

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5526		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
43836.1.1		PE	
43836.2.D1		RW & Util	
43836.3.D1		CONST	

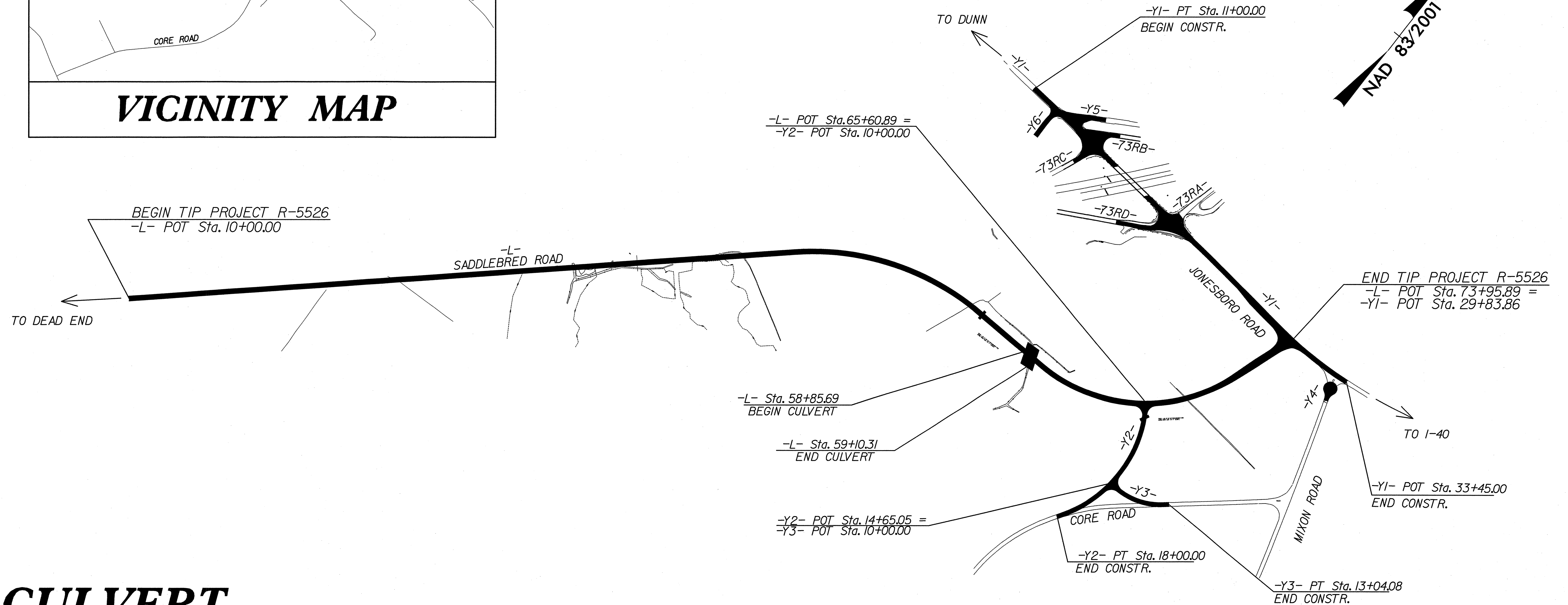
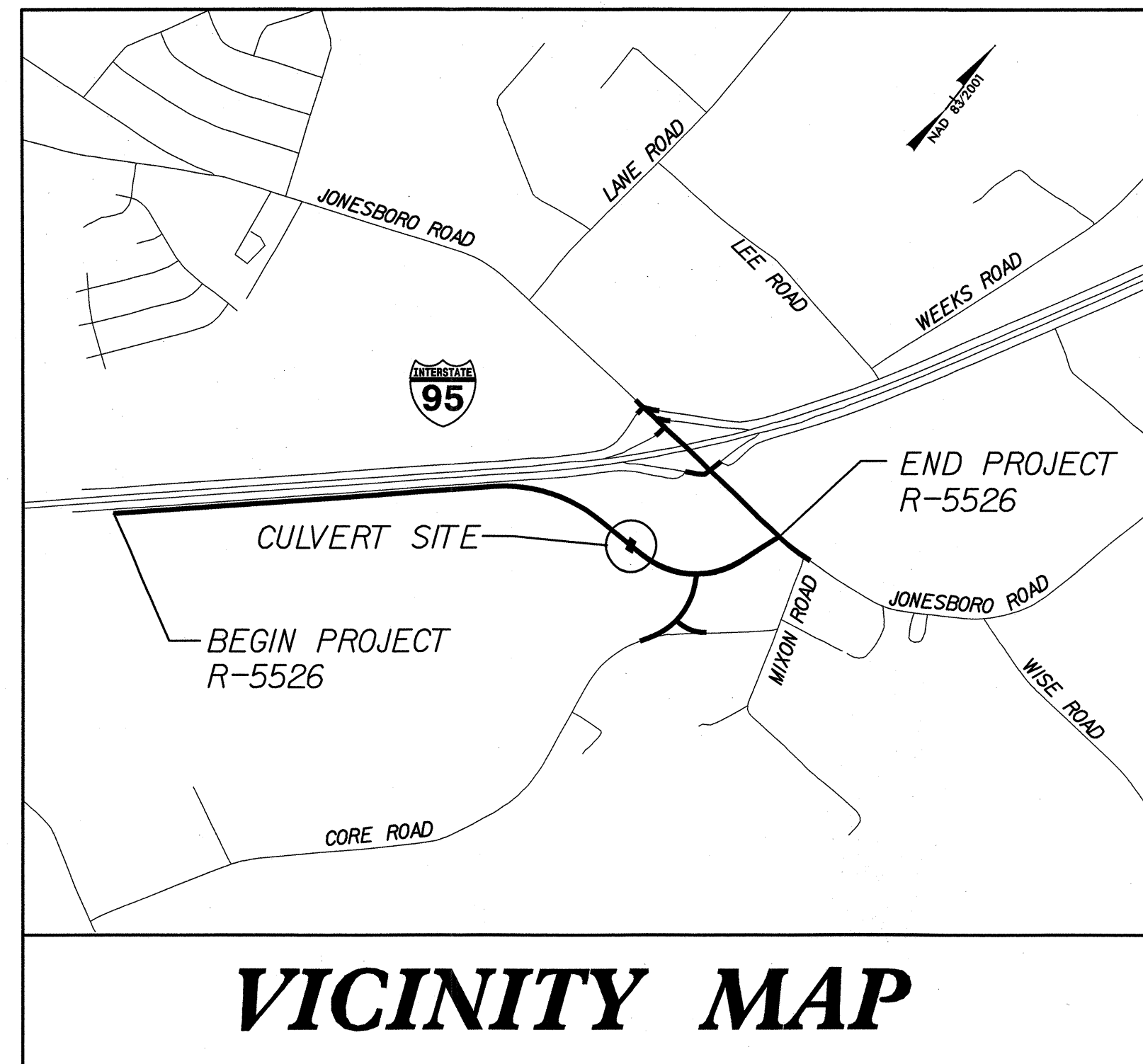
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STRUCTURE PLANS

HARNETT COUNTY

LOCATION: SR 1841 (SADDLEBRED ROAD) SOUTH OF I-95 AND
SR 1808 (JONESBORO ROAD) INTERCHANGE

TYPE OF WORK: GRADING, PAVING, WIDENING, RESURFACING, DRAINAGE,
PAVEMENT MARKINGS, SIGNING, AND CULVERT



CULVERT

TIP PROJECT: R-5526

CONTRACT: C203456

DESIGN DATA

ADT 2014 = 2,800
ADT 2034 = 5000
DHV = 20%
D = 60%
T = 13%
V = 50 MPH

*TTST=12% DUAL=1%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5526 = 1.209 MILES
LENGTH STRUCTURE TIP PROJECT R-5526 = 0.004 MILES
TOTAL LENGTH TIP PROJECT R-5526 = 1.213 MILES

NCDOT CONTACT: SCOTT PRIDGEN, DIVISION DESIGN ENGINEER

Prepared in the Office of:

ATKINS

1616 East Millbrook Road, Raleigh, NC 27609
for the North Carolina Division of Highways

2012 STANDARD SPECIFICATIONS

JOHN WERES, PE
PROJECT ENGINEER

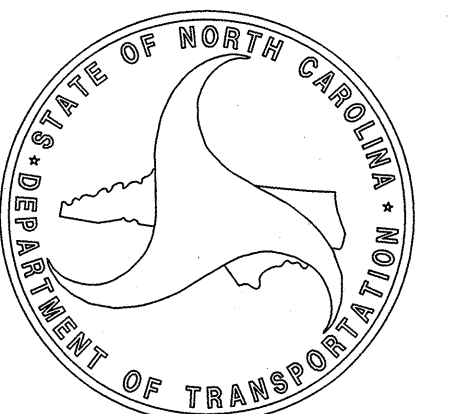
MATTHEW PAYNE, PE
PROJECT DESIGN ENGINEER

LETTING DATE:
MARCH 18, 2014

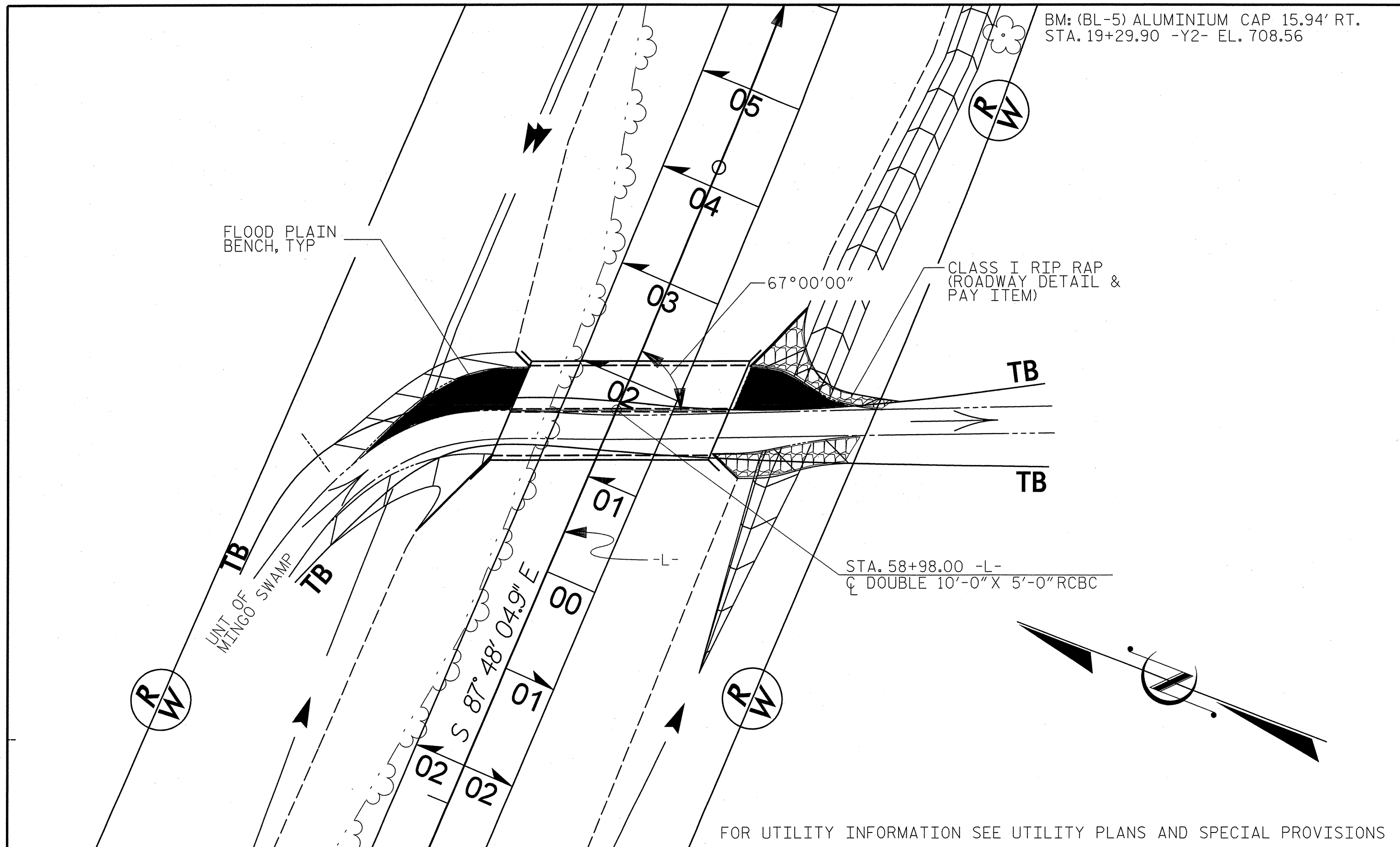
STRUCTURES ENGINEER



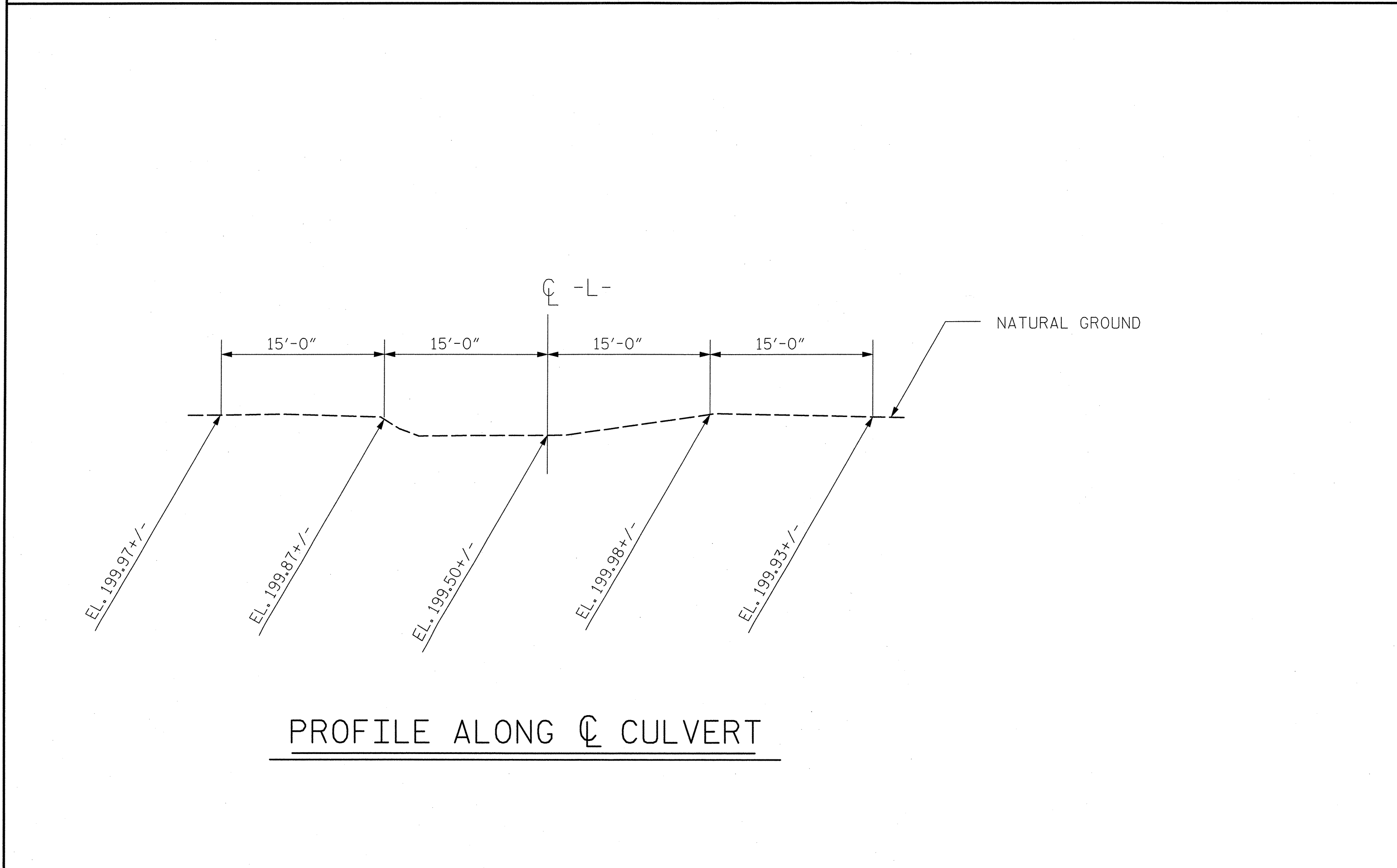
Matthew Payne
SIGNATURE: P.E.



