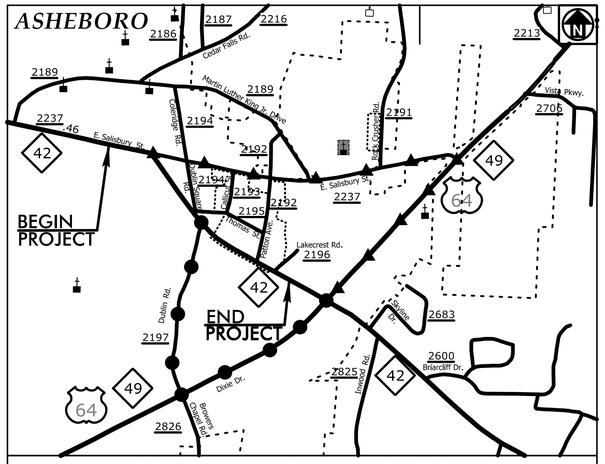
09/08/99

TIP PROJECT: U-5743

CONTRACT: C205157

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Plan Sheet Symbols



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

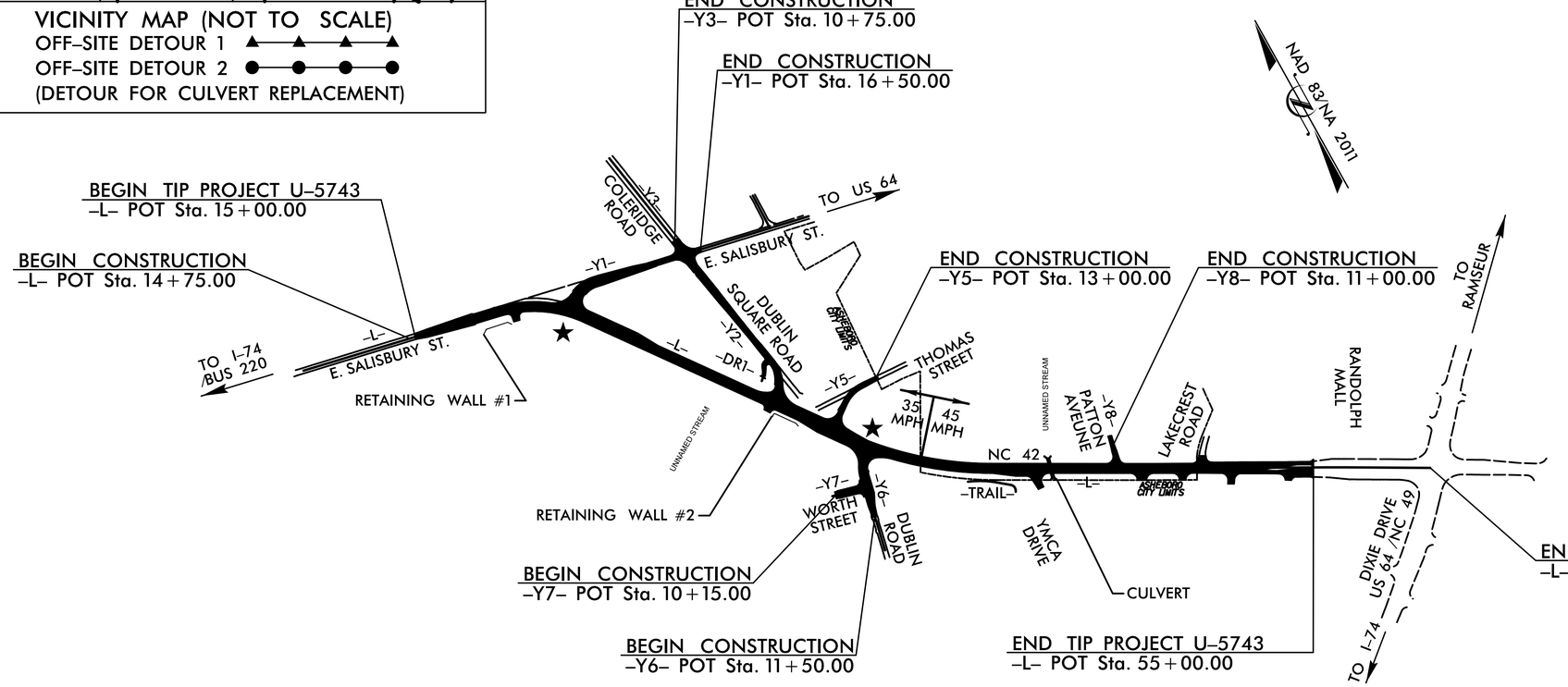
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5743		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
50165.1.1		P.E.
50165.2.1		R/W
50165.2.2		UTL.
50165.3.1		CONST.

LOCATION: NC 42 FROM SR 2237 (EAST SALISBURY STREET) TO NORTH OF US 64 /NC 49 (DIXIE DRIVE) IN ASHEBORO

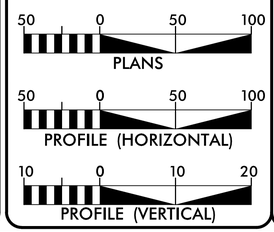
TYPE OF WORK: DRAINAGE, GRADING, PAVING, SIGNALS AND CULVERTS

STRUCTURE PLANS



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2026 = 19,290
ADT 2046 = 21,450
K = 9 %
D = 60 %
T = 3 % *
V = 40 / 50 MPH
* TTST = 1% DUAL = 2%
FUNC CLASS =
URBAN PRINCIPAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5743 = 0.758 MI

TOTAL LENGTH TIP PROJECT U-5743 = 0.758 MI

Prepared In the Office of WGI for
DIVISION 8
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 20, 2021

