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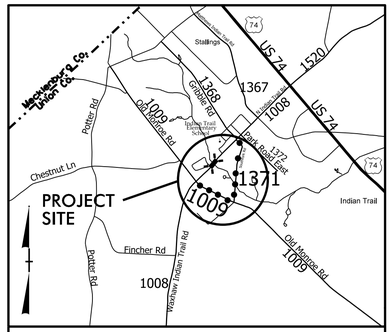
CONTRACT: C203663 TIP NO: B-5243



VICINITY MAP

DETOUR

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF INDIAN TRAIL.

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

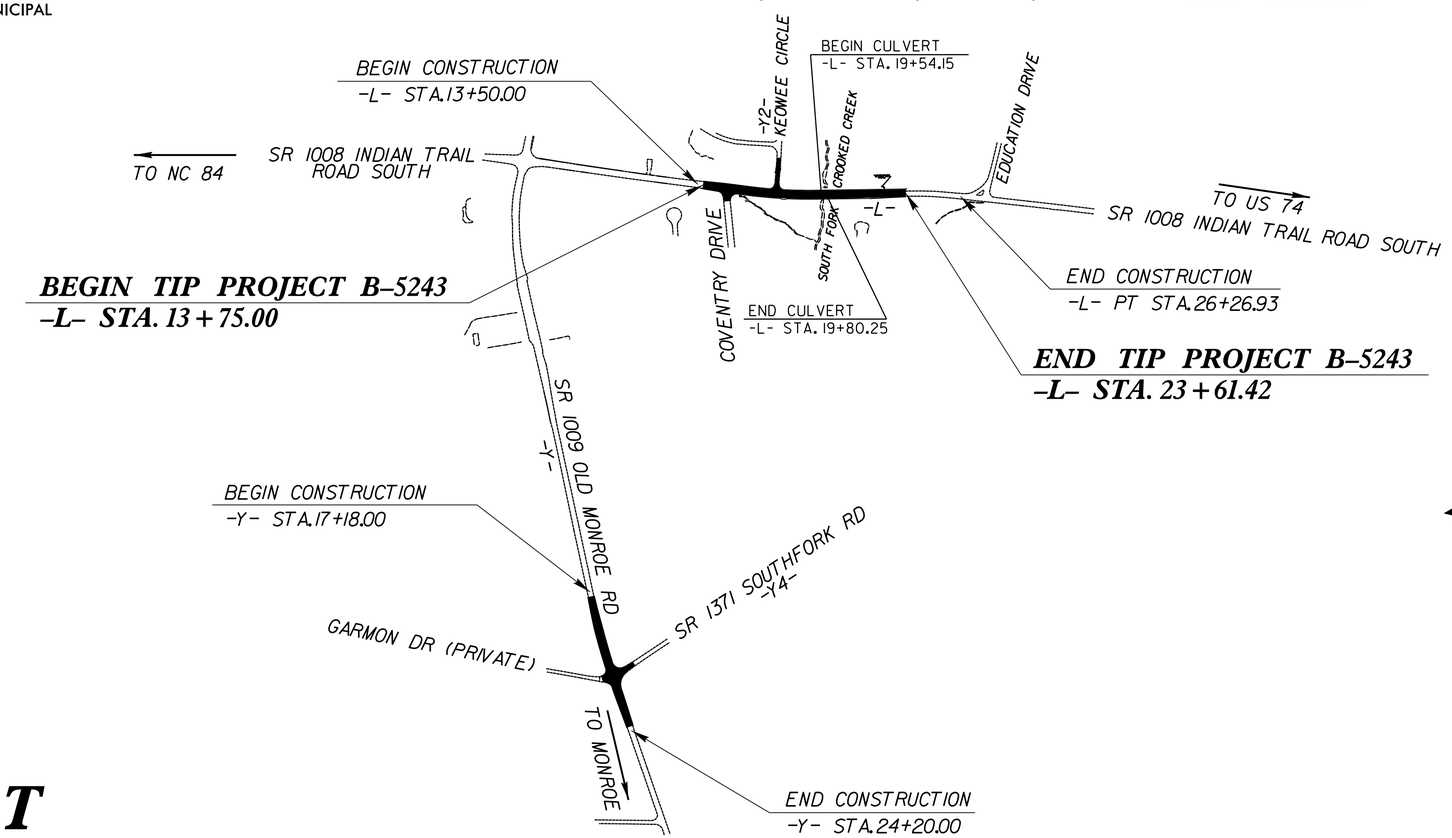
UNION COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5243		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
42845.1.1	BRSTP-1008(23)	PE
42845.2.FD1	BRSTP-1008(23)	R/W & UTIL.
42845.3.FD1	BRSTP-1008(23)	CONST.

LOCATION: BRIDGE 258 ON SR 1008 OVER SOUTH FORK CROOKED CREEK AND IMPROVEMENT OF THE INTERSECTION OF SR 1009 AND SR 1371

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



CULVERT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2016 = 15,900
ADT 2036 = 19,350
K = 9 %
D = 65 %
T = 5 % *
V = 40 MPH
* TTST =1% DUAL 4%

FUNC CLASS = MAJOR COLLECTOR

SUB REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5243 = 0.182 MILES
LENGTH STRUCTURE TIP PROJECT B-5243 = 0.005 MILES
TOTAL LENGTH OF TIP PROJECT B-5243 = 0.187 MILES

Prepared In the Office of:

DIVISION OF HIGHWAYS

STRUCTURES MANAGEMENT UNIT

1000 BIRCH RIDGE DR.

RALEIGH, N.C. 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE :

JANUARY 19, 2016

LAURA E. SUTTON, PE

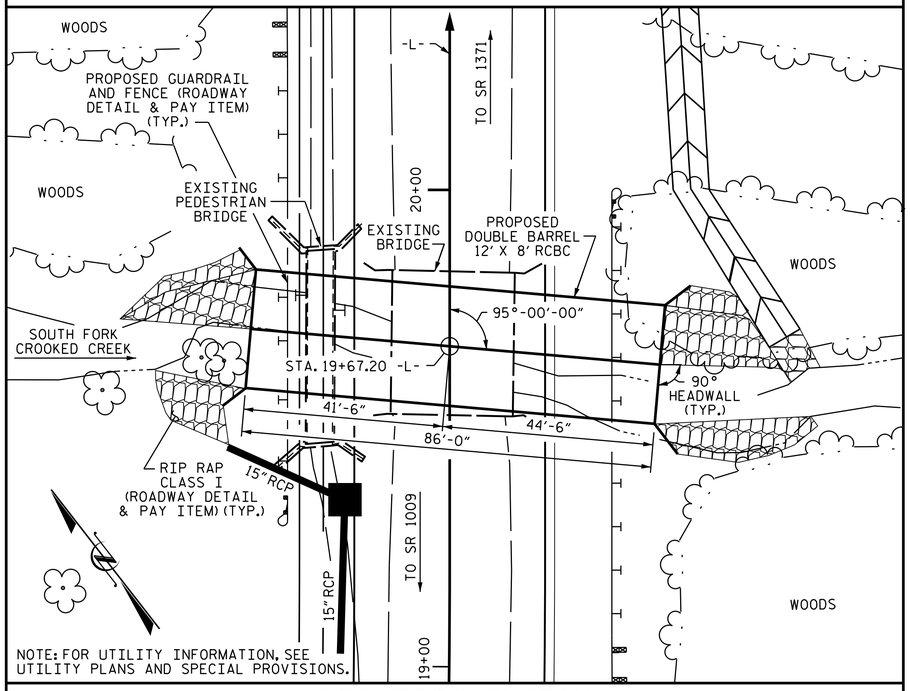
PROJECT ENGINEER

DONALD R. SMITH, JR., PE

PROJECT DESIGN ENGINEER

F. A. PROJECT NO. BRSTP-1008(23)

BM 2: RR SPIKE IN 20" OAK TREE, 94' RIGHT OF STA. 19+89.00 -L-, EL. 672.58.



LOCATION SKETCH

ROADWAY DATA

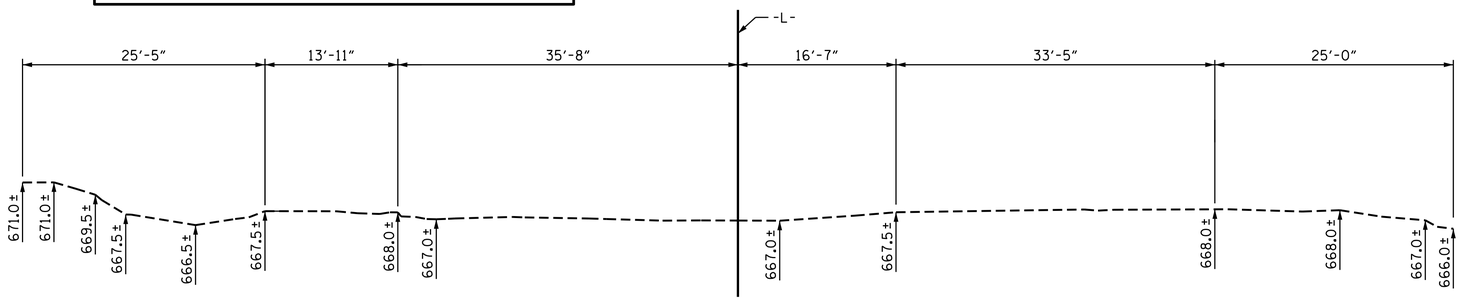
GRADE POINT EL. @ STA. 19+67.20 -L-	= 676.70
BED ELEVATION @ STA. 19+67.20 -L-	= 665.00
ROADWAY SLOPES	= 2:1

HYDRAULIC DATA

DESIGN DISCHARGE	= 900 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 673.9
DRAINAGE AREA	= 1.3 SQ. MI.
BASE DISCHARGE (Q100)	= 1,000 C.F.S.
BASE HIGH WATER ELEVATION	= 674.37

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 1,140 C.F.S
FREQUENCY OF OVERTOPPING FLOOD	= 200+ YRS.
OVERTOPPING FLOOD ELEVATION	= 675.40



PROFILE ALONG ℄ CULVERT

NOTES

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

DESIGN FILL----------2.94 FT.

FOR OTHER DESIGN DATA AND NOTES, SEE SHEET SN.

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

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. WING FOOTINGS, CURTAIN WALL AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS IN STAGE I.
2. THE REMAINING PORTIONS OF STAGE I WALLS, SILL AND WINGS FULL HEIGHT.
3. WING FOOTINGS, CURTAIN WALL AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS IN STAGE II.
4. THE REMAINING PORTION OF STAGE II WALLS, SILLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FT. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALL ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

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

THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 30'-6", WITH TIMBER DECK ON STEEL I-BEAMS; CLEAR ROADWAY WIDTH OF 25'-2" WITH TIMBER CAPS, POSTS & SILLS, TIMBER BULKHEADS AND TIMBER CRUTCH BENT; AND LOCATED AT THE PROPOSED STRUCTURE 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.

THE EXISTING PEDESTRIAN BRIDGE CONSISTING OF 1 SPAN @ 30'-0"± WITH CONCRETE DECK ON CONCRETE BEAMS LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED.

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 INCICATED ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

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.

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 19+67.20 -L-".

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

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

NATURAL STREAM BED MATERIAL SHALL BE USED TO BACKFILL THE CULVERT BETWEEN THE SILLS. FOR PLACEMENT OF NATURAL STREAM BED MATERIAL, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

TOTAL STRUCTURE QUANTITIES

REMOVAL OF EXISTING STRUCTURES	LUMP SUM	
CULVERT EXCAVATION	LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	TONS	182
CLASS A CONCRETE		
STAGE I	C.Y.	89.0
STAGE II	C.Y.	179.7
TOTAL	C.Y.	268.7
REINFORCING STEEL		
STAGE I	LBS.	12,002
STAGE II	LBS.	18,687
TOTAL	LBS.	30,689
PLACEMENT OF NATURAL STREAM BED MATERIAL	LUMP SUM	

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-5243

UNION COUNTY

STATION: 19+67.20 -L-

SHEET 1 OF 6 REPLACES BRIDGE NO. 258

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD

DOUBLE 12 FT. X 8 FT. CONCRETE BOX CULVERT

95° SKEW/90° HEADWALL

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
DocuSigned by: Laura C. Sutton AE35E3E67276406...
11/17/2015