09/08/99
28-JAN-2014 11:32
RA:Scoble\red_sr\structures\R-5526_STR_tsh.dgn
payn528 AT LUS290333



LOCATION SKETCH



PROFILE ALONG CL CULVERT

BM: (BL-5) ALUMINIUM CAP 15.94' RT.
STA. 19+29.90 -Y2- EL. 708.56

TOTAL STRUCTURE QUANTITIES		
CLASS A CONCRETE		
BARREL @	2.18	CY/FT 109.98 C.Y.
WING ETC.		13.02 C.Y.
TOTAL		123.00 C.Y.
REINFORCING STEEL		
BARREL		15,350 LBS.
WINGS ETC.		667 LBS.
TOTAL		16,017 LBS.
CULVERT EXCAVATION LUMP SUM		
FOUNDATION CONDITIONING MATERIAL		85.71 TONS

HYDRAULIC DATA

DESIGN DISCHARGE = 350 CFS
 FREQUENCY OF DESIGN FLOOD = 25 YR.
 DESIGN HIGH WATER ELEVATION = 202.9 FT.
 DRAINAGE AREA = 0.16 SQ. MI.
 BASE DISCHARGE (Q100) = 480 CFS
 BASE HIGH WATER ELEVATION = 203.25 FT.

OVERTOPPING FLOOD DATA

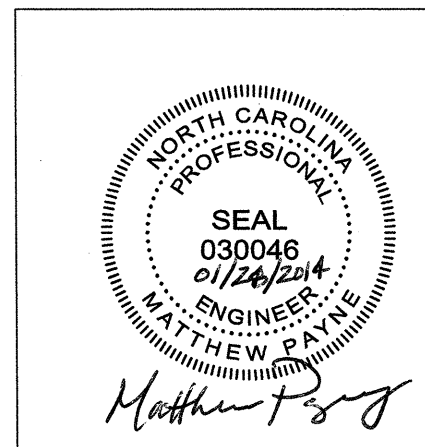
OVERTOPPING DISCHARGE = 600 CFS
 FREQUENCY OF OVERTOPPING FLOOD = 200 YR.
 OVERTOPPING FLOOD ELEVATION = 203.8 FT.

NOTES:

- ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
- DESIGN FILL-----3.0 FT.
- 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:
 1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.
- 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.
- 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.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- 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.
- SCOUR PROTECTION IS REQUIRED AT BOTH INLET AND OUTLET ENDS OF THE CULVERT. DO NOT PLACE RIP RAP ABOVE THE STREAM BED.
- THE SCOUR CRITICAL ELEVATION IS THE AS-BUILT BOTTOM OF CULVERT FLOOR SLAB ELEVATION. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

PROJECT NO. R5526
HARNETT COUNTY
 STATION: 58+98 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**DOUBLE BARREL
 10 FT. X 5 FT.
 CONCRETE BOX CULVERT
 67° SKEW**



DRAWN BY : C. R. DESROCHERS DATE : DEC. 2013
 CHECKED BY : M. PAYNE DATE : DEC. 2013

ATKINS 1616 E. MILLBROOK ROAD, SUITE #310
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBES #F-0326

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

C-2
 TOTAL SHEETS 8

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 _L)	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	1.63	--	1.75	1.63	2	TOP SLAB	21.67	1.89	2	TOP SLAB	21.67	.	
	HL-93 (OPERATING)	N/A		2.12	--	1.35	2.12	2	TOP SLAB	21.67	2.46	2	TOP SLAB	21.67	.	
	HS-20 (INVENTORY)	36.000	②	1.69	60.84	1.75	1.69	2	BOTTOM SLAB	21.67	2.09	2	TOP SLAB	21.67	.	
	HS-20 (OPERATING)	36.000		2.19	78.84	1.35	2.19	2	BOTTOM SLAB	21.67	2.71	2	TOP SLAB	21.67	.	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.37	45.50	1.40	3.37	1	TOP SLAB	10.75	3.86	2	TOP SLAB	21.67	.
		SNGRBS2	20.000		3.12	62.40	1.40	3.12	2	TOP SLAB	21.67	3.58	2	TOP SLAB	21.67	.
		SNAGRIS2	22.000		3.07	67.54	1.40	3.07	2	BOTTOM SLAB	21.67	3.79	2	TOP SLAB	21.67	.
		SNCOTTS3	27.250		1.97	53.68	1.40	1.97	2	TOP SLAB	21.67	2.36	2	TOP SLAB	21.67	.
		SNAGGRS4	34.925		1.96	68.45	1.40	1.96	2	BOTTOM SLAB	21.67	2.89	2	TOP SLAB	21.67	.
		SNS5A	35.550		2.08	73.94	1.40	2.08	2	BOTTOM SLAB	21.67	2.69	2	TOP SLAB	21.67	.
		SNS6A	39.950		1.92	76.70	1.40	1.92	2	TOP SLAB	21.67	2.63	2	TOP SLAB	21.67	.
		SNS7B	42.000		1.92	80.64	1.40	1.92	2	TOP SLAB	21.67	2.63	2	TOP SLAB	21.67	.
	TRUCK TRACTOR SEMI-TRAILER (TTS)	TNAGRIT3	33.000		2.23	73.59	1.40	2.23	2	BOTT. SLAB	21.67	3.41	2	TOP SLAB	21.67	.
		TNT4A	33.075		2.03	67.14	1.40	2.03	2	TOP SLAB	21.67	2.72	2	TOP SLAB	21.67	.
		TNT6A	41.600		1.98	82.37	1.40	1.98	2	TOP SLAB	21.67	2.63	2	TOP SLAB	21.67	.
		TNT7A	42.000		1.97	82.74	1.40	1.97	2	TOP SLAB	21.67	2.66	2	TOP SLAB	21.67	.
		TNT7B	42.000		1.97	82.74	1.40	1.97	2	TOP SLAB	21.67	2.67	2	TOP SLAB	21.67	.
		TNAGRIT4	43.000		1.78	76.54	1.40	1.78	2	BOTTOM SLAB	21.67	2.61	2	TOP SLAB	21.67	.
TNAGT5A	45.000		1.78	80.10	1.40	1.78	2	TOP SLAB	21.67	2.58	2	TOP SLAB	21.67	.		
TNAGT5B	45.000		③	1.67	75.15	1.40	1.67	2	TOP SLAB	21.67	2.52	2	TOP SLAB	21.67	.	

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	--

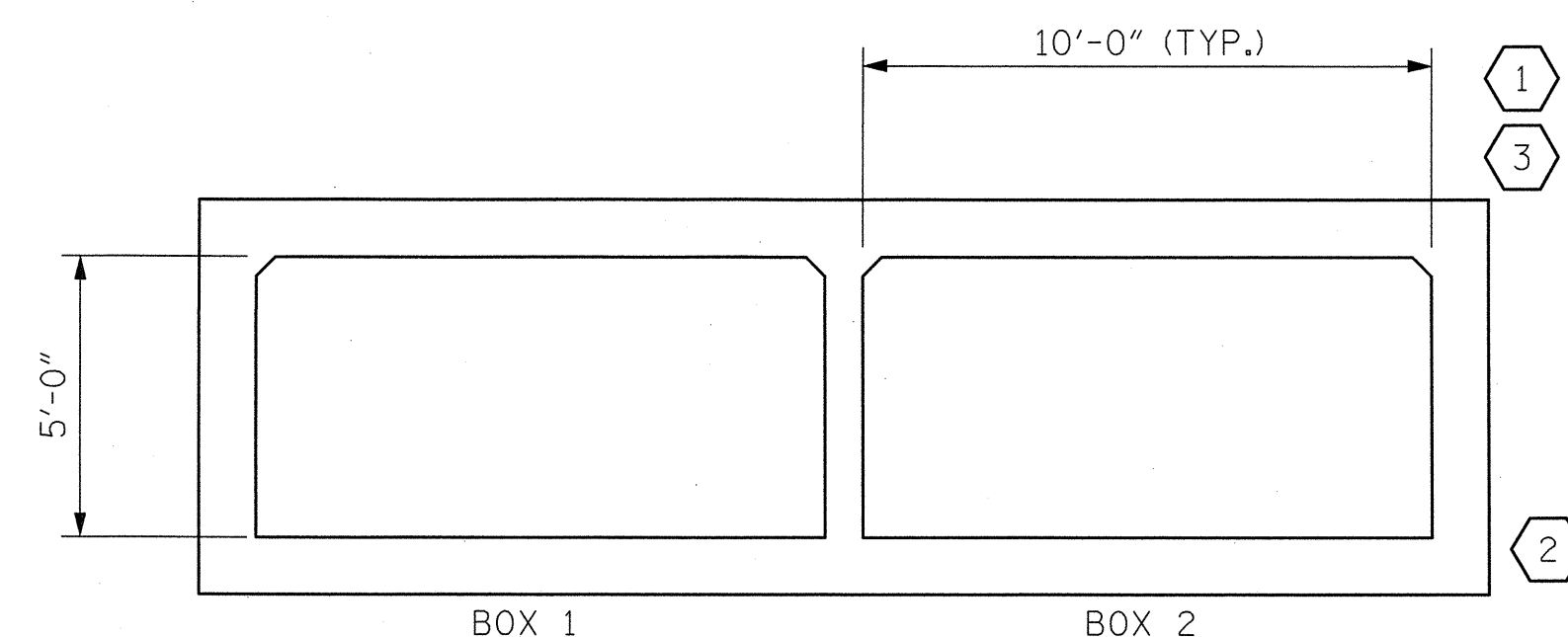
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

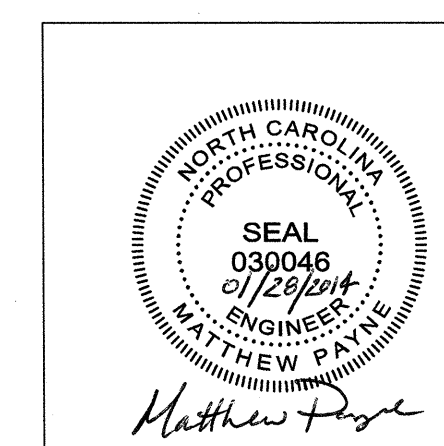
⊕	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. R5526
HARNETT COUNTY
STATION: 58+98 -L-

