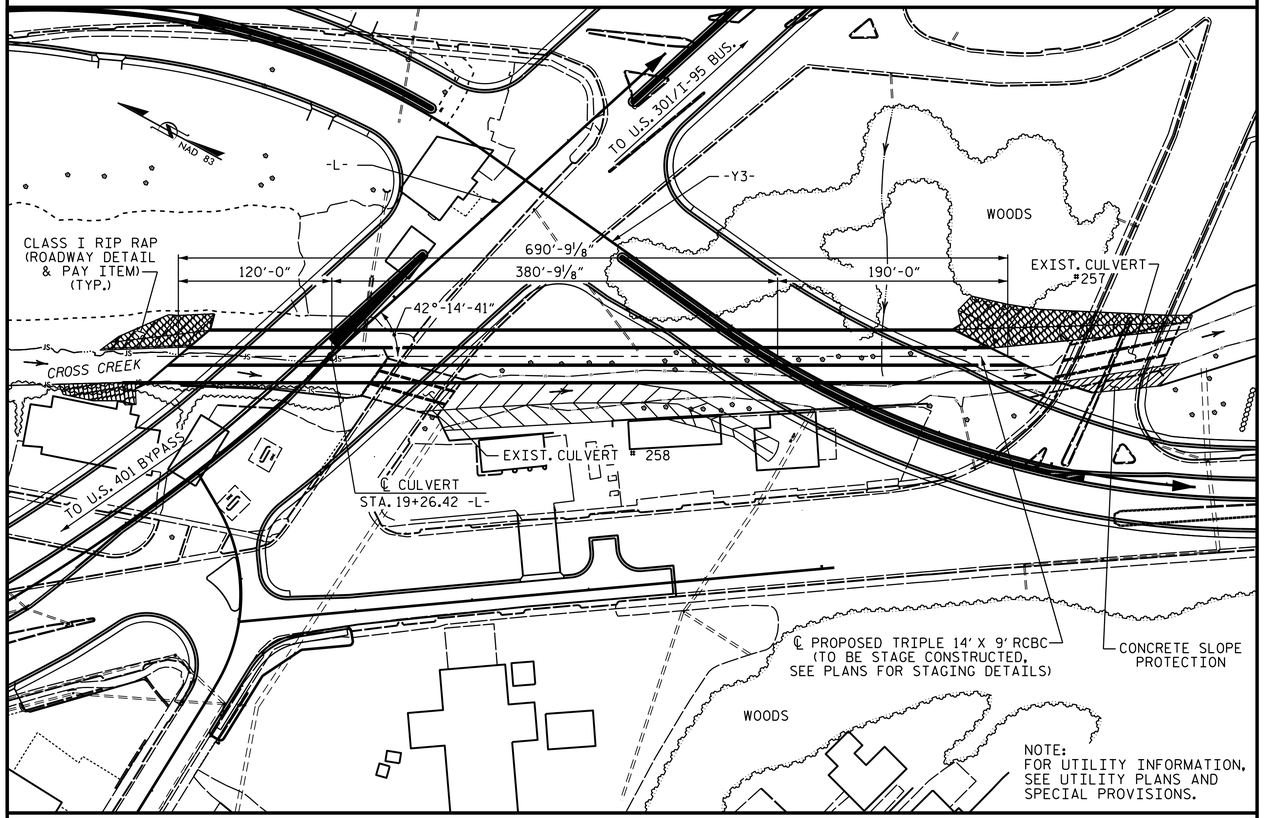
B.M. #BL-3: 80.06' RIGHT OF -L- STATION 17+99.86, ELEV. 94.80



LOCATION SKETCH

TEMPORARY SHORING NOT SHOWN FOR CLARITY. SEE TRAFFIC CONTROL PLANS FOR TEMPORARY SHORING LOCATIONS.

HYDRAULIC DATA

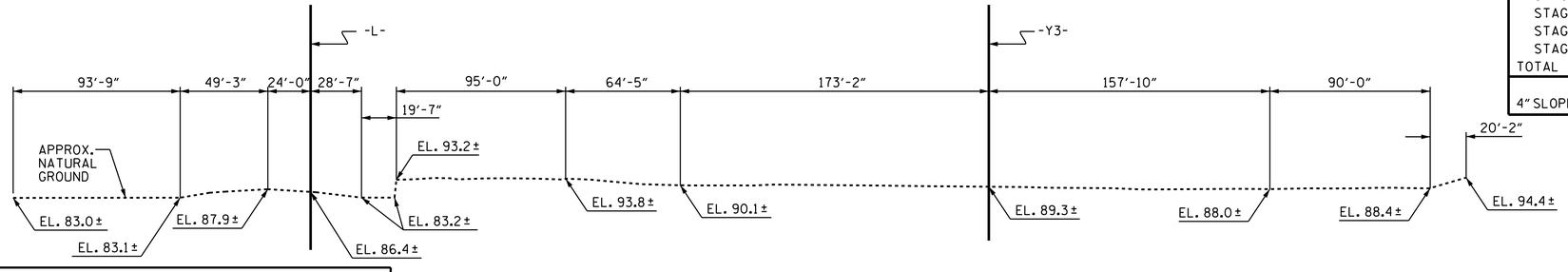
DESIGN DISCHARGE	=	4000 CFS
DESIGN FLOOD FREQUENCY	=	50 YR.
DESIGN HIGH WATER ELEVATION	=	100.3
BASE DISCHARGE (Q100)	=	4400 CFS
BASE ELEVATION (Q100)	=	101.40
DRAINAGE AREA	=	25.90 sq. mi.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	1900 CFS
OVERTOPPING FLOOD FREQUENCY	=	2 YR+
OVERTOPPING FLOOD ELEVATION	=	95.0

GRADE DATA

GRADE POINT ELEV. @ STA. 19+26.42 -L-	=	94.65
BED ELEV. @ STA. 19+26.42 -L-	=	81.75
ROADWAY SLOPE	=	2:1



PROFILE ALONG ℄ CULVERT

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

29-MAR-2016 09:20
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jpadams

F.A. PROJECT NO. BRNHS-0024(24)

NOTES

ASSUMED LIVE LOAD HL-93 OR ALTERNATE LOADING.

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

FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.

DESIGN FILL = 2.33 FEET (MIN. FILL)
4.84 FEET (MAX. FILL)

FOR OTHER DESIGN DATA AND NOTES, SEE SHEET SN.

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

FOR POURING SEQUENCE OF CONCRETE IN CULVERT, SEE "STAGING DETAILS", SHEET 4 OF 18.

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 SHEETS.

AT THE CONTRACTORS OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALLS 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 48" Ø, 36" Ø, 18" Ø AND 15" Ø R.C. 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.

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.

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

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

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.

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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING 96'-7" LONG TRIPLE 12 FT. X 9 FT. REINFORCED BOX CULVERT LOCATED AT THE OUTLET END OF THE PROPOSED CULVERT SHALL BE REMOVED.

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING 67'-6" LONG TRIPLE 12 FT. X 9 FT. REINFORCED BOX CULVERT LOCATED APPROXIMATELY 160 FEET DOWNSTREAM FROM THE INLET END OF THE PROPOSED CULVERT SHALL BE REMOVED.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

TOTAL STRUCTURE QUANTITIES

REMOVAL OF EXISTING STRUCTURES	LUMP SUM	
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION COND. MAT'L.	TONS	2175
CLASS A CONCRETE		
STAGE I (PART A)	CU. YDS.	137.5
STAGE I (PART B)	CU. YDS.	385.0
STAGE II	CU. YDS.	521.5
STAGE III	CU. YDS.	132.1
STAGE IV	CU. YDS.	2098.0
STAGE V	CU. YDS.	39.7
SILLS (STAGES VI & VII)	CU. YDS.	7.1
TOTAL	CU. YDS.	3320.9
REINFORCING STEEL		
STAGE I (PART A)	LBS.	22,286
STAGE I (PART B)	LBS.	63,148
STAGE II	LBS.	65,013
STAGE III	LBS.	22,036
STAGE IV	LBS.	241,411
STAGE V	LBS.	5,638
TOTAL	LBS.	419,533
4" SLOPE PROTECTION	SQ. YDS.	150

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: Kristy W. Alford
F2458389308F40E...
3/29/2016

NORTH CAROLINA PROFESSIONAL SEAL 022506 ENGINEER JESSE McARTHUR BAILEY

DocuSigned by: J. M. Bailey
9026554D9528471...
3/29/2016

PROJECT NO. B-4490
CUMBERLAND COUNTY
STATION: 19+26.42 -L-

SHEET 1 OF 18 REPLACES BRIDGE NO. 258

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

LEVEL		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 RATING		HL-93 (INVENTORY)	N/A	⬡1	1.13	--	1.75	1.13	1	TOP SLAB	5.87	1.25	1	TOP SLAB	13.26	
		HL-93 (OPERATING)	N/A		1.47	--	1.35	1.47	1	TOP SLAB	5.87	1.63	1	TOP SLAB	13.26	
		HS-20 (INVENTORY)	36.000	⬡2	1.33	47.70	1.75	1.33	1	TOP SLAB	5.87	1.49	1	BOTTOM SLAB	13.67	
		HS-20 (OPERATING)	36.000		1.72	61.84	1.35	1.72	1	TOP SLAB	5.87	1.93	1	BOTTOM SLAB	13.67	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.42	32.61	1.40	2.42	1	TOP SLAB	6.23	4.37	1	TOP SLAB	13.26	
		SNGARBS2	20.000		2.26	45.26	1.40	2.26	1	TOP SLAB	5.87	3.35	1	BOTTOM SLAB	13.67	
		SNAGRIS2	22.000		2.42	53.15	1.40	2.42	1	TOP SLAB	6.23	3.04	1	BOTTOM SLAB	13.67	
		SNCOTTS3	27.250	⬡3	1.42	38.58	1.40	1.42	1	TOP SLAB	5.87	1.73	1	TOP SLAB	13.26	
		SNAGGRS4	34.925		1.59	55.41	1.40	1.59	1	TOP SLAB	6.23	1.87	1	TOP SLAB	13.26	
		SNS5A	35.550		1.54	54.63	1.40	1.54	1	TOP SLAB	6.23	1.81	1	TOP SLAB	13.26	
		SNS6A	39.950		1.53	61.31	1.40	1.53	1	TOP SLAB	6.23	1.68	1	BOTTOM SLAB	13.67	
		SNS7B	42.000		1.57	65.98	1.40	1.57	1	TOP SLAB	5.87	1.59	1	TOP SLAB	13.26	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.03	67.00	1.40	2.38	1	TOP SLAB	5.50	2.03	1	BOTTOM SLAB	13.67	
		TNT4A	33.075		1.68	55.70	1.40	1.68	1	TOP SLAB	5.87	2.02	1	BOTTOM SLAB	13.67	
		TNT6A	41.600		1.59	66.24	1.40	1.66	1	TOP SLAB	6.23	1.59	1	TOP SLAB	13.26	
		TNT7A	42.000		1.61	67.46	1.40	1.80	1	TOP SLAB	5.87	1.61	1	BOTTOM SLAB	13.67	
		TNT7B	42.000		1.57	65.89	1.40	1.57	1	TOP SLAB	6.23	1.60	1	BOTTOM SLAB	13.67	
		TNAGRIT4	43.000		1.56	66.98	1.40	1.61	1	TOP SLAB	5.87	1.56	1	BOTTOM SLAB	13.67	
		TNAGT5A	45.000		1.49	67.20	1.40	1.66	1	TOP SLAB	5.87	1.49	1	BOTTOM SLAB	13.67	
		TNAGT5B	45.000		1.49	67.20	1.40	1.66	2	TOP SLAB	1.10	1.49	1	BOTTOM SLAB	13.67	

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	--

NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

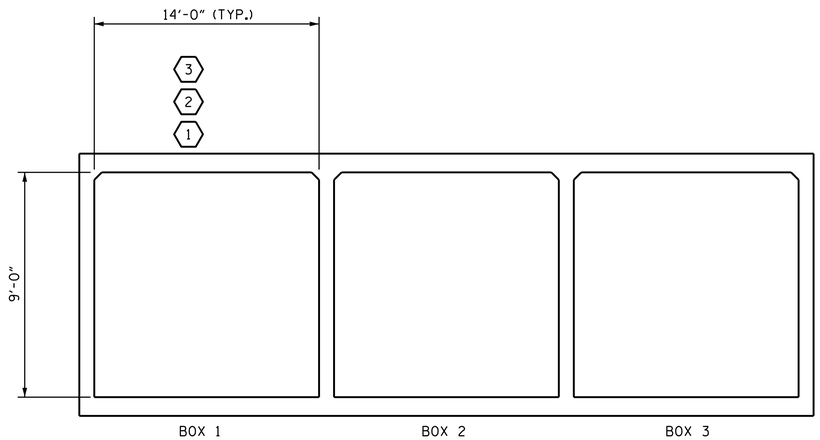
⬡# CONTROLLING LOAD RATING

⬡1 DESIGN LOAD RATING (HL-93)

⬡2 DESIGN LOAD RATING (HS-20)

⬡3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 2 OF 18

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KERSTY W. ALFORD

DocuSigned by: F24583B930BF40E...

