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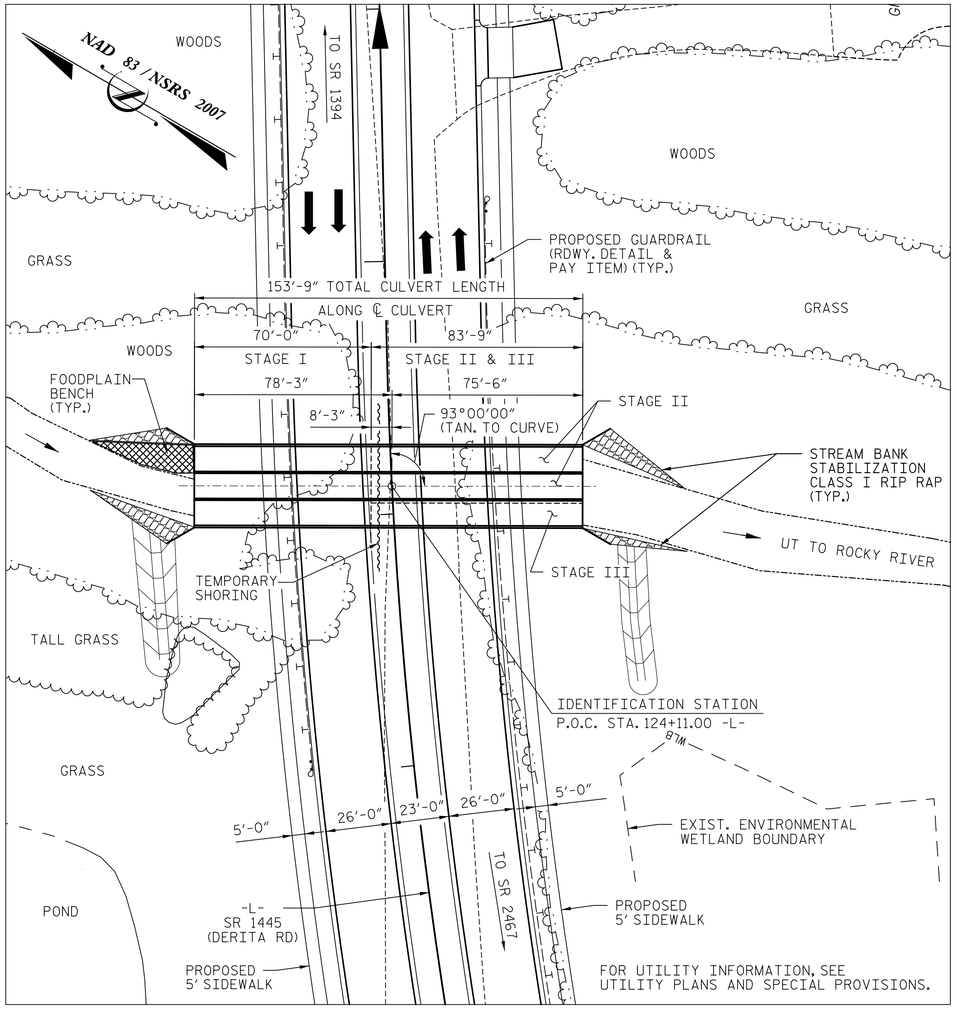
This file or an individual page shall not be considered a certified document.

BENCH MARK: TBM #109 - BENCH TIE NAIL SET IN A 16" PINE, -L- STA. 129+77.98, 91.75' LEFT
N=597727', E=1485493'
ELEV. 652.61', NAVD 88



GRADE PT. ELEV. @ STA. 124+11.00 -L- = 625.22
BED ELEV. @ STA. 124+11.00 -L- = 605.65
ROADWAY SLOPES = 2:1

LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE	1500	CFS
FREQUENCY OF DESIGN FLOOD	50	YR.
DESIGN HIGH WATER ELEVATION	613.7	FT.
BASE DISCHARGE (Q100)	1700	CFS
BASE HIGH WATER ELEVATION	614.50	FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	2700+	CFS
FREQUENCY OF OVERTOPPING FLOOD	500+	YR.
OVERTOPPING FLOOD ELEVATION	✳627.08	FT.

✳LT. SHOULDER POINT @ 124+19 -L-

STAGE I STRUCTURE QUANTITIES

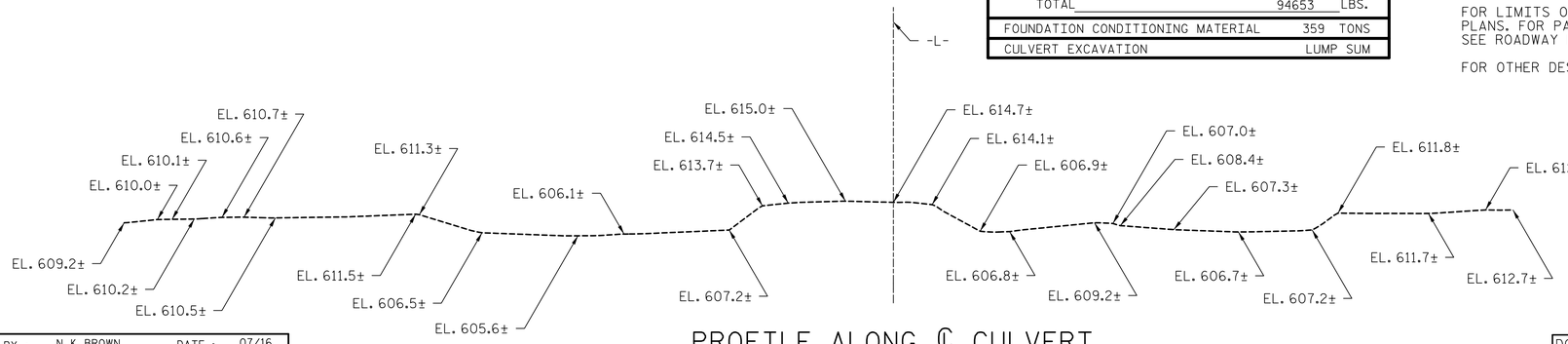
CLASS A CONCRETE		
BARREL @ 3.35 CY/FT	234.5	C.Y.
SILLS	0.7	C.Y.
INLET WINGS	13.9	C.Y.
TOTAL	249.1	C.Y.
REINFORCING STEEL		
BARREL	41979	LBS.
INLET WINGS	734	LBS.
TOTAL	42713	LBS.
FOUNDATION CONDITIONING MATERIAL	163	TONS
CULVERT EXCAVATION	LUMP SUM	

STAGE II & III STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 3.35 CY/FT	280.6	C.Y.
SILLS	0.7	C.Y.
INLET WINGS	13.9	C.Y.
TOTAL	295.2	C.Y.
REINFORCING STEEL		
BARREL	51206	LBS.
INLET WINGS	734	LBS.
TOTAL	51940	LBS.
FOUNDATION CONDITIONING MATERIAL	196	TONS
CULVERT EXCAVATION	LUMP SUM	

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @ 3.35 CY/FT	515.1	C.Y.
SILLS	1.4	C.Y.
INLET WINGS	27.8	C.Y.
TOTAL	544.3	C.Y.
REINFORCING STEEL		
BARREL	93185	LBS.
INLET WINGS	1468	LBS.
TOTAL	94653	LBS.
FOUNDATION CONDITIONING MATERIAL	359	TONS
CULVERT EXCAVATION	LUMP SUM	



PROFILE ALONG ℄ CULVERT

NOTES:

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

DESIGN FILL---------- 12.2 FT.