SHEET 3 OF 8

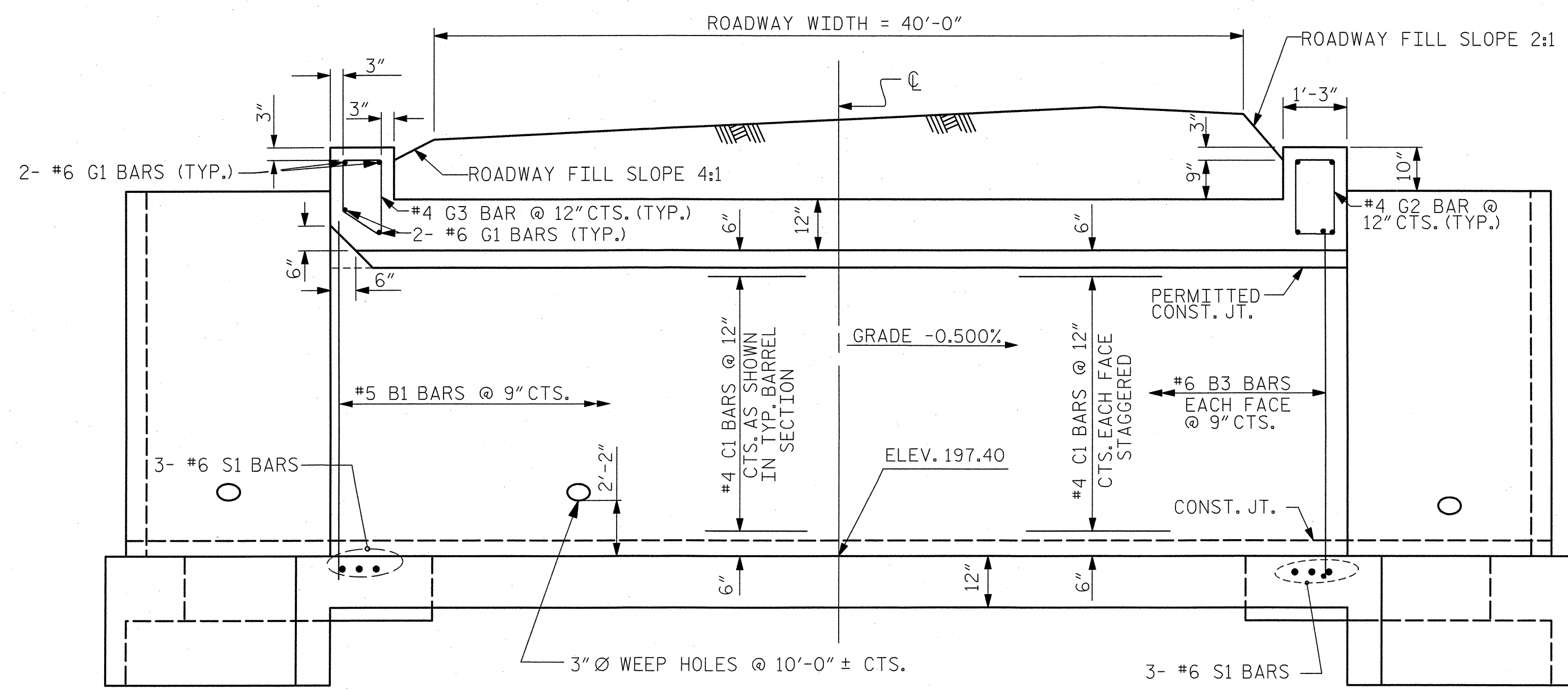


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

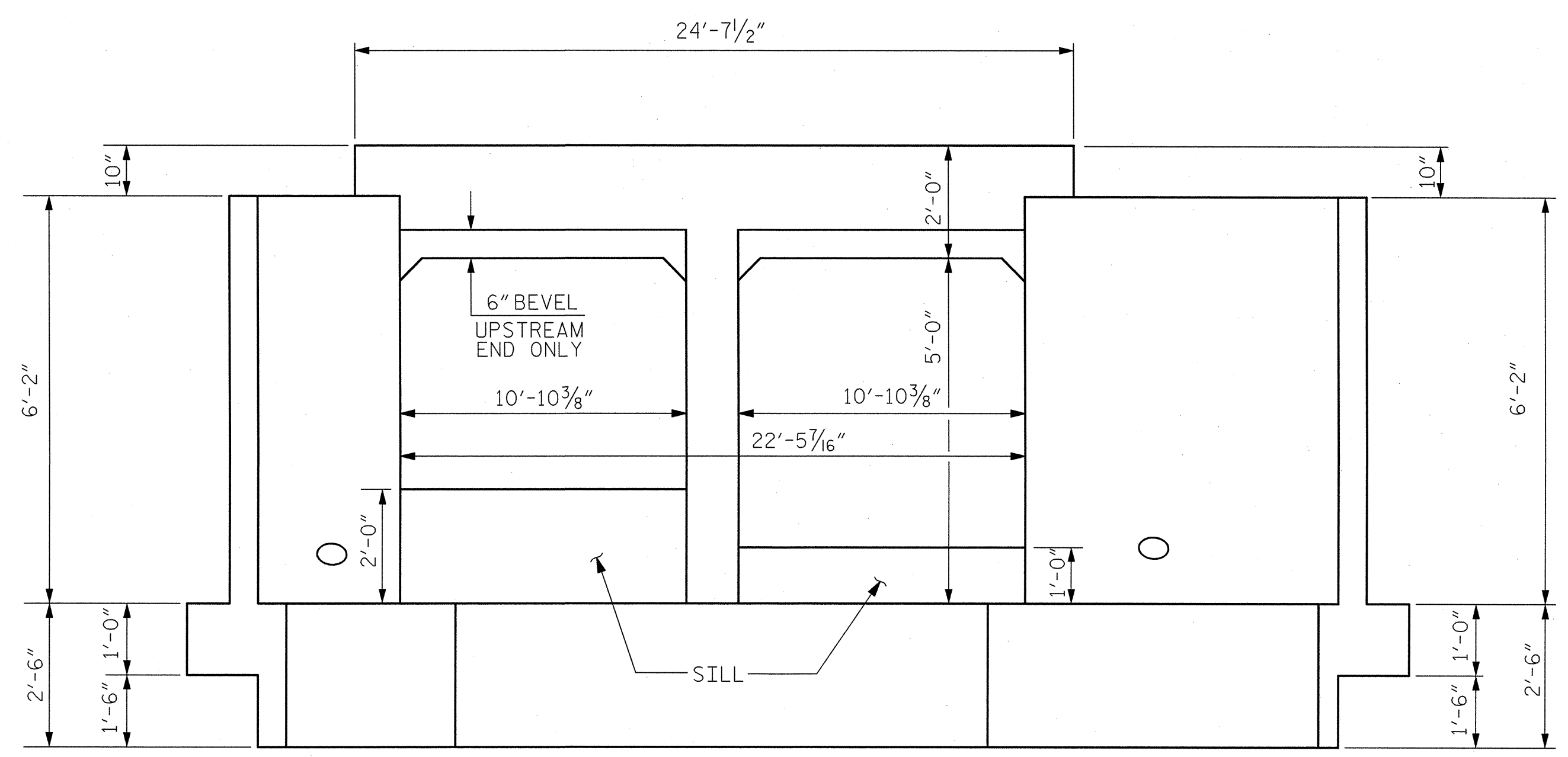
DRAWN BY: C.R. DESROCHERS DATE: OCT. 2013
CHECKED BY: J. WERES DATE: OCT. 2013

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RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

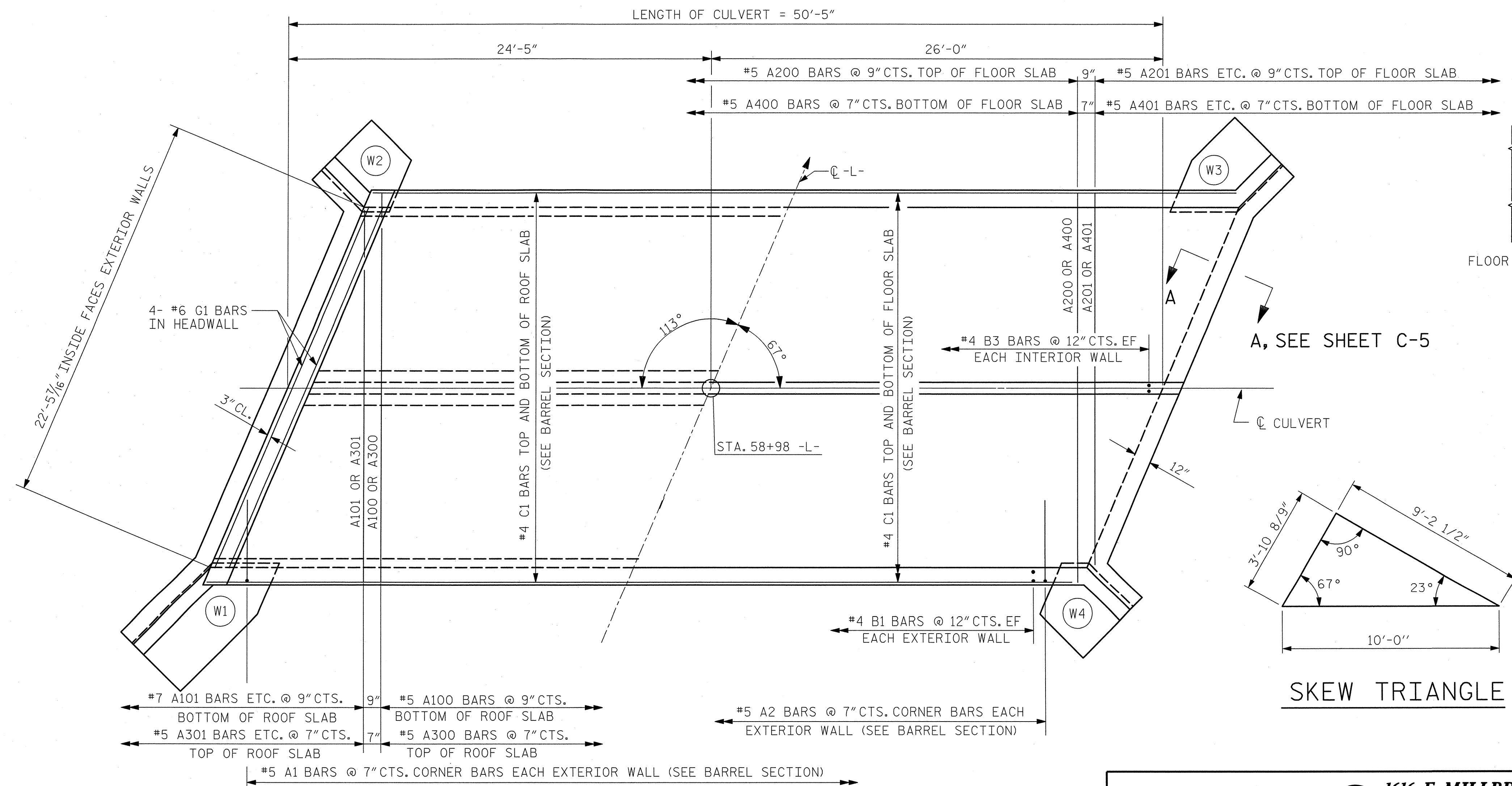
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS
2			4			8



EXTERIOR WALL INTERIOR WALL
 CULVERT SECTION NORMAL TO ROADWAY

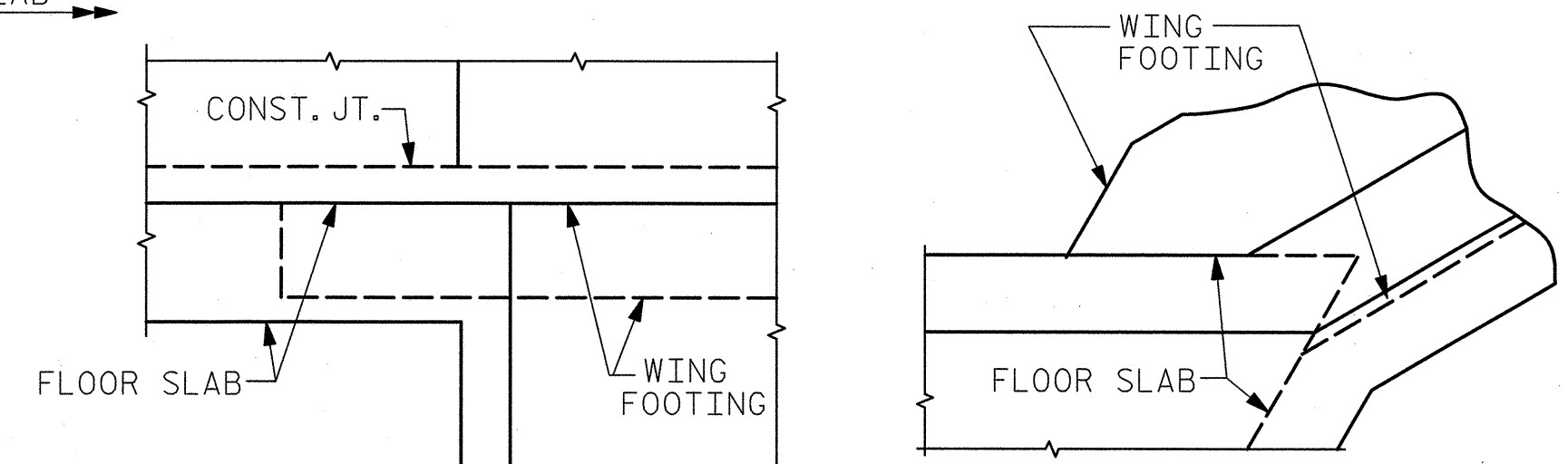


END ELEVATION NORMAL TO SKEW
 (LOOKING DOWNSTREAM)

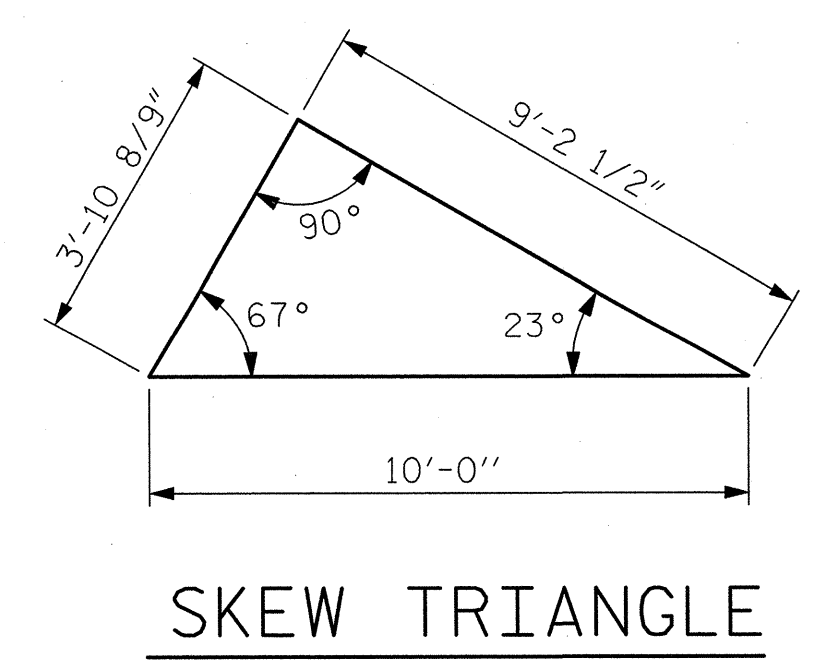


PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

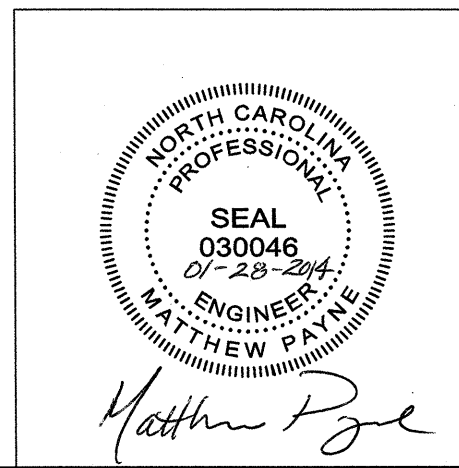


DETAIL
 CONNECTION OF WING FOOTING
 AND FLOOR SLAB WHEN SLAB
 IS THICKER THAN FOOTING



SKEW TRIANGLE

PROJECT NO. R5526
 HARNETT COUNTY
 STATION: 58+98 -L-
 SHEET 4 OF 8



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE BARREL
 10 FT. X 5 FT.
 CONCRETE BOX CULVERT
 67° SKEW

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
 REDRAWN 10-1-90 BY P. DONOVAN CHECKED BY ARB

DRAWN BY: C. R. DESROCHERS DATE: DEC. 2013
 CHECKED BY: M. PAYNE DATE: DEC. 2013

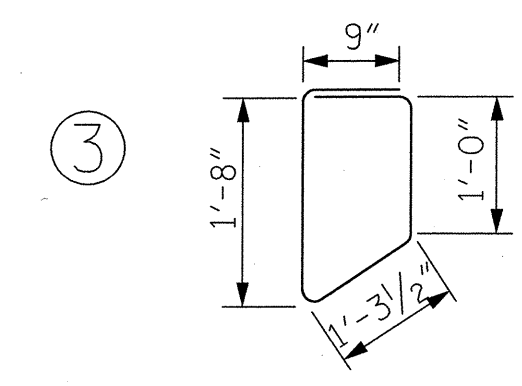
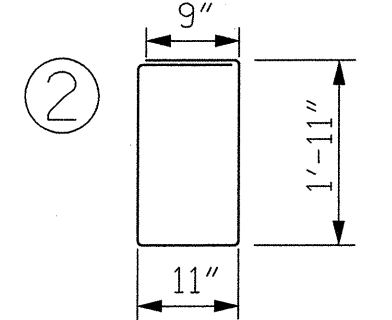
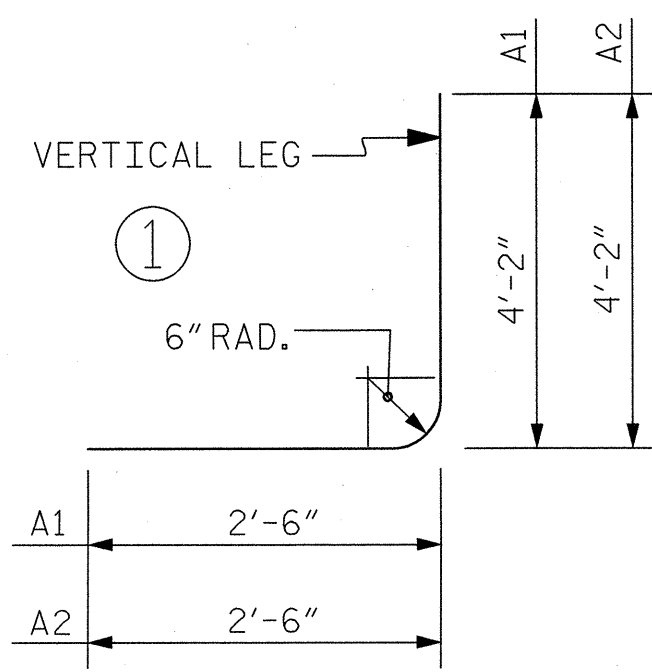
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 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBES #F-0326