3/29/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

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

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ASSEMBLED BY : T.L. AVERETTE DATE : 06-15
CHECKED BY : J.P. ADAMS DATE : 08-15

DRAWN BY : WMC 7/11
CHECKED BY : GM 7/11

REV. 10/1/11 MAA/GM

29-MAR-2016 09:20
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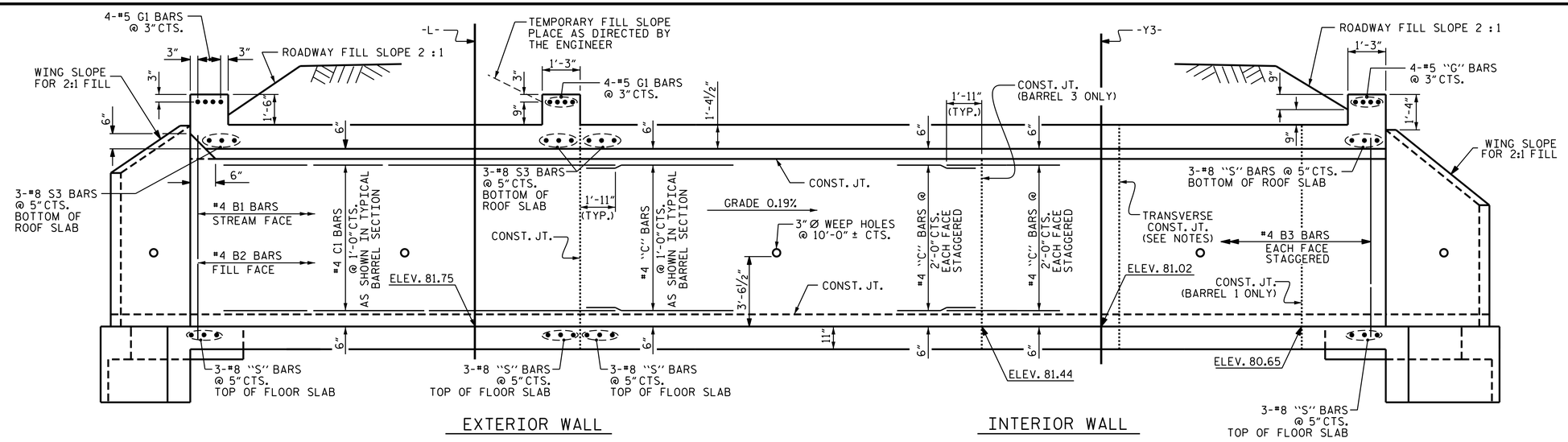
jpadams

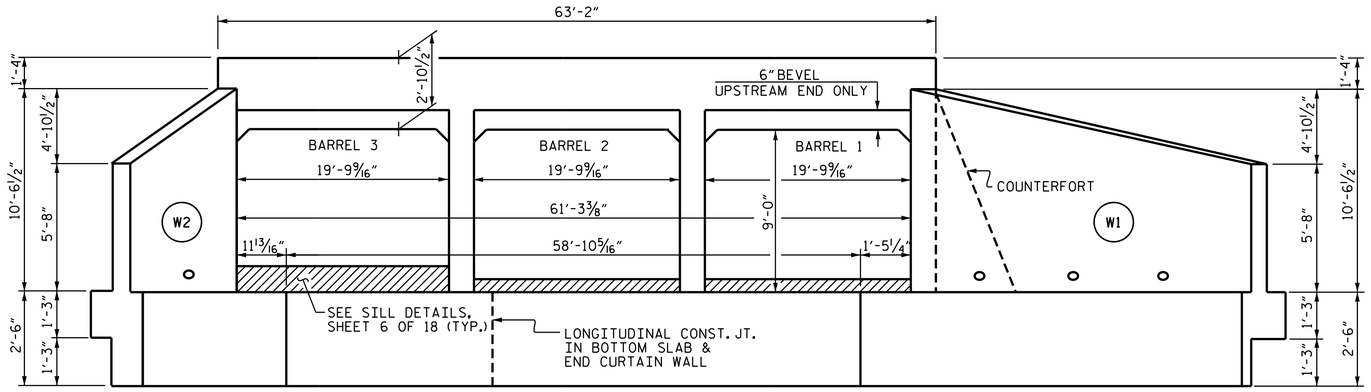
STD. NO. LRFR5



CULVERT SECTION NORMAL TO ROADWAY

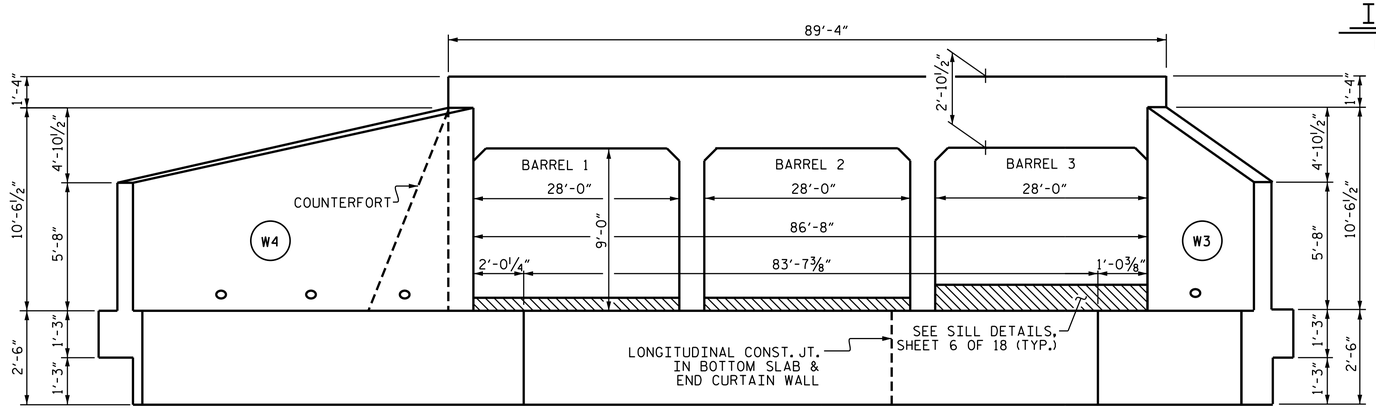
SEE SHEET 4 OF 18 FOR STAGING DETAILS
SILLS NOT SHOWN FOR CLARITY, SEE SHEET 6 OF 18
R.C. PIPES THROUGH SIDEWALLS OF CULVERT NOT SHOWN FOR CLARITY. SEE SHEETS 7, 9 AND 10 OF 18.

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



INLET END ELEVATION

NORMAL TO SKEW (LOOKING DOWNSTREAM)



OUTLET END ELEVATION

NORMAL TO SKEW (LOOKING UPSTREAM)

PROJECT NO. B-4490
CUMBERLAND COUNTY
STATION: 19+26.42 -L-

SHEET 3 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...
3/29/2016

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

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

29-MAR-2016 09:20
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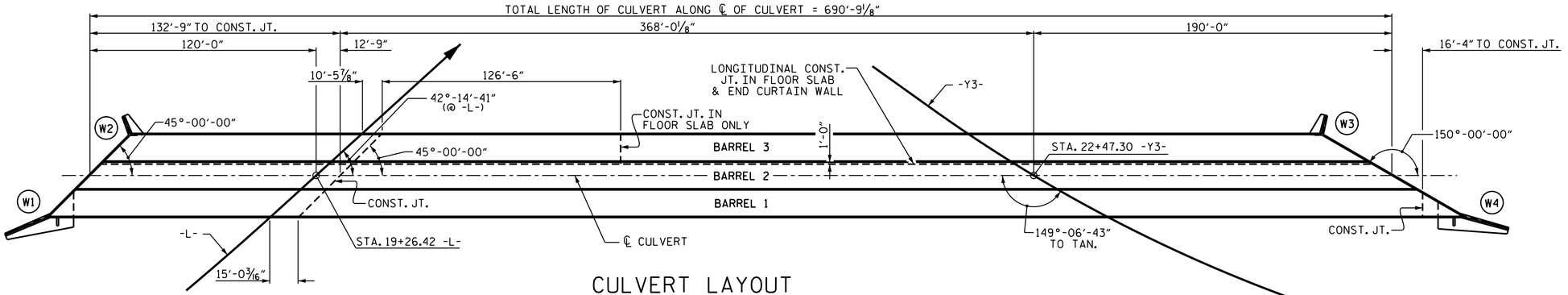
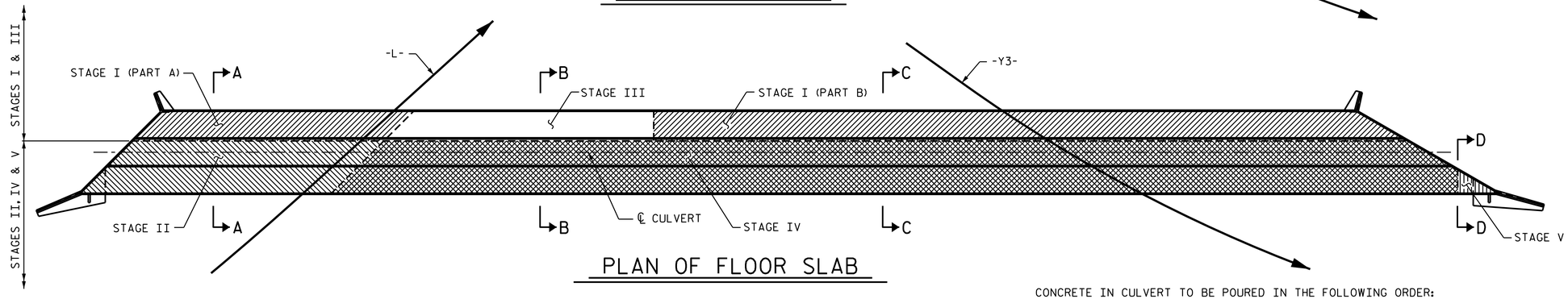


CULVERT LAYOUT



PLAN OF FLOOR SLAB

STAGE I

STAGE II

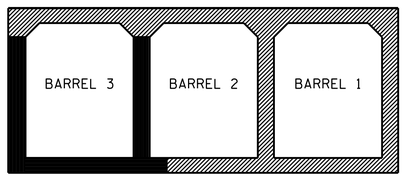
STAGE III

STAGE IV

STAGE V

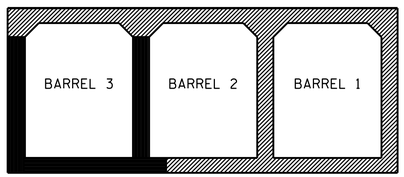
STAGE VI: INSTALL 1 FT SILLS IN BARRELS 1 & 2 AT THE INLET AND OUTLET.

STAGE VII: INSTALL 2 FT SILL IN BARREL 3 AT THE INLET AND OUTLET.



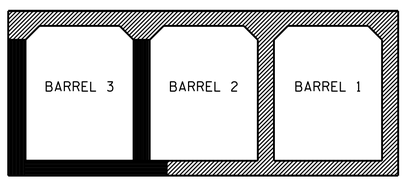
SECTION A-A

STAGE I (PART A)
STAGE II



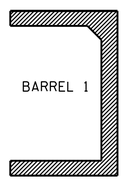
SECTION B-B

STAGE III
STAGE IV



SECTION C-C

STAGE I (PART B)
STAGE IV



SECTION D-D

STAGE V

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

1. STAGE I PART A
- INLET WING W2 FOOTING, BARREL 3 FLOOR SLAB, INCLUDING 4" OF BARREL 3 WALLS AND INLET WINGWALL W2
- REMAINING PORTIONS OF BARREL 3 WALLS AND INLET WING W2 FULL HEIGHT

2. STAGE I PART B
- OUTLET WING W3 FOOTING, BARREL 3 FLOOR SLAB, INCLUDING 4" OF BARREL 3 WALLS AND OUTLET WINGWALL W3
- REMAINING PORTIONS OF BARREL 3 WALLS AND OUTLET WING W3 FULL HEIGHT

3. STAGE II
- INLET WING W1 FOOTING, BARRELS 1 & 2 FLOOR SLAB, INCLUDING 4" OF INTERIOR AND EXTERIOR WALLS AND INLET WINGWALL W1
- REMAINING PORTIONS OF BARREL 1 & 2 WALLS AND INLET WING W1 FULL HEIGHT
- ROOF SLAB AND HEADWALLS FOR STAGE II & STAGE I PART A

4. STAGE III
- BARREL 3 FLOOR SLAB, INCLUDING 4" OF BARREL 3 WALLS
- REMAINING PORTIONS OF BARREL 3 WALLS

5. STAGE IV
- BARRELS 1 & 2 FLOOR SLAB, INCLUDING 4" OF INTERIOR AND EXTERIOR WALLS
- REMAINING PORTIONS OF BARREL 1 & 2 WALLS
- ROOF SLAB AND HEADWALL FOR STAGE IV & STAGE I PART B

6. STAGE V
- OUTLET WING W4 FOOTING, BARREL 1 FLOOR SLAB, INCLUDING 4" OF EXTERIOR WALL AND OUTLET WINGWALL W4
- REMAINING PORTIONS OF BARREL 1 WALL AND OUTLET WING W4 FULL HEIGHT
- ROOF SLAB AND HEADWALL FOR STAGE V

7. STAGE VI
- SILLS IN BARRELS 1 & 2, INLET AND OUTLET ENDS

8. STAGE VII
- SILLS IN BARREL 3, INLET AND OUTLET ENDS

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NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KEVIN W. ALFORD

DocuSigned by: F2458389308F40E...

3/29/2016

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 4 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STAGING DETAILS

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

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

29-MAR-2016 09:20
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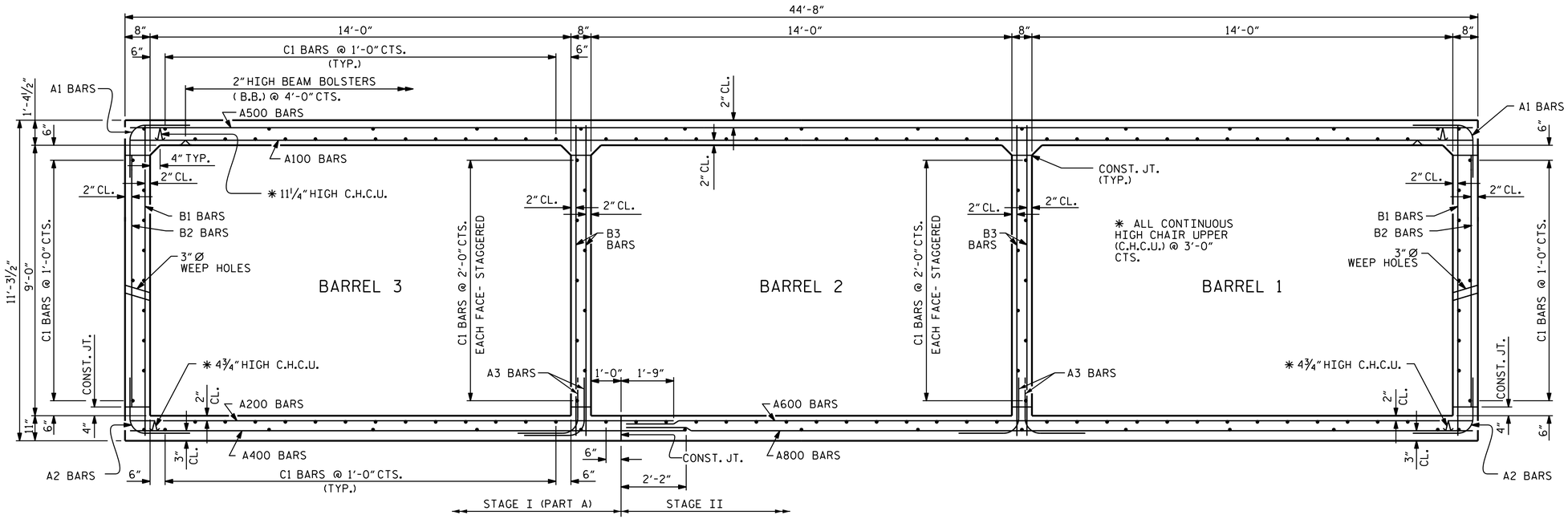
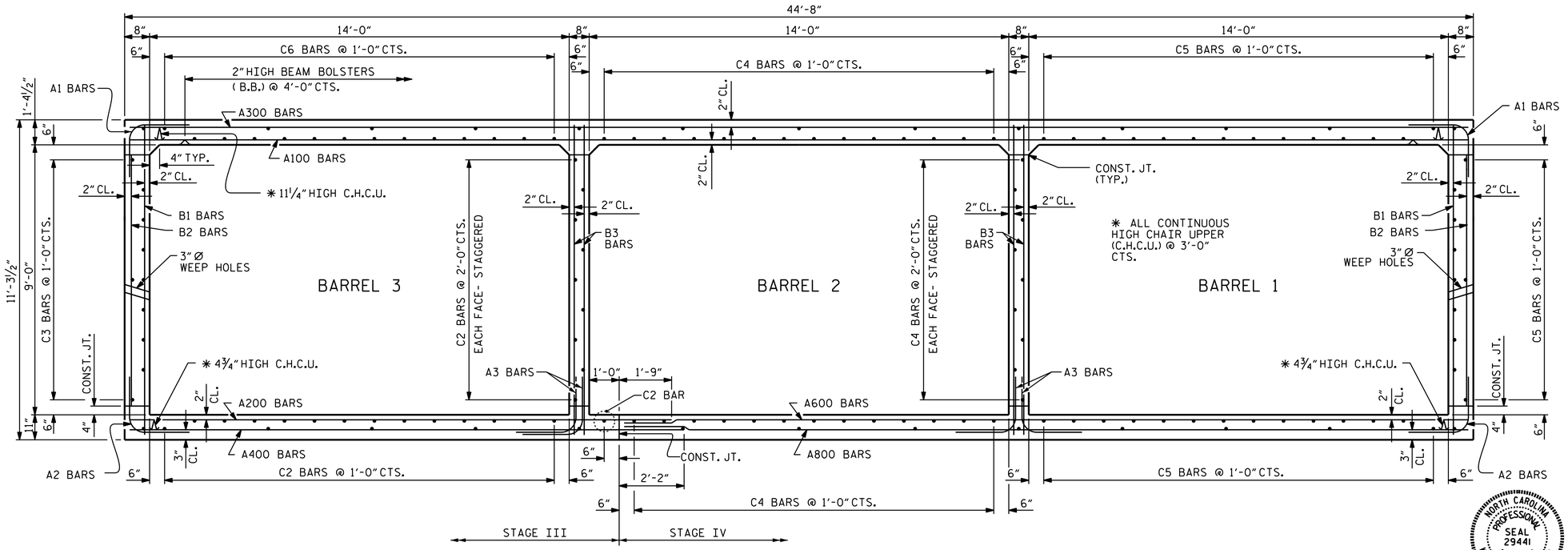