NORTH CAROLINA PROFESSIONAL SEAL 031480 ENGINEER DONALD R. SMITH, JR
DocuSigned by: Donald R. Smith, Jr EDC877061748490...
11/16/2015

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

STD. NO. CB12A

ASSEMBLED BY : N.D'AIUTO DATE : 2/1/15
CHECKED BY : P.S.ADKINS DATE : 3/2/15

DRAWN BY : R.W. WRIGHT DATE : JULY, 1990
CHECKED BY : D.A. GLADDEN DATE : JULY, 1990

SPECIAL
STANDARD

DESIGN ENGINEER OF RECORD: J.P.MCCARTHA DATE : 8/3/15

ADDED NOV. 1, 1990

16-NOV-2015 11:02
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jdhawk

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	**1.03**	--	1.75	1.29	1	BOTTOM SLAB	11.72	**1.03**	1	TOP SLAB	**11.34**	
		HL-93 (OPERATING)	N/A		1.33	--	1.35	1.68	1	BOTTOM SLAB	11.72	1.33	1	TOP SLAB	11.34	
		HS-20 (INVENTORY)	36.000	(2)	**1.12**	40.16	1.75	1.29	1	BOTTOM SLAB	11.72	**1.12**	1	BOTTOM SLAB	**11.64**	
		HS-20 (OPERATING)	36.000		1.45	52.06	1.35	1.68	1	BOTTOM SLAB	11.72	1.45	1	BOTTOM SLAB	11.64	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.40	32.42	1.40	2.77	1	TOP SLAB	5.38	2.40	1	TOP SLAB	11.34	
		SNGARBS2	20.000		2.23	44.69	1.40	2.53	1	BOTTOM SLAB	11.72	2.23	1	BOTTOM SLAB	11.64	
		SNAGRIS2	22.000		2.03	44.59	1.40	2.35	1	BOTTOM SLAB	11.72	2.03	1	BOTTOM SLAB	11.64	
		SNCOTTS3	27.250		1.29	35.13	1.40	1.66	1	TOP SLAB	5.07	1.29	1	TOP SLAB	11.34	
		SNAGGRS4	34.925		1.28	44.82	1.40	1.44	1	BOTTOM SLAB	11.72	1.28	1	BOTTOM SLAB	11.64	
		SNS5A	35.550		1.26	44.85	1.40	1.41	1	BOTTOM SLAB	11.72	1.26	1	BOTTOM SLAB	11.64	
		SNS6A	39.950		1.26	50.23	1.40	1.40	1	BOTTOM SLAB	11.72	1.26	1	BOTTOM SLAB	11.64	
		SNS7B	42.000		1.18	49.61	1.40	1.37	1	BOTTOM SLAB	11.72	1.18	1	BOTTOM SLAB	11.64	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.36	45.00	1.40	1.59	1	BOTTOM SLAB	11.72	1.36	1	BOTTOM SLAB	11.64	
		TNT4A	33.075		1.35	44.77	1.40	1.53	1	BOTTOM SLAB	11.72	1.35	1	BOTTOM SLAB	11.64	
		TNT6A	41.600		1.24	51.60	1.40	1.49	1	BOTTOM SLAB	11.72	1.24	1	BOTTOM SLAB	11.64	
		TNT7A	42.000		1.18	49.77	1.40	1.39	1	BOTTOM SLAB	11.72	1.18	1	BOTTOM SLAB	11.64	
		TNT7B	42.000		1.29	54.28	1.40	1.44	1	BOTTOM SLAB	11.72	1.29	1	BOTTOM SLAB	11.64	
		TNAGRIT4	43.000	(3)	**1.04**	44.93	1.40	1.20	1	BOTTOM SLAB	11.72	**1.04**	1	BOTTOM SLAB	**11.64**	
		TNAGT5A	45.000		1.16	52.32	1.40	1.34	1	BOTTOM SLAB	11.72	1.16	1	BOTTOM SLAB	11.64	
		TNAGT5B	45.000		1.07	48.10	1.40	1.24	1	BOTTOM SLAB	11.72	1.07	1	BOTTOM SLAB	11.64	

LOAD FACTORS

DESIGN LOAD RATING FACTORS

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

NOTE

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

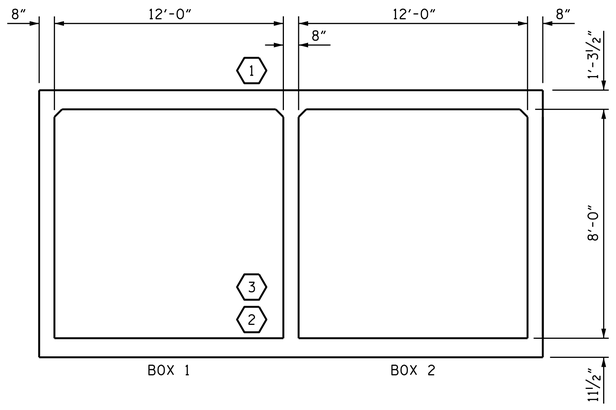
(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. B-5243

