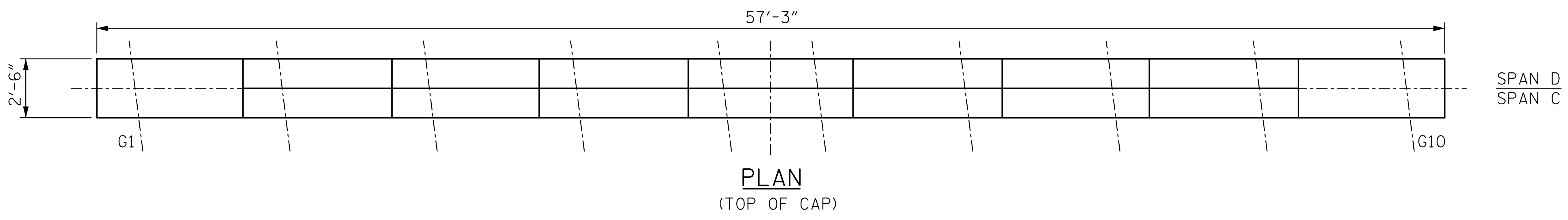
DWG. NO. II

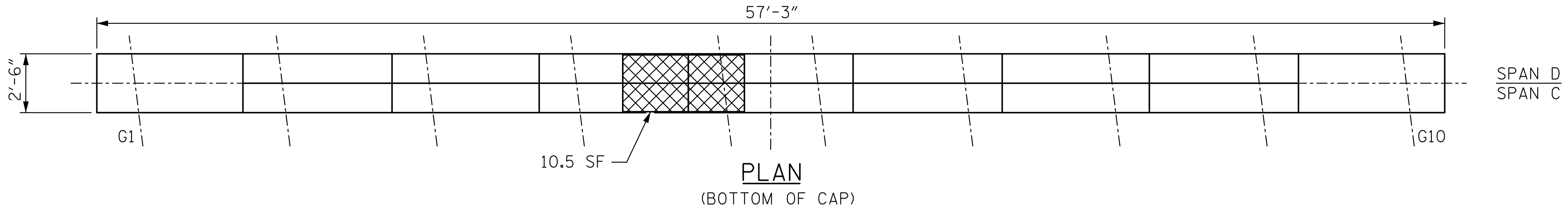
REVISIONS

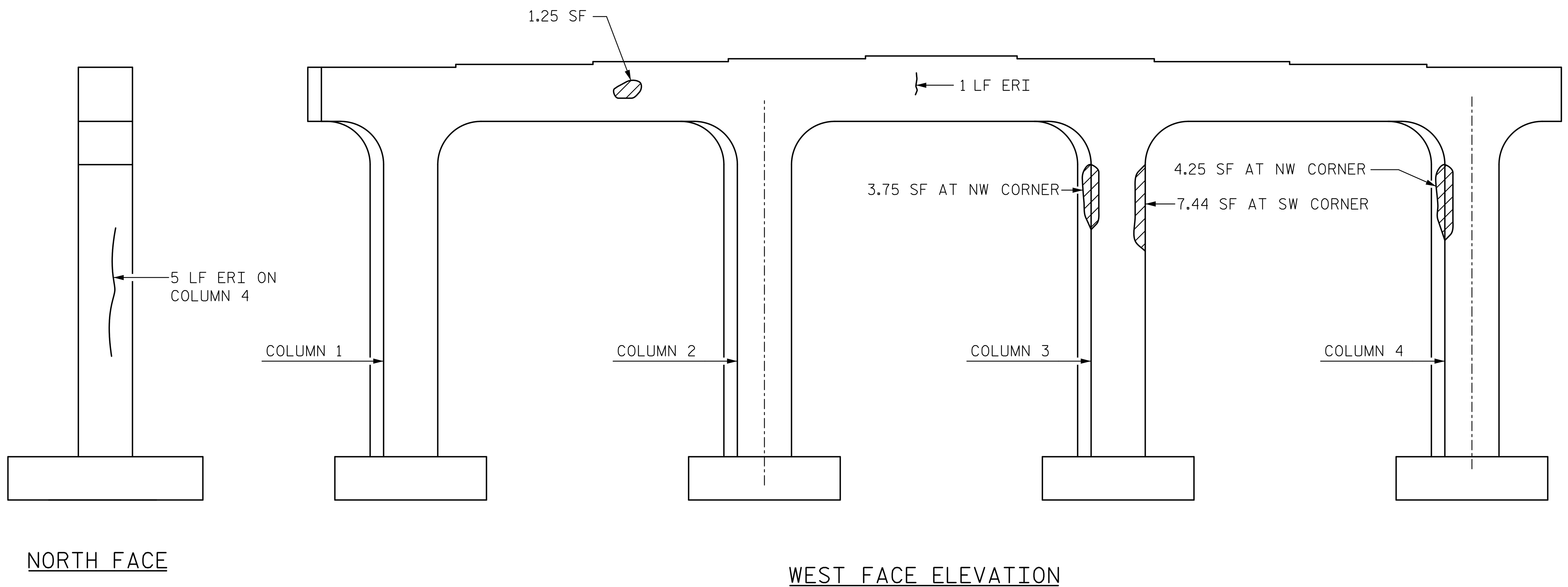
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

