STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4062		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33426.1.1	BRZ-1880(1)	P.E.
33426.2.1	BRZ-1880(1)	ROW/UTIL
33426.3.1	BRZ-1880(1)	CONST.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CATAWBA COUNTY

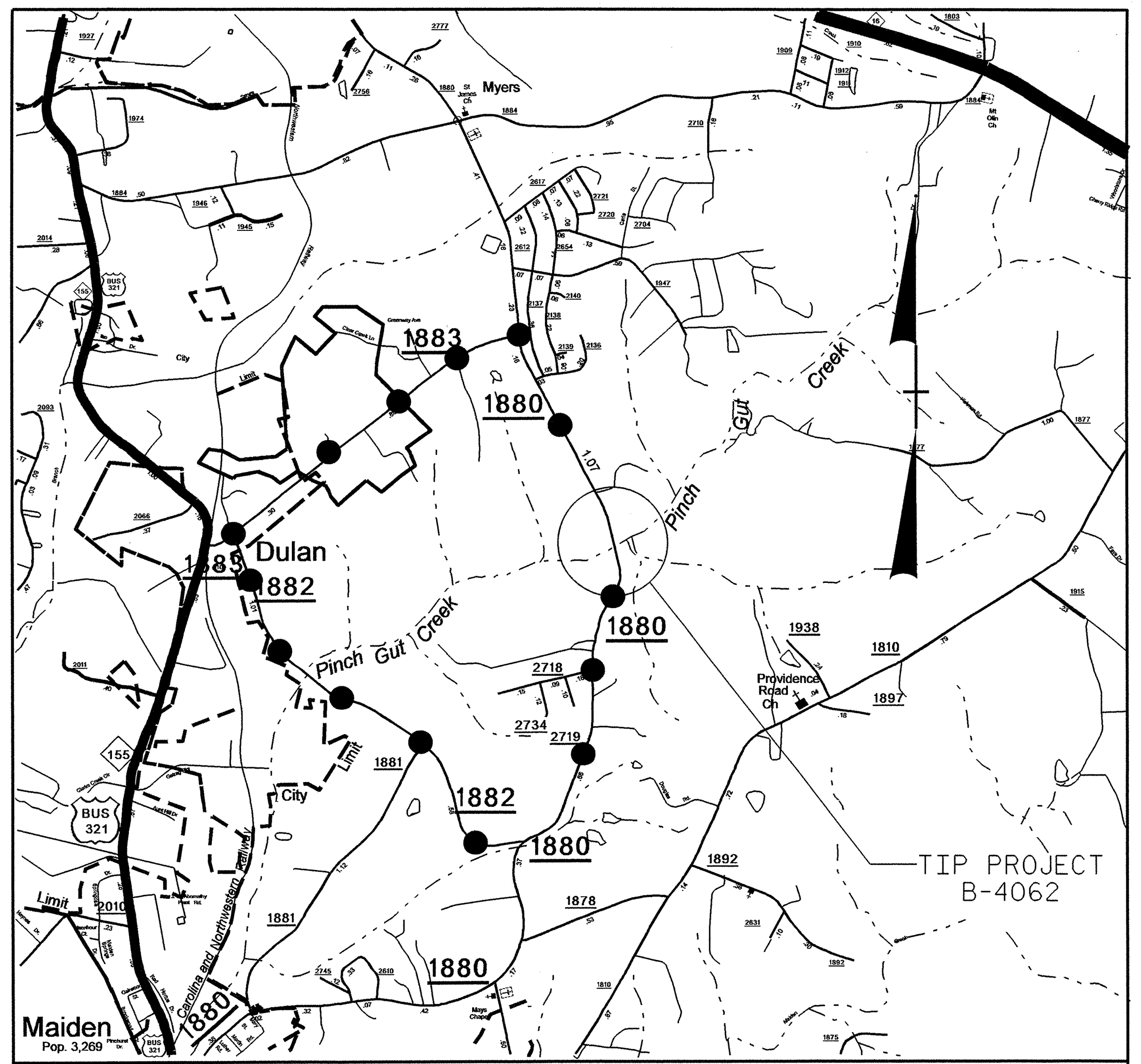
LOCATION: BRIDGE NO. 127 OVER PINCH GUT CREEK ON SR 1880 (ST. JAMES CHURCH RD.)

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

TIP PROJECT: B-4062

CONTRACT: C202577

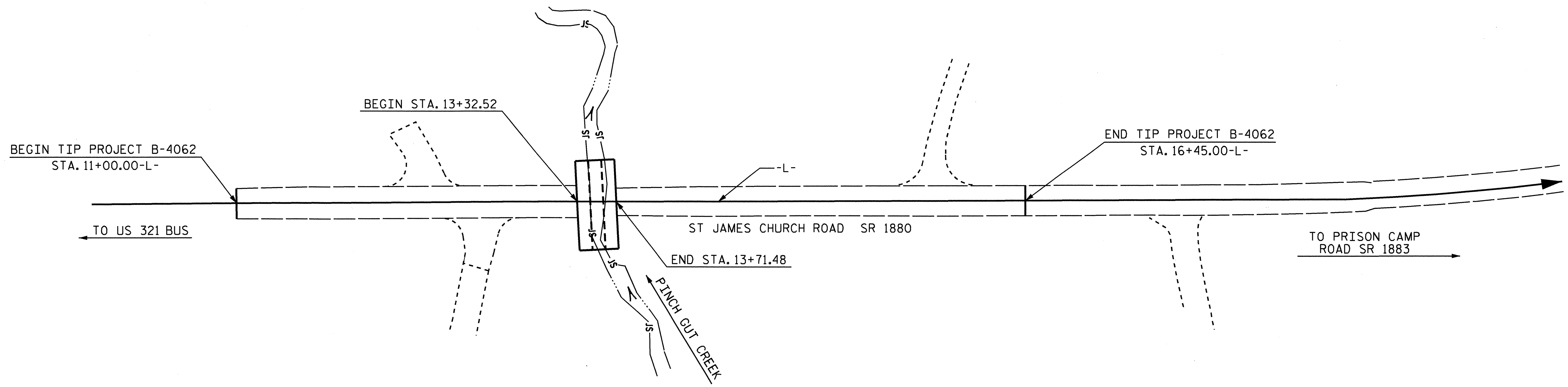
CULVERT



VICINITY MAP

OFFSITE DETOUR

NAD 83



DESIGN DATA

ADT (2009) = 3340
ADT (2035) = 5720
DHV = 12 %
D ≐ 70 %
T = 6 % *
V = 50 MPH

* (TTST 2% + DUAL 4%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4062 = 0.096 MILES

LENGTH STRUCTURE TIP PROJECT B-4062 = 0.007 MILES

TOTAL LENGTH TIP PROJECT B-4062 = 0.103 MILES

Prepared In the Office of:

DIVISION OF HIGHWAYS

1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

LETTING DATE:
JANUARY 18, 2011

J. M. BAILEY, P.E.
PROJECT ENGINEER

B. D. KLAPPENBACH, P.E.
PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT
1000 Birch Ridge Dr.
Raleigh NC, 27610

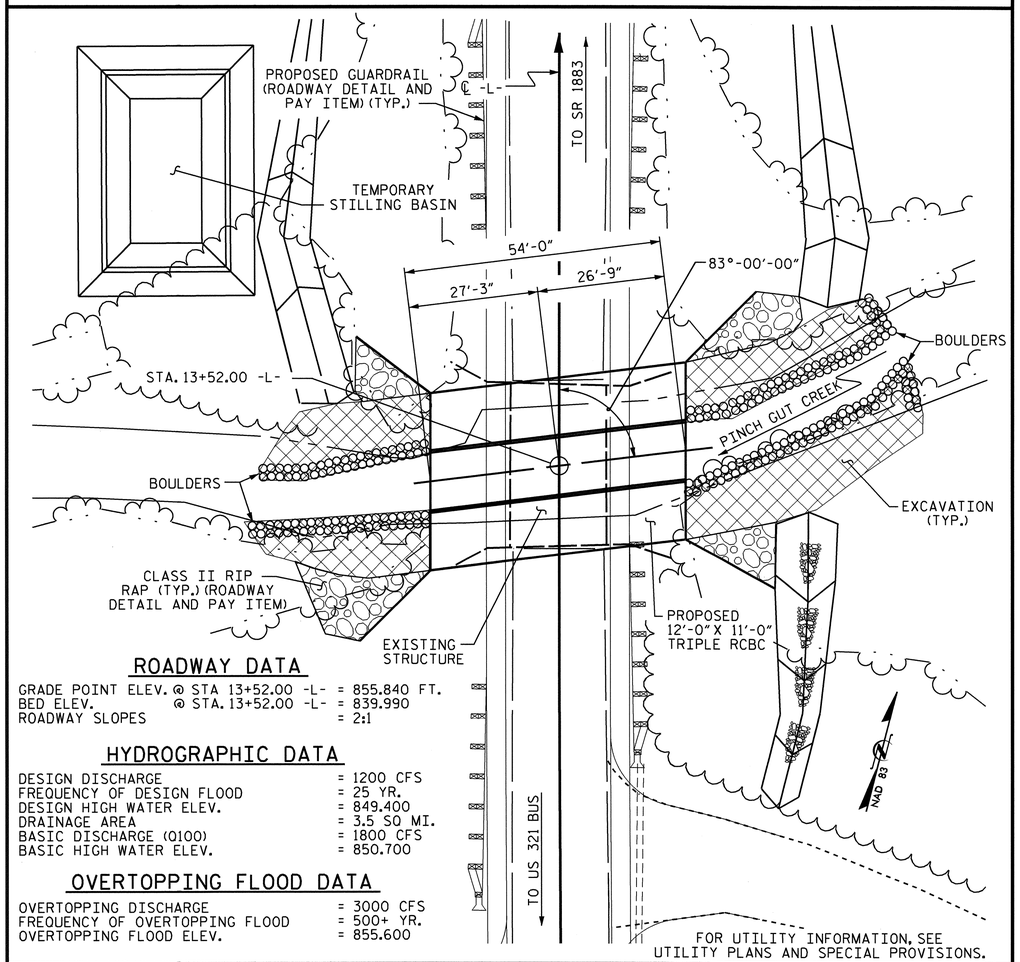
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