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

TOTAL SHEETS 8

BAR TYPES

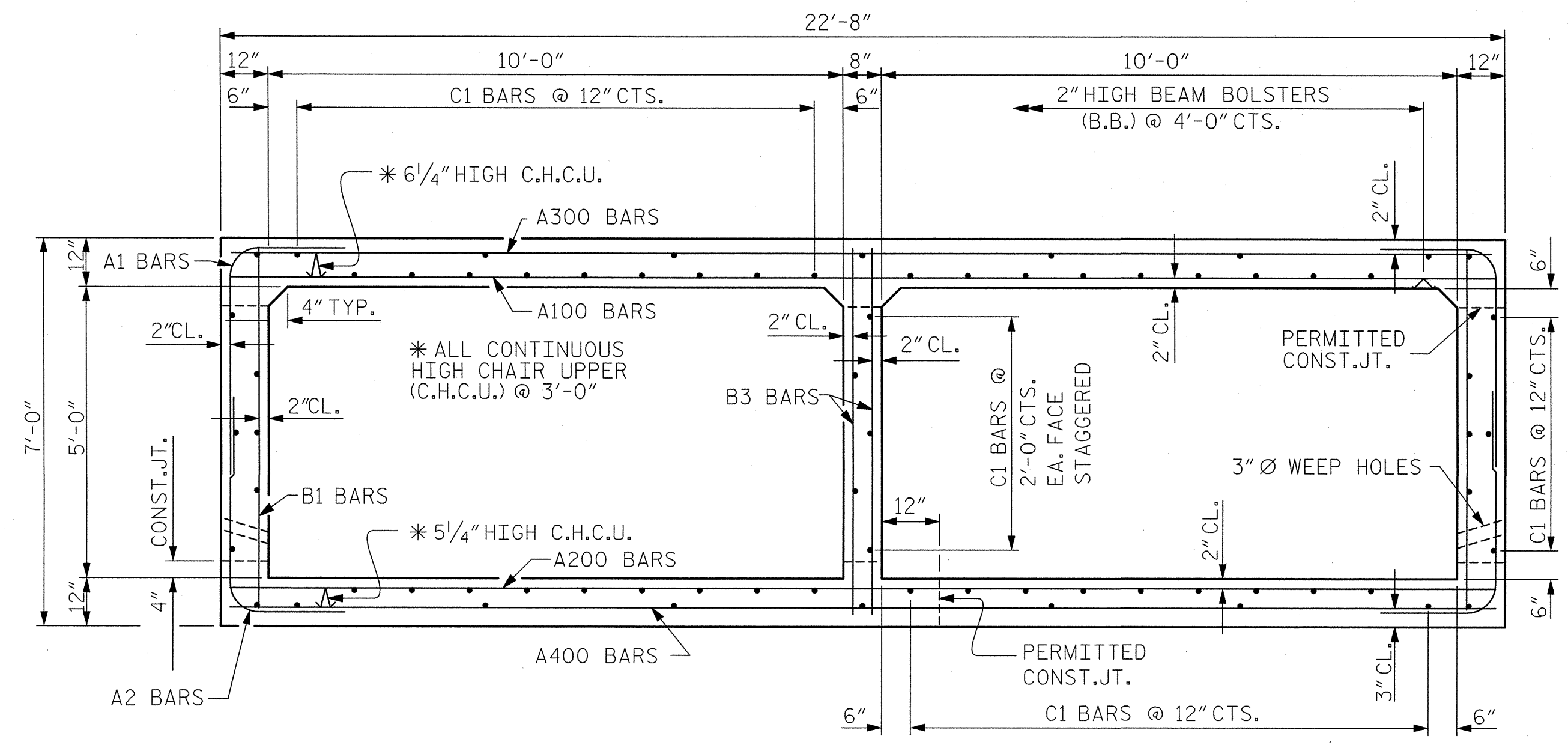
BAR DIMENSIONS ARE OUT TO OUT



SPLICE LENGTH CHART	
BAR	SPLICE LENGTH
#4	1'-9"
#5	2'-2"
#7	3'-9"

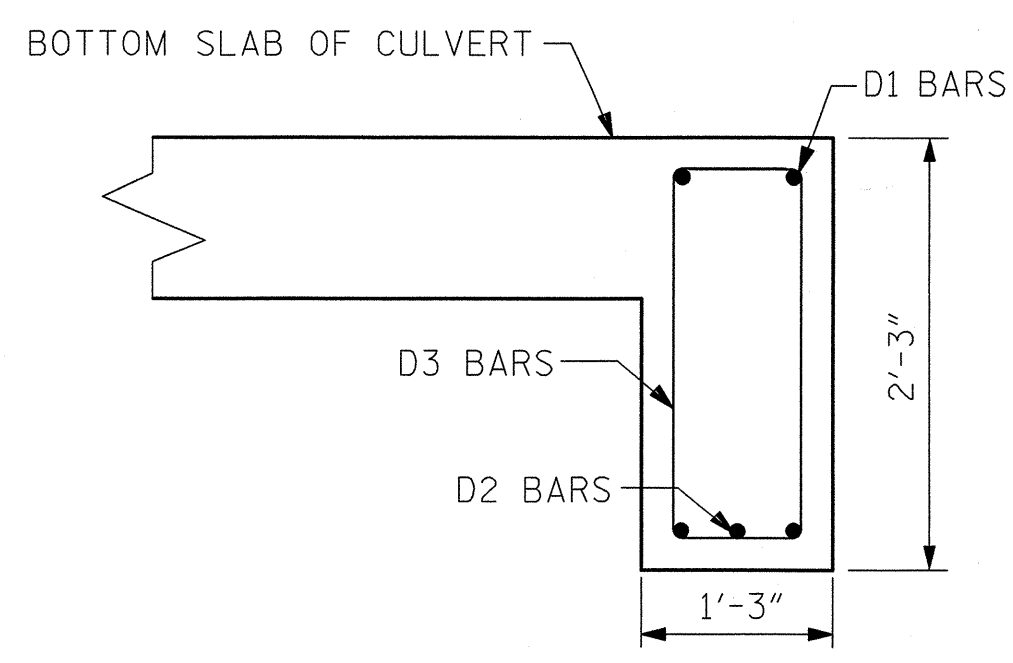
REINFORCING STEEL BAR SCHEDULE						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
A1	174	5	1	6'-8"	1210	
A2	174	5	1	6'-8"	1210	
A100	55	5	STR	22'-4"	1281	
A101	2	5	STR	20'-9"	43	
A102	2	5	STR	19'-0"	40	
A103	2	5	STR	17'-3"	36	
A104	2	5	STR	15'-5"	32	
A105	2	5	STR	13'-8"	29	
A106	2	5	STR	11'-11"	25	
A107	2	5	STR	10'-2"	21	
A108	2	5	STR	8'-4"	17	
A109	2	5	STR	6'-7"	14	
A110	2	5	STR	4'-10"	10	
A111	2	5	STR	3'-1"	6	
A112	2	5	STR	1'-4"	3	
A200	55	5	STR	22'-4"	1281	
A201	2	5	STR	20'-9"	43	
A202	2	5	STR	19'-0"	40	
A203	2	5	STR	17'-3"	36	
A204	2	5	STR	15'-5"	32	
A205	2	5	STR	13'-8"	29	
A206	2	5	STR	11'-11"	25	
A207	2	5	STR	10'-2"	21	
A208	2	5	STR	8'-4"	17	
A209	2	5	STR	6'-7"	14	
A210	2	5	STR	4'-10"	10	
A211	2	5	STR	3'-1"	6	
A212	2	5	STR	1'-4"	3	
A300	70	5	STR	22'-4"	1630	
A301	2	5	STR	21'-9"	45	
A302	2	5	STR	20'-4"	42	
A303	2	5	STR	19'-0"	40	
A304	2	5	STR	17'-7"	37	
A305	2	5	STR	16'-3"	34	
A306	2	5	STR	14'-10"	31	
A307	2	5	STR	13'-6"	28	
A308	2	5	STR	12'-1"	25	
A309	2	5	STR	10'-9"	22	
A310	2	5	STR	9'-4"	19	
A311	2	5	STR	8'-0"	17	
A312	2	5	STR	6'-7"	14	
A313	2	5	STR	5'-3"	11	
A314	2	5	STR	3'-10"	8	
A315	2	5	STR	2'-6"	5	
A400	70	5	STR	22'-4"	1630	
A401	2	5	STR	21'-9"	45	
A402	2	5	STR	20'-4"	42	
A403	2	5	STR	19'-0"	40	
A404	2	5	STR	17'-7"	37	
A405	2	5	STR	16'-3"	34	
A406	2	5	STR	14'-10"	31	
A407	2	5	STR	13'-6"	28	
A408	2	5	STR	12'-1"	25	
A409	2	5	STR	10'-9"	22	
A410	2	5	STR	9'-4"	19	
A411	2	5	STR	8'-0"	17	
A412	2	5	STR	6'-7"	14	
A413	2	5	STR	5'-3"	11	
A414	2	5	STR	3'-10"	8	
A415	2	5	STR	2'-6"	5	
B1	136	5	STR	5'-6"	780	
B3	136	6	STR	6'-7"	1345	
C1	71	4	STR	50'-1"	2375	
D1	4	5	STR	24'-0"	100	
D2	6	5	STR	24'-0"	150	
D3	46	4	2	6'-3"	192	
D4	6	6	STR	1'-7"	14	
D5	6	6	STR	2'-7"	23	
G1	8	6	STR	24'-1"	290	
G2	48	4	2	6'-3"	200	
G3	48	4	3	5'-6"	176	
S1	6	6	STR	24'-1"	217	

TOTAL REINFORCING STEEL = 15,350 LBS



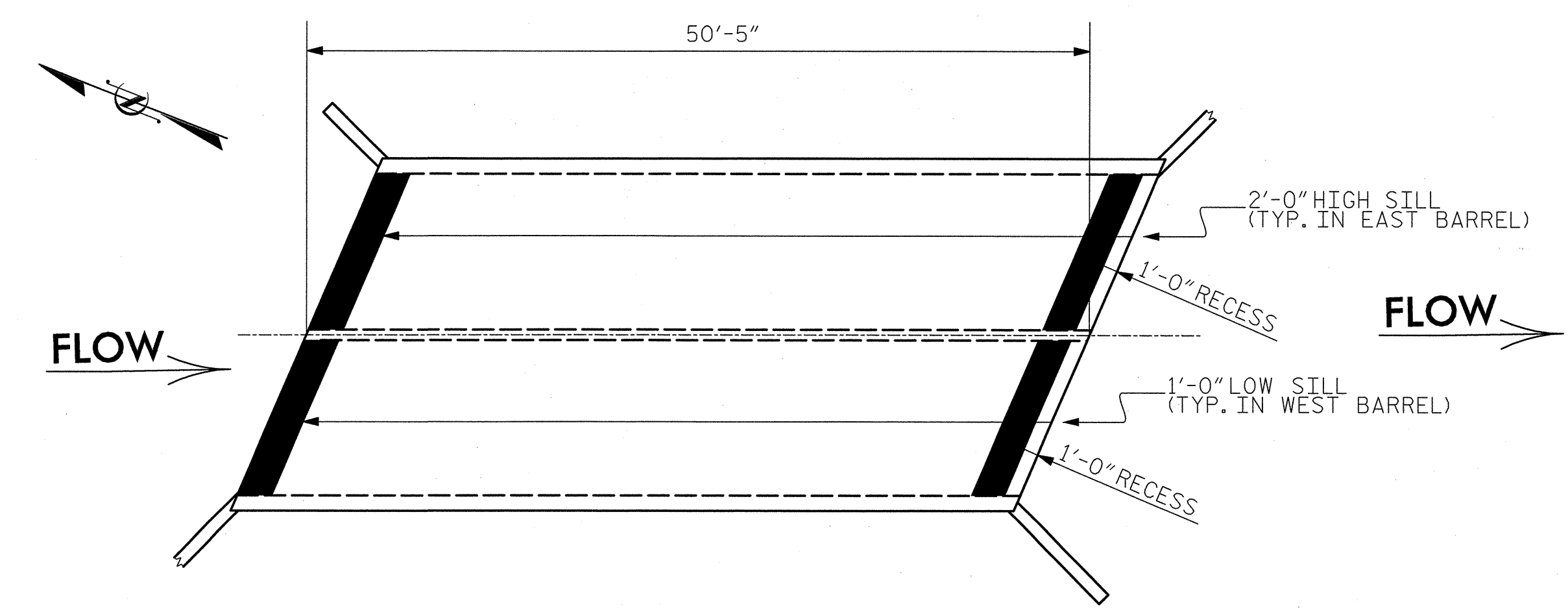
RIGHT ANGLE SECTION OF BARREL

THERE ARE 71 "C" BARS IN SECTION OF BARREL.

