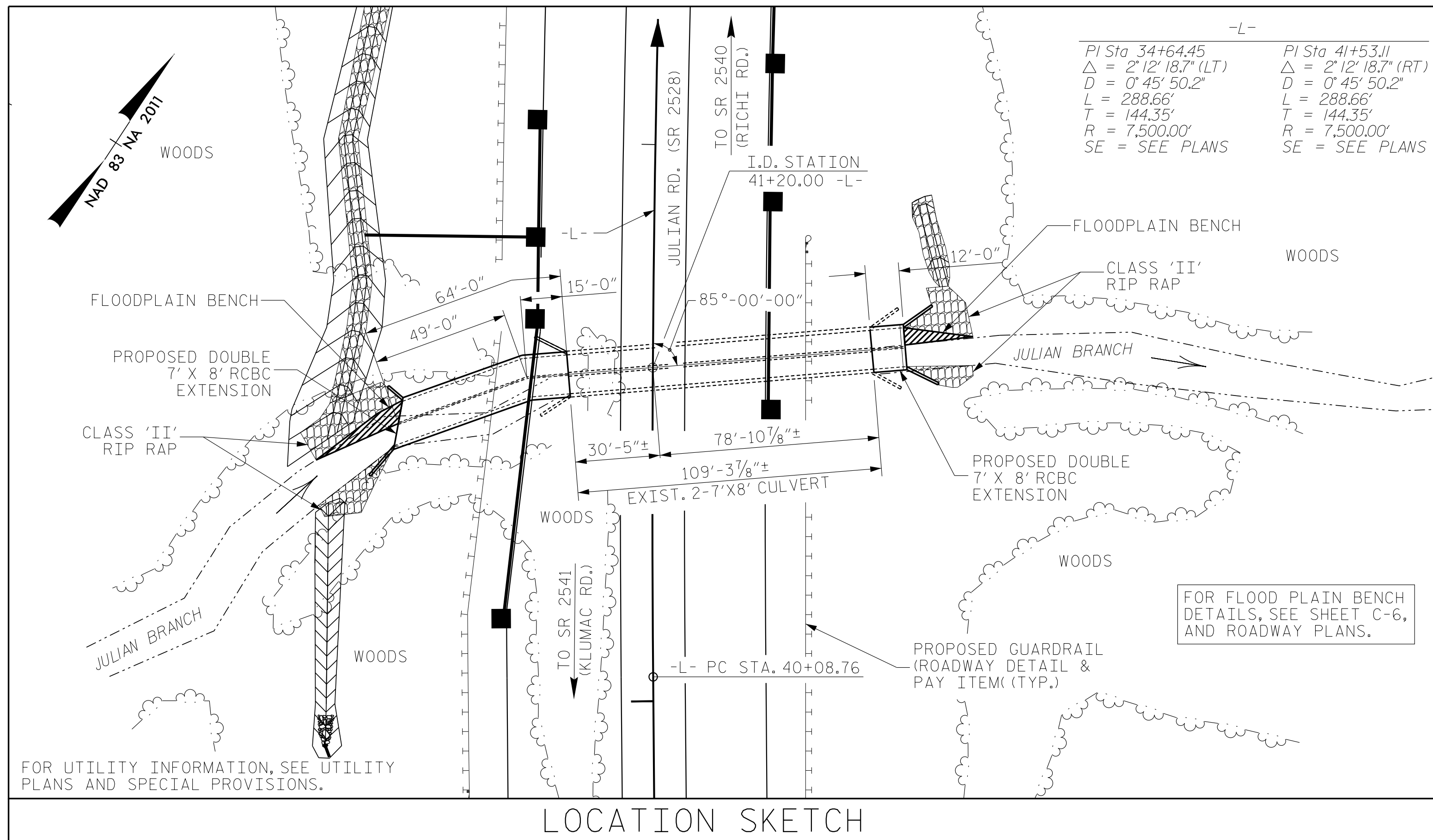


BM #2: CHISELED SQUARE IN TOP CURB AT WEST SIDE OF ENTRANCE TO 818 CORPORATE CIRCLE,
382.31' RT OF -L- STA. 47+19.79, ELEV. = 742.79 N: 691028 E: 1556606



TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE - LEFT EXTENSION	
BARREL @ 1.887 CY/FT	120.8 C.Y.
WING ETC.	14.9 C.Y.
CLASS A CONCRETE - RIGHT EXTENSION	
BARREL @ 1.887 CY/FT	22.6 C.Y.
WING ETC.	13.1 C.Y.
TOTAL	171.4 C.Y.
REINFORCING STEEL - LEFT EXTENSION	
BARREL	17,454 LBS.
WINGS ETC.	833 LBS.
REINFORCING STEEL - RIGHT EXTENSION	
BARREL	3,824 LBS.
WINGS ETC.	721 LBS.
TOTAL	22,832 LBS.
FOUNDATION CONDITIONING MAT'L. 90 TONS LEFT EXTENSION	
FOUNDATION CONDITIONING MAT'L. 17 TONS RIGHT EXTENSION	
TOTAL	107 TONS
CULVERT EXCAVATION LEFT EXTENSION LUMP SUM	
CULVERT EXCAVATION RIGHT EXTENSION LUMP SUM	
CLASS II RIP RAP (2'-0" THICK) LEFT EXTENSION 75 TONS	
CLASS II RIP RAP (2'-0" THICK) RIGHT EXTENSION 100 TONS	
TOTAL	175 TONS
GEOTEXTILE FOR DRAINAGE LEFT EXTENSION 85 SQ. YDS.	
GEOTEXTILE FOR DRAINAGE RIGHT EXTENSION 85 SQ. YDS.	
TOTAL	170 SQ. YDS.
COIR FIBER MAT LEFT EXTENSION 40 SQ. YDS.	
COIR FIBER MAT RIGHT EXTENSION 40 SQ. YDS.	
TOTAL	80 SQ. YDS.

GENERAL NOTES

ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
 DESIGN FILL-----16.92' (MIN), 17.67' (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 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.
 AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALLS 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.
 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.
 DOWELS SHALL BE USED TO CONNECT THE CULVERT EXTENSION TO THE EXISTING CULVERT AS SHOWN. FOR NOTE REGARDING SETTING OF DOWELS, SEE SHEET SN.
 THE EXISTING 7'X8' DOUBLE BARREL REINFORCED CONCRETE BOX CULVERT LOCATED AT THE PROPOSED SITE SHALL BE RETAINED AND EXTENDED TO THE LIMITS SHOWN.
 IF APPROVED BY THE ENGINEER, THE CONTRACTOR MAY USE THE EXISTING WINGS AS TEMPORARY SHORING FOR THE CONSTRUCTION OF THE CULVERT EXTENTIONS. IN THIS CASE, THE BOTTOM SLAB OF THE EXTENSIONS SHALL BE POURED AT LEAST 72 HOURS PRIOR TO CUTTING THE WINGS. THE WINGS MAY BE CUT EARLIER PROVIDED THE SLAB CONCRETE STRENGTH HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.
 FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
 NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.
 A THREE FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.
 FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
 FOR COIR FIBER MAT, SEE SPECIAL PROVISIONS.

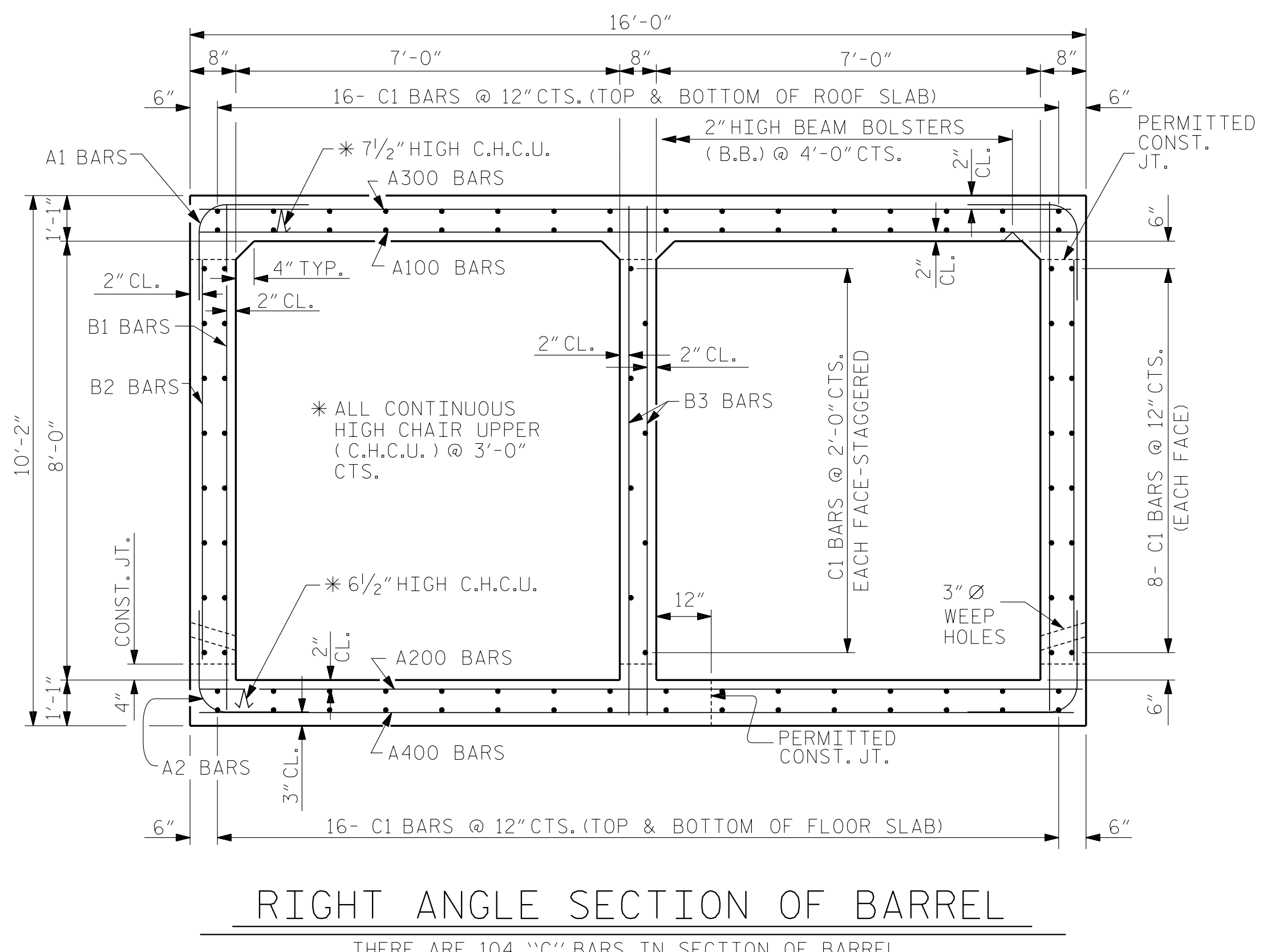
HYDRAULIC DATA

DESIGN DISCHARGE = 1100 CFS
 DESIGN FREQUENCY = 50 YRS
 DESIGN HW ELEVATION = 728.8 FT
 BASE DISCHARGE = 1200 CFS
 BASE FREQUENCY = 100 YRS
 BASE HW ELEVATION = 729.5 FT

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 3000 CFS
 OVERTOPPING FREQUENCY = 500+ YRS
 OVERTOPPING ELEVATION = 745.1* FT
 DRAINAGE AREA = 1.55 SQ. MI.