09/08/99

29-OCT-2010 08:36
$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$
TBARBOUR

BM: 8" SPIKE IN ROOT OF 8" Ø MAPLE STA. 11+46.21 -L- 113.390' LT EL. 847.69



ROADWAY DATA

GRADE POINT ELEV. @ STA 13+52.00 -L- = 855.840 FT.
BED ELEV. @ STA. 13+52.00 -L- = 839.990
ROADWAY SLOPES = 2:1

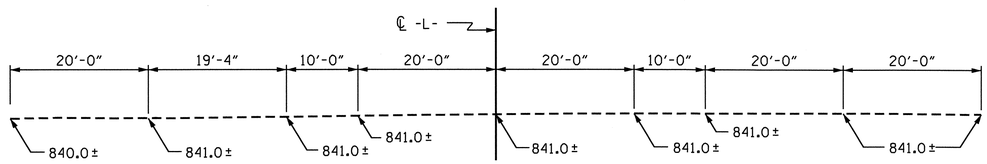
HYDROGRAPHIC DATA

DESIGN DISCHARGE = 1200 CFS
FREQUENCY OF DESIGN FLOOD = 25 YR.
DESIGN HIGH WATER ELEV. = 849.400
DRAINAGE AREA = 3.5 SQ MI.
BASIC DISCHARGE (Q100) = 1800 CFS
BASIC HIGH WATER ELEV. = 850.700

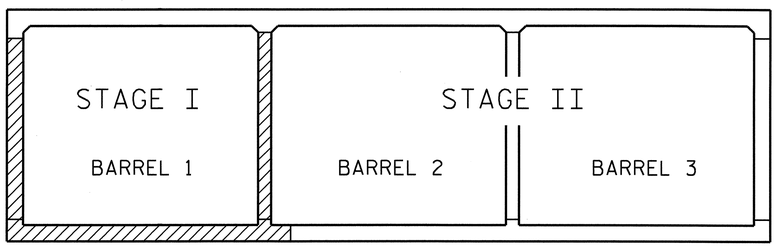
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 3000 CFS
FREQUENCY OF OVERTOPPING FLOOD = 500+ YR.
OVERTOPPING FLOOD ELEV. = 855.600

LOCATION SKETCH



PROFILE ALONG ℄ CULVERT



DENOTES STAGE I

STAGE I & II LOOKING UP STREAM

DRAWN BY : H. T. BARBOUR DATE : 6-7-10
CHECKED BY : D. A. GLADDEN DATE : 9-7-10

04-NOV-2010 11:06
R:\Structures\tbarbour\Microstation\B-4062_SD_CU.dgn
tbarbour

NOTES

ASSUMED LIVE LOAD ----------HS20-44 OR ALTERNATE LOADING.

DESIGN FILL = 4.48 FT. (MIN.) AND 4.92 FT. (MAX.)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

THE EXISTING STRUCTURE CONSISTING OF ONE SPAN @ 35'-6", WITH AN 1½" ASPHALT OVERLAY ON 4" X 8" TIMBER DECK ON 8 LINES OF W16 X 36 I-BEAMS, WITH A CLEAR ROADWAY WIDTH OF 19.3' ON TIMBER CAPS AND TIMBER PILES WITH TIMBER BULKHEADS @ END BENTS 1 AND 2 LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY FUTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:
STAGE I
1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF BARREL 1 VERTICAL WALLS AND CURTAIN WALLS TO CONSTRUCTION JOINTS.

2. THE REMAINING PORTIONS OF BARREL 1 WALLS AND WINGS FULL HEIGHT.

STAGE II
1. WING FOOTINGS AND FLOOR SLAB AND INCLUDING 4" OF BARRELS 2 & 3 VERTICAL WALLS AND CURTAIN WALLS TO CONSTRUCTION JOINTS.

2. THE REMAINING PORTIONS OF BARRELS 2 & 3 WALLS AND WING FULL HEIGHT.

3. ROOF SLAB FOR ALL BARRELS AND HEADWALLS.

4. CONSTRUCTION OF SILLS IN BARRELS 1 & 3. THE SILL IN BARREL 1 CAN NOT BE POURED UNTIL THE STREAM IS DIVERTED INTO BARREL 2, AND THE ROCK INLET SILLS ARE IN PLACE.

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

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

STEEL IN THE BOTTOM SLAB MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

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

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

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.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR BOULDERS, SEE SPECIAL PROVISIONS.

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 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.

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.

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 13+52.00-L-."

FOR COIR FIBER MAT, SEE SPECIAL PROVISIONS.

NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER BRUCE K. KLAPPERICH
11-4-2010

11/4/10

NORTH CAROLINA PROFESSIONAL SEAL 022506 ENGINEER JESSE McARTHUR BAILEY

F. A. PROJECT NO. BRZ-1880 (1)

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	186	#6	1	8'-1"	2258
A2	186	#7	1	7'-4"	2788
A3	260	#4	1	4'-4"	753
A100	84	#7	STR	38'-4"	6582
A101	2	#7	STR	35'-9"	146
A102	2	#7	STR	31'-0"	127
A103	2	#7	STR	26'-3"	107
A104	2	#7	STR	21'-6"	88
A105	2	#7	STR	16'-9"	68
A106	2	#7	STR	12'-0"	49
A107	2	#7	STR	7'-3"	30
A108	2	#7	STR	2'-6"	10
A200	103	#6	STR	17'-6"	2707
A201	1	#6	STR	15'-9"	24
A202	1	#6	STR	11'-8"	18
A203	1	#6	STR	7'-7"	11
A204	1	#6	STR	3'-6"	5
A205	1	#6	STR	15'-4"	23
A206	1	#6	STR	11'-3"	17
A207	1	#6	STR	7'-2"	11
A225	102	#6	STR	24'-0"	3677
A226	1	#6	STR	21'-9"	33
A227	1	#6	STR	17'-8"	27
A228	1	#6	STR	13'-7"	20
A229	1	#6	STR	9'-6"	14
A230	1	#6	STR	5'-5"	8
A231	1	#6	STR	19'-10"	30
A232	1	#6	STR	15'-9"	24
A233	1	#6	STR	11'-8"	18
A234	1	#6	STR	7'-7"	11
A235	1	#6	STR	3'-6"	5
A300	91	#8	STR	38'-4"	9314
A301	2	#8	STR	34'-9"	186
A302	2	#8	STR	30'-4"	162
A303	2	#8	STR	25'-11"	138
A304	2	#8	STR	21'-6"	115
A305	2	#8	STR	17'-1"	91
A306	2	#8	STR	12'-8"	68
A307	2	#8	STR	8'-3"	44
A308	2	#8	STR	3'-10"	20

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A400	95	#8	STR	18'-4''	4650
A401	1	#8	STR	17'-1"	46
A402	1	#8	STR	12'-8"	34
A403	1	#8	STR	8'-3"	22
A404	1	#8	STR	3'-10"	10
A405	1	#8	STR	14'-9"	39
A406	1	#8	STR	10'-4"	28
A407	1	#8	STR	5'-11"	16
A425	94	#8	STR	24'-0"	6024
A426	1	#8	STR	20'-4"	54
A427	1	#8	STR	16'-0"	43
A428	1	#8	STR	11'-7"	31
A429	1	#8	STR	7'-2"	19
A430	1	#8	STR	21'-6"	57
A431	1	#8	STR	17'-1"	46
A432	1	#8	STR	12'-8"	34
A433	1	#8	STR	8'-3"	22
A434	1	#8	STR	3'-10"	10
B1	108	#4	STR	13'-2"	950
B2	200	#4	STR	10'-4"	1381
B3	260	#4	STR	13'-2"	2287
C1	288	#4	STR	27'-11"	5371
D1	6	#6	STR	2'-11"	26
G1	8	#5	STR	38'-7"	322
S2	6	#8	STR	38'-7"	618
S3	6	#8	STR	18'-6"	296
S4	6	#8	STR	24'-2	387

REINFORCING STEEL = 52650 LBS

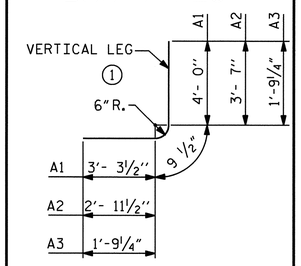
TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE
BARREL @ 4.918 CY/FT 265.6 C.Y.
WING ETC. 54.1 C.Y.
TOTAL 319.7 C.Y.