LETTING DATE: JUNE 16, 2026

TIM JORDAN, PE
PROJECT ENGINEER

JAMES R. RICE, PE
HYDRAULIC PROJECT ENGINEER

NCDOT CONTACT: JEFFREY L. TEAGUE, PE

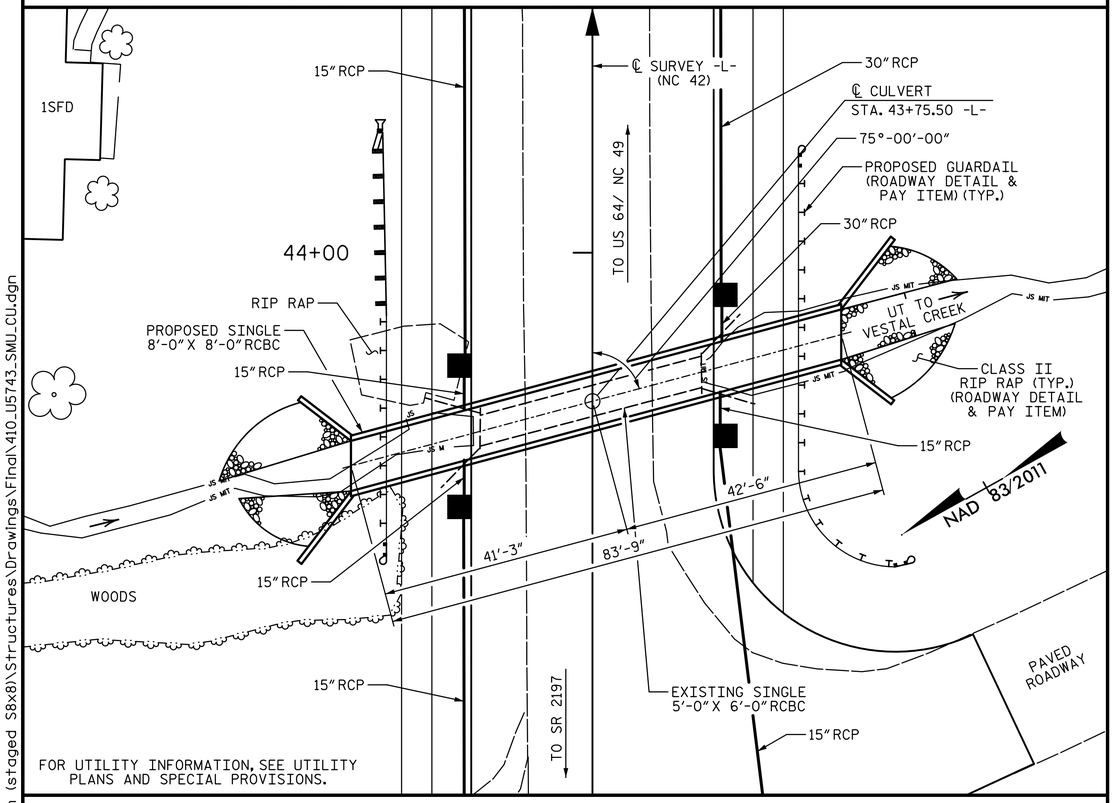
ENGINEER

1/14/2026 | 5:09 AM PST

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434



LOCATION SKETCH

HYDRAULIC DATA:

DESIGN DISCHARGE	= 360 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YEAR
DESIGN HIGH WATER ELEVATION	= 758.4
DRAINAGE AREA	= 0.3 SQ. MI.
BASE DISCHARGE (Q 100)	= 370 CFS
BASE HIGH WATER ELEVATION	= 758.6

OVERTOPPING FLOOD DATA:

OVERTOPPING DISCHARGE	= 640 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YEAR
OVERTOPPING FLOOD ELEVATION	= 761.7 **

** OVERTOPPING OCCURS AT ROADWAY SAG AT STA. 43+71.00 -L- AT ROADWAY CENTERLINE

GRADE DATA:

GRADE POINT EL. @ STA. 43+75.50 -L- = EL. 761.74
BED EL. @ STA. 43+75.50 -L- = EL. 750.77
ROADWAY SLOPE 2:1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE		
BARREL @	1.214 CY/FT	101.7 C.Y.
HEADWALLS		0.9 C.Y.
SILLS		0.6 C.Y.
WING ETC.		23.6 C.Y.
TOTAL		126.8 C.Y.
REINFORCING STEEL		
BARREL		11,052 LBS.
WINGS ETC.		1,547 LBS.
TOTAL		12,599 LBS.
CULVERT EXCAVATION		LUMP SUM
FOUNDATION CONDITIONING MATERIAL		81 TONS
REMOVAL OF EXISTING STRUCTURE		LUMP SUM

NOTES:

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

DESIGN FILL---------- 2'-3" (MIN.) AND 3'-9" (MAX.)

FOR OTHER DESIGN DATA AND NOTES SEE STANDARD NOTE SHEET.

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

CONCRETE IN CULVERTS TO BE POURED IN THE FOLLOWING ORDER:

1. 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, HEADWALLS, AND SILLS.

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

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

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR 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.

THE EXISTING STRUCTURE CONSISTS OF A SINGLE BARREL 5'-0" X 6'-0" RCBC WITH LENGTH OF 37.8' ALONG CENTERLINE. THE EXISTING CULVERT WHICH IS LOCATED AT THE SITE OF THE PROPOSED CULVERT, SHALL BE REMOVED.

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 GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

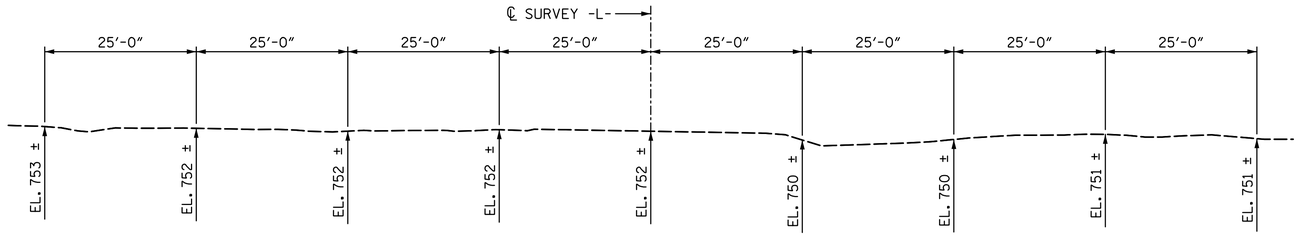
A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

CULVERT MUST BE CAST-IN-PLACE, PRECAST OPTION WILL NOT BE ALLOWED.