SECTION A-A

(LOOKING DOWNSTREAM)
THERE ARE 148 "C" BARS IN SECTION OF BARREL.



SECTION B-B

(LOOKING DOWNSTREAM)
THERE ARE 148 "C" BARS IN SECTION OF BARREL.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4490
CUMBERLAND COUNTY
STATION: 19+26.42 -L-

SHEET 5 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

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

SHEET NO. C-5
TOTAL SHEETS 18

DRAWN BY :	T.L. AVERETTE	DATE :	07-15
CHECKED BY :	J.P. ADAMS	DATE :	08-15
DESIGN ENGINEER OF RECORD:	T.L. AVERETTE	DATE :	09-15

29-MAR-2016 09:20
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jpadams

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD
3/29/2016
DocuSigned by:
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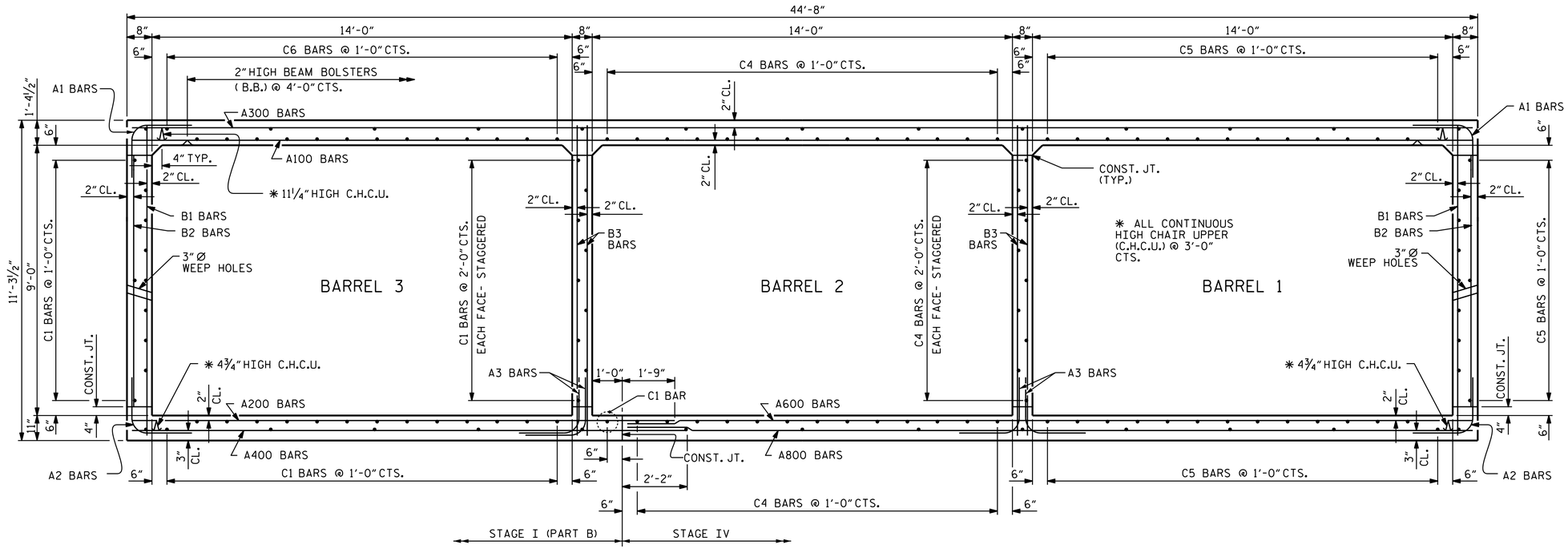
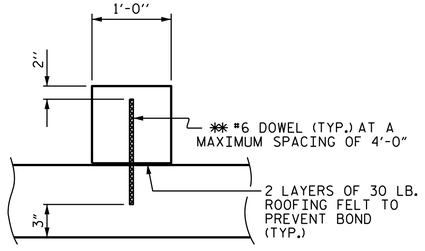
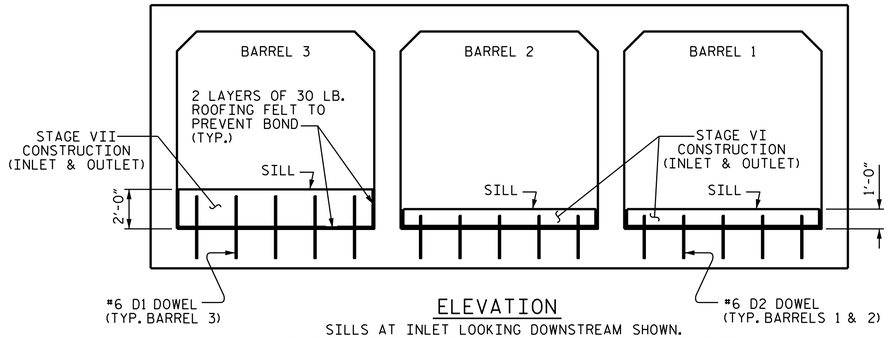


SECTION C-C

(LOOKING DOWNSTREAM)
THERE ARE 148 "C" BARS IN SECTION OF BARREL.



SECTION THROUGH SILL



ELEVATION

SILLS AT INLET LOOKING DOWNSTREAM SHOWN.
SILLS AT OUTLET SIMILAR EXCEPT NUMBER OF DOWELS REQUIRED.

SILL DETAILS

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

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALCORD

DocuSigned by: F24583B930BF40E...

3/29/2016

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PROJECT NO. B-4490
CUMBERLAND COUNTY
STATION: 19+26.42 -L-

SHEET 6 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			18

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

29-MAR-2016 09:20
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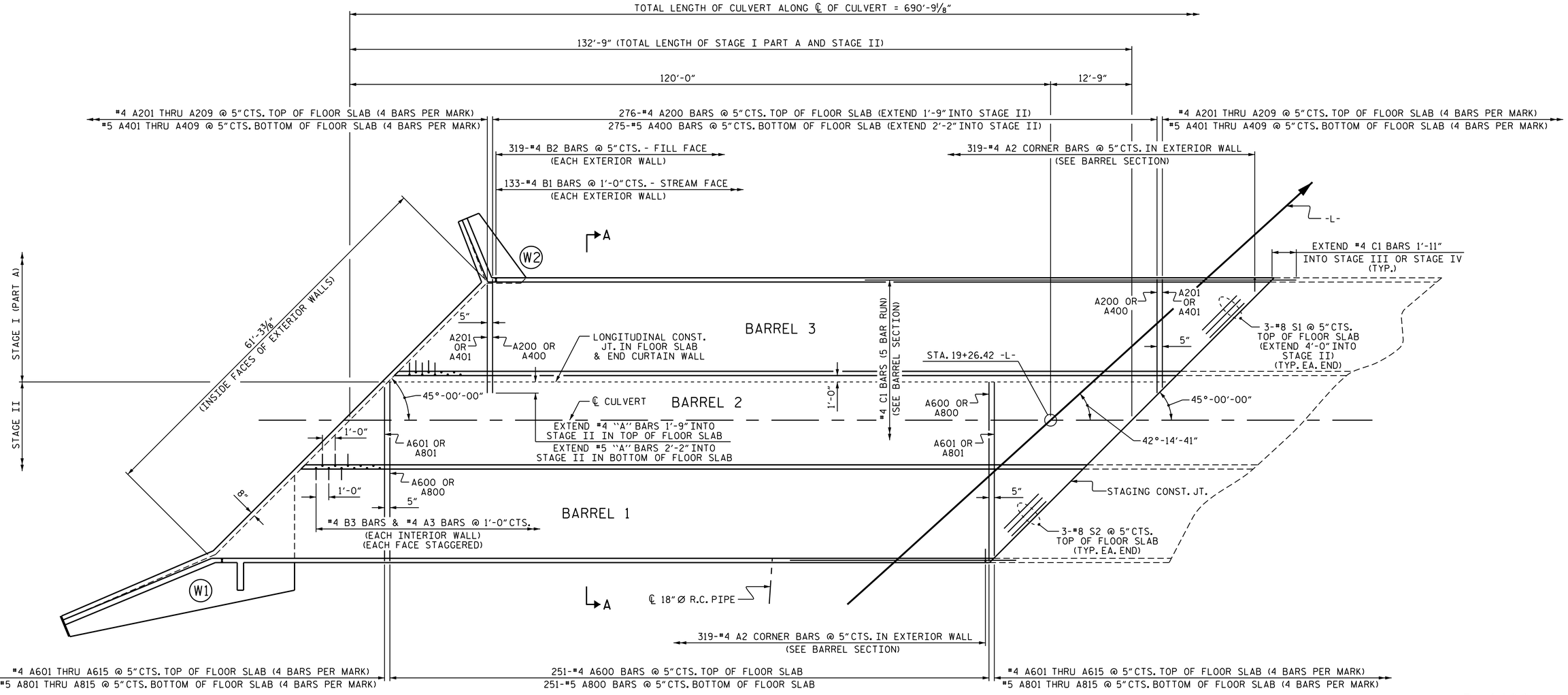
jpadams



PLAN OF FLOOR SLAB - STAGE I (PART A) & STAGE II

FOR PLAN OF FLOOR SLAB -STAGE I (PART B), SEE SHEET 9 OF 18.
SILLS FOR STAGES VI & VII NOT SHOWN FOR CLARITY. SEE "SILL DETAILS" ON SHEET 6 OF 18.
THE 18"Ø R.C. 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. SEE DETAILS ON SHEET 15 OF 18.

PROJECT NO. B-4490
CUMBERLAND COUNTY
STATION: 19+26.42 -L-

SHEET 7 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

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3/29/2016

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			18

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

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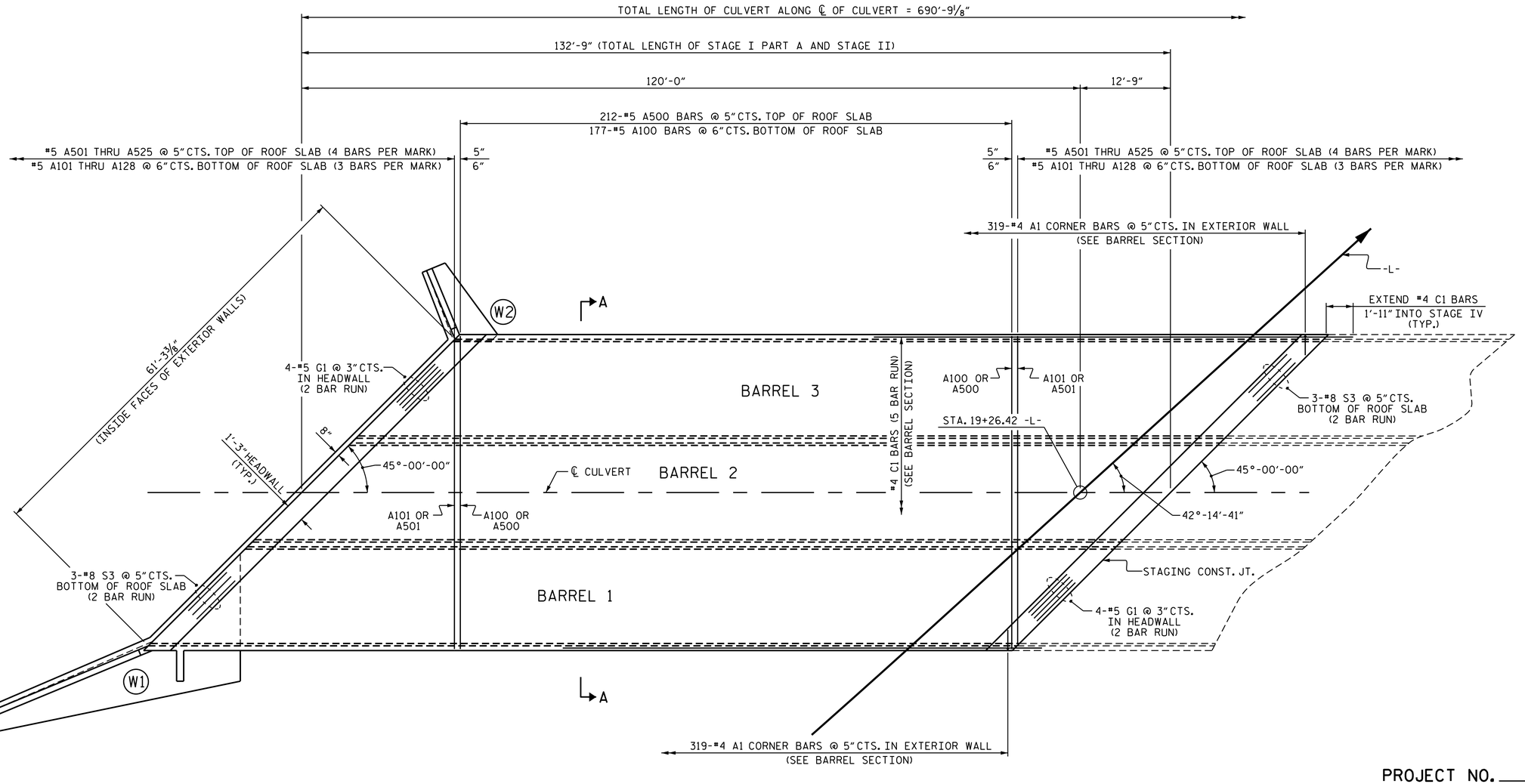

PLAN OF ROOF SLAB - STAGE II

THE 18" Ø R.C. PIPE THROUGH THE SIDEWALL OF THE CULVERT IS NOT SHOWN. SEE PLAN OF FLOOR SLAB SHEET 7 OF 18.