REINFORCING STEEL
BARREL 52650 LBS.
WINGS ETC. 3131 LBS.
TOTAL 55781 LBS.

CULVERT EXCAVATION	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	147 TONS
REMOVAL OF EXISTING STRUCTURE	LUMP SUM
BOULDERS	110 TONS
COIR FIBER MAT	420 SQ. YDS.

BAR TYPES



BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTH CHART

BAR	SIZE	LENGTH
A200	#6	3'-2''
A400	#8	4'-0''
B1	#4	1'-9''
B3	#4	1'-9''
C1	#4	1'-11''

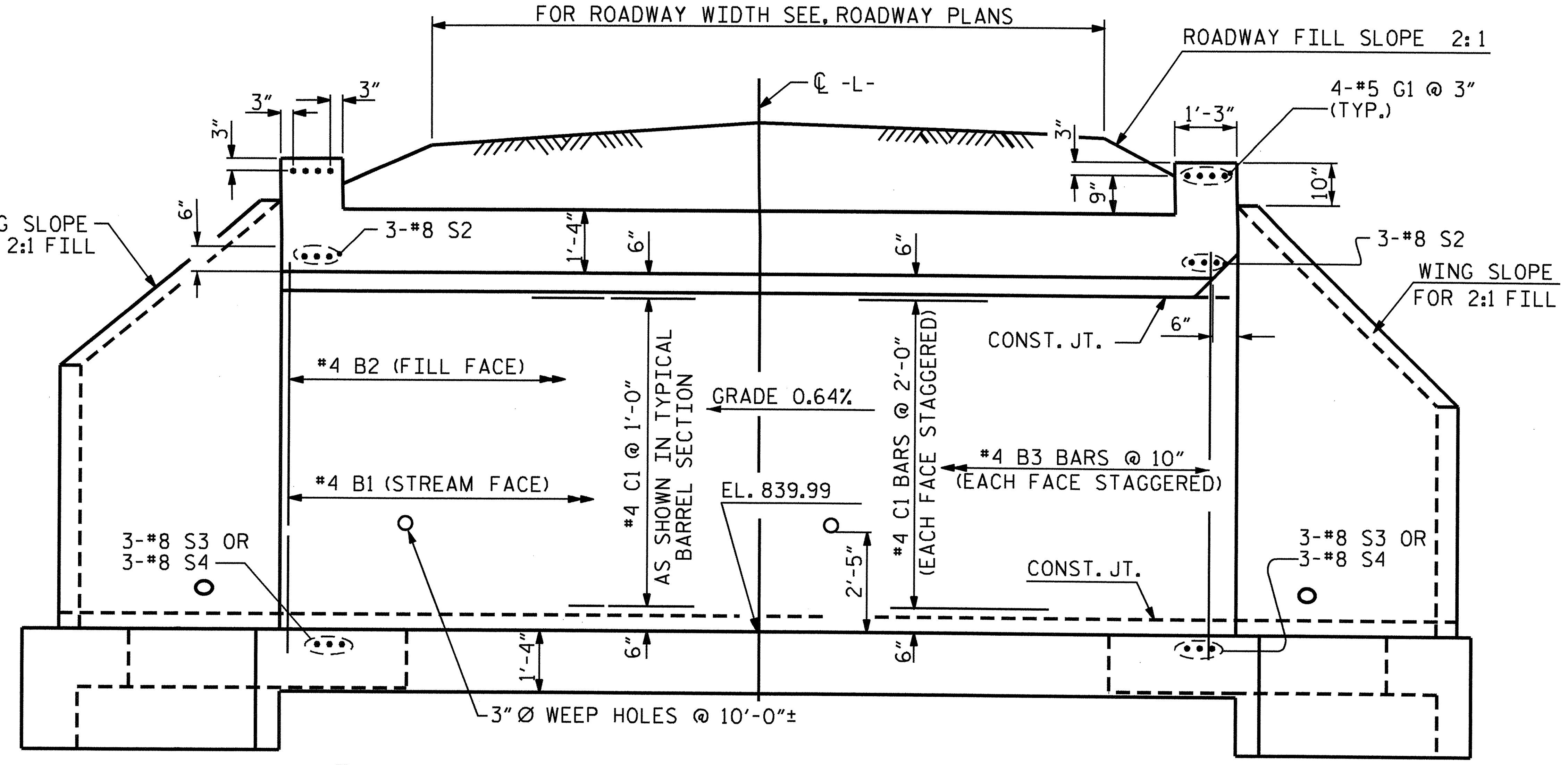
PROJECT NO. B-4062
CATAWBA COUNTY
STATION: 13+52.00 -L-

SHEET 1 OF 7 REPLACES BRIDGE #127

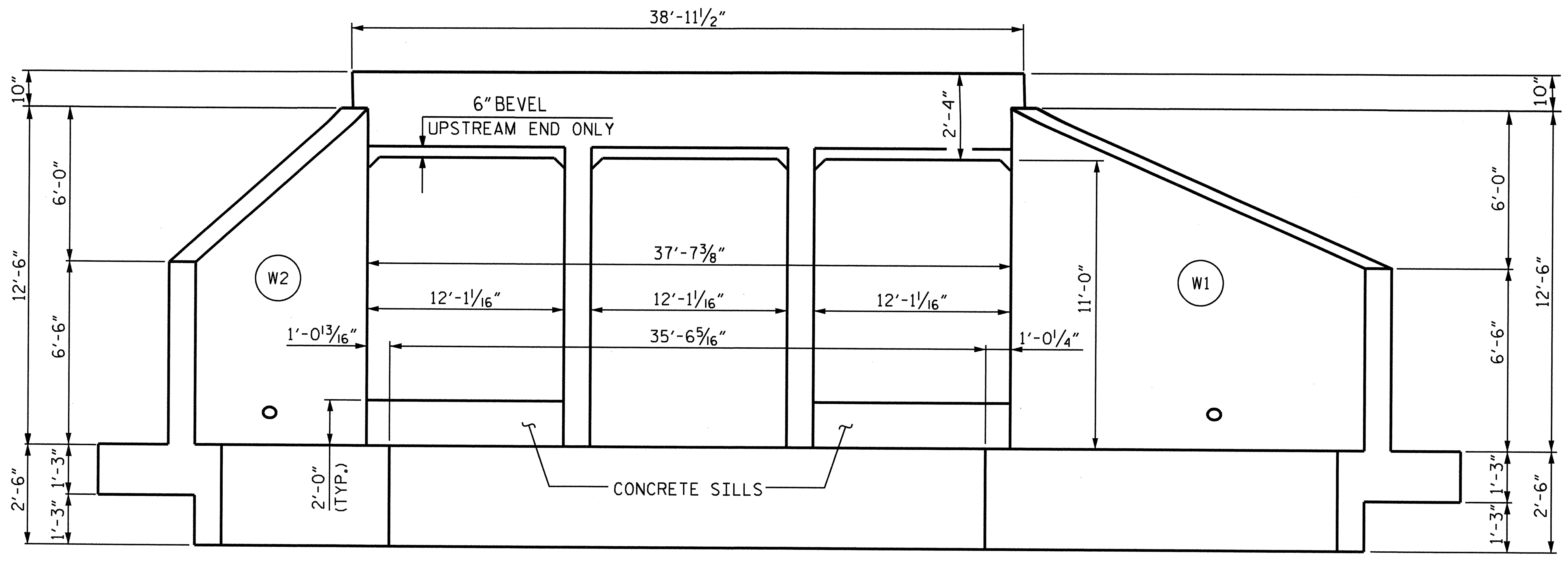
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 83°-00'-00" SKEW