THE EXISTING STRUCTURE CONSISTING OF 3 - 73"x 55"CSPA LOCATED AT THE PROPOSED STRUCTURE LOCATION SHALL BE REMOVED. THE EXISTING STRUCTURE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SEE SHEET NO. TMP-02B FOR CULVERT CONSTRUCTION SEQUENCE.

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 ALL VERTICAL WALLS.
2. THE REMAINING PORTIONS OF THE WALLS AND WINGS FULL HEIGHT FOLLOWED BY ROOF SLAB AND HEADWALLS.

STAGE II
1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF BARREL 3 VERTICAL WALLS AND CURTAIN WALLS TO CONSTRUCTION JOINTS.
2. THE REMAINING PORTION OF BARREL 3 WALLS AND WINGS FULL HEIGHT.

STAGE III
1. WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF BARRELS 1 & 2 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 HEAD WALLS.
4. CONSTRUCTION OF SILLS IN BARREL 1.

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 CONTRACTOR.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. 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 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 DESIGN. FOR OPTIONAL PRECAST REINFORCED 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 PROJECT 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 TEH 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.

EXCAVATE 1.0 FEET BELOW THE BARREL AND FOOTINGS AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL.

CONSTRUCT THE REINFORCED BOX CULVERT AT STA. 124+11 WITH 3" OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT.

BACKFILL WITH SELECT MATERIAL, CLASS VI MEETING THE REQUIREMENTS OF SECTION 1016 OF THE STANDARD SPECIFICATIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR CULVERT DIVERSION DETAILS, SEE EROSION CONTROL PLANS.

FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

FOR LIMITS OF TEMPORARY SHORING, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING, SEE ROADWAY PLANS.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

F.A. PROJECT NO. STPDA-1445(008)

PROJECT NO. U-4910A
CABARRUS COUNTY
STATION: 124+11.00 -L-

DRAWN BY : N. K. BROWN DATE : 07/16
CHECKED BY : J. C. MORRISON DATE : 07/16
DESIGNED BY : N. K. BROWN DATE : 07/16

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AECOM License No. F-0342

11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON
Docusigned by: John C. Morrison
A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SR 1445 (DERITA ROAD)
OVER UT TO ROCKY RIVER

TRIPLE 10 FT. X 8 FT.
CONCRETE BOX CULVERT
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-01
	.	.				TOTAL SHEETS 7

DATE: 11/30/2016
TIME: 9:42:57 AM
USER: kylazampan
DGN: d:\903304\rl\400_Technical\408_Structure\Cadd\CulvertM40_001_U4910A_SMU_C01.dgn

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
								MOMENT				SHEAR				
							LIVE-LOAD FACTORS (γ_{LL})	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	2	1.16	--	1.75	2.31	2	Top Slab	5.00	1.16	2	Top Slab	0.83	
		HL-93 (OPERATING)	N/A		1.50	--	1.35	2.95	2	Top Slab	5.00	1.50	2	Top Slab	0.83	
		HS-20 (INVENTORY)	36.000	1	1.16	41.76	1.75	2.17	2	Top Slab	5.00	1.16	2	Top Slab	0.83	
		HS-20 (OPERATING)	36.000		1.50	54.00	1.35	2.81	2	Top Slab	5.00	1.50	2	Top Slab	0.83	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.95	26.33	1.40	3.07	2	Top Slab	5.00	1.95	2	Top Slab	0.83	
		SNGARBS2	20.000		3.11	62.20	1.40	3.07	2	Top Slab	5.00	1.70	2	Top Slab	0.83	
		SNAGRIS2	22.000		1.74	38.28	1.40	3.12	2	Top Slab	5.00	1.74	2	Top Slab	0.83	
		SNCOTTS3	27.250	3	1.40	38.15	1.40	2.83	2	Top Slab	5.00	1.40	2	Top Slab	0.83	
		SNAGGRS4	34.925		1.66	57.98	1.40	2.98	2	Top Slab	5.00	1.66	2	Top Slab	0.83	
		SNS5A	35.550		1.49	52.97	1.40	2.97	2	Top Slab	5.00	1.49	2	Top Slab	0.83	
		SNS6A	39.950		1.48	59.13	1.40	2.95	2	Top Slab	5.00	1.48	2	Top Slab	0.83	
		SNS7B	42.000		2.11	88.62	1.40	2.99	2	Top Slab	5.00	1.48	2	Top Slab	0.83	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.64	54.12	1.40	3.13	2	Top Slab	5.00	1.64	2	Top Slab	0.83	
		TNT4A	33.075		1.64	54.24	1.40	2.98	2	Top Slab	5.00	1.64	2	Top Slab	0.83	
		TNT6A	41.600		1.57	65.31	1.40	2.98	2	Top Slab	5.00	1.57	2	Top Slab	0.83	
		TNT7A	42.000		1.60	67.20	1.40	2.95	2	Top Slab	5.00	1.60	2	Top Slab	0.83	
		TNT7B	42.000		1.92	80.64	1.40	2.92	2	Top Slab	5.00	1.92	2	Top Slab	0.83	
		TNAGRIT4	43.000		1.76	75.68	1.40	3.09	2	Top Slab	5.00	1.76	2	Top Slab	0.83	
		TNAGT5A	45.000		1.80	81.00	1.40	2.88	2	Top Slab	5.00	1.80	2	Top Slab	0.83	
		TNAGT5B	45.000		1.59	71.55	1.40	2.90	2	Top Slab	5.00	1.59	2	Top Slab	0.83	

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.

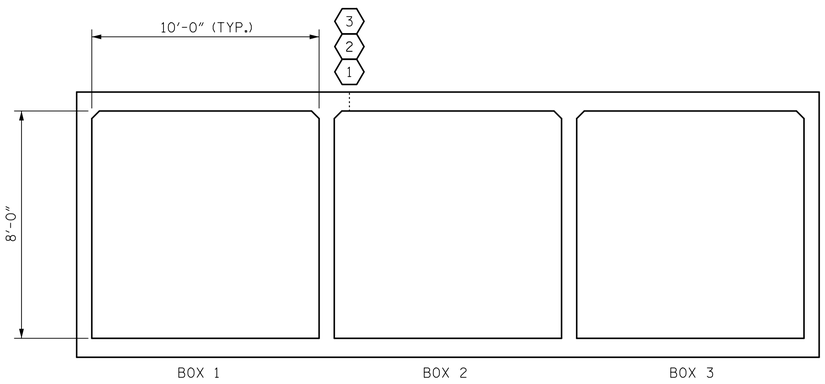
⟨#⟩ CONTROLLING LOAD RATING

⟨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. U-4910A

CABARRUS COUNTY

STATION: 124+11.00 -L-

AECOM
AECOM TECHNICAL SERVICES, INC.
701 CORPORATE CENTER DRIVE, SUITE 475
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison A2FDE142C82F4AB...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

