

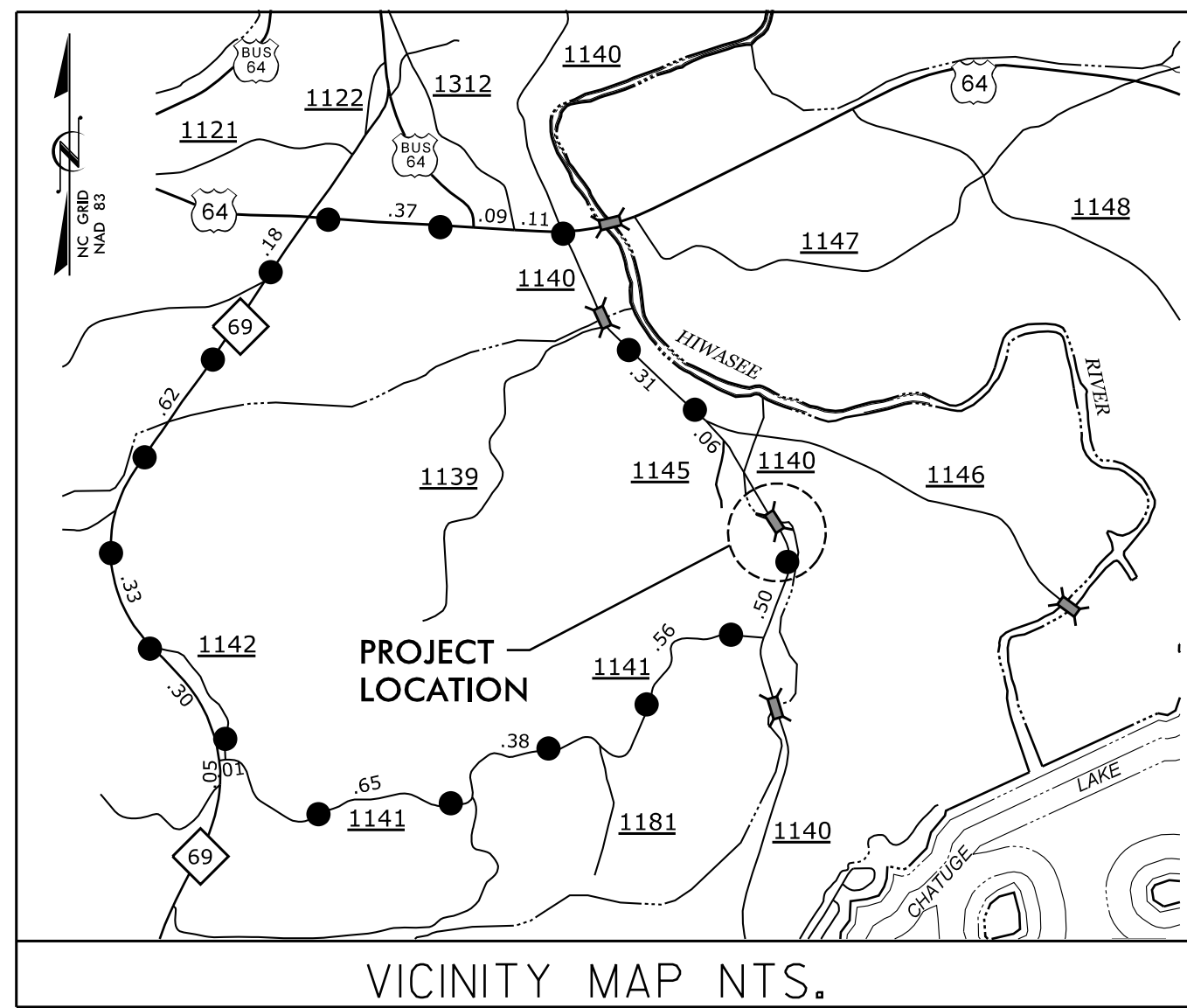
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CONTRACT: DN00125 TIP NO: 14SP.20221.1/2

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	14SP.20221.1/2		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
14SP.20221.1/2	N/A	P.E.	
14SP.20221.1/2	N/A	RW & UTIL.	
14SP.20221.1/2	N/A	CONST.	

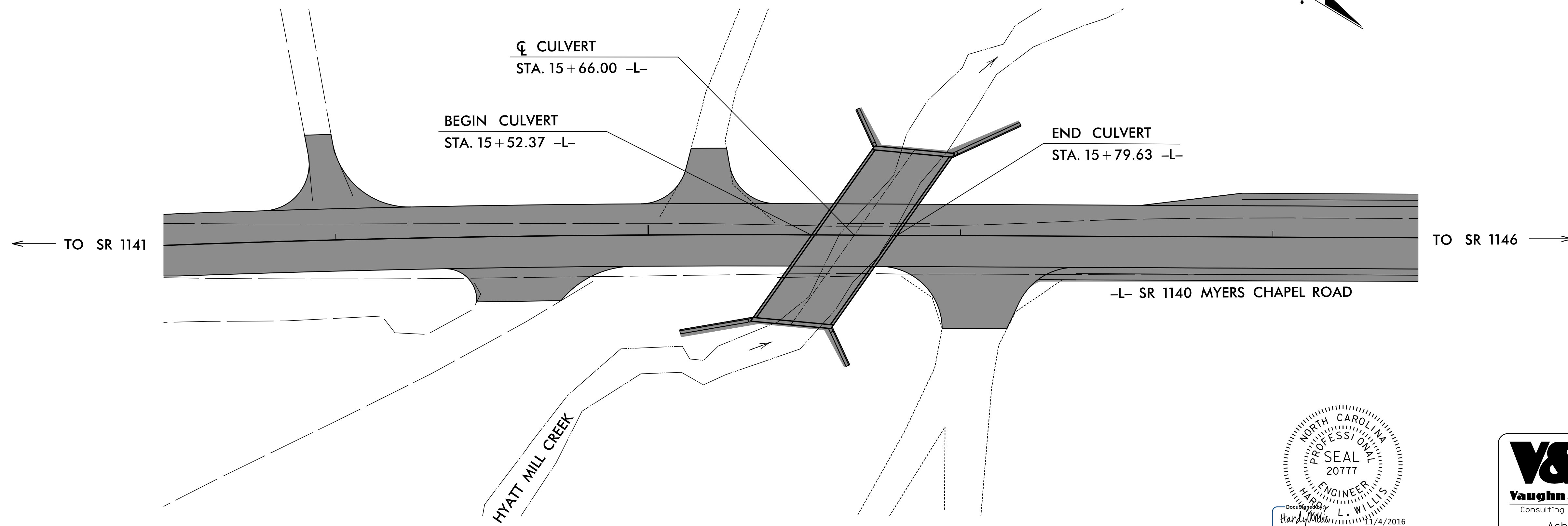


VICINITY MAP NTS.

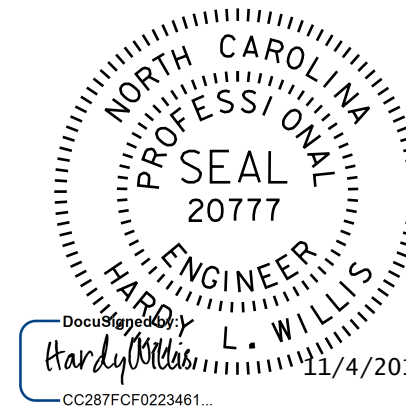
--- DETOUR ROUTE

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS
CLAY COUNTY

REPLACES BRIDGE 87 OVER HYATT MILL CREEK
 ON SR 1140 BETWEEN SR 1146 AND SR 1141



CULVERT



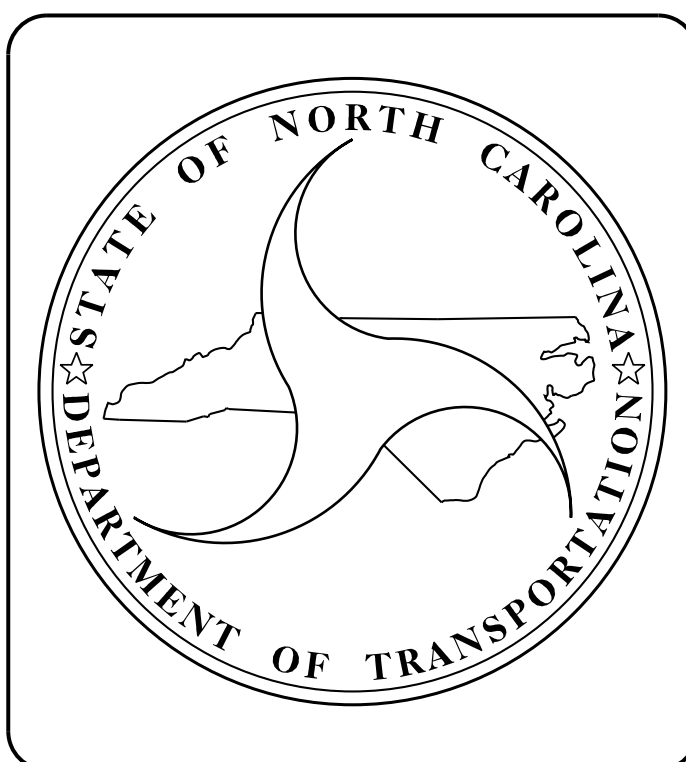
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DESIGN DATA

ADT 2010 = 690
 ADT 2025 = 1100

T = 6 %
 V = 50 MPH

FUNC CLASS =
 MINOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY PROJECT
 14SP.20221.1/2 = 0.213 MI.

LENGTH STRUCTURE PROJECT
 14SP.20221.2 = 0.005 MI.

TOTAL LENGTH PROJECT
 14SP.20221.1/2 = 0.218 MI.

Prepared in the Office of:
VAUGHN & MELTON
 1318-F PATTON AVE.
 ASHEVILLE, NC, 28806

FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

LETTING DATE :

HARDY L. WILLIS, PE
 PROJECT ENGINEER

CHARLES J. RICE, EI
 PROJECT DESIGN ENGINEER

STRUCTURES MANAGEMENT UNIT
 1000 BIRCH RIDGE DR.
 RALEIGH, N.C. 27610

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

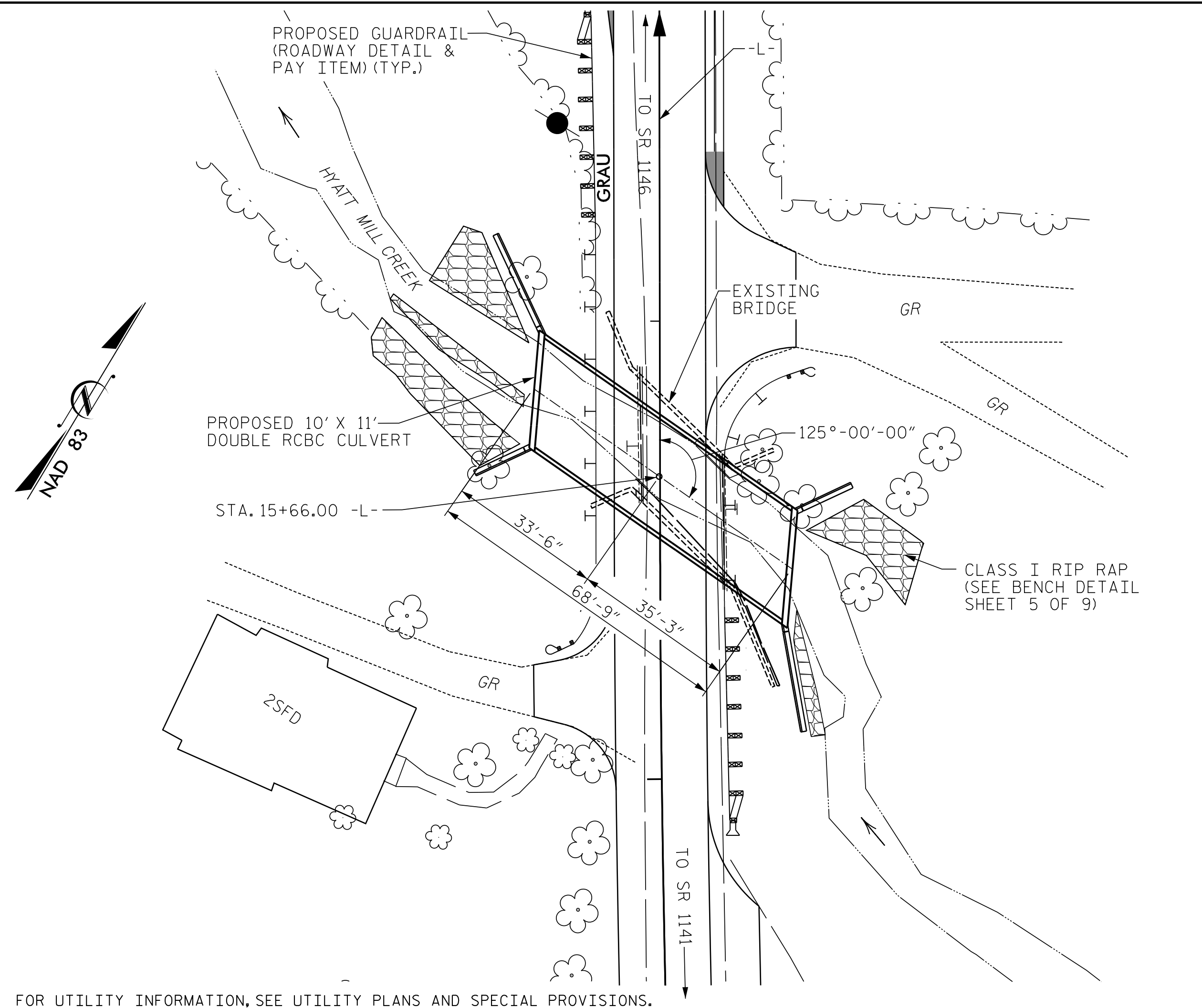
JOSH DEYTON P.E.
 STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION

