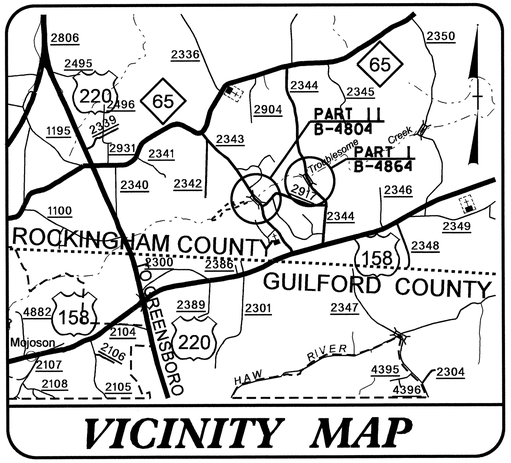
TIP PROJECTS: B-4864 /B-4804

CONTRACT: C203040

CULVERTS



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

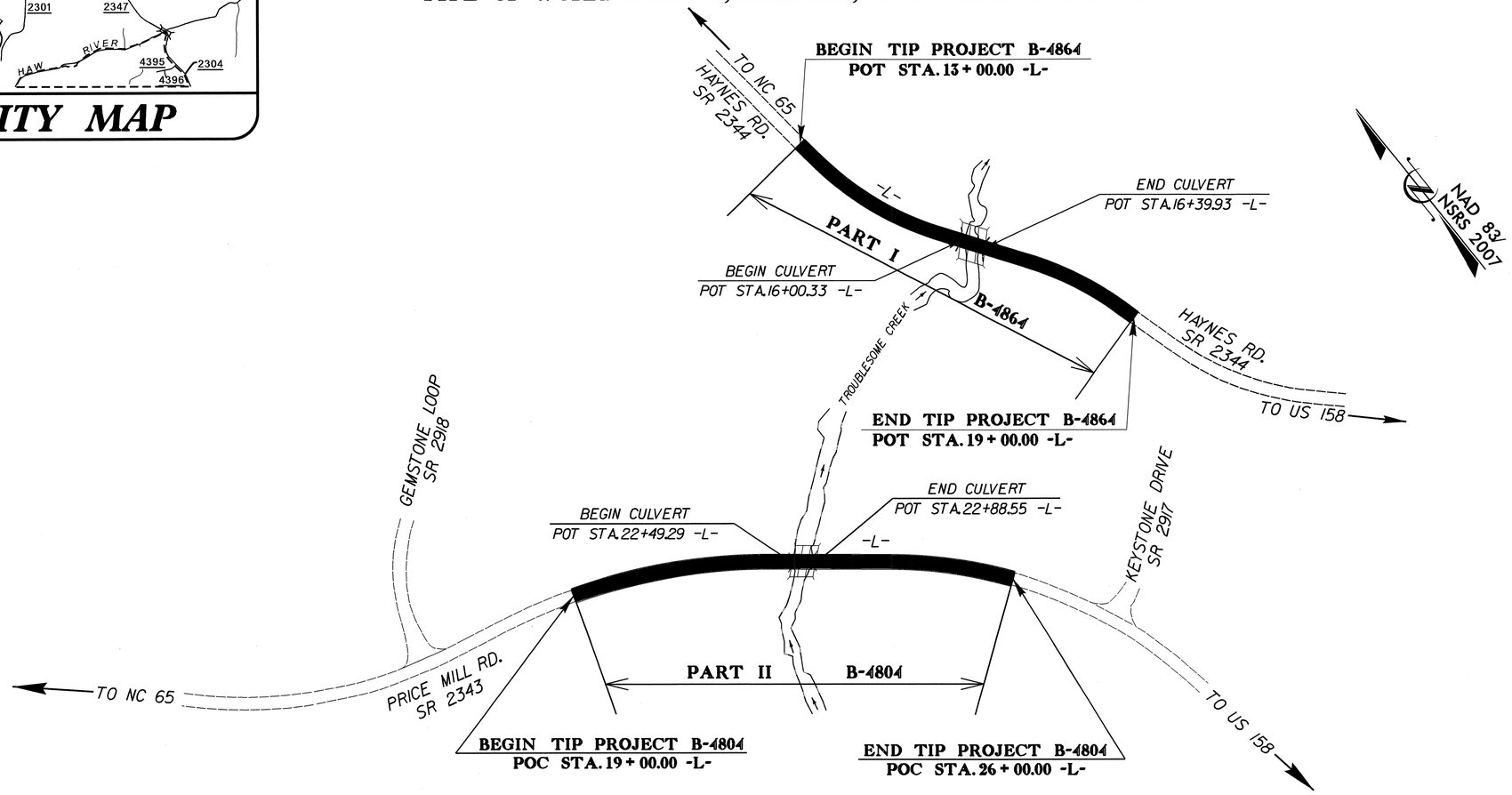
ROCKINGHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4864 /B-4804		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
	B-4864	
41553.1.1	BRZ-2344(1)	P.E.
41553.2.1	BRZ-2344(1)	RW,UTIL.
38574.3.1	BRZ-2343(2)	CONST.
	B-4804	
38574.1.1	BRZ-2343(2)	P.E.
38574.2.1	BRZ-2343(2)	RW,UTIL.
38574.3.1	BRZ-2343(2)	CONST.

LOCATION: BRIDGE NO. 13 OVER TROUBLESOME CREEK ON SR 2344
BRIDGE NO. 12 OVER TROUBLESOME CREEK ON SR 2343

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND CULVERTS



DESIGN DATA

B-4864		B-4804	
ADT 2013	= 1540	ADT 2013	= 1,421
ADT 2035	= 2800	ADT 2035	= 2,600
DHV	= 10 %	DHV	= 10 %
D	= 60 %	D	= 60 %
T	= 3 % *	T	= 3 % *
V	= 35 MPH	V	= 45 MPH
* TTST 1% DUAL 2%		* TTST 1% DUAL 2%	
FUNC. CLASS : SUBREGIONAL TIER		FUNC. CLASS : SUBREGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY	TIP PROJECTS B-4864 / B-4804 =	0.232 MI.
LENGTH STRUCTURE	TIP PROJECTS B-4864 / B-4804 =	0.015 MI.
TOTAL LENGTH OF	TIP PROJECTS B-4864 / B-4804 =	0.247 MI.

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 BIRCH RIDGE DR. RALEIGH, NC 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE:
FEBRUARY 19, 2013

J. M. BAILEY, PE
PROJECT ENGINEER

T. H. FANG, PE
D. R. CALHOUN, PE
PROJECT DESIGN ENGINEERS

STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, NC 27603

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

DIVISION ADMINISTRATOR

07-JAN-2013 10:41
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
dely

08-JAN-2013 19:28
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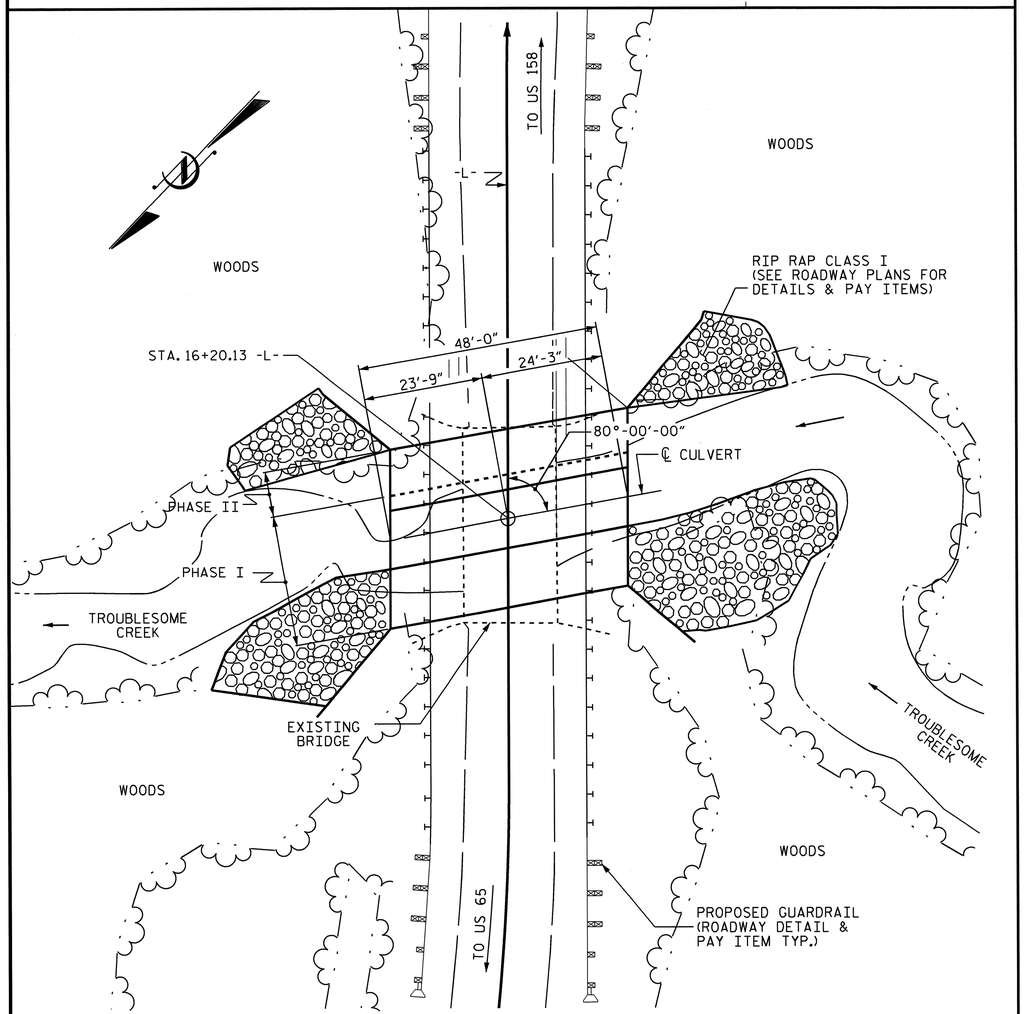
swance

F. A. PROJECT NO. BRZ-2343(2)

BM #2: R/R SPIKE IN NE ROOT 22"LEANING BLACK GUM TREE 144.36' LT. OF STA. 15+82.67 -L-, EL. 783.36'



FOR UTILITY INFORMATION, SEE UTILITY PLAN AND SPECIAL PROVISIONS.

LOCATION SKETCH

ROADWAY DATA

GRADE PT. EL. @ STA. 16+20.13 -L-	= 795.14'
BED ELEV. @ STA. 16+20.13 -L-	= 778.0'
ROADWAY SLOPE (LEFT)	= 2 : 1
ROADWAY SLOPE (RIGHT)	= 2 : 1

HYDRAULIC DATA

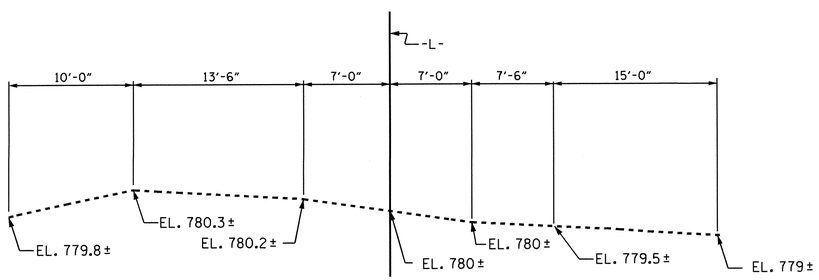
DESIGN DISCHARGE	= 2000 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 789.7'
DRAINAGE AREA	= 8.7 SQ. MI.
BASE DISCHARGE (Q100)	= 2758 CFS
BASE HIGH WATER ELEVATION	= 791.7'

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 3800+ CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= SAG (794.7')

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
PHASE I	130.6	C.Y.
PHASE II	72.8	C.Y.
PHASE III	95.6	C.Y.
TOTAL	299.0	C.Y.
REINFORCING STEEL		
PHASE I	19,426	LBS.
PHASE II	10,599	LBS.
PHASE III	10,174	LBS.
	40,199	LBS.
FOUNDATION COND. MAT'L		
PHASE I	92	TONS
PHASE II	40	TONS
TOTAL	132	TONS
CULVERT EXCAVATION		LUMP SUM
REMOVAL OF EXISTING STRUCTURE		LUMP SUM



PROFILE ALONG ℄ CULVERT

NOTES

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

DESIGN FILL----------2.57'.

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:

PHASE I - BARRELS 1 AND 2

1. WING FOOTING AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS, AND WING FULL HEIGHT.

PHASE II - BARREL 3

1. WING FOOTING AND FLOOR SLAB INCLUDING 4" OF EXTERIOR WALL.
2. THE REMAINING PORTION OF THE WALL AND WING FULL HEIGHT.

STAGE II SHALL NOT BE STARTED UNTIL STAGE I IS COMPLETE.

PHASE III

1. ROOF SLAB INCLUDING REMAINING PORTION OF WALLS 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.

NO WORK SHALL BE DONE ON THE CULVERT AT STA. 16+20.13 -L- UNTIL THE AREA OF THE BOX CULVERT HAS BEEN UNDERCUT TO ELEV. 774.2 OR TO COMPETENT MATERIAL AT THE DISCRETION OF THE ENGINEER AND UNSUITABLE MATERIAL REPLACED WITH FOUNDATION CONDITIONING MATERIAL WITH GEOTEXTILE FOR STABILIZATION, TYPE 4 AND PROPERLY COMPACTED TO THE ELEVATION OF THE BOTTOM OF THE PROPOSED FLOOR SLAB. THE LIMITS OF THIS UNDERCUT EXCAVATION SHALL BE AT LEAST THE LIMITS OF THE BOX CULVERT INCLUDING THE WINGS. NO SEPARATE PAYMENT WILL BE MADE FOR ANY TEMPORARY SHEETING, UNDERCUT, FOUNDATION CONDITIONING MATERIAL, OR GEOTEXTILE FOR SOIL STABILIZATION, TYPE 4 AS REQUIRED TO CONSTRUCT THE PROPOSED CULVERT. PAYMENT IS INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

FOR GEOTEXTILE FOR SOIL STABILIZATION, TYPE 4, SEE SECTION 270 OF THE STANDARD SPECIFICATIONS.