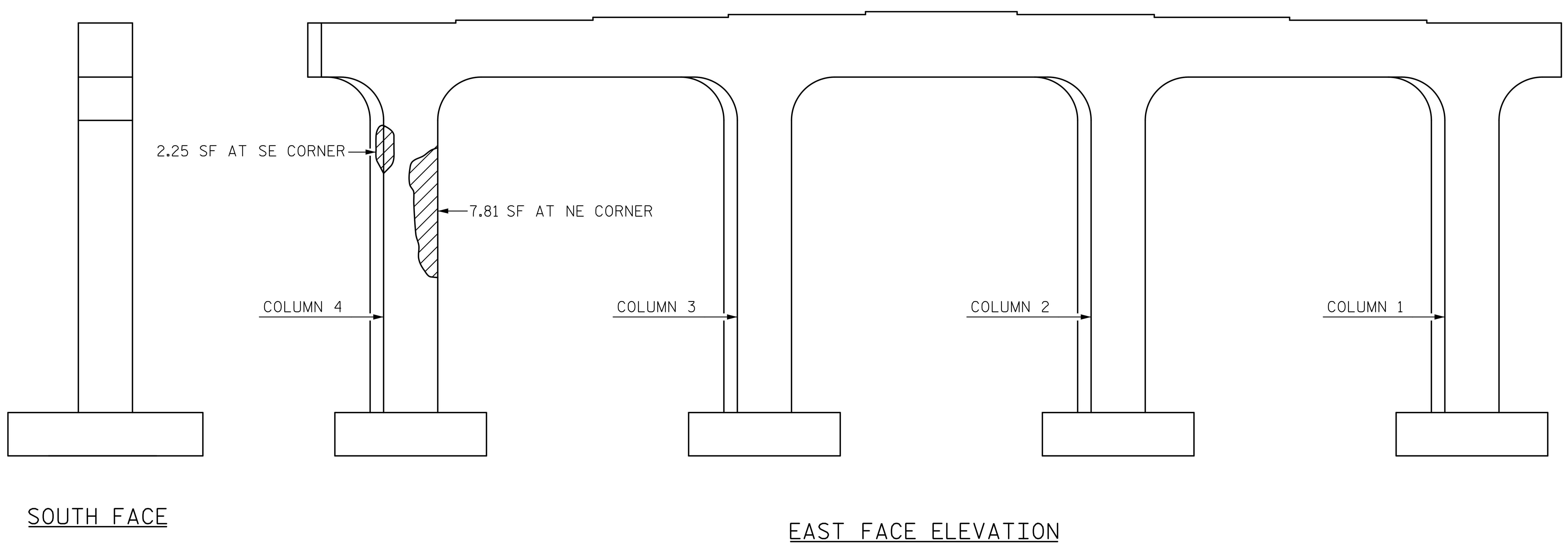
SHEET NO. S3-11
TOTAL SHEETS 14

10/23/2023
1:40:34 PM
\\rdw00\proj\ets\67753 - NCDOT 2016 P&D\U-5813 (Design)\Structures\Bridge Rehab\DGN\Bridge 177\403_21_U5813_SMU_B02_011_750177.dgn









NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE BEARINGS. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

AS-BUILT REPAIR QUANTITY TABLE

BENT 3	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	1.3	0.3		
COLUMN	25.5	14.4		
CONCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	10.5	7.9		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
COLUMN	5.0			
CAP	1.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF CAP	129.8			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTAL AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION

CONCRETE REPAIR AREA

PROJECT NO. U-5813

RANDOLPH **COUNTY**

BRIDGE: 750177

SHEET 4 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

DocuSigned by: David W. Hawkins 10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE REPAIR

BENT 3

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/23
CHECKED BY N. HART DATE 8/23
ENGINEER OF RECORD D. HAWKINS DATE 9/23

DWG. NO. 12

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

SHEET NO. S3-12
TOTAL SHEETS 14

10/23/2023
1:41:21 PM
\\rdw00\projects\67753 - NCDOT 2016 P&D\U-5813 (Design)\Structures\Bridge Rehab\DGN\Bridge 17\403_23_U5813_SMU_B03_012_750177.dgn