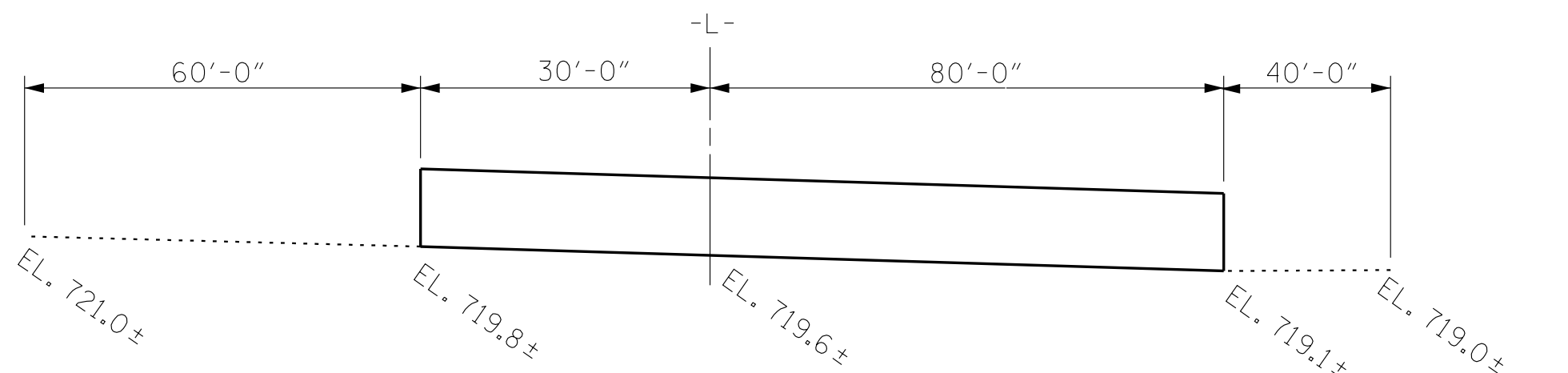
* OT ELEVATION IS ELEVATION OF MEDIAN MONOLITHIC ISLAND AT SAG STA. 41+80.1



I HEREBY CERTIFY THAT THESE PLANS ARE THE AS-BUILT PLANS.

ROADWAY DATA

GRADE POINT ELEVATION @ STA. 41+20.00 -L- = 744.85
 BED ELEVATION @ STA. 41+20.00 -L- = 719.59
 ROADWAY SLOPES 2:1



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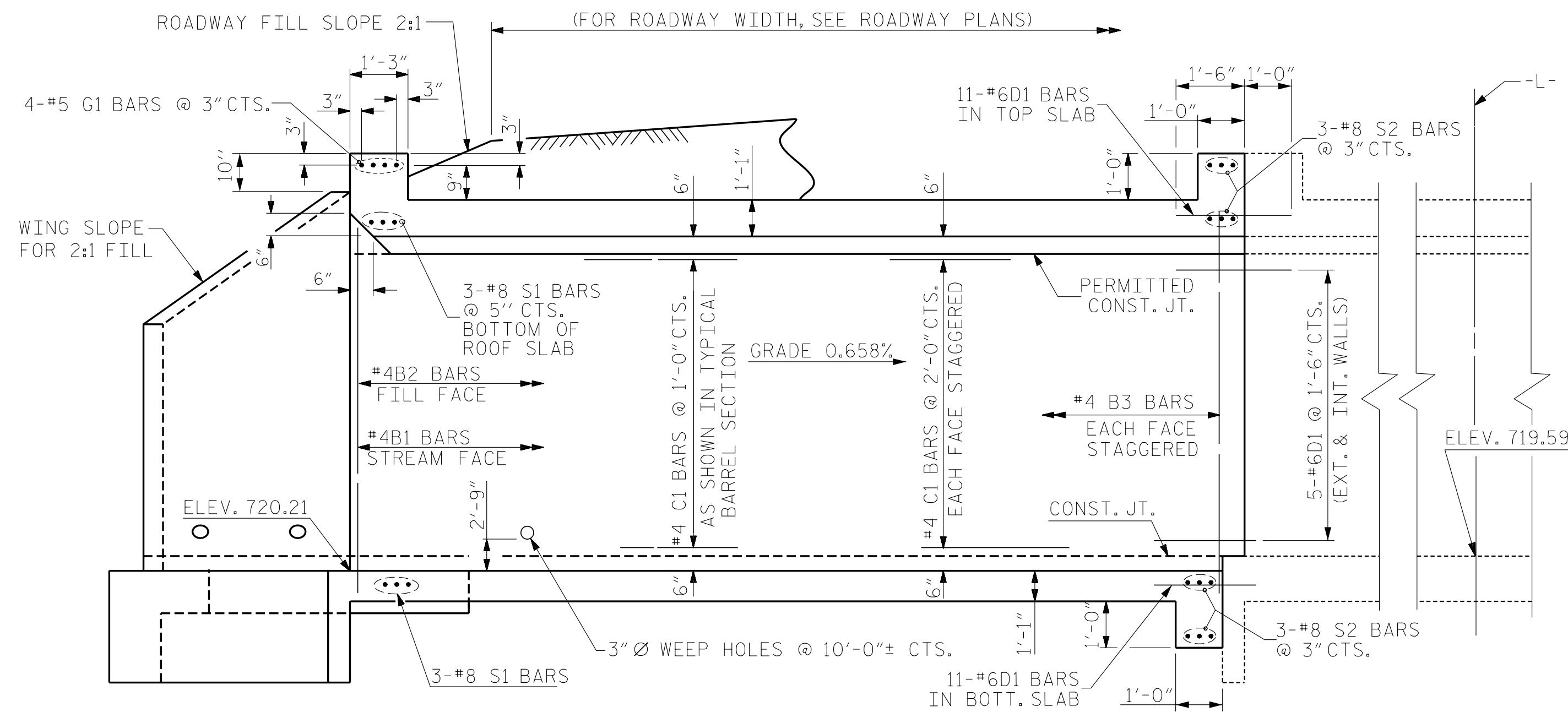
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PROJECT NO. U-5738
ROWAN COUNTY
 STATION: 41+20.00 -L-
 SHEET 1 OF 9

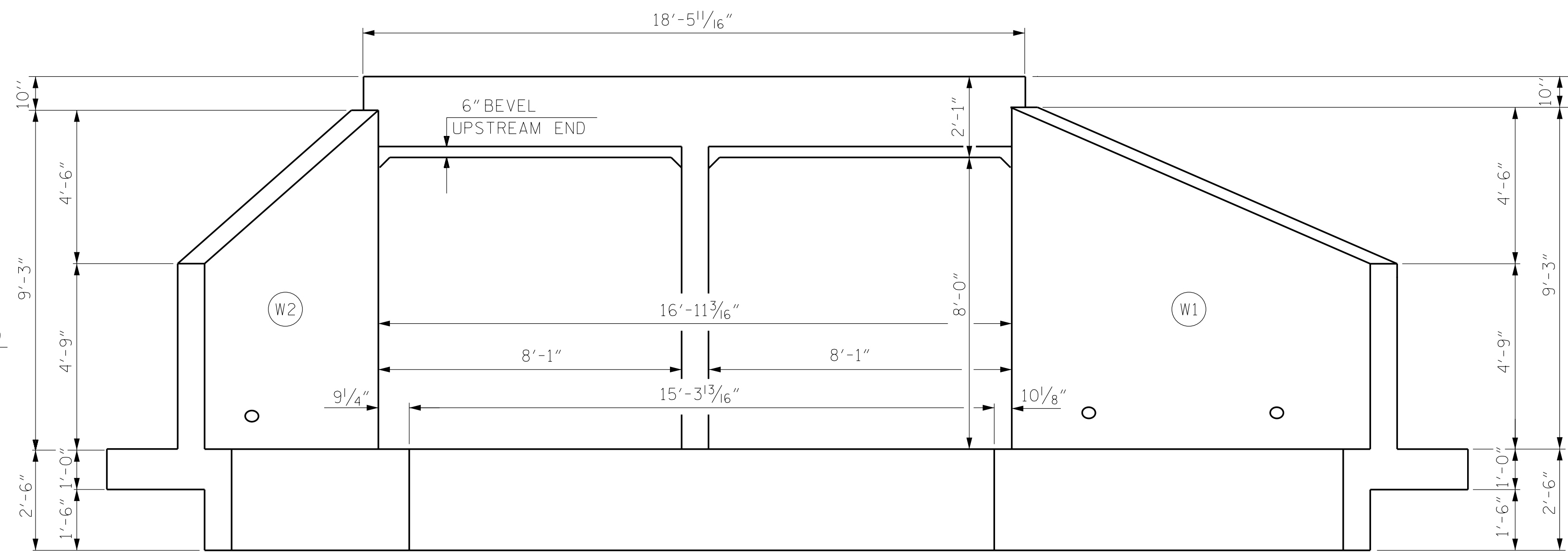
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 7FT. X 8FT. CONCRETE BOX CULVERT EXTENSION