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 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 SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF STANDARD SPECIFICATIONS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 16+20.13 -L-".

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 40'-6"; 19'-1" CLEAR ROADWAY WIDTH AND TIMBER DECK ON I-BEAMS WITH A 5" AWS; END BENTS CONSISTING OF TIMBER CAPS ON TIMBER PILES WITH TIMBER BULKHEADS AND LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE 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.

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

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

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

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.

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NORTH CAROLINA PROFESSIONAL SEAL 022506 ENGINEER JESSE MCARTHUR BAILEY
1/9/12

NORTH CAROLINA PROFESSIONAL SEAL 21545 ENGINEER STEVEN K. WANCE
01/08/13

PROJECT NO. B-4864

ROCKINGHAM COUNTY

STATION: 16+20.13 -L-

SHEET 1 OF 6 REPLACES BRIDGE NO. 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

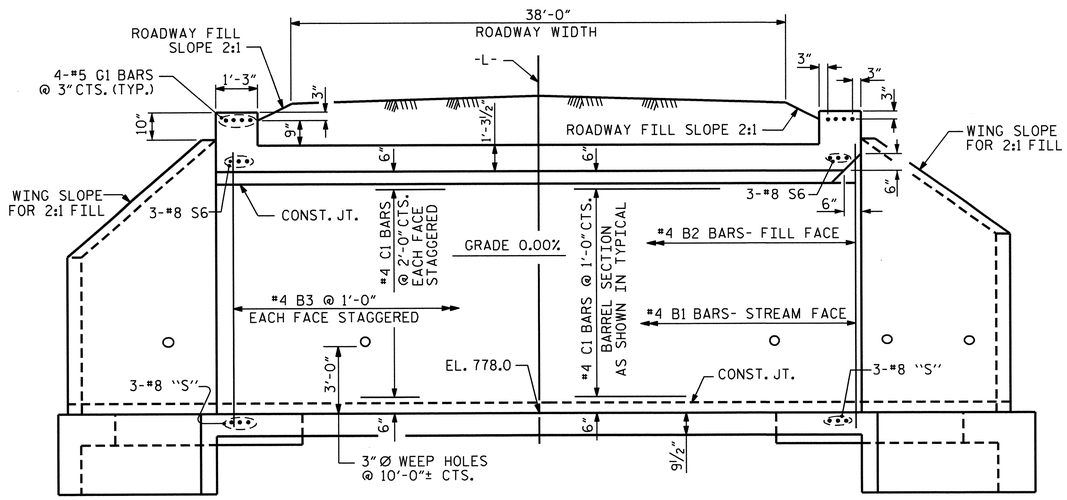
TRIPLE BARREL 12 FT. X 14 FT. CONCRETE BOX CULVERT 80° SKEW

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

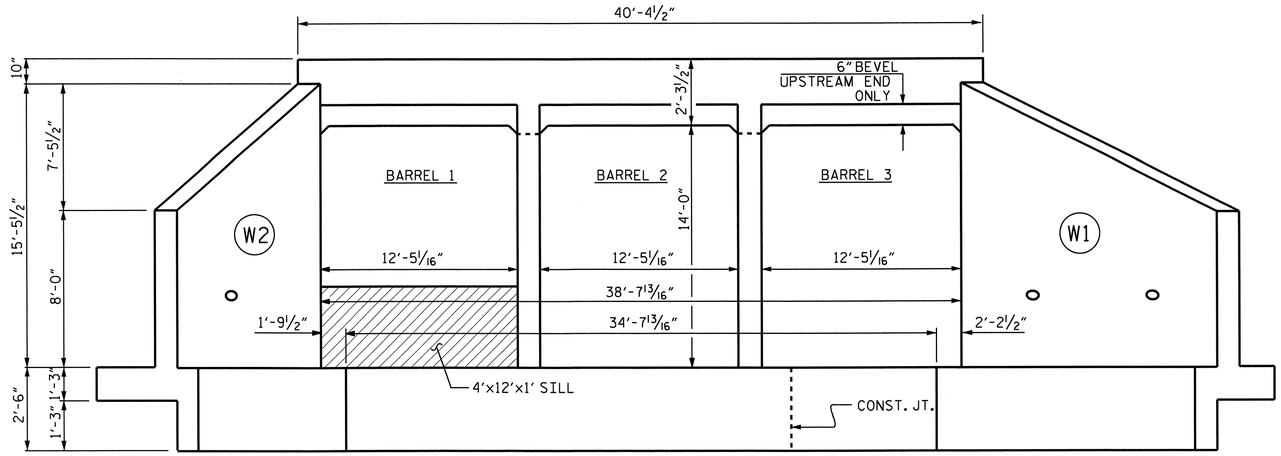
STD. NO. CB23

ADDED 8-27-90

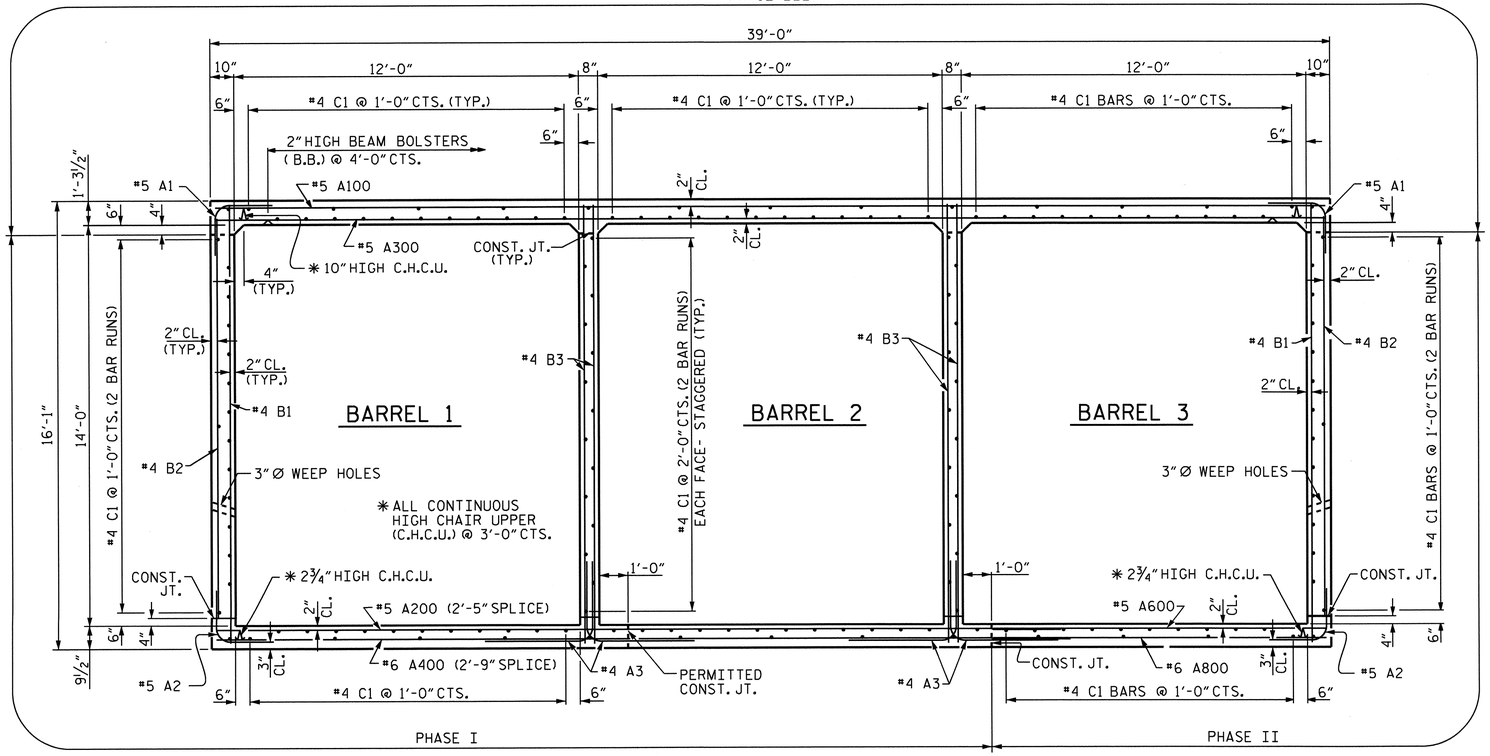
ASSEMBLED BY : J.H.CARDEN DATE : 9/29/11 CHECKED BY : R.P.PATEL DATE : 2/23/12	SPECIAL
DRAWN BY : C.O. CUEVAS DATE : 8-27-90 CHECKED BY : M.A. JONES DATE : 10-4-90	STANDARD



CULVERT SECTION NORMAL TO ROADWAY

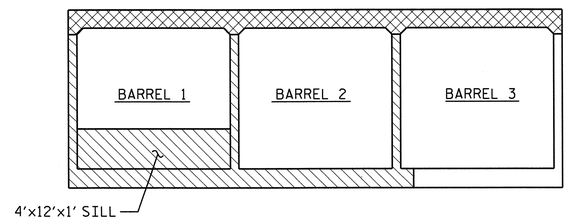


INLET END ELEVATION NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

THERE ARE 156 "C" BARS IN SECTION OF BARREL.
LOOKING DOWNSTREAM



CONSTRUCTION SEQUENCE

LOOKING DOWNSTREAM

PHASE I
PHASE II
PHASE III

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
REVISED 8-28-92 BY E.L.R. CHECKED BY G.R.P.
REDRAWN 8-27-90 BY C.O.C. CHECKED BY M.A.J.

ASSEMBLED BY : J.H.CARDEN DATE : 9/30/11
CHECKED BY : R.P.PATEL DATE : 2/22/12
SPECIAL

DRAWN BY : BRAIN STALEY III DATE : 11-30-71
CHECKED BY : JOEL A. JOHNSON DATE : 12-30-71
STANDARD

PROJECT NO. B-4864
ROCKINGHAM COUNTY
STATION: 16+20.13 -L-

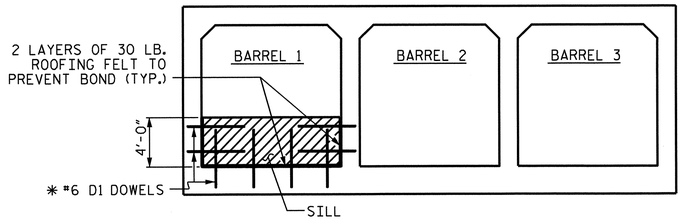
SHEET 2 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 21545 ENGINEER STEVEN L. WANCE
01/07/13

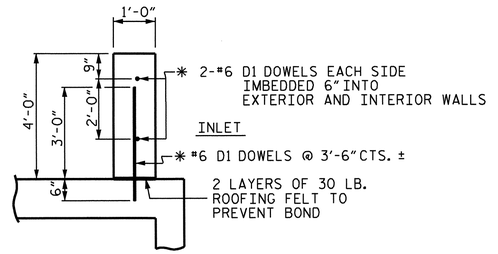
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 12 FT. X 14 FT. CONCRETE BOX CULVERT 80° SKEW

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



ELEVATION



SECTION THROUGH SILL

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

TOTAL STRUCTURE QUANTITIES PHASE II

CLASS A CONCRETE		
BARREL @ 0.769 CY/FT	36.9	C.Y.
WING ETC.	35.9	C.Y.
TOTAL	72.8	C.Y.
REINFORCING STEEL		
BARREL	6,946	LBS.
WINGS ETC.	3,653	LBS.
TOTAL	10,599	LBS.
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION COND. MAT'L	40	TONS

BILL OF MATERIAL

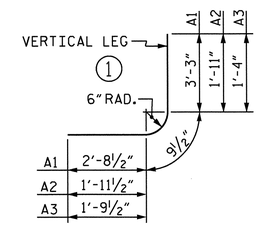
PHASE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	96	#5	1	6'-9"	676
A2	96	#5	1	4'-8"	467
A3	192	#4	1	3'-11"	502
A200	79	#5	STR	29'-7"	2438
A201	4	#5	STR	27'-0"	113
A302	4	#5	STR	23'-3"	97
A203	4	#5	STR	19'-6"	81
A204	4	#5	STR	15'-10"	66
A205	4	#5	STR	12'-1"	50
A206	4	#5	STR	8'-4"	35
A207	4	#5	STR	4'-7"	19
A400	79	#6	STR	29'-11"	3550
A401	4	#6	STR	27'-2"	164
A402	4	#6	STR	23'-4"	140
A403	4	#6	STR	19'-8"	118
A404	4	#6	STR	16'-0"	96
A405	4	#6	STR	12'-3"	74
A406	4	#6	STR	8'-6"	51
A407	4	#6	STR	4'-9"	29
B1	96	#4	STR	15'-7"	999
B2	96	#4	STR	13'-8"	887
B3	192	#4	STR	15'-7"	1999
C1	154	#4	STR	24'-11"	2563
D1	8	#6	STR	3'-6"	43
S2	6	#8	STR	32'-3"	517
REINFORCING STEEL				LBS.	15,773
CLASS A CONCRETE				CU.YD.	90.9

PHASE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	96	#5	1	6'-9"	676
A2	96	#5	1	4'-8"	467
A600	89	#5	STR	11'-5"	1060
A601	2	#5	STR	8'-0"	17
A602	2	#5	STR	4'-3"	9
A603	1	#5	STR	2'-4"	2
A651	2	#5	STR	9'-1"	19
A652	2	#5	STR	5'-4"	11
A800	89	#6	STR	11'-5"	1526
A801	2	#6	STR	7'-9"	23
A802	2	#6	STR	4'-0"	12
A803	1	#6	STR	2'-2"	3
A851	2	#6	STR	9'-3"	28
A852	2	#6	STR	5'-6"	17
B1	96	#4	STR	15'-7"	999
B2	96	#4	STR	13'-8"	887
S4	6	#8	STR	11'-10"	191
REINFORCING STEEL				LBS	6,946
CLASS A CONCRETE				CU.YD.	36.9

