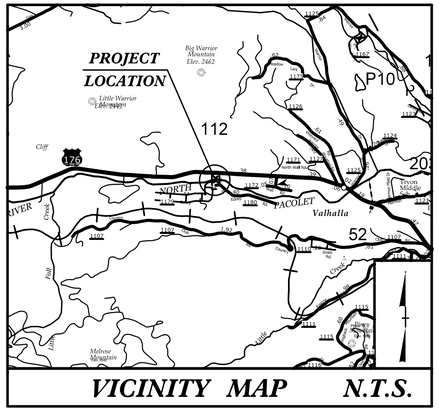
This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document –

The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page.
This file or an individual page shall not be considered a certified document.

CONTRACT: DN01119 PROJECT TIP: DF18314.2075090



VICINITY MAP N.T.S.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

POLK COUNTY

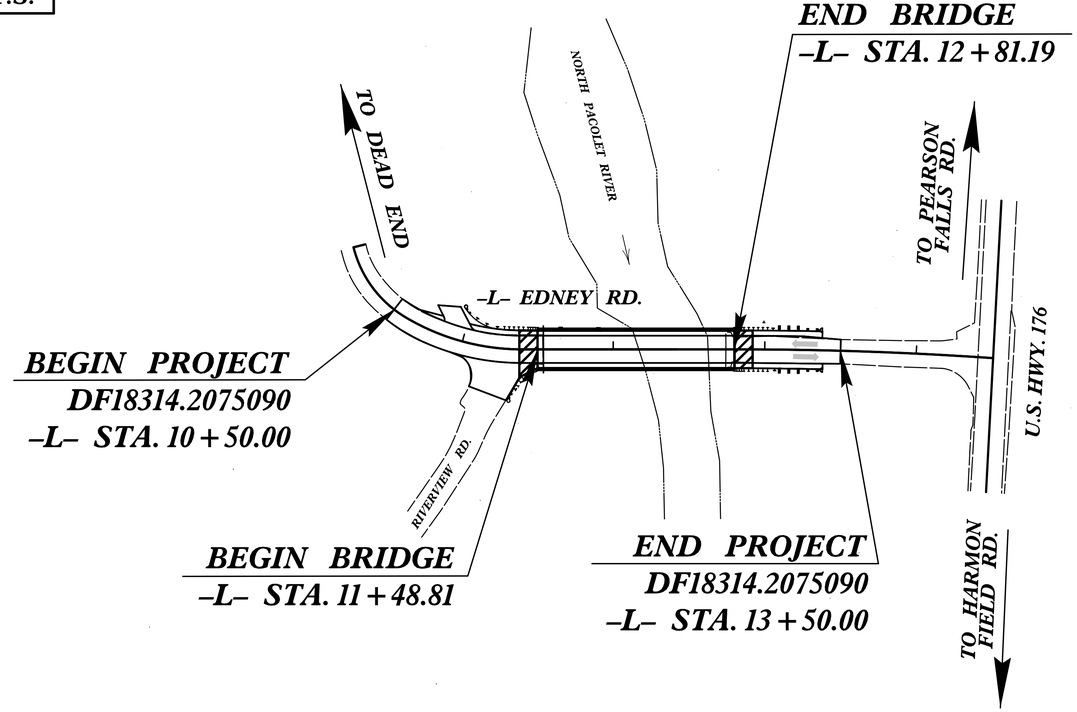
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	DF18314.2075090	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
DF18314.2075090	N/A	PE

LOCATION: BRIDGE 740112 OVER PACOLET RIVER ON EDNEY ROAD

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE

NAD 83/2011



STRUCTURE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2025 = <400
ADT 2045 = <400

V = 35 MPH

FUNC CLASS = LOCAL
SUBREGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT DF18314.2075090 = 0.032 MILES
LENGTH STRUCTURE PROJECT DF18314.2075090 = 0.025 MILES
TOTAL LENGTH PROJECT DF18314.2075090 = 0.057 MILES

PREPARED IN THE OFFICE OF:

RS&H
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH, 2025

LETTING DATE:
OCTOBER, 2025

TONY R. LAWS JR., PE
PROJECT ENGINEER

MATTHEW R. ACOSTA, PE
PROJECT DESIGN ENGINEER

ZACHARY T. SHULER, PE
NCDOT CONTACT

STRUCTURAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 040317 ENGINEER TONY R. LAWS

Signed by: Tony R. Laws Jr. P.E.
SIGNATURE:

10/7/2025

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

11+50 12+00 12+50 13+00

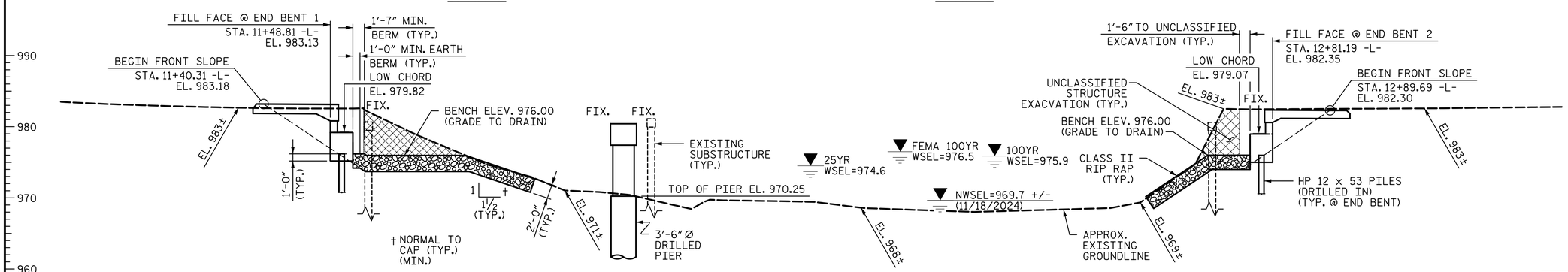
(-)14.0321% (-)0.5900%

GRADE DATA
PVI STA. 11+05.00 -L-
PVI EL. = 983.39
LVC = 70.00'

(-)0.5900% (+)3.4033%

GRADE DATA
PVI STA. 13+20.00 -L-
PVI EL. = 982.12
LVC = 60.00'

SPAN A SPAN B



END BENT 1 BENT 1 END BENT 2

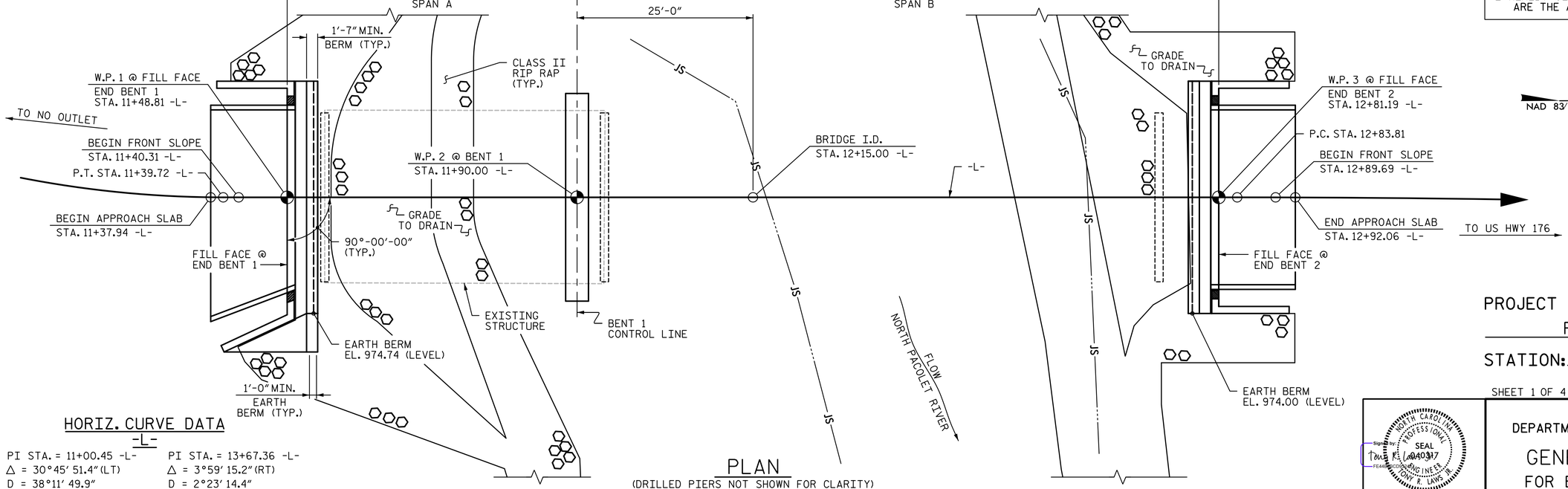
SECTION ALONG -L-

(SECTIONS AT END BENTS AND BENT AT RIGHT ANGLES TO END BENTS AND BENT)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.

TOTAL BRIDGE LENGTH = 132'-4½" (FILL FACE END BENT 1 TO FILL FACE END BENT 2)

41'-2¼" SPAN A | 25'-0" | 91'-2¼" SPAN B



PLAN

(DRILLED PIERS NOT SHOWN FOR CLARITY)

HORIZ. CURVE DATA -L-

PI STA. = 11+00.45 -L-	PI STA. = 13+67.36 -L-
Δ = 30°45' 51.4" (LT)	Δ = 3°59' 15.2" (RT)
D = 38°11' 49.9"	D = 2°23' 14.4"
L = 80.54'	L = 167.03'
T = 41.27'	T = 83.55'
R = 150.00'	R = 2,400.00'

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 1 OF 4 REPLACES BRIDGE NO. 740112

NORTH CAROLINA PROFESSIONAL SEAL 040317 ENGINEER TONY R. LAWS JR.
Signed by: Tony R. Laws Jr.
10/7/2025

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 1179 (EDNEY RD.) OVER NORTH PACOLET RIVER BETWEEN SR 1180 AND US HWY 176

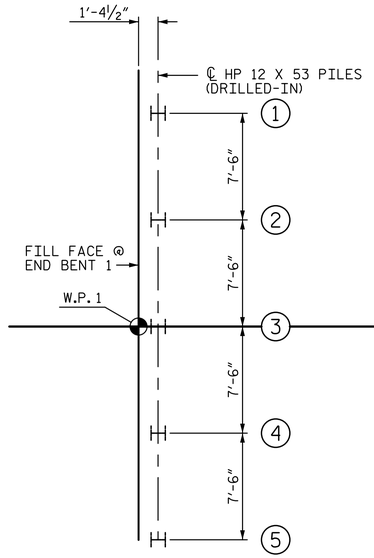
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : T. R. LAWS DATE : 02/2025
CHECKED BY : M. KHIN DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

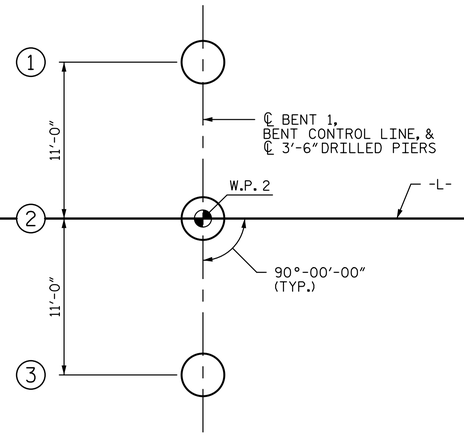
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_001_DF18314.2075090_SMU_GD1_S-1_740112.dgn
AcostaM

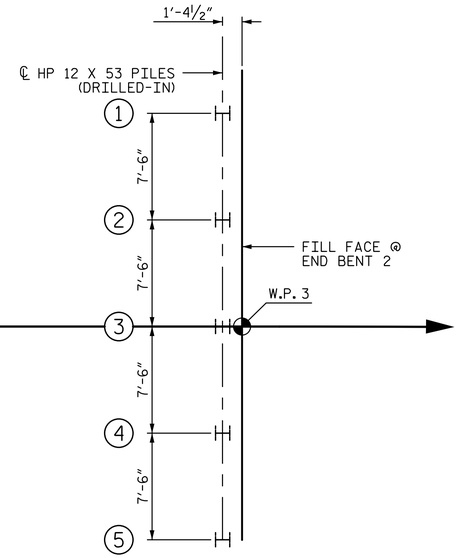
NAD 83/NA 2011



END BENT 1



BENT 1



END BENT 2

FOUNDATION LAYOUT

(DIMENSIONS SHOWN ARE TO THE ℄ OF THE PILES OR DRILLED PIERS)

FOUNDATION NOTES:

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

POLYMER SLURRY CONSTRUCTION IS REQUIRED FOR THE CONSTRUCTION OF BENT NO. 1.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 1 AND END BENT NO. 2 WITH CONCRETE.

BEFORE FILLING HOLES FOR PILE EXCAVATION AT END BENT NO. 1 AND END BENT NO. 2, DRIVE PILES TO THE REQUIRED DRIVING RESISTANCE.

PILE EXCAVATIONS ARE RECOMMENDED AT END BENT NO. 1 AND END BENT NO. 2 TO MINIMUM DEPTHS OF 10 FT TO REDUCE EARTH-BORNE VIBRATIONS ON ADJACENT STRUCTURES. REFER TO SPECIAL PROVISIONS FOR INSPECTION AND MONITORING REQUIREMENTS.

ONE BORING WAS PERFORMED AT THE INTERIOR BENT AND WEATHERED ROCK WAS ENCOUNTERED AT ELEV. 926.2 FT. THIS ELEVATION IS ASSUMED FOR ALL THREE PIERS. IN ORDER TO SATISFY THE 8 FT ROCK SOCKET REQUIREMENT, THE TIP ELEVATIONS MAY NEED TO BE EXTENDED AT SOME OR ALL PIER LOCATIONS.

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 2 OF 4

DRAWN BY :	J. SCACCA	DATE :	02/2025
CHECKED BY :	T. R. LAWS	DATE :	02/2025
DESIGN ENGINEER OF RECORD:	T. R. LAWS	DATE :	10/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 040317 ENGINEER TODD R. LAWS

10/7/2025

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 ° F-0493 ° C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

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

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_003_DF18314.2075090_SMU_GD2_S-2_740112.dgn
AcostaM

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Number of Piles per Line	Factored Resistance per Pile KIPS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-In Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent 1, Piles 1-5	5	238	977	45			397					967		10
End Bent 2, Piles 1-5	5	238	976	45			397					966		10
TOTAL QUANTITY:														100

$$* RDR = \frac{Factored\ Resistance + Factored\ Drag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Drag\ Load\ Resistance + Nominal\ Resistance\ from\ Scourable\ Material$$

** Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent 1, Piles 1-5	238			0.6		
End Bent 2, Piles 1-5	238			0.6		

* Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
Enb Bent 1, Piles 1-5				5
Enb Bent 2, Piles 1-5				5
TOTAL QUANTITY:				10

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Number of Piers per Line	Factored Resistance per Pier KIPS	Required Drilled Pier Tip Elevation FT	Required Tip Resistance per Pier KSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Weathered Rock or Rock per Pier LIN FT	Drilled Pier Length* per Pier LIN FT	Drilled Pier Length Not In Soil* per Pier LIN FT	Drilled Pier Length In Soil* per Pier LIN FT	Permanent Steel Casing Required? YES	Permanent Steel Casing Tip Elevation (Elevation Not To Extend Casing Below) FT	Permanent Steel Casing Length** per Pier LIN FT
Bent 1, Piers 1-3	3	685	918	20	956	8	53			Yes	958	13
TOTAL QUANTITY:							159					39

* Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "____ Dia. Drilled Piers" or "____ Dia. Drilled Piers Not in Soil" and "____ Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the NCDOT Standard Specifications. For bents with a not in soil pay item, drilled piers through air or water will be paid at the contract unit price for "__Dia. Drilled Piers in Soil."

** Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation and is measured and paid for as "Permanent Steel Casing for ____ Dia. Drilled Pier" in accordance with Article 411-7 of the NCDOT Standard Specifications.

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) EACH	Crosshole Sonic Logging (CSL) EACH	Sonic Caliper Testing (SCT) EACH	Shaft Inspection Device (SID) EACH	Pile Integrity Test (PIT) EACH
Bent 1, Piers 1-3		1	3	1	
TOTAL QUANTITY:		1	3	1	

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 3 OF 4

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (J.Jenkins, #050329) on 08-06-2025.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer may adjust the quantity for DPT Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, TIPs, SCTs, CSL Testing, SID Inspections and PITs when necessary.

NORTH CAROLINA PROFESSIONAL SEAL 050317 ENGINEER JOHN R. LAWS IV

10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

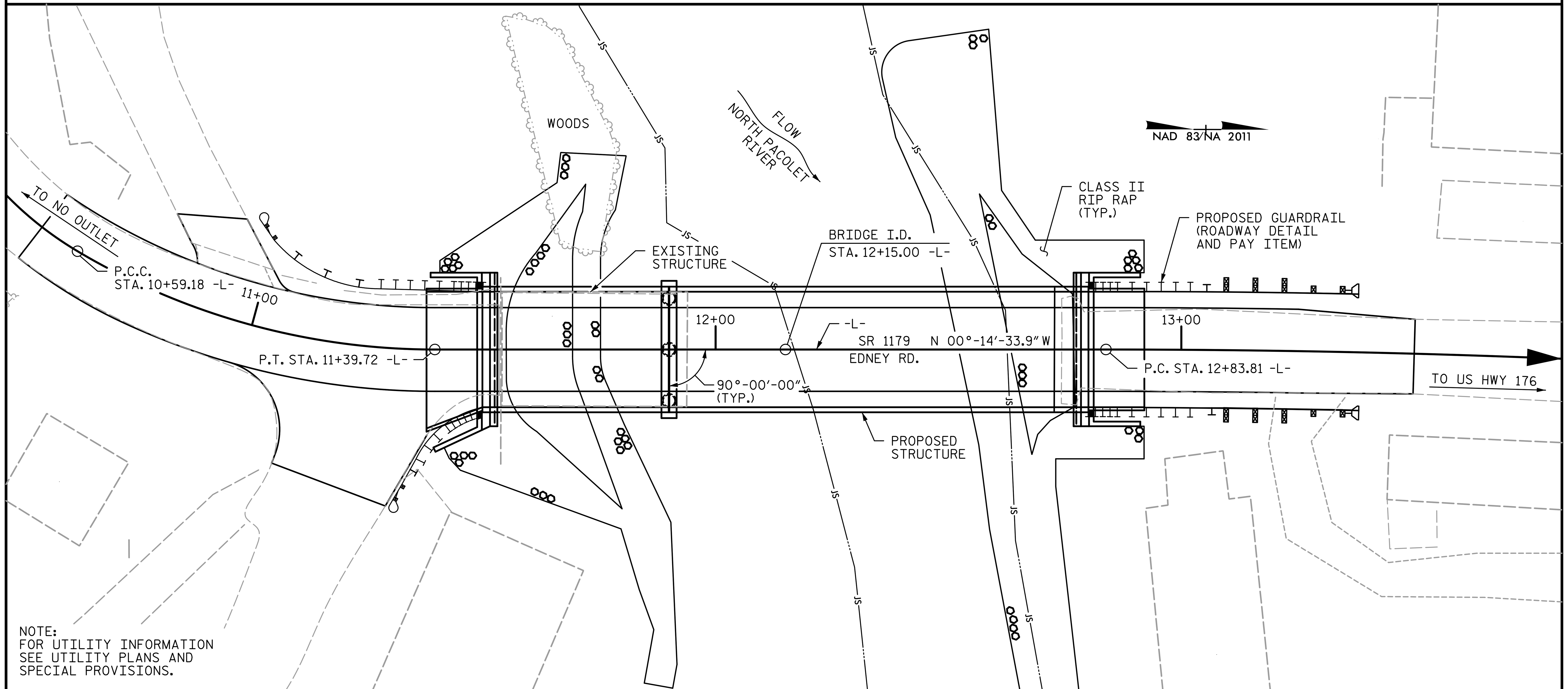
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			24

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : M. ACOSTA DATE : 08/2025
CHECKED BY : T. R. LAWS DATE : 08/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 08/2025

8/13/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_005_DF18314.2075090_SMU_GD3_S-3_740112.dgn
AcostaM

BENCHMARK BM-1: RR SPIKE IN BASE OF 48" OAK. STA. 13+31.44 -L-, 76.00' RT. EL. 981.97 (N 552683, E 1023469)



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE EXISTING STRUCTURE CONSISTING OF (3) 45'-0" SPAN WITH A CLEAR ROADWAY OF 30'-10" AND SUPPORTED BY REINFORCED CONCRETE ABUTMENTS SHALL BE REMOVED.

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

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

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED A DISTANCE OF 20'-0" +/- TO THE LEFT AND TO THE RIGHT OF THE CENTERLINE OF THE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

FOR SCT TESTING, SEE GEOTECHNICAL SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 2610 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YRS
DESIGN HIGH WATER ELEVATION	= 974.60'
DRAINAGE AREA	= 17.2 SQ. MI.
BASE DISCHARGE (Q100)	= 3860 CFS
BASE HIGH WATER ELEVATION	= 975.90'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 12,000 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS
* OVERTOPPING FLOOD ELEVATION	= 982.20'
* OVERTOPPING @ STA. 12+98.61 -L-	

WSEL TAKEN AT RIVER STATION 589+87

TOTAL BILL OF MATERIALS

	REMOVAL OF EXISTING STRUCTURE @ STA. 12+15.00 -L-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	3'-6" DIA. DRILLED PIERS	PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIER	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 12+15.00 -L-	CLASS A CONCRETE	BRIDGE APPROACH SLABS AT STA. 12+15.00 -L-	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	LBS.	EACH
SUPERSTRUCTURE													
END BENT NO. 1			50						22.8		3,345		5
BENT NO. 1				159	39	1	1		16.9		13,736	3,705	
END BENT NO. 2			50						22.3		3,143		5
TOTAL	LUMP SUM	LUMP SUM	100	159	39	1	1	LUMP SUM	62.0	LUMP SUM	20,224	3,705	10

	HP 12X53 STEEL PILES		STEEL PILE POINTS	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM		SCT TESTING
	NO.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.	EACH
SUPERSTRUCTURE				260				18	1,170	
END BENT NO. 1	5	225	5		213	225				
BENT NO. 1										3
END BENT NO. 2	5	225	5		417	440				
TOTAL	10	450	10	260	630	665	LUMP SUM	18	1,170	3

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 4 OF 4

SEAL 049317 — TONY R. LAWS JR. — NORTH CAROLINA PROFESSIONAL ENGINEER

10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1179 (EDNEY RD.) OVER NORTH PACOLET RIVER BETWEEN SR 1180 AND US HWY 176

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : M. R. ACOSTA DATE : 02/2025
CHECKED BY : T. R. LAWS DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_007_DF18314.2075090_SMU_GD4_S-4_740112.dgn
AcostaM

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III 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		HL-93 (INVENTORY)	N/A	(1)	2.52	---	1.75	0.28	3.19	A	EL	19.25	0.54	2.52	A	ER	7.25	0.80	0.28	4.33	A	EL	19.25	
		HL-93 (OPERATING)	N/A		3.31	---	1.35	0.28	4.14	A	EL	19.25	0.54	3.31	A	ER	7.25	NA	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	(2)	2.91	104.76	1.75	0.28	3.94	A	EL	15.25	0.54	2.91	A	ER	7.25	0.80	0.28	5.45	A	EL	15.25	
		HS-20 (OPERATING)	36.000		3.82	137.52	1.35	0.28	5.10	A	EL	15.25	0.54	3.82	A	ER	7.25	NA	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		7.64	103.14	1.40	0.28	9.24	A	EL	19.25	0.54	7.64	A	ER	7.25	0.80	0.28	10.01	A	EL	19.25	
		SNGARBS2	20.000		5.77	115.40	1.40	0.28	7.44	A	EL	15.25	0.54	5.77	A	ER	7.25	0.80	0.28	8.23	A	EL	15.25	
		SNAGRIS2	22.000		5.51	121.22	1.40	0.28	7.28	A	EL	15.25	0.54	5.51	A	ER	7.25	0.80	0.28	8.05	A	EL	15.25	
		SNCOTTS3	27.250		3.77	102.73	1.40	0.28	4.62	A	EL	19.25	0.54	3.77	A	ER	7.25	0.80	0.28	5.01	A	EL	19.25	
		SNAGGRS4	34.925		3.38	118.05	1.40	0.28	4.17	A	EL	19.25	0.54	3.38	A	ER	7.25	0.80	0.28	4.52	A	EL	19.25	
		SNS5A	35.550		3.59	127.62	1.40	0.28	4.05	A	EL	19.25	0.54	3.59	A	ER	7.25	0.80	0.28	4.39	A	EL	19.25	
		SNS6A	39.950		3.36	134.23	1.40	0.28	3.86	A	EL	19.25	0.54	3.36	A	ER	7.25	0.80	0.28	4.18	A	EL	19.25	
		SNS7B	42.000		3.46	145.32	1.40	0.28	3.68	A	EL	19.25	0.54	3.46	A	ER	7.25	0.80	0.28	3.99	A	EL	19.25	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		3.97	131.01	1.40	0.28	4.75	A	EL	19.25	0.54	3.97	A	ER	7.25	0.80	0.28	5.15	A	EL	19.25	
		TNT4A	33.075		3.72	123.04	1.40	0.28	4.79	A	EL	15.25	0.54	3.72	A	ER	7.25	0.80	0.28	5.22	A	EL	19.25	
		TNT6A	41.600		3.64	151.42	1.40	0.28	4.09	A	EL	19.25	0.54	3.64	A	ER	7.25	0.80	0.28	4.43	A	EL	19.25	
		TNT7A	42.000		3.38	141.96	1.40	0.28	4.19	A	EL	15.25	0.54	3.38	A	ER	7.25	0.80	0.28	4.55	A	EL	19.25	
		TNT7B	42.000		3.28	137.76	1.40	0.28	4.23	A	EL	15.25	0.54	3.28	A	ER	7.25	0.80	0.28	4.63	A	EL	19.25	
		TNAGRIT4	43.000		3.15	135.45	1.40	0.28	4.07	A	EL	15.25	0.54	3.15	A	ER	7.25	0.80	0.28	4.50	A	EL	15.25	
		TNAGRT5A	45.000		3.36	151.20	1.40	0.28	3.86	A	EL	19.25	0.54	3.36	A	ER	7.25	0.80	0.28	4.18	A	EL	19.25	
		TNAGRT5B	45.000	(3)	2.96	133.20	1.40	0.28	3.75	A	EL	19.25	0.54	2.96	A	ER	7.25	0.80	0.28	4.06	A	EL	19.25	
EMERGENCY VEHICLE (EV)		EV2	28.750		4.37	125.64	1.30	0.28	5.73	A	EL	15.25	0.54	4.37	A	ER	7.25	0.80	0.28	5.89	A	EL	15.25	
		EV3	43.000	(4)	2.93	125.99	1.30	0.28	3.82	A	EL	19.25	0.54	2.93	A	ER	7.25	0.80	0.28	3.84	A	EL	19.25	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

COMMENTS:

1.