UNION COUNTY

STATION: 19+67.20 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

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

STD. NO. LRFR5

NORTH CAROLINA PROFESSIONAL SEAL 039349 ENGINEER JEREMY P. McCARTHA

DocuSigned by: Jeremy P. McCartha F757FFCF9CBA420...
11/16/2015

ASSEMBLED BY : D.BOULWARE DATE : 2/3/15
CHECKED BY : P.S.ADKINS DATE : 3/2/15

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

REV. 10/1/11 MAA/GM

DESIGN ENGINEER OF RECORD:
J.P.MCCARTHA DATE : 8/4/15

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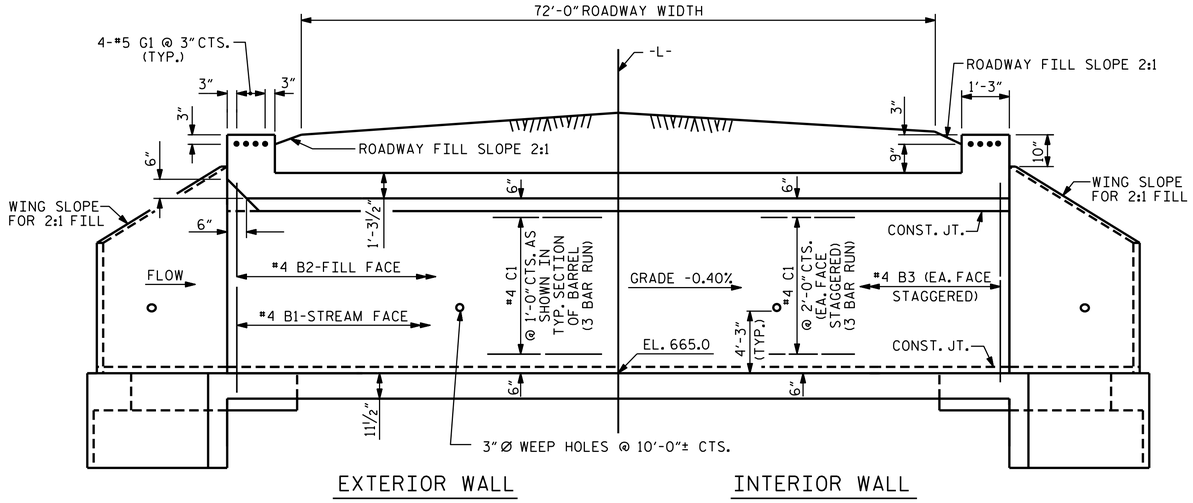
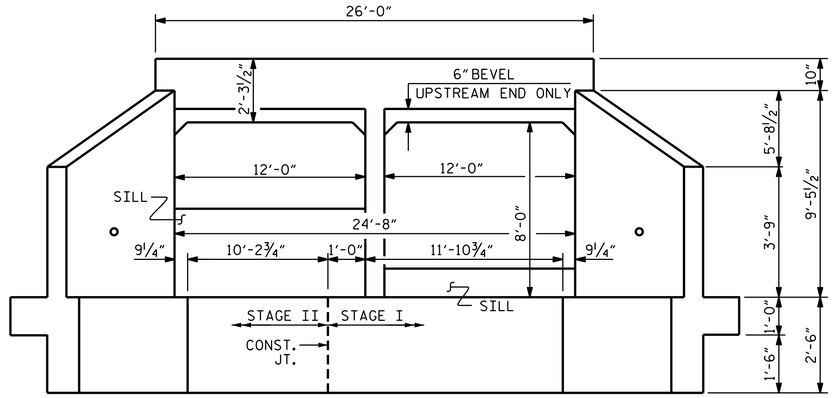
jdhawk

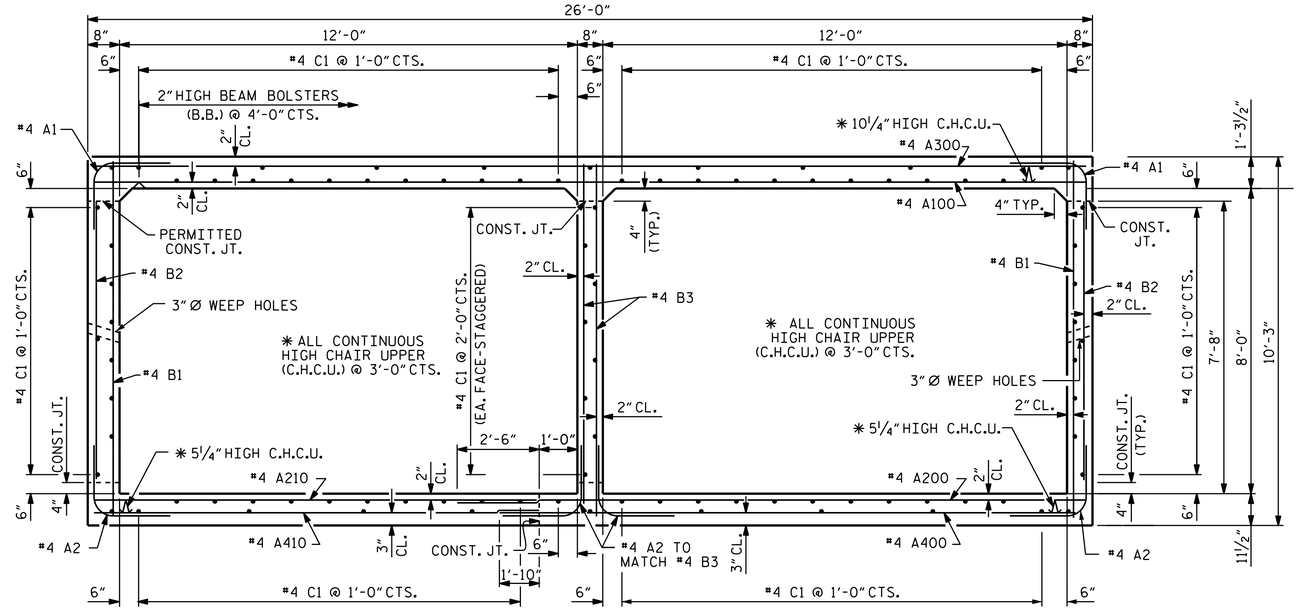


CULVERT SECTION NORMAL TO ROADWAY



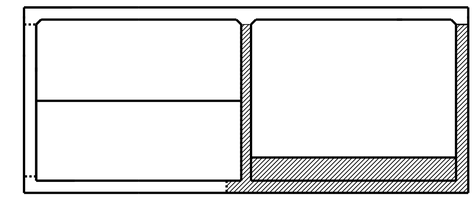
END ELEVATION

(LOOKING DOWNSTREAM)



RIGHT ANGLE SECTION OF BARREL

THERE ARE 92 C1 BARS IN SECTION OF BARREL.
(LOOKING DOWNSTREAM)



CONSTRUCTION SEQUENCE

(LOOKING DOWNSTREAM)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-5243

UNION COUNTY

STATION: 19+67.20 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD

DOUBLE 12 FT. X 8 FT. CONCRETE BOX CULVERT

95° SKEW/90° HEADWALL

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

STD. NO. CB12

NORTH CAROLINA PROFESSIONAL SEAL 039349 ENGINEER JEREMY P. McCARTHA

DocuSigned by: Jeremy P. McCartha F757FFCF9CBA420...
11/16/2015

DRAWN BY :	N.D'AIUTO	DATE :	2/3/15
CHECKED BY :	P.S.ADKINS	DATE :	3/2/15
DESIGN ENGINEER OF RECORD:	J.P.MCCARTHA	DATE :	8/3/15