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTHS CHART

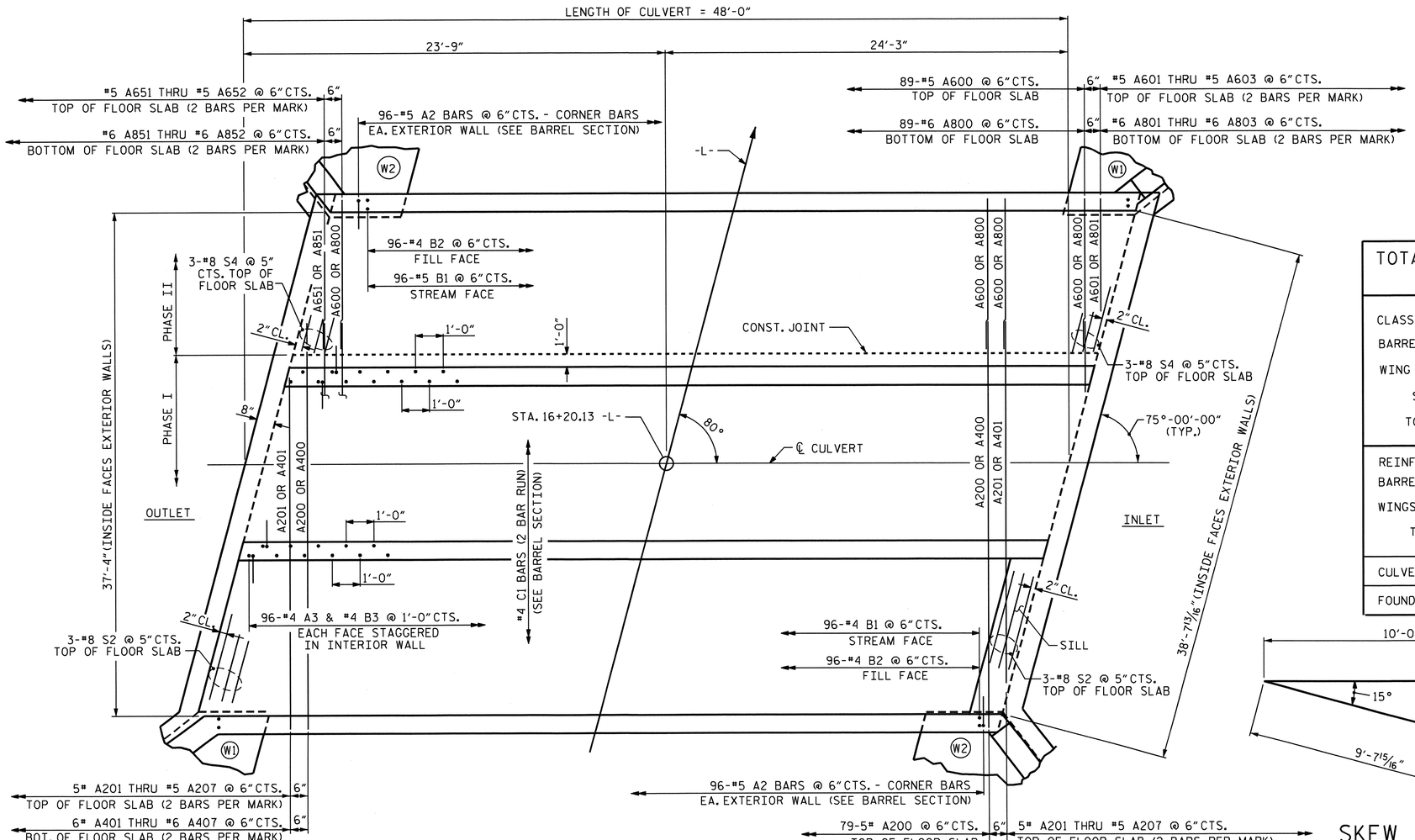
BAR	SIZE	SPLICE LENGTH
A200	#5	2'-5"
A400	#6	2'-9"
C1	#4	1'-11"
S2	#8	4'-0"

TOTAL STRUCTURE QUANTITIES PHASE I

CLASS A CONCRETE		
BARREL @ 1.893 CY/FT	90.9	C.Y.
WING ETC.	37.9	C.Y.
SILL	1.8	C.Y.
TOTAL	130.6	C.Y.
REINFORCING STEEL		
BARREL	15,773	LBS.
WINGS ETC.	3,653	LBS.
TOTAL	19,426	LBS.
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION COND. MAT'L	92	TONS

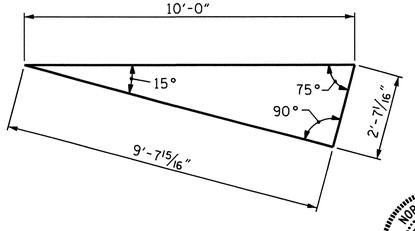
CULVERT SILL DETAILS

LOOKING DOWNSTREAM



FLOOR SLAB PLAN

PHASES I & II



SKEW TRIANGLE

STATE OF NORTH CAROLINA
PROFESSIONAL SEAL 21545 ENGINEER STEVEN L. WANCE
Steven L. Wance 01/07/13

PROJECT NO. B-4864

ROCKINGHAM COUNTY

STATION: 16+20.13 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 12 FT. X 14 FT. CONCRETE BOX CULVERT 80° SKEW

PHASES I & II

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

DRAWN BY : J.H.CARDEN DATE : 9/30/11
CHECKED BY : R.P.PATEL DATE : 2/22/12

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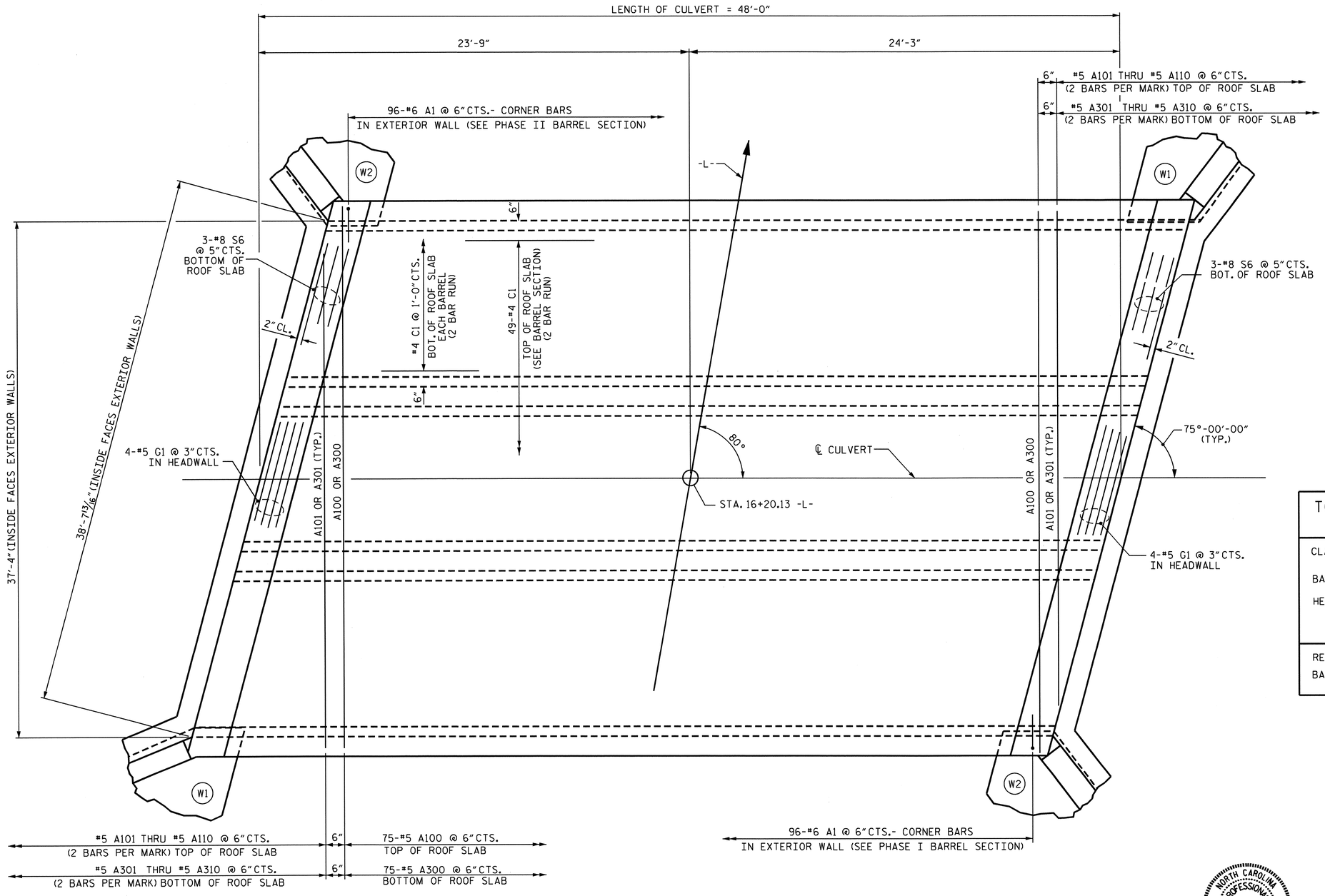

ROOF SLAB PLAN

PHASE III

BILL OF MATERIAL

PHASE III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	75	#5	STR	38'-7"	3018
A101	4	#5	STR	35'-2"	147
A102	4	#5	STR	31'-5"	131
A103	4	#5	STR	27'-8"	115
A104	4	#5	STR	24'-0"	100
A105	4	#5	STR	20'-3"	84
A106	4	#5	STR	16'-6"	69
A107	4	#5	STR	12'-9"	53
A108	4	#5	STR	9'-0"	38
A109	4	#5	STR	5'-3"	22
A110	4	#5	STR	1'-7"	7
A300	75	#5	STR	38'-7"	3018
A301	4	#5	STR	35'-2"	147
A302	4	#5	STR	31'-5"	131
A303	4	#5	STR	27'-8"	115
A304	4	#5	STR	24'-0"	100
A305	4	#5	STR	20'-3"	84
A306	4	#5	STR	16'-6"	69
A307	4	#5	STR	12'-9"	53
A308	4	#5	STR	9'-0"	38
A309	4	#5	STR	5'-3"	22
A310	4	#5	STR	1'-7"	7
C1	98	#4	STR	24'-11"	1631
G1	8	#5	STR	40'-0"	334
S6	6	#8	STR	40'-0"	641
REINFORCING STEEL				LBS	10,174
CLASS A CONCRETE				CU.YD.	91.9

TOTAL STRUCTURE QUANTITIES
PHASE III

CLASS A CONCRETE

BARREL @ 1.915 CY/FT 91.9 C.Y.

HEADWALLS 3.7 C.Y.

TOTAL 95.6 C.Y.

REINFORCING STEEL

BARREL 10,174 LBS.

NORTH CAROLINA PROFESSIONAL SEAL 21545 ENGINEER STEVEN L. WAICE

01/07/13

PROJECT NO. B-4864

ROCKINGHAM COUNTY

STATION: 16+20.13 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE BARREL 12 FT. X 14 FT. CONCRETE BOX CULVERT 80° SKEW
PHASE III

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

DRAWN BY : HARISH SHAH DATE : 5-13-11
CHECKED BY : R.P.PATEL DATE : 2-22-12

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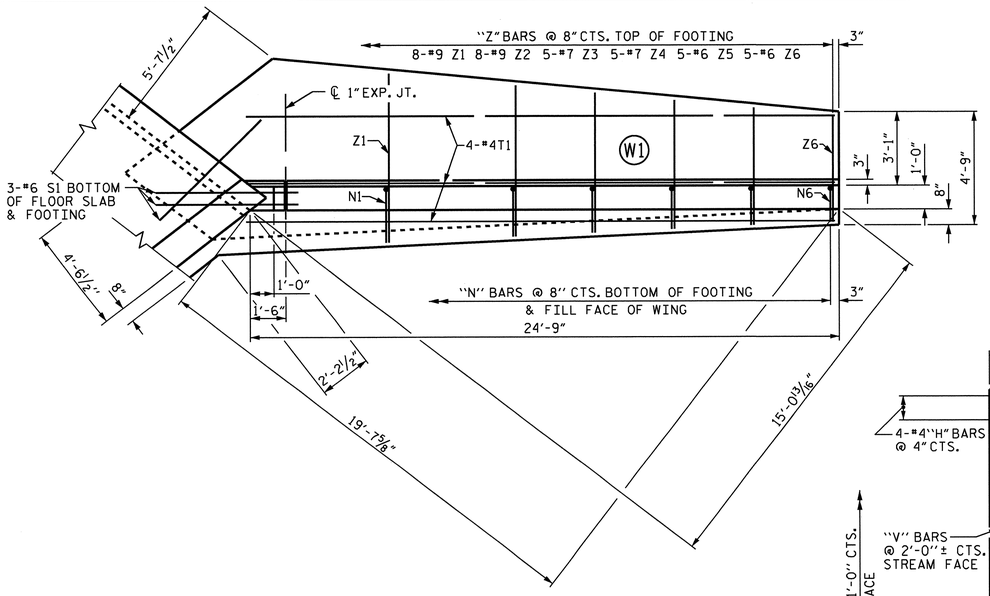
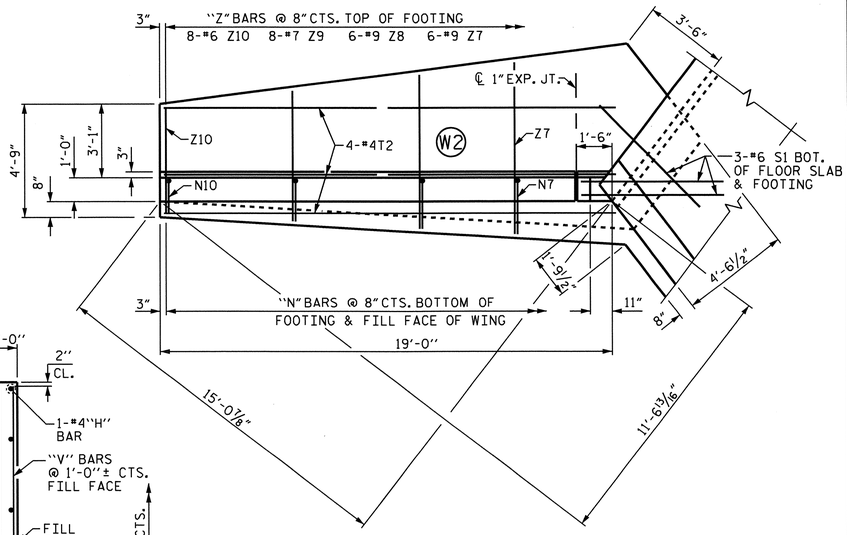
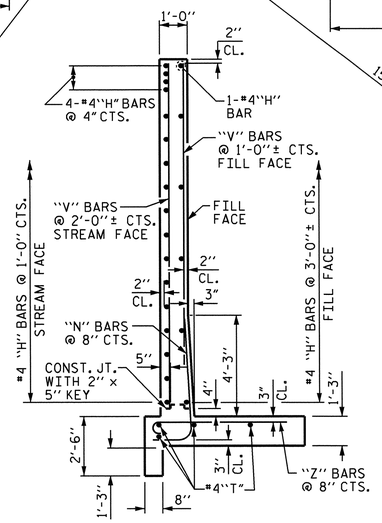