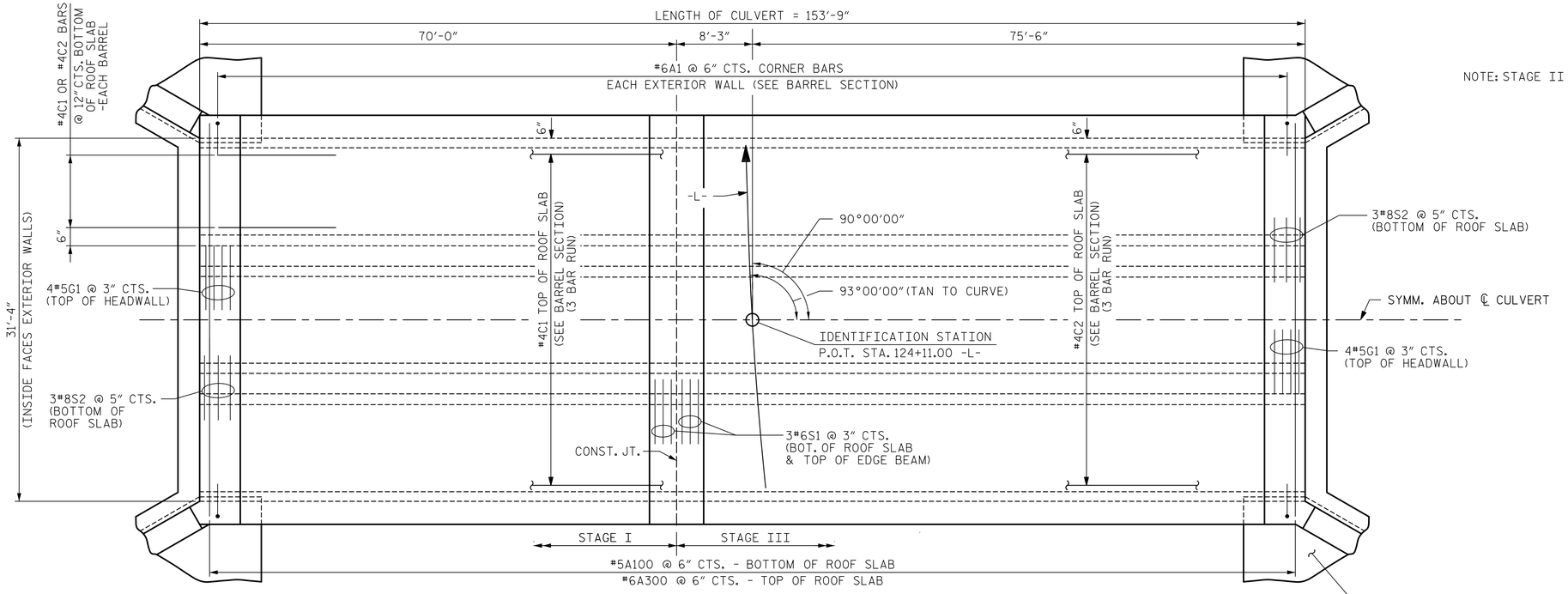
LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-02
1			3			TOTAL SHEETS
2			4			7

ASSEMBLED BY : NKB		DATE : 07/16	
CHECKED BY : JCM		DATE : 07/16	
DRAWN BY : WMC	7/11	REV. 10/1/11	MAA/GM
CHECKED BY : GM	7/11		

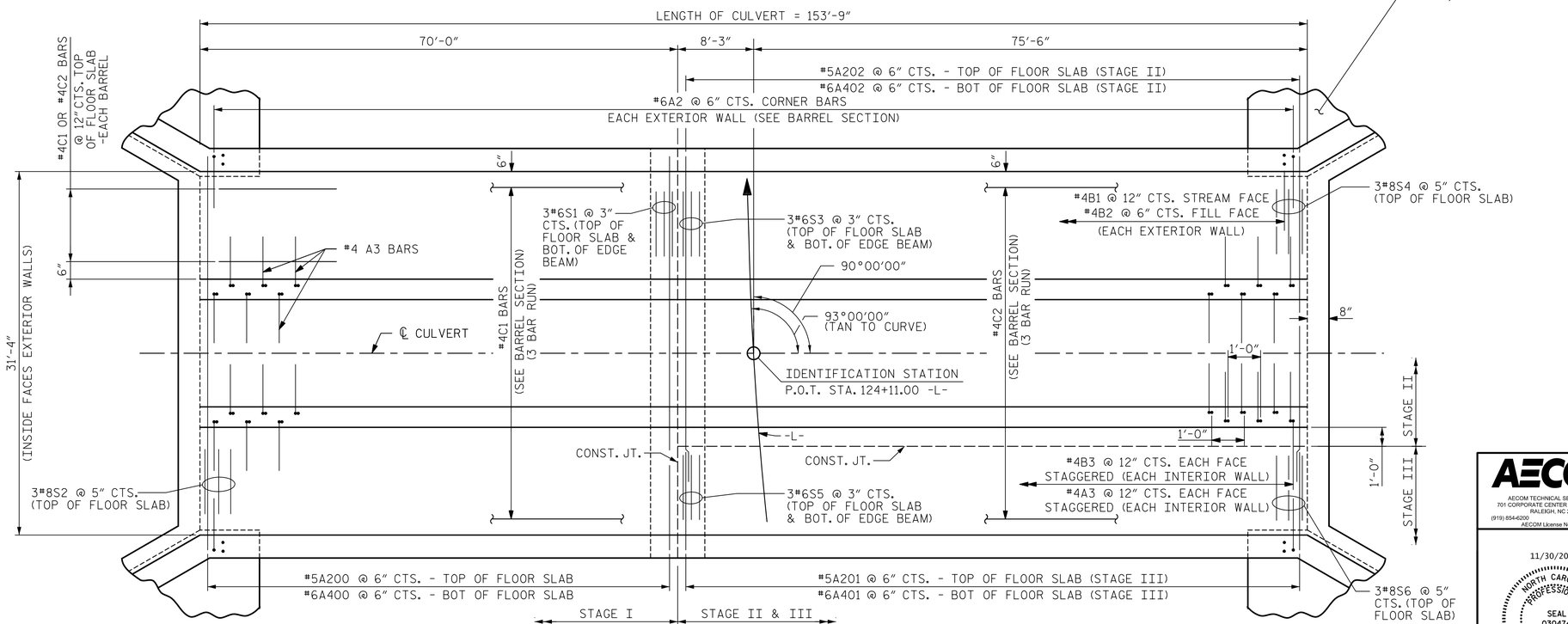
DATE: 11/30/2016
TIME: 9:43:59 AM

USER: kylazampa
DGN: Q:\60350841\400_Technical\408_Structural\Cadd\CulvertV40_003_U4910A_SMU_C02.dgn



NOTE: STAGE II WILL NOT INCLUDE ROOF SLAB.

PLAN - ROOF SLAB



W1, TYP.

PLAN - FLOOR SLAB

PROJECT NO. U-4910A

CABARRUS COUNTY

STATION: 124+11.00 -L-

ASSEMBLED BY : NKB	DATE : 07/16	SPECIAL
CHECKED BY : JCM	DATE : 07/16	
DRAWN BY : JOEL JOHNSON	DATE : MAR. 1971	STANDARD
CHECKED BY : GARY BROOME	DATE : MAR. 1971	

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DocuSigned by: John C. Morrison A2FDE142C82F4AB...