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.

THE 15" AND 30" RCP THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR THE PIPES.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.



PROFILE ALONG ℄ CULVERT

PROJECT NO. U-5743
RANDOLPH COUNTY
STATION: 43+75.50 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 8 FT. X 8 FT. CONCRETE BOX CULVERT

75° SKEW

DRAWN BY: T. BANKOVICH DATE: 8-22
CHECKED BY: B.S. COX DATE: 8-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 10-25

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

11/21/2025 | 7:40 AM PST

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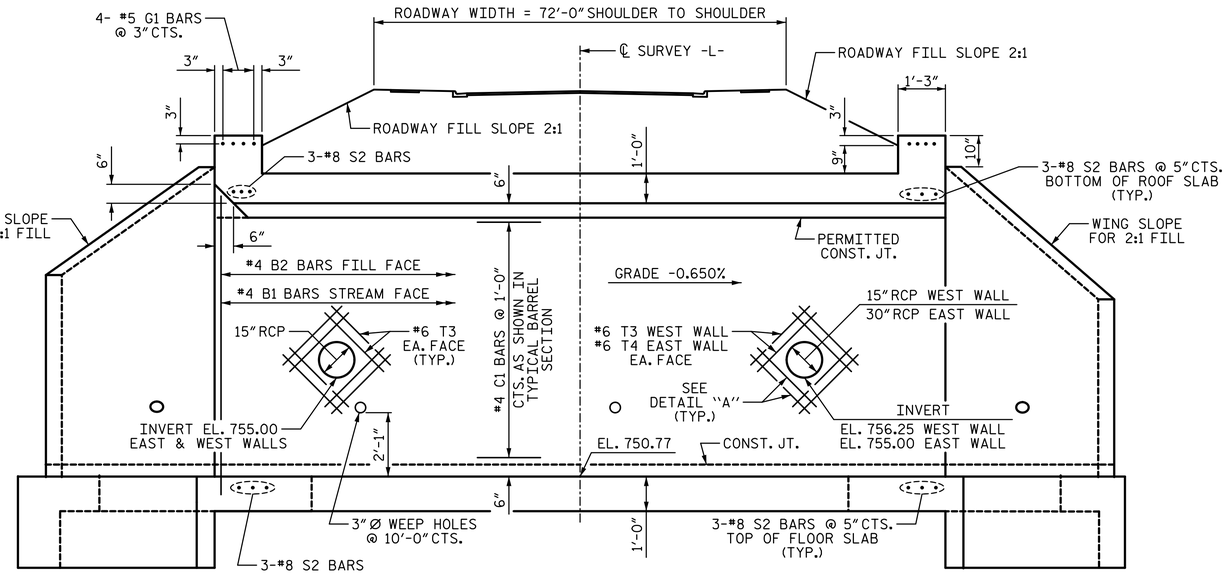
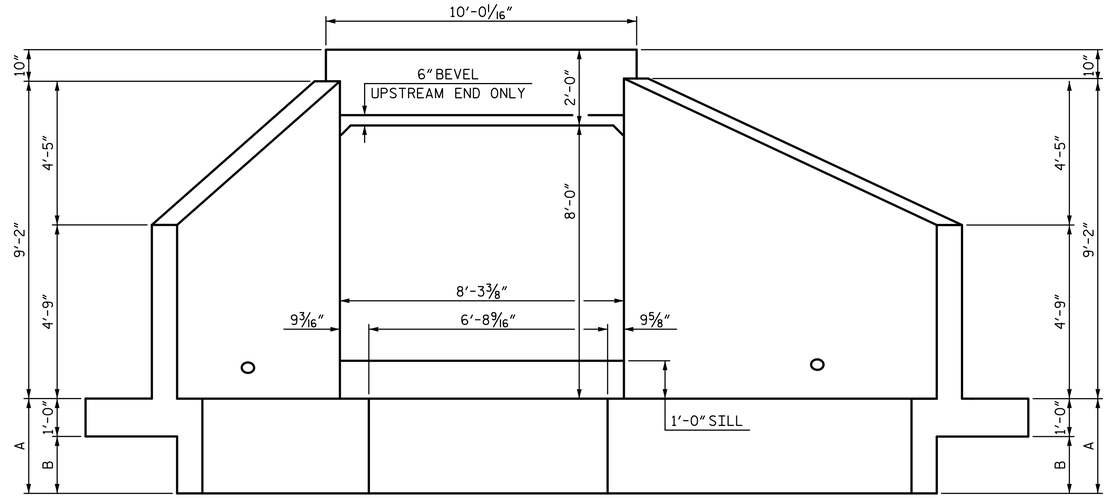
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
2			4			6