2.

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 **

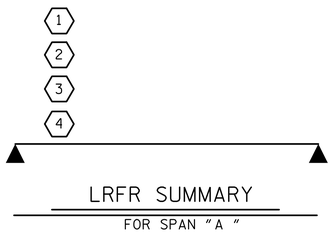
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

EL - EXTERIOR LEFT GIRDER

ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN "A"

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 1 OF 2

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 ° F-0493 ° C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR 40' BOX BEAM UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : J. SCACCA DATE : 02/2025

CHECKED BY : M. KHIN DATE : 02/2025

DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_009_DF18314.2075090_SMU_LRFR_S-5_740112.dgn
AcostaM

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III 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		HL-93 (INVENTORY)	N/A	(1)	1.109	--	1.75	0.272	1.47	B	EL	44.250	0.493	1.26	B	EL	4.425	0.80	0.272	1.11	B	EL	44.250	
		HL-93 (OPERATING)	N/A		1.633	--	1.35	0.272	1.90	B	EL	44.250	0.493	1.63	B	EL	4.425	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	(2)	1.507	54.255	1.75	0.272	1.99	B	EL	44.250	0.493	1.65	B	EL	4.425	0.80	0.272	1.51	B	EL	44.250	
		HS-20 (OPERATING)	36.000		2.140	77.039	1.35	0.272	2.59	B	EL	44.250	0.493	2.14	B	EL	4.425	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.519	47.501	1.40	0.272	5.82	B	EL	44.250	0.493	5.05	B	EL	4.425	0.80	0.272	3.52	B	EL	44.250	
		SNGARBS2	20.000		2.572	51.43	1.40	0.272	4.25	B	EL	44.250	0.493	3.55	B	EL	4.425	0.80	0.272	2.57	B	EL	44.250	
		SNAGRIS2	22.000		2.415	53.122	1.40	0.272	4.00	B	EL	44.250	0.493	3.27	B	EL	4.425	0.80	0.272	2.41	B	EL	44.250	
		SNCOTTS3	27.250		1.749	47.674	1.40	0.272	2.89	B	EL	44.250	0.493	2.52	B	EL	4.425	0.80	0.272	1.75	B	EL	44.250	
		SNAGGRS4	34.925		1.443	50.381	1.40	0.272	2.39	B	EL	44.250	0.493	2.06	B	EL	4.425	0.80	0.272	1.44	B	EL	44.250	
		SNS5A	35.550		1.412	50.195	1.40	0.272	2.34	B	EL	44.250	0.493	2.07	B	EL	4.425	0.80	0.272	1.41	B	EL	44.250	
		SNS6A	39.950		1.287	51.435	1.40	0.272	2.13	B	EL	44.250	0.493	1.88	B	EL	4.425	0.80	0.272	1.29	B	EL	44.250	
		SNS7B	42.000		1.226	51.483	1.40	0.272	2.03	B	EL	44.250	0.493	1.83	B	EL	4.425	0.80	0.272	1.23	B	EL	44.250	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.568	51.733	1.40	0.272	2.59	B	EL	44.250	0.493	2.24	B	EL	4.425	0.80	0.272	1.57	B	EL	44.250	
		TNT4A	33.075		1.572	52.007	1.40	0.272	2.60	B	EL	44.250	0.493	2.20	B	EL	4.425	0.80	0.272	1.57	B	EL	44.250	
		TNT6A	41.600		1.278	53.170	1.40	0.272	2.11	B	EL	44.250	0.493	1.92	B	EL	4.425	0.80	0.272	1.28	B	EL	44.250	
		TNT7A	42.000		1.281	53.782	1.40	0.272	2.12	B	EL	44.250	0.493	1.89	B	EL	4.425	0.80	0.272	1.28	B	EL	44.250	
		TNT7B	42.000		1.315	55.229	1.40	0.272	2.18	B	EL	44.250	0.493	1.79	B	EL	4.425	0.80	0.272	1.31	B	EL	44.250	
		TNAGRIT4	43.000		1.258	54.101	1.40	0.272	2.08	B	EL	44.250	0.493	1.74	B	EL	4.425	0.80	0.272	1.26	B	EL	44.250	
		TNAGRT5A	45.000		1.190	53.537	1.40	0.272	1.97	B	EL	44.250	0.493	1.71	B	EL	4.425	0.80	0.272	1.19	B	EL	44.250	
		TNAGRT5B	45.000	(3)	1.178	53.027	1.40	0.272	1.95	B	EL	44.250	0.493	1.66	B	EL	4.425	0.80	0.272	1.18	B	EL	44.250	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.296	66.005	1.30	0.272	3.25	B	EL	44.250	0.493	2.49	B	EL	4.425	0.80	0.272	2.30	B	EL	44.250	
		EV3	43.000	(4)	1.510	64.924	1.30	0.272	2.14	B	EL	44.250	0.493	1.67	B	EL	4.425	0.80	0.272	1.51	B	EL	44.250	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

COMMENTS:

1.

2.

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 **

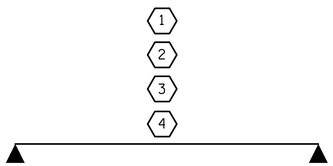
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

EL - EXTERIOR LEFT GIRDER

ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN "B"

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 2 OF 2

DRAWN BY : J. SCACCA DATE : 02/2025

CHECKED BY : M. KHIN DATE : 02/2025

DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_011_DF18314.2075090_SMU_LRFR_S-6_740112.dgn
AcostaM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 040317 ENGINEER TIMOTHY R. LAWS

10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 ° F-0493 ° C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

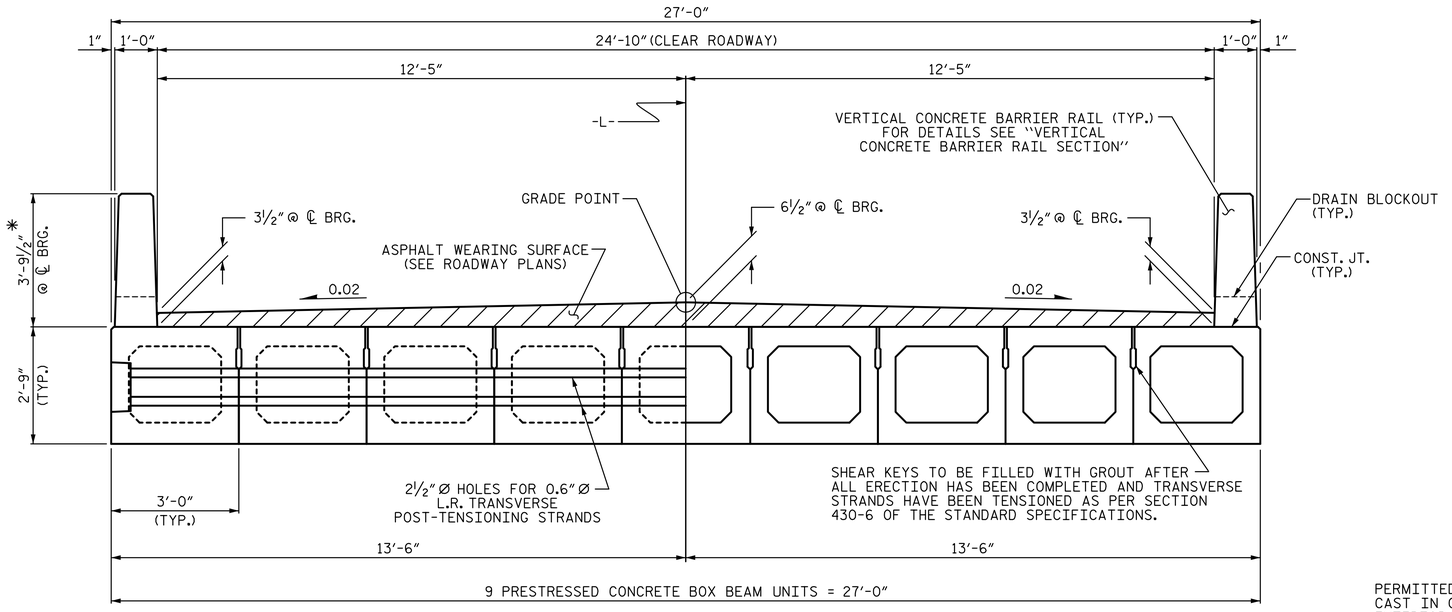
STANDARD

LRFR SUMMARY FOR 90' BOX BEAM UNIT 90° SKEW

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			24

STD. NO. 33LRFR1_90S_90L

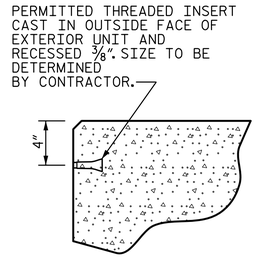


HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

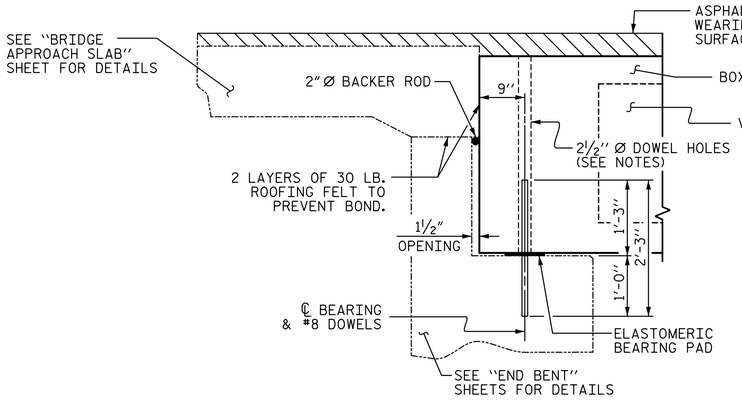
TYPICAL SECTION

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



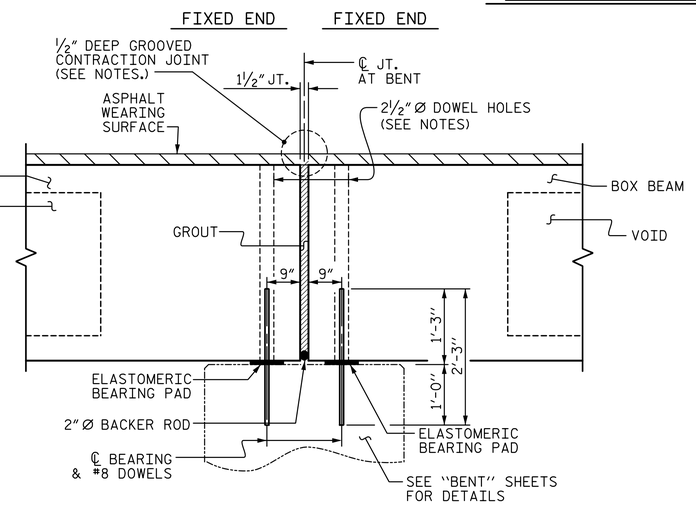
THREADED INSERT DETAIL

FIXED END



SECTION AT END BENT

FIXED END FIXED END



SECTION AT BENT

NOTES

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

ALL REINFORCING STEEL CAST WITH THE BOX BEAM SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BOX BEAMS.

FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2½″ Ø DOWEL HOLES AT FIXED ENDS OF BOX BEAM SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BOX BEAM UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4400 PSI IN SPAN A AND 6000 PSI IN SPAN B.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BOX BEAM UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO BOX BEAM UNIT ENDS.

VERTICAL GROOVED CONTRACTION JOINTS, ½″ IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A VERTICAL CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE LOCATION OF THE VOID DRAINS MAY BE SHIFTED SLIGHTLY WHERE NECESSARY TO CLEAR PRESTRESSING STRANDS OR TRANSVERSE REINFORCING STEEL.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.

THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4′-0″ CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.

THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.

THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.

THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 4″ X 5″. THE HEIGHT OF THE BLOCKOUT IN THE VERTICAL CONCRETE BARRIER RAIL SHALL EXTEND FROM THE TOP OF THE BOX BEAM UNIT TO THE TOP OF THE DRAIN OPENING.

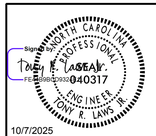
APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR BOX BEAM UNITS THAT REQUIRE DRAINS IN THE BARRIER RAIL.

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 1 OF 7



10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 ° F-0493 ° C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

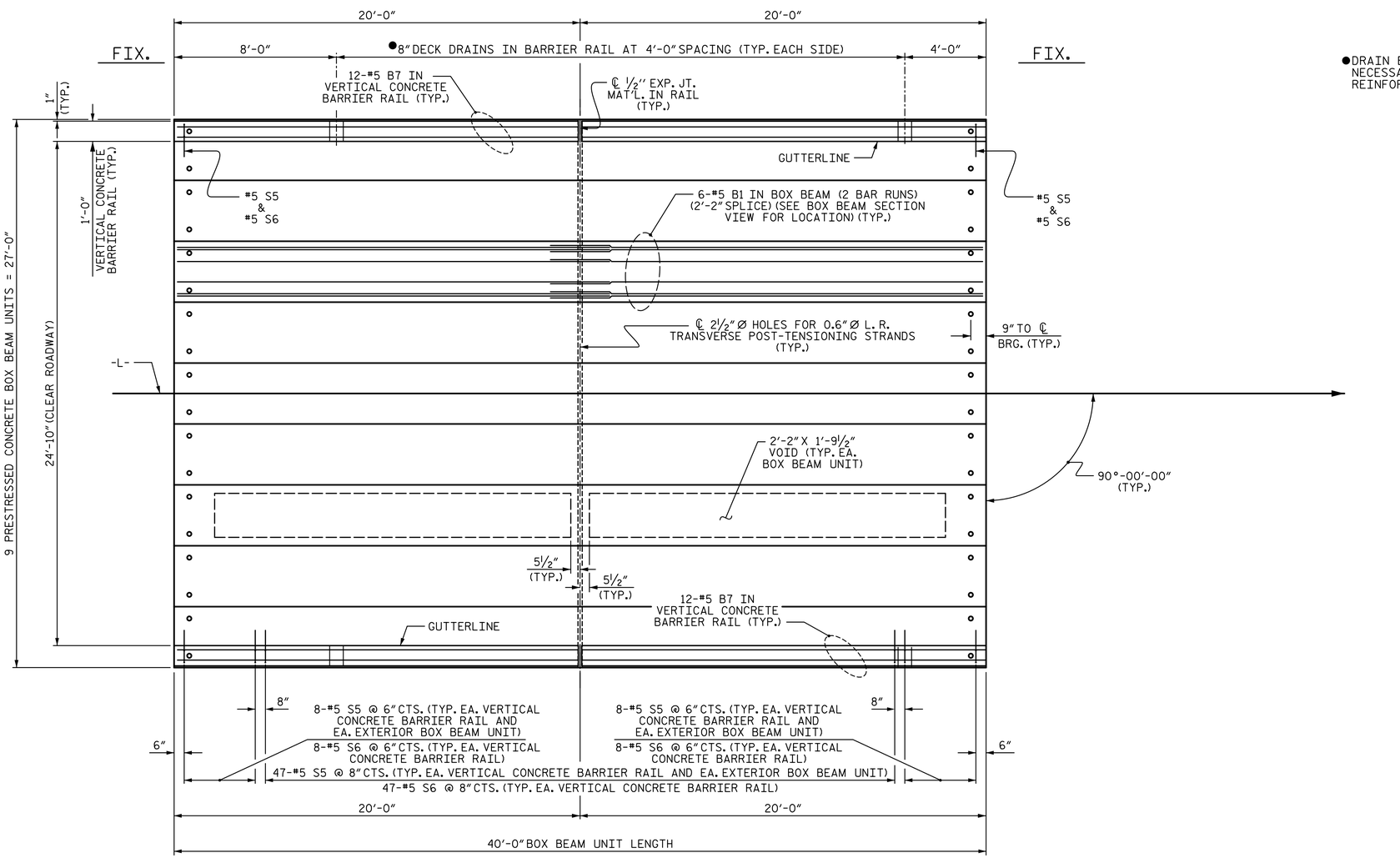
3′-0″ X 2′-9″ PRESTRESSED CONCRETE BOX BEAM UNIT 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : T. R. LAWS DATE : 02/2025
CHECKED BY : V. SELLERS DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

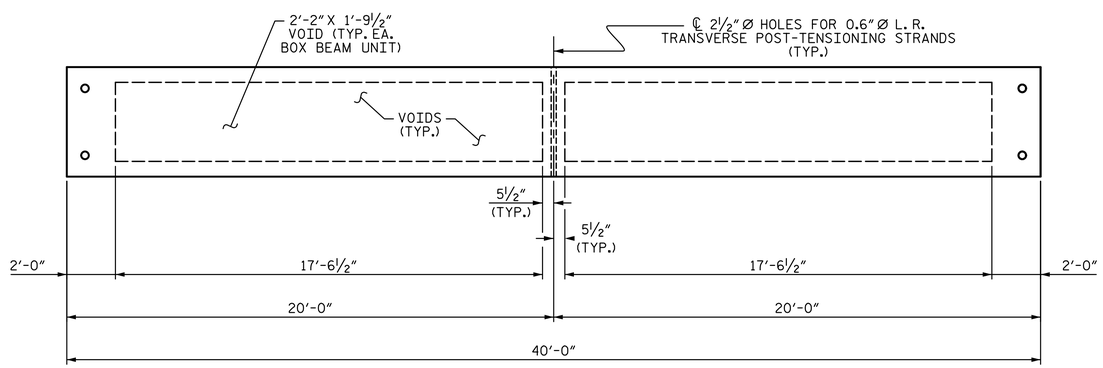
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_013_DF18314.2075090_SMU_PCBB_S-7_740112.dgn
AcostaM



●DRAIN BLOCKOUTS MAY BE SHIFTED AS NECESSARY TO AVOID BARRIER RAIL REINFORCING.