APPROVED
 DIVISION ADMINISTRATOR

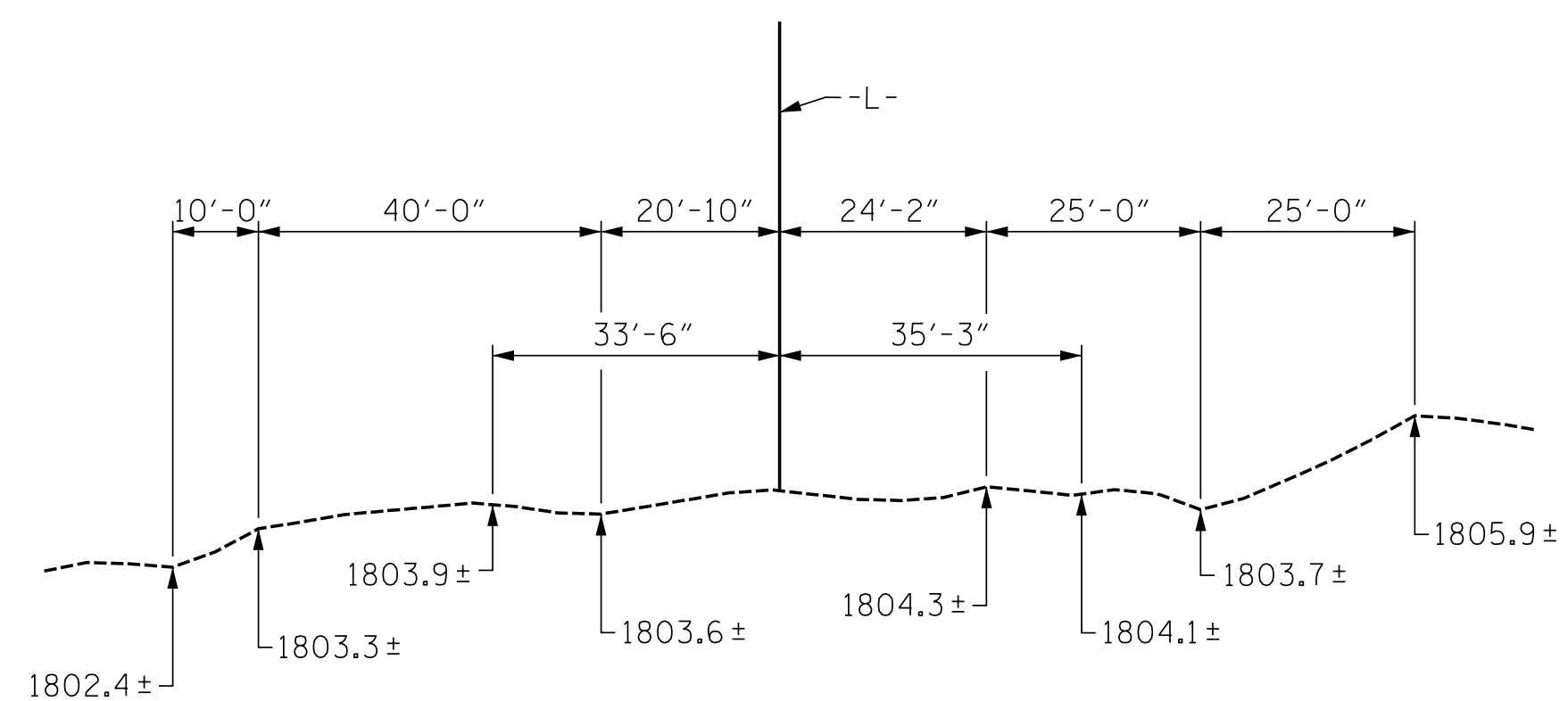
DATE

BM #4: 8" SPIKE IN BASE OF 18" WALNUT, 58.08' LEFT OF -L- STA. 17+16.26
 N 499083, E 562943 EL. 1817.26'



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

— LOCATION SKETCH —



PROFILE ALONG CULVERT

NOTES

ASSUMED LIVE LOAD -----HL-93 OR ALTERNATE LOADING.
 DESIGN FILL-----MAX. = 5.31' MIN. = 4.57'
 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.

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.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION ACTIVITIES, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 THE EXISTING STRUCTURE CONSISTING OF 1 SPAN @ 30'-0", WITH A CLEAR ROADWAY WIDTH OF 17'-11", WITH REINFORCED CONCRETE DECK GIRDERS AND CONCRETE ABUTMENTS, AND LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED.

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

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

EXCAVATE 1'-0" MIN. BENEATH CULVERT FOOTING AND REPLACE WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 414 OF THE STANDARD SPECIFICATIONS.

GRADE DATA

GRADE POINT ELEV. @ STA. 15+66.00 -L- = 1819.9
 BED ELEV. @ STA. 15+66.00 -L- = 1802.7 ±
 ROADWAY SLOPES 2:1

HYDRAULIC DATA		
DESIGN DISCHARGE	= 950	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1811.3	FT
DRAINAGE AREA	= 3.3	SO. MI.
BASE DISCHARGE	= 1626	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1814.11	FT
OVERTOPPING DISCHARGE	= 2900	CFS
OVERTOPPING FREQUENCY	= 500 +	YRS
OVERTOPPING ELEVATION	= 1819.7	FT
W.S. ELEVATION AT DATE OF SURVEY	= 1804.8	FT
	DATE: 10-9-12	

TOTAL STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @ 2.68 C.Y./FT.	184.3	C.Y.	
SILLS	1.5	C.Y.	
WINGS, ETC.	63.6	C.Y.	
TOTAL	249.4	C.Y.	
REINFORCING STEEL			
BARREL	19,474	LBS.	
WINGS	3,982	LBS.	
TOTAL	23,456	LBS.	
CULVERT EXCAVATION		LUMP SUM	
FOUNDATION CONDITIONING MATERIAL	108	TONS	
REMOVAL OF EXISTING STRUCTURE		LUMP SUM	
RIP RAP CLASS 1	108	TONS	
GEOTEXTILE MATERIAL UNDER RIP RAP	100.6	S.Y.	
ASBESTOS ASSESSMENT		LUMP SUM	
CHANNEL SUBSTRATE MATERIAL	94	TONS	

PROJECT NO. 14SP.20221.1/.2
 CLAY COUNTY
 STATION: 15+66.00 -L-

SHEET 1 OF 10 REPLACES BRIDGE NO. 87

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE BARREL
 10' X 11' RCBC
 125° SKEW
 HYATT MILL CREEK

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS 19
2			4			

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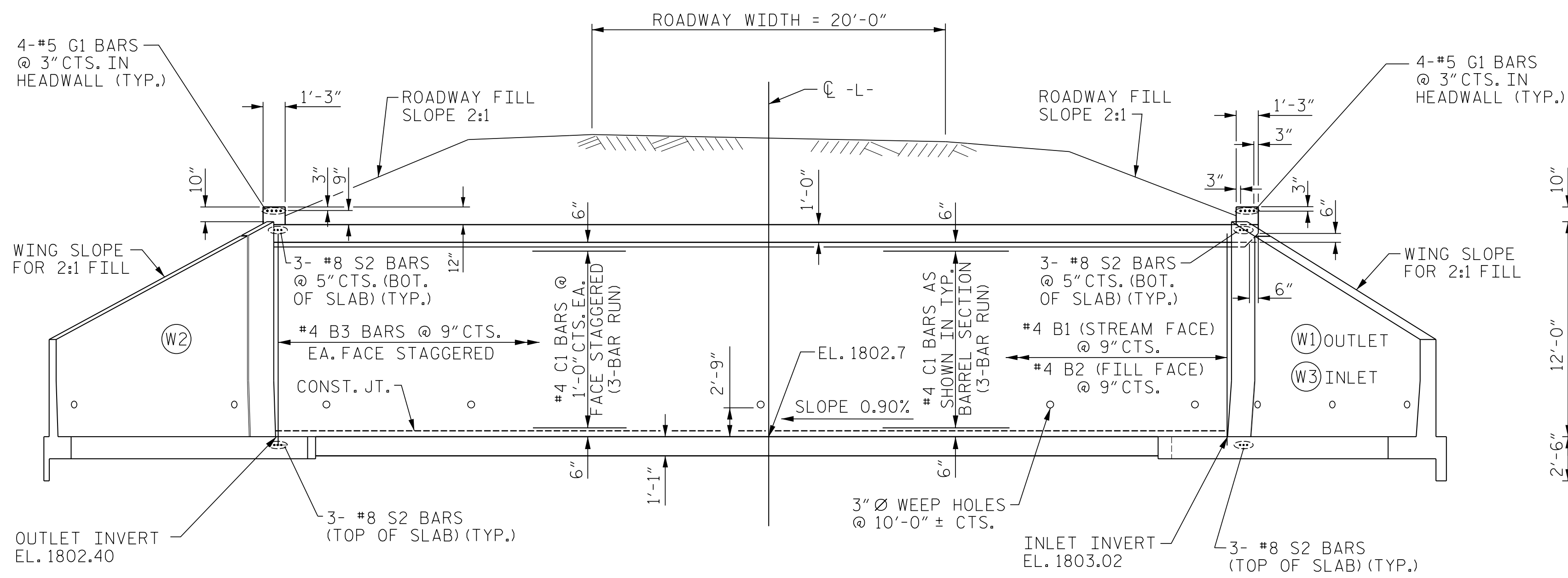
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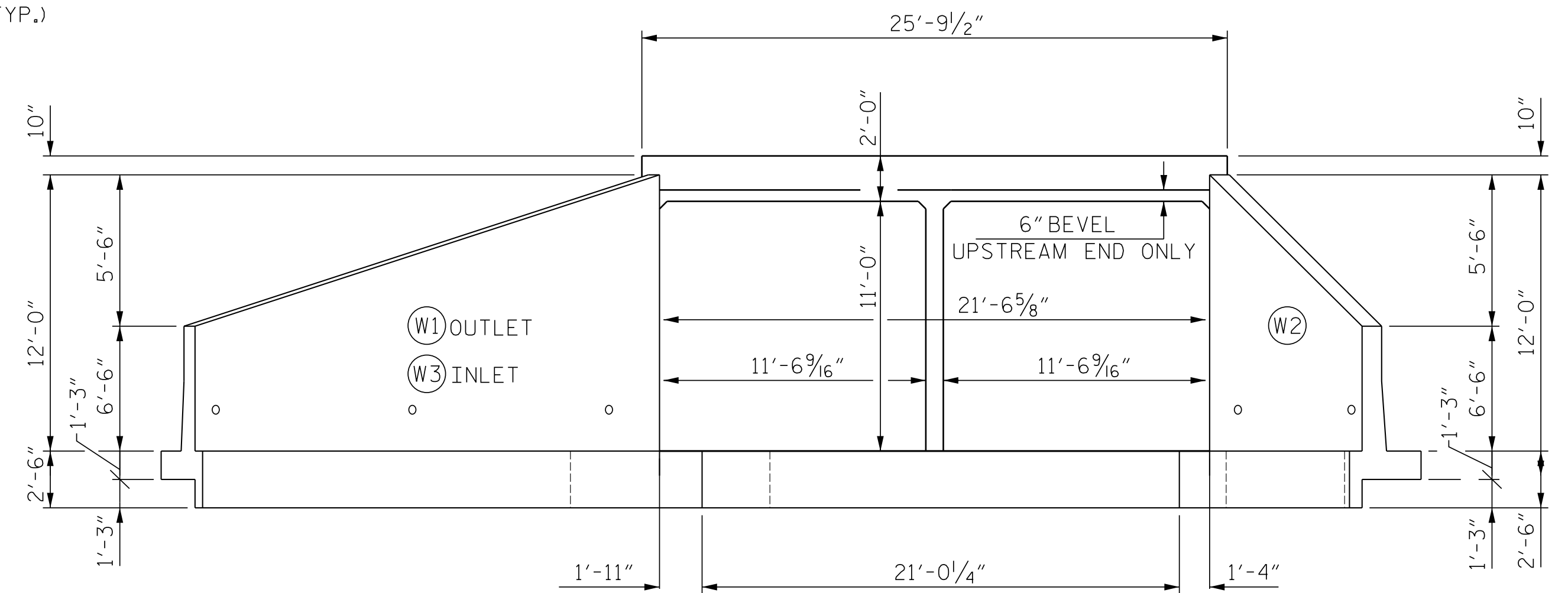
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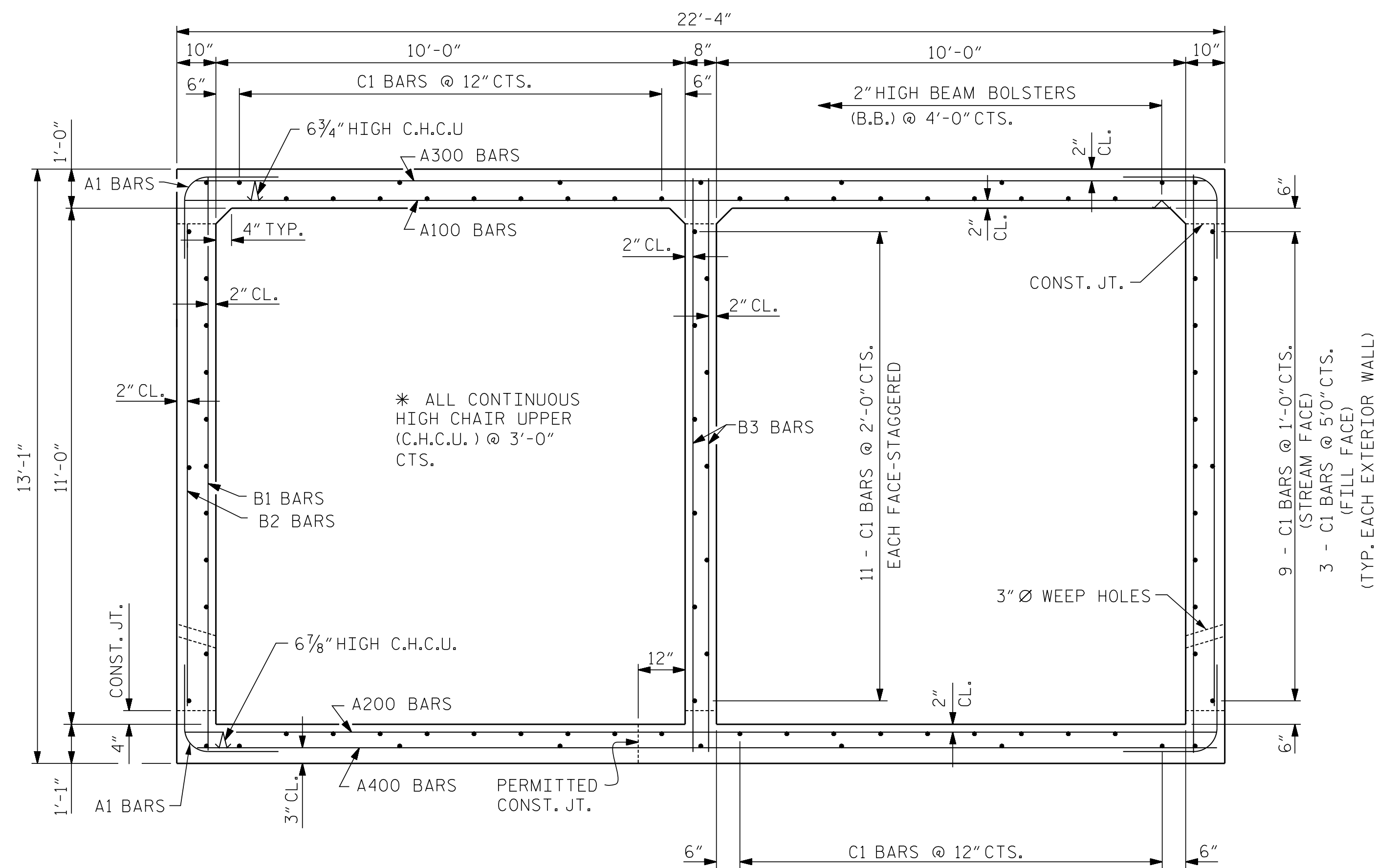