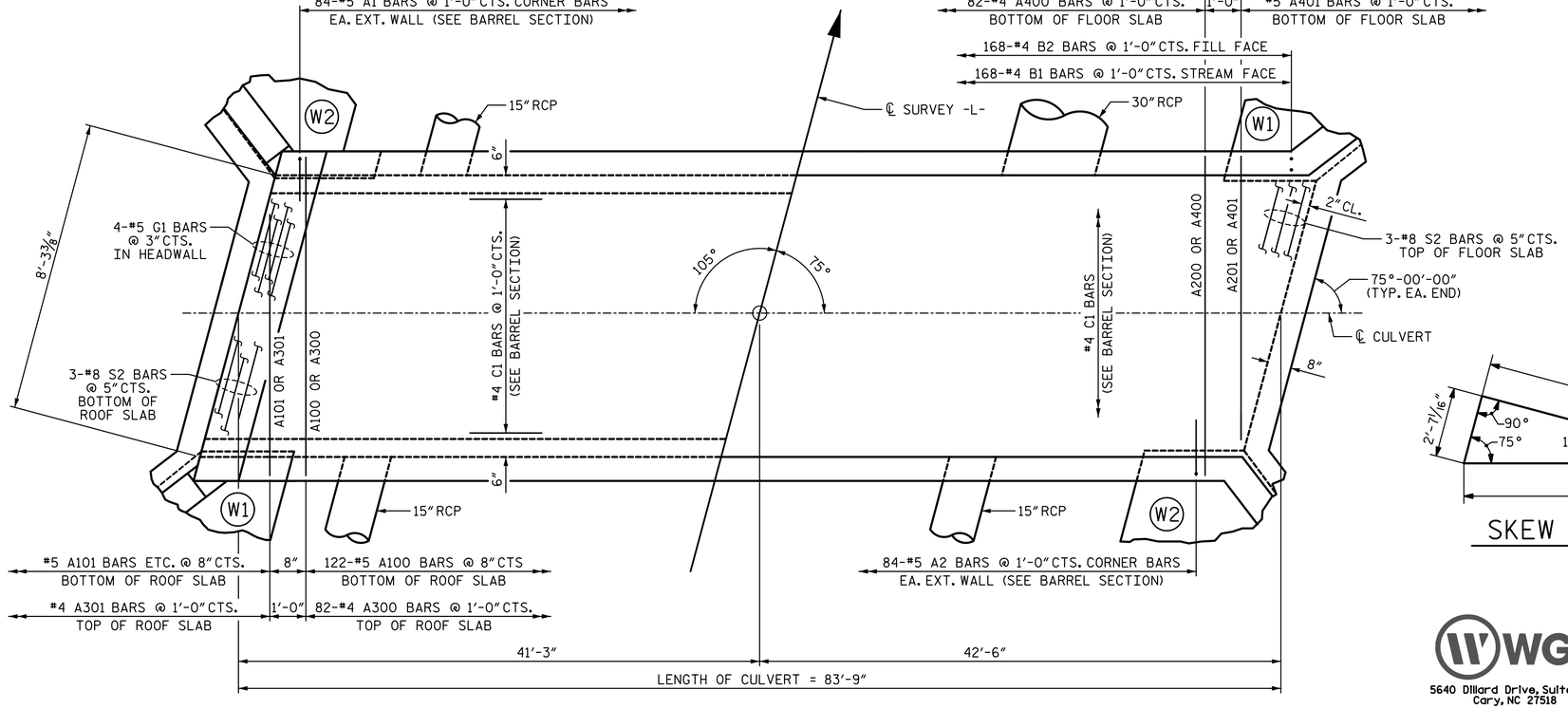


CULVERT SECTION NORMAL TO ROADWAY



END ELEVATION NORMAL TO SKEW

DIMENSIONS		
	INLET WING	OUTLET WING
A	2'-6"	3'-0"
B	1'-6"	2'-0"

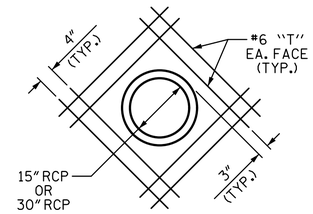


PART PLAN - ROOF SLAB

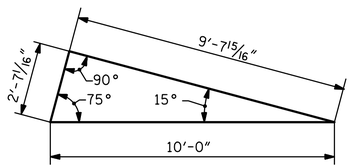
PART PLAN - FLOOR SLAB

(SILLS NOT SHOWN FOR CLARITY)

NOTE: C1 BARS ARE 3 BAR RUNS



DETAIL "A"



SKEW TRIANGLE

PROJECT NO. U-5743

RANDOLPH COUNTY

STATION: 43+75.50 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SINGLE 8 FT. X 8 FT. CONCRETE BOX CULVERT

75° SKEW

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

DRAWN BY: T. BANKOVICH DATE: 8-22
CHECKED BY: B.S. COX DATE: 8-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 10-25

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

Signed NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 ENGINEER MARK A. AVERETTE
11/21/2025 | 7:40 AM PST

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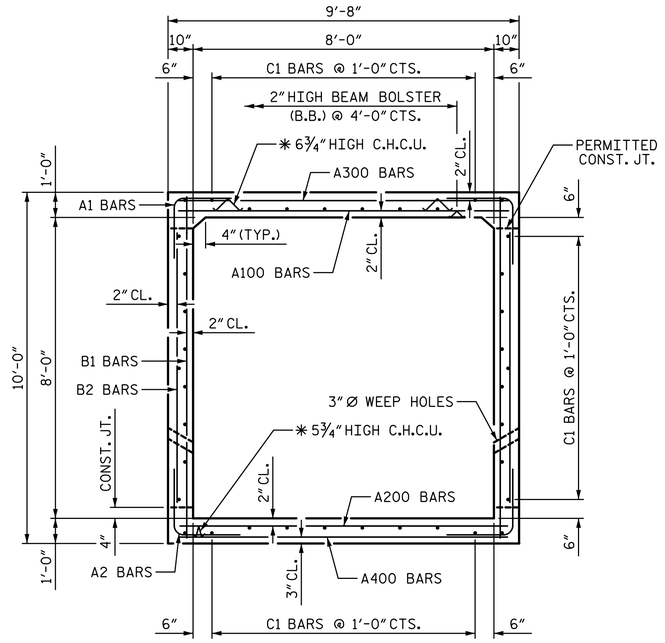
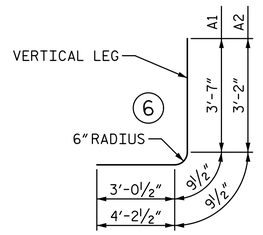


RIGHT ANGLE SECTION OF BARREL

(THERE ARE 38 ''C'' BARS IN SECTION OF BARREL)
(''C1'' BARS ARE 3 BAR RUNS)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