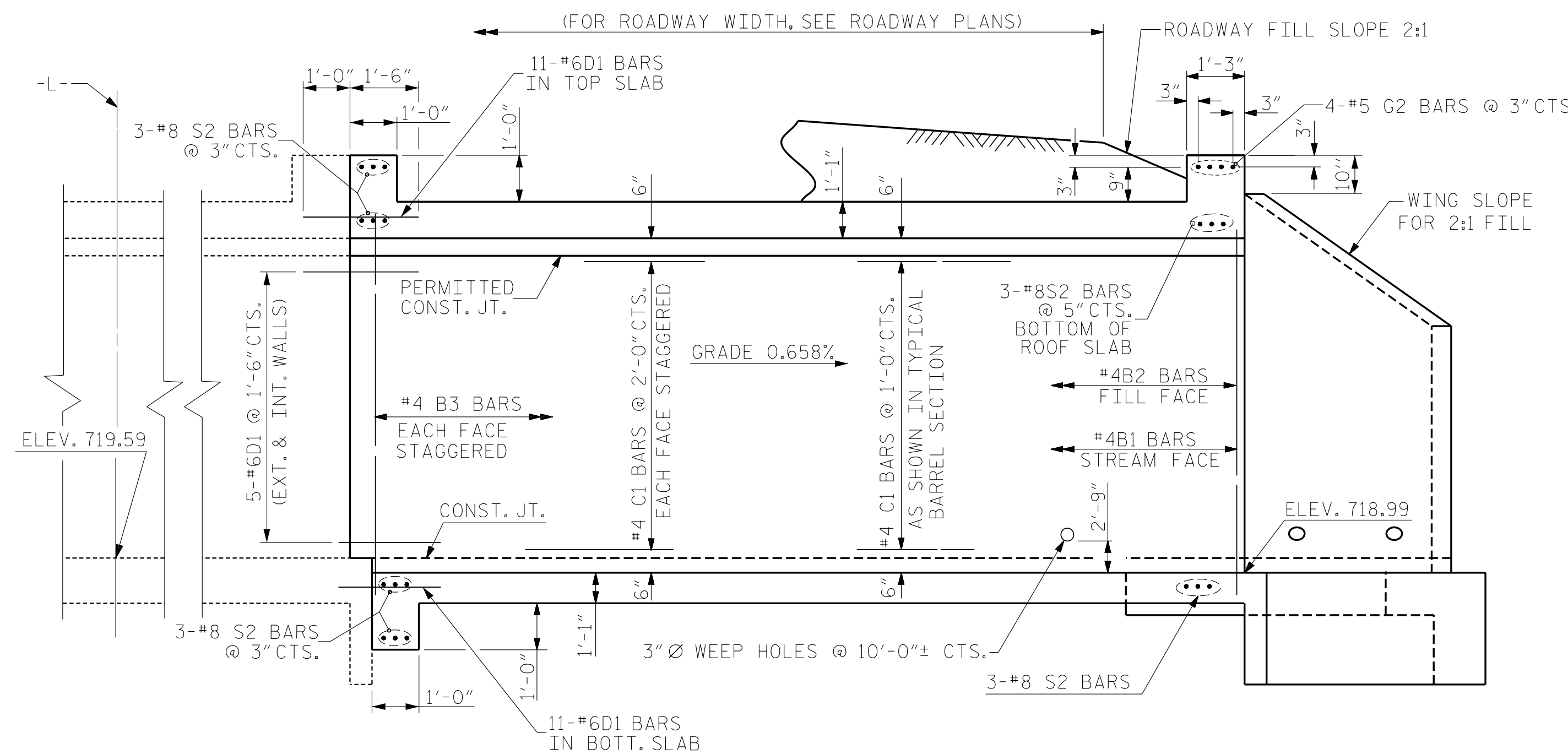
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CHKD. BY: HLW	DATE: 11/2017	NO. 1	BY: DATE:	TOTAL SHEETS 9
DES. EGR. OF RECORD: RTS	DATE: 11/2017	NO. 2	BY: DATE:	
		NO. 3	BY: DATE:	
		NO. 4	BY: DATE:	



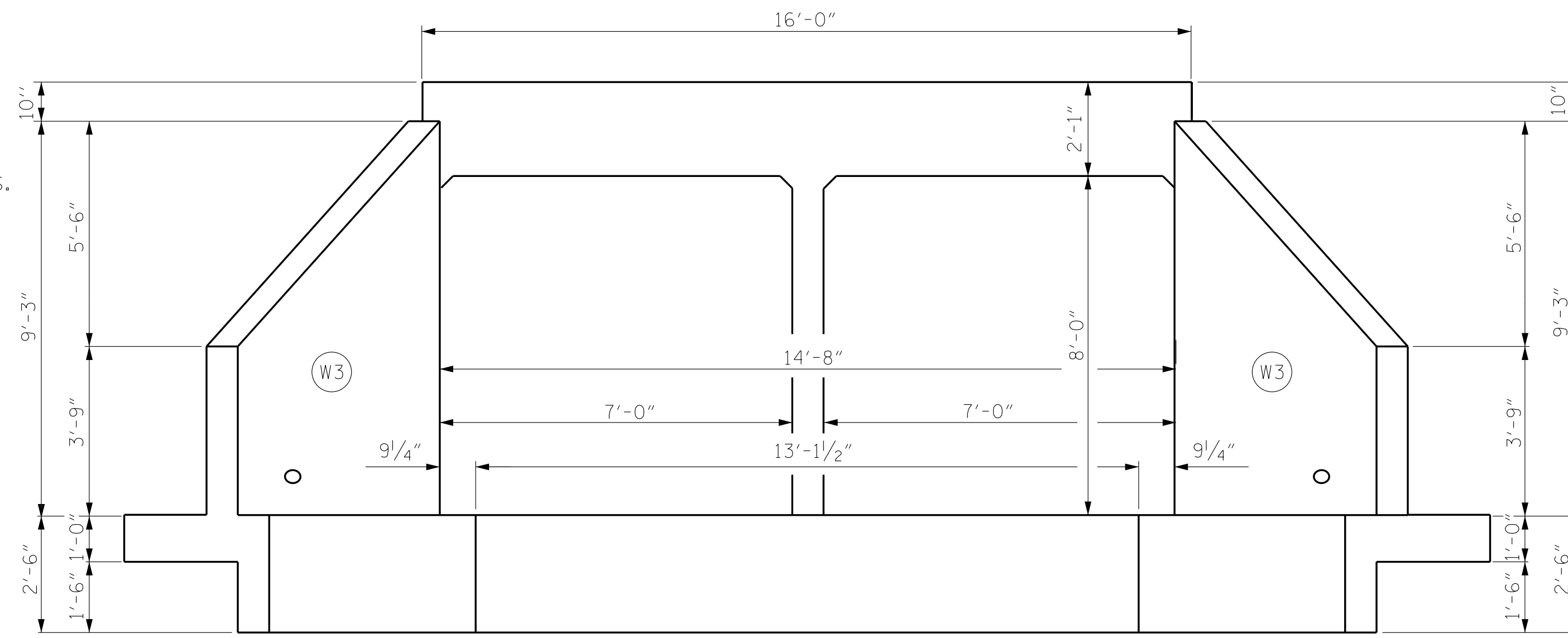
EXTERIOR WALL INTERIOR WALL
 CULVERT SECTION NORMAL TO ROADWAY
 (LEFT EXTENSION)



END ELEVATION NORMAL TO SKEW
 (LEFT EXTENSION)



INTERIOR WALL EXTERIOR WALL
 CULVERT SECTION NORMAL TO ROADWAY
 (RIGHT EXTENSION)



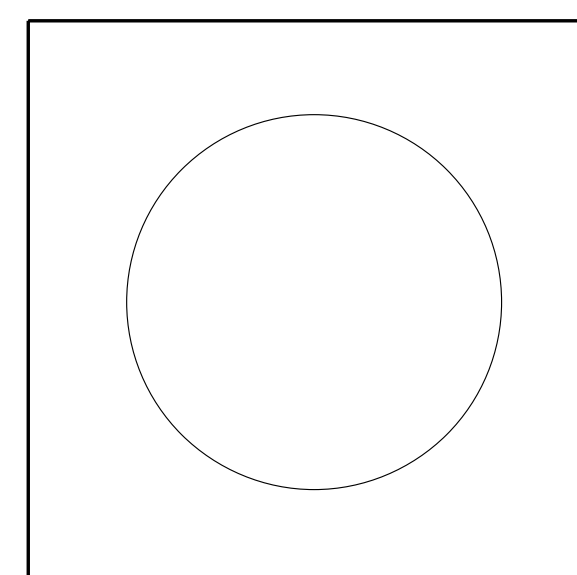
END ELEVATION NORMAL TO SKEW
 (RIGHT EXTENSION)

PROJECT NO. U-5738
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 STATION: 41+20.00 -L-

SHEET 2 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 7FT. X 8FT.
 CONCRETE BOX CULVERT
 EXTENSION

I HEREBY CERTIFY
 THAT THESE PLANS
 ARE THE
 AS-BUILT PLANS.



DESIGNED BY:
Handwritten signature
 0287FC023461...