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 8 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER MATTHEW W. ALFORD

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3/29/2016

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			18

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

29-MAR-2016 09:21
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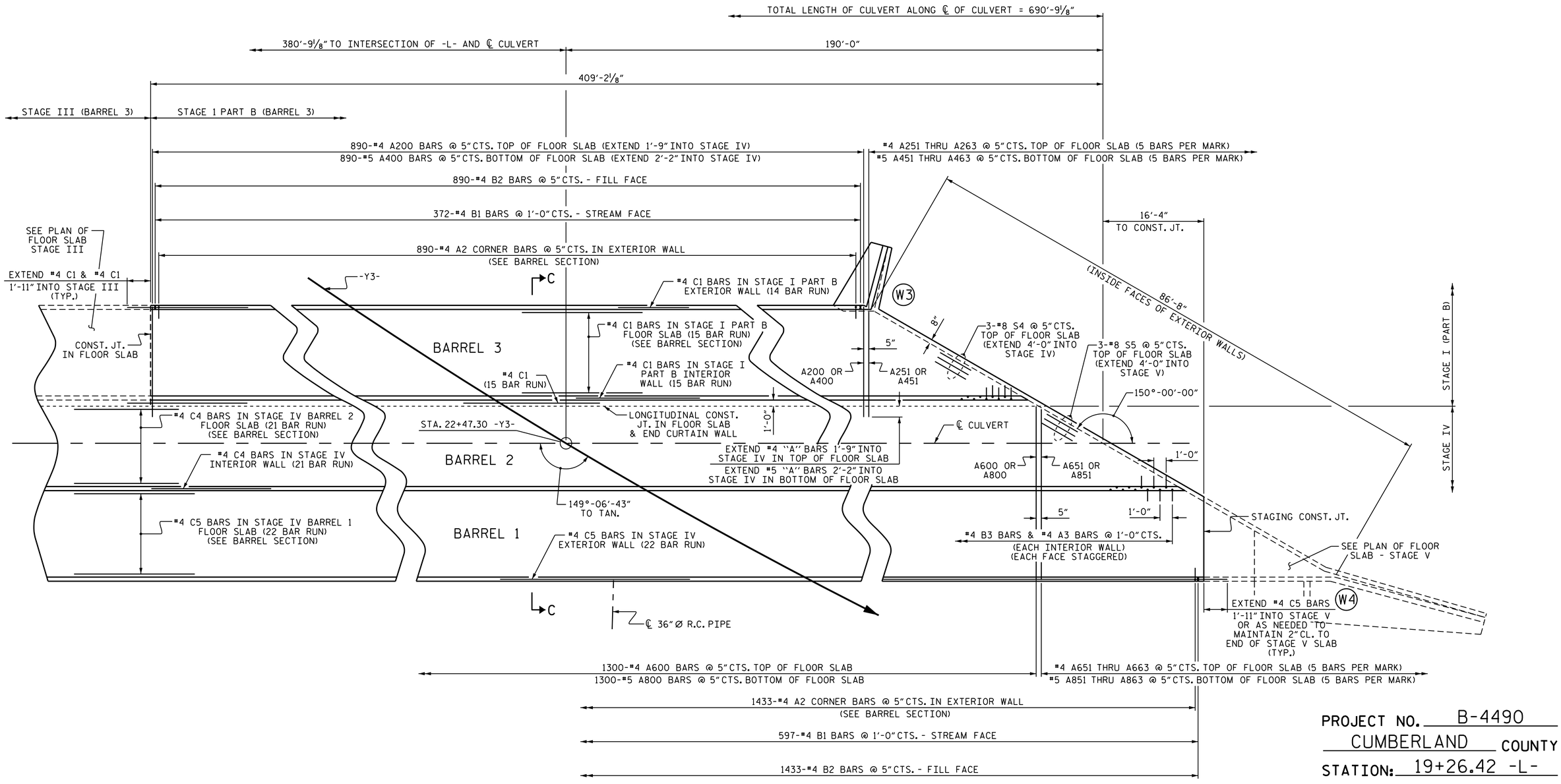

PLAN OF FLOOR SLAB - STAGE I (PART B) & PARTIAL PLAN OF FLOOR SLAB - STAGE IV

SILLS FOR STAGES VI & VII NOT SHOWN FOR CLARITY. SEE "SILL DETAILS" ON SHEET 6 OF 18.
THE 36" Ø R.C. 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. SEE DETAILS ON SHEET 15 OF 18.

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

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3/29/2016

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DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

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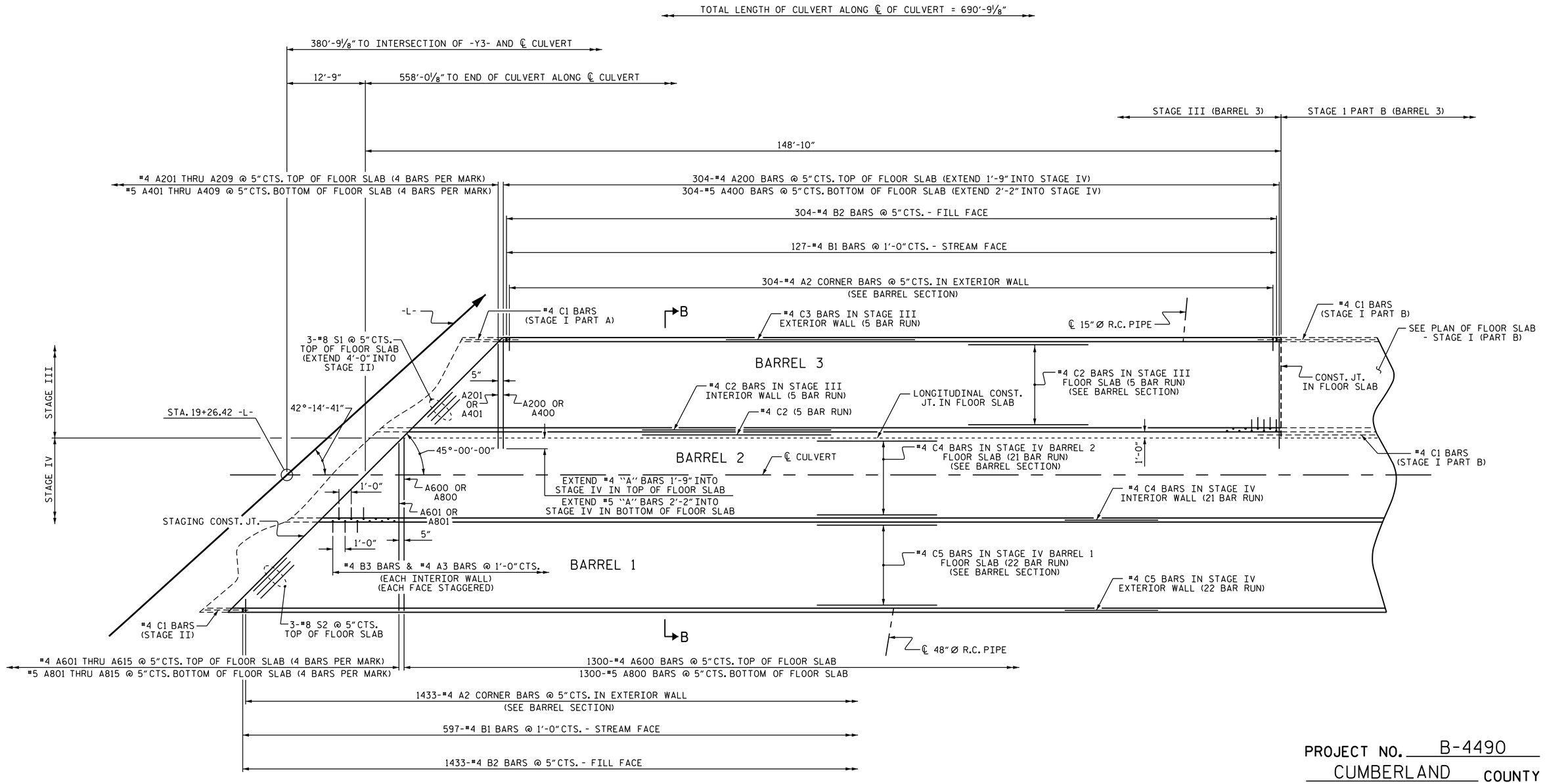
PROJECT NO. B-4490
CUMBERLAND COUNTY
STATION: 19+26.42 -L-

SHEET 9 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9
1			3			TOTAL SHEETS
2			4			18



PLAN OF FLOOR SLAB - STAGE III & PARTIAL PLAN OF FLOOR SLAB - STAGE IV

THE 48"Ø AND 15"Ø R.C. 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. SEE DETAILS ON SHEET 15 OF 18.

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 10 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

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3/29/2016

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10
1			3			TOTAL SHEETS
2			4			18

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

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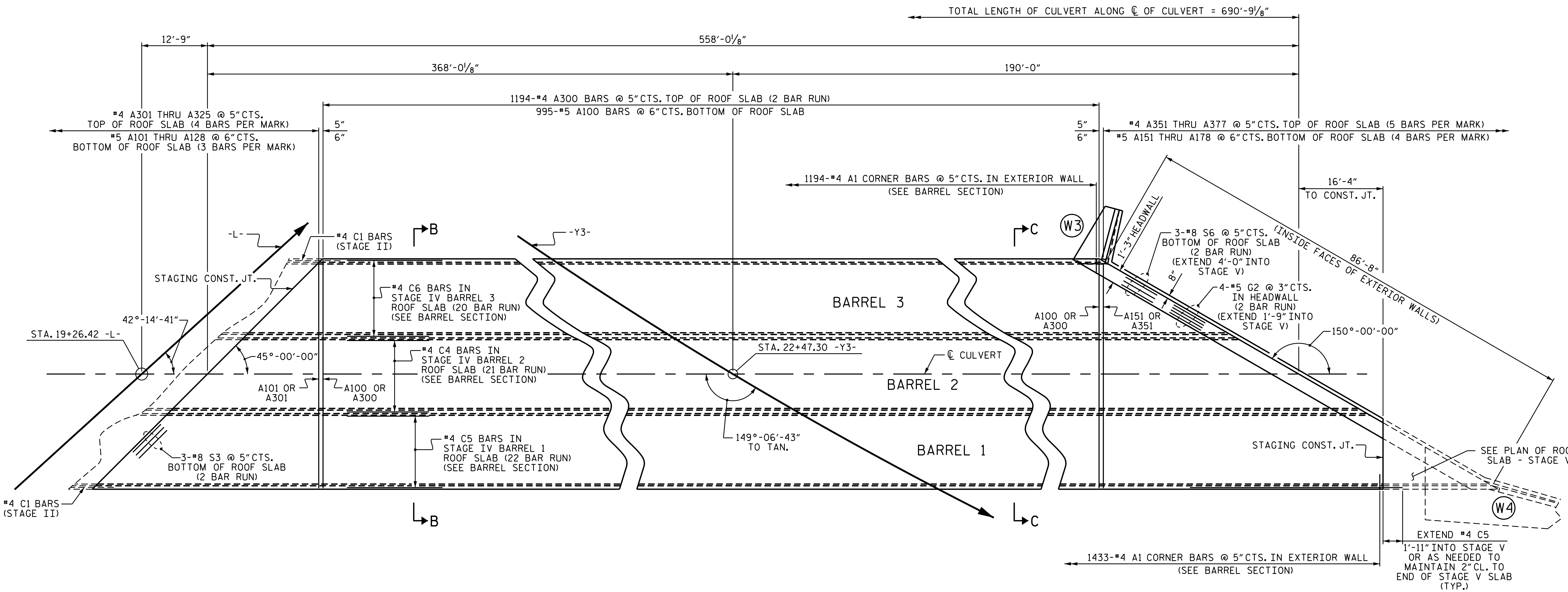

PLAN OF ROOF SLAB - STAGE IV

THE 48″, 36″ AND 15″Ø R.C. PIPES THROUGH THE SIDEWALLS OF THE CULVERT ARE NOT SHOWN. SEE PLAN OF FLOOR SLAB ON SHEETS 9 AND 10 OF 18.

