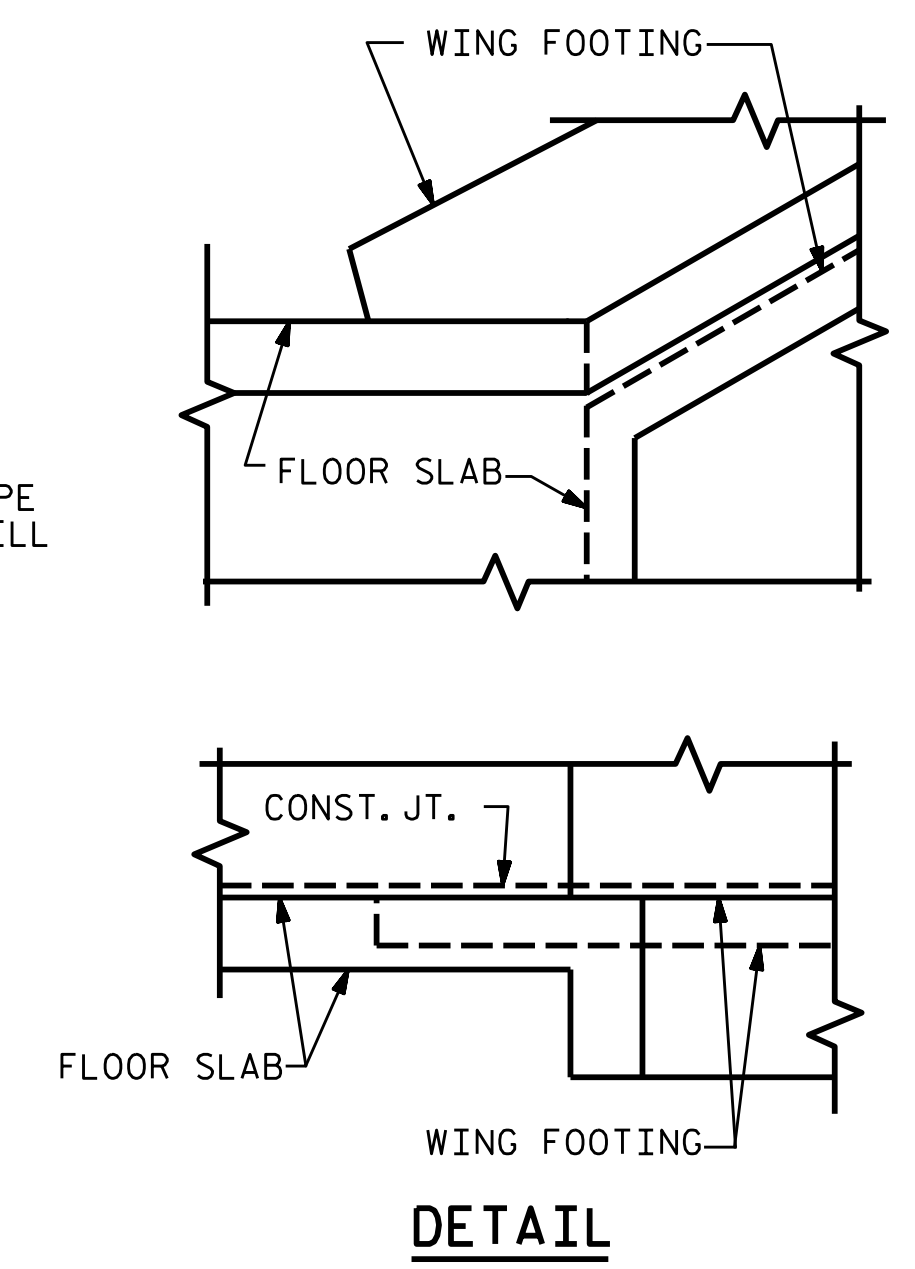
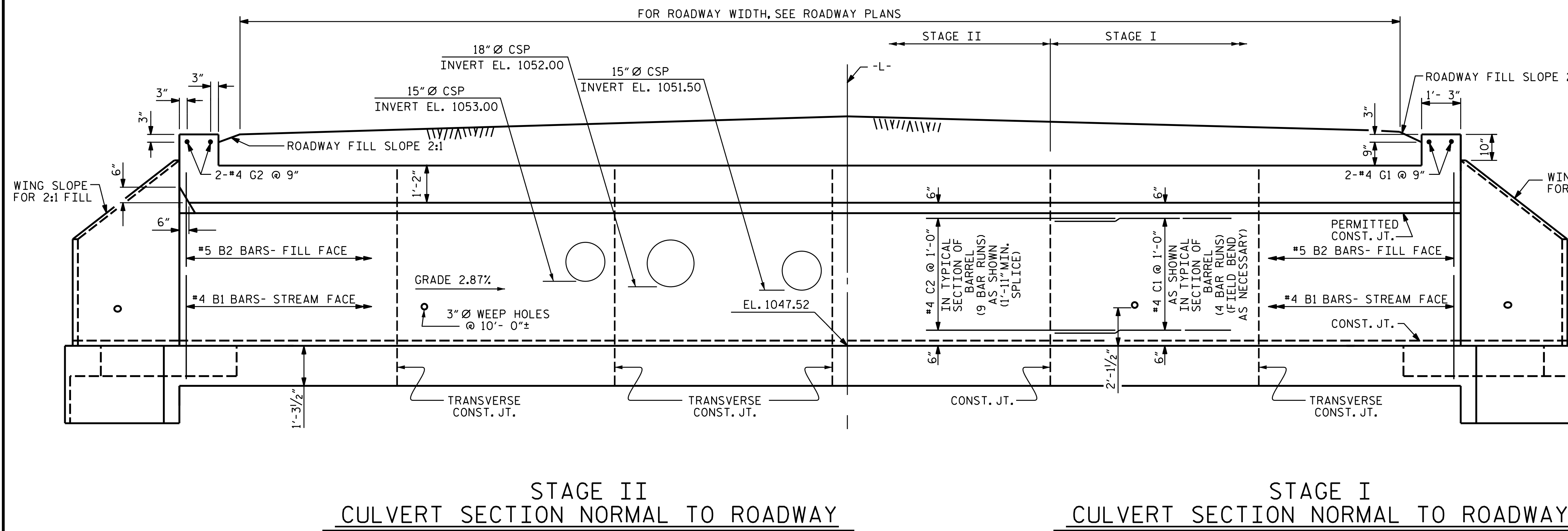


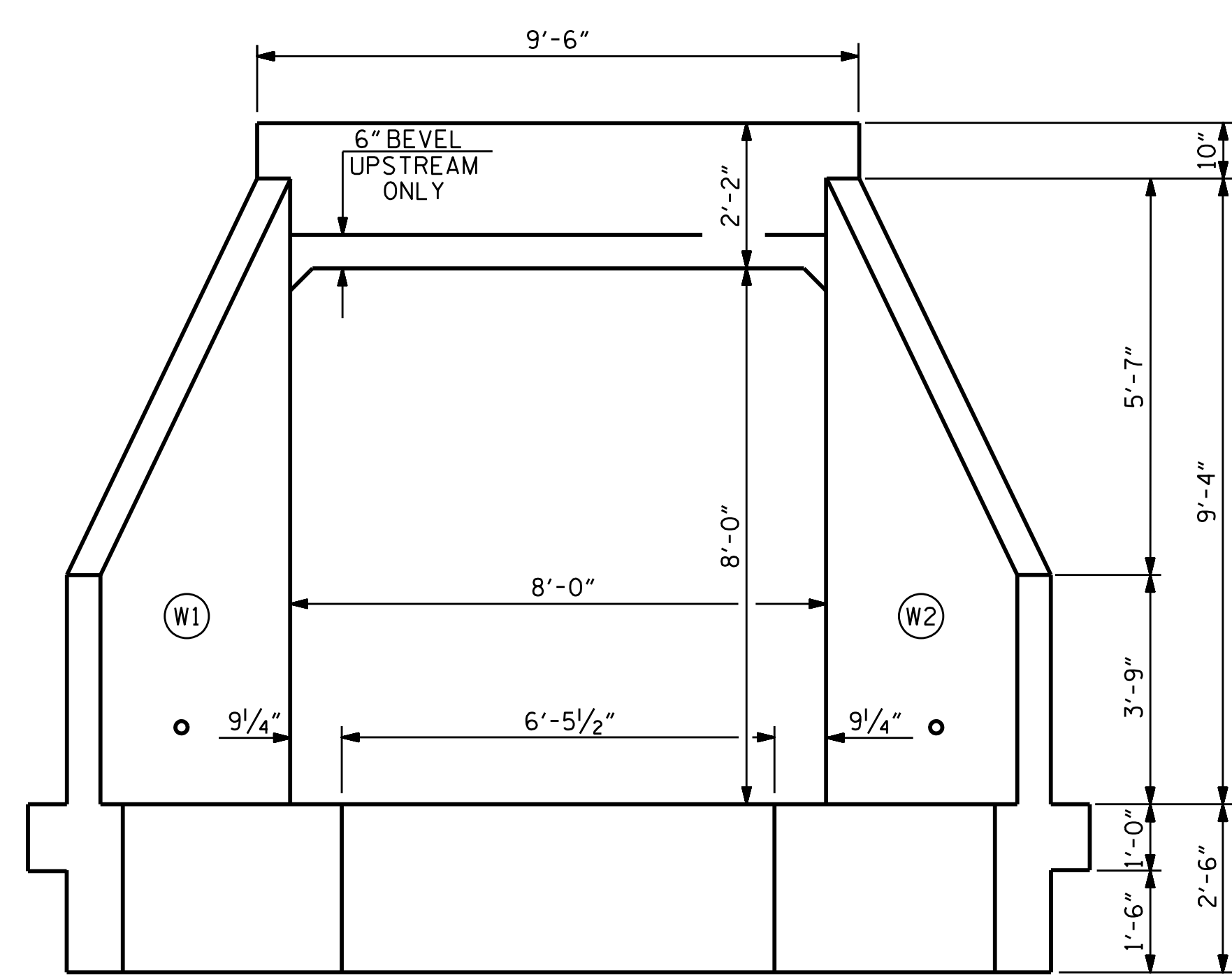
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for the convenience of the user
and is Not a Certified Document –**

