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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5724	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
54016.1.2		PE	
54016.2.1		RW	
54016.2.1		UTL	
54016.3.1		CONST	

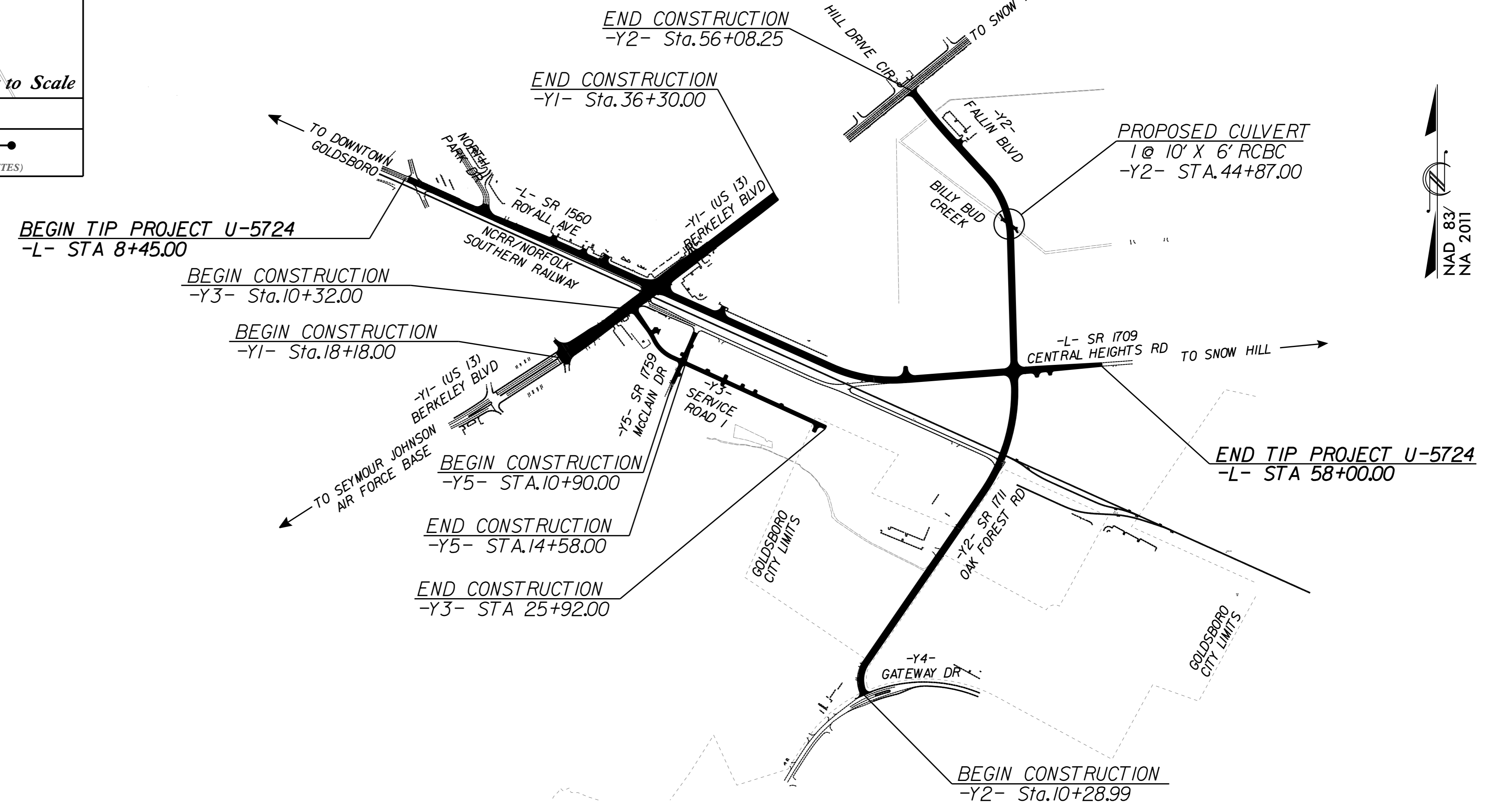
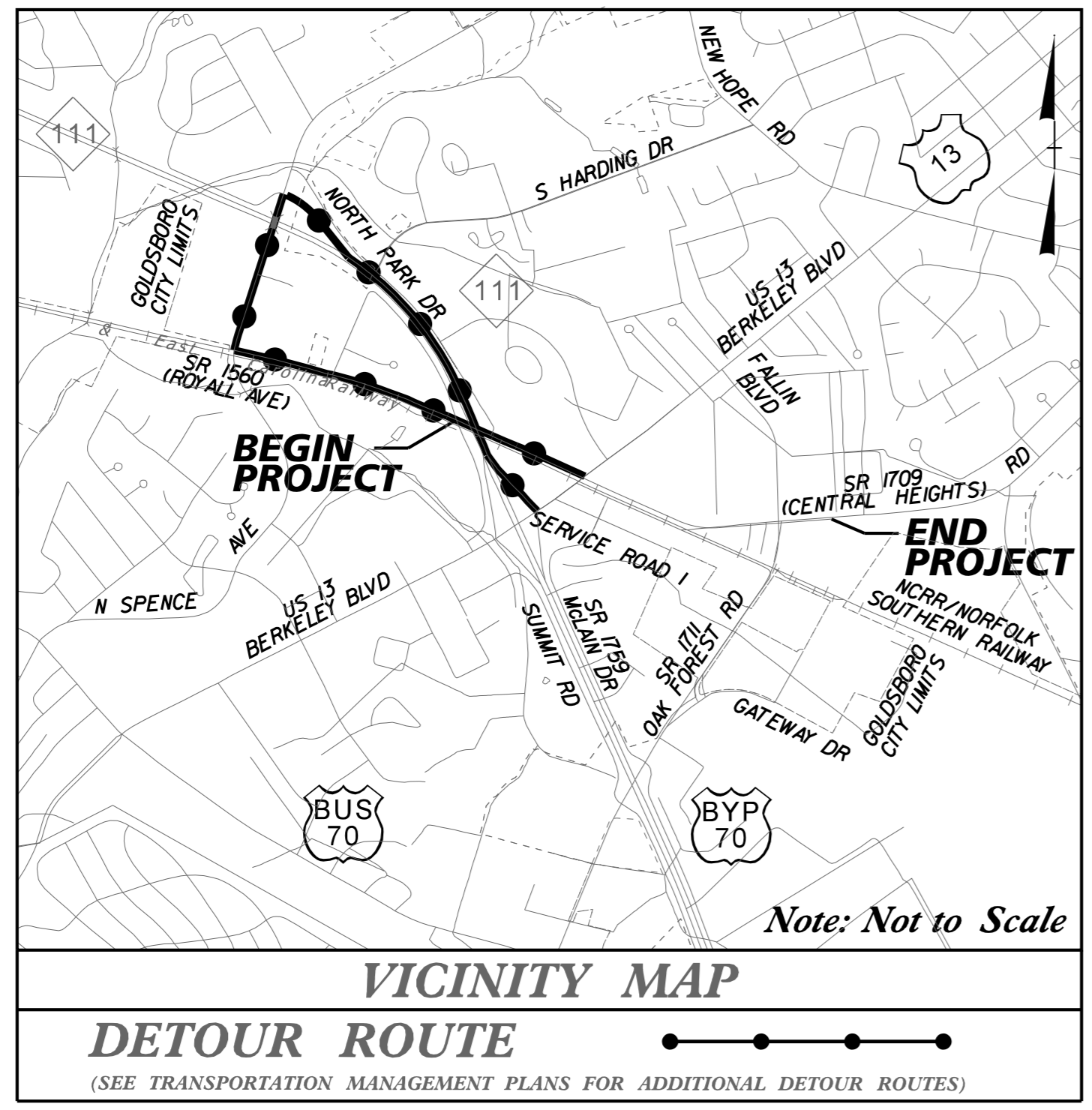
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAYNE COUNTY

LOCATION: US 13 (BERKELEY BOULEVARD) - REALIGNMENT OF SR 1709 (CENTRAL HEIGHTS ROAD) AT BERKELEY BOULEVARD

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



STRUCTURES

TIP PROJECT: U-5724

CONTRACT: C204540

DESIGN DATA

AADT 2020	=	10,000
AADT 2040	=	12,300
K	=	9%
D	=	55%
T	=	3%*
V	=	50 MPH

CLASSIFICATION:
URBAN COLLECTOR
* 1% TTST 2% DUAL
SUB-REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5724	=	0.938 MILES
TOTAL LENGTH TIP PROJECT U-5724	=	0.938 MILES

PLANS PREPARED FOR
THE NCDOT BY:

Kimley»Horn

2018 STANDARD SPECIFICATIONS

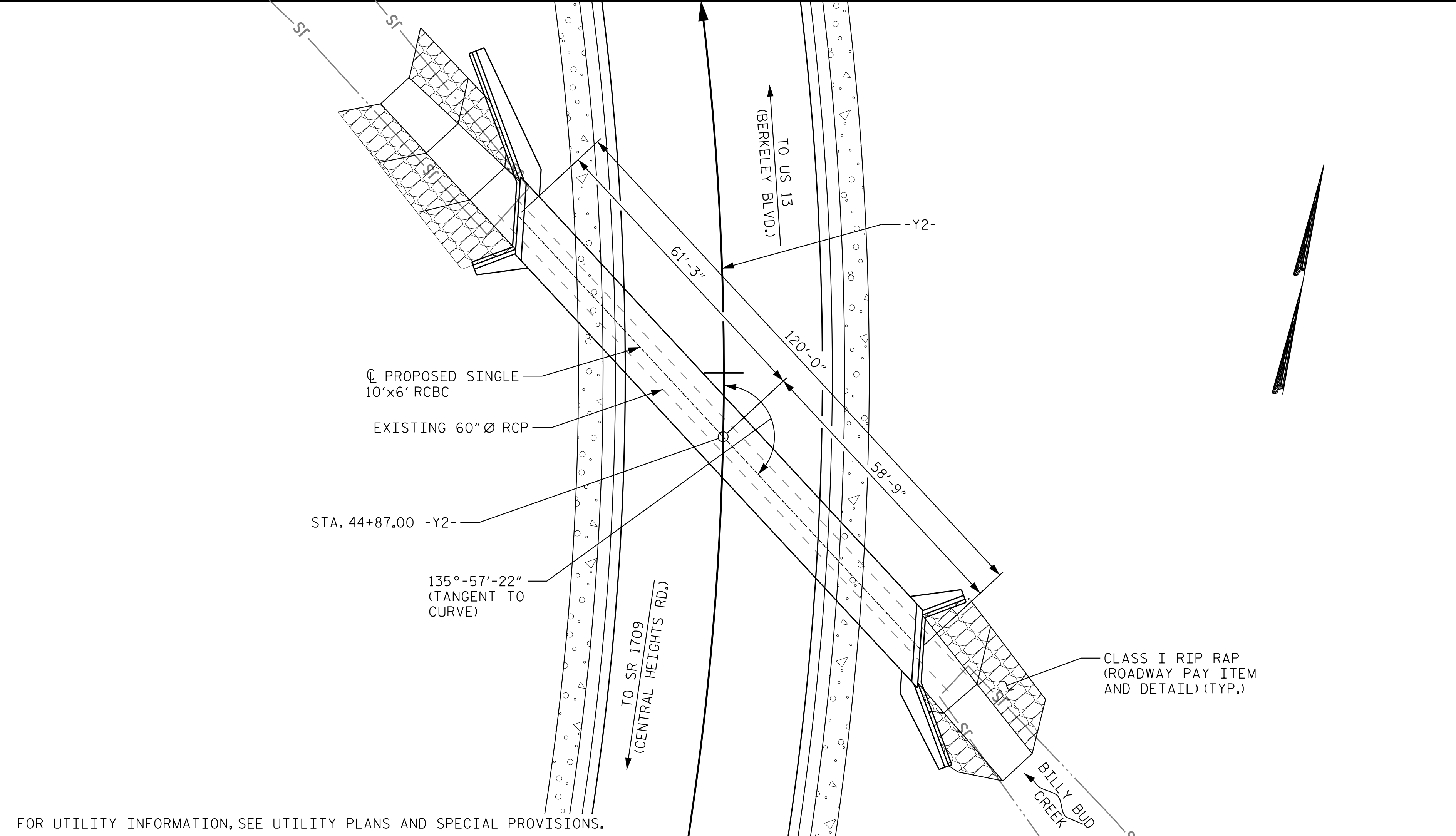
LETTING DATE:
NOVEMBER 15, 2022

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

REVISIONS

9/9/2022 \$FILEL\$

BENCHMARK: BM#7 -Y2- STA 54+48.27, OFFSET 29.34' RIGHT, EL. 115.14', (RIGHT SCRIBE ON FH BONNET BOLT)



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES

- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING
- DESIGN FILL ----- 3'-10 (MAX.), 2'-0" (MIN.)
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH NCDOT STANDARD SPECIFICATIONS.
- 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.
- CONCRETE IN THE CULVERT TO BE POURED IN THE FOLLOWING ORDER:
 1. WING FOOTINGS, CURTAIN WALLS 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.
- DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON THE WING SHEETS.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.
- 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.
- 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 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.

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

HYDRAULIC DATA

DESIGN DISCHARGE ----- 230 CFS
 FREQUENCY OF DESIGN FLOOD ----- 25 YR.
 DESIGN HIGH WATER ELEVATION ----- 113.9 FT.
 DRAINAGE AREA ----- 294 ACRES
 BASE DISCHARGE (Q100) ----- 300 CFS
 BASE HIGH WATER ELEVATION ----- 114.5 FT.

OVERTOPPING FLOOD DATA

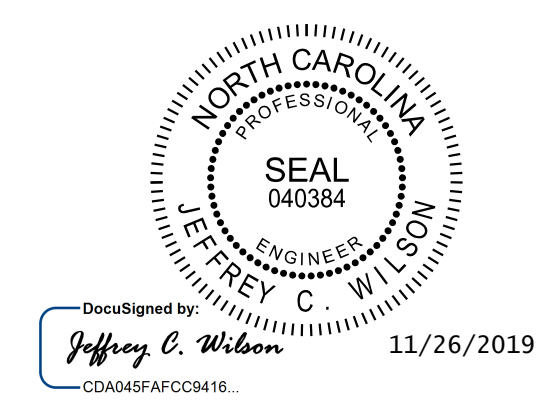
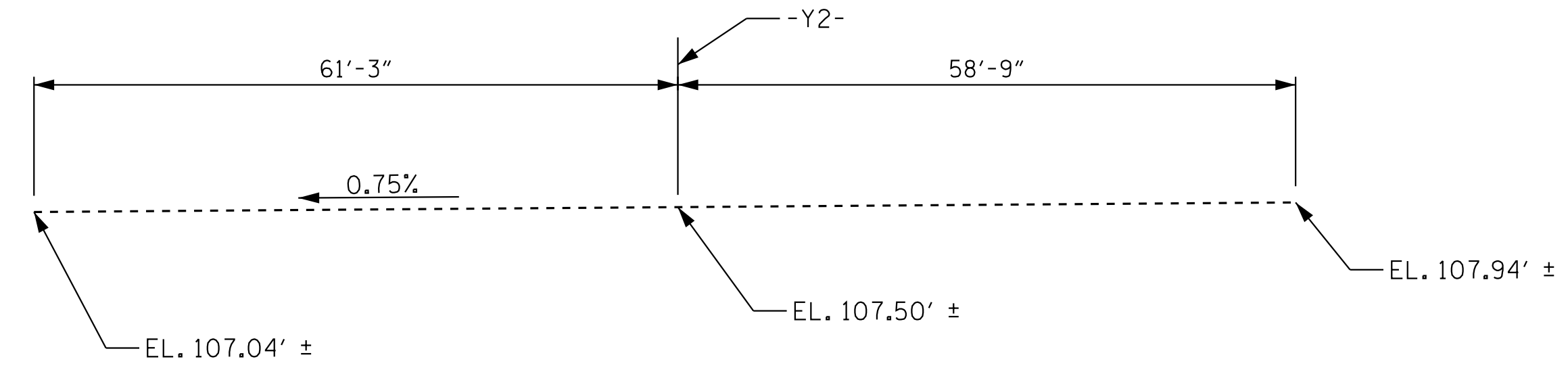
OVERTOPPING DISCHARGE ----- >230 CFS
 FREQUENCY OF OVERTOPPING FLOOD --- >25 YR.
 OVERTOPPING FLOOD ELEVATION ----- 114.1 FT.
 OVERTOPPING OCCURS AT SAG
 STA. 41+13.08 -Y2- AT SHOULDER POINT

ROADWAY DATA

GRADE POINT EL. @ STA. 44+87.00 -Y2- = 117.35'
 BED ELEVATION @ STA. 44+87.00 -Y2- = 107.50'
 ROADWAY SLOPES 3 : 1

TOTAL STRUCTURE QUANTITIES

CLASS A CONCRETE	
BARREL @ 1.189 CY/FT	142.7 C.Y.
WINGS ETC.	27.4 C.Y.
SILLS	0.7 C.Y.
TOTAL	170.8 C.Y.
REINFORCING STEEL	
BARREL	29,550 LBS.
WINGS ETC.	1,664 LBS.
TOTAL	31,214 LBS.
CULVERT EXCAVATION STA. 44+87.00 -Y2-	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	132 TONS
REMOVAL OF EXISTING STRUCTURE STA. 44+87.00 -Y2-	LUMP SUM



Kimley»Horn
 421 Fayetteville Street, Suite 600
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 Phone (919) 677-2000
 NC LICENSE # F-0102

PROJECT NO. U-5724
WAYNE COUNTY
 STATION: 44+87.00 -Y2-

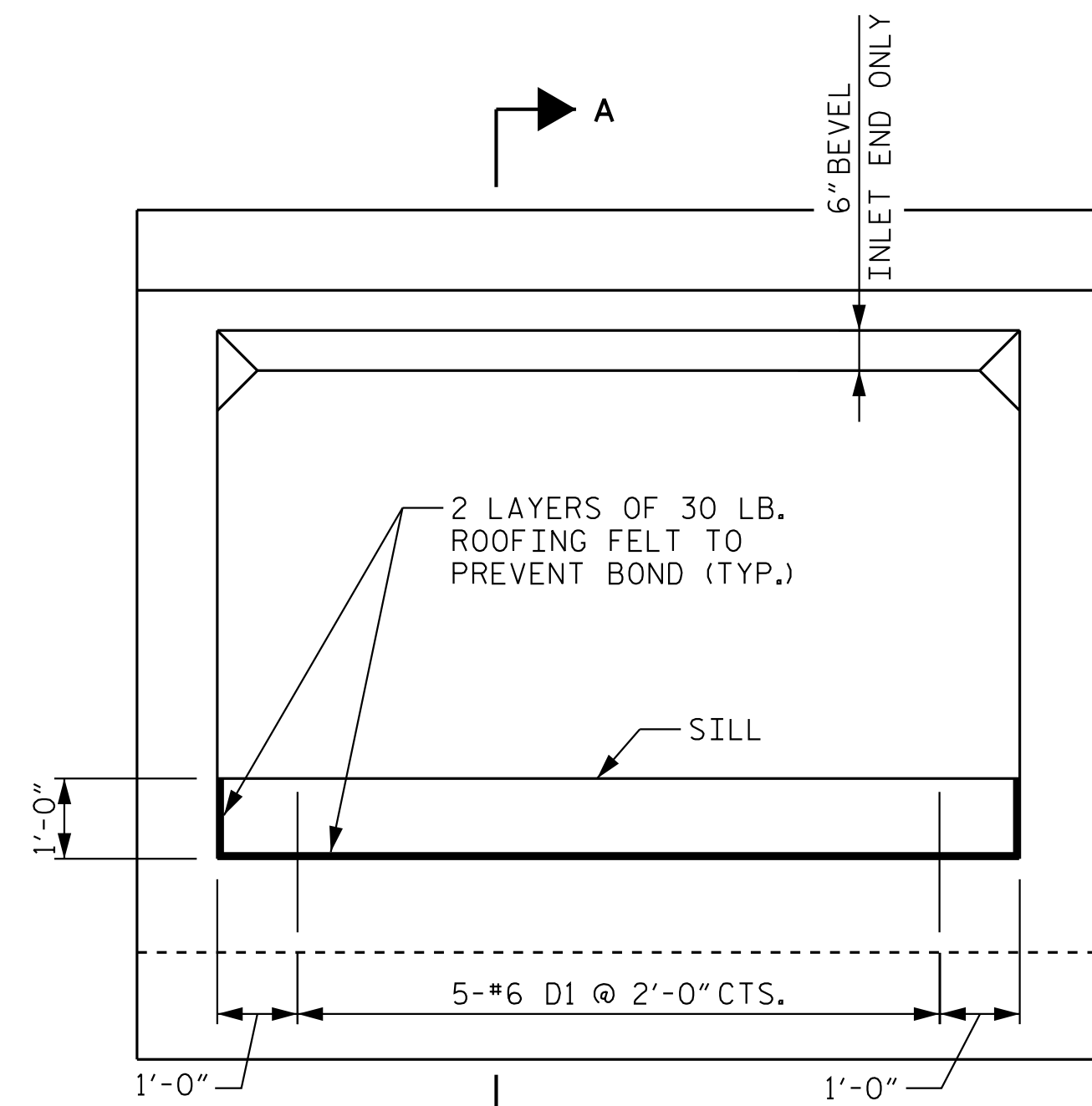
SHEET 1 OF 8
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 10 FT. X 6 FT.
 CONCRETE BOX CULVERT
 136° SKEW

