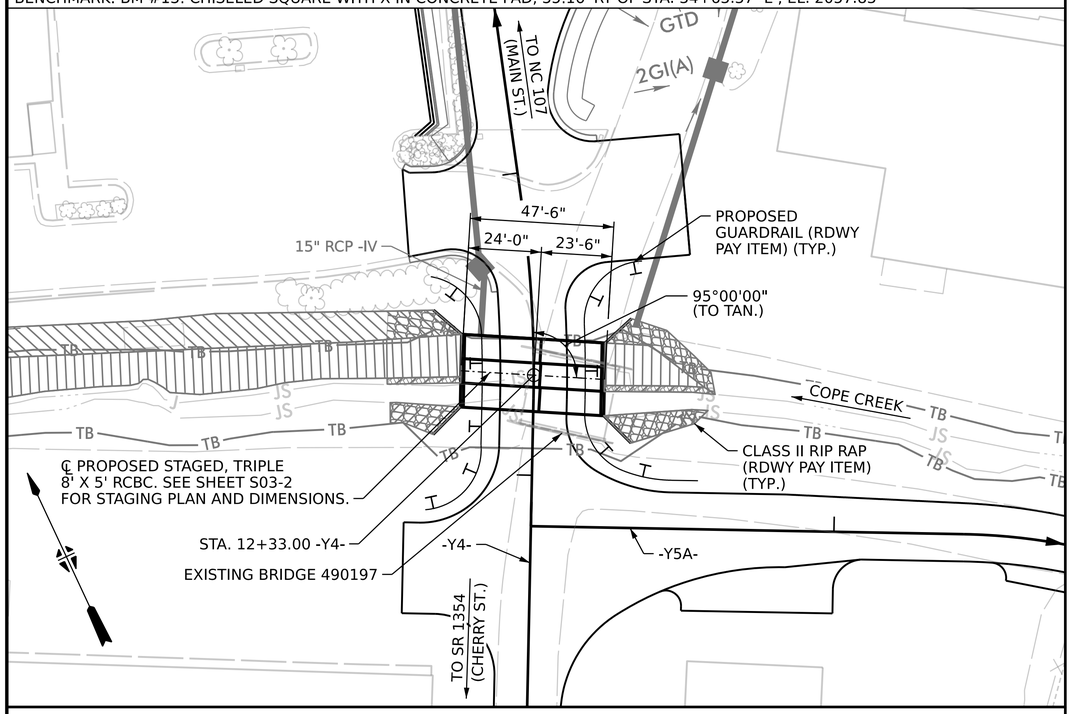
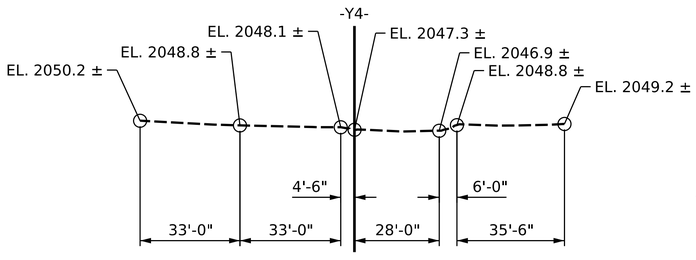
BENCHMARK: BM #13: CHISELED SQUARE WITH X IN CONCRETE PAD, 35.16' RT OF STA. 34+63.37 -L-, EL. 2057.83

F.A. PROJ. NO.: STP-0107(13)



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS



PROFILE ALONG ℄ CULVERT

HYDRAULIC DATA	
DESIGN DISCHARGE	= 690 CFS
FREQUENCY OF DESIGN FLOOD	= 10 YR.
DESIGN HIGH WATER ELEVATION	= 2052.1
DRAINAGE AREA	= 3.26 SQ. MI.
BASE DISCHARGE (Q100)	= 1300 CFS
BASE HIGH WATER ELEVATION	= 2053.9
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 710 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 10+/- YR.
OVERTOPPING FLOOD ELEVATION	= 2052.4

ROADWAY DATA	
GRADE POINT ELEV. @ STA. 12+33.00 -Y4-	= 2052.69
BED ELEV. @ STA. 12+33.00 -Y4-	= 2045.20
ROADWAY SLOPES	= 2:1

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

DESIGN FILL = 2.74' (MAX.) AND 1.53' (MIN.).

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.

3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

STAGE I

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS FOR BARRELS 2 & 3.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOR BARRELS 2 & 3.

STAGE II

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS FOR BARREL 1.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOR BARREL 1 FOLLOWED BY ROOF SLAB AND HEADWALLS FOR ALL BARRELS.

AT THE CONTRACTOR'S OPTION, THEY MAY PROPOSE AN ALTERNATE POUR SEQUENCE. CONTRACTOR SHALL ADHERE TO THE EROSION CONTROL PLAN. THE ALTERNATE POUR SEQUENCE MUST BE APPROVED BY THE RESIDENT ENGINEER.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

A 3 FOOT STRIP OF GEOTEXTILE SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

THE 15" DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE PIPE.

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.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 12+33.00 -Y4-".

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 25'-6"; 27'-8" CLEAR ROADWAY WIDTH AND TIMBER DECK ON I-BEAMS WITH A 1½" AWS; END BENTS CONSISTING OF TIMBER CAPS ON TIMBER PILES WITH TIMBER BULKHEADS AND LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT.

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

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE (STAGE I)		
BARREL @ 0.87 CY./FT.	41.5	C.Y.
CURTAIN WALL	2.4	C.Y.
WINGS	0.0	C.Y.
TOTAL	43.9	C.Y.
CLASS A CONCRETE (STAGE II)		
BARREL @ 1.44 CY./FT.	68.6	C.Y.
HEADWALLS, CURTAIN WALL, SILLS	6.8	C.Y.
WINGS	12.6	C.Y.
TOTAL	88.0	C.Y.
REINFORCING STEEL (STAGE I)		
BARREL, CURTAIN WALL	8449	LBS.
WINGS	0	LBS.
TOTAL	8449	LBS.
REINFORCING STEEL (STAGE II)		
BARREL, HEADWALLS, CURTAIN WALL, SILLS	10020	LBS.
WINGS	1380	LBS.
TOTAL	11400	LBS.
CULVERT EXCAVATION, STA. 12+33.00 -Y4-	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	103 TONS	
REMOVAL OF EXISTING STRUCTURE	LUMP SUM	
ASBESTOS ASSESSMENT	LUMP SUM	

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

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

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

Anna C. Teague

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+33.00 -Y4-

REPLACES BRIDGE 490197

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 8 FT. X 5 FT. CONCRETE BOX CULVERT 95° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-1
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY: D. MAST DATE : 07/24
DES CHK: G. M. CASTREJON DATE : 07/24

DWG BY: B. PETERSON DATE : 07/24
CHK BY: E. NOLTING DATE : 07/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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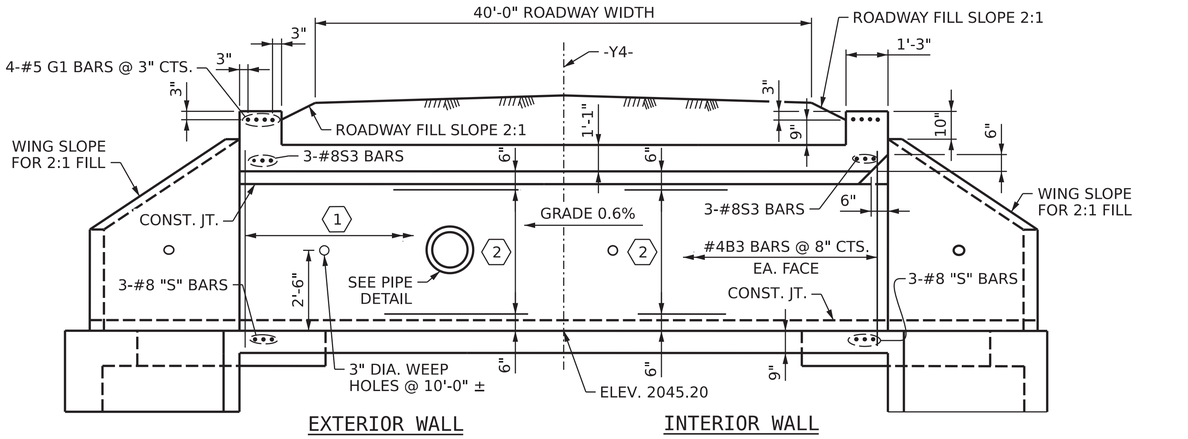
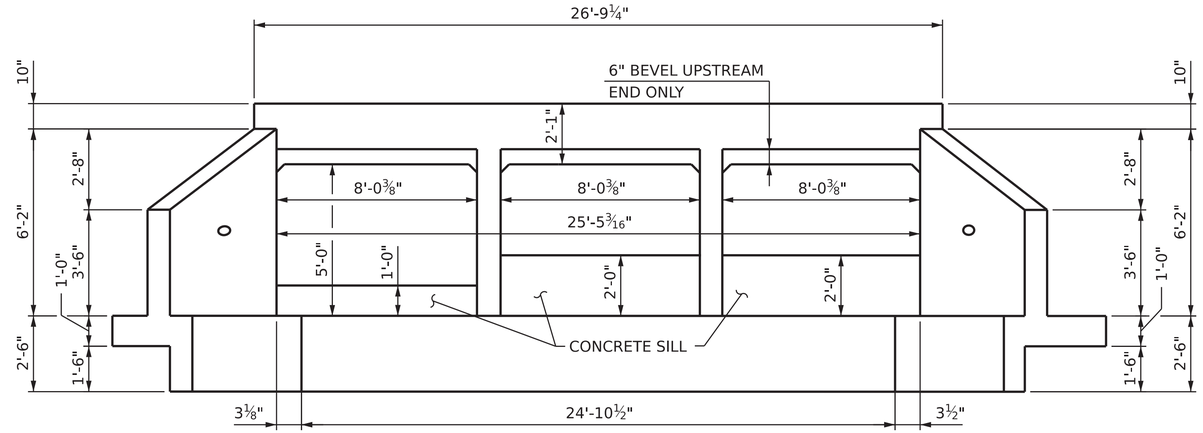
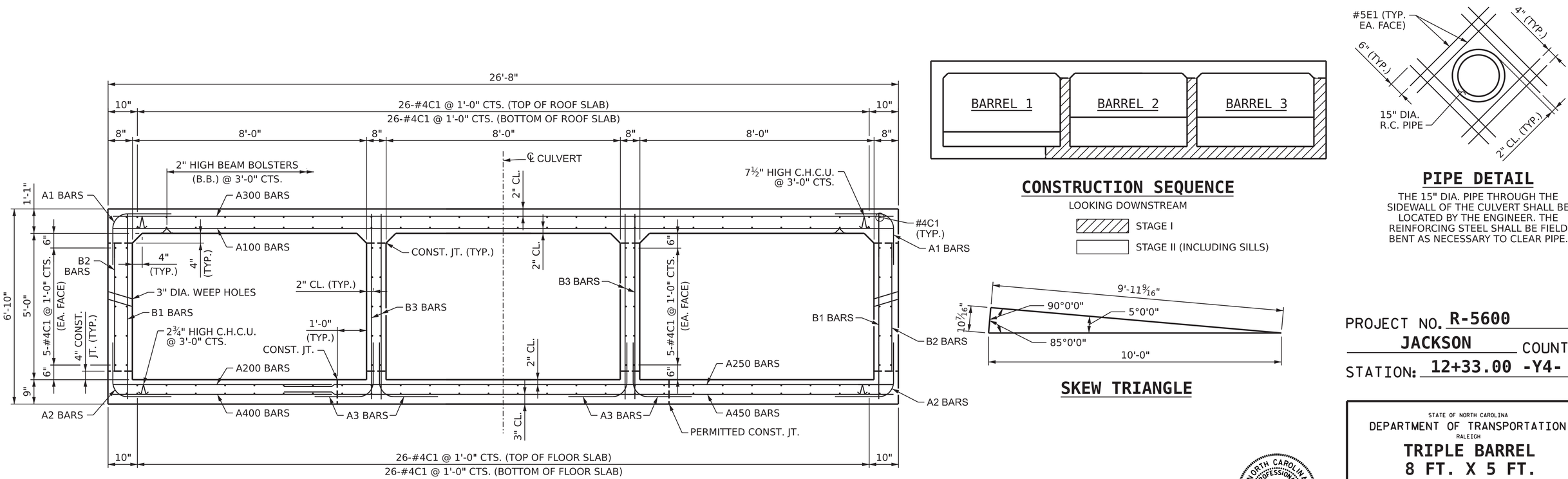


CULVERT SECTION NORMAL TO ROADWAY

1. #4B1 BARS @ 8" CTS. STREAM FACE
   #4B2 BARS @ 8" CTS. FILL FACE
2. #4C1 BARS @ 1'-0" CTS. AS SHOWN IN TYPICAL BARREL SECTION



INLET ELEVATION NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

THERE ARE 148 C1 BARS IN SECTION OF BARREL
(LOOKING DOWNSTREAM)

CONSTRUCTION SEQUENCE

LOOKING DOWNSTREAM

STAGE I

STAGE II (INCLUDING SILLS)

SKEW TRIANGLE

PIPE DETAIL

THE 15" DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+33.00 -Y4-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 8 FT. X 5 FT. CONCRETE BOX CULVERT 95° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
Anna C. Teague 8/5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-2
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY:	D. MAST	DATE :	06/24
DES CHK:	E. NOLTING	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	06/24
CHK BY:	E. NOLTING	DATE :	06/24

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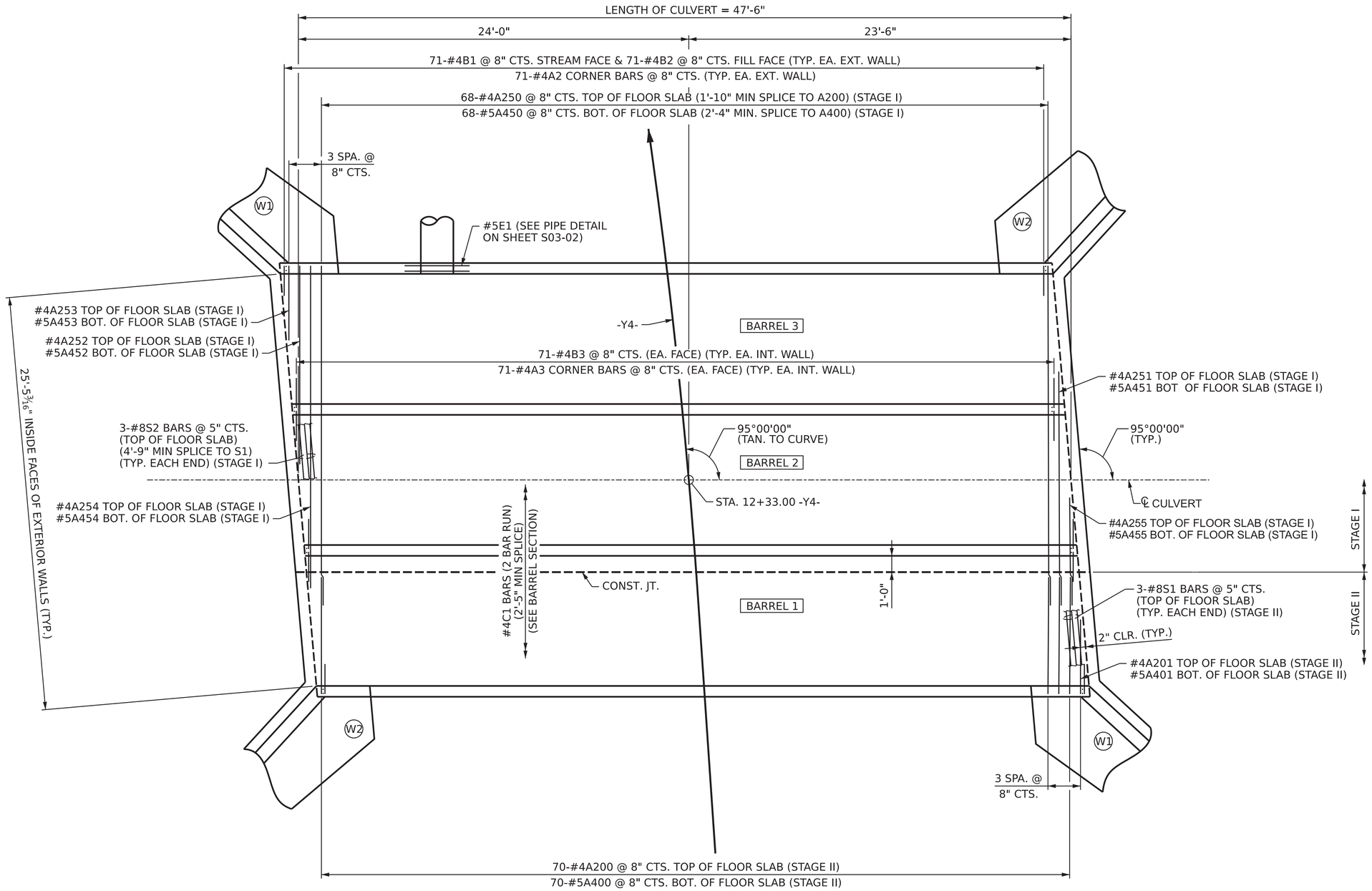

FLOOR SLAB

(SILLS NOT SHOWN FOR CLARITY)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+33.00 -Y4-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 8 FT. X 5 FT. CONCRETE BOX CULVERT 95° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
Anna C. Teague 8/5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-3
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY:	D. MAST	DATE :	07/24
DES CHK:	G. M. CASTREJON	DATE :	07/24
DWG BY:	D. CHAPMAN	DATE :	07/24
CHK BY:	E. NOLTING	DATE :	08/24

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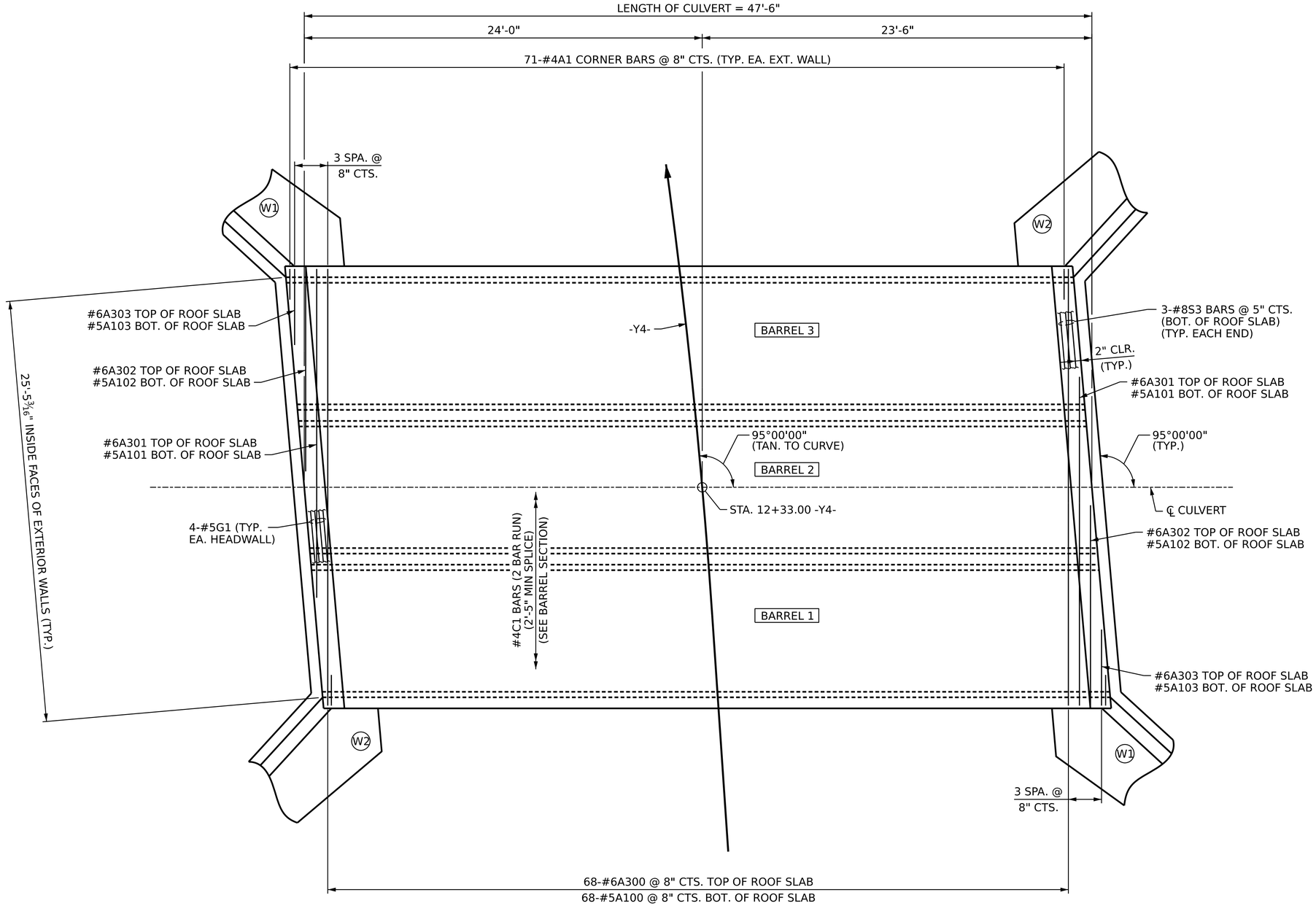

ROOF SLAB

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+33.00 -Y4-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 8 FT. X 5 FT. CONCRETE BOX CULVERT 95° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

Anna C. Teague

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-4
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY: D. MAST DATE : 07/24
DES CHK: G. M. CASTREJON DATE : 07/24

DWG BY: B. PETERSON DATE : 07/24
CHK BY: E. NOLTING DATE : 08/24

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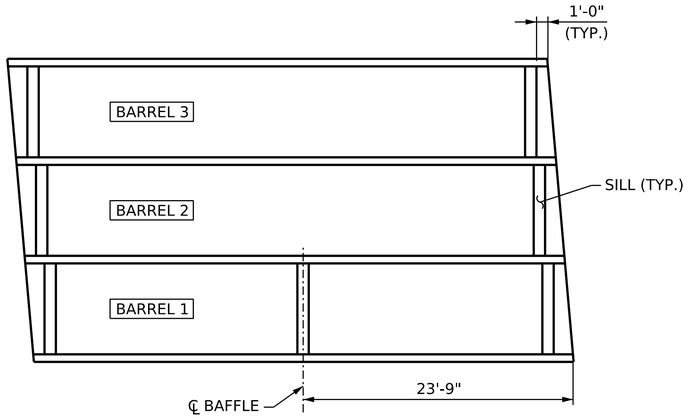
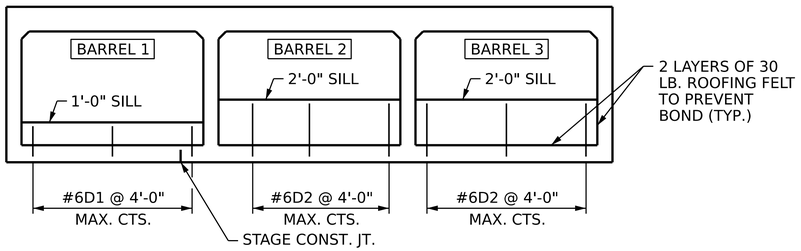
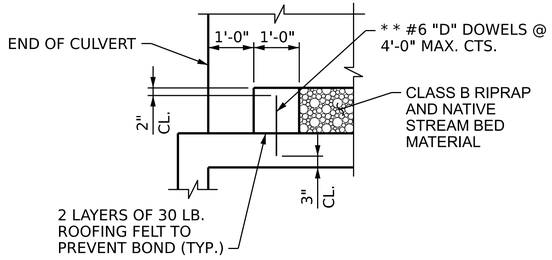


PLAN



SECTION - LOOKING DOWNSTREAM



SECTION THROUGH SILL (BAFFLE SIMILAR)

** DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

SILL & BAFFLE DETAILS

NOTES

BACKFILL CULVERT BARRELS WITH CLASS B RIPRAP AND TOP WITH NATIVE MATERIAL TO SILL HEIGHT.

NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIPRAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARRELS. IF RIPRAP IS USED TO LINE THE HIGH FLOW CULVERT BARRELS, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

SILLS ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

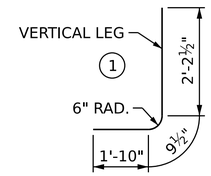
TOP OF LOW FLOW SILLS SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM.

SILLS TO BE CAST DURING STAGE II CONSTRUCTION. D2 DOWELS MAY BE INSTALLED DURING STAGE I CONSTRUCTION.

THE ENGINEER, IN CONSULTATION WITH DEO STAFF, SHALL REVIEW ALL MATERIAL TO BE USED AS BACKFILL PRIOR TO CONDUCTING THE BACKFILL ACTIVITY. BACKFILL SHALL CONSIST OF CLASS B RIPRAP AND NATIVE MATERIAL ONLY, UNLESS THE ENGINEER, IN CONSULATION WITH DEO STAFF, DETERMINES THAT (1) THE NATIVE MATERIAL IS UNSUITABLE, OR (2) ADDITIONAL MATERIAL IS REQUIRED TO SUPPLEMENT THE NATIVE MATERIAL. THE CHOSEN BACKFILL MATERIAL SHALL NOT HAVE ADVERSE EFFECTS TO AQUATIC LIFE, AQUATIC LIFE PASSAGE, OR WATER QUALITY. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION.

DES BY:	D. MAST	DATE :	07/24
DES CHK:	G. M. CASTREJON	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	07/24
CHK BY:	E. NOLTING	DATE :	08/24

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	71	#4	1	4'-10"	230
A2	71	#4	1	4'-10"	230
A3	284	#4	1	4'-10"	917
A250	68	#4	STR	20'-10"	947
A251	1	#4	STR	14'-4"	10
A252	1	#4	STR	12'-2"	9
A253	1	#4	STR	4'-7"	4
A254	1	#4	STR	19'-9"	14
A255	1	#4	STR	6'-7"	5
A450	68	#5	STR	21'-4"	1514
A451	1	#5	STR	14'-10"	16
A452	1	#5	STR	12'-2"	13
A453	1	#5	STR	4'-7"	5
A454	1	#5	STR	19'-9'	21
A455	1	#5	STR	7'-1"	8
B1	71	#4	STR	6'-5"	305
B2	71	#4	STR	4'-4"	206
B3	284	#4	STR	6'-5"	1218
C1	138	#4	STR	24'-10"	2290
D2	12	#6	STR	2'-4"	43
E1	16	#5	STR	3'-9"	63
S2	6	#8	STR	23'-9"	381

REINFORCING STEEL	8449	LBS.
CLASS A CONCRETE		
BARREL	41.5	C.Y.
CURTAIN WALL	2.4	C.Y.
TOTAL	43.9	C.Y.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	71	#4	1	4'-10"	230
A2	71	#4	1	4'-10"	230
A100	68	#5	STR	26'-4"	1868
A101	2	#5	STR	19'-10"	42
A102	2	#5	STR	12'-2"	26
A103	2	#5	STR	4'-7"	10
A200	70	#4	STR	7'-5"	347
A201	1	#4	STR	4'-7"	4
A300	68	#6	STR	26'-4"	2690
A301	2	#6	STR	19'-10"	60
A302	2	#6	STR	12'-2"	37
A303	2	#6	STR	4'-7"	14
A400	70	#5	STR	7'-5"	542
A401	1	#5	STR	4'-7"	5
B1	71	#4	STR	6'-5"	305
B2	71	#4	STR	4'-4"	206
C1	158	#4	STR	24'-10"	2622
D1	9	#6	STR	1'-4"	19
G1	8	#5	STR	26'-5"	221
S1	6	#8	STR	7'-4"	118
S3	6	#8	STR	26'-5"	424

REINFORCING STEEL	10020	LBS.
CLASS A CONCRETE		
BARREL	68.6	C.Y.
HEADWALL	2.5	C.Y.
CURTAIN WALL	1.0	C.Y.
SILL	3.3	C.Y.
TOTAL	75.4	C.Y.

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A200, A250	#4	1'-10"
A400, A450	#5	2'-4"
C1	#4	2'-5"
S1, S2	#8	4'-9"

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+33.00 -Y4-

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

Anna C. Teague

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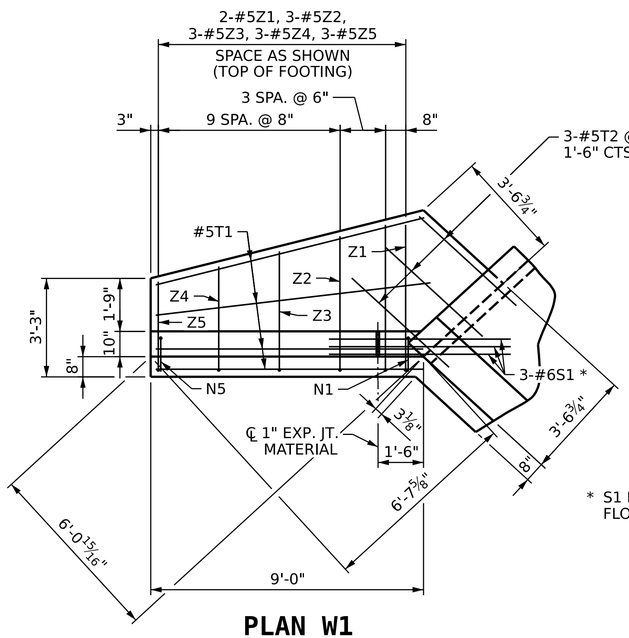
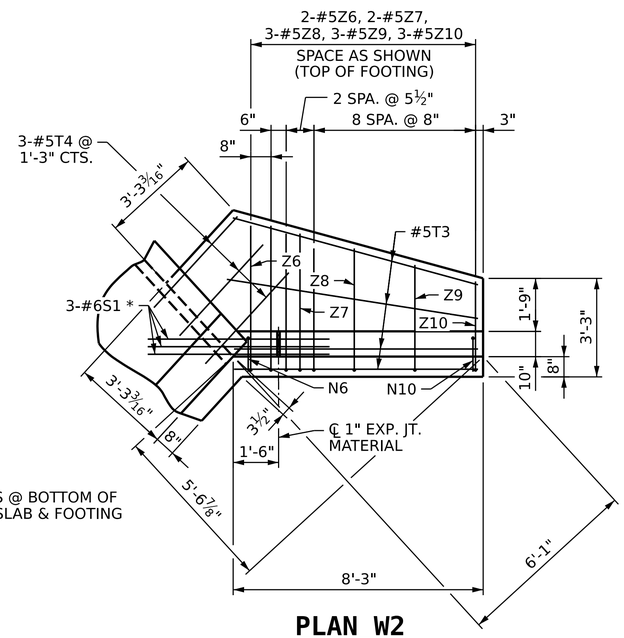
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 8 FT. X 5 FT. CONCRETE BOX CULVERT 95° SKEW

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S03-5
1	--	--	3	--	--	TOTAL SHEETS	
2	--	--	4	--	--	8	

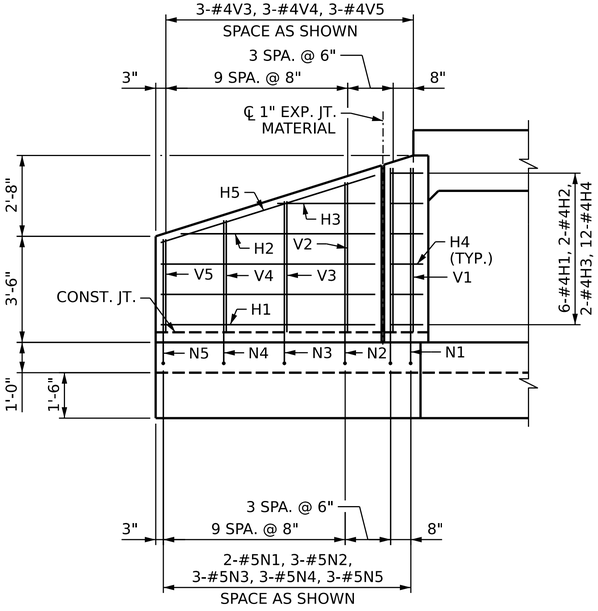


PLAN W1

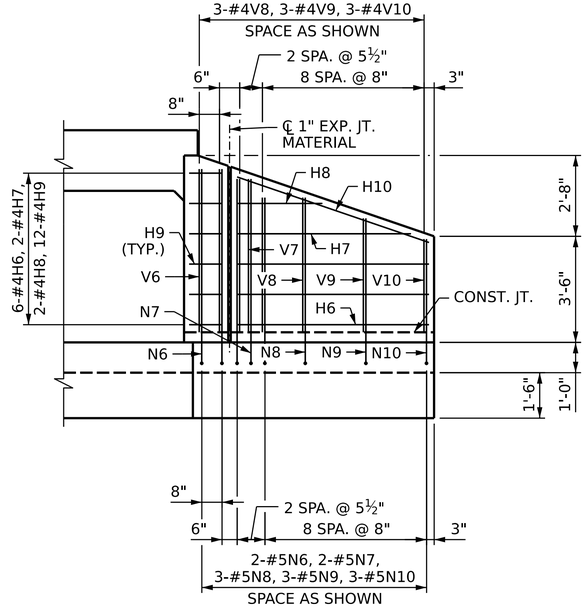


PLAN W2

* S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING



ELEVATION W1



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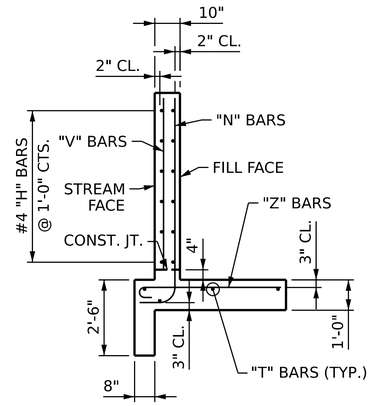
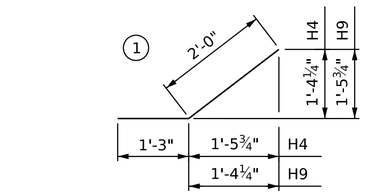
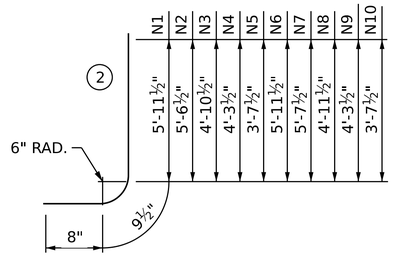
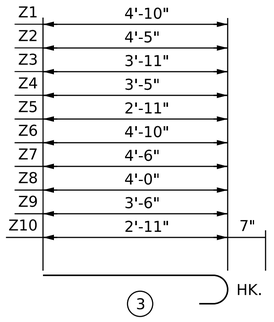


TYPICAL WING SECTION

BAR TYPES







ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	7'-1"	57
H2	4	#4	STR	6'-5"	18
H3	4	#4	STR	3'-2"	9
H4	24	#4	1	3'-3"	53
H5	4	#4	STR	7'-5"	20
H6	12	#4	STR	6'-4"	51
H7	4	#4	STR	5'-8"	16
H8	4	#4	STR	2'-9"	8
H9	24	#4	1	3'-3"	53
H10	4	#4	STR	6'-8"	18
N1	4	#5	2	7'-5"	31
N2	6	#5	2	7'-0"	44
N3	6	#5	2	6'-4"	40
N4	6	#5	2	5'-9"	36
N5	6	#5	2	5'-1"	32
N6	4	#5	2	7'-5"	31
N7	4	#5	2	7'-1"	30
N8	6	#5	2	6'-5"	41
N9	6	#5	2	5'-9"	36
N10	6	#5	2	5'-1"	32
S1	12	#6	STR	6'-0"	109
T1	8	#5	STR	9'-1"	76
T2	6	#5	STR	4'-6"	29
T3	8	#5	STR	8'-4"	70
T4	6	#5	STR	4'-6"	29
V1	4	#4	STR	5'-5"	15
V2	6	#4	STR	4'-11"	20
V3	6	#4	STR	4'-4"	18
V4	6	#4	STR	3'-8"	15
V5	6	#4	STR	3'-1"	13
V6	4	#4	STR	5'-5"	15
V7	4	#4	STR	5'-0"	14
V8	6	#4	STR	4'-5"	18
V9	6	#4	STR	3'-9"	16
V10	6	#4	STR	3'-1"	13
Z1	4	#5	3	5'-5"	23
Z2	6	#5	3	5'-0"	32
Z3	6	#5	3	4'-6"	29
Z4	6	#5	3	4'-0"	26
Z5	6	#5	3	3'-6"	22
Z6	4	#5	3	5'-5"	23
Z7	4	#5	3	5'-1"	22
Z8	6	#5	3	4'-7"	29
Z9	6	#5	3	4'-1"	26
Z10	6	#5	3	3'-6"	22

REINFORCING STEEL FOR 4 WINGS	1380	LBS.
CLASS A CONCRETE FOR 4 WINGS	12.6	C.Y.

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+33.00 -Y4-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT 95° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

Anna C. Teague 9/5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-6
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY: G. M. CASTREJON DATE : 09/24
DES CHK: E. NOLTING DATE : 10/24

DWG BY: D. CHAPMAN DATE : 09/24
CHK BY: E. NOLTING DATE : 10/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ LL)	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.34	--	1.75	1.34	1	TOP SLAB	4.00	1.35	1	TOP SLAB	8.00	
		HL-93 (OPERATING)	N/A		1.73	--	1.35	1.73	1	TOP SLAB	4.00	1.76	1	TOP SLAB	8.00	
		HS-20 (INVENTORY)	36.000	2	1.34	48.24	1.75	1.34	1	TOP SLAB	4.00	1.35	1	TOP SLAB	8.00	
		HS-20 (OPERATING)	36.000		1.73	62.28	1.35	1.73	1	TOP SLAB	4.00	1.76	1	TOP SLAB	8.00	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		2.50	33.75	1.40	2.50	1	TOP SLAB	4.00	2.83	1	TOP SLAB	0.00	
		SNGARBS2	20.000		2.31	46.20	1.40	2.31	1	TOP SLAB	4.00	2.66	1	TOP SLAB	0.00	
		SNAGRIS2	22.000		2.44	53.68	1.40	2.44	1	TOP SLAB	4.00	2.83	1	TOP SLAB	0.00	
		SNCOTTS3	27.250		1.69	46.05	1.40	1.82	1	TOP SLAB	4.00	1.69	1	TOP SLAB	8.00	
		SNAGGRS4	34.925		1.80	62.87	1.40	1.80	1	BOTTOM SLAB	8.00	1.94	1	BOTTOM SLAB	8.00	
		SNS5A	35.550		1.80	63.99	1.40	1.80	1	BOTTOM SLAB	8.00	1.90	1	BOTTOM SLAB	8.00	
		SNS6A	39.950		1.76	70.31	1.40	1.76	1	BOTTOM SLAB	4.00	1.82	1	BOTTOM SLAB	8.00	
		SNS7B	42.000		1.66	69.72	1.40	1.66	1	BOTTOM SLAB	8.00	1.77	1	BOTTOM SLAB	8.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.95	64.35	1.40	1.95	1	BOTTOM SLAB	8.00	2.04	1	BOTTOM SLAB	8.00	
		TNT4A	33.075		1.91	63.17	1.40	1.91	1	BOTTOM SLAB	4.00	2.03	1	BOTTOM SLAB	8.00	
		TNT6A	41.600		1.85	76.96	1.40	1.85	1	BOTTOM SLAB	4.00	1.91	1	BOTTOM SLAB	8.00	
		TNT7A	42.000		1.67	70.14	1.40	1.67	1	BOTTOM SLAB	4.00	1.75	1	BOTTOM SLAB	8.00	
		TNT7B	42.000		1.77	74.34	1.40	1.77	1	BOTTOM SLAB	4.00	1.85	1	BOTTOM SLAB	8.00	
		TNAGRIT4	43.000	3	1.51	64.93	1.40	1.51	1	BOTTOM SLAB	4.00	1.56	1	BOTTOM SLAB	8.00	
		TNAGT5A	45.000		1.62	72.90	1.40	1.62	1	BOTTOM SLAB	8.00	1.75	1	BOTTOM SLAB	8.00	
		TNAGT5B	45.000		1.55	69.75	1.40	1.55	1	BOTTOM SLAB	4.00	1.61	1	BOTTOM SLAB	8.00	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.72	49.45	1.30	1.72	1	TOP SLAB	4.00	1.97	1	TOP SLAB	8.00	
		EV3	43.000	4	1.36	58.48	1.30	1.53	1	BOTTOM SLAB	4.00	1.36	1	TOP SLAB	8.00	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATES.

COMMENTS:

1.

2.

3.

4.