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

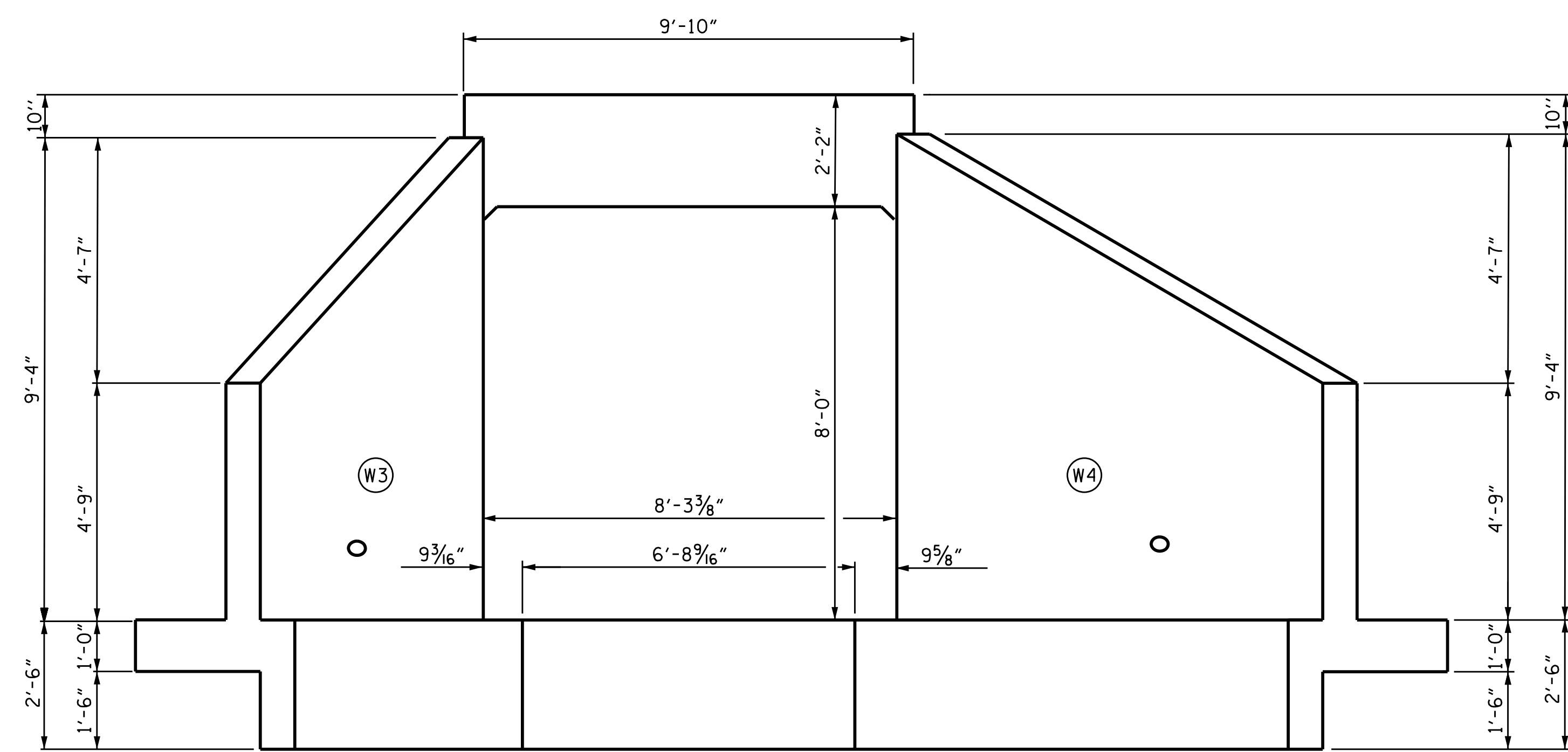
**This file or an individual page
shall not be considered a certified document.**



CONNECTION OF WING FOOTING AND FLOOR SLAB WHEN SLAB IS THICKER THAN FOOTING



INLET END ELEVATION
(90°-00'-00" SKEW)

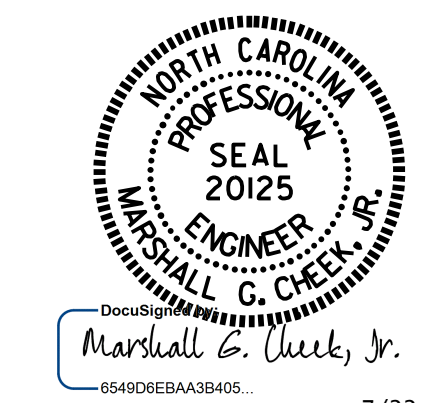


OUTLET END ELEVATION NORMAL TO SKEW
(75°-00'-00" SKEW)

PROJECT NO. R-2603
WILKES COUNTY
STATION: 59+43.00 -L-
SHEET 2 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE
8 FT. X 8 FT.
CONCRETE BOX CULVERT

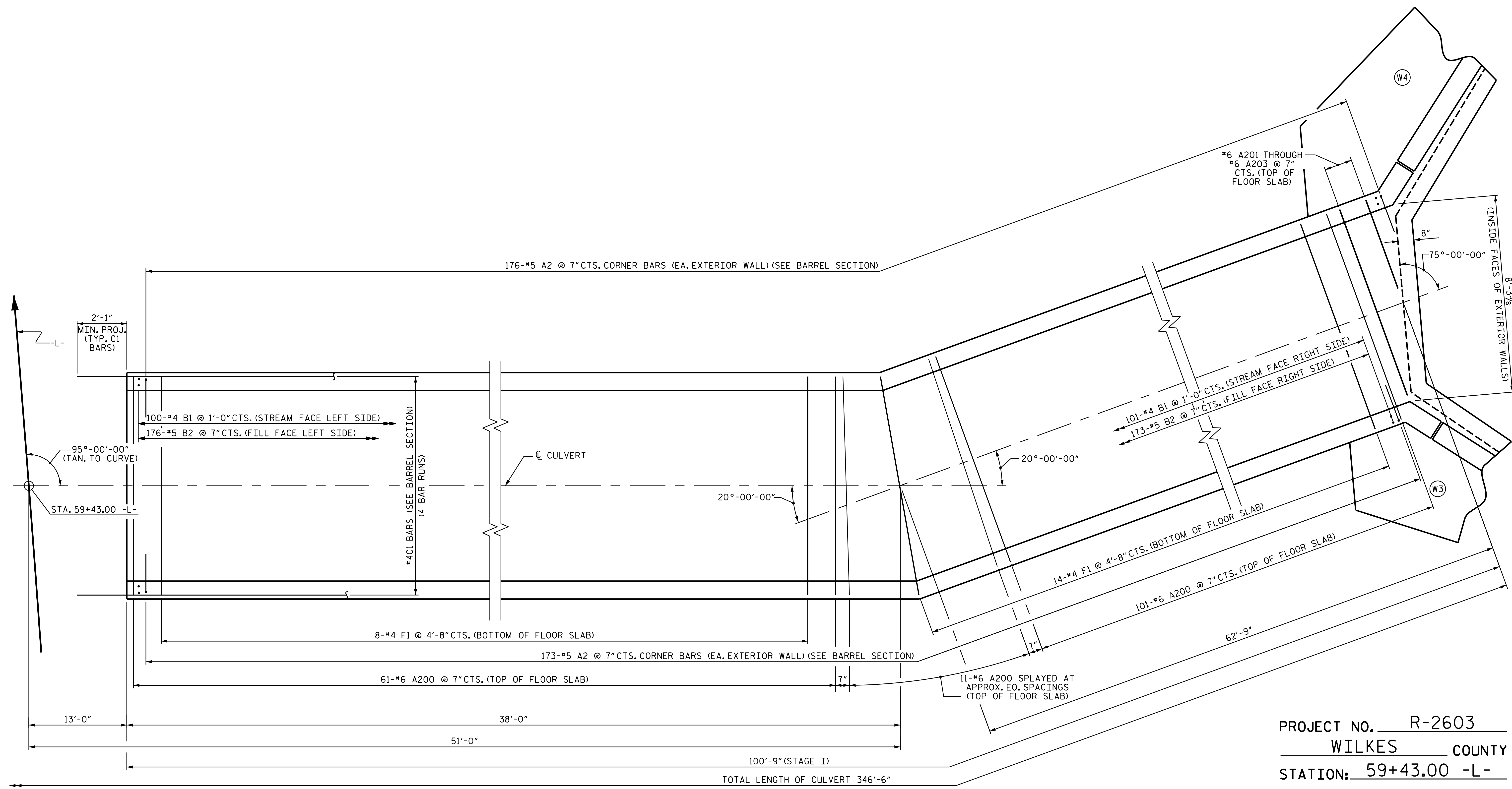


7/22/2015

DRAWN BY: H. T. BARBOUR DATE: 5-6-14
CHECKED BY: S. B. WILLIAMS DATE: 12-14

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

TOTAL SHEETS: 10

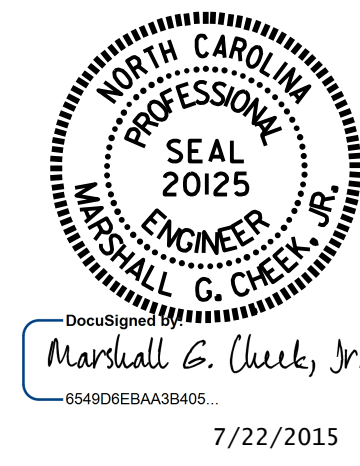


PLAN FLOOR SLAB

"C" BARS SHALL BE FIELD BENT AS NECESSARY.

PROJECT NO. R-2603
WILKES COUNTY
 STATION: 59+43.00 -L-

SHEET 3 OF 10

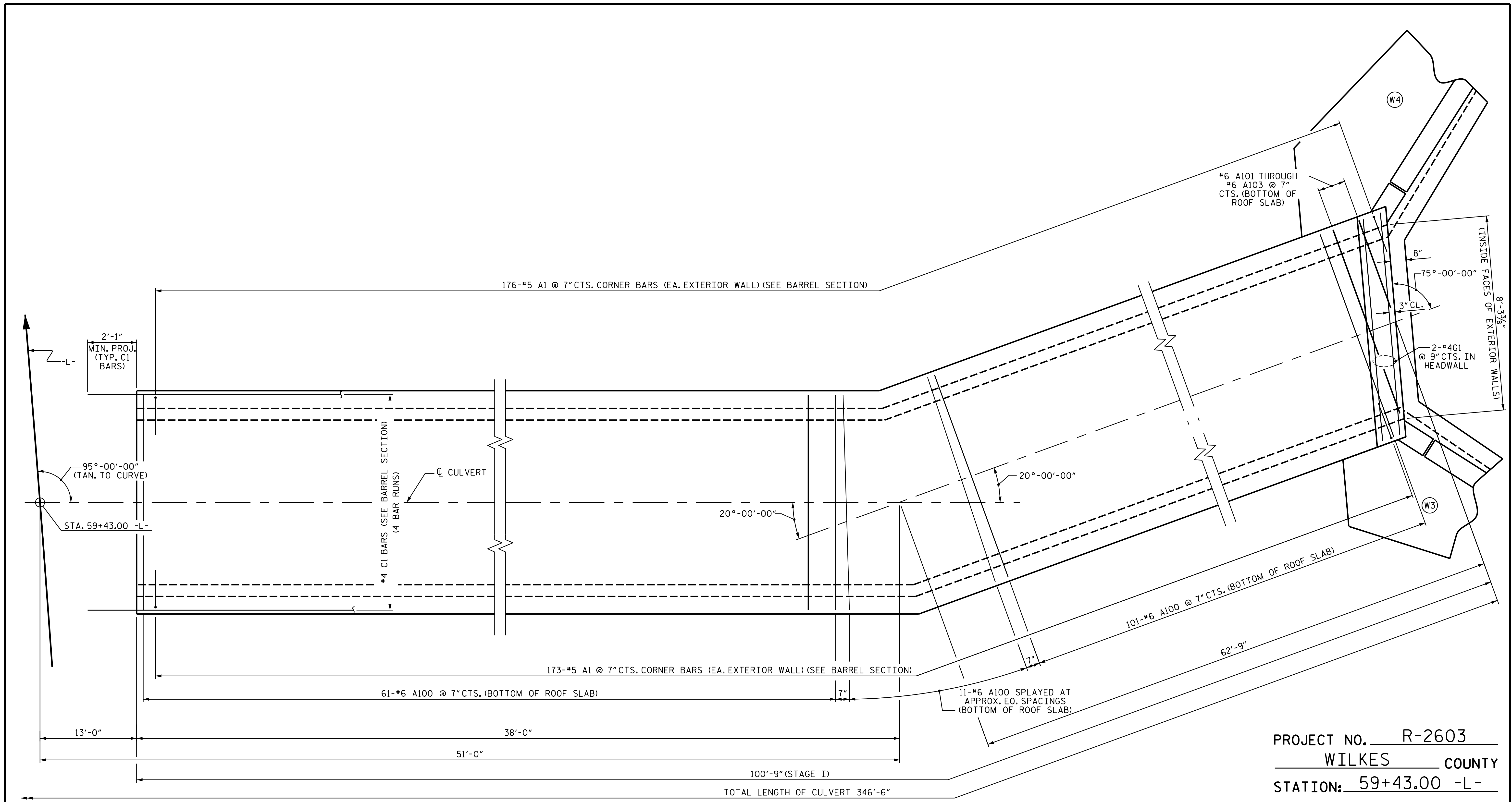


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**SINGLE
 8 FT. X 8 FT.
 CONCRETE BOX CULVERT
 STAGE I**

DRAWN BY :	H. T. BARBOUR	DATE :	5-6-14
CHECKED BY :	S. B. WILLIAMS	DATE :	12-14
DESIGN ENGINEER OF RECORD:	B. A. DUKE	DATE :	6-14

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

STR. #3



PLAN ROOF SLAB

1/2" BARS SHALL BE FIELD BENT AS NECESSARY.