PLAN OF UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 2 OF 7

NORTH CAROLINA PROFESSIONAL SEAL 040317 ENGINEER TONY R. LAWS

10/7/2025

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 · F-0493 · C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

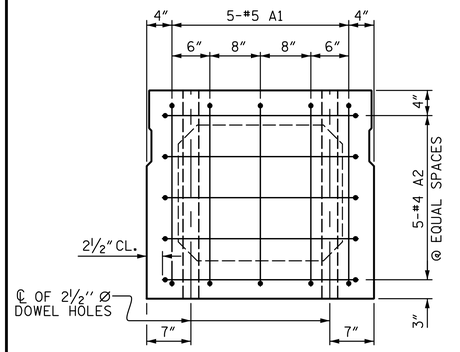
PLAN OF 40′ UNIT 24′-10″ CLEAR ROADWAY 90° SKEW SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : T. R. LAWS DATE : 02/2025
CHECKED BY : V. SELLERS DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

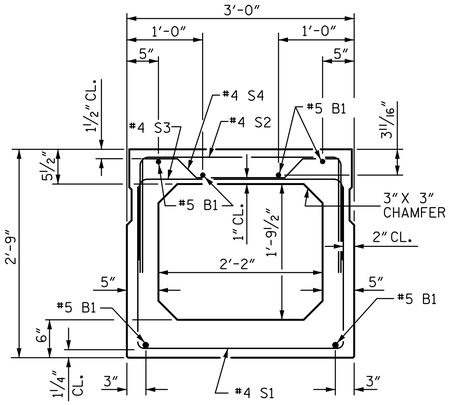
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_015_DF18314.2075090_SMU_PCBB_S-8_740112.dgn
AcostaM



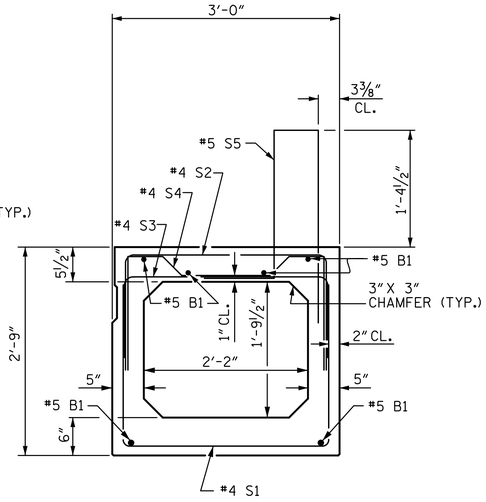
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES.
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



INTERIOR BOX BEAM SECTION

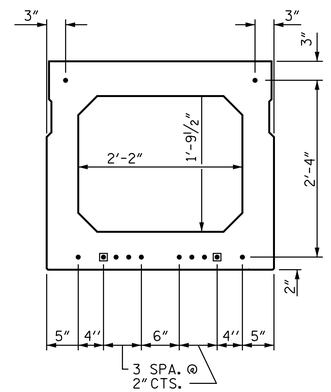
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6" Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

(12 STRANDS REQUIRED)

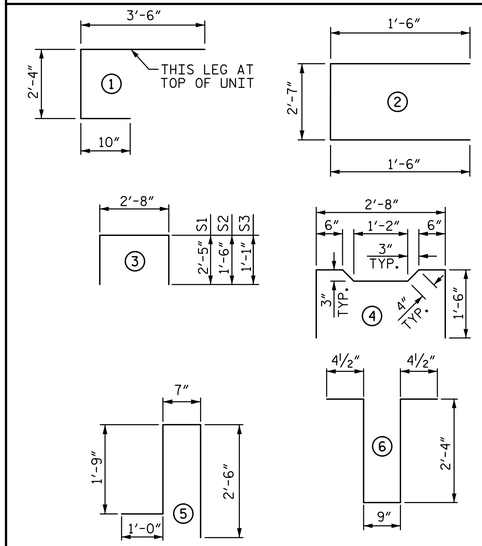
DEBONDING LEGEND

● FULLY BONDED STRANDS

◉ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

BAR TYPES



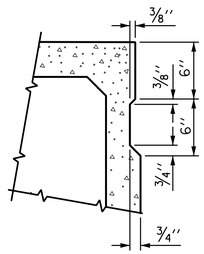
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6'-8"	70	6'-8"	70
A2	16	#4	2	5'-7"	60	5'-7"	60
B1	12	#5	STR	20'-6"	257	20'-6"	257
K1	3	#4	6	6'-2"	12	6'-2"	12
K2	2	#4	STR	2'-7"	3	2'-7"	3
S1	40	#4	3	7'-6"	200	7'-6"	200
S2	40	#4	3	5'-8"	151	5'-8"	151
S3	61	#4	3	4'-10"	197	4'-10"	197
S4	21	#4	4	5'-10"	82	5'-10"	82
✳ S5	63	#5	5	5'-10"	383	--	--
REINFORCING STEEL					1032 LBS.		1032 LBS.
✳ EPOXY COATED REINF. STEEL					383 LBS.		
5500 P.S.I. CONCRETE					7.3 CU. YDS.		7.2 CU. YDS.
0.6" Ø L.R. STRANDS					No. 12		No. 12

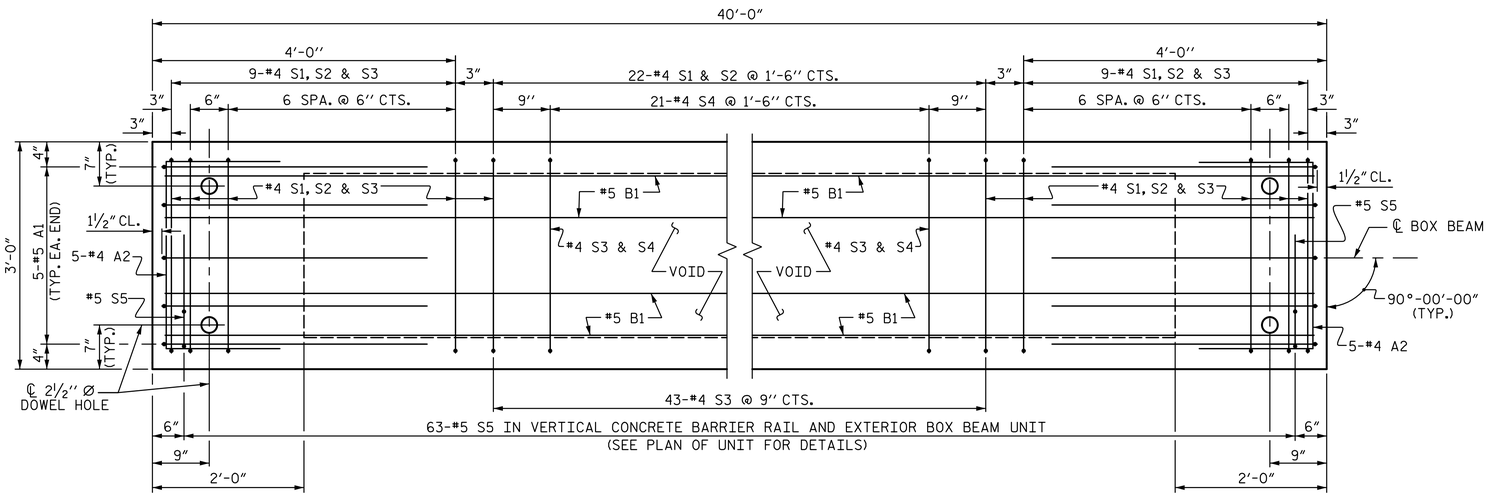
GRADE 270 STRANDS

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



SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS.
FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT".
FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL".
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 040317 ENGINEER TONY R. LAWS
Signature: Tony Laws
10/7/2025

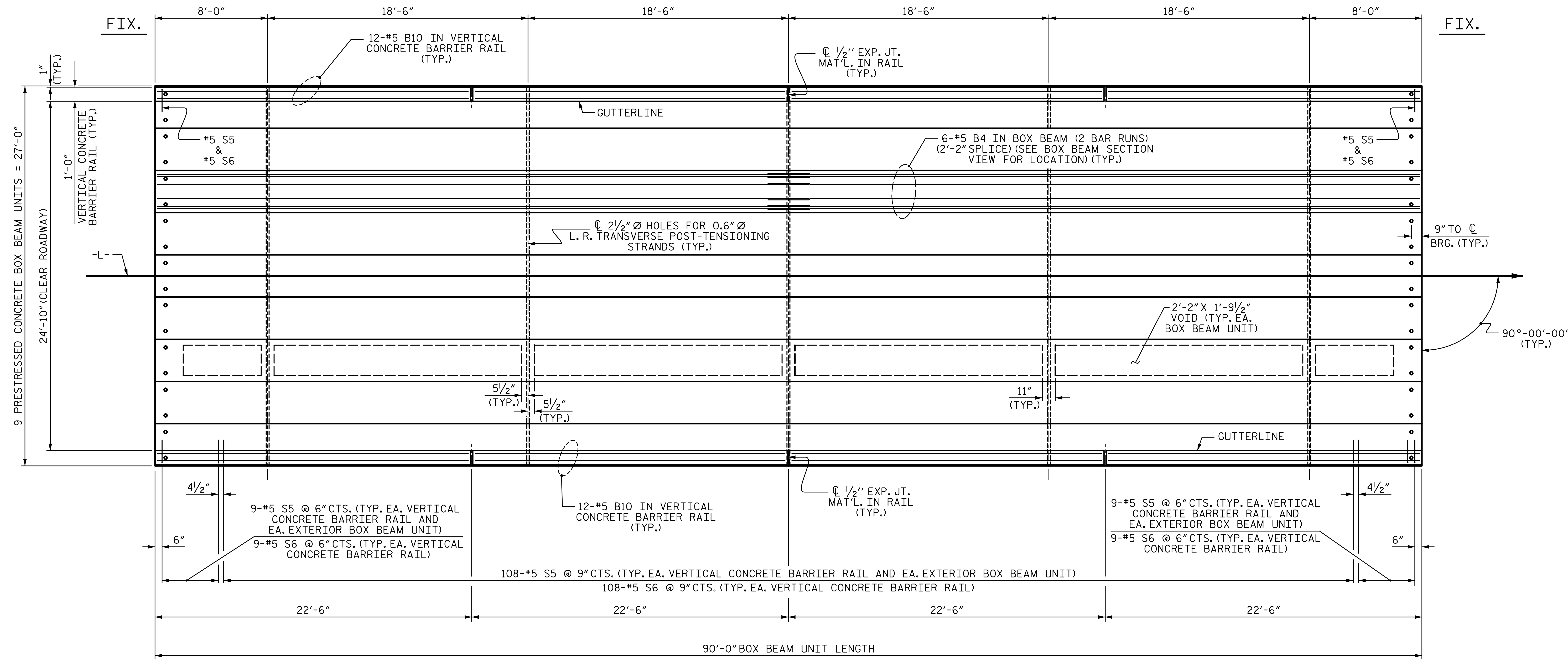
RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 ° F-0493 ° C-28

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			24

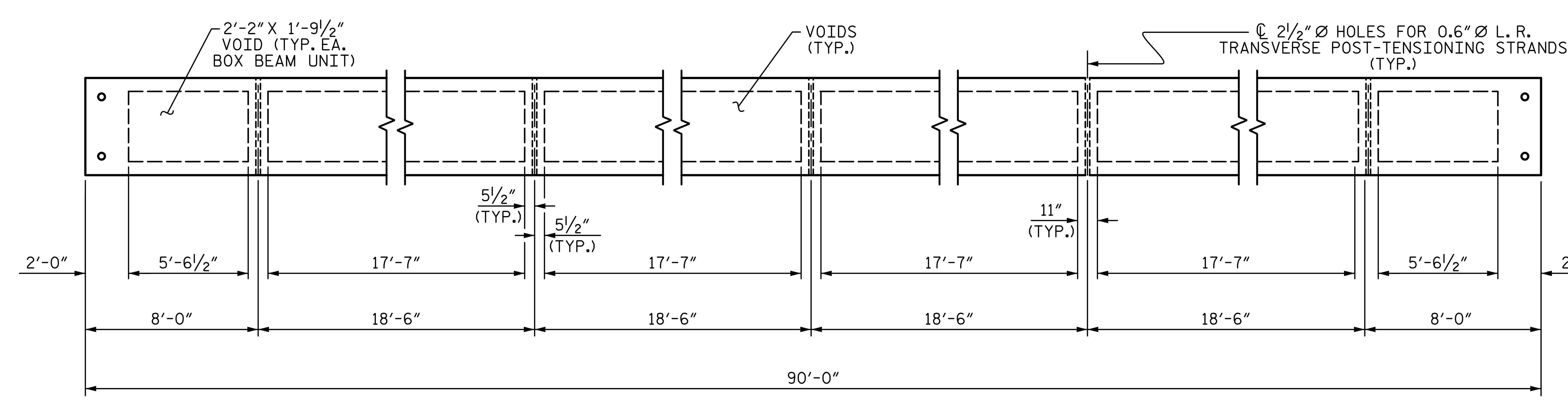
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : T. R. LAWS DATE : 02/2025
CHECKED BY : V. SELLERS DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_017_DF18314.2075090_SMU_PCBB_S-9_740112.dgn
AcostaM



PLAN OF UNIT



DIAPHRAGM AND VOID LAYOUT

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 4 OF 7

10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PLAN OF 90' UNIT 24'-10" CLEAR ROADWAY 90° SKEW SPAN B

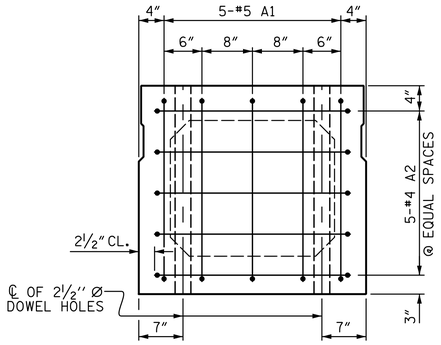
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			24

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : T. R. LAWS	DATE : 02/2025
CHECKED BY : V. SELLERS	DATE : 02/2025
DRAWN BY : DGE 8/11 CHECKED BY : TMG 11/11	REV. 8/14 MAA/TMG

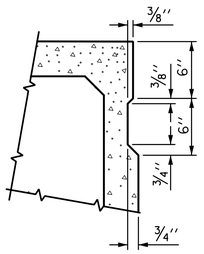
STD.NO.33PCBB_27_90S_90L

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_019_DF18314.2075090_SMU_PCBB_S-10_740112.dgn
AcostaM



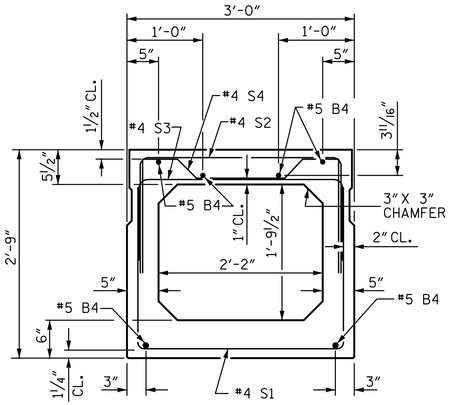
END ELEVATION

SHOWING PLACEMENT OF #5 & #4 "A" BARS AND LOCATION OF DOWEL HOLES.
(INTERIOR BOX BEAM SECTION SHOWN-EXTERIOR SECTION SIMILAR EXCEPT SHEAR KEY LOCATION. STRAND LAYOUT NOT SHOWN.)



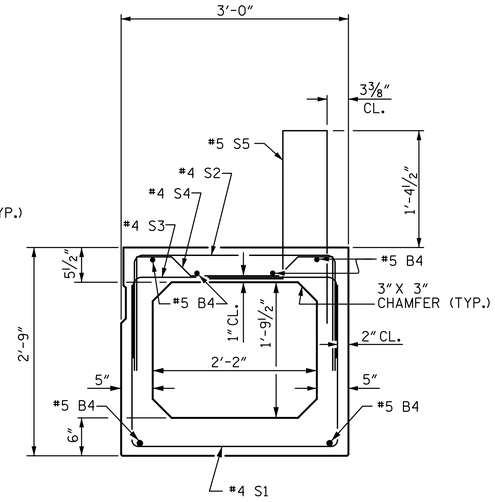
SHEAR KEY DETAIL

NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR BOX BEAMS.



INTERIOR BOX BEAM SECTION

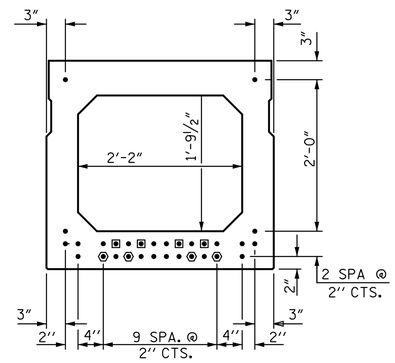
(STRAND LAYOUT NOT SHOWN)



EXTERIOR BOX BEAM SECTION

(STRAND LAYOUT NOT SHOWN)

0.6″ Ø LOW RELAXATION STRAND LAYOUT



TYPICAL STRAND LOCATION

(30 STRANDS REQUIRED)

DEBONDING LEGEND

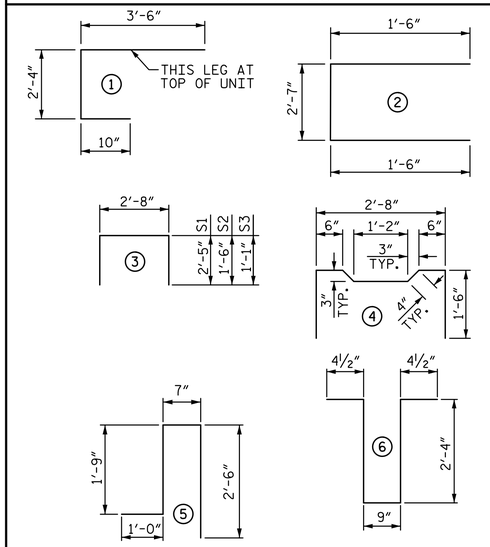
- ● FULLY BONDED STRANDS
- ◙ STRANDS DEBONDED FOR 4′-0″ FROM END OF GIRDER
- ⬢ STRANDS DEBONDED FOR 12′-0″ FROM END OF GIRDER

BOND SHALL BE BROKEN ON STRANDS AS SHOWN FOR THE SPECIFIED LENGTH FROM EACH END OF THE BOX BEAM. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7.

GRADE 270 STRANDS

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

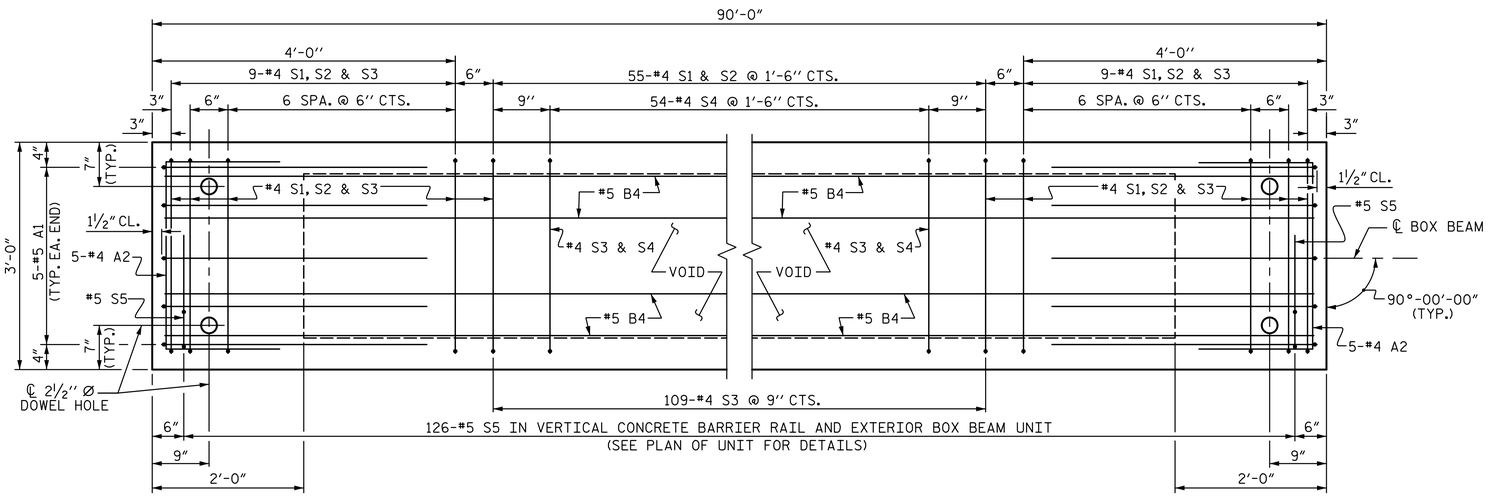
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE BOX BEAM SECTION

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
A1	10	#5	1	6′-8″	70	6′-8″	70
A2	40	#4	2	5′-7″	149	5′-7″	149
B4	12	#5	STR	45′-11″	575	45′-11″	575
K1	15	#4	6	6′-2″	62	6′-2″	62
K2	10	#4	STR	2′-7″	17	2′-7″	17
S1	73	#4	3	7′-6″	366	7′-6″	366
S2	73	#4	3	5′-8″	276	5′-8″	276
S3	127	#4	3	4′-10″	410	4′-10″	410
S4	54	#4	4	5′-10″	210	5′-10″	210
✳ S5	126	#5	5	5′-10″	767	--	--
REINFORCING STEEL					2135 LBS.		2135 LBS.
✳ EPOXY COATED REINF. STEEL					767 LBS.		
8000 P.S.I. CONCRETE					16.0 CU. YDS.		15.9 CU. YDS.
0.6″ Ø L.R. STRANDS					No. 30		No. 30



PLAN OF BOX BEAM

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S5 BARS.
FOR LOCATION OF DIAPHRAGMS, SEE "PLAN OF UNIT".
FOR THREADED INSERTS, SEE "THREADED INSERT DETAIL".
FOR REINFORCING STEEL IN DIAPHRAGMS, SEE "DOUBLE DIAPHRAGM DETAILS".

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 5 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD 3′-0″ X 2′-9″ PRESTRESSED CONCRETE BOX BEAM UNIT SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			24

NORTH CAROLINA PROFESSIONAL SEAL 040037 ENGINEER TONY R. LAWS JR.
Signed by: TONY R. LAWS
10/7/2025

RS&H

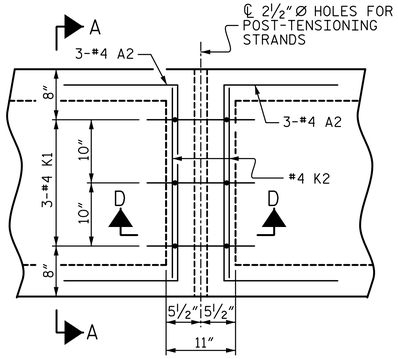
RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 • F-0493 • C-28

ASSEMBLED BY :	T. R. LAWS	DATE :	02/2025
CHECKED BY :	V. SELLERS	DATE :	02/2025
DRAWN BY :	DGE 10/11	REV. 9/14	MAA/TMG
CHECKED BY :	TMG 11/11		

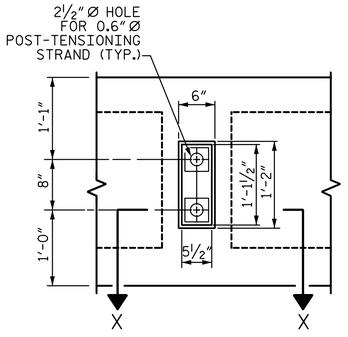
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_021_DF18314.2075090_SMU_PCBB_S-11_740112.dgn
AcostaM

STD. NO. 33PCBB4_90S_90L

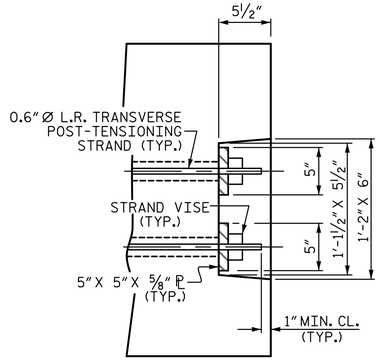


PLAN

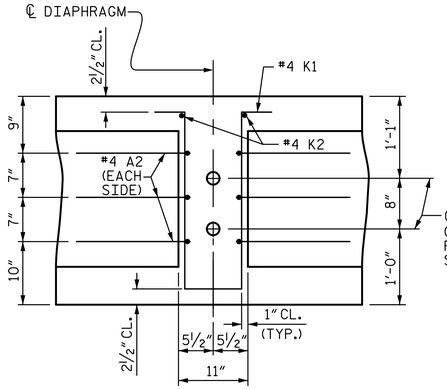


VIEW Y-Y

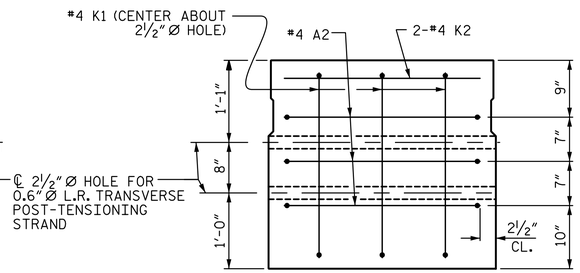
SHOWING ELEVATION VIEW OF GROUTED RECESS



DETAIL "C"

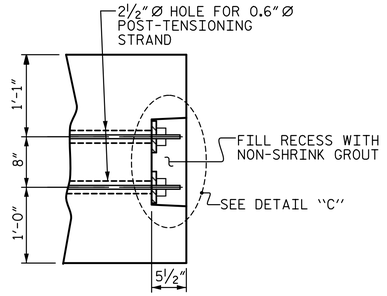


SECTION D-D

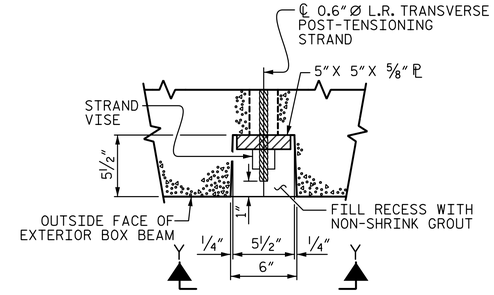


SECTION A-A

VOIDS NOT SHOWN



PART SECTION AT RECESS



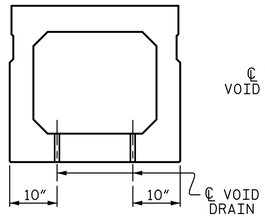
SECTION X-X

SHOWING PLAN VIEW OF GROUTED RECESS

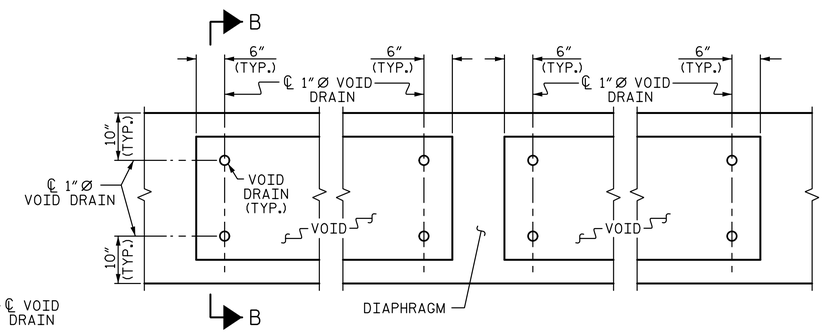
GROUTED RECESS DETAIL AT END OF POST-TENSIONED STRANDS OF EXTERIOR BOX BEAM

DOUBLE DIAPHRAGM DETAILS

#4 "S" BARS NOT SHOWN. #4 "S" BARS MAY BE SHIFTED SLIGHTLY TO CLEAR 2½" Ø HOLE.