(#) CONTROLLING LOAD RATING

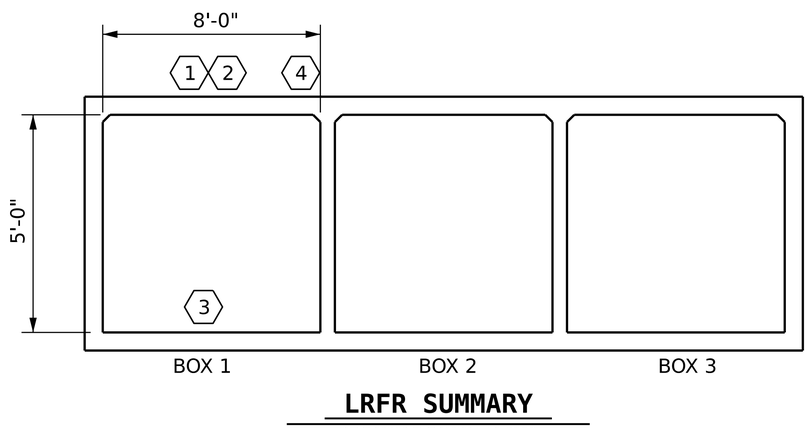
(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING * *

(4) EMERGENCY VEHICLE LOAD RATING * *

* * SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+33.00 -Y4-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

Anna C. Teague

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-7
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY: D. MAST DATE : 07/24
DES CHK: G. M. CASTREJON DATE : 07/24

DWG BY: D. CHAPMAN DATE : 07/24
CHK BY: E. NOLTING DATE : 08/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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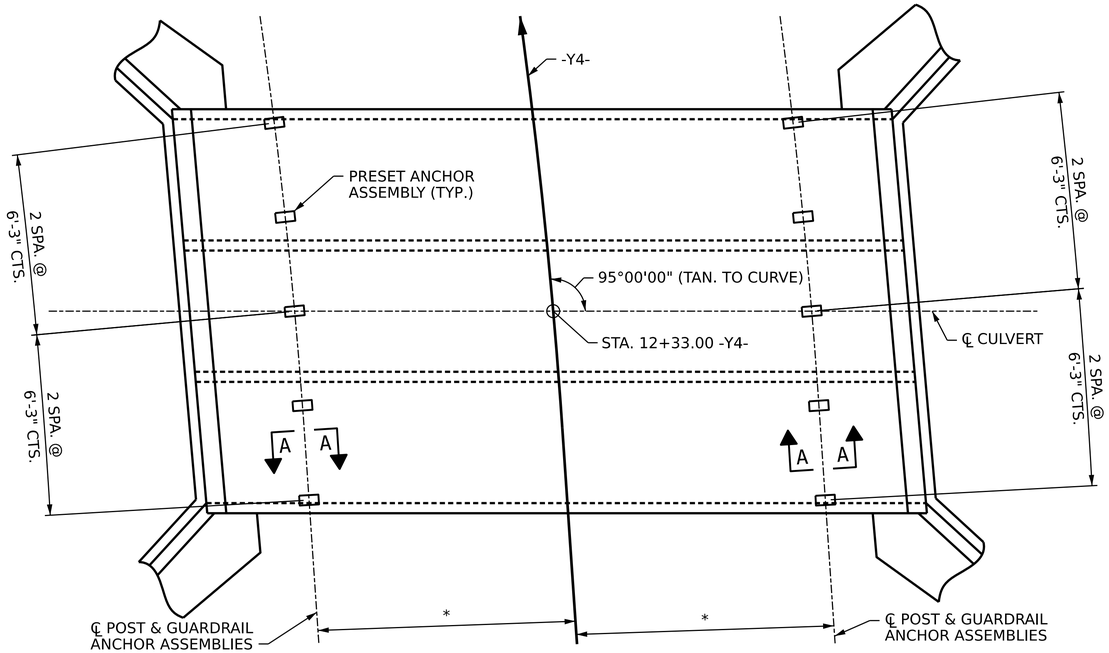


PLAN OF CULVERT GUARDRAIL ANCHOR ASSEMBLY SPACING

* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1" ∅ X 2¼" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" ∅ X 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16" ∅ WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

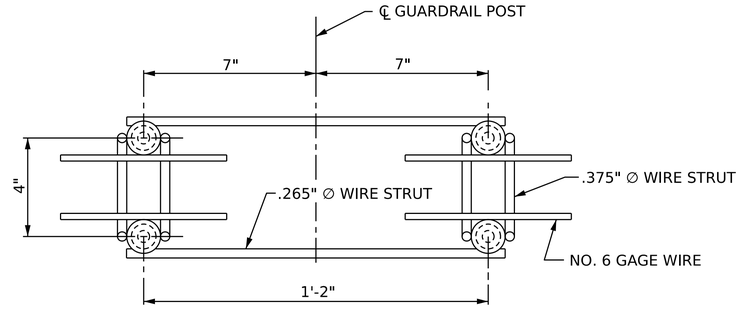
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

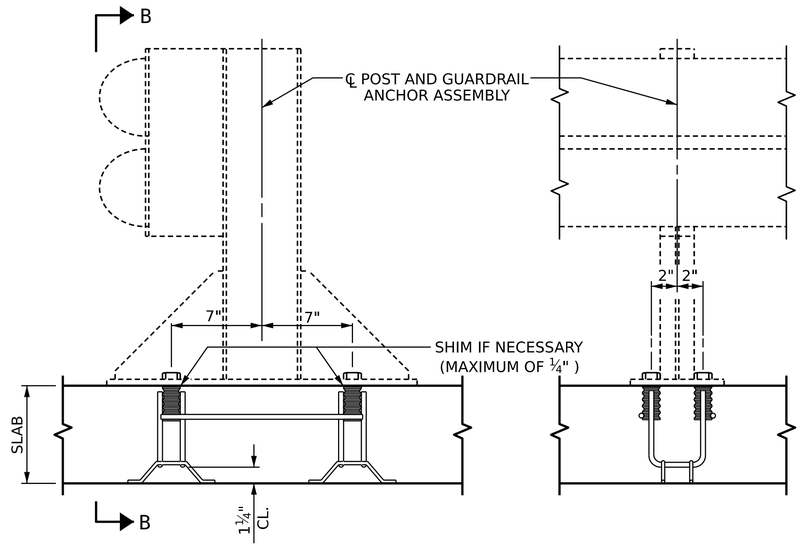
PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" ∅ BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

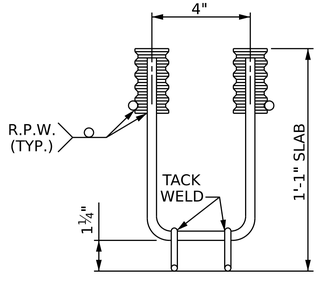


PLAN

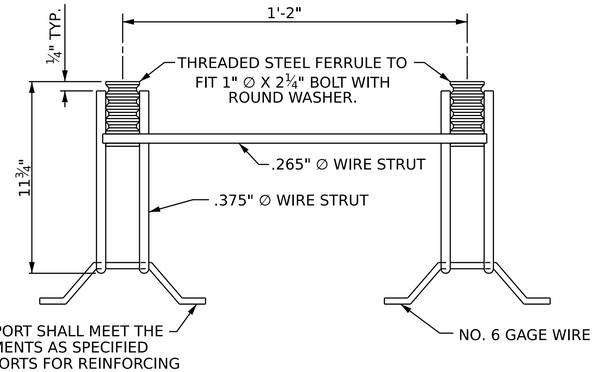


SECTION A-A

SECTION B-B



ELEVATION



THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+33.00 -Y4-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-8
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

Anna C. Teague 9/5/2025

DES BY:	B. BUSH	DATE :	09/24
DES CHK:	D. MAST	DATE :	09/24
DWG BY:	D.CARTER	DATE :	09/24
CHK BY:	B. BUSH	DATE :	09/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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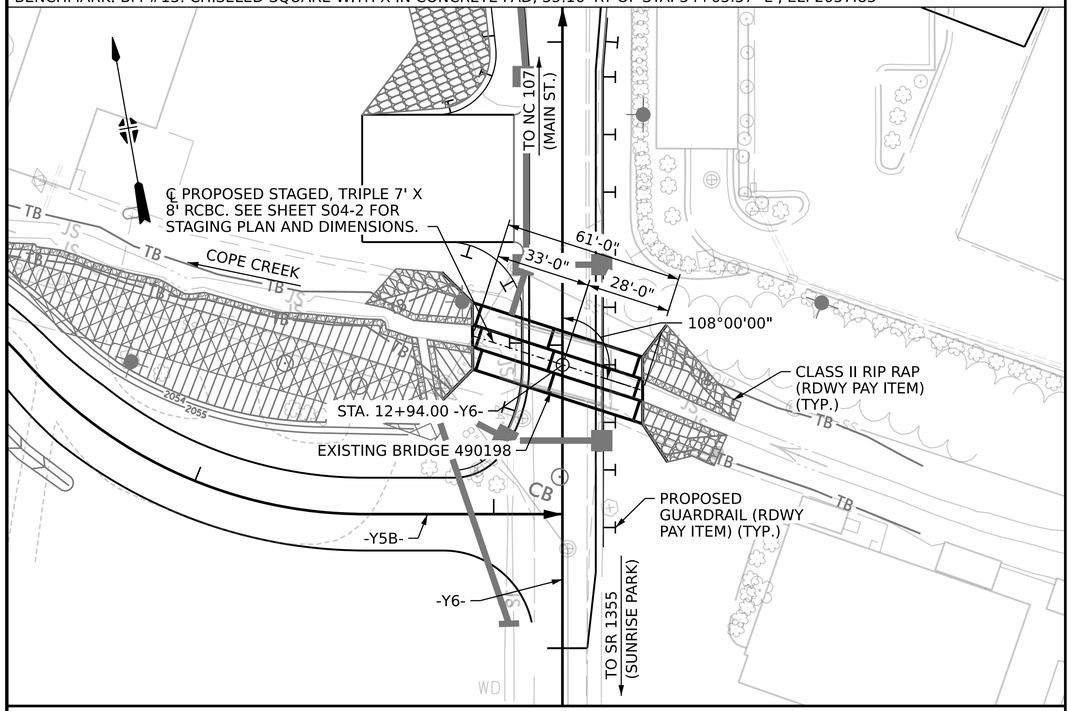
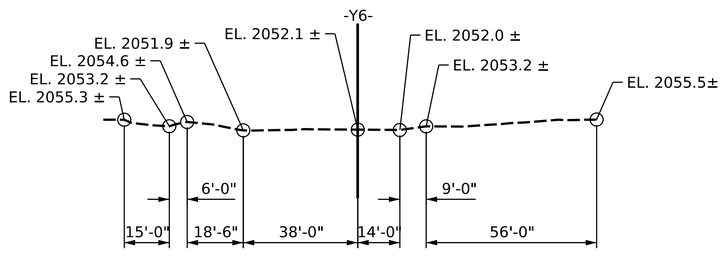
BENCHMARK: BM #13: CHISELED SQUARE WITH X IN CONCRETE PAD, 35.16' RT OF STA. 34+63.37 -L-, EL. 2057.83



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS



PROFILE ALONG ℄ CULVERT

HYDRAULIC DATA	
DESIGN DISCHARGE	= 940 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YR.
DESIGN HIGH WATER ELEVATION	= 2059.2
DRAINAGE AREA	= 3.26 SQ. MI.
BASE DISCHARGE (Q100)	= 1300 CFS
BASE HIGH WATER ELEVATION	= 2060.6
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 1050 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 50+/- YR.
OVERTOPPING FLOOD ELEVATION	= 2060.2

ROADWAY DATA	
GRADE POINT ELEV. @ STA. 12+94.00 -Y6-	= 2062.63
BED ELEV. @ STA. 12+94.00 -Y6-	= 2051.60
ROADWAY SLOPES	= 2:1

F.A. PROJ. NO.: STP-0107(13)

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

DESIGN FILL = 4.79' (MAX.) AND 1.60' (MIN.).

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.

3" ∅ WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

STAGE I

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS FOR BARREL 1.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOR BARREL 1.

STAGE II

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS FOR BARRELS 2 & 3.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOR BARRELS 2 & 3 FOLLOWED BY ROOF SLAB AND HEADWALLS FOR ALL BARRELS.

AT THE CONTRACTOR'S OPTION, THEY MAY PROPOSE AN ALTERNATE POUR SEQUENCE. CONTRACTOR SHALL ADHERE TO THE EROSION CONTROL PLAN. THE ALTERNATE POUR SEQUENCE MUST BE APPROVED BY THE RESIDENT ENGINEER.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

A 3 FOOT STRIP OF GEOTEXTILE SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR CULVERT DIRVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

THE 18" DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE PIPE.

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.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 12+94.00 -Y6-".

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 20'-6"; 28'-2" CLEAR ROADWAY WIDTH AND STEEL PLANK DECK ON I-BEAMS WITH A 4" AWS; END BENTS CONSISTING OF STEEL CAPS ON STEEL PILES WITH TIMBER BULKHEADS AND LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT.

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

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE (STAGE I)		
BARREL @ 0.64 CY./FT.	39.0	C.Y.
CURTAIN WALL	1.3	C.Y.
WINGS	0.0	C.Y.
TOTAL	40.3	C.Y.
CLASS A CONCRETE (STAGE II)		
BARREL @ 1.77 CY./FT.	108.1	C.Y.
HEADWALLS, CURTAIN WALL, SILLS	7.2	C.Y.
WINGS	33.0	C.Y.
TOTAL	148.3	C.Y.
REINFORCING STEEL (STAGE I)		
BARREL, CURTAIN WALL	7558	LBS.
WINGS	0	LBS.
TOTAL	7558	LBS.
REINFORCING STEEL (STAGE II)		
BARREL, HEADWALLS, CURTAIN WALL, SILLS	15444	LBS.
WINGS	4095	LBS.
TOTAL	19539	LBS.
CULVERT EXCAVATION, STA. 12+94.00 -Y6-	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	120 TONS	
REMOVAL OF EXISTING STRUCTURE	LUMP SUM	
ASBESTOS ASSESSMENT	LUMP SUM	

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

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

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+94.00 -Y6-

REPLACES BRIDGE 490198

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 108° SKEW

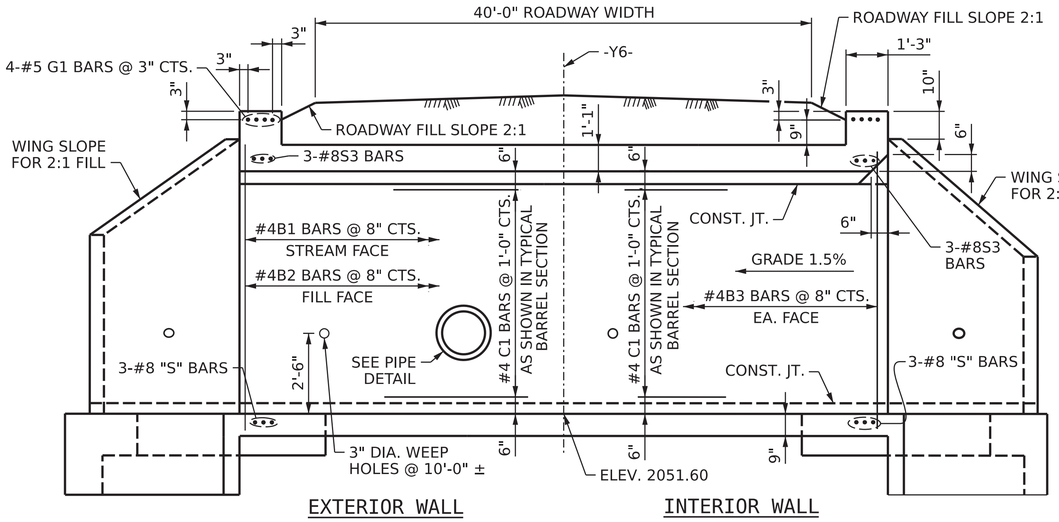
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S04-1
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY: D. MAST DATE : 07/24
DES CHK: E. NOLTING DATE : 07/24

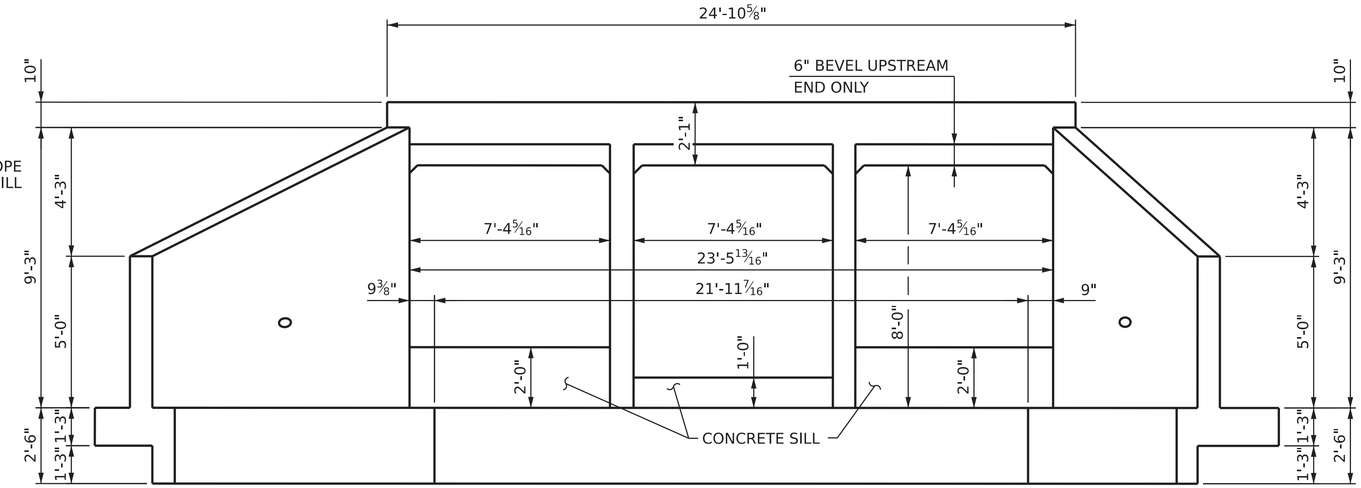
DWG BY: B. PETERSON DATE : 08/24
CHK BY: E. NOLTING DATE : 08/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

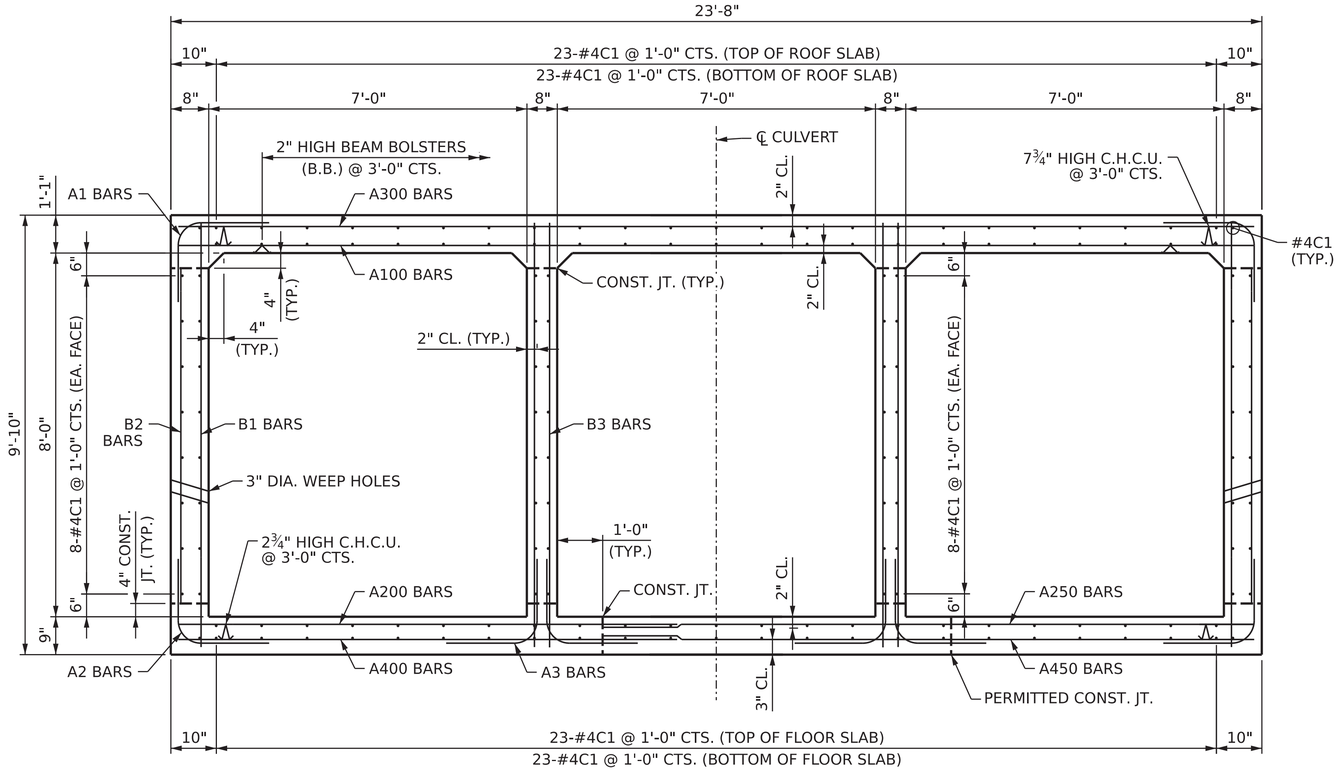
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



CULVERT SECTION NORMAL TO ROADWAY

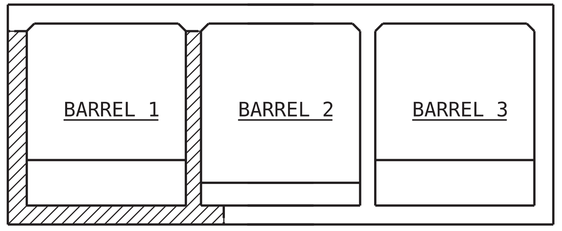


INLET ELEVATION NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

THERE ARE 160 C1 BARS IN SECTION OF BARREL
(LOOKING DOWNSTREAM)

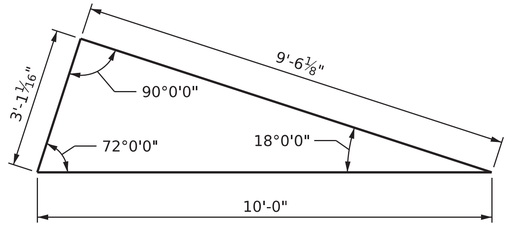


CONSTRUCTION SEQUENCE

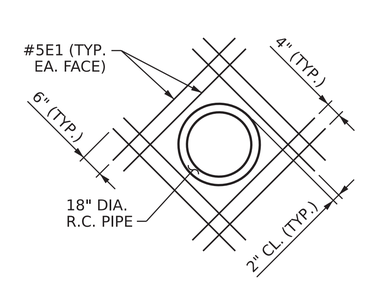
LOOKING DOWNSTREAM

STAGE I

STAGE II (INCLUDING SILLS)



SKEW TRIANGLE



PIPE DETAIL

THE 18" DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+94.00 -Y6-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 108° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S04-2
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY: D. MAST DATE: 06/24
DES CHK: E. NOLTING DATE: 07/24
DWG BY: B. PETERSON DATE: 06/24
CHK BY: E. NOLTING DATE: 08/24

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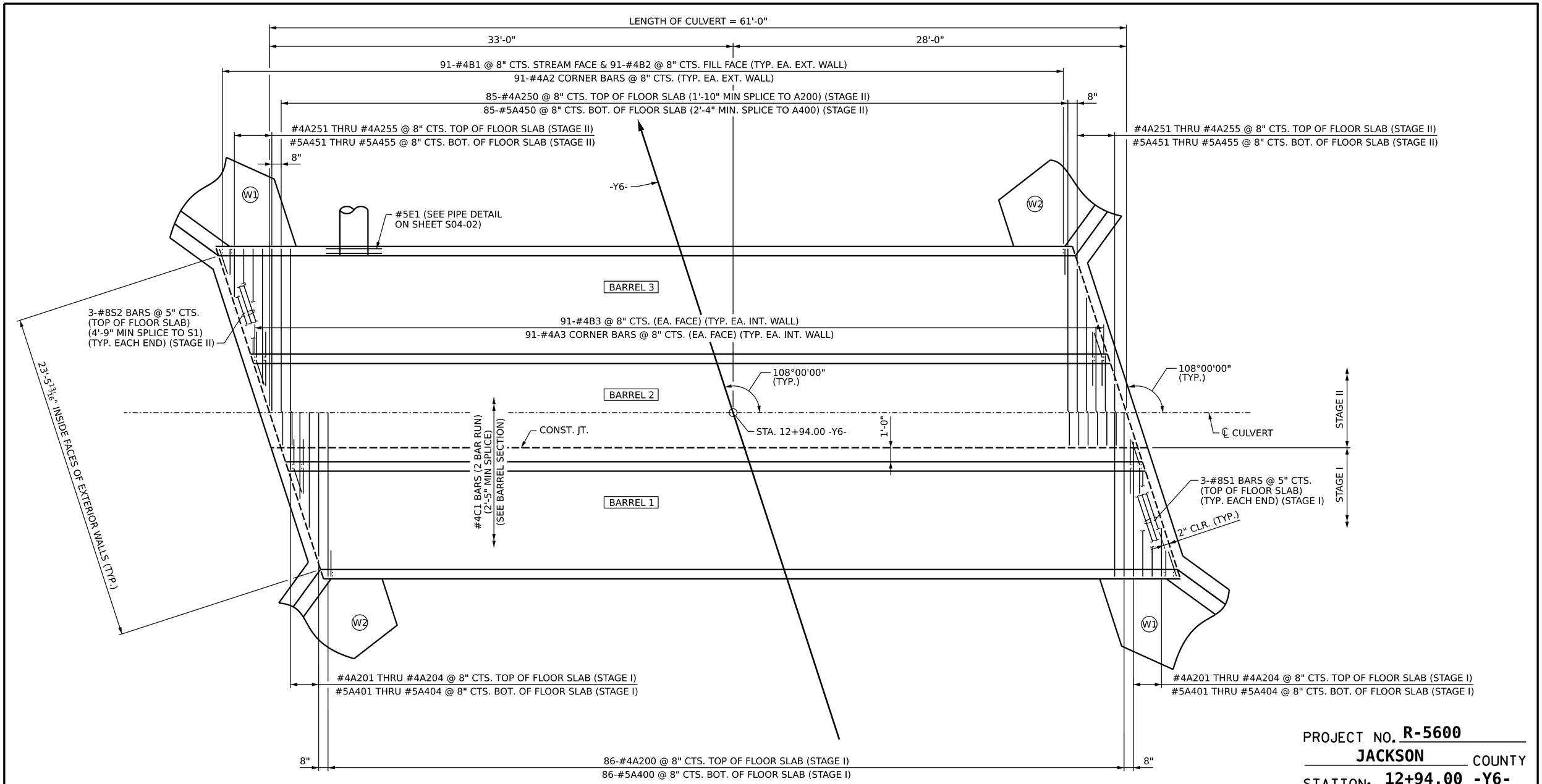

FLOOR SLAB

(SILLS NOT SHOWN FOR CLARITY)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+94.00 -Y6-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 108° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

DES BY:	D. MAST	DATE :	06/24		
DES CHK:	E. NOLTING	DATE :	07/24		
DWG BY:	B. PETERSON	DATE :	06/24		
CHK BY:	E. NOLTING	DATE :	08/24		

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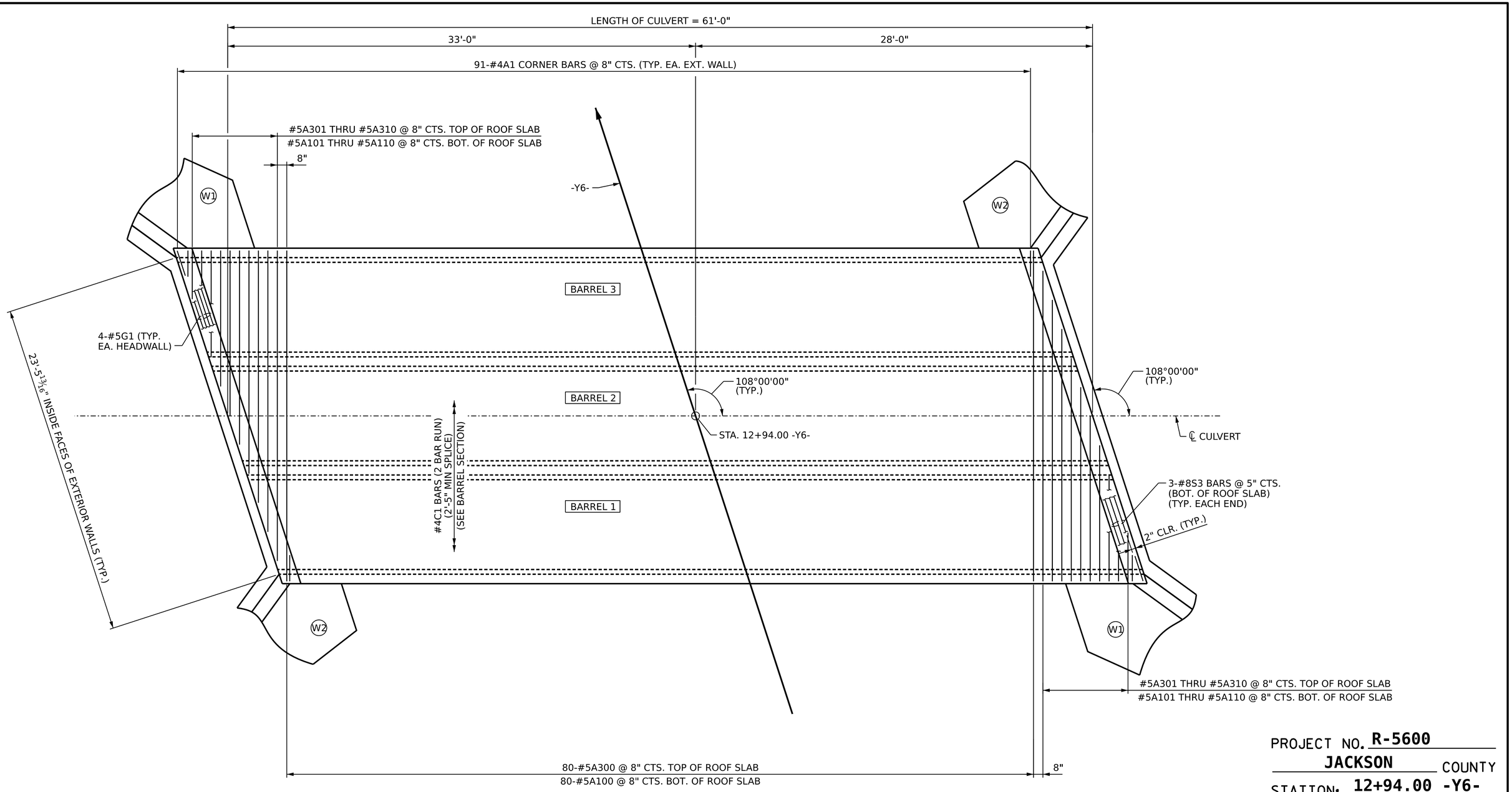
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S04-3
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8



ROOF SLAB

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+94.00 -Y6-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 108° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S04-4
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY: D. MAST DATE : 06/24
DES CHK: E. NOLTING DATE : 07/24

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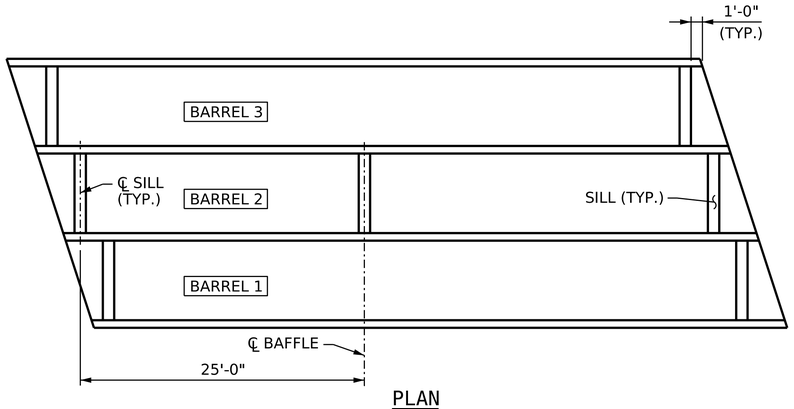
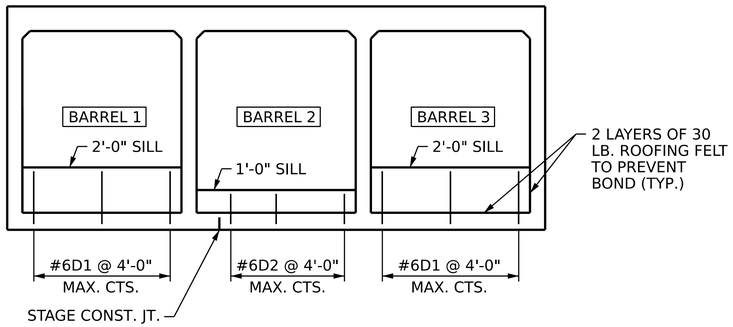
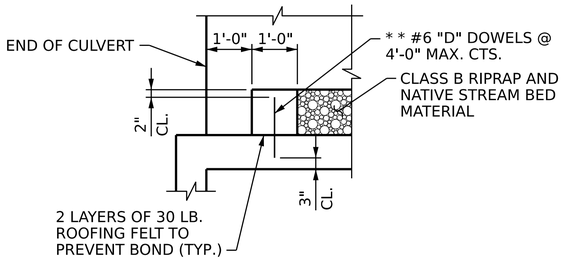


PLAN



SECTION - LOOKING DOWNSTREAM

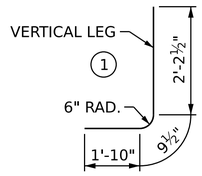


SECTION THROUGH SILL (BAFFLE SIMILAR)

* * DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

SILL & BAFFLE DETAILS

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	91	#4	1	4'-10"	294
A2	91	#4	1	4'-10"	294
A3	182	#4	1	4'-10"	588
A200	86	#4	STR	11'-4"	652
A201	2	#4	STR	9'-7"	13
A202	2	#4	STR	7'-6"	11
A203	2	#4	STR	5'-5"	8
A204	2	#4	STR	3'-5"	5
A400	86	#5	STR	11'-10"	1062
A401	2	#5	STR	9'-7"	20
A402	2	#5	STR	7'-6"	16
A403	2	#5	STR	5'-5"	12
A404	2	#5	STR	3'-5"	8
B1	91	#4	STR	9'-5"	573
B2	91	#4	STR	7'-4"	446
B3	182	#4	STR	9'-5"	1145
C1	102	#4	STR	31'-7"	2152
D1	6	#6	STR	2'-4"	22
S1	6	#8	STR	14'-9"	237

REINFORCING STEEL	7558	LBS.
CLASS A CONCRETE		
BARREL	39.0	C.Y.
CURTAIN WALL	1.3	C.Y.
TOTAL	40.3	C.Y.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	91	#4	1	4'-10"	294
A2	91	#4	1	4'-10"	294
A3	182	#4	1	4'-10"	588
A100	80	#5	STR	23'-4"	1947
A101	2	#5	STR	21'-10"	46
A102	2	#5	STR	19'-10"	42
A103	2	#5	STR	17'-9"	38
A104	2	#5	STR	15'-8"	33
A105	2	#5	STR	13'-8"	29
A106	2	#5	STR	11'-7"	25
A107	2	#5	STR	9'-7"	20
A108	2	#5	STR	7'-6"	16
A109	2	#5	STR	5'-5"	12
A110	2	#5	STR	3'-5"	8
A250	85	#4	STR	14'-0"	795
A251	2	#4	STR	11'-7"	16
A252	2	#4	STR	9'-7"	13
A253	2	#4	STR	7'-6"	11
A254	2	#4	STR	5'-5"	8
A255	2	#4	STR	3'-5"	5
A300	80	#5	STR	23'-4"	1947
A301	2	#5	STR	21'-10"	46
A302	2	#5	STR	19'-10"	42
A303	2	#5	STR	17'-9"	38
A304	2	#5	STR	15'-8"	33
A305	2	#5	STR	13'-8"	29
A306	2	#5	STR	11'-7"	25
A307	2	#5	STR	9'-7"	20
A308	2	#5	STR	7'-6"	16
A309	2	#5	STR	5'-5"	12
A310	2	#5	STR	3'-5"	8
A450	85	#5	STR	14'-0"	1242
A451	1	#5	STR	11'-7"	13
A452	1	#5	STR	9'-7"	10
A453	1	#5	STR	7'-6"	8
A454	1	#5	STR	5'-5"	6
A455	1	#5	STR	3'-5"	4

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	91	#4	STR	9'-5"	573
B2	91	#4	STR	7'-4"	446
B3	182	#4	STR	9'-5"	1145
C1	218	#4	STR	31'-7"	4600
D1	6	#6	STR	2'-4"	22
D2	9	#6	STR	1'-4"	19
E1	16	#5	STR	4'-0"	67
G1	8	#5	STR	24'-6"	205
S2	6	#8	STR	14'-8"	235
S3	6	#8	STR	24'-6"	393

REINFORCING STEEL	15444	LBS.
CLASS A CONCRETE		
BARREL	108.1	C.Y.
HEADWALL	2.4	C.Y.
CURTAIN WALL	1.9	C.Y.
SILL	2.9	C.Y.
TOTAL	115.3	C.Y.

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A200, A250	#4	1'-10"
A400, A450	#5	2'-4"
C1	#4	2'-5"
S1, S2	#8	4'-9"

NOTES

BACKFILL CULVERT BARRELS WITH CLASS B RIPRAP AND TOP WITH NATIVE MATERIAL TO SILL HEIGHT.

NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIPRAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARRELS. IF RIPRAP IS USED TO LINE THE HIGH FLOW CULVERT BARRELS, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

SILLS ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

TOP OF LOW FLOW SILLS SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM.

SILLS TO BE CAST DURING STAGE II CONSTRUCTION. D1 DOWELS MAY BE INSTALLED DURING STAGE I CONSTRUCTION.

THE ENGINEER, IN CONSULTATION WITH DEO STAFF, SHALL REVIEW ALL MATERIAL TO BE USED AS BACKFILL PRIOR TO CONDUCTING THE BACKFILL ACTIVITY. BACKFILL SHALL CONSIST OF CLASS B RIPRAP AND NATIVE MATERIAL ONLY, UNLESS THE ENGINEER, IN CONSULATION WITH DEO STAFF, DETERMINES THAT (1) THE NATIVE MATERIAL IS UNSUITABLE, OR (2) ADDITIONAL MATERIAL IS REQUIRED TO SUPPLEMENT THE NATIVE MATERIAL. THE CHOSEN BACKFILL MATERIAL SHALL NOT HAVE ADVERSE EFFECTS TO AQUATIC LIFE, AQUATIC LIFE PASSAGE, OR WATER QUALITY. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION.

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+94.00 -Y6-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL
7 FT. X 8 FT.
CONCRETE BOX CULVERT
108° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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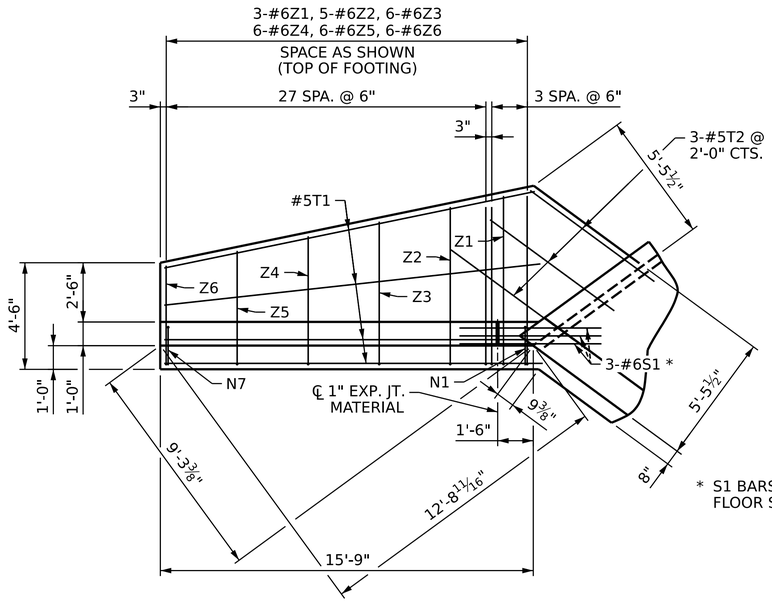
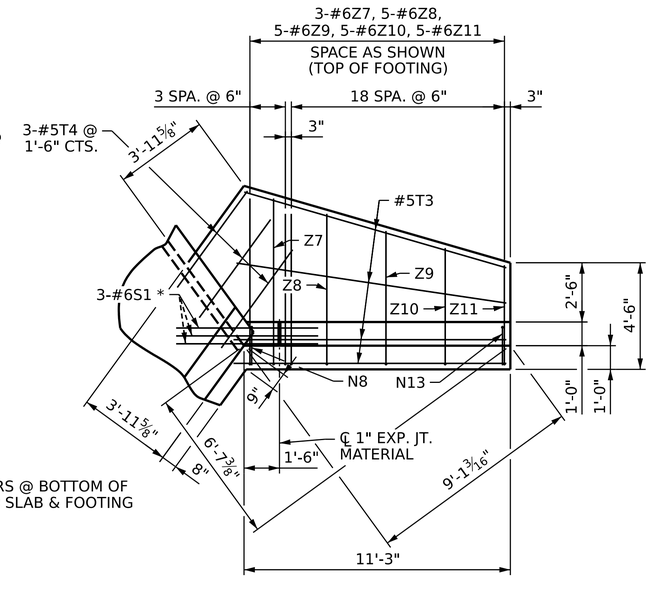
DES BY:	D. MAST	DATE :	06/24
DES CHK:	E. NOLTING	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	07/24
CHK BY:	E. NOLTING	DATE :	08/24

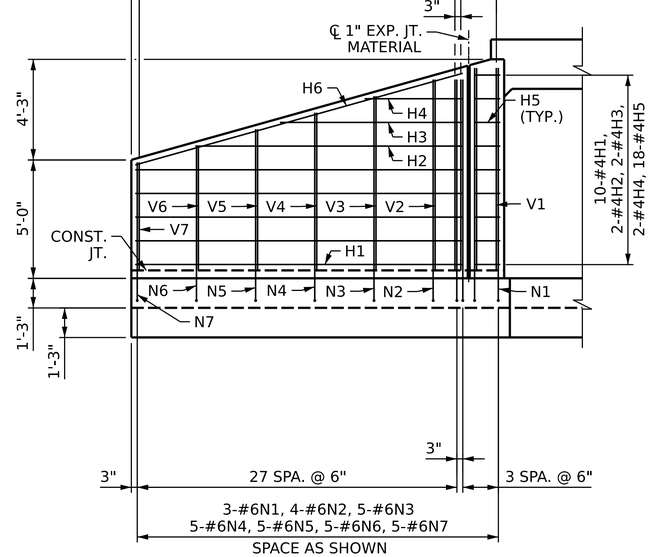


PLAN W1

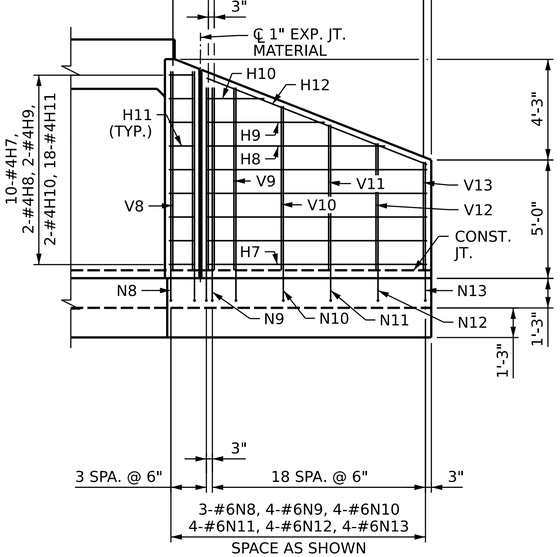


PLAN W2

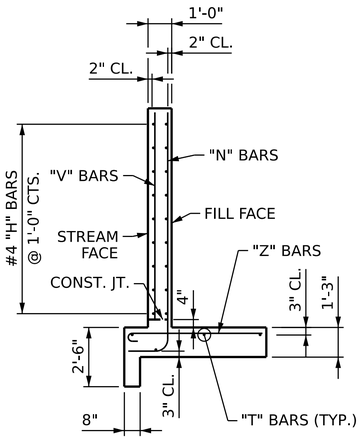
* S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING



ELEVATION W1

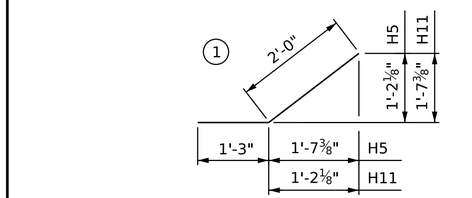


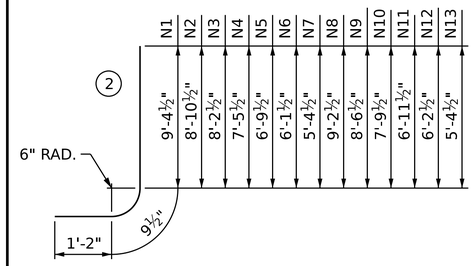
ELEVATION W2

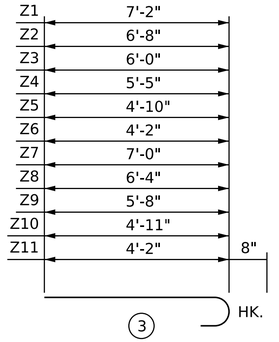


TYPICAL WING SECTION

BAR TYPES







ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING STEEL FOR 4 WINGS	4095	LBS.
CLASS A CONCRETE FOR 4 WINGS	33.0	C.Y.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	20	#4	STR	13'-10"	185
H2	4	#4	STR	11'-3"	31
H3	4	#4	STR	7'-8"	21
H4	4	#4	STR	4'-1"	11
H5	36	#4	1	3'-3"	79
H6	4	#4	STR	14'-4"	39
H7	20	#4	STR	9'-4"	125
H8	4	#4	STR	7'-6"	21
H9	4	#4	STR	5'-0"	14
H10	4	#4	STR	2'-5"	7
H11	36	#4	1	3'-3"	79
H12	4	#4	STR	10'-0"	27
N1	6	#6	2	11'-4"	103
N2	8	#6	2	10'-10"	131
N3	10	#6	2	10'-2"	153
N4	10	#6	2	9'-5"	142
N5	10	#6	2	8'-9"	132
N6	10	#6	2	8'-1"	122
N7	10	#6	2	7'-4"	111
N8	6	#6	2	11'-2"	101
N9	8	#6	2	10'-6"	127
N10	8	#6	2	9'-9"	118
N11	8	#6	2	8'-11"	108
N12	8	#6	2	8'-2"	99
N13	8	#6	2	7'-4"	89
S1	12	#6	STR	6'-0"	109
T1	8	#5	STR	16'-0"	134
T2	6	#5	STR	6'-6"	41
T3	8	#5	STR	11'-6"	96
T4	6	#5	STR	5'-0"	32
V1	6	#4	STR	8'-6"	35
V2	8	#4	STR	8'-0"	43
V3	10	#4	STR	7'-4"	49
V4	10	#4	STR	6'-8"	45
V5	10	#4	STR	5'-11"	40
V6	10	#4	STR	5'-3"	36
V7	10	#4	STR	4'-6"	31
V8	6	#4	STR	8'-5"	34
V9	8	#4	STR	7'-8"	41
V10	8	#4	STR	6'-11"	37
V11	8	#4	STR	6'-2"	33
V12	8	#4	STR	5'-4"	29
V13	8	#4	STR	4'-7"	25
Z1	6	#6	3	7'-10"	71
Z2	10	#6	3	7'-4"	111
Z3	12	#6	3	6'-8"	121
Z4	12	#6	3	6'-1"	110
Z5	12	#6	3	5'-6"	100
Z6	12	#6	3	4'-10"	88
Z7	6	#6	3	7'-8"	70
Z8	10	#6	3	7'-0"	106
Z9	10	#6	3	6'-4"	96
Z10	10	#6	3	5'-7"	84
Z11	10	#6	3	4'-10"	73

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+94.00 -Y6-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT 108° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S04-6

TOTAL SHEETS 8

DES BY:	G. M. CASTREJON	DATE :	09/24
DES CHK:	E. NOLTING	DATE :	10/24
DWG BY:	D. CHAPMAN	DATE :	09/24
CHK BY:	E. NOLTING	DATE :	10/24

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
								MOMENT				SHEAR				
							LIVE-LOAD FACTORS (γ LL)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.41	--	1.75	1.49	1	TOP SLAB	3.50	1.41	1	TOP SLAB	7.00	
		HL-93 (OPERATING)	N/A		1.82	--	1.35	1.93	1	TOP SLAB	3.50	1.82	1	TOP SLAB	7.00	
		HS-20 (INVENTORY)	36.000	2	1.45	52.20	1.75	1.49	1	TOP SLAB	3.50	1.45	1	TOP SLAB	7.00	
		HS-20 (OPERATING)	36.000		1.88	67.68	1.35	1.93	1	TOP SLAB	3.50	1.88	1	TOP SLAB	7.00	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		2.81	37.94	1.40	2.81	1	TOP SLAB	3.50	2.88	1	TOP SLAB	0.00	
		SNGARBS2	20.000		2.57	51.40	1.40	2.57	1	TOP SLAB	3.50	2.71	1	TOP SLAB	0.00	
		SNAGRIS2	22.000		2.71	59.62	1.40	2.71	1	TOP SLAB	3.50	2.88	1	TOP SLAB	0.00	
		SNCOTTS3	27.250		1.79	48.78	1.40	2.15	1	TOP SLAB	3.50	1.79	1	TOP SLAB	7.00	
		SNAGGRS4	34.925		1.93	67.41	1.40	2.01	1	BOTTOM SLAB	3.50	1.93	1	BOTTOM SLAB	7.00	
		SNS5A	35.550		1.99	70.74	1.40	2.09	1	BOTTOM SLAB	3.50	1.99	1	BOTTOM SLAB	7.00	
		SNS6A	39.950		2.00	79.90	1.40	2.07	1	BOTTOM SLAB	3.50	2.00	1	BOTTOM SLAB	7.00	
		SNS7B	42.000		1.97	82.74	1.40	1.97	1	BOTTOM SLAB	3.50	2.12	1	TOP SLAB	7.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.15	70.95	1.40	2.15	1	BOTTOM SLAB	3.50	2.77	1	BOTTOM SLAB	7.00	
		TNT4A	33.075		2.20	72.77	1.40	2.35	1	BOTTOM SLAB	3.50	2.20	1	TOP SLAB	7.00	
		TNT6A	41.600		2.07	86.11	1.40	2.07	1	BOTTOM SLAB	3.50	2.19	1	TOP SLAB	7.00	
		TNT7A	42.000		1.92	80.64	1.40	1.92	1	BOTTOM SLAB	3.50	2.21	1	TOP SLAB	7.00	
		TNT7B	42.000		2.05	86.10	1.40	2.12	1	BOTTOM SLAB	3.50	2.05	1	BOTTOM SLAB	7.00	
		TNAGRIT4	43.000		1.88	80.84	1.40	1.96	1	BOTTOM SLAB	3.50	1.88	1	BOTTOM SLAB	7.00	
		TNAGT5A	45.000		1.99	89.55	1.40	2.01	1	BOTTOM SLAB	3.50	1.99	1	BOTTOM SLAB	7.00	
		TNAGT5B	45.000	3	1.61	72.45	1.40	1.65	1	BOTTOM SLAB	3.50	1.61	1	BOTTOM SLAB	7.00	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.86	53.48	1.30	1.94	1	TOP SLAB	3.50	1.86	1	TOP SLAB	7.00	
		EV3	43.000	4	1.43	61.49	1.30	1.68	1	BOTTOM SLAB	3.50	1.43	1	TOP SLAB	7.00	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATES.