REVISED 11-19-99 BY M.M. CHECKED BY R.W.W.
REDRAWN NOV. 1990 BY TSS CHECKED BY ARB

16-NOV-2015 11:03
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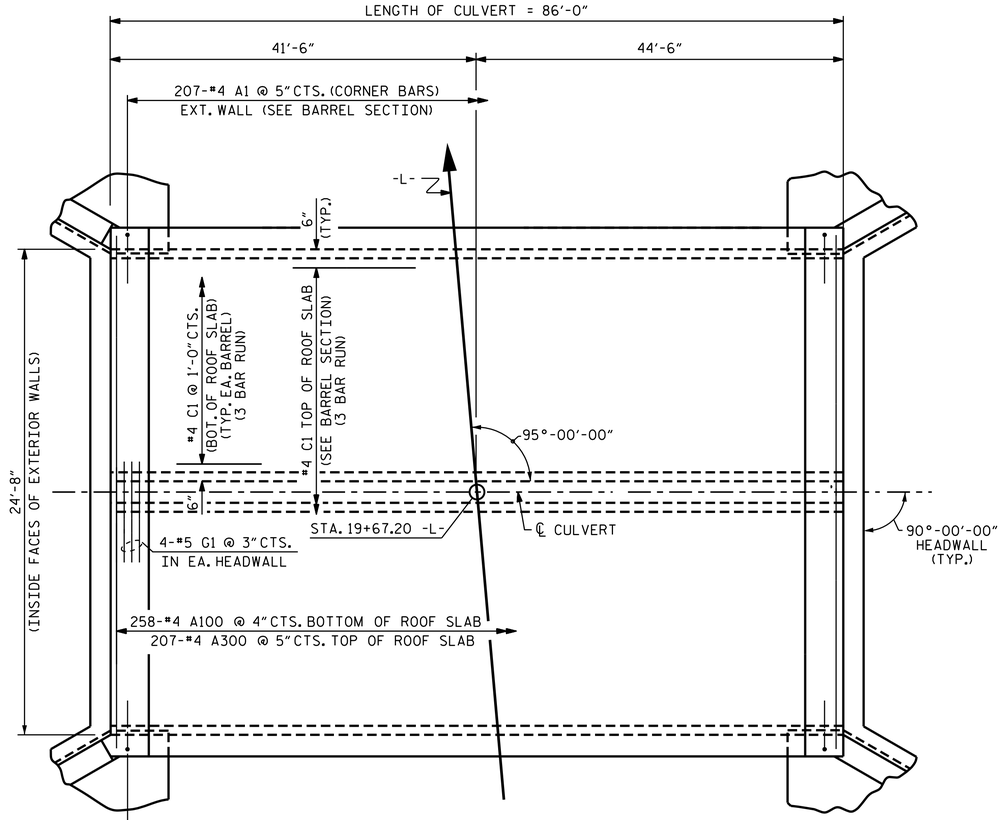
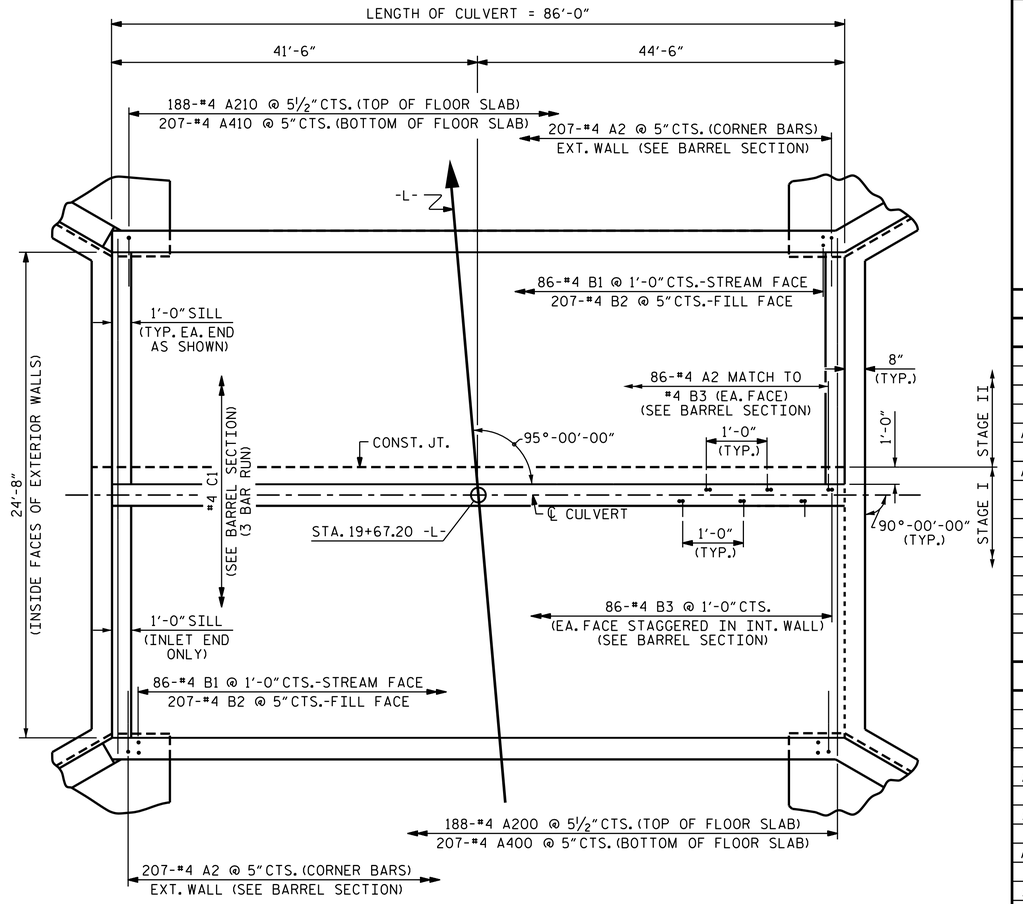
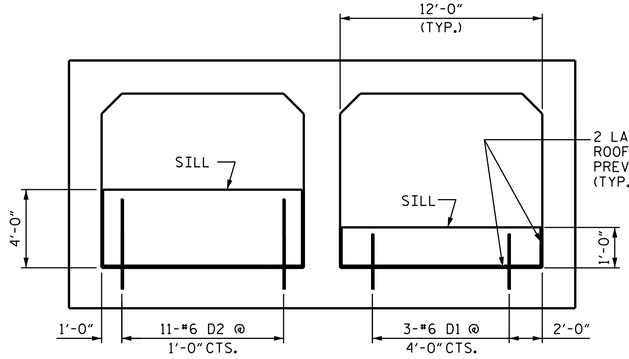
jdhawk