AS-BUILT REPAIR QUANTITY TABLE

END BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	9.0	4.5		
CURTAIN WALL	1.3	0.3		
WING	1.1	0.0		
CONCRETE REPAIRS	AREA SQ. FT	VOLUMNE CU. FT.	AREA SQ. FT	VOLUMNE CU. FT.
CAP	29.0	9.0		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CURTAIN WALL	0.0			
CAP	29.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF CAP	87.4			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTAL AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE BEARINGS. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

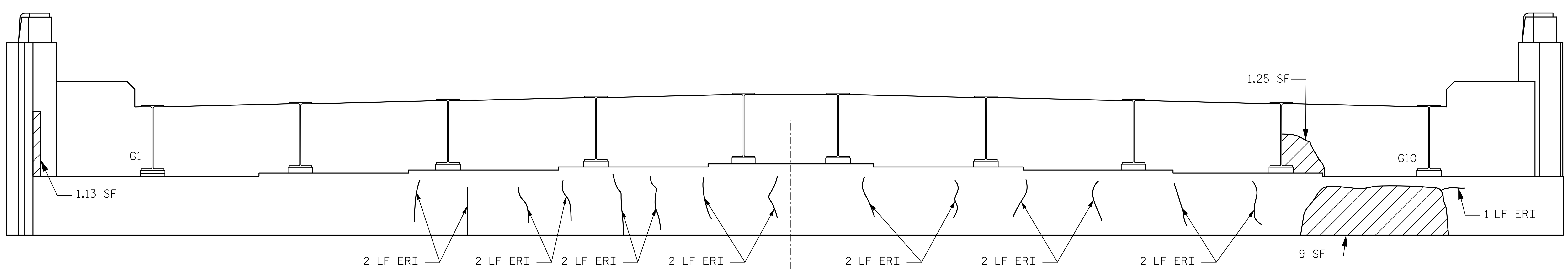
FOR REPAIR DETAILS, SEE "TYPICAL CONCRETE REPAIR DETAILS" SHEET.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

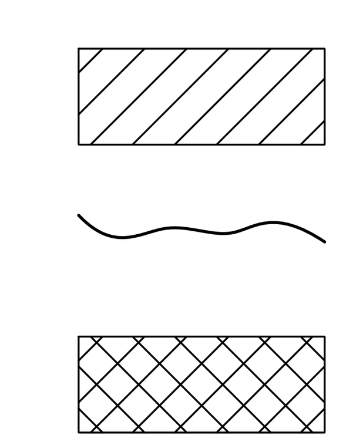
FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

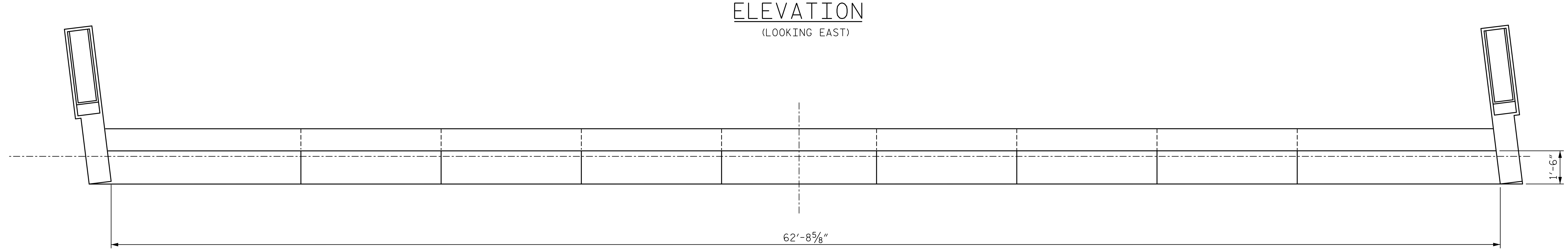
FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.



ELEVATION
(LOOKING EAST)





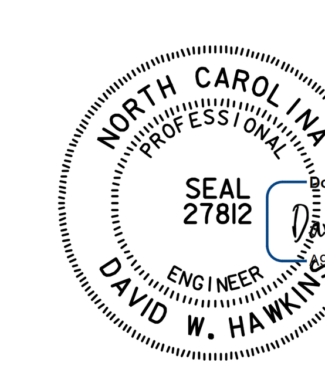
PLAN

PROJECT NO. U-5813

RANDOLPH COUNTY

BRIDGE: 750177

SHEET 5 OF 5



DocuSigned by: David W. Hawkins 10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE REPAIR