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

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 11/25/2019

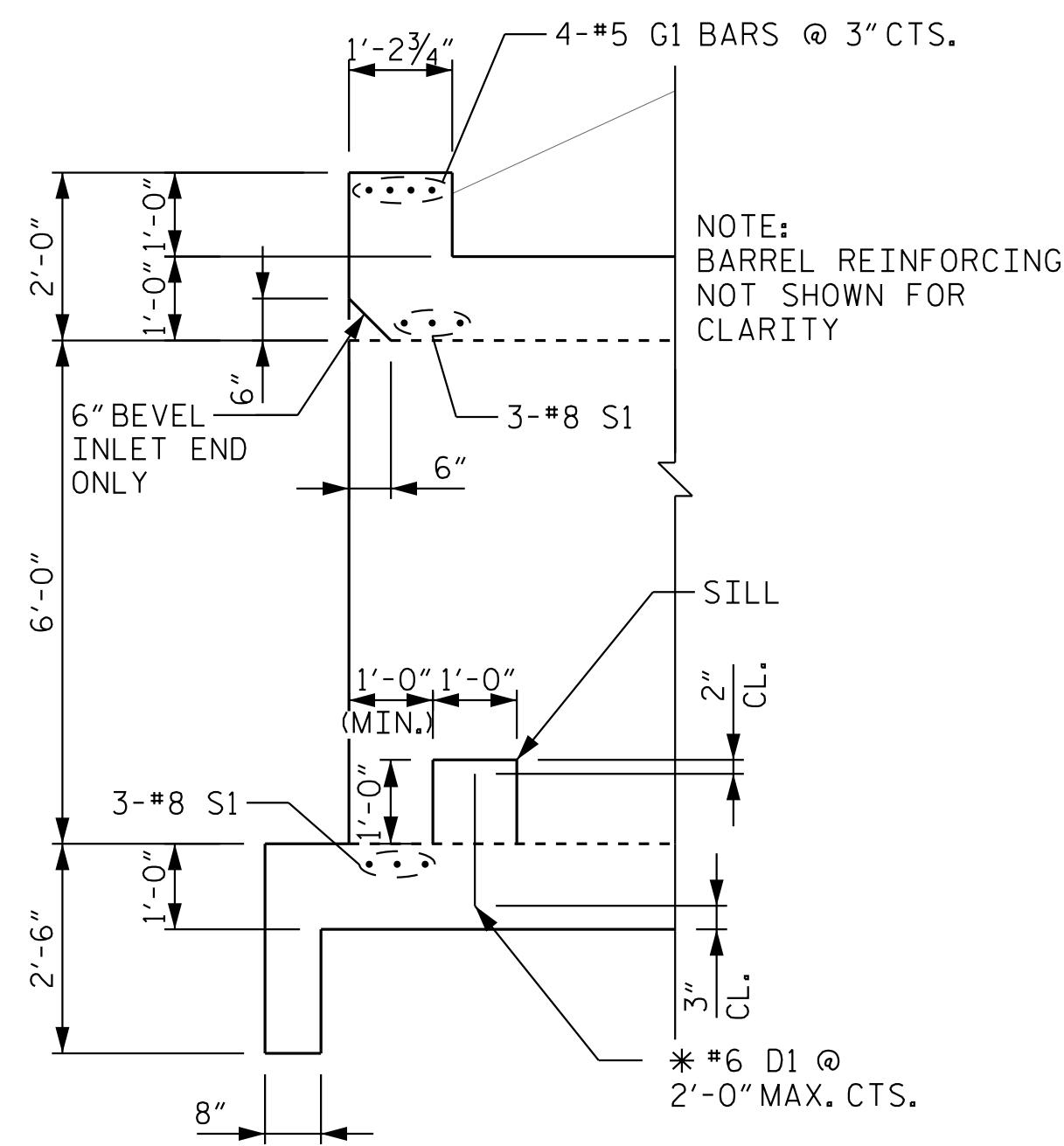
DRAWN BY: J. I. KIMBLE DATE: 11/19
 CHECKED BY: C. T. POOLE DATE: 11/19
 DESIGN ENGINEER OF RECORD: J. C. WILSON DATE: 11/19



NOTE:
WING WALLS NOT
SHOWN FOR CLARITY.

SILL ELEVATION

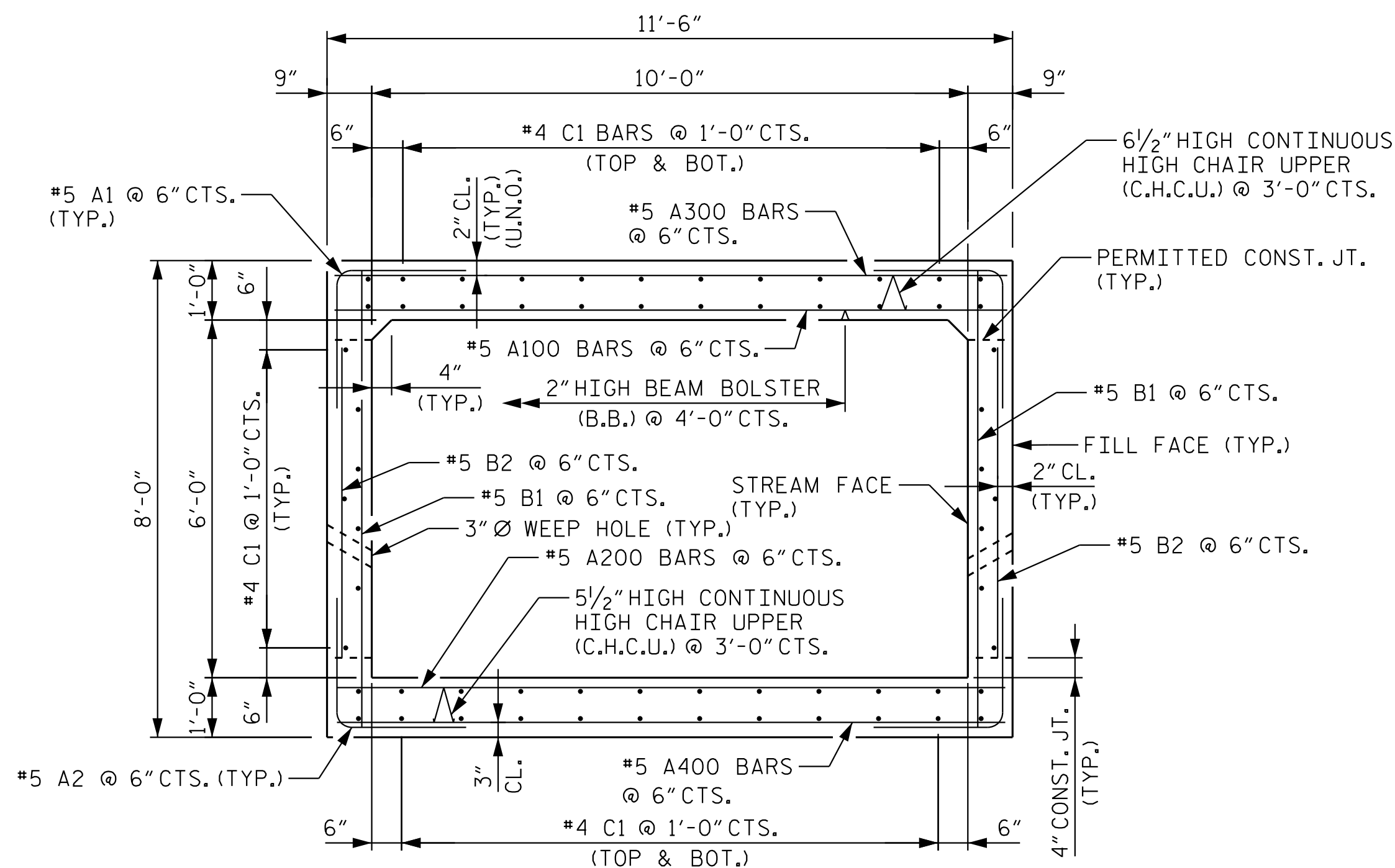
(LOOKING DOWNSTREAM, INLET END SHOWN. OUTLET END SIMILAR.)



SECTION A-A

(INLET END SHOWN, OUTLET SIMILAR)

* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED
NOTE: 1'-0" SILL IS TO BE CAST NORMAL TO CULVERT WALLS.

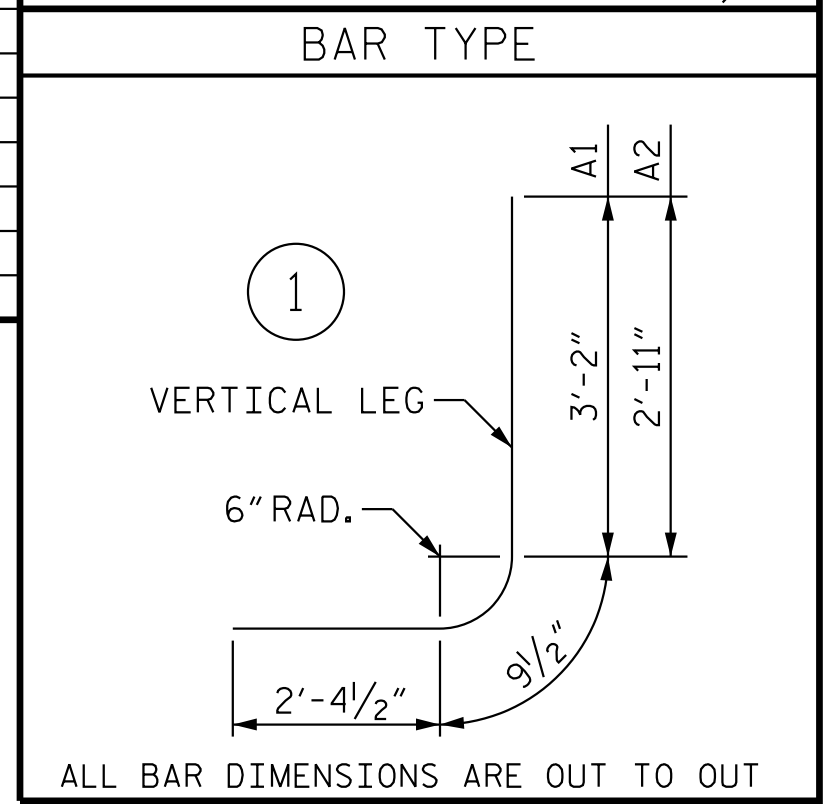


RIGHT ANGLE SECTION OF BARREL

THERE ARE 62 "C" BARS IN SECTION OF BARREL

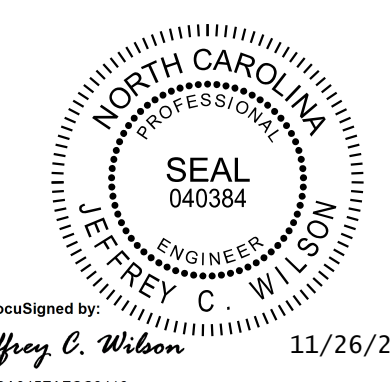
BAR SIZE	SPLICE LENGTH
#4	1'-10"
#5	2'-4"
#6	2'-9"
#7	3'-2"
#8	3'-8"