INTERIOR WALL EXTERIOR WALL

CULVERT SECTION NORMAL TO ROADWAY

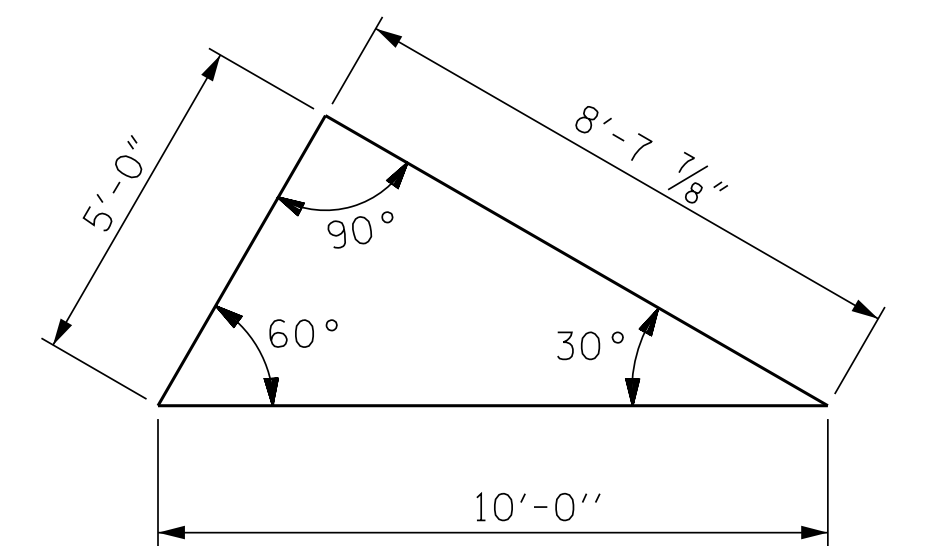


END ELEVATION NORMAL TO SKEW



RIGHT ANGLE SECTION OF BARREL

THERE ARE 89 "C" BARS IN SECTION OF BARREL.



SKEW TRIANGLE

PROJECT NO. 14SP.20221.1/.2
 CLAY COUNTY
 STATION: 15+66.00 -L-

SHEET 2 OF 10

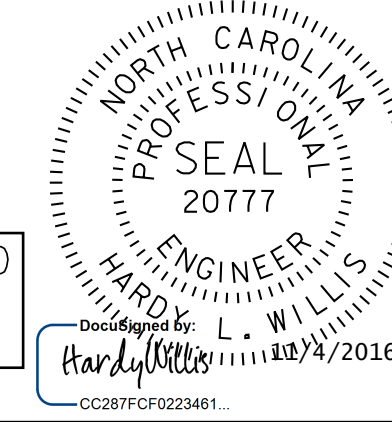
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DOUBLE BARREL
 10' X 11' RCBC
 125° SKEW
 HYATT MILL CREEK

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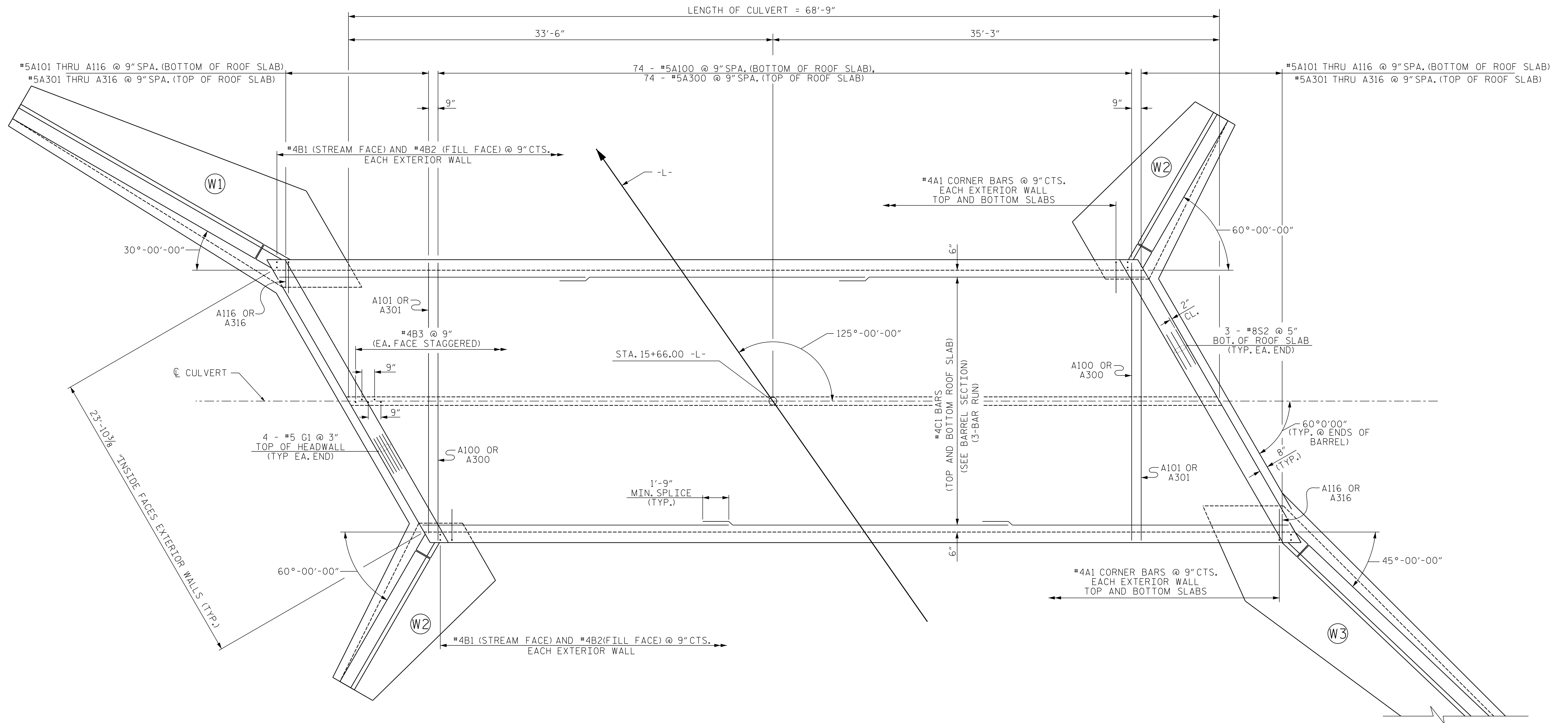


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 DATE: 7/14

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2	
1			3			TOTAL SHEETS	
2			4			19	



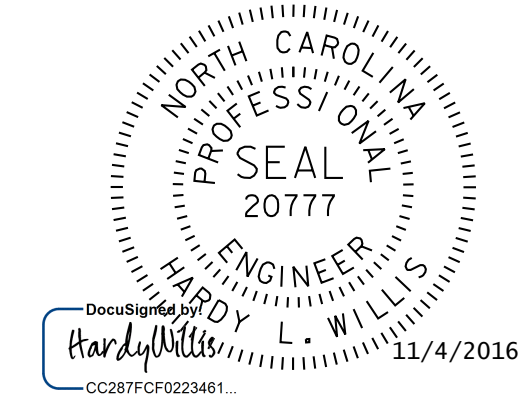
ROOF SLAB PLAN

PROJECT NO. 14SP.20221.1/.2
 CLAY COUNTY
 STATION: 15+66.00 -L-

SHEET 3 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE BARREL
 10' X 11' RCBC
 125° SKEW
 HYATT MILL CREEK



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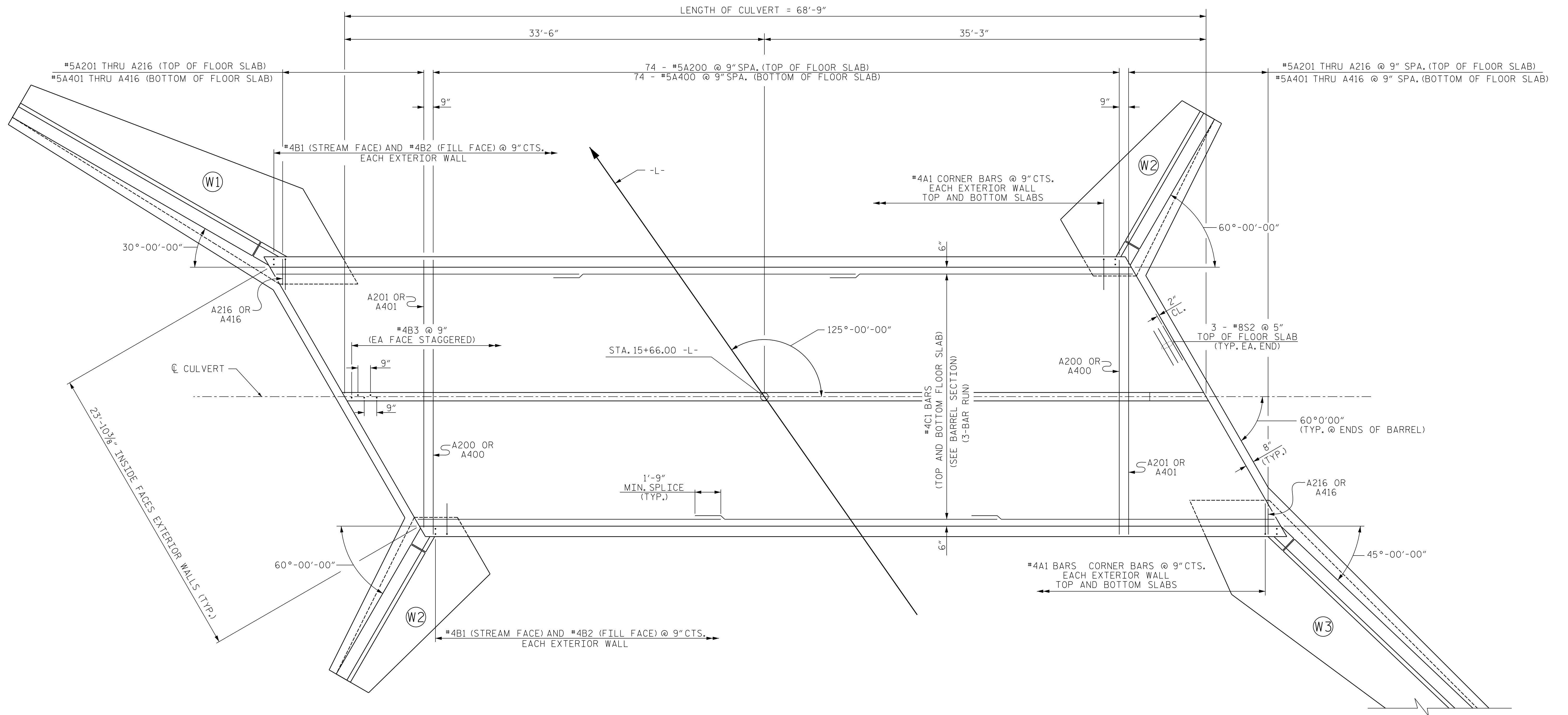
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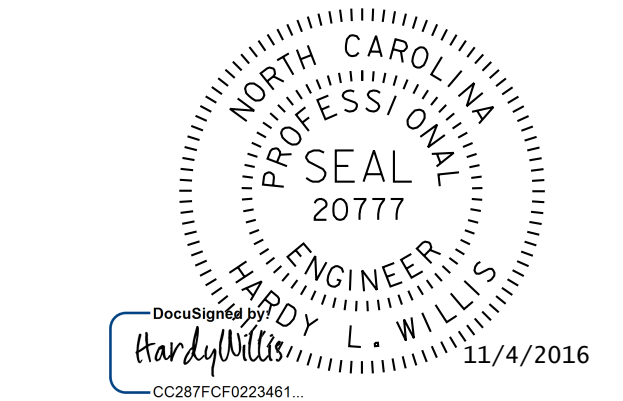
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-3
1			3			TOTAL SHEETS
2			4			19



FLOOR SLAB PLAN

PROJECT NO. 14SP.20221.1/.2
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 STATION: 15+66.00 -L-

SHEET 4 OF 10



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STATE OF NORTH CAROLINA
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DOUBLE BARREL
 10' X 11' RCBC
 125° SKEW
 HYATT MILL CREEK