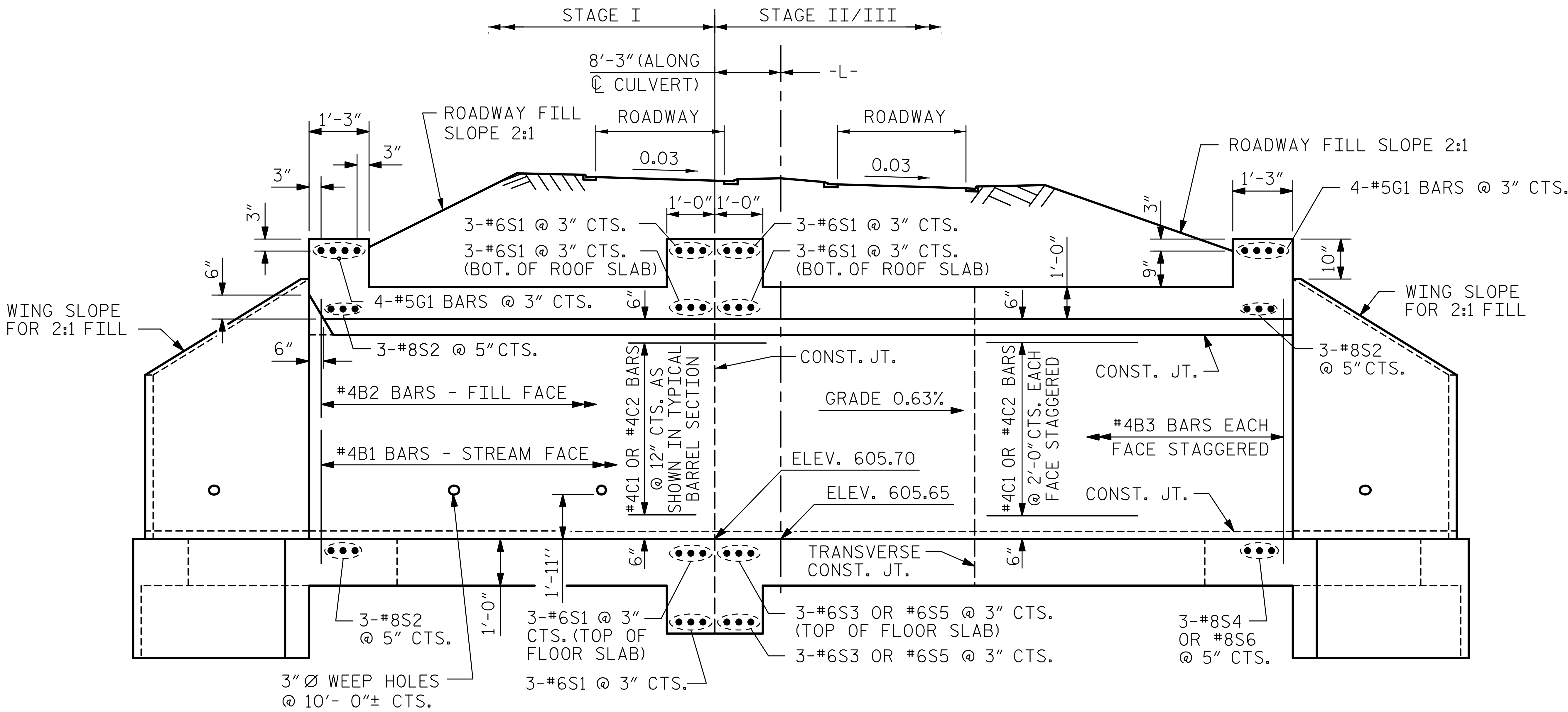
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD TRIPLE 10 FT. X 8 FT. CONCRETE BOX CULVERT 90° SKEW

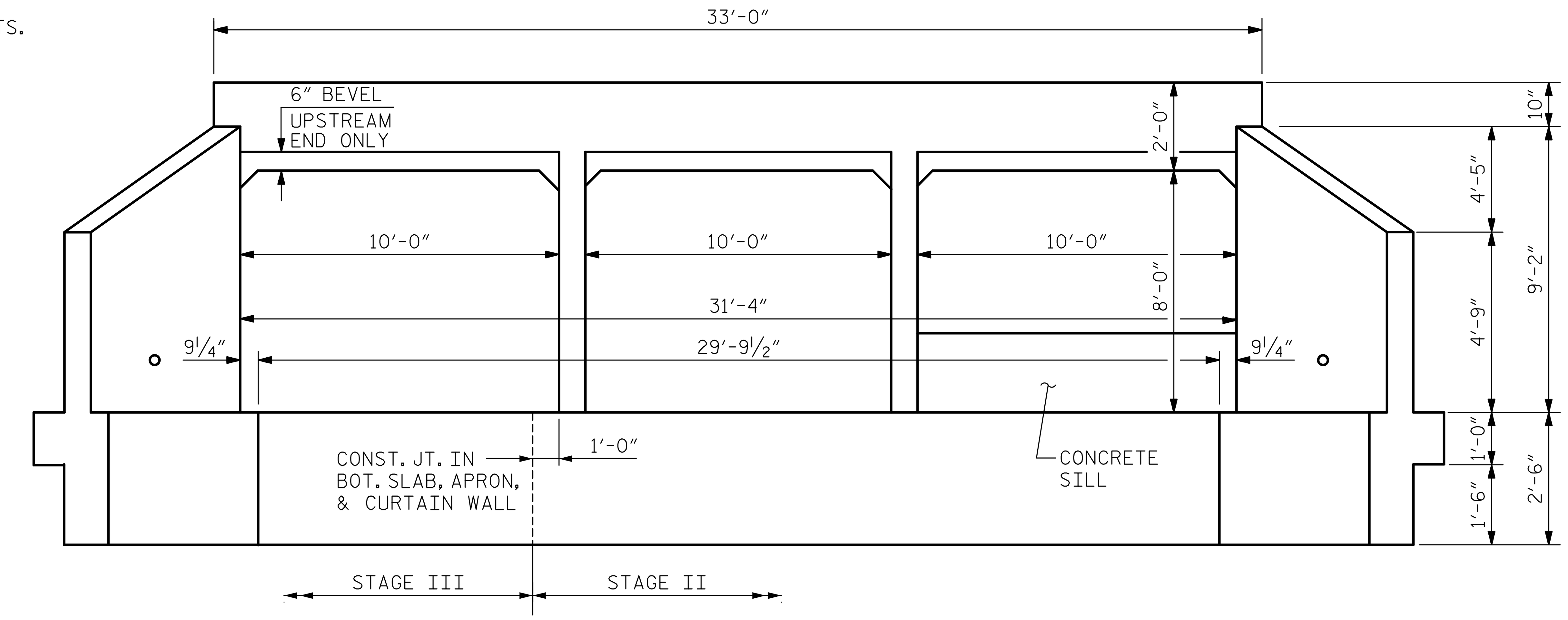
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-03
1			3			TOTAL SHEETS
2			4			7

STD. NO. CB13

DATE: 11/30/2016
TIME: 9:44:16 AM
USER: kylecampbell
DGN: dx60300417\400_Technical\408_Structural\Cadd\Culvert\40_005_U4910A_SMU_C03.dgn