BILL OF MATERIAL											
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	478	5	1	6'-4"	3,158	A308	2	5	STR	7'-2"	15
A2	478	5	1	6'-1"	3,033	A309	2	5	STR	6'-7"	14
						A310	2	5	STR	6'-1"	13
A100	218	5	STR	11'-2"	2,539	A311	2	5	STR	5'-7"	12
A101	2	5	STR	10'-10"	23	A312	2	5	STR	5'-0"	10
A102	2	5	STR	8'-9"	18	A313	2	5	STR	4'-6"	9
A103	2	5	STR	9'-10"	21	A314	2	5	STR	4'-0"	8
A104	2	5	STR	9'-3"	19	A315	2	5	STR	3'-5"	7
A105	2	5	STR	8'-9"	18	A316	2	5	STR	2'-11"	6
A106	2	5	STR	8'-2"	17	A317	2	5	STR	2'-5"	5
A107	2	5	STR	7'-8"	16	A318	8	5	STR	2'-2"	18
A108	2	5	STR	7'-2"	15						
A109	2	5	STR	6'-7"	14	A400	218	5	STR	11'-2"	2,539
A110	2	5	STR	6'-1"	13	A401	2	5	STR	10'-10"	23
A111	2	5	STR	5'-7"	12	A402	2	5	STR	10'-4"	22
A112	2	5	STR	5'-0"	10	A403	2	5	STR	9'-10"	21
A113	2	5	STR	4'-6"	9	A404	2	5	STR	9'-3"	19
A114	2	5	STR	4'-0"	8	A405	2	5	STR	8'-9"	18
A115	2	5	STR	3'-5"	7	A406	2	5	STR	8'-2"	17
A116	2	5	STR	2'-11"	6	A407	2	5	STR	7'-8"	16
A117	2	5	STR	2'-5"	5	A408	2	5	STR	7'-2"	15
A118	8	5	STR	2'-2"	18	A409	2	5	STR	6'-7"	14
						A410	2	5	STR	6'-1"	13
A200	218	5	STR	11'-2"	2,539	A411	2	5	STR	5'-7"	12
A201	2	5	STR	10'-10"	23	A412	2	5	STR	5'-0"	10
A202	2	5	STR	10'-4"	22	A413	2	5	STR	4'-6"	9
A203	2	5	STR	9'-10"	21	A414	2	5	STR	4'-0"	8
A204	2	5	STR	9'-3"	19	A415	2	5	STR	3'-5"	7
A205	2	5	STR	8'-9"	18	A416	2	5	STR	2'-11"	6
A206	2	5	STR	8'-2"	17	A417	2	5	STR	2'-5"	5
A207	2	5	STR	7'-8"	16	A418	8	5	STR	2'-2"	18
A208	2	5	STR	7'-2"	15						
A209	2	5	STR	6'-7"	14	B1	478	5	STR	7'-7"	3,781
A210	2	5	STR	6'-1"	13	B2	478	5	STR	5'-2"	2,576
A211	2	5	STR	5'-7"	12						
A212	2	5	STR	5'-0"	10	C1	248	4	STR	31'-4"	5,191
A213	2	5	STR	4'-6"	9						
A214	2	5	STR	4'-0"	8	D1	10	6	STR	1'-7"	24
A215	2	5	STR	3'-5"	7						
A216	2	5	STR	2'-11"	6	G1	8	5	STR	15'-4"	128
A217	2	5	STR	2'-5"	5						
A218	8	5	STR	2'-2"	18	S1	12	8	STR	15'-4"	491
A300	218	5	STR	11'-2"	2,539						
A301	2	5	STR	10'-10"	23						
A302	2	5	STR	10'-4"	22						
A303	2	5	STR	9'-10"	21						
A304	2	5	STR	9'-3"	19						
A305	2	5	STR	8'-9"	18						
A306	2	5	STR	8'-2"	17						
A307	2	5	STR	7'-8"	16						



PROJECT NO. U-5724
WAYNE COUNTY
 STATION: 44+87.00 -Y2-

SHEET 2 OF 8



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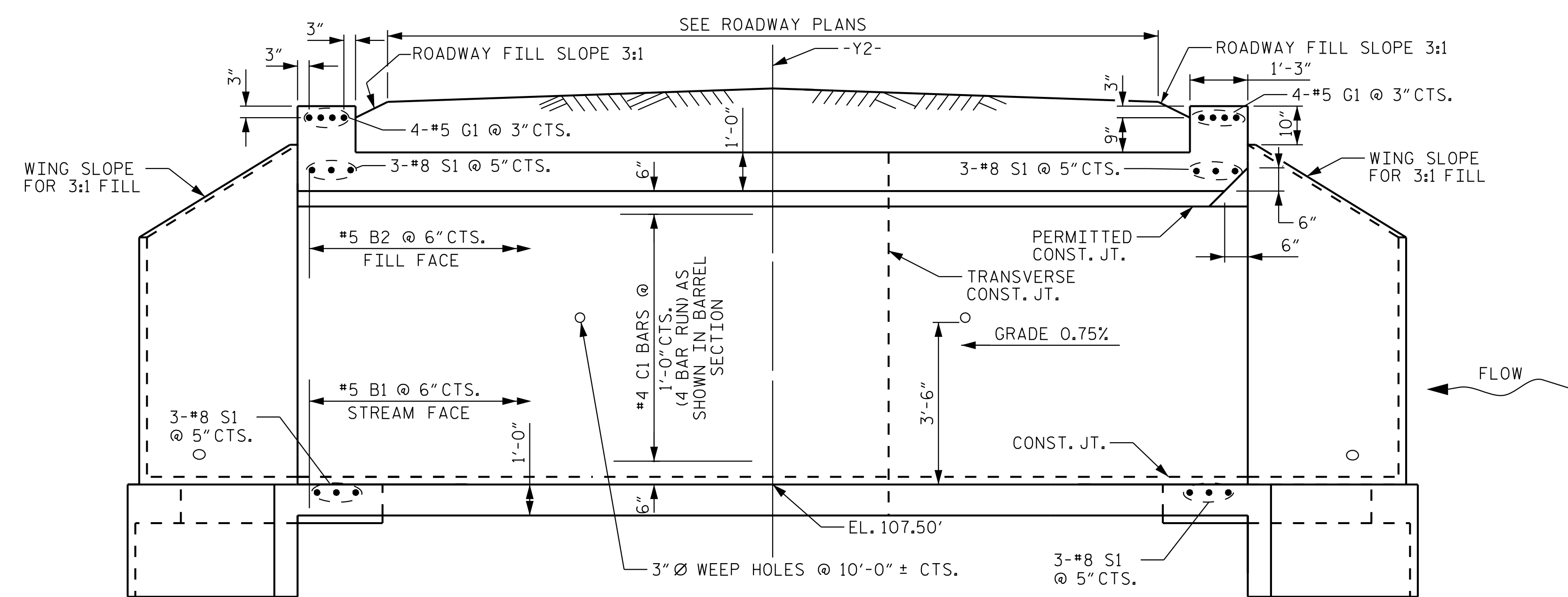
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 10 FT. X 6 FT.
 CONCRETE BOX CULVERT
 136° SKEW

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			8

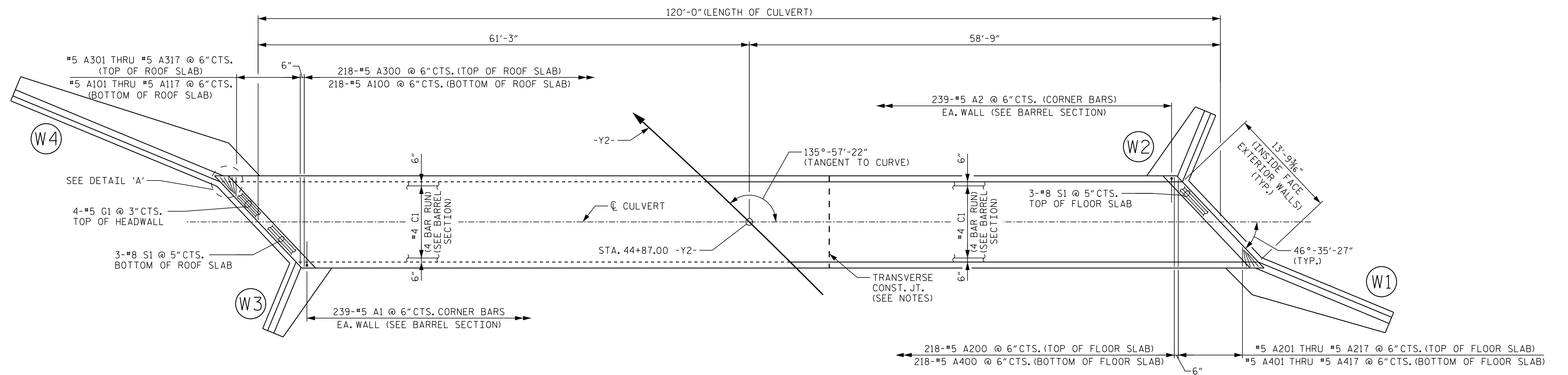
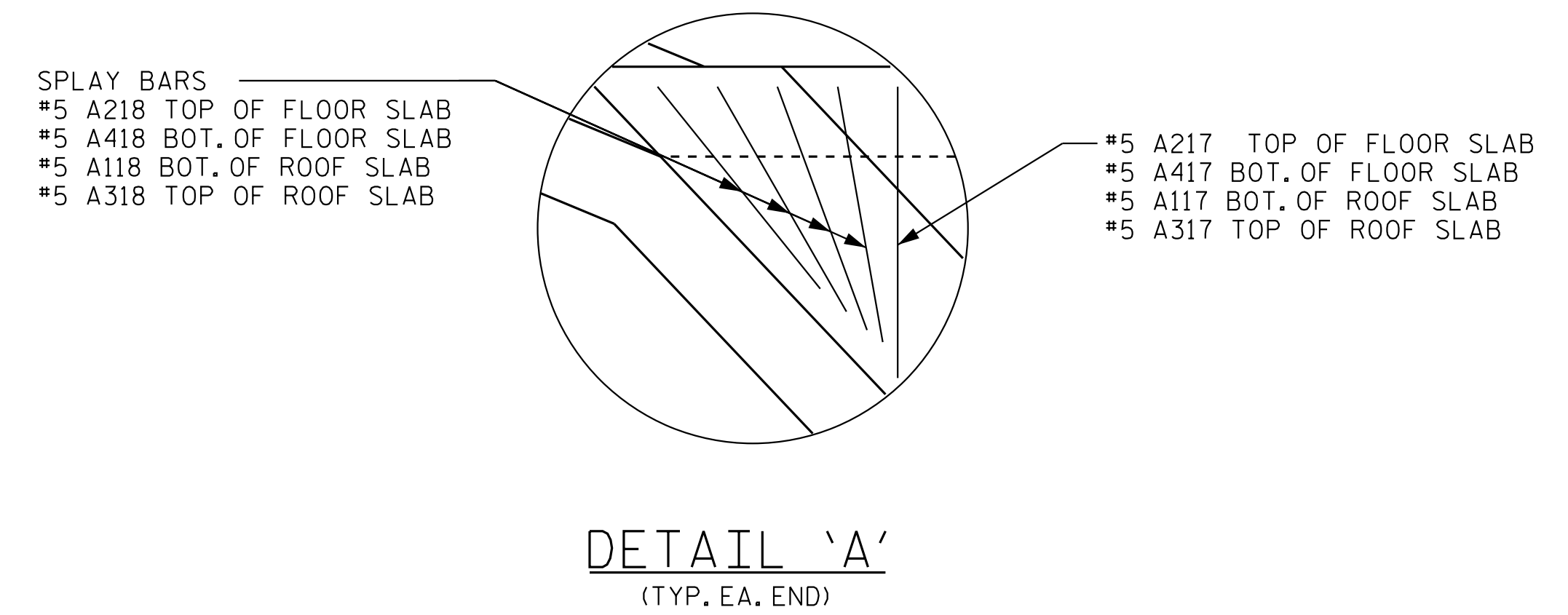
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 11/25/2019