SECTION B-B



PART PLAN

VOID DRAIN DETAILS

(DIMENSIONS SHOWN ARE TYPICAL FOR EACH VOID)

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0"x 2'-9"
40' UNIT BOX BEAM UNIT (NC & SE)	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	⅜" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1/16" ↓
FINAL CAMBER	5/16" ↑

** INCLUDES FUTURE WEARING SURFACE

DEAD LOAD DEFLECTION AND CAMBER	
	3'-0"x 2'-9"
90' BOX BEAM UNIT (NC & SE)	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¾" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	¾" ↓
FINAL CAMBER	2" ↑

** INCLUDES FUTURE WEARING SURFACE

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 6 OF 7

Signed NORTH CAROLINA PROFESSIONAL SEAL 040317 ENGINEER TONY R. LAWS
Tony R. Laws
10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 • F-0493 • C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

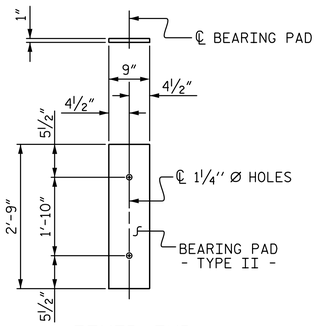
3'-0"X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : T. R. LAWS DATE : 02/2025
CHECKED BY : V. SELLERS DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

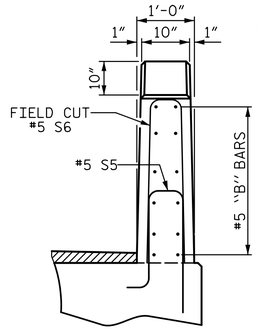
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_023_DF18314.2075090_SMU_PCBB_S-12_740112.dgn
AcostaM

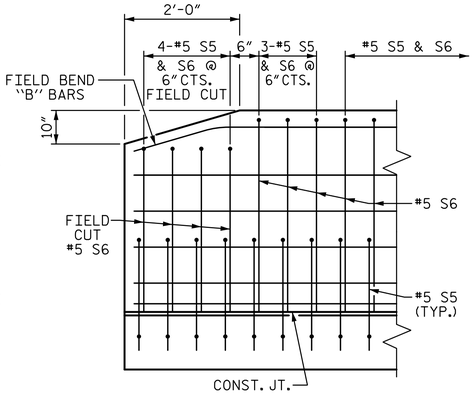


FIXED END

(TYPE II - 36 REQ'D)



END VIEW



SIDE VIEW

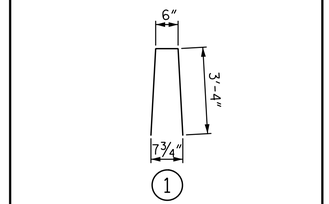
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

END OF RAIL DETAILS

BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	40'-0"	80'-0"
INTERIOR B.B.	7	40'-0"	280'-0"
TOTAL	9	———	360'-0"

BOX BEAM UNITS REQUIRED			
	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR B.B.	2	90'-0"	180'-0"
INTERIOR B.B.	7	90'-0"	630'-0"
TOTAL	9	———	810'-0"

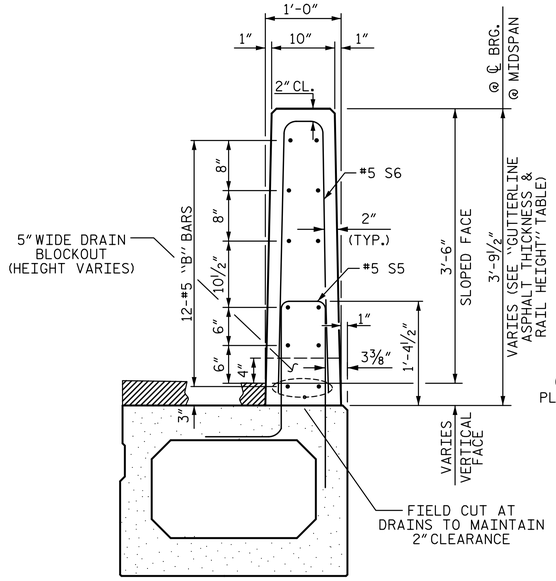


BAR TYPE

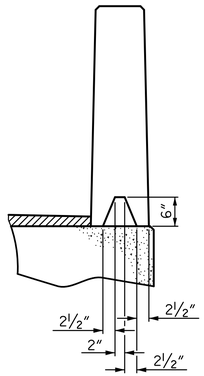
BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL					
BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	40' UNIT				
✳ B7	48	#5	STR	19'-8"	985
✳ S6	126	#5	1	7'-2"	942
✳ EPOXY COATED REINFORCING STEEL			LBS.		1927
CLASS AA CONCRETE			CU.YDS.		10.4
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN. FT.		80.0

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL					
BAR	BARS PER PAIR OF EXTERIOR UNITS	SIZE	TYPE	LENGTH	WEIGHT
	90' UNIT				
✳B10	96	#5	STR	22'-1"	2211
✳ S6	252	#5	1	7'-2"	1884
✳ EPOXY COATED REINFORCING STEEL			LBS.		4095
CLASS AA CONCRETE			CU.YDS.		23.3
TOTAL VERTICAL CONCRETE BARRIER RAIL			LN. FT.		180.0



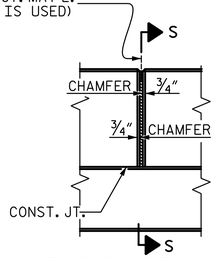
SECTION THRU RAIL



SECTION S-S

AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

℄ ½" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

VERTICAL CONCRETE BARRIER RAIL DETAILS

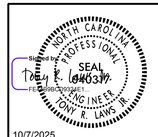
GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
40' UNITS	3⅜"	3'-9⅜"
90' UNITS	1½"	3'-7½"

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 7 OF 7



10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.

8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080

www.rsandh.com

North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

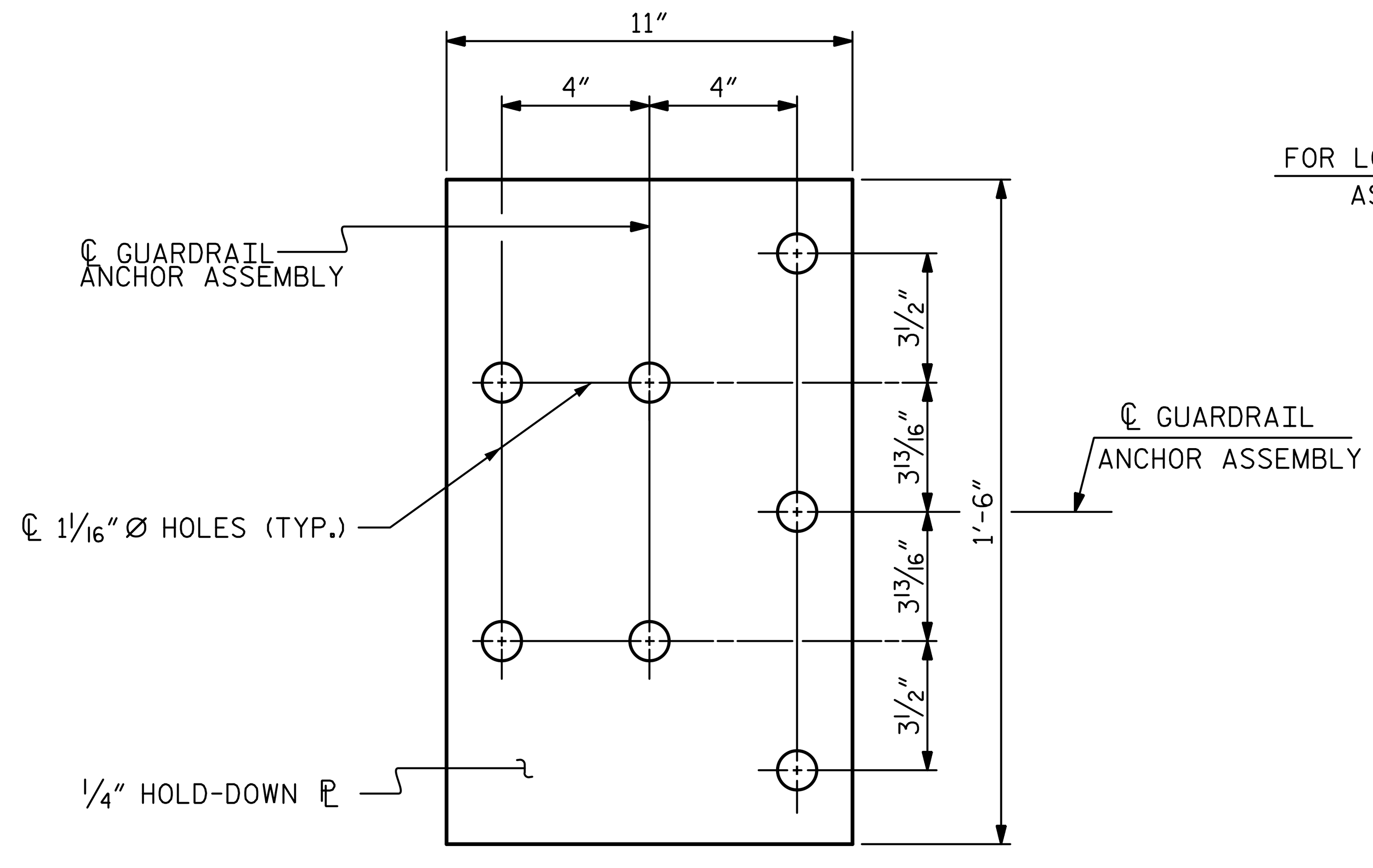
3'-0" X 2'-9" PRESTRESSED CONCRETE BOX BEAM UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			24

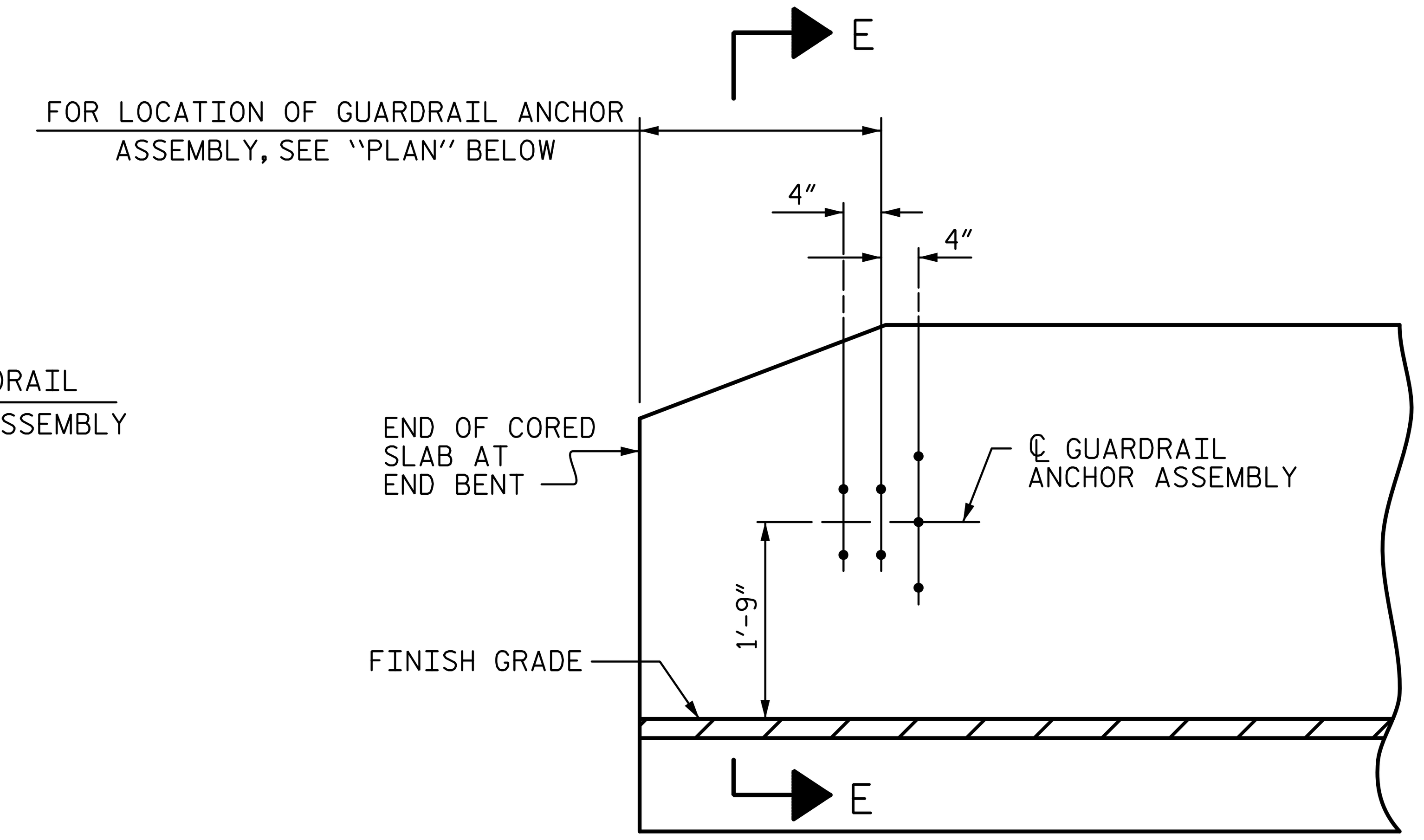
DRAWN BY : T. R. LAWS DATE : 02/2025
CHECKED BY : V. SELLERS DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_025_DF18314.2075090_SMU_PCBB_S-13_740112.dgn
AcostaM



PLAN



ELEVATION

NOTES

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

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

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

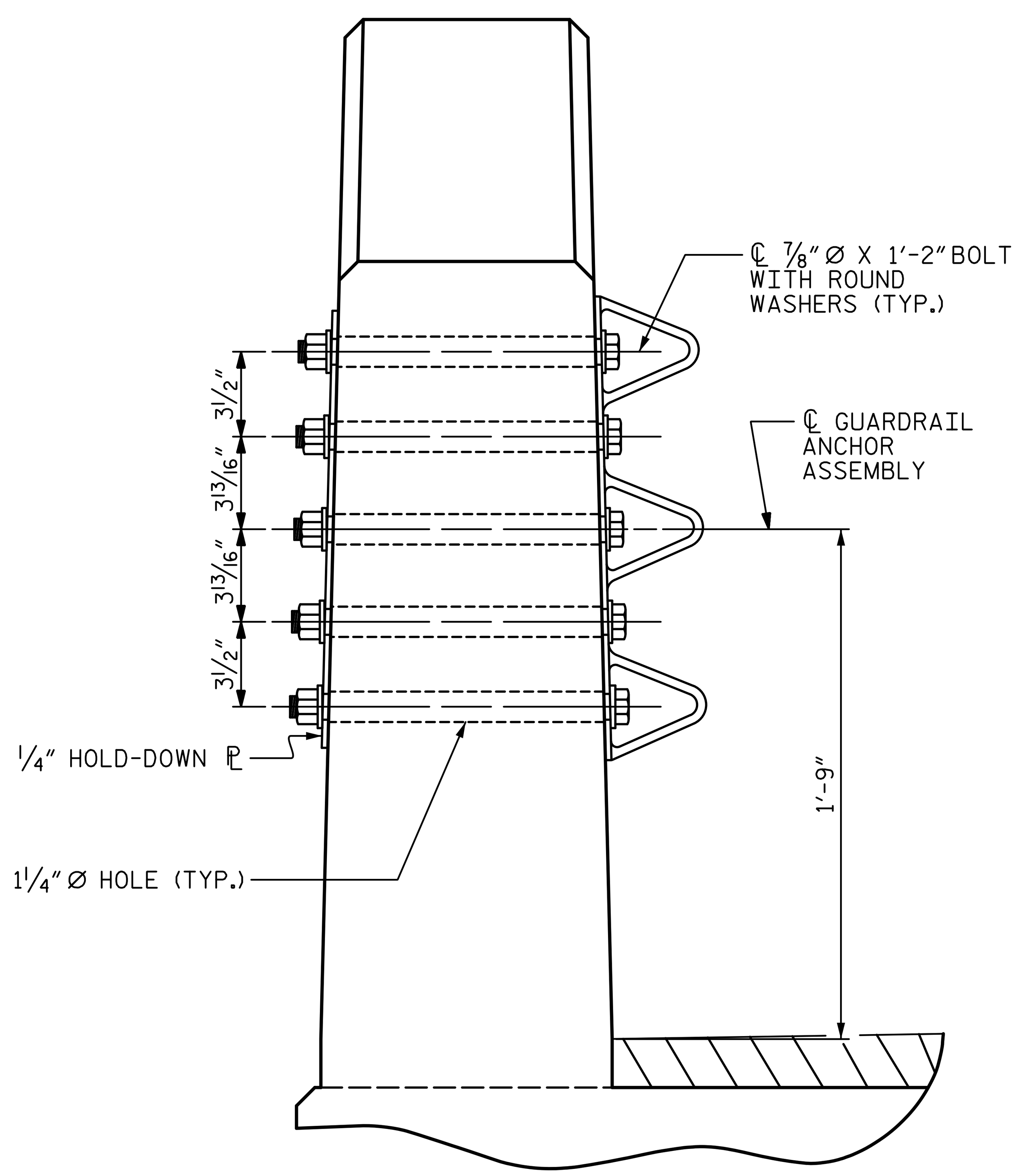
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

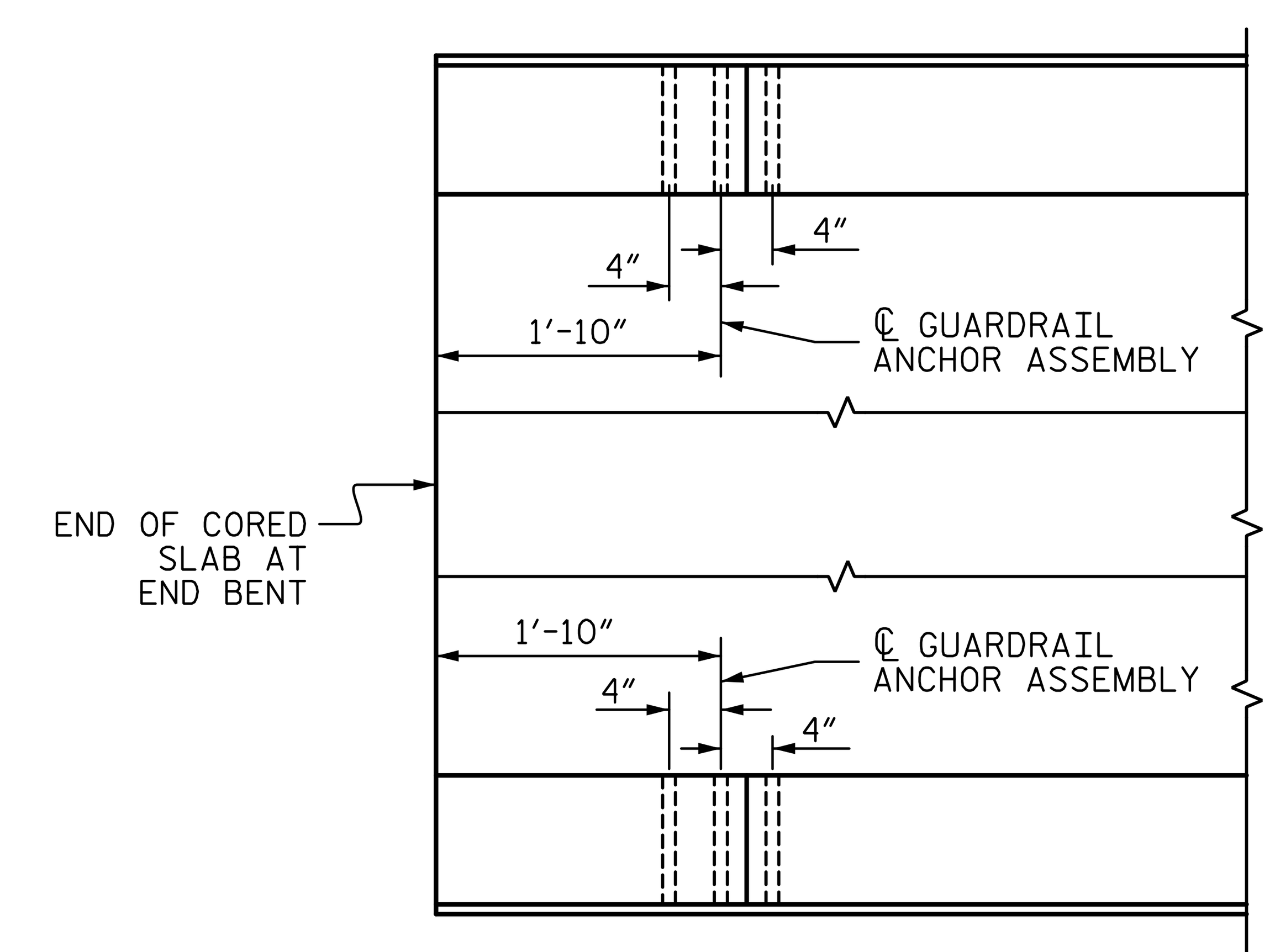
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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



SECTION E-E

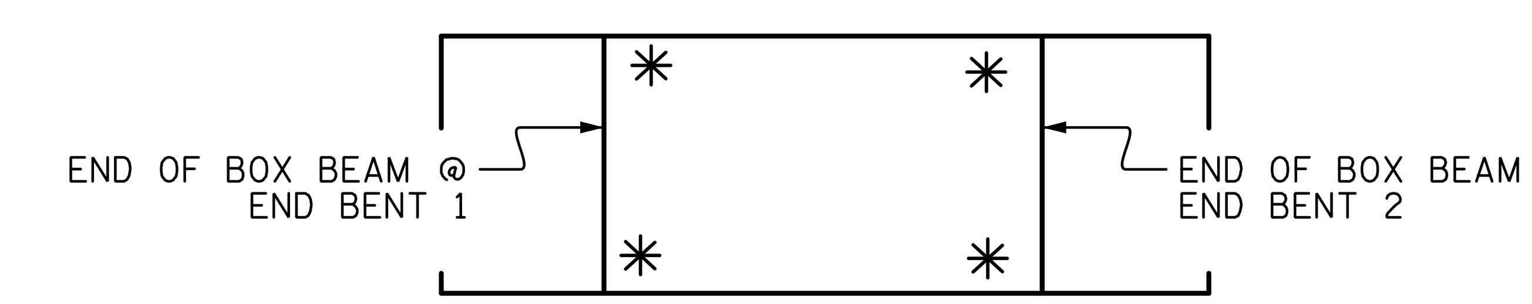
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SEAL 040397 — NORTH CAROLINA PROFESSIONAL ENGINEER — TONY R. LAWS JR.