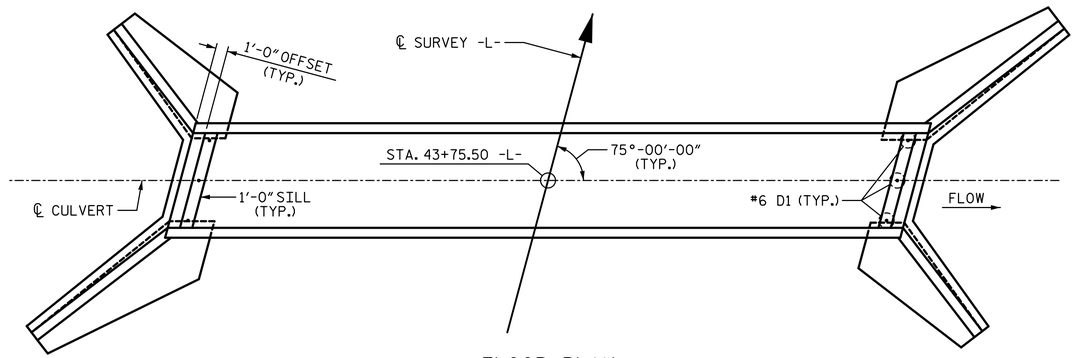
SPLICE CHART

#4 B1 SPLICE LENGTH = 1′-10″
#4 C1 SPLICE LENGTH = 2′-5″

BILL OF MATERIAL

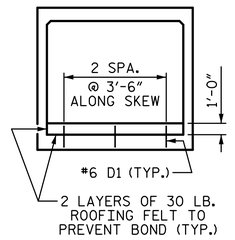
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	168	#5	6	7′-5″	1300
A2	168	#5	6	8′-2″	1431
A100	122	#5	STR	9′-3″	1177
A101	2	#5	STR	6′-4″	13
A102	2	#5	STR	3′-10″	8
A200	122	#5	STR	9′-3″	1177
A201	2	#5	STR	6′-4″	13
A202	2	#5	STR	3′-10″	8
A300	82	#4	STR	9′-3″	507
A301	2	#4	STR	5′-1″	7
A400	82	#4	STR	9′-3″	507
A401	2	#4	STR	5′-1″	7
B1	168	#4	STR	9′-7″	1075
B2	168	#4	STR	7′-4″	823
C1	114	#4	STR	29′-5″	2240
D1	6	#6	STR	1′-7″	14
G1	8	#5	STR	9′-7″	80
S2	12	#8	STR	9′-7″	307
T3	48	#6	STR	3′-4″	240
T4	16	#6	STR	4′-11″	118
TOTAL REINFORCING STEEL					11052 LB

CLASS A CONCRETE BREAKDOWN	
BARREL	101.7 CY
SILLS	0.6 CY
HEADWALLS	0.9 CY

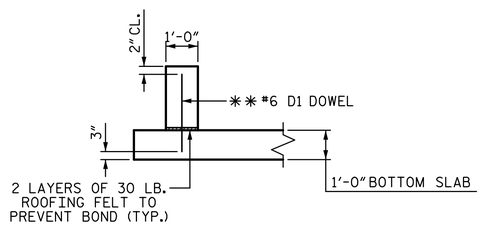


FLOOR PLAN

(SHOWING PLACEMENT OF SILLS)



ELEVATION - LOOKING DOWNSTREAM



SECTION THROUGH SILL

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

CULVERT SILL DETAILS

BACKFILL WITH NATIVE MATERIAL TO SILL HEIGHT. NATIVE MATERIAL CONSIST OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOOD PLAIN AT THE PROJECT SITE DURING THE CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS. THE ENTIRE COST OF WORK REQUIRED TO PLACE THE EXCAVATED MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

DRAWN BY: T. BANKOVICH DATE: 8-22
CHECKED BY: B.S. COX DATE: 8-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 10-25

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE
11/21/2025 | 7:40 AM PST

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PROJECT NO. U-5743
RANDOLPH COUNTY
STATION: 43+75.50 -L-

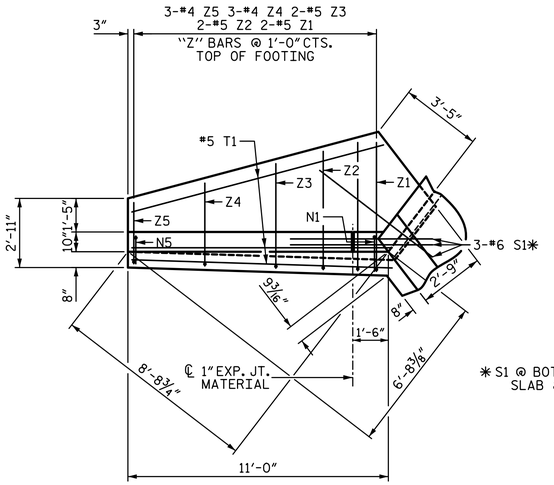
SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

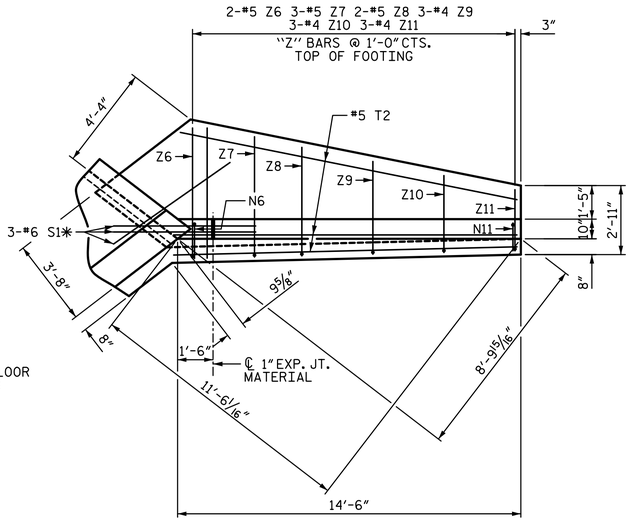
SINGLE 8 FT. X 8 FT. CONCRETE BOX CULVERT

