

R-3403AB

CONTRACT: C202017

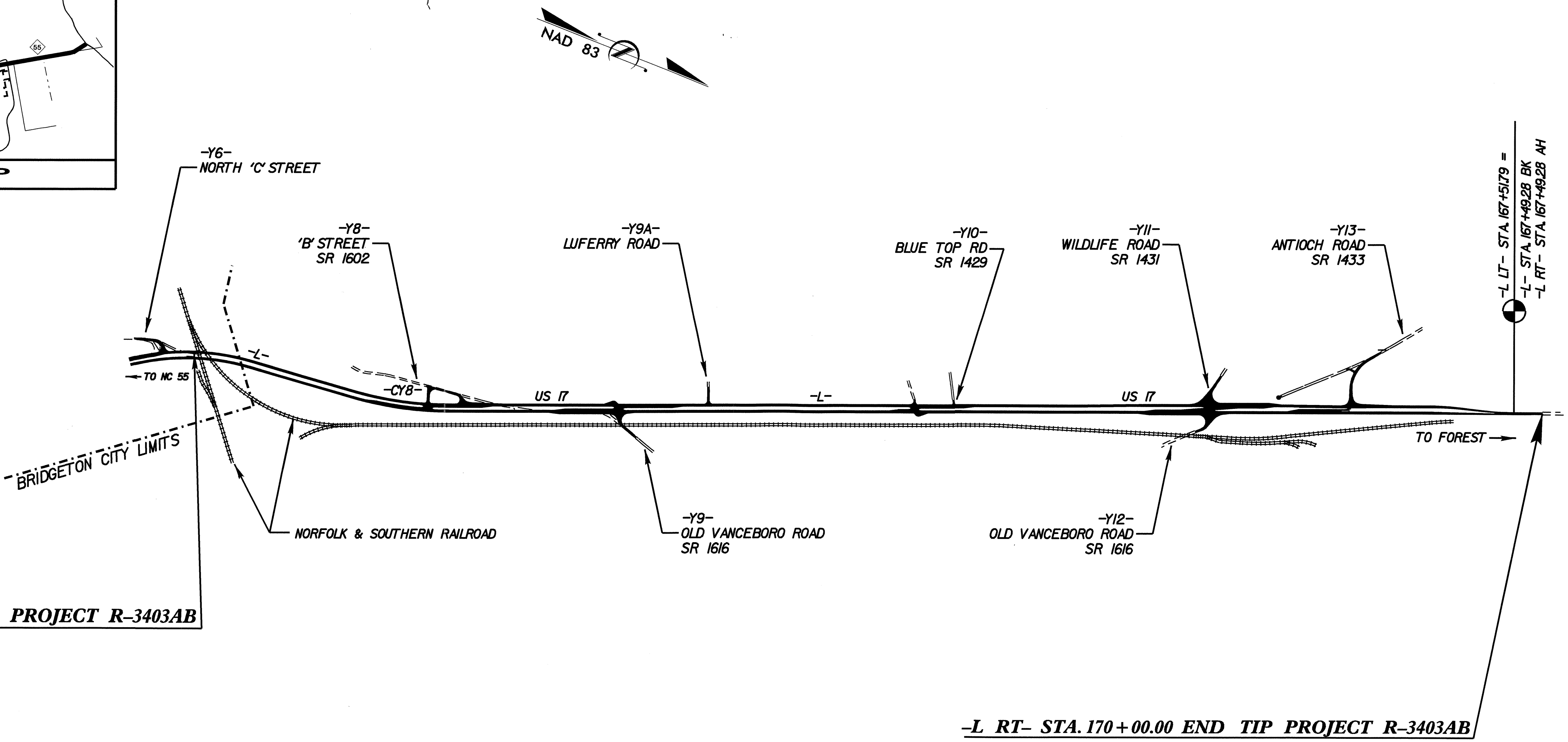
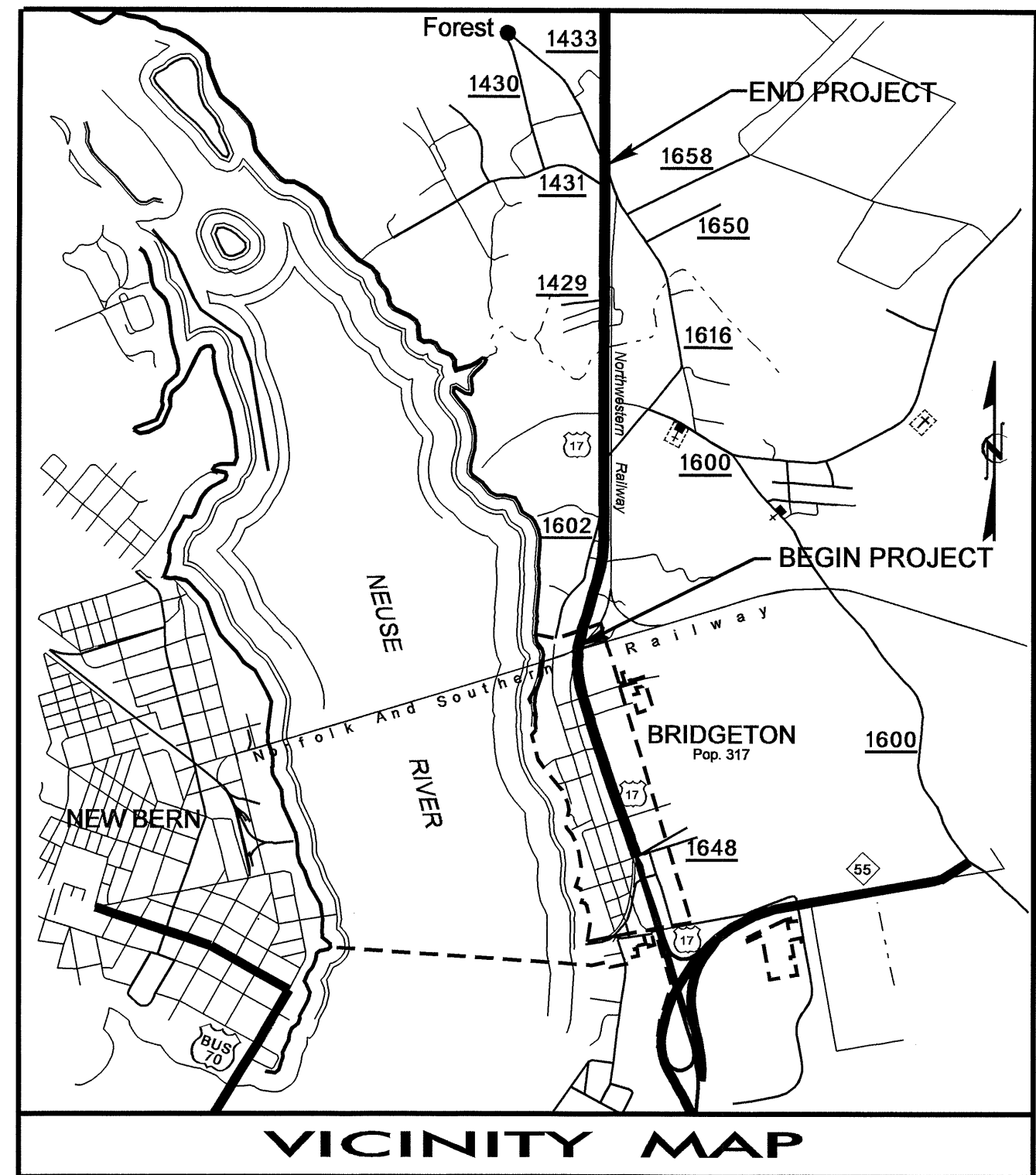
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CRAVEN COUNTY**

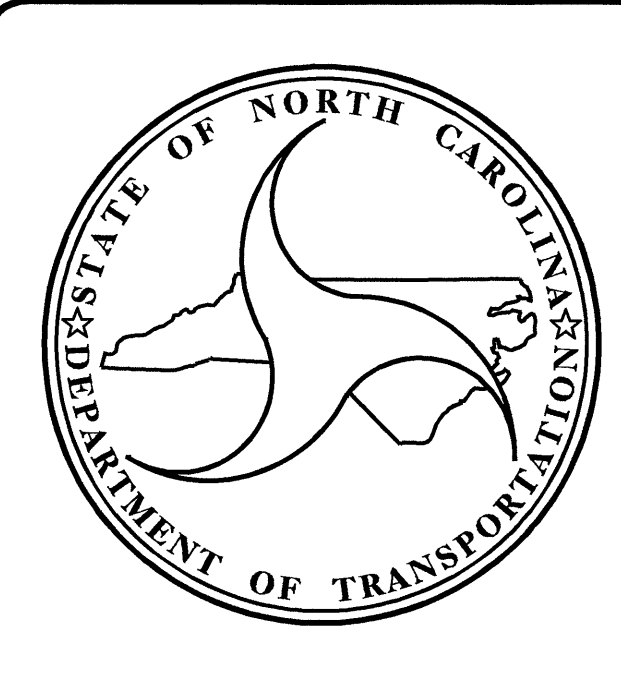
LOCATION: US 17 FROM NORFOLK & SOUTHERN RR  
TO NORTH OF SR 1433 (ANTIOCH ROAD)

TYPE OF WORK: GRADING, PAVING, CULVERT EXTENSIONS AND  
DRAINAGE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3403AB		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34538.1.1	STPNHF-17(24)	PE	
34538.2.2	STPNHF-17(47)	R/W, UTIL	
34538.3.6	STPNHF-17(75)	CONST	



**CULVERTS**



**DESIGN DATA**

ADT 2007 =	14,100
ADT 2035 =	30,400
DHV =	10 %
D =	60 %
T =	10 % *
V =	60 MPH
* TTST 5%	DUAL 5%
FUNC. CLASS =	ARTERIAL

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT R-3403AB	=	2.256 MILES
TOTAL LENGTH OF TIP PROJECT R-3403AB	=	2.256 MILES

Prepared In the Office of:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., NC, 27610

2006 STANDARD SPECIFICATIONS

LETTING DATE:  
MAY 18, 2010

ROY M. GIROLAMI, P.E.  
PROJECT ENGINEER

LAURA E. SUTTON, P.E.  
PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT  
1000 BIRCH RIDGE DR.  
RALEIGH, NC 27610

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

P.E.

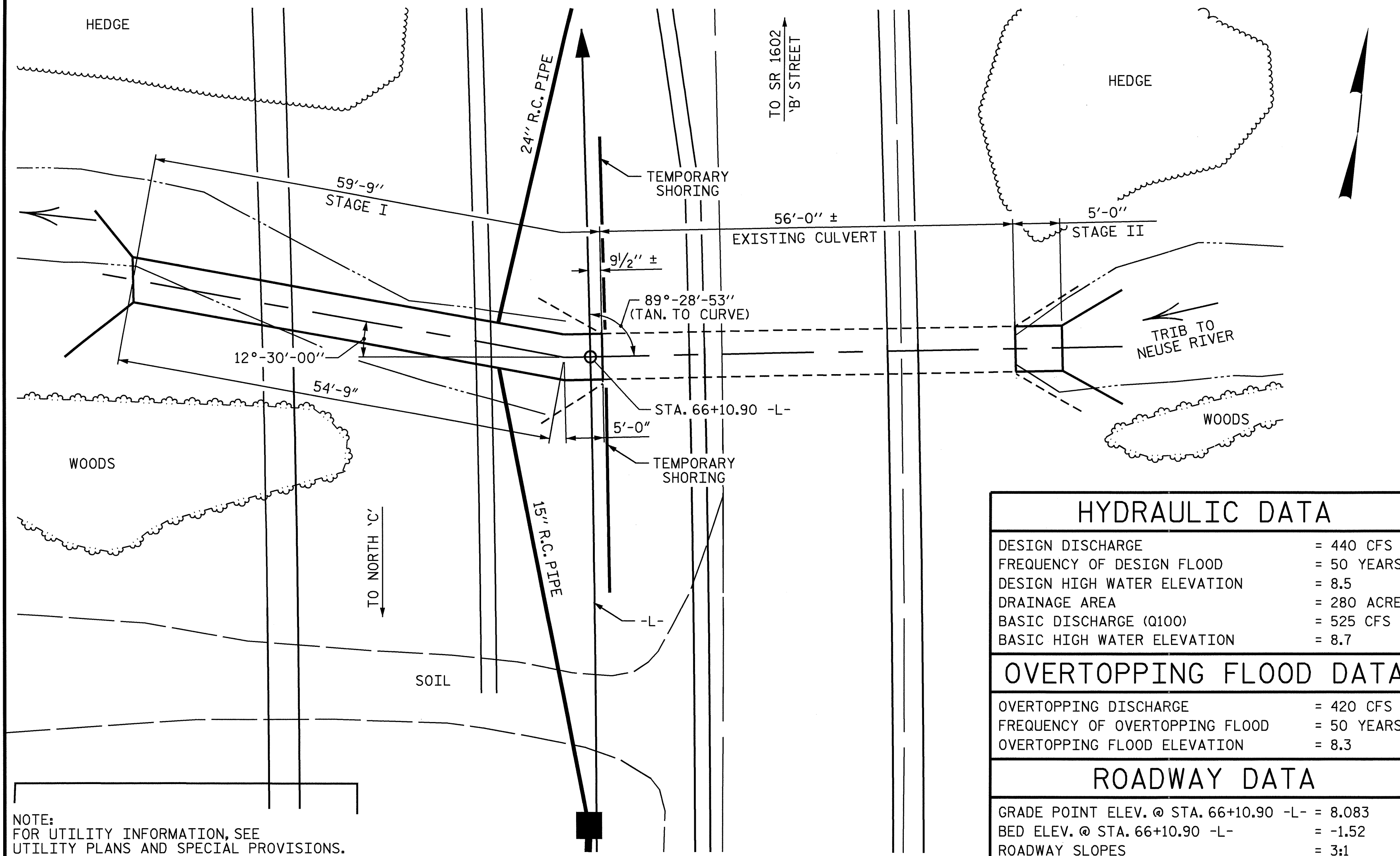
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

APPROVED  
DIVISION ADMINISTRATOR

DATE

BM #4 - RR SPIKE SET IN BASE OF 28" GUM TREE, -BL- STA. 65+04.40, 208.3' RIGHT, EL. 9.44.



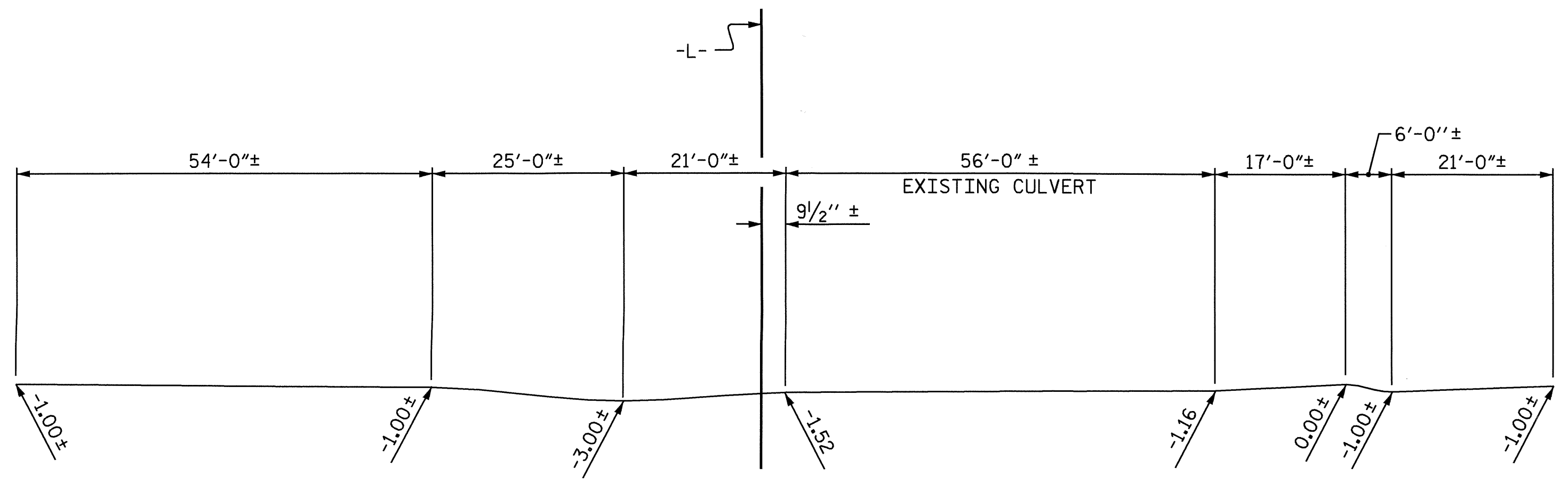
NOTE:  
FOR UTILITY INFORMATION, SEE  
UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

HYDRAULIC DATA	
DESIGN DISCHARGE	= 440 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YEARS
DESIGN HIGH WATER ELEVATION	= 8.5
DRAINAGE AREA	= 280 ACRES
BASIC DISCHARGE (Q100)	= 525 CFS
BASIC HIGH WATER ELEVATION	= 8.7
OVERTOPPING FLOOD DATA	
OVERTOPPING DISCHARGE	= 420 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 50 YEARS
OVERTOPPING FLOOD ELEVATION	= 8.3
ROADWAY DATA	
GRADE POINT ELEV. @ STA. 66+10.90 -L-	= 8.083
BED ELEV. @ STA. 66+10.90 -L-	= -1.52
ROADWAY SLOPES	= 3:1

NOTES

- ASSUMED LIVE LOAD HS20 OR ALTERNATE LOADING.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- DESIGN FILL 3.5'.
- FOR OTHER DESIGN DATA AND NOTES, SEE SHEET SN.
- 3" Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- CONCRETE IN CULVERT STAGES TO BE POURED IN THE FOLLOWING ORDER:
  - STAGE I FLOOR SLAB AND OUTLET WING FOOTINGS INCLUDING 4" OF ALL VERTICAL WALLS.
  - THE REMAINING PORTIONS OF STAGE I WALLS AND OUTLET WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALL.
  - STAGE II FLOOR SLAB AND INLET WING FOOTINGS INCLUDING 4" OF ALL VERTICAL WALLS.
  - THE REMAINING PORTIONS OF STAGE II WALLS AND INLET WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALL.
- 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.
- AT THE CONTRACTORS OPTION, THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT MAY BE SPLICED. 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.
- 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.
- IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENSIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSION SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.
- DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.
- NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
- NO WORK SHALL BE DONE ON THE CULVERT AT STA. 66+10.90 -L- UNTIL THE ROADWAY UNCLASSIFIED EXCAVATION HAS BEEN REMOVED AND REPLACED WITH SUITABLE MATERIAL. SEE ROADWAY PLANS FOR LIMITS OF UNCLASSIFIED EXCAVATION.
- THE 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 PIPES.
- 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.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEMS FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
- 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.