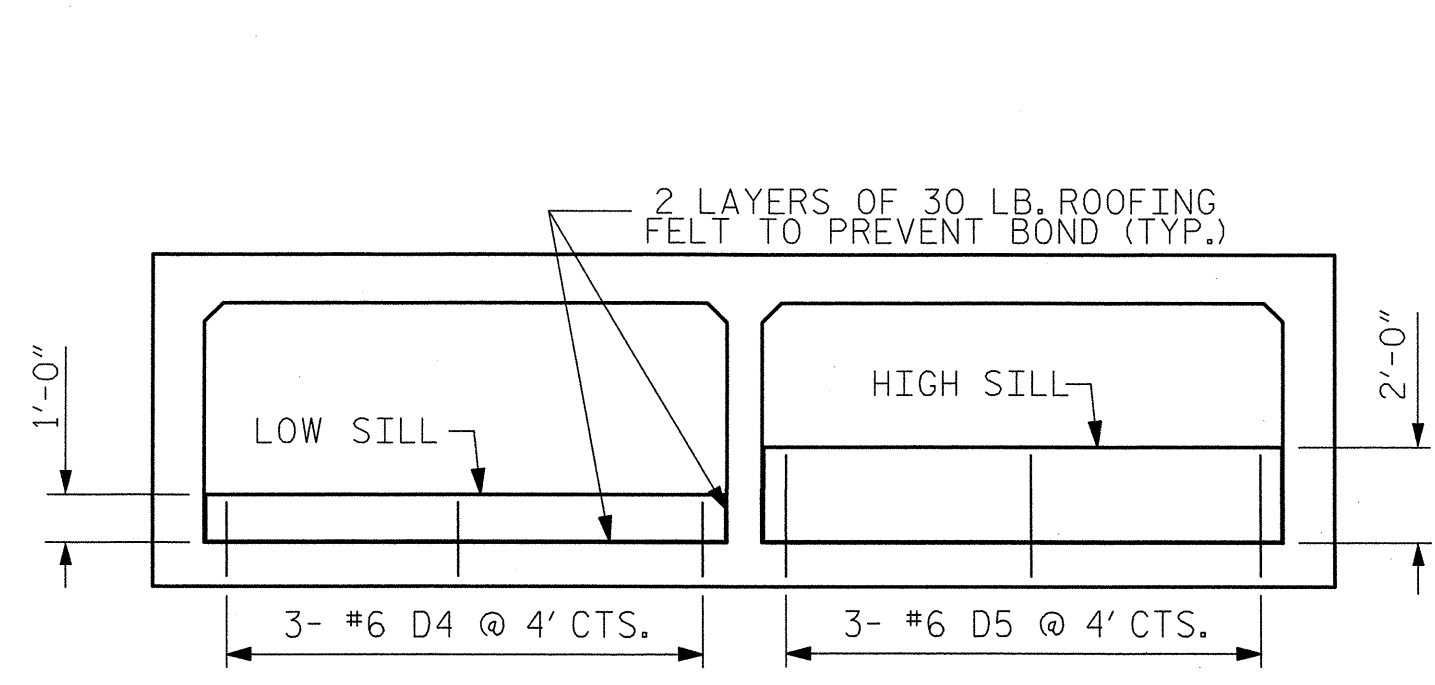


CURTAIN WALL SECTION A-A

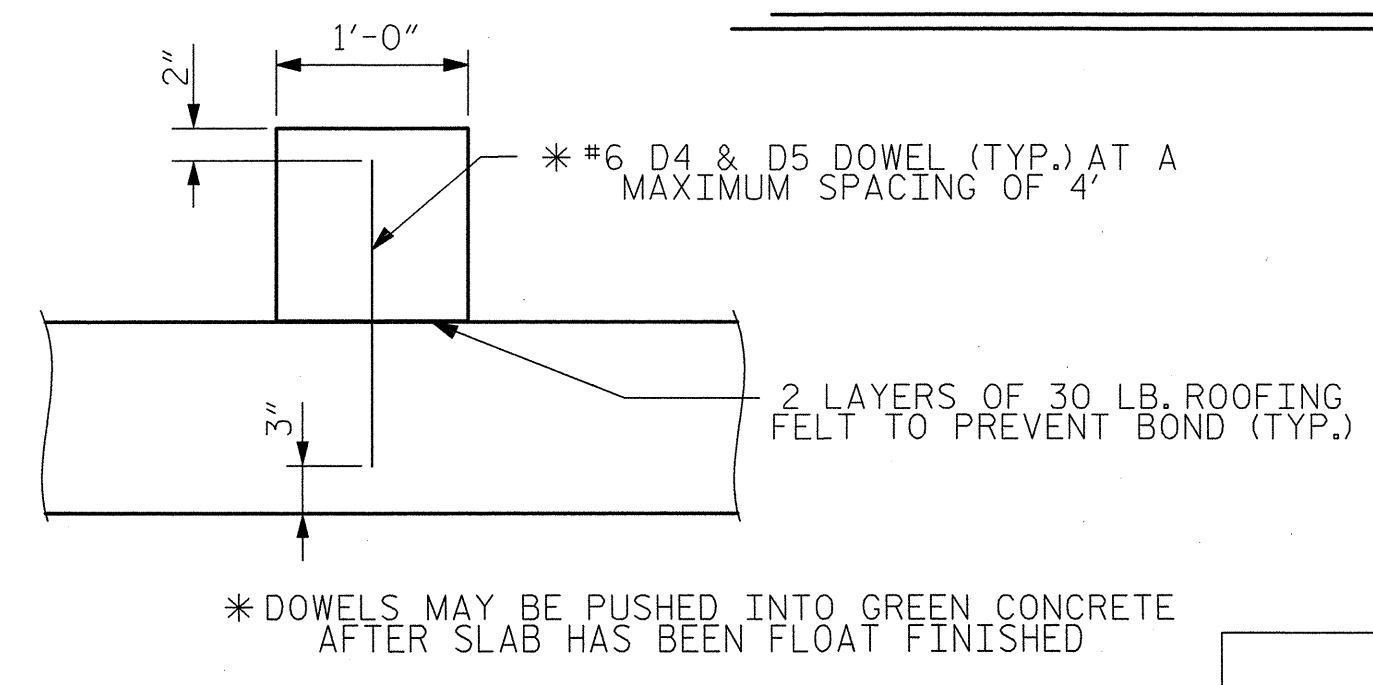
(LEFT CURTAIN WALL SIMILAR, OPPOSITE HAND)
(FOR LOCATION OF SECTION A-A, SEE SHEET C-4)



CULVERT SILL LAYOUT



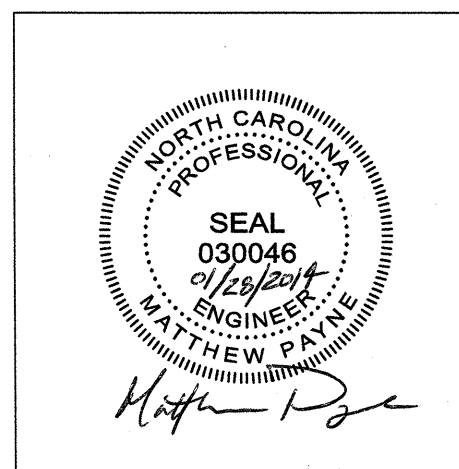
ELEVATION - LOOKING UPSTREAM



SECTION THROUGH SILL

CULVERT SILL DETAILS

PROJECT NO. R5526
HARNETT COUNTY
 STATION: 58+98 -L-
 SHEET 5 OF 8



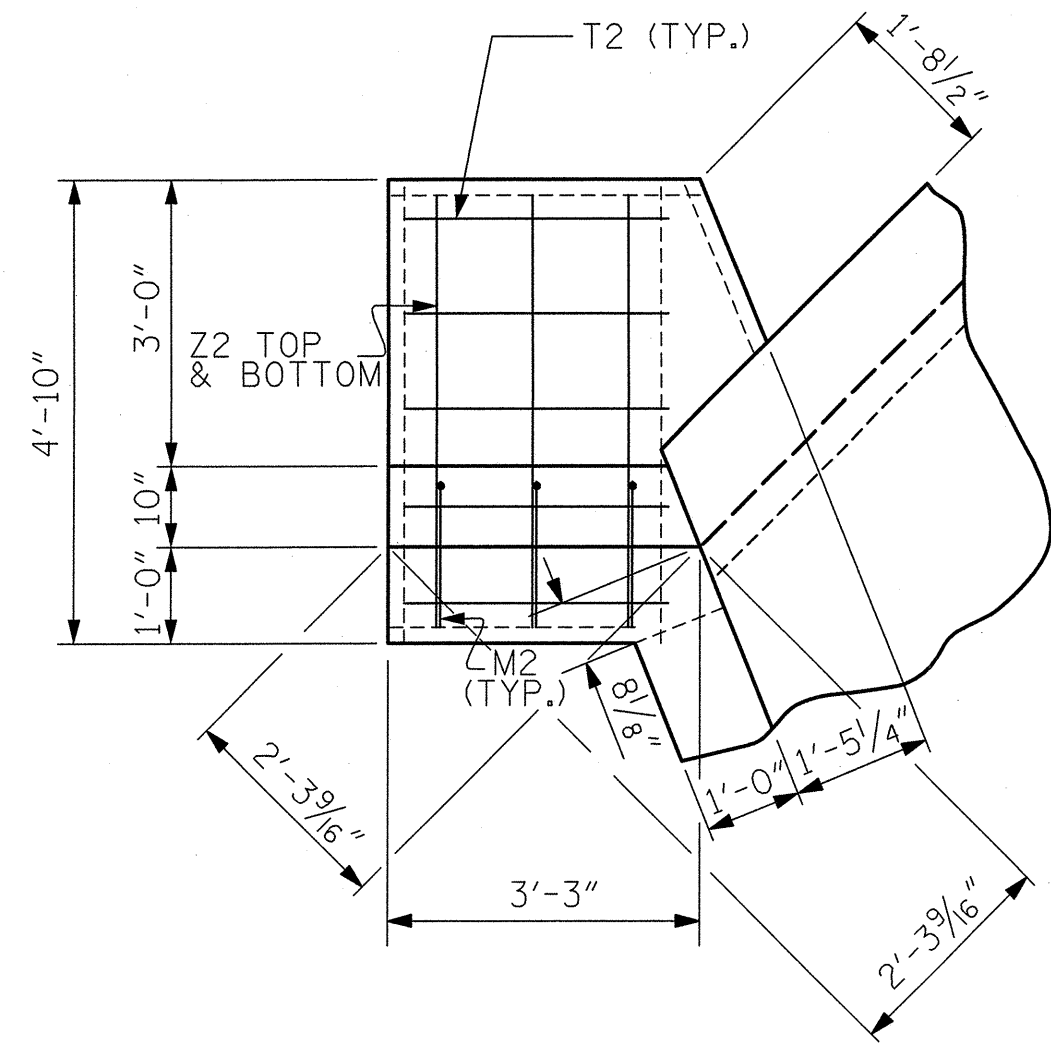
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
DOUBLE BARREL
10 FT. X 5 FT.
CONCRETE BOX CULVERT
67° SKEW

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

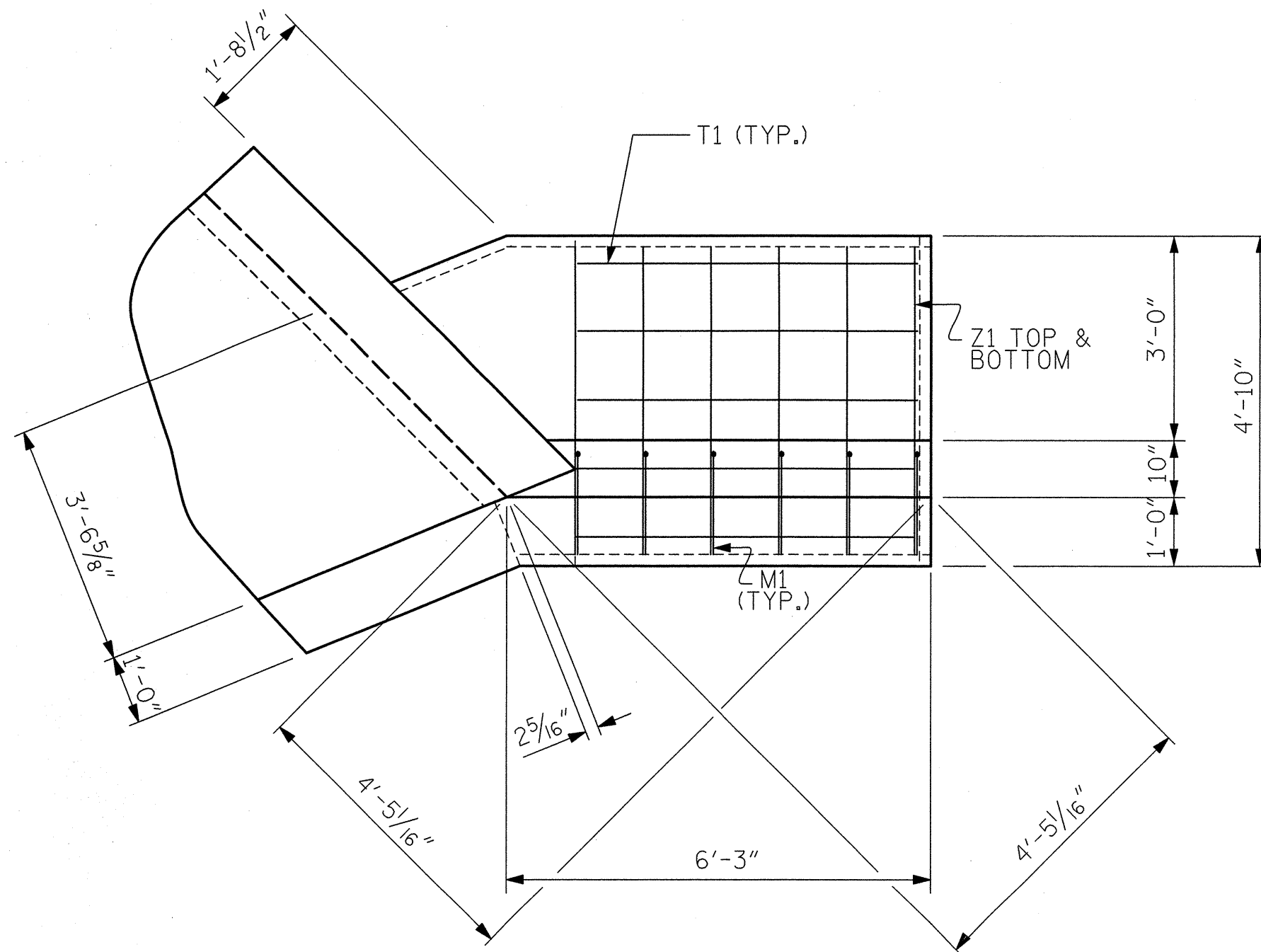
TOTAL SHEETS: 8

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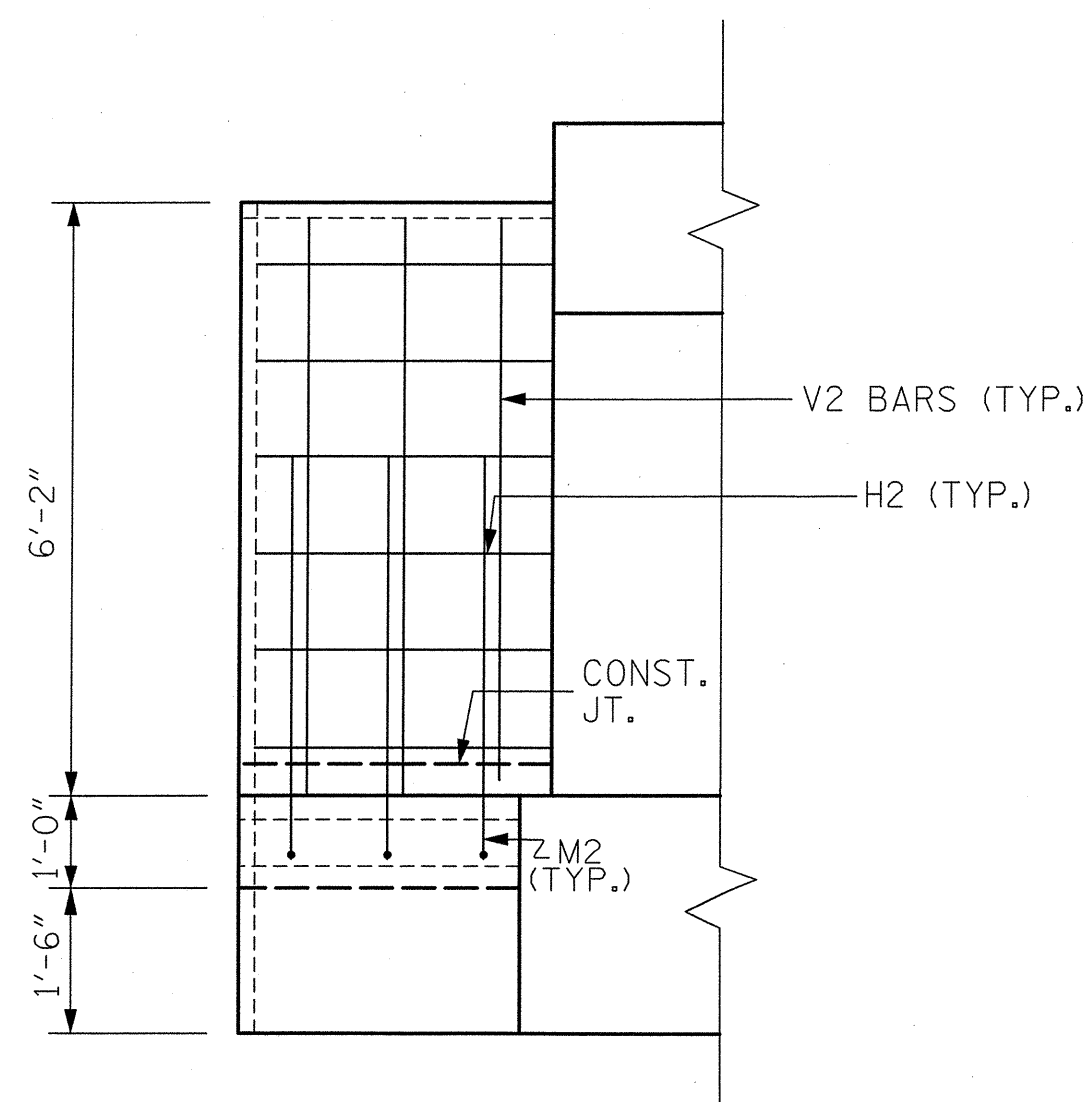
DRAWN BY: C. R. DESROCHERS DATE: DEC. 2013
 CHECKED BY: M. PAYNE DATE: DEC. 2013