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 11 OF 18

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

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3/29/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT.
CONCRETE BOX CULVERT

DRAWN BY :	T.L. AVERETTE	DATE :	06-15
CHECKED BY :	J.P. ADAMS	DATE :	08-15
DESIGN ENGINEER OF RECORD:	T.L. AVERETTE	DATE :	09-15

29-MAR-2016 09:21
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jpadams

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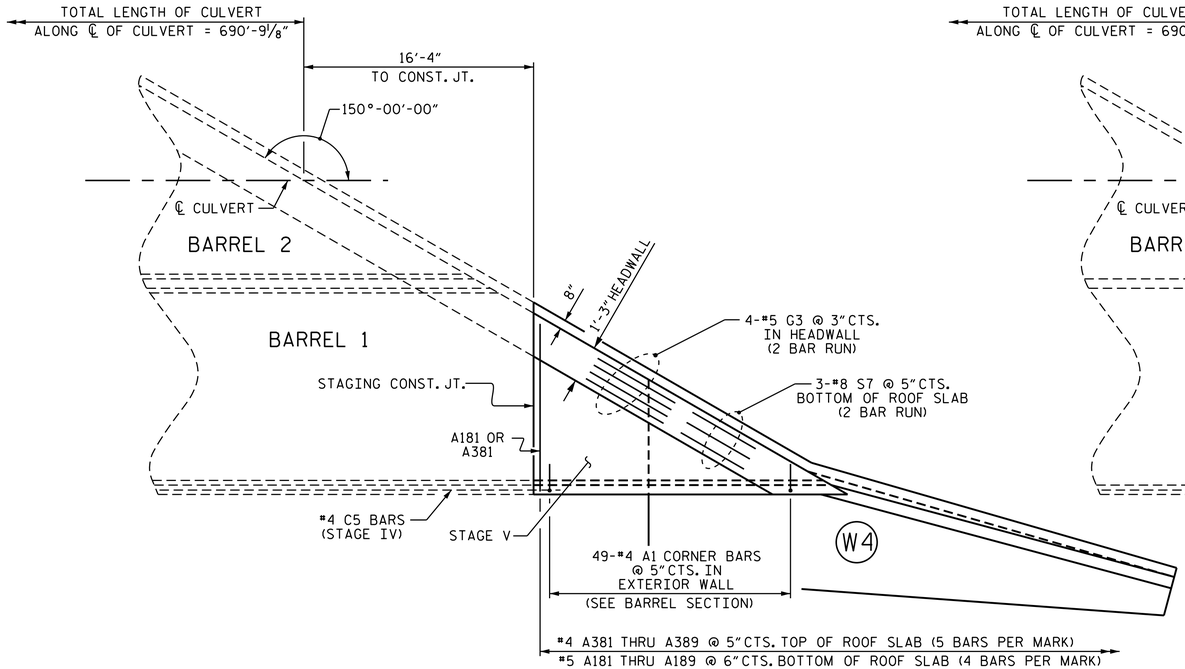
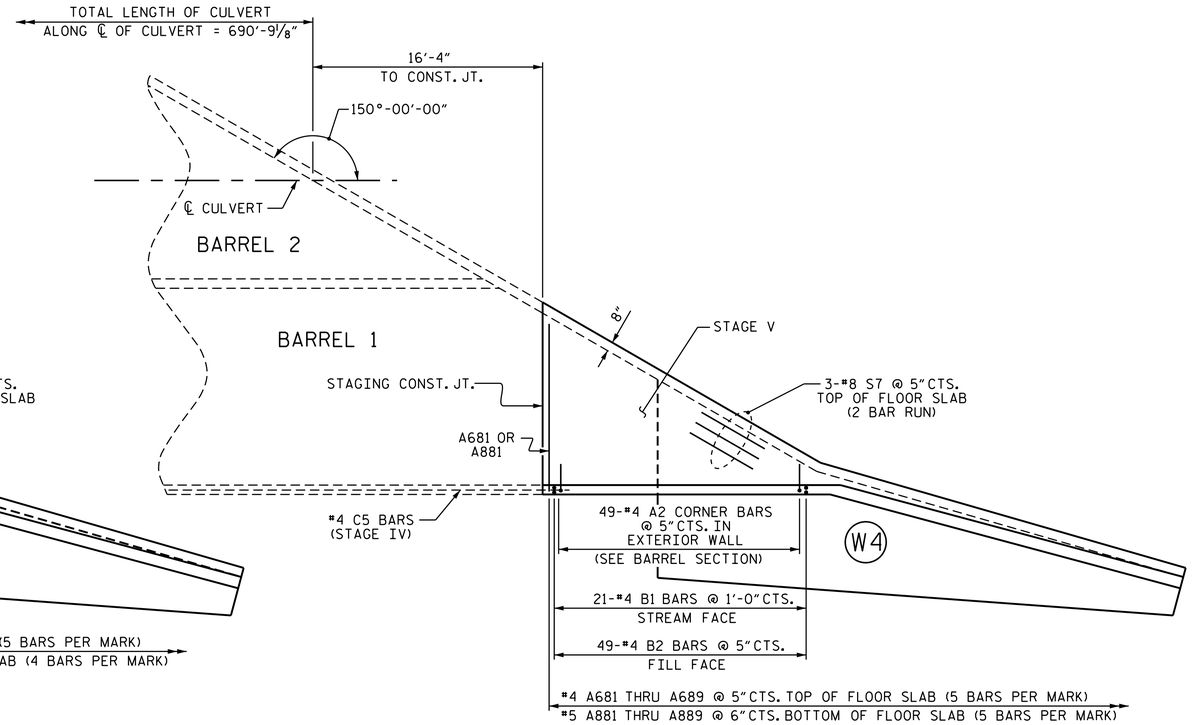
REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		C-11
1				3				TOTAL SHEETS
2				4				18



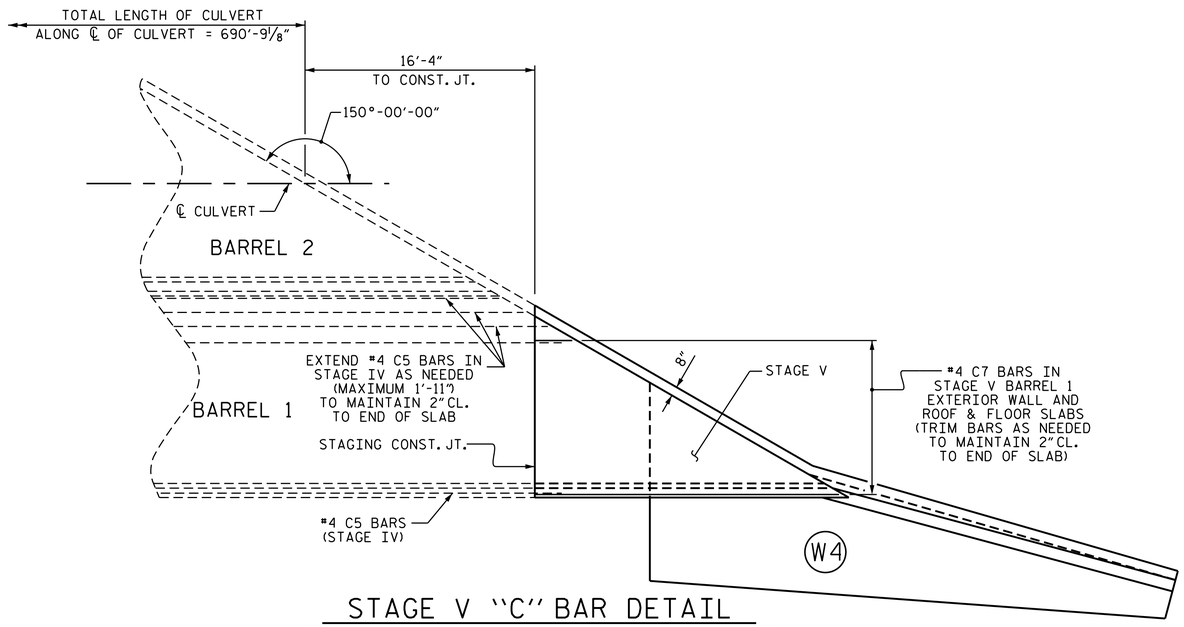
PLAN OF ROOF SLAB - STAGE V

FOR "C" BARS, SEE "STAGE V "C" BAR DETAIL"



PLAN OF FLOOR SLAB - STAGE V

FOR "C" BARS, SEE "STAGE V "C" BAR DETAIL"
SILLS FOR STAGES VI & VII NOT SHOWN FOR CLARITY. SEE "SILL DETAILS" ON SHEET 6 OF 18



STAGE V "C" BAR DETAIL

HEADWALL NOT SHOWN FOR CLARITY

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

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DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

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PROJECT NO. B-4490
CUMBERLAND COUNTY
STATION: 19+26.42 -L-

SHEET 12 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-12
1			3			TOTAL SHEETS
2			4			18

REINFORCING STEEL BAR SCHEDULE FOR BARREL (STAGE I PART A)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	319	#4	1	7'-2"	1527	C1	195	#4	STR	28'-6"	3712
A2	319	#4	1	4'-9"	1012						
A3	266	#4	1	4'-5"	785	D1	5	#6	STR	2'-6"	19
A200	276	#4	STR	17'-11"	3303	S1	6	#8	STR	26'-11"	431
A201	8	#4	STR	16'-2"	86						
A202	8	#4	STR	14'-6"	77						
A203	8	#4	STR	12'-10"	69						
A204	8	#4	STR	11'-2"	60						
A205	8	#4	STR	9'-6"	51						
A206	8	#4	STR	7'-10"	42						
A207	8	#4	STR	6'-2"	33						
A208	8	#4	STR	4'-6"	24						
A209	8	#4	STR	2'-10"	15						
A400	275	#5	STR	18'-4"	5258						
A401	8	#5	STR	16'-7"	138						
A402	8	#5	STR	14'-11"	124						
A403	8	#5	STR	13'-3"	111						
A404	8	#5	STR	11'-7"	97						
A405	8	#5	STR	9'-11"	83						
A406	8	#5	STR	8'-3"	69						
A407	8	#5	STR	6'-7"	55						
A408	8	#5	STR	4'-11"	41						
A409	8	#5	STR	3'-3"	27						
B1	133	#4	STR	10'-9"	955						
B2	319	#4	STR	8'-4"	1776						
B3	266	#4	STR	10'-9"	1910						
						REINFORCING STEEL				= 21,890 LBS.	

REINFORCING STEEL BAR SCHEDULE FOR BARREL (STAGE II)

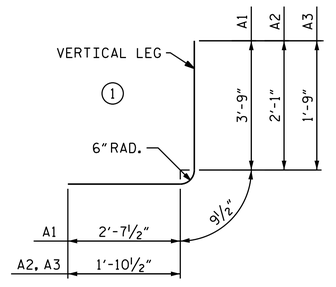
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	319	#4	1	7'-2"	1527	A126	6	#5	STR	5'-3"	33	A600	251	#4	STR	28'-1"	4709	A813	8	#5	STR	6'-5"	54
A2	319	#4	1	4'-9"	1012	A127	6	#5	STR	3'-9"	23	A601	8	#4	STR	26'-5"	141	A814	8	#5	STR	4'-9"	40
A3	266	#4	1	4'-5"	785	A128	6	#5	STR	2'-3"	14	A602	8	#4	STR	24'-9"	132	A815	8	#5	STR	3'-1"	26
												A603	8	#4	STR	23'-1"	123						
A100	177	#5	STR	44'-3"	8169	A500	212	#5	STR	44'-3"	9784	A604	8	#4	STR	21'-5"	114	B1	133	#4	STR	10'-9"	955
A101	6	#5	STR	42'-9"	268	A501	8	#5	STR	42'-7"	355	A605	8	#4	STR	19'-9"	106	B2	319	#4	STR	8'-4"	1776
A102	6	#5	STR	41'-3"	258	A502	8	#5	STR	40'-11"	341	A606	8	#4	STR	18'-1"	97	B3	266	#4	STR	10'-9"	1910
A103	6	#5	STR	39'-9"	249	A503	8	#5	STR	39'-3"	328	A607	8	#4	STR	16'-5"	88						
A104	6	#5	STR	38'-3"	239	A504	8	#5	STR	37'-7"	314	A608	8	#4	STR	14'-9"	79	C1	545	#4	STR	28'-6"	10376
A105	6	#5	STR	36'-9"	230	A505	8	#5	STR	35'-11"	300	A609	8	#4	STR	13'-1"	70						
A106	6	#5	STR	35'-3"	221	A506	8	#5	STR	34'-3"	286	A610	8	#4	STR	11'-5"	61	D2	10	#6	STR	1'-6"	23
A107	6	#5	STR	33'-9"	211	A507	8	#5	STR	32'-7"	272	A611	8	#4	STR	9'-9"	52						
A108	6	#5	STR	32'-3"	202	A508	8	#5	STR	30'-11"	258	A612	8	#4	STR	8'-1"	43	E3	16	#5	STR	4'-0"	67
A109	6	#5	STR	30'-9"	192	A509	8	#5	STR	29'-3"	244	A613	8	#4	STR	6'-5"	34						
A110	6	#5	STR	29'-3"	183	A510	8	#5	STR	27'-7"	230	A614	8	#4	STR	4'-9"	25	G1	16	#5	STR	32'-3"	538
A111	6	#5	STR	27'-9"	174	A511	8	#5	STR	25'-11"	216	A615	8	#4	STR	3'-1"	16						
A112	6	#5	STR	26'-3"	164	A512	8	#5	STR	24'-3"	202							S2	6	#8	STR	39'-10"	638
A113	6	#5	STR	24'-9"	155	A513	8	#5	STR	22'-7"	188	A800	251	#5	STR	28'-1"	7352	S3	12	#8	STR	33'-5"	1071
A114	6	#5	STR	23'-3"	145	A514	8	#5	STR	20'-11"	175	A801	8	#5	STR	26'-5"	220						
A115	6	#5	STR	21'-9"	136	A515	8	#5	STR	19'-3"	161	A802	8	#5	STR	24'-9"	207						
A116	6	#5	STR	20'-3"	127	A516	8	#5	STR	17'-7"	147	A803	8	#5	STR	23'-1"	193						
A117	6	#5	STR	18'-9"	117	A517	8	#5	STR	15'-11"	133	A804	8	#5	STR	21'-5"	179						
A118	6	#5	STR	17'-3"	108	A518	8	#5	STR	14'-3"	119	A805	8	#5	STR	19'-9"	165						
A119	6	#5	STR	15'-9"	99	A519	8	#5	STR	12'-7"	105	A806	8	#5	STR	18'-1"	151						
A120	6	#5	STR	14'-3"	89	A520	8	#5	STR	10'-11"	91	A807	8	#5	STR	16'-5"	137						
A121	6	#5	STR	12'-9"	80	A521	8	#5	STR	9'-3"	77	A808	8	#5	STR	14'-9"	123						
A122	6	#5	STR	11'-3"	70	A522	8	#5	STR	7'-7"	63	A809	8	#5	STR	13'-1"	109						
A123	6	#5	STR	9'-9"	61	A523	8	#5	STR	5'-11"	49	A810	8	#5	STR	11'-5"	95						
A124	6	#5	STR	8'-3"	52	A524	8	#5	STR	4'-3"	35	A811	8	#5	STR	9'-9"	81						
A125	6	#5	STR	6'-9"	42	A525	8	#5	STR	2'-7"	22	A812	8	#5	STR	8'-1"	67	REINFORCING STEEL				= 62,373 LBS.	