DRAWN BY: J. I. KIMBLE DATE: 11/19
 CHECKED BY: C. T. POOLE DATE: 11/19
 DESIGN ENGINEER OF RECORD: J. C. WILSON DATE: 11/19

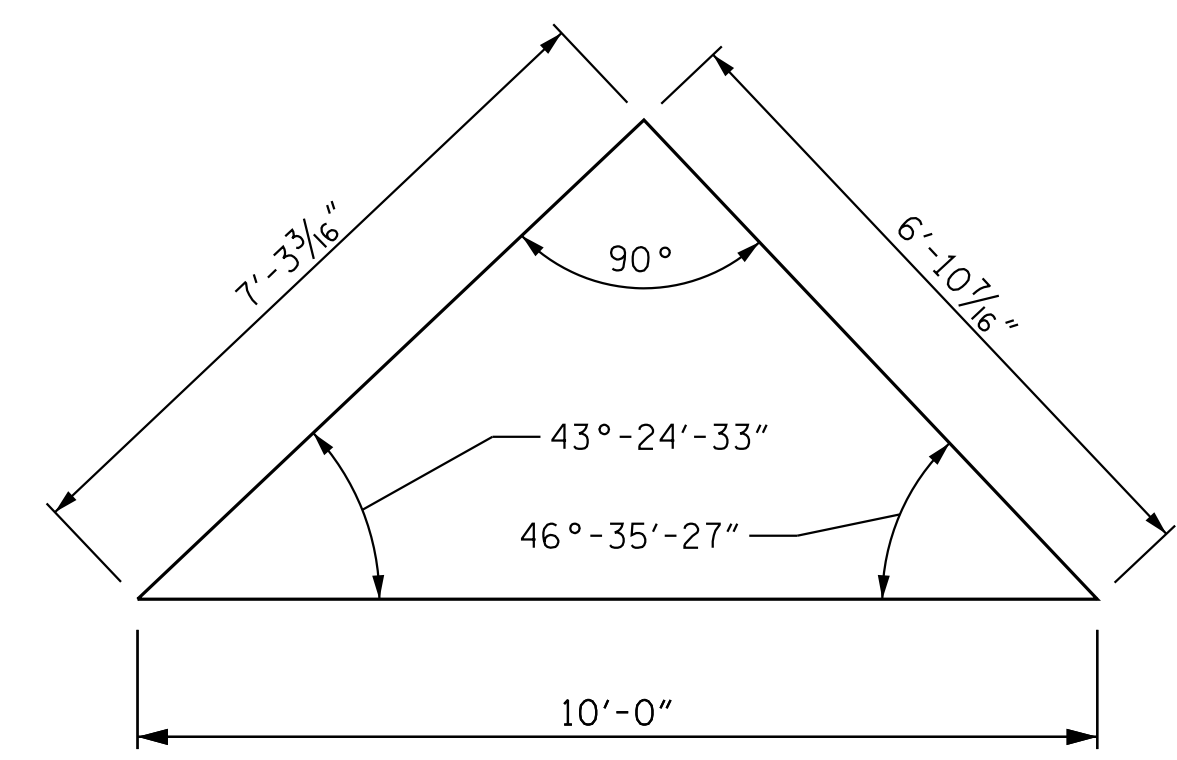


CULVERT SECTION NORMAL TO ROADWAY



PART PLAN - ROOF SLAB

PART PLAN - FLOOR SLAB

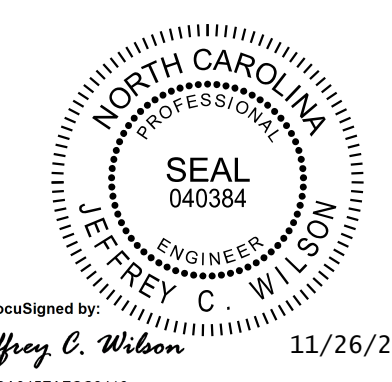


SKEW TRIANGLE

PROJECT NO. U-5724
 WAYNE COUNTY
 STATION: 44+87.00 -Y2-

SHEET 3 OF 8

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SINGLE 10 FT. X 6 FT.
 CONCRETE BOX CULVERT
 136° SKEW



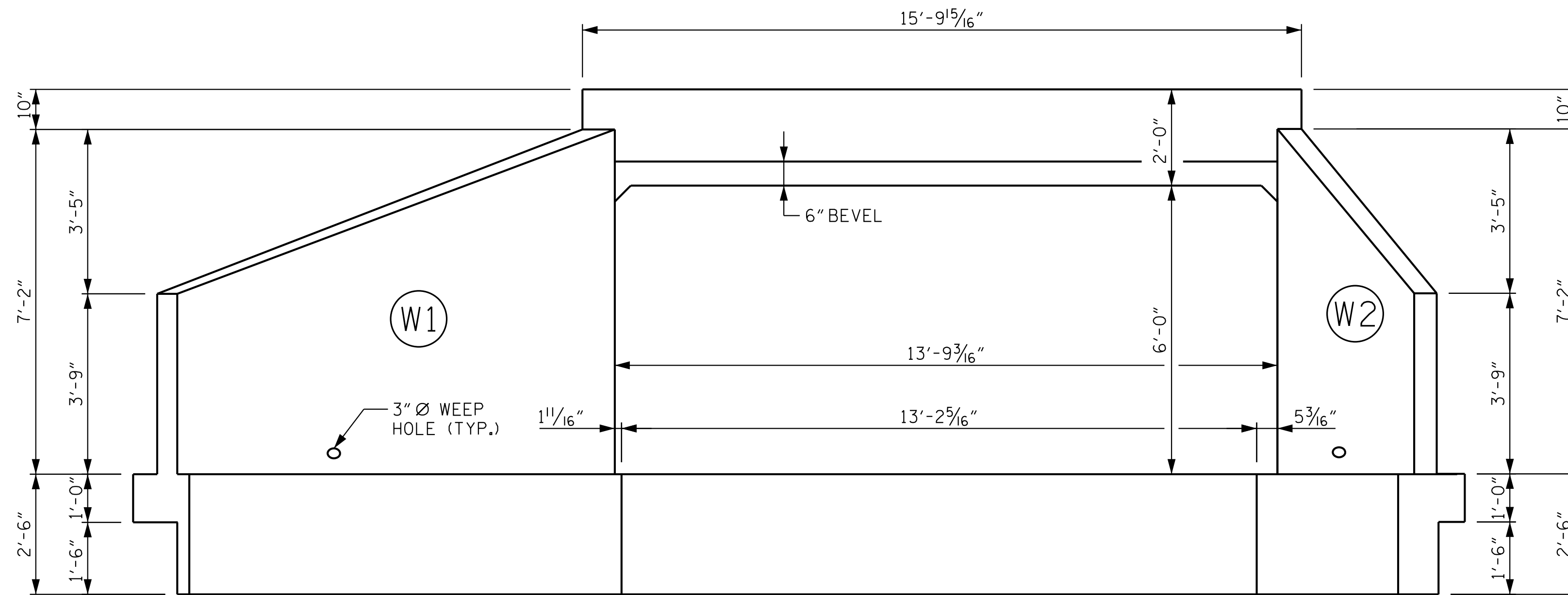
Kimley»Horn
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 Raleigh, NC 27601-1772
 Phone (919) 677-2000 NC LICENSE # F-0102

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 CHECKED BY: C. T. POOLE DATE: 11/19
 DESIGN ENGINEER OF RECORD: J. C. WILSON DATE: 11/19