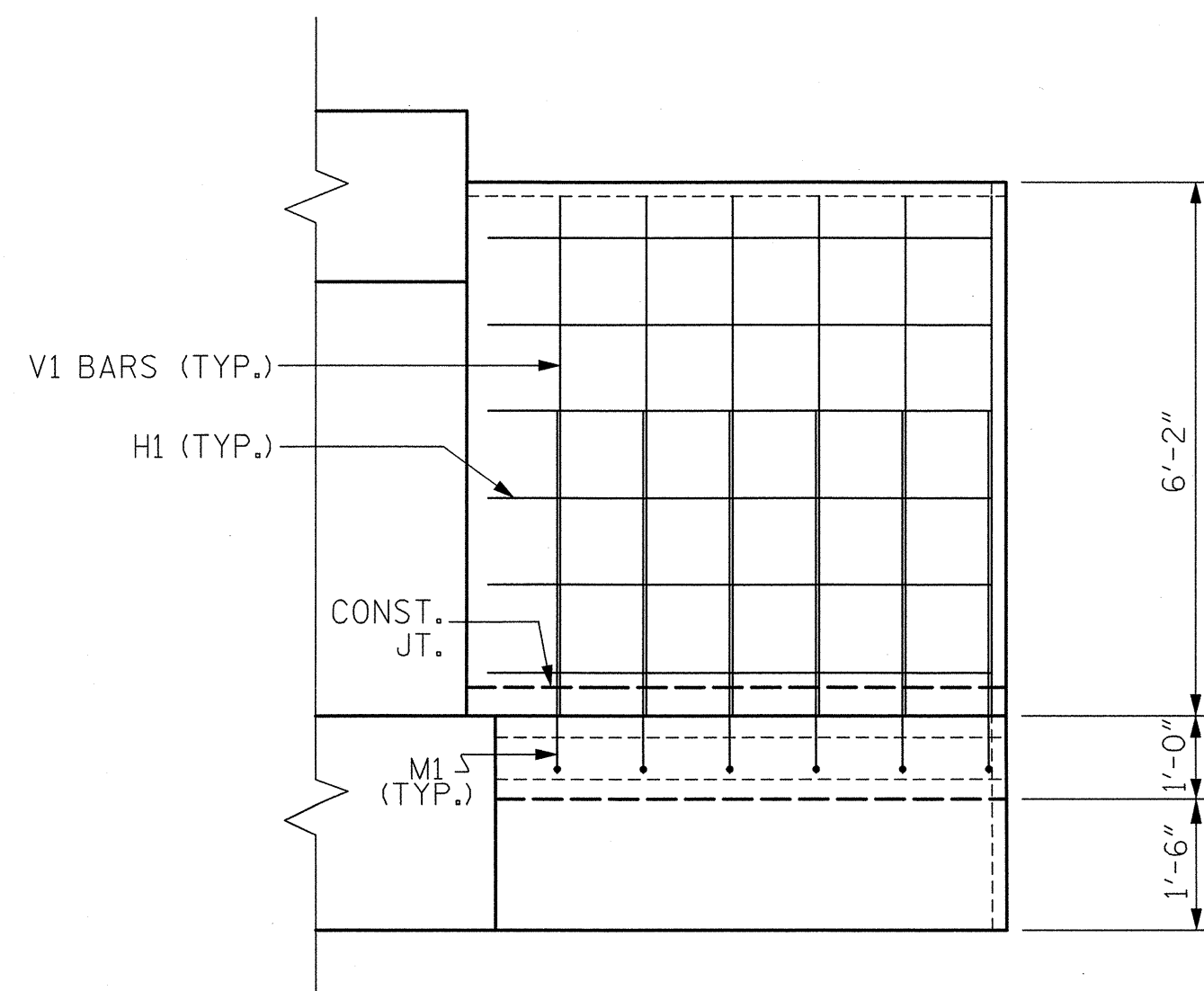
PLAN W2



PLAN W1

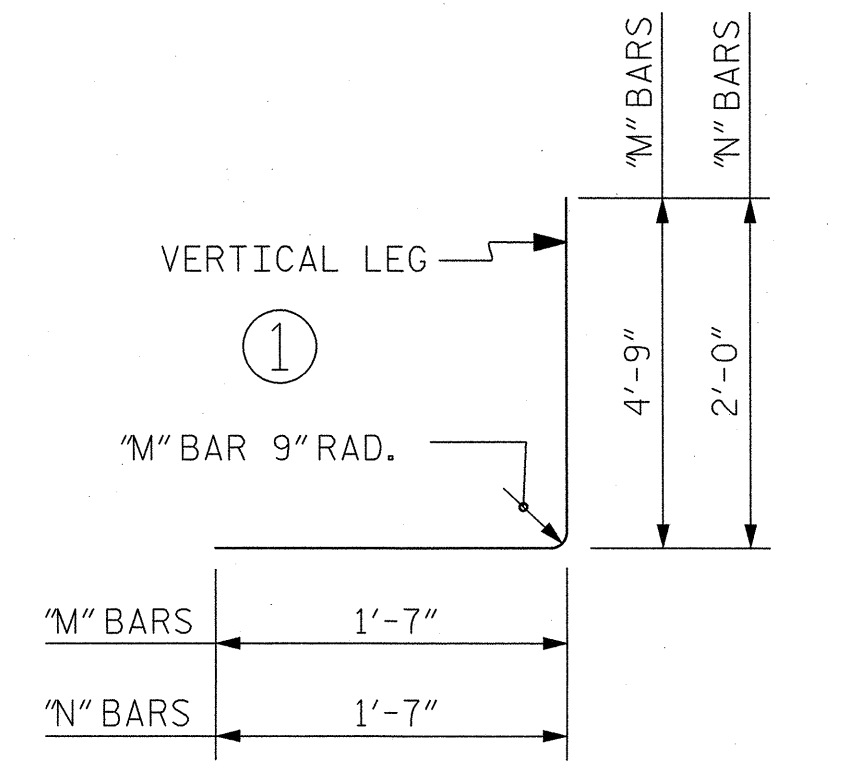


ELEVATION W2

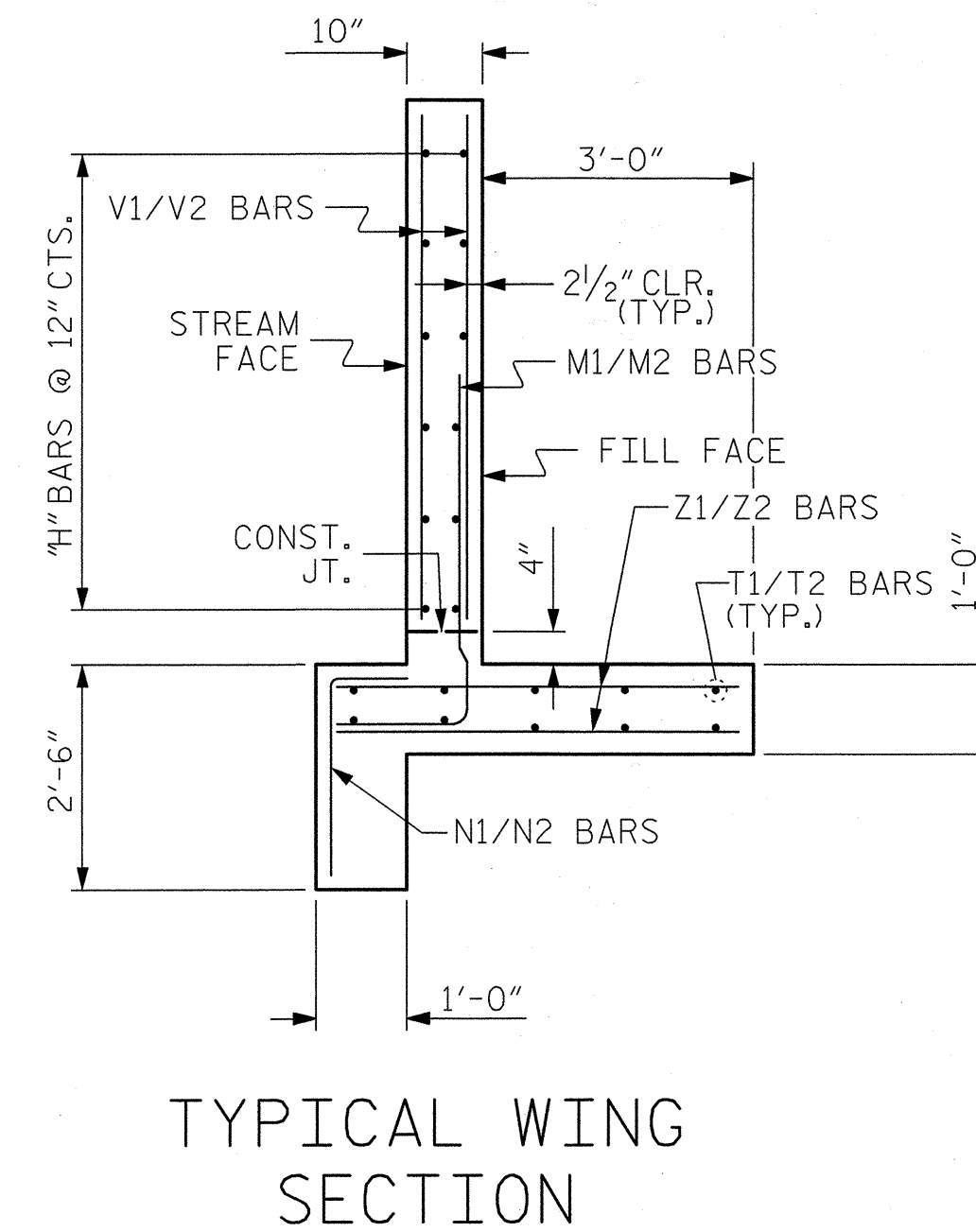


ELEVATION W1

BAR TYPES
ALL BAR DIMENSIONS ARE OUT TO OUT.



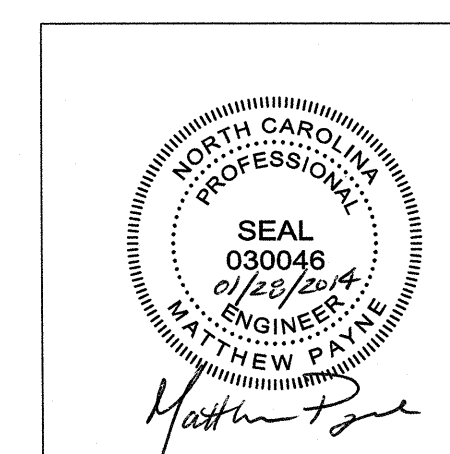
BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	4	STR	5'-10"	47
H2	12	4	STR	3'-1"	25
N1	6	4	1	3'-7"	14
N2	3	4	1	3'-7"	7
M1	6	6	1	6'-4"	57
M2	3	6	1	6'-4"	29
T1	10	4	STR	6'-0"	40
T2	10	4	STR	3'-0"	20
V1	12	4	STR	6'-0"	48
V2	6	4	STR	6'-0"	24
Z1	12	5	STR	4'-6"	56
Z2	6	5	STR	4'-6"	28
REINFORCING STEEL FOR 2 WINGS					395 LBS
CLASS A CONCRETE					
2 WINGS					4.04 CY
1 HEADWALLS					1.14 CY
1 END CURTAIN WALLS					1.83 CY
TOTAL					7.0 CY



TYPICAL WING SECTION

PROJECT NO. R5526
HARNETT COUNTY
 STATION: 58+98 -L-

SHEET 6 OF 8

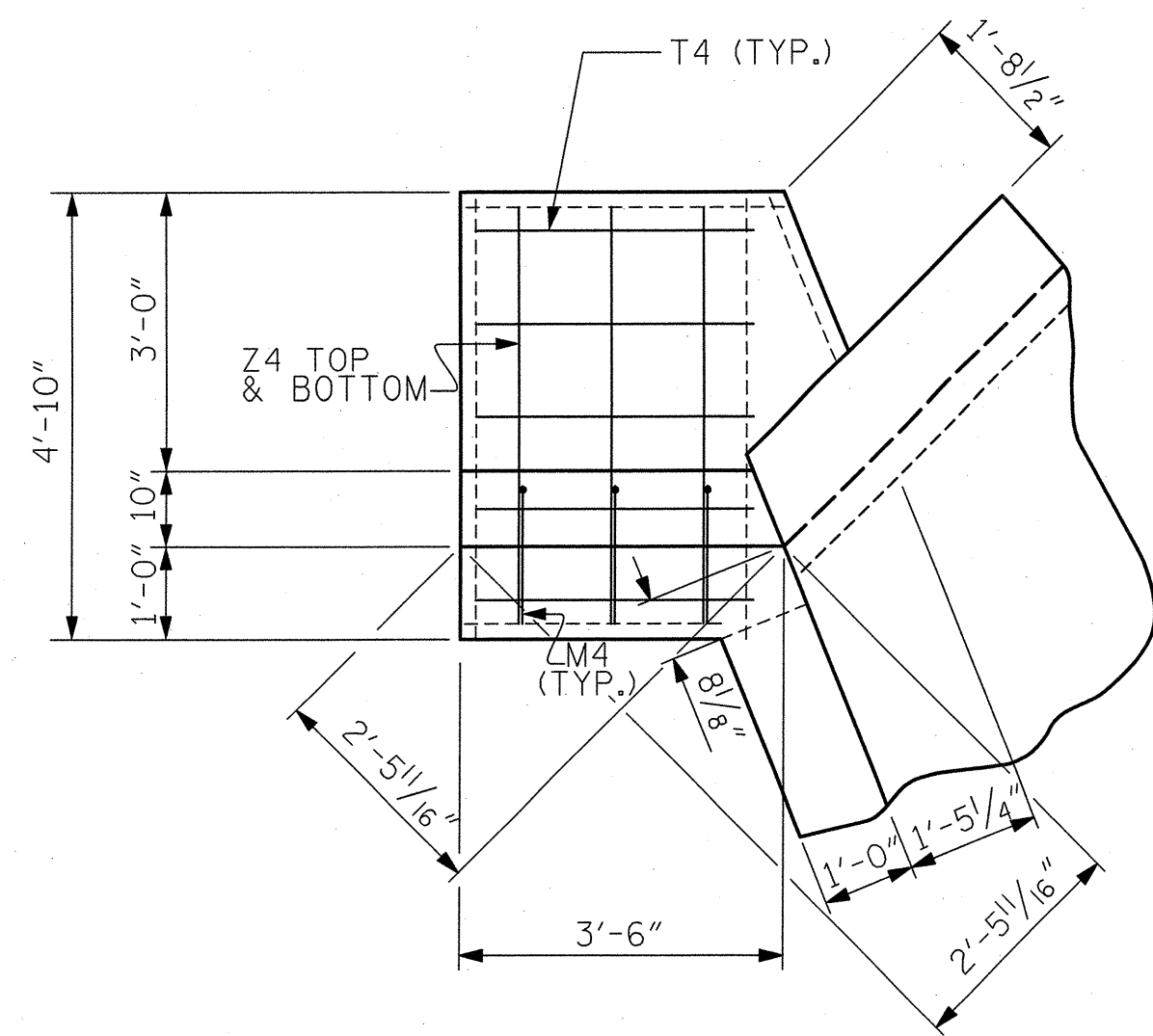


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 WINGS 1 AND 2 FOR
 CONCRETE BOX CULVERT
 H = 5'-0" SLOPE = 2:1
 67° SKEW