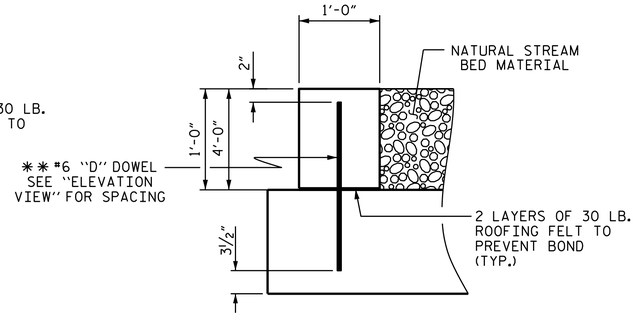
PLAN - ROOF SLAB



PLAN - FLOOR SLAB



ELEVATION



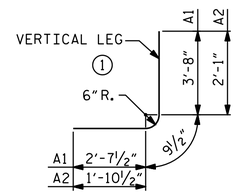
SECTION THROUGH SILL

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

CULVERT SILL DETAILS

(4'-0" SILL AT BOTH ENDS OF BARREL 1)
(1'-0" SILL AT INLET END ONLY OF BARREL 2)
(LOOKING DOWNSTREAM)

BAR TYPE



DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	207	#4	1	7'-1"	979
A2	379	#4	1	4'-9"	1203
A200	188	#4	STR	16'-8"	2093
A400	207	#4	STR	16'-0"	2212
B1	86	#4	STR	9'-9"	560
B2	207	#4	STR	7'-4"	1014
B3	172	#4	STR	9'-9"	1120
C1	105	#4	STR	29'-10"	2093
D1	3	#6	STR	1'-6"	7
REINFORCING STEEL			LBS.		11,281

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	207	#4	1	7'-1"	979
A2	207	#4	1	4'-9"	657
A100	258	#4	STR	25'-8"	4423
A210	188	#4	STR	11'-5"	1434
A300	207	#4	STR	25'-8"	3549
A410	207	#4	STR	11'-5"	1579
B1	86	#4	STR	9'-9"	560
B2	207	#4	STR	7'-4"	1014
C1	171	#4	STR	29'-10"	3408
D2	22	#6	STR	4'-6"	149
G1	8	#5	STR	25'-8"	214
REINFORCING STEEL			LBS.		17,966

SPLICE LENGTH CHART

BAR	SIZE	SPLICE LENGTH
A200	#4	2'-5"
A400	#4	1'-9"
B1	#4	1'-9"
B3	#4	1'-9"
C1	#4	1'-11"

STAGE I QUANTITIES

CLASS A CONCRETE	
BARREL @ 0.887 C.Y./FT.	76.3 C.Y.
WINGS, ETC.	12.7 C.Y.
TOTAL	89.0 C.Y.
REINFORCING STEEL	
BARREL	11,281 LBS.
WINGS, ETC.	721 LBS.
TOTAL	12,002 LBS.

STAGE II QUANTITIES

CLASS A CONCRETE	
BARREL @ 1.880 C.Y./FT.	161.7 C.Y.
WINGS, ETC.	18.0 C.Y.
TOTAL	179.7 C.Y.
REINFORCING STEEL	
BARREL	17,966 LBS.
WINGS, ETC.	721 LBS.
TOTAL	18,687 LBS.

NORTH CAROLINA PROFESSIONAL SEAL 039349 ENGINEER JEREMY P. MCCARTHA

Docusigned by: Jeremy P. McCartha
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11/16/2015

PROJECT NO. B-5243
UNION COUNTY
STATION: 19+67.20 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 12 FT. X 8 FT. CONCRETE BOX CULVERT

95° SKEW/90° HEADWALL

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

DRAWN BY : N.D'AIUTO DATE : 2/2/15
CHECKED BY : P.S.ADKINS DATE : 3/2/15
DESIGN ENGINEER OF RECORD: J.P.MCCARTHA DATE : 8/3/15