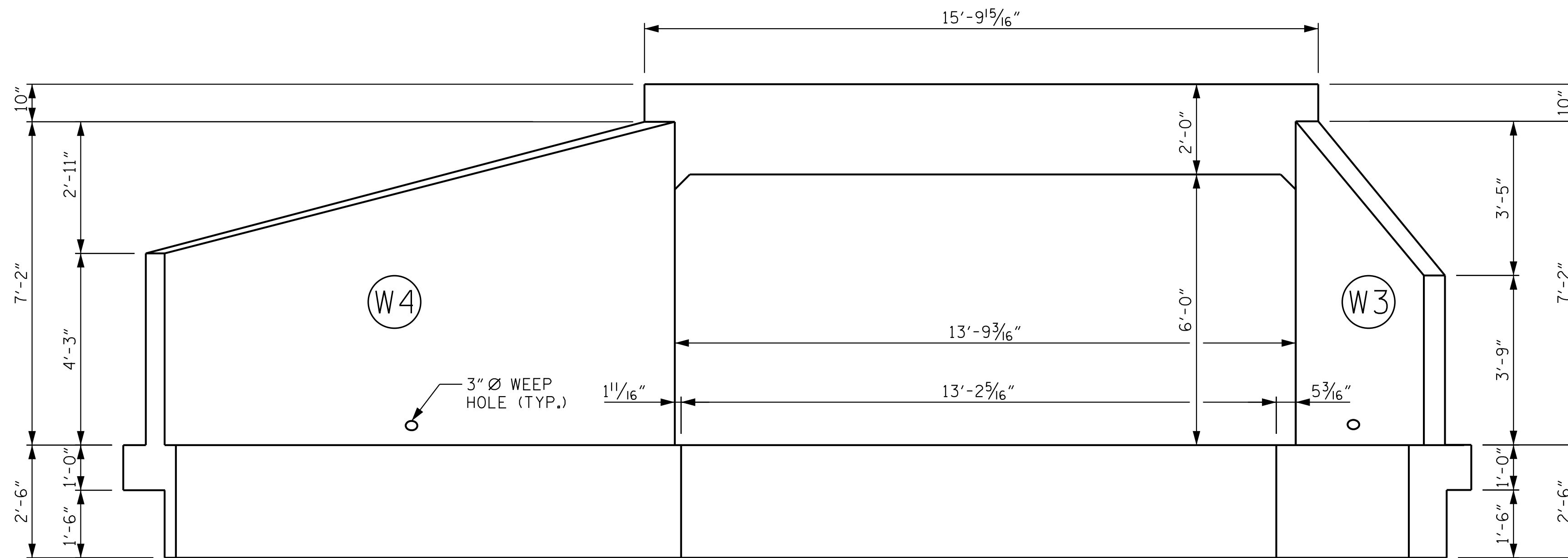
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REVISIONS						SHEET NO. C-3
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2			4			

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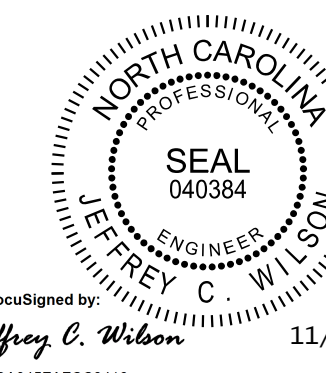
END ELEVATION NORMAL TO SKEW - INLET



END ELEVATION NORMAL TO SKEW - OUTLET

PROJECT NO. U-5724
WAYNE COUNTY
 STATION: 44+87.00 -Y2-

SHEET 4 OF 8



DocuSigned by:
 Jeffrey C. Wilson
 11/26/2019

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SINGLE 10 FT. X 6 FT.
 CONCRETE BOX CULVERT
 136° SKEW

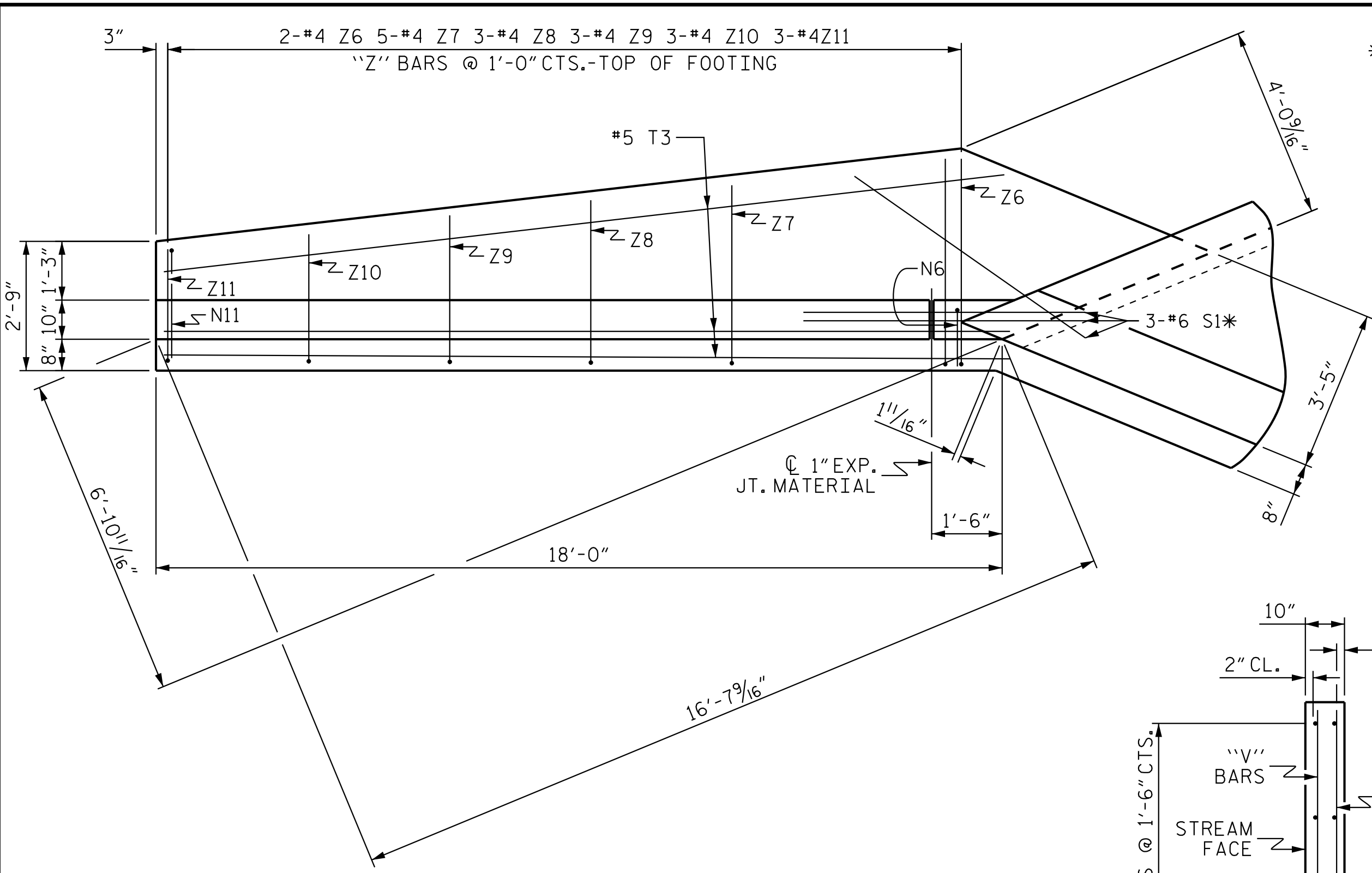
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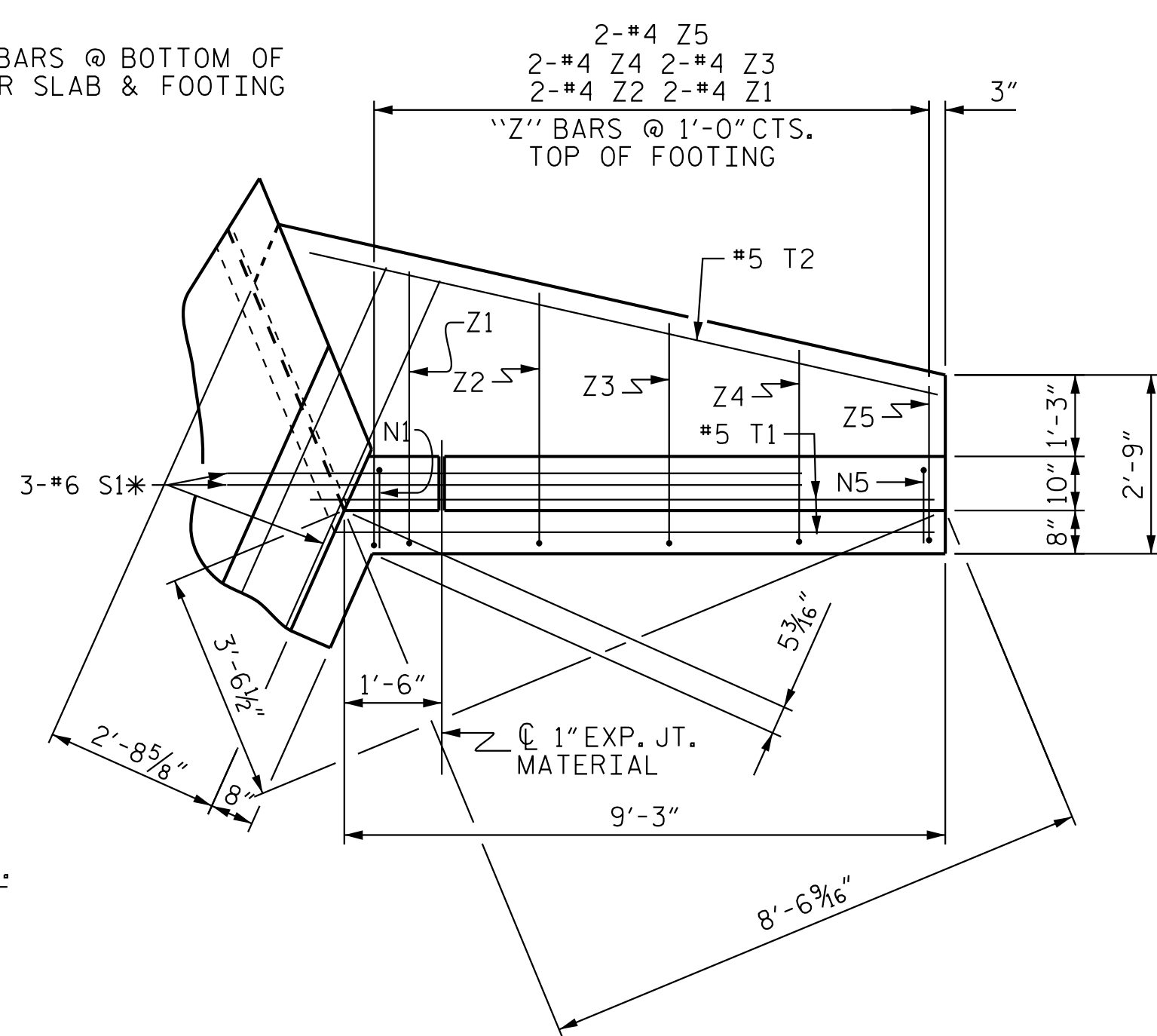
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DESIGN ENGINEER OF RECORD: <u>J. C. WILSON</u>	DATE: <u>11/19</u>