COMMENTS:

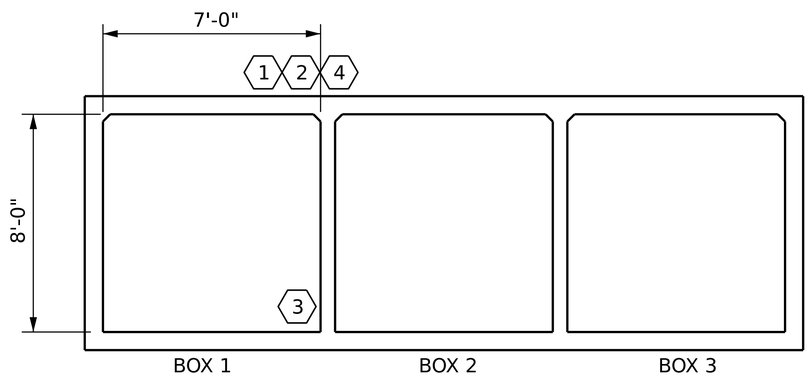
1.

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



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+94.00 -Y6-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERT
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

Anna C. Teague

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S04-7
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY: D. MAST DATE : 07/24
DES CHK: E. NOLTING DATE : 07/24

DWG BY: D. CHAPMAN DATE : 07/24
CHK BY: E. NOLTING DATE : 08/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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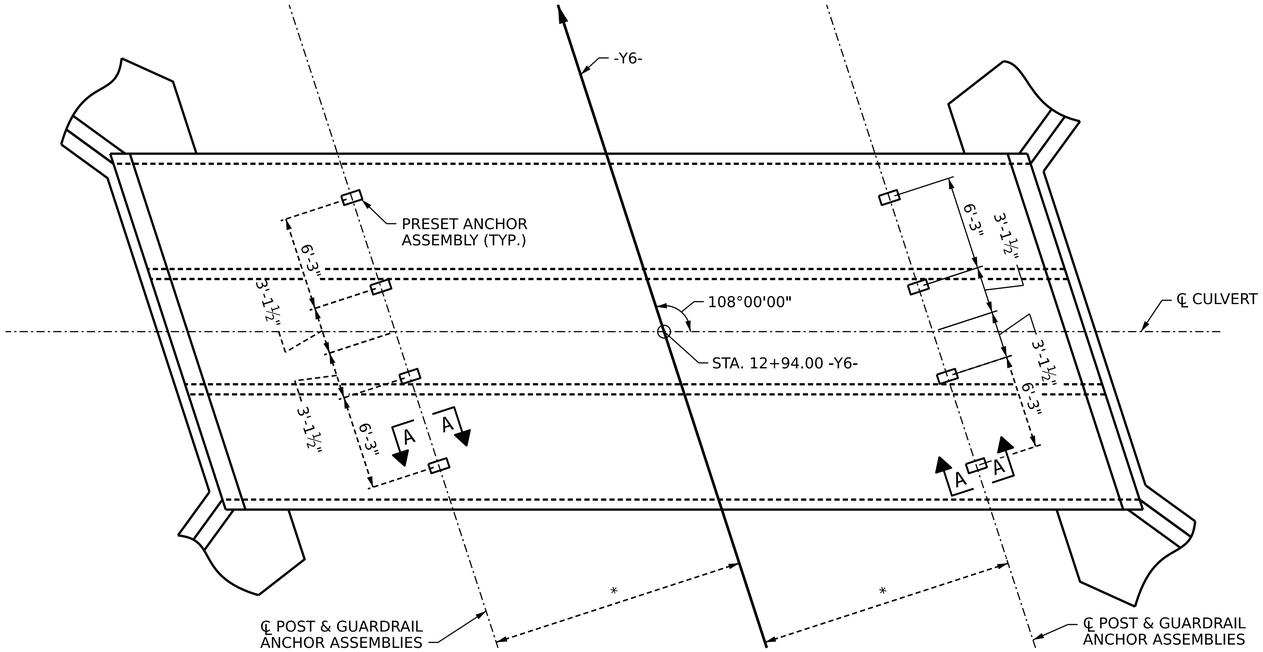


PLAN OF CULVERT GUARDRAIL ANCHOR ASSEMBLY SPACING

* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1" ∅ X 2¼" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" ∅ X 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16" ∅ WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

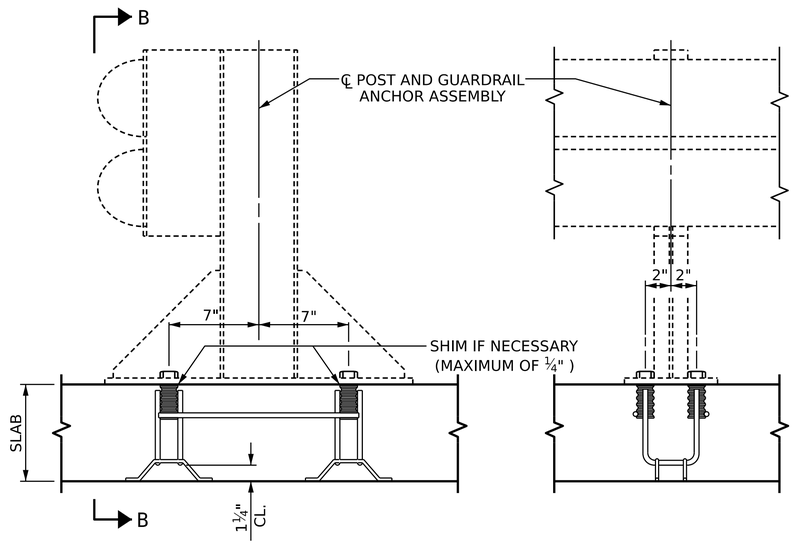
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

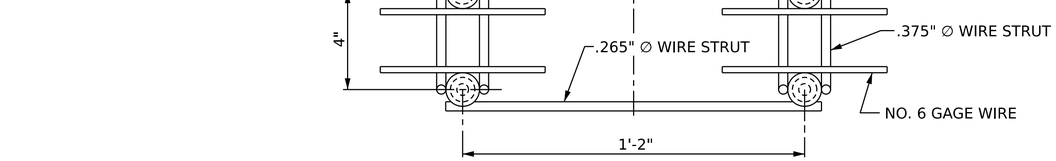
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" ∅ BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

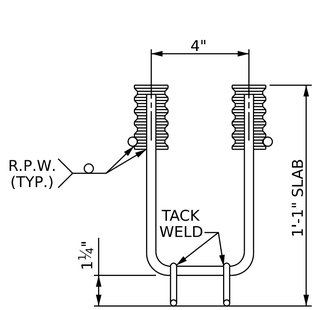


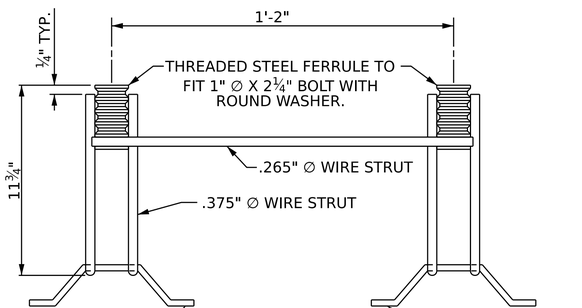
SECTION A-A

SECTION B-B



PLAN





THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

Anna C. Teague 9/5/2025

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 12+94.00 -Y6-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S04-8
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	8

DES BY:	B. BUSH	DATE :	09/24
DES CHK:	D. MAST	DATE :	09/24
DWG BY:	D.CARTER	DATE :	09/24
CHK BY:	B. BUSH	DATE :	09/24

HDR Engineering, Inc. of the Carolinas
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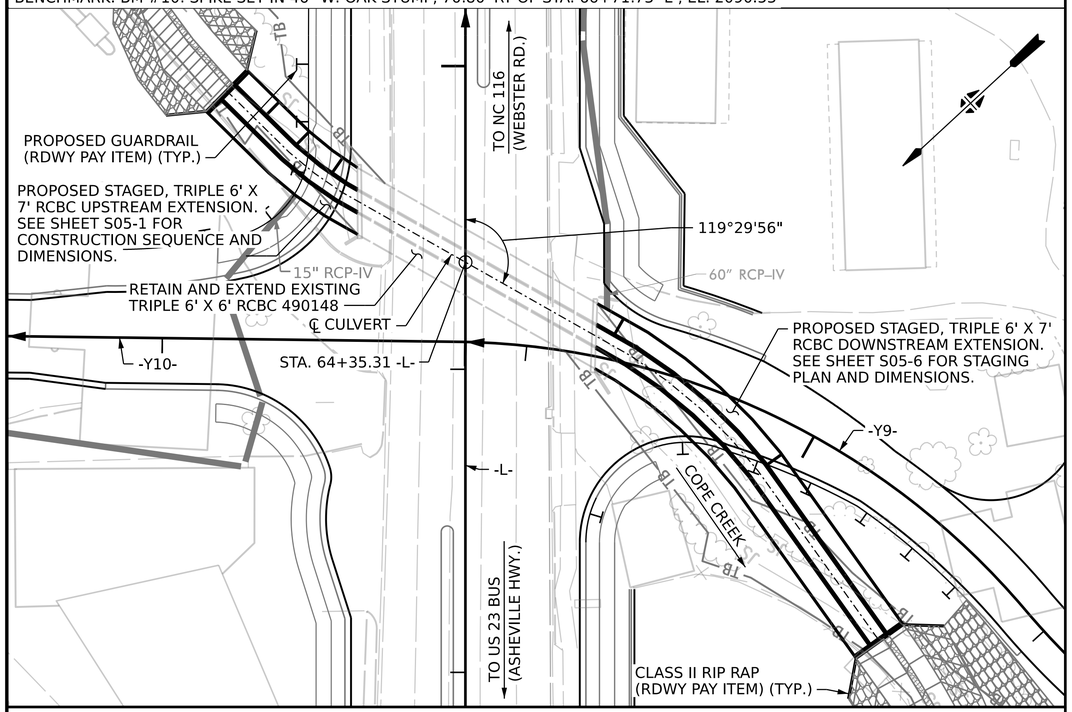
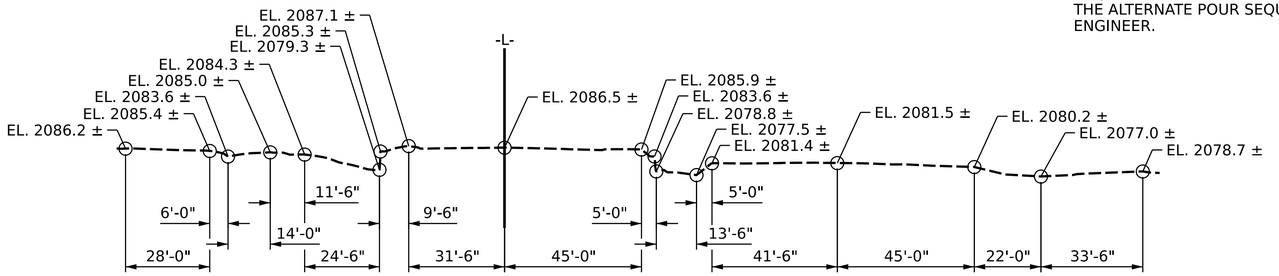
BENCHMARK: BM #10: SPIKE SET IN 46" W. OAK STUMP, 70.80' RT OF STA. 66+71.73 -L-, EL. 2090.53



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS



PROFILE ALONG ℄ CULVERT

TOTAL STRUCTURE QUANTITIES - UPSTREAM EXTENSION		
CLASS A CONCRETE (STAGE I)		
BARREL @ 0.61 CY./FT.	34.7	C.Y.
CURTAIN WALL, EDGE BEAM	1.4	C.Y.
WINGS	4.7	C.Y.
TOTAL	40.8	C.Y.
CLASS A CONCRETE (STAGE II)		
BARREL @ 1.36 CY./FT.	76.9	C.Y.
HEADWALLS, CURTAIN WALL, EDGE BEAM	3.8	C.Y.
WINGS	4.7	C.Y.
TOTAL	85.4	C.Y.
REINFORCING STEEL (STAGE I)		
BARREL, CURTAIN WALL	8015	LBS.
WINGS	556	LBS.
TOTAL	8571	LBS.
REINFORCING STEEL (STAGE II)		
BARREL, HEADWALLS, CURTAIN WALL, SILLS*	15199	LBS.
WINGS	556	LBS.
TOTAL	15755	LBS.
CULVERT EXCAVATION, STA. 64+35.31 -L-	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	99 TONS	

TOTAL STRUCTURE QUANTITIES - DOWNSTREAM EXTENSION		
CLASS A CONCRETE (STAGE II)		
BARREL @ 0.59 CY./FT.	81.7	C.Y.
CURTAIN WALL, EDGE BEAM	1.4	C.Y.
WINGS	4.6	C.Y.
TOTAL	87.7	C.Y.
CLASS A CONCRETE (STAGE III)		
BARREL @ 2.91 CY./FT.	405.0	C.Y.
HEADWALLS, CURTAIN WALL, EDGE BEAM, SILLS*	6.3	C.Y.
WINGS	4.6	C.Y.
TOTAL	415.9	C.Y.
REINFORCING STEEL (STAGE II)		
BARREL, CURTAIN WALL	18107	LBS.
WINGS	556	LBS.
TOTAL	18663	LBS.
REINFORCING STEEL (STAGE III)		
BARREL, HEADWALLS, CURTAIN WALL, SILLS*	35150	LBS.
WINGS	555	LBS.
TOTAL	35705	LBS.
CULVERT EXCAVATION, STA. 64+35.31 -L-	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	243 TONS	

* SILL QUANTITY INCLUDES BOTH UPSTREAM AND DOWNSTREAM EXTENSIONS.

HYDRAULIC DATA	
DESIGN DISCHARGE	= 1000 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 2086.8
DRAINAGE AREA	= 2.9 SQ. MI.
BASE DISCHARGE (Q100)	= 1200 CFS
BASE HIGH WATER ELEVATION	= 2088.0
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 1070 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 50+/- YR.
OVERTOPPING FLOOD ELEVATION	= 2087.4

ROADWAY DATA	
GRADE POINT ELEV. @ STA. 64+35.31 -L-	= 2086.93
BED ELEV. @ STA. 64+35.31 -L-	= 2076.80
BED ELEV. @ BEGIN UPSTREAM EXT.	= 2076.50
BED ELEV. @ BEGIN DOWNSTREAM EXT.	= 2074.90
ROADWAY SLOPES	= 2:1

DES BY: E. NOLTING DATE : 07/24
DES CHK: G. M. CASTREJON DATE : 07/24
DWG BY: B. PETERSON DATE : 08/24
CHK BY: E. NOLTING DATE : 08/24

F.A. PROJ. NO.: STP-0107(13)

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

UPSTREAM EXTENSION DESIGN FILL = 4.18' (MAX.) AND 3.35' (MIN.).
DOWNSTREAM EXTENSION DESIGN FILL = 4.23' (MAX.) AND 2.62' (MIN.).

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.

3" ∅ WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

STAGE I

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS FOR BARREL 3 OF UPSTREAM EXTENSION.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOR BARREL 3 OF UPSTREAM EXTENSION.

STAGE II

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS FOR BARRELS 1 & 2 OF UPSTREAM EXTENSION.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOR BARRELS 1 & 2 FOLLOWED BY ROOF SLAB AND HEADWALLS FOR ALL BARRELS OF UPSTREAM EXTENSION.
3. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS FOR BARREL 1 OF DOWNSTREAM EXTENSION.
4. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOR BARREL 1 OF DOWNSTREAM EXTENSION.

STAGE III

1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS FOR BARRELS 2 & 3 OF DOWNSTREAM EXTENSION.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOR BARRELS 2 & 3 FOLLOWED BY ROOF SLAB AND HEADWALLS FOR ALL BARRELS OF DOWNSTREAM EXTENSION.

AT THE CONTRACTOR'S OPTION, THEY MAY PROPOSE AN ALTERNATE POUR SEQUENCE. CONTRACTOR SHALL ADHERE TO THE EROSION CONTROL PLAN. THE ALTERNATE POUR SEQUENCE MUST BE APPROVED BY THE RESIDENT ENGINEER.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

A 3 FOOT STRIP OF GEOTEXTILE SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

THE 60" DIA. AND 15" DIA. PIPES THROUGH THE SIDEWALLS OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE PIPE.

IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

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

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

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

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

PROJECT NO. R-5600
JACKSON COUNTY
STATION: 64+35.31 -L-
BRIDGE NO. 490148

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT EXTENSIONS 119° SKEW

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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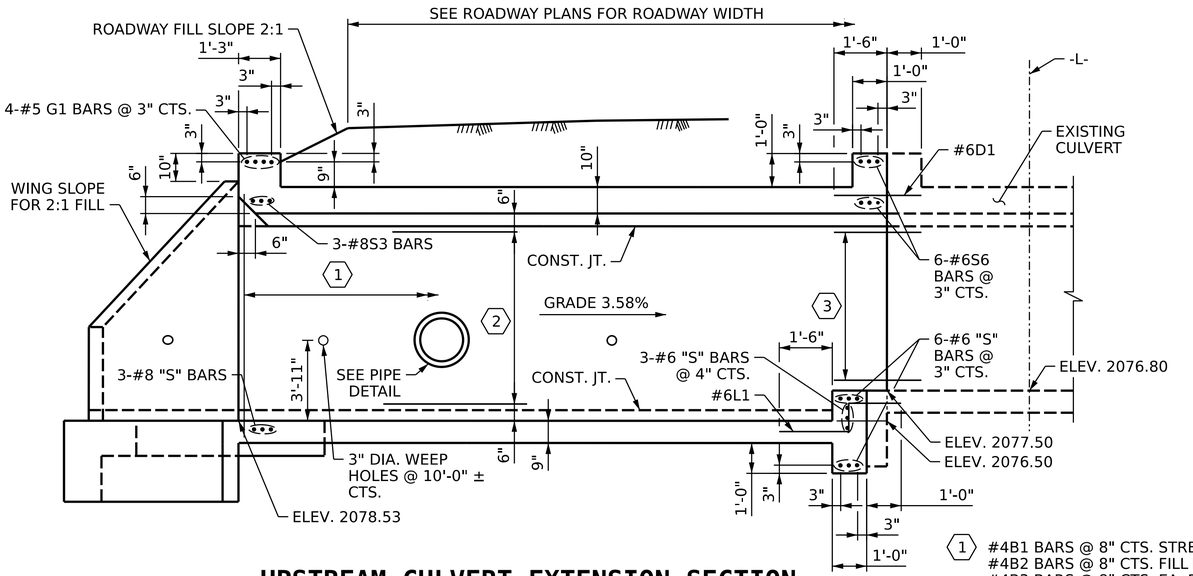
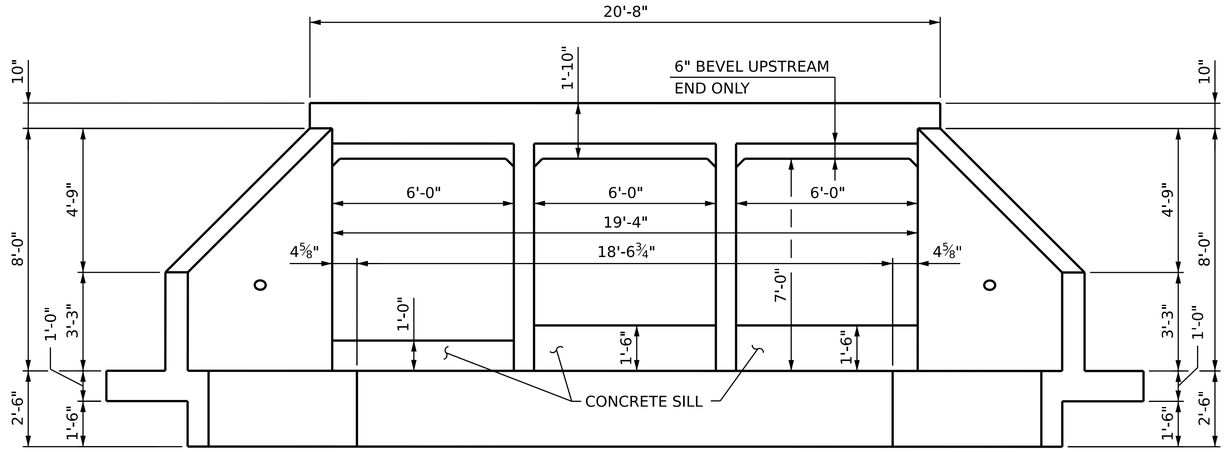
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-1
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	14

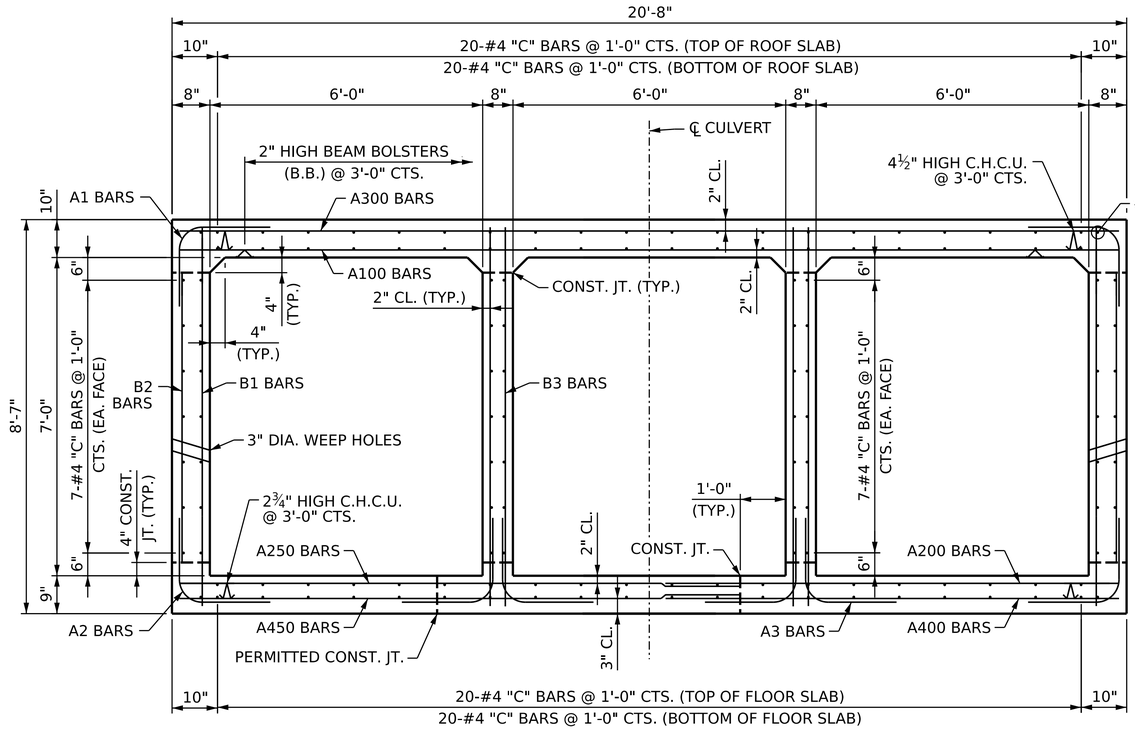


UPSTREAM CULVERT EXTENSION SECTION NORMAL TO ROADWAY



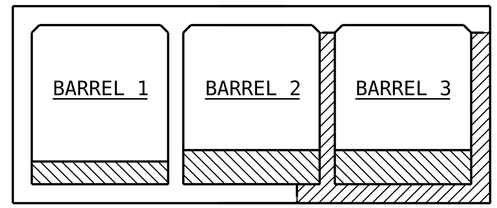
INLET ELEVATION NORMAL TO SKEW

1. #4B1 BARS @ 8" CTS. STREAM FACE (EXTERIOR WALL)
   #4B2 BARS @ 8" CTS. FILL FACE (EXTERIOR WALL)
   #4B3 BARS @ 8" CTS. EA. FACE (INTERIOR WALL)
2. #4 "C" BARS @ 1'-0" CTS. AS SHOWN IN TYPICAL BARREL SECTION
3. 5-#6D1 @ 1'-6" CTS.



RIGHT ANGLE SECTION OF BARREL (UPSTREAM EXTENSION)

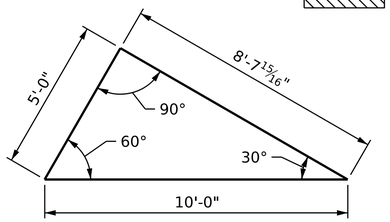
THERE ARE 140 "C" BARS BARS IN SECTION OF BARREL
(LOOKING DOWNSTREAM)

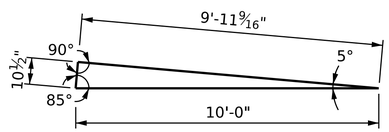


CONSTRUCTION SEQUENCE

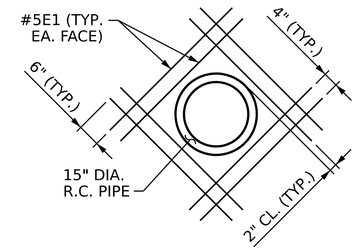
LOOKING DOWNSTREAM

STAGE I
STAGE II
STAGE III (SILLS)





SKEW TRIANGLES



PIPE DETAIL

THE 15" DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.

PROJECT NO. R-5600
JACKSON COUNTY
STATION: 64+35.31 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT UPSTREAM EXTENSION 119° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TERGUE
9/5/2025
Anna C. Tergue

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DES CHK:	G. M. CASTREJON	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	06/24
CHK BY:	E. NOLTING	DATE :	08/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
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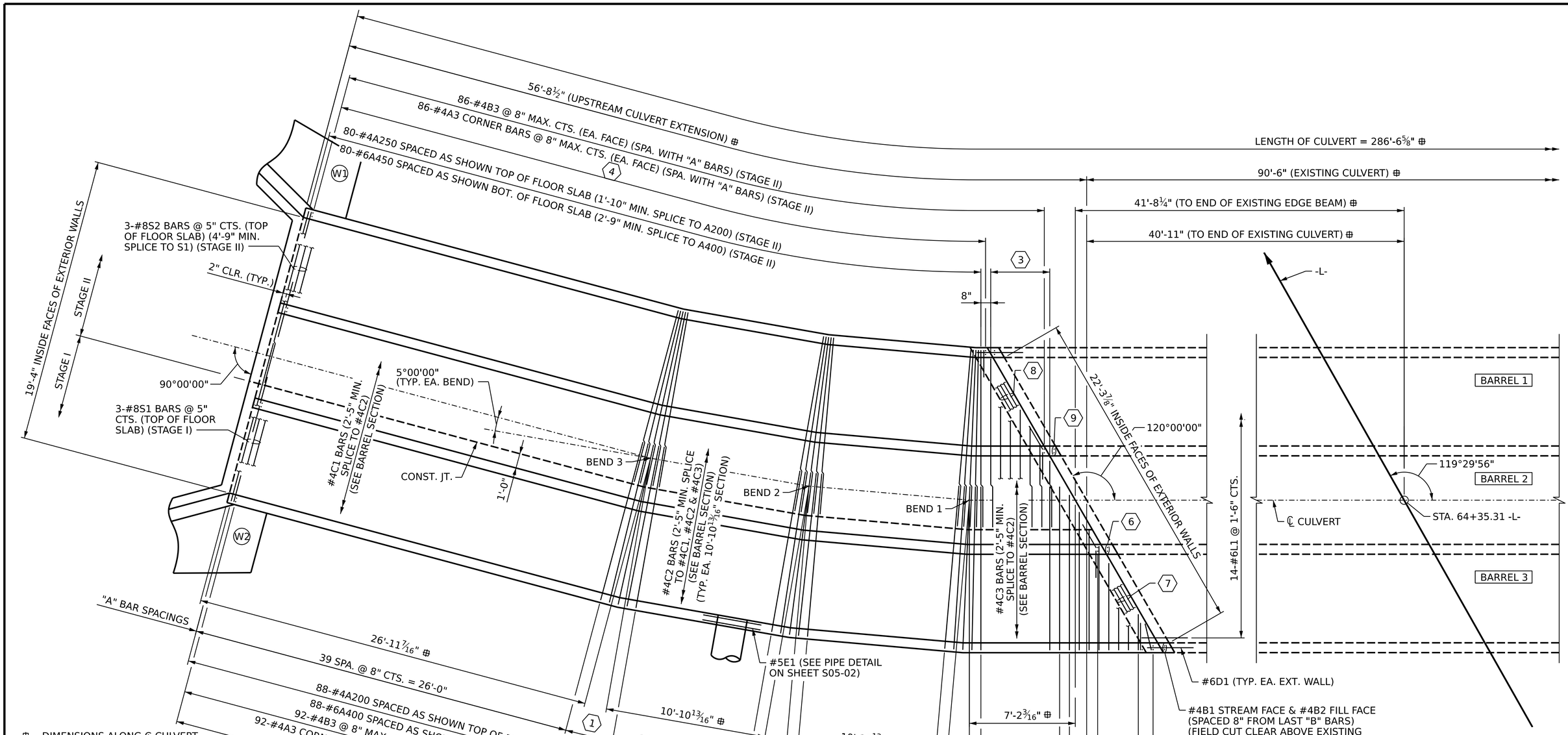

⊕ DIMENSIONS ALONG ℄ CULVERT

1. 4 SPACES @ 8" MAX. CTS. SPLAYED
2. #4A201 THRU #4A208 @ 8" CTS. TOP OF FLOOR SLAB (STAGE I)
   #6A401 THRU #6A408 @ 8" CTS. BOT. OF FLOOR SLAB (STAGE I)
3. #4A251 THRU #4A257 @ 8" CTS. TOP OF FLOOR SLAB (STAGE II)
   #6A451 THRU #6A457 @ 8" CTS. BOT. OF FLOOR SLAB (STAGE II)
4. 80-#4B1 @ 8" MAX. CTS. STREAM FACE, 80-#4B2 @ 8" MAX. CTS. FILL FACE & 80-#4A2 CORNER BARS @ 8" MAX. CTS. (SPACED WITH "A" BARS) (STAGE II)
5. 97-#4B1 @ 8" MAX. CTS. STREAM FACE, 97-#4B2 @ 8" MAX. CTS. FILL FACE & 97-#4A2 CORNER BARS @ 8" MAX. CTS. (SPACED WITH "A" BARS) (STAGE I)
6. #4B3 (EA. FACE) (SPACED 8" FROM LAST "B" BARS) (FIELD CUT CLEAR ABOVE EXISTING EDGE BEAM) (TYP. EA. INT. WALL) (STAGE I)
7. 9-#6S4 BARS (SEE SECTION NORMAL TO ROADWAY) (STAGE I)
8. 9-#6S5 BARS (3'-7" MIN. SPLICE TO S4) (SEE SECTION NORMAL TO ROADWAY) (STAGE II)
9. #4B3 (EA. FACE) (SPACED 8" FROM LAST "B" BARS) (FIELD CUT CLEAR ABOVE EXISTING EDGE BEAM) (TYP. EA. INT. WALL) (STAGE II)

FLOOR SLAB

(SILLS NOT SHOWN FOR CLARITY)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 64+35.31 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT UPSTREAM EXTENSION 119° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025

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DES CHK:	G. M. CASTREJON	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	08/24
CHK BY:	E. NOLTING	DATE :	09/24

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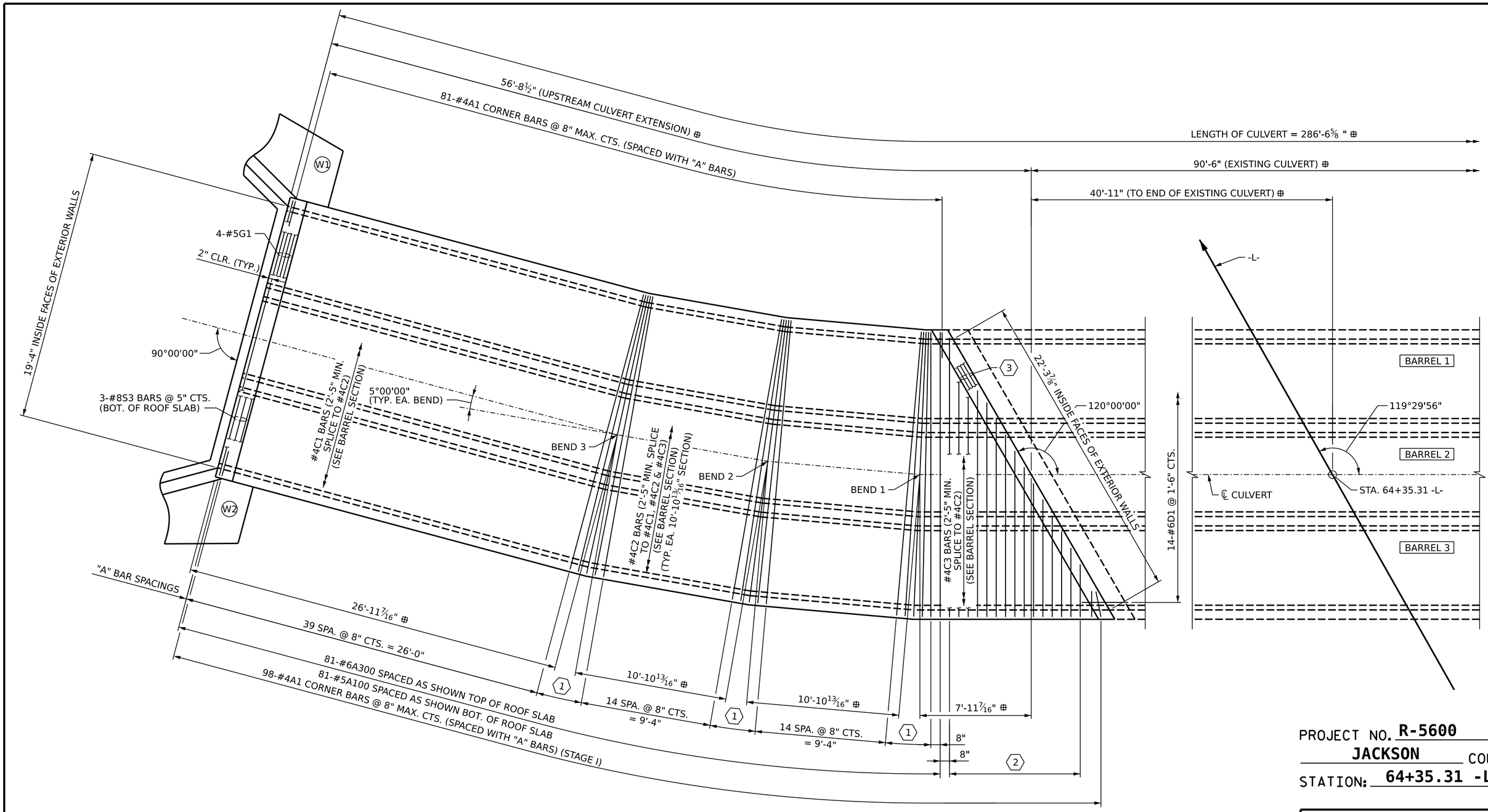

⊕ DIMENSIONS ALONG ℄ CULVERT

(1) 4 SPACES @ 8" MAX. CTS. SPLAYED

(2) #6A301 THRU #6A315 @ 8" CTS. TOP OF ROOF SLAB
#5A101 THRU #5A115 @ 8" CTS. BOT. OF ROOF SLAB

(3) 6-#6S6 BARS (SEE SECTION NORMAL TO ROADWAY)

ROOF SLAB

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 64+35.31 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT UPSTREAM EXTENSION 119° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

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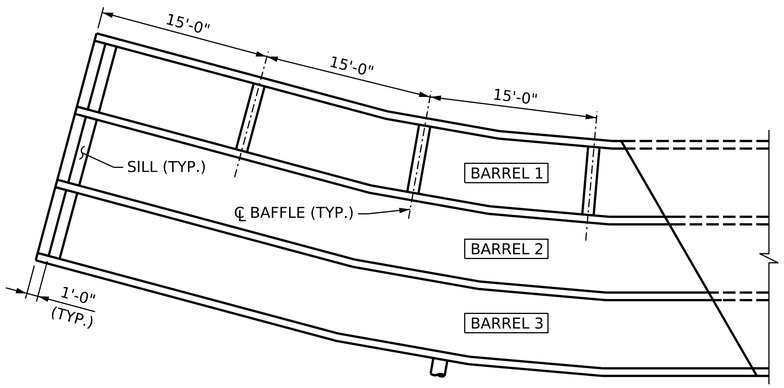
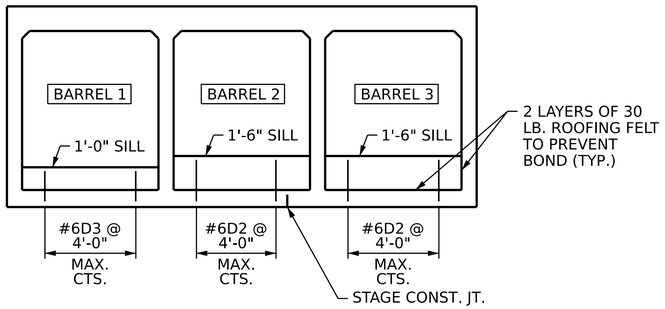
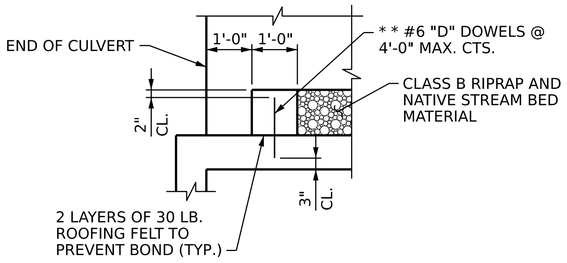


PLAN



SECTION - LOOKING DOWNSTREAM

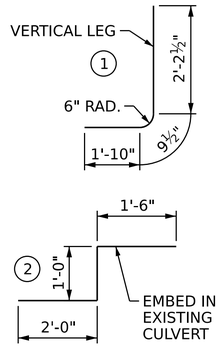


SECTION THROUGH SILL (BAFFLE SIMILAR)

** DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

SILL & BAFFLE DETAILS

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	98	#4	1	4'-10"	317
A2	97	#4	1	4'-10"	314
A3	184	#4	1	4'-10"	595
A200	88	#4	STR	10'-4"	608
A201	1	#4	STR	10'-6"	8
A202	1	#4	STR	9'-4"	7
A203	1	#4	STR	8'-2"	6
A204	1	#4	STR	7'-0"	5
A205	1	#4	STR	5'-10"	4
A206	1	#4	STR	4'-8"	4
A207	1	#4	STR	3'-7"	3
A208	1	#4	STR	2'-5"	2
A400	88	#6	STR	11'-3"	1487
A401	1	#6	STR	10'-6"	16
A402	1	#6	STR	9'-4"	15
A403	1	#6	STR	8'-2"	13
A404	1	#6	STR	7'-0"	11
A405	1	#6	STR	5'-10"	9
A406	1	#6	STR	4'-8"	8
A407	1	#6	STR	3'-7"	6
A408	1	#6	STR	2'-5"	4
B1	98	#4	STR	8'-2"	535
B2	98	#4	STR	6'-4"	415
B3	186	#4	STR	8'-2"	1015
C1	45	#4	STR	28'-8"	862
C2	90	#4	STR	14'-3"	857
C3	45	#4	STR	15'-8"	471
D1	5	#6	STR	2'-6"	19
D2	2	#6	STR	1'-10"	6
E1	16	#5	STR	3'-9"	63
L1	6	#6	2	4'-6"	41
S1	3	#8	STR	13'-3"	107
S4	9	#6	STR	13'-5"	182

REINFORCING STEEL	8015	LBS.
CLASS A CONCRETE		
BARREL	34.7	C.Y.
CURTAIN WALL	0.6	C.Y.
EDGE BEAM	0.8	C.Y.
TOTAL	36.1	C.Y.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	81	#4	1	4'-10"	262
A2	80	#4	1	4'-10"	259
A3	172	#4	1	4'-10"	556
A100	81	#5	STR	20'-4"	1718
A101	1	#5	STR	19'-11"	21
A102	1	#5	STR	18'-9"	20
A103	1	#5	STR	17'-7"	19
A104	1	#5	STR	16'-5"	18
A105	1	#5	STR	15'-3"	16
A106	1	#5	STR	14'-1"	15
A107	1	#5	STR	13'-0"	14
A108	1	#5	STR	11'-10"	13
A109	1	#5	STR	10'-8"	12
A110	1	#5	STR	9'-6"	10
A111	1	#5	STR	8'-4"	9
A112	1	#5	STR	7'-2"	8
A113	1	#5	STR	6'-0"	7
A114	1	#5	STR	4'-11"	6
A115	1	#5	STR	3'-9"	4
A250	80	#4	STR	12'-0"	642
A251	1	#4	STR	11'-5"	8
A252	1	#4	STR	10'-3"	7
A253	1	#4	STR	9'-1"	7
A254	1	#4	STR	7'-11"	6
A255	1	#4	STR	6'-9"	5
A256	1	#4	STR	5'-7"	4
A257	1	#4	STR	4'-6"	4
A300	81	#6	STR	20'-4"	2474
A301	1	#6	STR	19'-11"	30
A302	1	#6	STR	18'-9"	29
A303	1	#6	STR	17'-7"	27
A304	1	#6	STR	16'-5"	25
A305	1	#6	STR	15'-3"	23
A306	1	#6	STR	14'-1"	22
A307	1	#6	STR	13'-0"	20
A308	1	#6	STR	11'-10"	18
A309	1	#6	STR	10'-8"	17
A310	1	#6	STR	9'-6"	15
A311	1	#6	STR	8'-4"	13
A312	1	#6	STR	7'-2"	11
A313	1	#6	STR	6'-0"	10
A314	1	#6	STR	4'-11"	8
A315	1	#6	STR	3'-9"	6

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A450	80	#6	STR	12'-0"	1442
A451	1	#6	STR	11'-5"	18
A452	1	#6	STR	10'-3"	16
A453	1	#6	STR	9'-1"	14
A454	1	#6	STR	7'-11"	12
A455	1	#6	STR	6'-9"	11
A456	1	#6	STR	5'-7"	9
A457	1	#6	STR	4'-6"	7
B1	81	#4	STR	8'-2"	442
B2	81	#4	STR	6'-4"	343
B3	174	#4	STR	8'-2"	950
C1	95	#4	STR	28'-8"	1820
C2	190	#4	STR	14'-3"	1809
C3	95	#4	STR	15'-8"	995
D1	19	#6	STR	2'-6"	72
D2	2	#6	STR	1'-10"	6
E1	16	#5	STR	3'-9"	63
L1	6	#6	2	4'-6"	41
S1	3	#8	STR	13'-3"	107
S4	9	#6	STR	13'-5"	182
G1	4	#5	STR	20'-4"	85
L1	8	#6	2	4'-6"	55
S2	3	#8	STR	11'-11"	96
S3	3	#8	STR	20'-4"	163
S5	9	#6	STR	13'-10"	187
S6	6	#6	STR	23'-6"	212

REINFORCING STEEL	15199	LBS.
CLASS A CONCRETE		
BARREL	76.9	C.Y.
HEADWALL	1.0	C.Y.
CURTAIN WALL	0.8	C.Y.
EDGE BEAM	2.0	C.Y.
TOTAL	80.7	C.Y.