12/13/2021

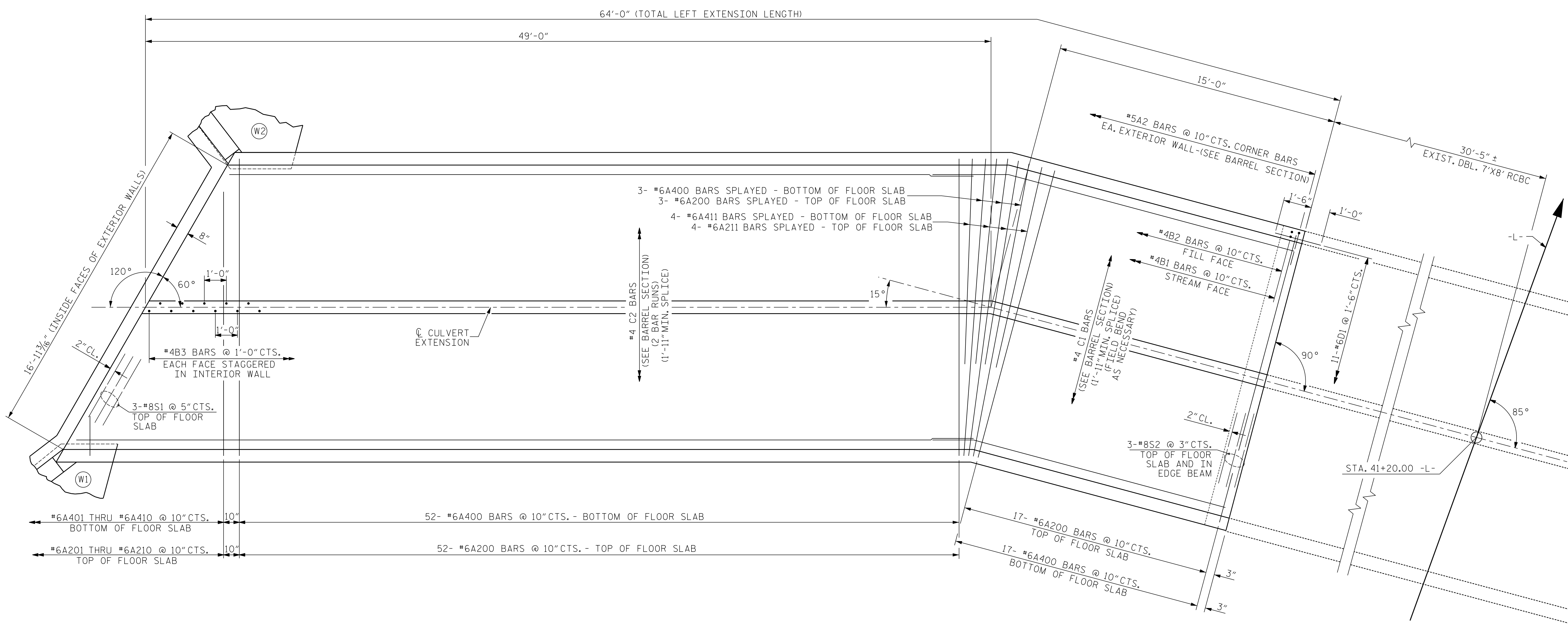
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2			4			9



PLAN - FLOOR SLAB

PROJECT NO. U-5738
 ROWAN COUNTY
 STATION: 41+20.00 -L-

SHEET 3 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 7FT. X 8FT.
 CONCRETE BOX CULVERT
 LEFT EXTENSION

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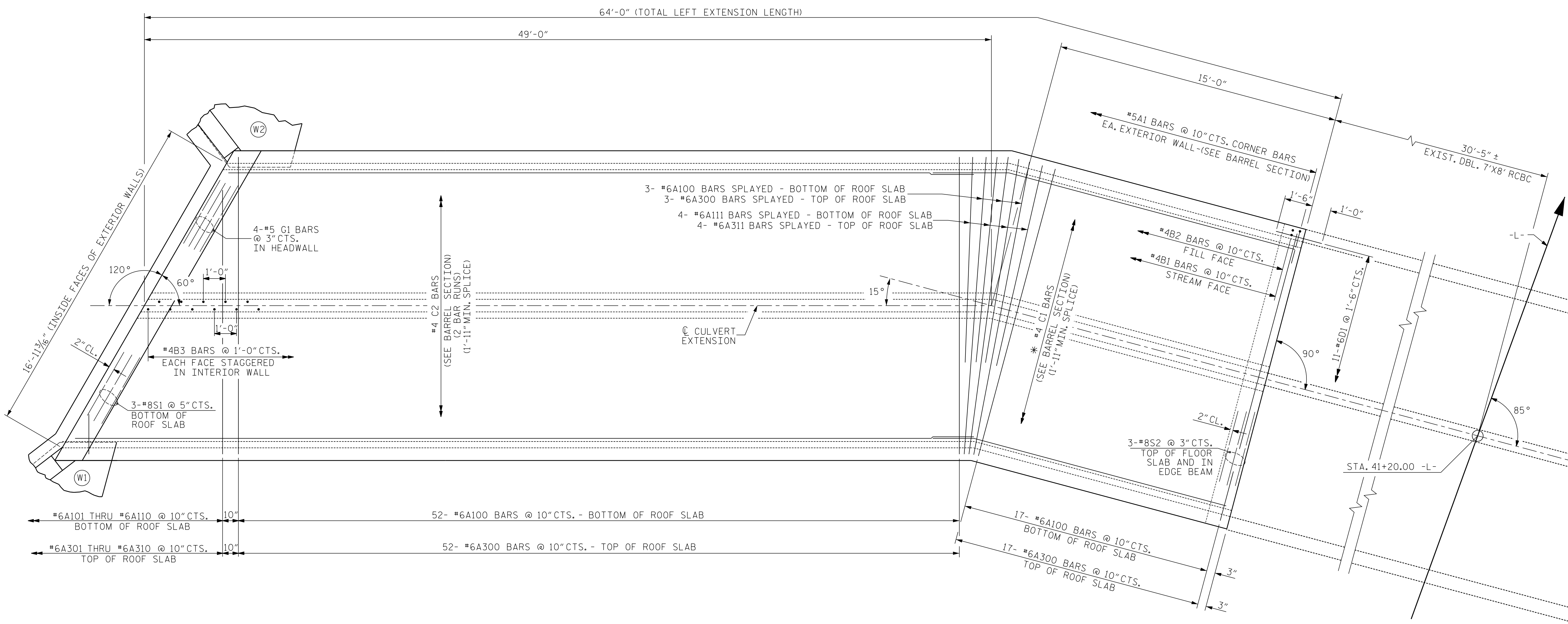
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PLAN - ROOF SLAB

* C1 BARS SHALL BE FIELD BENT AS NECESSARY

PROJECT NO. U-5738
 ROWAN COUNTY
 STATION: 41+20.00 -L-

SHEET 4 OF 9
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE 7FT. X 8FT.
 CONCRETE BOX CULVERT
 LEFT EXTENSION

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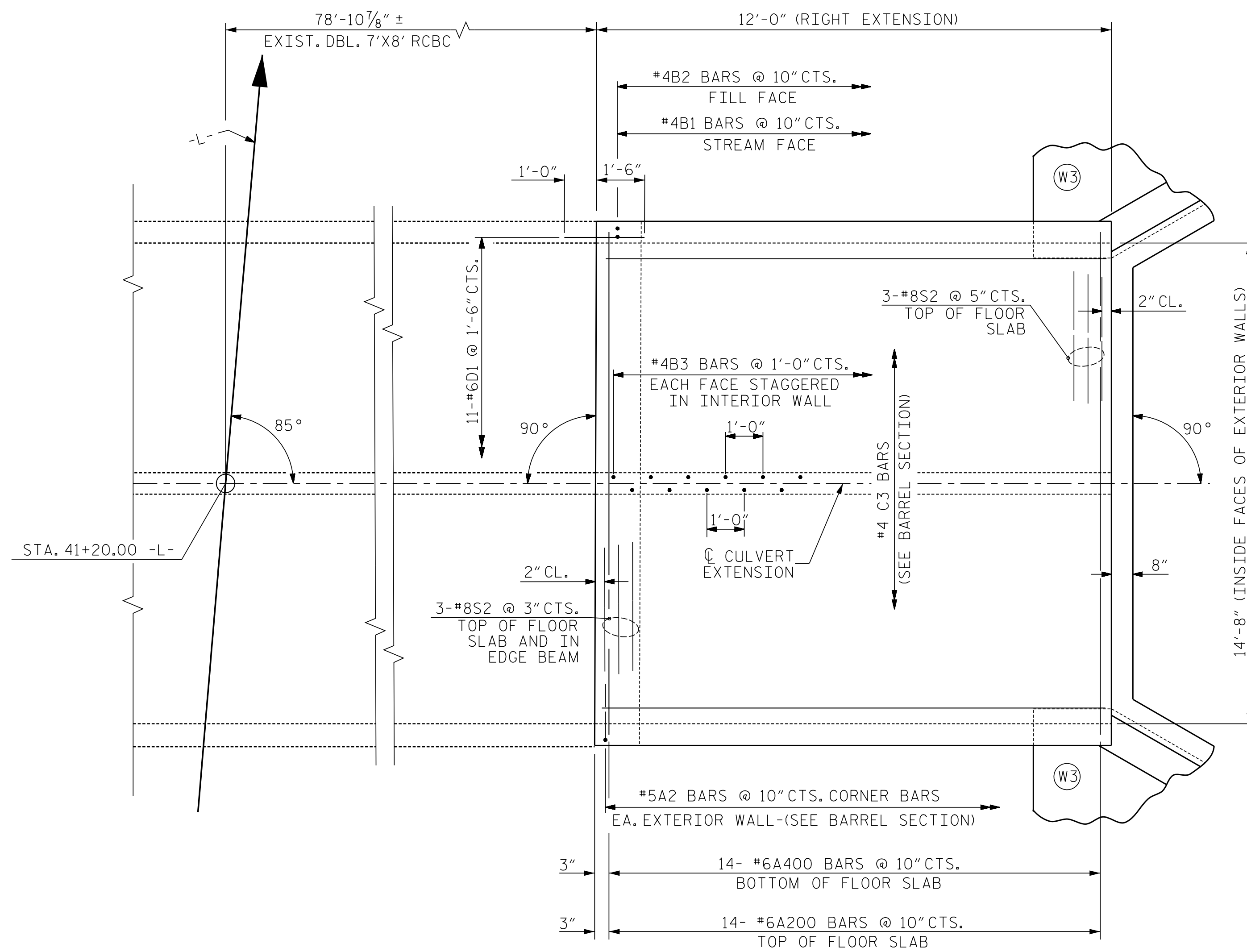
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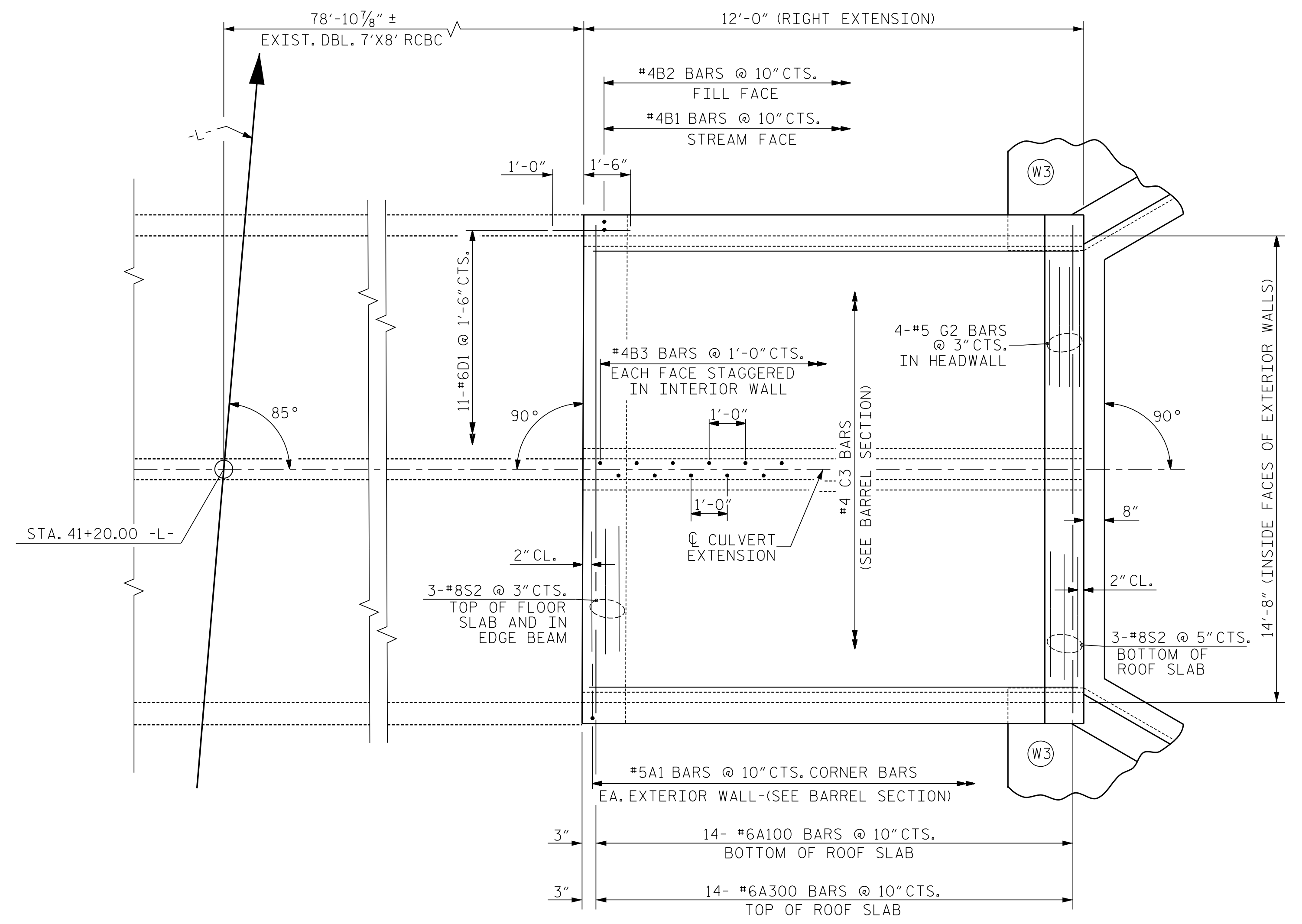
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PLAN - FLOOR SLAB