REINFORCING STEEL BAR SCHEDULE FOR BARREL (STAGE I PART B)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	890	#4	1	7'-2"	4261	A461	5	#5	STR	5'-1"	27
A2	890	#4	1	4'-9"	2824	A462	5	#5	STR	3'-10"	20
A3	792	#4	1	4'-5"	2337	A463	5	#5	STR	2'-8"	14
A200	890	#4	STR	17'-11"	10652	B1	372	#4	STR	10'-9"	2671
A251	5	#4	STR	16'-8"	56	B2	890	#4	STR	8'-4"	4954
A252	5	#4	STR	15'-6"	52	B3	792	#4	STR	10'-9"	5687
A253	5	#4	STR	14'-3"	48						
A254	5	#4	STR	13'-1"	44	C1	575	#4	STR	28'-6"	10947
A255	5	#4	STR	11'-11"	40						
A256	5	#4	STR	10'-8"	36	D1	7	#6	STR	2'-6"	26
A257	5	#4	STR	9'-6"	32						
A258	5	#4	STR	8'-3"	28	S4	3	#8	STR	36'-4"	291
A259	5	#4	STR	7'-1"	24						
A260	5	#4	STR	5'-10"	19						
A261	5	#4	STR	4'-8"	16						
A262	5	#4	STR	3'-5"	11						
A263	5	#4	STR	2'-3"	8						
A400	890	#5	STR	18'-4"	17018						
A451	5	#5	STR	17'-1"	89						
A452	5	#5	STR	15'-11"	83						
A453	5	#5	STR	14'-8"	76						
A454	5	#5	STR	13'-6"	70						
A455	5	#5	STR	12'-4"	64						
A456	5	#5	STR	11'-1"	58						
A457	5	#5	STR	9'-11"	52						
A458	5	#5	STR	8'-8"	45						
A459	5	#5	STR	7'-6"	39						
A460	5	#5	STR	6'-3"	33	REINFORCING STEEL				= 62,752 LBS.	

REINFORCING STEEL BAR SCHEDULE FOR BARREL (STAGE III)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	304	#4	1	7'-2"	1455	C2	145	#4	STR	30'-0"	2906
A2	304	#4	1	4'-9"	965	C3	50	#4	STR	27'-0"	902
A3	284	#4	1	4'-5"	838						
						E4	16	#5	STR	3'-8"	61
A200	304	#4	STR	17'-11"	3638						
A201	4	#4	STR	16'-2"	43	S1	3	#8	STR	26'-11"	216
A202	4	#4	STR	14'-6"	39						
A203	4	#4	STR	12'-10"	34						
A204	4	#4	STR	11'-2"	30						
A205	4	#4	STR	9'-6"	25						
A206	4	#4	STR	7'-10"	21						
A207	4	#4	STR	6'-2"	16						
A208	4	#4	STR	4'-6"	12						
A209	4	#4	STR	2'-10"	8						
A400	304	#5	STR	18'-4"	5813						
A401	4	#5	STR	16'-7"	69						
A402	4	#5	STR	14'-11"	62						
A403	4	#5	STR	13'-3"	55						
A404	4	#5	STR	11'-7"	48						
A405	4	#5	STR	9'-11"	41						
A406	4	#5	STR	8'-3"	34						
A407	4	#5	STR	6'-7"	27						
A408	4	#5	STR	4'-11"	21						
A409	4	#5	STR	3'-3"	14						
B1	127	#4	STR	10'-9"	912						
B2	304	#4	STR	8'-4"	1692						
B3	284	#4	STR	10'-9"	2039						
						REINFORCING STEEL				= 22,036 LBS.	



SPLICE LENGTHS CHART

BAR	SIZE	SPLICE LENGTH
A200, A600	4	1'-9''
A300	4	2'-5''
A400, A800	5	2'-2''
B1	4	1'-5''
B3	4	1'-5''
''C''	4	1'-11''
''S''	8	4'-0''
''G''	5	1'-9''

BAR TYPE

BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 13 OF 18

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by: F2458389308F40E...

3/29/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-13
1			3			TOTAL SHEETS
2			4			18

29-MAR-2016 09:21
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jpadams

REINFORCING STEEL BAR SCHEDULE FOR BARREL (STAGE IV)

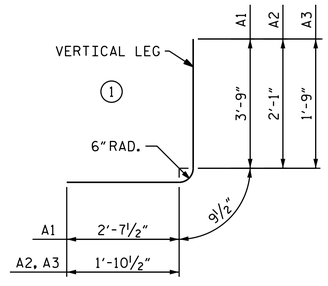
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	1433	#4	1	7'-2"	6860	A176	4	#5	STR	14'-3"	59	A600	1300	#4	STR	28'-1"	24388	A863	5	#5	STR	12'-6"	65
A2	1433	#4	1	4'-9"	4547	A177	4	#5	STR	13'-1"	55	A601	4	#4	STR	26'-5"	71						
A3	1158	#4	1	4'-5"	3416	A178	4	#5	STR	11'-11"	50	A602	4	#4	STR	24'-9"	66	B1	597	#4	STR	10'-9"	4287
												A603	4	#4	STR	23'-1"	62	B2	1433	#4	STR	8'-4"	7977
A100	995	#5	STR	44'-3"	45922	A300	2388	#4	STR	23'-4"	37221	A604	4	#4	STR	21'-5"	57	B3	1158	#4	STR	10'-9"	8316
A101	3	#5	STR	42'-9"	134	A301	8	#4	STR	22'-6"	120	A605	4	#4	STR	19'-9"	53						
A102	3	#5	STR	41'-3"	129	A302	8	#4	STR	21'-8"	116	A606	4	#4	STR	18'-1"	48	C4	924	#4	STR	29'-5"	18157
A103	3	#5	STR	39'-9"	124	A303	8	#4	STR	20'-10"	111	A607	4	#4	STR	16'-5"	44	C5	1012	#4	STR	29'-1"	19661
A104	3	#5	STR	38'-3"	120	A304	8	#4	STR	20'-0"	107	A608	4	#4	STR	14'-9"	39	C6	380	#4	STR	28'-9"	7298
A105	3	#5	STR	36'-9"	115	A305	8	#4	STR	19'-2"	102	A609	4	#4	STR	13'-1"	35						
A106	3	#5	STR	35'-3"	110	A306	8	#4	STR	18'-4"	98	A610	4	#4	STR	11'-5"	31	D2	8	#6	STR	1'-6"	18
A107	3	#5	STR	33'-9"	106	A307	8	#4	STR	17'-6"	94	A611	4	#4	STR	9'-9"	26						
A108	3	#5	STR	32'-3"	101	A308	8	#4	STR	16'-8"	89	A612	4	#4	STR	8'-1"	22	E1	16	#5	STR	6'-11"	115
A109	3	#5	STR	30'-9"	96	A309	4	#4	STR	29'-3"	78	A613	4	#4	STR	6'-5"	17	E2	16	#5	STR	5'-9"	96
A110	3	#5	STR	29'-3"	92	A310	4	#4	STR	27'-7"	74	A614	4	#4	STR	4'-9"	13						
A111	3	#5	STR	27'-9"	87	A311	4	#4	STR	25'-11"	69	A615	4	#4	STR	3'-1"	8	G2	8	#5	STR	34'-7"	289
A112	3	#5	STR	26'-3"	82	A312	4	#4	STR	24'-3"	65	A651	5	#4	STR	26'-11"	90						
A113	3	#5	STR	24'-9"	77	A313	4	#4	STR	22'-7"	60	A652	5	#4	STR	25'-9"	86	S2	3	#8	STR	39'-10"	319
A114	3	#5	STR	23'-3"	73	A314	4	#4	STR	20'-11"	56	A653	5	#4	STR	24'-6"	82	S3	6	#8	STR	33'-5"	535
A115	3	#5	STR	21'-9"	68	A315	4	#4	STR	19'-3"	51	A654	5	#4	STR	23'-4"	78	S5	3	#8	STR	37'-5"	300
A116	3	#5	STR	20'-3"	63	A316	4	#4	STR	17'-7"	47	A655	5	#4	STR	22'-2"	74	S6	6	#8	STR	36'-11"	591
A117	3	#5	STR	18'-9"	59	A317	4	#4	STR	15'-11"	43	A656	5	#4	STR	20'-11"	70						
A118	3	#5	STR	17'-3"	54	A318	4	#4	STR	14'-3"	38	A657	5	#4	STR	19'-9"	66						
A119	3	#5	STR	15'-9"	49	A319	4	#4	STR	12'-7"	34	A658	5	#4	STR	18'-6"	62						
A120	3	#5	STR	14'-3"	45	A320	4	#4	STR	10'-11"	29	A659	5	#4	STR	17'-4"	58						
A121	3	#5	STR	12'-9"	40	A321	4	#4	STR	9'-3"	25	A660	5	#4	STR	16'-1"	54						
A122	3	#5	STR	11'-3"	35	A322	4	#4	STR	7'-7"	20	A661	5	#4	STR	14'-11"	50						
A123	3	#5	STR	9'-9"	31	A323	4	#4	STR	5'-11"	16	A662	5	#4	STR	13'-8"	46						
A124	3	#5	STR	8'-3"	26	A324	4	#4	STR	4'-3"	11	A663	5	#4	STR	12'-6"	42						
A125	3	#5	STR	6'-9"	21	A325	4	#4	STR	2'-7"	7												
A126	3	#5	STR	5'-3"	16	A351	10	#4	STR	22'-9"	152	A800	1300	#5	STR	28'-1"	38078						
A127	3	#5	STR	3'-9"	12	A352	10	#4	STR	22'-2"	148	A801	4	#5	STR	26'-5"	110						
A128	3	#5	STR	2'-3"	7	A353	10	#4	STR	21'-7"	144	A802	4	#5	STR	24'-9"	103						
A151	4	#5	STR	43'-1"	180	A354	10	#4	STR	21'-0"	140	A803	4	#5	STR	23'-1"	96						
A152	4	#5	STR	41'-11"	175	A355	10	#4	STR	20'-4"	136	A804	4	#5	STR	21'-5"	89						
A153	4	#5	STR	40'-10"	170	A356	10	#4	STR	19'-9"	132	A805	4	#5	STR	19'-9"	82						
A154	4	#5	STR	39'-8"	165	A357	10	#4	STR	19'-2"	128	A806	4	#5	STR	18'-1"	75						
A155	4	#5	STR	38'-6"	161	A358	10	#4	STR	18'-7"	124	A807	4	#5	STR	16'-5"	68						
A156	4	#5	STR	37'-4"	156	A359	10	#4	STR	18'-0"	120	A808	4	#5	STR	14'-9"	62						
A157	4	#5	STR	36'-2"	151	A360	10	#4	STR	17'-4"	116	A809	4	#5	STR	13'-1"	55						
A158	4	#5	STR	35'-0"	146	A361	10	#4	STR	16'-9"	112	A810	4	#5	STR	11'-5"	48						
A159	4	#5	STR	33'-10"	141	A362	5	#4	STR	29'-10"	100	A811	4	#5	STR	9'-9"	41						
A160	4	#5	STR	32'-9"	137	A363	5	#4	STR	28'-8"	96	A812	4	#5	STR	8'-1"	34						
A161	4	#5	STR	31'-7"	132	A364	5	#4	STR	27'-5"	92	A813	4	#5	STR	6'-5"	27						
A162	4	#5	STR	30'-5"	127	A365	5	#4	STR	26'-3"	88	A814	4	#5	STR	4'-9"	20						
A163	4	#5	STR	29'-3"	122	A366	5	#4	STR	25'-0"	84	A815	4	#5	STR	3'-1"	13						
A164	4	#5	STR	28'-1"	117	A367	5	#4	STR	23'-10"	80	A851	5	#5	STR	26'-11"	140						
A165	4	#5	STR	26'-11"	112	A368	5	#4	STR	22'-7"	75	A852	5	#5	STR	25'-9"	134						
A166	4	#5	STR	25'-9"	107	A369	5	#4	STR	21'-5"	72	A853	5	#5	STR	24'-6"	128						
A167	4	#5	STR	24'-8"	103	A370	5	#4	STR	20'-3"	68	A854	5	#5	STR	23'-4"	122						
A168	4	#5	STR	23'-6"	98	A371	5	#4	STR	19'-0"	63	A855	5	#5	STR	22'-2"	116						
A169	4	#5	STR	22'-4"	93	A372	5	#4	STR	17'-10"	60	A856	5	#5	STR	20'-11"	109						
A170	4	#5	STR	21'-2"	88	A373	5	#4	STR	16'-7"	55	A857	5	#5	STR	19'-9"	103						
A171	4	#5	STR	20'-0"	83	A374	5	#4	STR	15'-5"	51	A858	5	#5	STR	18'-6"	96						
A172	4	#5	STR	18'-10"	79	A375	5	#4	STR	14'-2"	47	A859	5	#5	STR	17'-4"	90						
A173	4	#5	STR	17'-8"	74	A376	5	#4	STR	13'-0"	43	A860	5	#5	STR	16'-1"	84						
A174	4	#5	STR	16'-7"	69	A377	5	#4	STR	11'-9"	39	A861	5	#5	STR	14'-11"	78						
A175	4	#5	STR	15'-5"	64							A862	5	#5	STR	13'-8"	71	REINFORCING STEEL = 241,411 LBS.					

REINFORCING STEEL BAR SCHEDULE FOR BARREL (STAGE V)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	49	#4	1	7'-2"	235	A688	5	#4	STR	2'-11"	10
A2	49	#4	1	4'-9"	155	A689	5	#4	STR	2'-0"	7
A181	4	#5	STR	11'-5"	48	A881	5	#5	STR	11'-4"	59
A182	4	#5	STR	10'-3"	43	A882	5	#5	STR	10'-1"	53
A183	4	#5	STR	9'-1"	38	A883	5	#5	STR	8'-11"	47
A184	4	#5	STR	8'-0"	33	A884	5	#5	STR	7'-9"	40
A185	4	#5	STR	6'-10"	29	A885	5	#5	STR	6'-6"	34
A186	4	#5	STR	5'-8"	24	A886	5	#5	STR	5'-4"	28
A187	4	#5	STR	4'-6"	19	A887	5	#5	STR	4'-1"	21
A188	4	#5	STR	3'-4"	14	A888	5	#5	STR	2'-11"	15
A189	4	#5	STR	2'-2"	9	A889	5	#5	STR	2'-0"	10
A381	5	#4	STR	11'-4"	38	B1	21	#4	STR	10'-9"	151
A382	5	#4	STR	10'-1"	34	B2	49	#4	STR	8'-4"	273
A383	5	#4	STR	8'-11"	30						
A384	5	#4	STR	7'-9"	26	C7	40	#4	STR	21'-7"	577
A385	5	#4	STR	6'-6"	22						
A386	5	#4	STR	5'-4"	18	D2	6	#6	STR	1'-6"	14
A387	5	#4	STR	4'-1"	14						
A388	5	#4	STR	2'-11"	10	G3	8	#5	STR	13'-4"	111
A389	5	#4	STR	2'-0"	7						
						S7	12	#8	STR	14'-6"	465
A681	5	#4	STR	11'-4"	38						
A682	5	#4	STR	10'-1"	34						
A683	5	#4	STR	8'-11"	30						
A684	5	#4	STR	7'-9"	26						
A685	5	#4	STR	6'-6"	22						
A686	5	#4	STR	5'-4"	18						
A687	5	#4	STR	4'-1"	14	REINFORCING STEEL = 2,943					

SPLICE LENGTHS CHART

BAR	SIZE	SPLICE LENGTH
A200, A600	4	1'-9''
A300	4	2'-5''
A400, A800	5	2'-2''
B1	4	1'-5''
B3	4	1'-5''
''C''	4	1'-11''
''S''	8	4'-0''
''G''	5	1'-9''