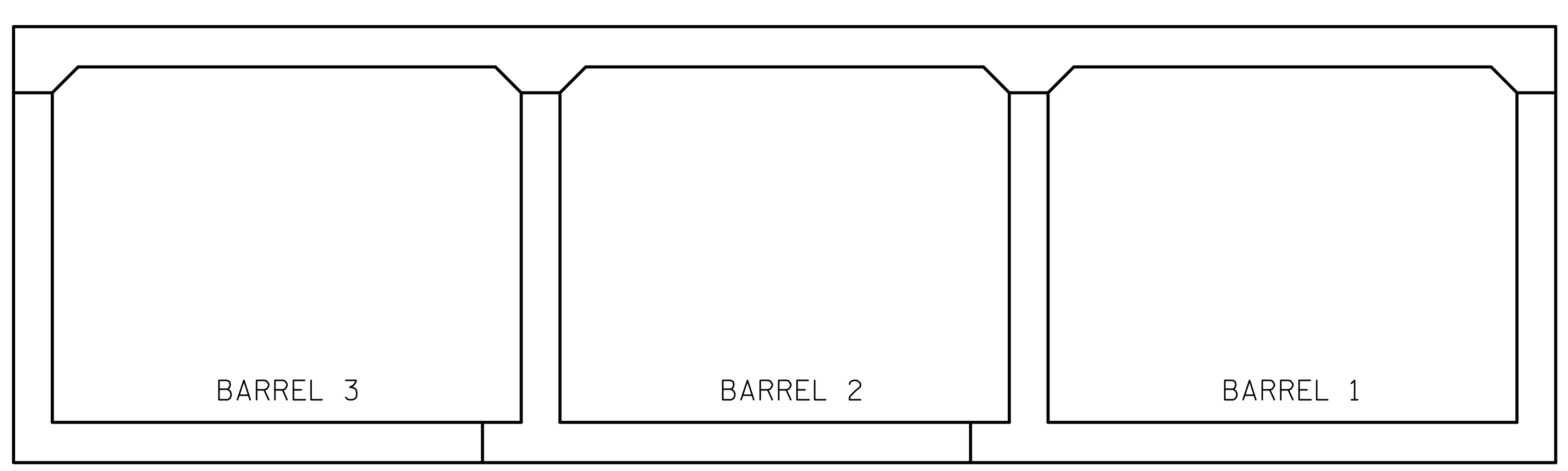


CULVERT SECTION NORMAL TO ROADWAY



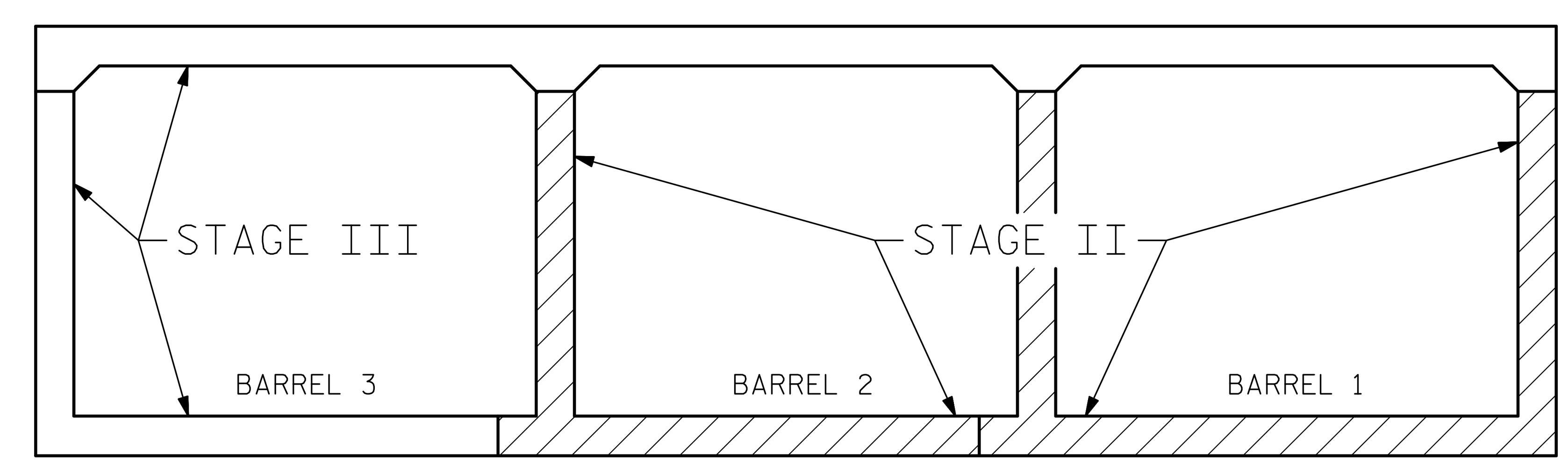
END ELEVATION

(LOOKING UPSTREAM)



STAGE I

(LOOKING UPSTREAM)



STAGE II & III

(LOOKING UPSTREAM)

DENOTES STAGE II

NOTE: FOR ADDITIONAL STAGING INFORMATION, SEE TRAFFIC CONTROL PLANS SHEET TMP-02B.

PROJECT NO. U-4910A

CABARRUS COUNTY

STATION: 124+11.00 -L-

CONSTRUCTION SEQUENCE

AECOM
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11/30/2016
NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BARREL STANDARD
TRIPLE 10 FT. X 8 FT.
CONCRETE BOX CULVERT
90° SKEW

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

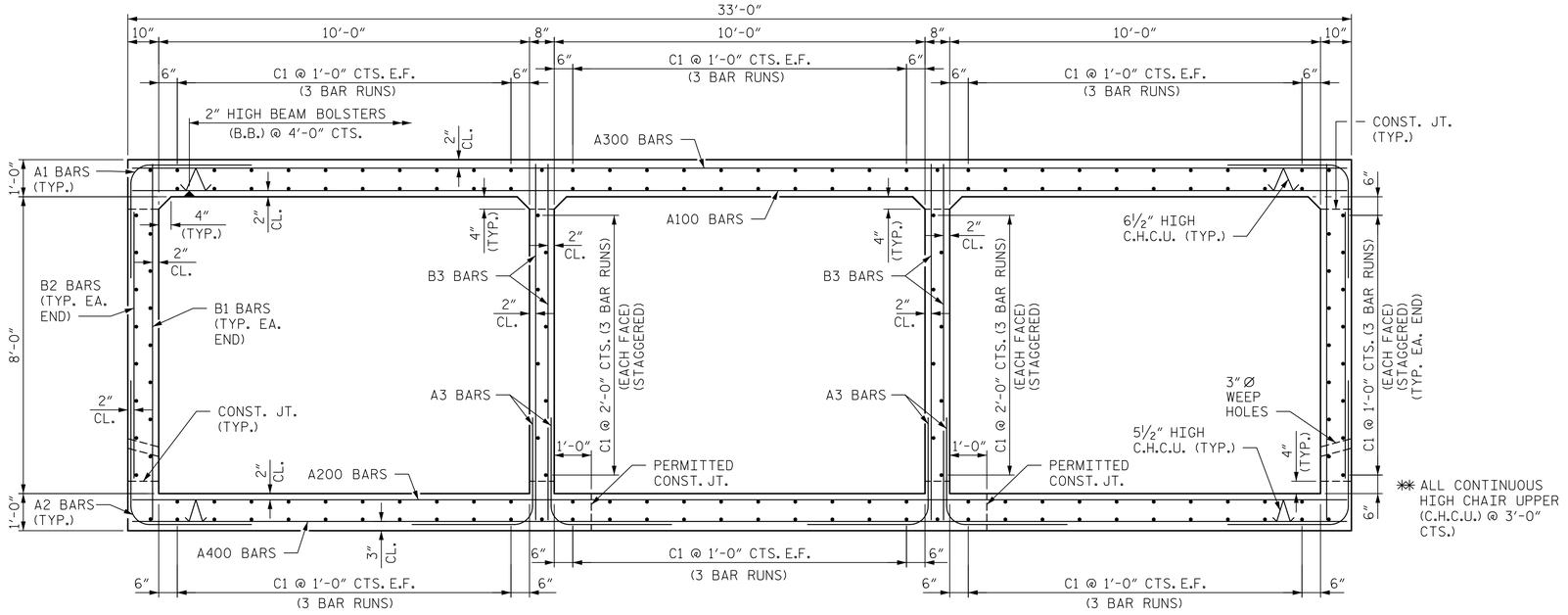
ASSEMBLED BY : NKB	DATE : 07/16	SPECIAL
CHECKED BY : JCM	DATE : 07/16	
DRAWN BY : JOEL JOHNSON	DATE : MAR. 1971	STANDARD
CHECKED BY : GARY BROOME	DATE : MAR. 1971	