Signed by: Tony R. Laws

10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			24

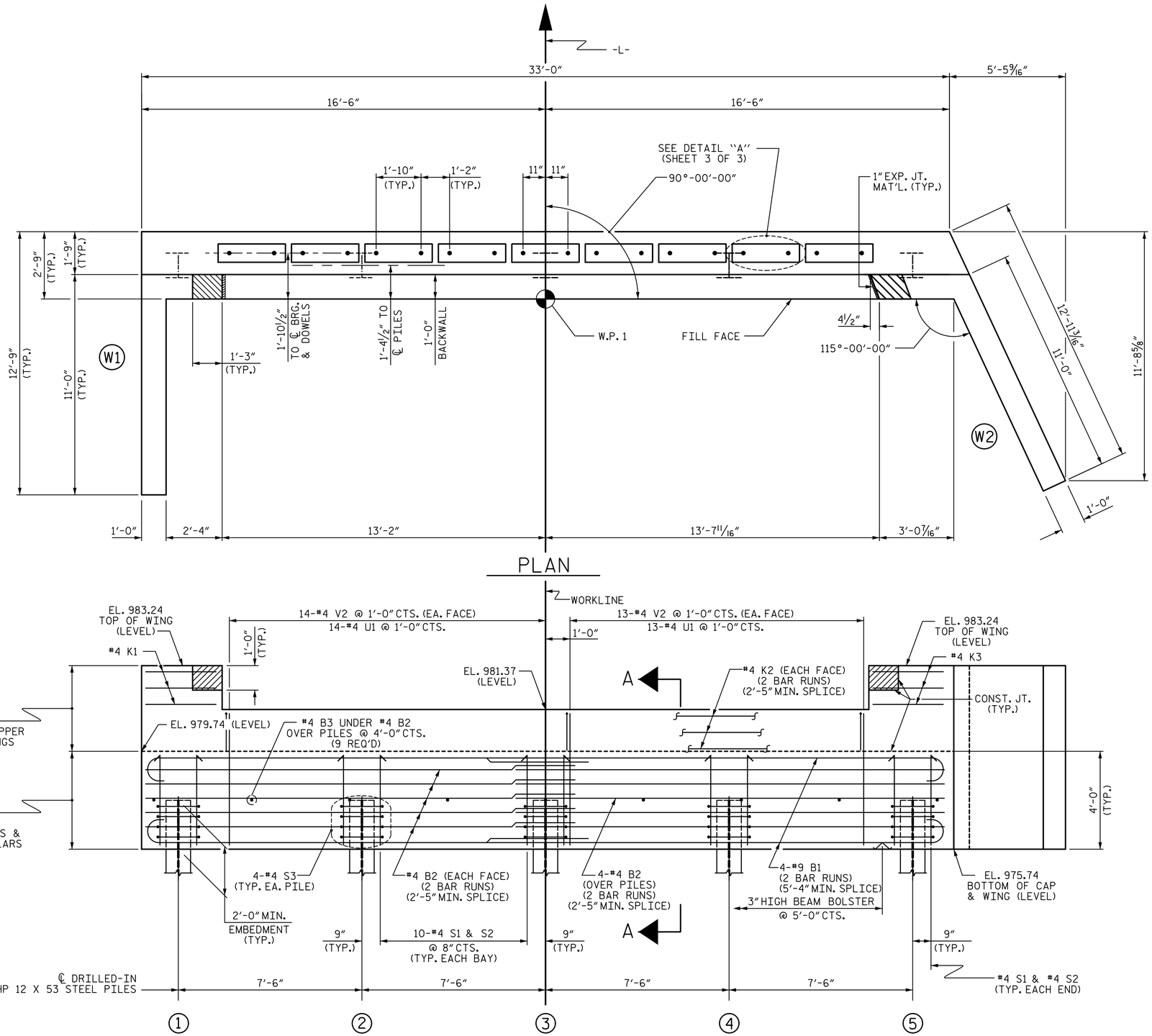
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. GRA3

ASSEMBLED BY :	T. R. LAWS	DATE :	02/2025
CHECKED BY :	V. SELLERS	DATE :	02/2025

DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17	MAA/TMG
	REV. 5/18	MAA/TMG

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_027_DF18314.2075090_SMU_GR_S-14_740112.dgn
AcostaM



PLAN

ELEVATION

FOR SECTION A-A, SEE SHEET 3 OF 3.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

NOTES

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

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

FOR WING DETAILS, SEE SHEET 2 OF 3.

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040317 TONY R. LAWS JR.

10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 · F-0493 · C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

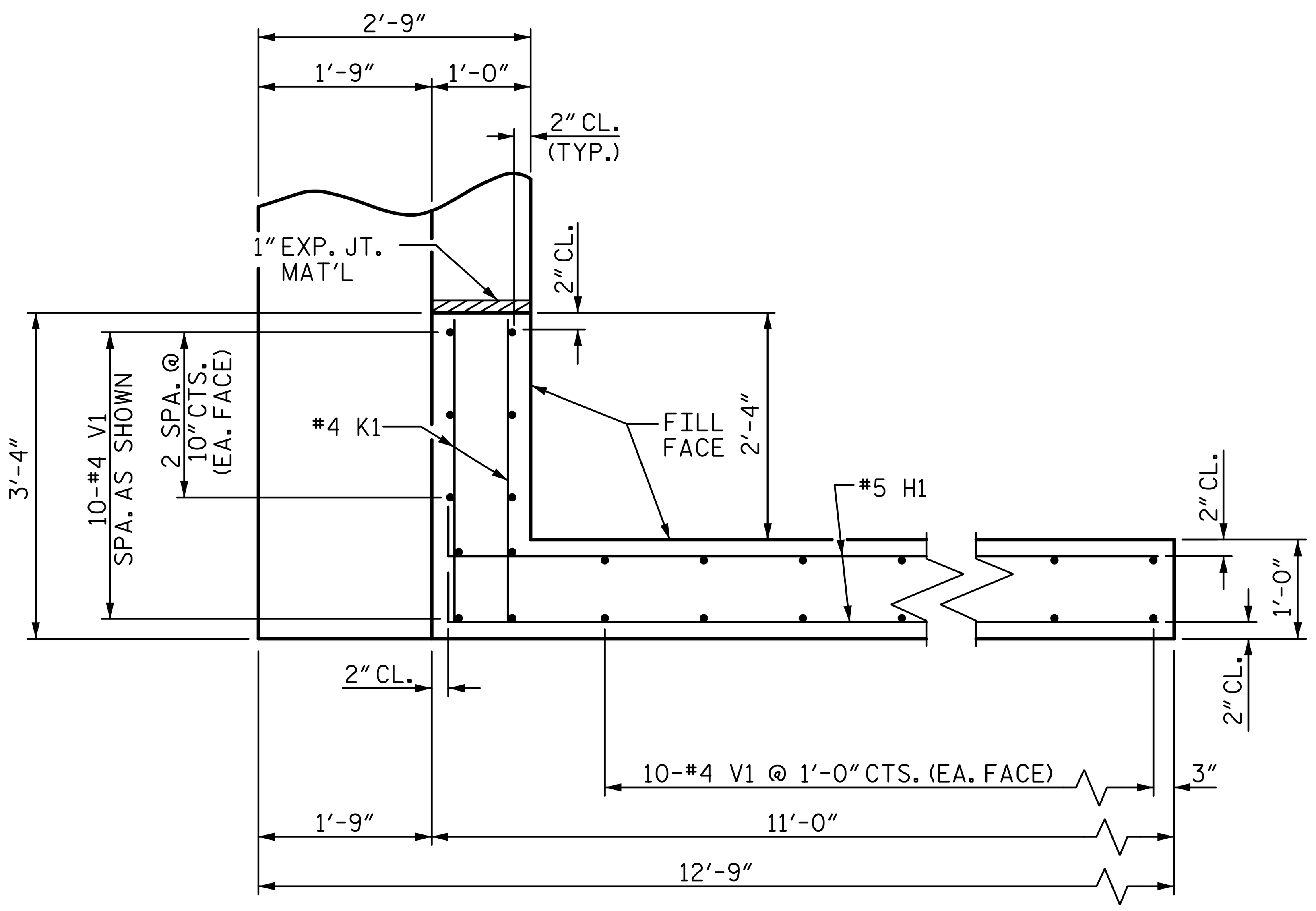
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			24

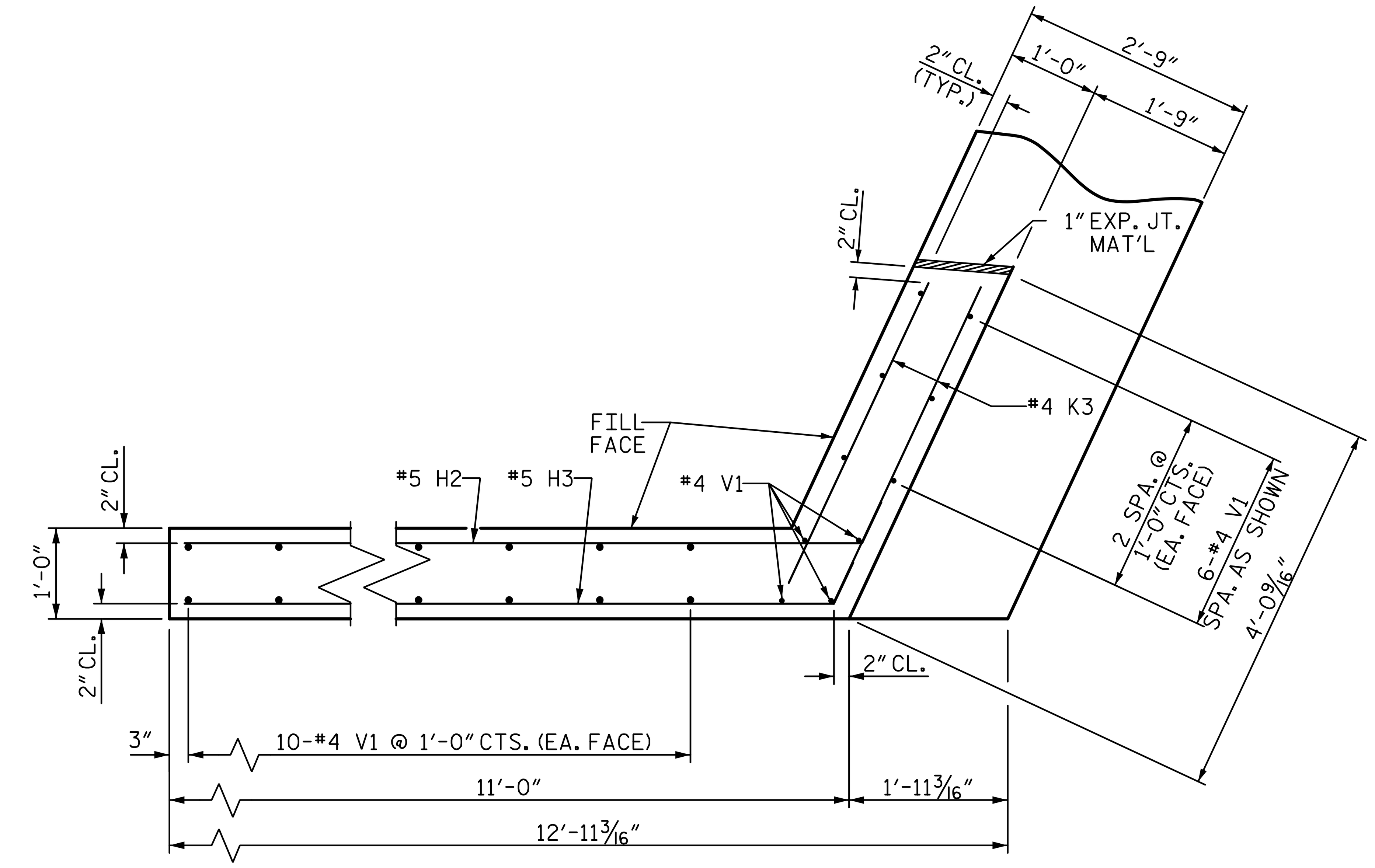
DRAWN BY : J. SCACCA DATE : 05/2025
CHECKED BY : M. ACOSTA DATE : 07/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

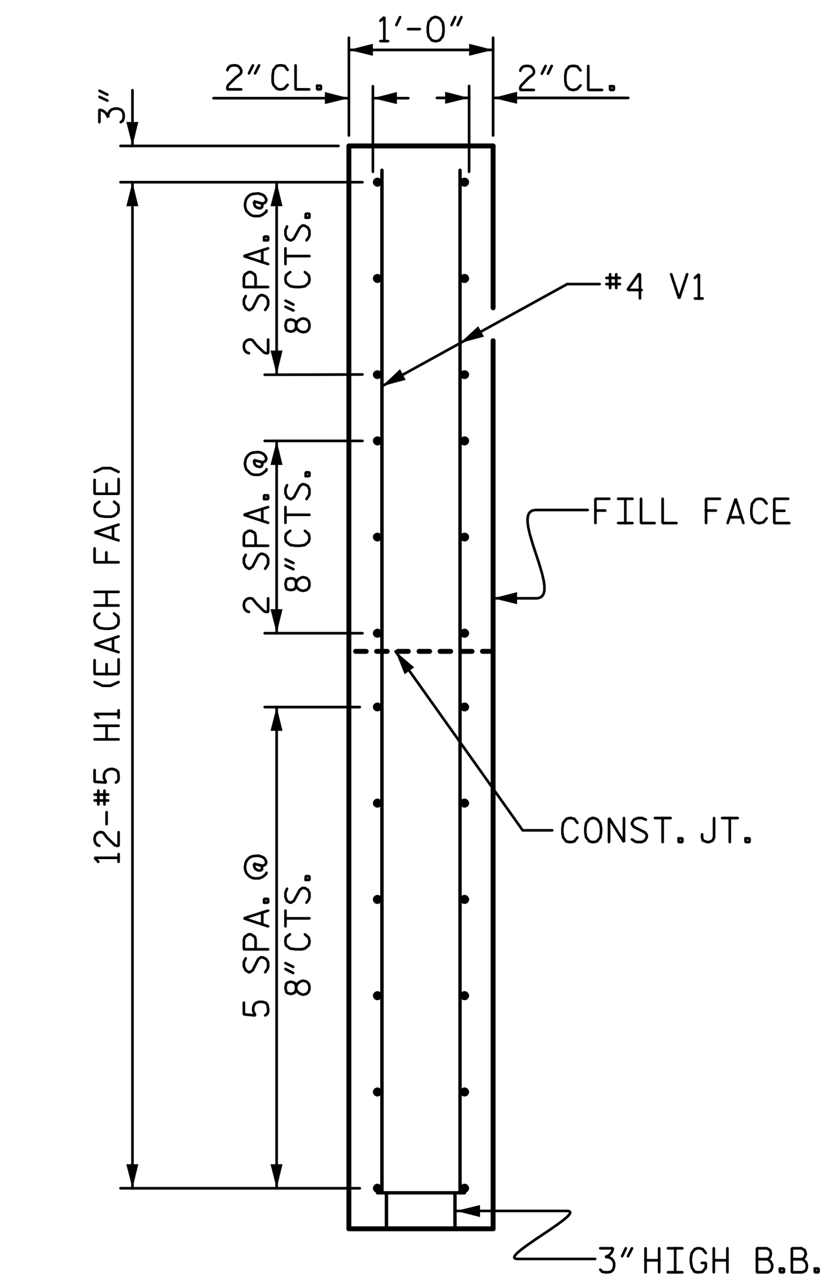
10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_029_DF18314.2075090_SMU_E1_S-15_740112.dgn
AcostaM



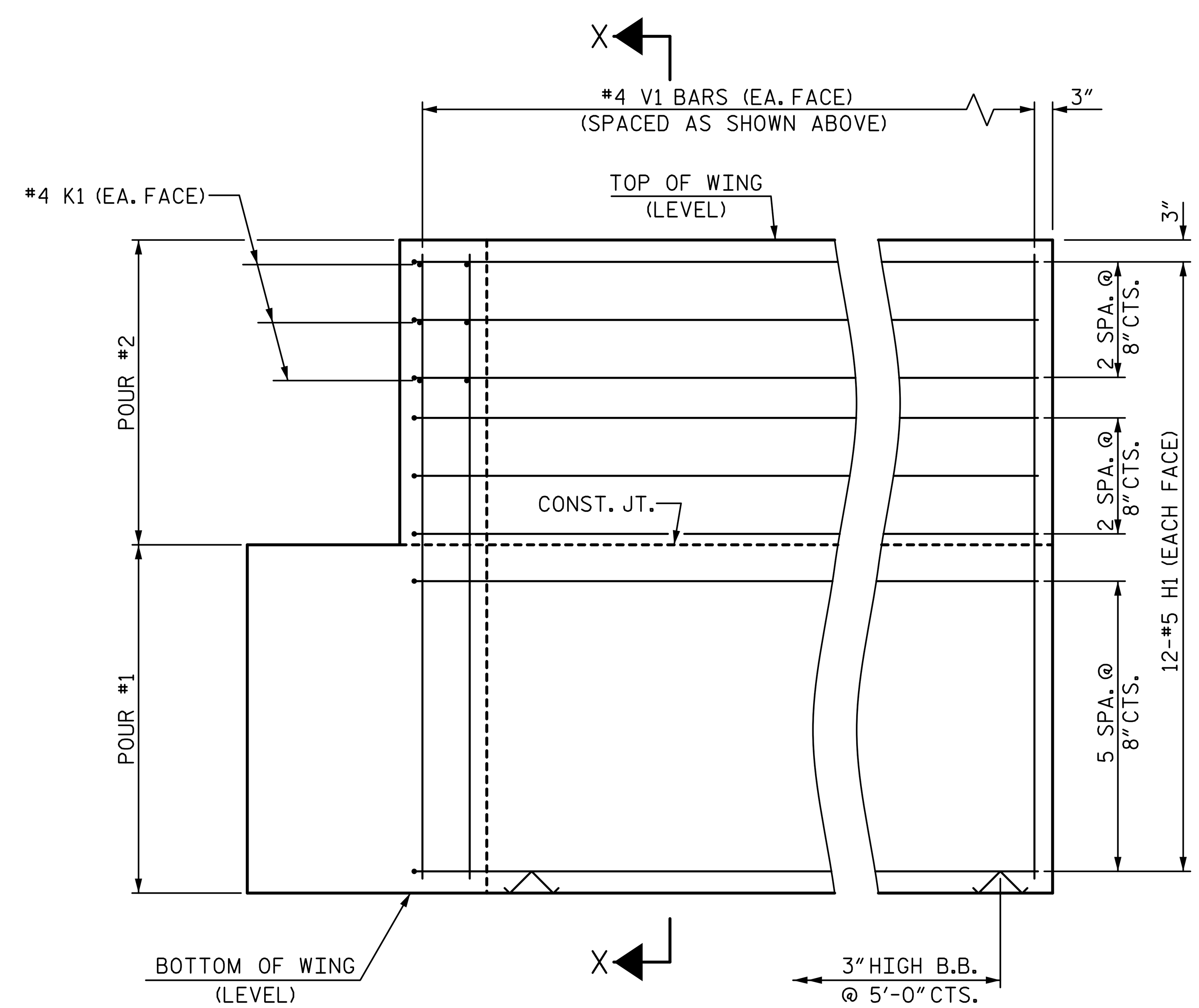
PLAN OF WING (W1)



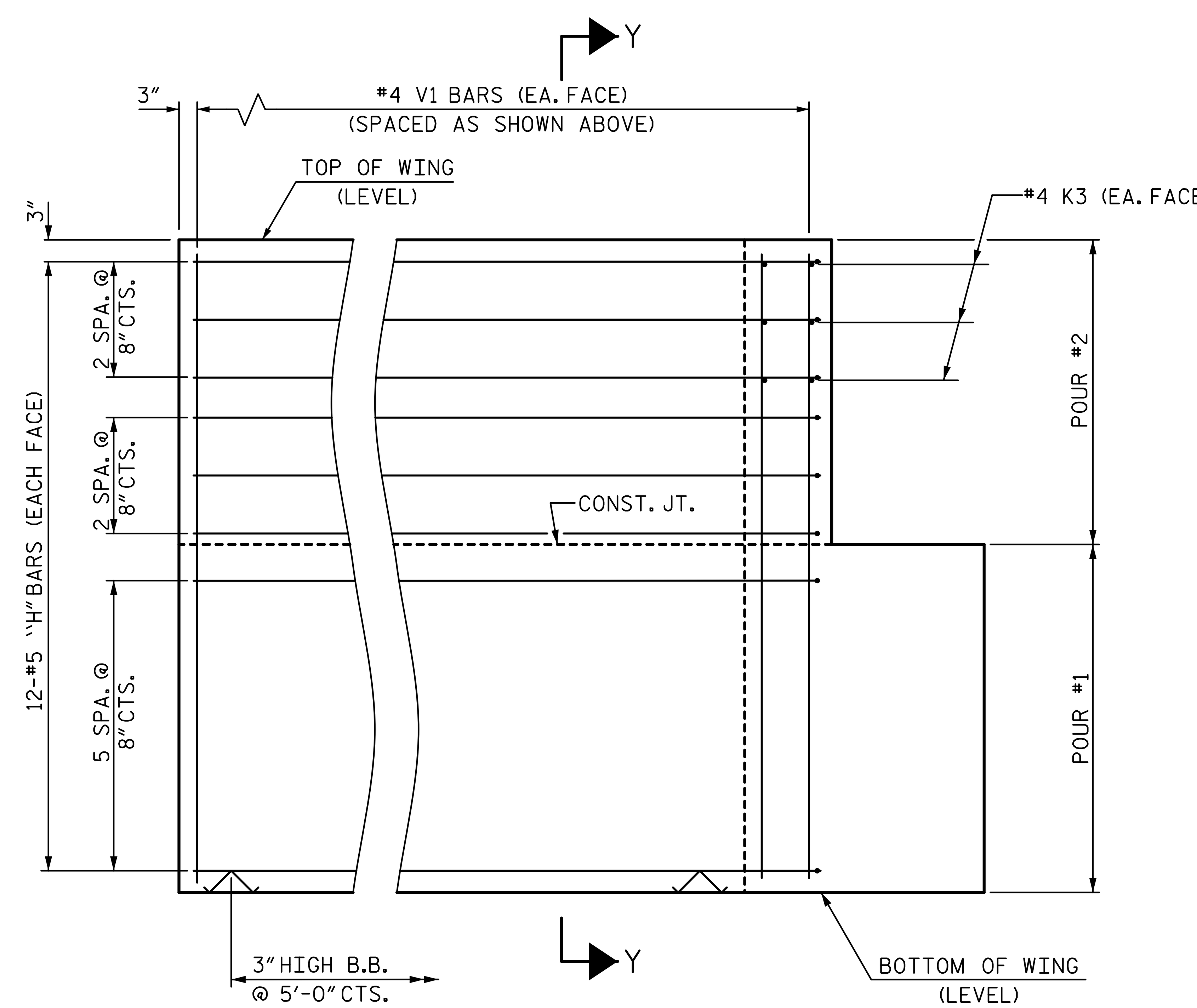
PLAN OF WING (W2)