PLAN - ROOF SLAB

PROJECT NO. U-5738
 ROWAN COUNTY
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SHEET 5 OF 9

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE 7FT. X 8FT.
 CONCRETE BOX CULVERT
 RIGHT EXTENSION

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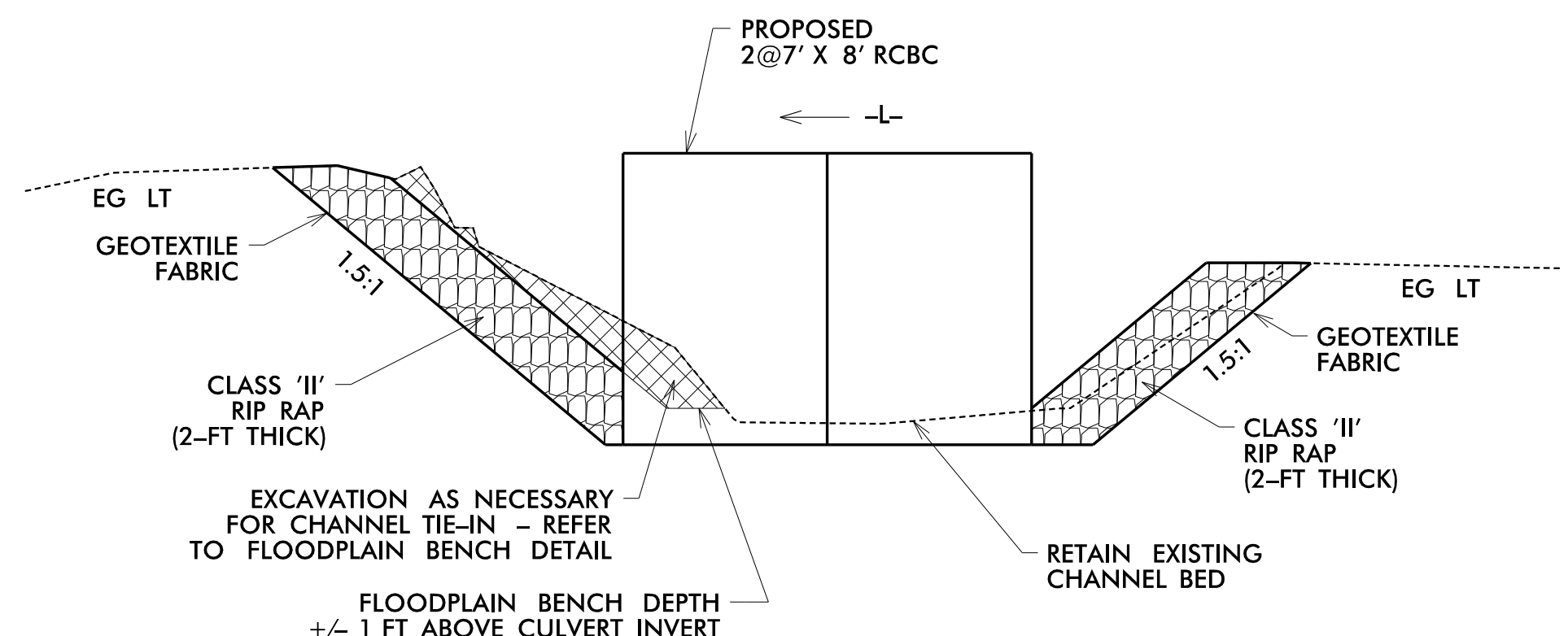


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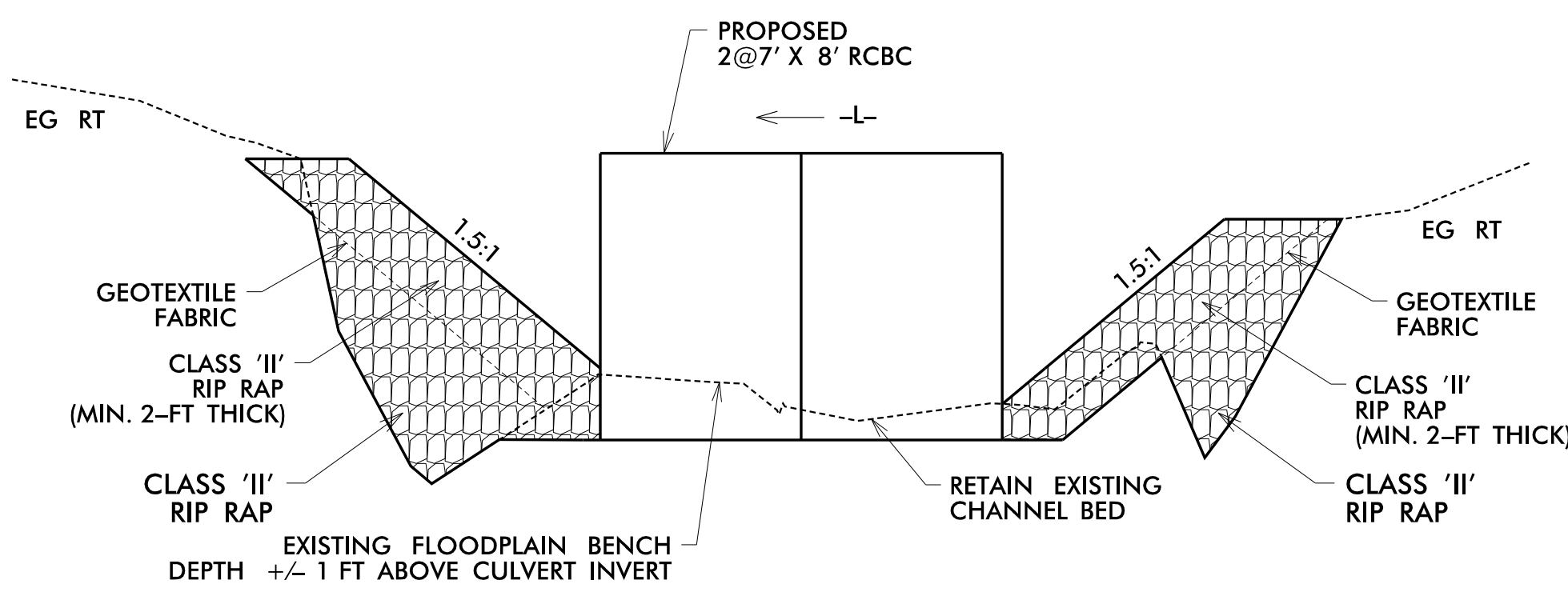
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INLET DETAIL

TOTAL EST. EXCAVATION AT INLET = 10 C.Y.
 TOTAL EST. CL II RIP RAP AT INLET = 75 TONS
 TOTAL EST. GEOTEXTILE AT INLET = 85 S.Y.
 TOTAL EST. COIR FIBER MAT = 40 S.Y.



OUTLET DETAIL

TOTAL EST. CL II RIP RAP AT INLET = 100 TONS
 TOTAL EST. GEOTEXTILE AT INLET = 85 S.Y.
 TOTAL EST. COIR FIBER MAT = 40 S.Y.