REVISIONS

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

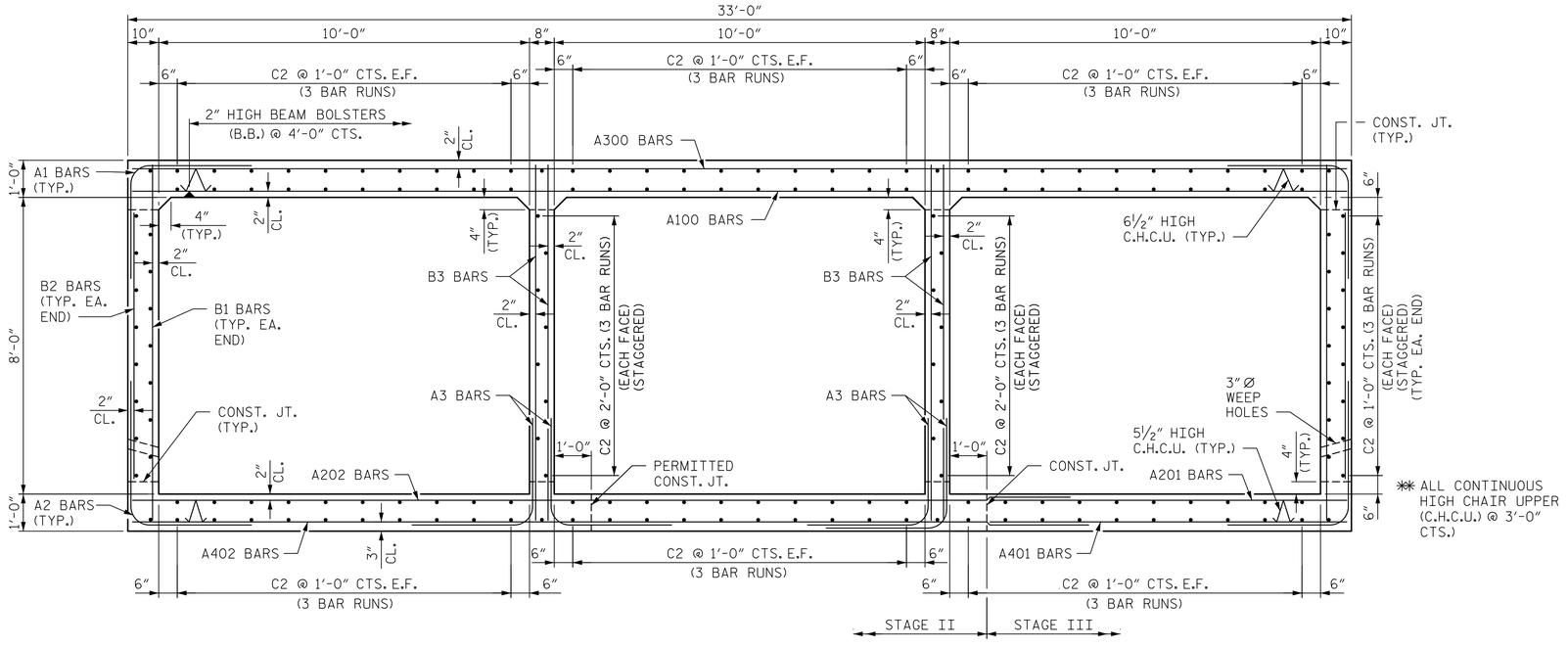
SHEET NO. C-04
TOTAL SHEETS 7

STD. NO. CB13



RIGHT ANGLE SECTION OF BARREL - STAGE I

(THERE ARE 174 ''C'' BARS IN SECTION OF BARREL)
(LOOKING DOWNSTREAM)



RIGHT ANGLE SECTION OF BARREL - STAGE II & III

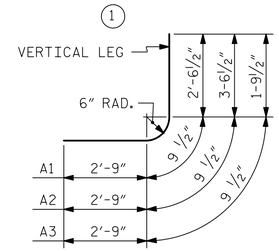
(THERE ARE 174 ''C'' BARS IN SECTION OF BARREL)
(LOOKING DOWNSTREAM)

REINFORCING STEEL SCHEDULE STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	278	#4	①	6′-1″	1130
A2	278	#6	①	7′-1″	2958
A3	278	#4	①	5′-4″	990
A100	139	#5	STR	32′-8″	4736
A200	139	#5	STR	32′-8″	4736
A300	139	#6	STR	32′-8″	6820
A400	139	#6	STR	32′-8″	6820
B1	140	#4	STR	9′-9″	912
B2	278	#4	STR	7′-2″	1331
B3	278	#4	STR	9′-9″	1811
C1	522	#4	STR	24′-3″	8456
D1	4	#6	STR	2′-7″	16
G1	4	#5	STR	32′-8″	136
S1	12	#6	STR	32′-8″	604
S2	6	#6	STR	32′-8″	523
TOTAL REINFORCING STEEL					41979

SPLICE LENGTH CHART

BAR SIZE	SPLICE LENGTH
#4	1′-9″
#5	2′-2″
#6	2′-9″
#7	3′-9″
#8	4′-11″



BAR TYPE

BAR DIMENSIONS ARE OUT TO OUT

REINFORCING STEEL SCHEDULE STAGE II & III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	334	#4	①	6′-1″	1358
A2	334	#6	①	7′-1″	3554
A3	334	#4	①	5′-4″	1190
A100	167	#5	STR	32′-8″	5690
A201	167	#5	STR	9′-7″	1669
A202	167	#5	STR	25′-4″	4413
A300	167	#6	STR	32′-8″	8194
A401	167	#6	STR	9′-7″	2404
A402	167	#6	STR	25′-10″	6480
B1	168	#4	STR	9′-9″	1094
B2	334	#4	STR	7′-2″	1600
B3	334	#4	STR	9′-5″	2102
C2	522	#4	STR	29′-0″	10112
D1	4	#6	STR	2′-7″	16
G1	4	#5	STR	32′-8″	136
S1	6	#6	STR	32′-8″	294
S2	3	#8	STR	25′-4″	203
S3	6	#6	STR	25′-10″	233
S4	3	#8	STR	28′-0″	224
S5	6	#6	STR	9′-7″	86
S6	3	#8	STR	9′-7″	154
TOTAL REINFORCING STEEL					51206

NOTE: SEE SHEET C-01 FOR COMPLETE SUMMARY OF QUANTITIES

PROJECT NO. U-4910A

CABARRUS COUNTY

STATION: 124+11.00 -L-

DRAWN BY : N. K. BROWN DATE : 07/16
CHECKED BY : N. K. BROWN DATE : 07/16
DESIGNED BY : J. C. MORRISON DATE : 07/16

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AECOM License No. F-0342

11/30/2016

NORTH CAROLINA PROFESSIONAL SEAL 030474 ENGINEER JOHN C. MORRISON

DocuSigned by: John C. Morrison
A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SR 1445 (DERITA ROAD)
OVER UT TO ROCKY RIVER

TRIPLE 10 FT. X 8 FT.
CONCRETE BOX CULVERT
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-05
	.	.				TOTAL SHEETS
						7