END BENT 2

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

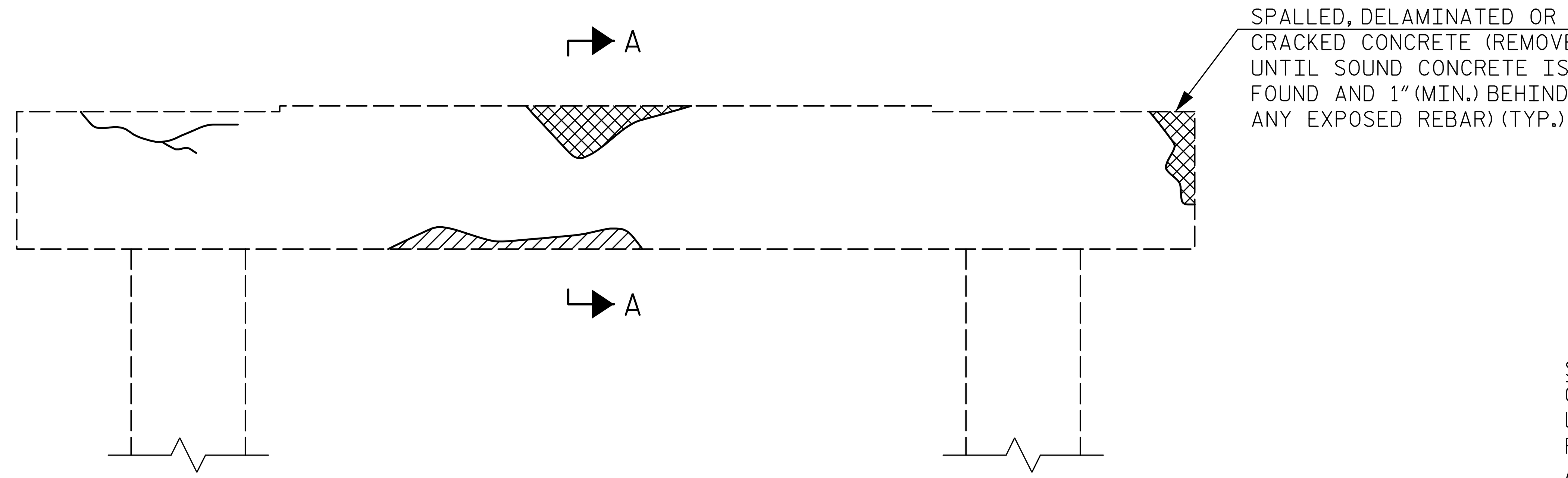
DWG. NO. 13

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

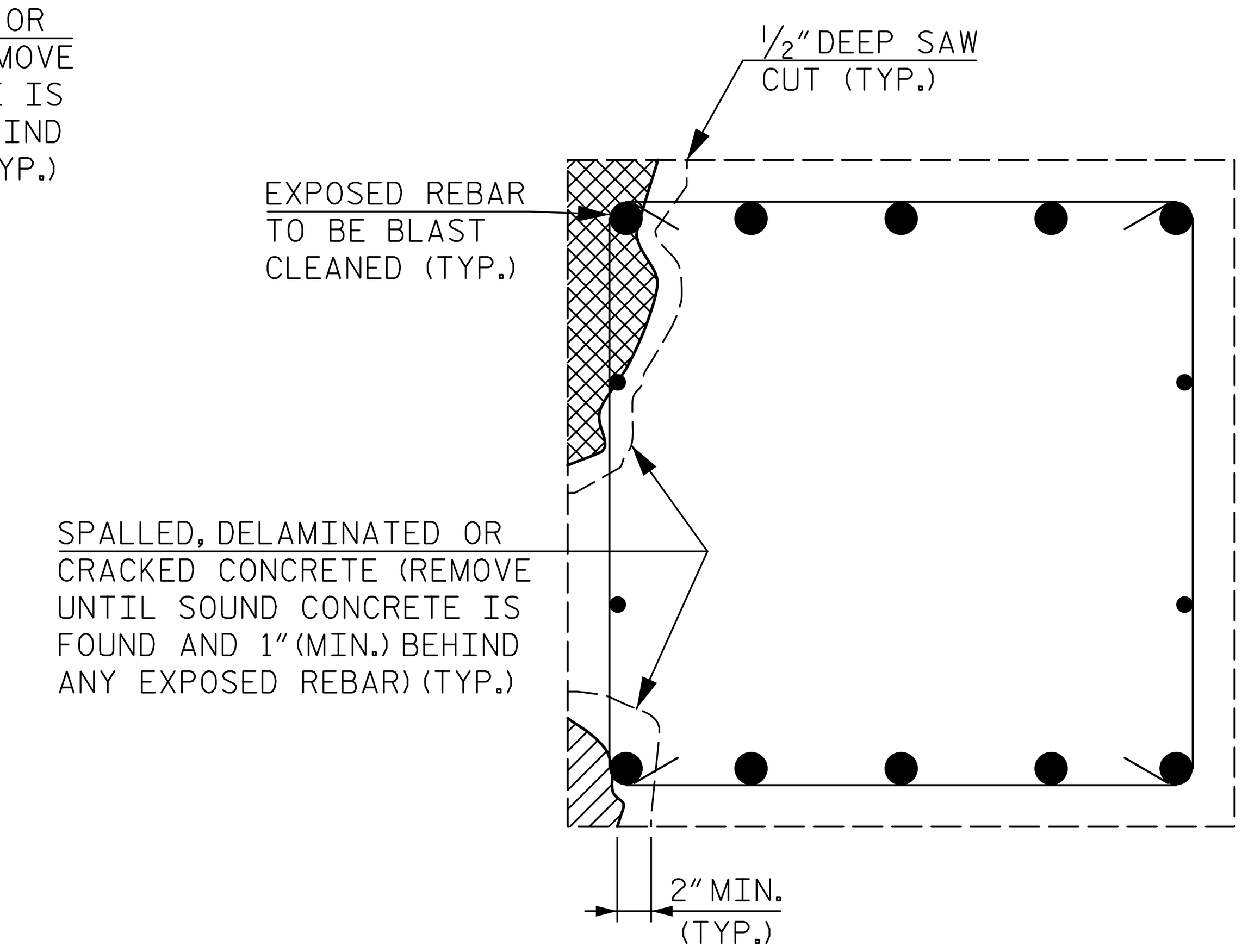
SHEET NO. S3-13

TOTAL SHEETS 14

10/23/2023
1:45:24 PM
\\rdlw00\proj\ects\67753 - NCDOT 2016 P&D\U-5813 (Design)\Structures\Bridge Rehab\DGN\Bridge 177\403_25_U5813_SMU_EB02_013_750177.dgn