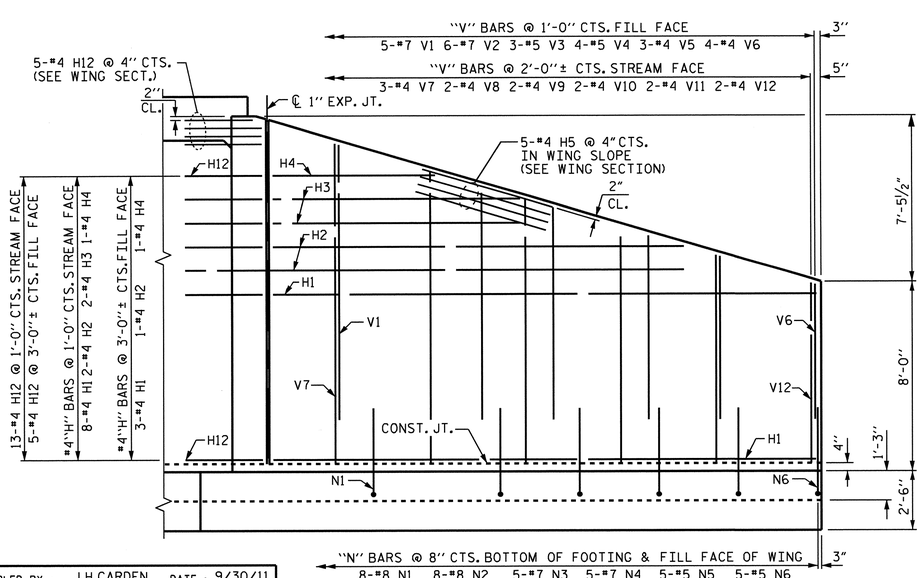
PLAN W1



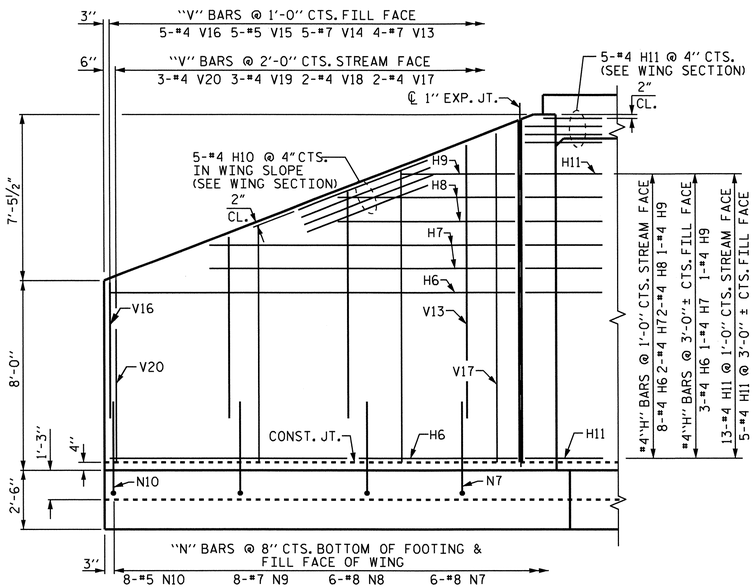
PLAN W2



TYPICAL WING SECTION

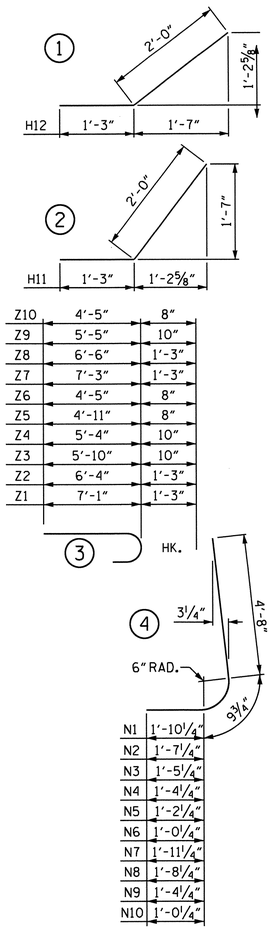


ELEVATION W1



ELEVATION W2

BAR TYPES



Z10	4'-5" 8"
Z9	5'-5" 10"
Z8	6'-6" 1'-3"
Z7	7'-3" 1'-3"
Z6	4'-5" 8"
Z5	4'-11" 8"
Z4	5'-4" 10"
Z3	5'-10" 10"
Z2	6'-4" 1'-3"
Z1	7'-1" 1'-3"

N1	1'-10 1/4"
N2	1'-7 1/4"
N3	1'-5 1/4"
N4	1'-4 1/4"
N5	1'-2 1/4"
N6	1'-0 1/4"
N7	1'-11 1/4"
N8	1'-8 1/4"
N9	1'-4 1/4"
N10	1'-0 1/4"

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
(FOR 2 WINGS, 4 REQUIRED)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	11	#4	STR	22'-10"	168
H2	3	#4	STR	16'-10"	34
H3	2	#4	STR	10'-1"	13
H4	2	#4	STR	6'-9"	9
H5	5	#4	STR	23'-2"	77
H6	11	#4	STR	17'-1"	126
H7	3	#4	STR	12'-7"	25
H8	2	#4	STR	7'-7"	10
H9	2	#4	STR	4'-10"	6
H10	5	#4	STR	17'-8"	59
H11	23	#4	2	3'-3"	50
H12	23	#4	1	3'-3"	50
N1	8	#8	4	7'-4"	157
N2	8	#8	4	7'-1"	151
N3	5	#7	4	6'-11"	71
N4	5	#7	4	6'-10"	70
N5	5	#5	4	6'-8"	35
N6	5	#5	4	6'-6"	34
N7	6	#8	4	7'-5"	119
N8	6	#8	4	7'-2"	115
N9	8	#7	4	6'-10"	112
N10	8	#5	4	6'-6"	54
S1	6	#6	STR	6'-0"	54
T1	4	#4	STR	24'-9"	66
T2	4	#4	STR	19'-0"	51
V1	5	#7	STR	12'-11"	132
V2	6	#7	STR	11'-1"	136
V3	3	#5	STR	9'-2"	29
V4	4	#5	STR	8'-0"	33
V5	3	#4	STR	6'-10"	14
V6	4	#4	STR	5'-8"	15
V7	3	#4	STR	13'-7"	27
V8	2	#4	STR	12'-4"	16
V9	2	#4	STR	11'-2"	15
V10	2	#4	STR	10'-0"	13
V11	2	#4	STR	8'-9"	12
V12	2	#4	STR	7'-7"	10
V13	4	#7	STR	12'-10"	105
V14	5	#7	STR	10'-11"	112
V15	5	#5	STR	8'-0"	42
V16	5	#4	STR	5'-9"	19
V17	2	#4	STR	13'-10"	18
V18	2	#4	STR	12'-4"	16
V19	3	#4	STR	10'-0"	20
V20	3	#4	STR	7'-8"	15
Z1	8	#9	3	8'-4"	227
Z2	8	#9	3	7'-7"	206
Z3	5	#7	3	6'-8"	68
Z4	5	#7	3	6'-2"	63
Z5	5	#6	3	5'-7"	42
Z6	5	#6	3	5'-1"	38
Z7	6	#9	3	8'-6"	173
Z8	6	#9	3	7'-9"	158
Z9	8	#7	3	6'-3"	102
Z10	8	#6	3	5'-1"	61

PHASE I	
REINFORCING STEEL	3,653 LBS.
CLASS A CONCRETE	
2 WINGS	34.6 C.Y.
2 END CURTAIN WALLS	3.3 C.Y.
TOTAL	37.9 C.Y.
PHASE II	
REINFORCING STEEL	3,653 LBS.
CLASS A CONCRETE	
2 WINGS	34.6 C.Y.
2 END CURTAIN WALLS	1.3 C.Y.
TOTAL	35.9 C.Y.
PHASE III	
CLASS A CONCRETE	
2 HEADWALLS	3.7 C.Y.

PROJECT NO. B-4864

ROCKINGHAM COUNTY

STATION: 16+20.13 -L-

SHEET 5 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 21545 ENGINEER STEVEN L. WANCE

01/07/13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H=14' SLOPE=2:1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			15

STD. NO. CW7514

ASSEMBLED BY :	J.H.CARDEN	DATE :	9/30/11
CHECKED BY :	R.P.PATEL	DATE :	2/22/12
DRAWN BY :	DAN PLATICA	DATE :	4/2005
CHECKED BY :	M.K. BEARD	DATE :	4/2005

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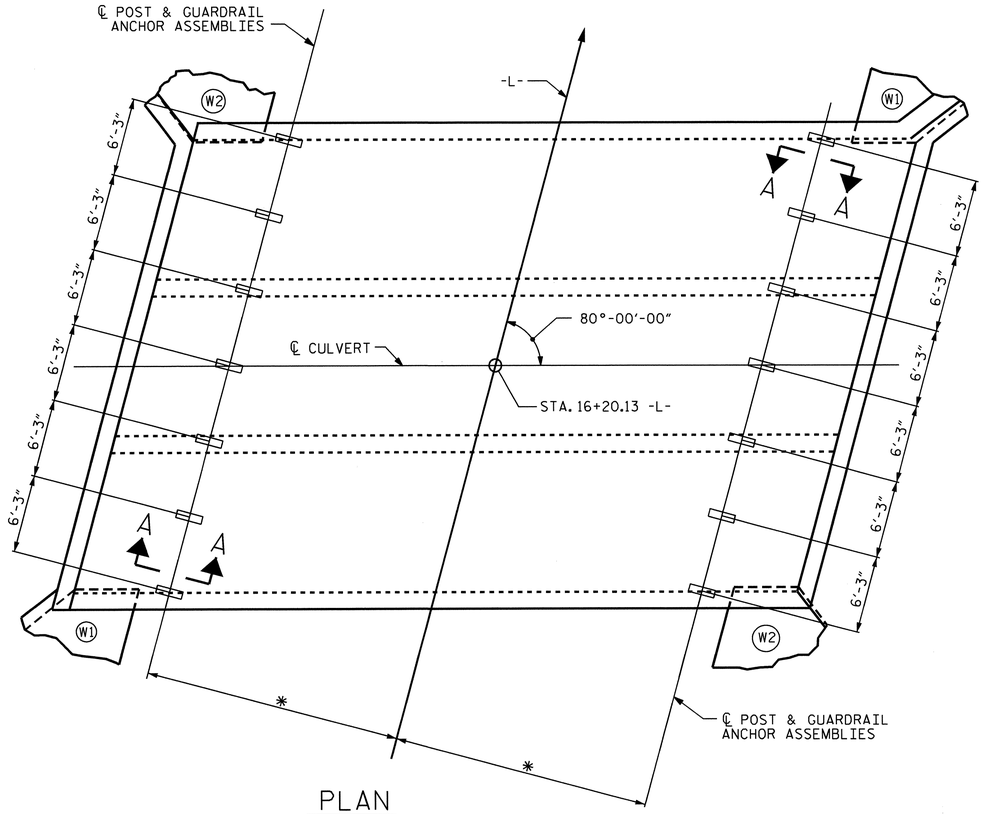
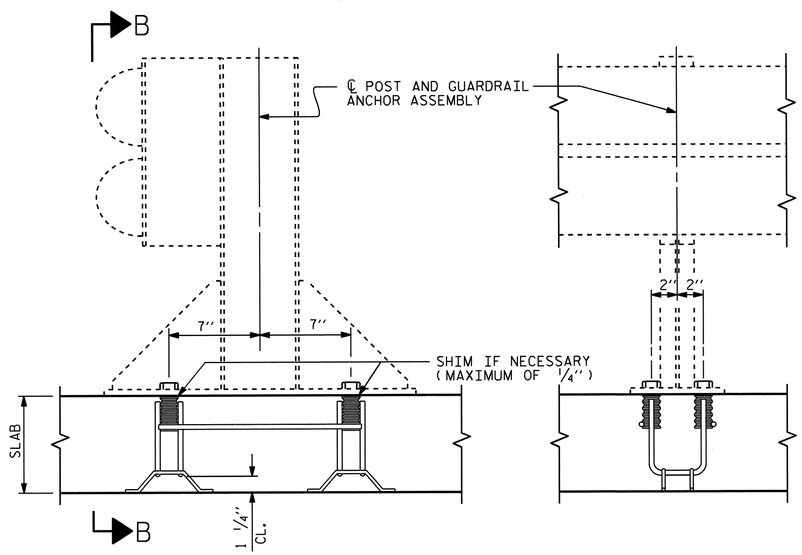


PLAN

SHOWING GUARDRAIL ANCHOR ASSEMBLY SPACING.
* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER.