PROFILE ALONG CULVERT

TOTAL STRUCTURE QUANTITIES		
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION COND. MAT'L.	TONS	34
CLASS A CONCRETE		
STAGE I	CU. YDS.	48.8
STAGE II	CU. YDS.	13.8
TOTAL	CU. YDS.	62.6
REINFORCING STEEL		
STAGE I	LBS.	5,796
STAGE II	LBS.	1,072
TOTAL	LBS.	6,868

PROJECT NO. R-3403AB  
CRAVEN COUNTY  
STATION: 66+10.90 -L-

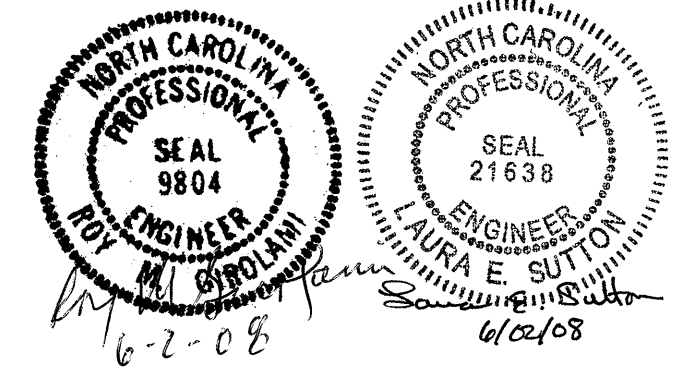
SHEET 1 OF 7

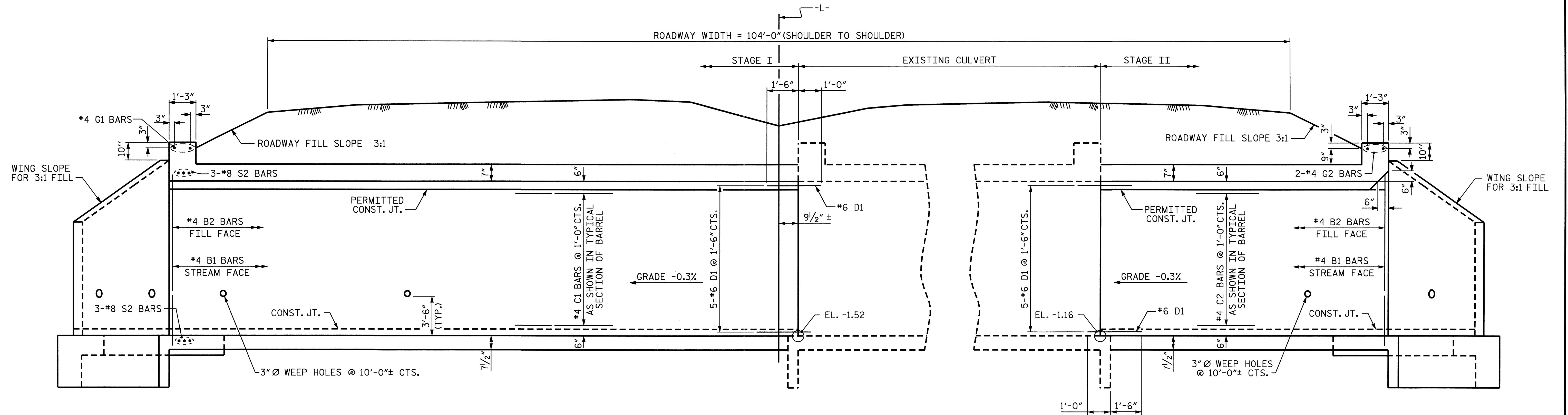
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SINGLE 6 FT. x 6 FT.  
CONCRETE BOX CULVERT  
89°-28'-53" SKEW

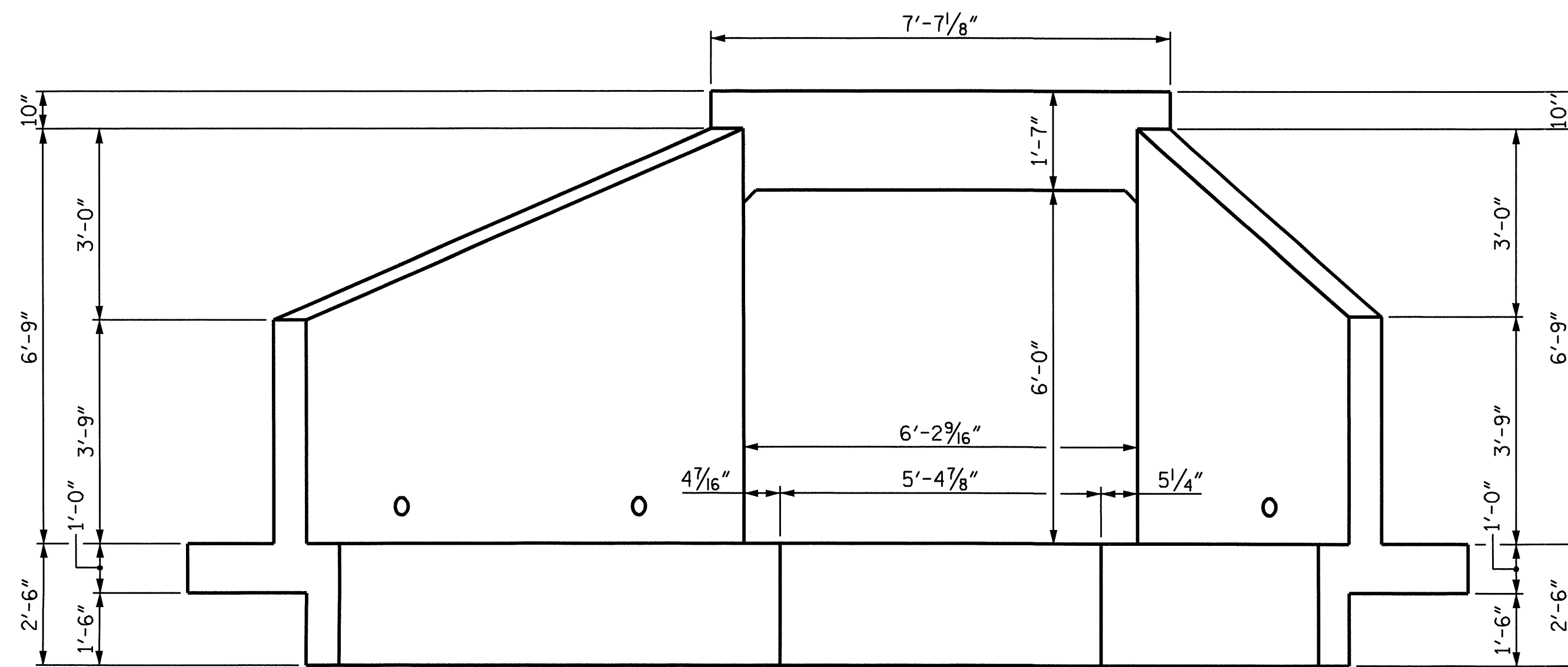
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
2			4			14

DRAWN BY : A.S. CALLAWAY DATE : 3/20/08  
CHECKED BY : L.E. SUTTON DATE : 3/26/08

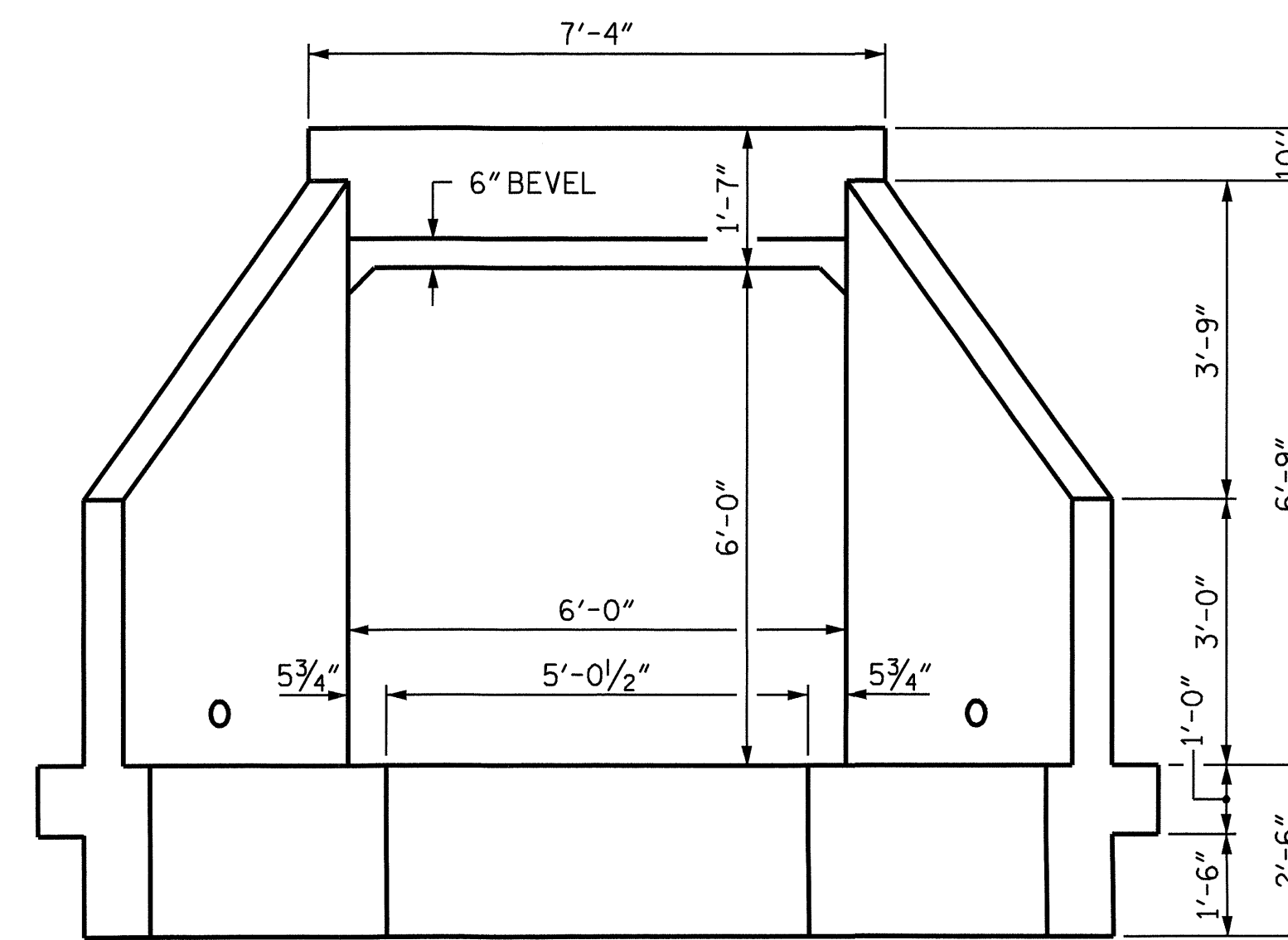




CULVERT SECTION NORMAL TO ROADWAY



OUTLET END ELEVATION - NORMAL TO SKEW



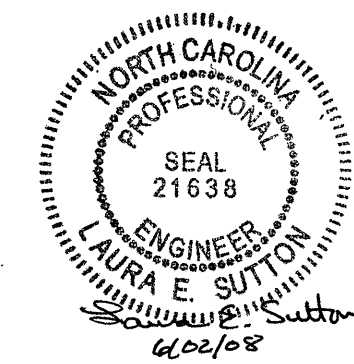
INLET END ELEVATION

PROJECT NO. R-3403AB  
 CRAVEN COUNTY  
 STATION: 66+10.90 -L-

SHEET 2 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SINGLE 6 FT. x 6 FT.  
 CONCRETE BOX CULVERT  
 89°-28'-53" SKEW

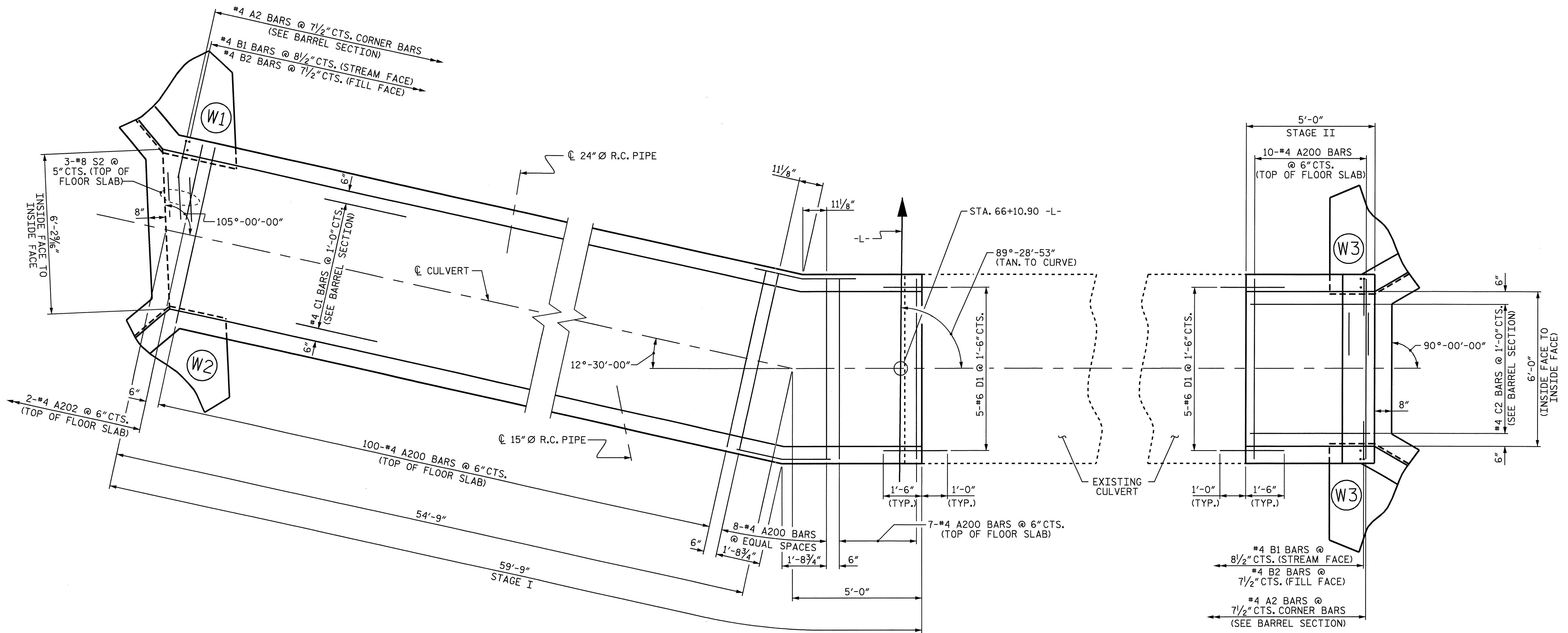


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 CHECKED BY: L.E. SUTTON DATE: 3/26/08

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

STR. #1





**PLAN - FLOOR SLAB**

FIELD BEND "C" BARS AS REQUIRED.

THE 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 PIPES. SEE DETAILS ON SHEET 5 OF 7.

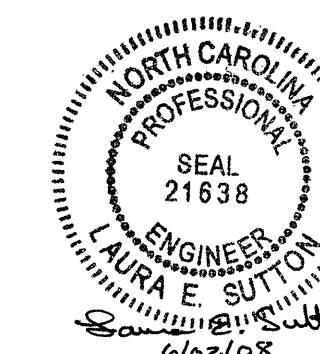
PROJECT NO. R-3403AB  
CRAVEN COUNTY  
 STATION: 66+10.90 -L-

SHEET 3 OF 7

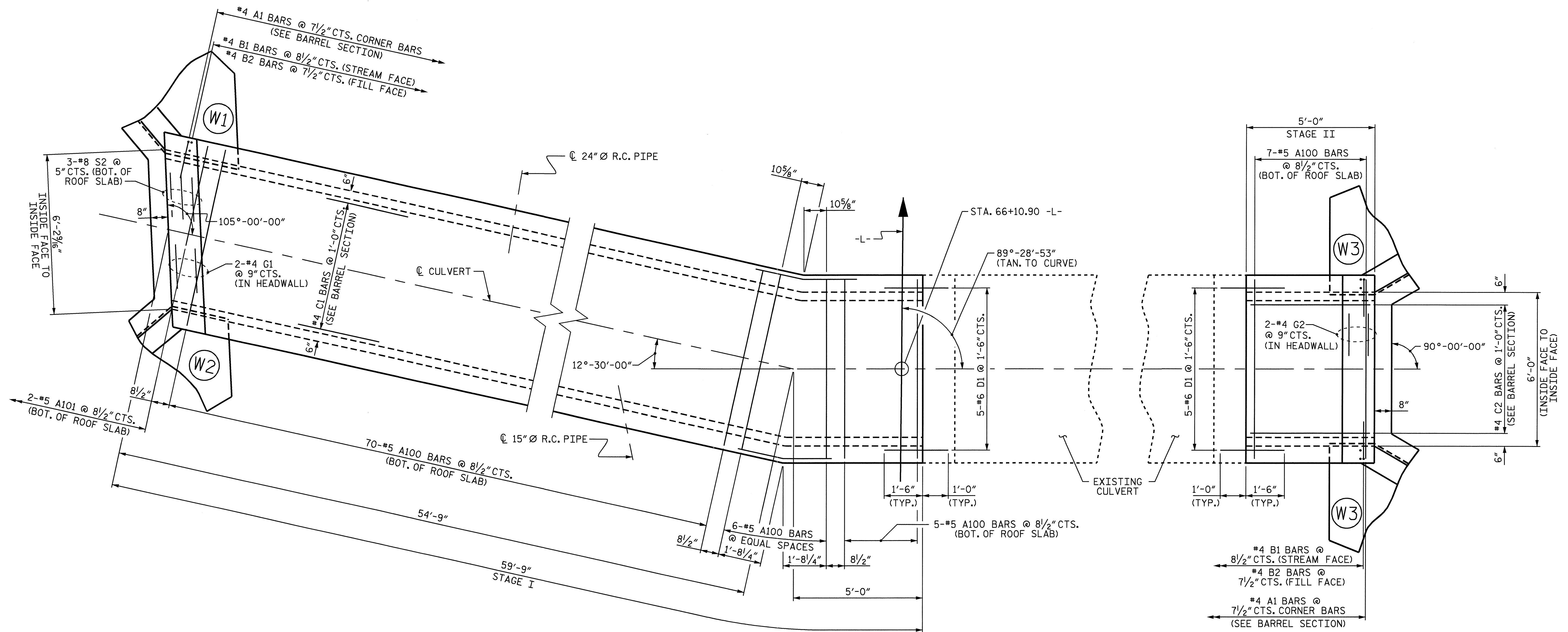
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**SINGLE 6 FT. x 6 FT.  
 CONCRETE BOX CULVERT  
 89°-28'-53" SKEW**

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



DRAWN BY : A.S. CALLAWAY DATE : 3/20/08  
 CHECKED BY : L.E. SUTTON DATE : 3/28/08



**PLAN - ROOF SLAB**

FIELD BEND "C" BARS AS REQUIRED.

THE 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 PIPES. SEE DETAILS ON SHEET 5 OF 7.

PROJECT NO. R-3403AB  
CRAVEN COUNTY  
 STATION: 66+10.90 -L-

SHEET 4 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SINGLE 6 FT. x 6 FT.  
 CONCRETE BOX CULVERT  
 89°-28'-53" SKEW

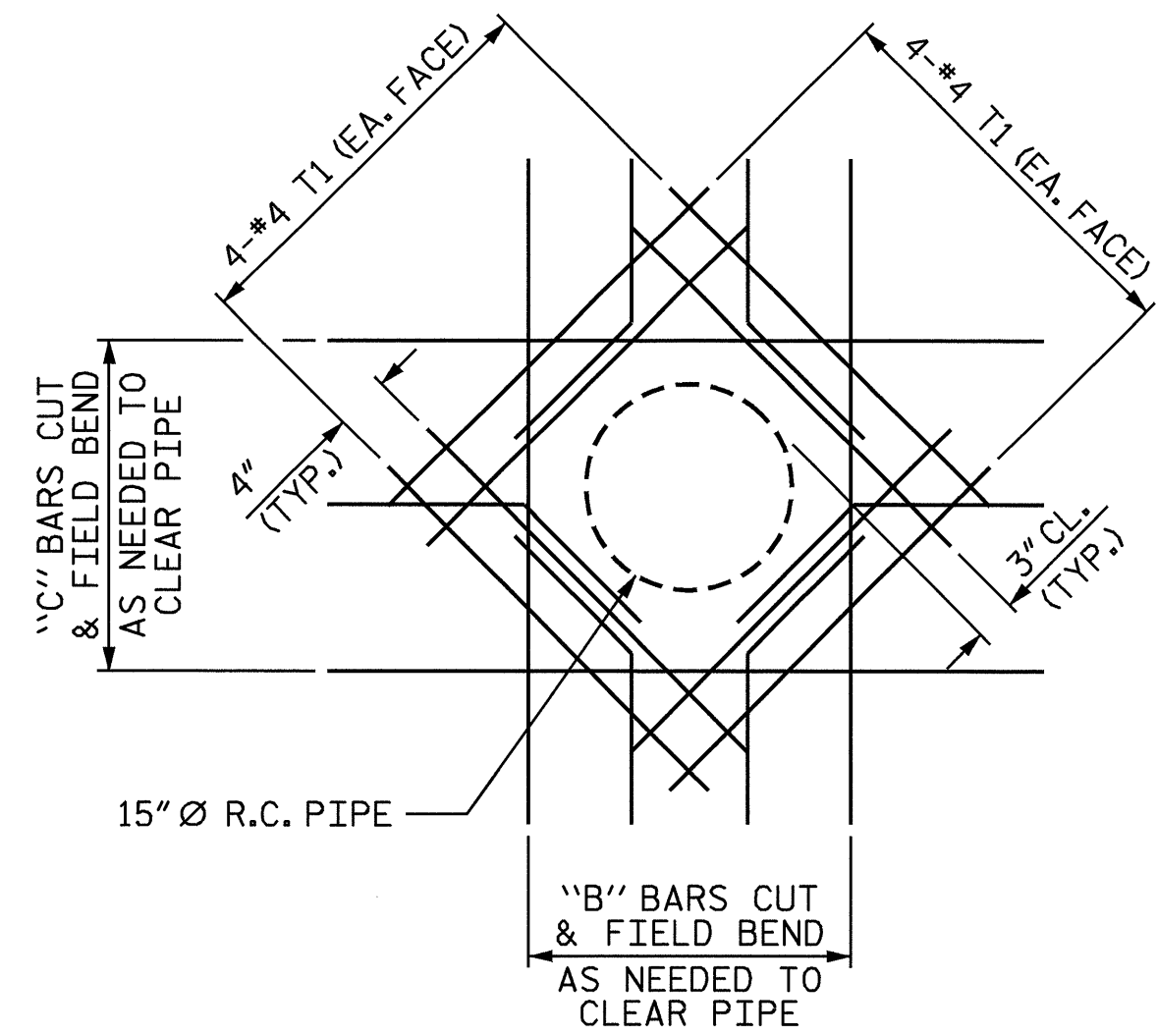


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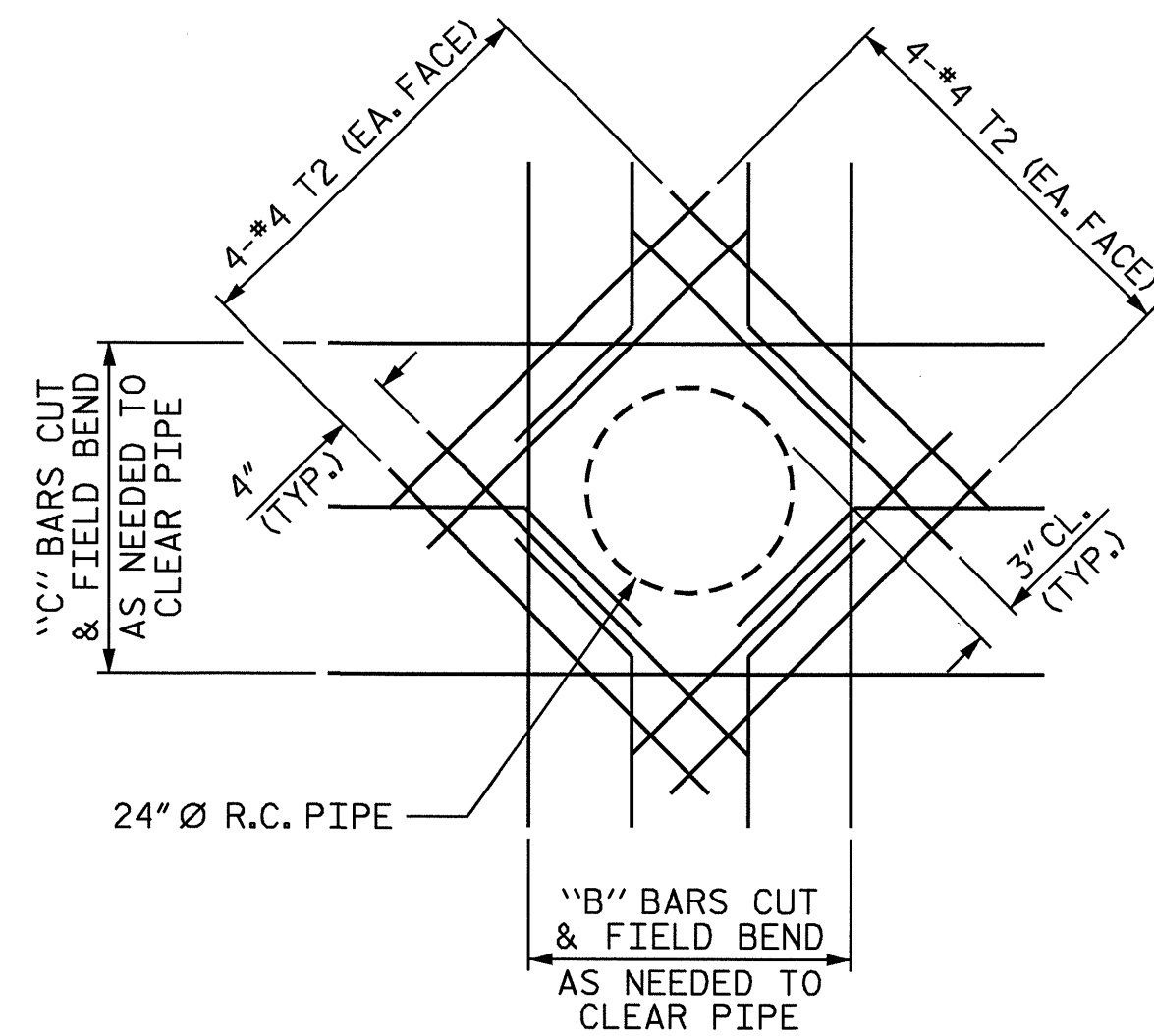
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REVISIONS						SHEET NO.	
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2			4				