75° SKEW

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

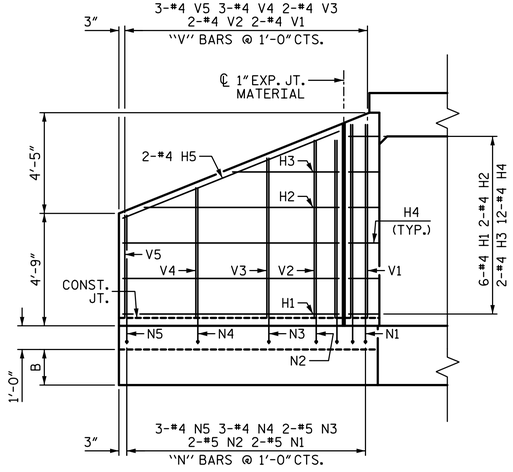


PLAN W2

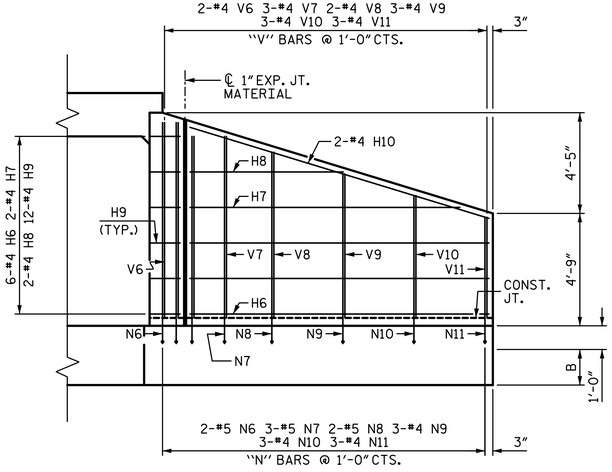


* S1 @ BOTTOM OF FLOOR SLAB & FOOTING

PLAN W1

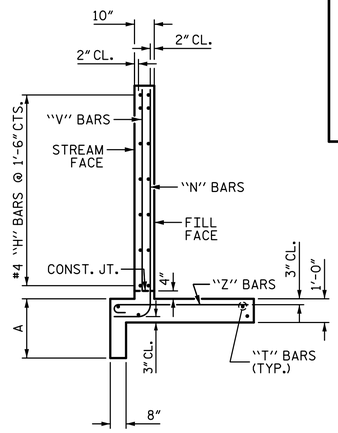


ELEVATION W2



ELEVATION W1

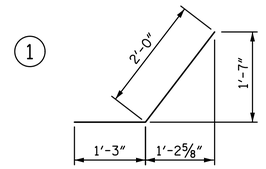
DIMENSIONS		
	INLET WING	OUTLET WING
A	2'-6"	3'-0"
B	1'-6"	2'-0"

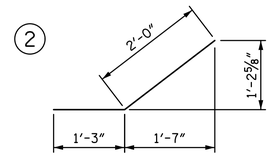


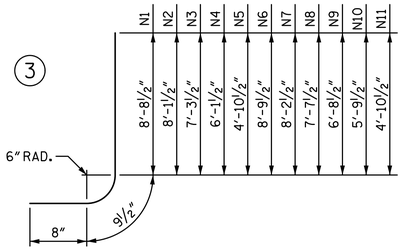
TYPICAL WING SECTION

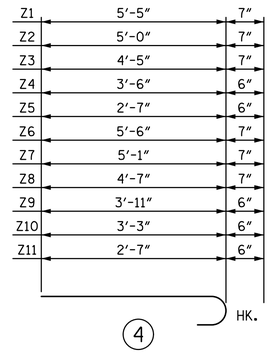
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.









BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	#4	STR	9'-1"	73
H2	4	#4	STR	8'-2"	22
H3	4	#4	STR	4'-5"	12
H4	24	#4	1	3'-3"	52
H5	4	#4	STR	9'-10"	26
H6	12	#4	STR	12'-7"	101
H7	4	#4	STR	11'-4"	30
H8	4	#4	STR	6'-5"	17
H9	24	#4	2	3'-3"	52
H10	4	#4	STR	13'-2"	35
N1	4	#5	3	10'-2"	42
N2	4	#5	3	9'-7"	40
N3	4	#5	3	8'-9"	37
N4	6	#4	3	7'-7"	30
N5	6	#4	3	6'-4"	25
N6	4	#5	3	10'-3"	43
N7	6	#5	3	9'-8"	60
N8	4	#5	3	9'-1"	38
N9	6	#4	3	8'-2"	33
N10	6	#4	3	7'-3"	29
N11	6	#4	3	6'-4"	25
S1	12	#6	STR	6'-0"	108
T1	6	#5	STR	11'-0"	69
T2	6	#5	STR	14'-6"	91
V1	4	#4	STR	8'-2"	22
V2	4	#4	STR	7'-6"	20
V3	4	#4	STR	6'-9"	18
V4	6	#4	STR	5'-6"	22
V5	6	#4	STR	4'-4"	17
V6	4	#4	STR	8'-3"	22
V7	6	#4	STR	7'-8"	31
V8	4	#4	STR	7'-0"	19
V9	6	#4	STR	6'-1"	24
V10	6	#4	STR	5'-2"	21
V11	6	#4	STR	4'-3"	17
Z1	4	#5	4	6'-0"	25
Z2	4	#5	4	5'-7"	23
Z3	4	#5	4	5'-0"	21
Z4	6	#4	4	4'-0"	16
Z5	6	#4	4	3'-1"	12
Z6	4	#5	4	6'-1"	25
Z7	6	#5	4	5'-8"	35
Z8	4	#5	4	5'-2"	22
Z9	6	#4	4	4'-5"	18
Z10	6	#4	4	3'-9"	15
Z11	6	#4	4	3'-1"	12