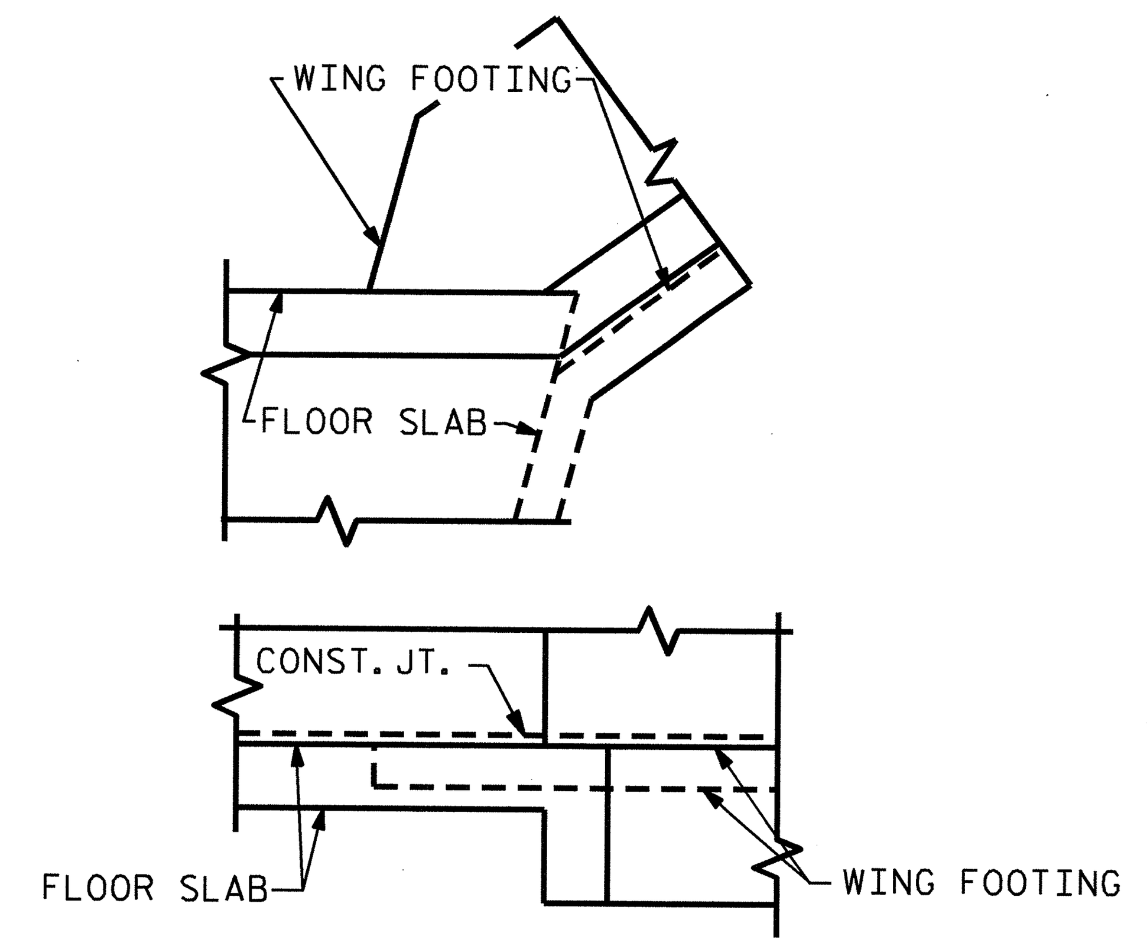
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
2			4			7



CULVERT SECTION NORMAL TO ROADWAY

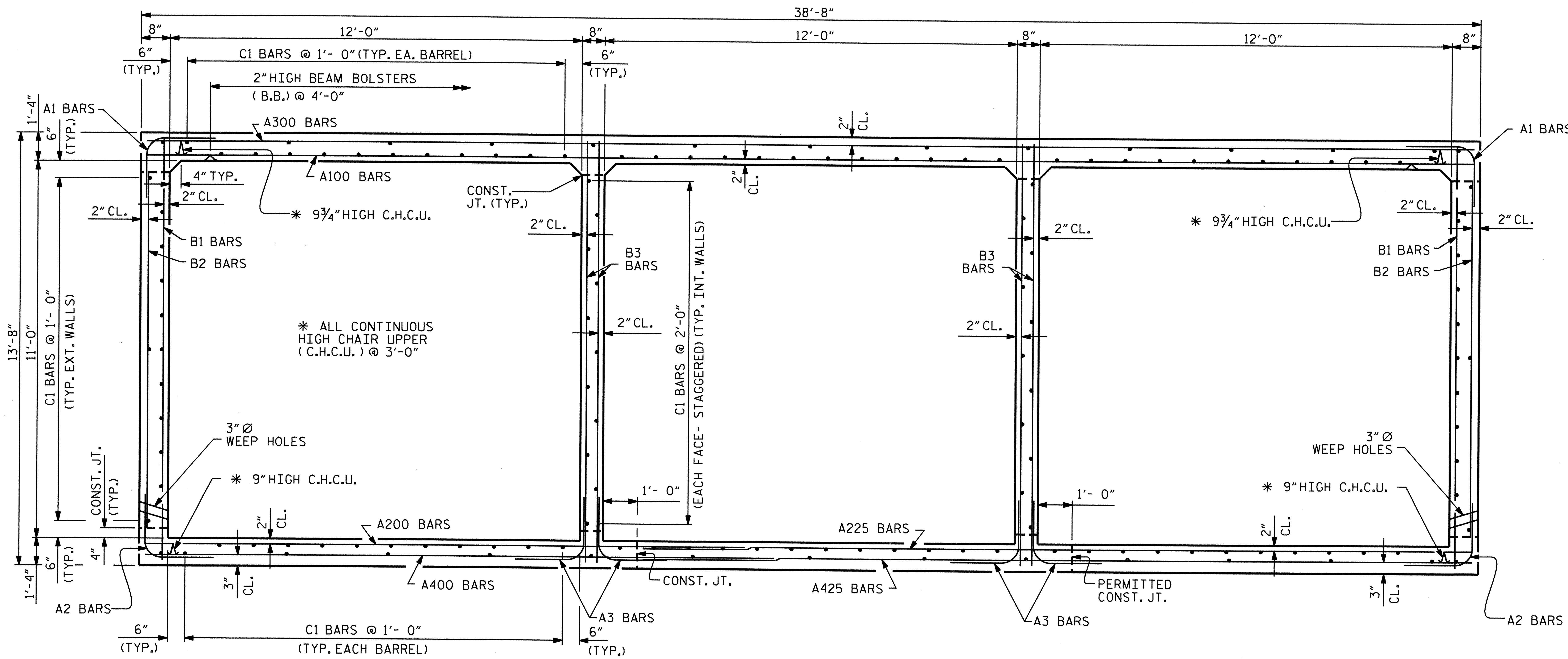


INLET END ELEVATION NORMAL TO SKEW



DETAIL

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



RIGHT ANGLE SECTION OF BARREL

THERE ARE 144 "C" BARS IN SECTION OF BARREL.