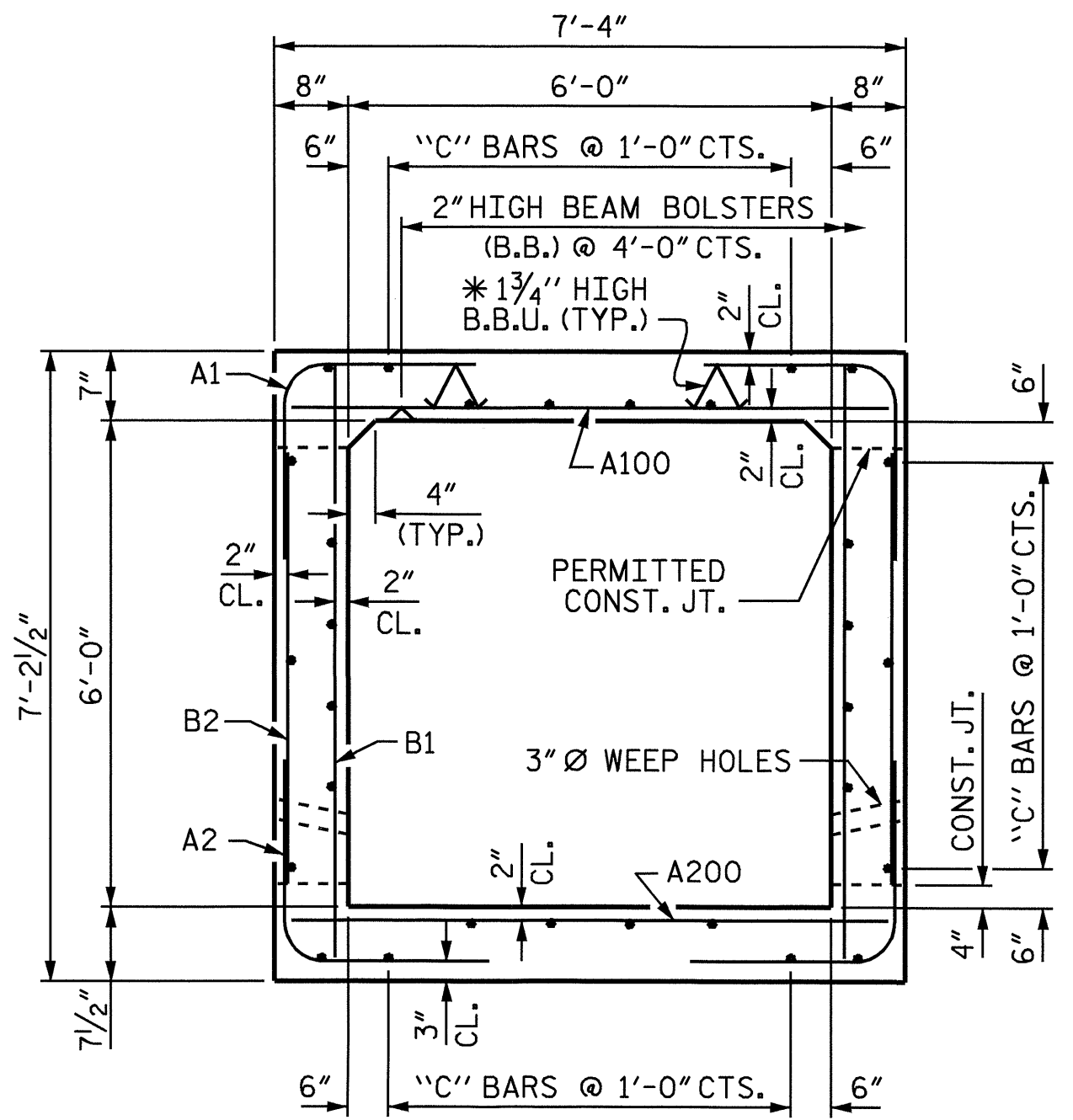
STR. #1



15" Ø R.C. PIPE  
THRU EXTERIOR WALL



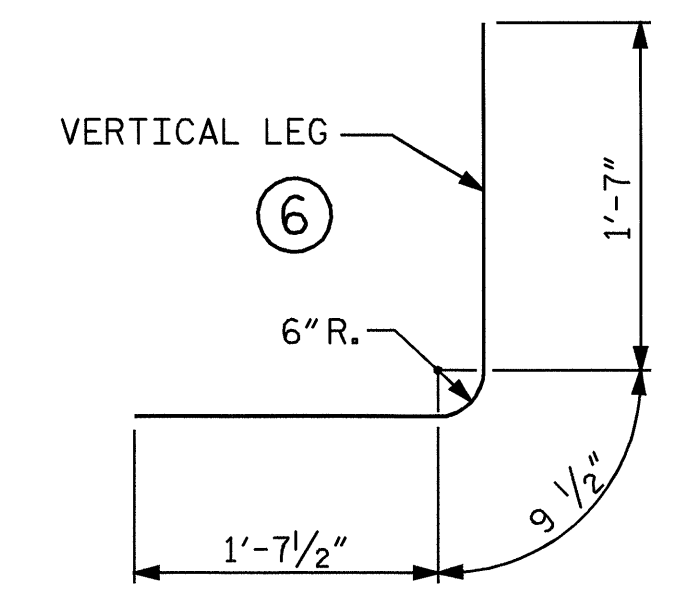
24" Ø R.C. PIPE  
THRU EXTERIOR WALL



RIGHT ANGLE SECTION OF BARREL

THERE ARE 30 "C" BARS IN SECTION OF BARREL  
\* ALL BEAM BOLSTER UPPER (B.B.U.) @ 3'-0" CTS.

BAR TYPES						BILL OF MATERIAL											
						STAGE I					STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	81	#5	STR	6'-11"	584	A100	7	#5	STR	6'-11"	50	A200	10	#4	STR	6'-11"	46
A101	2	#5	STR	3'-7"	7							A1	16	#4	6	4'-0"	43
A200	115	#5	STR	6'-11"	531							A2	16	#4	6	4'-0"	43
A202	2	#5	STR	3'-0"	4							B1	14	#4	STR	6'-8"	62
												B2	16	#4	STR	5'-4"	57
A1	192	#4	6	4'-0"	513												
A2	192	#4	6	4'-0"	513												
B1	168	#4	STR	6'-8"	748												
B2	192	#4	STR	5'-4"	684												
C1	90	#4	STR	21'-2"	1273												
D1	20	#6	STR	2'-6"	75												
G1	2	#4	STR	7'-2"	10												
S2	6	#8	STR	7'-2"	115												
T1	16	#4	STR	2'-9"	29												
T2	16	#4	STR	3'-6"	37												
C1		#4		1'-11"													
					REINFORCING STEEL	LBS.	5,123						REINFORCING STEEL	LBS.	479		



ALL BAR DIMENSIONS ARE OUT TO OUT.

SPLICE LENGTH CHART

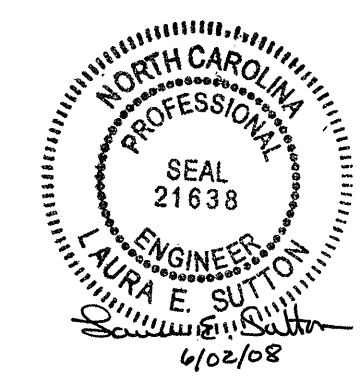
BAR	SIZE	SPLICE LENGTH
B1	#4	1'-9"
C1	#4	1'-11"

STRUCTURE QUANTITIES					
STAGE I			STAGE II		
CLASS A CONCRETE					
BARREL @ 0.629 CY/FT	CU. YDS.	37.6	BARREL @ 0.629 CY/FT	CU. YDS.	3.1
OUTLET WINGS, ETC.	CU. YDS.	11.2	INLET WINGS, ETC.	CU. YDS.	10.7
TOTAL	CU. YDS.	48.8	TOTAL	CU. YDS.	13.8
REINFORCING STEEL					
BARREL	LBS.	5,123	BARREL	LBS.	479
OUTLET WINGS, ETC.	LBS.	673	INLET WINGS, ETC.	LBS.	593
TOTAL	LBS.	5,796	TOTAL	LBS.	1,072
FOUNDATION COND. MAT'L.	TONS	31	FOUNDATION COND. MAT'L.	TONS	3

PROJECT NO. R-3403AB  
 CRAVEN COUNTY  
 STATION: 66+10.90 -L-

SHEET 5 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SINGLE 6 FT. x 6 FT.  
 CONCRETE BOX CULVERT  
 89°-28'-53" SKEW

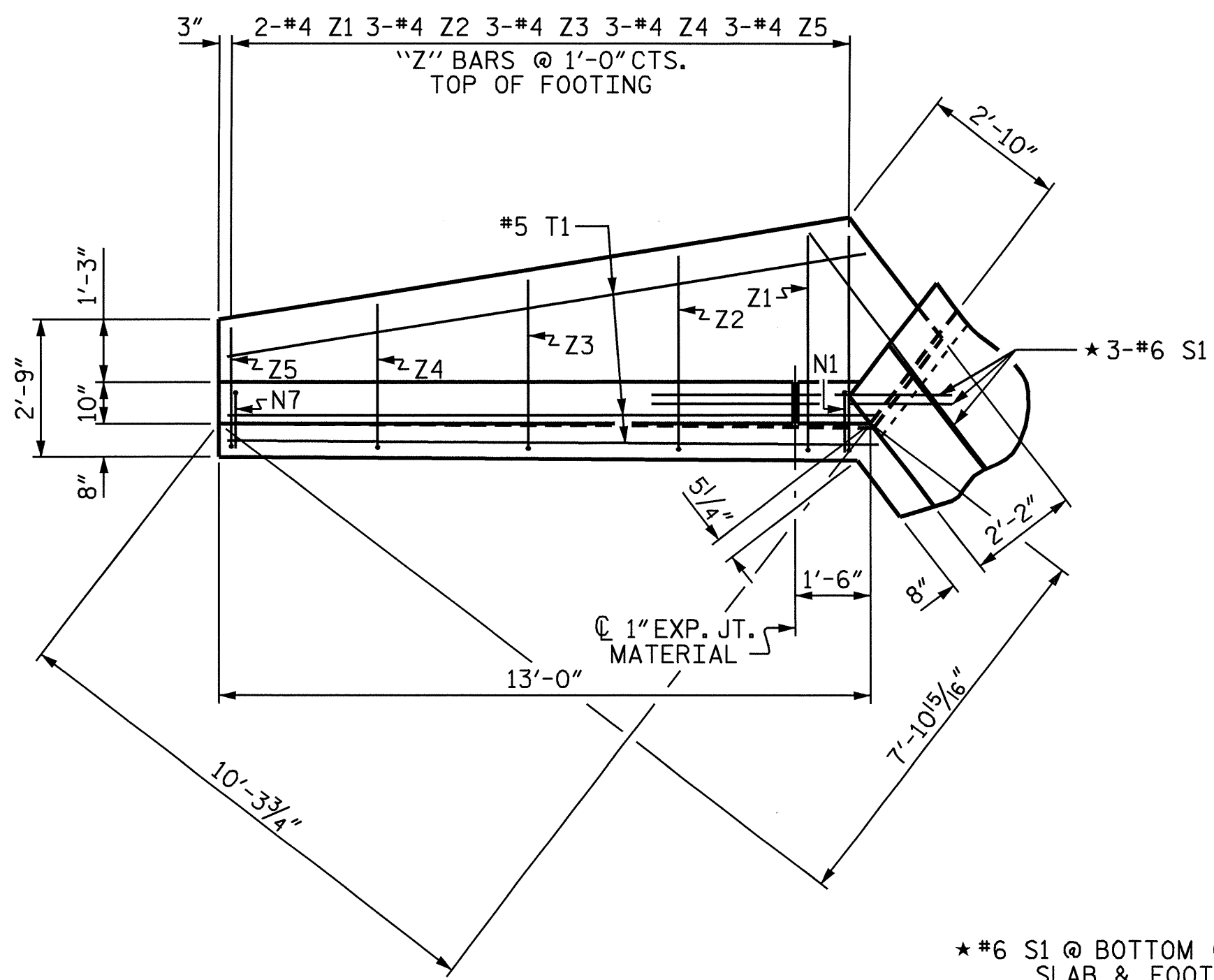


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5	
1			3			TOTAL	14
2			4			SHEETS	

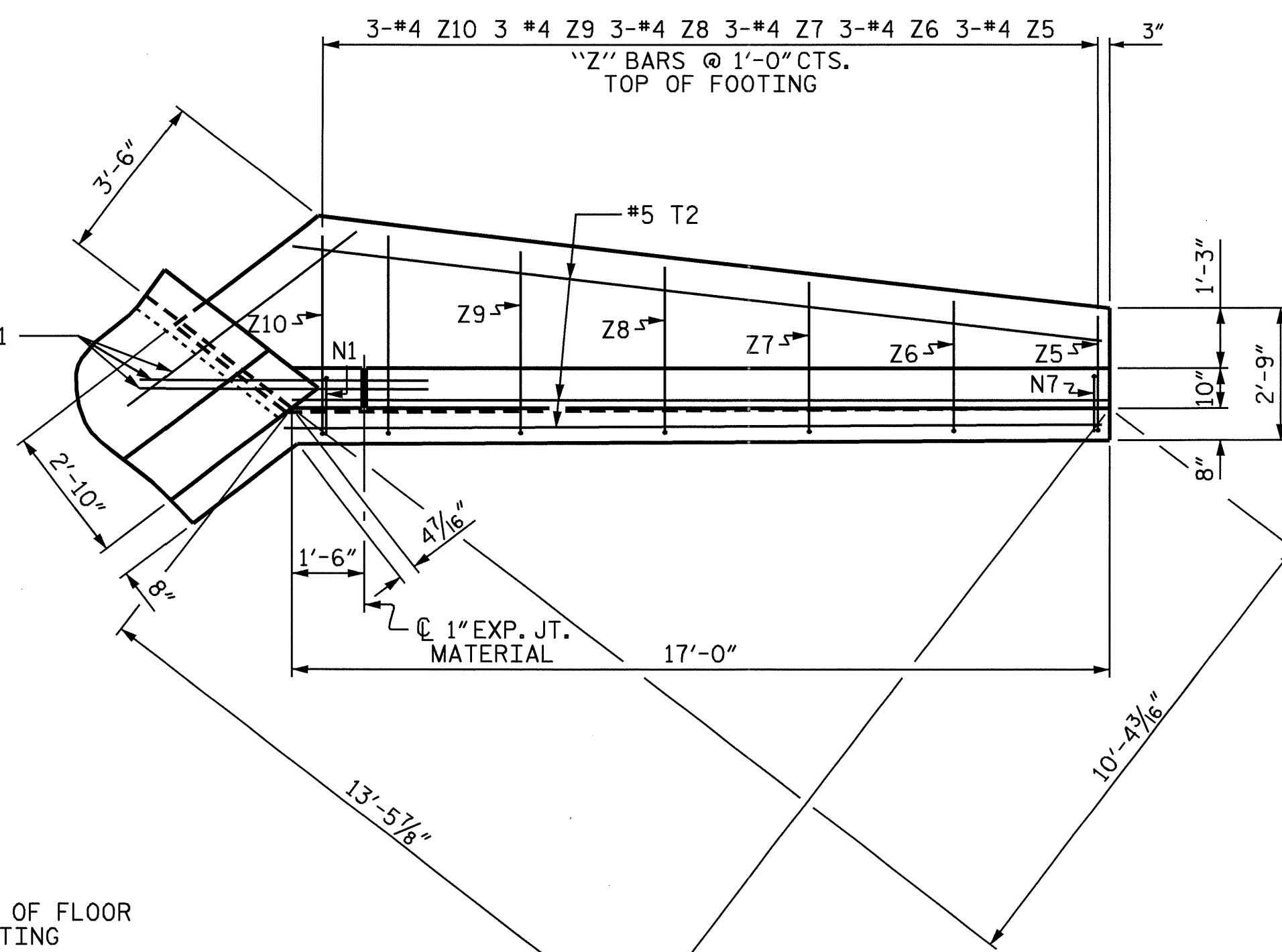
DRAWN BY : A.S. CALLAWAY DATE : 3/20/08  
 CHECKED BY : L.E. SUTTON DATE : 3/28/08