REINFORCING STEEL FOR 4 WINGS	1547 LBS

CLASS A CONCRETE		
4 WINGS	22.9	CY
2 END CURTAIN WALLS	0.7	CY
TOTAL	23.6	CY

PROJECT NO. U-5743

RANDOLPH COUNTY

STATION: 43+75.50 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

WINGS FOR CONCRETE BOX CULVERT

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

75° SKEW

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

DRAWN BY: T. BANKOVICH DATE: 8-22
CHECKED BY: B.S. COX DATE: 8-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 10-25

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5640 Dillard Drive, Suite 200
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11/21/2025 | 7:40 AM PST

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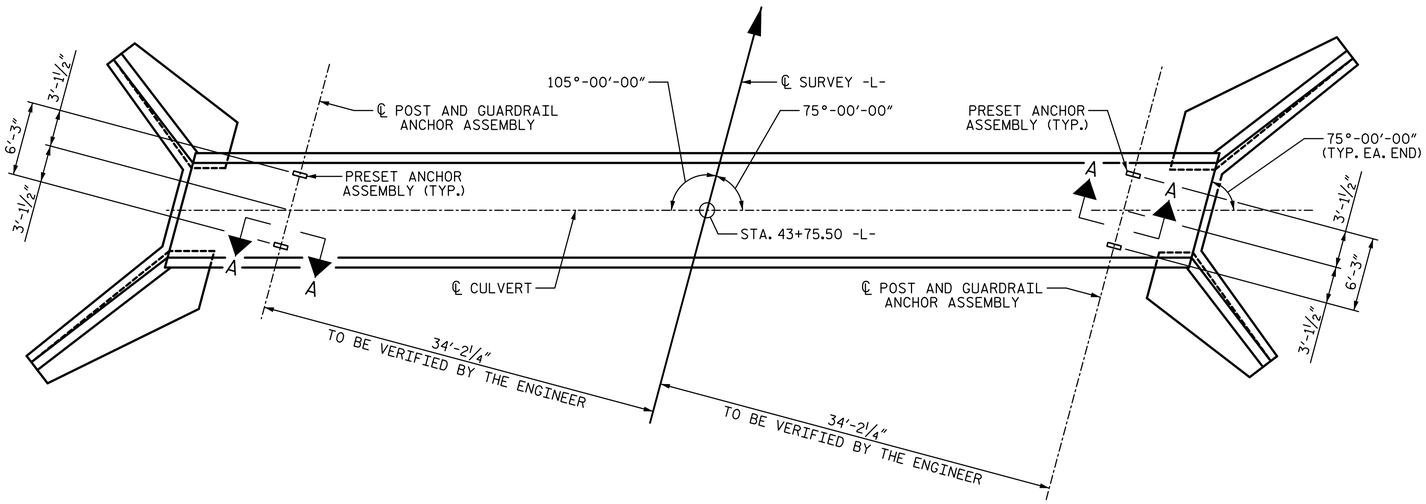
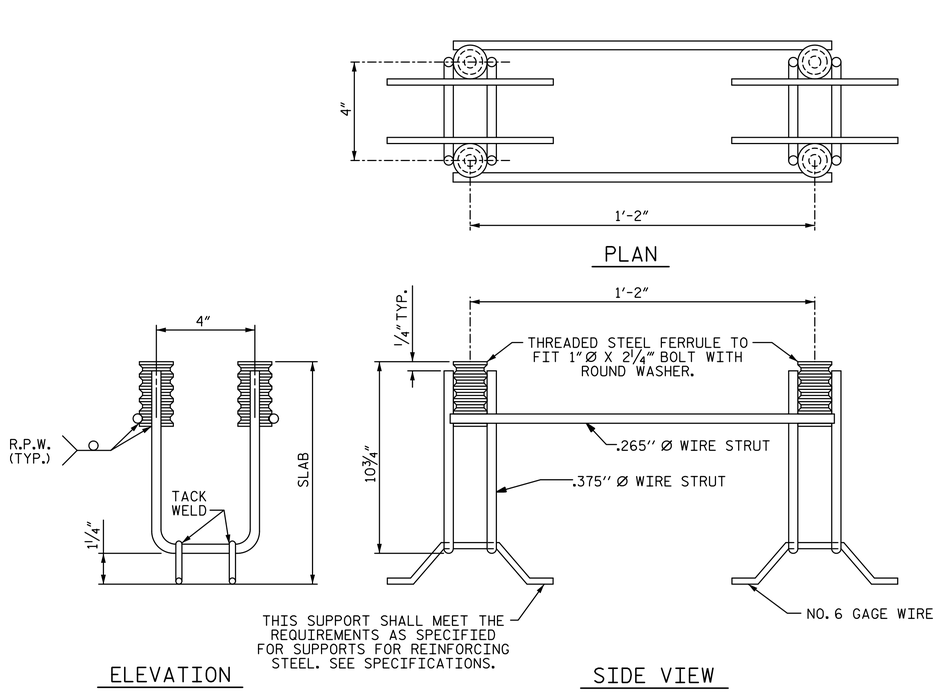
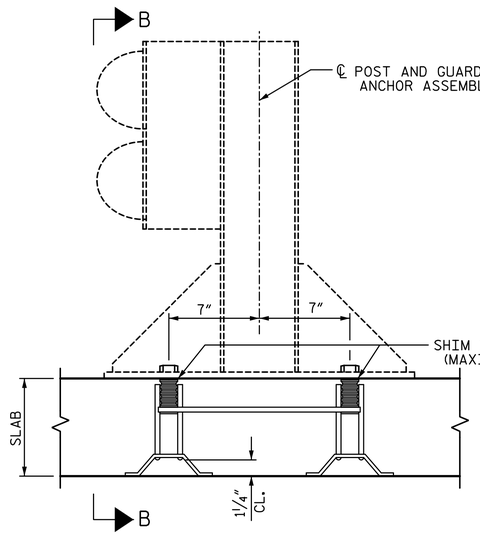


PLAN

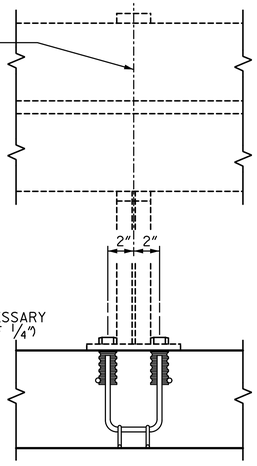
(SHOWING GUARDRAIL ANCHOR ASSEMBLY SPACING)



GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS



SECTION A-A



SECTION B-B

NOTES:

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

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

B. 4 - 1" Ø X 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.

PROJECT NO. U-5743

RANDOLPH COUNTY

STATION: 43+75.50 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ANCHORAGE DETAILS FOR GUARDRAIL ANCHOR ASSEMBLY FOR CULVERTS

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

DRAWN BY: T. BANKOVICH DATE: 8-22
CHECKED BY: B.S. COX DATE: 8-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 10-25

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518
LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

11/21/2025 | 7:40 AM PST

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT				SHEAR				
								RATING FACTOR	BARREL NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BARREL NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.26	- -	1.75	1.26	1	BOT SLAB - MID	4.00	2.44	1	BOT SLAB - LT END	0.72	
		HL-93 (OPERATING)	N/A		1.63	- -	1.35	1.63	1	BOT SLAB - MID	4.00	3.16	1	BOT SLAB - LT END	0.72	
		HS-20 (INVENTORY)	36.000	2	1.31	47.2	1.75	1.31	1	BOT SLAB - MID	4.00	2.53	1	BOT SLAB - LT END	0.72	
		HS-20 (OPERATING)	36.000		1.70	61.1	1.35	1.70	1	BOT SLAB - MID	4.00	3.28	1	BOT SLAB - LT END	0.72	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.46	33.2	1.40	2.46	1	TOP SLAB - MID	4.00	4.64	1	TOP SLAB - LT END	0.72	
		SNGARBS2	20.000		2.30	46.0	1.40	2.30	1	TOP SLAB - MID	4.00	4.35	1	TOP SLAB - LT END	0.72	
		SNAGRIS2	22.000		2.46	54.1	1.40	2.46	1	TOP SLAB - MID	4.00	4.64	1	TOP SLAB - LT END	0.72	
		SNCOTTS3	27.250	3	1.58	43.1	1.40	1.58	1	BOT SLAB - MID	4.00	3.05	1	BOT SLAB - LT END	0.72	
		SNAGGRS4	34.925		1.91	66.7	1.40	1.91	1	BOT SLAB - MID	4.00	3.65	1	BOT SLAB - LT END	0.72	
		SNS5A	35.550		1.81	64.3	1.40	1.81	1	BOT SLAB - MID	4.00	3.46	1	BOT SLAB - LT END	0.72	
		SNS6A	39.950		1.81	72.3	1.40	1.81	1	BOT SLAB - MID	4.00	3.46	1	BOT SLAB - LT END	0.72	
		SNS7B	42.000		1.81	76.0	1.40	1.81	1	BOT SLAB - MID	4.00	3.46	1	BOT SLAB - LT END	0.72	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.45	80.9	1.40	2.45	1	TOP SLAB - MID	4.00	4.64	1	TOP SLAB - LT END	0.72	
		TNT4A	33.075		1.88	62.2	1.40	1.88	1	BOT SLAB - MID	4.00	3.63	1	BOT SLAB - LT END	0.72	
		TNT6A	41.600		1.81	75.3	1.40	1.81	1	BOT SLAB - MID	4.00	3.47	1	BOT SLAB - LT END	0.72	
		TNT7A	42.000		1.85	77.7	1.40	1.85	1	BOT SLAB - MID	4.00	3.55	1	BOT SLAB - LT END	0.72	
		TNT7B	42.000		1.81	76.0	1.40	1.81	1	BOT SLAB - MID	4.00	3.46	1	BOT SLAB - LT END	0.72	
		TNAGRIT4	43.000		1.88	80.8	1.40	1.88	1	BOT SLAB - MID	4.00	3.63	1	BOT SLAB - LT END	0.72	
		TNAGT5A	45.000		1.88	84.6	1.40	1.88	1	BOT SLAB - MID	4.00	3.63	1	BOT SLAB - LT END	0.72	
		TNAGT5B	45.000		1.88	84.6	1.40	1.88	1	BOT SLAB - MID	4.00	3.63	1	BOT SLAB - LT END	0.72	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.74	50.0	1.30	1.74	1	BOT SLAB - MID	4.00	3.28	1	BOT SLAB - LT END	0.72	
		EV3	43.000	4	1.37	58.9	1.30	1.37	1	BOT SLAB - MID	4.00	2.65	1	BOT SLAB - LT END	0.72	

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.

DISTANCE FROM LEFT END OF ELEMENT IS GIVEN FROM STREAM FACE OF BOX.

(#) CONTROLLING LOAD RATING

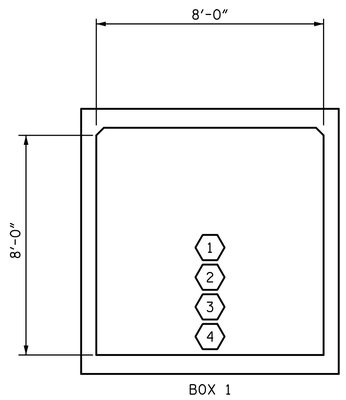
(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

(4) EMERGENCY VEHICLE LOAD RATING **

** SEE CHART FOR VEHICLE TYPE



BOX 1

LRFR SUMMARY

(LOOKING DOWNSTREAM)

PROJECT NO. U-5743

RANDOLPH COUNTY

STATION: 43+75.50 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

(NON-INTERSTATE TRAFFIC)

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

DRAWN BY: T. BANKOVICH DATE: 8-22
CHECKED BY: B.S. COX DATE: 8-22
DESIGN ENGINEER OF RECORD: M.A. AVERETTE DATE: 10-25

WGI
5640 Dillard Drive, Suite 200
Cary, NC 27518

LICENSURE NO. C-4434

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 023908 MARK A. AVERETTE

11/21/2025 | 7:40 AM PST

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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 2024 "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 ¾" 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.