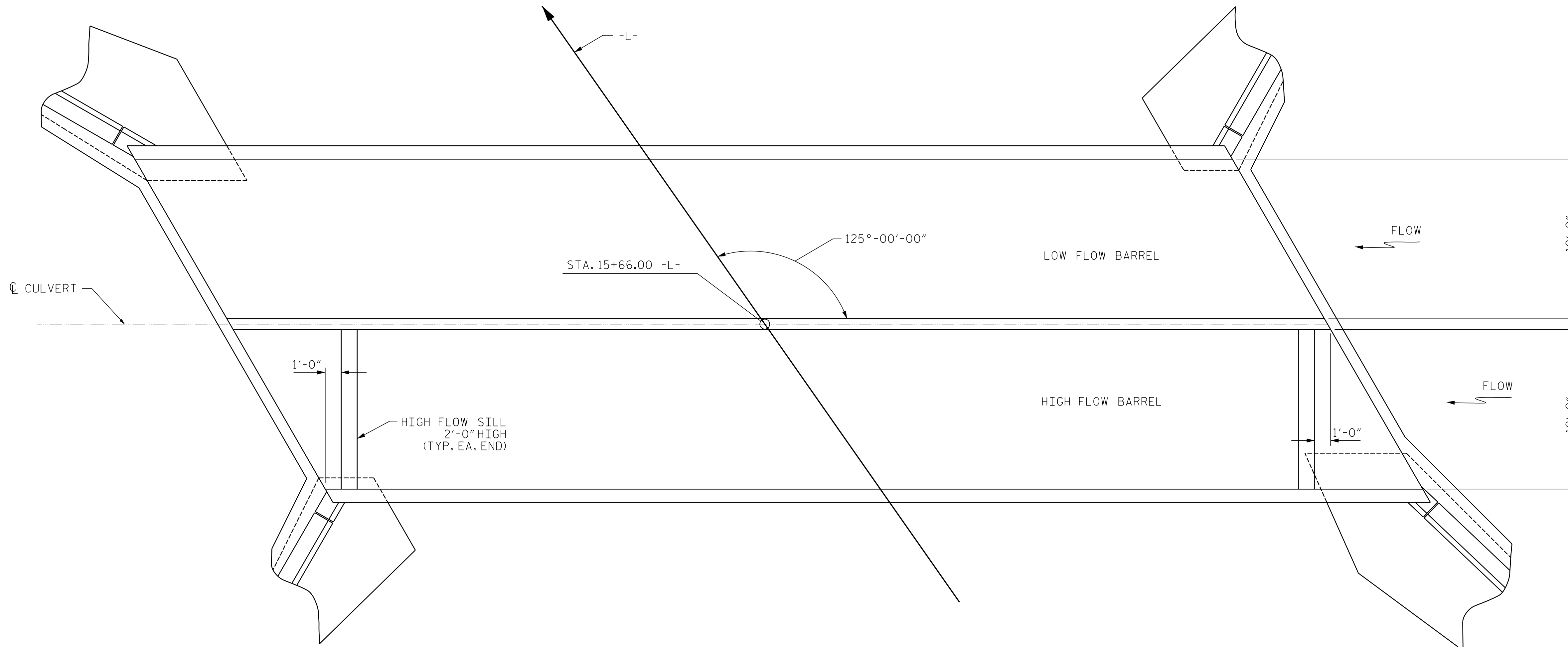
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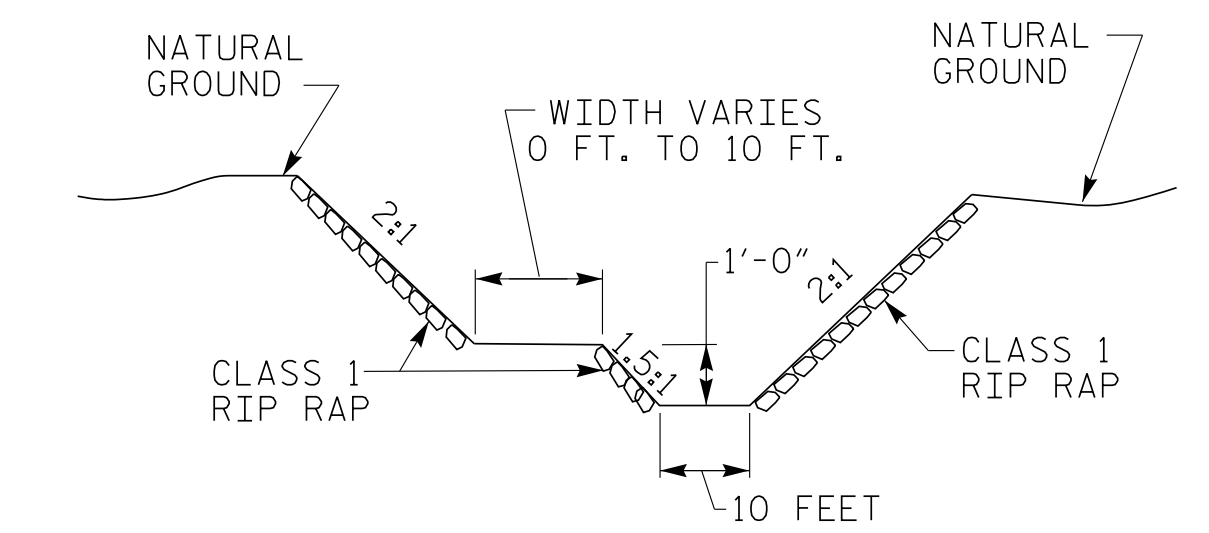
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NO.	BY:	DATE:	NO.	BY:	DATE:	C-4
1			3			TOTAL SHEETS
2			4			19

NOTES

SEE SHEET C-1 FOR SILL CONCRETE QUANTITY
 SEE SHEET C-6 BAR SCHEDULE FOR DOWELS
 BED MATERIAL SHALL BE EXCAVATED AND STOCKPILED DURING INSTALLATION OF THE CULVERT AND SILLS. THE NATURAL BED MATERIALS SHALL THEN BE PLACED IN THE CULVERT TO A DEPTH OF ONE FOOT.
 CHANNEL SUBSTRATE MATERIAL MAY BE USED TO SUPPLEMENT BED MATERIAL.

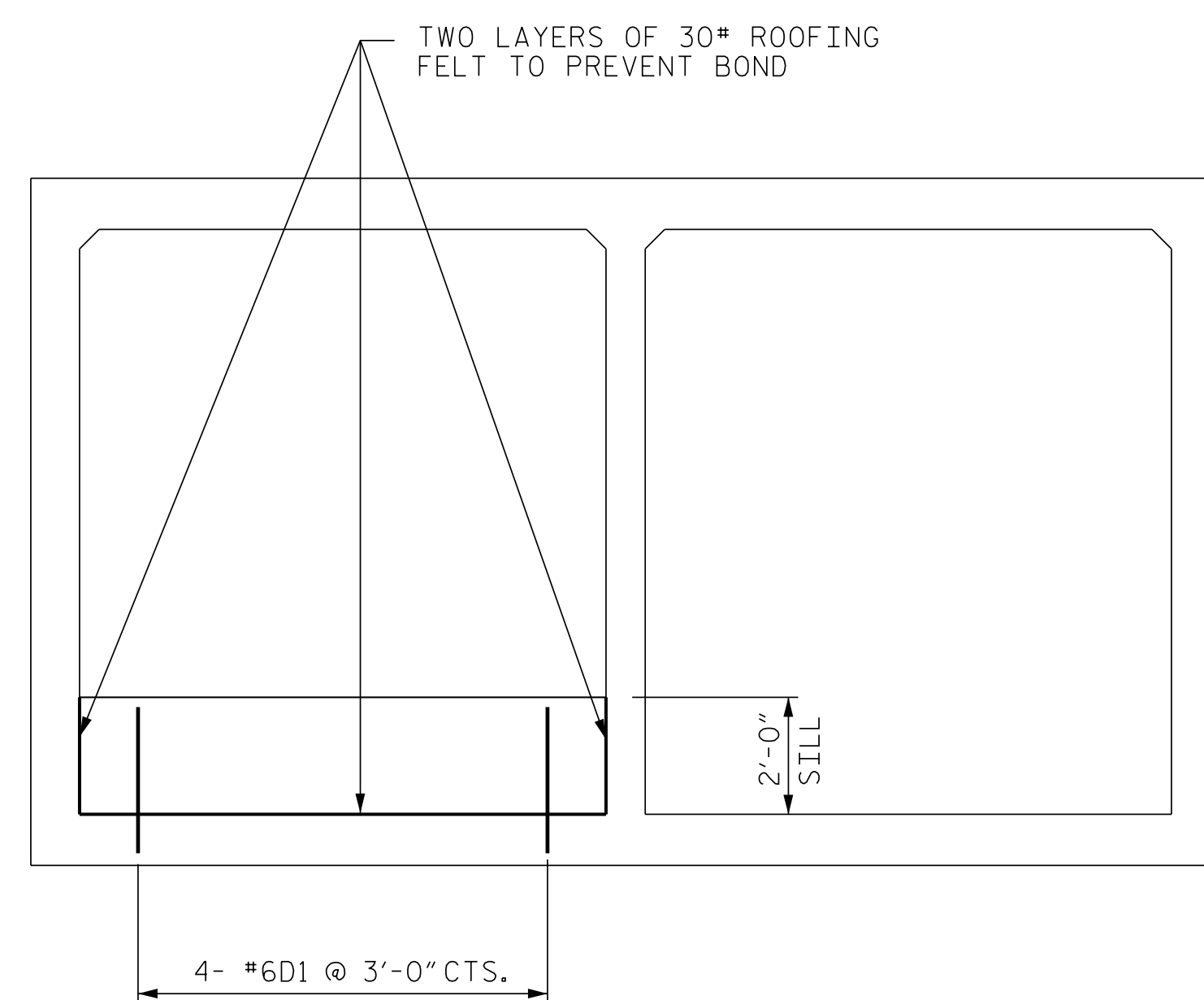


CULVERT SILL LAYOUT



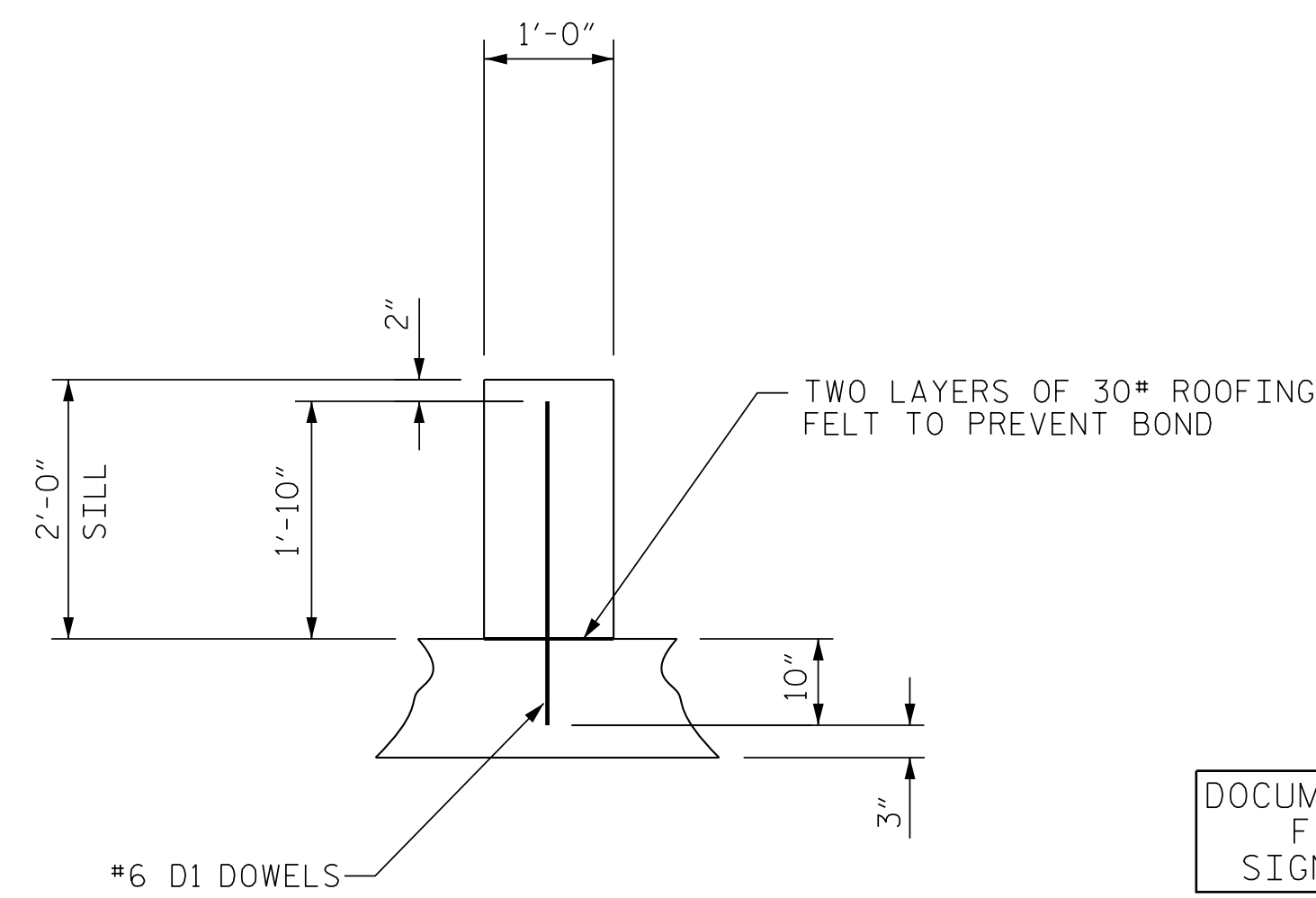
FLOODPLAIN BENCH DETAIL

(FACING DOWN STREAM)
 (TYPICAL EACH END)



END ELEVATION

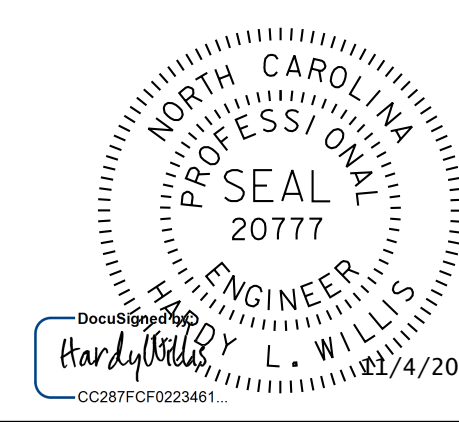
LOOKING DOWNSTREAM



SECTION THROUGH SILL

DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOATED.