STR. #1

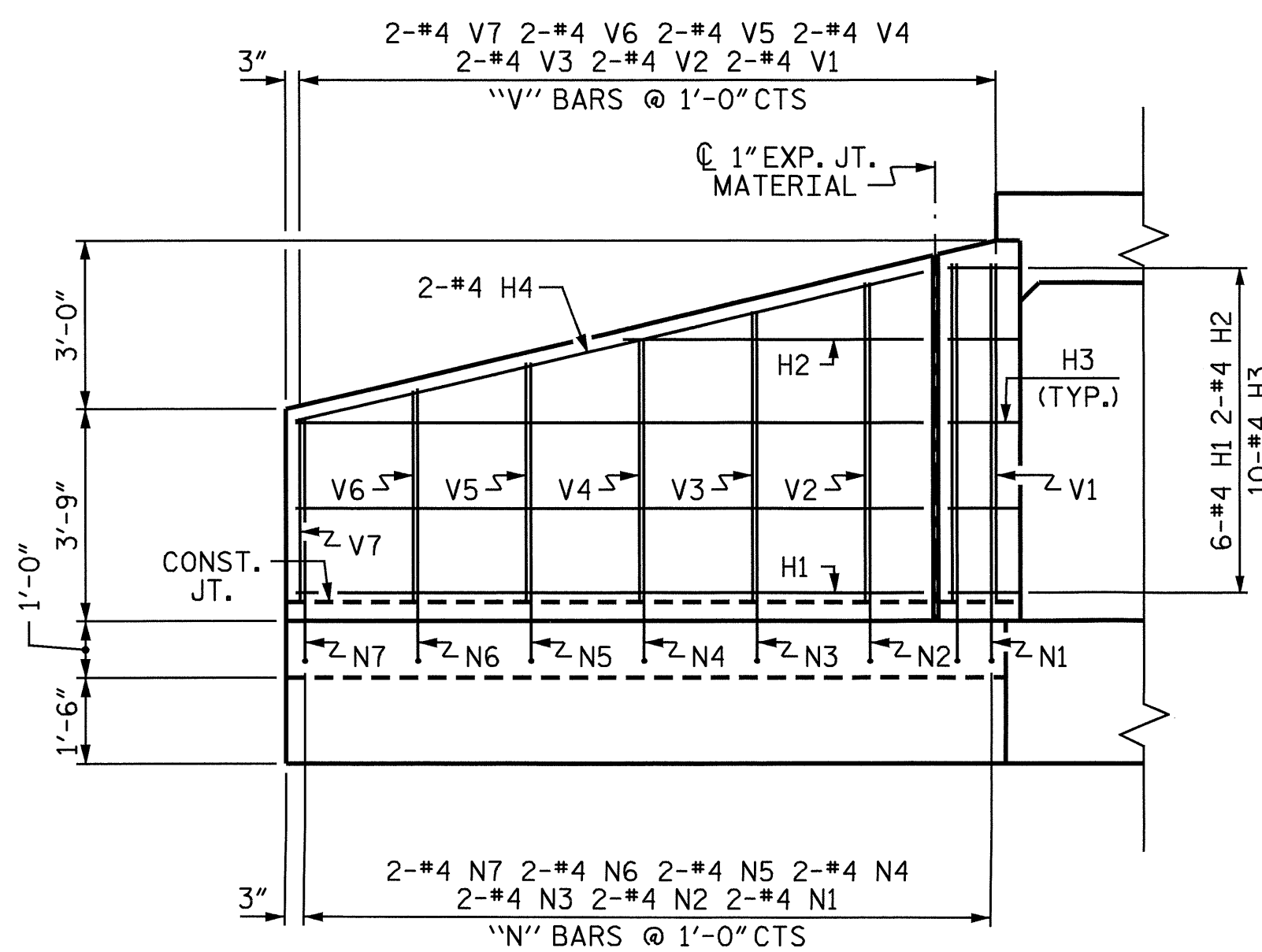




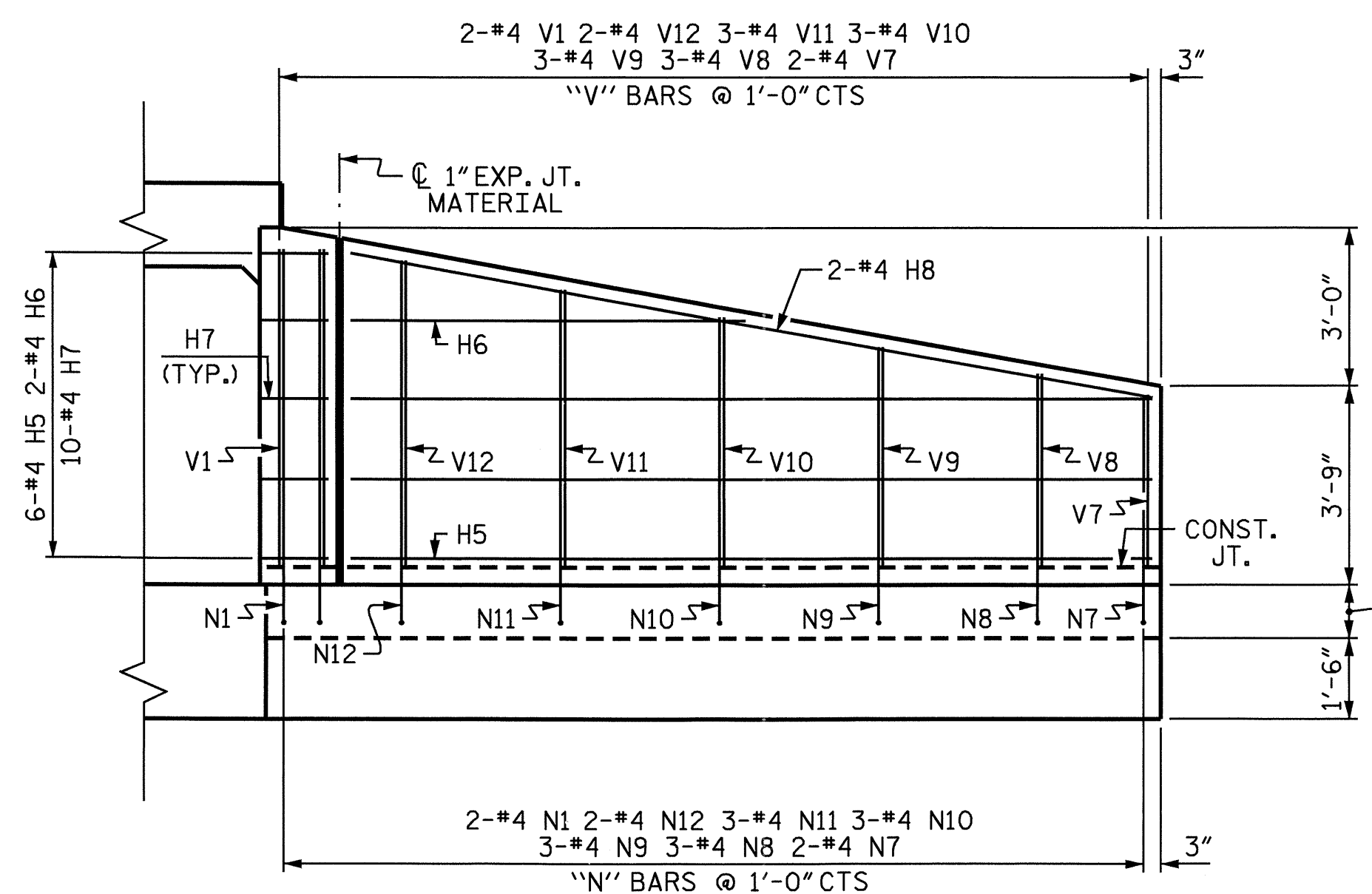
PLAN W2



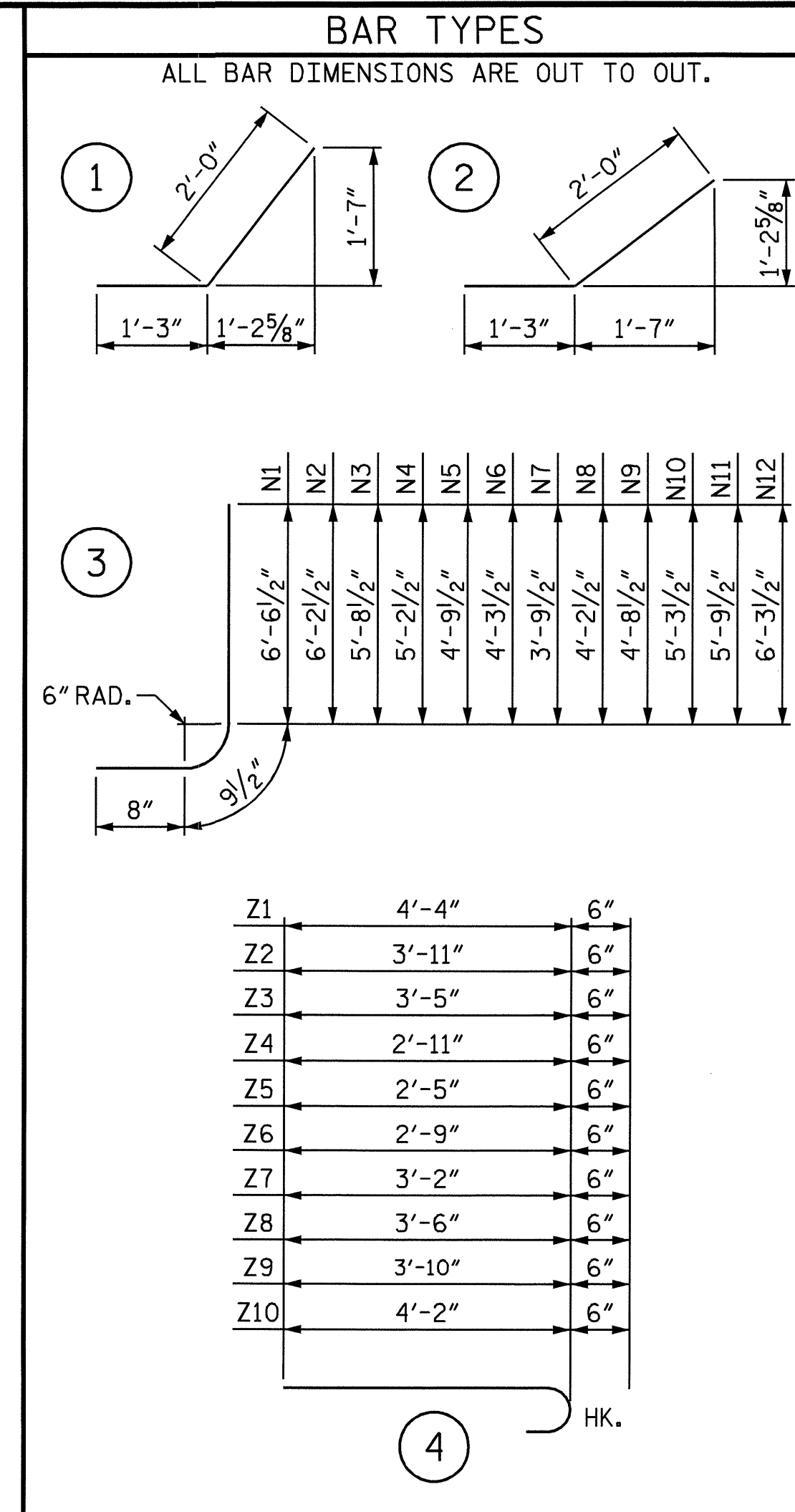
PLAN W1



ELEVATION W2

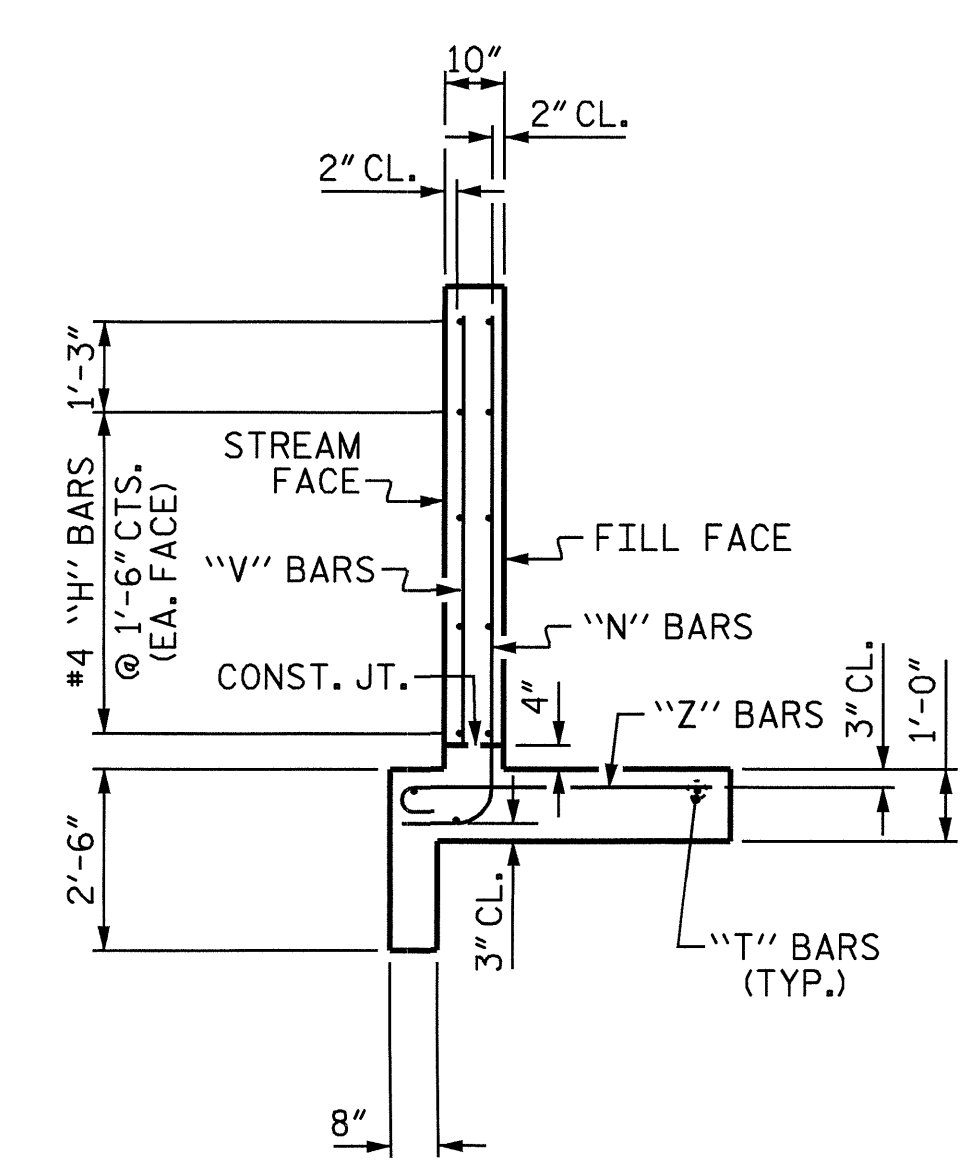


ELEVATION W1



BILL OF MATERIAL					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	11'-1"	44
H2	2	#4	STR	5'-4"	7
H3	10	#4	1	3'-3"	22
H4	2	#4	STR	11'-5"	15
H5	6	#4	STR	15'-1"	60
H6	2	#4	STR	7'-5"	10
H7	10	#4	2	3'-3"	22
H8	2	#4	STR	15'-4"	20
N1	4	#4	3	8'-0"	21
N2	2	#4	3	7'-8"	10
N3	2	#4	3	7'-2"	10
N4	2	#4	3	6'-8"	9
N5	2	#4	3	6'-3"	8
N6	2	#4	3	5'-9"	8
N7	4	#4	3	5'-3"	14
N8	3	#4	3	5'-8"	11
N9	3	#4	3	6'-2"	12
N10	3	#4	3	6'-9"	14
N11	3	#4	3	7'-3"	15
N12	2	#4	3	7'-9"	10
S1	6	#6	STR	6'-0"	54
T1	3	#5	STR	13'-0"	41
T2	3	#5	STR	17'-0"	53
V1	4	#4	STR	6'-0"	16
V2	2	#4	STR	5'-8"	8
V3	2	#4	STR	5'-2"	7
V4	2	#4	STR	4'-8"	6
V5	2	#4	STR	4'-3"	6
V6	2	#4	STR	3'-9"	5
V7	4	#4	STR	3'-3"	9
V8	3	#4	STR	3'-8"	7
V9	3	#4	STR	4'-2"	8
V10	3	#4	STR	4'-9"	10
V11	3	#4	STR	5'-3"	11
V12	2	#4	STR	5'-9"	8
Z1	2	#4	4	4'-10"	6
Z2	3	#4	4	4'-5"	9
Z3	3	#4	4	3'-11"	8
Z4	3	#4	4	3'-5"	7
Z5	6	#4	4	2'-11"	12
Z6	3	#4	4	3'-3"	7
Z7	3	#4	4	3'-8"	7
Z8	3	#4	4	4'-0"	8
Z9	3	#4	4	4'-4"	9
Z10	3	#4	4	4'-8"	9

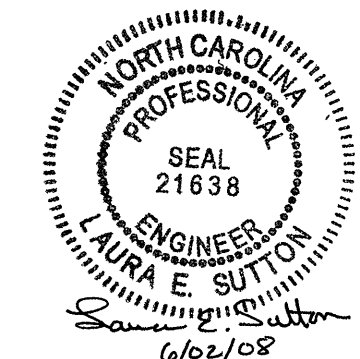
REINFORCING STEEL FOR 2 WINGS	LBS.	673
CLASS A CONCRETE		
2 WINGS	CU. YDS.	10.5
1 HEADWALL	CU. YDS.	0.4
1 END CURTAIN WALL	CU. YDS.	0.3
TOTAL	CU. YDS.	11.2



TYPICAL WING SECTION

PROJECT NO. R-3403AB  
 CRAVEN COUNTY  
 STATION: 66+10.90 -L-

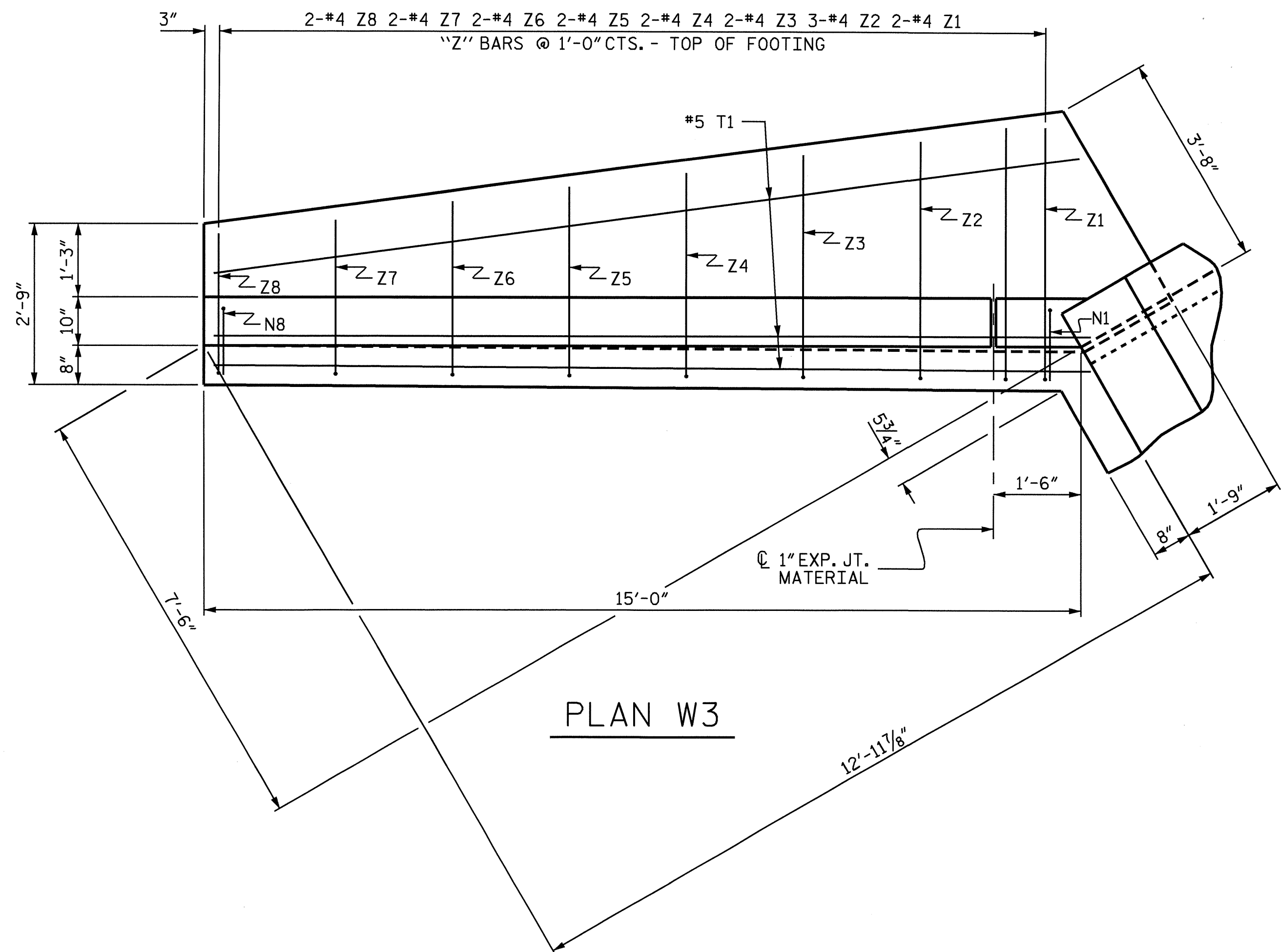
SHEET 6 OF 7  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 OUTLET WINGS  
 FOR  
 CONCRETE BOX CULVERT  
 H = 6'-0" SLOPE = 3:1  
 105° SKEW



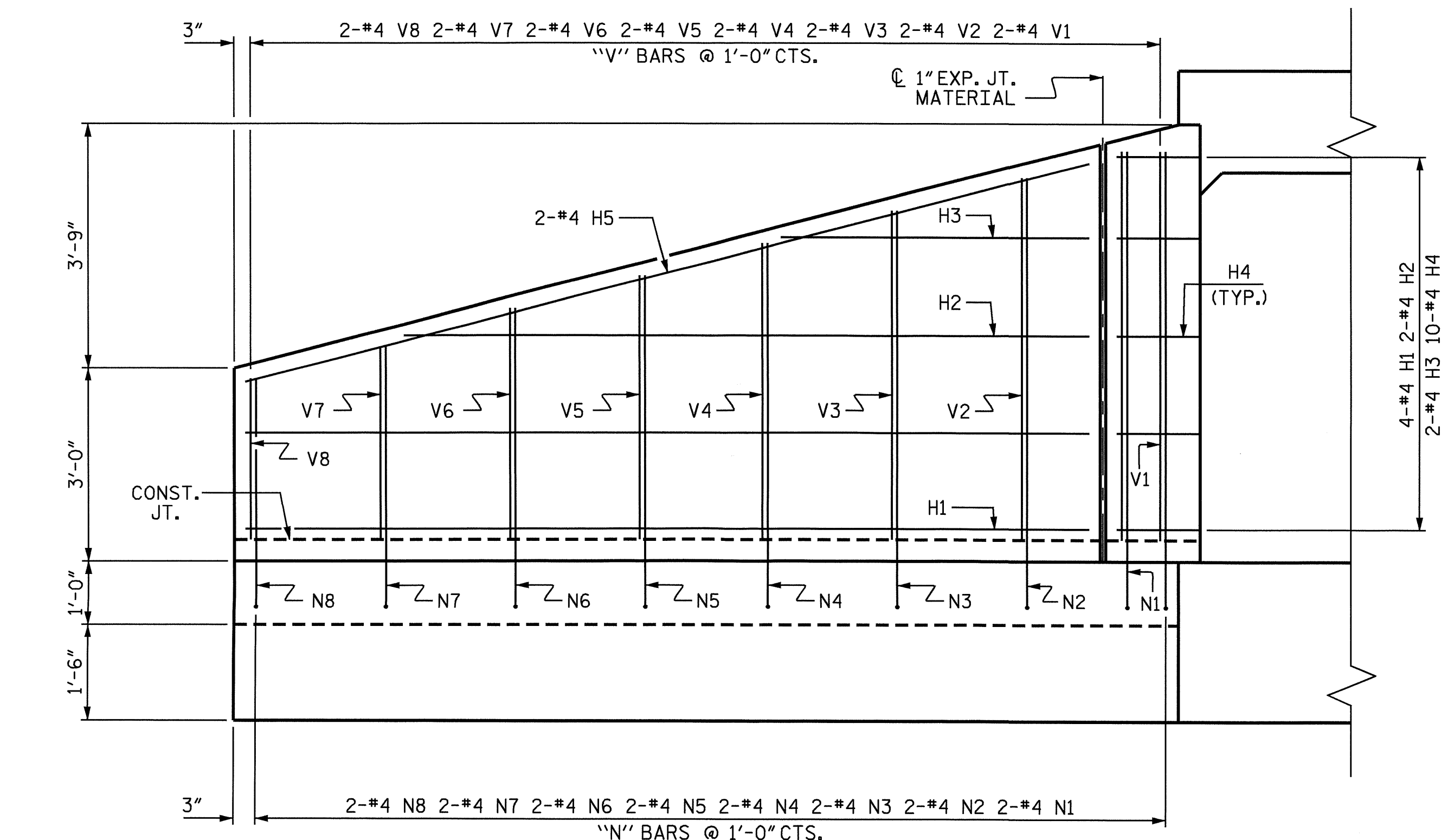
DRAWN BY: L.E. SUTTON DATE: 3/19/08  
 CHECKED BY: A.S. CALLAWAY DATE: 3/19/08