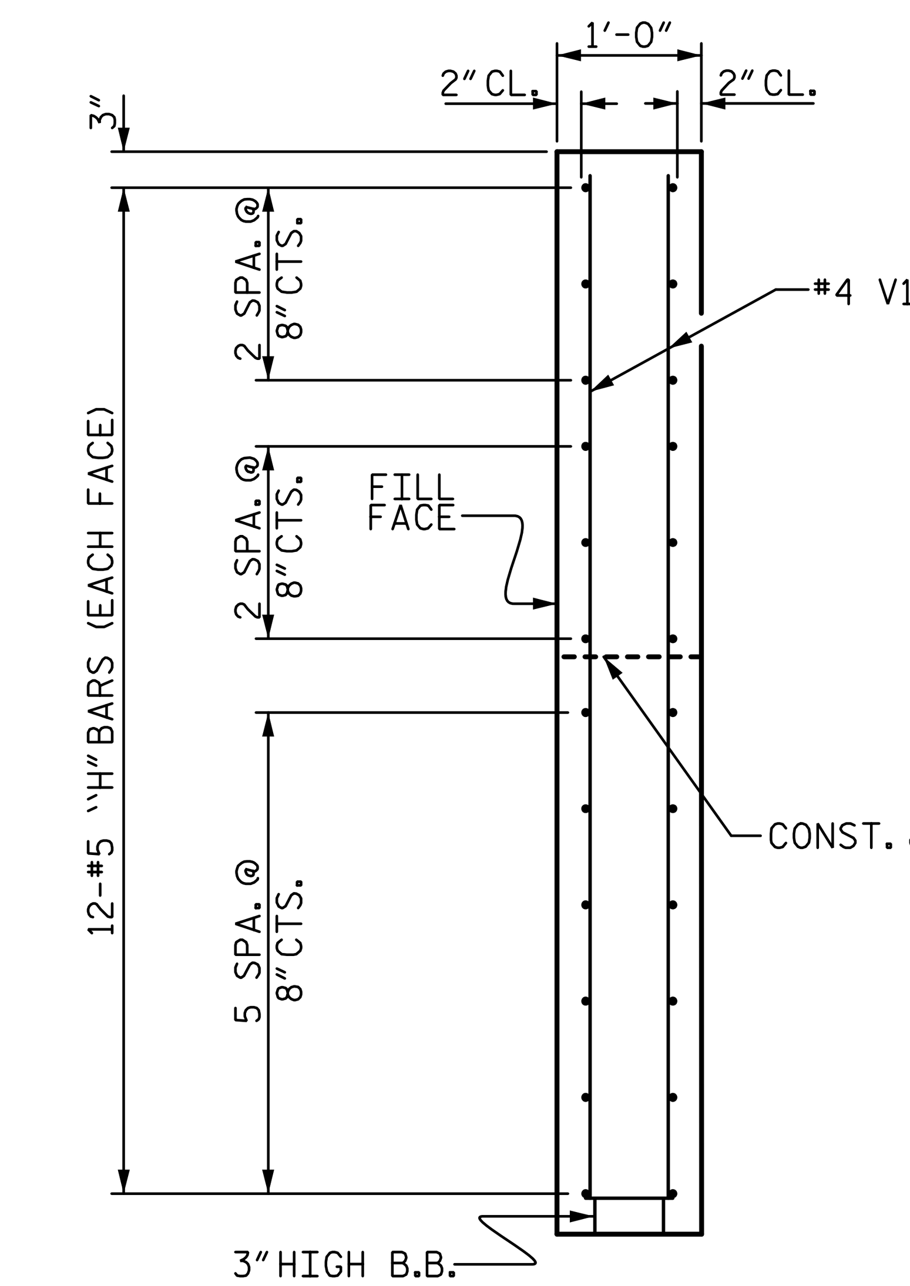
SECTION X-X



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION Y-Y

WING DETAILS

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 2 OF 3

10/7/2025

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

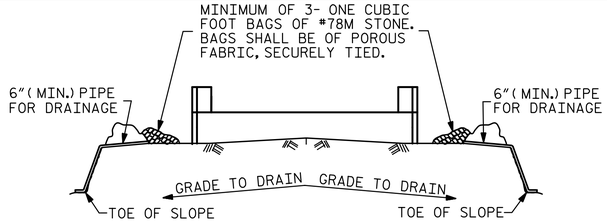
END BENT 1
WING DETAILS

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-16
1			3				TOTAL SHEETS
2			4				24

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : J. SCACCA DATE : 05/2025
CHECKED BY : M. ACOSTA DATE : 07/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_031_DF18314.2075090_SMU_E1_S-16_740112.dgn
AcostaM

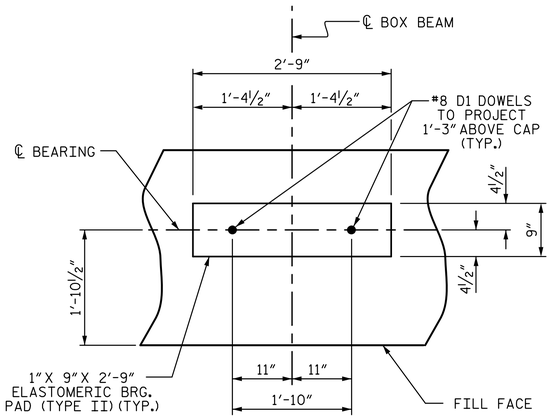


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

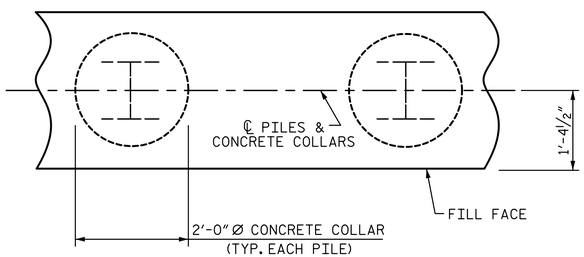
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

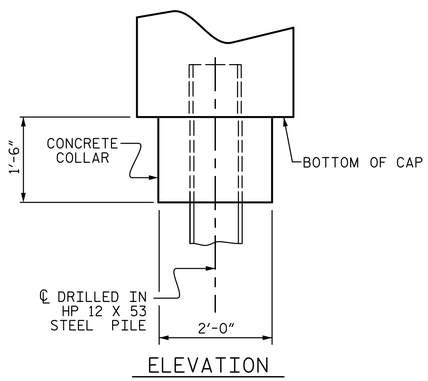
TEMPORARY DRAINAGE AT END BENT



DETAIL "A"

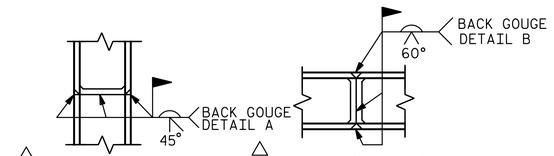


PLAN



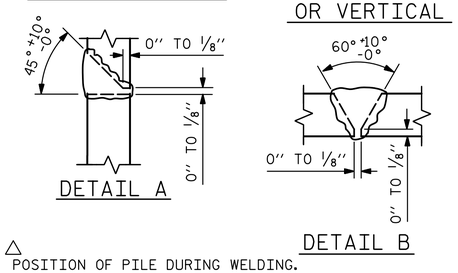
ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL



△ PILE VERTICAL

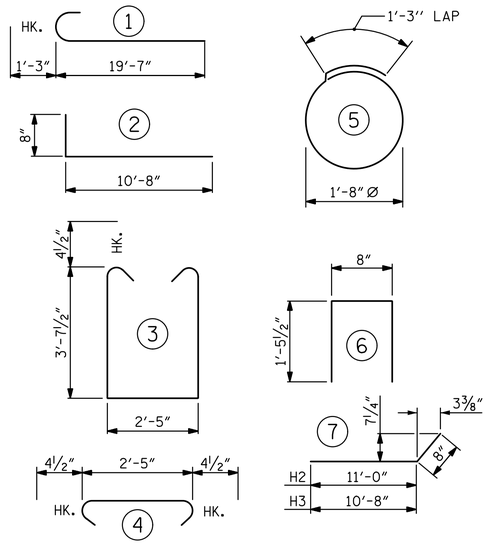
△ PILE HORIZONTAL OR VERTICAL



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9	1	20'-10"	1133
B2	28	#4	STR	18'-0"	337
B3	9	#4	STR	2'-5"	15
D1	18	#8	STR	2'-3"	108
H1	24	#5	2	11'-4"	284
H2	12	#5	7	11'-8"	146
H3	12	#5	7	11'-4"	142
K1	6	#4	STR	2'-11"	12
K2	12	#4	STR	18'-0"	144
K3	6	#4	STR	3'-9"	15
S1	42	#4	3	10'-5"	292
S2	42	#4	4	3'-2"	89
S3	20	#4	5	6'-6"	87
U1	27	#4	6	3'-7"	65
V1	60	#4	STR	7'-2"	287
V2	54	#4	STR	5'-3"	189

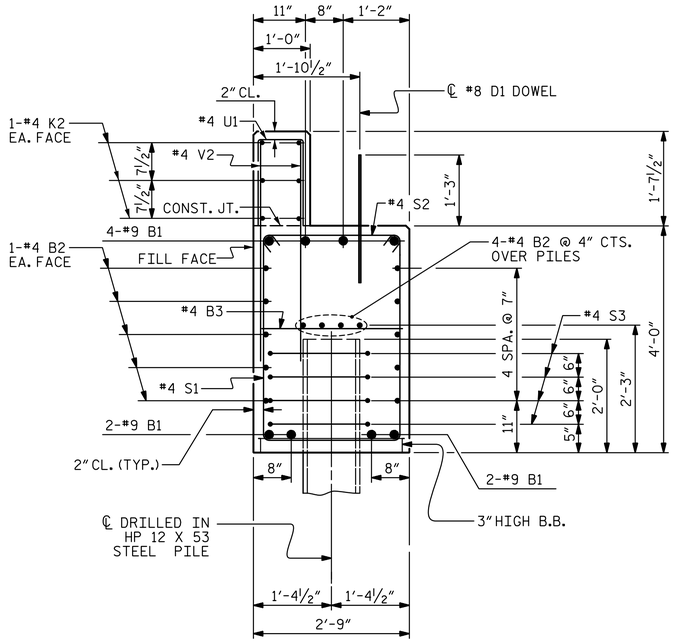
REINFORCING STEEL (FOR ONE END BENT) 3,345 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 17.7 C.Y.

POUR #2 BACKWALL & UPPER PART OF WINGS 5.1 C.Y.

TOTAL CLASS A CONCRETE 22.8 C.Y.



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040317 T. R. LAWS

10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 ' F-0493 ' C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

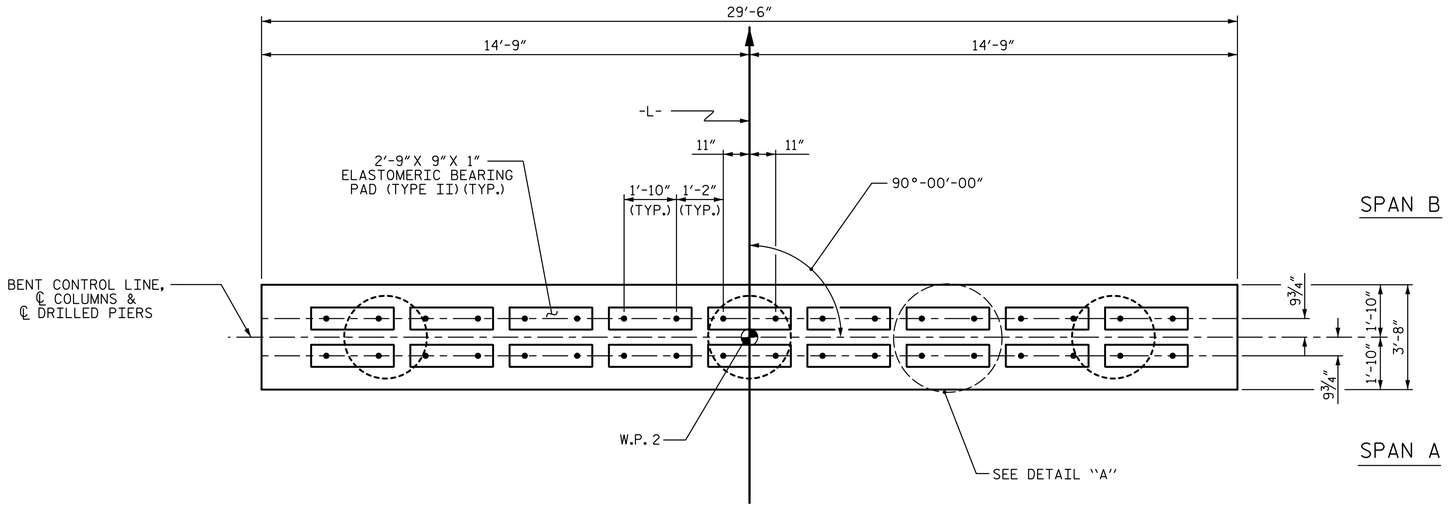
END BENT 1 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			24

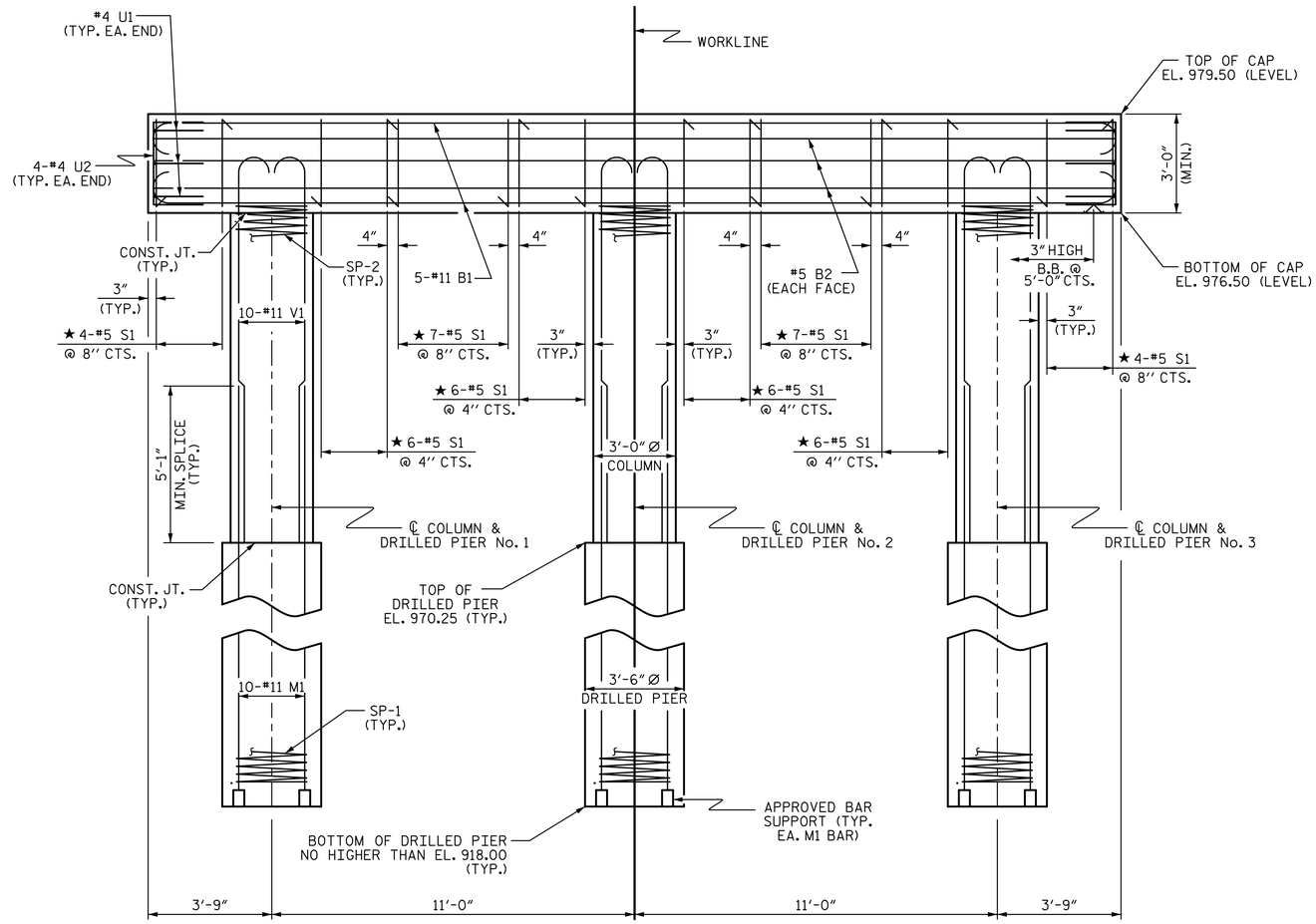
DRAWN BY : J. SCACCA DATE : 05/2025
CHECKED BY : M. ACOSTA DATE : 07/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_033_DF18314.2075090_SMU_E1_S-17_740112.dgn
AcostaM



PLAN



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.

NOTES

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

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

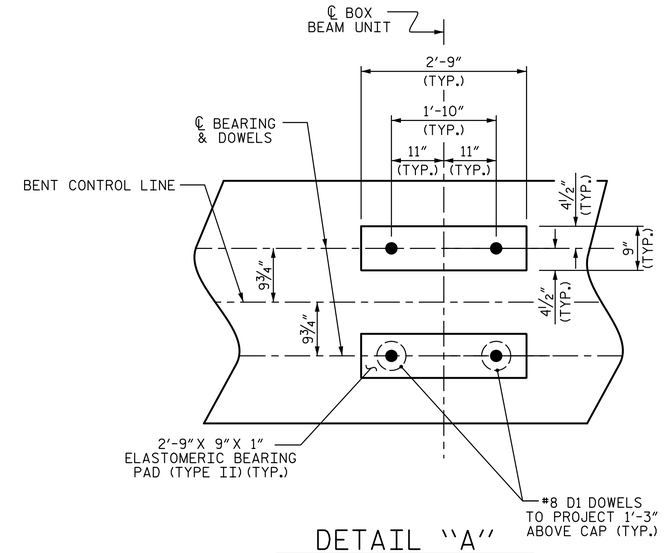
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

★ INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

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



DETAIL ″A″

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 1 OF 2

DRAWN BY : J. SCACCA DATE : 02/2025
CHECKED BY : T. R. LAWS DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER TONY R. LAWS JR. 040317
Signature: Tony R. Laws Jr.
10/7/2025

RS&H

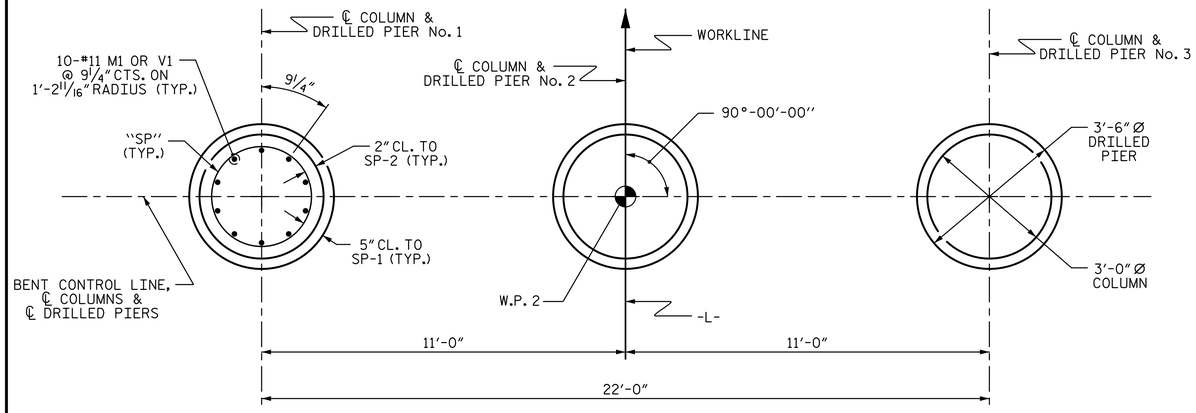
RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

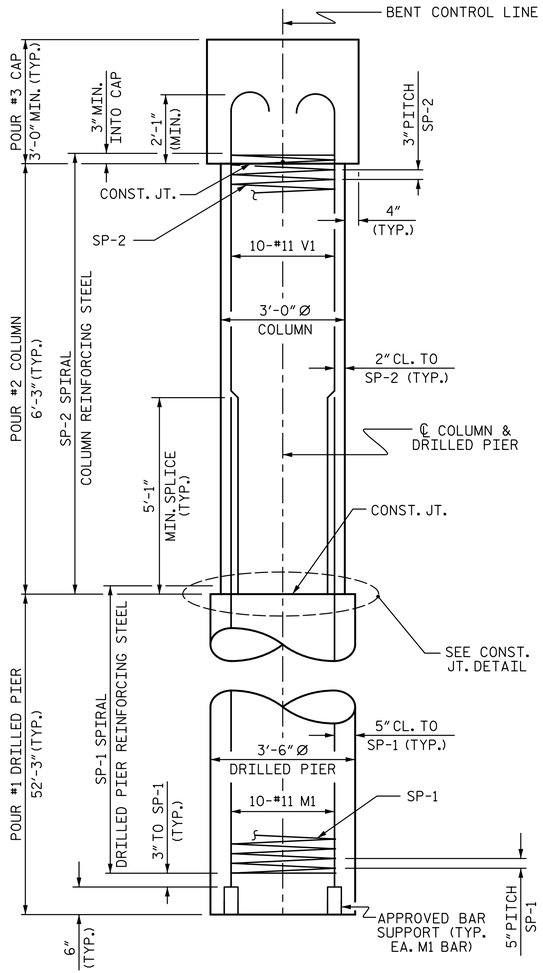
BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			24

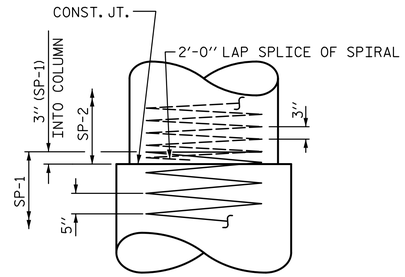
10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_035_DF18314.2075090_SMU_B1_S-18_740112.dgn
AcostaM



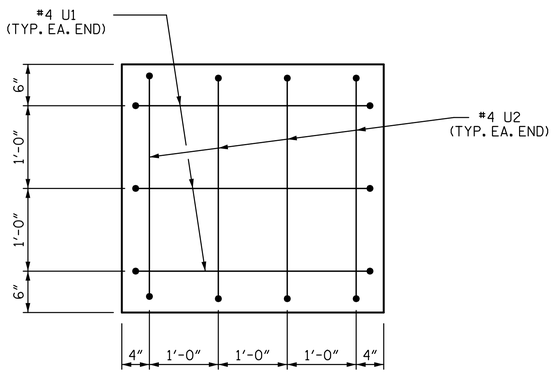
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

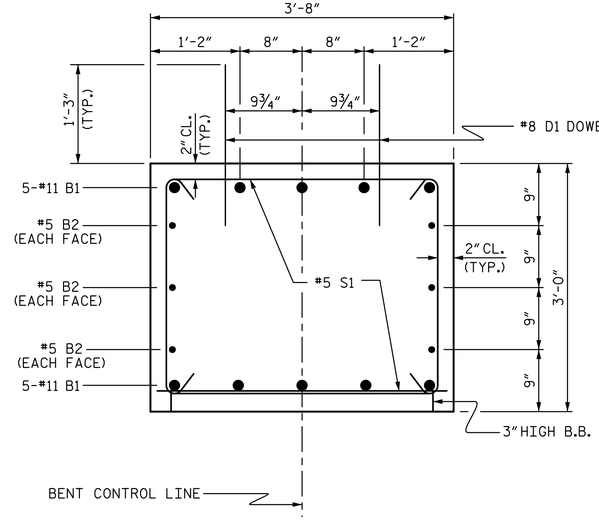


CONSTRUCTION JOINT DETAIL



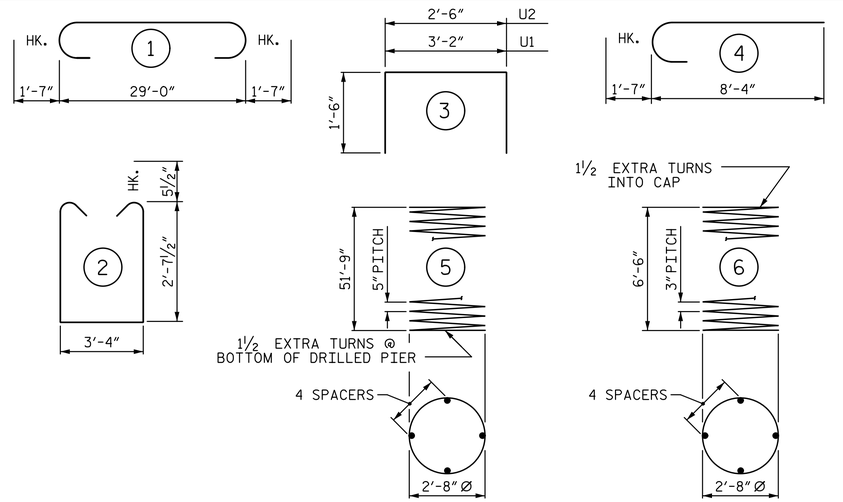
END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION THRU CAP

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	32'-2"	1709
B2	6	#5	STR	29'-2"	183
D1	36	#8	STR	2'-3"	216
M1	30	#11	STR	59'-10"	9537
S1	46	#5	2	9'-6"	456
U1	6	#4	3	6'-2"	25
U2	8	#4	3	5'-6"	29
V1	30	#11	4	9'-11"	1581
REINFORCING STEEL					13,736 LBS.
SP-1	3	*	5	1036'-3"	3242
SP-2	3	**	6	231'-0"	463
SPIRAL REINFORCING STEEL					3,705 LBS.

*THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

**THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

DRILLED PIER CONCRETE	
POUR #1 DRILLED PIERS	55.9 C.Y.
CLASS A CONCRETE BREAKDOWN	
POUR #2 COLUMNS	4.9 C.Y.
POUR #3 CAP	12.0 C.Y.
TOTAL CLASS A CONCRETE	16.9 C.Y.

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

BENT 1 DETAILS

Signed by: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040317 TONY R. LAWS JR. Electronic Signature
10/7/2025

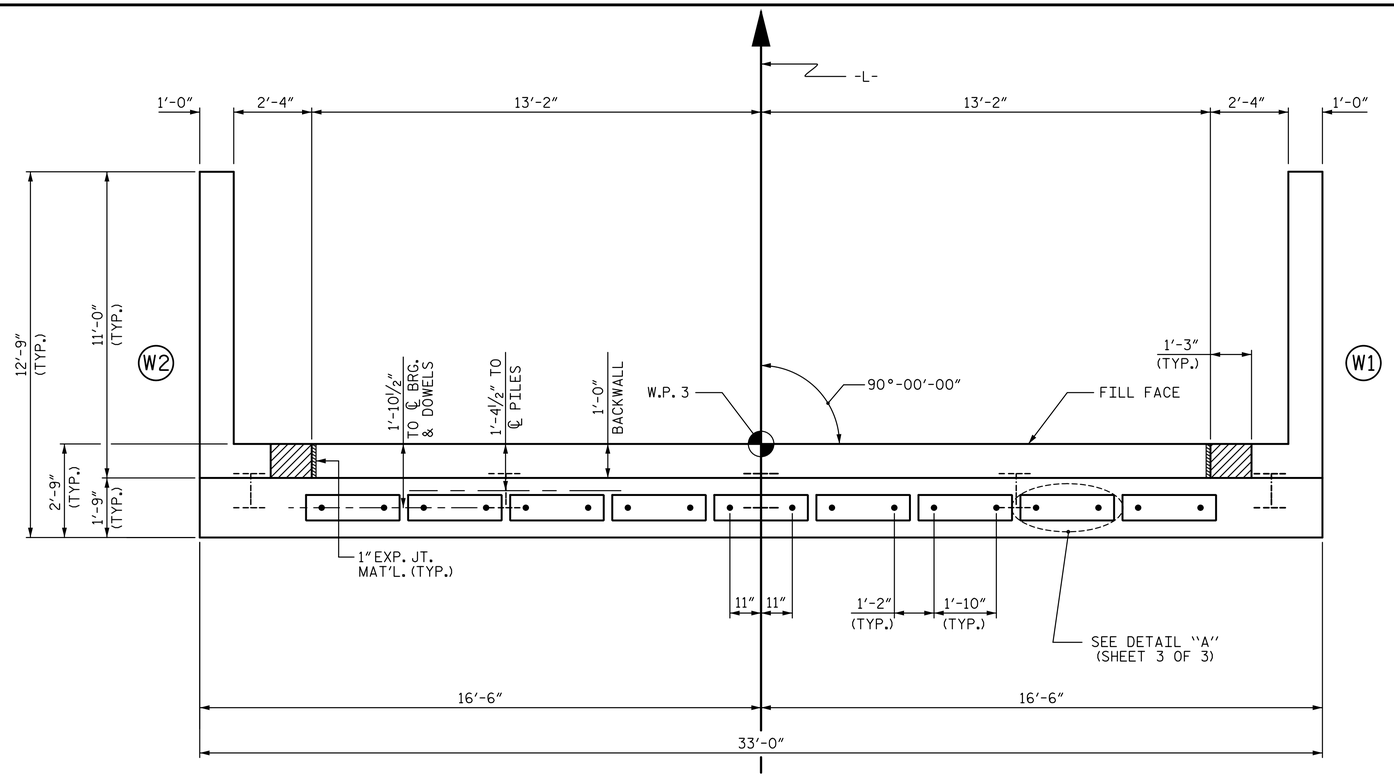
RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 ° F-0493 ° C-28

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			24

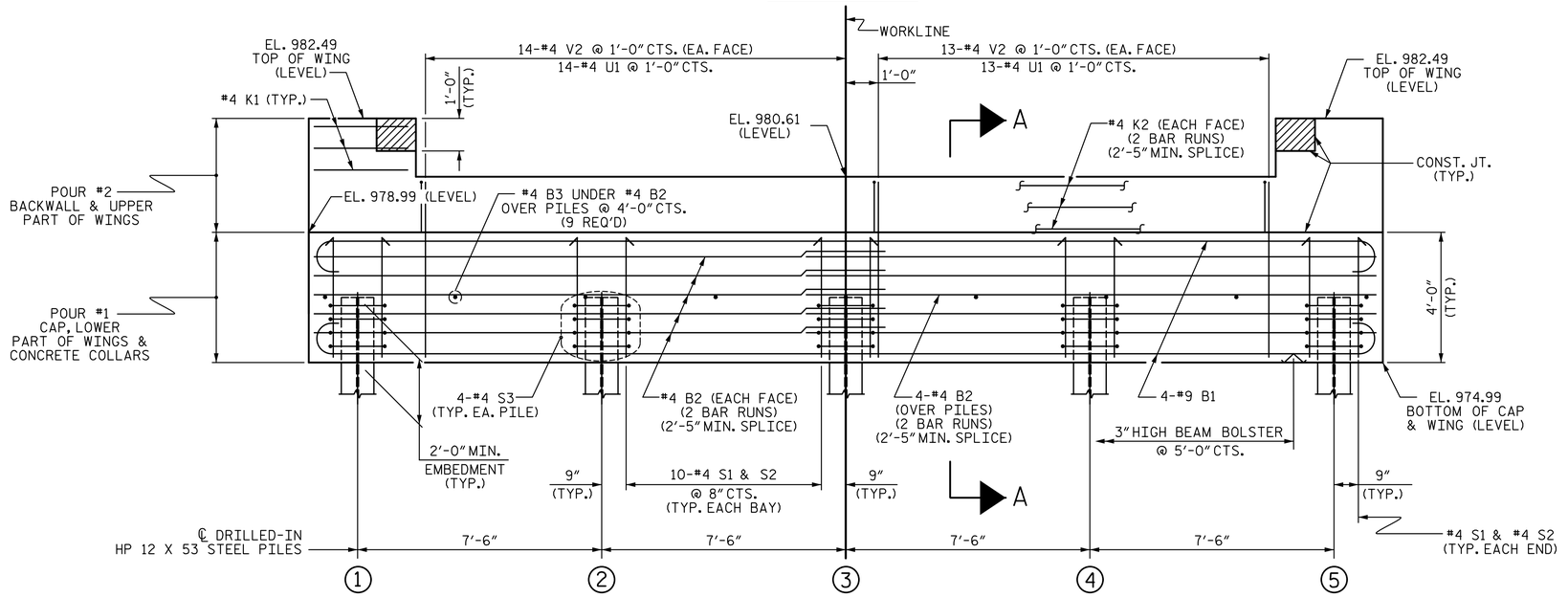
DRAWN BY : J. SCACCA DATE : 02/2025
CHECKED BY : T. R. LAWS DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_037_DF18314.2075090_SMU_B1_S-19_740112.dgn
AcostaM



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
FOR SECTION A-A, SEE SHEET 3 OF 3.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 3 OF 3.

NOTES

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

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

FOR WING DETAILS, SEE SHEET 2 OF 3.

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

PROJECT NO. DF18314.2075090
POLK COUNTY
STATION: 12+15.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 040037 ENGINEER TONY R. LAWS
10/7/2025

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 · F-0493 · C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

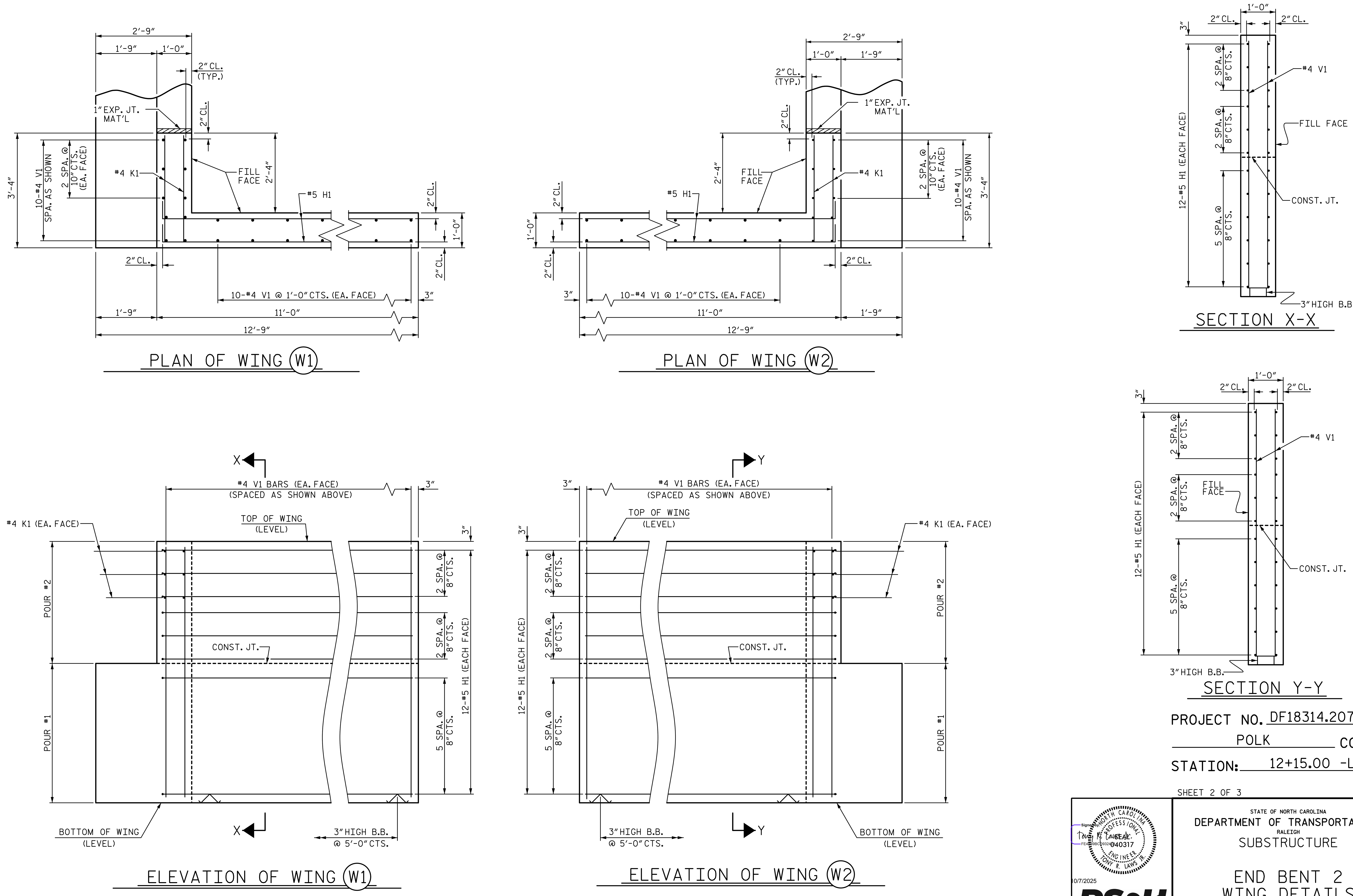
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : J. SCACCA DATE : 05/2025
CHECKED BY : M. ACOSTA DATE : 07/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_039_DF18314.2075090_SMU_E2_S-20_740112.dgn
AcostaM



WING DETAILS

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 2
WING DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040317 TONY R. LAWS JR.

10/7/2025

RS&H

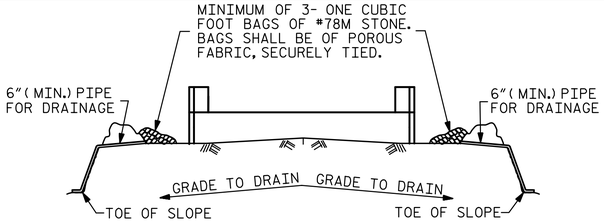
RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : J. SCACCA DATE : 05/2025
CHECKED BY : M. ACOSTA DATE : 07/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_041_DF18314.2075090_SMU_E2_S-21_740112.dgn
AcostaM

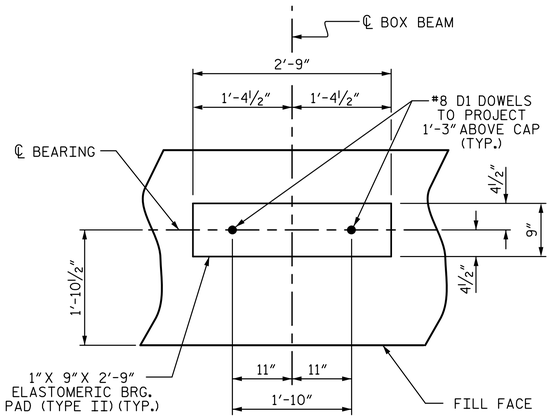


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

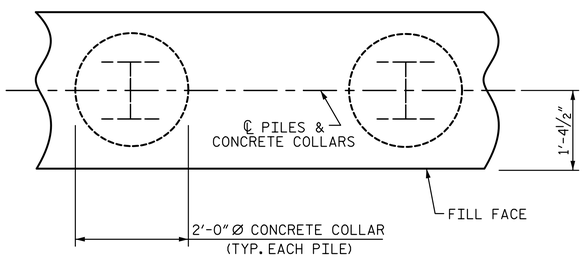
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

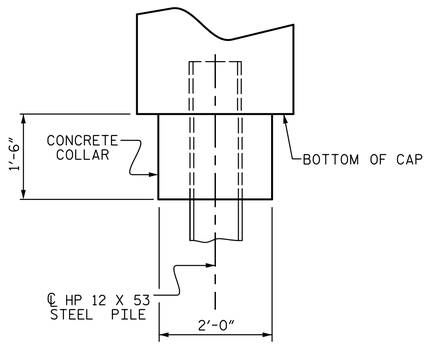
TEMPORARY DRAINAGE AT END BENT



DETAIL "A"
(END BENT 2 SHOWN)

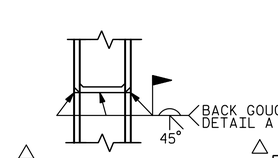


PLAN

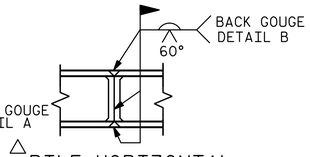


ELEVATION

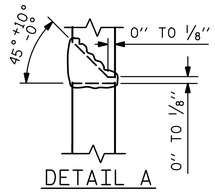
CORROSION PROTECTION FOR STEEL PILES DETAIL
(END BENT 2 SHOWN)

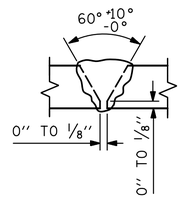


△ PILE VERTICAL



△ PILE HORIZONTAL OR VERTICAL

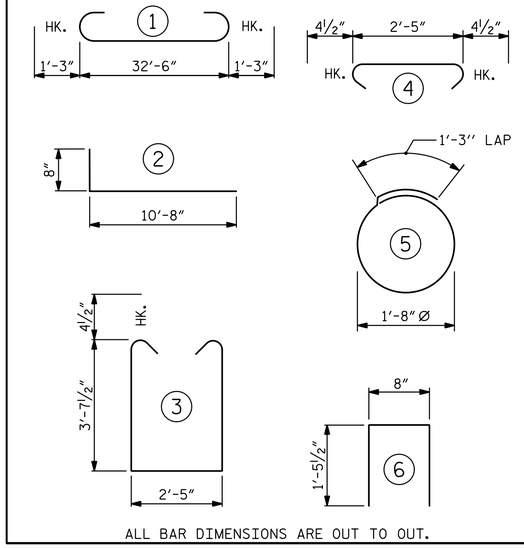




△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	35'-0"	952
B2	28	#4	STR	17'-7"	329
B3	9	#4	STR	2'-5"	15
D1	18	#8	STR	2'-3"	108
H1	48	#5	2	11'-4"	567
K1	12	#4	STR	2'-11"	23
K2	12	#4	STR	17'-7"	140
S1	42	#4	3	10'-5"	292
S2	42	#4	4	3'-2"	89
S3	20	#4	5	6'-6"	87
U1	27	#4	6	3'-7"	65
V1	60	#4	STR	7'-2"	287
V2	54	#4	STR	5'-3"	189

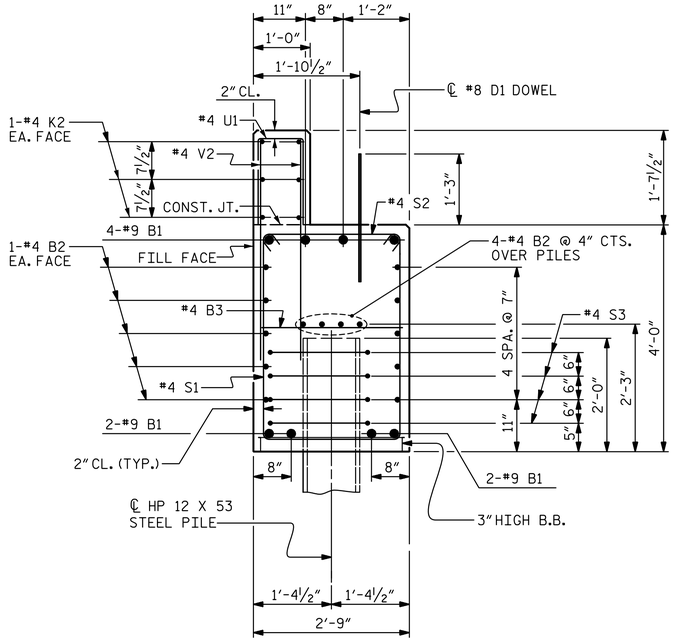
REINFORCING STEEL (FOR ONE END BENT) 3,143 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 17.3 C.Y.

POUR #2 BACKWALL & UPPER PART OF WINGS 5.0 C.Y.

TOTAL CLASS A CONCRETE 22.3 C.Y.



SECTION A-A
(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 040337 ENGINEER TROY R. LAWS
10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 ' F-0493 ' C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS

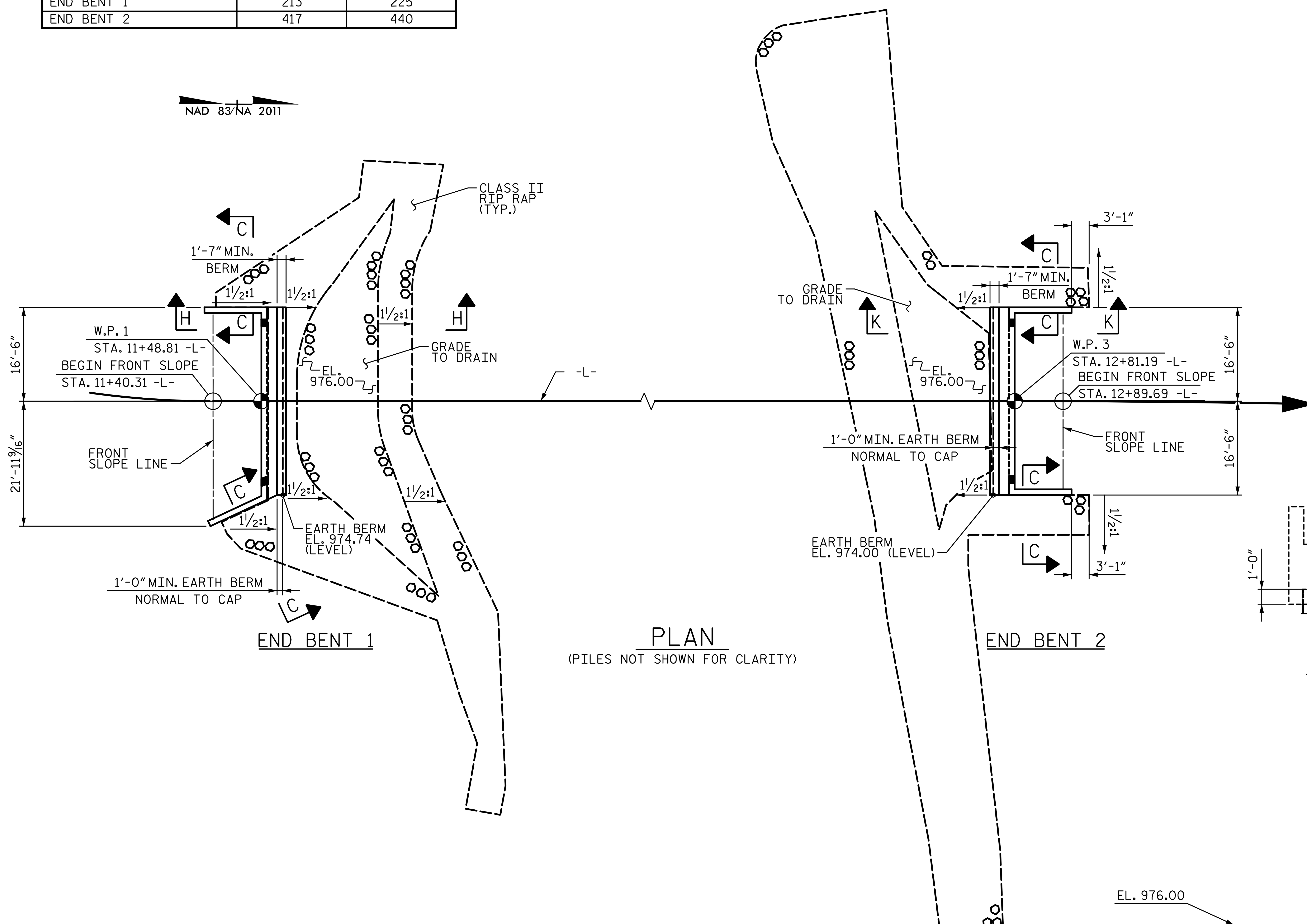
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			24

DRAWN BY : J. SCACCA DATE : 05/2025
CHECKED BY : M. ACOSTA DATE : 07/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

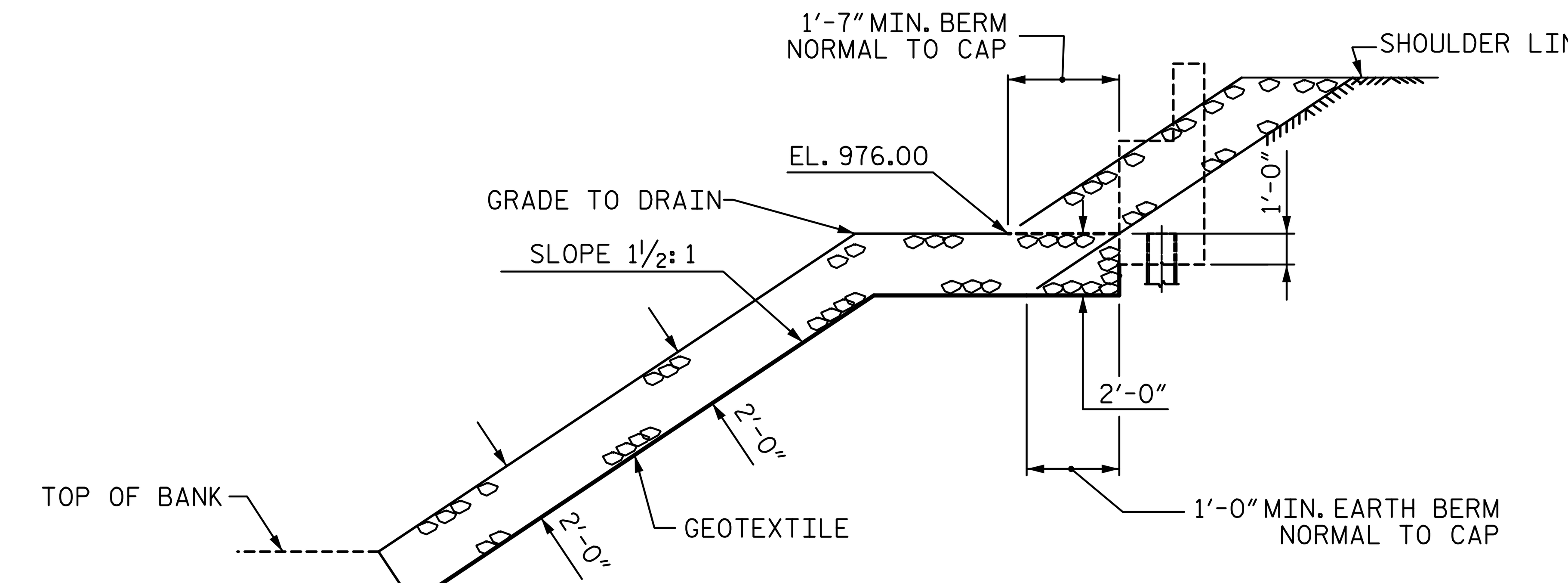
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_043_DF18314.2075090_SMU_E2_S-22_740112.dgn
AcostaM