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 STATION: 15+66.00 -L-

SHEET 5 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE BARREL
10' X 11' RCBC
125° SKEW
HYATT MILL CREEK

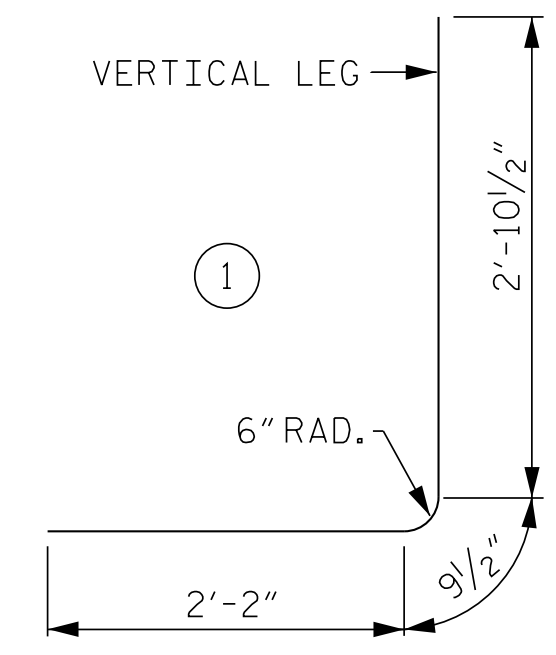
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NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			19

DWN. BY: MAF
 CHKD. BY: HLW
 DATE: 7/14
 DATE: 7/14

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
A1	368	4	①	5'-10"	1434	B1	184	4	STR.	12'-8"	1557	
A100	74	5	STR.	22'-0"	1698	B2	184	4	STR.	10'-2"	1250	
A101	2	5	STR.	21'-4"	45	B3	184	4	STR.	12'-8"	1557	
A102	2	5	STR.	20'-0"	42	C1	267	4	STR.	24'-0"	4281	
A103	2	5	STR.	18'-9"	39	D1	8	6	STR.	2'-8"	32	
A104	2	5	STR.	17'-5"	36	G1	8	5	STR.	25'-4"	211	
A105	2	5	STR.	16'-2"	34	S2	12	8	STR.	25'-4"	812	
A106	2	5	STR.	14'-10"	31	BARREL REINFORCING STEEL:		19,474 LB.				
A107	2	5	STR.	13'-6"	28	BARREL AND SILLS		CLASS A CONCRETE		185.8 CY		
A108	2	5	STR.	12'-3"	26	SPLICE LENGTH CHART						
A109	2	5	STR.	10'-11"	23	BAR SIZE		SPLICE LENGTH				
A110	2	5	STR.	9'-3"	19	#4	1'-9"					
A111	2	5	STR.	8'-4"	17	#5	2'-2"					
A112	2	5	STR.	7'-1"	15	#6	2'-9"					
A113	2	5	STR.	5'-9"	12							
A114	2	5	STR.	4'-5"	9							
A115	2	5	STR.	3'-2"	7							
A116	2	5	STR.	1'-10"	4							
A200	74	5	STR.	22'-0"	1698							
A201	2	5	STR.	21'-4"	45							
A202	2	5	STR.	20'-0"	42							
A203	2	5	STR.	18'-9"	39							
A204	2	5	STR.	17'-5"	36							
A205	2	5	STR.	16'-2"	34							
A206	2	5	STR.	14'-10"	31							
A207	2	5	STR.	13'-6"	28							
A208	2	5	STR.	12'-3"	26							
A209	2	5	STR.	10'-11"	23							
A210	2	5	STR.	9'-3"	19							
A211	2	5	STR.	8'-4"	17							
A212	2	5	STR.	7'-1"	15							
A213	2	5	STR.	5'-9"	12							
A214	2	5	STR.	4'-5"	9							
A215	2	5	STR.	3'-2"	7							
A216	2	5	STR.	1'-10"	4							
A300	74	5	STR.	22'-0"	1698							
A301	2	5	STR.	21'-4"	45							
A302	2	5	STR.	20'-0"	42							
A303	2	5	STR.	18'-9"	39							
A304	2	5	STR.	17'-5"	36							
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A400	74	5	STR.	22'-0"	1698							
A401	2	5	STR.	21'-4"	45							
A402	2	5	STR.	20'-0"	42							
A403	2	5	STR.	18'-9"	39							
A404	2	5	STR.	17'-5"	36							
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A409	2	5	STR.	10'-11"	23							
A410	2	5	STR.	9'-3"	19							
A411	2	5	STR.	8'-4"	17							
A412	2	5	STR.	7'-1"	15							
A413	2	5	STR.	5'-9"	12							
A414	2	5	STR.	4'-5"	9							
A415	2	5	STR.	3'-2"	7							
A416	2	5	STR.	1'-10"	4							

BAR TYPES



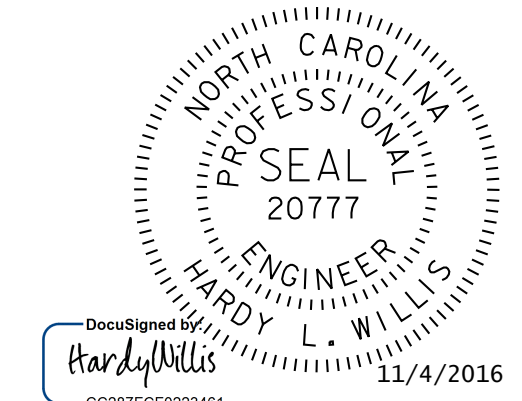
BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. 14SP.20221.1/.2
 CLAY COUNTY
 STATION: 15+66.00 -L-

SHEET 6 OF 10

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE BARREL
 10' X 11' RCBC
 125° SKEW
 HYATT MILL CREEK



V&M
 Vaughn & Melton
 Consulting Engineers

Asheville, North Carolina
 828-253-2796

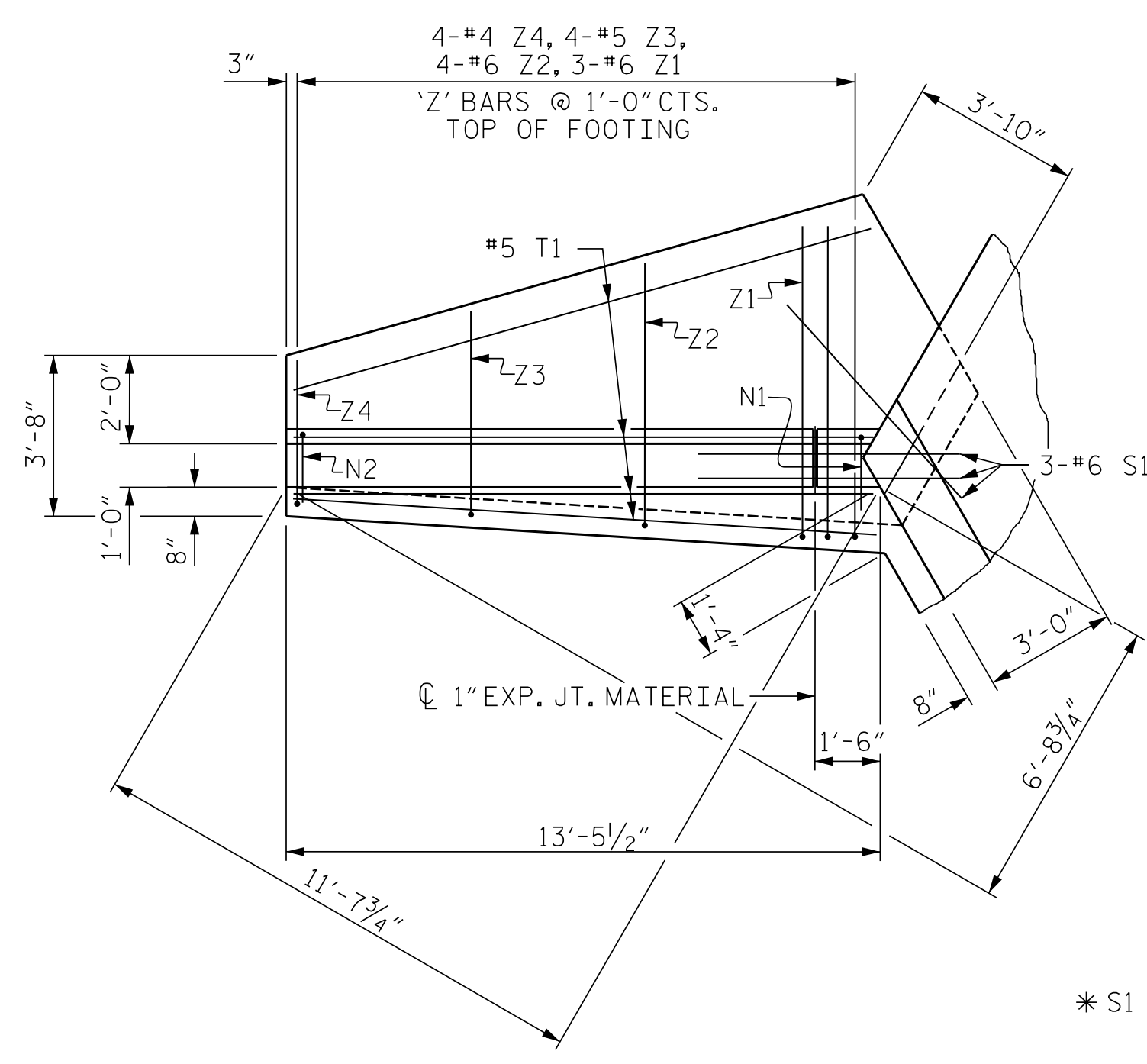
Charlotte, NC
 Boone, NC
 Tri-Cities, TN
 Knoxville, TN
 Spartanburg, SC
 Charleston, SC
 Middlesboro, KY
 Atlanta, GA

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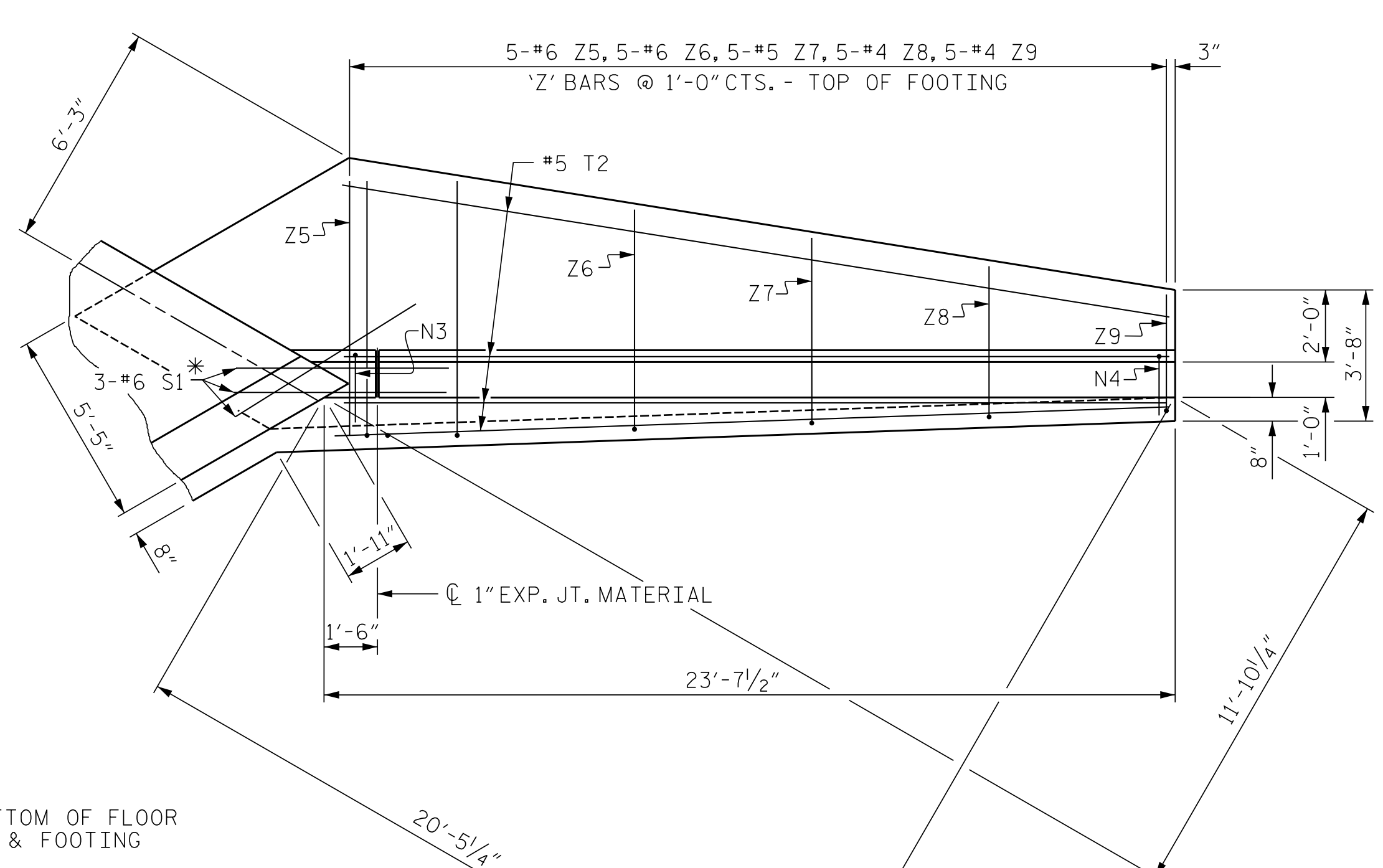
DOCUMENT NOT CONSIDERED
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DWN. BY: MAF DATE: 7/14
 CHKD. BY: HLW DATE: 7/14

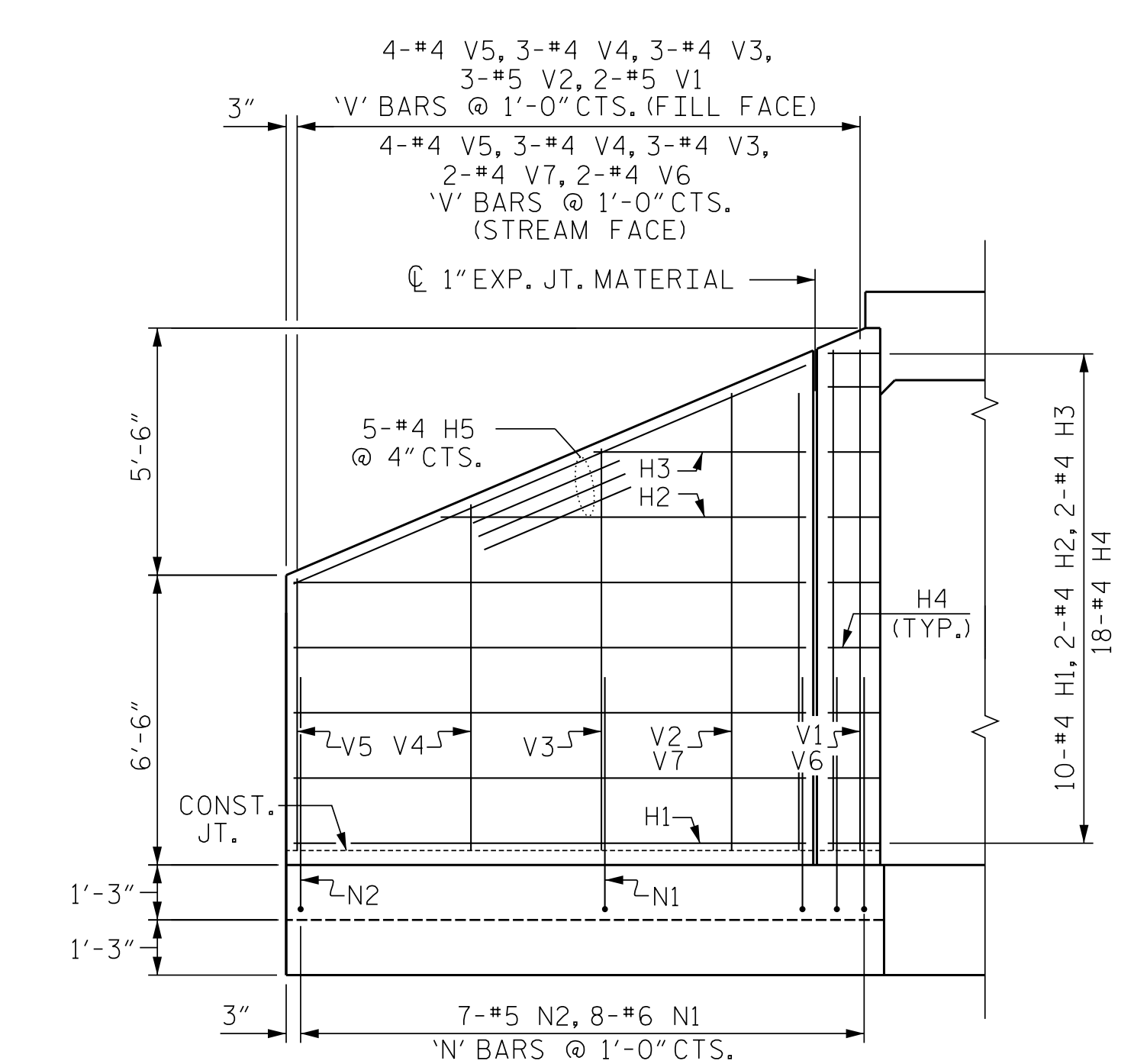
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			19