SECTION A-A

SECTION B-B

NOTES

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

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

B. 4 - 1" Ø X 2 ¼" 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 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

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

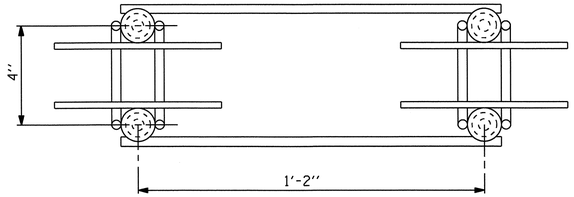
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

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

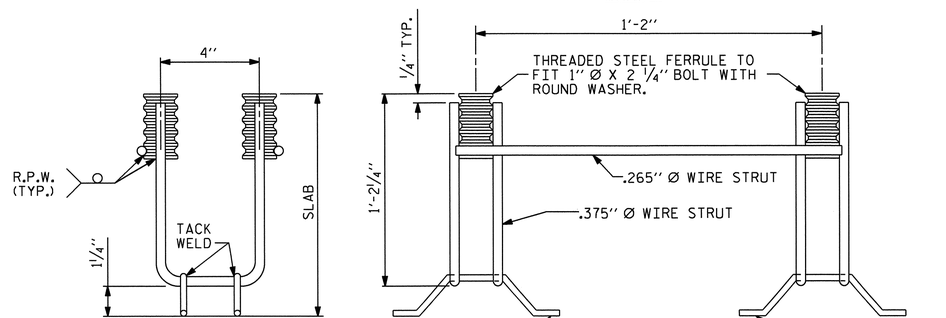
PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

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.



PLAN



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

NORTH CAROLINA PROFESSIONAL SEAL 21545 ENGINEER STEVEN L. WALCE
01/07/13

PROJECT NO. B-4864
ROCKINGHAM COUNTY
STATION: 16+20.13 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			15

STD. NO. GRA1

ASSEMBLED BY : S. B. WILLIAMS	DATE : 10/25/12		
CHECKED BY : T. H. FANG	DATE : 10/29/12		
DRAWN BY : FCJ 6/88	REV. 5/7/03	RWW/JTE	
CHECKED BY : ARB 6/88	REV. 5/1/06R	KMM/GM	
	REV. 10/1/11	MAA/GM	

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

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)	1.03	--	1.75	1.13	1	BOTTOM SLAB	12.43	1.03	1	TOP SLAB	11.43	
		HL-93 (OPERATING)	N/A		1.34	--	1.35	1.46	1	BOTTOM SLAB	12.43	1.34	1	TOP SLAB	11.43	
		HS-20 (INVENTORY)	36.000	(2)	1.07	38.66	1.75	1.13	1	BOTTOM SLAB	12.43	1.07	1	BOTTOM SLAB	11.85	
		HS-20 (OPERATING)	36.000		1.39	50.11	1.35	1.46	1	BOTTOM SLAB	12.43	1.39	1	BOTTOM SLAB	11.85	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.14	28.83	1.40	2.52	1	TOP SLAB	5.42	2.14	1	EXTERIOR WALL	14.05	
		SNGARBS2	20.000		2.06	41.16	1.40	2.36	1	TOP SLAB	5.42	2.06	1	EXTERIOR WALL	14.05	
		SNAGRIS2	22.000		2.03	44.74	1.40	2.28	1	BOTTOM SLAB	12.43	2.03	1	EXTERIOR WALL	14.05	
		SNCOTTS3	27.250		1.30	35.29	1.40	1.52	1	TOP SLAB	5.10	1.30	1	TOP SLAB	11.43	
		SNAGGRS4	34.925		1.39	48.40	1.40	1.47	1	BOTTOM SLAB	12.43	1.39	1	BOTTOM SLAB	11.85	
		SNS5A	35.550		1.37	48.74	1.40	1.44	1	BOTTOM SLAB	12.43	1.37	1	BOTTOM SLAB	11.85	
		SNS6A	39.950		1.22	48.54	1.40	1.28	1	BOTTOM SLAB	12.43	1.22	1	BOTTOM SLAB	11.85	
		SNS7B	42.000		1.16	48.72	1.40	1.22	1	BOTTOM SLAB	12.43	1.16	1	BOTTOM SLAB	11.85	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.47	48.62	1.40	1.54	1	BOTTOM SLAB	12.43	1.47	1	BOTTOM SLAB	11.85	
		TNT4A	33.075		1.46	48.45	1.40	1.54	1	BOTTOM SLAB	12.43	1.46	1	BOTTOM SLAB	11.85	
		TNT6A	41.600		1.17	48.70	1.40	1.23	1	BOTTOM SLAB	12.43	1.17	1	BOTTOM SLAB	11.85	
		TNT7A	42.000		1.16	48.72	1.40	1.22	1	BOTTOM SLAB	12.43	1.16	1	BOTTOM SLAB	11.85	
		TNT7B	42.000		1.15	48.50	1.40	1.24	1	BOTTOM SLAB	12.43	1.15	1	BOTTOM SLAB	11.85	
		TNAGRIT4	43.000		1.13	48.56	1.40	1.19	1	BOTTOM SLAB	12.43	1.13	1	BOTTOM SLAB	11.85	
		TNAGT5A	45.000	(3)	1.08	48.47	1.40	1.14	1	BOTTOM SLAB	12.43	1.08	1	BOTTOM SLAB	11.85	
		TNAGT5B	45.000		1.08	48.47	1.40	1.13	1	BOTTOM SLAB	12.43	1.08	1	BOTTOM SLAB	11.85	

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.

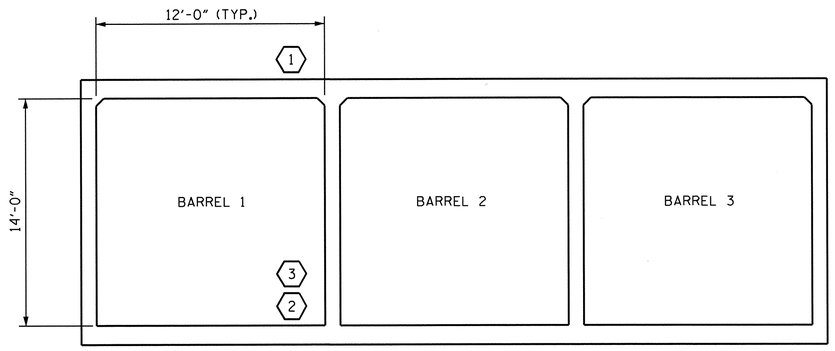
(#) CONTROLLING LOAD RATING

(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. B-4864

ROCKINGHAM COUNTY

STATION: 16+20.13 -L-

NORTH CAROLINA PROFESSIONAL SEAL 21545 ENGINEER STEVEN L. WANCE

01/07/13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
1			3			TOTAL SHEETS
2			4			15

STD. NO. LRFR5

ASSEMBLED BY : R. P. PATEL DATE : 8-29-12
CHECKED BY : T. H. FANG DATE : 8-28-12

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

REV. 10/1/11 MAA/GM

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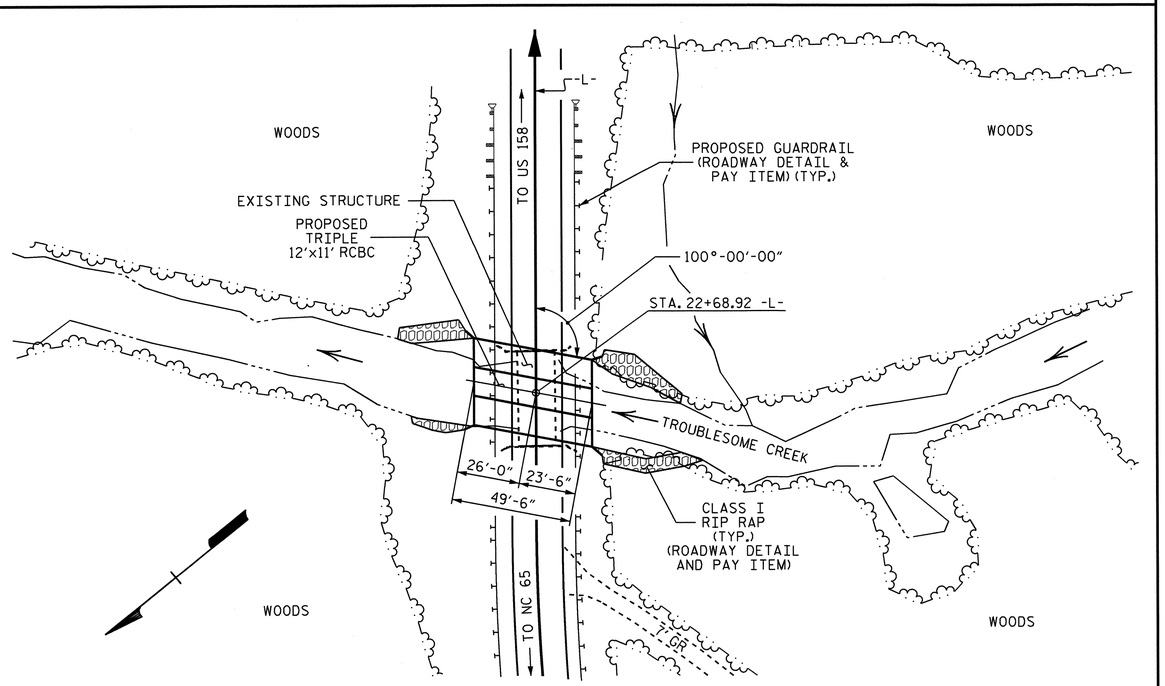
F. A. PROJECT NO. BRZ-2343(2)

B.M. #2: RAIL ROAD SPIKE IN BASE OF 12" POPLAR 110.42' RIGHT OF -L- STA. 23+13.52, EL. 795.91



LOCATION SKETCH

HYDRAULIC DATA

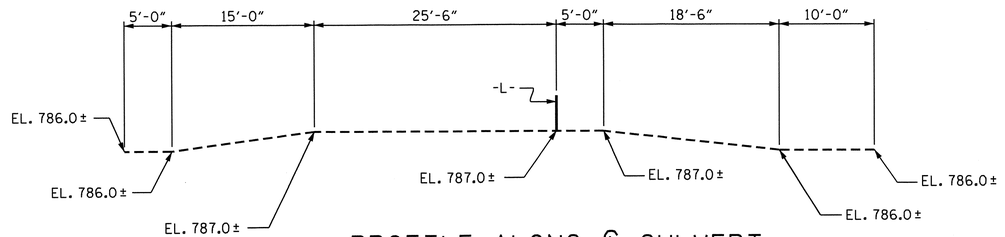
DESIGN DISCHARGE	= 1790 CFS
FREQUENCY OF DESIGN FLOOD	= 25 YRS.
DESIGN HIGH WATER ELEVATION	= 796.20
DRAINAGE AREA	= 7.31 SQ. MI.
BASE DISCHARGE (Q100)	= 2485 CFS
BASE HIGH WATER ELEVATION	= 797.7

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 2850 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 100 YRS. ±
OVERTOPPING FLOOD ELEVATION	= 798.5

GRADE DATA

GRADE POINT ELEVATION @ STA. 22+68.92 -L-	= 799.30'
BED ELEVATION @ STA. 22+68.92 -L-	= 785.00'
ROADWAY FILL SLOPES	= 2:1



PROFILE ALONG ℄ CULVERT

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

NOTES

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

DESIGN FILL MAXIMUM---------- 4.06'
DESIGN FILL MINIMUM---------- 2.49'

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. PHASE I WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF PHASE I VERTICAL WALL.
2. THE REMAINING PORTIONS OF PHASE I WALL AND PHASE I WINGS FULL HEIGHT.
3. PHASE II WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF PHASE II VERTICAL WALLS.
4. THE REMAINING PORTIONS OF PHASE II WALLS AND PHASE II WINGS FULL HEIGHT.
5. ROOF SLAB IN ITS ENTIRETY 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 PROVIED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

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

THE 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.

THE EXISTING STRUCTURE CONSISTING OF SINGLE SPAN, 1 @ 40'-6", WITH TIMBER DECK ON STEEL GIRDER/STEEL FLOOR BEAM SYSTEM AND CLEAR ROADWAY WIDTH OF 15'-8" AND A 3" ASPHALT WEARING SURFACE ON TIMBER CAPS, POSTS AND SILLS WITH TIMBER BULKHEADS AND LOCATED AT THE PROPOSED SITE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTAION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 22+68.92 -L-."

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

NO WORK SHALL BE DONE ON THE CULVERT AT STA. 22+68.92 UNTIL THE AREA OF THE BOX CULVERT HAS BEEN UNDERCUT TO ELEVATION 781.2 OR TO COMPETENT MATERIAL AT THE DISCRETION OF THE ENGINEER AND UNSUITABLE MATERIAL REPLACED WITH FOUNDATION CONDITIONING MATERIAL WITH GEOTEXTILE FOR SOIL STABILIZATION, TYPE 4 AND PROPERLY COMPACTED TO THE ELEVATION OF THE BOTTOM OF THE PROPOSED FLOOR SLAB. THE LIMITS OF THIS UNDERCUT EXCAVATION SHALL BE AT LEAST THE LIMITS OF THE BOX CULVERT INCLUDING THE WINGS. NO SEPARATE PAYMENT WILL BE MADE FOR ANY TEMPORARY SHEETING, UNDERCUT, FOUNDATION CONDITIONING MATERIAL, OR GEOTEXTILE FOR SOIL STABILIZATION, TYPE 4 AS REQUIRED TO CONSTRUCT THE PROPOSED CULVERT. PAYMENT IS INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

FOR GEOTEXTILE FOR SOIL STABILIZATION, TYPE 4, SEE SECTION 270 OF THE STANDARD SPECIFICATIONS.