STAGE III

CLASS A CONCRETE		
SILL	1.6	C.Y.
TOTAL	1.6	C.Y.

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A200, A250	#4	1'-10"
A400, A450	#6	2'-9"
C1	#4	2'-5"
S1, S2, S3	#8	4'-9"
S4, S5, S6	#6	3'-7"

NOTES

BACKFILL CULVERT BARRELS WITH CLASS B RIPRAP AND TOP WITH NATIVE MATERIAL TO STILL HEIGHT.

NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIPRAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARRELS. IF RIPRAP IS USED TO LINE THE HIGH FLOW CULVERT BARRELS, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

SILLS ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

TOP OF LOW FLOW SILLS SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM.

SILLS TO BE CAST DURING STAGE III CONSTRUCTION. D1 DOWELS MAY BE INSTALLED DURING STAGES I & II CONSTRUCTION.

THE ENGINEER, IN CONSULTATION WITH DEO STAFF, SHALL REVIEW ALL MATERIAL TO BE USED AS BACKFILL PRIOR TO CONDUCTING THE BACKFILL ACTIVITY. BACKFILL SHALL CONSIST OF CLASS B RIPRAP AND NATIVE MATERIAL ONLY, UNLESS THE ENGINEER, IN CONSULATION WITH DEO STAFF, DETERMINES THAT (1) THE NATIVE MATERIAL IS UNSUITABLE, OR (2) ADDITIONAL MATERIAL IS REQUIRED TO SUPPLEMENT THE NATIVE MATERIAL. THE CHOSEN BACKFILL MATERIAL SHALL NOT HAVE ADVERSE EFFECTS TO AQUATIC LIFE, AQUATIC LIFE PASSAGE, OR WATER QUALITY. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION.

PROJECT NO. R-5600

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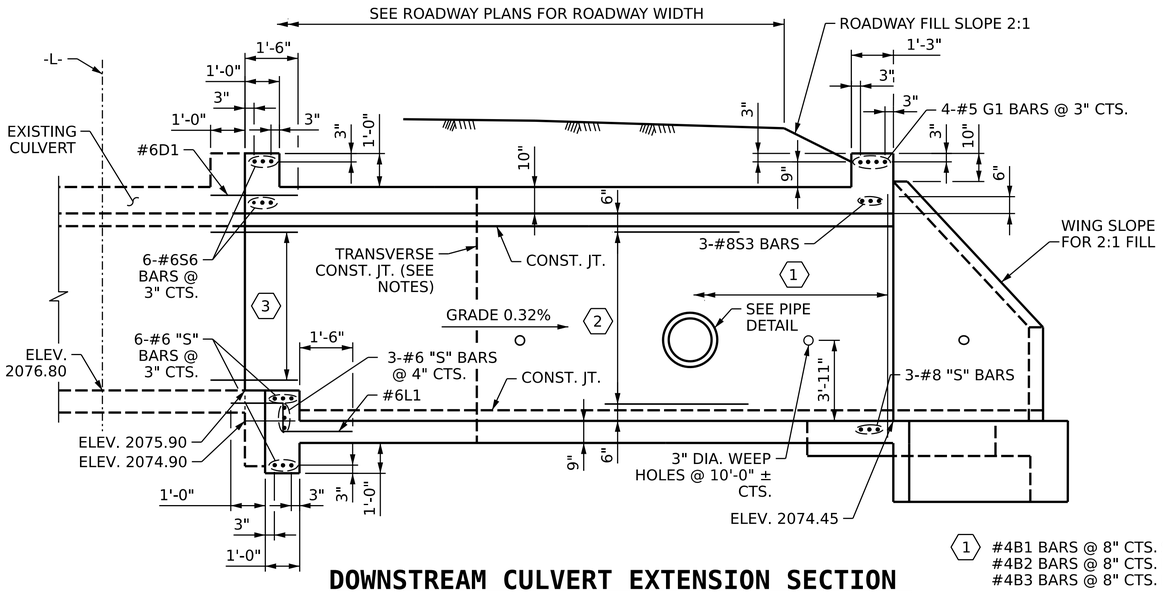
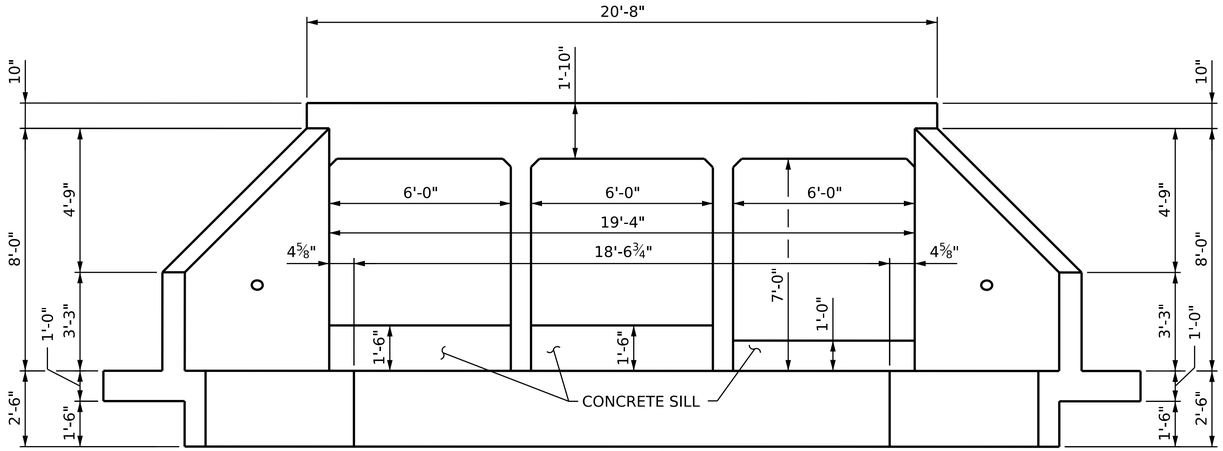
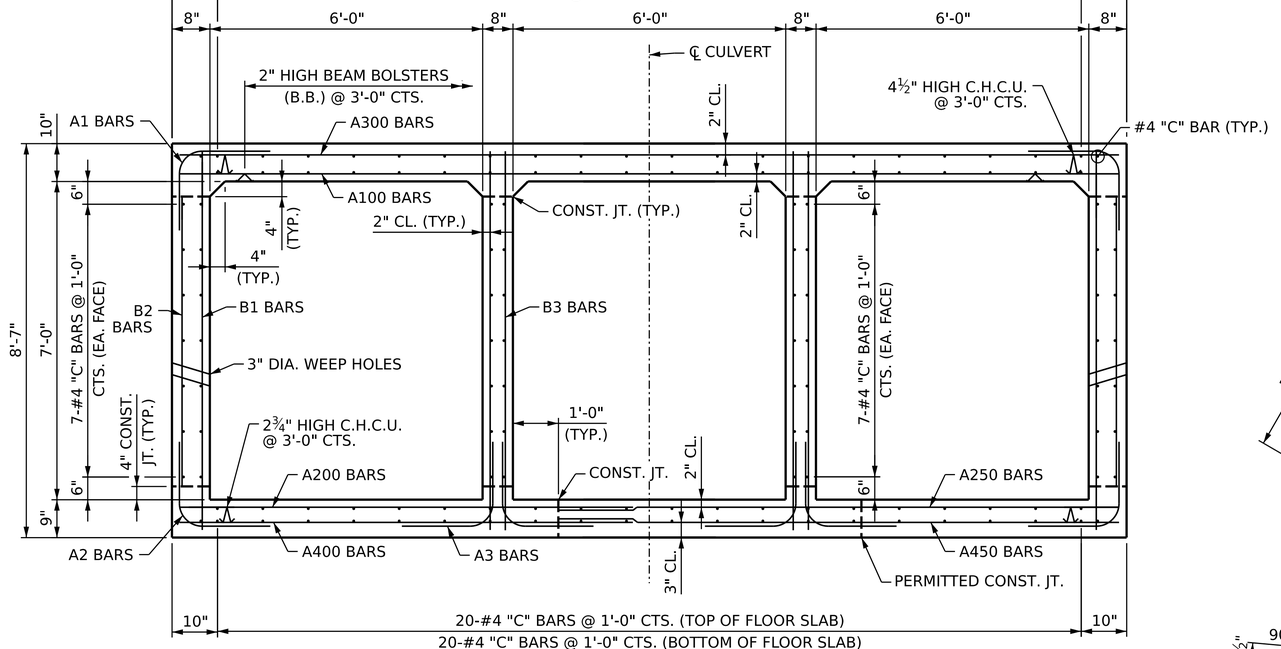


DOWNSTREAM CULVERT EXTENSION SECTION NORMAL TO ROADWAY



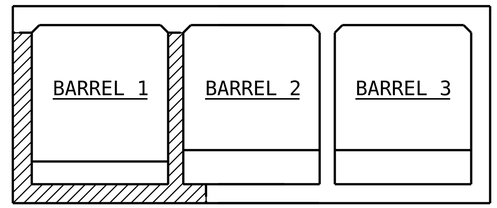
OUTLET ELEVATION NORMAL TO SKEW

1. #4B1 BARS @ 8" CTS. STREAM FACE (EXTERIOR WALL)
   #4B2 BARS @ 8" CTS. FILL FACE (EXTERIOR WALL)
   #4B3 BARS @ 8" CTS. EA. FACE (INTERIOR WALL)
2. #4 "C" BARS @ 1'-0" CTS. AS SHOWN IN TYPICAL BARREL SECTION
3. 5-#6D1 @ 1'-6" CTS.



RIGHT ANGLE SECTION OF BARREL(DOWNSTREAM EXTENSION)

THERE ARE 140 "C" BARS BARS IN SECTION OF BARREL
(LOOKING DOWNSTREAM)

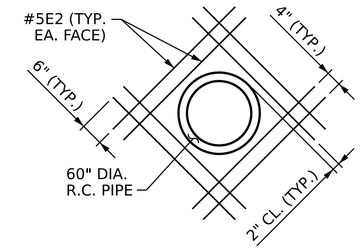


CONSTRUCTION SEQUENCE

LOOKING DOWNSTREAM

STAGE II

STAGE III (INCLUDING SILLS)



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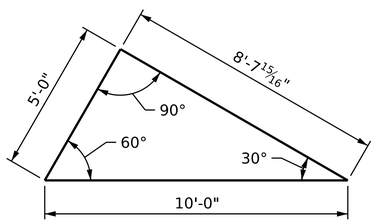
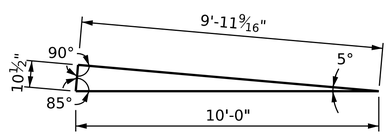
THE 60" DIA. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.





SKEW TRIANGLES

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 64+35.31 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT DOWNSTREAM EXTENSION 119° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-6
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	14

DES BY: E. NOLTING DATE: 07/24
DES CHK: G. M. CASTREJON DATE: 07/24
DWG BY: B. PETERSON DATE: 06/24
CHK BY: E. NOLTING DATE: 08/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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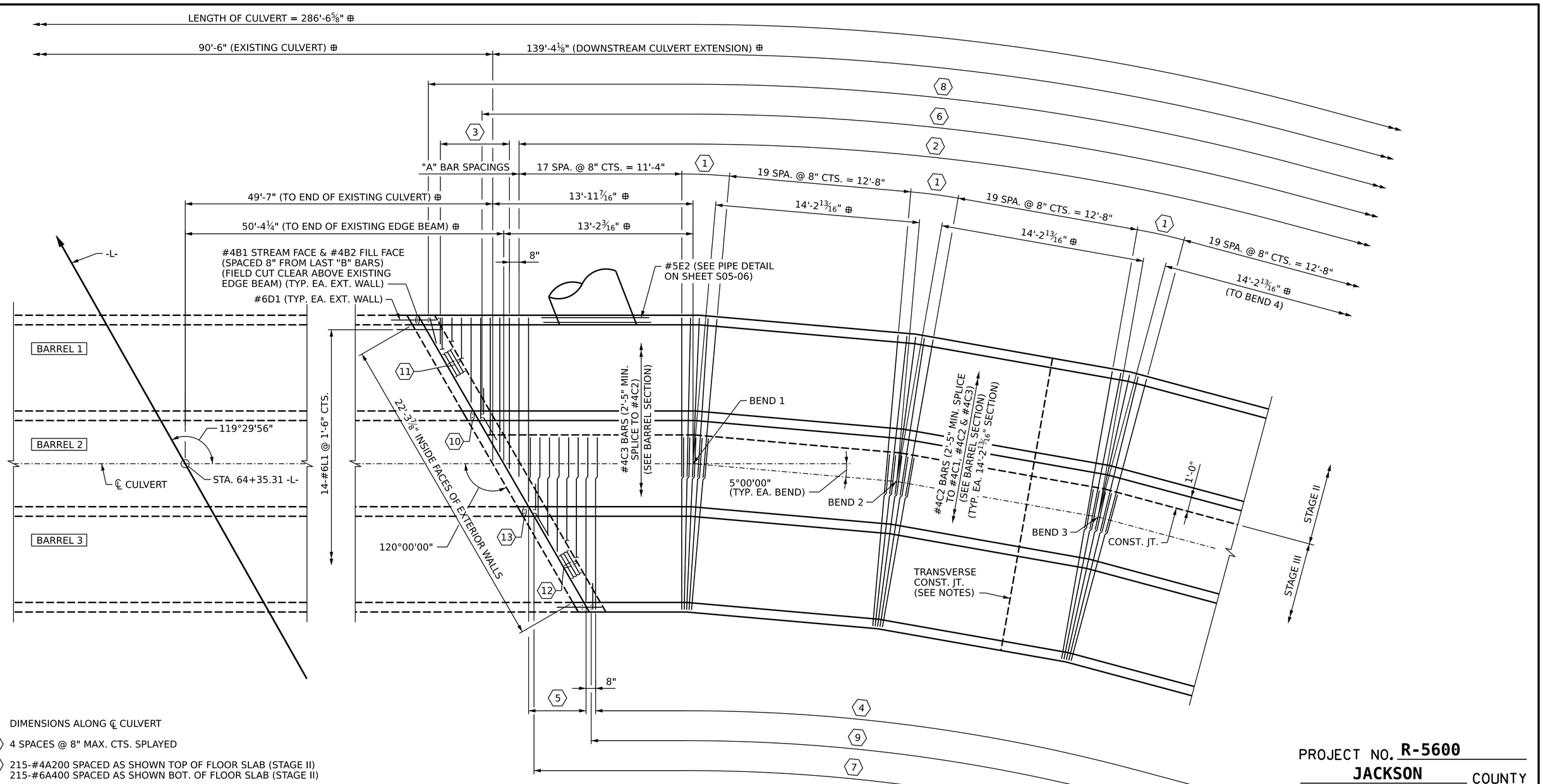

⊕ DIMENSIONS ALONG ℄ CULVERT

1. 4 SPACES @ 8" MAX. CTS. SPLAYED
2. 215-#4A200 SPACED AS SHOWN TOP OF FLOOR SLAB (STAGE II)
   215-#6A400 SPACED AS SHOWN BOT. OF FLOOR SLAB (STAGE II)
3. #4A201 THRU #4A208 @ 8" CTS. TOP OF FLOOR SLAB (STAGE II)
   #6A401 THRU #6A408 @ 8" CTS. BOT. OF FLOOR SLAB (STAGE II)
4. 207-#4A250 SPACED AS SHOWN TOP OF FLOOR SLAB
   (1'-10" MIN. SPLICE TO A200) (STAGE III)
   207-#6A450 SPACED AS SHOWN BOT. OF FLOOR SLAB
   (2'-9" MIN. SPLICE TO A400) (STAGE III)
5. #4A251 THRU #4A257 @ 8" CTS. TOP OF FLOOR SLAB (STAGE III)
   #6A451 THRU #6A457 @ 8" CTS. BOT. OF FLOOR SLAB (STAGE III)
6. 219-#4B3 @ 8" MAX. CTS. (EA. FACE) (SPA. WITH "A" BARS) (STAGE II)
   219-#4A3 CORNER BARS @ 8" MAX. CTS. (EA. FACE) (SPA. WITH "A" BARS)
   (STAGE II)
7. 213-#4B3 @ 8" MAX. CTS. (EA. FACE) (SPA. WITH "A" BARS) (STAGE III)
   213-#4A3 CORNER BARS @ 8" MAX. CTS. (EA. FACE) (SPA. WITH "A" BARS)
   (STAGE III)
8. 224-#4B1 @ 8" MAX. CTS. STREAM FACE, 224-#4B2 @ 8" MAX. CTS. FILL FACE
   & 224-#4A2 CORNER BARS @ 8" MAX. CTS. (SPACED WITH "A" BARS) (STAGE II)
9. 207-#4B1 @ 8" MAX. CTS. STREAM FACE, 207-#4B2 @ 8" MAX. CTS. FILL FACE
   & 207-#4A2 CORNER BARS @ 8" MAX. CTS. (SPACED WITH "A" BARS) (STAGE III)
10. #4B3 (EA. FACE) (SPACED 8" FROM LAST "B" BARS) (FIELD CUT CLEAR ABOVE
    EXISTING EDGE BEAM) (TYP. EA. INT. WALL) (STAGE II)
11. 9-#6S4 BARS (SEE SECTION NORMAL TO ROADWAY) (STAGE II)
12. 9-#6S5 BARS (3'-7" MIN. SPLICE TO S4) (SEE SECTION NORMAL TO ROADWAY)
    (STAGE III)
13. #4B3 (EA. FACE) (SPACED 8" FROM LAST "B" BARS) (FIELD CUT CLEAR ABOVE
    EXISTING EDGE BEAM) (TYP. EA. INT. WALL) (STAGE III)

PARTIAL FLOOR SLAB

(SILLS NOT SHOWN FOR CLARITY)

DES BY: E. NOLTING	DATE : 07/24	DWG BY: B. PETERSON	DATE : 08/24
DES CHK: G. M. CASTREJON	DATE : 07/24	CHK BY: E. NOLTING	DATE : 09/24

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

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PROJECT NO. R-5600
JACKSON COUNTY
STATION: 64+35.31 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT DOWNSTREAM EXTENSION 119° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-7
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	14

LENGTH OF CULVERT = 286'-6⅝" ⊕

139'-4⅛" (DOWNSTREAM CULVERT EXTENSION) ⊕

EXT. WALL - 224-#4B1 @ 8" MAX. CTS. STREAM FACE, 224-#4B2 @ 8" MAX. CTS. FILL FACE (STAGE II)
& 224-#4A2 CORNER BARS @ 8" MAX. CTS. (SPACED WITH "A" BARS) (STAGE II)

INT WALL - 219-#4B3 @ 8" MAX. CTS. (EA. FACE) (SPA. WITH "A" BARS) (STAGE II)
219-#4A3 CORNER BARS @ 8" MAX. CTS. (EA. FACE) (SPA. WITH "A" BARS) (STAGE II)

215-#4A200 SPACED AS SHOWN TOP OF FLOOR SLAB (STAGE II)

215-#6A400 SPACED AS SHOWN BOT. OF FLOOR SLAB (STAGE II)

101 SPA. @ 8" CTS. = 67'-4" — "A" BAR SPACINGS

68'-5$\frac{7}{16}$" ⊕

19 SPA. @ 8" CTS. = 12'-8"

14'-2$\frac{13}{16}$" ⊕

19 SPA. @ 8" CTS. = 12'-8"

14'-2$\frac{13}{16}$" ⊕

(TO BEND 3)

(1) 4 SPACES @ 8" MAX. CTS. SPLAYED

CONST. JT.

1'-0"

BEND 4

BEND 5

5°00'00" (TYP. EA. BEND)

#4C2 BARS (2'-5" MIN. SPLICE TO #4C1. #4C2 & #4C3)

(SEE BARREL SECTION)

(TYP. EA. 14'-2$\frac{13}{16}$" SECTION)

#4C1 BARS (2 BAR RUN) (2'-5" MIN. SPLICE TO #4C2)

(SEE BARREL SECTION)

W2

BARREL 1

3-#8S1 BARS @ 5" CTS. (TOP OF FLOOR SLAB) (STAGE II)

2" CLR. (TYP.)

BARREL 2

℄ CULVERT

90°00'00"

STAGE II

STAGE III

19'-4" INSIDE FACES OF EXTERIOR WALLS

BARREL 3

3-#8S2 BARS @ 5" CTS. (TOP OF FLOOR SLAB) (4'-9" MIN. SPLICE TO S1) (STAGE III)

TRANSVERSE CONST. JT. (SEE NOTES)

W1

207-#4A250 SPACED AS SHOWN TOP OF FLOOR SLAB (1'-10" MIN. SPLICE TO A200) (STAGE III)

207-#6A450 SPACED AS SHOWN BOT. OF FLOOR SLAB (2'-9" MIN. SPLICE TO A400) (STAGE III)

EXT. WALL - 207-#4B1 @ 8" MAX. CTS. STREAM FACE, 207-#4B2 @ 8" MAX. CTS. FILL FACE (STAGE III)
& 207-#4A2 CORNER BARS @ 8" MAX. CTS. (SPACED WITH "A" BARS) (STAGE III)

INT WALL - 213-#4B3 @ 8" MAX. CTS. (EA. FACE) (SPA. WITH "A" BARS) (STAGE III)
213-#4A3 CORNER BARS @ 8" MAX. CTS. (EA. FACE) (SPA. WITH "A" BARS) (STAGE III)

⊕ DIMENSIONS ALONG ℄ CULVERT

(1) 4 SPACES @ 8" MAX. CTS. SPLAYED

PARTIAL FLOOR SLAB

(SILLS NOT SHOWN FOR CLARITY)

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DES CHK:	G. M. CASTREJON	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	08/24
CHK BY:	E. NOLTING	DATE :	09/24

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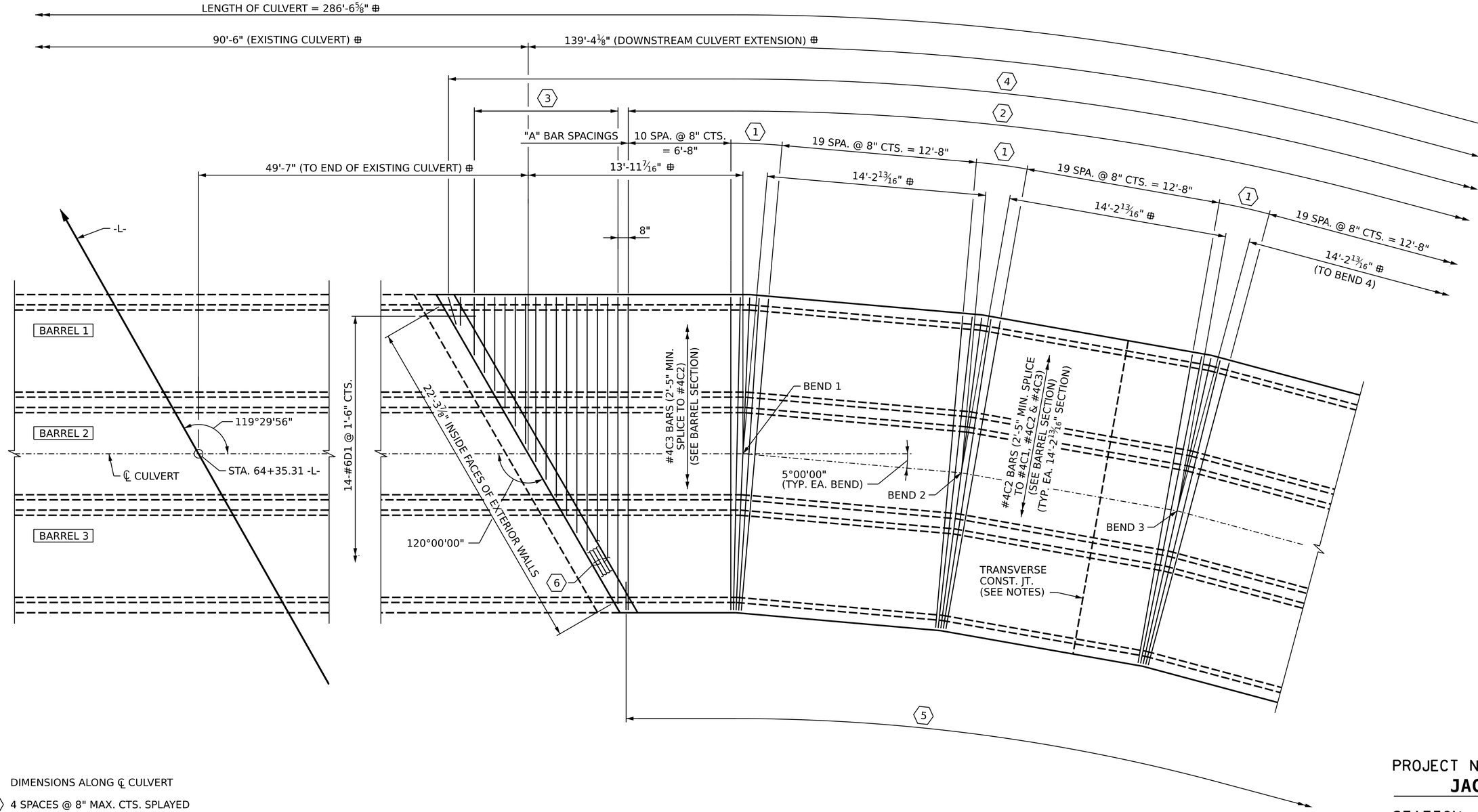

⊕ DIMENSIONS ALONG ℄ CULVERT

1. 4 SPACES @ 8" MAX. CTS. SPLAYED
2. 208-#6A300 SPACED AS SHOWN TOP OF ROOF SLAB (STAGE III)
   208-#5A100 SPACED AS SHOWN BOT. OF ROOF SLAB (STAGE III)
3. #6A301 THRU #6A315 @ 8" CTS. TOP OF ROOF SLAB (STAGE III)
   #5A101 THRU #5A115 @ 8" CTS. BOT. OF ROOF SLAB (STAGE III)
4. 225-#4A1 CORNER BARS @ 8" MAX. CTS. (SPA. WITH "A" BARS) (STAGE II)
5. 208-#4A1 CORNER BARS @ 8" MAX. CTS. (SPA. WITH "A" BARS) (STAGE III)
6. 6-#6S6 BARS (SEE SECTION NORMAL TO ROADWAY) (STAGE III)

PARTIAL ROOF SLAB

PROJECT NO. R-5600

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RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT DOWNSTREAM EXTENSION 119° SKEW

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9/5/2025
Anna C. Teague

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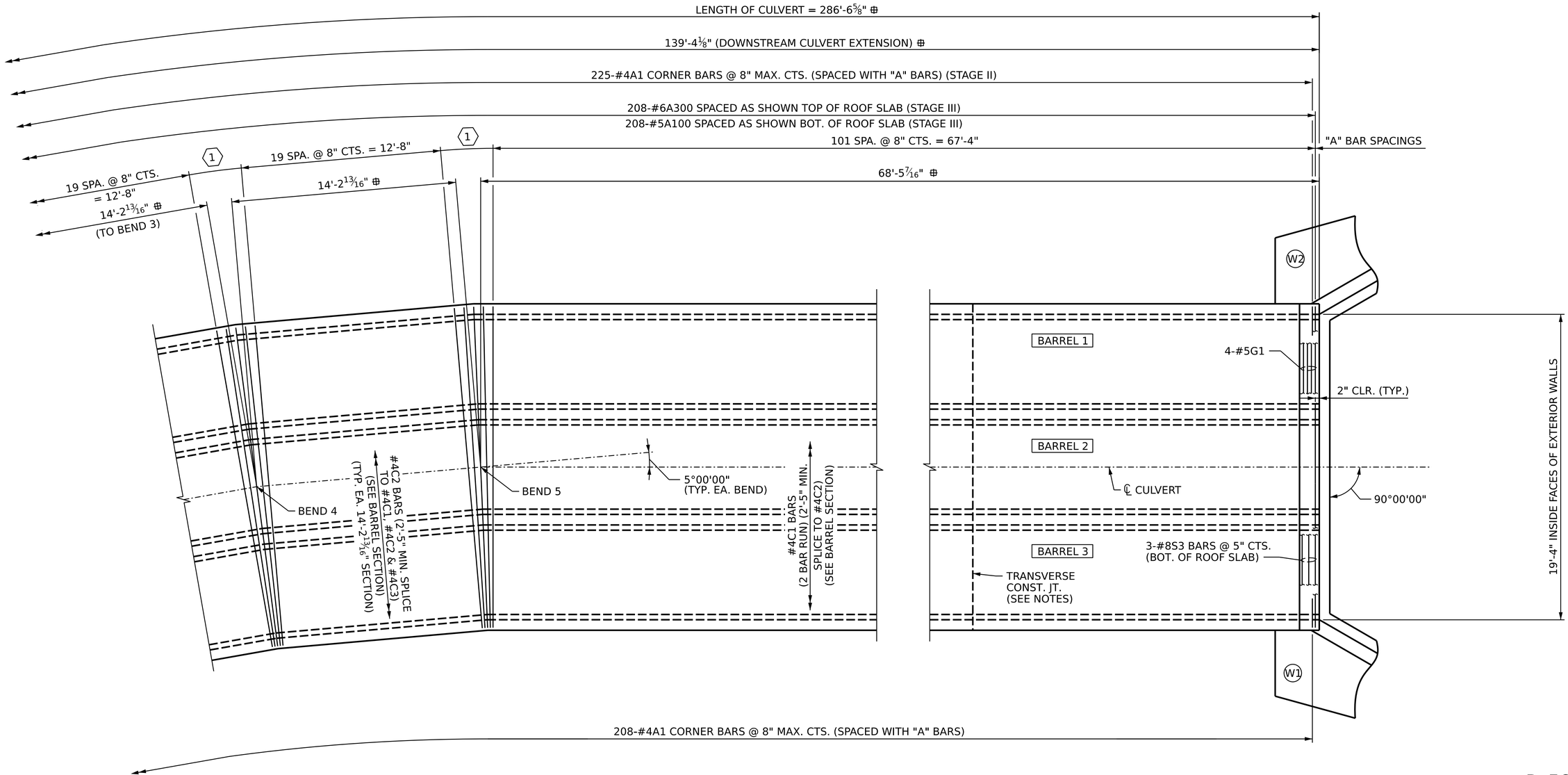

⊕ DIMENSIONS ALONG ℄ CULVERT

1 4 SPACES @ 8" MAX. CTS. SPLAYED

PARTIAL ROOF SLAB

PROJECT NO. R-5600

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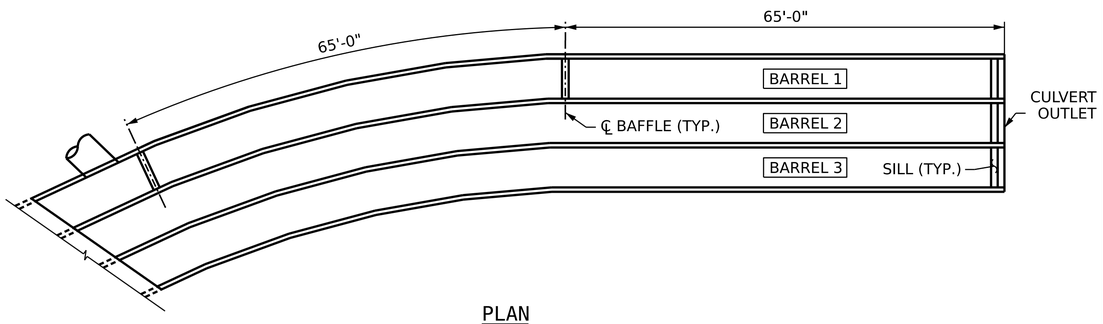
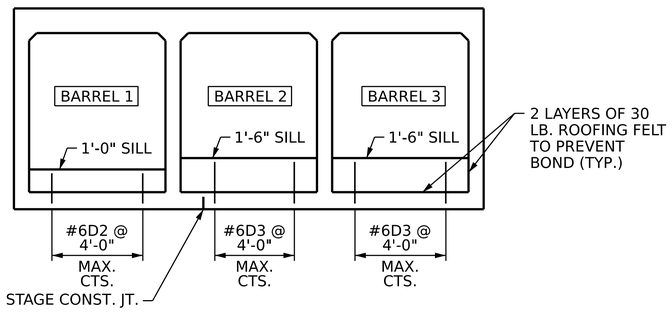
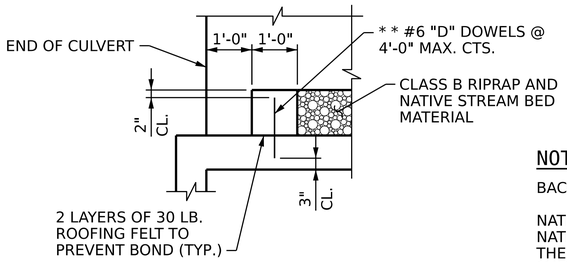


PLAN



SECTION - LOOKING DOWNSTREAM

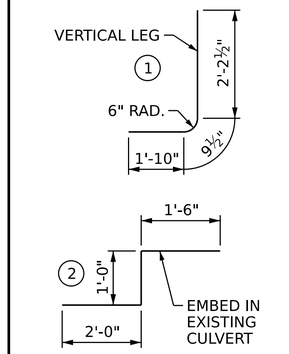


SECTION THROUGH SILL (BAFFLE SIMILAR)

* * DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

SILL & BAFFLE DETAILS

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	225	#4	1	4'-10"	727
A2	224	#4	1	4'-10"	724
A3	438	#4	1	4'-10"	1415
A200	215	#4	STR	10'-4"	1485
A201	1	#4	STR	10'-6"	8
A202	1	#4	STR	9'-4"	7
A203	1	#4	STR	8'-2"	6
A204	1	#4	STR	7'-0"	5
A205	1	#4	STR	5'-10"	4
A206	1	#4	STR	4'-8"	4
A207	1	#4	STR	3'-7"	3
A208	1	#4	STR	2'-5"	2
A400	215	#6	STR	11'-3"	3633
A401	1	#6	STR	10'-6"	16
A402	1	#6	STR	9'-4"	15
A403	1	#6	STR	8'-2"	13
A404	1	#6	STR	7'-0"	11
A405	1	#6	STR	5'-10"	9
A406	1	#6	STR	4'-8"	8
A407	1	#6	STR	3'-7"	6
A408	1	#6	STR	2'-5"	4
B1	224	#4	STR	8'-2"	1222
B2	224	#4	STR	6'-4"	948
B3	440	#4	STR	8'-2"	2400
C1	90	#4	STR	36'-4"	2185
C2	180	#4	STR	17'-7"	2115
C3	45	#4	STR	21'-8"	652
D1	5	#6	STR	2'-6"	19
D2	6	#6	STR	1'-4"	12
E2	16	#5	STR	7'-6"	126
L1	6	#6	2	4'-6"	41
S1	3	#8	STR	13'-3"	107
S4	9	#6	STR	13'-5"	182

REINFORCING STEEL	18114	LBS.
CLASS A CONCRETE		
BARREL	81.7	C.Y.
CURTAIN WALL	0.6	C.Y.
EDGE BEAM	0.8	C.Y.
TOTAL	83.1	C.Y.

STAGE III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	208	#4	1	4'-10"	672
A2	207	#4	1	4'-10"	669
A3	426	#4	1	4'-10"	1376
A100	208	#5	STR	20'-4"	4412
A101	1	#5	STR	19'-11"	21
A102	1	#5	STR	18'-9"	20
A103	1	#5	STR	17'-7"	19
A104	1	#5	STR	16'-5"	18
A105	1	#5	STR	15'-3"	16
A106	1	#5	STR	14'-1"	15
A107	1	#5	STR	13'-0"	14
A108	1	#5	STR	11'-10"	13
A109	1	#5	STR	10'-8"	12
A110	1	#5	STR	9'-6"	10
A111	1	#5	STR	8'-4"	9
A112	1	#5	STR	7'-2"	8
A113	1	#5	STR	6'-0"	7
A114	1	#5	STR	4'-11"	6
A115	1	#5	STR	3'-9"	4
A250	207	#4	STR	12'-0"	1660
A251	1	#4	STR	11'-5"	8
A252	1	#4	STR	10'-3"	7
A253	1	#4	STR	9'-1"	7
A254	1	#4	STR	7'-11"	6
A255	1	#4	STR	6'-9"	5
A256	1	#4	STR	5'-7"	4
A257	1	#4	STR	4'-6"	4
A300	208	#6	STR	20'-4"	6353
A301	1	#6	STR	19'-11"	30
A302	1	#6	STR	18'-9"	29
A303	1	#6	STR	17'-7"	27
A304	1	#6	STR	16'-5"	25
A305	1	#6	STR	15'-3"	23
A306	1	#6	STR	14'-1"	22
A307	1	#6	STR	13'-0"	20
A308	1	#6	STR	11'-10"	18
A309	1	#6	STR	10'-8"	17
A310	1	#6	STR	9'-6"	15
A311	1	#6	STR	8'-4"	13
A312	1	#6	STR	7'-2"	11
A313	1	#6	STR	6'-0"	10
A314	1	#6	STR	4'-11"	8
A315	1	#6	STR	3'-9"	6

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A450	207	#6	STR	12'-0"	3731
A451	1	#6	STR	11'-5"	18
A452	1	#6	STR	10'-3"	16
A453	1	#6	STR	9'-1"	14
A454	1	#6	STR	7'-11"	12
A455	1	#6	STR	6'-9"	11
A456	1	#6	STR	5'-7"	9
A457	1	#6	STR	4'-6"	7
B1	208	#4	STR	8'-2"	1135
B2	208	#4	STR	6'-4"	880
B3	428	#4	STR	8'-2"	2335
C1	190	#4	STR	36'-4"	4612
C2	380	#4	STR	17'-7"	4464
C3	95	#4	STR	21'-8"	1375
D1	19	#6	STR	2'-6"	72
D3	4	#6	STR	1'-10"	12
G1	4	#5	STR	20'-4"	85
L1	8	#6	2	4'-6"	55
S2	3	#8	STR	11'-11"	96
S3	3	#8	STR	20'-4"	163
S5	9	#6	STR	13'-10"	187
S6	6	#6	STR	23'-6"	212

REINFORCING STEEL	35150	LBS.
CLASS A CONCRETE		
BARREL	405.0	C.Y.
HEADWALL	1.0	C.Y.
CURTAIN WALL	0.8	C.Y.
EDGE BEAM	2.0	C.Y.
SILL	1.4	C.Y.
TOTAL	410.2	C.Y.