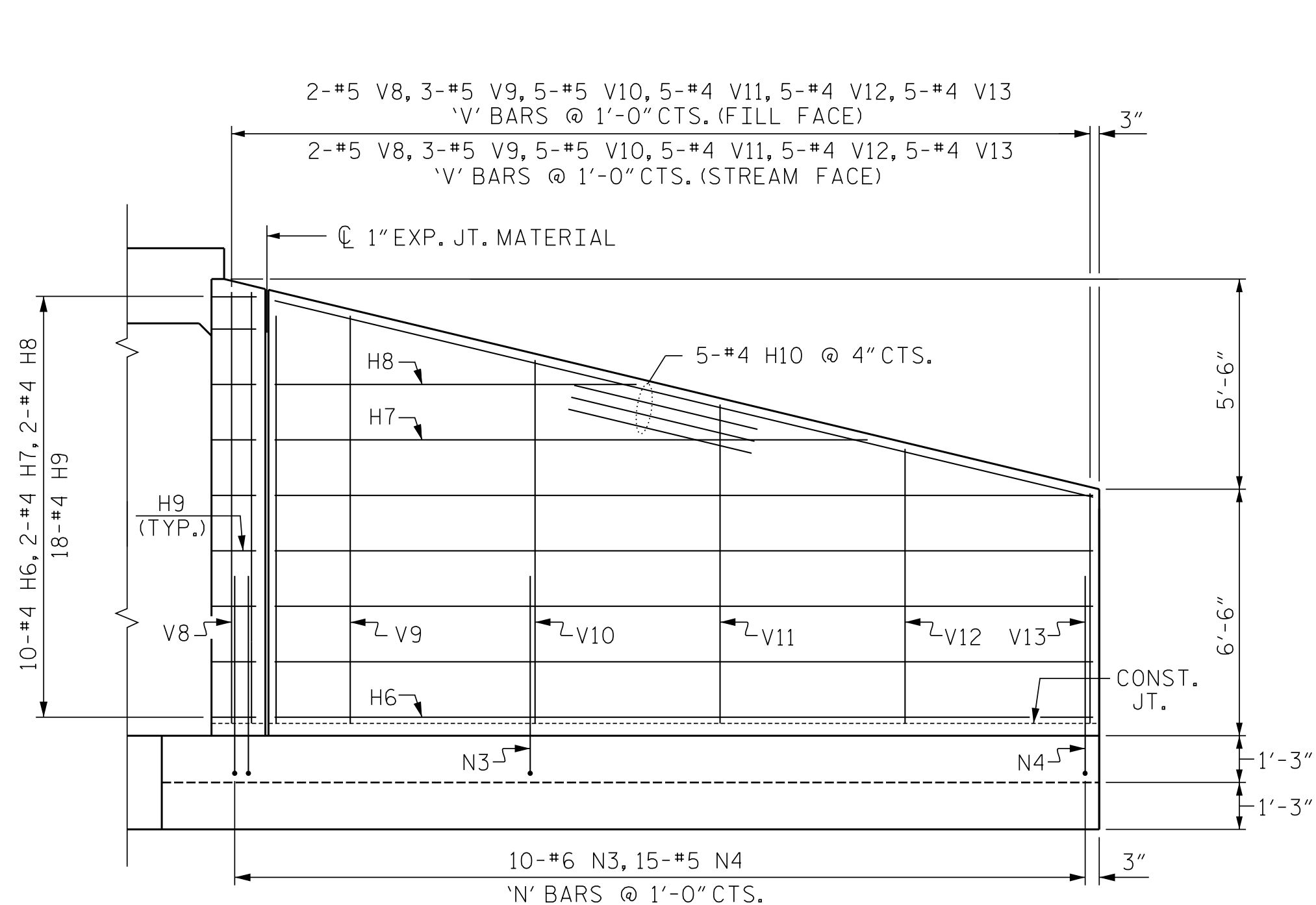
PLAN W2
(TWO LOCATIONS)



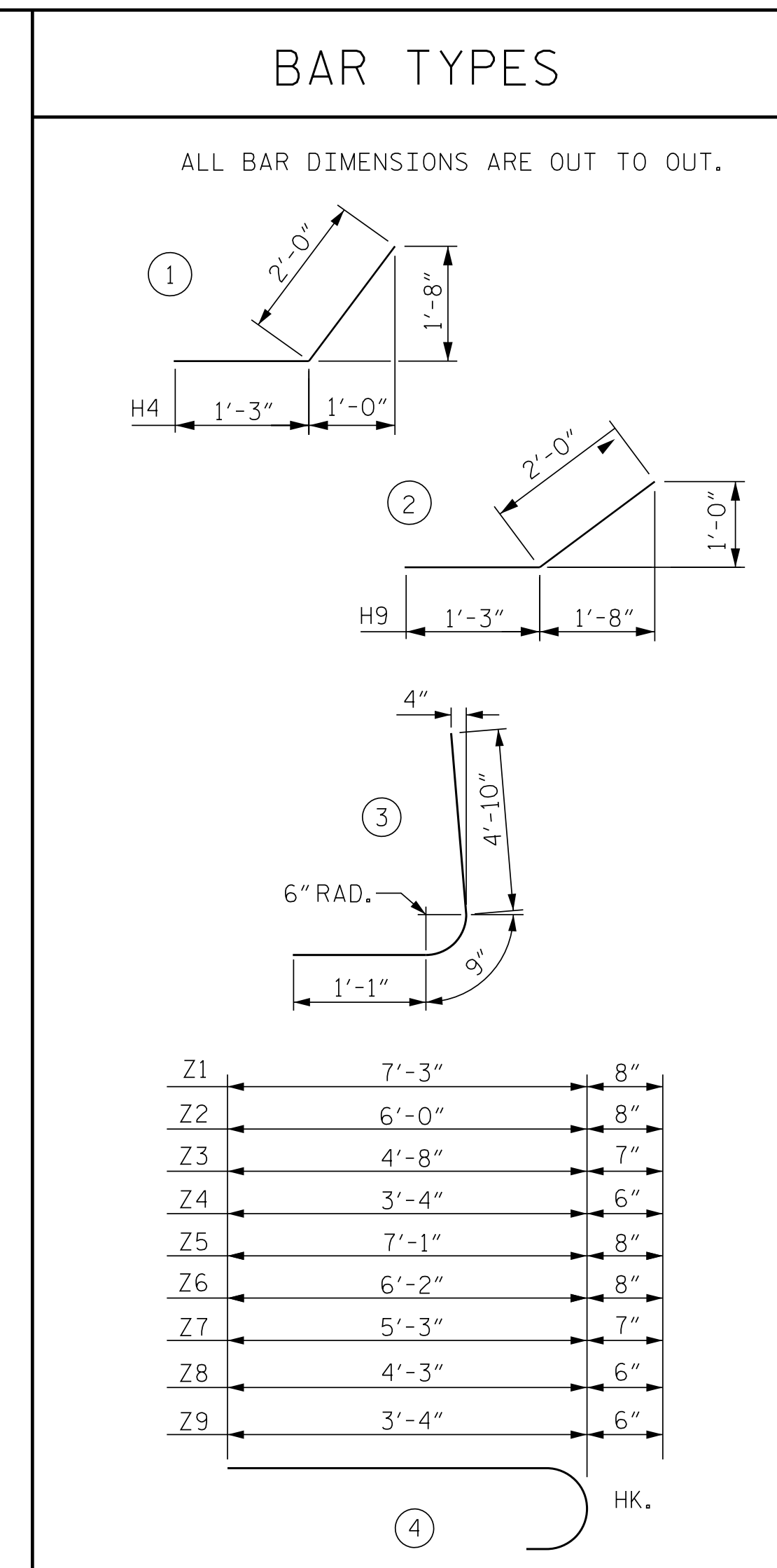
PLAN W1
(ONE LOCATION)



ELEVATION W2



ELEVATION W1



ALL BAR DIMENSIONS ARE OUT TO OUT.

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	20	4	STR	11'-7"	155
H2	4	4	STR	8'-6"	23
H3	4	4	STR	5'-0"	13
H4	36	4	1	3'-3"	78
H5	10	4	STR	12'-6"	84
H6	10	4	STR	21'-9"	145
H7	2	4	STR	16'-2"	22
H8	2	4	STR	10'-1"	13
H9	18	4	2	3'-3"	39
H10	5	4	STR	22'-4"	75
N1	16	6	3	6'-9"	162
N2	14	5	3	6'-9"	99
N3	10	6	3	6'-9"	101
N4	15	5	3	6'-9"	106
S1	9	6	STR	6'-0"	81
T1	8	5	STR	13'-5"	112
T2	4	5	STR	23'-7"	98
V1	4	5	STR	11'-3"	47
V2	6	5	STR	10'-3"	64
V3	12	4	STR	9'-0"	72
V4	12	4	STR	7'-9"	62
V5	16	4	STR	6'-2"	66
V6	4	4	STR	11'-3"	30
V7	4	4	STR	10'-4"	28
V8	4	5	STR	11'-3"	47
V9	6	5	STR	10'-10"	68
V10	10	5	STR	9'-8"	101
V11	10	4	STR	8'-5"	56
V12	10	4	STR	7'-3"	48
V13	10	4	STR	6'-1"	41
Z1	6	6	4	7'-11"	71
Z2	8	6	4	6'-8"	80
Z3	8	5	4	5'-3"	44
Z4	8	4	4	3'-10"	20
Z5	5	6	4	7'-9"	58
Z6	5	6	4	6'-10"	51
Z7	5	5	4	5'-10"	30
Z8	5	4	4	4'-9"	16
Z9	5	4	4	3'-10"	13

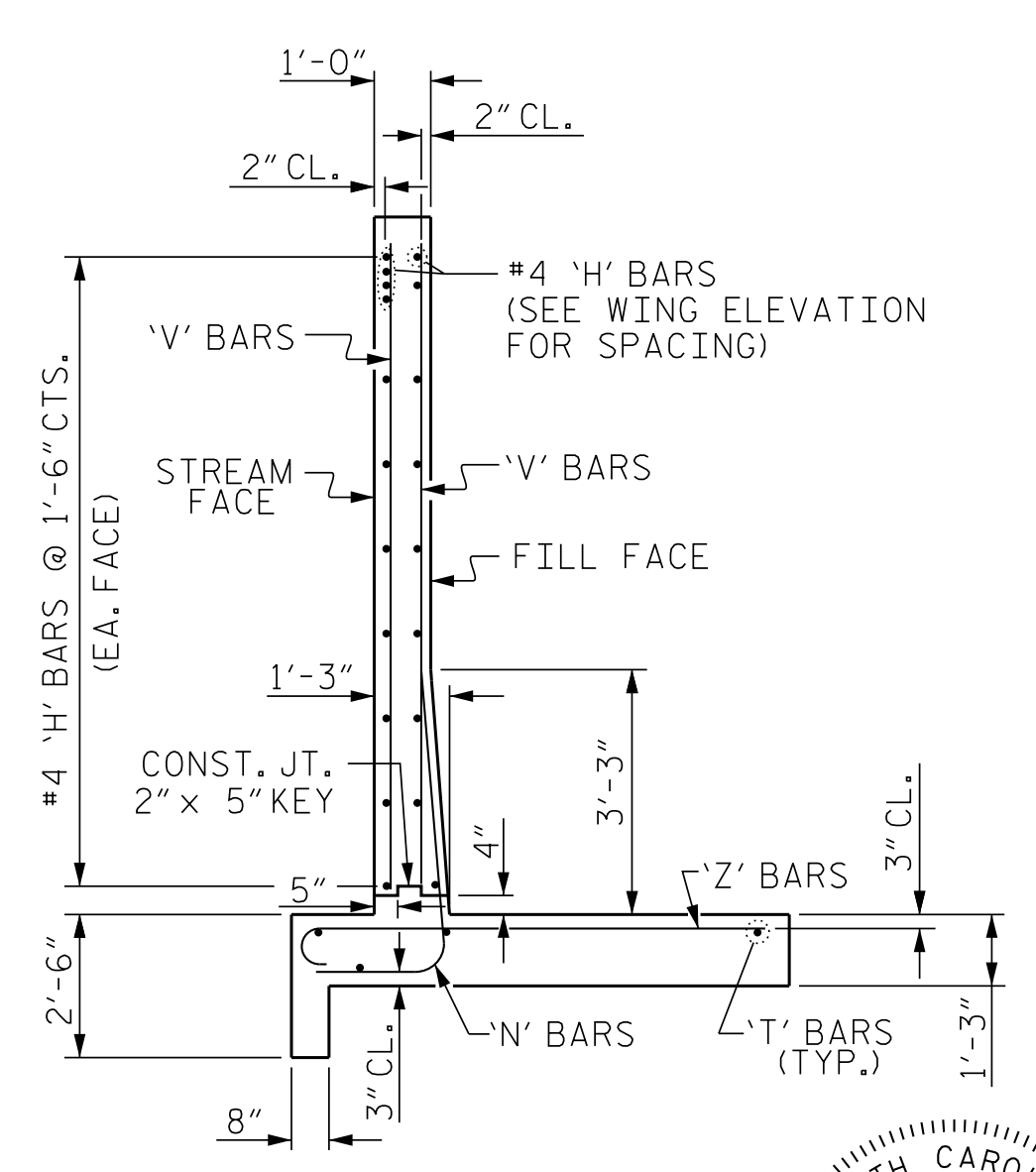
BILL OF MATERIAL FOR WINGWALLS 1 & 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	20	4	STR	11'-7"	155
H2	4	4	STR	8'-6"	23
H3	4	4	STR	5'-0"	13
H4	36	4	1	3'-3"	78
H5	10	4	STR	12'-6"	84
H6	10	4	STR	21'-9"	145
H7	2	4	STR	16'-2"	22
H8	2	4	STR	10'-1"	13
H9	18	4	2	3'-3"	39
H10	5	4	STR	22'-4"	75
N1	16	6	3	6'-9"	162
N2	14	5	3	6'-9"	99
N3	10	6	3	6'-9"	101
N4	15	5	3	6'-9"	106
S1	9	6	STR	6'-0"	81
T1	8	5	STR	13'-5"	112
T2	4	5	STR	23'-7"	98
V1	4	5	STR	11'-3"	47
V2	6	5	STR	10'-3"	64
V3	12	4	STR	9'-0"	72
V4	12	4	STR	7'-9"	62
V5	16	4	STR	6'-2"	66
V6	4	4	STR	11'-3"	30
V7	4	4	STR	10'-4"	28
V8	4	5	STR	11'-3"	47
V9	6	5	STR	10'-10"	68
V10	10	5	STR	9'-8"	101
V11	10	4	STR	8'-5"	56
V12	10	4	STR	7'-3"	48
V13	10	4	STR	6'-1"	41
Z1	6	6	4	7'-11"	71
Z2	8	6	4	6'-8"	80
Z3	8	5	4	5'-3"	44
Z4	8	4	4	3'-10"	20
Z5	5	6	4	7'-9"	58
Z6	5	6	4	6'-10"	51
Z7	5	5	4	5'-10"	30
Z8	5	4	4	4'-9"	16
Z9	5	4	4	3'-10"	13