PROJECT NO. R-2603
WILKES COUNTY
 STATION: 59+43.00 -L-

SHEET 4 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

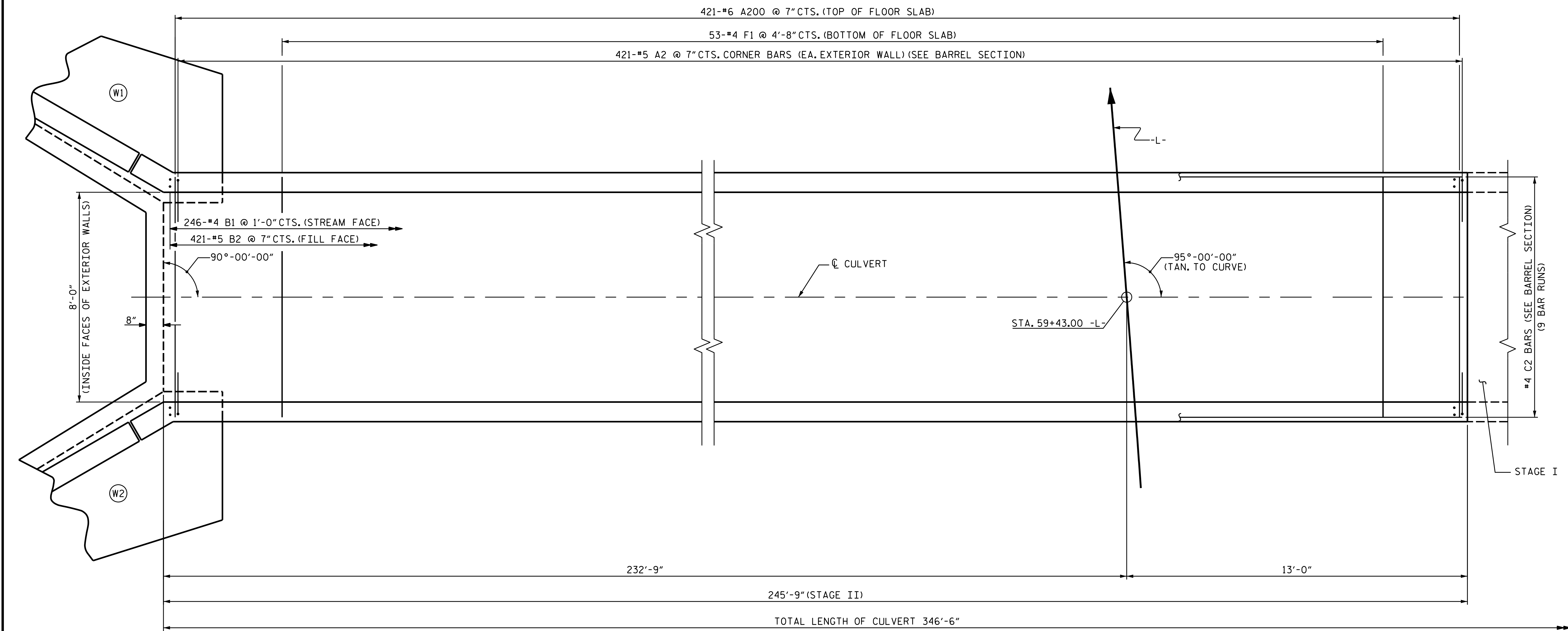
**SINGLE
 8 FT. X 8 FT.
 CONCRETE BOX CULVERT
 STAGE I**



DRAWN BY : H. T. BARBOUR DATE : 5-6-14
 CHECKED BY : S. B. WILLIAMS DATE : 12-14
 DESIGN ENGINEER OF RECORD: B. A. DUKE DATE : 6-14

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

STR. #3



PLAN FLOOR SLAB

PROJECT NO. R-2603
WILKES COUNTY
 STATION: 59+43.00 -L-

SHEET 5 OF 10



DocuSigned by:
 Marshall G. Check, Jr.
 65480E8BA3B405
 7/22/2015

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE
 8 FT. X 8 FT.
 CONCRETE BOX CULVERT
 STAGE II

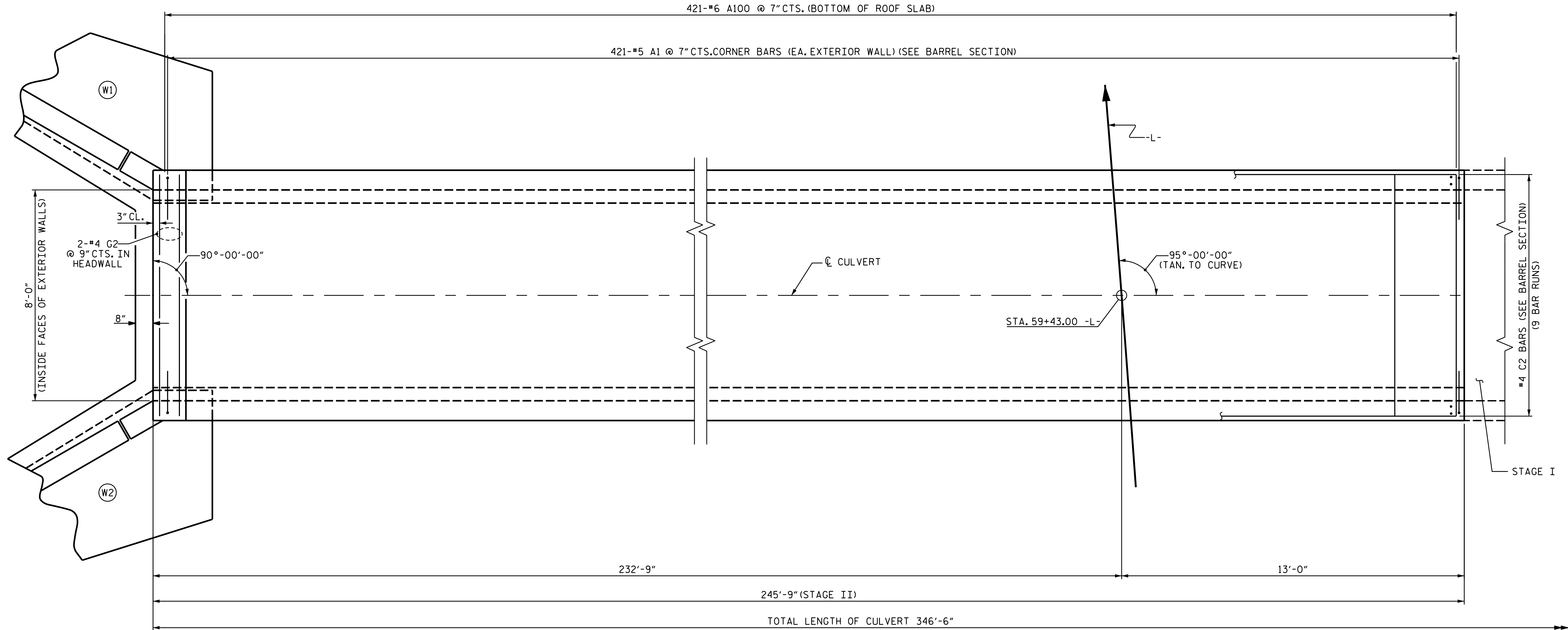
DRAWN BY : H. T. BARBOUR DATE : 5-6-14
 CHECKED BY : S. B. WILLIAMS DATE : 12-14
 DESIGN ENGINEER OF RECORD: B. A. DUKE DATE : -

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			10

STR. #3

421-#6 A100 @ 7" CTS. (BOTTOM OF ROOF SLAB)

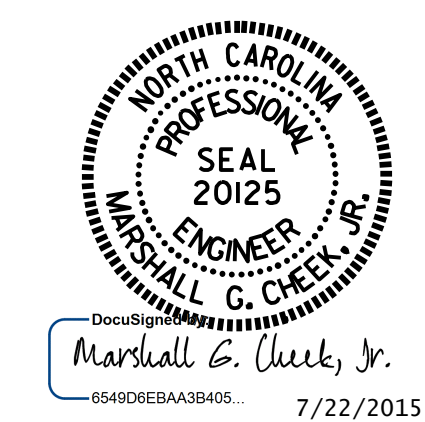
421-#5 A1 @ 7" CTS. CORNER BARS (EA. EXTERIOR WALL) (SEE BARREL SECTION)



PLAN ROOF SLAB

PROJECT NO. R-2603
WILKES COUNTY
 STATION: 59+43.00 -L-

SHEET 6 OF 10

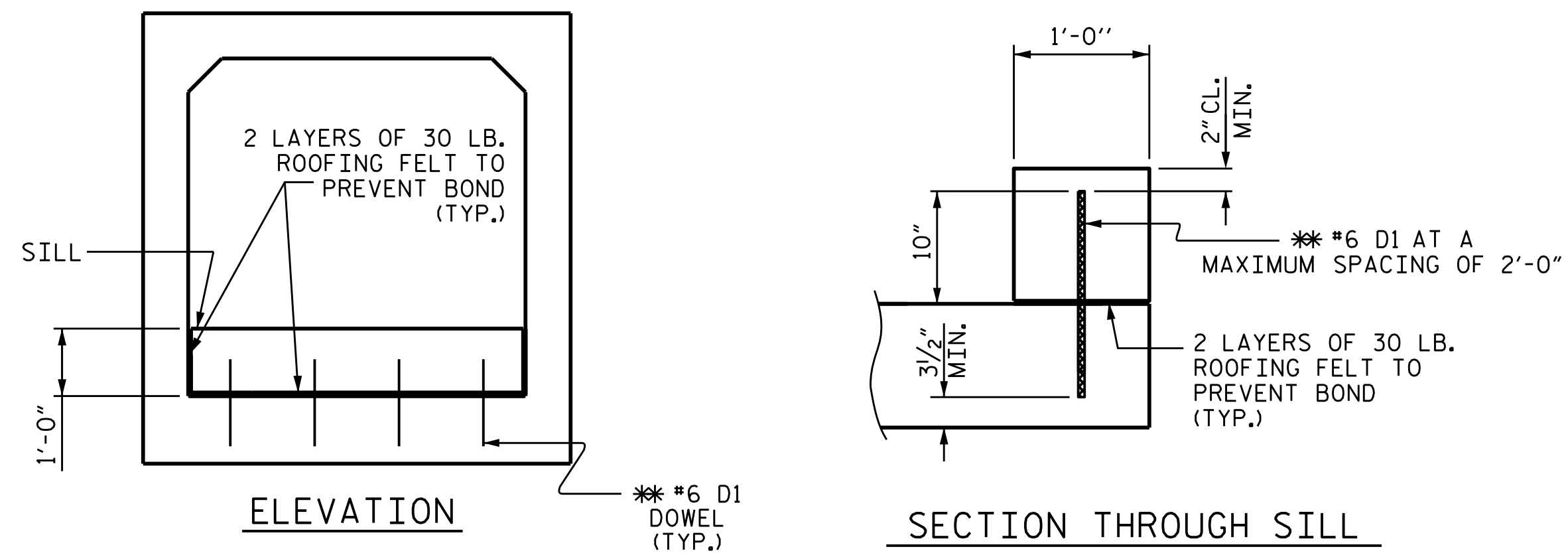


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE
 8 FT. X 8 FT.
 CONCRETE BOX CULVERT
 STAGE II