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

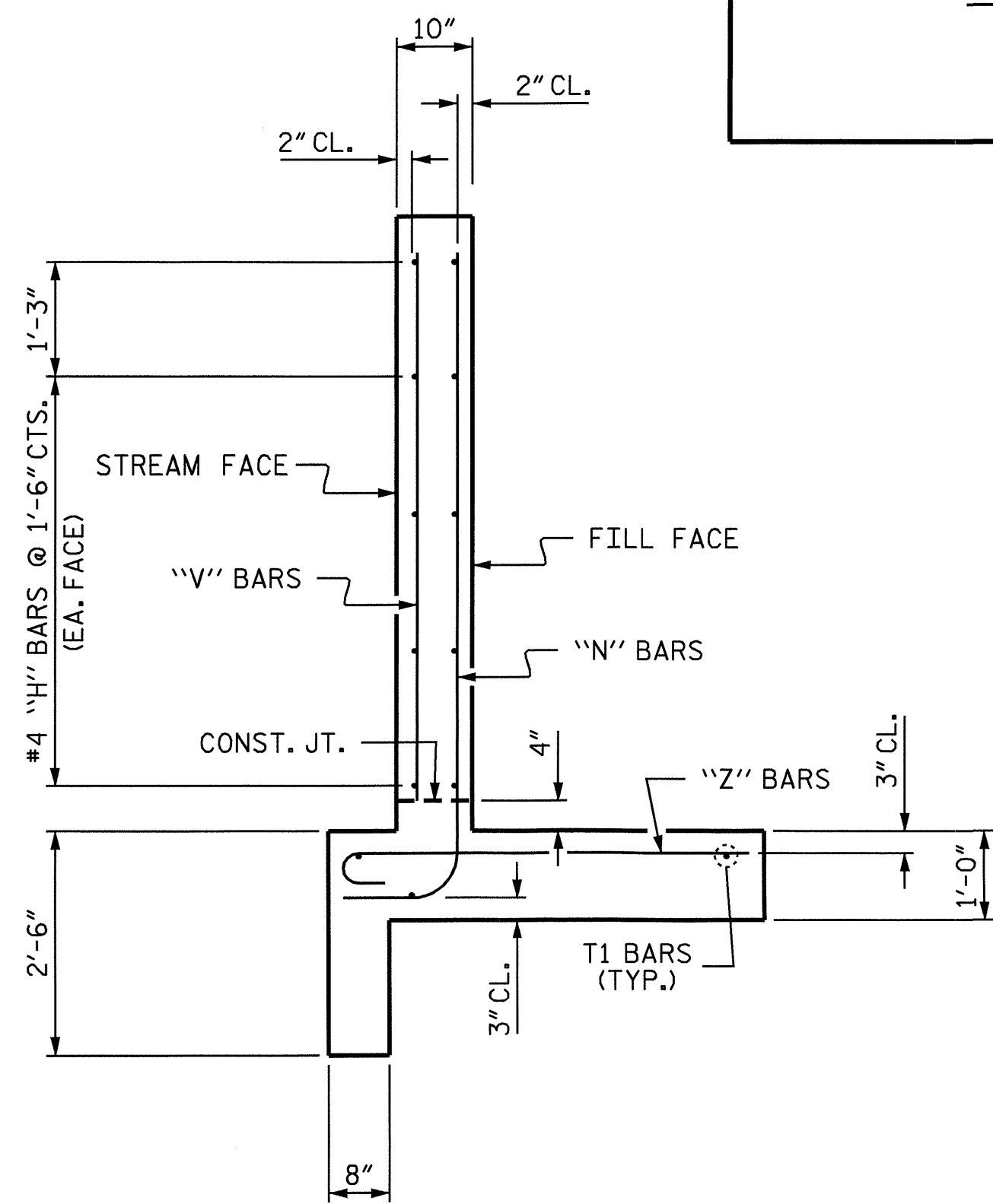
STR. #1



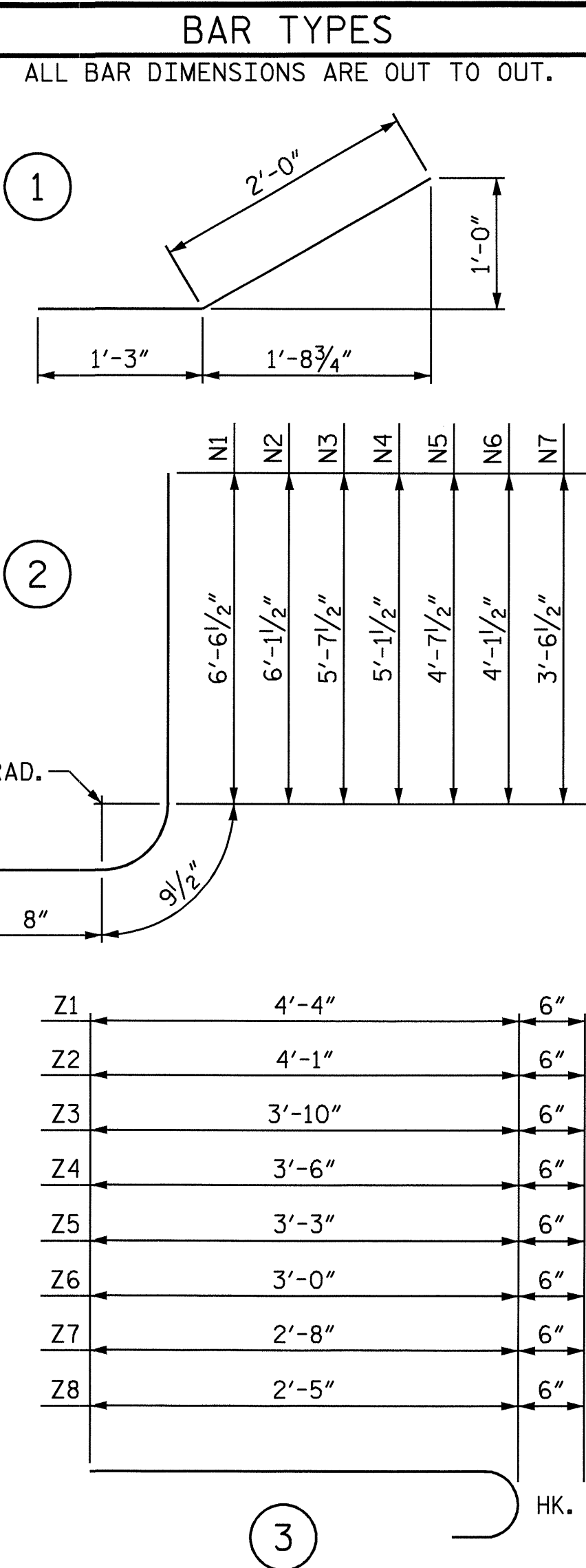
PLAN W3



ELEVATION W3



TYPICAL WING SECTION



BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	#4	STR	13'-0"	69
H2	4	#4	STR	10'-7"	28
H3	4	#4	STR	4'-9"	13
H4	20	#4	1	3'-3"	43
H5	4	#4	STR	13'-5"	36
N1	4	#4	2	8'-0"	21
N2	4	#4	2	7'-7"	20
N3	4	#4	2	7'-1"	19
N4	4	#4	2	6'-7"	18
N5	4	#4	2	6'-1"	16
N6	4	#4	2	5'-7"	15
N7	4	#4	2	5'-0"	13
N8	4	#4	2	4'-6"	12
T1	6	#5	STR	15'-0"	94
V1	4	#4	STR	6'-0"	16
V2	4	#4	STR	5'-7"	15
V3	4	#4	STR	5'-1"	14
V4	4	#4	STR	4'-7"	12
V5	4	#4	STR	4'-1"	11
V6	4	#4	STR	3'-7"	10
V7	4	#4	STR	3'-0"	8
V8	4	#4	STR	2'-6"	7
Z1	4	#4	3	4'-10"	13
Z2	4	#4	3	4'-7"	12
Z3	4	#4	3	4'-4"	12
Z4	4	#4	3	4'-0"	11
Z5	4	#4	3	3'-9"	10
Z6	4	#4	3	3'-6"	9
Z7	4	#4	3	3'-2"	8
Z8	4	#4	3	2'-11"	8
REINFORCING STEEL FOR 2 WINGS				LBS.	593
CLASS A CONCRETE					
2 WINGS				CU. YDS.	10.1
1 HEADWALL				CU. YDS.	0.3
1 END CURTAIN WALL				CU. YDS.	0.3
TOTAL				CU. YDS.	10.7

PROJECT NO. R-3403AB  
 CRAVEN COUNTY  
 STATION: 66+10.90 -L-

SHEET 7 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 INLET WINGS  
 FOR  
 CONCRETE BOX CULVERT  
 H = 6'-0" SLOPE = 3:1  
 90° SKEW



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

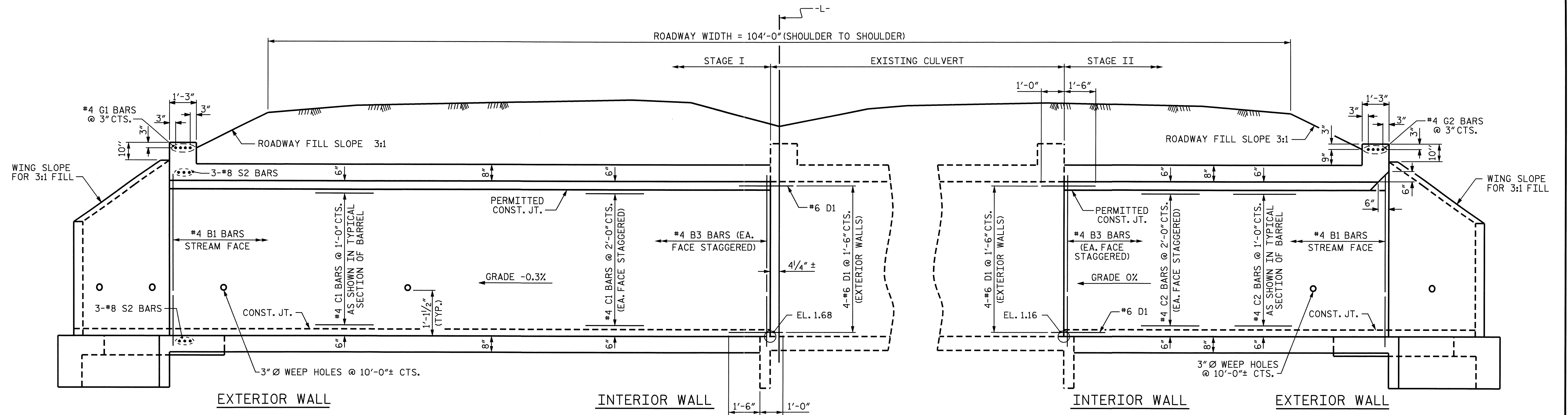
DRAWN BY: L.E. SUTTON DATE: 3/18/08  
 CHECKED BY: A.S. CALLAWAY DATE: 3/19/08

21-APR-2008 08:24  
 R:\Structures\str1\scallaway\3403a\_sd\_cu.01.dgn  
 wparker

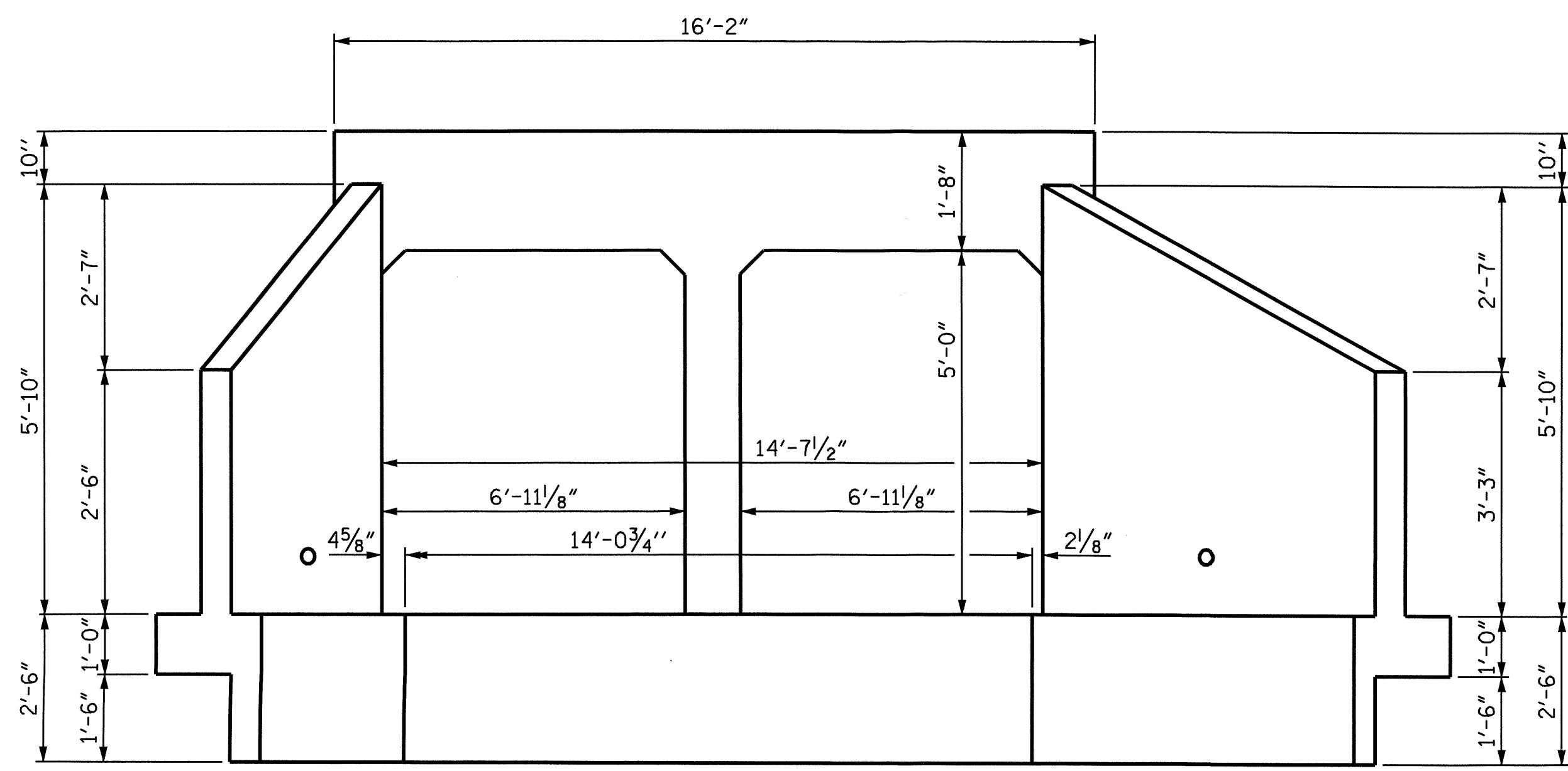
STR. #1



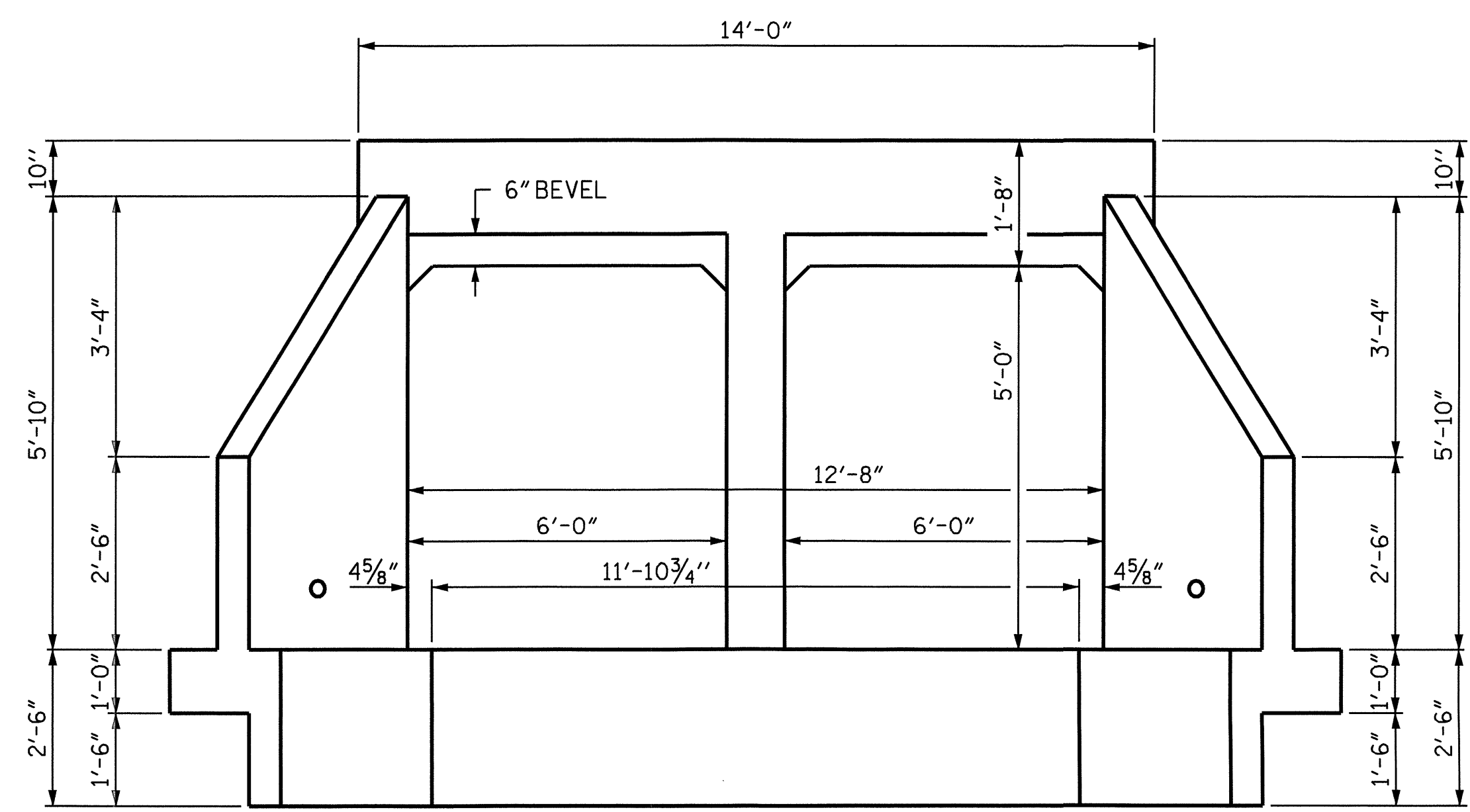




CULVERT SECTION NORMAL TO ROADWAY



OUTLET END ELEVATION - NORMAL TO SKEW

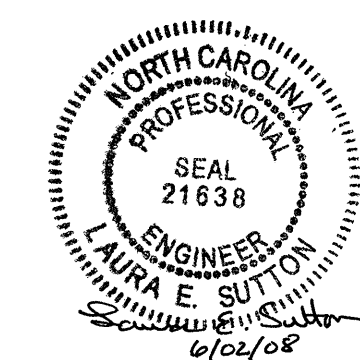


INLET END ELEVATION

PROJECT NO. R-3403AB  
 CRAVEN COUNTY  
 STATION: 109+35.67 -L-

SHEET 2 OF 7

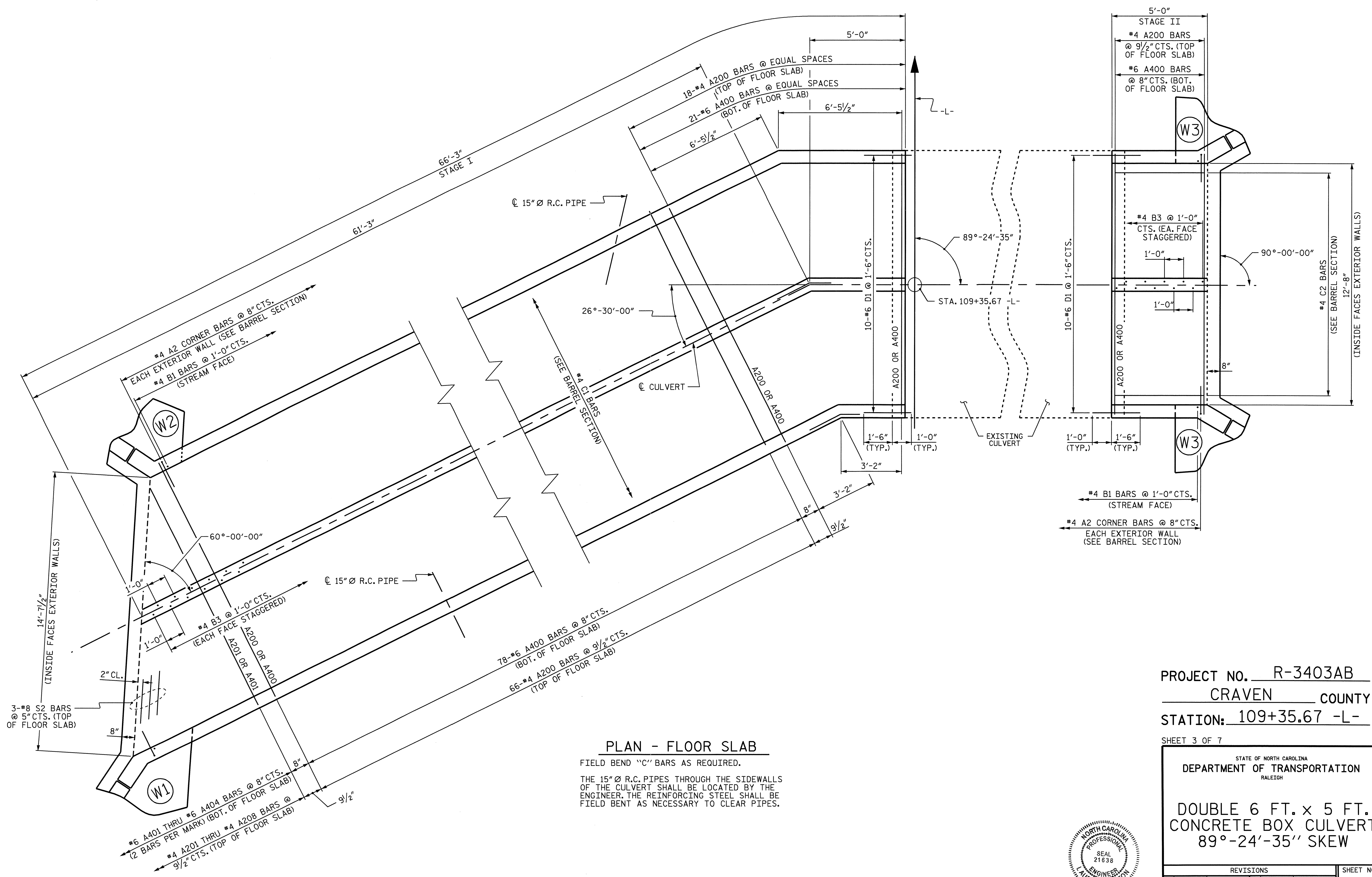
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 DOUBLE 6 FT. x 5 FT.  
 CONCRETE BOX CULVERT  
 89°-24'-35" SKEW