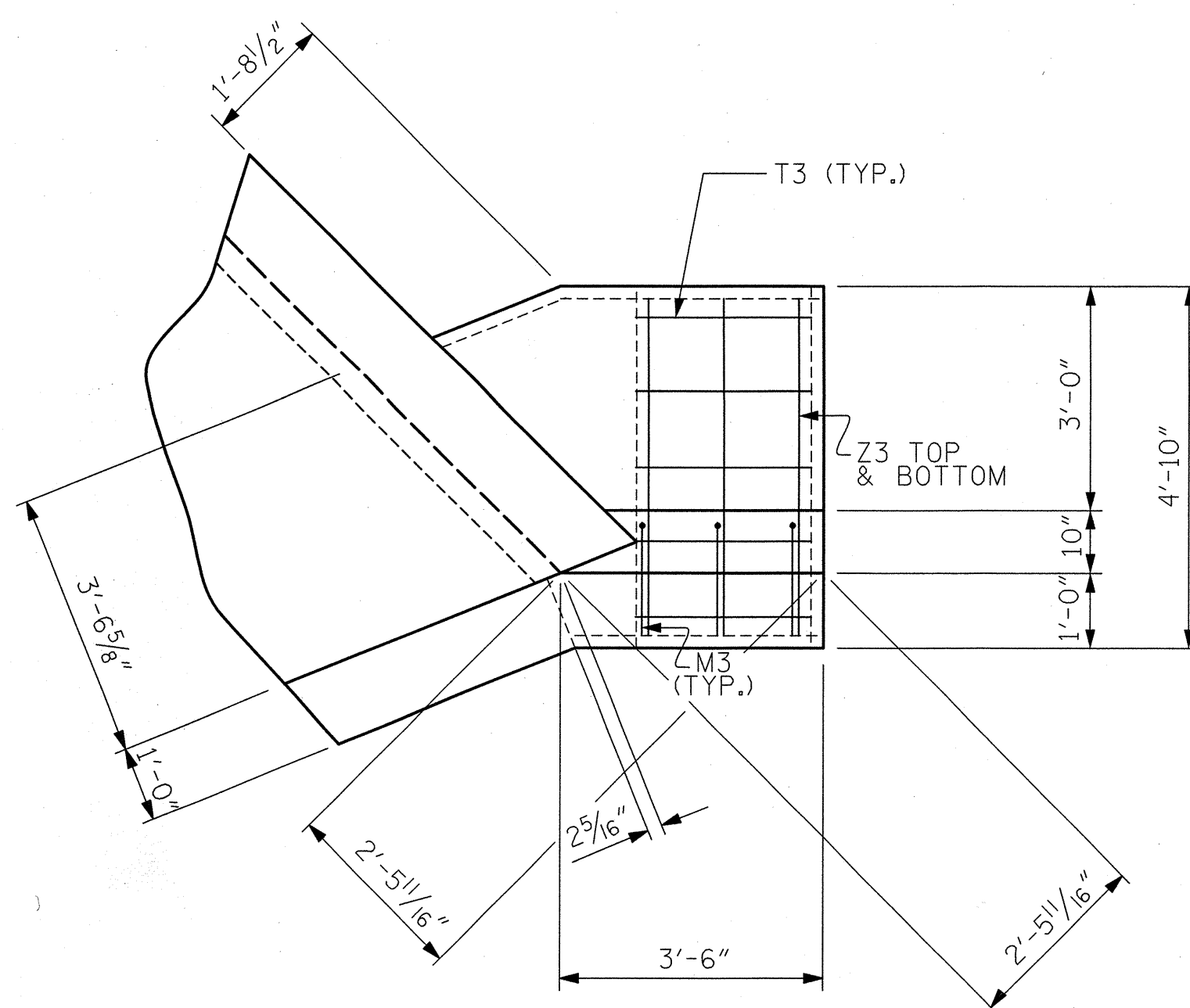
DRAWN BY: C. R. DESROCHERS DATE: OCT. 2013
 CHECKED BY: J. WERES DATE: OCT. 2013

ATKINS 1616 E. MILLBROOK ROAD, SUITE #310
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBES #F-0326

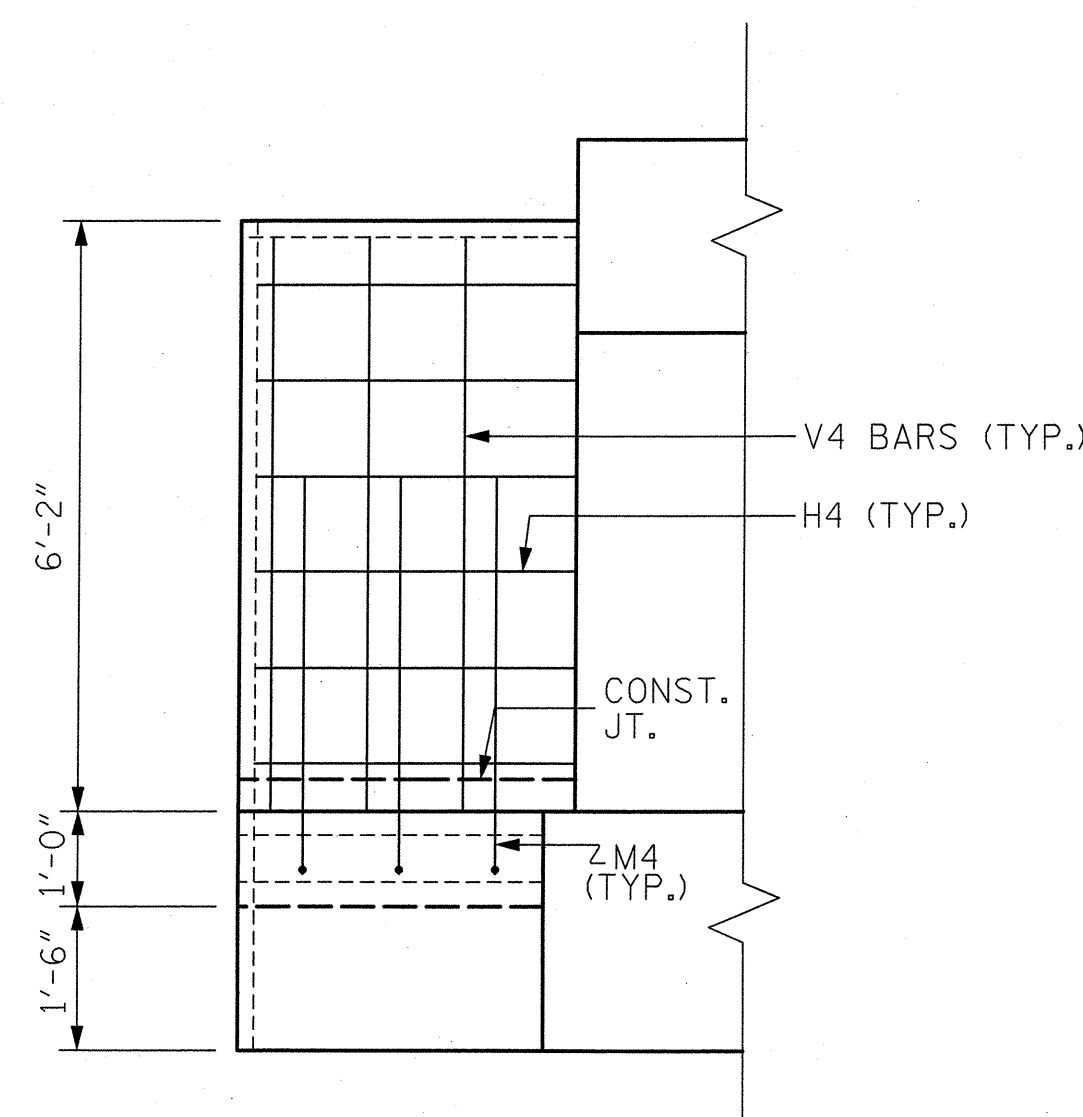
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			8