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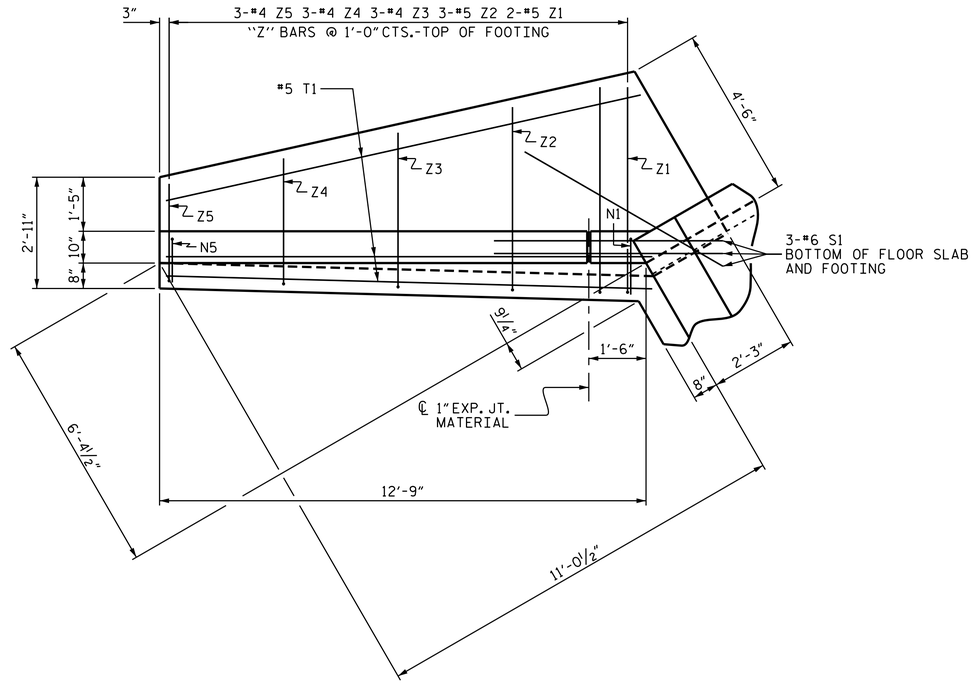
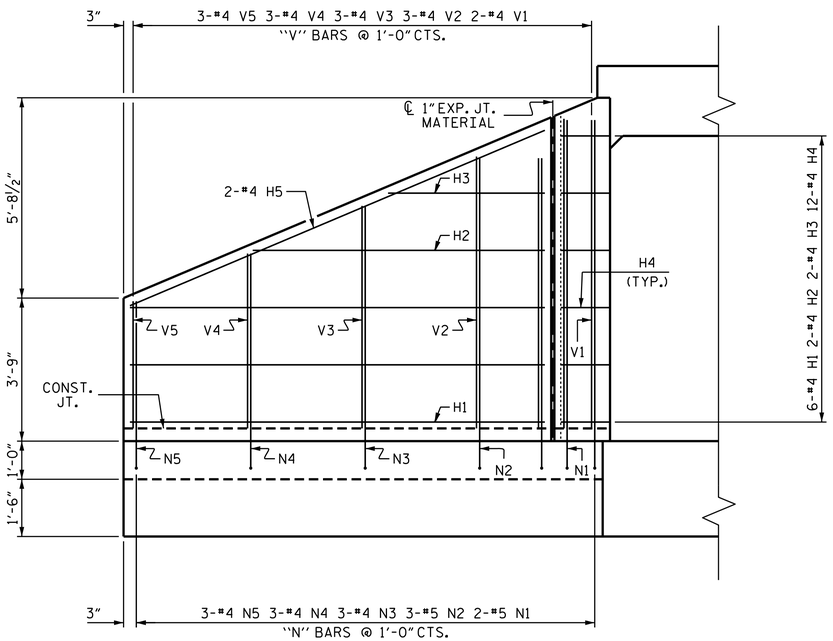
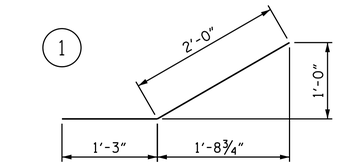


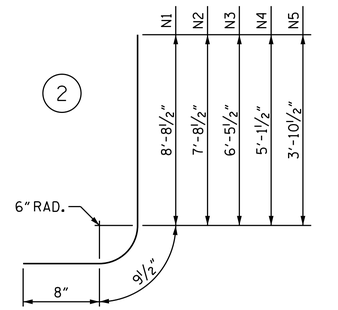
PLAN

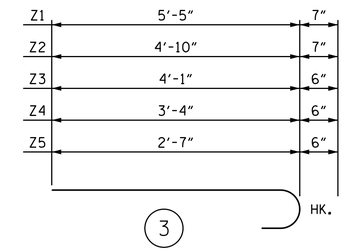


ELEVATION

BAR TYPES







ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

STAGE I

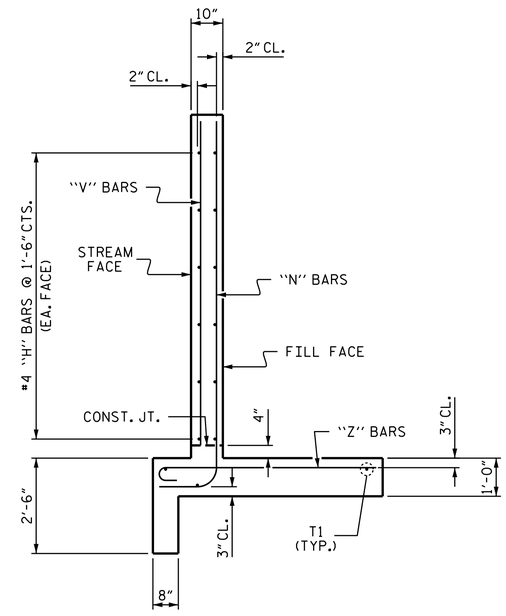
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	10'-10"	87
H2	4	#4	STR	7'-8"	20
H3	4	#4	STR	4'-1"	11
H4	24	#4	1	3'-3"	52
H5	4	#4	STR	11'-9"	31
N1	4	#5	2	10'-2"	42
N2	6	#5	2	9'-2"	57
N3	6	#4	2	7'-11"	32
N4	6	#4	2	6'-7"	26
N5	6	#4	2	5'-4"	21
S1	6	#6	STR	6'-0"	54
T1	6	#5	STR	12'-9"	80
V1	4	#4	STR	8'-1"	22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

REINFORCING STEEL FOR 2 WINGS	LBS.	721
CLASS A CONCRETE		
2 WINGS	C.Y.	10.7
2 END CURTAIN WALLS	C.Y.	1.6
1 SILL	C.Y.	0.4
TOTAL	C.Y.	12.7

STAGE II

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

REINFORCING STEEL FOR 2 WINGS	LBS.	721
CLASS A CONCRETE		
2 WINGS	C.Y.	10.7
2 HEADWALLS	C.Y.	2.4
2 END CURTAIN WALLS	C.Y.	1.3
2 SILLS	C.Y.	3.6
TOTAL	C.Y.	18.0



TYPICAL WING SECTION

ASSEMBLED BY : N.D'AIUTO	DATE : 2/2/15		
CHECKED BY : P.S.ADKINS	DATE : 3/2/15		
DRAWN BY : CCJ	10/99		
CHECKED BY : RWW	03/00		