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 4.142 CY/FT	205.0	C.Y.
WINGS, ETC.	52.5	C.Y.
TOTAL	257.5	C.Y.
REINFORCING STEEL		
BARREL	27,199	LBS.
WINGS, ETC.	3,131	LBS.
TOTAL	30,330	LBS.
FOUNDATION CONDITIONING MATERIAL	149	TONS
CULVERT EXCAVATION	LUMP SUM	
REMOVAL OF EXISTING STRUCTURE	LUMP SUM	

NORTH CAROLINA PROFESSIONAL SEAL 022018 ENGINEER JOSE McARTHUR BAILEY
11/9/12

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALLEAN
1-9-13

PROJECT NO. B-4804
ROCKINGHAM COUNTY
STATION: 22+68.92 -L-

SHEET 1 OF 8 REPLACES BRIDGE NO. 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

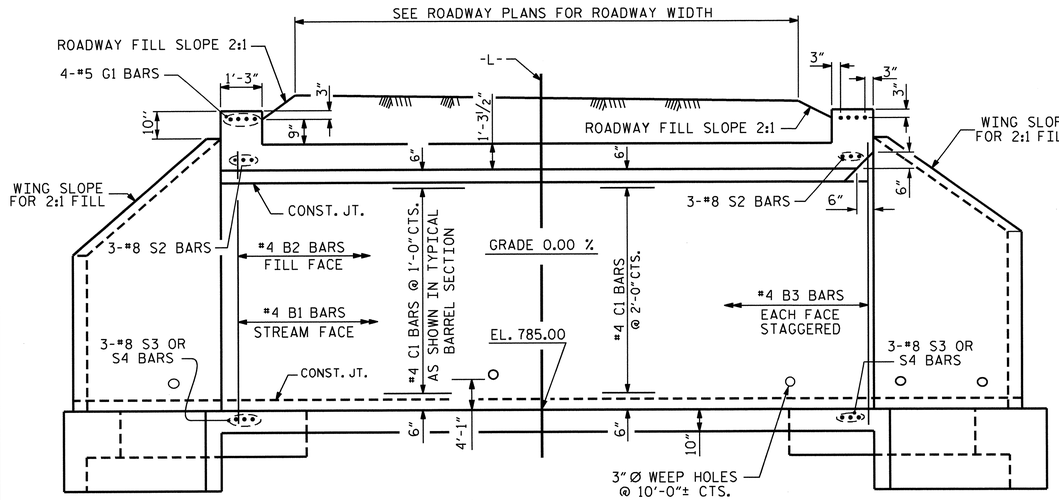
TRIPLE BARREL 12 FT. X 11 FT. CONCRETE BOX CULVERT 100° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			15

ADDED 8-27-90

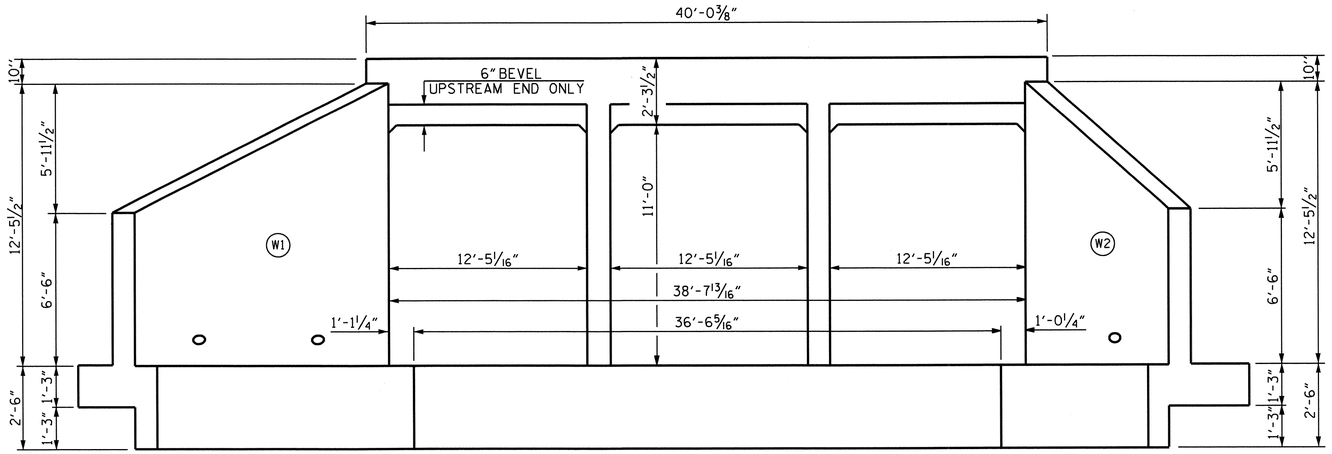
ASSEMBLED BY : A. SORSENGINH DATE : 9/2012		SPECIAL
CHECKED BY : W.F. PARKER DATE : 11/2012		
DRAWN BY : C.O. CUEVAS DATE : 8-27-90		STANDARD
CHECKED BY : M.A. JONES DATE : 10-4-90		

STD. NO. CB223A

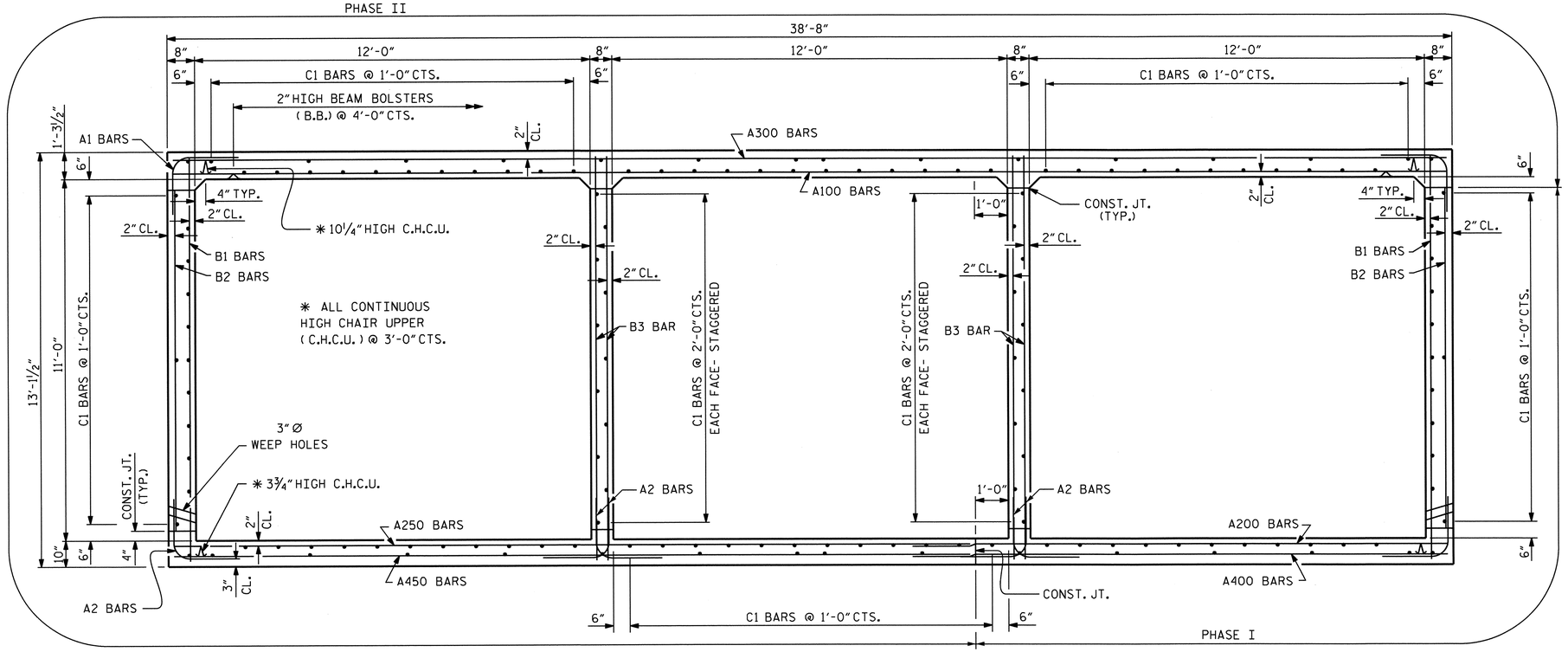


EXTERIOR WALL INTERIOR WALL

CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

THERE ARE 144 C1 BARS IN SECTION OF BARREL.
(LOOKING DOWNSTREAM)

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
REVISED 8-28-92 BY E.L.P. CHECKED BY G.R.P.
REDRAWN 8-27-90 BY C.O.C. CHECKED BY M.A.J.

ASSEMBLED BY : A. SORSENGINH	DATE : 9/2012	SPECIAL	
CHECKED BY : W.F. PARKER	DATE : 11/2012		
DRAWN BY : BRAIN STALEY III	DATE : 11-30-71	STANDARD	
CHECKED BY : JOEL A. JOHNSON	DATE : 12-30-71		

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
11-7-13

PROJECT NO. B-4804
ROCKINGHAM COUNTY
STATION: 22+68.92 -L-

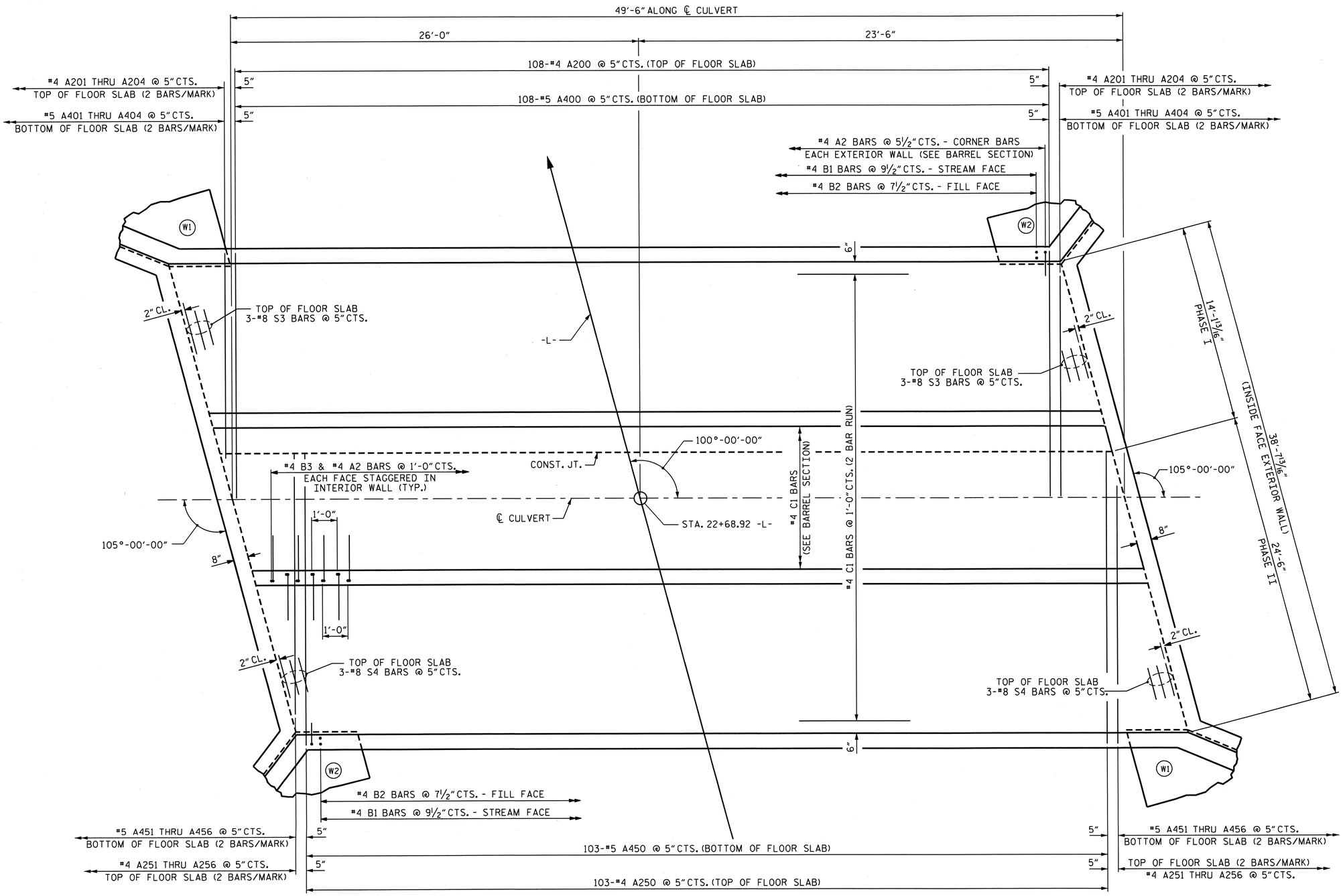
SHEET 2 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 100° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9
1			3			TOTAL SHEETS
2			4			15

STD. NO. CB223



PLAN OF FLOOR SLAB

PROJECT NO. B-4804
ROCKINGHAM COUNTY
STATION: 22+68.92 -L-

SHEET 3 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

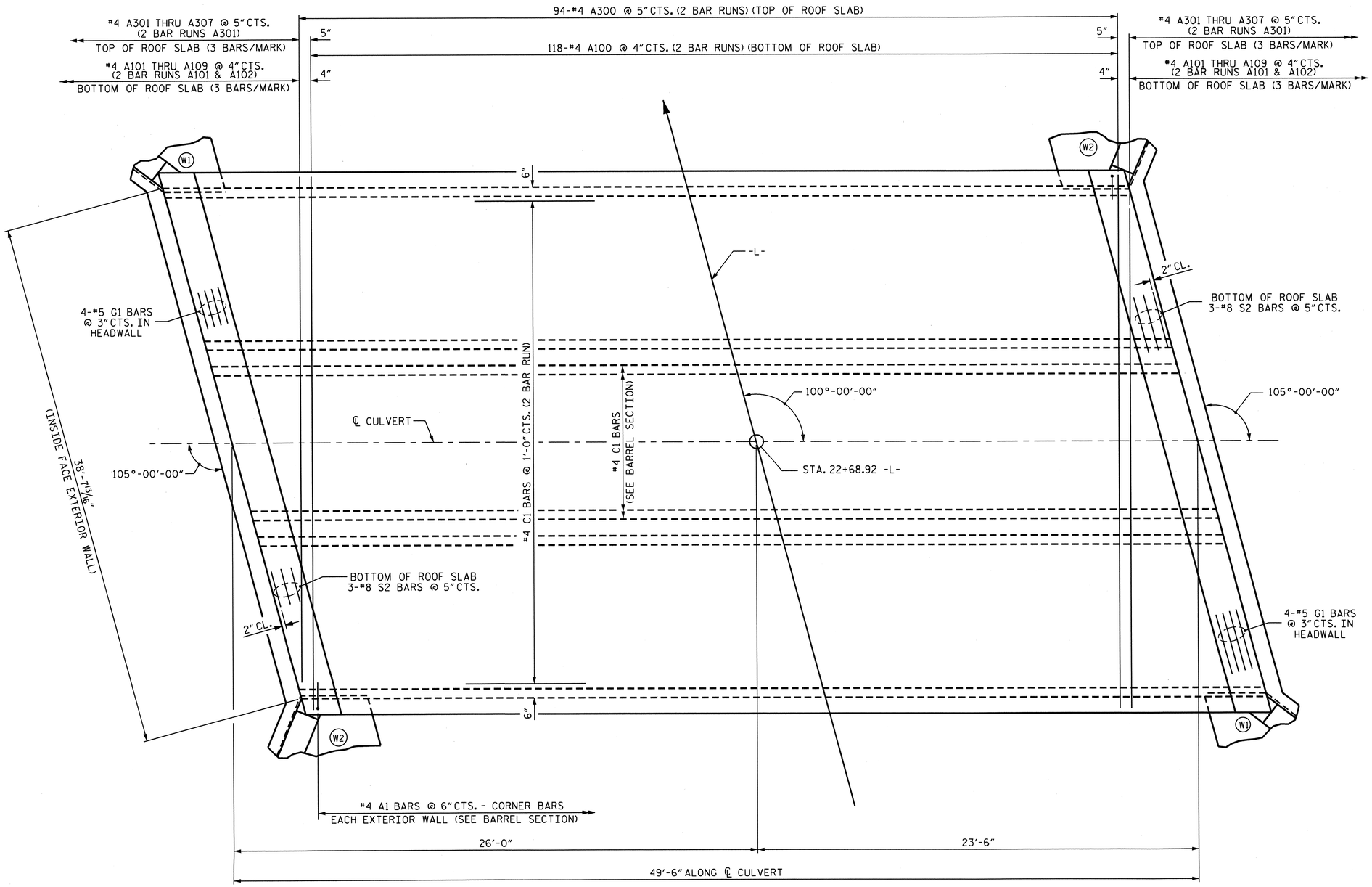
TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 100° SKEW