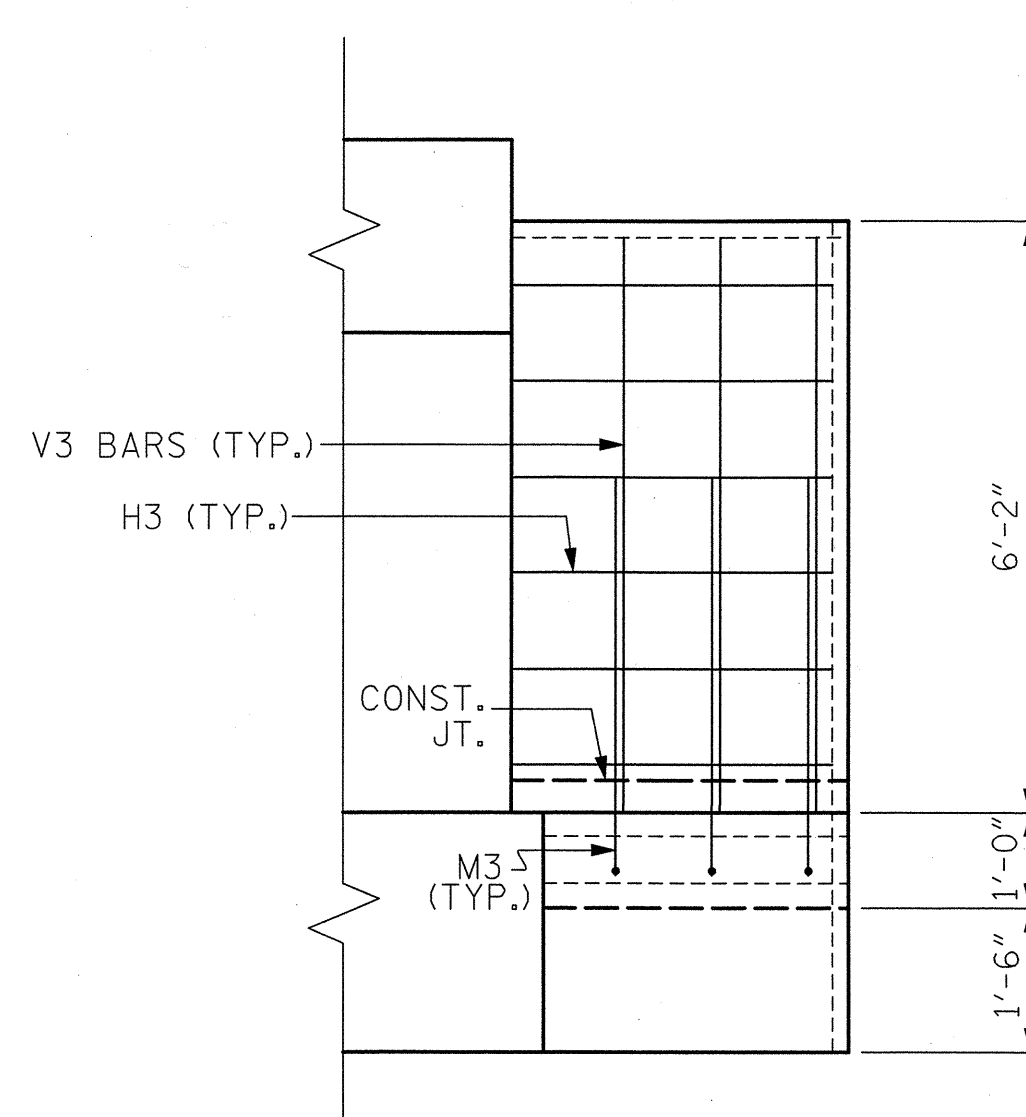
PLAN W4



PLAN W3

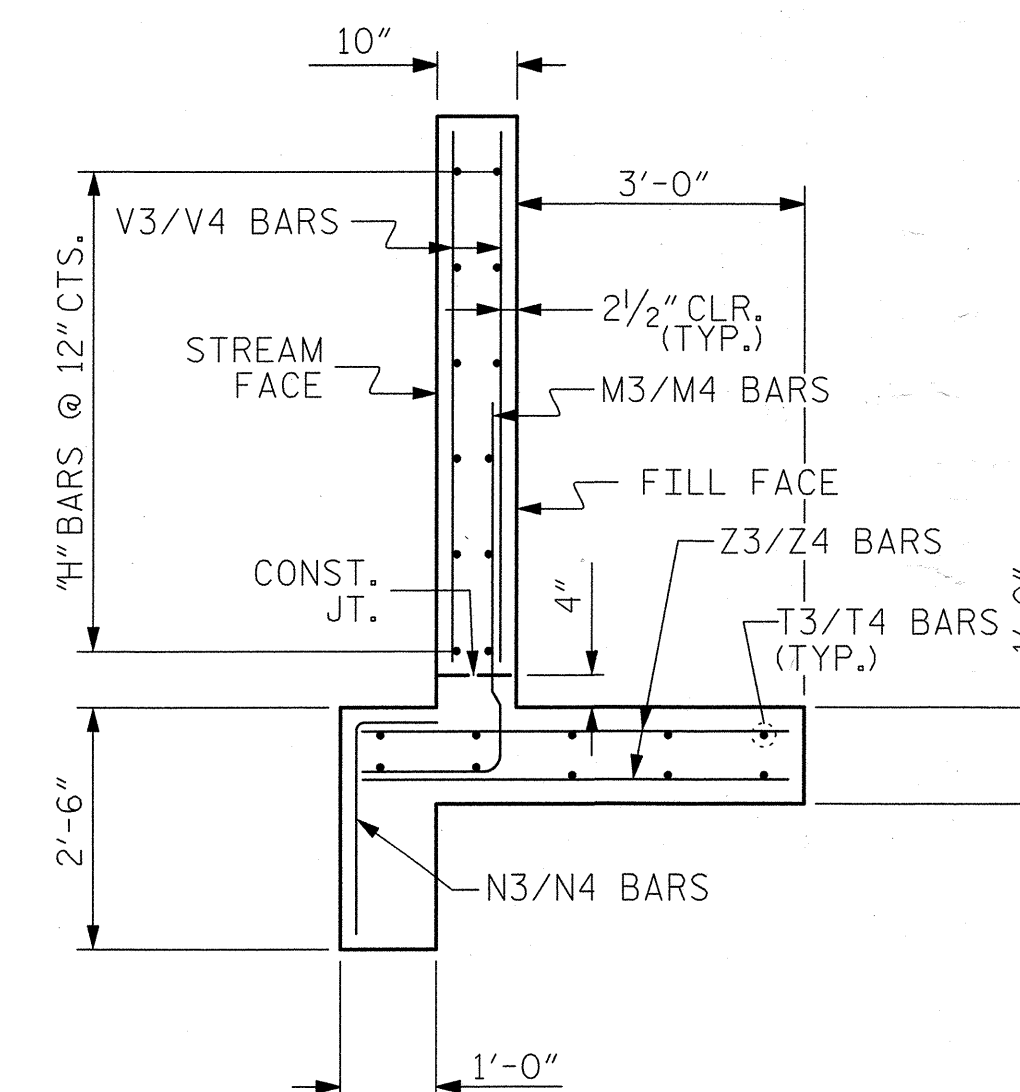


ELEVATION W4



ELEVATION W3

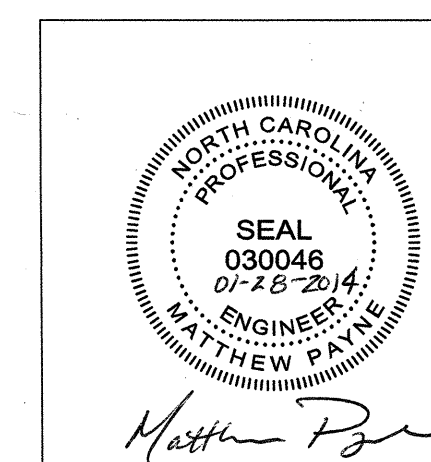
BAR TYPES						BILL OF MATERIAL										
ALL BAR DIMENSIONS ARE OUT TO OUT.																
						BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT					
						H3	12	4	STR	3'-2"	25					
						H4	12	4	STR	3'-4"	27					
						N3	3	4	1	3'-7"	7					
						N4	3	4	1	3'-7"	7					
						M3	3	6	1	6'-4"	29					
						M4	3	6	1	6'-4"	29					
						T3	10	4	STR	3'-4"	22					
						T4	10	4	STR	3'-4"	22					
						V3	6	4	STR	6'-0"	24					
						V4	6	4	STR	6'-0"	24					
						Z3	6	5	STR	4'-6"	28					
						Z4	6	5	STR	4'-6"	28					
REINFORCING STEEL FOR 2 WINGS											272 LBS					
CLASS A CONCRETE																
2 WINGS											3.01 CY					
1 HEADWALLS											1.14 CY					
1 END CURTAIN WALLS											1.83 CY					
TOTAL											6.0 CY					



TYPICAL WING SECTION

PROJECT NO. R5526
HARNETT COUNTY
 STATION: 58+98 -L-

SHEET 7 OF 8



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 WINGS 3 AND 4 FOR
 CONCRETE BOX CULVERT
 H = 5'-0" SLOPE = 2:1
 67° SKEW

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

DRAWN BY: C.R. DESROCHERS DATE: DEC. 2013
 CHECKED BY: M. PAYNE DATE: DEC. 2013

ATKINS 1616 E. MILLBROOK ROAD, SUITE #310
 RALEIGH, NORTH CAROLINA 27609
 (919) 876-6888 NCBES #F-0326

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

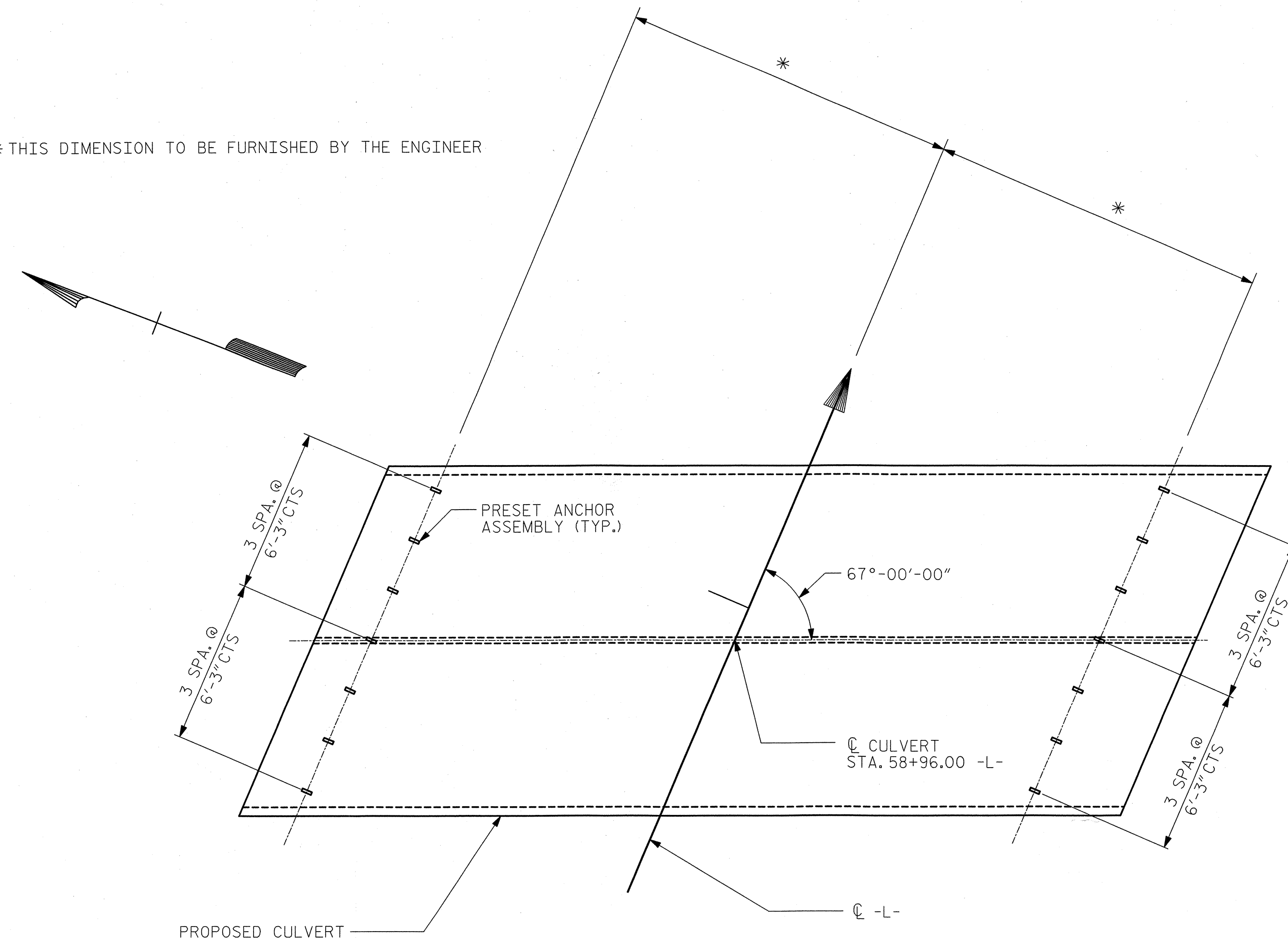
AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.

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.

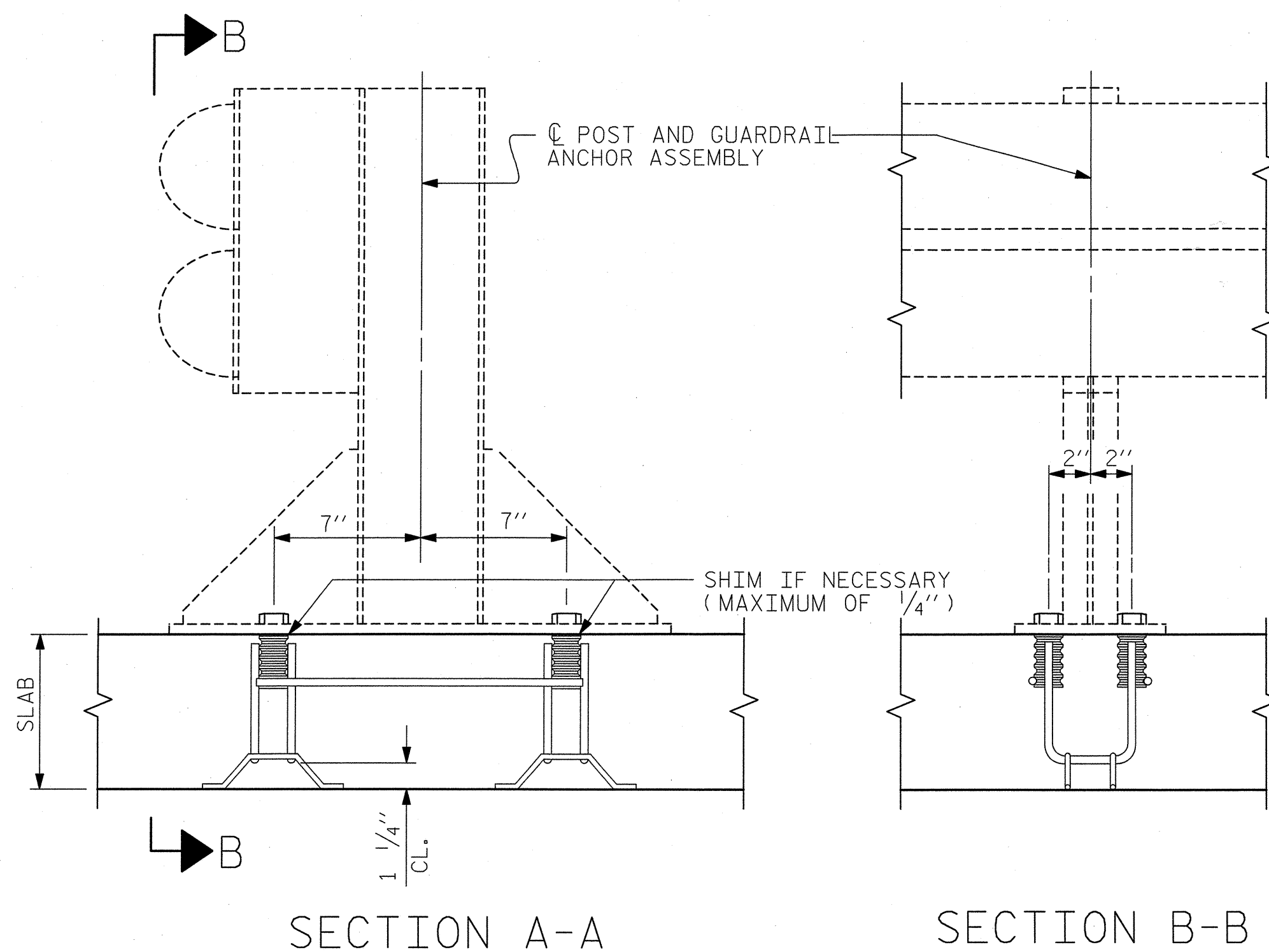
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF GUARDRAIL ANCHOR ASSEMBLY. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 1" Ø BOLT IS 21.8 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER



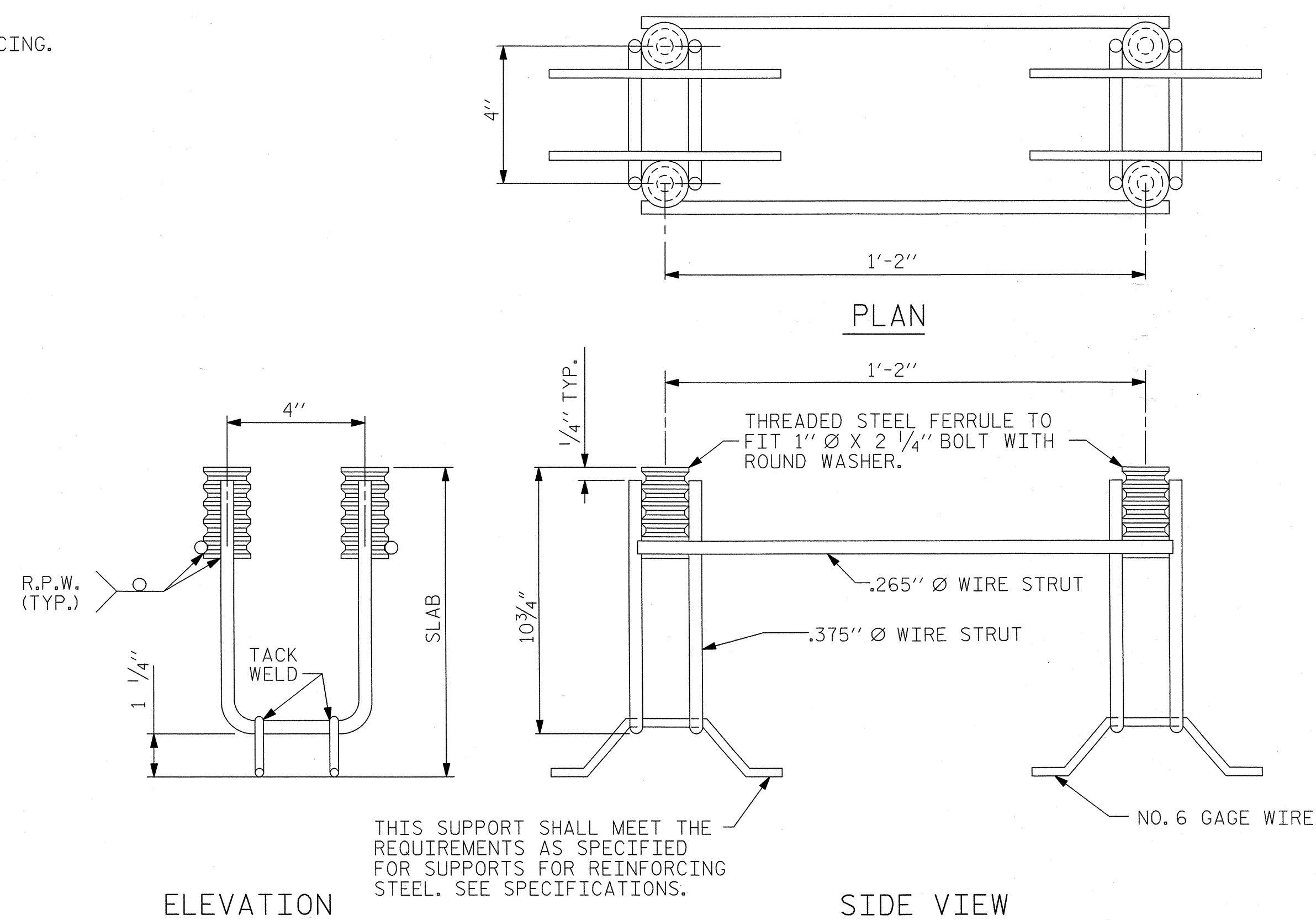
PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.



SECTION A-A

SECTION B-B



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

PROJECT NO. R5526
 HARNETT COUNTY
 STATION: 58+98 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ANCHORAGE DETAILS FOR
 GUARDRAIL ANCHOR ASSEMBLY
 FOR CULVERTS

ASSEMBLED BY : M. PAYNE	DATE : 01/14
CHECKED BY : J. WERES	DATE : 01/14
DRAWN BY : FCJ 6/88	REV. 7/10/01 LES/RDR
CHECKED BY : ARB 6/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06R KMM/GM

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

STD. NO. GRA1