PROJECT NO. B-4062

CATAWBA COUNTY

STATION: 13+52.00 -L-

SHEET 2 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

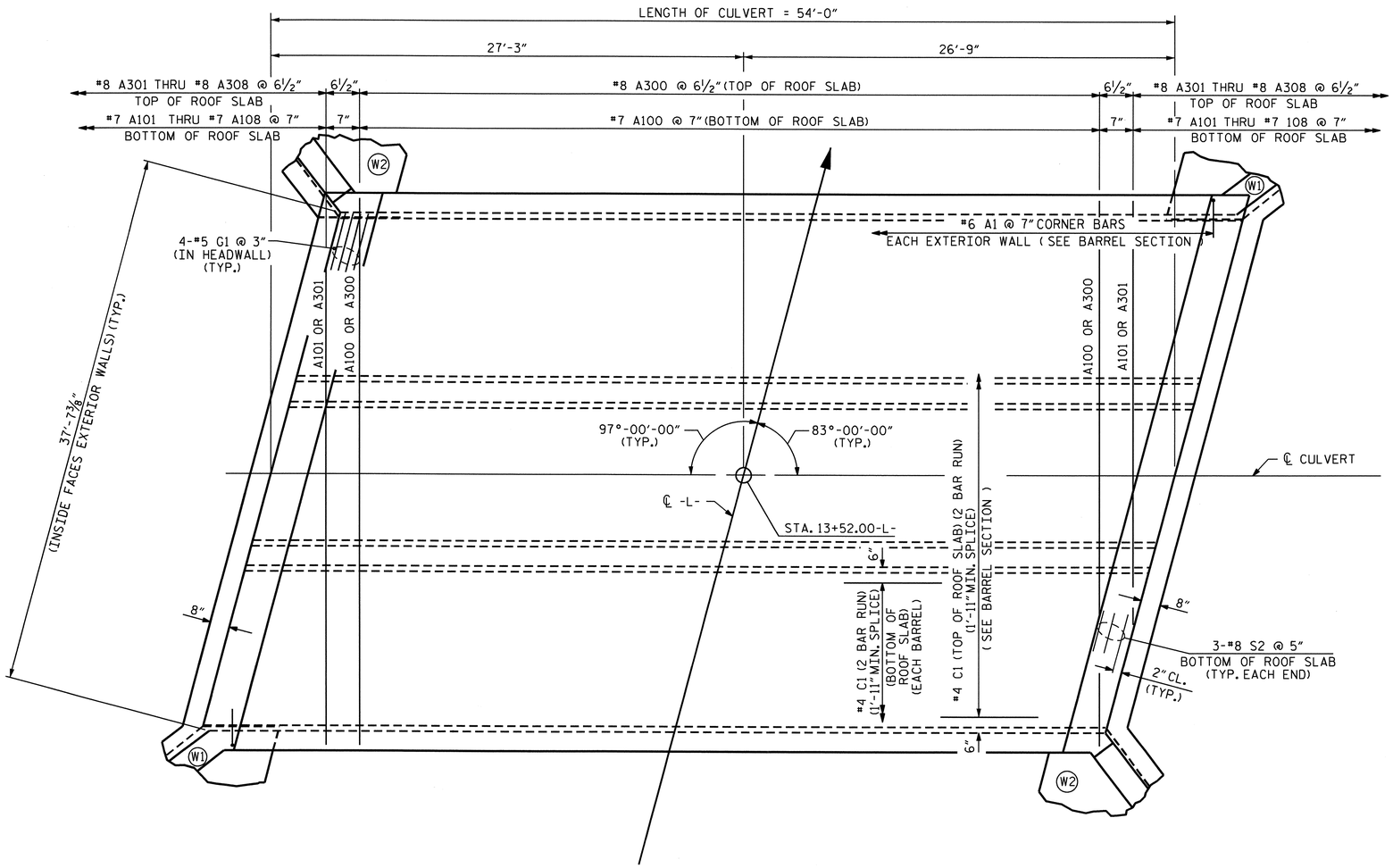
TRIPLE 12 FT. X 11 FT.
CONCRETE BOX CULVERT
83°-00'-00" SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER BRUCE D. KLAPPENBACH
[illegible]
11-2-2010

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

REVISED 8-28-92 BY E.L.R.; ✓BY G.R.P.
REDRAWN 10-16-89 BY R.W.W.; ✓BY A.R.B.

ASSEMBLED BY : H. T. BARBOUR DATE : 6-7-10 CHECKED BY : D. A. GLADDEN DATE : 9-7-10	SPECIAL
DRAWN BY : R.F. HOLMES DATE : NOV. 1971 CHECKED BY : J.A. JOHNSON DATE : NOV. 1971	STANDARD



PLAN - ROOF SLAB

PROJECT NO. B-4062

CATAWBA COUNTY

STATION: 13+52.00 -L-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 83°-00'-00" SKEW

NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER D. KLAPPENBACH
10-12-2010

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

DRAWN BY : H. T. BARBOUR DATE : 5-5-10
CHECKED BY : D. A. GLADDEN DATE : 9-7-10

12-OCT-2010 14:45
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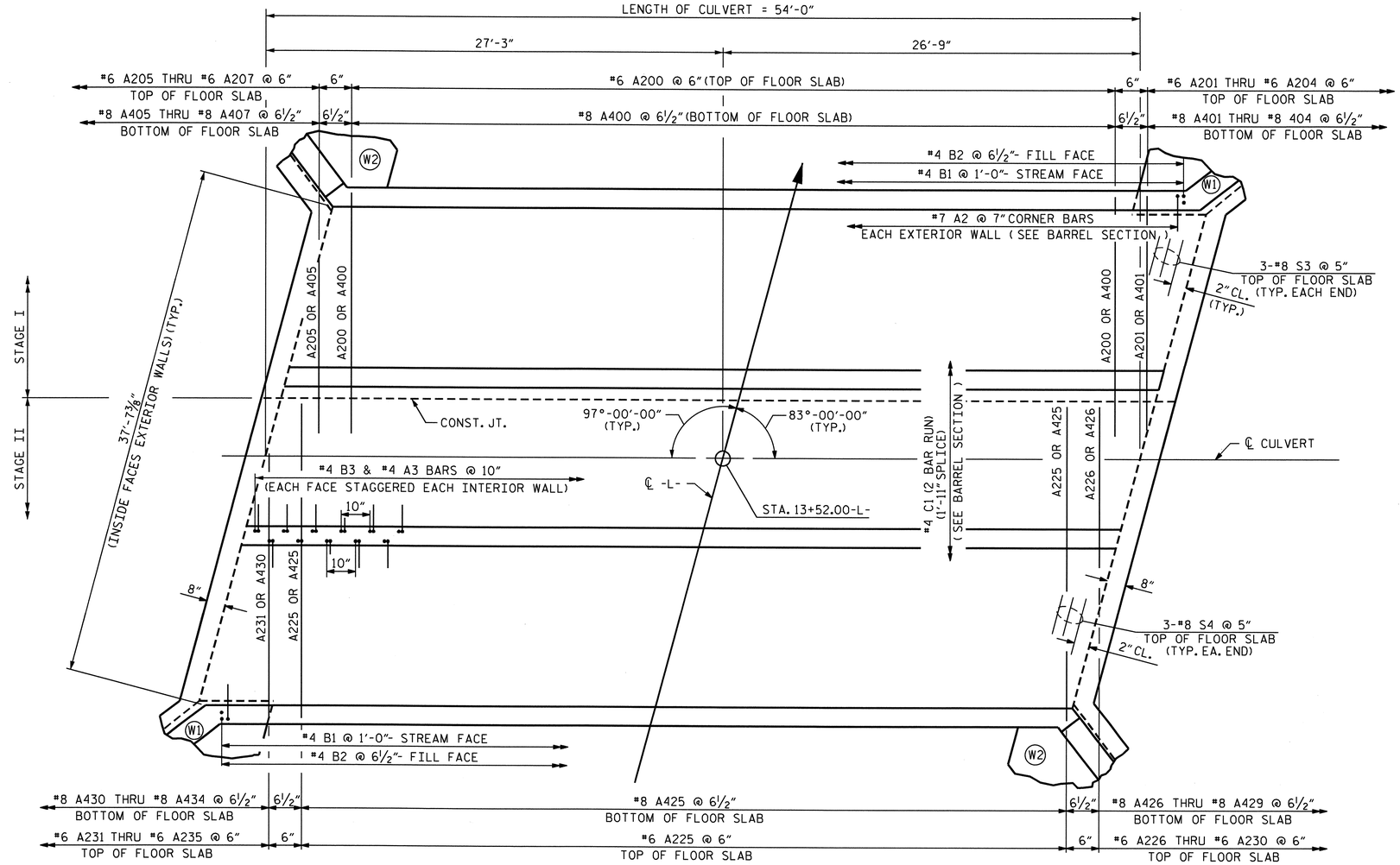
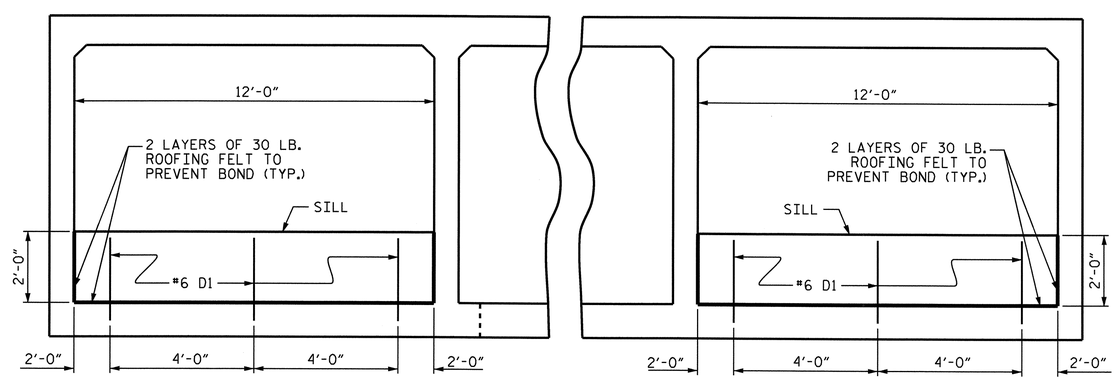
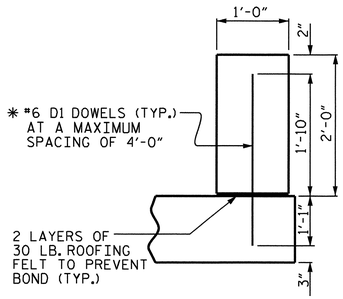
tbarbour



PLAN - FLOOR SLAB



ELEVATION VIEW - INLET



SECTION THROUGH 1'-0" SILL

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

THE SILL IN BARREL 1 CAN NOT BE POURED UNTIL THE STREAM IS DIVERTED INTO BARREL 2, AND THE ROCK INLET SILLS ARE IN PLACE.