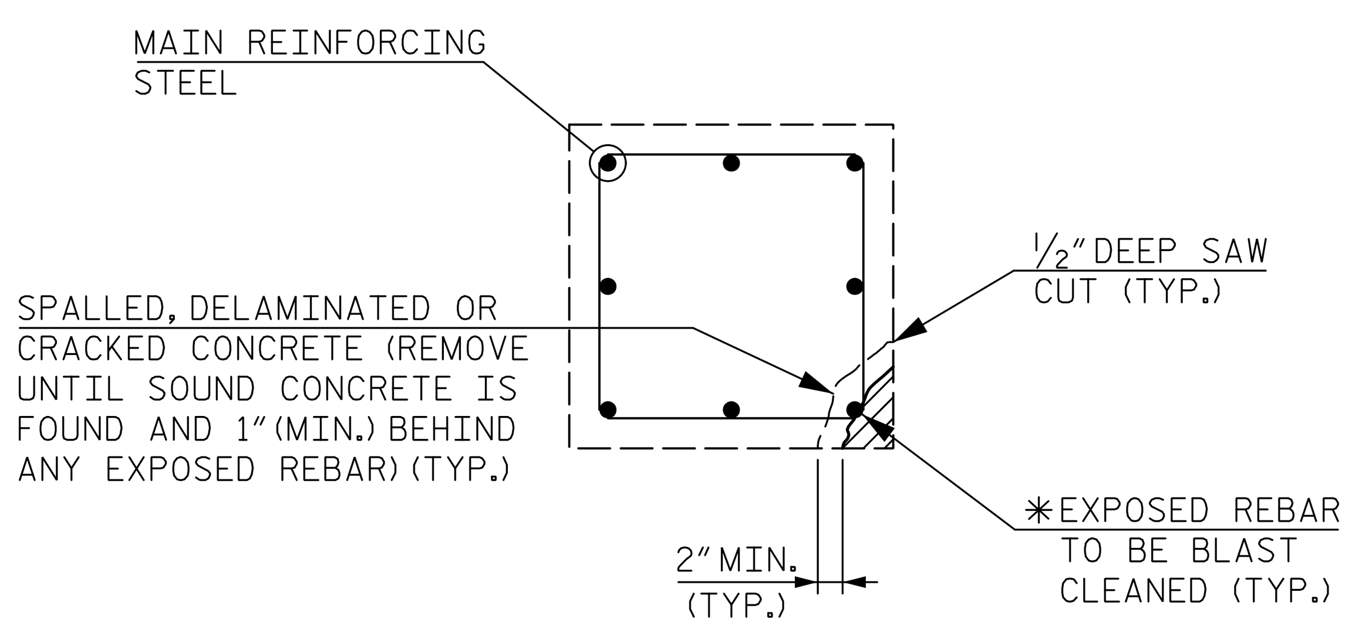


BENT CAP REPAIRS



SECTION A-A

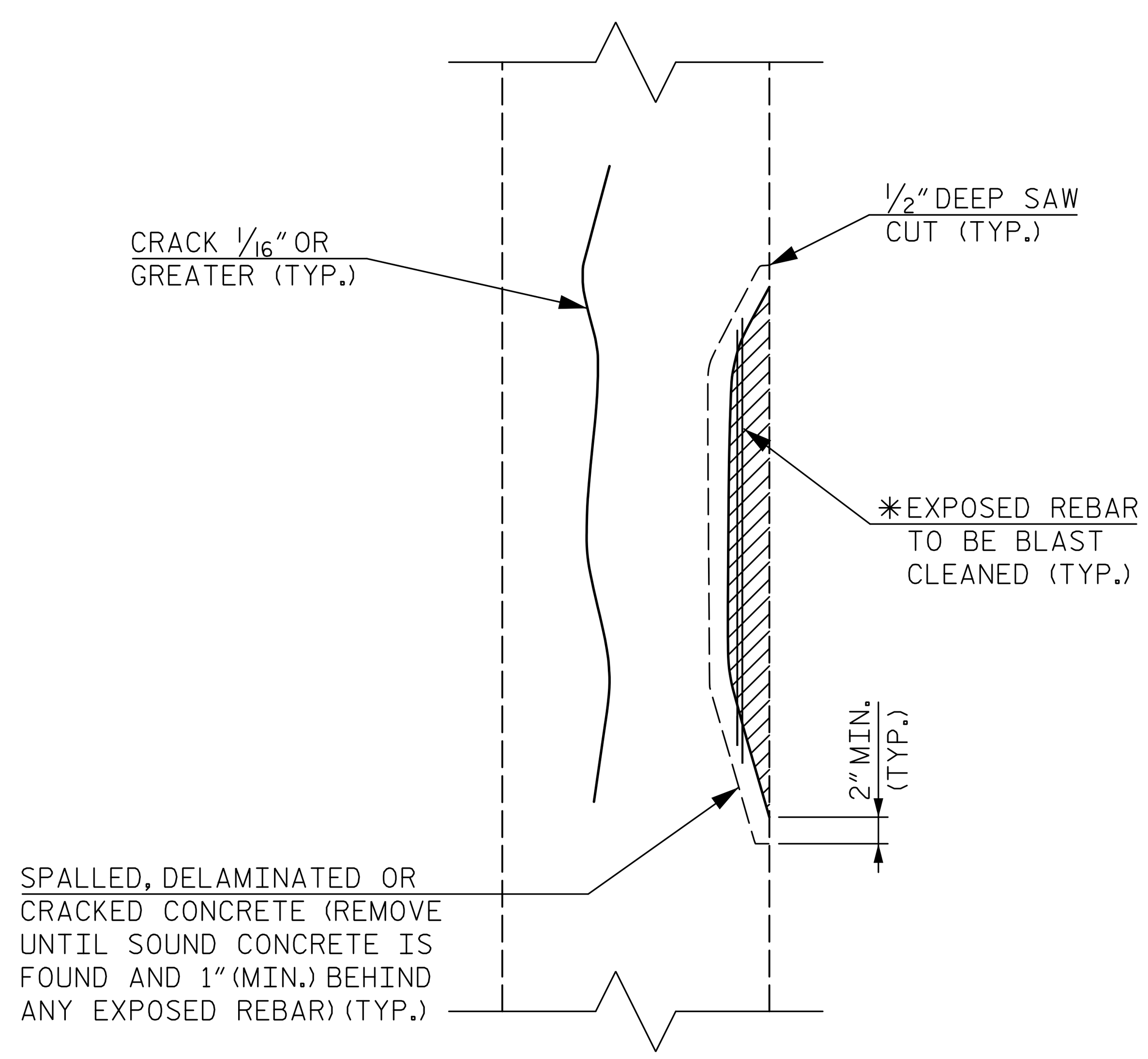
CAP REPAIR



PLAN OF COLUMN

REPAIR KEY

- CONCRETE REPAIR AREA (FORM AND POUR)
- SHOTCRETE REPAIR AREA
- EPOXY RESIN INJECTION (ERI)