DRAWN BY : H. T. BARBOUR DATE : 5-6-14
 CHECKED BY : S. B. WILLIAMS DATE : 12-14
 DESIGN ENGINEER OF RECORD: B. A. DUKE DATE : 6-14

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			10

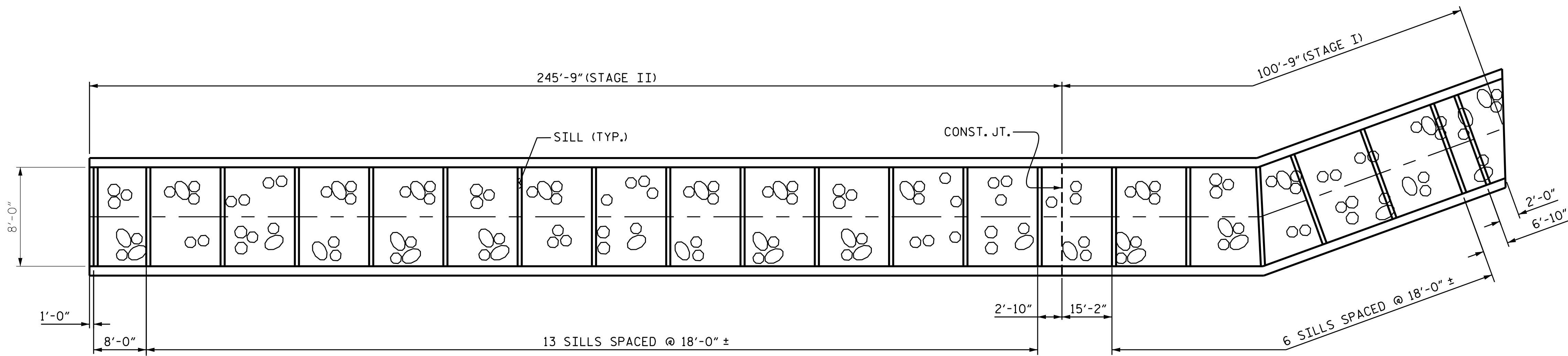


CULVERT SILL DETAILS

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

BAR	SIZE	SPLICE LENGTH
"C"	#4	1'-11"
B1	#4	1'-9"

STAGE I						STAGE II					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	349	#5	1	6'-5"	2336	A1	842	#5	1	6'-5"	5635
A2	349	#5	1	6'-2"	2245	A2	842	#5	1	6'-2"	5416
A100	173	#6	STR	9'-2"	2382	A100	421	#6	STR	9'-2"	5796
A101	1	#6	STR	8'-3"	12						
A102	1	#6	STR	6'-1"	9	A200	421	#6	STR	9'-2"	5796
A103	1	#6	STR	3'-11"	6						
A200	173	#6	STR	9'-2"	2382	B1	492	#4	STR	9'-11"	3259
A201	1	#6	STR	8'-3"	12	B2	842	#5	STR	7'-6"	6587
A202	1	#6	STR	6'-1"	9	C2	441	#4	STR	29'-0"	8543
A203	1	#6	STR	3'-11"	6						
B1	201	#4	STR	9'-11"	1331	D1	56	#6	STR	1'-10"	154
B2	349	#5	STR	7'-6"	2730	E1	16	#5	STR	4'-8"	78
						E2	32	#5	STR	3'-8"	122
C1	196	#4	STR	27'-1"	3546	F1	53	#4	STR	4'-4"	153
D1	28	#6	STR	1'-10"	77	G2	2	#4	STR	9'-2"	12
F1	22	#4	STR	4'-4"	64						
G1	2	#4	STR	9'-6"	13						
REINFORCING STEEL 17160 LBS.						REINFORCING STEEL 41551 LBS.					

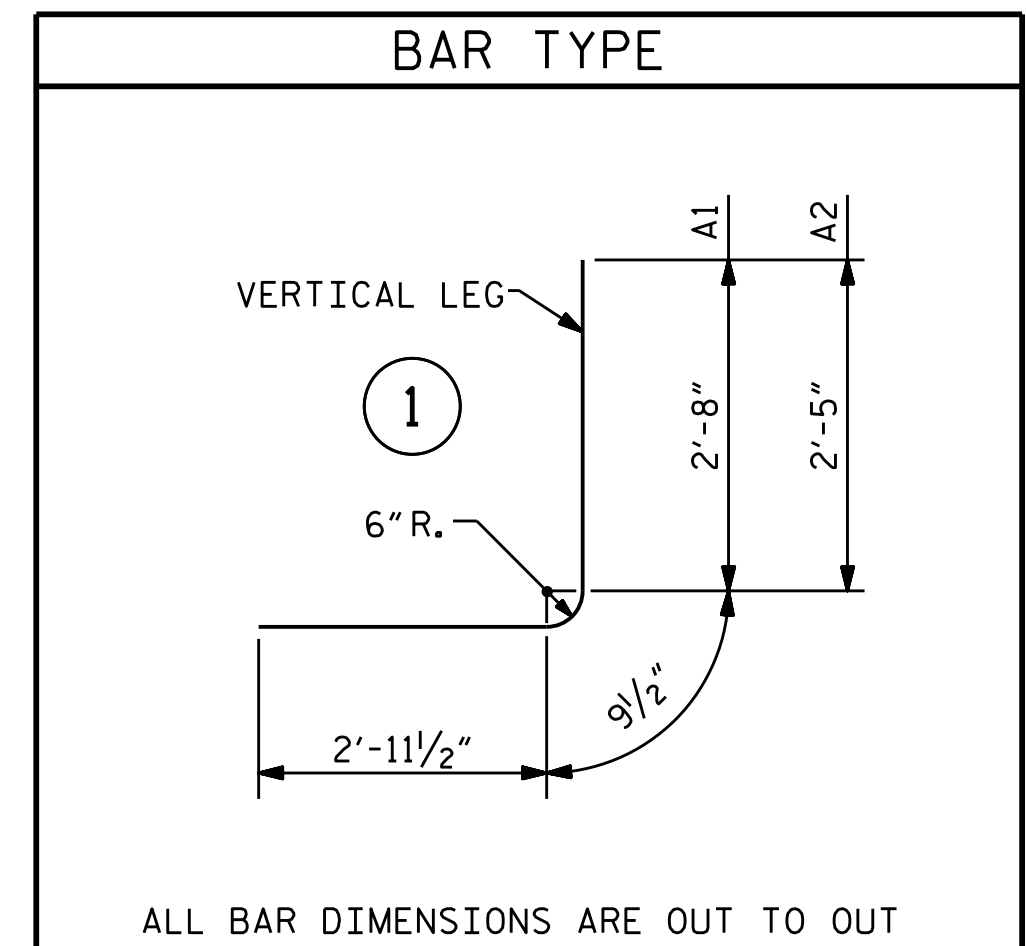


PLAN SHOWING 1'-0" SILL SPACING ARRANGEMENT

MATERIAL EXCAVATED FROM THE STREAM BED SHALL BE STOCKPILED FOR USE IN THE PROPOSED CULVERT. BED MATERIAL SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER. BED MATERIAL SHALL BE SUPPLEMENTED BY CLASS B RIP RAP AS NECESSARY.

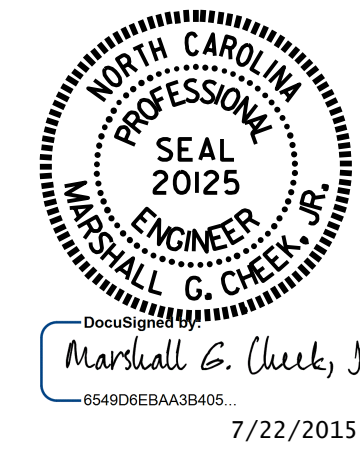
THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED MATERIAL OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE BID FOR CULVERT EXCAVATION.

THE ENTIRE COST OF WORK REQUIRED TO CONSTRUCT THE SILLS AS SHOWN SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.



PROJECT NO. R-2603
WILKES COUNTY
 STATION: 59+43.00 -L-

SHEET 7 OF 10



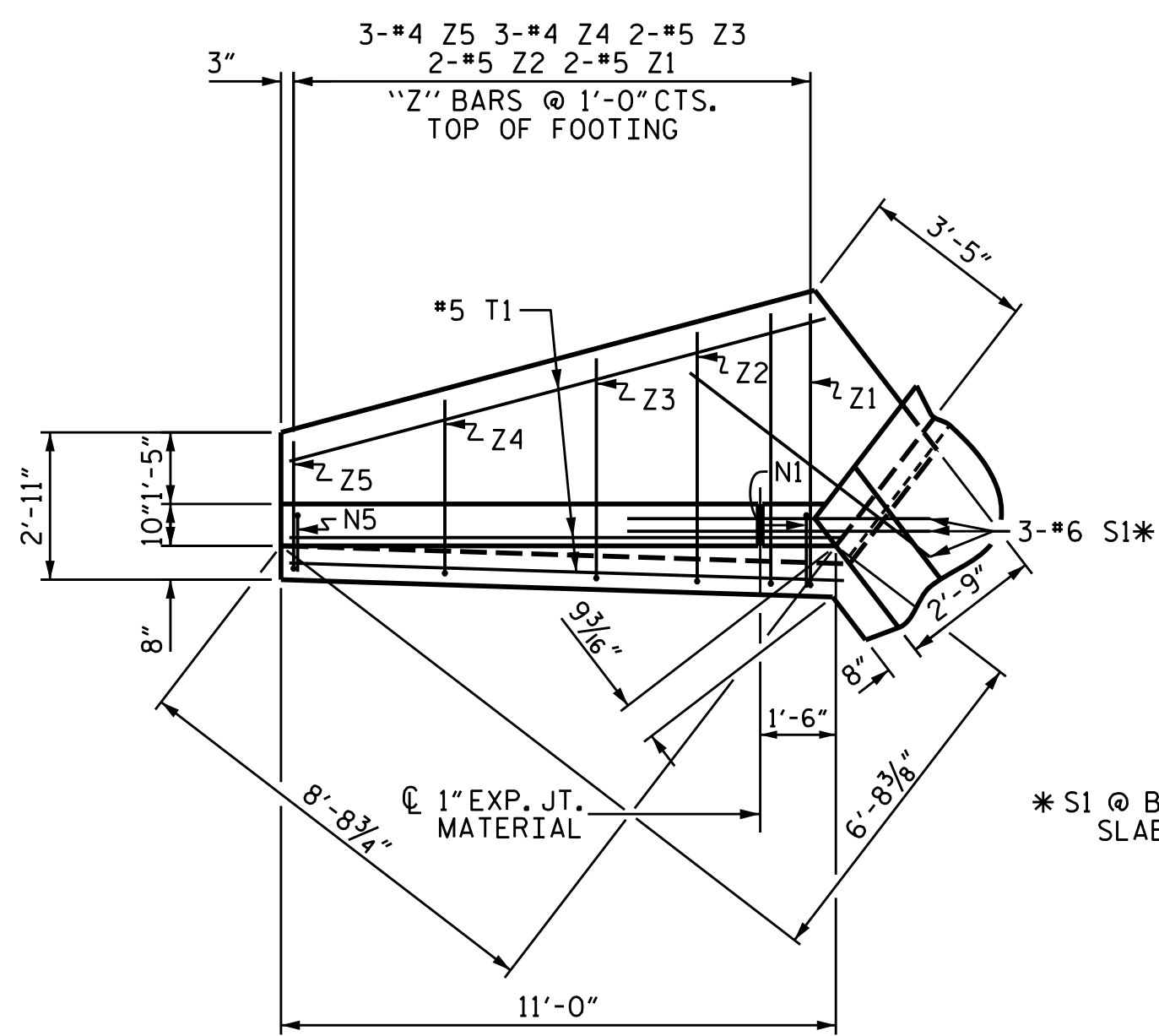
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE
 8 FT. X 8 FT.
 CONCRETE BOX CULVERT