DRAWN BY: A.S. CALLAWAY DATE: 3/20/08  
 CHECKED BY: L.E. SUTTON DATE: 3/31/08

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9	
1			3			TOTAL SHEETS	
2			4			14	

STR. #2



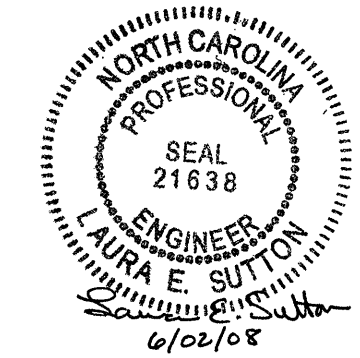
**PLAN - FLOOR SLAB**

FIELD BEND "C" BARS AS REQUIRED.  
 THE 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 PIPES.

PROJECT NO. R-3403AB  
 CRAVEN  COUNTY  
 STATION: 109+35.67 -L-

SHEET 3 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 DOUBLE 6 FT. x 5 FT.  
 CONCRETE BOX CULVERT  
 89°-24'-35" SKEW

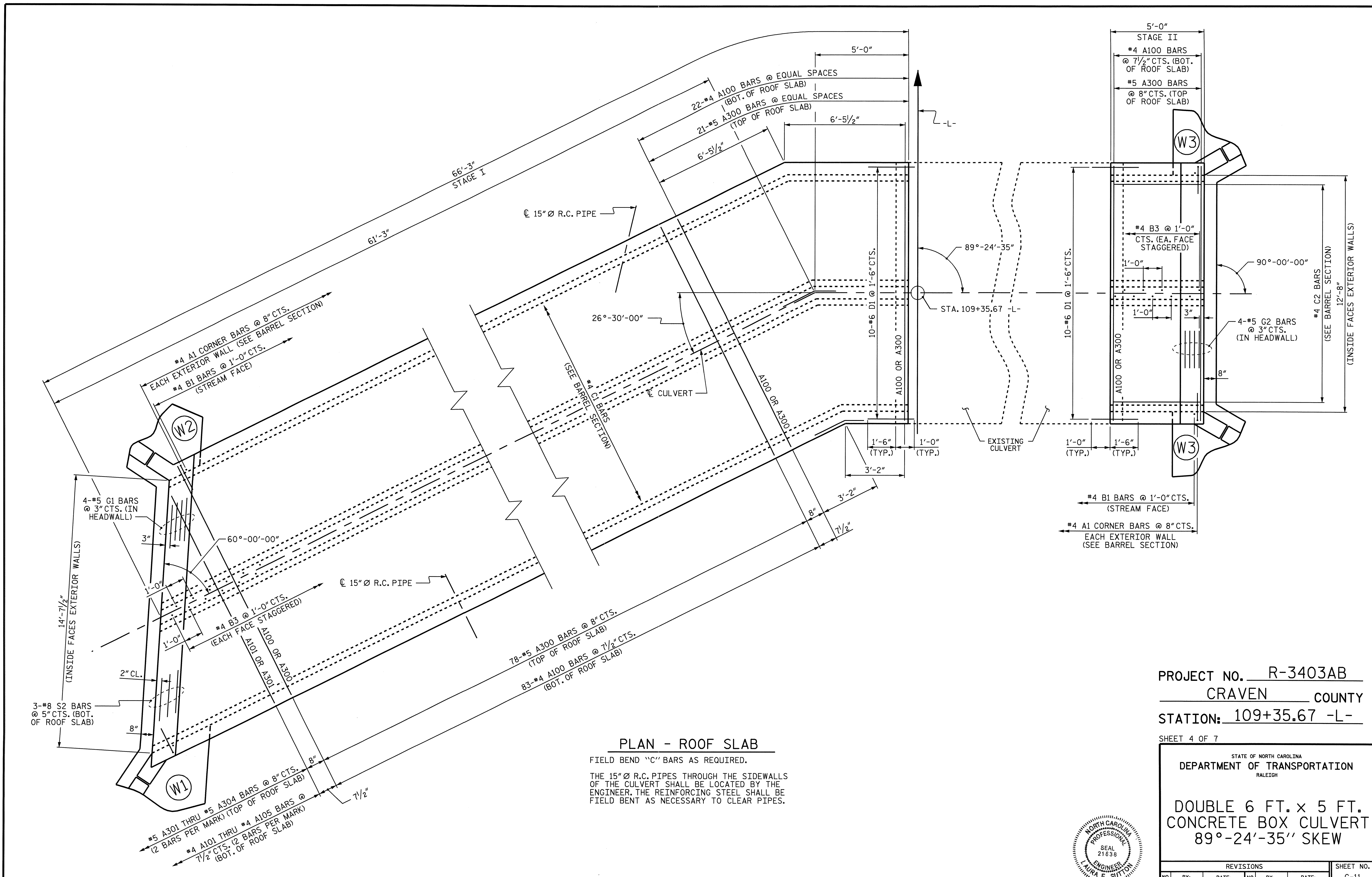


DRAWN BY: A.S. CALLAWAY DATE: 3/20/08  
 CHECKED BY: L.E. SUTTON DATE: 3/31/08

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10	
1			3			TOTAL	14
2			4			SHEETS	

STR. #2





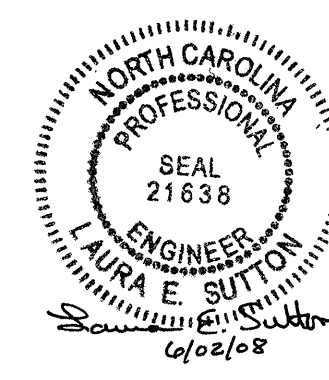
**PLAN - ROOF SLAB**

FIELD BEND "C" BARS AS REQUIRED.  
 THE 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 PIPES.

PROJECT NO. R-3403AB  
 CRAVEN  COUNTY  
 STATION: 109+35.67 -L-

SHEET 4 OF 7

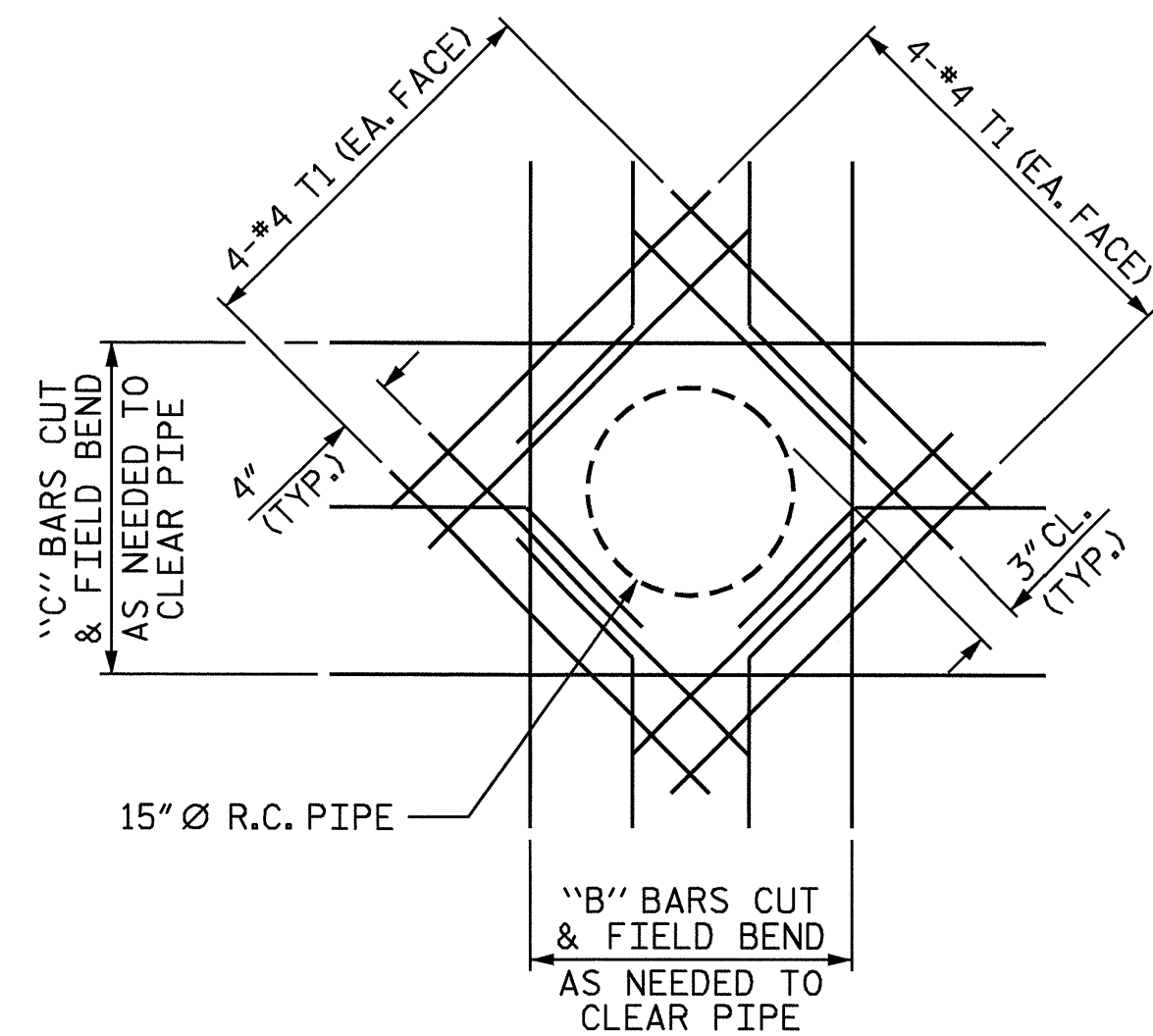
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 DOUBLE 6 FT. x 5 FT.  
 CONCRETE BOX CULVERT  
 89°-24'-35" SKEW



DRAWN BY: A.S. CALLAWAY DATE: 3/20/08  
 CHECKED BY: L.E. SUTTON DATE: 3/31/08

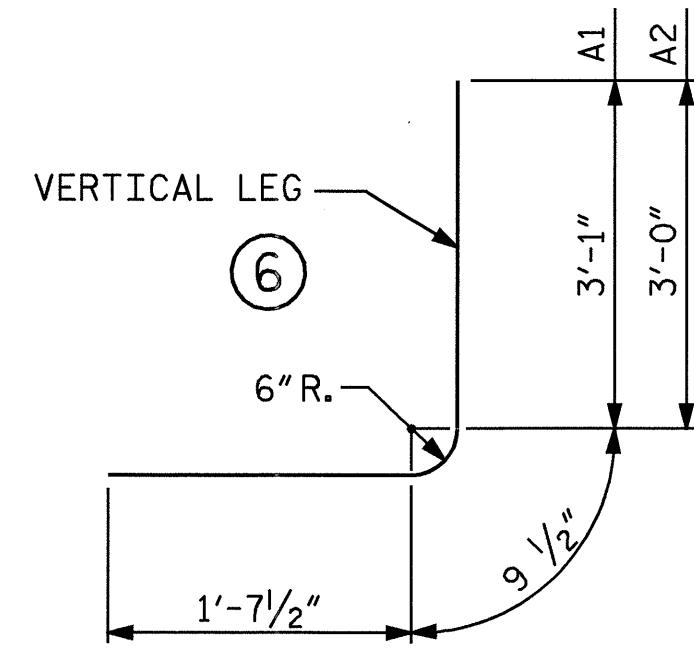
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-11	
1			3			TOTAL	14
2			4			SHEETS	

STR. #2



15" Ø R.C. PIPE  
THRU EXTERIOR WALL

BAR TYPES



SPLICE LENGTH  
CHART

BAR	SIZE	SPLICE LENGTH
A200	#4	1'-9"
A400	#6	2'-4"
"B"	#4	1'-9"
C1	#4	1'-11"

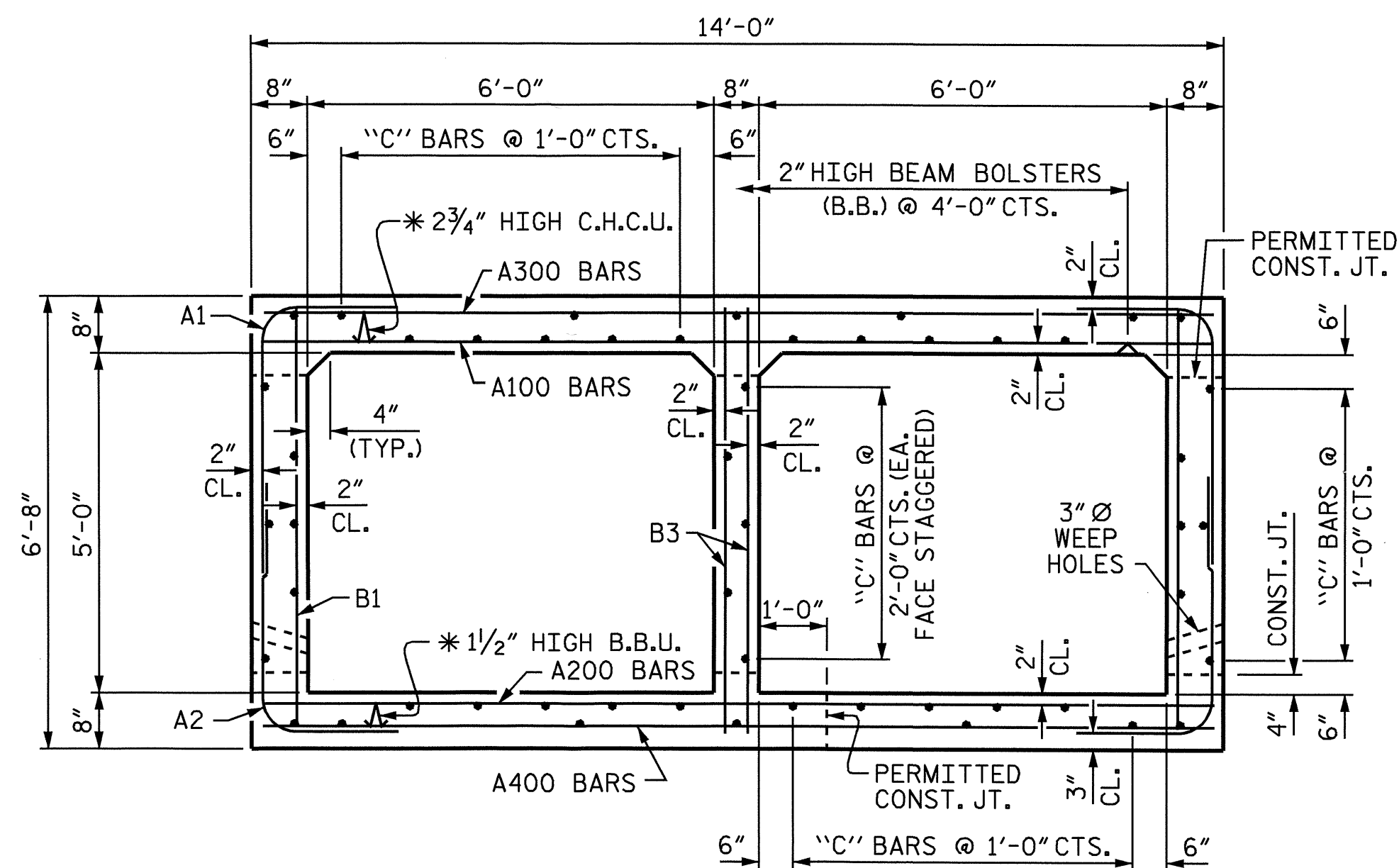
BILL OF MATERIAL

STAGE I											STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	105	#4	STR	13'-7"	953	A400	99	#6	STR	13'-7"	2020	A100	8	#4	STR	13'-7"	73
A101	2	#4	STR	12'-3"	16	A401	2	#6	STR	11'-10"	36						
A102	2	#4	STR	10'-0"	13	A402	2	#6	STR	9'-6"	29	A200	7	#4	STR	13'-7"	64
A103	2	#4	STR	7'-10"	10	A403	2	#6	STR	6'-2"	19						
A104	2	#4	STR	5'-8"	8	A404	2	#6	STR	4'-11"	15	A300	8	#5	STR	13'-7"	113
A105	2	#4	STR	3'-6"	5												
						A1	210	#4	6	5'-6"	772	A400	8	#6	STR	13'-7"	163
A200	84	#4	STR	13'-7"	762	A2	210	#4	6	5'-5"	760						
A201	1	#4	STR	12'-4"	8							A1	16	#4	6	5'-6"	59
A202	1	#4	STR	11'-0"	7	B1	134	#4	STR	5'-10"	522	A2	16	#4	6	5'-5"	58
A203	1	#4	STR	9'-7"	6	B3	134	#4	STR	5'-10"	522						
A204	1	#4	STR	8'-3"	6							B1	10	#4	STR	5'-10"	39
A205	1	#4	STR	6'-10"	5	C1	153	#4	STR	23'-6"	2402	B3	10	#4	STR	5'-10"	39
A206	1	#4	STR	5'-6"	4												
A207	1	#4	STR	4'-1"	3	D1	28	#6	STR	2'-6"	105	C2	51	#4	STR	4'-8"	159
A208	1	#4	STR	2'-9"	2												
						G1	4	#5	STR	15'-9"	66	D1	28	#6	STR	2'-6"	105
A300	99	#5	STR	13'-7"	1403												
A301	2	#5	STR	11'-10"	25	S2	6	#8	STR	15'-9"	252	G2	4	#5	STR	13'-8"	57
A302	2	#5	STR	9'-6"	20												
A303	2	#5	STR	6'-2"	13	T1	32	#4	STR	2'-9"	59						
A304	2	#5	STR	4'-11"	10												

REINFORCING STEEL LBS. 10,858 REINFORCING STEEL LBS. 929

STRUCTURE QUANTITIES

STAGE I				STAGE II			
CLASS A CONCRETE				CLASS A CONCRETE			
BARREL @ 1,070 CY/FT	CU. YDS.	70.9		BARREL @ 1,070 CY/FT	CU. YDS.	5.4	
OUTLET WINGS, ETC.	CU. YDS.	10.5		INLET WINGS, ETC.	CU. YDS.	9.2	
TOTAL	CU. YDS.	81.4		TOTAL	CU. YDS.	14.6	
REINFORCING STEEL				REINFORCING STEEL			
BARREL	LBS.	10,858		BARREL	LBS.	929	
OUTLET WINGS, ETC.	LBS.	572		INLET WINGS, ETC.	LBS.	511	
TOTAL	LBS.	11,430		TOTAL	LBS.	1,440	
FOUNDATION COND. MAT'L.	TONS	65		FOUNDATION COND. MAT'L.	TONS	5	



RIGHT ANGLE SECTION OF BARREL

THERE ARE 51 "C" BARS IN SECTION OF BARREL.