DATE: 11/30/2016
TIME: 9:44:41 AM

USER: kyleamdon
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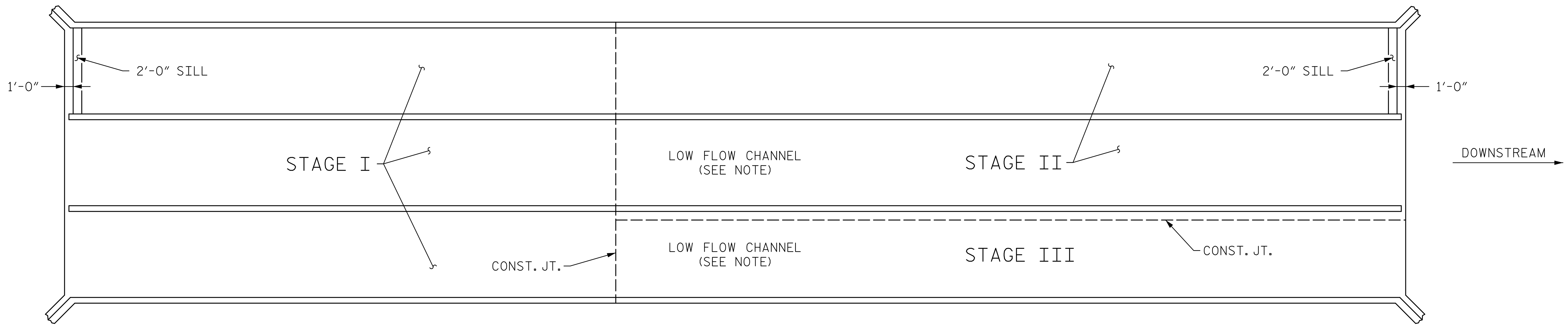
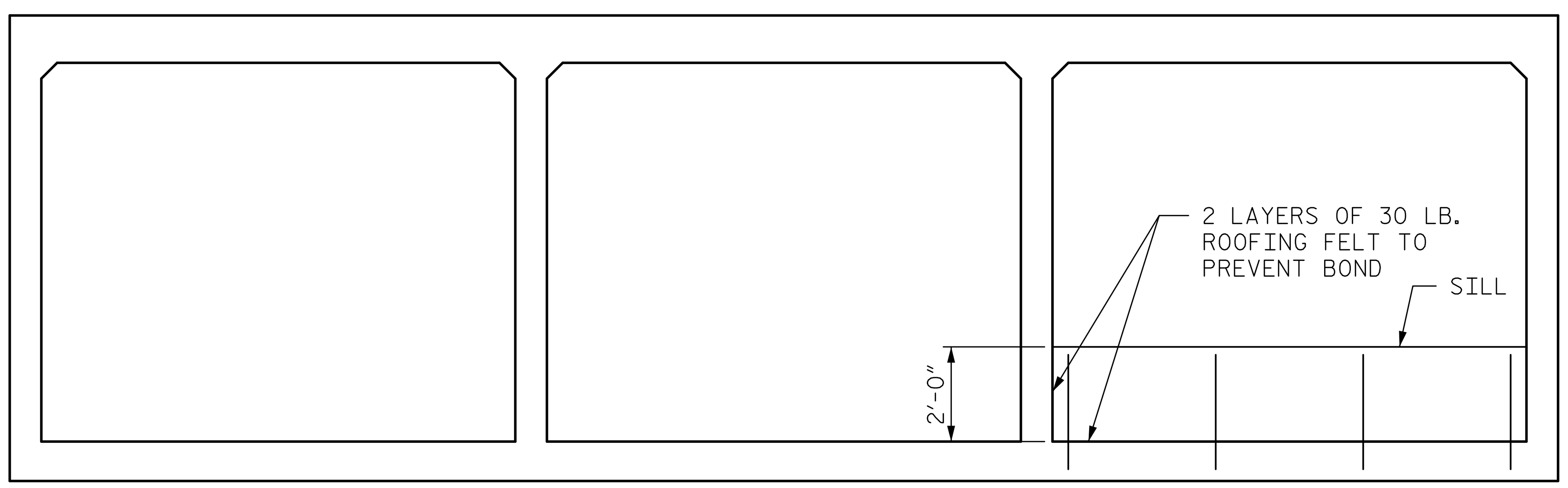
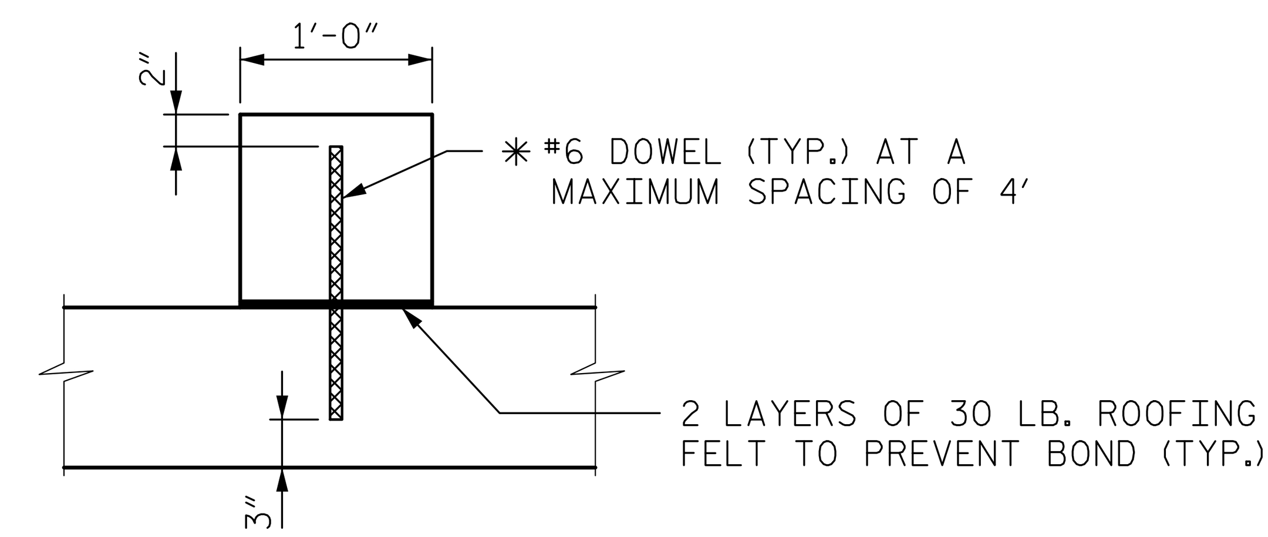


PLAN VIEW

NOTE:
BED MATERIAL PLACED BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER SILLS. THE MATERIAL SHALL BE NATURAL STONE WITH A GRADATION SIZE SIMILAR TO THAT OF CLASS B RIP RAP. STONES LARGER THAN 9 INCHES SHALL NOT BE PLACED WITHIN THE LOW FLOW CHANNEL. BED MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.



ELEVATION - LOOKING UPSTREAM



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

SECTION THROUGH SILL

CULVERT SILL DETAILS

PROJECT NO. U-4910A
CABARRUS COUNTY
STATION: 124+11.00 -L-

AECOM
AECOM TECHNICAL SERVICES, INC.
701 CORPORATE CENTER DRIVE, SUITE 475
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
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RALEIGH

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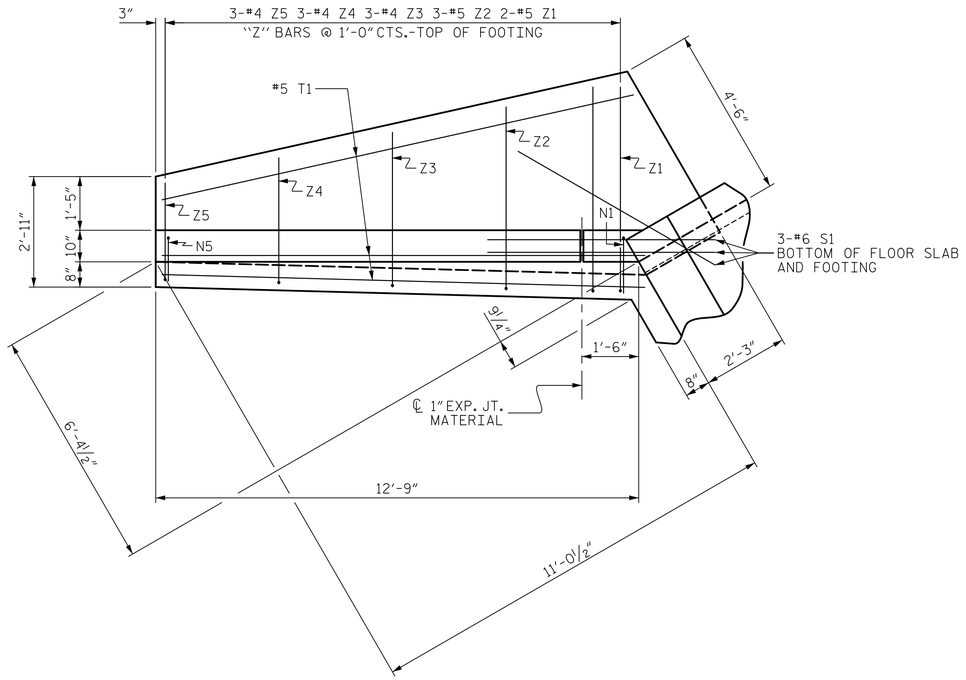
OVER ROCKY RIVER