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
1-7-13

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-10
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : A. SORSENGINH DATE : 9/2012
CHECKED BY : W.F. PARKER DATE : 11/2012

STD. NO. CB443



PLAN OF ROOF SLAB

ASSEMBLED BY : A. SORSENGINH DATE : 9/2012
CHECKED BY : W.F. PARKER DATE : 11/2012

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R CALHOUN
1-7-13

PROJECT NO. B-4804
ROCKINGHAM COUNTY
STATION: 22+68.92 -L-

SHEET 4 OF 8

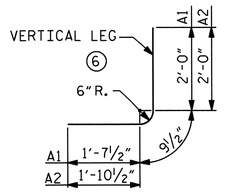
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 100° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-11
1			3			TOTAL SHEETS
2			4			15

STD. NO. CB443

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTH CHART

BAR	SIZE	LENGTH
A100	#4	1'-5"
A200	#4	1'-11"
A300	#4	1'-11"
A400	#5	1'-9"
C1	#4	1'-11"
S3	#8	4'-11"

BAR SCHEDULE

PHASE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A200	108	#4	STR	16'-1"	1160
A201	4	#4	STR	13'-5"	36
A202	4	#4	STR	10'-4"	28
A203	4	#4	STR	7'-2"	19
A204	4	#4	STR	4'-1"	11
A400	108	#5	STR	15'-11"	1793
A401	4	#5	STR	13'-4"	56
A402	4	#5	STR	10'-3"	43
A403	4	#5	STR	7'-1"	30
A404	4	#5	STR	4'-0"	17
A1	99	#4	6	4'-5"	292
A2	208	#4	6	4'-8"	648
B1	63	#4	STR	12'-4"	519
B2	80	#4	STR	10'-4"	552
B3	100	#4	STR	12'-4"	824
C1	82	#4	STR	25'-8"	1406
S3	6	#8	STR	19'-9"	316

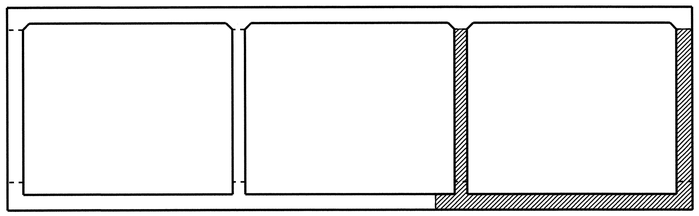
REINFORCING STEEL = 7,750 LBS

PHASE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A100	236	#4	STR	19'-10"	3127
A101	12	#4	STR	17'-9"	142
A102	12	#4	STR	15'-11"	128
A103	6	#4	STR	26'-7"	107
A104	6	#4	STR	22'-11"	92
A105	6	#4	STR	19'-2"	77
A106	6	#4	STR	15'-5"	62
A107	6	#4	STR	11'-8"	47
A108	6	#4	STR	7'-11"	32
A109	6	#4	STR	4'-3"	17
A250	103	#4	STR	24'-2"	1663
A251	4	#4	STR	21'-4"	57
A252	4	#4	STR	18'-3"	49
A253	4	#4	STR	15'-2"	41
A254	4	#4	STR	12'-0"	32
A255	4	#4	STR	8'-11"	24
A256	4	#4	STR	5'-10"	16

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A300	188	#4	STR	20'-1"	2522
A301	12	#4	STR	17'-7"	141
A302	6	#4	STR	28'-6"	114
A303	6	#4	STR	23'-10"	96
A304	6	#4	STR	19'-2"	77
A305	6	#4	STR	14'-6"	58
A306	6	#4	STR	9'-10"	39
A307	6	#4	STR	5'-2"	21
A450	103	#5	STR	24'-2"	2596
A451	4	#5	STR	21'-4"	89
A452	4	#5	STR	18'-3"	76
A453	4	#5	STR	15'-2"	63
A454	4	#5	STR	12'-0"	50
A455	4	#5	STR	8'-11"	37
A456	4	#5	STR	5'-10"	24
A1	99	#4	6	4'-5"	292
A2	208	#4	6	4'-8"	648
B1	63	#4	STR	12'-4"	519
B2	80	#4	STR	10'-4"	552
B3	100	#4	STR	12'-4"	824
C1	206	#4	STR	25'-8"	3533
G1	8	#5	STR	39'-8"	331
S2	6	#8	STR	39'-8"	635
S4	6	#8	STR	24'-11"	399

REINFORCING STEEL = 19,449 LBS



CONSTRUCTION PHASING

(LOOKING DOWNSTREAM)

PHASE I CONSTRUCTION

PHASE II CONSTRUCTION

PROJECT NO. B-4804

ROCKINGHAM COUNTY

STATION: 22+68.92 -L-

SHEET 5 OF 8

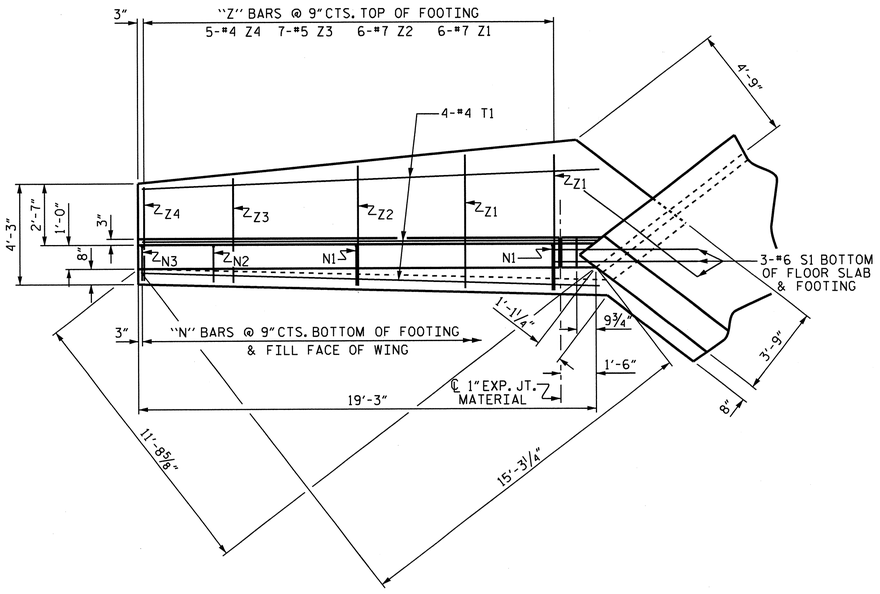
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 100° SKEW

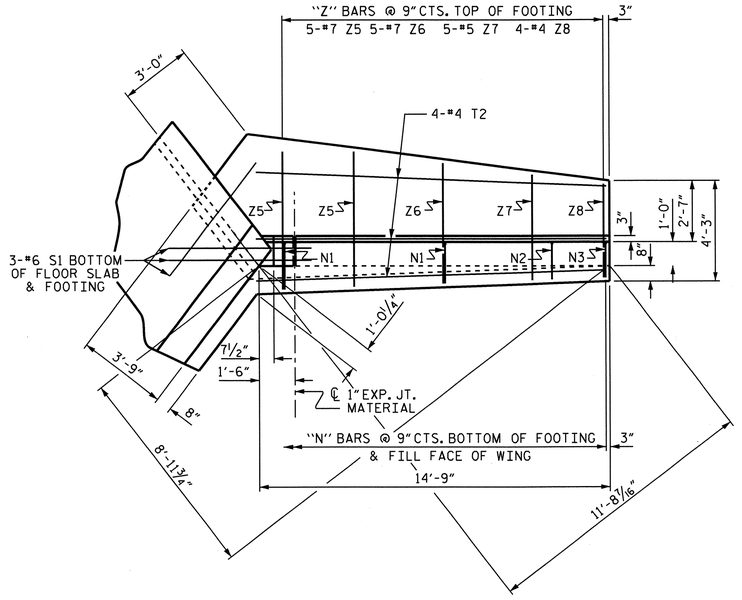
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
1-7-13

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-12
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : A. SORSENGINH DATE : 9/2012
CHECKED BY : W.F. PARKER DATE : 11/2012



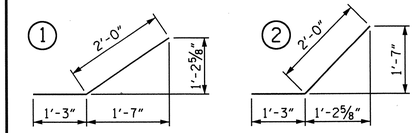
PLAN - W1

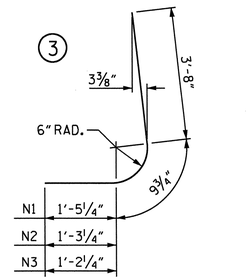


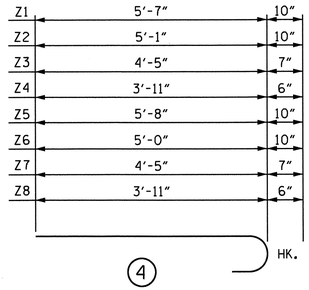
PLAN - W2

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



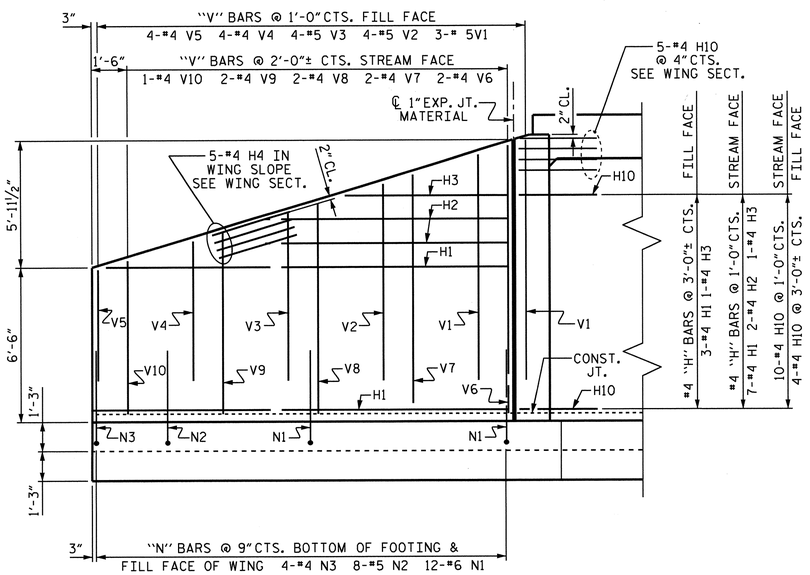




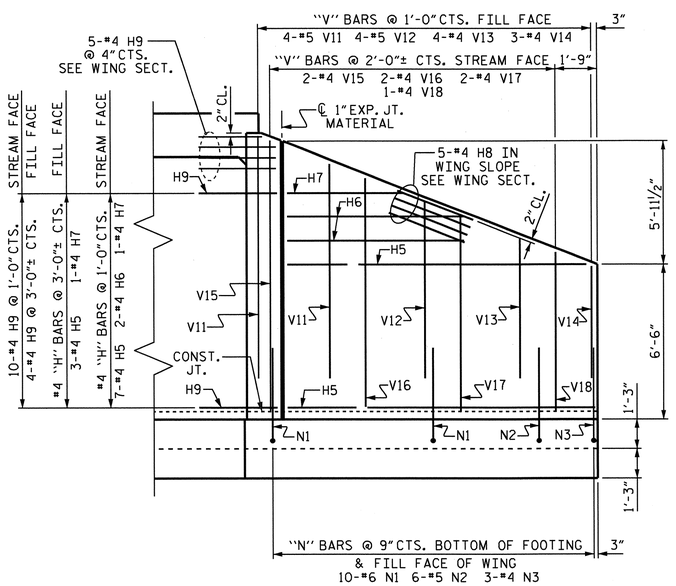
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	20	4	STR	17-4	232
H2	4	4	STR	10-1	27
H3	4	4	STR	6-10	18
H4	10	4	STR	17-5	116
H5	20	4	STR	12-10	171
H6	4	4	STR	7-4	20
H7	4	4	STR	4-10	13
H8	10	4	STR	13-2	88
H9	38	4	2	3-3	82
H10	38	4	1	3-3	82
N1	44	6	3	5-11	391
N2	28	5	3	5-9	168
N3	14	4	3	5-8	53
S1	12	6	STR	6-0	108
T1	8	4	STR	19-3	103
T2	8	4	STR	14-9	79
V1	6	5	STR	10-3	64
V2	8	5	STR	9-0	75
V3	8	5	STR	7-9	65
V4	8	4	STR	6-3	33
V5	8	4	STR	5-3	28
V6	4	4	STR	10-3	27
V7	4	4	STR	9-3	25
V8	4	4	STR	8-0	21
V9	4	4	STR	7-0	19
V10	2	4	STR	6-3	8
V11	8	5	STR	9-9	81
V12	8	5	STR	8-3	69
V13	8	4	STR	6-3	33
V14	6	4	STR	5-3	21
V15	4	4	STR	10-3	27
V16	4	4	STR	8-9	23
V17	4	4	STR	7-3	19
V18	2	4	STR	6-6	9
Z1	12	7	4	6-5	157
Z2	12	7	4	5-11	145
Z3	14	5	4	5-0	73
Z4	10	4	4	4-5	30
Z5	10	7	4	6-6	133
Z6	10	7	4	5-10	119
Z7	10	5	4	5-0	52
Z8	8	4	4	4-5	24