BAR TYPE

BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 14 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

DRAWN BY : T.L. AVERETTE DATE : 07-15
CHECKED BY : J.P. ADAMS DATE : 08-15
DESIGN ENGINEER OF RECORD: T.L. AVERETTE DATE : 09-15

29-MAR-2016 09:21
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NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

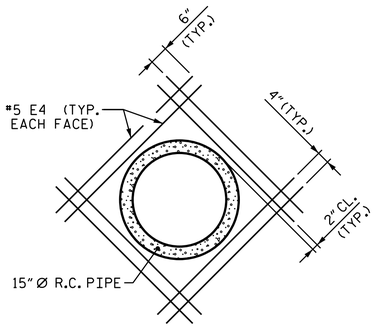
DocuSigned by:
F2458389300BFADE...
3/29/2016

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

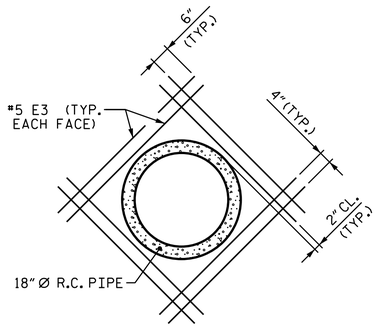
SHEET NO. C-14

TOTAL SHEETS 18

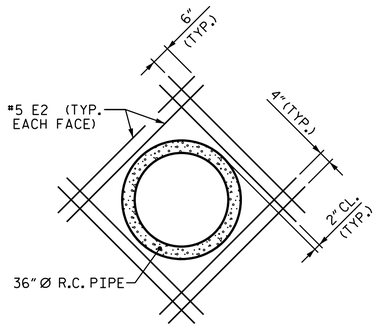
STRUCTURE QUANTITIES												
STAGE I (PART A)			STAGE I (PART B)			STAGE II			STAGE III			STAGE IV			STAGE V		
CLASS A CONCRETE			CLASS A CONCRETE			CLASS A CONCRETE			CLASS A CONCRETE			CLASS A CONCRETE			CLASS A CONCRETE		
BARREL @ 0.983 CY/FT	CU. YDS.	130.4	BARREL @ 0.983 CY/FT	CU. YDS.	377.5	BARREL @ 3.710 CY/FT	CU. YDS.	492.5	BARREL @ 0.983 CY/FT	CU. YDS.	132.1	BARREL @ 3.710 CY/FT	CU. YDS.	2091.6	BARREL @ 1.319 CY/FT	CU. YDS.	17.1
WING, ETC.	CU. YDS.	7.1	WING, ETC.	CU. YDS.	7.5	WING, ETC.	CU. YDS.	29.0				END CURTAIN WALL & HEADWALL	CU. YDS.	6.4	WING, ETC.	CU. YDS.	22.6
TOTAL	CU. YDS.	137.5	TOTAL	CU. YDS.	385.0	TOTAL	CU. YDS.	521.5	TOTAL	CU. YDS.	132.1	TOTAL	CU. YDS.	2098.0	TOTAL	CU. YDS.	39.7
REINFORCING STEEL			REINFORCING STEEL			REINFORCING STEEL			REINFORCING STEEL			REINFORCING STEEL			REINFORCING STEEL		
BARREL	LBS.	21,890	BARREL	LBS.	62,752	BARREL	LBS.	62,373	BARREL	LBS.	22,036	BARREL	LBS.	241,411	BARREL	LBS.	2,943
WING, ETC.	LBS.	396	WING, ETC.	LBS.	396	WING, ETC.	LBS.	2,640							WING, ETC.	LBS.	2,695
TOTAL	LBS.	22,286	TOTAL	LBS.	63,148	TOTAL	LBS.	65,013	TOTAL	LBS.	22,036	TOTAL	LBS.	241,411	TOTAL	LBS.	5,638
FOUNDATION COND. MAT'L.	TONS	153	FOUNDATION COND. MAT'L.	TONS	443	FOUNDATION COND. MAT'L.	TONS	265	FOUNDATION COND. MAT'L.	TONS	155	FOUNDATION COND. MAT'L.	TONS	1149	FOUNDATION COND. MAT'L.	TONS	10



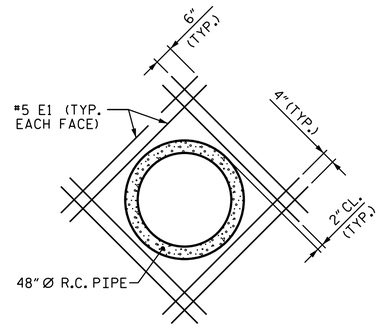
DETAIL OF REINFORCING AROUND 15" Ø PIPE



DETAIL OF REINFORCING AROUND 18" Ø PIPE



DETAIL OF REINFORCING AROUND 36" Ø PIPE



DETAIL OF REINFORCING AROUND 48" Ø PIPE

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 15 OF 18

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

DocuSigned by:
F2458389308F40E...

3/29/2016

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 14 FT. X 9 FT. CONCRETE BOX CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-15
1			3			TOTAL SHEETS
2			4			18

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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CHECKED BY : J.P. ADAMS DATE : 08-15
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29-MAR-2016 09:21
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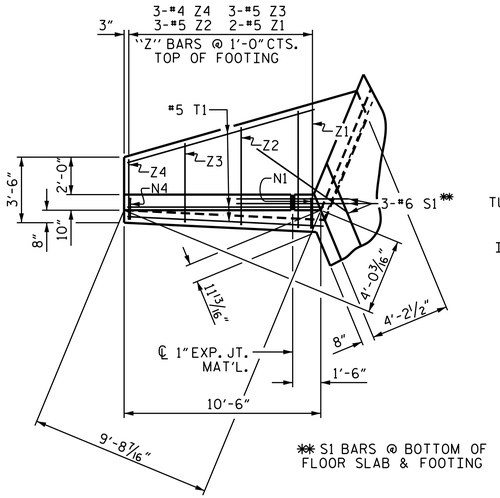
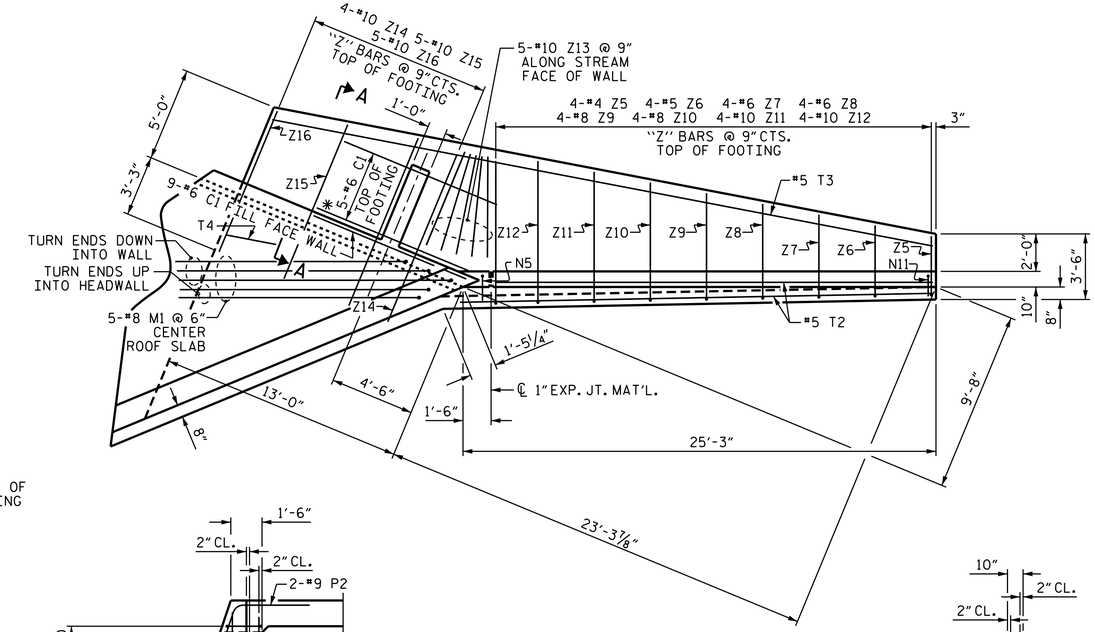
jpadams



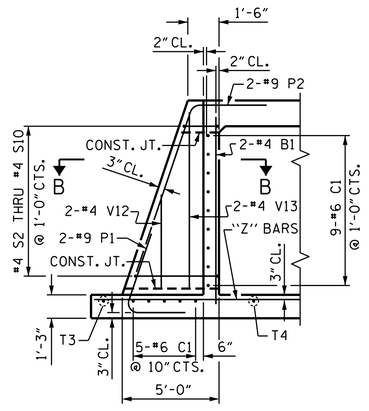
** S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING

PLAN W2



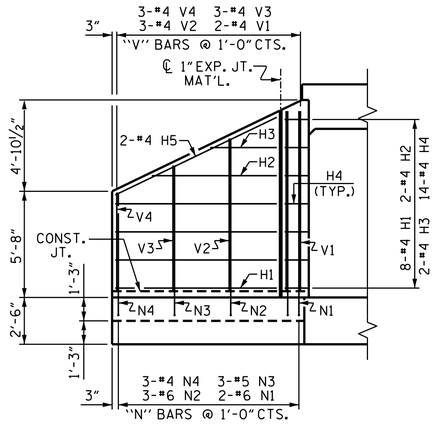
PLAN W1

* CENTER ALL #6 C1 BARS ON ℄ COUNTERFORT

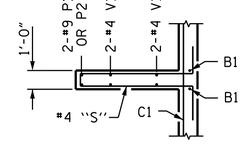


SECTION A-A

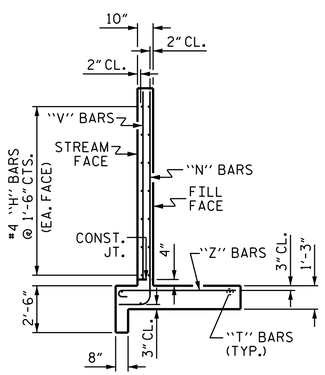
STANDARD REINFORCING STEEL IN BARREL NOT SHOWN



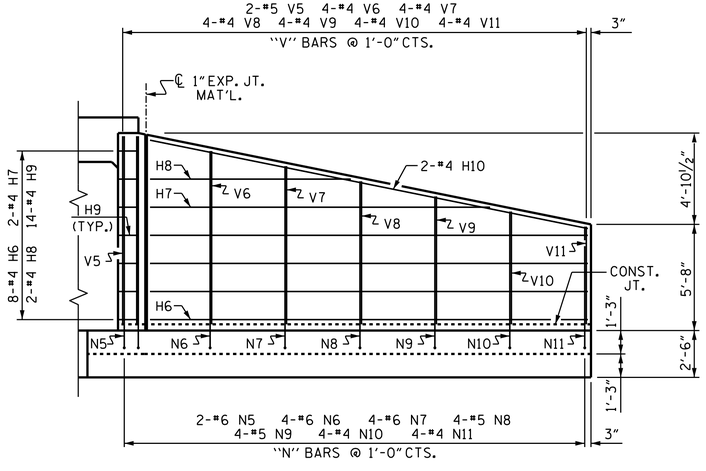
ELEVATION W2



SECTION B-B

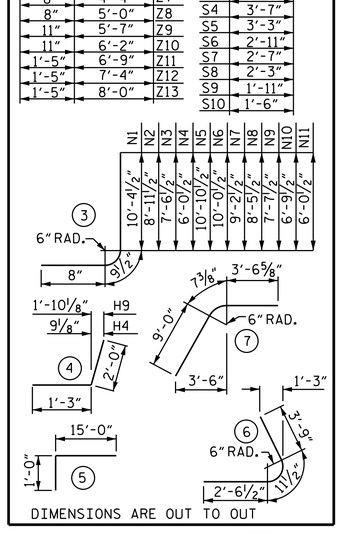


TYPICAL WING SECTION



ELEVATION W1

BAR TYPES



DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

SHORT WING W2 (STAGE I PART A)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	#4	STR	8'-7"	46
H2	2	#4	STR	6'-8"	9
H3	2	#4	STR	3'-6"	5
H4	14	#4	4	3'-3"	30
H5	2	#4	STR	9'-6"	13
N1	2	#6	3	11'-10"	36
N2	3	#6	3	10'-5"	47
N3	3	#5	3	9'-0"	28
N4	3	#4	3	7'-6"	15
S1	3	#6	STR	6'-0"	27
T1	3	#5	STR	10'-6"	33
V1	2	#4	STR	9'-7"	13
V2	3	#4	STR	8'-1"	16
V3	3	#4	STR	6'-8"	13
V4	3	#4	STR	5'-3"	11
Z1	2	#5	1	6'-10"	14
Z2	3	#5	1	5'-9"	18
Z3	3	#5	1	4'-9"	15
Z4	3	#4	1	3'-8"	7

REINFORCING STEEL FOR 1 WING W2 (STAGE I PART A) 396 LBS.

CLASS A CONCRETE (STAGE I PART A)

1 WING	5.8 C.Y.
END CURTAIN WALL	1.3 C.Y.
TOTAL	7.1 C.Y.

LONG WING W1 (STAGE II)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	2	#4	STR	10'-0"	13
C1	14	#6	STR	9'-0"	189
H6	8	#4	STR	23'-4"	125
H7	2	#4	STR	18'-1"	24
H8	2	#4	STR	10'-8"	14
H9	14	#4	4	3'-3"	30
H10	2	#4	STR	23'-10"	32
M1	5	#8	5	16'-0"	214
N5	2	#6	3	12'-4"	37
N6	4	#6	3	11'-6"	69
N7	4	#6	3	10'-8"	64
N8	4	#5	3	9'-11"	41
N9	4	#5	3	9'-1"	38
N10	4	#4	3	8'-3"	22
N11	4	#4	3	7'-6"	20
P1	2	#9	6	7'-3"	49
P2	2	#9	7	13'-2"	90
S2	1	#4	2	11'-9"	8
S3	1	#4	2	11'-1"	7
S4	1	#4	2	10'-5"	7
S5	1	#4	2	9'-9"	7
S6	1	#4	2	9'-1"	6
S7	1	#4	2	8'-5"	6
S8	1	#4	2	7'-9"	5
S9	1	#4	2	7'-1"	5
S10	1	#4	2	6'-3"	4
T2	2	#5	STR	25'-3"	53
T3	1	#5	STR	35'-10"	37
T4	1	#5	STR	13'-0"	14
V5	2	#5	STR	10'-0"	21
V6	4	#4	STR	9'-3"	25
V7	4	#4	STR	8'-5"	22
V8	4	#4	STR	7'-7"	20
V9	4	#4	STR	6'-9"	18
V10	4	#4	STR	6'-0"	16
V11	4	#4	STR	5'-2"	14
V12	2	#4	STR	4'-6"	6
V13	2	#4	STR	8'-9"	12
Z5	4	#4	1	3'-7"	10
Z6	4	#5	1	4'-4"	18
Z7	4	#6	1	5'-0"	30
Z8	4	#6	1	5'-8"	34
Z9	4	#8	1	6'-6"	69
Z10	4	#8	1	7'-1"	76
Z11	4	#10	1	8'-2"	141
Z12	4	#10	1	8'-9"	151
Z13	5	#10	1	9'-5"	203
Z14	4	#10	STR	9'-6"	164
Z15	5	#10	STR	8'-9"	188
Z16	5	#10	STR	8'-0"	172

REINFORCING STEEL FOR 1 WING W1 (STAGE II) 2,640 LBS.