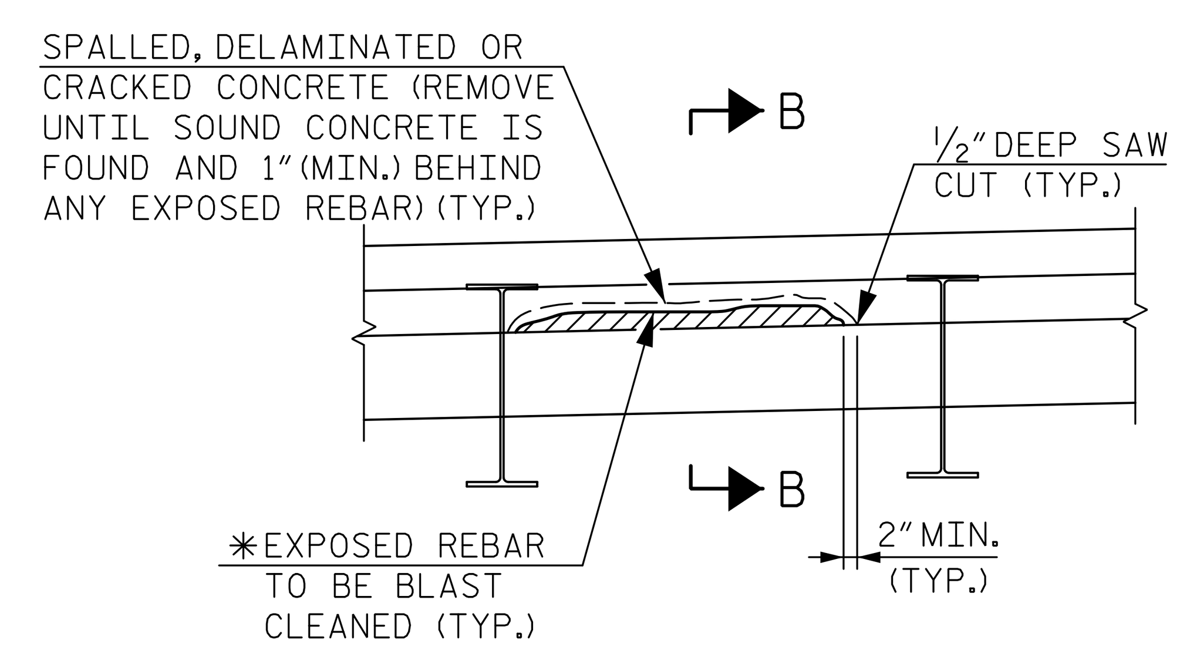
✱REPAIR LENGTH SHALL NOT EXCEED 10 FEET.