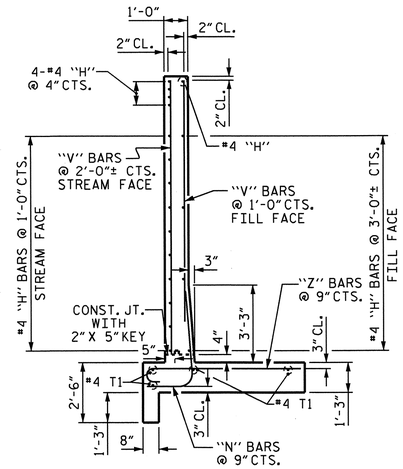
REINFORCING STEEL FOR 4 WINGS	3,131 LBS
CLASS A CONCRETE	
4 WINGS	44.3 CY
2 HEADWALLS	3.7 CY
2 END CURTAIN WALLS	4.5 CY
TOTAL	52.5 CY



ELEVATION - W1



ELEVATION - W2



TYPICAL WING SECTION

PROJECT NO. B-4804

ROCKINGHAM COUNTY

STATION: 22+68.92 -L-

SHEET 6 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H = 11'-0" SLOPE = 2:1

105° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-13
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY :	A. SORSENGINH	DATE :	9/2012
CHECKED BY :	W.F. PARKER	DATE :	11/2012
DRAWN BY :	A.K.PATEL	DATE :	11/04
CHECKED BY :	M. K. BEARD	DATE :	12/04

13-NOV-2012 15:44
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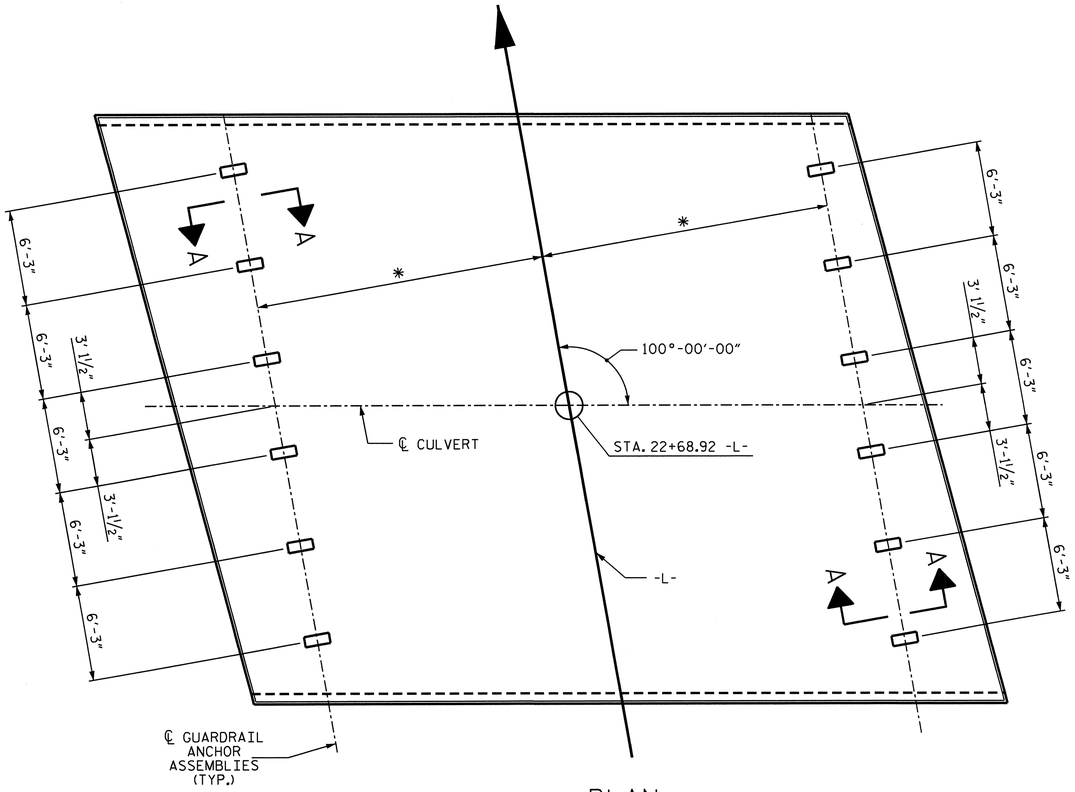
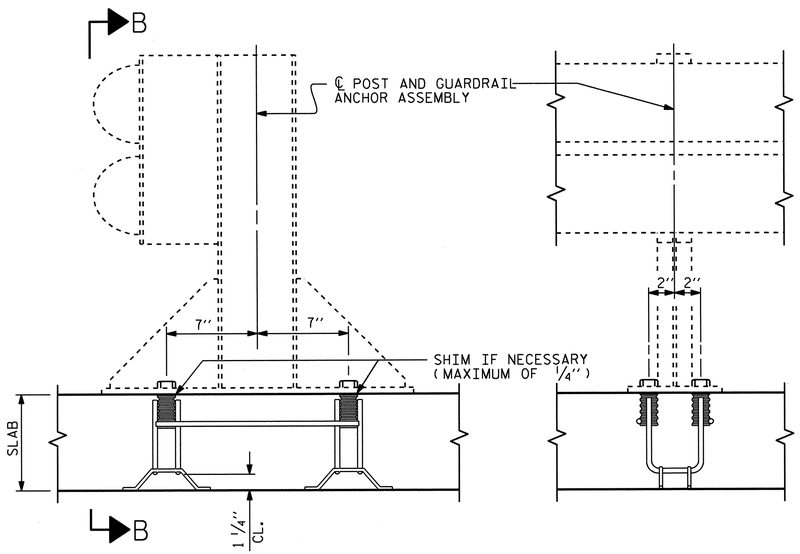
NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
1-7-13

STD. NO. CW10511



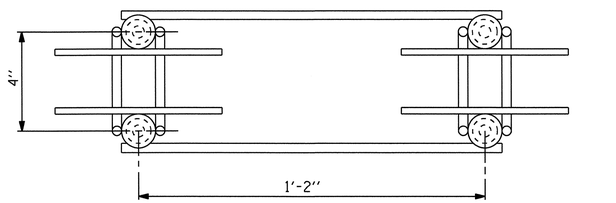
PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.
* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER.

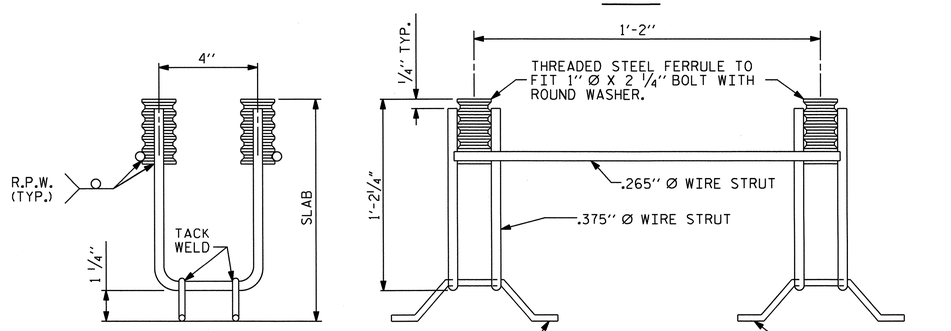


SECTION A-A

SECTION B-B



PLAN



ELEVATION

SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

NOTES

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

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

B. 4 - 1" Ø X 2 ¼" 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 2¼" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

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

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CALHOUN
1-7-13

PROJECT NO. B-4804
ROCKINGHAM COUNTY
STATION: 22+68.92 -L-
SHEET 7 OF 8

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-14
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : A. SORSENGINH	DATE : 11/2012		
CHECKED BY :	DATE :		
DRAWN BY : FCJ 6/88	REV. 5/7/03	RWW/JTE	
CHECKED BY : ARB 6/88	REV. 5/1/06R	KMM/GM	
	REV. 10/1/11	MAA/GM	

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STD. NO. GRA1

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

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)	1.02	--	1.75	1.02	1	BOT CORNER WALL	11.76	1.23	1	BOTTOM SLAB	11.73	
		HL-93 (OPERATING)	N/A		1.32	--	1.35	1.32	1	BOT CORNER WALL	11.76	1.59	1	BOTTOM SLAB	11.73	
		HS-20 (INVENTORY)	36.00	(2)	1.02	36.68	1.75	1.02	1	BOT CORNER WALL	11.76	1.23	1	BOTTOM SLAB	11.73	
		HS-20 (OPERATING)	36.00		1.32	47.54	1.35	1.32	1	BOT CORNER WALL	11.76	1.59	1	BOTTOM SLAB	11.73	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.50		2.03	27.46	1.40	2.03	1	BOT CORNER WALL	11.76	3.16	1	BOTTOM SLAB	11.73	
		SNGARBS2	20.00		1.72	34.47	1.40	1.72	1	BOT CORNER WALL	11.76	2.76	1	BOTTOM SLAB	11.73	
		SNAGRIS2	22.00		1.65	36.30	1.40	1.65	1	BOT CORNER WALL	11.76	2.51	1	BOTTOM SLAB	11.73	
		SNCOTTS3	27.25		1.45	39.64	1.40	1.45	1	BOT CORNER WALL	11.76	1.98	1	BOTTOM SLAB	11.73	
		SNAGGRS4	34.93		1.29	45.21	1.40	1.29	1	BOT CORNER WALL	11.76	1.59	1	BOTTOM SLAB	11.73	
		SNS5A	35.55		1.28	45.37	1.40	1.28	1	BOT CORNER WALL	11.76	1.56	1	BOTTOM SLAB	11.73	
		SNS6A	39.95		1.20	47.83	1.40	1.20	1	BOT CORNER WALL	11.76	1.39	1	BOTTOM SLAB	11.73	
		SNS7B	42.00		1.16	48.57	1.40	1.16	1	BOT CORNER WALL	11.76	1.32	1	BOTTOM SLAB	11.73	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.00		1.34	44.20	1.40	1.34	1	BOT CORNER WALL	11.76	1.69	1	BOTTOM SLAB	11.73	
		TNT4A	33.08		1.36	44.97	1.40	1.36	1	BOT CORNER WALL	11.76	1.68	1	BOTTOM SLAB	11.73	
		TNT6A	41.60		1.18	48.94	1.40	1.18	1	BOT CORNER WALL	11.76	1.33	1	BOTTOM SLAB	11.73	
		TNT7A	42.00		1.16	48.57	1.40	1.16	1	BOT CORNER WALL	11.76	1.34	1	BOTTOM SLAB	11.73	
		TNT7B	42.00		1.22	51.19	1.40	1.22	1	BOT CORNER WALL	11.76	1.33	1	BOTTOM SLAB	11.73	
		TNAGRIT4	43.00		1.17	50.15	1.40	1.17	1	BOT CORNER WALL	11.76	1.29	1	BOTTOM SLAB	11.73	
		TNAGT5A	45.00		1.13	50.73	1.40	1.13	1	BOT CORNER WALL	11.76	1.24	1	BOTTOM SLAB	11.73	
		TNAGT5B	45.00	(3)	1.10	49.70	1.40	1.10	1	BOT CORNER WALL	11.76	1.24	1	BOTTOM SLAB	11.73	

	LOAD TYPE	MAX. FACTOR	MIN. FACTOR
STRENGTH I LIMIT STATE DESIGN LOAD RATING FACTORS	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	0.00
	WA	1.00	0.00

NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

1.

2.

3.

4.

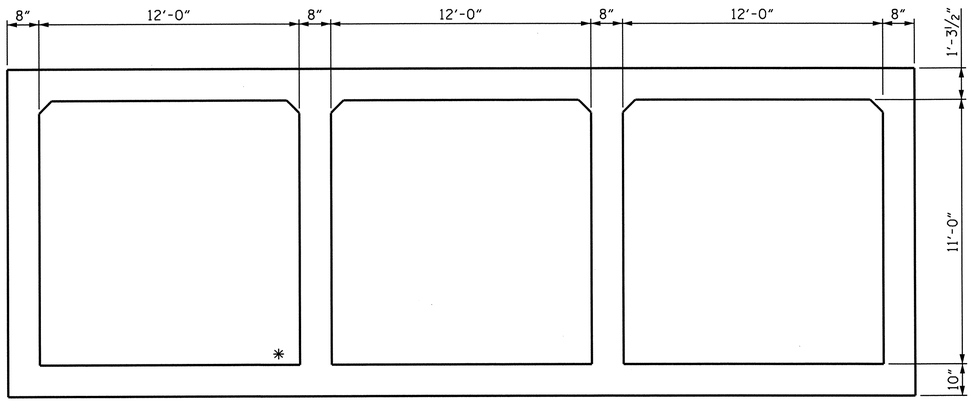
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

* (1) (2) (3) CONTROLS

PROJECT NO. B-4804

ROCKINGHAM COUNTY

STATION: 22+68.92 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERT

(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DAVID A. R. CALHOUN
1-7-13

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

ASSEMBLED BY :	A. SORSENGINH	DATE :	9/2012
CHECKED BY :	W.F. PARKER	DATE :	11/2012
DRAWN BY :	MAA 1/08	REV. 11/12/08RR	MAA/GM
CHECKED BY :	GM/DI 2/08		

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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 OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "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. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (c) RGW REV. 5-7-03 RWW (c) JTE REV. 10-1-11 MAA (c) GM
REV. 8-16-99 RWW (c) LES REV. 5-1-06 TLA (c) GM