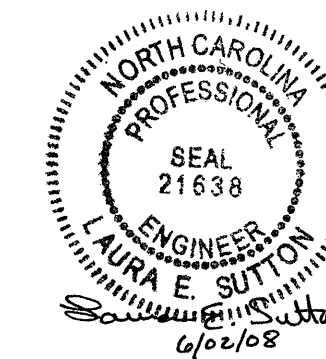
\* ALL CONTINUOUS HIGH CHAIR UPPER (C.H.C.U.) AND BEAM BOLSTER UPPER (B.B.U.) @ 3'-0" CTS.

PROJECT NO. R-3403AB  
 CRAVEN COUNTY  
 STATION: 109+35.67 -L-

SHEET 5 OF 7

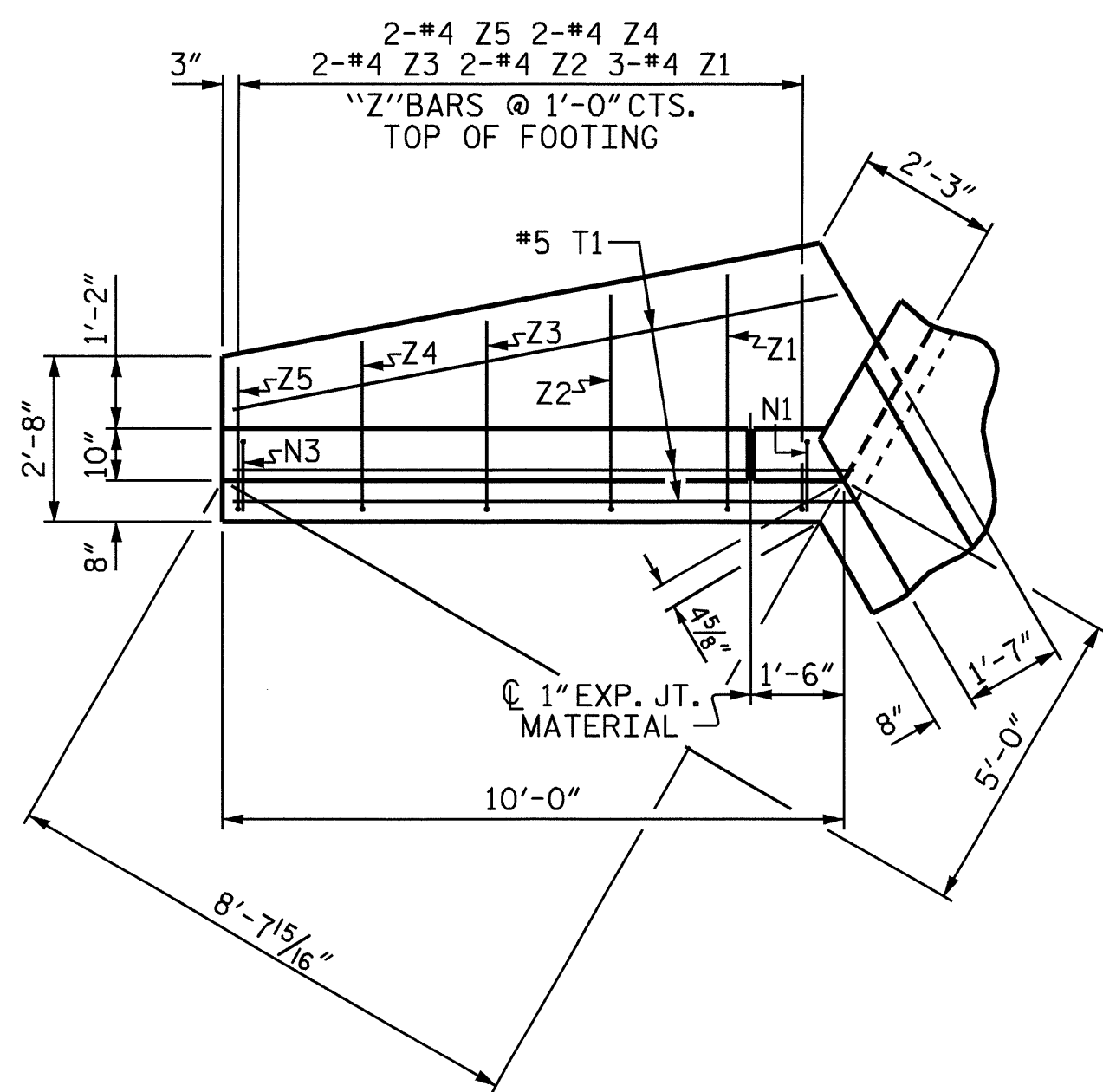
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

DOUBLE 6 FT. x 5 FT.  
 CONCRETE BOX CULVERT  
 89°-24'-35" SKEW

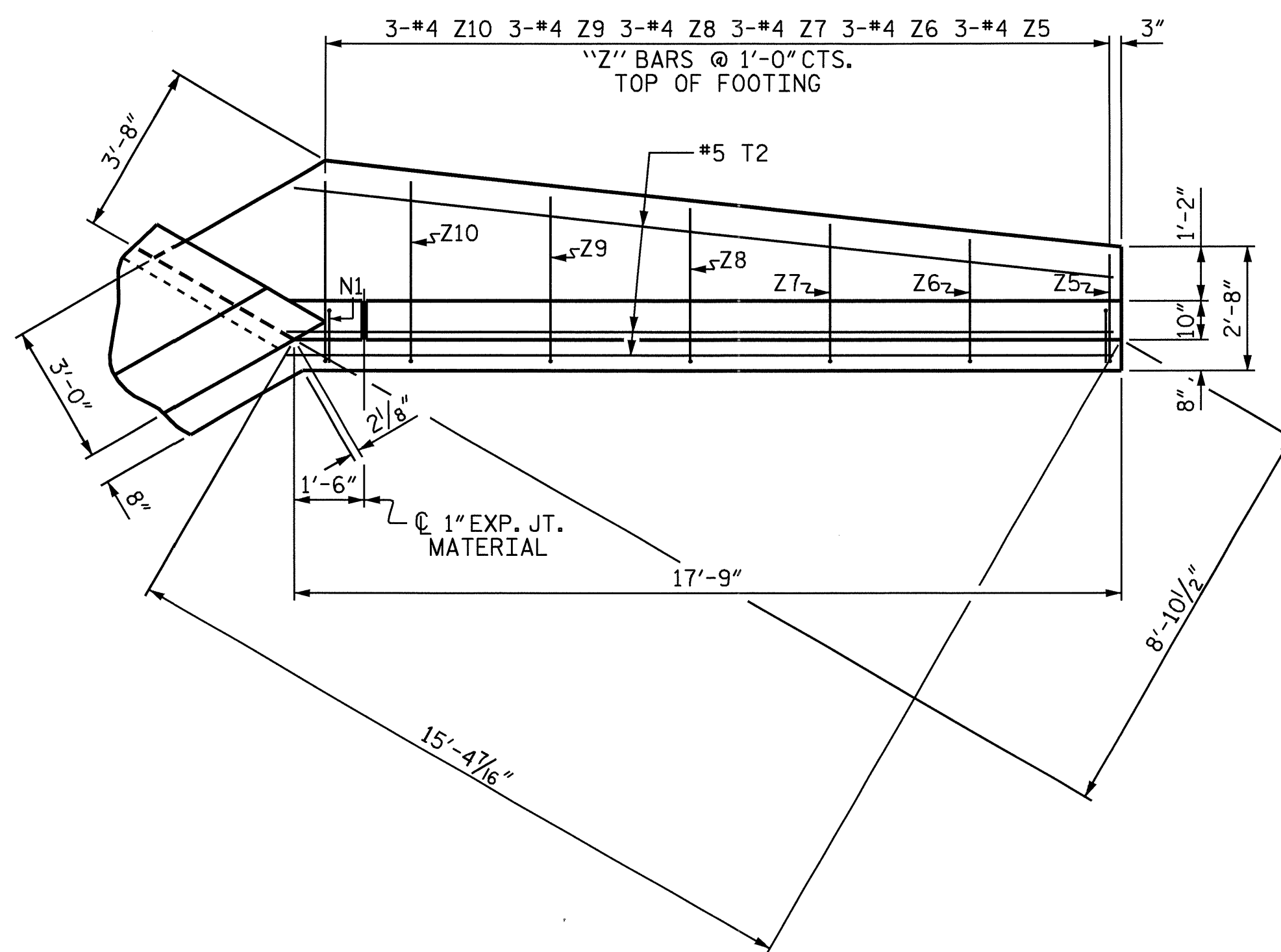


REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-12	
1			3			TOTAL	14
2			4			SHEETS	

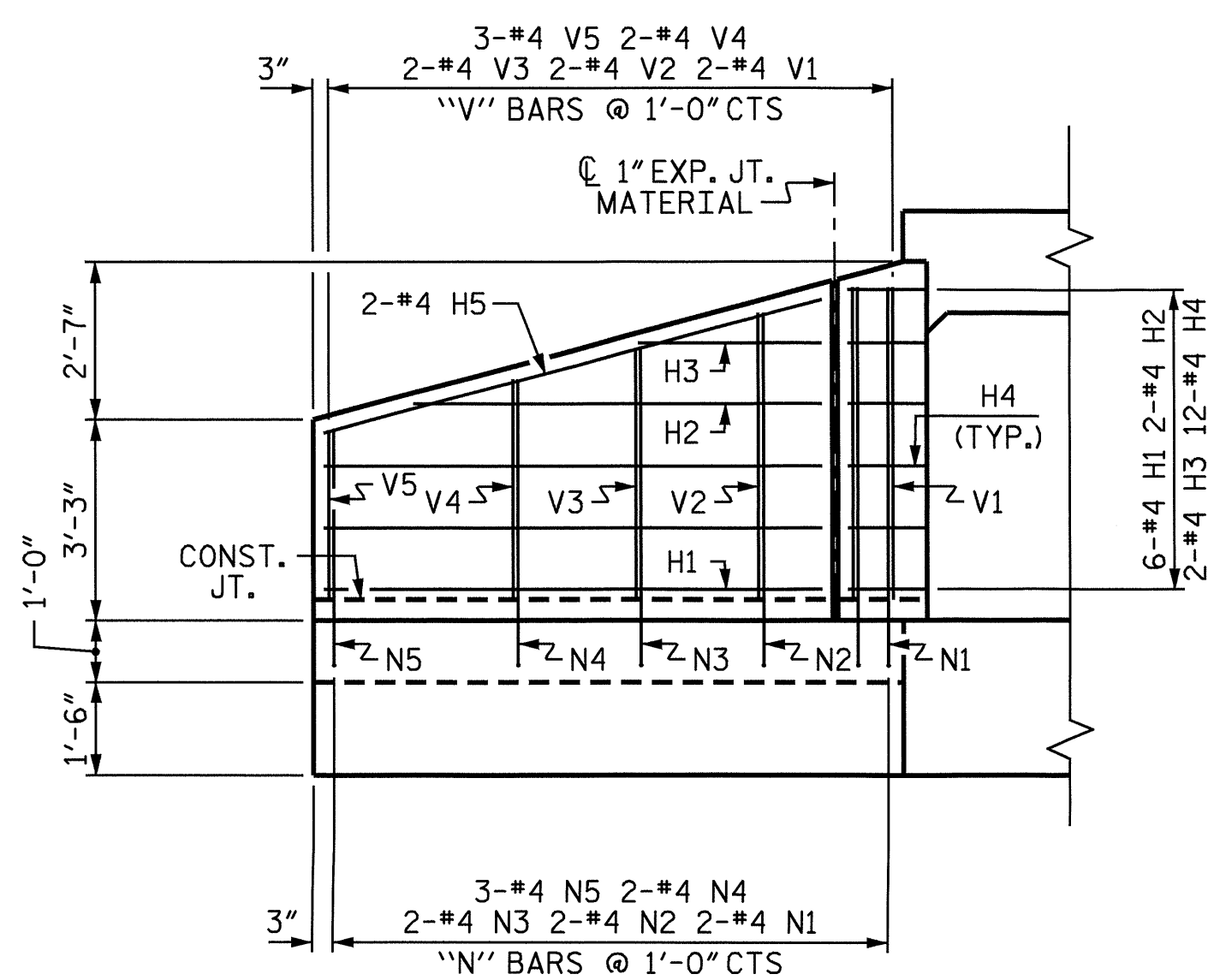
DRAWN BY: A.S. CALLAWAY DATE: 3/20/08  
 CHECKED BY: L.E. SUTTON DATE: 3/31/08



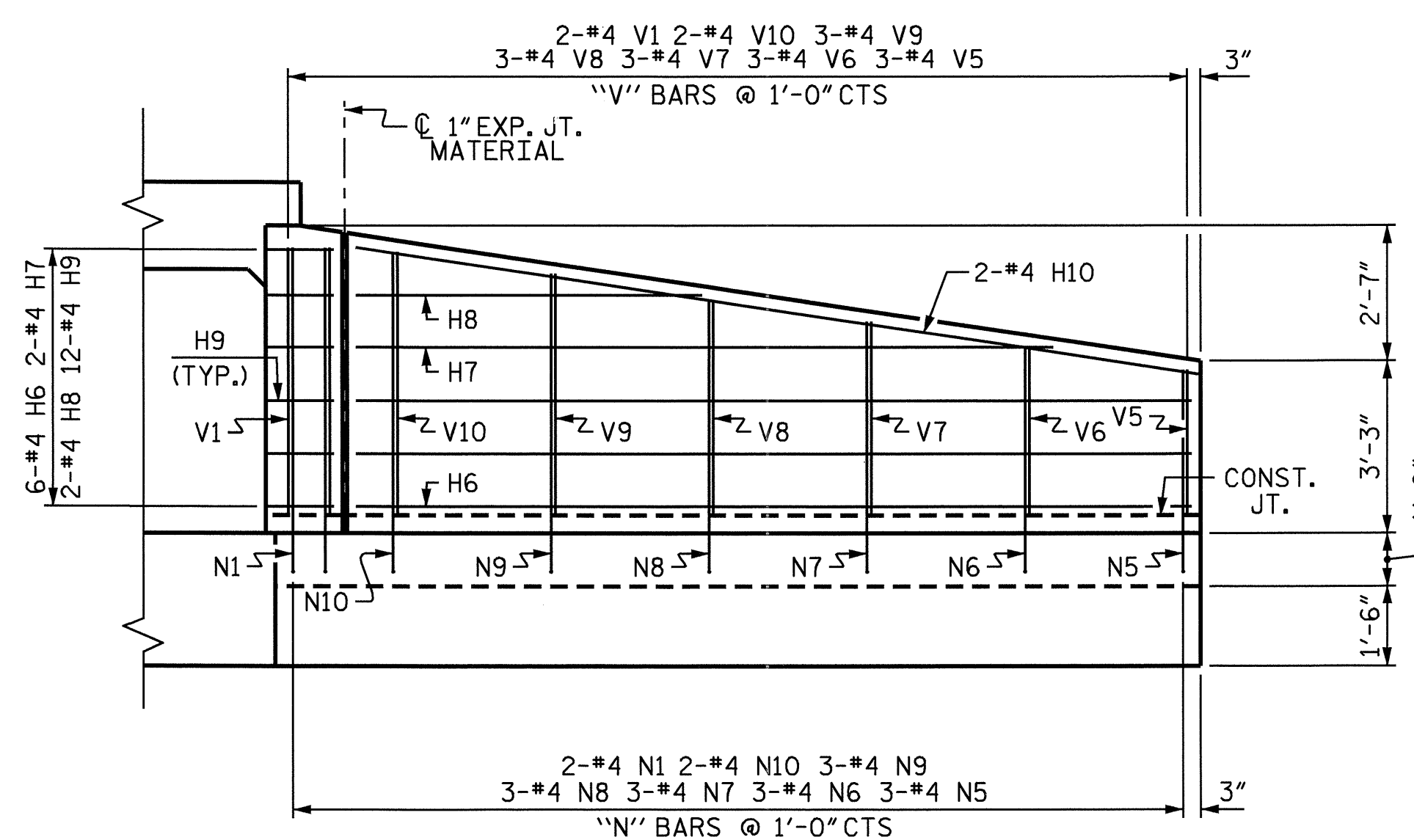
PLAN W2



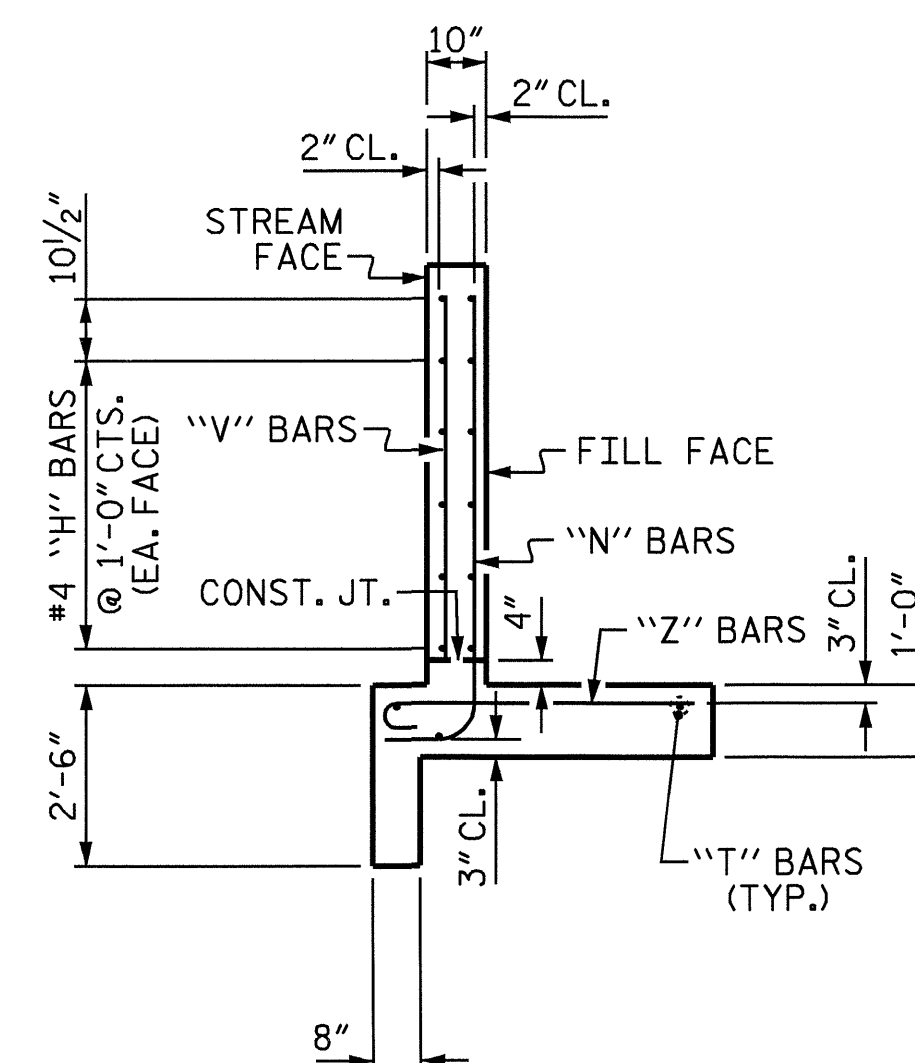
PLAN W1



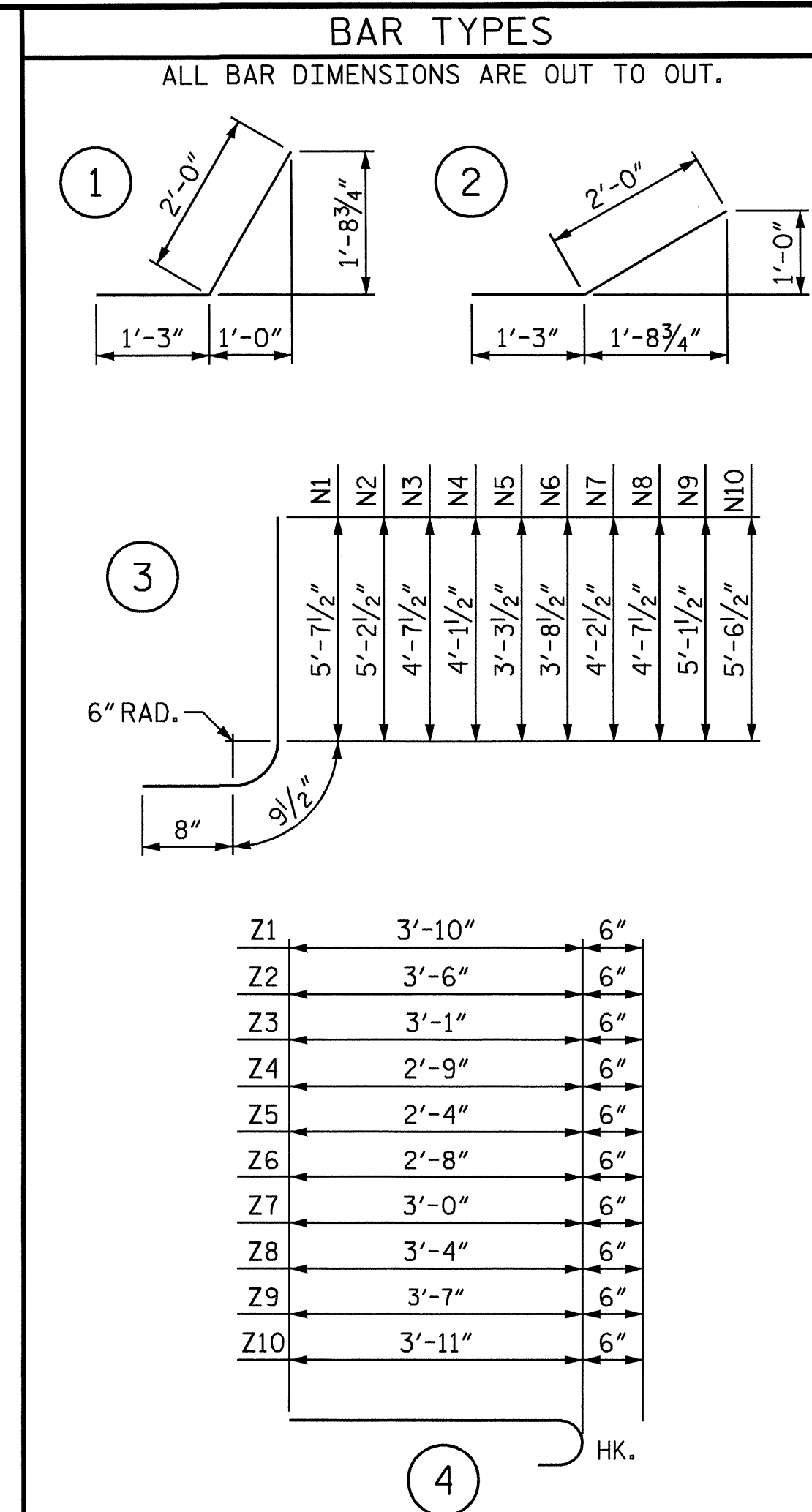
ELEVATION W2



ELEVATION W1



TYPICAL WING SECTION



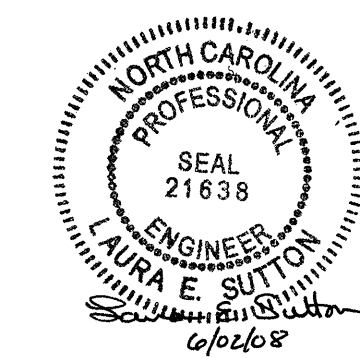
Z1	3'-10"	6"
Z2	3'-6"	6"
Z3	3'-1"	6"
Z4	2'-9"	6"
Z5	2'-4"	6"
Z6	2'-8"	6"
Z7	3'-0"	6"
Z8	3'-4"	6"
Z9	3'-7"	6"
Z10	3'-11"	6"