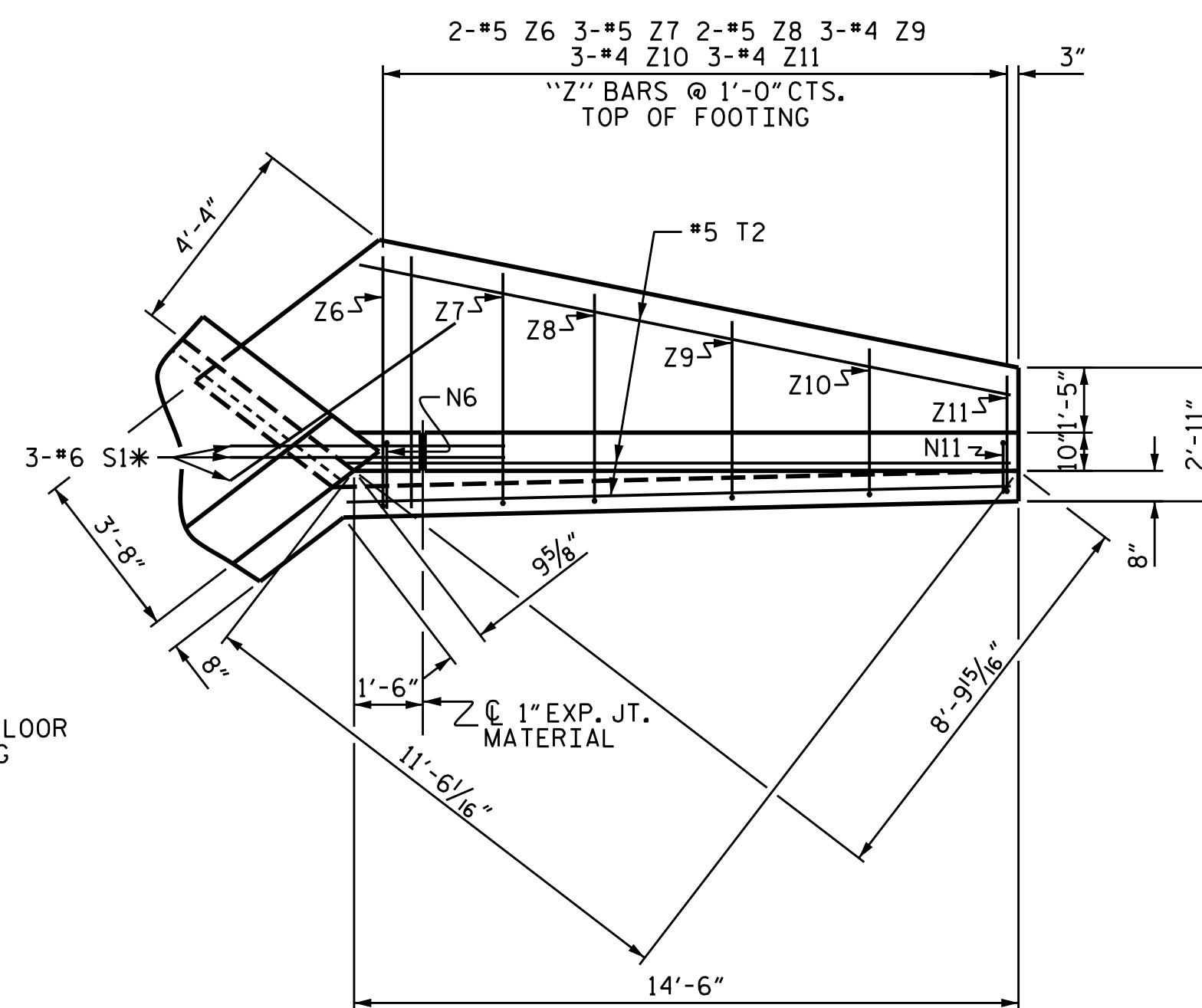
DRAWN BY : H. T. BARBOUR DATE : 6-13
 CHECKED BY : S. B. WILLIAMS DATE : 12-14

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			10

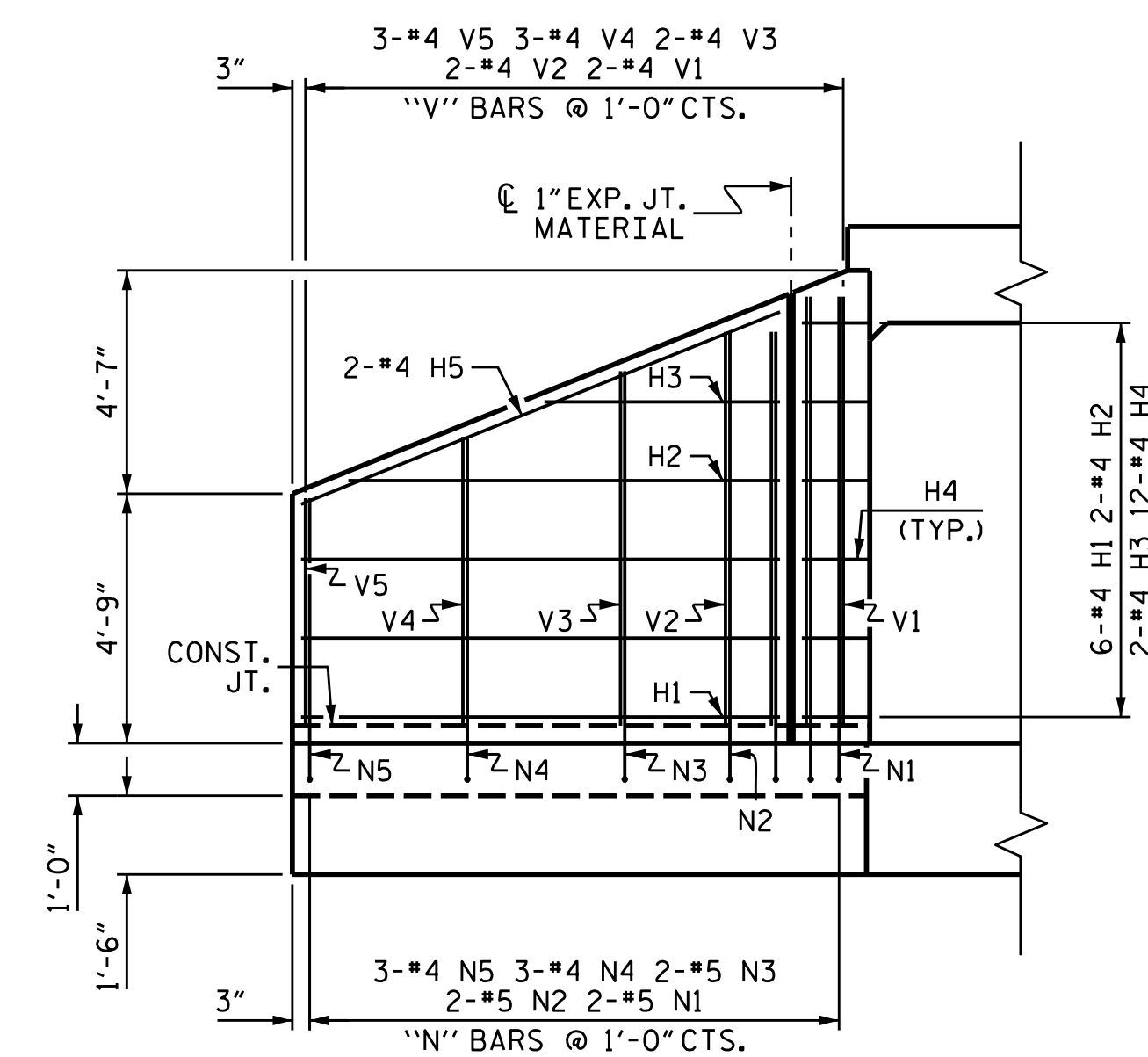
STR. #3



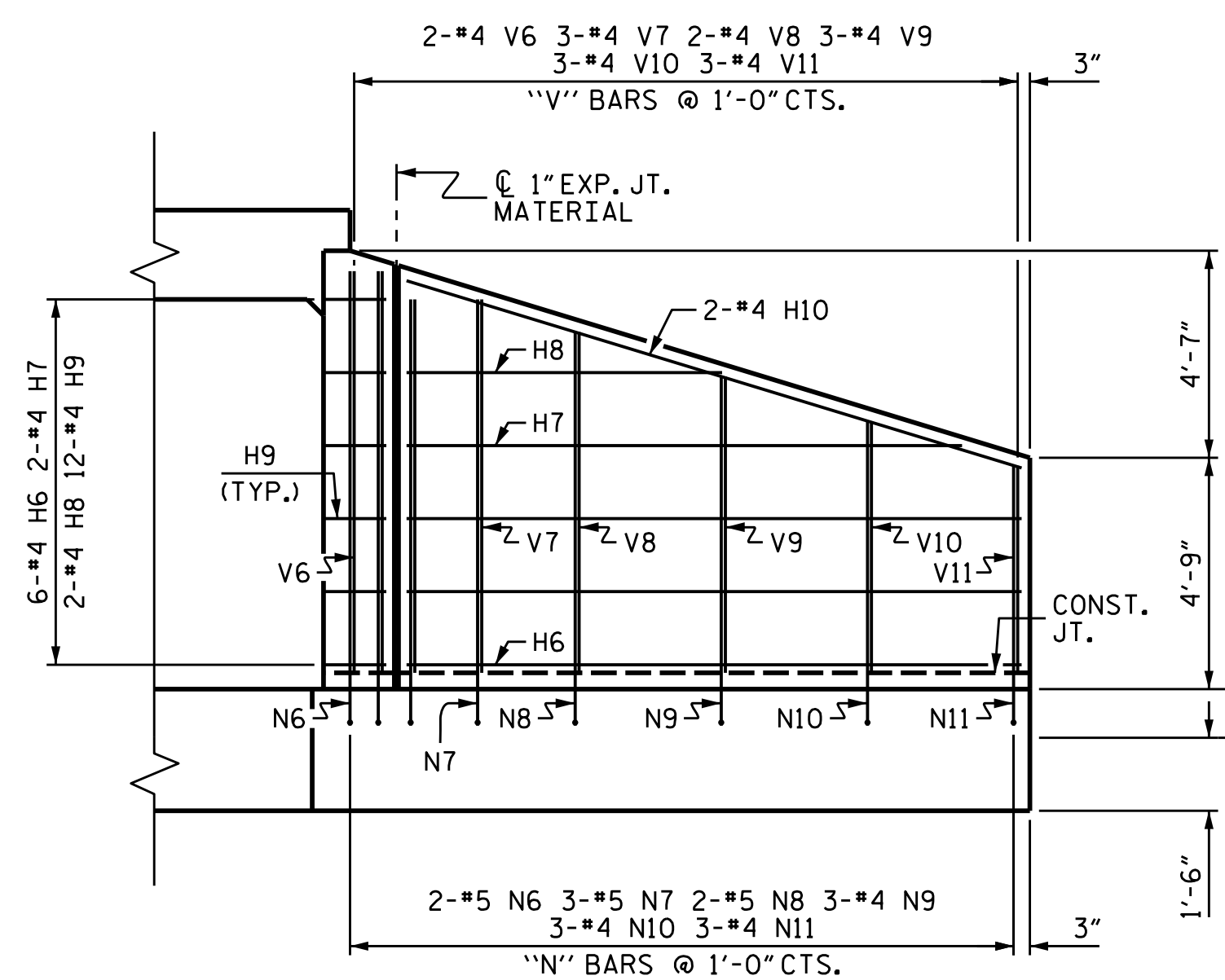
PLAN W3



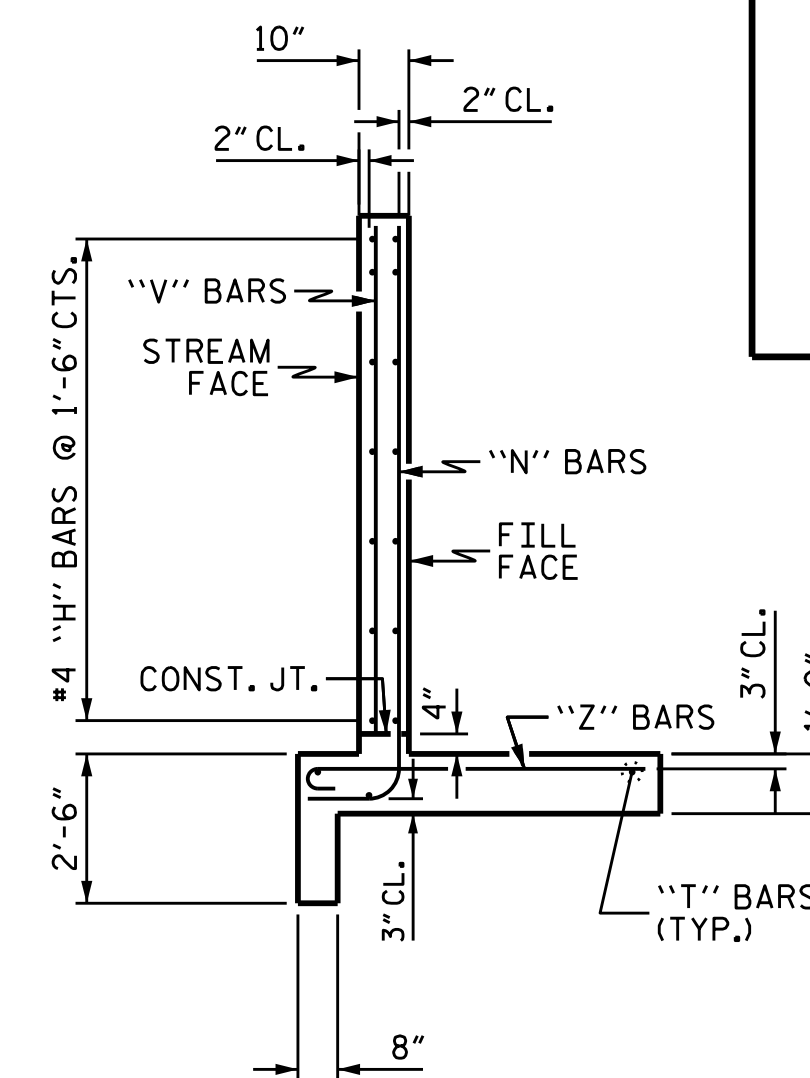
PLAN W4



ELEVATION W3



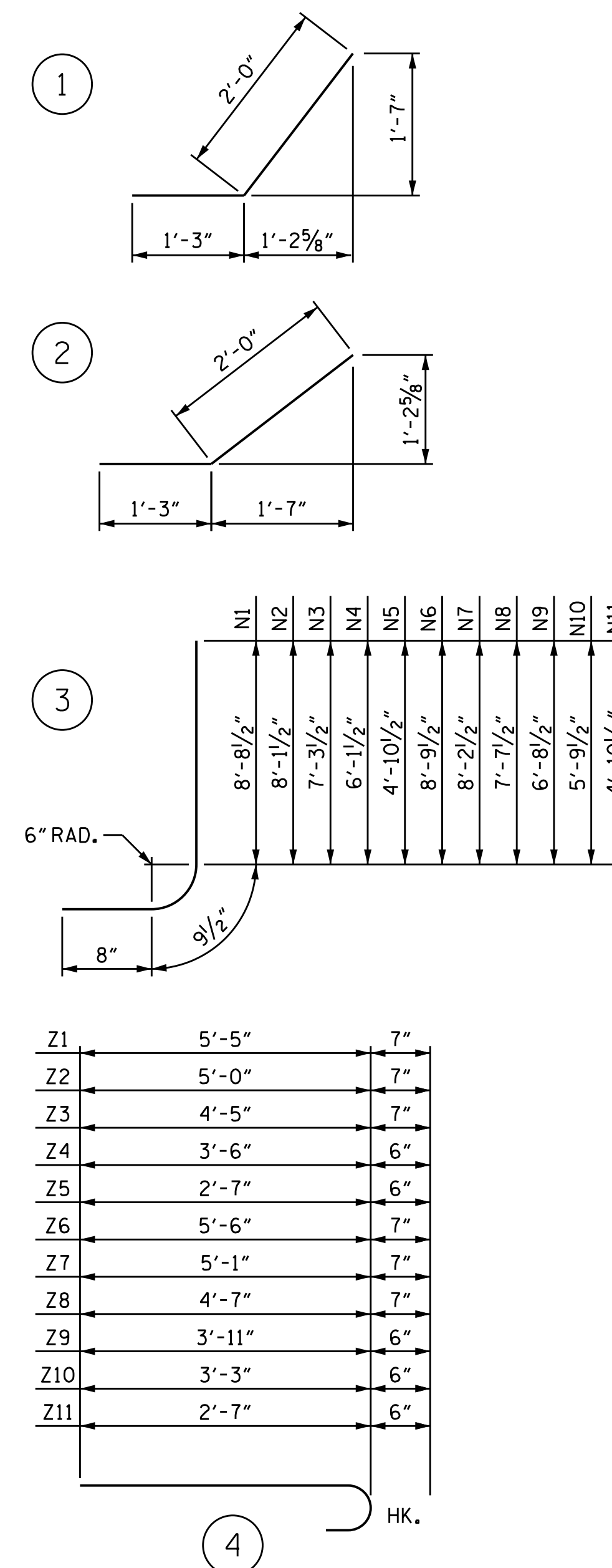
ELEVATION W4



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



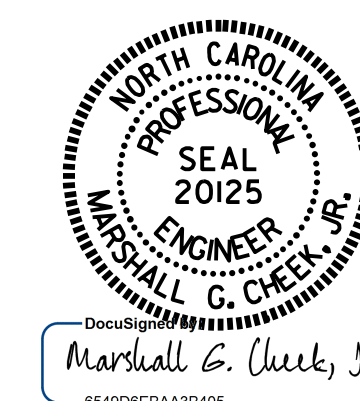
BILL OF MATERIAL

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	9'-1"	36
H2	2	#4	STR	8'-2"	11
H3	2	#4	STR	4'-5"	6
H4	12	#4	1	3'-3"	26
H5	2	#4	STR	9'-10"	13
H6	6	#4	STR	12'-7"	50
H7	2	#4	STR	11'-4"	15
H8	2	#4	STR	6'-5"	9
H9	12	#4	2	3'-3"	26
H10	2	#4	STR	13'-2"	18
N1	2	#5	3	10'-2"	21
N2	2	#5	3	9'-7"	20
N3	2	#5	3	8'-9"	18