CLASS A CONCRETE (STAGE II)

1 WING	19.4 C.Y.
END CURTAIN WALL	2.3 C.Y.
2 HEADWALLS	7.3 C.Y.
TOTAL	29.0 C.Y.

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 16 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INLET WINGS FOR CONCRETE BOX CULVERT

H = 9'-0" SLOPE = 2:1

45° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALCORD

DocuSigned by: F245838900BF40E...

3/29/2016

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-16
1			3			TOTAL SHEETS
2			4			18

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CHECKED BY :	J.P. ADAMS	DATE : 08-15
DESIGN ENGINEER OF RECORD:	T.L. AVERETTE	DATE : 09-15

29-MAR-2016 09:21
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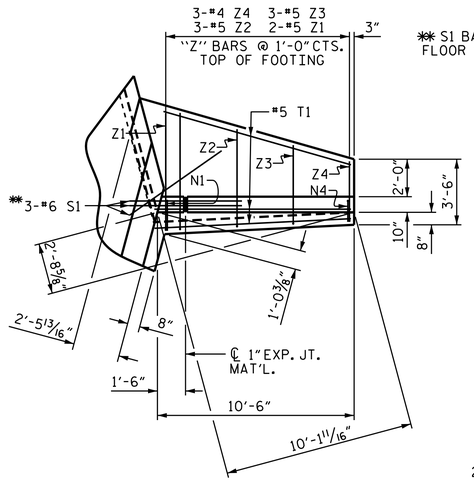
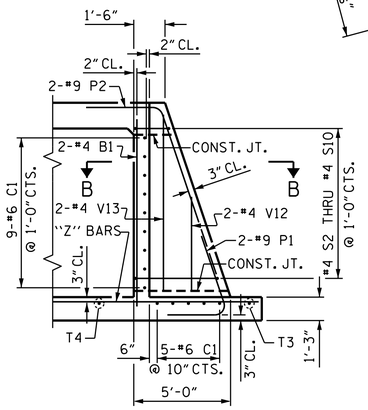
jpadams



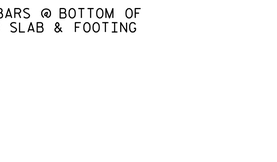
PLAN W3

✱✱ S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING

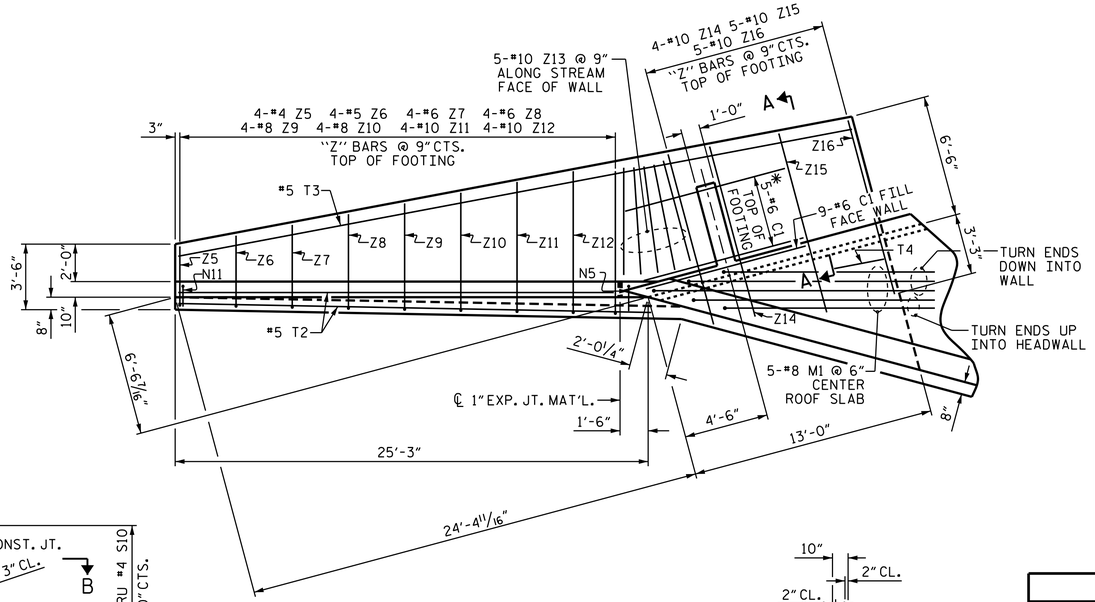


SECTION A-A

STANDARD REINFORCING STEEL IN BARREL NOT SHOWN

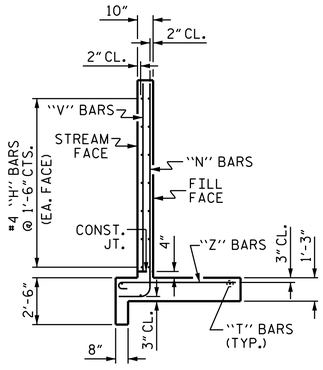


SECTION B-B

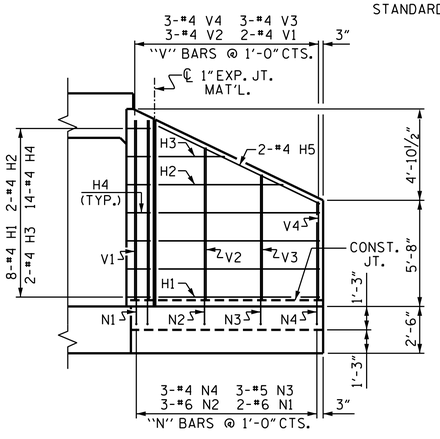


PLAN W4

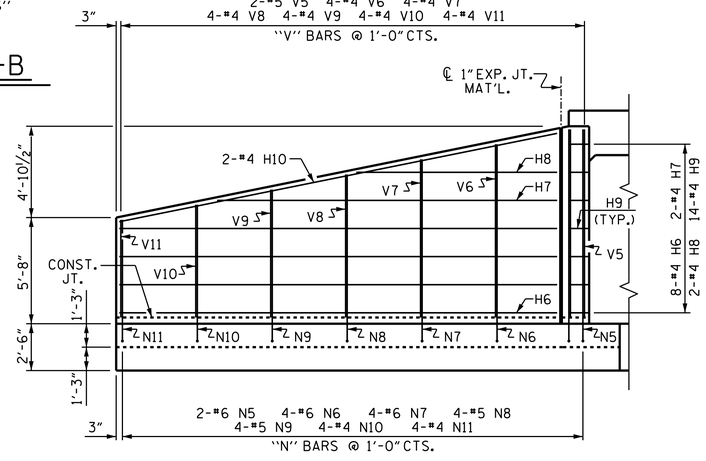
✱ CENTER ALL #6 C1 BARS ON ℄ COUNTERFORT



TYPICAL WING SECTION

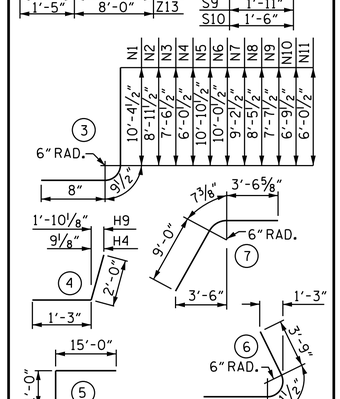


ELEVATION W3



ELEVATION W4

BAR TYPES



DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

SHORT WING W3 (STAGE I PART B)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	#4	STR	8'-7"	46
H2	2	#4	STR	6'-8"	9
H3	2	#4	STR	3'-6"	5
H4	14	#4	4	3'-3"	30
H5	2	#4	STR	9'-6"	13
N1	2	#6	3	11'-10"	36
N2	3	#6	3	10'-5"	47
N3	3	#5	3	9'-0"	28
N4	3	#4	3	7'-6"	15
S1	3	#6	STR	6'-0"	27
T1	3	#5	STR	10'-6"	33
V1	2	#4	STR	9'-7"	13
V2	3	#4	STR	8'-1"	16
V3	3	#4	STR	6'-8"	13
V4	3	#4	STR	5'-3"	11
Z1	2	#5	1	6'-10"	14
Z2	3	#5	1	5'-9"	18
Z3	3	#5	1	4'-9"	15
Z4	3	#4	1	3'-8"	7

REINFORCING STEEL FOR 1 WING W3 (STAGE I PART B) 396 LBS.

CLASS A CONCRETE (STAGE I PART B)

1 WING	5.6 C.Y.
END CURTAIN WALL	1.9 C.Y.
TOTAL	7.5 C.Y.

LONG WING W4 (STAGE V)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	2	#4	STR	10'-0"	13
C1	14	#6	STR	9'-0"	189
H6	8	#4	STR	23'-4"	125
H7	2	#4	STR	18'-1"	24
H8	2	#4	STR	10'-8"	14
H9	14	#4	4	3'-3"	30
H10	2	#4	STR	23'-10"	32
M1	5	#8	5	16'-0"	214
N5	2	#6	3	12'-4"	37
N6	4	#6	3	11'-6"	69
N7	4	#6	3	10'-8"	64
N8	4	#5	3	9'-11"	41
N9	4	#5	3	9'-1"	38
N10	4	#4	3	8'-3"	22
N11	4	#4	3	7'-6"	20
P1	2	#9	6	7'-3"	49
P2	2	#9	7	13'-2"	90
S2	1	#4	2	11'-9"	8
S3	1	#4	2	11'-1"	7
S4	1	#4	2	10'-5"	7
S5	1	#4	2	9'-9"	7
S6	1	#4	2	9'-1"	6
S7	1	#4	2	8'-5"	6
S8	1	#4	2	7'-9"	5
S9	1	#4	2	7'-1"	5
S10	1	#4	2	6'-3"	4
T2	2	#5	STR	25'-3"	53
T3	1	#5	STR	36'-7"	38
T4	1	#5	STR	13'-0"	14
V5	2	#5	STR	10'-0"	21
V6	4	#4	STR	9'-3"	25
V7	4	#4	STR	8'-5"	22
V8	4	#4	STR	7'-7"	20
V9	4	#4	STR	6'-9"	18
V10	4	#4	STR	6'-0"	16
V11	4	#4	STR	5'-2"	14
V12	2	#4	STR	4'-6"	6
V13	2	#4	STR	8'-9"	12
Z5	4	#4	1	3'-7"	10
Z6	4	#5	1	4'-4"	18
Z7	4	#6	1	5'-0"	30
Z8	4	#6	1	5'-8"	34
Z9	4	#8	1	6'-6"	69
Z10	4	#8	1	7'-1"	76
Z11	4	#10	1	8'-2"	141
Z12	4	#10	1	8'-9"	151
Z13	5	#10	1	9'-5"	203
Z14	4	#10	STR	9'-4"	160
Z15	5	#10	STR	9'-10"	212
Z16	5	#10	STR	9'-7"	206

REINFORCING STEEL FOR 1 WING W4 (STAGE V) 2,695 LBS.

CLASS A CONCRETE (STAGE V)

1 WING	19.5 C.Y.
END CURTAIN WALL	1.4 C.Y.
HEADWALL	1.7 C.Y.
TOTAL	22.6 C.Y.

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 17 OF 18

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

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3/29/2016

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

OUTLET WINGS FOR CONCRETE BOX CULVERT

H = 9'-0" SLOPE = 2:1

150° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-17
1			3			TOTAL SHEETS
2			4			18

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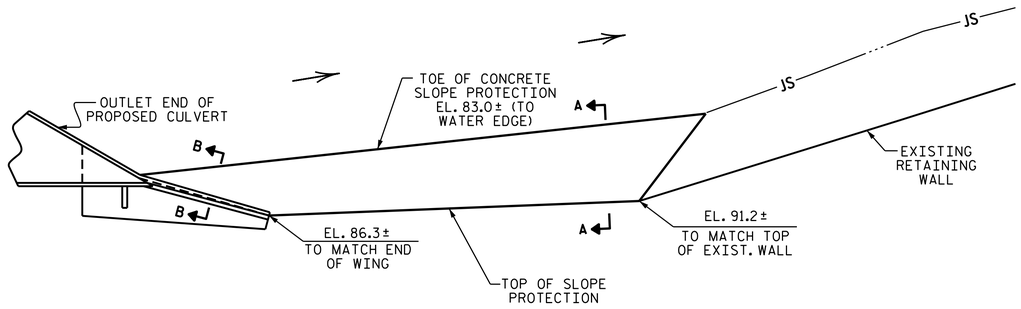
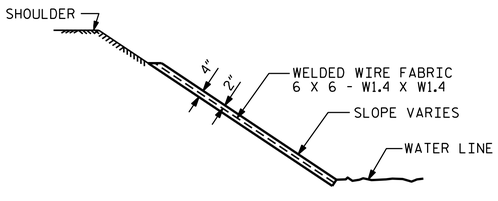
NOTE

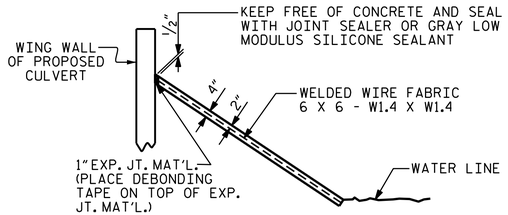
SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60'' WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE ''POURING DETAIL'' WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE ''OPTIONAL POURING DETAIL'' WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6''. THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.



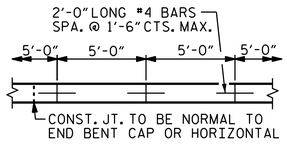
PLAN OF SLOPE PROTECTION



SECTION A-A

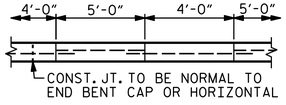


SECTION B-B



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL

CULVERT @ STA. 19+26.42 -L-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
	150	300

* QUANTITY SHOWN IS BASED ON 5' POURS.

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD

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3/29/2016

PROJECT NO. B-4490

CUMBERLAND COUNTY

STATION: 19+26.42 -L-

SHEET 18 OF 18

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

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

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