CULVERT SILL DETAILS

(INLET END ONLY)

DRAWN BY : H. T. BARBOUR DATE : 6-7-10
CHECKED BY : D. A. GLADDEN DATE : 9-7-10

12-OCT-2010 15:15
P:\Structures\tbarbour\Microstation\B-4062_SD_CU.dgn
tbarbour

NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER BRENT D. KLAPPENBACH
10-12-2010

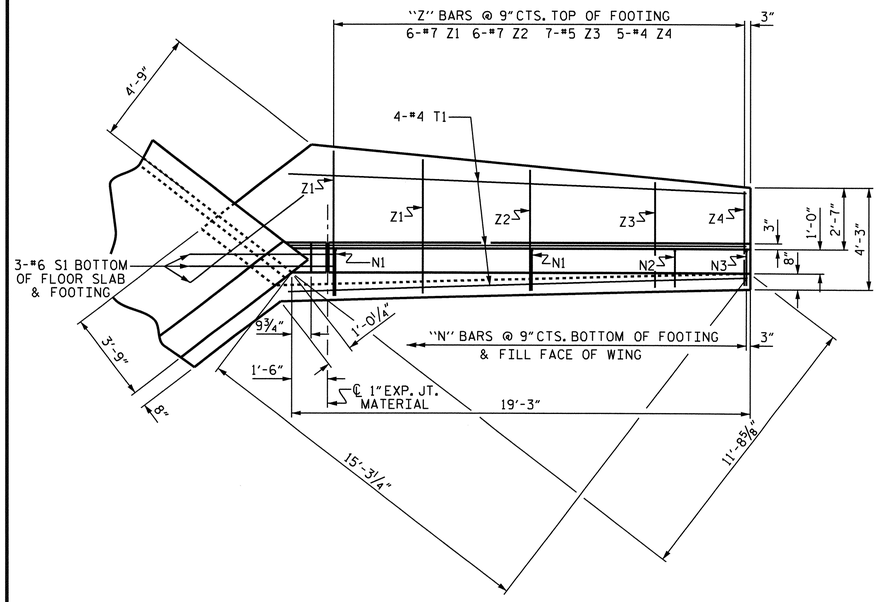
PROJECT NO. B-4062
CATAWBA COUNTY
STATION: 13+52.00 -L-

SHEET 4 OF 7

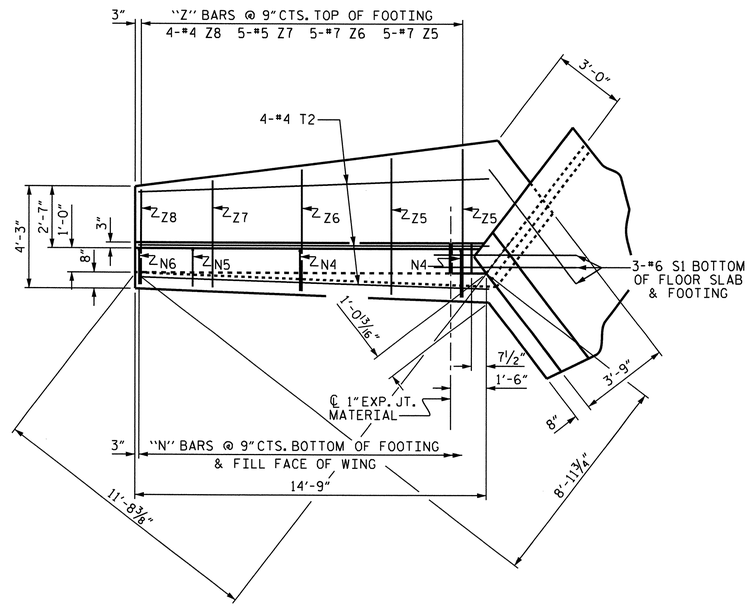
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 83°-00'-00" SKEW

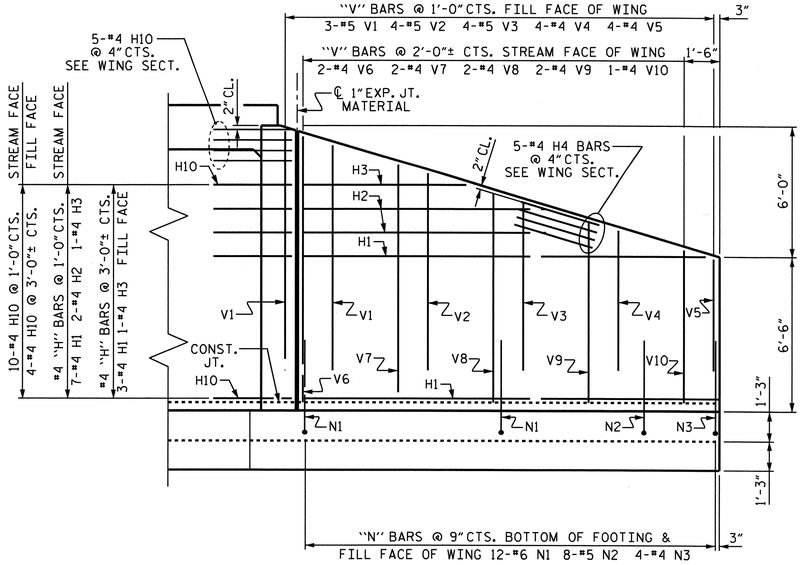
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1			3			TOTAL SHEETS
2			4			7



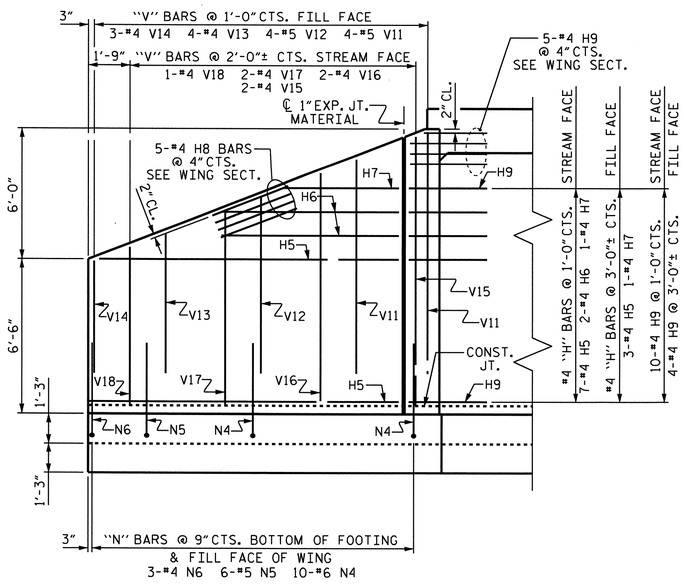
PLAN - W1



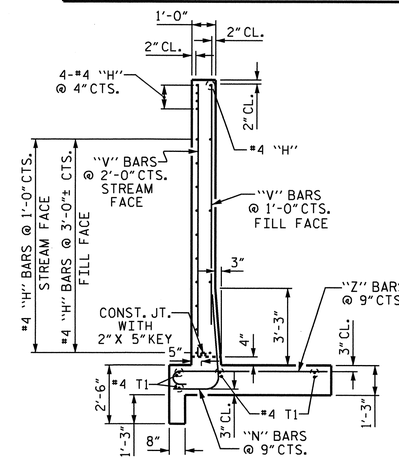
PLAN - W2



ELEVATION - W1



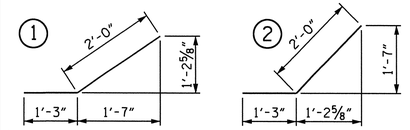
ELEVATION - W2

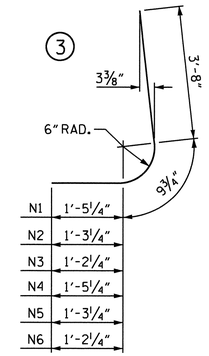


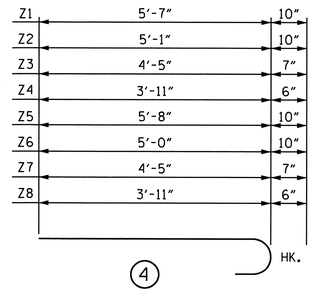
TYPICAL WING SECTION

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	24	6	3	5-11	213
N2	16	5	3	5-9	96
N3	8	4	3	5-8	30
N4	20	6	3	5-11	178
N5	12	5	3	5-9	72
N6	6	4	3	5-8	23
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	3.6 CY
2 END CURTAIN WALLS	4.4 CY
2 CULVERT SILLS	1.8 CY
TOTAL	54.1 CY