NOTES

BACKFILL CULVERT BARRELS WITH CLASS B RIPRAP AND TOP WITH NATIVE MATERIAL TO SILL HEIGHT.

NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIPRAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARRELS. IF RIPRAP IS USED TO LINE THE HIGH FLOW CULVERT BARRELS, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

SILLS ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

TOP OF LOW FLOW SILLS SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM.

SILLS TO BE CAST DURING STAGE III CONSTRUCTION. D2 DOWELS MAY BE INSTALLED DURING STAGE II CONSTRUCTION.

THE ENGINEER, IN CONSULTATION WITH DEO STAFF, SHALL REVIEW ALL MATERIAL TO BE USED AS BACKFILL PRIOR TO CONDUCTING THE BACKFILL ACTIVITY. BACKFILL SHALL CONSIST OF CLASS B RIPRAP AND NATIVE MATERIAL ONLY, UNLESS THE ENGINEER, IN CONSULATION WITH DEO STAFF, DETERMINES THAT (1) THE NATIVE MATERIAL IS UNSUITABLE, OR (2) ADDITIONAL MATERIAL IS REQUIRED TO SUPPLEMENT THE NATIVE MATERIAL. THE CHOSEN BACKFILL MATERIAL SHALL NOT HAVE ADVERSE EFFECTS TO AQUATIC LIFE, AQUATIC LIFE PASSAGE, OR WATER QUALITY. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION.

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A200, A250	#4	1'-10"
A400, A450	#6	2'-9"
C1	#4	2'-5"
S1, S2, S3	#8	4'-9"
S4, S5, S6	#6	3'-7"

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RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT DOWNSTREAM EXTENSION 119° SKEW

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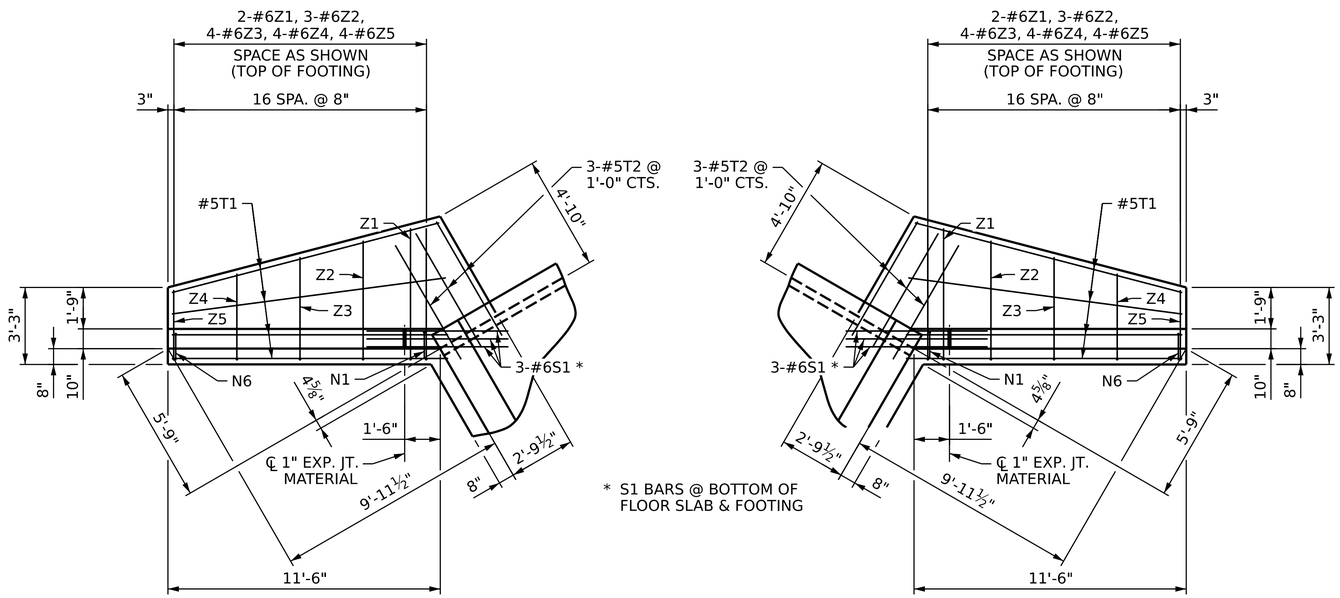
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-11
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	14

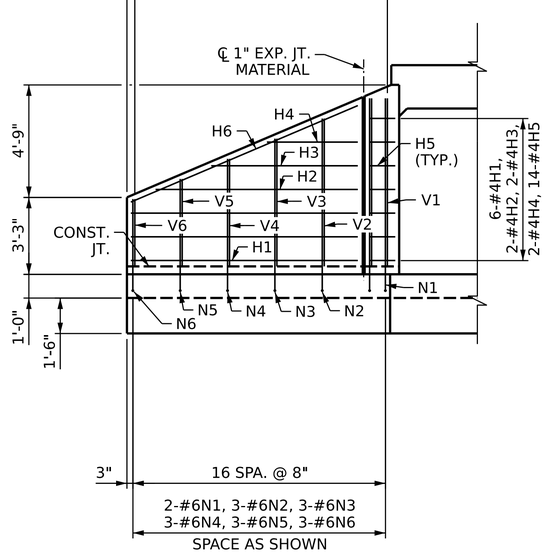
DES BY:	E. NOLTING	DATE :	07/24
DES CHK:	G. M. CASTREJON	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	08/24
CHK BY:	E. NOLTING	DATE :	09/24



PLAN W1

* S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING

PLAN W2



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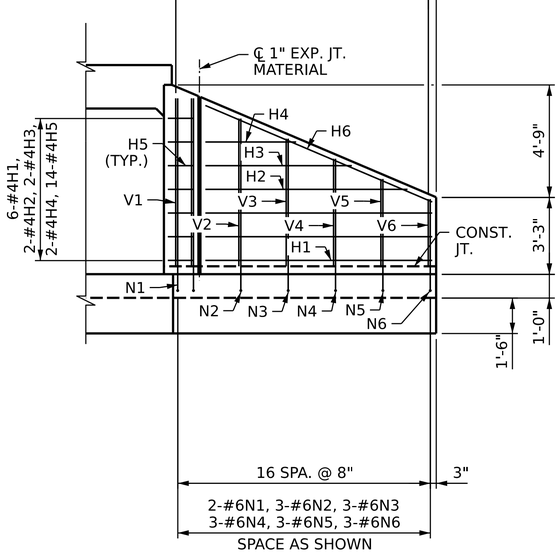

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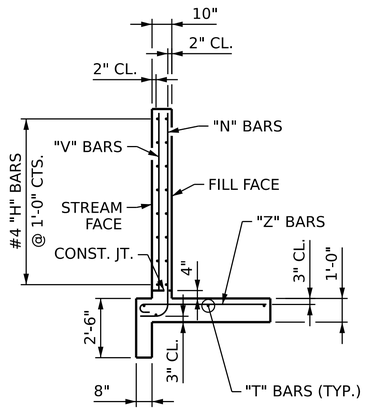
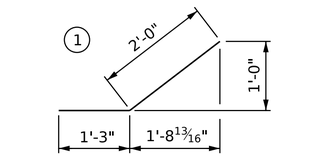
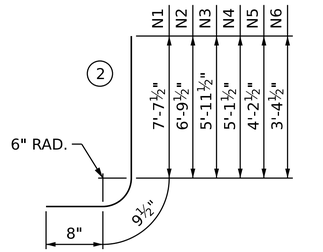
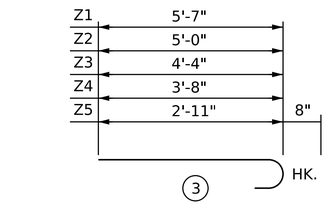


TYPICAL WING SECTION

BAR TYPES







ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	24	#4	STR	9'-7"	154
H2	8	#4	STR	8'-6"	46
H3	8	#4	STR	6'-2"	33
H4	8	#4	STR	3'-10"	21
H5	56	#4	1	3'-3"	122
H6	8	#4	STR	10'-5"	56
N1	8	#6	2	9'-1"	110
N2	12	#6	2	8'-3"	149
N3	12	#6	2	7'-5"	134
N4	12	#6	2	6'-7"	119
N5	12	#6	2	5'-8"	103
N6	12	#6	2	4'-10"	88
S1	12	#6	STR	6'-0"	109
T1	16	#5	STR	11'-8"	195
T2	12	#5	STR	5'-7"	70
V1	8	#4	STR	7'-1"	38
V2	12	#4	STR	6'-3"	51
V3	12	#4	STR	5'-4"	43
V4	12	#4	STR	4'-6"	37
V5	12	#4	STR	3'-8"	30
V6	12	#4	STR	2'-10"	23
Z1	8	#6	3	6'-3"	76
Z2	12	#6	3	5'-8"	103
Z3	16	#6	3	5'-0"	121
Z4	16	#6	3	4'-4"	105
Z5	16	#6	3	3'-7"	87

REINFORCING STEEL FOR 4 WINGS	2223	LBS.
CLASS A CONCRETE FOR 4 WINGS	18.6	C.Y.

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 64+35.31 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT 119° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TERGUE
9/5/2025
Anna C. Tergue

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-12
1	--	--	3	--	--	TOTAL SHEETS
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DES BY: G. M. CASTREJON DATE : 09/24
DES CHK: E. NOLTING DATE : 10/24
DWG BY: D. CHAPMAN DATE : 09/24
CHK BY: E. NOLTING DATE : 10/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
								MOMENT				SHEAR				
							LIVE-LOAD FACTORS (γ LL)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.32	--	1.75	1.42	1	TOP SLAB	3.00	1.32	1	TOP SLAB	0.00	
		HL-93 (OPERATING)	N/A		1.71	--	1.35	1.84	1	TOP SLAB	3.00	1.71	1	TOP SLAB	0.00	
		HS-20 (INVENTORY)	36.000	2	1.32	47.52	1.75	1.42	1	TOP SLAB	3.00	1.32	1	TOP SLAB	0.00	
		HS-20 (OPERATING)	36.000		1.71	61.56	1.35	1.84	1	TOP SLAB	3.00	1.71	1	TOP SLAB	0.00	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		2.68	36.18	1.40	2.68	1	TOP SLAB	3.00	2.71	1	TOP SLAB	0.00	
		SNGARBS2	20.000		2.45	49.00	1.40	2.45	1	TOP SLAB	3.00	2.47	1	TOP SLAB	0.00	
		SNAGRIS2	22.000		2.59	56.98	1.40	2.59	1	TOP SLAB	3.00	2.65	1	TOP SLAB	0.00	
		SNCOTTS3	27.250		2.06	56.14	1.40	2.20	1	TOP SLAB	3.00	2.06	1	TOP SLAB	6.00	
		SNAGGRS4	34.925		2.15	75.09	1.40	2.15	1	BOTTOM SLAB	3.00	2.75	1	TOP SLAB	6.00	
		SNS5A	35.550		2.31	82.12	1.40	2.31	1	BOTTOM SLAB	3.00	2.48	1	TOP SLAB	6.00	
		SNS6A	39.950		2.32	92.68	1.40	2.32	1	BOTTOM SLAB	3.00	2.45	1	TOP SLAB	6.00	
		SNS7B	42.000		2.32	97.44	1.40	2.32	1	BOTTOM SLAB	3.00	2.45	1	TOP SLAB	6.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.65	87.45	1.40	2.65	1	BOTTOM SLAB	3.00	2.71	1	TOP SLAB	0.00	
		TNT4A	33.075		2.55	84.34	1.40	2.58	1	BOTTOM SLAB	3.00	2.55	1	TOP SLAB	6.00	
		TNT6A	41.600		2.26	94.02	1.40	2.26	1	BOTTOM SLAB	3.00	2.52	1	TOP SLAB	6.00	
		TNT7A	42.000		2.20	92.40	1.40	2.20	1	BOTTOM SLAB	3.00	2.55	1	TOP SLAB	6.00	
		TNT7B	42.000		2.45	102.9	1.40	2.46	1	BOTTOM SLAB	3.00	2.45	1	TOP SLAB	6.00	
		TNAGRIT4	43.000		2.22	95.46	1.40	2.22	1	BOTTOM SLAB	3.00	2.53	1	TOP SLAB	6.00	
		TNAGT5A	45.000		2.10	94.50	1.40	2.10	1	BOTTOM SLAB	3.00	2.53	1	TOP SLAB	6.00	
		TNAGT5B	45.000	3	1.74	78.30	1.40	1.74	1	BOTTOM SLAB	3.00	2.56	1	TOP SLAB	0.00	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.69	48.59	1.30	1.86	1	TOP SLAB	3.00	1.69	1	TOP SLAB	0.00	
		EV3	43.000	4	1.68	72.24	1.30	1.92	1	TOP SLAB	3.00	1.68	1	TOP SLAB	6.00	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATES.

COMMENTS:

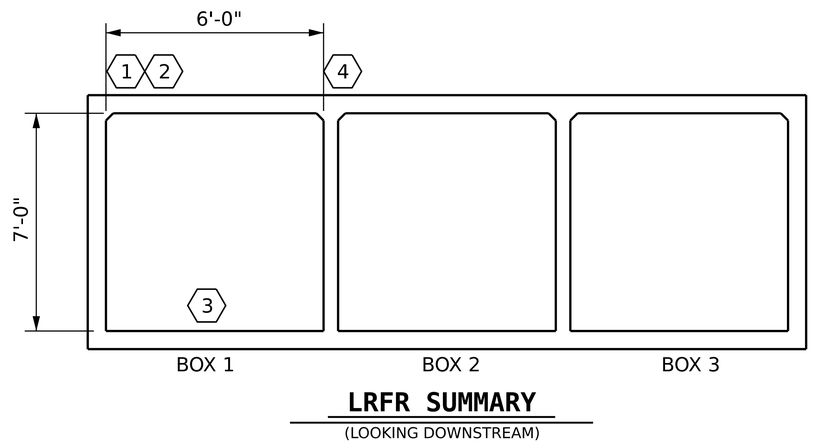
1.

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



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 64+35.31 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 6 FT. X 7 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-13
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DES BY: E. NOLTING DATE : 07/24
DES CHK: G. M. CASTREJON DATE : 07/24

DWG BY: D. CHAPMAN DATE : 07/24
CHK BY: E. NOLTING DATE : 08/24

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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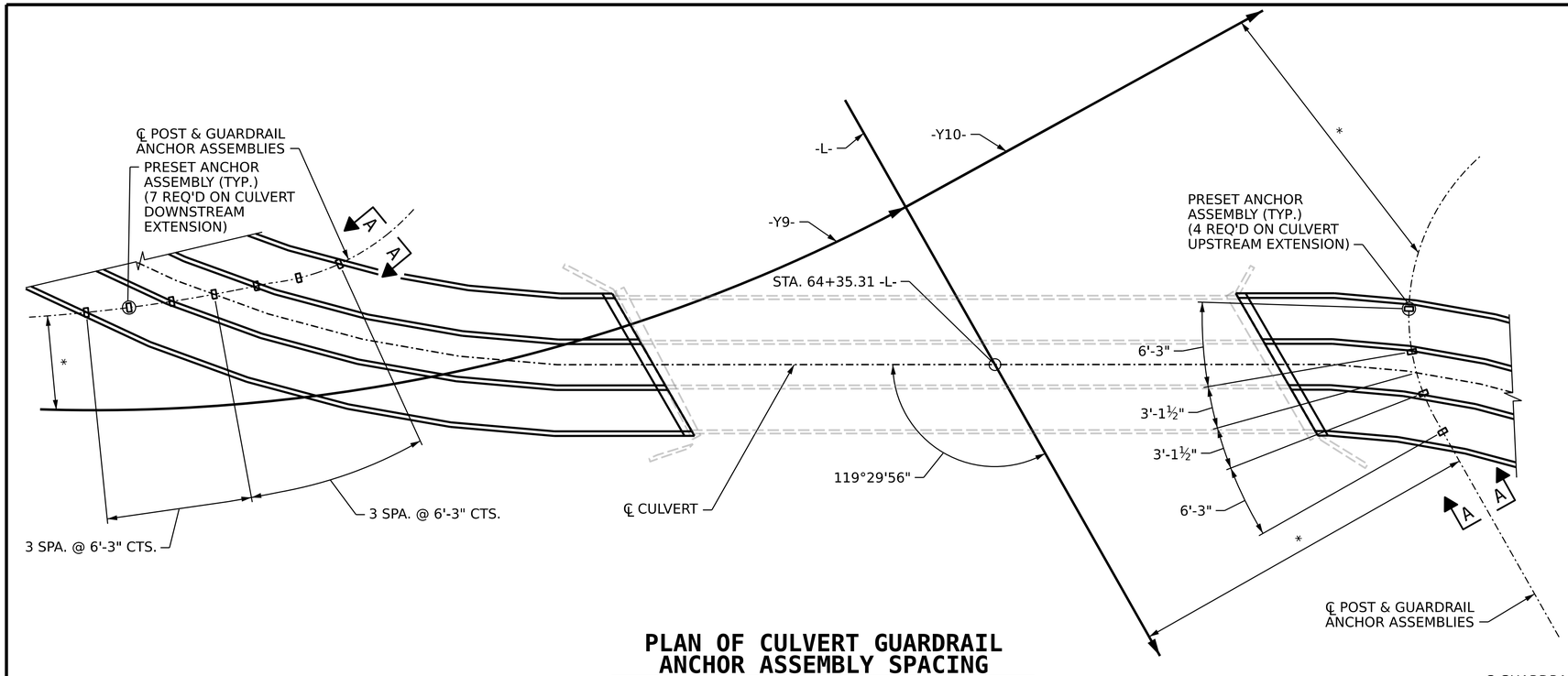


PLAN OF CULVERT GUARDRAIL ANCHOR ASSEMBLY SPACING

* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2½".

B. 4 - 1" ∅ X 2¼" BOLTS WITH WASHERS, BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" ∅ X 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUTS SHOWN IN THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS DETAIL ARE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 P.S.I. AS AN OPTION, A 7/16" ∅ WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO INSURE FIT.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CLASS "A" CONCRETE.

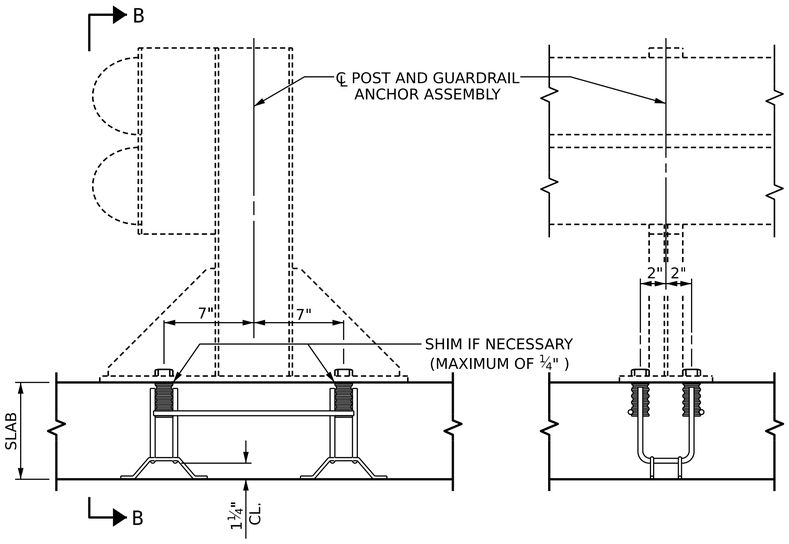
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

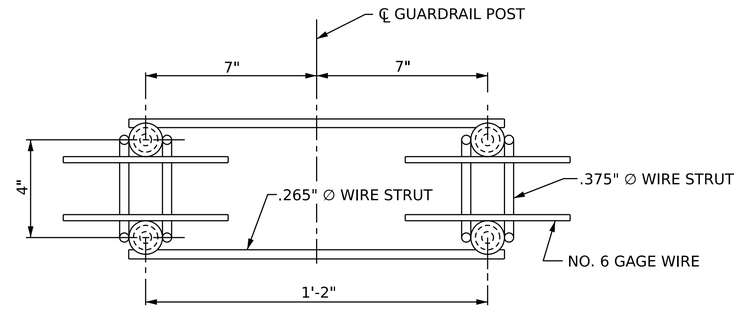
SLAB REINFORCING STEEL MAY BE SHIFTED AS NECESSARY TO CLEAR GUARDRAIL ANCHOR ASSEMBLY. CARE SHOULD BE TAKEN TO KEEP THE SHIFTING OF REINFORCING STEEL TO A MINIMUM.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" ∅ BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

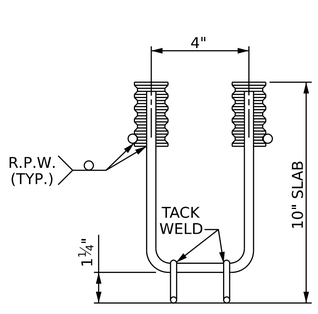


SECTION A-A

SECTION B-B



PLAN



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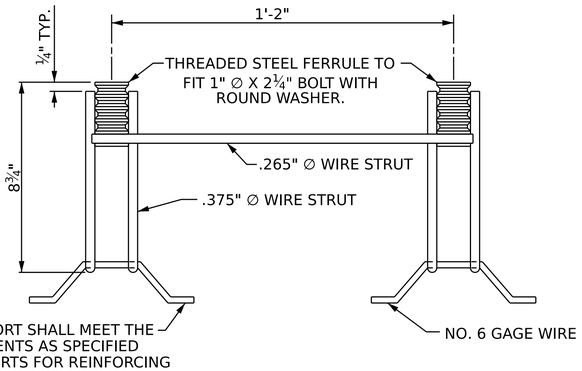

THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

PROJECT NO. R-5600
JACKSON COUNTY
STATION: 64+35.31 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-14
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	14

DES BY:	B. BUSH	DATE :	09/24
DES CHK:	D. MAST	DATE :	09/24
DWG BY:	D.CARTER	DATE :	09/24
CHK BY:	B. BUSH	DATE :	09/24

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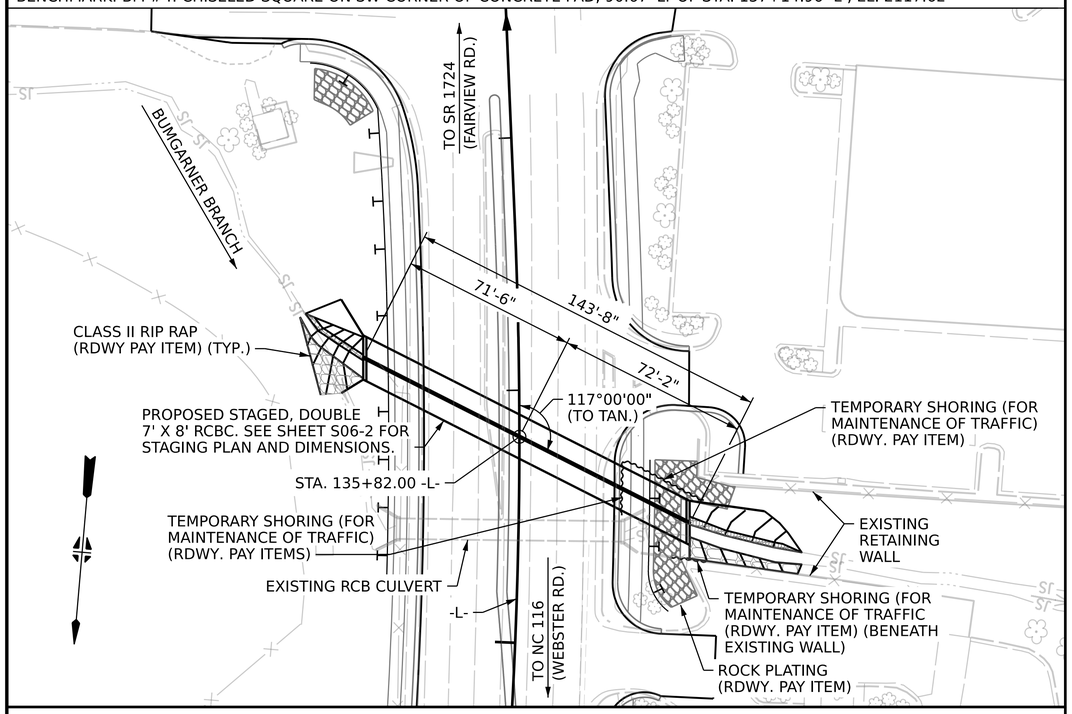
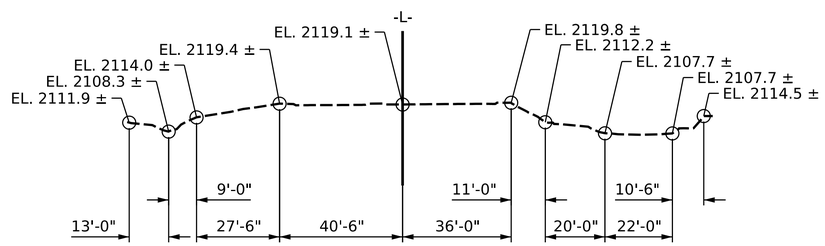
BENCHMARK: BM #4: CHISELED SQUARE ON SW CORNER OF CONCRETE PAD, 90.67' LT OF STA. 137+14.96 -L-, EL. 2117.62



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS



PROFILE ALONG ℄ CULVERT

NOTES

F.A. PROJ. NO.: STP-0107(13)

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

DESIGN FILL = 7.70' (MAX.) AND 3.62' (MIN.).

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.

3" ∅ WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

STAGE I

1. FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS AND CURTAIN WALL FOR CAST IN PLACE PORTION OF BARREL 1.
2. THE REMAINING PORTIONS OF THE WALLS FOR CAST IN PLACE PORTION OF BARREL 1 AND WING W3 CONCRETE COPING.

STAGE II

1. PLACE PRECAST PORTION OF CULVERT FOR BARRELS 1 & 2.
2. WING W1 & W2 FOOTINGS INCLUDING 4" OF VERTICAL WALLS AND CURTAIN WALL FOR PRECAST PORTION OF BARRELS 1 & 2. FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS AND EDGE BEAM FOR CLOSURE POUR OF BARREL 1.
3. THE REMAINING PORTIONS OF WINGS W1 & W2 AND HEADWALLS FOR PRECAST PORTION OF BARRELS 1 & 2. THE REMAINING PORTIONS OF THE VERTICAL WALLS FOR CLOSURE POUR OF BARREL 1.

STAGE III

1. FLOOR SLAB INCLUDING 4" OF EXTERIOR WALL, WING W4 FOOTING INCLUDING 4" OF VERTAICL WALL, EDGE BEAM AND CURTAIN WALL FOR CAST IN PLACE PORTION OF BARREL 2.
2. THE REMAINING PORTIONS OF THE EXTERIOR WALL AND WING W4 FOR CAST IN PLACE PORTION OF BARREL 2 FOLLOWED BY ROOF SLAB, EDGE BEAM AND HEADWALL FOR BARRELS 1 & 2.
3. SILLS FOR BARRELS 1 & 2.

AT THE CONTRACTOR'S OPTION, THEY MAY PROPOSE AN ALTERNATE POUR SEQUENCE. CONTRACTOR SHALL ADHERE TO THE EROSION CONTROL PLAN. THE ALTERNATE POUR SEQUENCE MUST BE APPROVED BY THE RESIDENT ENGINEER.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECCIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

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

THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

THE 30" DIA. AND 42" DIA. PIPES THROUGH THE SIDEWALLS OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE PIPE.

ALL PRECAST UNITS SHALL BE PLACED PRIOR TO POURING THE WINGS, END CURTAIN WALL, HEADWALL, AND CLOSURE POUR FOR STAGE II. THE EXTERIOR PRECAST UNITS SHALL BE UNDERMINED TO PROVIDE FOR THE WING FOOTINGS AND CLOSURE POUR TO BE POURED TO THE DEPTH AND DIMENSIONS AS SHOWN IN THE PLANS.

WHEN ANY PRECAST UNIT IS DAMAGED DURING HANDLING, THE ENGINEER AT HIS DISCRETION SHALL REJECT THE UNIT AS BEING UNFIT FOR INSTALLATION AND THE CONTRACTOR SHALL REMOVE SUCH REJECTED UNIT FROM THE PROJECT. MINOR DAMAGE TO THE UNIT MAY BE REPAIRED BY THE CONTRACTOR WHEN PERMITTED BY THE ENGINEER.

CARE SHALL BE TAKEN DURING BACKFILL AND COMPACTION OPERATION TO MAINTAIN ALIGNMENT AND PREVENT DAMAGE TO THE JOINTS. UNITS WHICH BECOME MISALIGNED, SHOW EXCESSIVE SETTLEMENT, OR HAVE OTHERWISE BEEN DAMAGED BY THE CONTRACTOR'S OPERATION SHALL AT THE DISCRETION OF THE ENGINEER BE REMOVED AND REPLACED BY THE CONTRACTOR AT NO COST TO THE DEPARTMENT OF TRANSPORTATION.

CONCRETE CHAMFERS ON EXTERIOR LONGITUDINAL EDGES OF THE PRECAST UNITS MAY BE AS PER THE FABRICATORS RECOMMENDATION, HOWEVER ALL WORKMANSHIP SHALL PROVIDE CONCRETE COVER OVER THE WELDED WIRE FABRIC AS SPECIFIED ON THE PLANS AND THE CONCRETE CHAMFERS CHOSEN SHALL IN NO WAY FUNCTIONALLY LESSEN THE DESIGN SHOWN ON THE PLANS.

ONE PERMITTED CONSTRUCTION JOINT WILL BE ALLOWED IN THE CURTAIN WALL.

THE CONCRETE FOR THE HEADWALLS, WINGS, EDGE BEAMS AND CURTAIN WALLS SHALL BE CLASS "A" CONCRETE AS PER THE STANDARD SPECIFICATIONS.

FULL COMPENSATION FOR CONCRETE, REINFORCING STEEL, LABOR, EQUIPMENT, AND ALL OTHER RELATED MATERIALS NECESSARY FOR WINGS AND WING FOOTINGS FOR WINGS W1 AND W2, AND STAGE II CLOSURE POUR SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR PRECAST REINFORCED CONCRETE BOX CULVERT @ STA. 135+82.00 -L-.

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

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

HYDRAULIC DATA	
DESIGN DISCHARGE	= 660 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 2115.2
DRAINAGE AREA	= 1.55 SQ. MI.
BASE DISCHARGE (Q100)	= 980 CFS
BASE HIGH WATER ELEVATION	= 2117.6
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 1160 CFS
FREQUENCY OF OVERTOPPING FLOOD	= >500 YR.
OVERTOPPING FLOOD ELEVATION	= 2119.5

ROADWAY DATA	
GRADE POINT ELEV. @ STA. 135+82.00 -L-	= 2120.23
BED ELEV. @ STA. 135+82.00 -L-	= 2106.90
ROADWAY SLOPES	= 2:1 LT & 1.5:1 RT

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE (STAGE I)		
BARREL @ 0.95 CY./FT.	24.4	C.Y.
CURTAIN WALL	0.8	C.Y.
TOTAL	25.2	C.Y.
REINFORCING STEEL (STAGE I)		
BARREL	3653	LBS.
CURTAIN WALL	131	LBS.
TOTAL	3784	LBS.
CLASS A CONCRETE (STAGE III)		
BARREL @ 0.98 CY./FT.	27.1	C.Y.
HEADWALL, CURTAIN WALL, EDGE BEAM, SILLS	5.0	C.Y.
WING W4	3.7	C.Y.
TOTAL	35.8	C.Y.
REINFORCING STEEL (STAGE III)		
BARREL	4116	LBS.
HEADWALL, CURTAIN WALL, EDGE BEAM, SILLS	512	LBS.
WING W4	377	LBS.
TOTAL	5005	LBS.

TOTAL STRUCTURE QUANTITIES	
CULVERT EXCAVATION @ STA. 135+82.00 -L-	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	211 TONS
REMOVAL OF EXISTING STRUCTURE	LUMP SUM
PRECAST REINFORCED CONCRETE BOX CULVERT @ STA. 135+82.00 -L-	LUMP SUM
SHEET PILE RETAINING WALLS	49.4 S.F.

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

Kent Dickens 9/5/2025

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 117° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S06-01
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	12

DES BY: E. NOLTING DATE: 07/24
DES CHK: G. M. CASTREJON DATE: 07/24
DWG BY: B. PETERSON DATE: 06/24
CHK BY: K. DICKENS DATE: 04/25

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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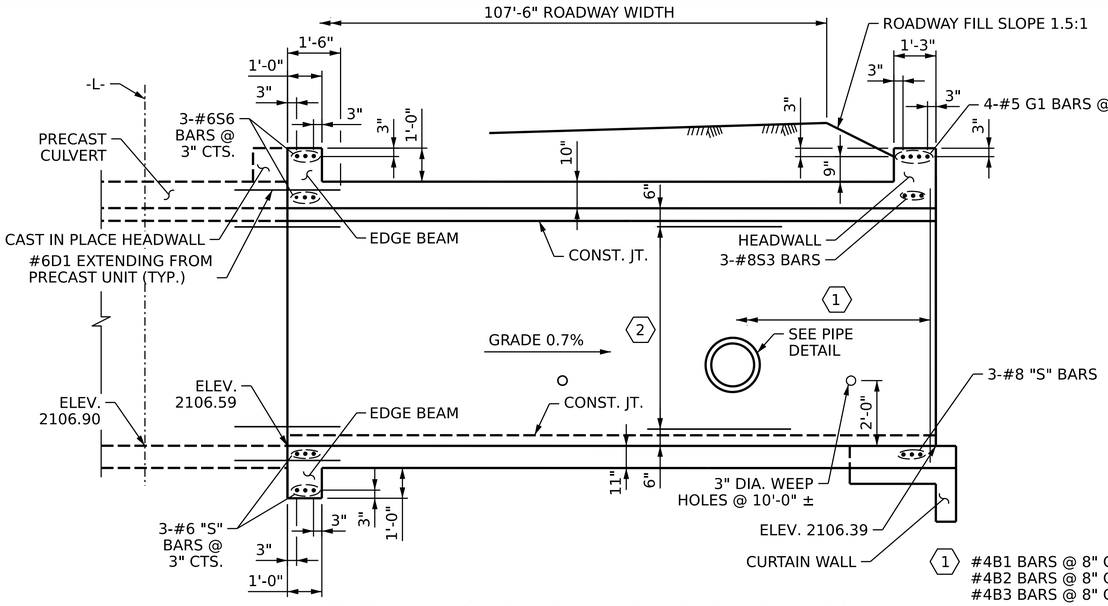
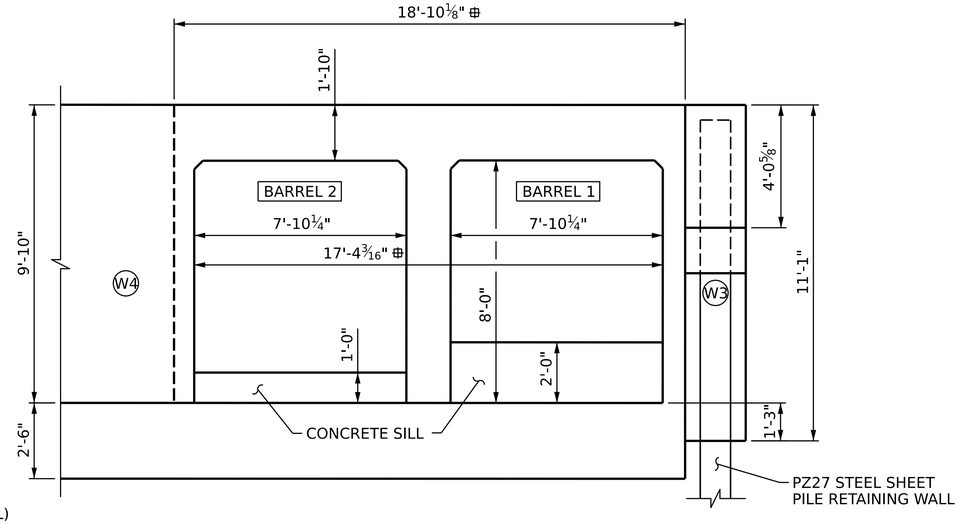


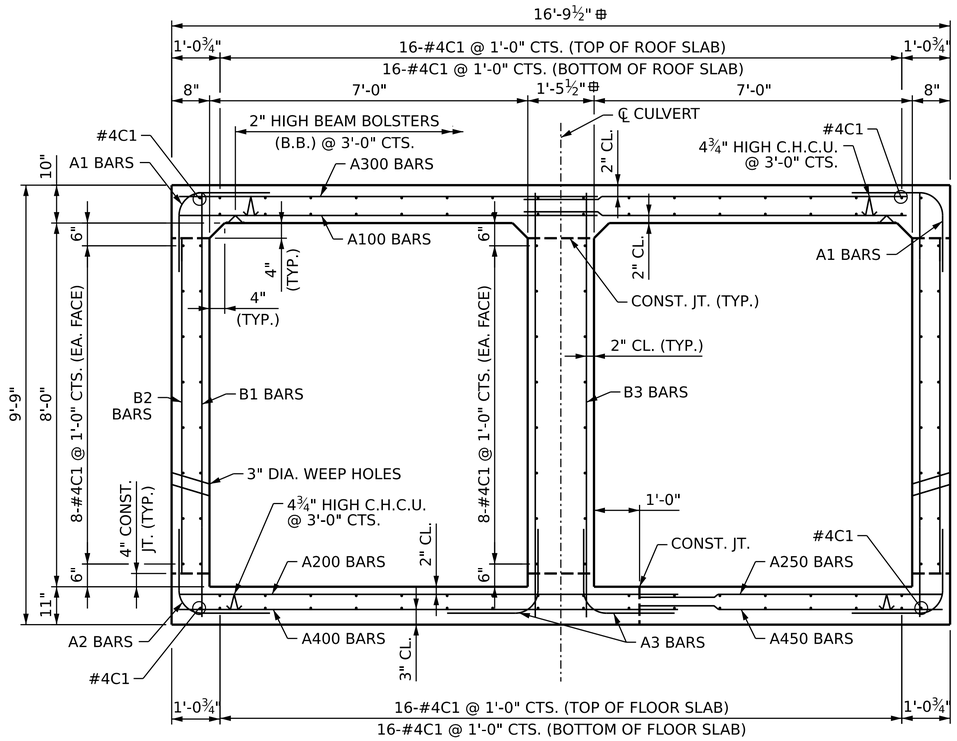
CAST IN PLACE CULVERT SECTION NORMAL TO ROADWAY

1 #4B1 BARS @ 8" CTS. STREAM FACE (EXTERIOR WALL)
#4B2 BARS @ 8" CTS. FILL FACE (EXTERIOR WALL)
#4B3 BARS @ 8" CTS. EA. FACE (INTERIOR WALL)

2 #4C1 BARS @ 1'-0" CTS. AS SHOWN IN TYPICAL BARREL SECTION



OUTLET ELEVATION NORMAL TO SKEW

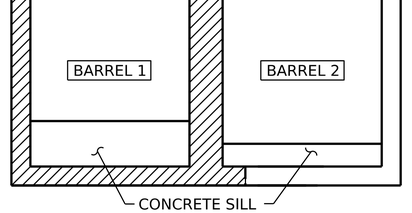


RIGHT ANGLE SECTION OF BARREL (CAST IN PLACE)

THERE ARE 116 C1 BARS IN SECTION OF BARREL
(LOOKING DOWNSTREAM)

NOTE

⊕ INTERIOR WALL THICKNESS BASED ON AN ASSUMED 8" WALL THICKNESS FOR THE PRECAST UNITS PLUS 1½" BETWEEN THE UNITS. THE CONTRACTOR SHALL ADJUST THE INTERIOR WALL THICKNESS, CULVERT WIDTH AND HEADWALL DIMENSIONS BASED ON THE ACTUAL WALL THICKNESS OF THE PRECAST UNITS. 8" INTERIOR WALL THICKNESS MINIMUM.

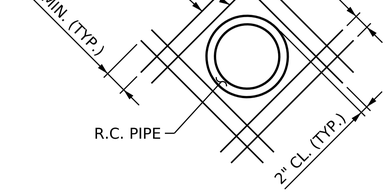


CONSTRUCTION SEQUENCE

LOOKING DOWNSTREAM

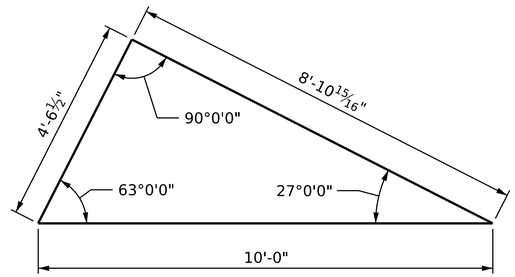
STAGE I

STAGE III (INCLUDING SILLS)



PIPE DETAIL

THE 30" DIA. & 42" DIA. PIPES THROUGH THE SIDEWALLS OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.