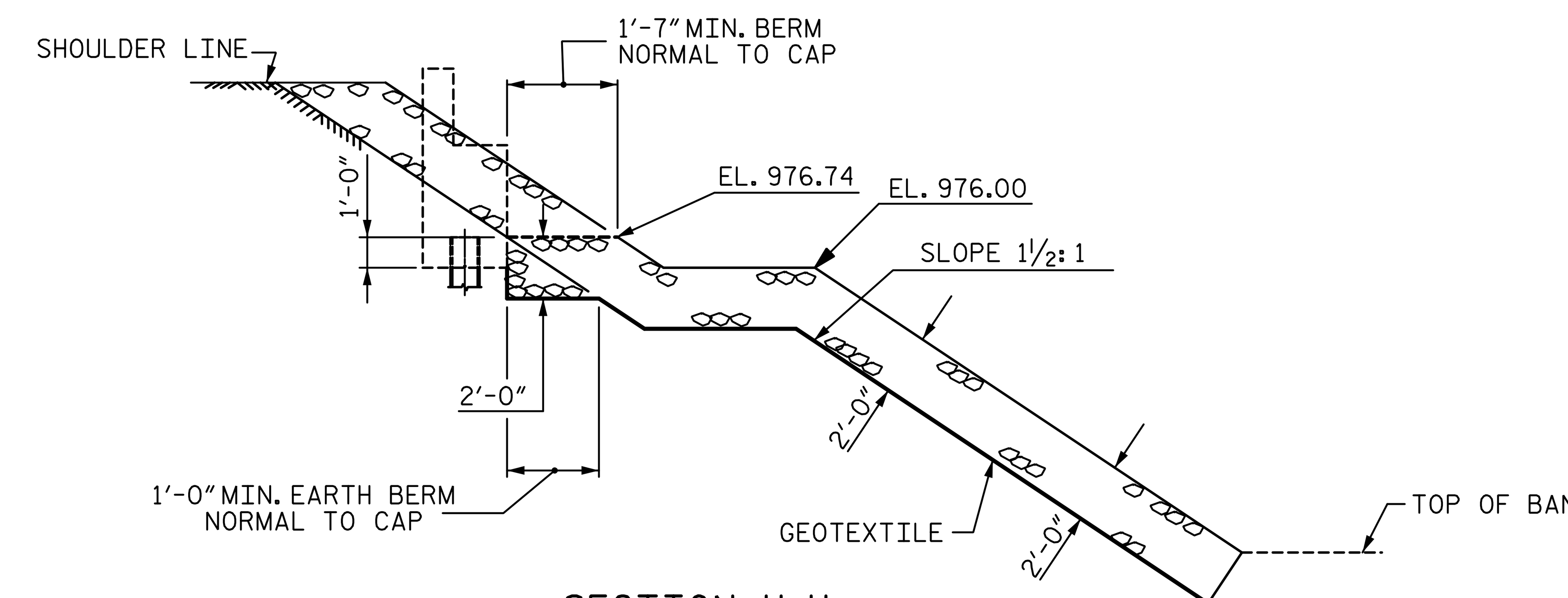
ESTIMATED QUANTITIES		
BRIDGE @ STA. 12+15.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	213	225
END BENT 2	417	440



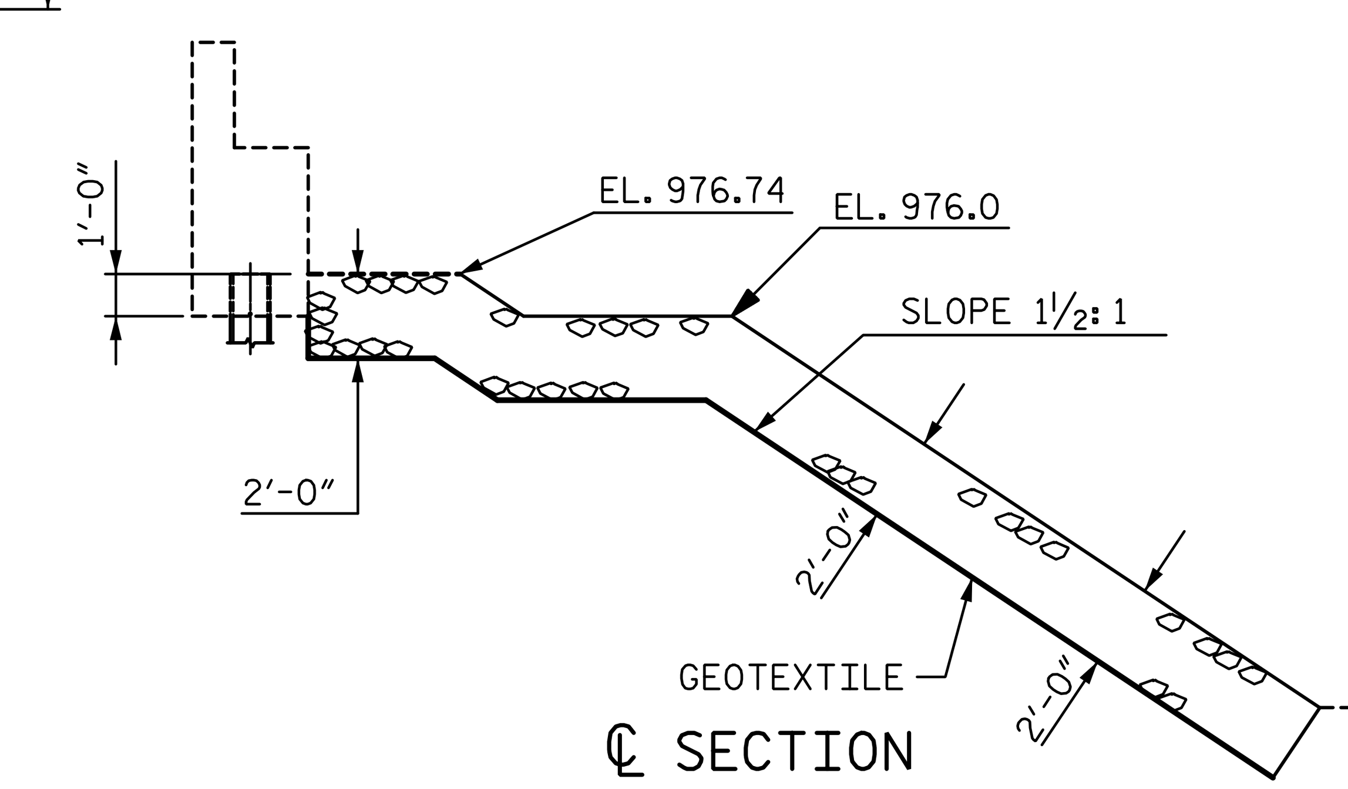
PLAN
(PILES NOT SHOWN FOR CLARITY)



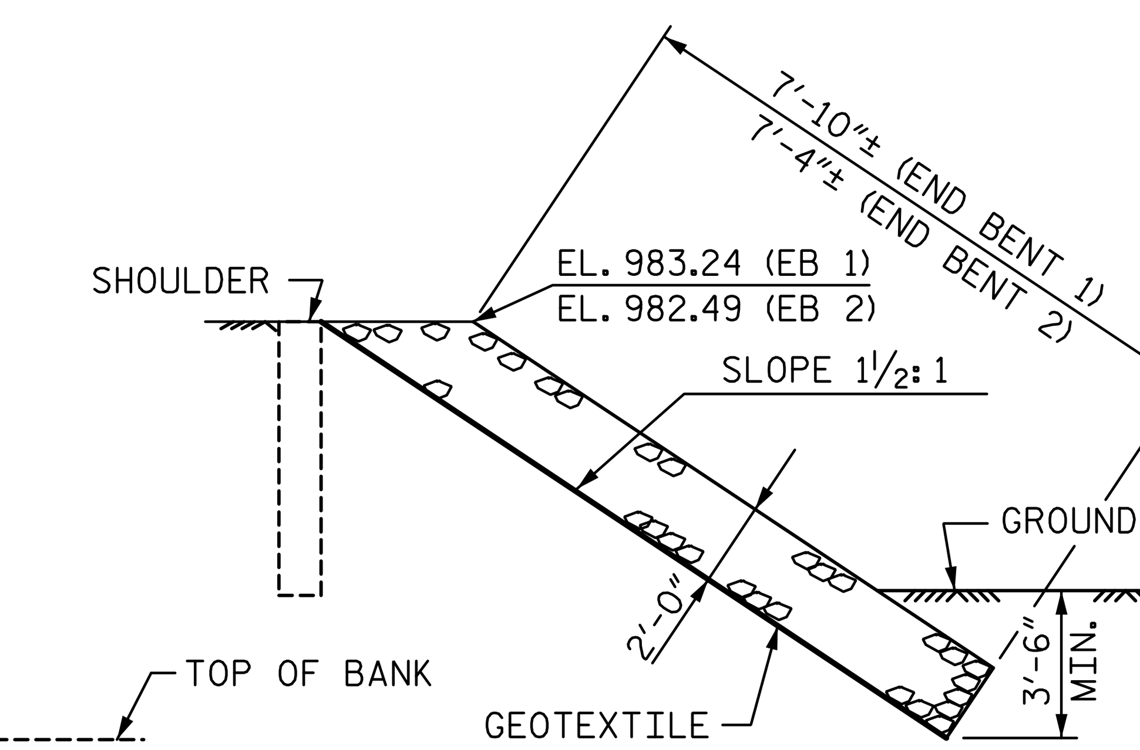
SECTION K-K



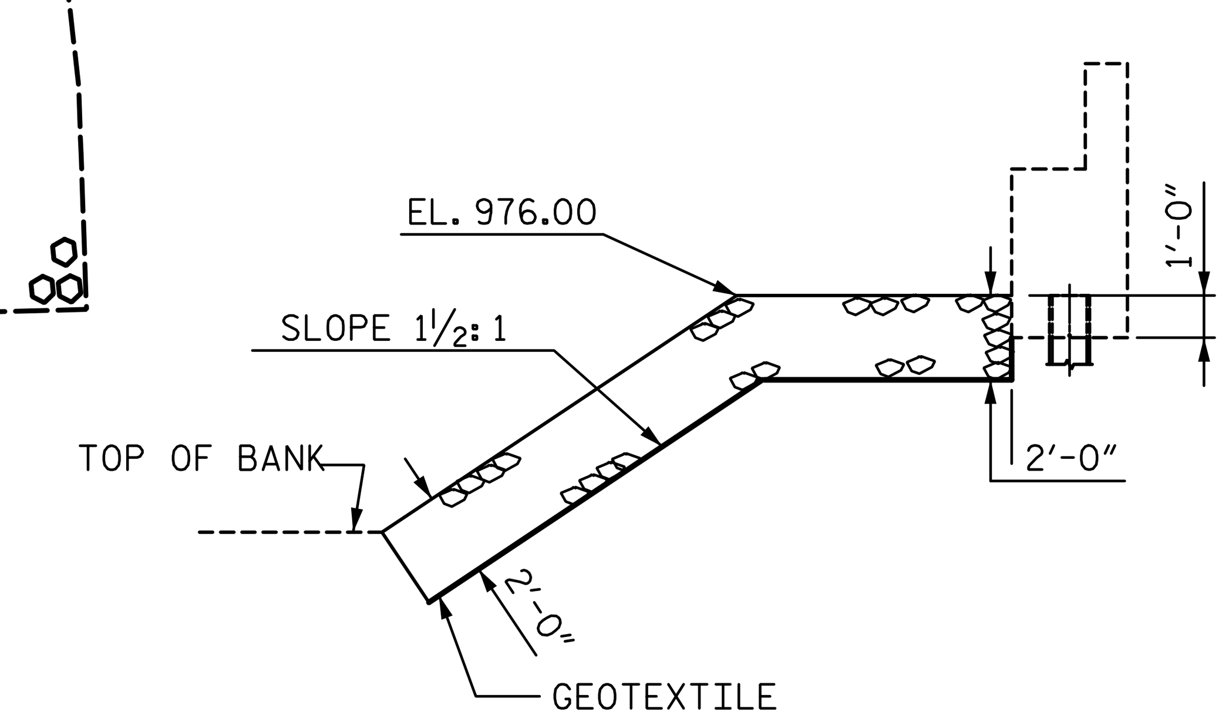
SECTION H-H



℄ SECTION
BERM RIP RAPPED
(END BENT 1 SHOWN)



SECTION C-C



℄ SECTION
BERM RIP RAPPED
(END BENT 2 SHOWN)

PROJECT NO. DF18314.2075090
POLK COUNTY
STATION: 12+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAIL

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER 040317 TONY R. LAWS JR.
10/7/2025

RS&H
RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 * F-0493 * C-28

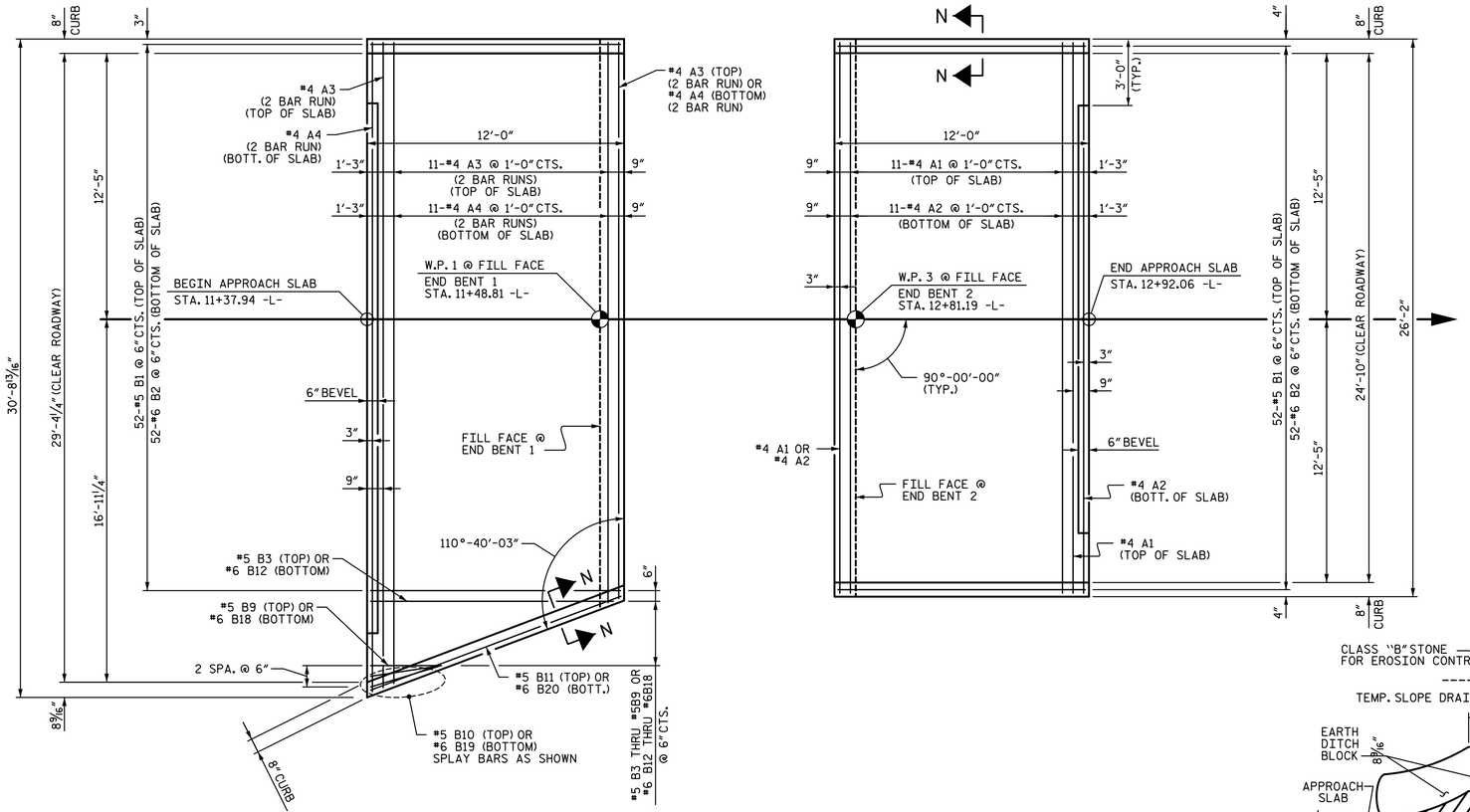
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S-23
TOTAL SHEETS 24

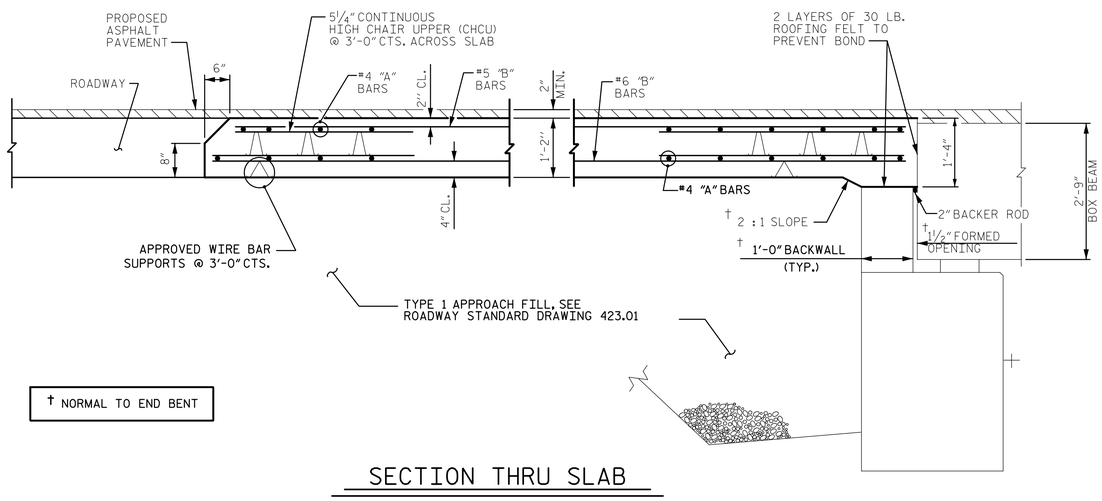
DRAWN BY : J. SCACCA DATE : 06/2025
CHECKED BY : M. ACOSTA DATE : 06/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS DATE : 10/2025

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_045_DF18314.2075090_SMU_RR_S-23_740112.dgn
AcostaM



PLAN @ END BENT 1

PLAN @ END BENT 2



† NORMAL TO END BENT

SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

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

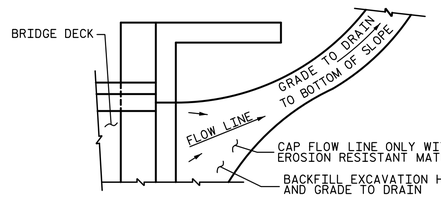
SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

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.

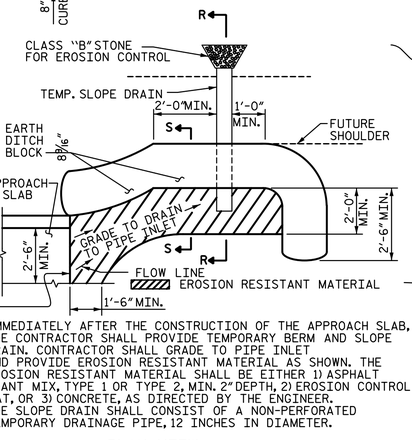
FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



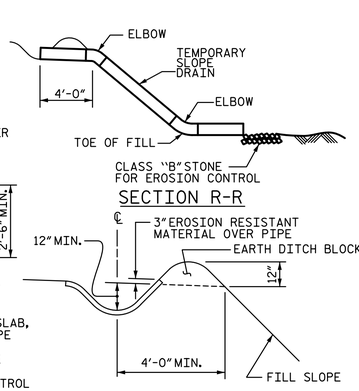
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL



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

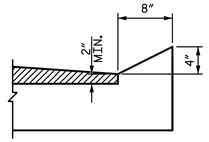


SECTION R-R

SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION N-N

CURB DETAILS

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

BILL OF MATERIAL

APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A3	26	#4	STR.	16'-1"	279
A4	26	#4	STR.	15'-11"	276
✱B1	52	#5	STR.	11'-2"	606
B2	52	#6	STR.	11'-8"	911
✱B3	1	#5	STR.	10'-10"	11
✱B4	1	#5	STR.	9'-6"	10
✱B5	1	#5	STR.	8'-2"	9
✱B6	1	#5	STR.	6'-10"	7
✱B7	1	#5	STR.	5'-6"	6
✱B8	1	#5	STR.	4'-2"	4
✱B9	1	#5	STR.	2'-11"	3
✱B10	2	#5	STR.	2'-6"	5
✱B11	1	#5	STR.	12'-5"	13
B12	1	#6	STR.	11'-3"	17
B13	1	#6	STR.	9'-11"	15
B14	1	#6	STR.	8'-7"	13
B15	1	#6	STR.	7'-3"	11
B16	1	#6	STR.	5'-11"	9
B17	1	#6	STR.	4'-7"	7
B18	1	#6	STR.	3'-3"	5
B19	2	#6	STR.	2'-6"	8
B20	1	#6	STR.	12'-5"	19

REINFORCING STEEL	LBS.	1291
✱EPOXY COATED REINFORCING STEEL	LBS.	953
CLASS AA CONCRETE	C.Y.	14.9

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	13	#4	STR	25'-10"	224
A2	13	#4	STR	25'-10"	224
✱B1	52	#5	STR	11'-2"	606
B2	52	#6	STR	11'-8"	911

REINFORCING STEEL	LBS.	1135
✱EPOXY COATED REINFORCING STEEL	LBS.	830
CLASS AA CONCRETE	C.Y.	13.9

PROJECT NO. DF18314.2075090

POLK COUNTY

STATION: 12+15.00 -L-

DRAWN BY : J. SCACCA	DATE : 02/2025
CHECKED BY : T. R. LAWS	DATE : 02/2025
DESIGN ENGINEER OF RECORD: T. R. LAWS	DATE : 10/2025

10/7/2025
\\rsandh.com\files\Projects\NCDOT\10034734006_Polk_112\03.00 Project Execution\03.04 Design\Structures\CAD\401_047_DF18314.2075090_SMU_AS_S-24_740112.dgn
AcostaM

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEALED NORTH CAROLINA PROFESSIONAL ENGINEER TREY R. LAWS SEAL 040317 SIGNATURE 10/7/2025

RS&H

RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License Nos. 50073 • F-0493 • C-28

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE BOX BEAM UNIT (SUB-REGIONAL TIER)

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

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 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" 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.