ELEVATION OF COLUMN

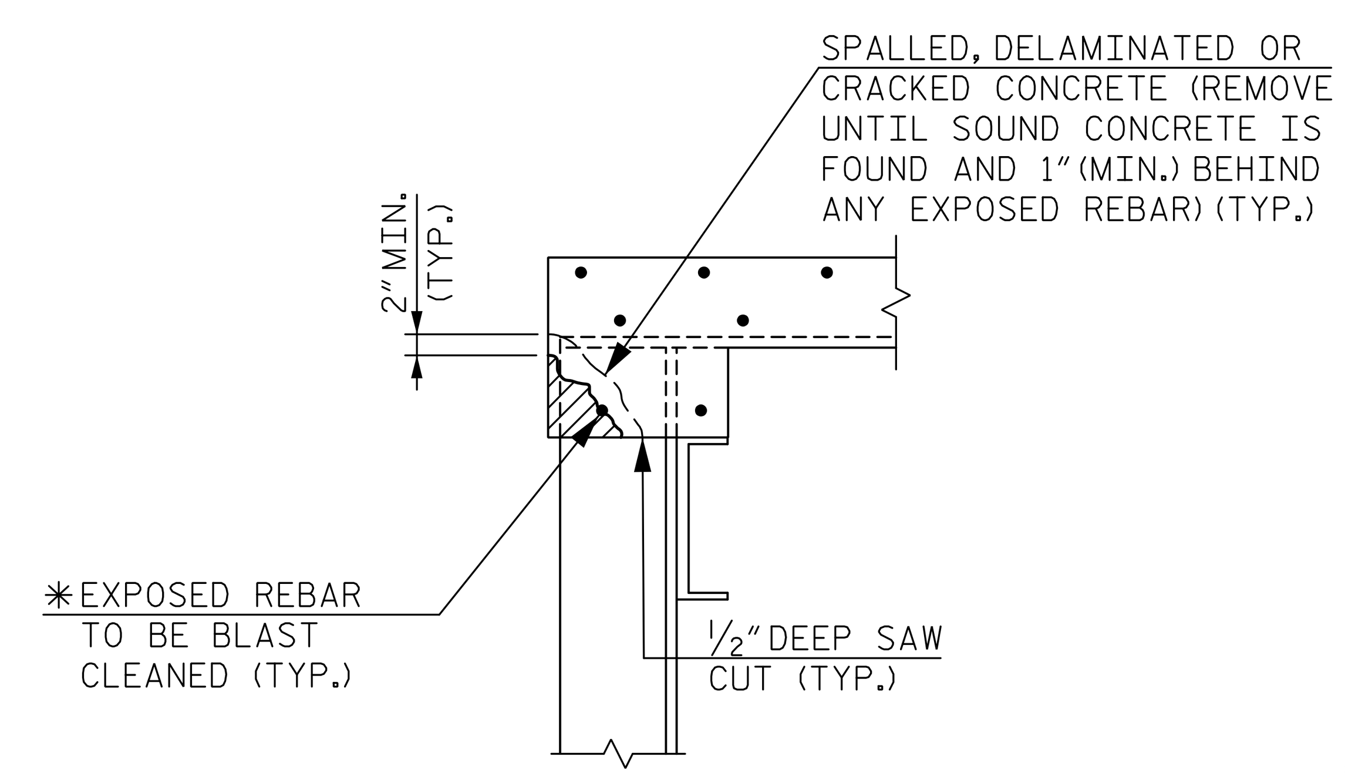
COLUMN REPAIR

SPLICE LENGTH TABLE

BAR SIZE	MIN. SPLICE LENGTH
#4	1'-10"
#5	2'-4"
#6	2'-9"
#7	3'-2"
#8	3'-8"
#9	4'-1"
#10	4'-7"
#11	5'-1"



UNDERSIDE JOINT HEADER REPAIR



SECTION B-B

NOTES:

TYPICAL BENT CAP REPAIRS ARE SHOWN. REPAIR DETAILS SIMILAR FOR END BENT CAPS.

THE METHOD USED TO DELINEATE THE AREAS OF UNSOUND CONCRETE TO BE REPAIRED SHALL NOT PERMANENTLY MARK THE CONCRETE, LEAVE ANY RESIDUE AFTER REMOVAL OR REQUIRE HARSH CHEMICALS TO REMOVE.

THE CONTRACTOR SHALL REMOVE THE DETERIORATED CONCRETE IN ACCORDANCE WITH THE GUIDELINES SET IN THESE NOTES, IN THE SPECIAL PROVISIONS AND THE STANDARD SPECIFICATIONS.

REMOVE UNSOUND CONCRETE TO THE EXTENT NECESSARY. MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT.

NO MORE THAN ONE-THIRD OF THE CAP OR COLUMN CROSS SECTIONAL AREA SHALL BE REMOVED AT ONE TIME. SHOULD IT BECOME NECESSARY TO REMOVE MORE THAN 30% OF A CAP OR COLUMN CROSS SECTIONAL AREA, NOTIFY THE ENGINEER PRIOR TO PROCEEDING.

SIMULTANEOUS REMOVAL OF UNSOUND CONCRETE MAY BE PERMITTED ON MORE THAN ONE FACE OF A CAP AND/OR COLUMN, IF THE AREAS OF REMOVAL ARE NOT ADJACENT TO OR DIRECTLY OPPOSITE ONE ANOTHER. IF REMOVAL EXTENDS MORE THAN 1½" BEHIND THE MAIN REINFORCING BARS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING.

REINFORCING STEEL WHICH IS DETERMINED BY THE ENGINEER TO BE REPLACED SHALL BE REMOVED TO A POINT WHERE IT IS SOUND. THE PATCH SHALL EXTEND A SUFFICIENT DISTANCE BEYOND THIS POINT TO DEVELOP A SPLICE LENGTH SPECIFIED IN THE TABLE ON THIS SHEET.