SKEW TRIANGLE

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 117° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

Kent Dickens 9/5/2025

DES BY:	E. NOLTING	DATE :	07/24
DES CHK:	G. M. CASTREJON	DATE :	08/24
DWG BY:	B. PETERSON	DATE :	08/24
CHK BY:	K. DICKENS	DATE :	04/25

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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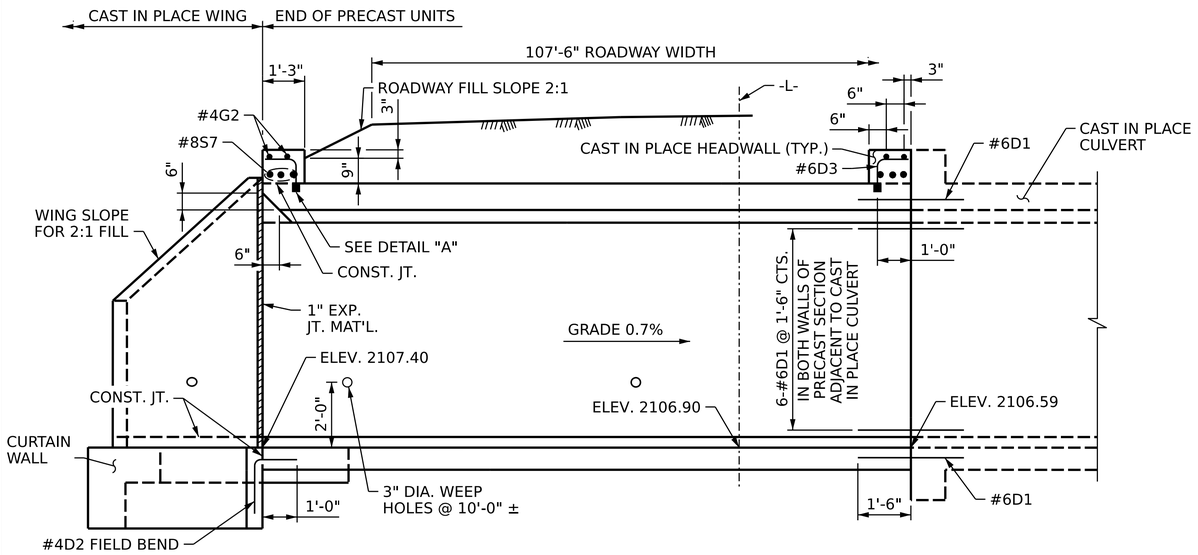
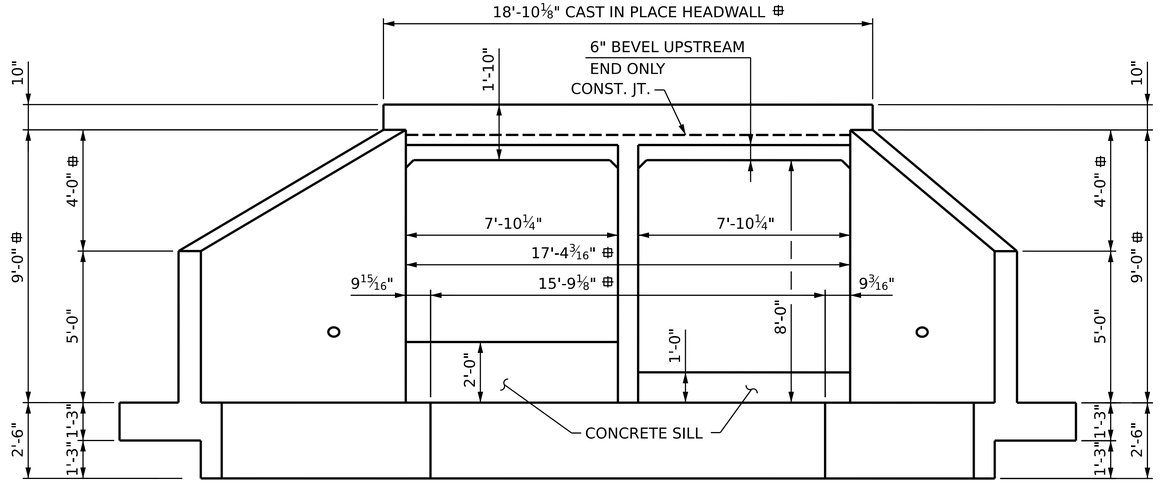
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S06-02
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	12



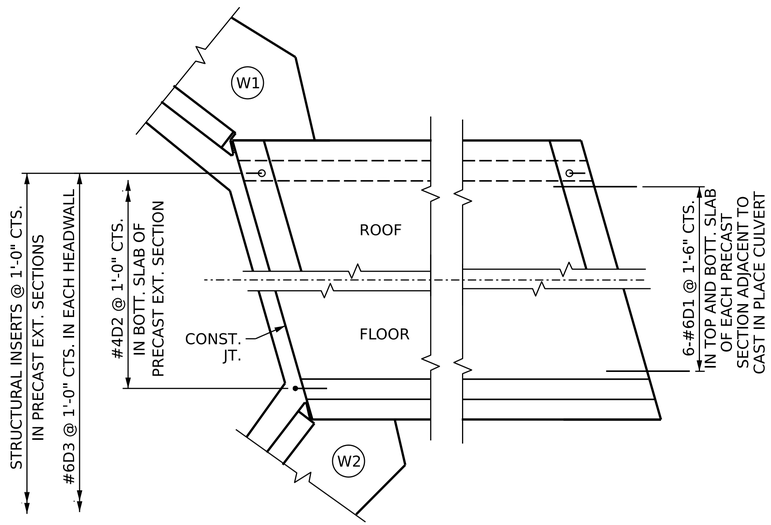
PRECAST CULVERT SECTION NORMAL TO ROADWAY

(DIMENSIONS AND REINFORCING TYPICAL AT EACH HEADWALL)
NOTE: NO END UNIT SHALL BE LESS THAN 3'-0".



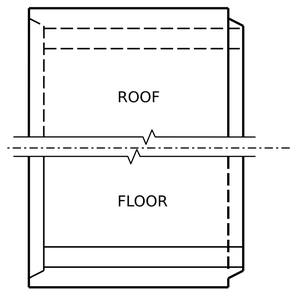
INLET ELEVATION NORMAL TO SKEW

⊕ WINGWALL AND HEADWALL DIMENSIONS BASED ON AN ASSUMED 10" TOP SLAB THICKNESS AND 8" WALL THICKNESS FOR THE PRECAST UNITS. THE CONTRACTOR SHALL ADJUST THE DIMENSIONS BASED ON THE ACTUAL TOP SLAB AND WALL THICKNESS OF THE PRECAST UNITS.



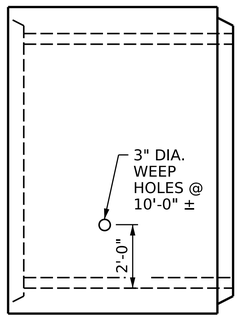
PLAN - PRECAST END UNITS

NOTE: D1 & D2 BARS SHALL BE CAST WITH THE END UNITS. D2 BARS SHALL BE FIELD BENT.



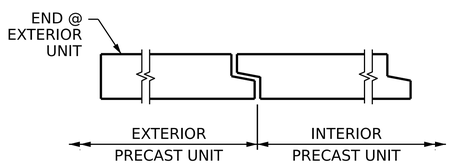
PLAN - TYPICAL PRECAST UNIT

(INTERIOR UNIT SHOWN)



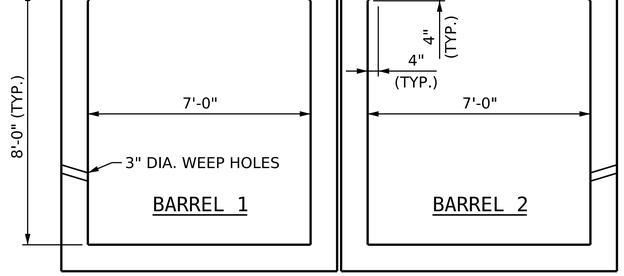
ELEVATION - TYPICAL PRECAST UNIT

(INTERIOR UNIT SHOWN)



SECTION THRU TOP SLAB

(BOTTOM SLAB JOINT SIMILAR)



RIGHT ANGLE SECTION OF CULVERT PRECAST CONCRETE BOXES

(LOOKING DOWNSTREAM)

DETAIL A

** STRUCTURAL CONNECTION INSERTS 2 STRUT OR EQUAL; LENGTH = 4 1/2", INSERT WIDTH = 2", DIA. = ¾". TOTAL REQUIRED 51; 36 @ HEADWALLS, 15 @ SILLS

PROJECT NO. R-5600
JACKSON COUNTY
STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 117° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
Kent Dickens 9/5/2025

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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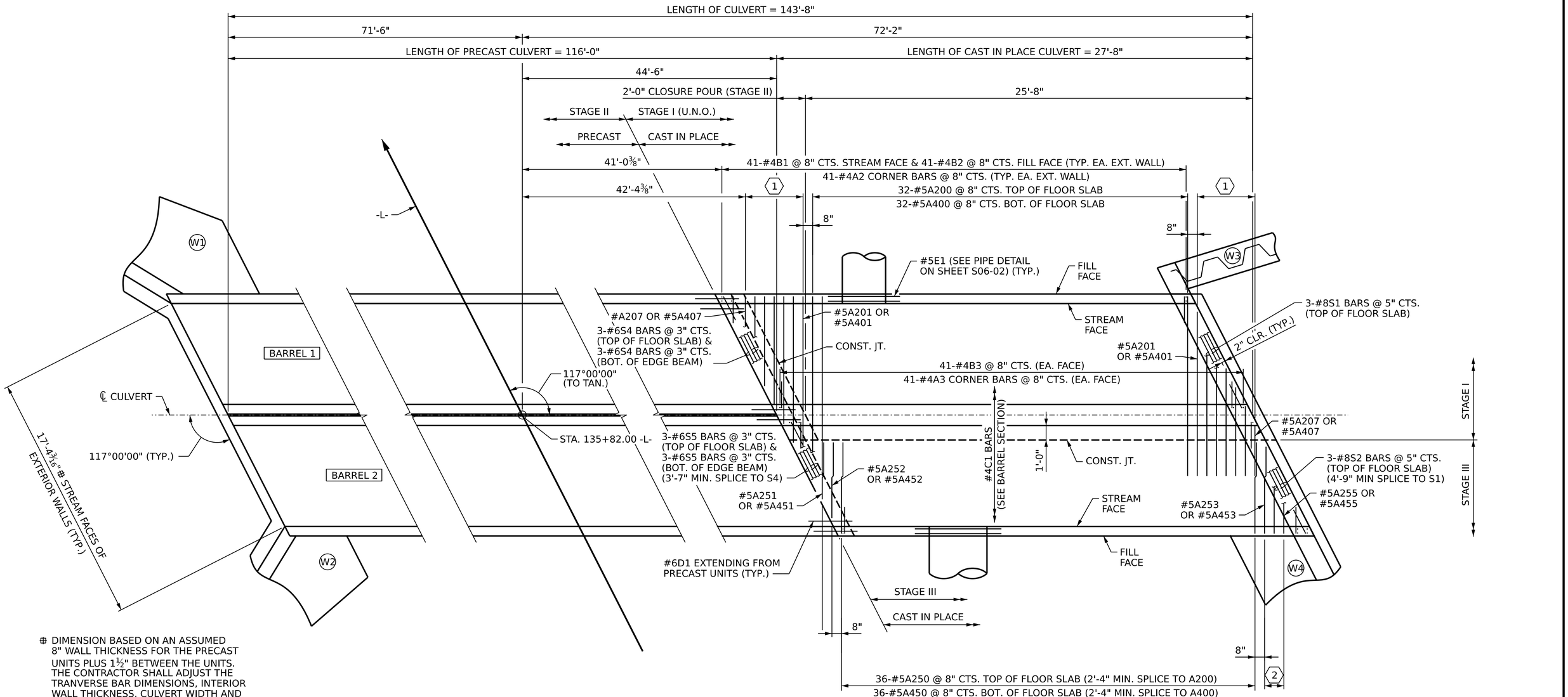
2	--	--	4	--	--

SHEET NO. S06-03
TOTAL SHEETS 12

DES BY:	E. NOLTING	DATE :	07/24
DES CHK:	G. M. CASTREJON	DATE :	08/24
DWG BY:	B. PETERSON	DATE :	08/24
CHK BY:	E. NOLTING	DATE :	08/24



⌖ DIMENSION BASED ON AN ASSUMED 8" WALL THICKNESS FOR THE PRECAST UNITS PLUS 1½" BETWEEN THE UNITS. THE CONTRACTOR SHALL ADJUST THE TRANVERSE BAR DIMENSIONS, INTERIOR WALL THICKNESS, CULVERT WIDTH AND HEADWALL DIMENSIONS BASED ON THE ACTUAL WALL THICKNESS OF THE PRECAST UNITS. 8" INTERIOR WALL THICKNESS MINIMUM.

(1) #5A201 THRU #5A207 @ 8" CTS. TOP OF FLOOR SLAB
#5A401 THRU #5A407 @ 8" CTS. BOT. OF FLOOR SLAB

(2) #5A253 THRU #5A255 @ 8" CTS. TOP OF FLOOR SLAB
#5A453 THRU #5A455 @ 8" CTS. BOT. OF FLOOR SLAB

FLOOR SLAB

(SILLS NOT SHOWN FOR CLARITY)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 117° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
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REVISIONS						SHEET NO.
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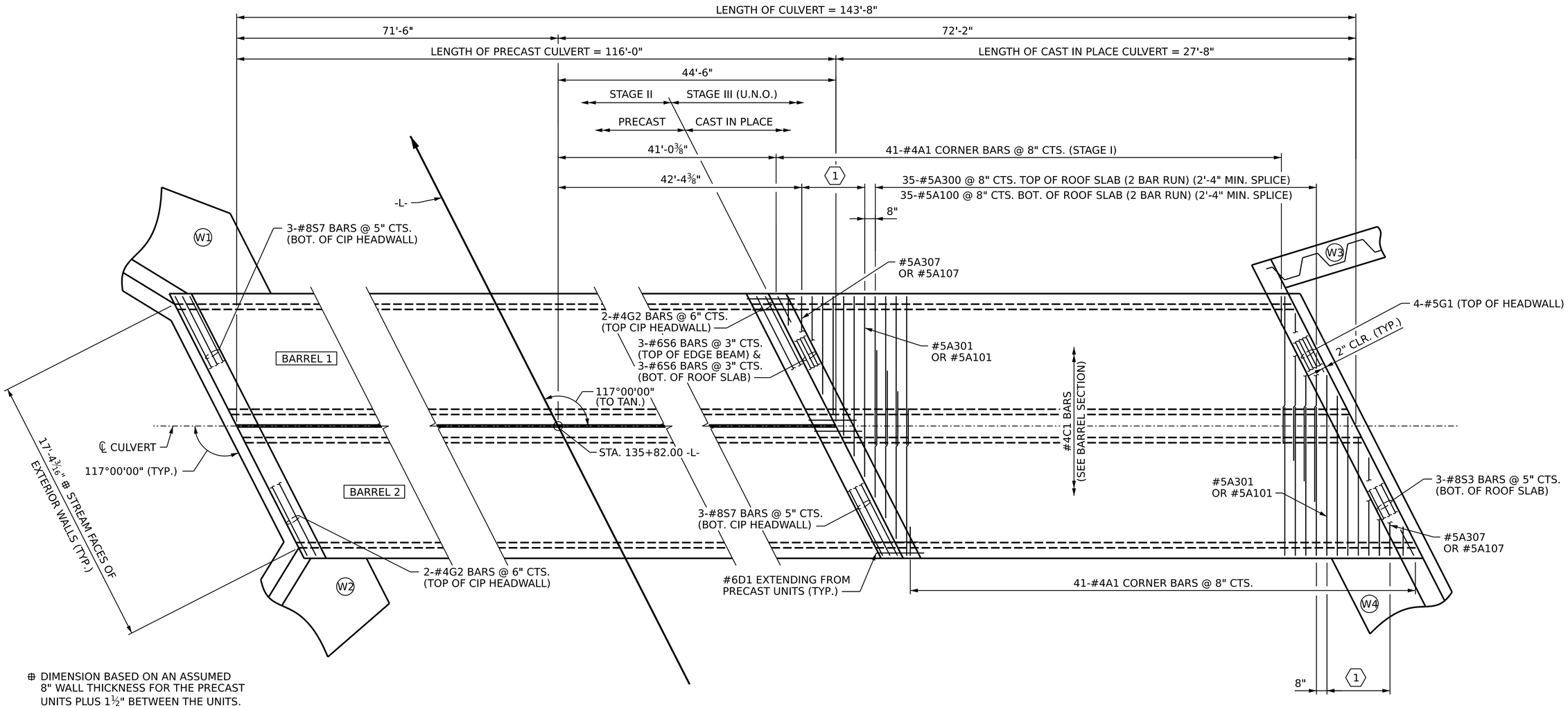
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	12

DES BY:	E. NOLTING	DATE :	07/24
DES CHK:	G. M. CASTREJON	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	08/24
CHK BY:	K. DICKENS	DATE :	04/25



ROOF SLAB

DIMENSION BASED ON AN ASSUMED 8" WALL THICKNESS FOR THE PRECAST UNITS PLUS 1½" BETWEEN THE UNITS. THE CONTRACTOR SHALL ADJUST THE TRANVERSE BAR DIMENSIONS, INTERIOR WALL THICKNESS, CULVERT WIDTH AND HEADWALL DIMENSIONS BASED ON THE ACTUAL WALL THICKNESS OF THE PRECAST UNITS. 8" INTERIOR WALL THICKNESS MINIMUM.

(1) #5A301 THRU #5A307 @ 7" CTS. TOP OF ROOF SLAB
#5A101 THRU #5A107 @ 7" CTS. BOT. OF ROOF SLAB

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL
7 FT. X 8 FT.
CONCRETE BOX CULVERT
117° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
Kent Dickens 9/5/2025

REVISIONS						SHEET NO.
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DES CHK:	G. M. CASTREJON	DATE :	07/24
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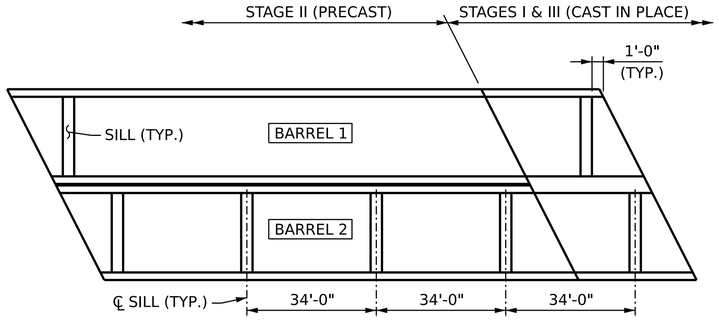
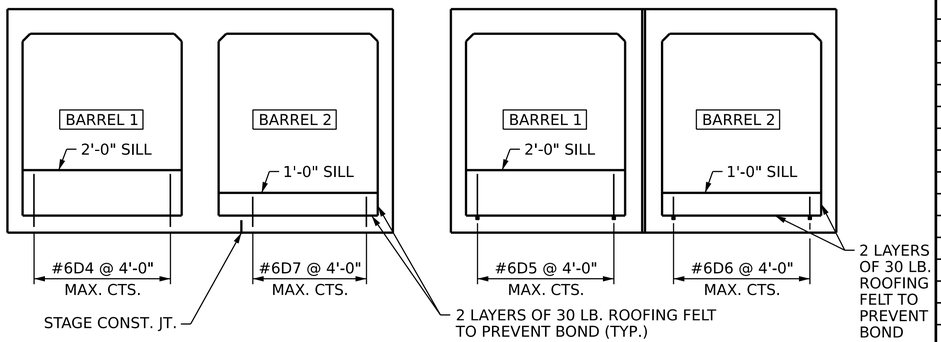
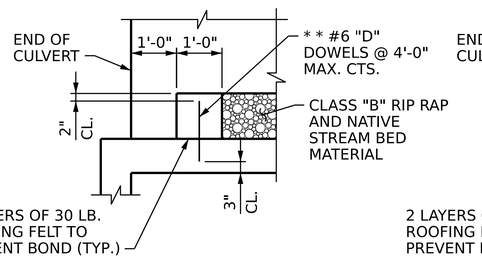


PLAN

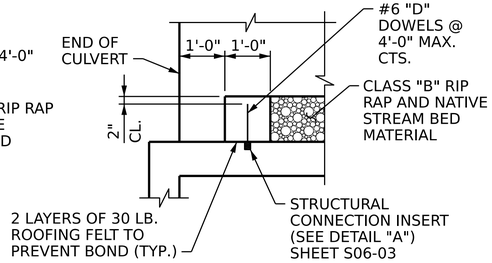


CAST IN PLACE SECTION
LOOKING DOWNSTREAM

PRECAST SECTION
LOOKING DOWNSTREAM



CAST IN PLACE SECTION THROUGH SILL



PRECAST SECTION THROUGH SILL

** DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED

SILL DETAILS

NOTES

BACKFILL CULVERT BARRELS WITH CLASS "B" RIP RAP AND TOP WITH NATIVE MATERIAL TO SILL HEIGHT.

NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. RIP-RAP SHOULD BE USED IN ALL CULVERT BARREL(S). WHEN RIP-RAP IS USED TO LINE THE CULVERT BARREL(S), NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

SILLS TO BE CAST DURING STAGE III CONSTRUCTION. D4 DOWELS MAY BE INSTALLED DURING STAGE I CONSTRUCTION.

TOP OF LOW FLOW SILLS SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM.

THE ENGINEER, IN CONSULTATION WITH DEO STAFF, SHALL REVIEW ALL MATERIAL TO BE USED AS BACKFILL PRIOR TO CONDUCTING THE BACKFILL ACTIVITY. BACKFILL SHALL CONSIST OF NATIVE MATERIAL AND CLASS "B" RIP RAP ONLY, UNLESS THE ENGINEER, IN CONSULTATION WITH DEO STAFF, DETERMINES THAT (1) THE NATIVE MATERIAL IS UNSUITABLE, OR (2) ADDITIONAL MATERIAL IS REQUIRED TO SUPPLEMENT THE NATIVE MATERIAL. THE CHOSEN BACKFILL MATERIAL SHALL NOT HAVE ADVERSE EFFECTS TO AQUATIC LIFE, AQUATIC LIFE PASSAGE, OR WATER QUALITY. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OF FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION.

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	41	#4	1	4'-10"	133
A2	41	#4	1	4'-10"	133
A3	82	#4	1	4'-10"	265
A200	32	#5	STR	12'-8"	423
A201	2	#5	STR	11'-4"	24
A202	2	#5	STR	10'-1"	22
A203	2	#5	STR	8'-9"	19
A204	2	#5	STR	7'-5"	16
A205	2	#5	STR	6'-2"	13
A206	2	#5	STR	4'-10"	11
A207	2	#5	STR	3'-6"	8
A400	32	#5	STR	12'-8"	423
A401	2	#5	STR	11'-4"	24
A402	2	#5	STR	10'-1"	22
A403	2	#5	STR	8'-9"	19
A404	2	#5	STR	7'-5"	16
A405	2	#5	STR	6'-2"	13
A406	2	#5	STR	4'-10"	11
A407	2	#5	STR	3'-6"	8
B1	41	#4	STR	9'-4"	256
B2	41	#4	STR	7'-4"	201
B3	82	#4	STR	9'-4"	512
C1	53	#4	STR	27'-4"	968
D4	3	#6	STR	2'-6"	12
E1	16	#5	STR	6'-0"	101
S1	3	#8	STR	16'-4"	131

REINFORCING STEEL		
BARREL	3653	LBS.
CURTAIN WALL	131	LBS.
TOTAL	3784	LBS.
CLASS A CONCRETE		
BARREL	24.4	C.Y.
CURTAIN WALL	0.8	C.Y.
TOTAL	25.2	C.Y.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
D1	48	#6	STR	3'-0"	217
D2	18	#4	STR	3'-4"	41
D3	36	#6	2	1'-8"	91
D5	3	#6	3	2'-0"	10
D6	12	#6	3	1'-0"	19
G2	4	#4	STR	18'-5"	50
S4	6	#6	STR	15'-2"	137
S7	6	#8	STR	18'-5"	296

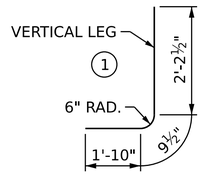
REINFORCING STEEL	861	LBS.
CLASS A CONCRETE		
HEAD WALL	1.8	C.Y.
CURTAIN WALL	1.2	C.Y.
BARREL (CLOSURE POUR)	1.9	C.Y.
EDGE BEAM (CLOSURE POUR)	0.5	C.Y.
TOTAL	5.4	C.Y.

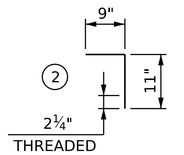
STAGE III

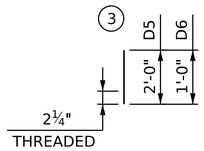
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	41	#4	1	4'-10"	133
A2	41	#4	1	4'-10"	133
A100	70	#5	STR	9'-5"	688
A101	2	#5	STR	11'-4"	24
A102	2	#5	STR	10'-1"	22
A103	2	#5	STR	8'-9"	19
A104	2	#5	STR	7'-5"	16
A105	2	#5	STR	6'-2"	13
A106	2	#5	STR	4'-10"	11
A107	2	#5	STR	3'-6"	8
A250	36	#5	STR	6'-4"	238
A251	1	#5	STR	5'-3"	6
A252	1	#5	STR	3'-11"	5
A253	1	#5	STR	6'-2"	7
A254	1	#5	STR	4'-10"	6
A255	1	#5	STR	3'-6"	4
A300	70	#5	STR	9'-5"	688
A301	2	#5	STR	11'-4"	24
A302	2	#5	STR	10'-1"	22
A303	2	#5	STR	8'-9"	19
A304	2	#5	STR	7'-5"	16
A305	2	#5	STR	6'-2"	13
A306	2	#5	STR	4'-10"	11
A307	2	#5	STR	3'-6"	8
A450	36	#5	STR	6'-4"	238
A451	1	#5	STR	5'-3"	6
A452	1	#5	STR	3'-11"	5
A453	1	#5	STR	6'-2"	7
A454	1	#5	STR	4'-10"	6
A455	1	#5	STR	3'-6"	4
B1	41	#4	STR	9'-4"	256
B2	41	#4	STR	7'-4"	201
C1	63	#4	STR	27'-4"	1151
D7	3	#6	STR	1'-6"	7
E1	16	#5	STR	6'-0"	101
G1	4	#5	STR	18'-5"	77
S2	3	#8	STR	7'-1"	57
S3	3	#8	STR	18'-5"	148
S5	6	#6	STR	7'-1"	64
S6	6	#6	STR	18'-5"	166

REINFORCING STEEL		
BARREL	4116	LBS
HEADWALL, CURTAIN WALL, EDGE BEAMS	512	LBS
TOTAL	4628	LBS
CLASS A CONCRETE		
BARREL	27.1	C.Y.
HEADWALL	0.9	C.Y.
CURTAIN WALL	0.5	C.Y.
SILLS	2.4	C.Y.
EDGE BEAMS	1.2	C.Y.
TOTAL	32.1	C.Y.

BAR TYPES







BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A100, A300 A200, A250, A400, A450	#5	2'-4"
G2	#4	2'-5"
G1	#5	3'-0"
S1, S2, S3, S7	#8	4'-9"
S4, S5, S6	#6	3'-7"

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT 117° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
Kent Dickens 9/5/2025

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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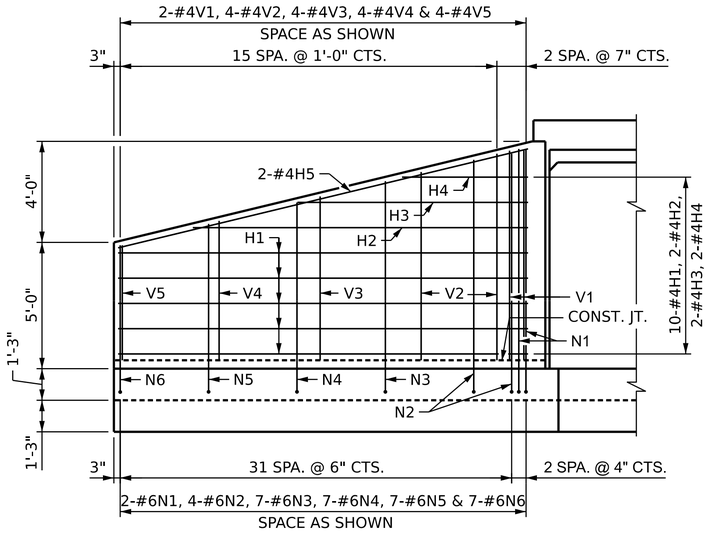
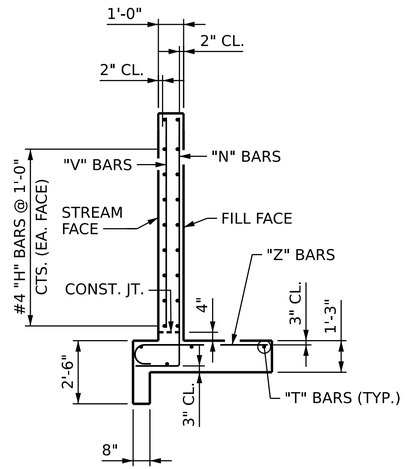
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S06-06
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	12

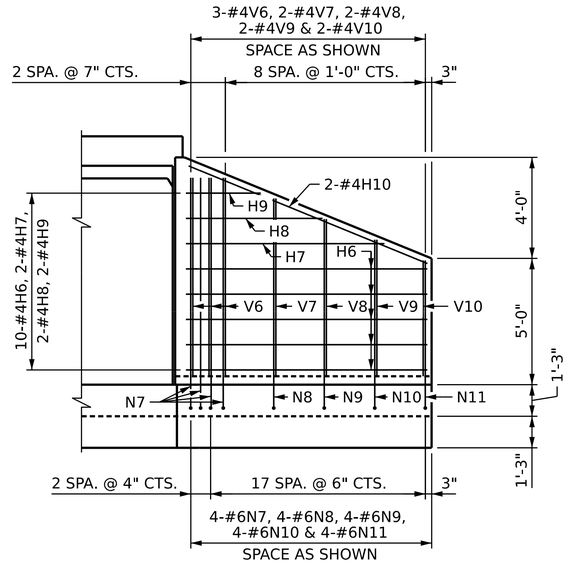
DES BY:	E. NOLTING	DATE :	07/24
DES CHK:	G. M. CASTREJON	DATE :	07/24
DWG BY:	B. PETERSON	DATE :	08/24
CHK BY:	K. DICKENS	DATE :	04/25



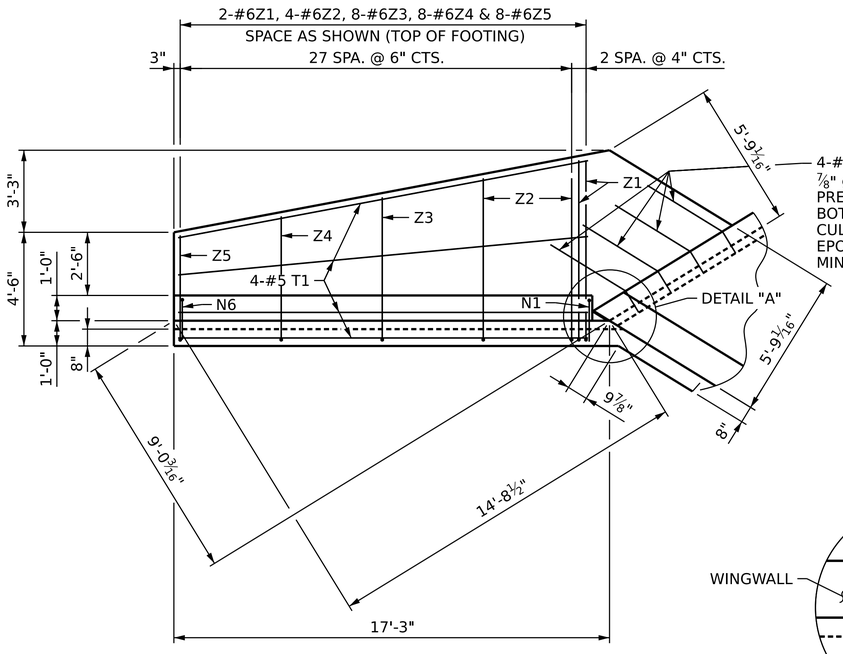
ELEVATION - WING W1



TYPICAL WING SECTION

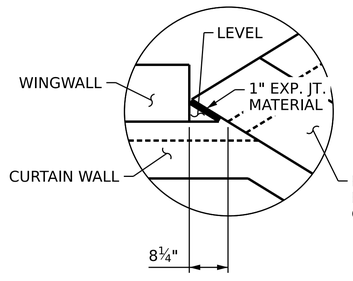


ELEVATION - WING W2

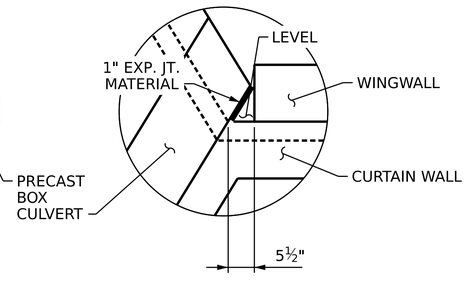


4-#6 S1 BARS @ 1'-6" CTS. PRE-DRILL ⅞" ∅ HOLES FOR S1 BARS. CENTER THE PRE-DRILLED HOLES VERTICALLY IN THE BOTTOM SLAB OF THE PRECAST BOX CULVERT. FIELD BEND S1 BARS PRIOR TO EPOXY GROUTING THE BARS IN PLACE. MINIMUM EMBEDMENT LENGTH = 1'-0"

PLAN - WING W1



DETAIL "A"



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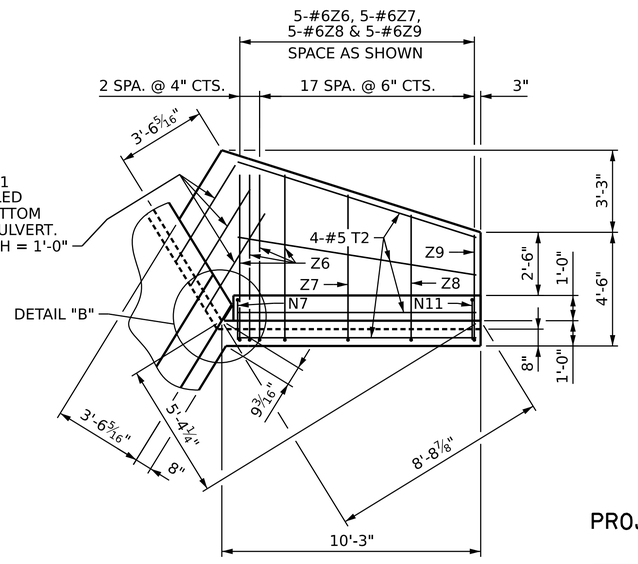

3-#6 S1 BARS @ 1'-6" CTS. PRE-DRILL ⅞" ∅ HOLES FOR S1 BARS. CENTER THE PRE-DRILLED HOLES VERTICALLY IN THE BOTTOM SLAB OF THE PRECAST BOX CULVERT. MINIMUM EMBEDMENT LENGTH = 1'-0"

PLAN - WING W2

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

Kent Dickens 9/5/2025

DES BY:	E. NOLTING	DATE :	6/24
DES CHK:	G. CASTREJON	DATE :	9/24
DWG BY:	D. CARTER	DATE :	9/24
CHK BY:	K. DICKENS	DATE :	05/25

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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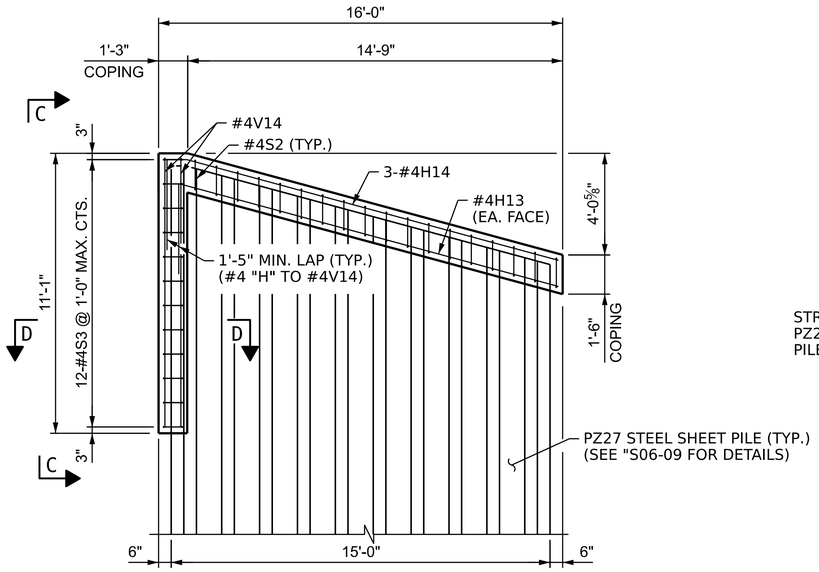
REVISIONS

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

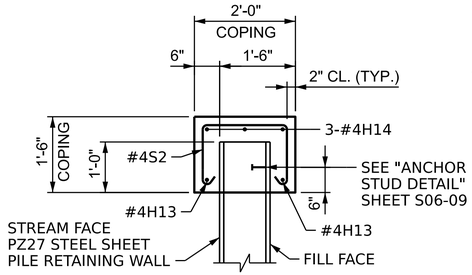
SHEET NO. S06-07

TOTAL SHEETS 12

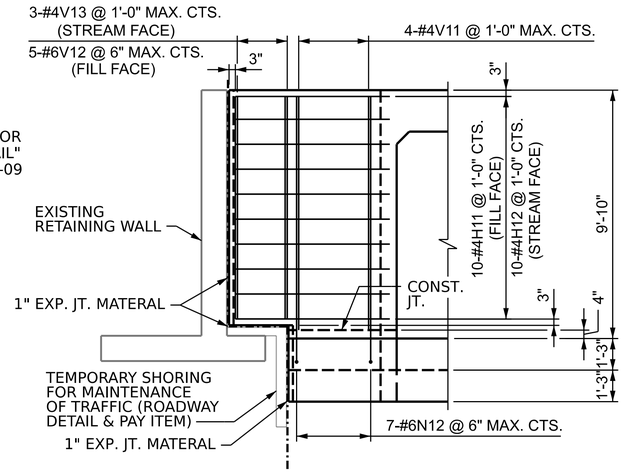


ELEVATION - WING W3 (SECTION B-B)

ANCHOR STUDS, WALER AND GROUND ANCHORS NOT SHOWN FOR CLARITY, FOR DETAILS SEE SHEETS S06-09 AND S06-10.

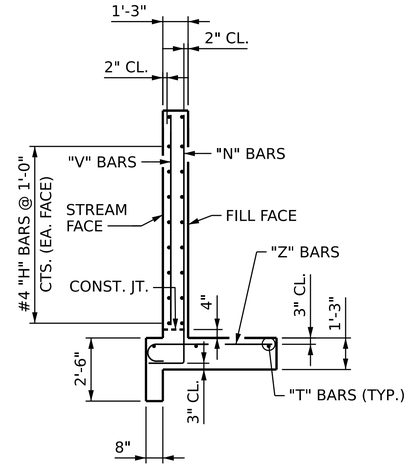


WING W3 SECTION A-A

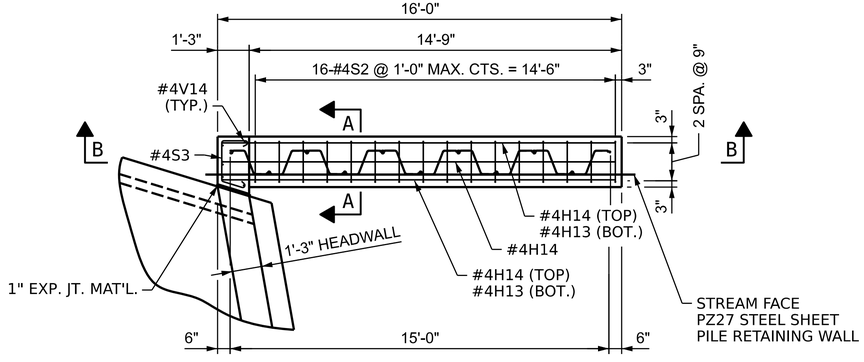


ELEVATION - WING W4

⊕ DISTANCE BASED ON INFORMATION AVAILABLE, TO BE FIELD ADJUSTED AS REQUIRED TO PROVIDE 1" EXP. JT. MATERIAL BETWEEN THE EXISTING RETAINING WALL AND TEMPORARY SHORING, AND WING W4.

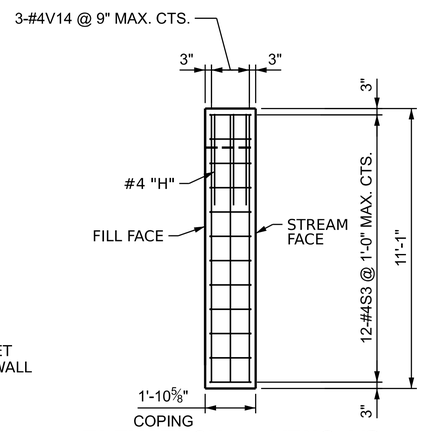


SECTION - WING W4

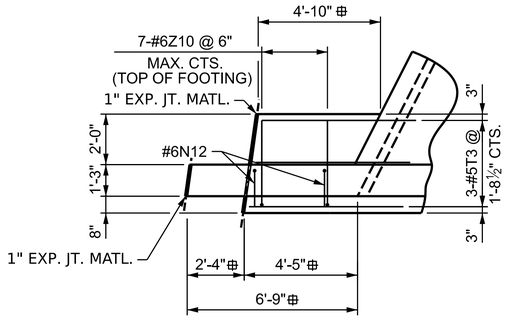


PLAN - WING W3

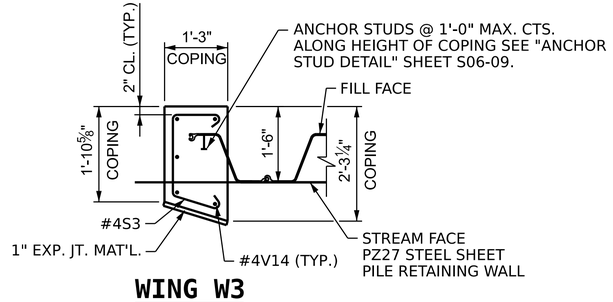
ANCHOR STUDS, WALER AND GROUND ANCHORS NOT SHOWN FOR CLARITY, FOR DETAILS SEE SHEETS S06-09 AND S06-10.