PROJECT NO. B-4062

CATAWBA COUNTY

STATION: 13+52.00 -L-

SHEET 5 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

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

83° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			7

ASSEMBLED BY : H. T. BARBOUR DATE : 5-5-10
CHECKED BY : D. A. GLADDEN DATE : 9-7-10

DRAWN BY : A.K.PATEL DATE : 11/04
CHECKED BY : M. K. BEARD DATE : 12/04

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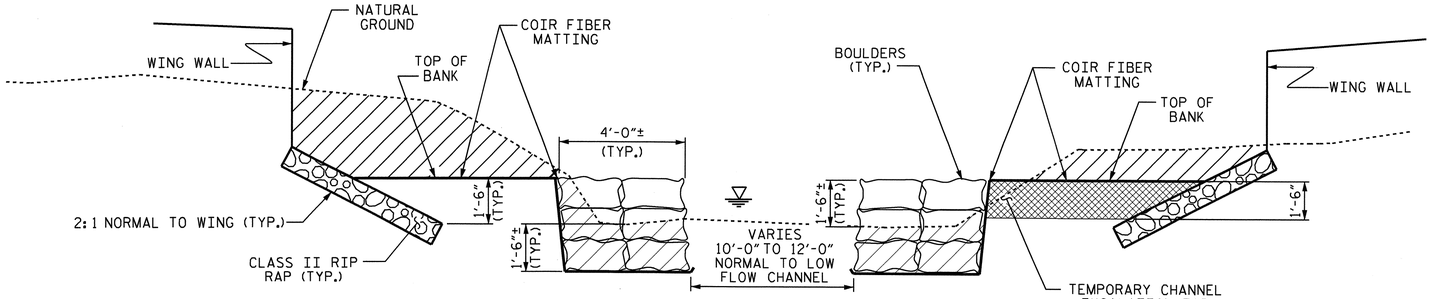
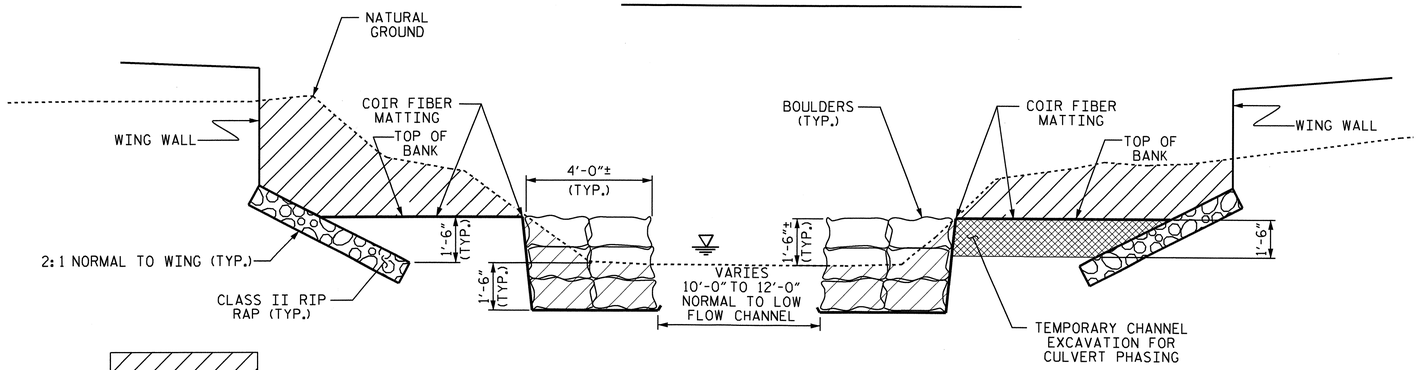
NORTH CAROLINA PROFESSIONAL SEAL 15825 ENGINEER BRUCE D. KLAPPENBACH
10-12-2010

STD. NO. CW7511



SECTION A-A (UPSTREAM)



SECTION B-B (DOWNSTREAM)

PERMANENT CHANNEL EXCAVATION

TEMPORARY CHANNEL EXCAVATION

NOTES

THE EXCAVATED OVER BANK AREAS USED FOR THE TEMPORARY CHANNEL ARE TO BE BACKFILLED WITH UNEARTHED STREAM BED MATERIAL TO CREATE A BENCH 1'-6" ABOVE THE STREAM BED.

THE WATERS EDGE SHALL BE ARMORED WITH BOULDERS (AS SHOWN ON THE PLAN VIEW). THE DEPTH OF ARMOR PROTECTION SHOULD EXTEND 1'-6" BELOW THE STREAM BED AND LINED WITH COIR FIBER MATTING.

COIR FIBER MATTING SHALL BE PLACED ON THE UPSTREAM AND DOWNSTREAM SIDES OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. MATTING SHALL EXTEND FROM THE BOTTOM OF THE BOULDER TO THE FINISHED GRADE ELEVATION, THEN ACROSS THE SURFACE AREA OF THE BENCH AND SHALL BE PLACED THE ENTIRE LENGTH OF ARMOR PROTECTION.

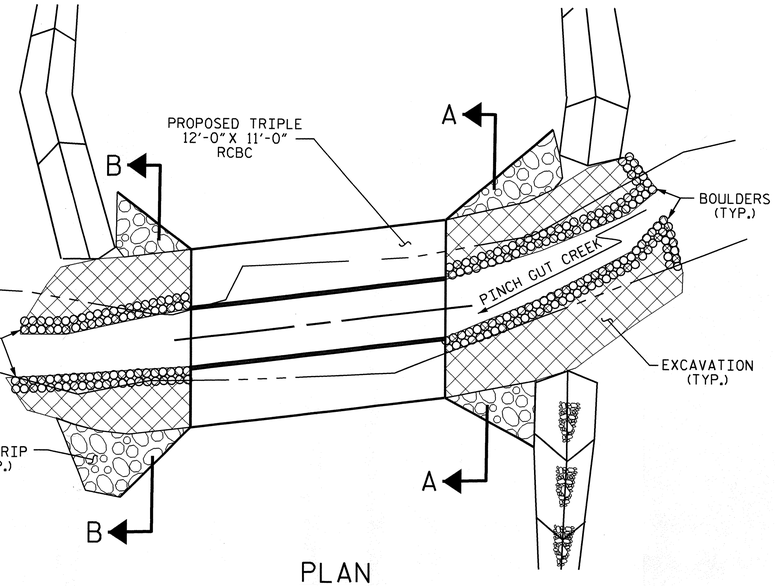
DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.

BOULDERS CAN BE NATURAL STREAM BOULDERS OR EXTRACTED FROM CLASS II RIP RAP OR SHOT ROCK MATERIAL AND RECTANGULAR IN NATURE. SEE BOULDERS SPECIAL PROVISION.

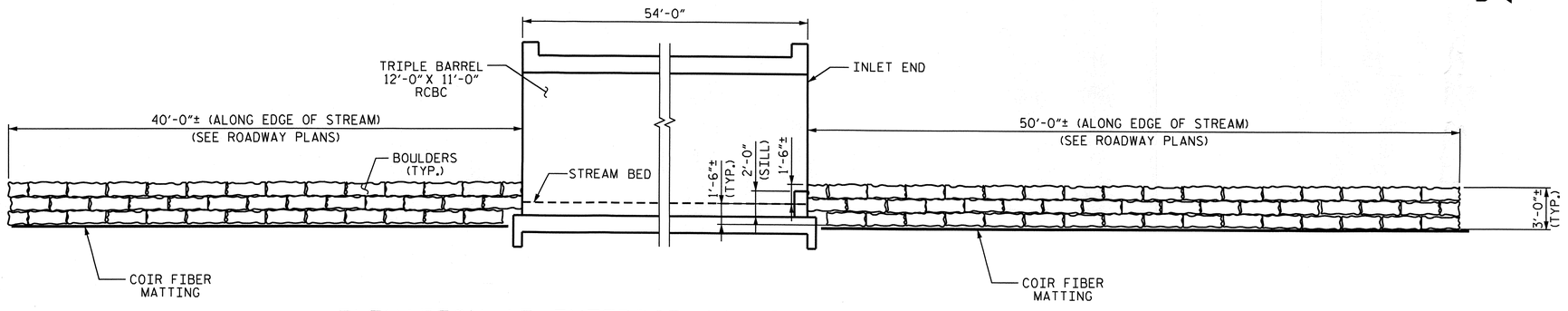
ACCEPTABLE BOULDERS FOR THE ARMOR PROTECTION SHALL HAVE THE FOLLOWING APPROXIMATE DIMENSIONS; 3'-0" x 2'-0" x 1'-0". UNSUITABLE MATERIAL THAT REMAINS FROM CLASS II RIP RAP OR SHOT ROCK STORES, MAY BE USED IN BACK FILL OF THE OVER BANK AREA OR DISCARDED.