REINFORCING STEEL FOR 3 WINGS 2549 LBS.

CLASS A CONCRETE

3 WINGS	36.8	C.Y.
2 HEADWALLS	2.4	C.Y.
2 END CURTAIN WALLS	2.6	C.Y.
TOTAL	41.8	C.Y.



TYPICAL WING SECTION

V&M
Vaughn & Melton
Consulting Engineers

Asheville, NC 828-253-2796
North Carolina

Tri-Cities, TN 423-467-8400
Knoxville, TN 865-546-5800
Spartanburg, SC 864-574-4775
Charleston, SC 843-574-5650
Middletown, NY 606-248-6600
Atlanta, GA 770-627-3509
Charlotte, NC 704-357-0488
Boone, NC 828-355-9933

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PROJECT NO. 14SP.20221.1/.2
CLAY COUNTY
STATION: 15+66.00 -L-
SHEET 7 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

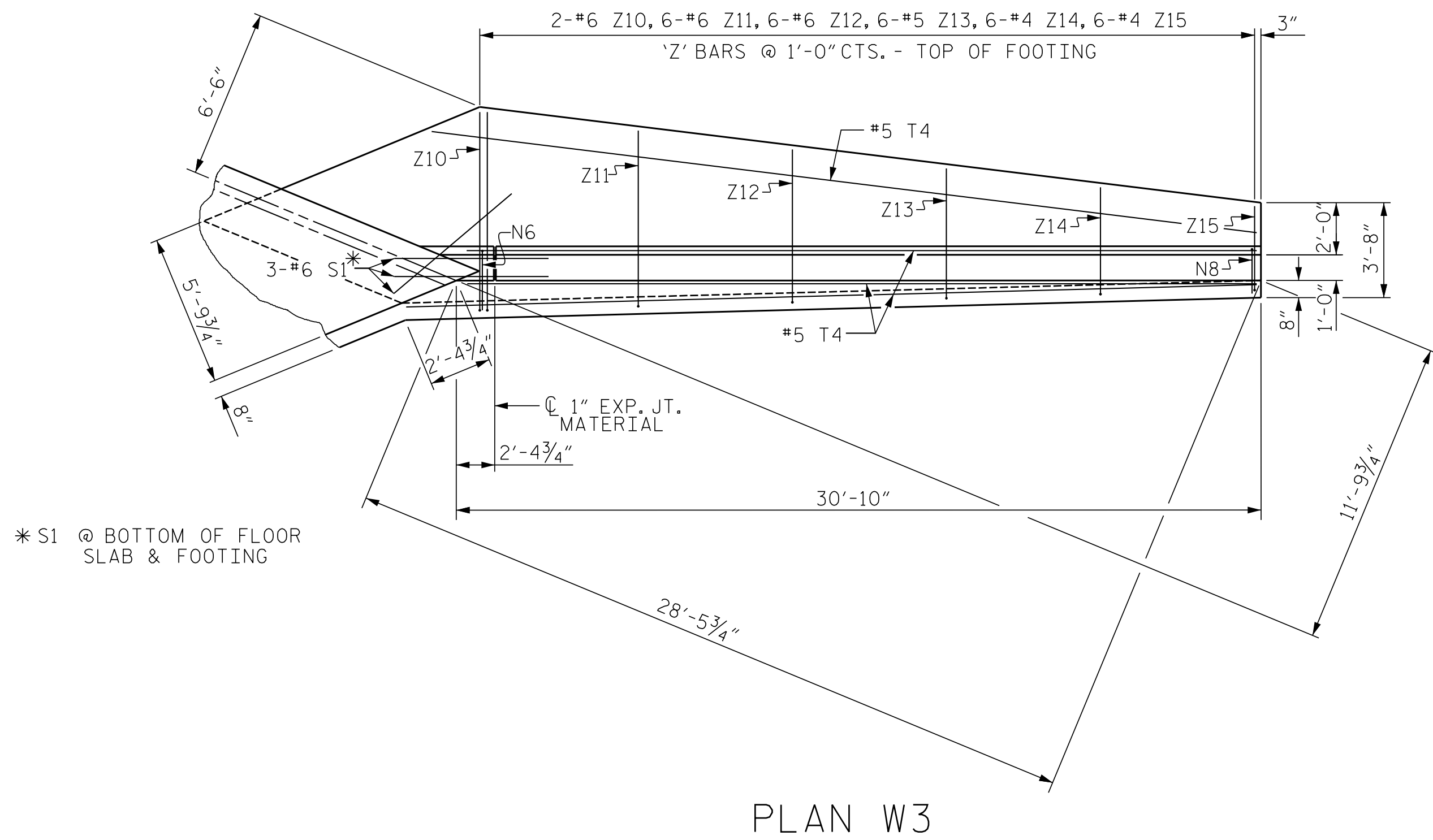
WINGS FOR CONCRETE BOX CULVERT
H = 11'-0" SLOPE = 2 : 1
60° OR 120° SKEW

NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
20777
Hardy L. Willis

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

C-7
TOTAL SHEETS 19

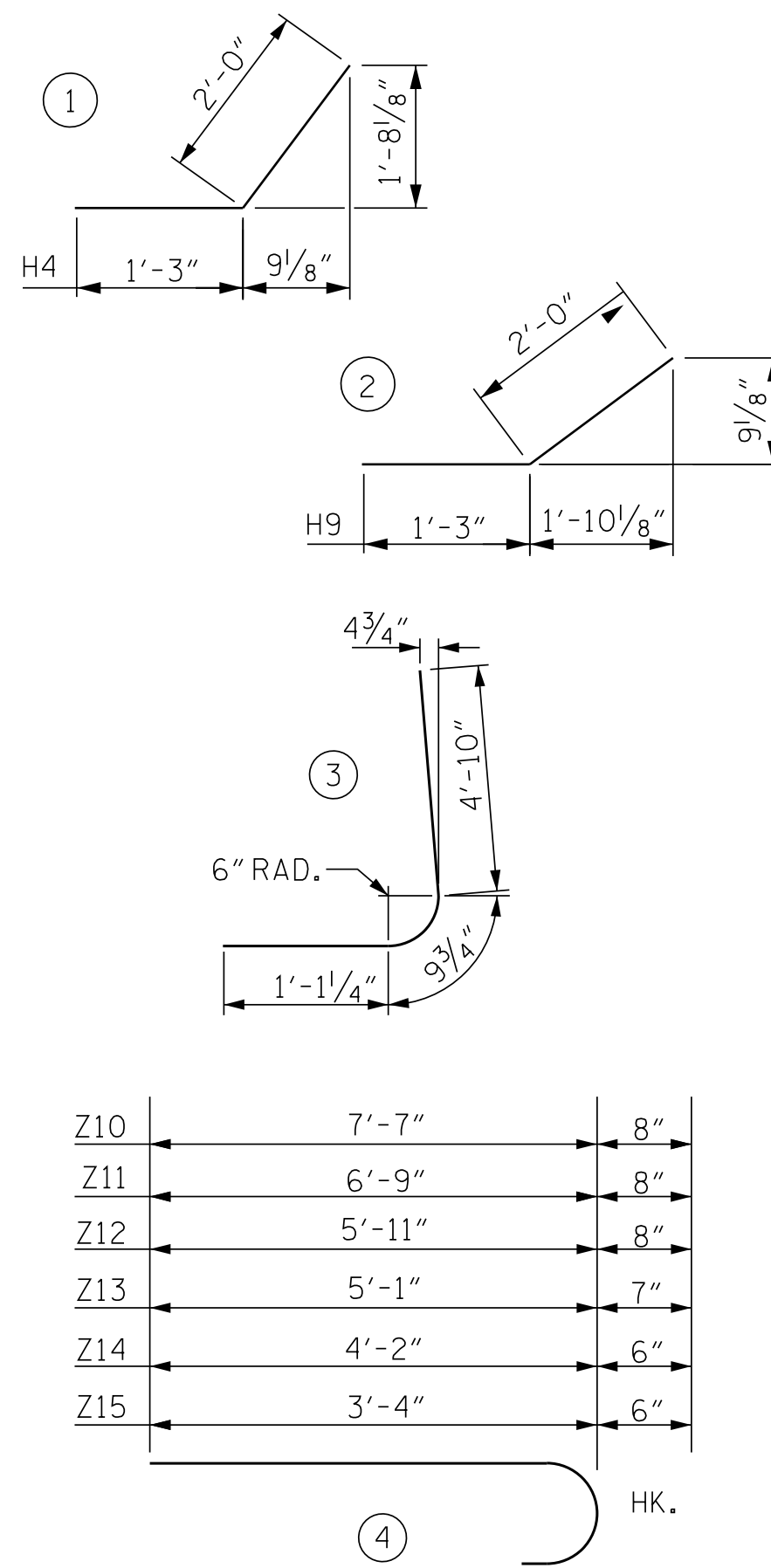


* S1 @ BOTTOM OF FLOOR SLAB & FOOTING

PLAN W3

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



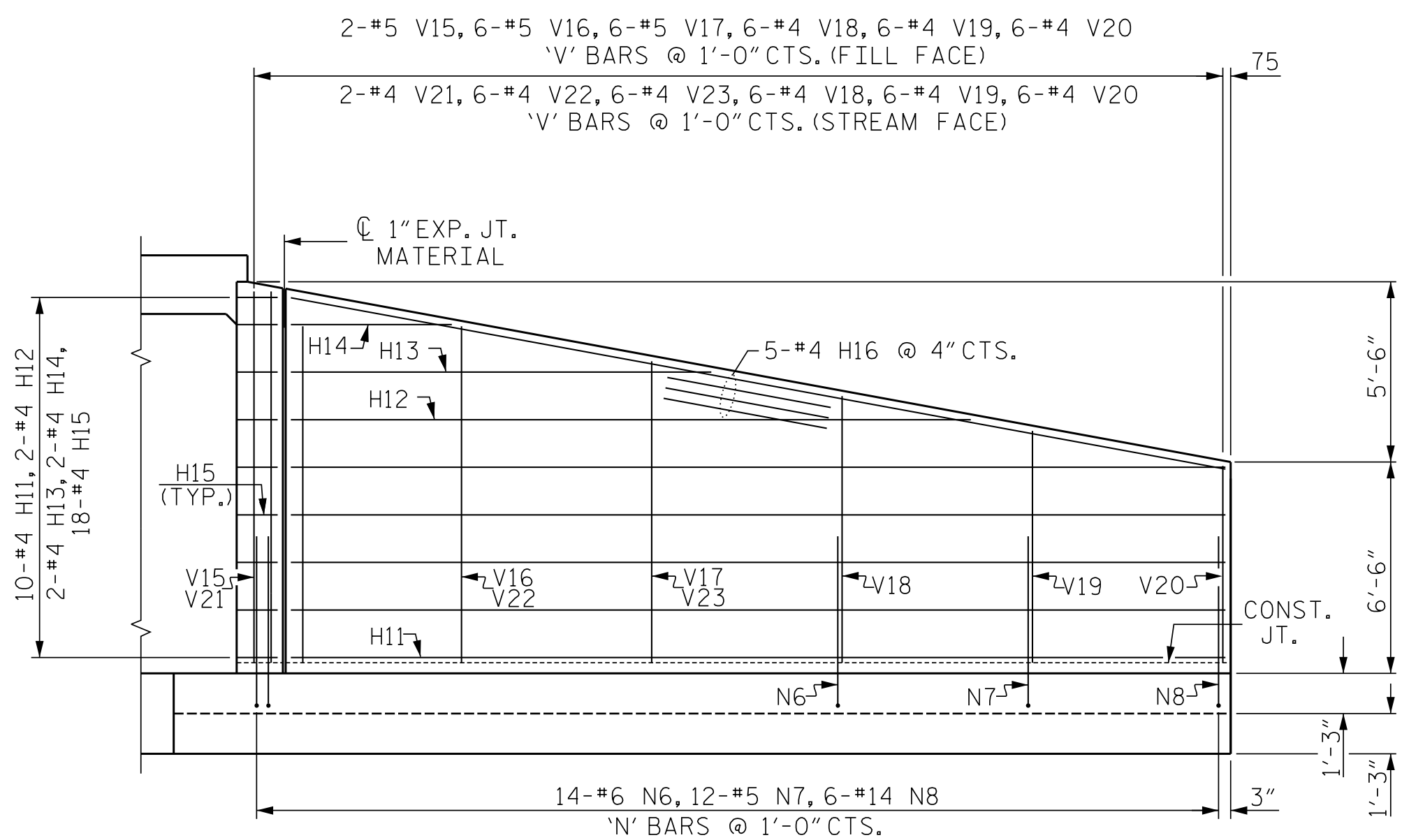
Z10	7'-7"	8"
Z11	6'-9"	8"
Z12	5'-11"	8"
Z13	5'-1"	7"
Z14	4'-2"	6"
Z15	3'-4"	6"