ELEVATION - WING W3 (VIEW C-C)



PLAN - WING W4



WING W3 SECTION D-D

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
Kent Dickens 9/5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S06-08
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	12

DES BY: J. PATT	DATE : 05/25	DWG BY: M. SELLS	DATE : 05/25
DES CHK: K. DICKENS	DATE : 05/25	CHK BY: K. DICKENS	DATE : 05/25

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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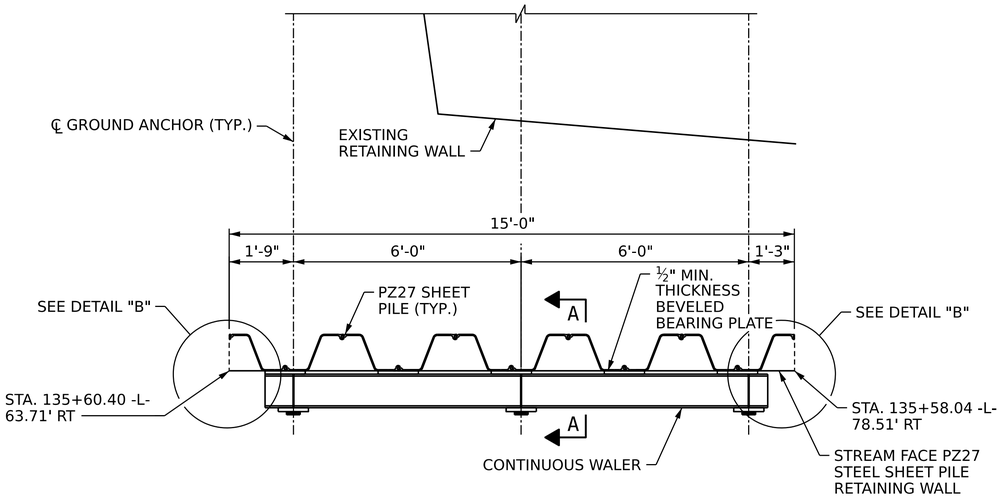
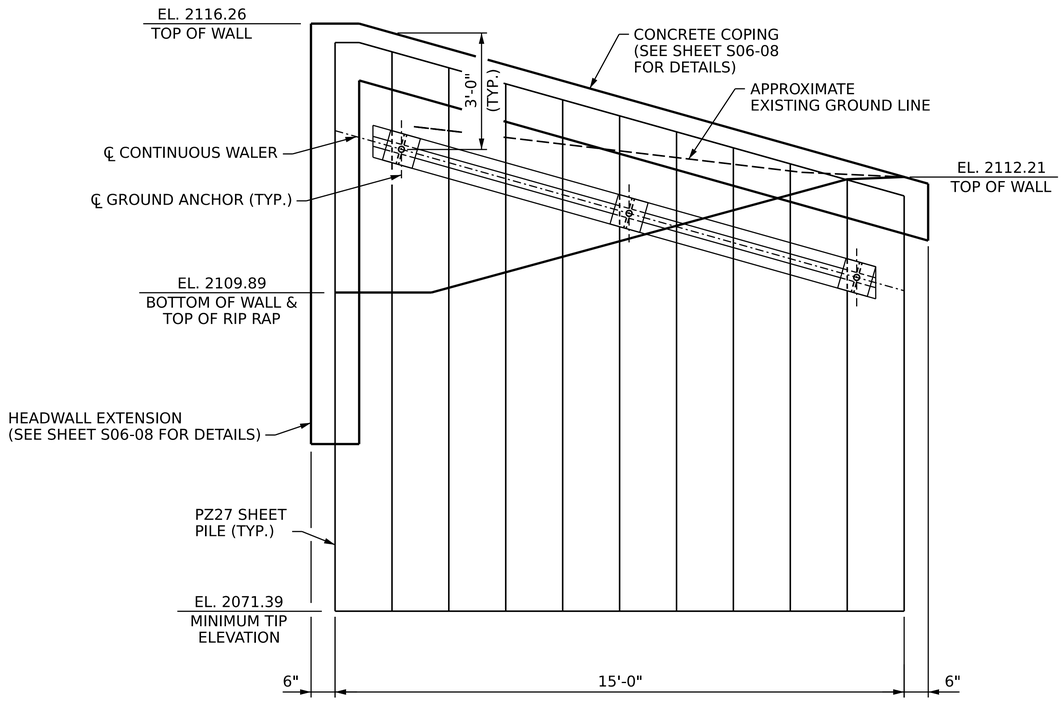
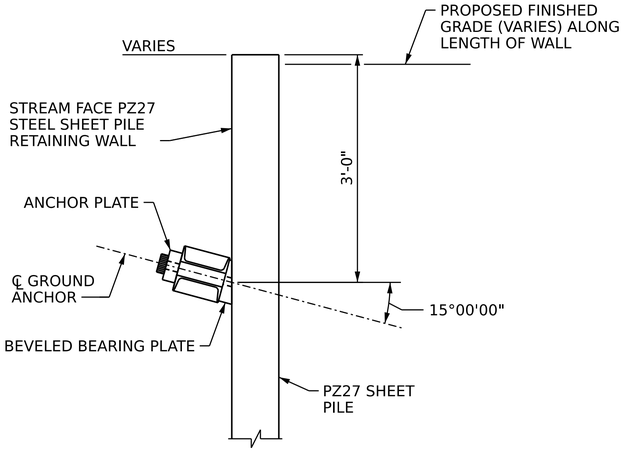


PLAN - WING W3

(CONCRETE COPING AND CULVERT HEADWALL NOT SHOWN FOR CLARITY)



ELEVATION - WING W3



SECTION A-A

(REINFORCED CONCRETE COPING
NOT SHOWN FOR CLARITY)

NOTES

FOR ANCHORED RETAINING WALLS, SEE ANCHORED RETAINING WALLS PROVISION.

BEFORE BEGINNING WALL DESIGN FOR WINGWALL NO. 3, SURVEY WALL LOCATION AND SUBMIT A REVISED WALL PROFILE VIEW (WALL ENVELOPE) FOR REVIEW. DO NOT START WALL DESIGN OR CONSTRUCTION UNTIL THE REVISED WALL ENVELOPE IS ACCEPTED.

DESIGN WINGWALL NO. 3 FOR THE FOLLOWING:

1) H = DESIGN HEIGHT + EMBEDMENT
2) DESIGN LIFE = 100 YEARS
3) IN-SITU ASSUMED MATERIAL PROPERTIES
   - UNIT WEIGHT = 120 PCF
   - FRICTION ANGLE = 24 DEGREES
   - COHESION = 0 PSF
4) GROUNDWATER ELEVATION FOR DESIGN IS LOCATED AT APPROXIMATELY 2108 FEET.

EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, GUARDRAIL, FENCE OR HANDRAIL POSTS, PAVEMENTS, PIPES, INLETS OR UTILITIES MAY INTERFERE WITH SOIL NAILS OR GROUND ANCHORS FOR WINGWALL NO. 3.

DESIGN BOND LENGTH OF WALL ANCHORS FOR THE FACTORED LOADS SHOWN IN THE TABLE BELOW.

TEMPORARY SHORING MAY BE REQUIRED FOR WINGWALL NO. 3 IN ACCORDANCE WITH THE TEMPORARY SHORING PROVISION. SEE ROADWAY, STRUCTURE, OR TRAFFIC CONTROL PLANS.)

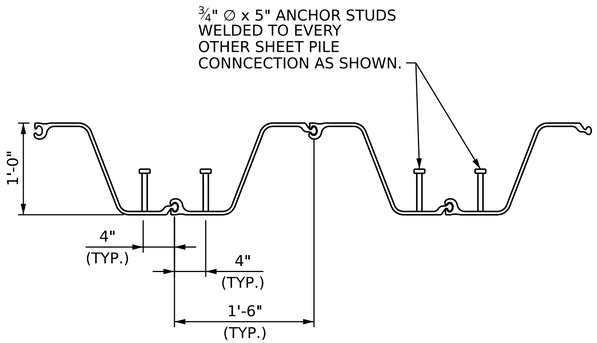
CLASS A CONCRETE SHALL BE USED FOR ALL C.I.P. CONCRETE COPING.

STRUCTURAL STEEL FOR SHEET PILING, ANCHOR PLATES, BEARING PLATES, STIFFENER PLATES AND WALERS SHALL BE ASTM A709 GR. 50 AND GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

FOR ADDITIONAL SHEET PILE, GROUND ANCHOR AND WALER DETAILS, SEE SHEET S06-10.

NO SEPARATE PAYMENT SHALL BE MADE FOR THE COPING CONCRETE AND REINFORCING, ANCHOR BOLTS, ANCHOR PLATES, WASHERS, NUTS, WALERS, AND BEVELED PLATES. THE COST OF THE MATERIAL AND INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO THE SHEET PILE RETAINING WALLS PAY ITEM.

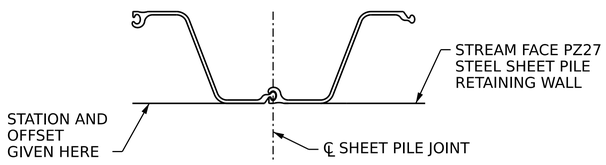
FILL SHALL BE PLACED BEHIND SHEET PILE RETAINING WALL TO PROVIDE A MINIMUM OF 3 FEET OF SOIL COVER PRIOR TO GROUND ANCHOR INSTALLATION.



ANCHOR STUD DETAIL

ANCHOR DATA TABLE				
TIEBACK DEPTH (FT.)	UNBONDED LENGTH ✳ (FT)	ESTIMATED BOND LENGTH (FT)	FACTORED TIEBACK FORCE (KIPS)	UNFACTORED TIEBACK FORCE (KIPS)
3	10	35	140	73

✳ = UNBONDED LENGTH OF 10 FT. FOR BAR TENDONS AND 15 FT. FOR STRAND TENDONS.



DETAIL B

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
9/5/2025
Kent Dickens

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S06-09
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	12

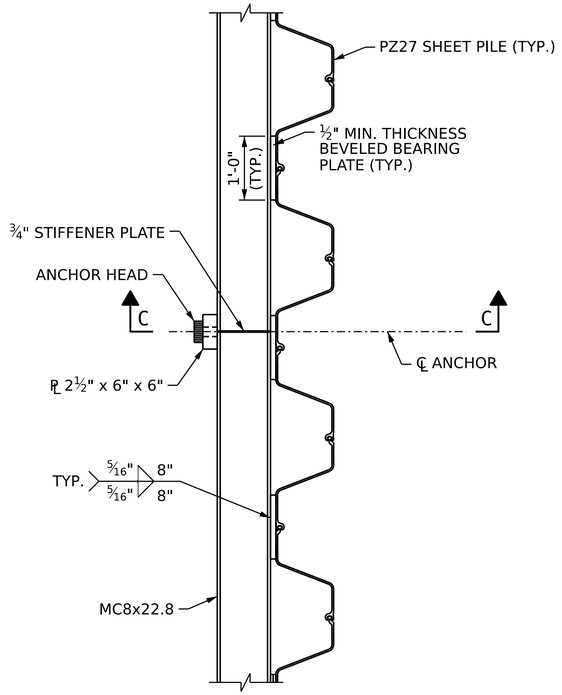
DES BY: J. PATT DATE : 05/25
DES CHK: K. DICKENS DATE : 05/25
DWG BY: M. SELLS DATE : 05/25
CHK BY: K. DICKENS DATE : 05/25

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

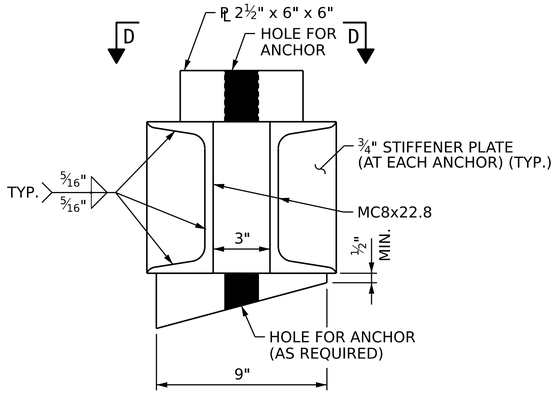
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES

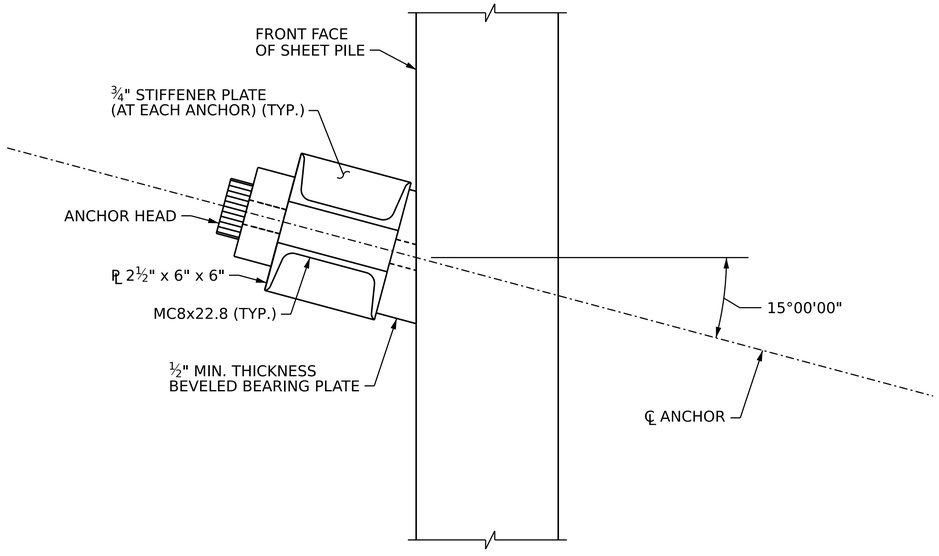
FOR NOTES, SEE SHEET S06-09.



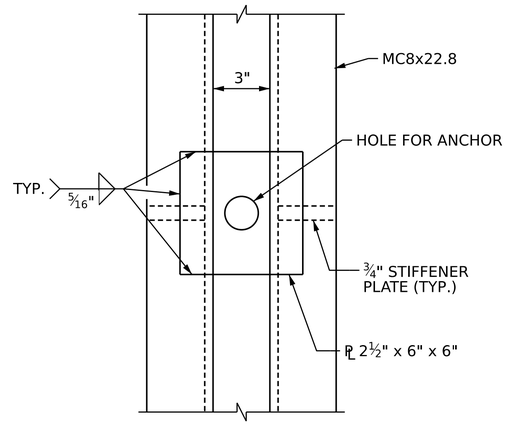
ANCHOR DETAIL



WALER DETAIL



SECTION C-C



VIEW D-D

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

Kent Dickens 9/5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S06-10
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	12

DES BY: J. PATT DATE : 05/25
DES CHK: K. DICKENS DATE : 05/25

DWG BY: M. SELLS DATE : 05/25
CHK BY: K. DICKENS DATE : 05/25

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N.C.B.E.L.S. License Number: F-0116

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BILL OF MATERIAL

QUANTITIES FOR WINGS W1 & W2

MARK	NO.	SIZE	TYPE	LENGTH	DIM. "A"	WEIGHT
H1	10	#4	STR	16'-2"		108
H2	2	#4	STR	13'-3"		18
H3	2	#4	STR	9'-1"		13
H4	2	#4	STR	4'-11"		7
H5	2	#4	STR	16'-8"		23
H6	10	#4	STR	9'-6"		64
H7	2	#4	STR	7'-10"		11
H8	2	#4	STR	5'-4"		8
H9	2	#4	STR	2'-11"		4
H10	2	#4	STR	10'-2"		14
N1	2	#6	1	10'-6"	9'-0½"	32
N2	4	#6	1	10'-1"	8'-7½"	61
N3	7	#6	1	9'-3"	7'-9½"	98
N4	7	#6	1	8'-5"	6'-11½"	89
N5	7	#6	1	7'-7"	6'-1½"	80
N6	7	#6	1	6'-9"	5'-3½"	71
N7	4	#6	1	10'-0"	8'-6½"	61
N8	4	#6	1	9'-3"	7'-9½"	56
N9	4	#6	1	8'-5"	6'-11½"	51
N10	4	#6	1	7'-7"	6'-1½"	46
N11	4	#6	1	6'-9"	5'-3½"	41
S1	7	#6	STR	4'-6"		48
T1	4	#5	STR	16'-2"		68
T2	4	#5	STR	9'-5"		40
V1	2	#4	STR	8'-3"		12
V2	4	#4	STR	7'-5"		20
V3	4	#4	STR	6'-5"		18
V4	4	#4	STR	5'-6"		15
V5	4	#4	STR	4'-6"		13
V6	3	#4	STR	7'-10"		16
V7	2	#4	STR	7'-0"		10
V8	2	#4	STR	6'-2"		9
V9	2	#4	STR	5'-4"		8
V10	2	#4	STR	4'-7"		7
Z1	2	#6	2	7'-9"	7'-1"	24
Z2	4	#6	2	7'-0"	6'-4"	43
Z3	8	#6	2	6'-3"	5'-7"	76
Z4	8	#6	2	5'-6"	4'-10"	67
Z5	8	#6	2	4'-9"	4'-1"	58
Z6	5	#6	2	7'-2"	6'-6"	54
Z7	5	#6	2	6'-5"	5'-9"	49
Z8	5	#6	2	5'-7"	4'-11"	42
Z9	5	#6	2	4'-9"	4'-1"	36
REINFORCING STEEL						1689 LBS.
CLASS A CONCRETE						16.4 C.Y.

QUANTITIES FOR WING W3

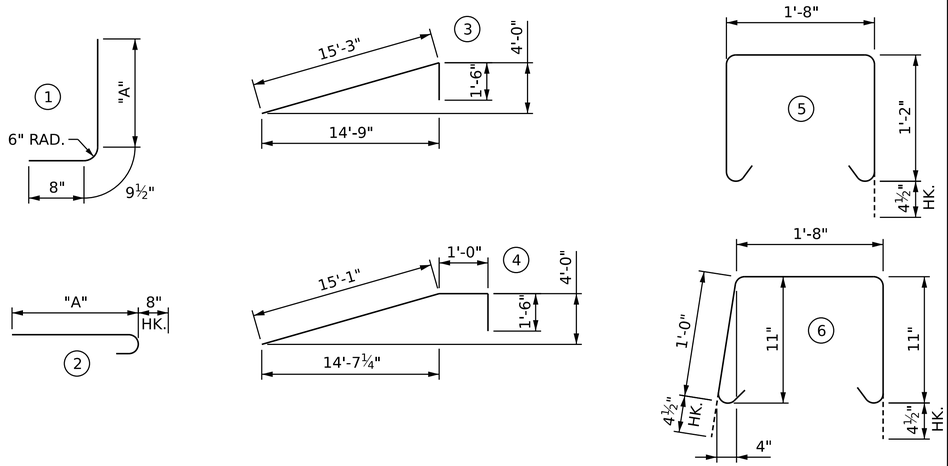
MARK	NO.	SIZE	TYPE	LENGTH	DIM. "A"	WEIGHT
H13	2	#4	3	16'-9"		23
H14	3	#4	4	17'-7"		36
S2	16	#4	5	4'-9"		51
S3	12	#4	6	4'-4"		35
V14	5	#4	STR	10'-8"		36
REINFORCING STEEL						181 LBS.
CLASS A CONCRETE						2.9 C.Y.
SHEET PILE RETAINING WALLS						49.4 S.F.

QUANTITIES FOR WING W4

MARK	NO.	SIZE	TYPE	LENGTH	DIM. "A"	WEIGHT
H11	10	#4	STR	6'-8"		45
H12	10	#4	STR	6'-4"		43
N12	7	#6	1	11'-7"	10'-1½"	122
T3	3	#4	STR	5'-8"		12
V11	4	#4	STR	9'-4"		25
V12	5	#6	STR	8'-10"		67
V13	3	#4	STR	8'-10"		18
Z10	7	#6	2	4'-3"	3'-7"	45
REINFORCING STEEL						377 LBS.
CLASS "A" CONCRETE						3.7 C.Y.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR DOUBLE BARREL 7 FT. X 8 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS

Kent Dickens 9/5/2025

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S06-11
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	12

DES BY: J. PATT DATE : 05/25
DES CHK: K. DICKENS DATE : 05/25

DWG BY: D. CARTER DATE : 09/24
CHK BY: K. DICKENS DATE : 05/25

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ LL)	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.79	--	1.75	1.82	1	TOP SLAB	3.50	1.79	1	TOP SLAB	7.00	
		HL-93 (OPERATING)	N/A		2.32	--	1.35	2.36	1	TOP SLAB	3.50	2.32	1	TOP SLAB	7.00	
		HS-20 (INVENTORY)	36.000	2	1.80	64.80	1.75	1.82	1	TOP SLAB	3.50	1.80	1	TOP SLAB	7.00	
		HS-20 (OPERATING)	36.000		2.33	83.88	1.35	2.36	1	TOP SLAB	3.50	2.33	1	TOP SLAB	7.00	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.25	43.88	1.40	3.31	1	TOP SLAB	3.50	3.25	1	TOP SLAB	7.00	
		SNGARBS2	20.000		3.05	61.00	1.40	3.10	1	TOP SLAB	3.50	3.05	1	TOP SLAB	7.00	
		SNAGRIS2	22.000		3.25	71.50	1.40	3.31	1	TOP SLAB	3.50	3.25	1	TOP SLAB	7.00	
		SNCOTTS3	27.250		2.35	64.04	1.40	2.35	1	TOP SLAB	3.50	2.36	1	TOP SLAB	7.00	
		SNAGGRS4	34.925		2.45	85.57	1.40	2.45	1	BOTTOM SLAB	7.00	2.82	1	TOP SLAB	7.00	
		SNS5A	35.550		2.45	87.10	1.40	2.45	1	BOTTOM SLAB	7.00	3.06	1	BOTTOM SLAB	7.00	
		SNS6A	39.950		2.25	89.89	1.40	2.25	1	BOTTOM SLAB	7.00	2.68	1	TOP SLAB	7.00	
		SNS7B	42.000		2.25	94.50	1.40	2.25	1	BOTTOM SLAB	7.00	2.62	1	TOP SLAB	7.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.97	98.01	1.40	3.02	1	TOP SLAB	3.50	2.97	1	TOP SLAB	7.00	
		TNT4A	33.075		2.58	85.33	1.40	2.58	1	BOTTOM SLAB	7.00	2.71	1	TOP SLAB	7.00	
		TNT6A	41.600		2.58	107.33	1.40	2.58	1	BOTTOM SLAB	7.00	2.68	1	TOP SLAB	7.00	
		TNT7A	42.000		2.59	108.78	1.40	2.59	1	BOTTOM SLAB	7.00	2.73	1	TOP SLAB	7.00	
		TNT7B	42.000	3	2.28	95.76	1.40	2.28	1	BOTTOM SLAB	7.00	2.61	1	TOP SLAB	7.00	
		TNAGRIT4	43.000		2.36	101.48	1.40	2.36	1	BOTTOM SLAB	7.00	2.62	1	TOP SLAB	7.00	
		TNAGT5A	45.000		2.36	106.20	1.40	2.36	1	BOTTOM SLAB	7.00	2.62	1	TOP SLAB	7.00	
		TNAGT5B	45.000		2.37	106.65	1.40	2.37	1	BOTTOM SLAB	7.00	2.62	1	TOP SLAB	7.00	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.32	66.70	1.30	2.34	1	TOP SLAB	3.50	2.32	1	TOP SLAB	7.00	
		EV3	43.000	4	2.04	87.72	1.30	2.04	1	TOP SLAB	3.50	2.06	1	TOP SLAB	7.00	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.90
ES	1.35	0.90
LS	1.75	--
WA	1.00	--

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATES.

RATING FACTORS ARE PROVIDED FOR THE CAST IN PLACE PORTION OF THE CULVERT.

COMMENTS:

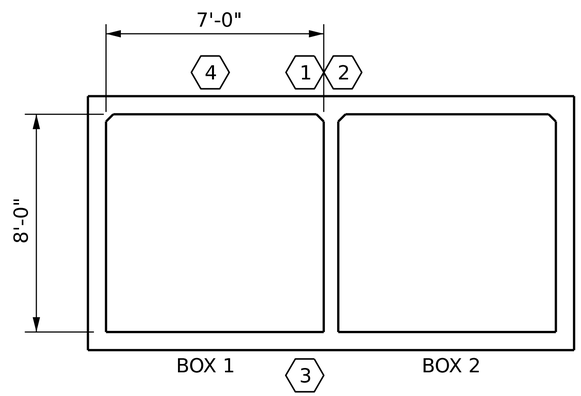
1.

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



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 135+82.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 040757 ENGINEER S. KENT DICKENS
Kent Dickens 9/5/2025

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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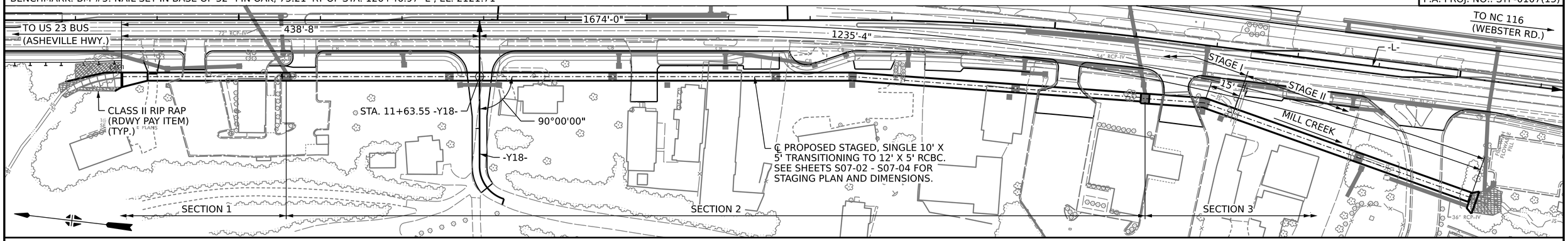
DES CHK: G. M. CASTREJON DATE : 07/24

DWG BY: D. CHAPMAN DATE : 07/24
CHK BY: E. NOLTING DATE : 08/24

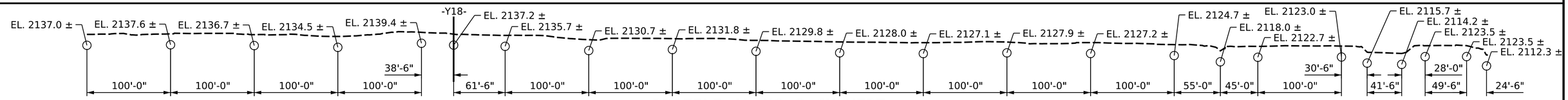
BENCHMARK: BM #5: NAIL SET IN BASE OF 32" PIN OAK, 73.21' RT OF STA. 126+46.97 -L-, EL. 2121.71

F.A. PROJ. NO.: STP-0107(13)



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS



PROFILE ALONG ℄ CULVERT

HYDRAULIC DATA (SECTION 1)	
DESIGN DISCHARGE	= 290 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 2135.8
DRAINAGE AREA	= 0.21 SQ. MI.
BASE DISCHARGE (Q100)	= 390 CFS
BASE HIGH WATER ELEVATION	= 2136.8
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 520 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 100+/- YR.
OVERTOPPING FLOOD ELEVATION	= 2138.0

HYDRAULIC DATA (SECTION 2)	
DESIGN DISCHARGE	= 420 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 2134.4
DRAINAGE AREA	= 0.39 SQ. MI.
BASE DISCHARGE (Q100)	= 490 CFS
BASE HIGH WATER ELEVATION	= 2135.1
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 697 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 100+/- YR.
OVERTOPPING FLOOD ELEVATION	= 2136.9

HYDRAULIC DATA (SECTION 3)	
DESIGN DISCHARGE	= 560 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 2122.2
DRAINAGE AREA	= 0.49 SQ. MI.
BASE DISCHARGE (Q100)	= 650 CFS
BASE HIGH WATER ELEVATION	= 2124.5
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 730 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 100+/- YR.
OVERTOPPING FLOOD ELEVATION	= 2126.2

TOTAL STRUCTURE QUANTITIES	
CULVERT EXCAVATION, STA. 11+63.55 -Y18-	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	1879 TONS
PRECAST REINFORCED CONCRETE BOX CULVERT, STA. 11+63.55 -Y18-	LUMP SUM

ROADWAY DATA	
GRADE POINT ELEV. @ STA. 11+63.55 -Y18-	= 2135.74
BED ELEV. @ STA. 11+63.55 -Y18-	= 2125.00
ROADWAY SLOPES	= 2:1

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

DESIGN FILL = 11.60' (MAX.) AND 1.50' (MIN.).

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTE SHEET.

3" ∅ WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

STAGE I

1. PLACE PRECAST PORTION OF CULVERT. PRECAST SEGMENTS SHALL BE PLACED SUCH THAT DRIVEWAY ACCESS IS MAINTAINED THROUGHOUT STAGE I CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF PHASE 1, STEP 1 OF THE TRANSPORTATION MANAGEMENT PLAN. SEE SHEET TMP-12 FOR DETAILS.
2. WING FOOTINGS AND CURTAIN WALL.
3. HEADWALL AND WINGWALLS.

STAGE II

1. PLACE PRECAST PORTION OF CULVERT.
2. WING FOOTINGS AND CURTAIN WALL.
3. HEADWALL AND WINGWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

A 3 FOOT STRIP OF GEOTEXTILE SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

FOR CULVERT DIRVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

FOR PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FULL COMPENSATION FOR CONCRETE, REINFORCING STEEL, LABOR, EQUIPMENT, AND ALL OTHER RELATED MATERIALS NECESSARY FOR WINGS AND WING FOOTINGS FOR WINGS W1, W2, W3, AND W4, AND CLOSURE POUR SHALL BE INCCLUDED IN THE LUMP SUM PRICE FOR PRECAST REINFORCED CONCRETE BOX CULVERT @ STA. 11+63.55 -Y18-.

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

ALL PRECAST UNITS SHALL BE PLACED PRIOR TO POURING THE WINGS, END CURTAIN WALL, HEADWALL, AND CLOSURE POUR FOR EACH STAGE. THE EXTERIOR PRECAST UNITS SHALL BE UNDERMINED TO PROVIDE FOR THE WING FOOTINGS AND CLOSURE POUR TO BE POURED TO THE DEPTH AND DIMENSIONS AS SHOWN IN THE PLANS.

FOUNDATION CONDITIONING MATERIAL SHALL HAVE A THICKNESS OF AT LEAST 1'-0" BELOW THE BOTTOM OF THE PRECAST UNITS. THE MATERIAL SHALL BE FORMED AND SCREEDED TO THE PROPER ELEVATION AT LEAST 1'-0" BEYOND THE SIDES OF THE PRECAST UNITS.

THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

THE 15" DIA., 72" DIA., AND 54" DIA. PIPES THROUGH THE SIDEWALL OF THE CULVERT AND THE 36" DIA. PIPE THROUGH THE HEADWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE PRECAST CULVERT JUNCTION BOX SHALL PROVIDE A HOLE FOR THE PIPES AT LEAST 6" LARGER IN DIA. THAN THE OUTSIDE DIA. OF THE PIPES TO ALLOW FOR CONSTRUCTION TOLERANCE. THE VOID BETWEEN THE PIPE AND THE PRECAST CULVERT JUNCTION BOX SHALL BE FILLED WITH CLASS "A" CONCRETE AS PER THE STANDARD SPECIFICATIONS.

THE PRECAST UNITS SHALL BE CAREFULLY POSITIONED ON THE PREPARED FOUNDATION CONDITIONING MATERIAL, FEMALE END UPGRADE WITH THE MALE END FULLY INSERTED AND EACH JOINT CHECKED FOR ALIGNMENT PRIOR TO JACKING THE UNIT INTO PLACE. SATISFACTORY FITTING AND PROPER GRADE SHALL BE MAINTAINED AS THE WORK PROCEEDS.

WHEN ANY PRECAST UNIT IS DAMAGED DURING HANDLING, THE ENGINEER AT HIS DISCRETION SHALL REJECT THE UNIT AS BEING UNFIT FOR INSTALLATION AND THE CONTRACTOR SHALL REMOVE SUCH REJECTED UNIT FROM THE PROJECT. MINOR DAMAGE TO THE UNIT MAY BE REPAIRED BY THE CONTRACTOR WHEN PERMITTED BY THE ENGINEER.

CARE SHALL BE TAKEN DURING BACKFILL AND COMPACTION OPERATION TO MAINTAIN ALIGNMENT AND PREVENT DAMAGE TO THE JOINTS. UNITS WHICH BECOME MISALIGNED, SHOW EXCESSIVE SETTLEMENT, OR HAVE OTHERWISE BEEN DAMAGED BY THE CONTRACTOR'S OPERATION SHALL AT THE DISCRETION OF THE ENGINEER BE REMOVED AND REPLACED BY THE CONTRACTOR AT NO COST TO THE DEPARTMENT OF TRANSPORTATION.

CONCRETE CHAMFERS ON EXTERIOR LONGITUDINAL EDGES OF THE PRECAST UNITS MAY BE AS PER THE FABRICATORS RECOMMENDATION, HOWEVER ALL WORKMANSHIP SHALL PROVIDE CONCRETE COVER OVER THE WELDED WIRE FABRIC AS SPECIFIED ON THE PLANS AND THE CONCRETE CHAMFERS CHOSEN SHALL IN NO WAY FUNCTIONALLY LESSEN THE DESIGN SHOWN ON THE PLANS.

THE CONCRETE FOR THE PRECAST UNITS SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 5000 P.S.I. THE CONCRETE FOR THE HEADWALLS, WINGS AND END CURTAIN WALLS SHALL BE CLASS "A" CONCRETE AS PER THE STANDARD SPECIFICATIONS.

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

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

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 11+63.55 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE BARREL 10 FT. X 5 FT. CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S07-01
1	--	--	3	--	--	TOTAL SHEETS
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DES BY: E. NOLTING DATE: 08/24
DES CHK: G. M. CASTREJON DATE: 08/24
DWG BY: B. PETERSON DATE: 08/24
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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
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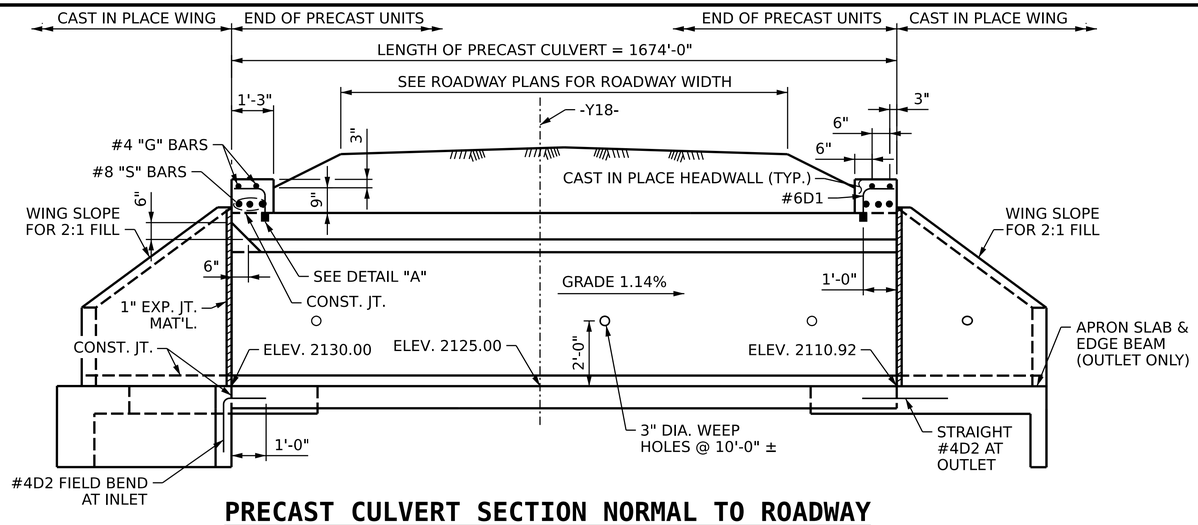
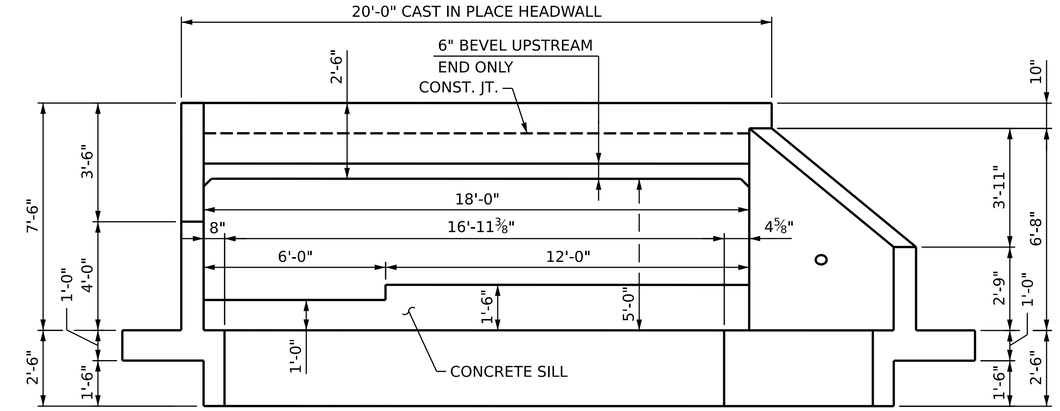


PRECAST CULVERT SECTION NORMAL TO ROADWAY

(DIMENSIONS AND REINFORCING TYPICAL AT EACH HEADWALL)
NOTE: NO END UNIT SHALL BE LESS THAN 3'-0".



INLET ELEVATION NORMAL TO SKEW (LOOKING DOWNSTREAM)

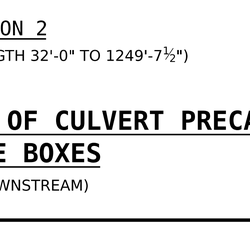
WINGWALL AND HEADWALL DIMENSIONS BASED ON AN ASSUMED 1'-6" TOP SLAB THICKNESS AND 1-0" WALL THICKNESS FOR THE PRECAST UNITS. THE CONTRACTOR SHALL ADJUST THE DIMENSIONS BASED ON THE ACTUAL TOP SLAB AND WALL THICKNESS OF THE PRECAST UNITS.

PLAN - END UNITS

NOTE: D2 BARS SHALL BE CAST WITH THE END UNIT. D2 BARS AT INLET SHALL BE FIELD BENT. D2 BARS AT OUTLET SHALL BE STRAIGHT.

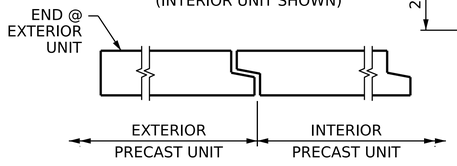
PLAN - TYPICAL PRECAST UNIT

(INTERIOR UNIT SHOWN)



ELEVATION - TYPICAL PRECAST UNIT

(INTERIOR UNIT SHOWN)

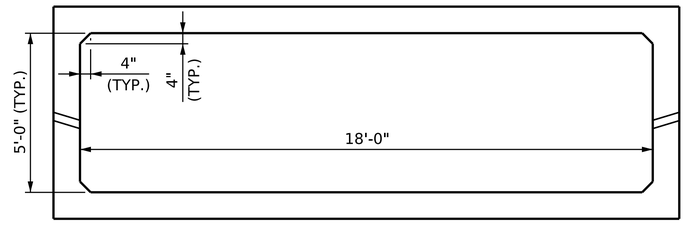


SECTION THRU TOP SLAB

(BOTTOM SLAB JOINT SIMILAR)

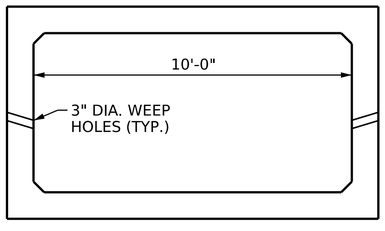
OUTLET ELEVATION NORMAL TO SKEW (LOOKING UPSTREAM)

WINGWALL AND HEADWALL DIMENSIONS BASED ON AN ASSUMED 1'-0" TOP SLAB THICKNESS AND 1-0" WALL THICKNESS FOR THE PRECAST UNITS. THE CONTRACTOR SHALL ADJUST THE DIMENSIONS BASED ON THE ACTUAL TOP SLAB AND WALL THICKNESS OF THE PRECAST UNITS.



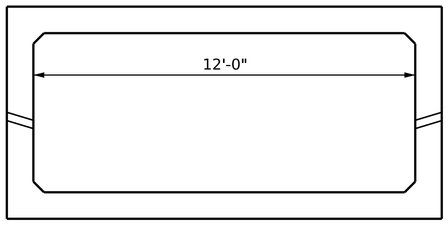
SECTION 1 AT INLET

(SECTION 1: TAPERS FROM INLET TO SECTION 2 AT CULVERT LENGTH 32'-0")



SECTION 2

(SECTION 2: CULVERT LENGTH 32'-0" TO 1249'-7½")



SECTION 3

(SECTION 3: CULVERT LENGTH 1249'-7½" TO 1674'-0")

DETAIL A

** STRUCTURAL CONNECTION INSERTS 2 STRUT OR EQUAL; LENGTH = 4 1/2", INSERT WIDTH = 2", DIA. = ¾". NO. REQUIRED 45

RIGHT ANGLE SECTION OF CULVERT PRECAST CONCRETE BOXES

(LOOKING DOWNSTREAM)

PROJECT NO. R-5600
JACKSON COUNTY
STATION: 11+63.55 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE BARREL 10 FT. X 5 FT. CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

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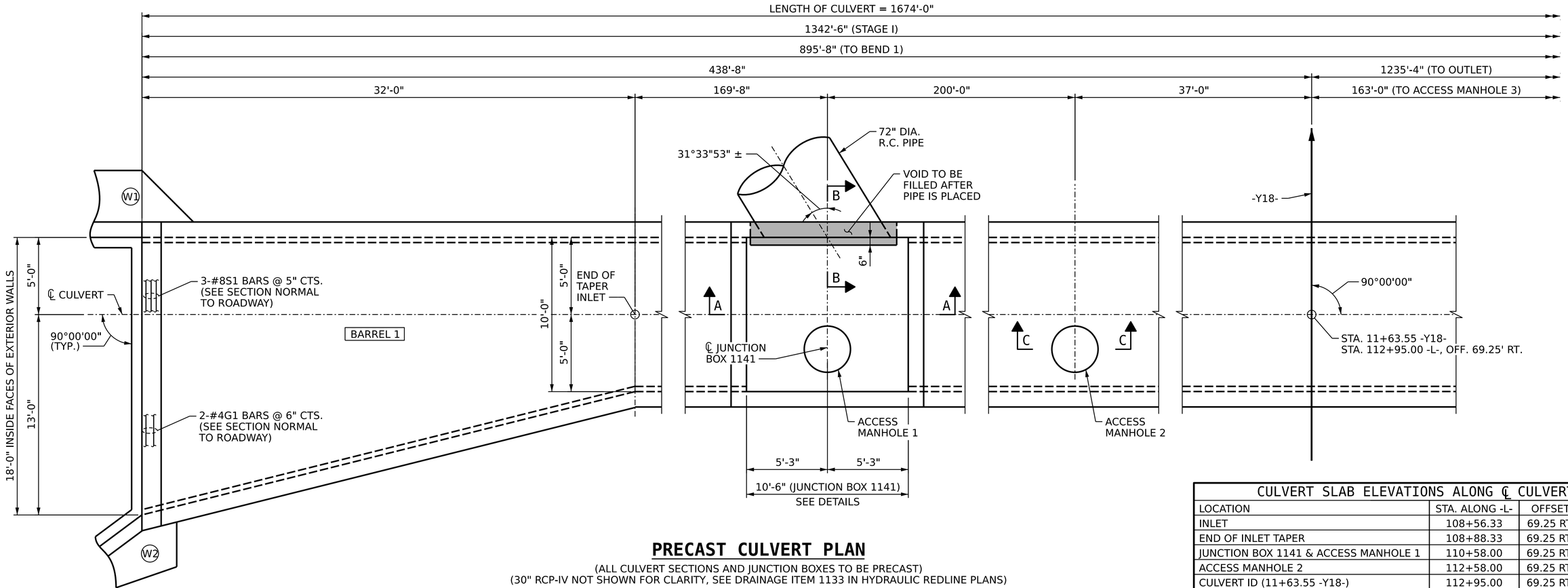
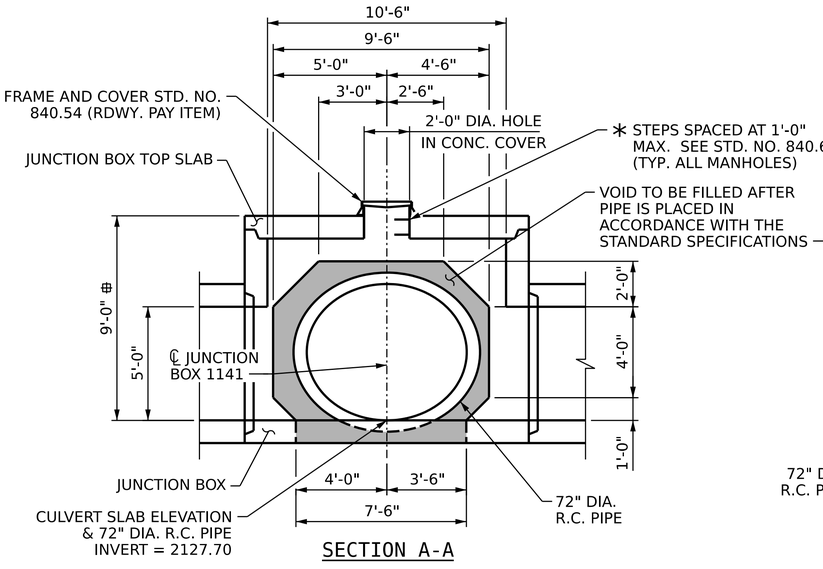


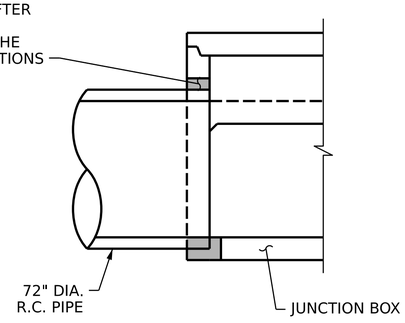
PRECAST CULVERT PLAN

(ALL CULVERT SECTIONS AND JUNCTION BOXES TO BE PRECAST)
(30" RCP-IV NOT SHOWN FOR CLARITY, SEE DRAINAGE ITEM 1133 IN HYDRAULIC REDLINE PLANS)

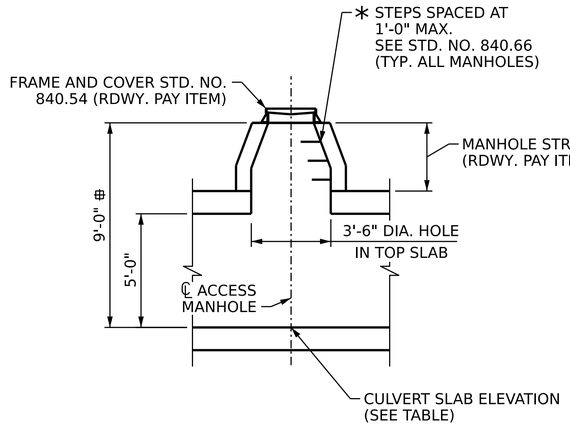
CULVERT SLAB ELEVATIONS ALONG ℄ CULVERT			
LOCATION	STA. ALONG -L-	OFFSET	ELEV.
INLET	108+56.33	69.25 RT.	2130.00
END OF INLET TAPER	108+88.33	69.25 RT.	2129.64
JUNCTION BOX 1141 & ACCESS MANHOLE 1	110+58.00	69.25 RT.	2127.70
ACCESS MANHOLE 2	112+58.00	69.25 RT.	2125.42
CULVERT ID (11+63.55 -Y18-)	112+95.00	69.25 RT.	2125.00
ACCESS MANHOLE 3	114+58.00	69.25 RT.	2123.14
ACCESS MANHOLE 4	116+58.00	69.25 RT.	2120.86
BEND 1 & ACCESS MANHOLE 5	117+52.00	69.25 RT.	2119.79
ACCESS MANHOLE 6	119+56.88	76.86 RT.	2117.51
JUNCTION BOX 1254 & ACCESS MANHOLE 7	121+20.20	74.14 RT.	2115.69
BEND 2 & ACCESS MANHOLE 8	121+92.93	70.30 RT.	2114.87
STAGE I TO STAGE II CONST. JT.	122+07.58	73.52 RT.	2114.70
ACCESS MANHOLE 9	123+89.23	113.47 RT.	2112.58
OUTLET	125+31.34	144.73 RT.	2110.92



SECTION A-A



SECTION B-B



ACCESS MANHOLE SECTION C-C

JUNCTION BOX 1141 DETAILS

⌗ HEIGHT TO MANHOLE FRAME AND COVER TO BE VERIFIED BY THE ENGINEER AT EACH LOCATION.