NATIVE BED MATERIAL SHALL BE PLACED ALONG THE FLOODPLAIN BENCH UP AND DOWNSTREAM OF THE PROPOSED CULVERT. NATIVE MATERIALS CONSIST OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP SHOULD BE USED TO SUPPLEMENT THE NATIVE MATERIAL. NATIVE MATERIAL SHOULD BE PLACED ON TOP OF RIP RAP TO FACILITATE ANIMAL PASSAGE. THE TOP SURFACE OF THE NATURAL STREAM BED MATERIAL SHALL BE PLACED AND LEVELED TO A FLAT SURFACE TO ALLOW FOR ANIMAL PASSAGE. NATIVE MATERIAL AND RIP RAP ARE SUBJECT TO PERMIT CONDITIONS.

NO SILLS ARE TO BE INSTALLED IN THE PROPOSED CULVERT. NO BACKFILL IS TO BE PLACED WITHIN THE PROPOSED CULVERT.

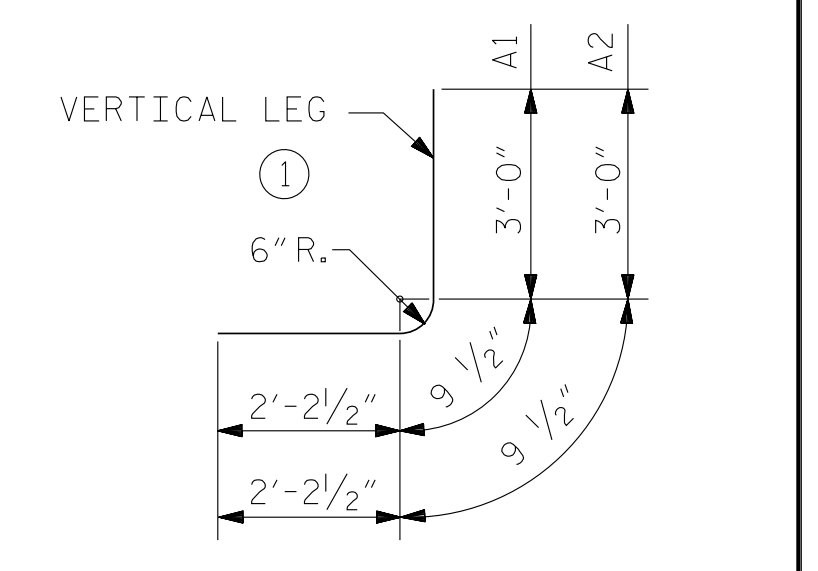
BED MATERIALS; SAND, SILT, COBBLE, SMALL BOULDERS.

MAINTAIN EXISTING FLOODPLAIN BENCH DEPTH OF +/- 1 FT UPSTREAM OF CULVERT INLET.

BILL OF MATERIAL

LEFT EXTENSION						RIGHT EXTENSION					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	152	#5	1	6'-0"	951	A1	28	#5	1	6'-0"	175
A2	152	#5	1	6'-0"	951	A2	28	#5	1	6'-0"	175
A100	72	#6	STR	15'-8"	1694	A100	14	#6	STR	15'-8"	329
A101	1	#6	STR	14'-4"	22	A200	14	#6	STR	15'-8"	329
A102	1	#6	STR	12'-11"	19	A300	14	#6	STR	15'-8"	329
A103	1	#6	STR	11'-6"	17	A400	14	#6	STR	15'-8"	329
A104	1	#6	STR	10'-0"	15						
A105	1	#6	STR	8'-7"	13	B1	28	#4	STR	9'-9"	182
A106	1	#6	STR	7'-2"	11	B2	28	#4	STR	7'-3"	136
A107	1	#6	STR	5'-8"	9	B3	12	#4	STR	9'-9"	78
A108	1	#6	STR	4'-3"	6						
A109	1	#6	STR	2'-10"	4	C3	104	#4	STR	11'-7"	805
A110	1	#6	STR	1'-4"	2						
A111	4	#6	STR	10'-10"	65	D1	37	#6	STR	2'-6"	139
A200	72	#6	STR	15'-8"	1694	G2	4	#5	STR	15'-8"	65
A201	1	#6	STR	14'-4"	22						
A102	1	#6	STR	12'-11"	19	S2	18	#8	STR	15'-8"	753
A203	1	#6	STR	11'-6"	17						
A204	1	#6	STR	10'-0"	15						
A205	1	#6	STR	8'-7"	13						
A206	1	#6	STR	7'-2"	11						
A207	1	#6	STR	5'-8"	9						
A208	1	#6	STR	4'-3"	6						
A209	1	#6	STR	2'-10"	4						
A210	1	#6	STR	1'-4"	2						
A211	4	#6	STR	10'-10"	65						
A300	72	#6	STR	15'-8"	1694						
A301	1	#6	STR	14'-4"	22						
A302	1	#6	STR	12'-11"	19						
A303	1	#6	STR	11'-6"	17						
A304	1	#6	STR	10'-0"	15						
A305	1	#6	STR	8'-7"	13						
A306	1	#6	STR	7'-2"	11						
A307	1	#6	STR	5'-8"	9						
A308	1	#6	STR	4'-3"	6						
A309	1	#6	STR	2'-10"	4						
A310	1	#6	STR	1'-4"	2						
A311	4	#6	STR	10'-10"	65						
A400	72	#6	STR	15'-8"	1694						
A401	1	#6	STR	14'-4"	22						
A402	1	#6	STR	12'-11"	19						
A403	1	#6	STR	11'-6"	17						
A404	1	#6	STR	10'-0"	15						
A405	1	#6	STR	8'-7"	13						
A406	1	#6	STR	7'-2"	11						
A407	1	#6	STR	5'-8"	9						
A408	1	#6	STR	4'-3"	6						
A409	1	#6	STR	2'-10"	4						
A410	1	#6	STR	1'-4"	2						
A411	4	#6	STR	10'-10"	65						
B1	154	#4	STR	9'-9"	1003						
B2	154	#4	STR	7'-3"	746						
B3	64	#4	STR	9'-9"	417						
C1	104	#4	STR	20'-0"	1389						
C2	208	#4	STR	25'-1"	3485						
D1	37	#6	STR	2'-6"	139						
G1	4	#5	STR	18'-0"	75						
S1	6	#8	STR	18'-0"	288						
S2	12	#8	STR	15'-8"	502						
REINFORCING STEEL						17,454					

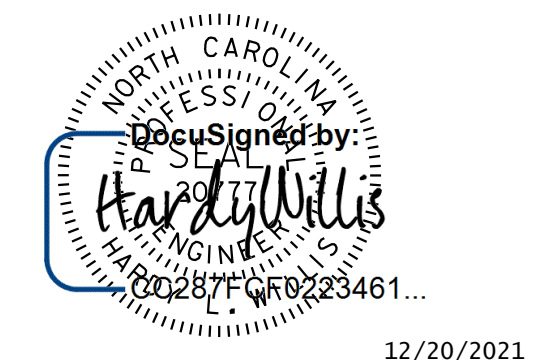
BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTHS		
BAR MARK	SIZE	SPLICE LENGTH
B1	#4	1'-9"
B3	#4	1'-9"
C1	#4	1'-11"

REINFORCING STEEL 3,824



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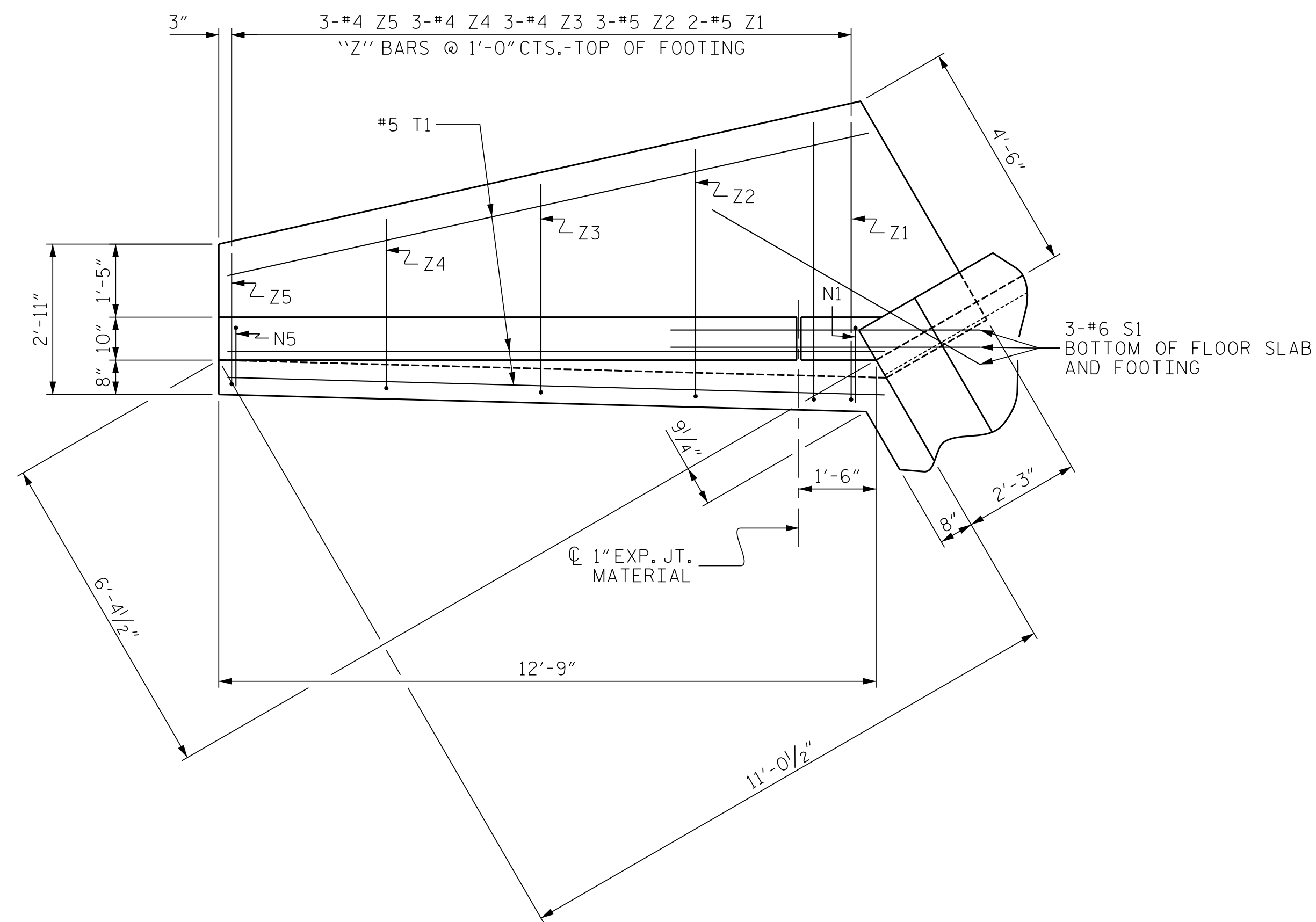
SHEET 6 OF 9