N4	3	#4	3	7'-7"	15
N5	3	#4	3	6'-4"	13
N6	2	#5	3	10'-3"	21
N7	3	#5	3	9'-8"	30
N8	2	#5	3	9'-1"	19
N9	3	#4	3	8'-2"	16
N10	3	#4	3	7'-3"	15
N11	3	#4	3	6'-4"	13
S1	6	#6	STR	6'-0"	54
T1	3	#5	STR	11'-0"	34
T2	3	#5	STR	14'-6"	45
V1	2	#4	STR	8'-2"	11
V2	2	#4	STR	7'-6"	10
V3	2	#4	STR	6'-9"	9
V4	3	#4	STR	5'-6"	11
V5	3	#4	STR	4'-4"	9
V6	2	#4	STR	8'-3"	11
V7	3	#4	STR	7'-8"	15
V8	2	#4	STR	7'-0"	9
V9	3	#4	STR	6'-1"	12
V10	3	#4	STR	5'-2"	10
V11	3	#4	STR	4'-3"	9
Z1	2	#5	4	6'-0"	13
Z2	2	#5	4	5'-7"	12
Z3	2	#5	4	5'-0"	10
Z4	3	#4	4	4'-0"	8
Z5	3	#4	4	3'-1"	6
Z6	2	#5	4	6'-1"	13
Z7	3	#5	4	5'-8"	18
Z8	2	#5	4	5'-2"	11
Z9	3	#4	4	4'-5"	9
Z10	3	#4	4	3'-9"	8
Z11	3	#4	4	3'-1"	6
REINFORCING STEEL					774 LBS.
FOR 2 WINGS					
CLASS A CONCRETE					
2 WINGS					11.3 C.Y.
1 HEADWALL					0.5 C.Y.
1 END CURTAIN WALLS					0.4 C.Y.
TOTAL					12.2 C.Y.