TRIPLE 10 FT. X 8 FT.
CONCRETE BOX CULVERT
90° SKEW

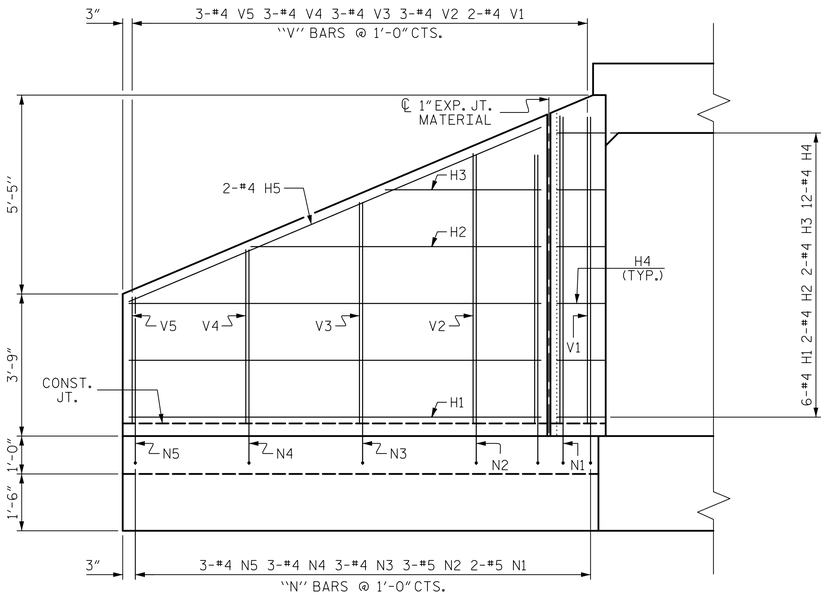
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-06
						TOTAL SHEETS 7

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

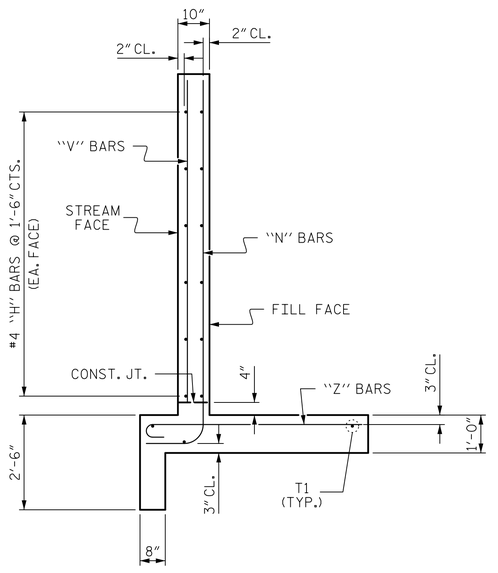
DRAWN BY : N. K. BROWN DATE : 07/16
CHECKED BY : N. K. BROWN DATE : 07/16
DESIGNED BY : J. C. MORRISON DATE : 07/16



PLAN W1



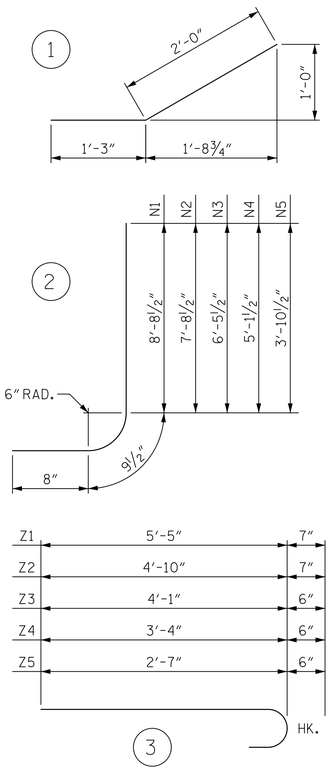
ELEVATION W1



TYPICAL WING SECTION

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"	21
H3	4	#4	STR	4'-1"	11
H4	24	#4	1	3'-3"	52
H5	4	#4	STR	11'-9"	32
N1	4	#5	2	10'-2"	43
N2	6	#5	2	9'-2"	58
N3	6	#4	2	7'-11"	32
N4	6	#4	2	6'-7"	27
N5	6	#4	2	5'-4"	22
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"	29
V3	6	#4	STR	5'-10"	24
V4	6	#4	STR	4'-7"	19
V5	6	#4	STR	3'-4"	14
Z1	4	#5	3	6'-0"	25
Z2	6	#5	3	5'-5"	34
Z3	6	#4	3	4'-7"	19
Z4	6	#4	3	3'-10"	16
Z5	6	#4	3	3'-1"	13

REINFORCING STEEL
FOR 2 WINGS 734 LBS

CLASS A CONCRETE
2 WINGS 10.7 CY
1 HEADWALLS 1.3 CY
1 END CURTAIN WALLS 1.9 CY
TOTAL 13.9 CY

STAGE II & III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	10'-10"	87
H2	4	#4	STR	7'-8"	21
H3	4	#4	STR	4'-1"	11
H4	24	#4	1	3'-3"	52
H5	4	#4	STR	11'-9"	32
N1	4	#5	2	10'-2"	43
N2	6	#5	2	9'-2"	58
N3	6	#4	2	7'-11"	32
N4	6	#4	2	6'-7"	27
N5	6	#4	2	5'-4"	22
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"	29
V3	6	#4	STR	5'-10"	24
V4	6	#4	STR	4'-7"	19
V5	6	#4	STR	3'-4"	14
Z1	4	#5	3	6'-0"	25
Z2	6	#5	3	5'-5"	34
Z3	6	#4	3	4'-7"	19
Z4	6	#4	3	3'-10"	16
Z5	6	#4	3	3'-1"	13

REINFORCING STEEL
FOR 2 WINGS 734 LBS

CLASS A CONCRETE
2 WINGS 10.7 CY
1 HEADWALLS 1.3 CY
1 END CURTAIN WALLS 1.9 CY
TOTAL 13.9 CY

NOTE:
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.

PROJECT NO. U-4910A
CABARRUS COUNTY
STATION: 124+11.00 -L-

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11/30/2016

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Document signed by: John C. Morrison A2FDE142C82F4AB...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD WINGS FOR CONCRETE BOX CULVERT

H = 8'-0" SLOPE = 2:1
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-07
1			3			TOTAL SHEETS
2			4			7

STD. NO. CW9008

ASSEMBLED BY : NKB DATE : 07/16
CHECKED BY : JCM DATE : 07/16

DRAWN BY : CCJ 10/99
CHECKED BY : RWW 03/00

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DATE: 11/30/2016
TIME: 9:45:06 AM

USER: kylecampton
DGN: Q:\6033047\r400_Technical\r408_Structural\Cadd\Culvert\r410_013_U4910A_SMU_C07.dgn

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

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