BILL OF MATERIAL					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
H1	#6	STR	8'-1"	32	
H2	#4	STR	6'-8"	9	
H3	#4	STR	3'-0"	4	
H4	#4	1	3'-3"	26	
H5	#4	STR	8'-5"	11	
H6	#4	STR	15'-10"	63	
H7	#4	STR	13'-3"	18	
H8	#4	STR	6'-7"	9	
H9	#4	2	3'-3"	26	
H10	#4	STR	16'-2"	22	
N1	#4	3	7'-1"	19	
N2	#4	3	6'-8"	9	
N3	#4	3	6'-1"	8	
N4	#4	3	5'-7"	7	
N5	#4	3	4'-9"	19	
N6	#4	3	5'-2"	10	
N7	#4	3	5'-8"	11	
N8	#4	3	6'-1"	12	
N9	#4	3	6'-7"	13	
N10	#4	3	7'-0"	9	
T1	#5	STR	10'-0"	31	
T2	#5	STR	17'-9"	56	
V1	#4	STR	5'-1"	14	
V2	#4	STR	4'-8"	6	
V3	#4	STR	4'-1"	5	
V4	#4	STR	3'-7"	5	
V5	#4	STR	2'-9"	11	
V6	#4	STR	3'-2"	6	
V7	#4	STR	3'-8"	7	
V8	#4	STR	4'-1"	8	
V9	#4	STR	4'-7"	9	
V10	#4	STR	5'-0"	7	
Z1	#4	4	4'-4"	9	
Z2	#4	4	4'-0"	5	
Z3	#4	4	3'-7"	5	
Z4	#4	4	3'-3"	4	
Z5	#4	4	2'-10"	9	
Z6	#4	4	3'-2"	6	
Z7	#4	4	3'-6"	7	
Z8	#4	4	3'-10"	8	
Z9	#4	4	4'-1"	8	
Z10	#4	4	4'-5"	9	

REINFORCING STEEL FOR 2 WINGS	LBS.	572
CLASS A CONCRETE		
2 WINGS	CU. YDS.	8.9
1 HEADWALL	CU. YDS.	0.7
1 END CURTAIN WALL	CU. YDS.	0.9
TOTAL	CU. YDS.	10.5

PROJECT NO. R-3403AB  
 CRAVEN COUNTY  
 STATION: 109+35.67 -L-

SHEET 6 OF 7  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 OUTLET WINGS  
 FOR  
 CONCRETE BOX CULVERT  
 H = 5'-0" SLOPE = 3:1  
 60° SKEW

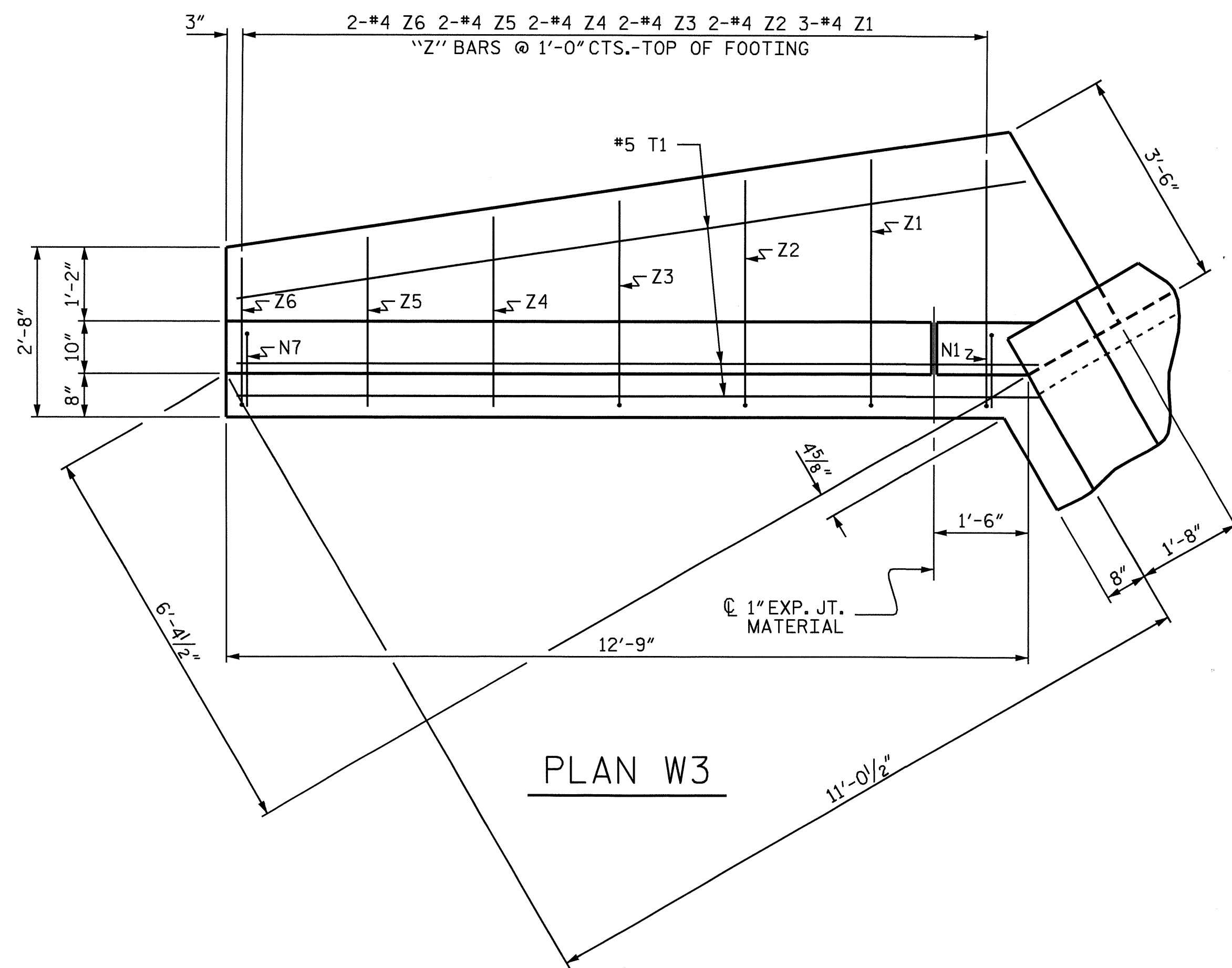


DRAWN BY: L.E. SUTTON DATE: 3/25/08  
 CHECKED BY: A.S. CALLAWAY DATE: 3/26/08

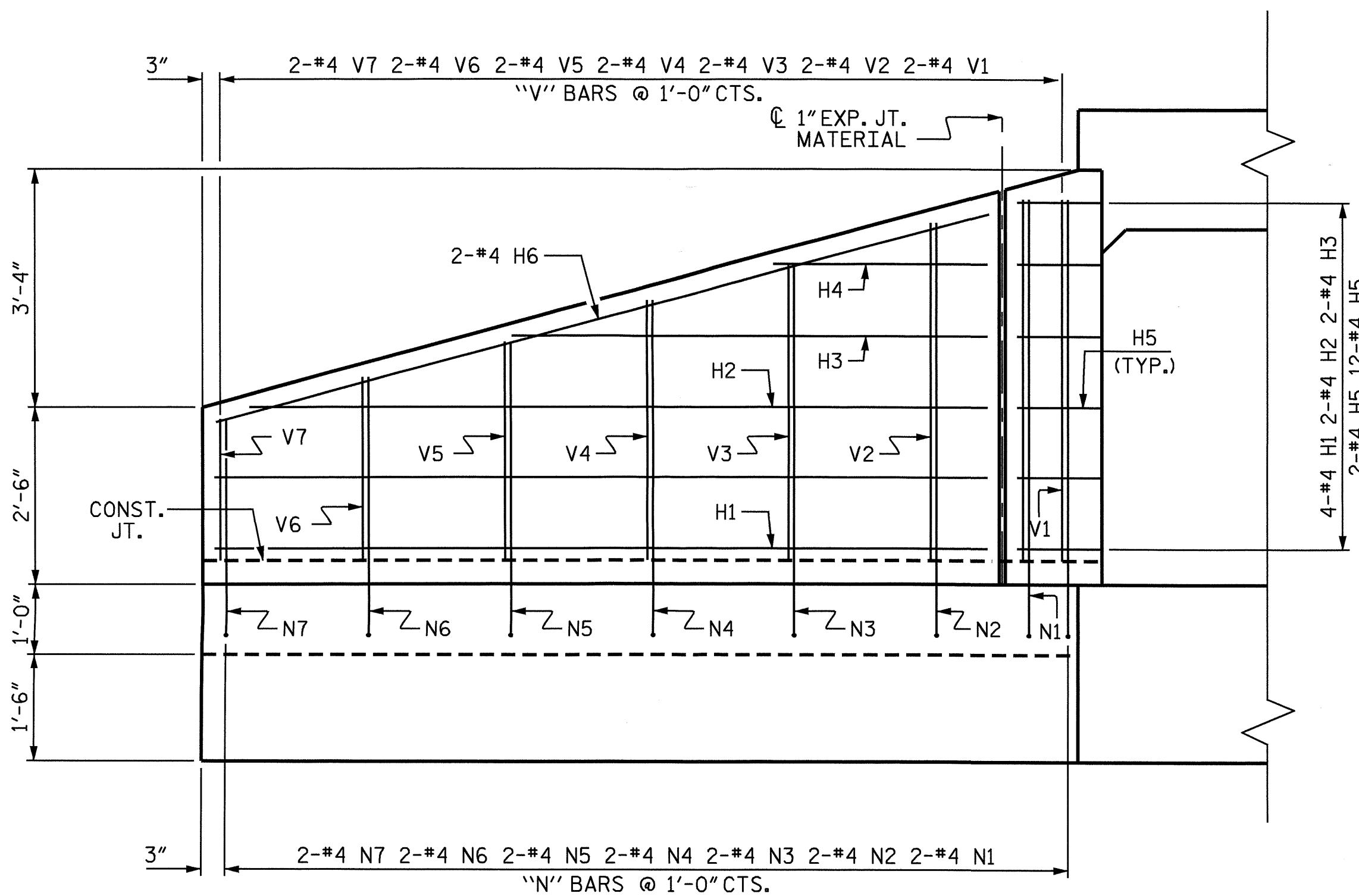
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-13	
1			3			TOTAL	14
2			4				

STR. #2

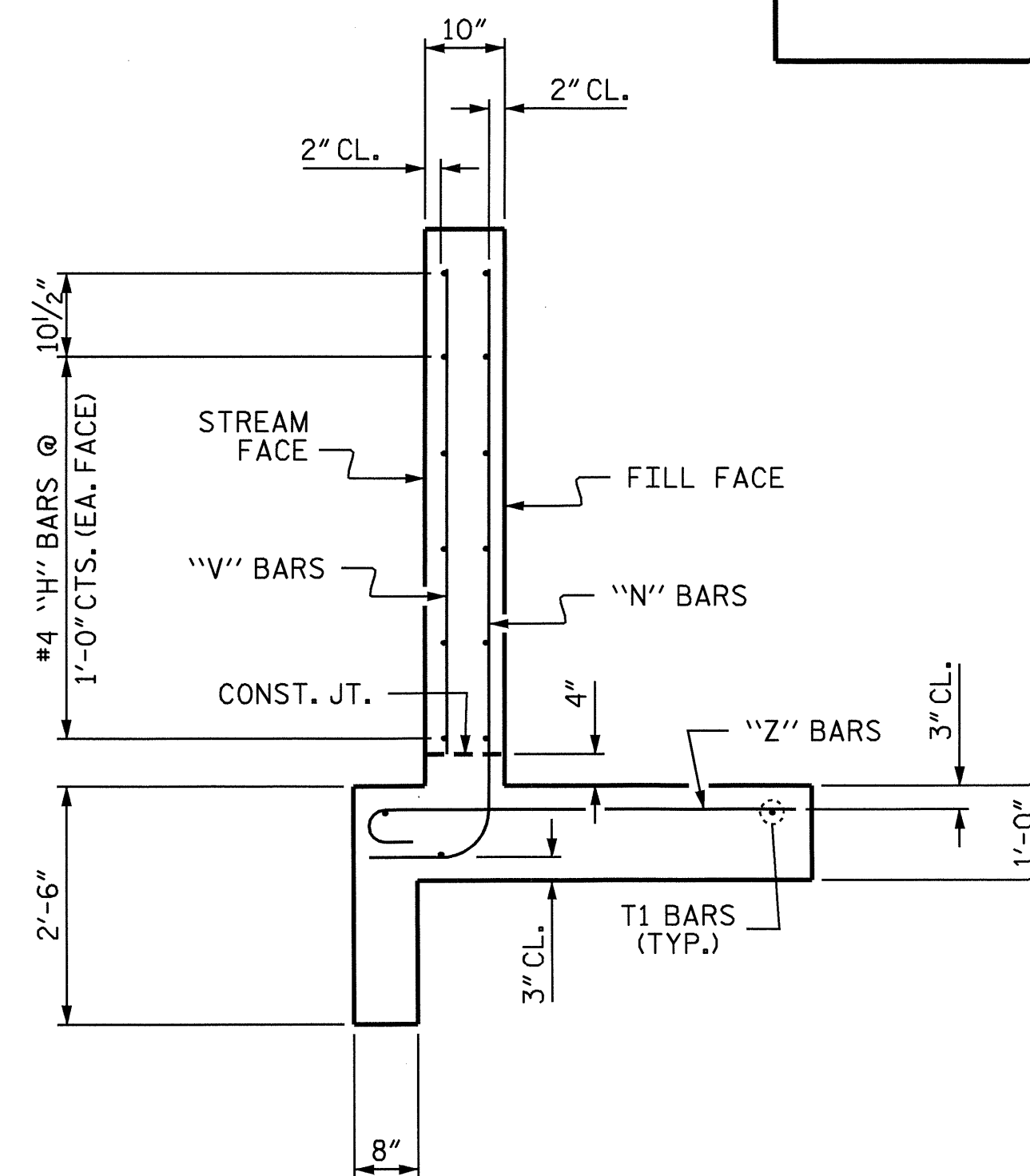




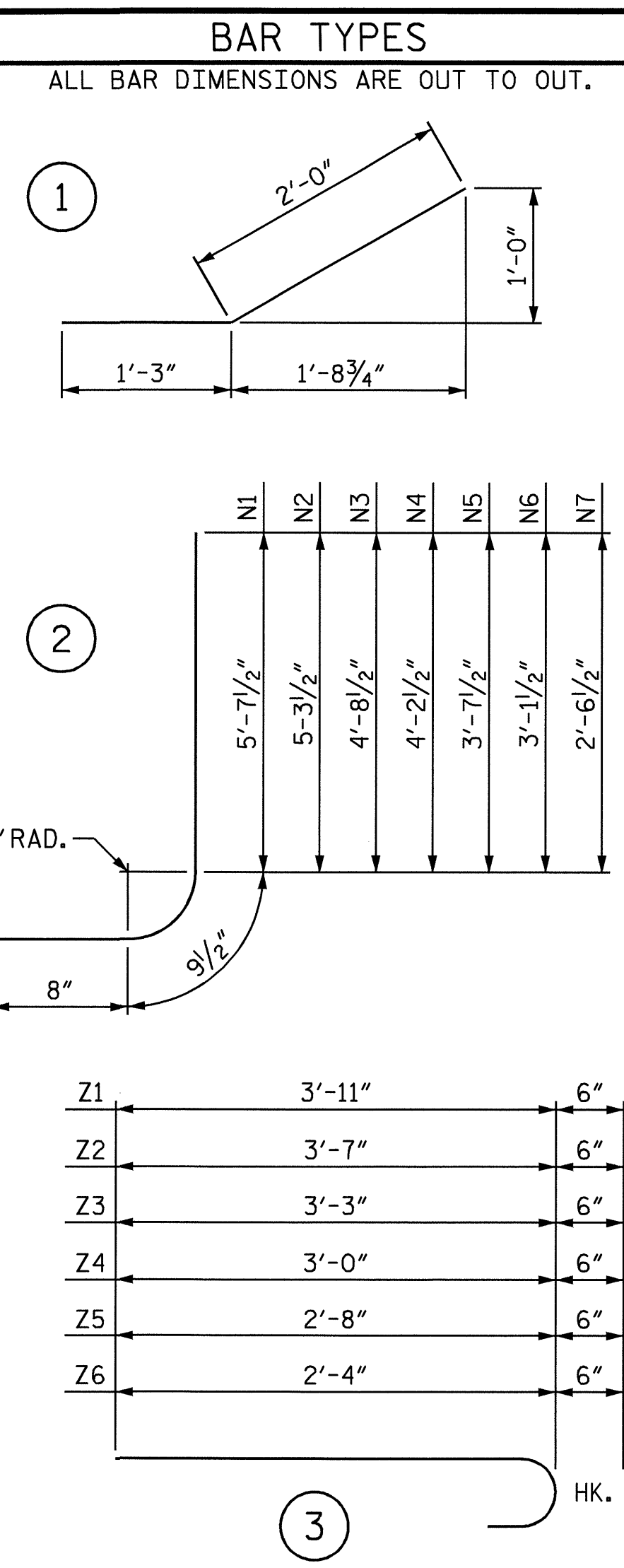
PLAN W3



ELEVATION W3



TYPICAL WING SECTION



BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	8	#4	STR	10'-10"	58
H2	4	#4	STR	10'-4"	28
H3	4	#4	STR	6'-8"	18
H4	4	#4	STR	3'-0"	8
H5	24	#4	1	3'-3"	52
H6	4	#4	STR	11'-3"	30
N1	4	#4	2	7'-1"	19
N2	4	#4	2	6'-9"	18
N3	4	#4	2	6'-2"	16
N4	4	#4	2	5'-8"	15
N5	4	#4	2	5'-1"	14
N6	4	#4	2	4'-7"	12
N7	4	#4	2	4'-0"	11
T1	6	#5	STR	12'-9"	80
V1	4	#4	STR	5'-1"	14
V2	4	#4	STR	4'-9"	13
V3	4	#4	STR	4'-2"	11
V4	4	#4	STR	3'-8"	10
V5	4	#4	STR	3'-1"	8
V6	4	#4	STR	2'-7"	7
V7	4	#4	STR	2'-0"	5
Z1	6	#4	3	4'-5"	18
Z2	4	#4	3	4'-1"	11
Z3	4	#4	3	3'-9"	10
Z4	4	#4	3	3'-6"	9
Z5	4	#4	3	3'-2"	8
Z6	4	#4	3	2'-10"	8
REINFORCING STEEL FOR 2 WINGS				LBS.	511
CLASS A CONCRETE				CU. YDS.	7.8
2 WINGS				CU. YDS.	0.7
1 HEADWALL				CU. YDS.	0.7
1 END CURTAIN WALL				CU. YDS.	0.7
TOTAL				CU. YDS.	9.2

PROJECT NO. R-3403AB  
CRAVEN COUNTY  
 STATION: 109+35.67 -L-

SHEET 7 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 INLET WINGS  
 FOR  
 CONCRETE BOX CULVERT  
 H = 5'-0" SLOPE = 3:1  
 90° SKEW



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

DRAWN BY: L.E. SUTTON DATE: 3/20/08  
 CHECKED BY: A.S. CALLAWAY DATE: 3/26/08

## STANDARD NOTES

### DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF		
STRUCTURAL STEEL - AASHTO M270 GRADE 36	-	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	-	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	-	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION		
GRADE 60	--	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	-----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN	-----	375 LBS. PER SQ. IN.
OF TIMBER	-----	
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT.
		(MINIMUM)

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

### CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

### CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

### DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

### ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE. ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

### REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16" INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB. METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

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