∗ PROVIDE STEPS IN MANHOLE STRUCTURE IN ACCORDANCE WITH STANDARD SPECIFICATION 1074-8. PROVIDE STEPS IN PRECAST SEGMENT IN ACCORDANCE WITH STANDARD SPECIFICATION 1077-13. LOCATE STEPS IN PRECAST SEGMENT ADJACENT TO STEPS IN MANHOLE.

PROJECT NO. R-5600
JACKSON COUNTY
STATION: 11+63.55 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE BARREL 10 FT. X 5 FT. CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S07-03
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	10

DES BY:	E. NOLTING	DATE :	08/24
DES CHK:	G. M. CASTREJON	DATE :	09/24
DWG BY:	B. PETERSON	DATE :	09/24
CHK BY:	J. PATT	DATE :	12/24

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N.C.B.E.L.S. License Number: F-0116

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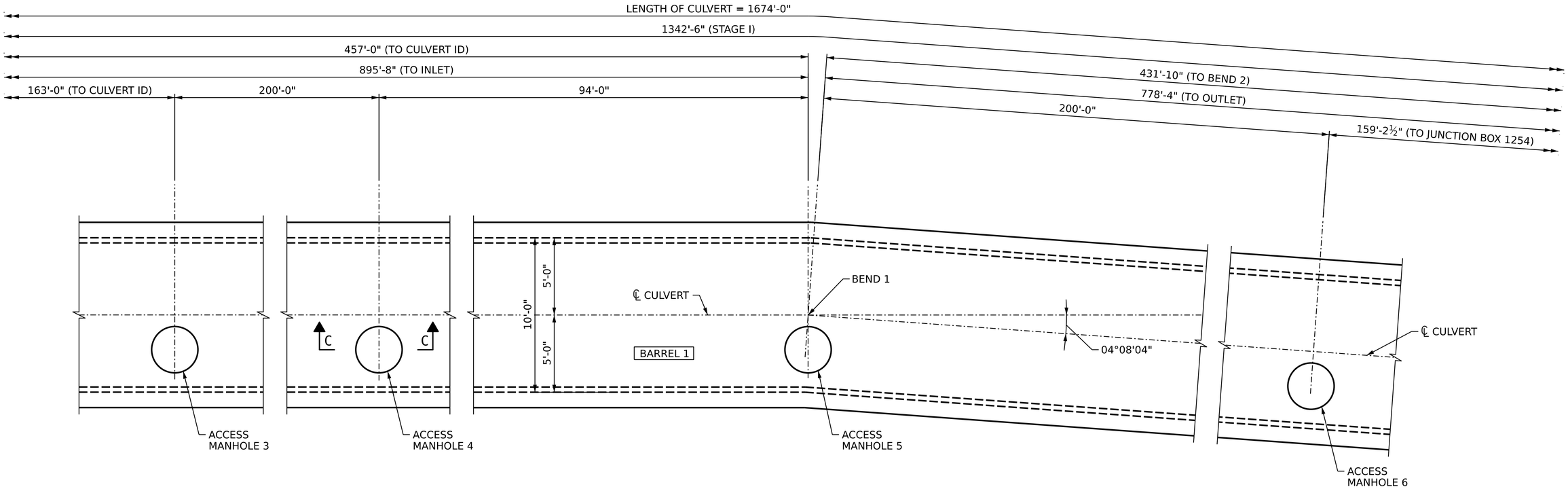

PRECAST CULVERT PLAN

(ALL CULVERT SECTIONS AND JUNCTION BOXES TO BE PRECAST)

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 11+63.55 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE BARREL 10 FT. X 5 FT. CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

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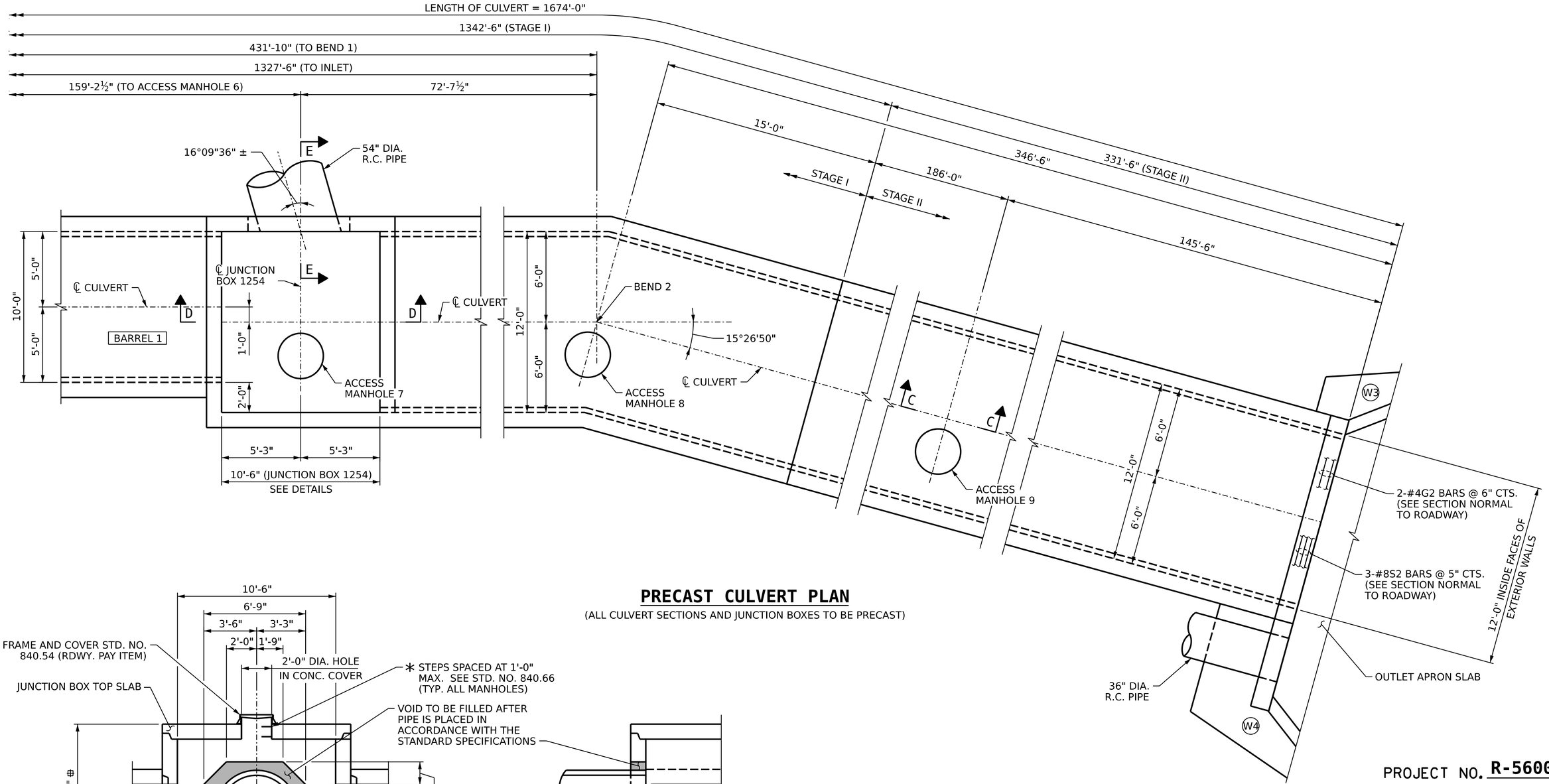
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S07-04
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	10

DES BY:	E. NOLTING	DATE :	08/24
DES CHK:	G. M. CASTREJON	DATE :	09/24
DWG BY:	B. PETERSON	DATE :	09/24
CHK BY:	J. PATT	DATE :	12/24



PRECAST CULVERT PLAN

(ALL CULVERT SECTIONS AND JUNCTION BOXES TO BE PRECAST)

JUNCTION BOX 1254 DETAILS

⌖ HEIGHT TO MANHOLE FRAME AND COVER TO BE VERIFIED BY THE ENGINEER AT EACH LOCATION.

* PROVIDE STEPS IN MANHOLE STRUCTURE IN ACCORDANCE WITH STANDARD SPECIFICATION 1074-8. PROVIDE STEPS IN PRECAST SEGMENT IN ACCORDANCE WITH STANDARD SPECIFICATION 1077-13. LOCATE STEPS IN PRECAST SEGMENT ADJACENT TO STEPS IN MANHOLE.

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 11+63.55 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE BARREL 10 FT. X 5 FT. CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

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1	--	--	3	--	--	TOTAL SHEETS
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DES CHK: G. M. CASTREJON DATE : 09/24

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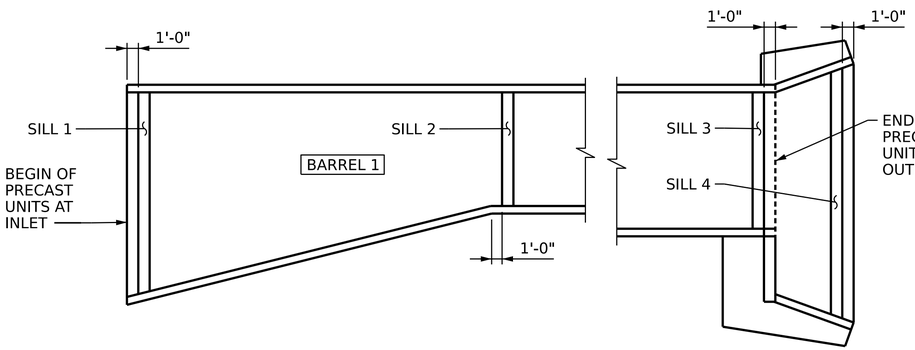
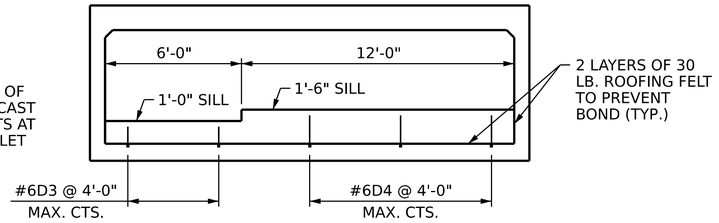
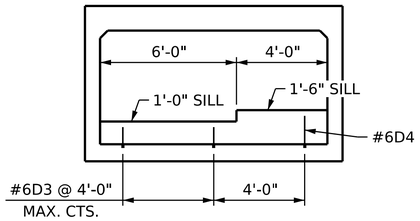


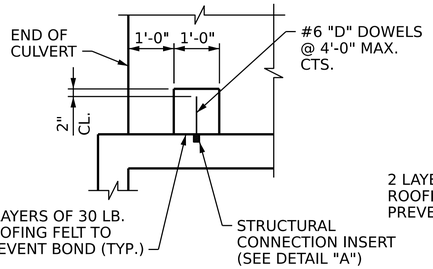
PLAN



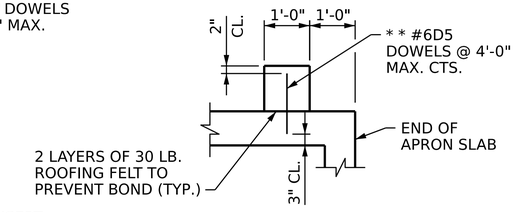
SECTION AT SILL 1 - LOOKING DOWNSTREAM



SECTION AT SILL 2 - LOOKING DOWNSTREAM

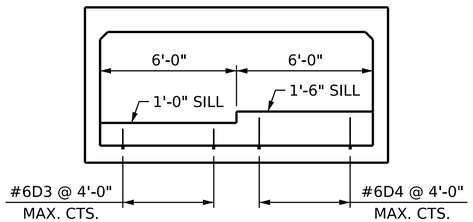


SECTION THROUGH SILLS 1 - 3



SECTION THROUGH SILL 4

** DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED



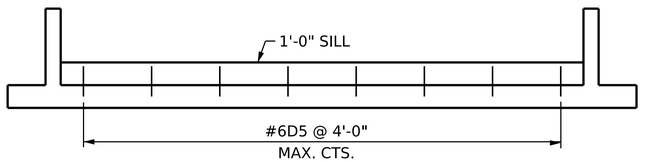
SECTION AT SILL 3 - LOOKING DOWNSTREAM

SILL DETAILS

NOTES

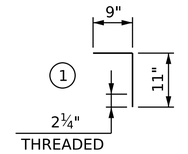
SILLS 1 & 2 TO BE CAST DURING STAGE I CONSTRUCTION. SILLS 3 & 4 TO BE CAST DURING STAGE II CONSTRUCTION.

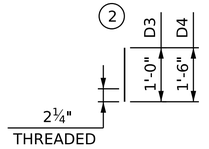
TOP OF LOW FLOW SILL SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM (THALWEG).



SECTION AT SILL 4 - LOOKING DOWNSTREAM

BAR TYPES





BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
D1	20	#6	1	1'-8"	51
D2	20	#6	STR	3'-4"	101
D3	4	#6	2	1'-0"	7
D4	4	#6	2	1'-6"	10
G1	2	#4	STR	19'-0"	26
S1	3	#8	STR	19'-0"	153

REINFORCING STEEL	348	LBS.
CLASS A CONCRETE		
HEADWALL	0.9	C.Y.
CURTAIN WALL	1.1	C.Y.
SILLS	1.4	C.Y.
TOTAL	3.4	C.Y.

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
D1	13	#6	1	1'-8"	33
D2	13	#6	STR	3'-4"	66
D3	2	#6	2	1'-0"	4
D4	2	#6	2	1'-6"	5
D5	8	#6	STR	1'-6"	19
G2	2	#4	STR	21'-8"	29
S2	3	#8	STR	21'-8"	174

REINFORCING STEEL	330	LBS.
CLASS A CONCRETE		
HEADWALL	1.1	C.Y.
SILLS	1.6	C.Y.
TOTAL	2.7	C.Y.

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 11+63.55 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE BARREL 10 FT. X 5 FT. CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S07-06
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	10

DES BY:	E. NOLTING	DATE :	08/24
DES CHK:	G. M. CASTREJON	DATE :	09/24
DWG BY:	B. PETERSON	DATE :	09/24
CHK BY:	J. PATT	DATE :	12/24

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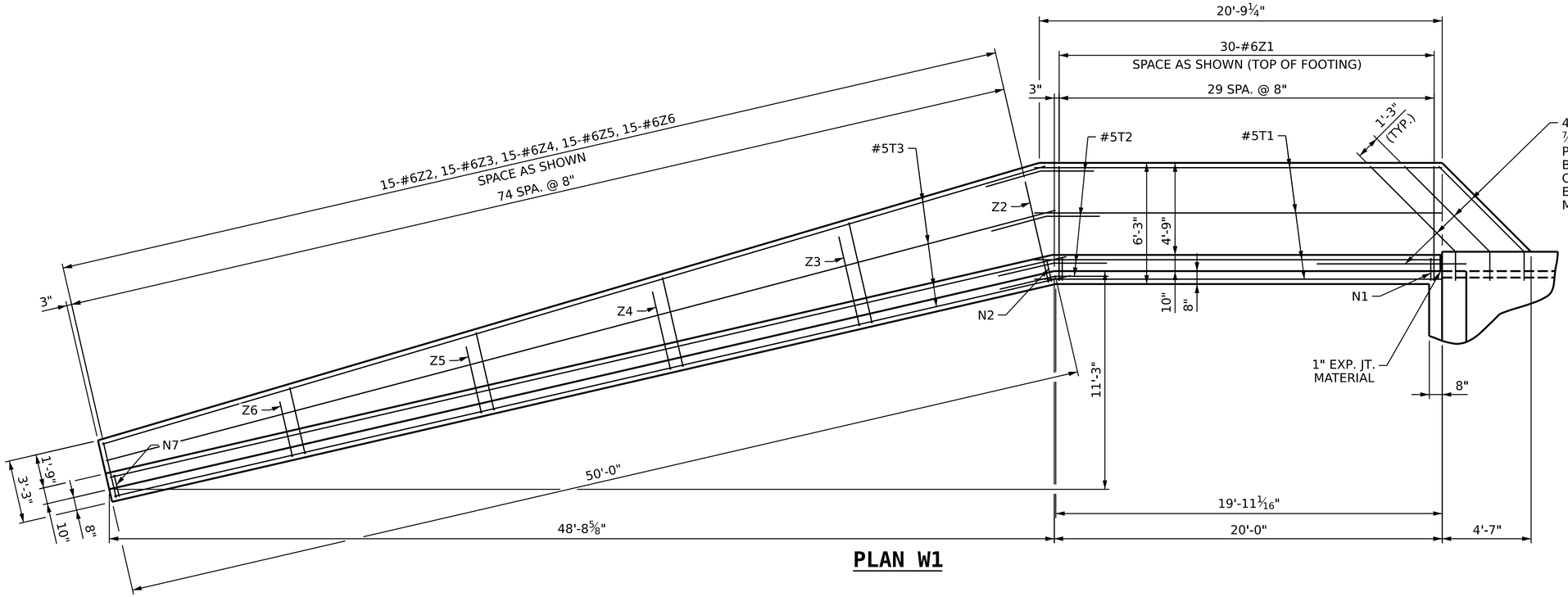
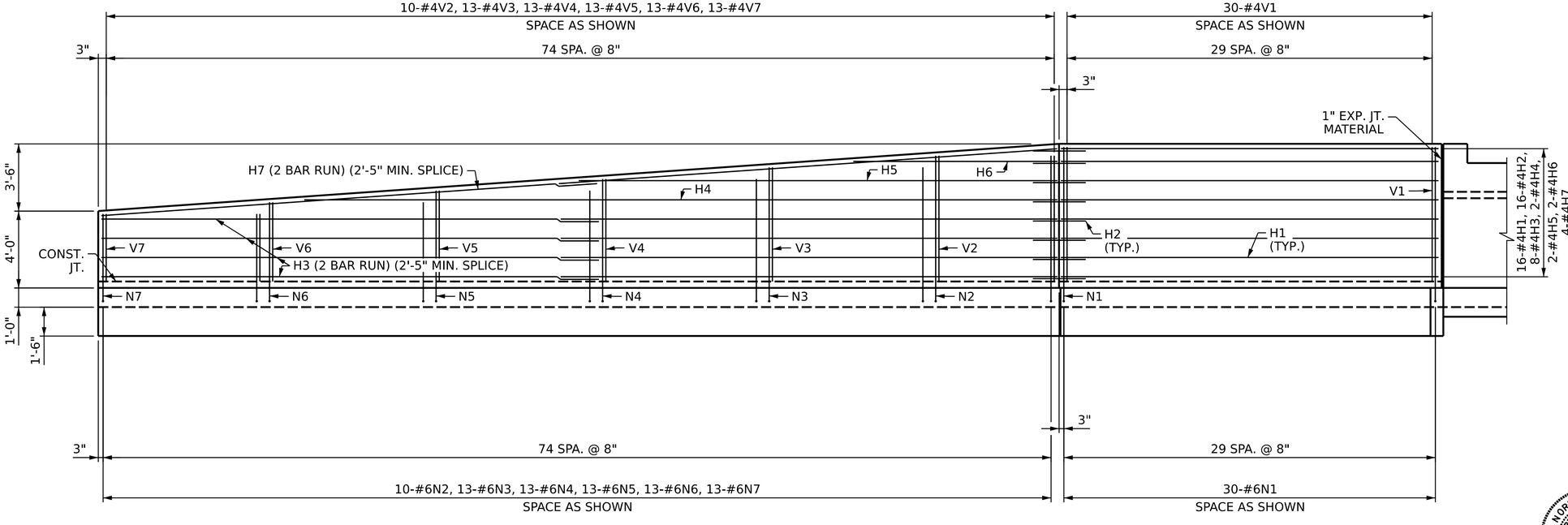
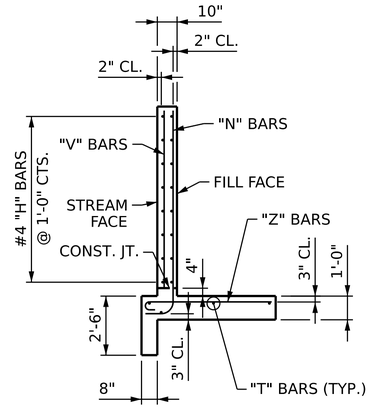


PLAN W1



ELEVATION W1



TYPICAL WING SECTION

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 11+63.55 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S07-07
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	10

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

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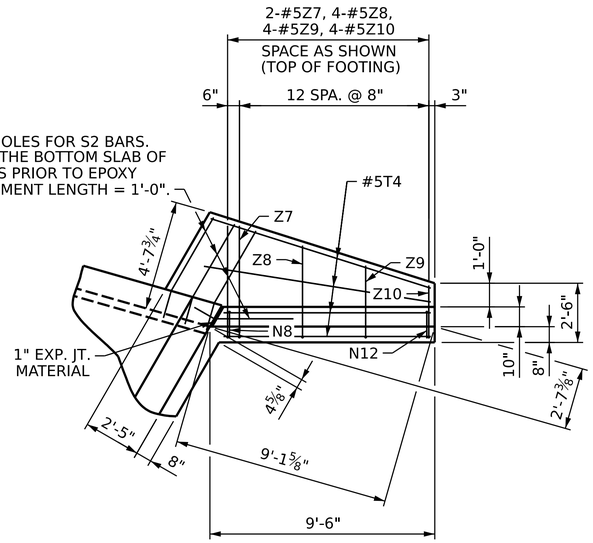
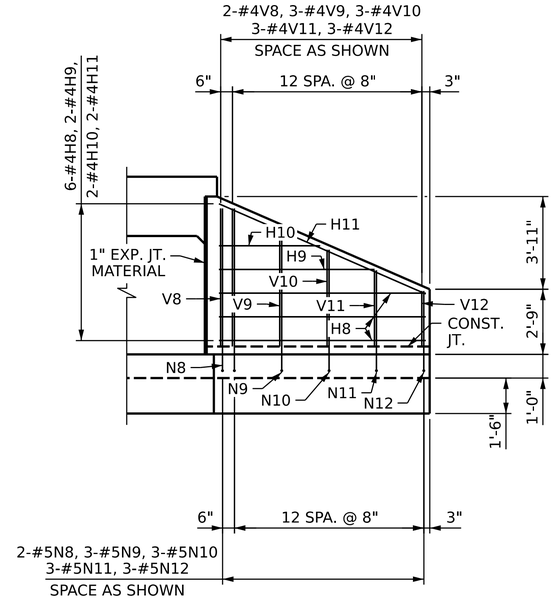
DES BY:	E. NOLTING	DATE :	10/24
DES CHK:	J. PATT	DATE :	11/24
DWG BY:	D. CHAPMAN	DATE :	10/24
CHK BY:	J. PATT	DATE :	12/24

4-#6S2 BARS SPA. AS SHOWN. PRE-DRILL 7/8" ∅ HOLES FOR S2 BARS. CENTER THE PRE-DRILLED HOLES VERTICALLY IN THE BOTTOM SLAB OF THE PRECAST BOX CULVERT. FIELD BEND S2 BARS PRIOR TO EPOXY GROUTING THE BARS IN PLACE. MINIMUM EMBEDMENT LENGTH = 1'-0".

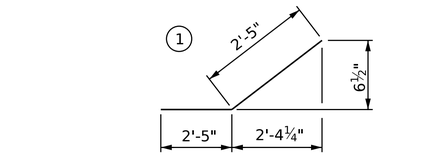


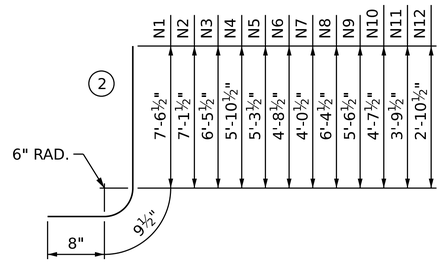
PLAN W2

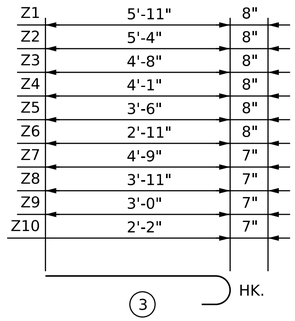


ELEVATION W2

BAR TYPES







ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL - W1 & W2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	19'-9"	212
H2	16	#4	1	4'-10"	52
H3	16	#4	STR	26'-2"	280
H4	2	#4	STR	39'-3"	53
H5	2	#4	STR	24'-11"	34
H6	2	#4	STR	10'-8"	15
H7	4	#4	STR	26'-3"	71
H8	6	#4	STR	8'-8"	35
H9	2	#4	STR	6'-6"	9
H10	2	#4	STR	4'-3"	6
H11	2	#4	STR	9'-6"	13
N1	30	#6	2	9'-0"	406
N2	10	#6	2	8'-7"	129
N3	13	#6	2	7'-11"	155
N4	13	#6	2	7'-4"	144
N5	13	#6	2	6'-9"	132
N6	13	#6	2	6'-2"	121
N7	13	#6	2	5'-6"	108
N8	2	#5	2	7'-10"	17
N9	3	#5	2	7'-0"	22
N10	3	#5	2	6'-1"	20
N11	3	#5	2	5'-3"	17
N12	3	#5	2	4'-4"	14
S1	4	#6	STR	7'-2"	44
S2	4	#6	STR	4'-7"	28
T1	4	#5	STR	21'-0"	88
T2	4	#5	1	4'-10"	21
T3	4	#5	STR	50'-8"	212
T4	4	#5	STR	8'-9"	37
V1	30	#4	STR	7'-0"	141
V2	10	#4	STR	6'-6"	44
V3	13	#4	STR	5'-11"	52
V4	13	#4	STR	5'-4"	47
V5	13	#4	STR	4'-8"	41
V6	13	#4	STR	4'-1"	36
V7	13	#4	STR	3'-6"	31
V8	2	#4	STR	5'-10"	8
V9	3	#4	STR	4'-11"	10
V10	3	#4	STR	4'-1"	9
V11	3	#4	STR	3'-2"	7
V12	3	#4	STR	2'-4"	5
Z1	30	#6	3	6'-7"	297
Z2	15	#6	3	6'-0"	136
Z3	15	#6	3	5'-4"	121
Z4	15	#6	3	4'-9"	108
Z5	15	#6	3	4'-2"	94
Z6	15	#6	3	3'-7"	81
Z7	2	#5	3	5'-4"	12
Z8	4	#5	3	4'-6"	19
Z9	4	#5	3	3'-7"	15
Z10	4	#5	3	2'-9"	12
REINFORCING STEEL FOR WINGS 1 & 2				3821	LBS.
CLASS A CONCRETE FOR WINGS 1 & 2				33.3	C.Y.

PROJECT NO. R-5600

JACKSON COUNTY

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RALEIGH

WINGS FOR CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S07-08
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	10

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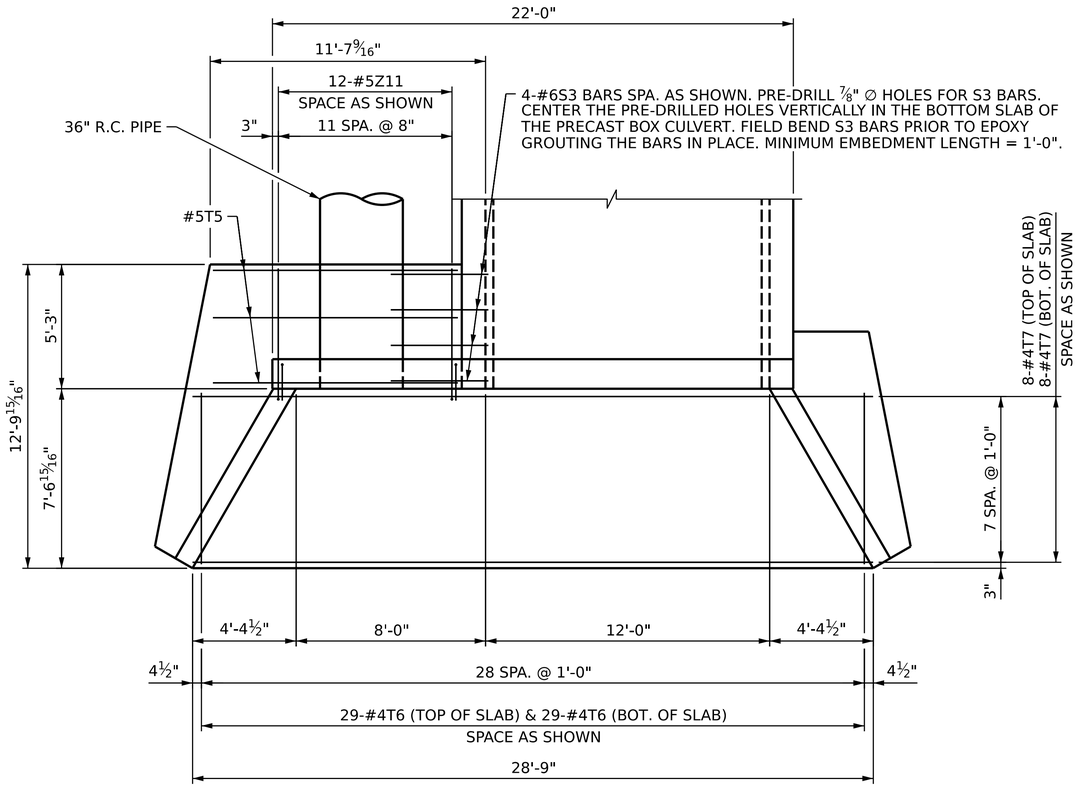
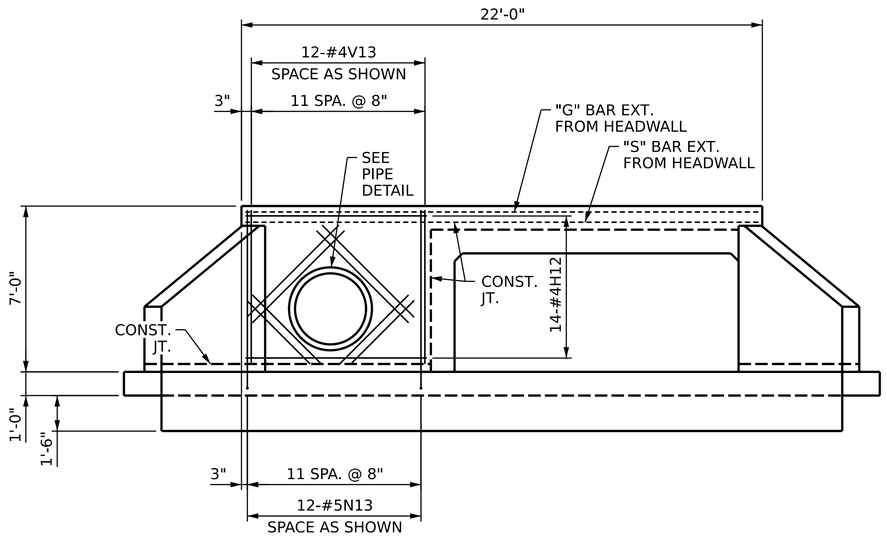
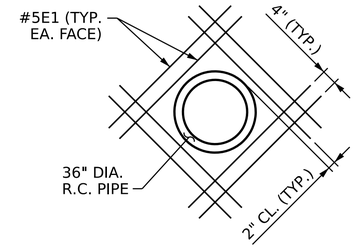
DES BY: E. NOLTING	DATE: 10/24	DWG BY: D. CHAPMAN	DATE: 10/24
DES CHK: J. PATT	DATE: 11/24	CHK BY: J. PATT	DATE: 12/24



PLAN OUTLET HEADWALL

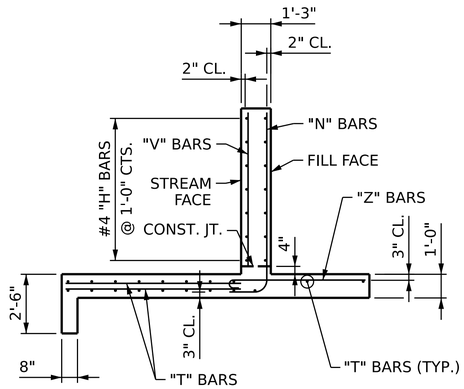


ELEVATION OUTLET HEADWALL



PIPE DETAIL

THE 36" DIA. PIPE THROUGH THE HEADWALL SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.



HEADWALL SECTION

PROJECT NO. R-5600

JACKSON COUNTY

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DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE

9/5/2025

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DES CHK:	J. PATT	DATE :	11/24	CHK BY:	J. PATT	DATE : 12/24

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555 Fayetteville St., Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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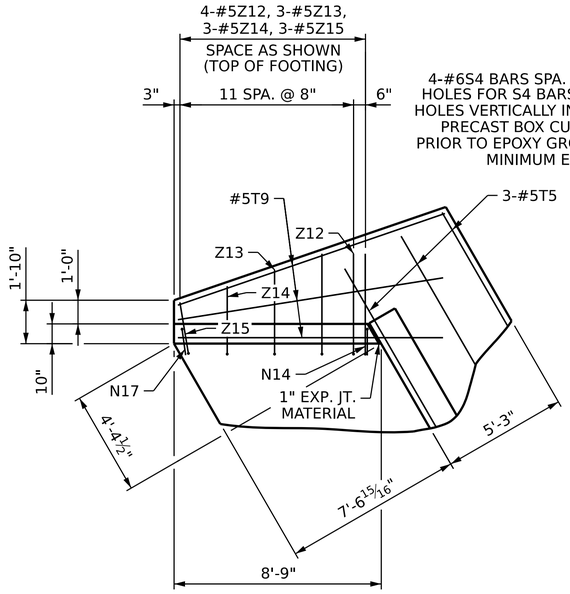
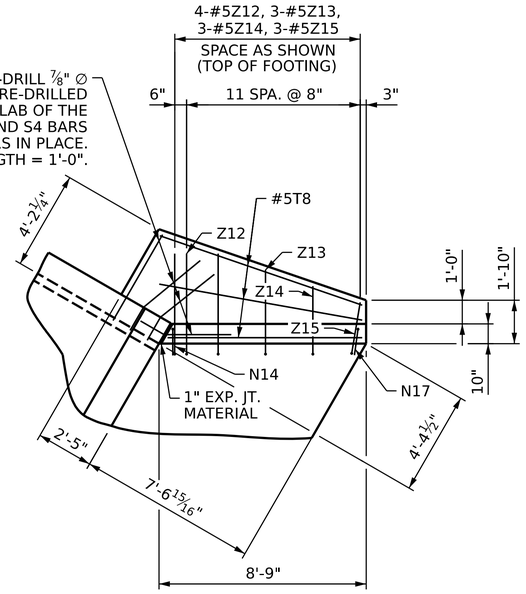
NO.	BY:	DATE:	NO.	BY:	DATE:	S07-09
1	--	--	3	--	--	TOTAL SHEETS
2	--	--	4	--	--	10

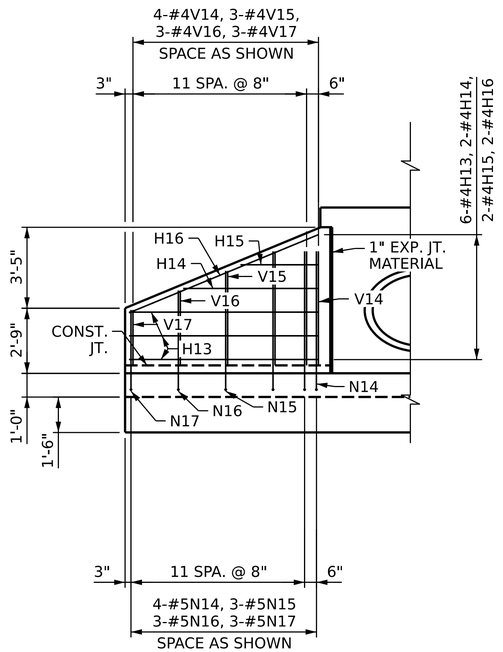


PLAN W4

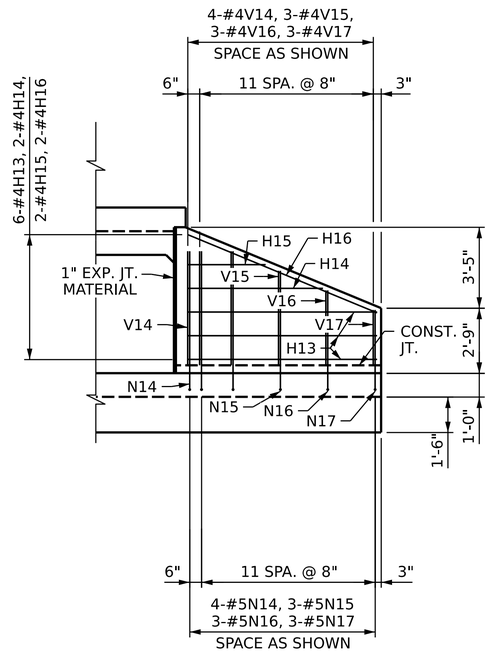
4-#6S4 BARS SPA. AS SHOWN. PRE-DRILL ⅞" ∅ HOLES FOR S4 BARS. CENTER THE PRE-DRILLED HOLES VERTICALLY IN THE BOTTOM SLAB OF THE PRECAST BOX CULVERT. FIELD BEND S4 BARS PRIOR TO EPOXY GROUTING THE BARS IN PLACE. MINIMUM EMBEDMENT LENGTH = 1'-0".



PLAN W3



ELEVATION W4



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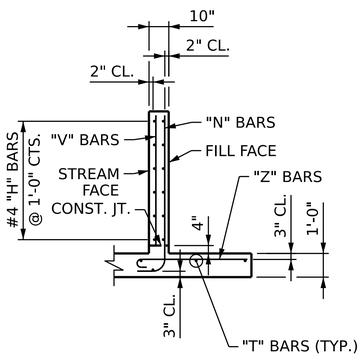
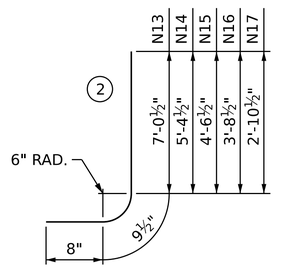
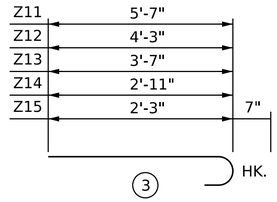


TYPICAL WING SECTION

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL - W3 & W4

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
E1	16	#5	STR	5'-6"	92
H12	14	#4	STR	7'-8"	72
H13	12	#4	STR	8'-0"	65
H14	4	#4	STR	5'-8"	16
H15	4	#4	STR	3'-3"	9
H16	4	#4	STR	8'-8"	24
N13	12	#5	2	8'-6"	107
N14	8	#5	2	6'-10"	58
N15	6	#5	2	6'-0"	38
N16	6	#5	2	5'-2"	33
N17	6	#5	2	4'-4"	28
S3	4	#6	STR	4'-6"	28
S4	4	#6	STR	4'-1"	25
T5	3	#5	STR	10'-4"	33
T6	58	#4	STR	7'-3"	281
T7	16	#4	STR	28'-9"	308
T8	3	#5	STR	8'-3"	26
T9	3	#5	STR	11'-11"	38
V13	12	#4	STR	6'-6"	53
V14	8	#4	STR	4'-9"	26
V15	6	#4	STR	4'-0"	17
V16	6	#4	STR	3'-2"	13
V17	6	#4	STR	2'-4"	9
Z11	12	#5	3	6'-2"	78
Z12	8	#5	3	4'-10"	41
Z13	6	#5	3	4'-2"	27
Z14	6	#5	3	3'-6"	22
Z15	6	#5	3	2'-10"	18

REINFORCING STEEL FOR WINGS 3 & 4	1585	LBS.
CLASS A CONCRETE FOR WINGS 3 & 4	17.1	C.Y.

PROJECT NO. R-5600

JACKSON COUNTY

STATION: 11+63.55 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT 90° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 033730 ENGINEER ANNA C. TEAGUE
9/5/2025
Anna C. Teague

DES BY: E. NOLTING	DATE : 10/24	DWG BY: D. CHAPMAN	DATE : 10/24
DES CHK: J. PATT	DATE : 11/24	CHK BY: J. PATT	DATE : 12/24

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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" ∅ SHEAR STUDS FOR THE ¾" ∅ STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" ∅ STUDS FOR 4 - ¾" ∅ STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" ∅ STUDS ALONG THE BEAM AS SHOWN FOR ¾" ∅ STUDS BASED ON THE RATIO OF 3 - ⅞"∅ STUDS FOR 4 - ¾" ∅ 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.

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DES BY: E. NOLTING DATE : 08/24
DES CHK: G. M. CASTREJON DATE : 08/24

DWG BY: B. PETERSON DATE : 06/24
CHK BY: E. NOLTING DATE : 08/24

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