PROJECT NO. R-2603
 WILKES COUNTY
 STATION: 59+43.00 -L-

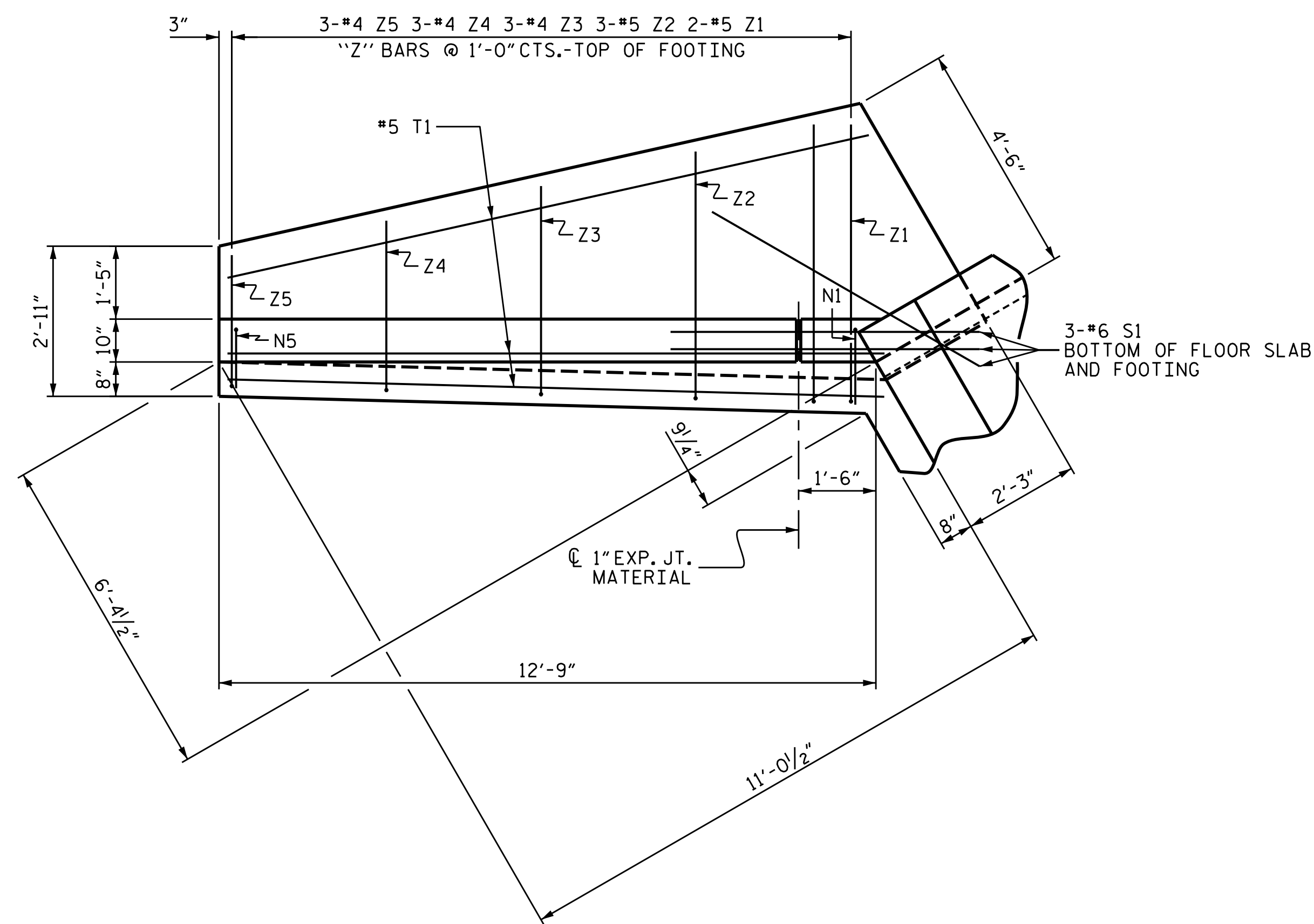
SHEET 8 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD WINGS
 FOR
 CONCRETE BOX CULVERT
 STAGE I
 H = 8'-0" SLOPE = 2:1
 75°SKEW

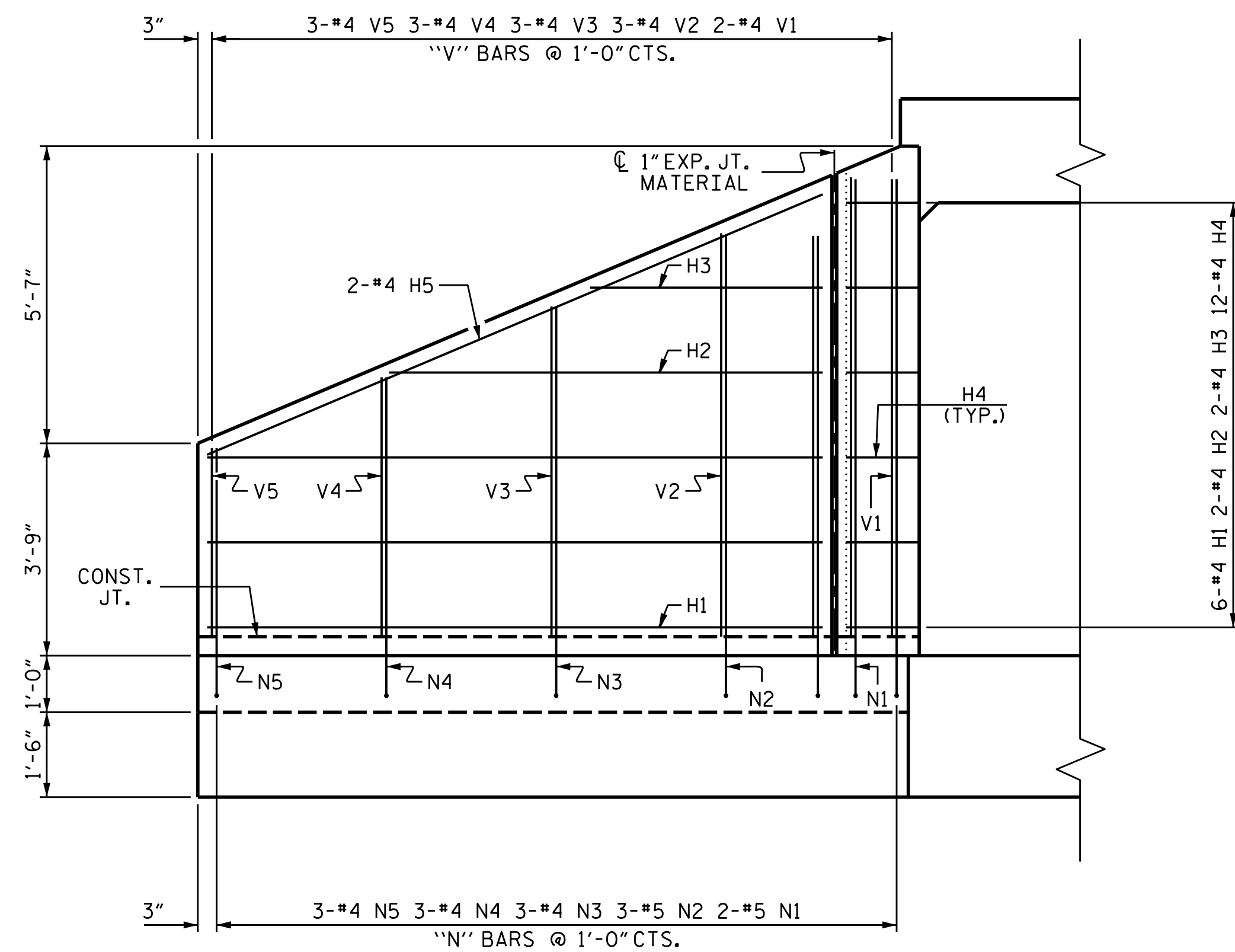


REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			10

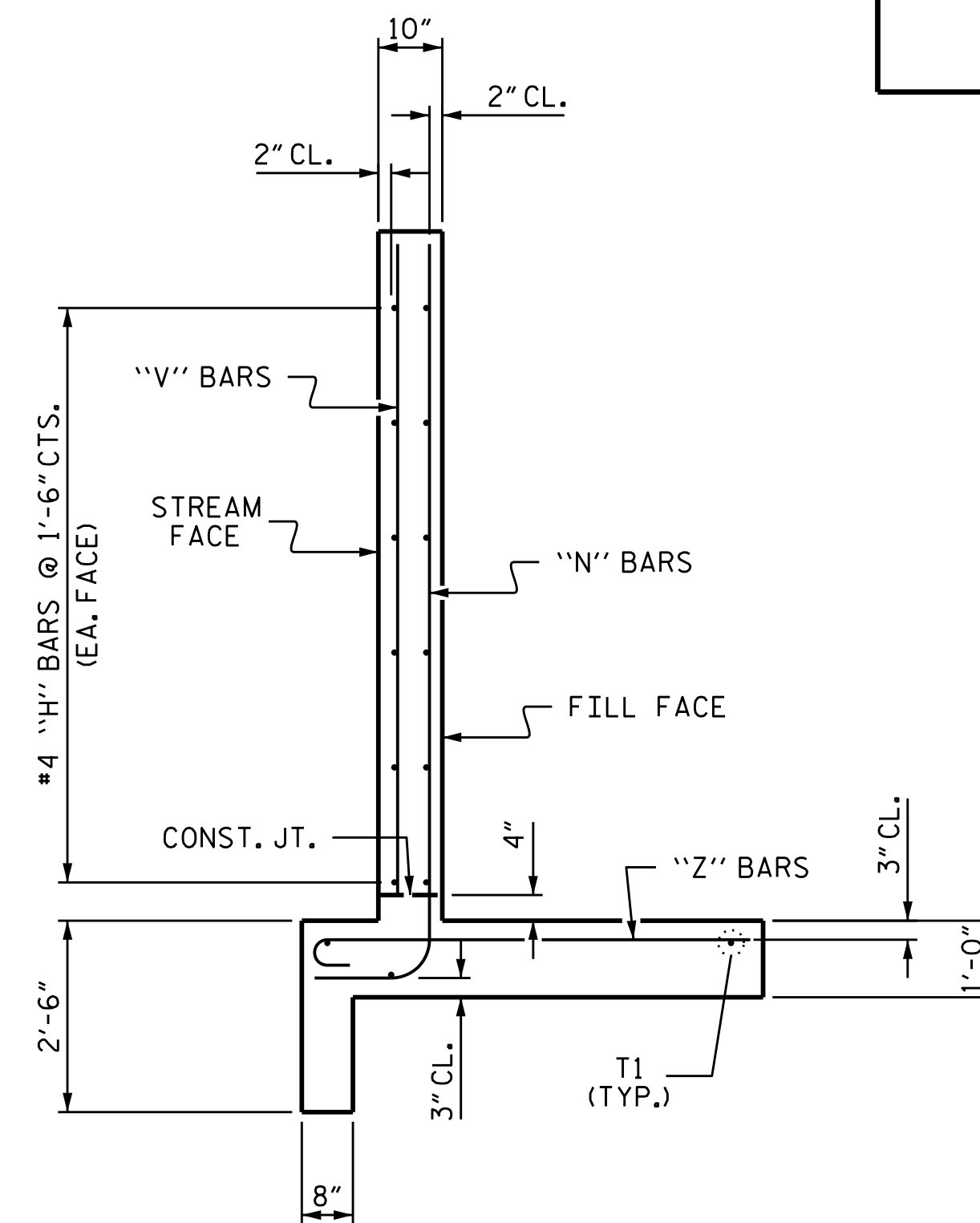
ASSEMBLED BY : H. T. BARBOUR DATE : 6-16-14
 CHECKED BY : S. B. WILLIAMS DATE : 12-14
 DRAWN BY : CCJ 01/00
 CHECKED BY : RWW 03/00



PLAN
(W1 SHOWN, W2 SIMILAR)