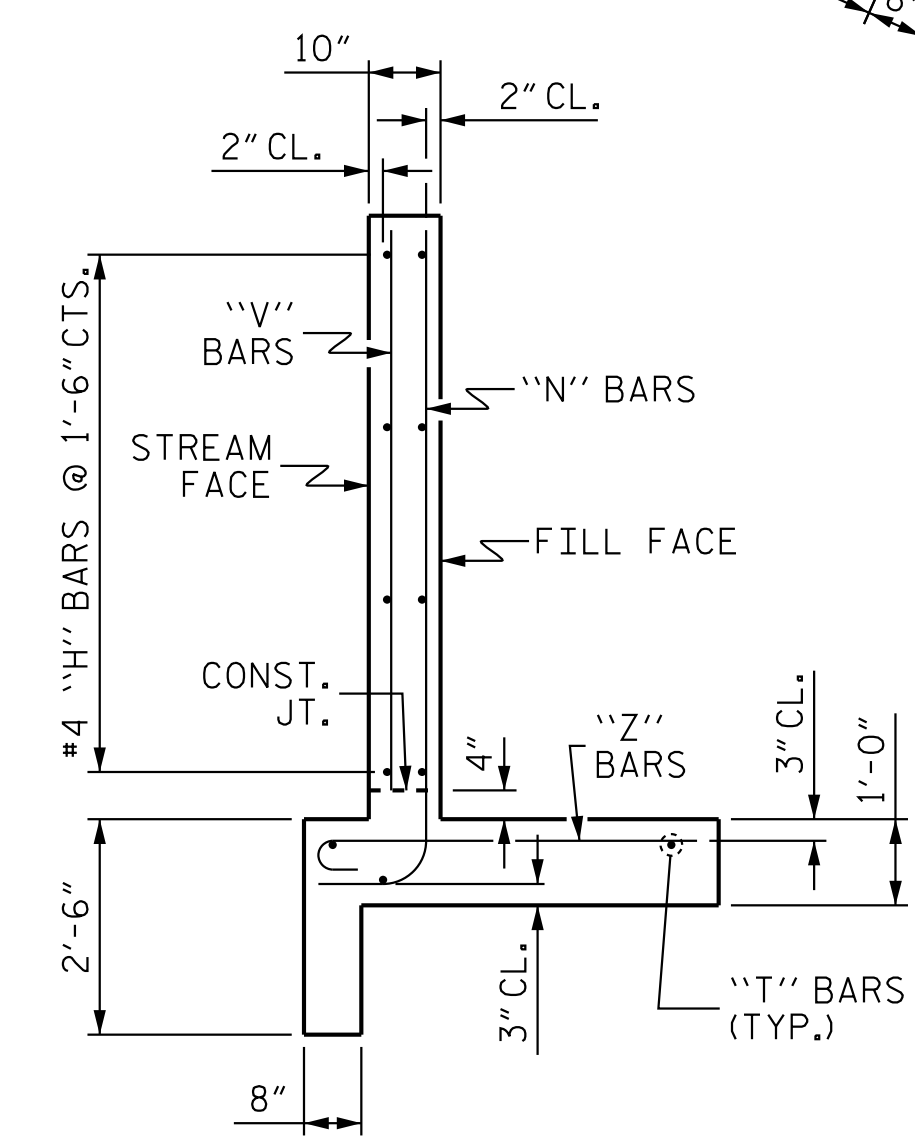


PLAN W1

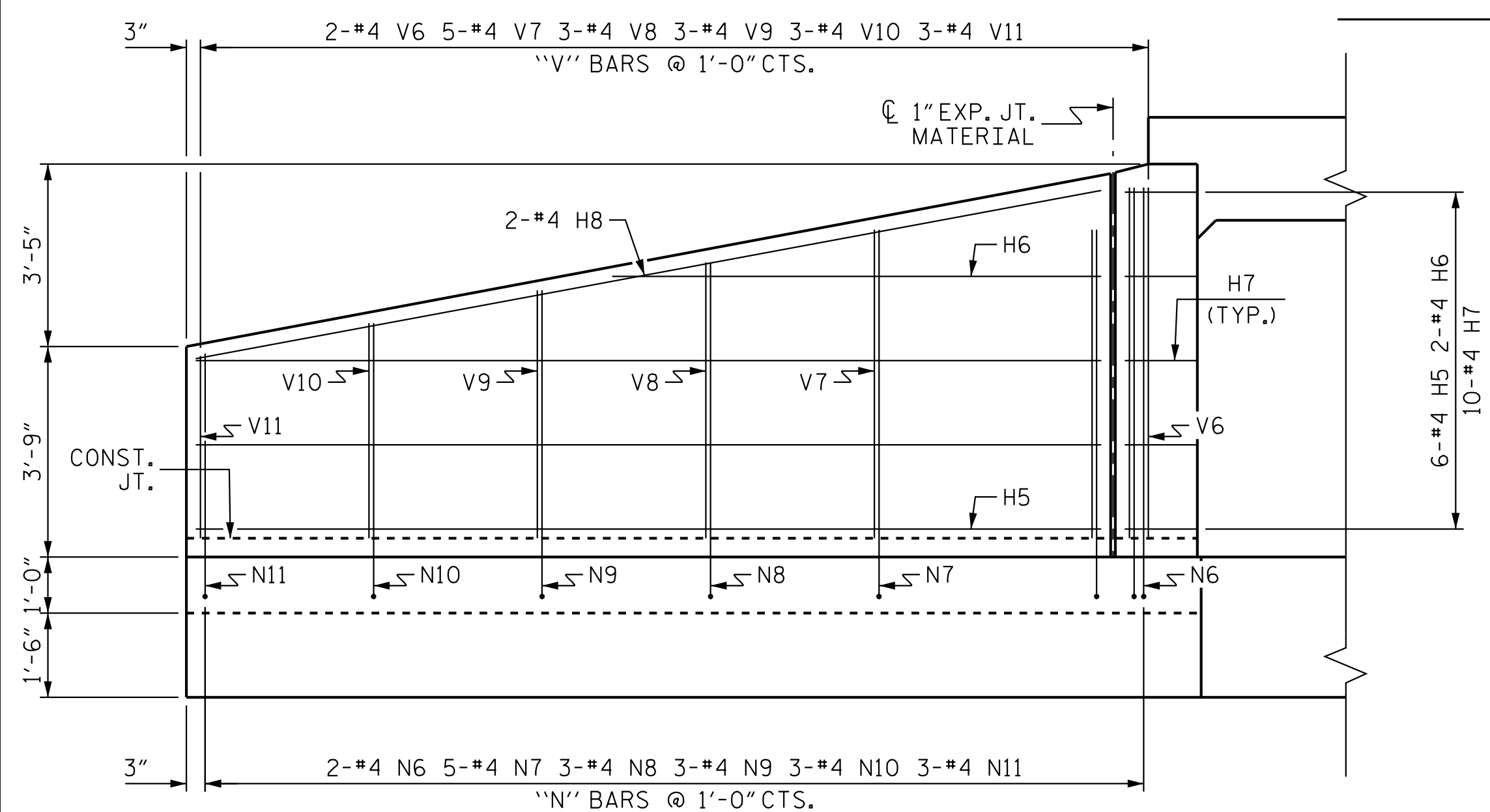
* S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING