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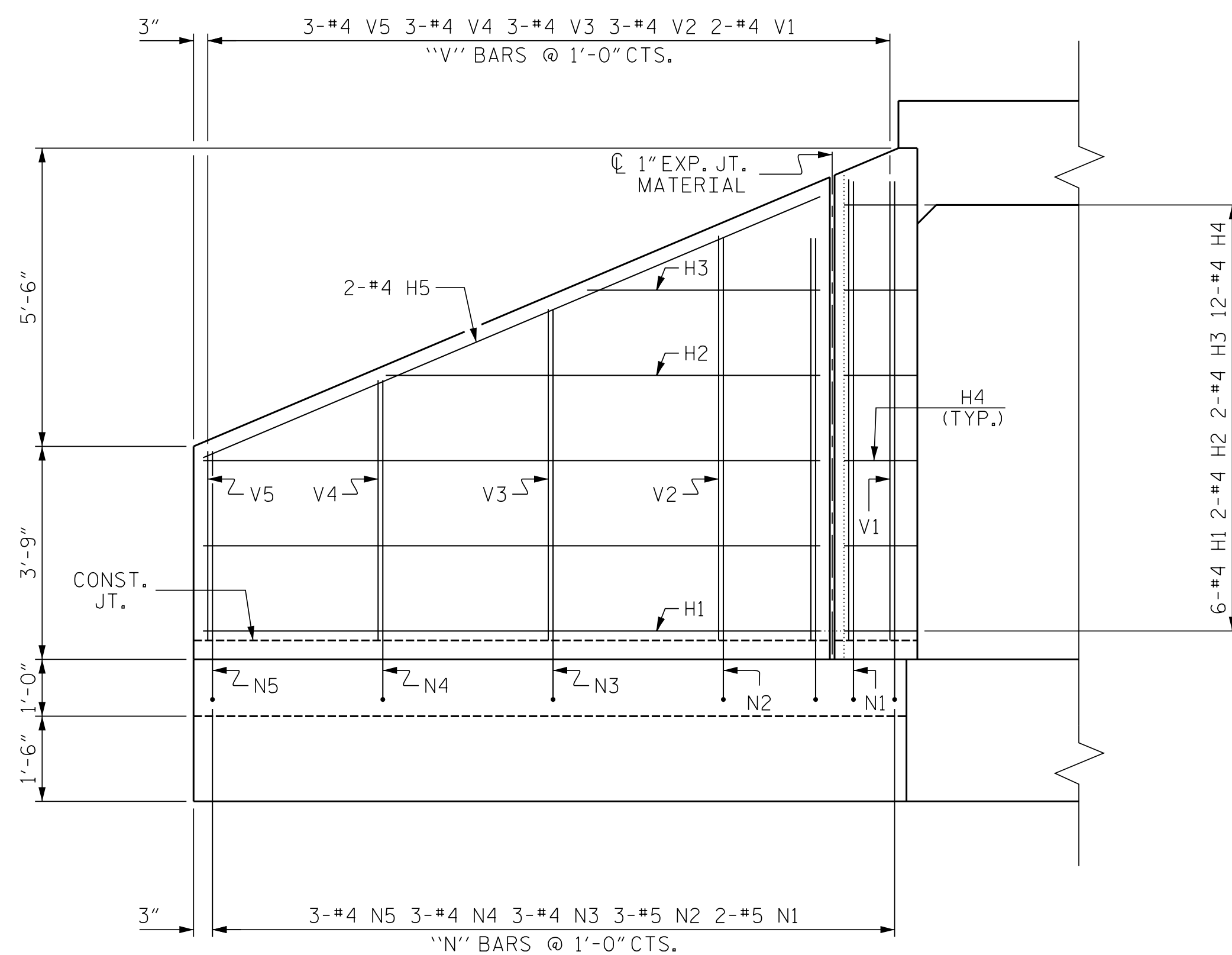
DOUBLE 7FT. X 8FT. CONCRETE BOX CULVERT RIGHT EXTENSION

DWN. BY: WDC DATE: 10/2017
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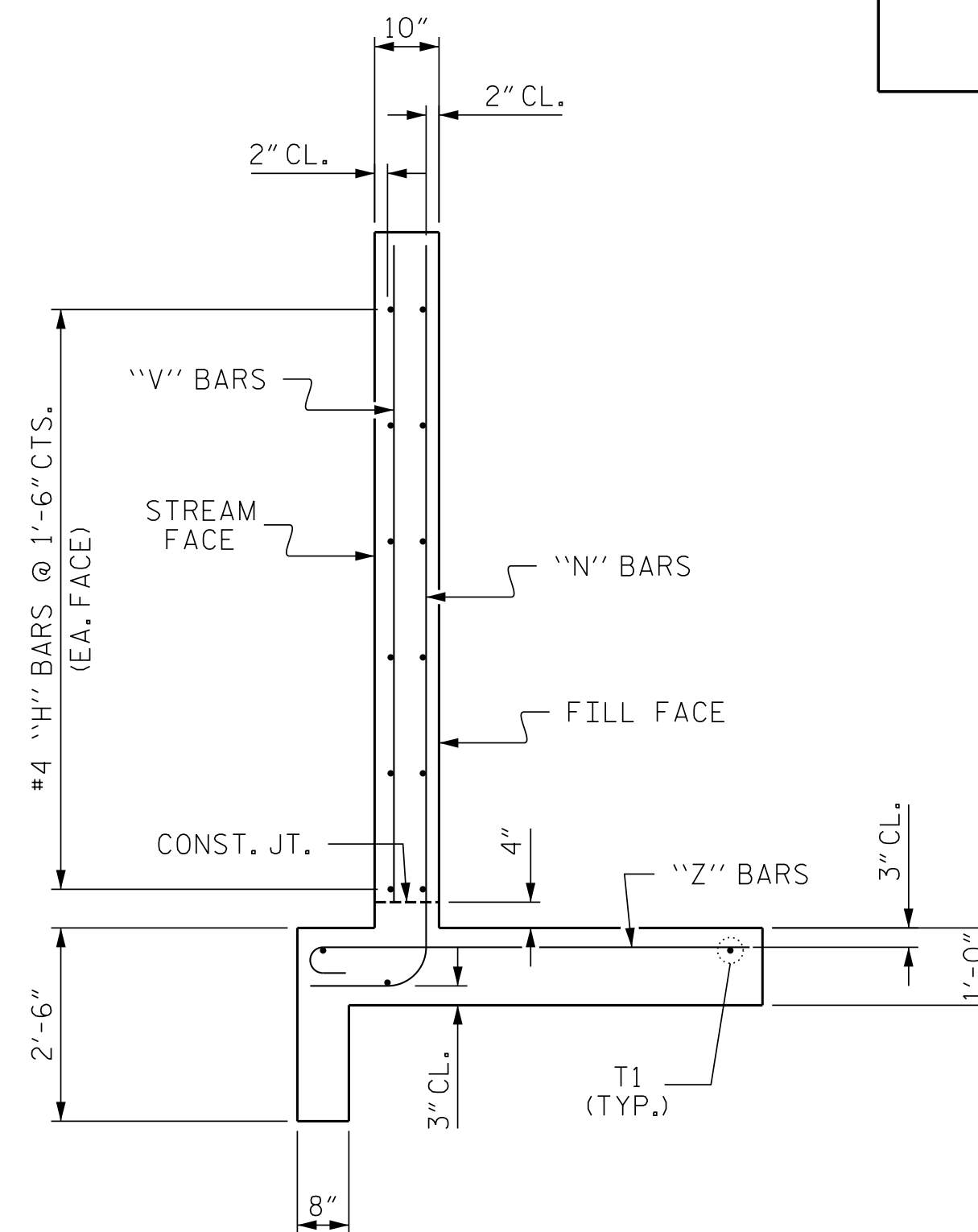
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PLAN W3



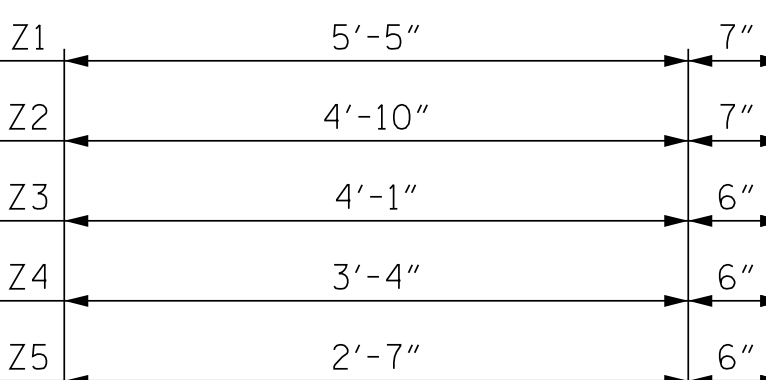
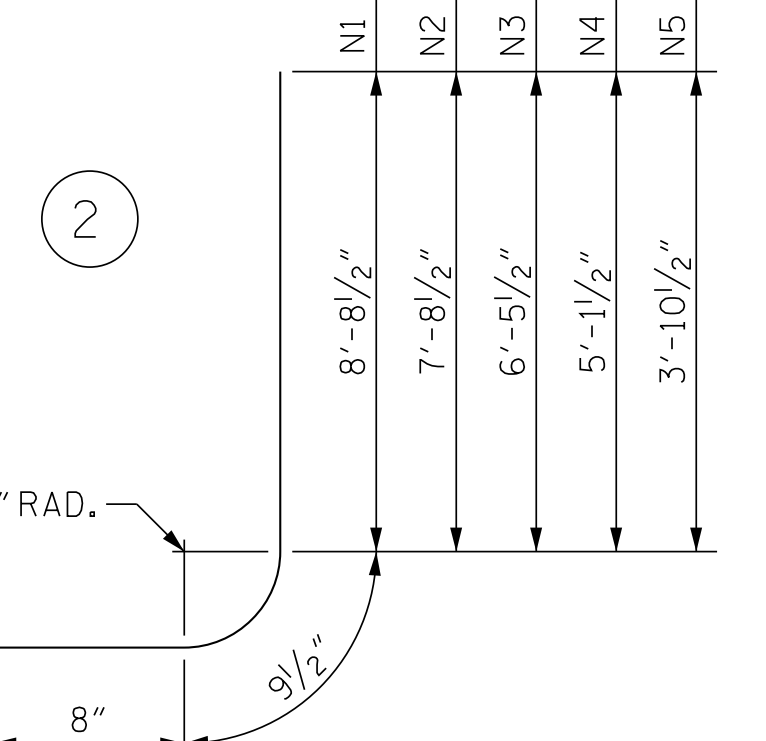
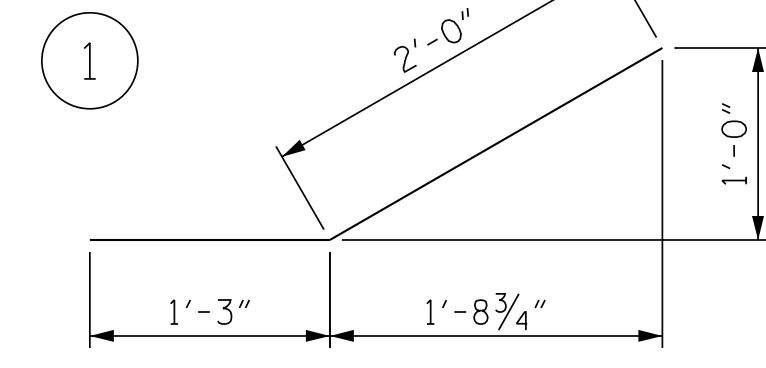
ELEVATION W3