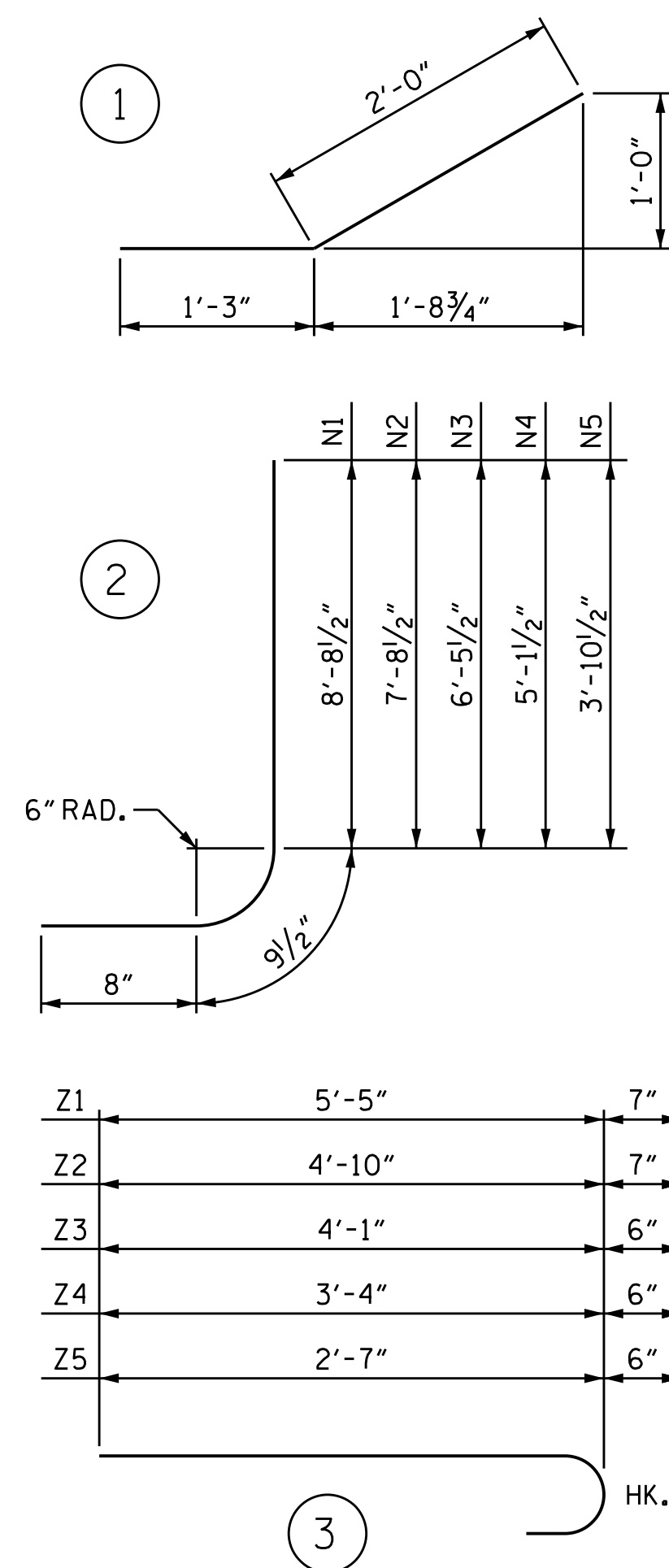


ELEVATION
(W1 SHOWN, W2 SIMILAR)



TYPICAL WING SECTION

BAR TYPES
ALL BAR DIMENSIONS ARE OUT TO OUT.



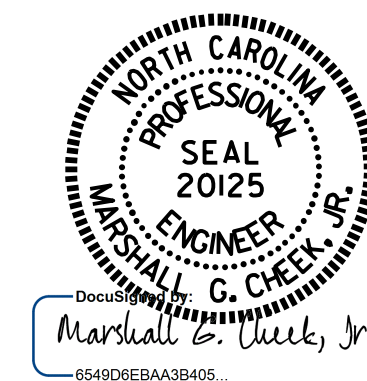
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	10'-10"	87
H2	4	#4	STR	7'-8"	20
H3	4	#4	STR	4'-1"	11
H4	24	#4	1	3'-3"	52
H5	4	#4	STR	11'-9"	31
N1	4	#5	2	10'-2"	42
N2	6	#5	2	9'-2"	57
N3	6	#4	2	7'-11"	32
N4	6	#4	2	6'-7"	26
N5	6	#4	2	5'-4"	21
S1	6	#6	STR	6'-0"	54
T1	6	#5	STR	12'-9"	80
V1	4	#4	STR	8'-1"	22
V2	6	#4	STR	7'-1"	28
V3	6	#4	STR	5'-10"	23
V4	6	#4	STR	4'-7"	18
V5	6	#4	STR	3'-4"	13
Z1	4	#5	3	6'-0"	25
Z2	6	#5	3	5'-5"	34
Z3	6	#4	3	4'-7"	18
Z4	6	#4	3	3'-10"	15
Z5	6	#4	3	3'-1"	12

REINFORCING STEEL FOR 2 WINGS	721 LBS.
CLASS A CONCRETE	
2 WINGS	10.7 C.Y.
1 HEADWALL	0.5 C.Y.
1 END CURTAIN WALL	0.4 C.Y.
TOTAL	11.6 C.Y.

ASSEMBLED BY : H. T. BARBOUR DATE : 5-6-14
 CHECKED BY : S. B. WILLIAMS DATE : 12-14
 DRAWN BY : CCJ 10/99
 CHECKED BY : RWW 03/00

PROJECT NO. R-2603
WILKES COUNTY
 STATION: 59+43.00 -L-
 SHEET 9 OF 10



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
STANDARD WINGS FOR CONCRETE BOX CULVERT STAGE II
 H = 8'-0" SLOPE = 2:1
 90° SKEW

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9	
1			3			TOTAL SHEETS	10
2			4				

**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 (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	2.07	--	1.75	3.55	1	EXTERIOR WALL	4.61	2.07	1	EXTERIOR WALL	8.04		
	HL-93 (OPERATING)	N/A		2.69	--	1.35	4.61	1	EXTERIOR WALL	4.61	2.69	1	EXTERIOR WALL	8.04		
	HS-20 (INVENTORY)	36.000	②	2.07	74.69	1.75	3.55	1	EXTERIOR WALL	4.61	2.07	1	EXTERIOR WALL	8.04		
	HS-20 (OPERATING)	36.000		2.69	96.82	1.35	4.61	1	EXTERIOR WALL	4.61	2.69	1	EXTERIOR WALL	8.04		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500	③	2.59	35.01	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		SNGARBS2	20,000		2.59	51.87	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		SNAGRIS2	22,000		2.59	57.05	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		SNCOTTS3	27,250		2.59	70.67	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		SNAGGRS4	34,925		2.59	90.57	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		SNS5A	35,550		2.59	92.19	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		SNS6A	39,950		2.59	103.60	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		SNS7B	42,000		2.59	108.92	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		2.59	85.58	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		TNT4A	33,075		2.59	85.77	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		TNT6A	41,600		2.59	107.88	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		TNT7A	42,000		2.59	108.92	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		TNT7B	42,000		2.59	108.92	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
		TNAGRIT4	43,000		2.59	111.51	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04	
TNAGT5A	45,000		2.59	116.70	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04			
TNAGT5B	45,000		2.59	116.70	1.40	4.44	1	EXTERIOR WALL	4.61	2.59	1	EXTERIOR WALL	8.04			

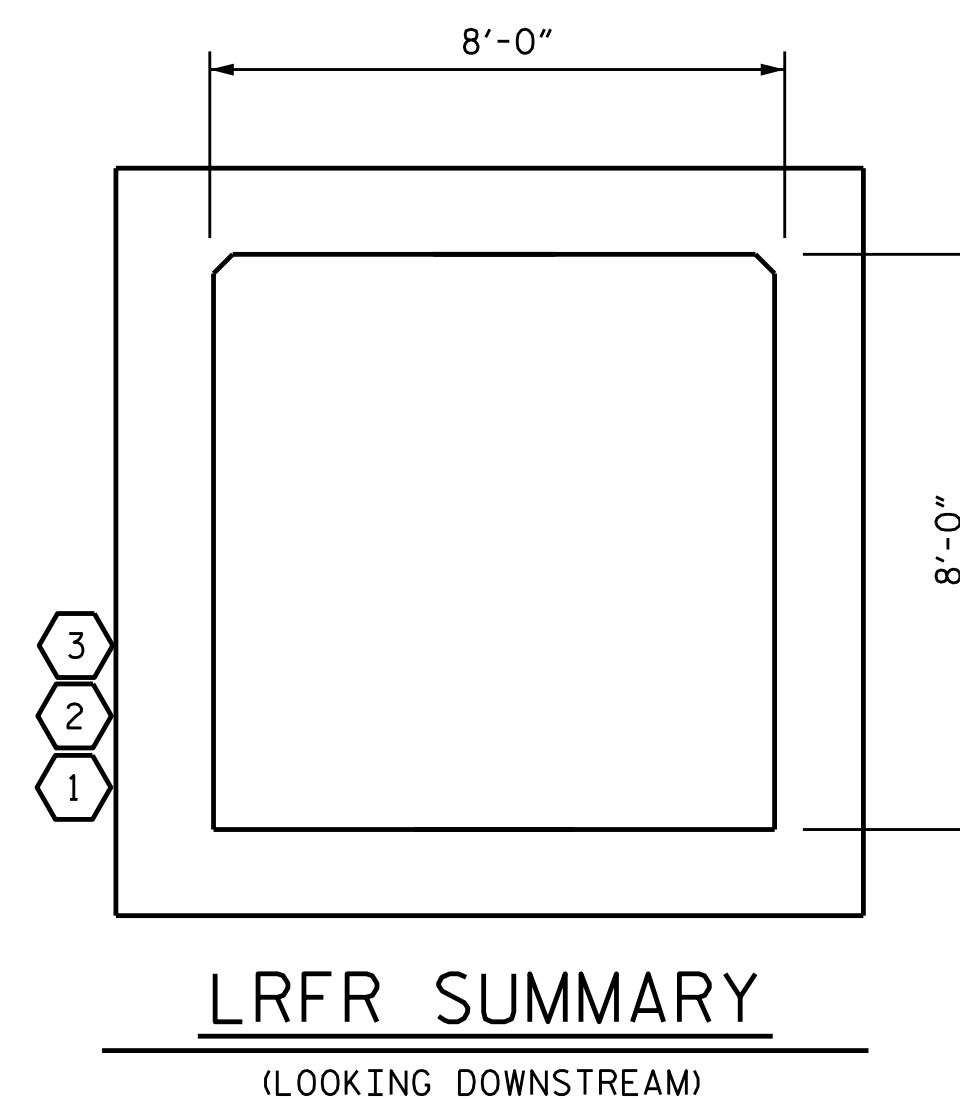
LOAD FACTORS:

LOAD TYPE	MAX FACTOR	MIN FACTOR
DC	1.25	0.90
DW	1.50	0.65
EV	1.30	0.90
EH	1.35	0.50 or 0.90
ES	1.35	0.50 or 0.90
LS	1.75	--
WA	1.00	--

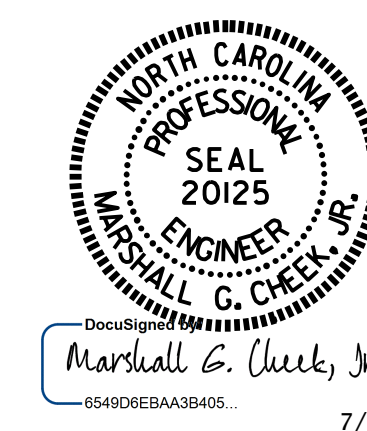
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

③	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



PROJECT NO. R-2603
WILKES COUNTY
 STATION: 59+43.00 -L-
 SHEET 10 OF 10



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-10
1			3			TOTAL SHEETS
2			4			10

ASSEMBLED BY : C. EICHELBERGER DATE : 1/21/2015
 CHECKED BY : B.A. DUKE DATE : 1/22/2015
 DRAWN BY : WMC 7/11 REV. 10/1/11 MAA/GM
 CHECKED BY : GM 7/11