FOR BOULDERS, SEE SPECIAL PROVISIONS.

PERMANENT CHANNEL EXCAVATION, TEMPORARY CHANNEL EXCAVATION AND BACK FILLING TO CREATE A BENCH SHALL BE PAID FOR AT THE LUMP SUM PRICE BID FOR CULVERT EXCAVATION AT STATION 13+52.00-L-.



PLAN



ELEVATION AT INTERIOR WALLS OF BARREL 2

PROJECT NO. B-4062

CATAWBA COUNTY

STATION: 13+52.00 -L-

SHEET 6 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TRIPLE 12 FT. X 11 FT. CONCRETE BOX CULVERT 83°-00'-00" SKEW ARMOR PROTECTION DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 15828 ENGINEER BRADLEY D. KLAPPENBACH
11-4-2010

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS 7
2			4			

DRAWN BY : H. T. BARBOUR DATE : 5-11-10
CHECKED BY : B. D. KLAPPENBACH DATE : 9-7-10

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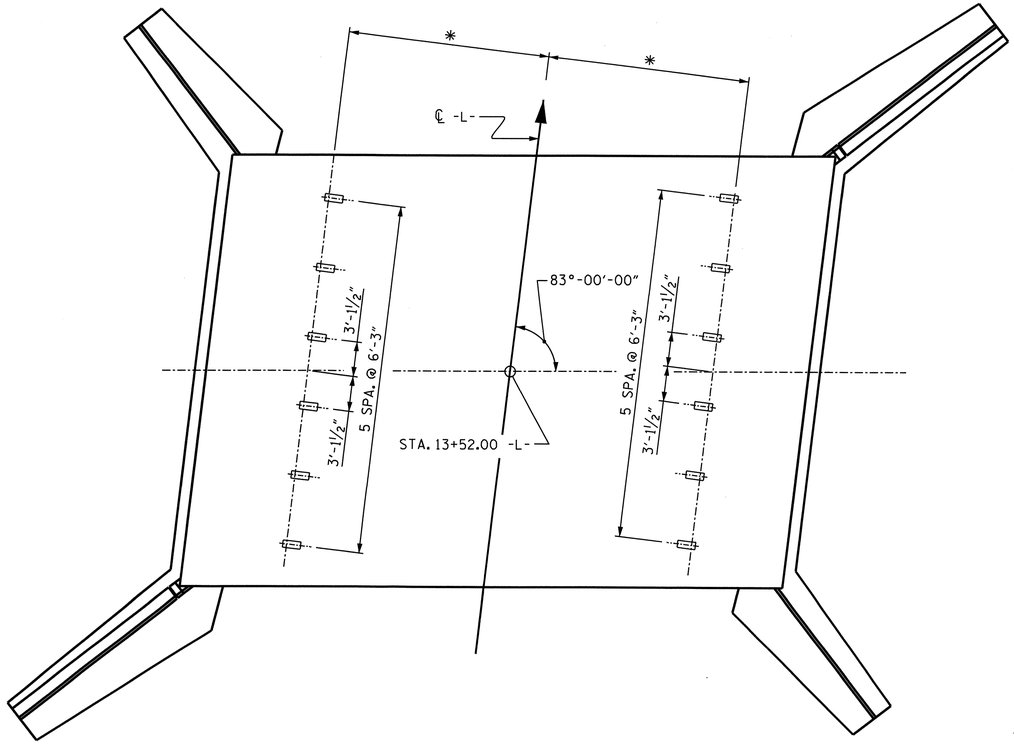
tbarbour

* THIS DIMENSION TO BE FURNISHED BY THE ENGINEER



PLAN

SHOWING : GUARDRAIL ANCHOR ASSEMBLY SPACING.

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.

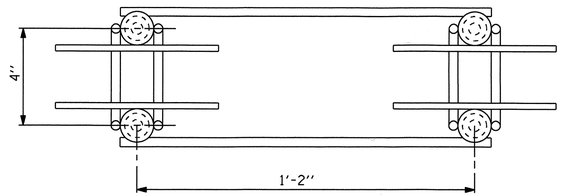
FERRULES TO BE PLUGGED DURING POURING OF SLAB AS RECOMMENDED BY THE MANUFACTURER.

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

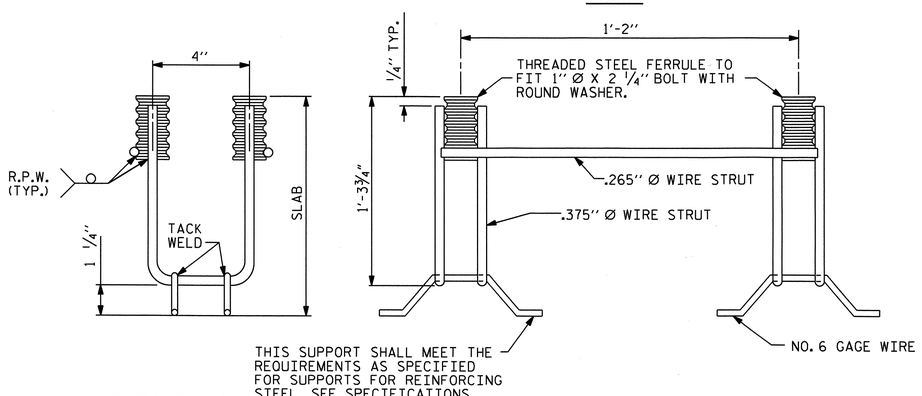
PAYMENT FOR GUARDRAIL, POSTS, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.

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 SPECIAL PROVISIONS.

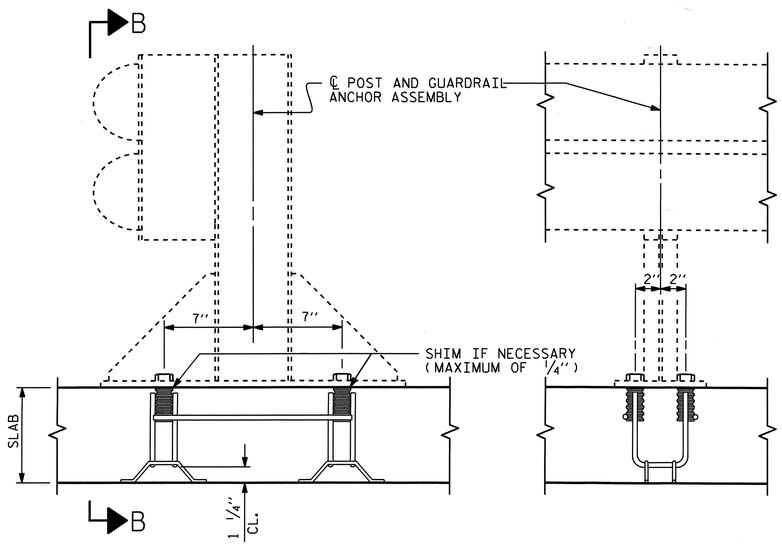


PLAN



ELEVATION SIDE VIEW

GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS



SECTION A-A SECTION B-B

PROJECT NO. B-4062

CATAWBA COUNTY

STATION: 13+52.00 -L-

SHEET 7 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

ASSEMBLED BY :	H. T. BARBOUR	DATE :	9-17-10
CHECKED BY :	B. D. KLAPPENBACH	DATE :	9-23-10
DRAWN BY : FCJ	6/88	REV. 7/10/01	LES/RDR
CHECKED BY : ARB	6/88	REV. 5/7/03	RWW/JTE
		REV. 5/1/06R	KMM/GM

NORTH CAROLINA PROFESSIONAL SEAL 5825 ENGINEER BRUCE D. KLAPPENBACH 11-2-2010

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-7
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2			4			

STD. NO. GRA1

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TBARBOUR

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 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. 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. 8-16-95 EEM W RGW REV. 5-7-03 RWW W JTE
REV. 8-16-99 RWW W LES REV. 5-1-06 TLA W GM

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