TYPICAL WING SECTION

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BAR NO.	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 721 LBS

CLASS A CONCRETE
 2 WINGS 10.7 CY
 1 HEADWALL 0.7 CY
 1 END CURTAIN WALL 0.5 CY
 2 EDGE BEAMS 1.2 CY
 TOTAL 13.1 CY



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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PROJECT NO. U-5738
 ROWAN COUNTY
 STATION: 41+20.00 -L-

SHEET 8 OF 9

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-8
1			3			TOTAL SHEETS
2			4			9

STD. NO. CW9008

ASSEMBLED BY : WDC DATE : 10-2017
 CHECKED BY : RTS DATE : 11-2017
 DRAWN BY : CCJ 10/99 REV. 6/19 MAA/THC
 CHECKED BY : RWW 03/00

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	①	1.22	--	1.75	2.46	1	TOP SLAB	7.33	1.22	1	TOP SLAB	7.33		
	HL-93 (OPERATING)	N/A		1.58	--	1.35	3.19	1	TOP SLAB	7.33	1.58	1	TOP SLAB	7.33		
	HS-20 (INVENTORY)	36.000	②	1.22	43.92	1.75	2.46	1	TOP SLAB	7.33	1.22	1	TOP SLAB	7.33		
	HS-20 (OPERATING)	36.000		1.58	56.88	1.35	3.19	1	TOP SLAB	7.33	1.58	1	TOP SLAB	7.33		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.02	27.27	1.40	6.27	1	EXT. WALL	8.54'	2.02	1	EXT. WALL	0.54'	
		SNGARBS2	20,000		2.09	41.80	1.40	4.73	1	TOP SLAB	7.33	2.09	1	EXT. WALL	0.54'	
		SNAGRIS2	22,000		2.11	46.42	1.40	4.48	1	TOP SLAB	7.33	2.11	1	EXT. WALL	0.54'	
		SNCOTTS3	27,250		1.93	52.59	1.40	3.43	1	TOP SLAB	7.33	1.93	1	TOP SLAB	7.33	
		SNAGGRS4	34,925		1.56	54.48	1.40	2.92	1	TOP SLAB	7.33	1.56	1	TOP SLAB	7.33	
		SNS5A	35,550		1.62	57.59	1.40	2.96	1	TOP SLAB	7.33	1.62	1	TOP SLAB	7.33	
		SNS6A	39,950		1.50	59.93	1.40	2.72	1	TOP SLAB	7.33	1.50	1	TOP SLAB	7.33	
	SNS7B	42,000		1.46	61.32	1.40	2.64	1	TOP SLAB	7.33	1.46	1	TOP SLAB	7.33		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		1.79	59.07	1.40	3.23	1	TOP SLAB	7.33	1.79	1	TOP SLAB	7.33	
		TNT4A	33,075		1.80	59.54	1.40	3.23	1	TOP SLAB	7.33	1.80	1	TOP SLAB	7.33	
		TNT6A	41,600		1.47	61.15	1.40	2.75	1	TOP SLAB	7.33	1.47	1	TOP SLAB	7.33	
		TNT7A	42,000		1.46	61.32	1.40	2.75	1	TOP SLAB	7.33	1.46	1	TOP SLAB	7.33	
		TNT7B	42,000		1.53	64.26	1.40	2.86	1	TOP SLAB	7.33	1.53	1	TOP SLAB	7.33	
		TNAGRIT4	43,000		1.43	61.49	1.40	2.58	1	TOP SLAB	7.33	1.43	1	TOP SLAB	7.33	
TNAGT5A		45,000		1.60	72.00	1.40	2.76	1	TOP SLAB	7.33	1.60	1	TOP SLAB	7.33		
TNAGT5B	45,000		③	1.34	60.30	1.40	2.42	1	TOP SLAB	7.33	1.34	1	TOP SLAB	7.33		

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	--

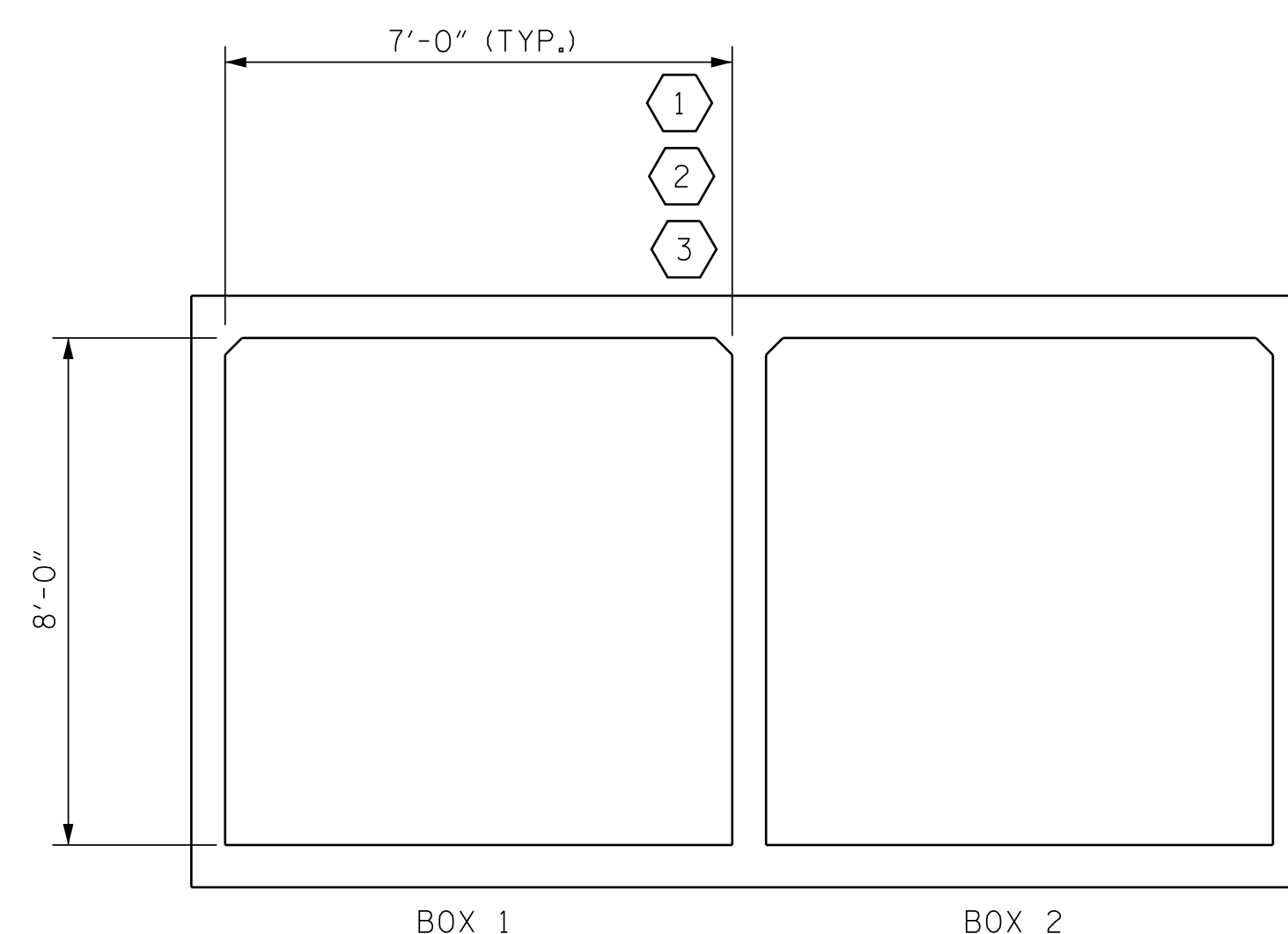
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

①	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)



12/13/2021

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT NO. U-5738
ROWAN COUNTY
STATION: 41+20.00 -L-

SHEET 9 OF 9

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Atlanta, GA 770-827-3509

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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-9
1			3			TOTAL SHEETS
2			4			9

STD. NO. LRFR5

ASSEMBLED BY : WDC	DATE : 10-2017
CHECKED BY : RTS	DATE : 11-2017
DRAWN BY : WMC 7/11	REV. 10/1/11 MAA/GM
CHECKED BY : GM 7/11	REV. 12/17 MAA/THC

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 2018 "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 $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$ " 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 $\frac{1}{4}$ " 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 $\frac{7}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset 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 $\frac{3}{16}$ " 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 $\frac{1}{16}$ " 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