COAT ALL REPAIR SURFACE AREAS ON THE TOP OF CAPS, INCLUDING CHAMFERS, WITH EPOXY PROTECTIVE COATING, OVERLAPPING THE REPAIR AREA BY A MINIMUM OF 3" ON ALL POSSIBLE SIDES.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION (ERI), SEE SPECIAL PROVISIONS.

PROJECT NO. U-5813
RANDOLPH COUNTY
BRIDGE: 750177

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS
DocuSigned by: David W. Hawkins
10/24/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL CONCRETE REPAIR DETAILS

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	D. HORTON	DATE	8/23
CHECKED BY	N. HART	DATE	8/23
ENGINEER OF RECORD	D. HAWKINS	DATE	9/23

DWG. NO. 14

REVISIONS

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

SHEET NO. S3-14
TOTAL SHEETS 14

10/23/2023
1:42:47 PM

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	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 AASHTO
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 2024 "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 $1\frac{1}{2}$" 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 $\frac{7}{8}$" ∅ SHEAR STUDS FOR THE $\frac{3}{4}$" ∅ STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$" ∅ STUDS FOR 4 - $\frac{3}{4}$" ∅ STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$" ∅ STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$" ∅ STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$"∅ STUDS FOR 4 - $\frac{3}{4}$" ∅ 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 $\frac{5}{16}$" 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 $\frac{1}{16}$" 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.