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NORTH CAROLINA PROFESSIONAL SEAL 039349 ENGINEER JEREMY P. McCARTHA

DocuSigned by: Jeremy P. McCartha F757FFCF9CBA420...
11/16/2015

PROJECT NO. B-5243

UNION COUNTY

STATION: 19+67.20 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

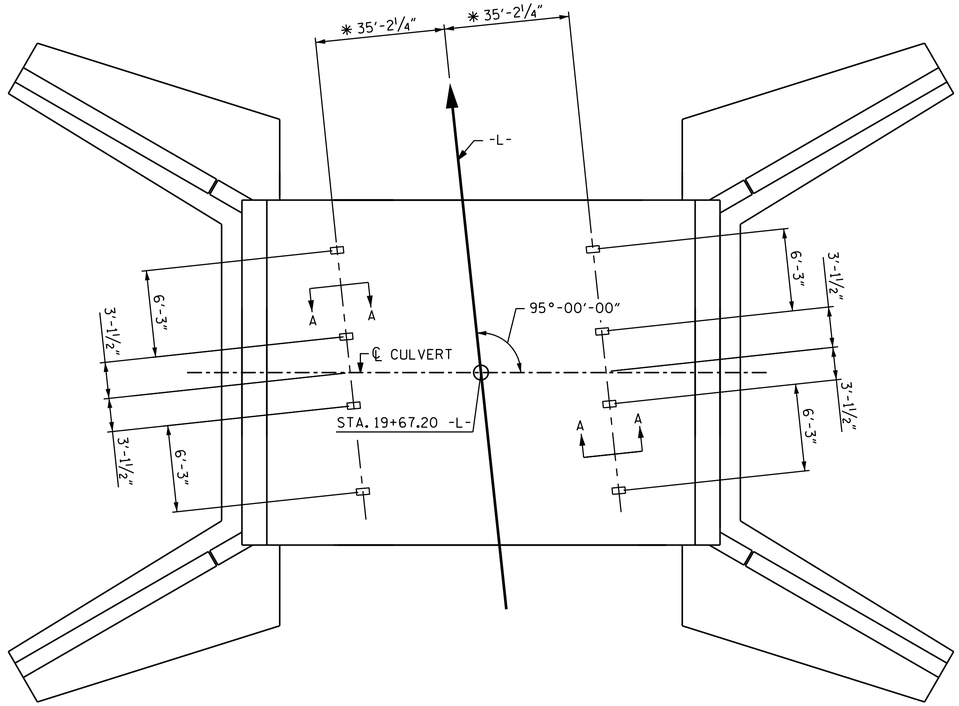
STANDARD WINGS FOR CONCRETE BOX CULVERT

H= 8'-0" SLOPE= 2:1

90° HEADWALL

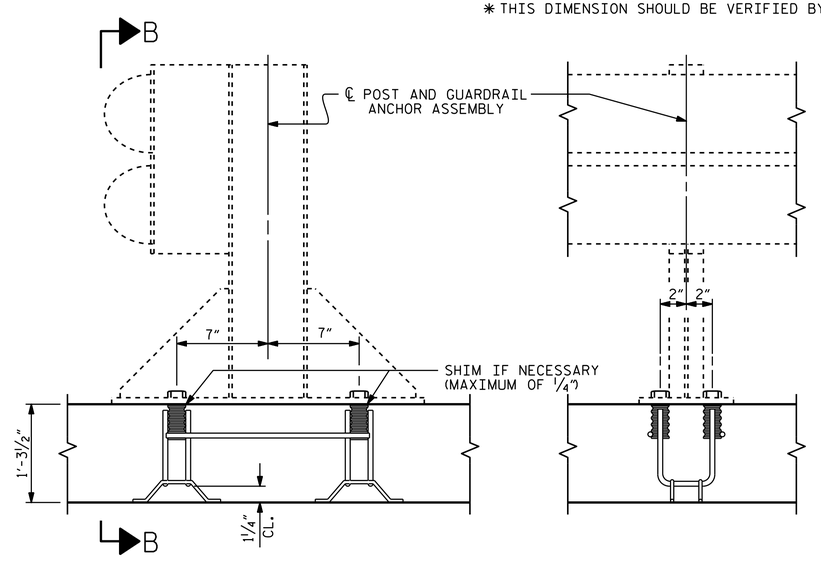
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			6

STD. NO. CW9008



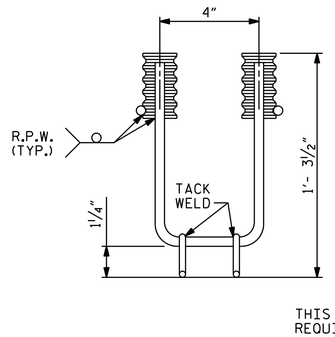
PLAN

SHOWING: GUARDRAIL ANCHOR ASSEMBLY SPACING.
✱ THIS DIMENSION SHOULD BE VERIFIED BY THE RESIDENT ENGINEER.

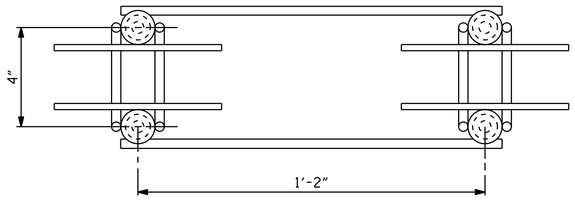


SECTION A-A

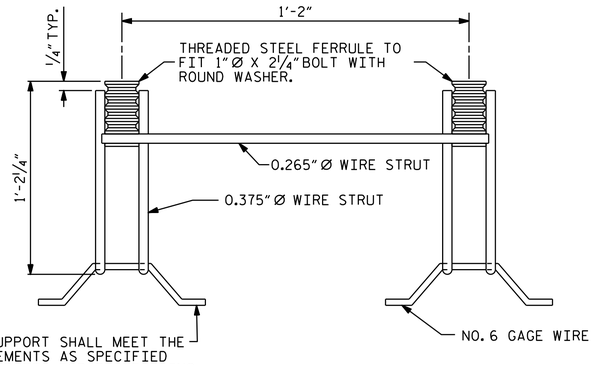
SECTION B-B



ELEVATION



PLAN



THIS SUPPORT SHALL MEET THE REQUIREMENTS AS SPECIFIED FOR SUPPORTS FOR REINFORCING STEEL. SEE SPECIFICATIONS.

SIDE VIEW

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 2¼" 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.

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

ASSEMBLED BY : N.D'AIUTO	DATE : 2/2/15		
CHECKED BY : P.S.ADKINS	DATE : 3/2/15		
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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DocuSigned by: Jeremy P. McCartha
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11/16/2015

NORTH CAROLINA PROFESSIONAL SEAL 039349 ENGINEER JEREMY P. MCCARTHA

PROJECT NO. B-5243
UNION COUNTY
STATION: 19+67.20 -L-

SHEET 6 OF 6

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-6
1			3			TOTAL SHEETS
2			4			6

STD. NO. GRA1

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.

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

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ENGLISH

JANUARY, 1990

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