BILL OF MATERIAL FOR WINGWALL 3

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
H11	10	4	STR	29'-0"	194
H12	2	4	STR	21'-8"	29
H13	2	4	STR	13'-8"	18
H14	2	4	STR	5'-9"	8
H15	18	4	2	3'-3"	39
H16	5	4	STR	29'-6"	99
N6	14	6	3	6'-9"	142
N7	12	5	3	6'-9"	84
N8	6	4	3	6'-9"	27
S1	3	6	STR	6'-0"	27
T4	4	5	STR	30'-10"	129
V15	2	5	STR	11'-7"	24
V16	6	5	STR	10'-6"	66
V17	6	5	STR	9'-5"	59
V18	12	4	STR	8'-3"	66
V19	12	4	STR	7'-3"	58
V20	12	4	STR	6'-1"	49
V21	2	4	STR	11'-6"	15
V22	6	4	STR	10'-6"	42
V23	6	4	STR	9'-5"	38
Z10	2	6	4	8'-3"	25
Z11	6	6	4	7'-5"	67
Z12	6	6	4	6'-7"	59
Z13	6	5	4	5'-8"	35
Z14	6	4	4	4'-8"	19
Z15	6	4	4	3'-10"	15

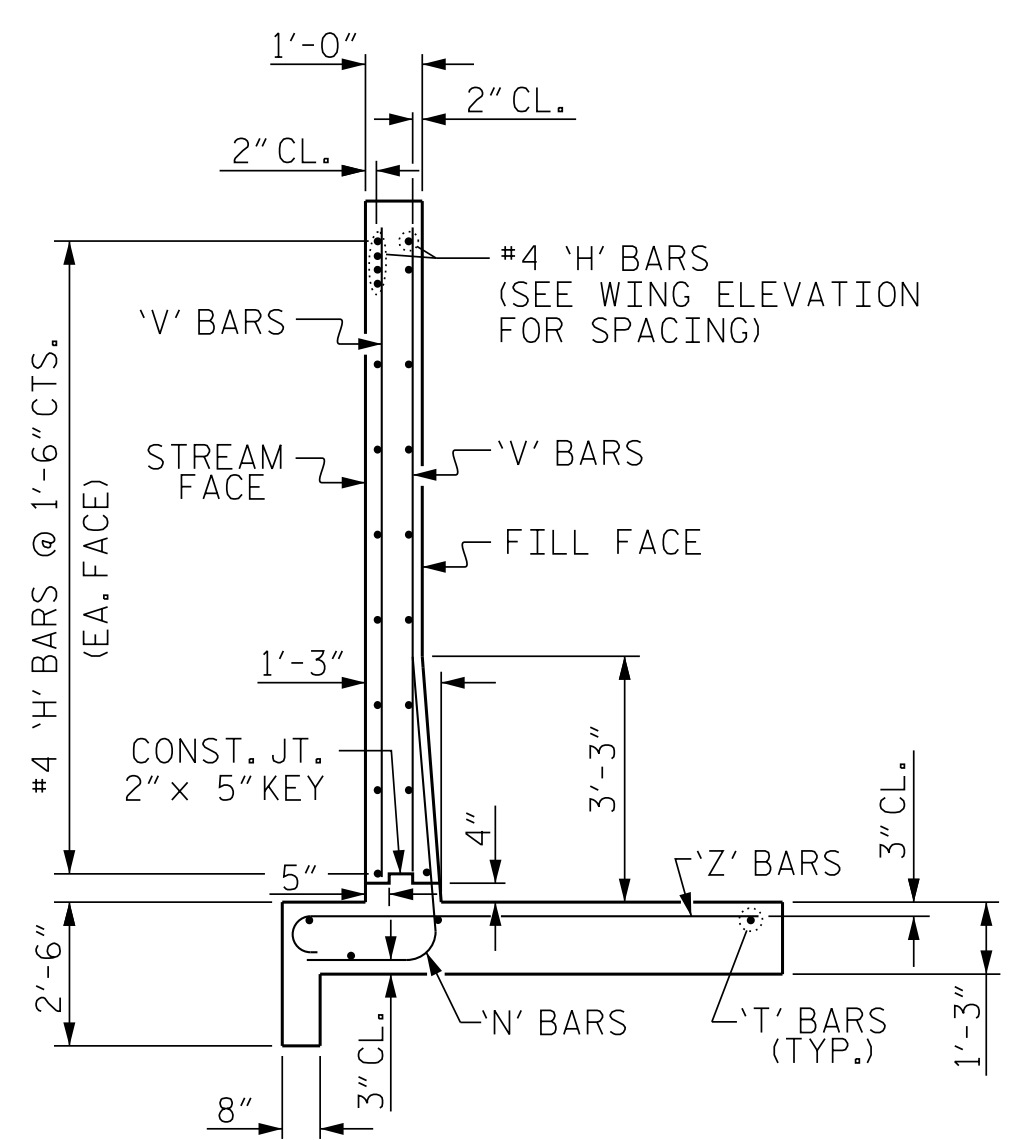
REINFORCING STEEL FOR 1 WING 1,433 LBS.

CLASS A CONCRETE 1 WING 21.8 C.Y.



ELEVATION W3

FOR WING ORIENTATION, SEE BARREL STANDARD SHEET.

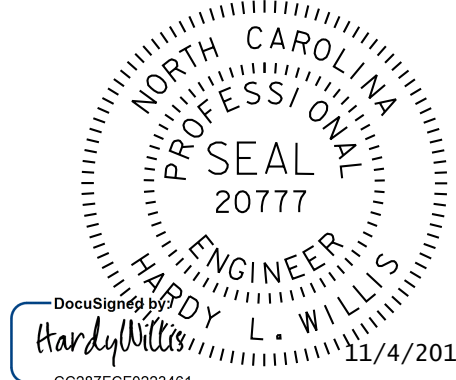


TYPICAL WING SECTION

PROJECT NO. 14SP.20221.1/.2
CLAY COUNTY
STATION: 15+66.00 -L-

SHEET 8 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD WINGS
FOR
CONCRETE BOX CULVERT
H = 11'-0" SLOPE = 2 : 1
45° OR 135° SKEW



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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
2			4			19

ASSEMBLED BY : MAF	DATE : 7/14
CHECKED BY : HLW	DATE : 7/14
DRAWN BY : FPP 07/97	
CHECKED BY : VAP 07/97	

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PROJECT NO. 14SP.20221.1/.2
CLAY COUNTY
STATION: 15+66.00 -L-

SHEET 9 OF 10

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-9
1			3			TOTAL SHEETS 19
2			4			

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING #	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE								COMMENT NUMBER		
						LIVE-LOAD FACTORS (LL)	MOMENT				SHEAR					
							RATING FACTOR	BOX NO.	ELEMENT TYPE	DISTANCE FROM LEFT END OF ELEMENT (ft)	RATING FACTOR	BOX NO.	ELEMENT TYPE		DISTANCE FROM LEFT END OF ELEMENT (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.09	--	1.75	1.09	1	BOT. SLAB	10.83	1.68	1	TOP SLAB	10.11		
	HL-93 (OPERATING)	N/A		1.41	--	1.35	1.41	1			2.18	1				
	HS-20 (INVENTORY)	36.000	②	1.09	63.0	1.75	1.09	1			1.74	1				
	HS-20 (OPERATING)	36.000		1.41	48.6	1.35	1.41	1	BOT. SLAB	10.83	2.26	1	TOP SLAB	10.11		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.83	38.2	1.40	2.83	1	EXT. WALL	0.00	3.05	1	EXT. WALL	0.00	
		SNGARBS2	20.000		2.12	42.4	1.40	2.12	1	BOT. SLAB	10.83	3.00	1	TOP SLAB	10.11	
		SNAGRIS2	22.000		1.98	43.6	1.40	1.98	1			3.05	1	EXT. WALL	0.00	
		SNCOTTS3	27.250		1.67	45.5	1.40	1.67	1			3.07	1	EXT. WALL	0.00	
		SNAGGRS4	34.925		1.42	49.6	1.40	1.42	1			2.86	1	BOT. SLAB	10.05	
		SNS5A	35.550		1.63	57.9	1.40	1.63	1			3.06	1	EXT. WALL	0.00	
		SNS6A	39.950		1.66	66.3	1.40	1.66	1			3.07	1			
	SNS7B	42.000		1.77	74.3	1.40	1.77	1			3.08	1	EXT. WALL	0.00		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.61	53.1	1.40	1.61	1			2.95	1	TOP SLAB	10.11	
		TNT4A	33.075		1.81	59.9	1.40	1.81	1			3.08	1	EXT. WALL	0.00	
		TNT6A	41.600		1.84	76.5	1.40	1.84	1			3.08	1			
		TNT7A	42.000		2.02	84.8	1.40	2.02	1			3.09	1			
		TNT7B	42.000		2.02	84.8	1.40	2.02	1			3.09	1	EXT. WALL	0.00	
		TNAGRIT4	43.000	③	1.40	60.2	1.40	1.40	1			2.81	1	BOT. SLAB	10.05	
TNAGT5A		45.000		1.52	68.4	1.40	1.52	1			3.06	1	EXT. WALL	0.00		
TNAGT5B	45.000		1.52	68.4	1.40	1.52	1	BOT. SLAB	10.83	3.06	1	EXT. WALL	0.00			

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	--

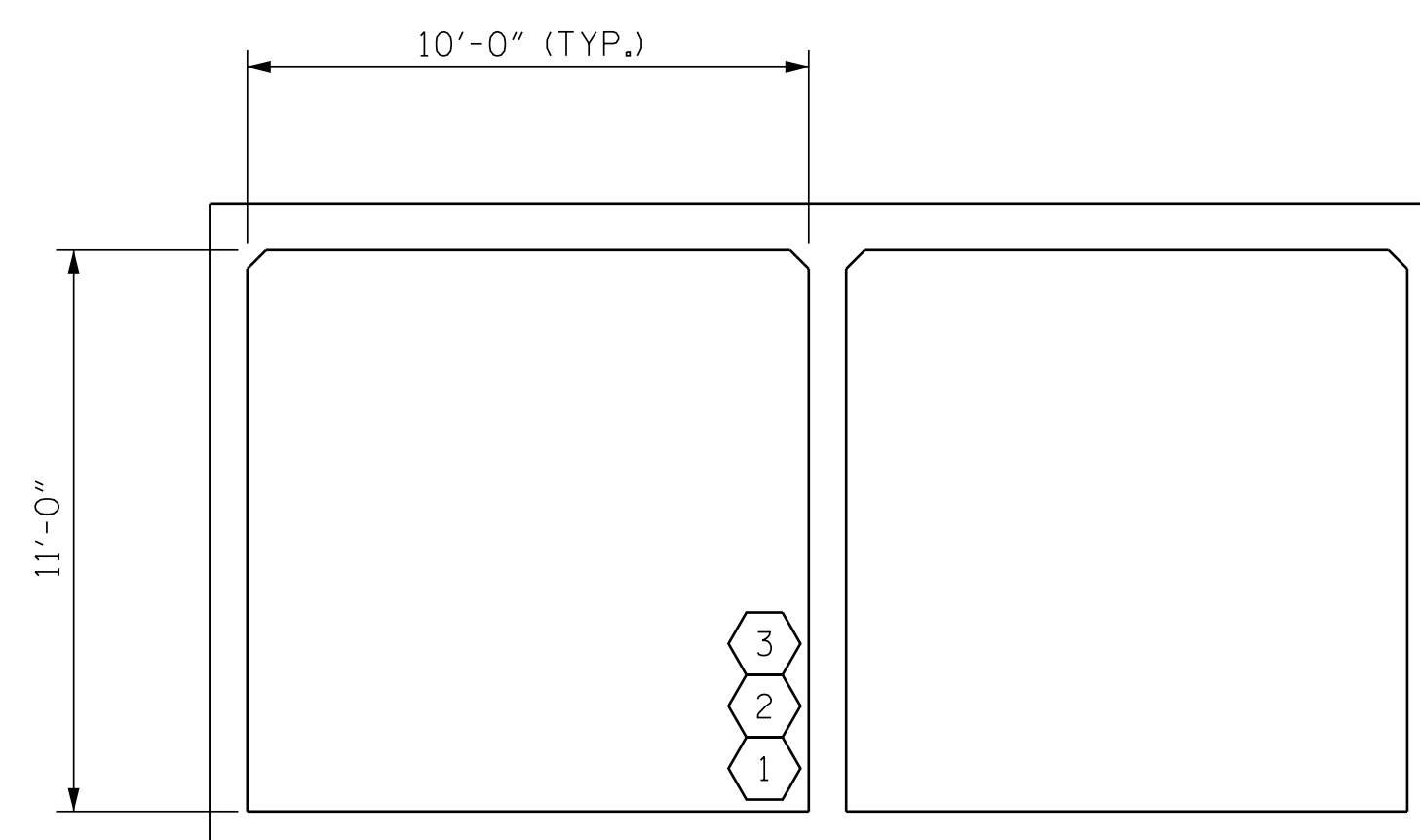
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

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

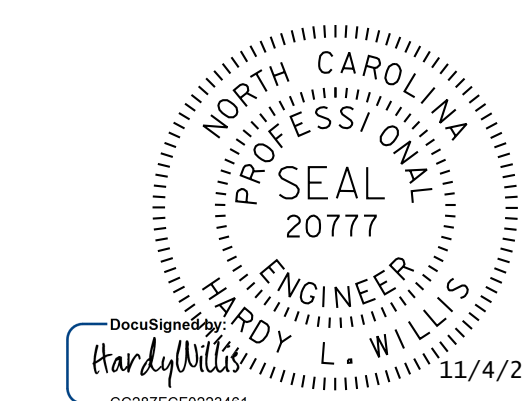
#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



BOX 1 BOX 2
LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. 14SP.20221.1/.2
CLAY COUNTY
STATION: 15+66.00 -L-

SHEET 10 OF 10



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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-10
1			3			TOTAL SHEETS
2			4			19

STD. NO. LRFR5

ASSEMBLED BY : MAF	DATE : 7/14
CHECKED BY : HLW	DATE : 7/14
DRAWN BY : WMC 7/11	REV. 10/1/11
CHECKED BY : GM 7/11	MAA/GM