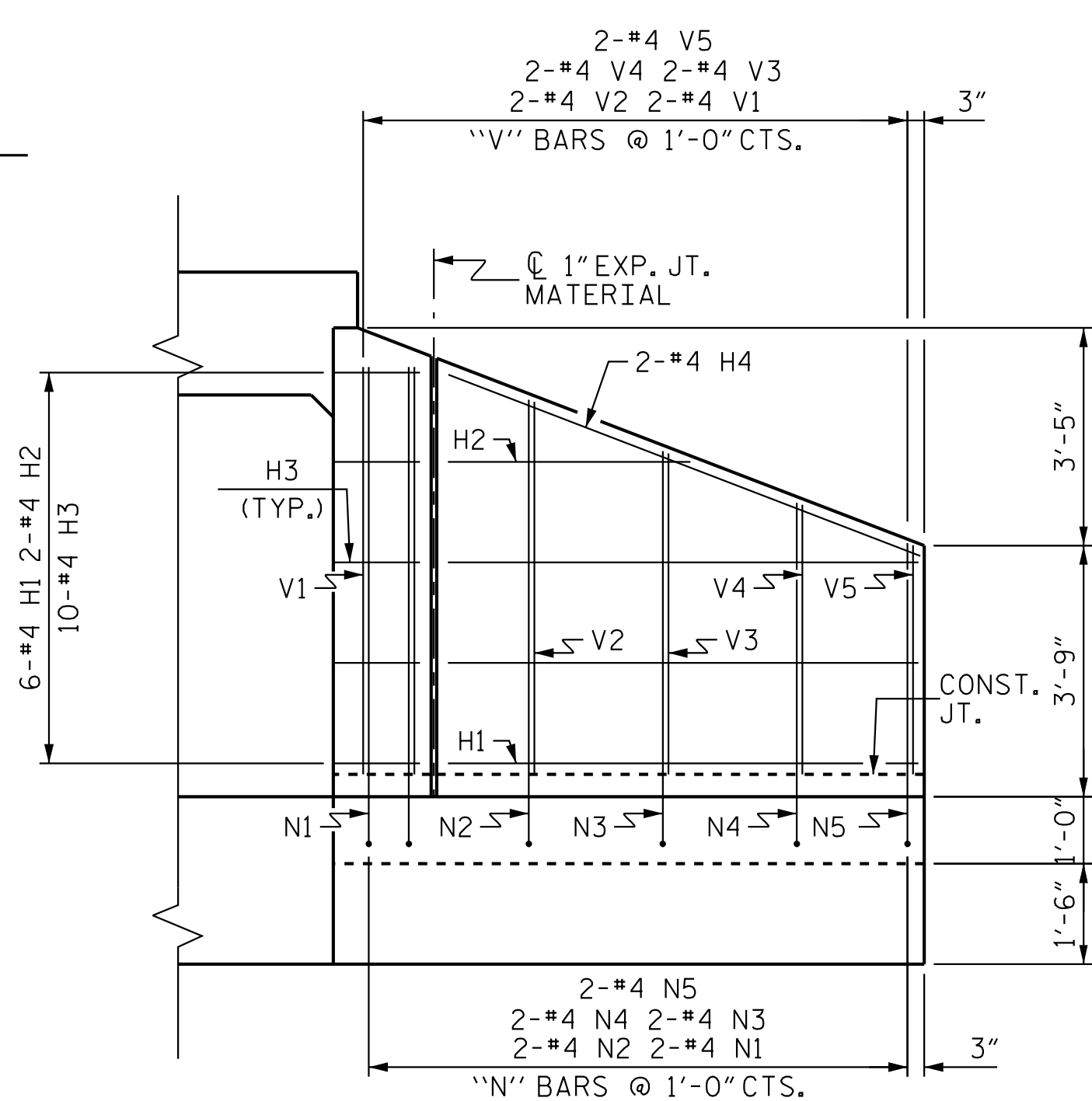
PLAN W2



TYPICAL WING SECTION



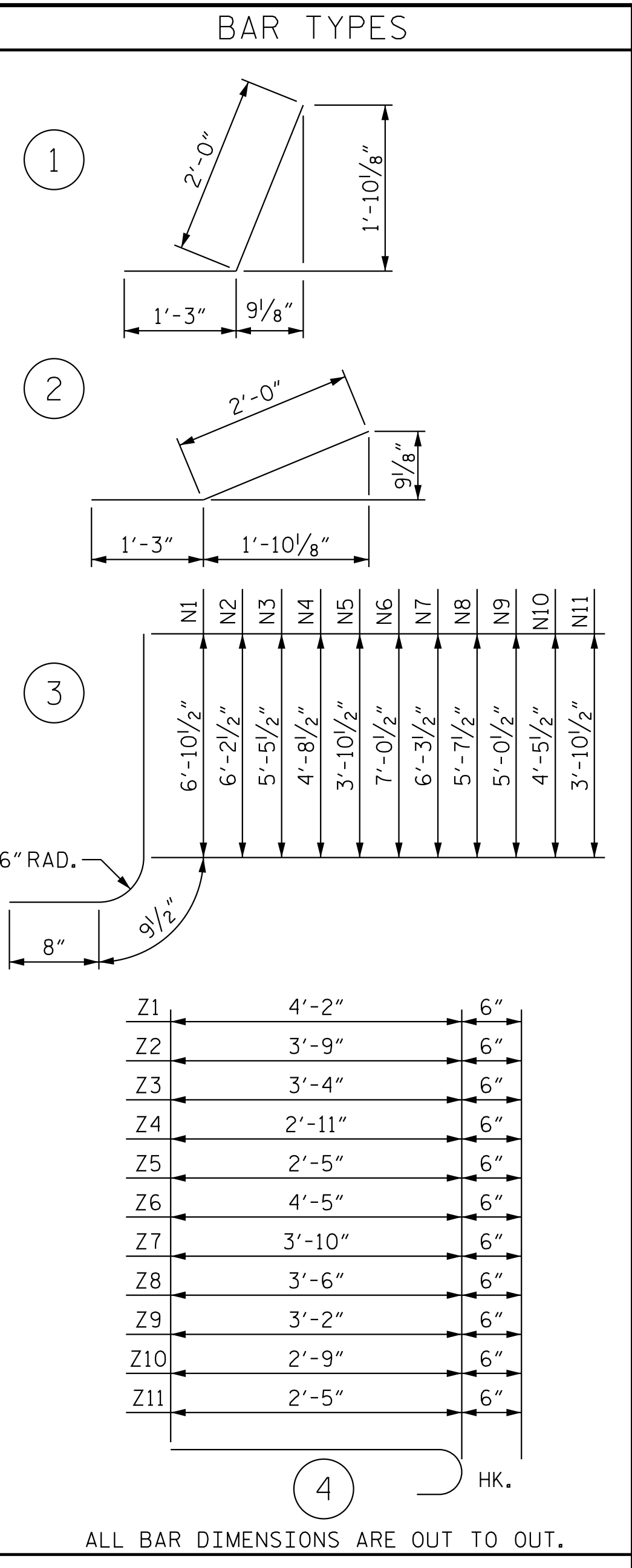
ELEVATION W1



ELEVATION W2

BILL OF MATERIAL - W1 & W2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	4	STR	7'-4"	29
H2	2	4	STR	3'-10"	5
H3	10	4	1	3'-3"	22
H4	2	4	STR	7'-11"	11
H5	6	4	STR	16'-1"	64
H6	2	4	STR	9'-2"	12
H7	10	4	2	3'-3"	22
H8	2	4	STR	16'-4"	22
N1	2	4	3	8'-4"	11
N2	2	4	3	7'-8"	10
N3	2	4	3	6'-11"	9
N4	2	4	3	6'-2"	8
N5	2	4	3	5'-4"	7
N6	2	4	3	8'-6"	11
N7	5	4	3	7'-9"	26
N8	3	4	3	7'-1"	14
N9	3	4	3	6'-6"	13
N10	3	4	3	5'-11"	12
N11	3	4	3	5'-4"	11
S1	6	6	STR	6'-0"	54
T1	2	5	STR	8'-7"	18
T2	1	5	STR	9'-10"	10
T3	3	5	STR	18'-0"	56
V1	2	4	STR	6'-4"	8
V2	2	4	STR	5'-7"	7
V3	2	4	STR	4'-10"	6
V4	2	4	STR	4'-1"	5
V5	2	4	STR	3'-4"	4
V6	2	4	STR	6'-6"	9
V7	5	4	STR	5'-8"	19
V8	3	4	STR	5'-1"	10
V9	3	4	STR	4'-5"	9
V10	3	4	STR	3'-10"	8
V11	3	4	STR	3'-3"	7
Z1	2	4	4	4'-8"	6
Z2	2	4	4	4'-3"	6
Z3	2	4	4	3'-10"	5
Z4	2	4	4	3'-5"	5
Z5	2	4	4	2'-11"	4
Z6	2	4	4	4'-11"	7
Z7	5	4	4	4'-4"	14
Z8	3	4	4	4'-0"	8
Z9	3	4	4	3'-8"	7
Z10	3	4	4	3'-3"	7
Z11	3	4	4	2'-11"	6

REINFORCING STEEL FOR 2 WINGS	624 LBS
CLASS A CONCRETE	
2 WINGS	9.7 CY
1 HEADWALL	0.7 CY
1 END CURTAIN WALL	0.8 CY
TOTAL	11.2 CY

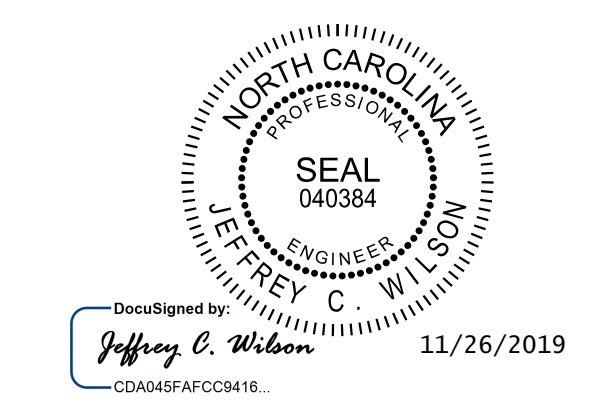


PROJECT NO. U-5724
 WAYNE COUNTY
 STATION: 44+87.00 -Y2-

SHEET 5 OF 8

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 INLET WING (W1 & W2)
 DETAILS FOR
 CONCRETE BOX CULVERT
 H = 6'-0" SLOPE = 3:1
 136° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-5
1			3			TOTAL SHEETS
2			4			8

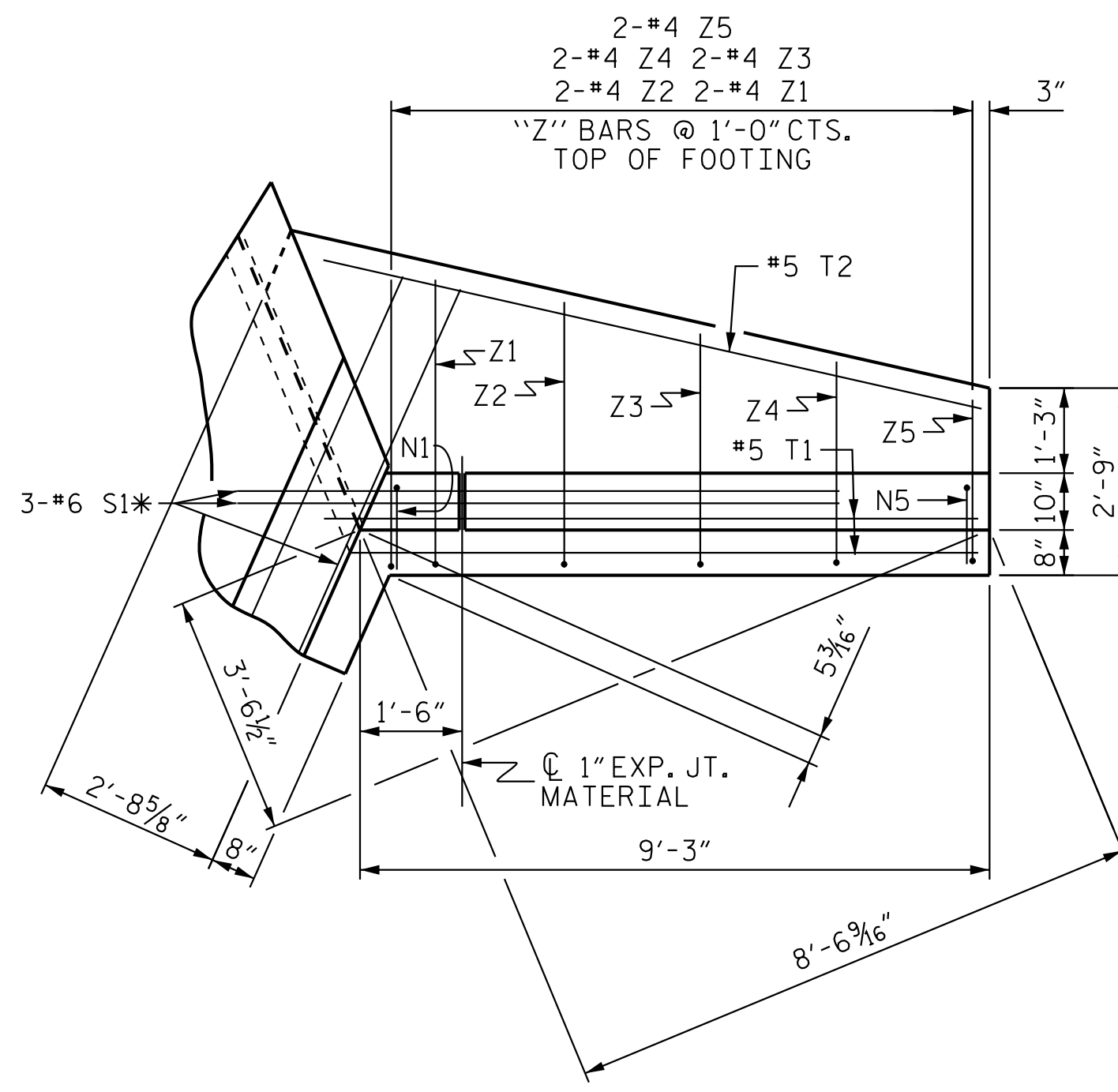


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DRAWN BY: J. I. KIMBLE DATE: 11/19
 CHECKED BY: C.T. POOLE DATE: 11/19
 DESIGN ENGINEER OF RECORD: J. C. WILSON DATE: 11/19

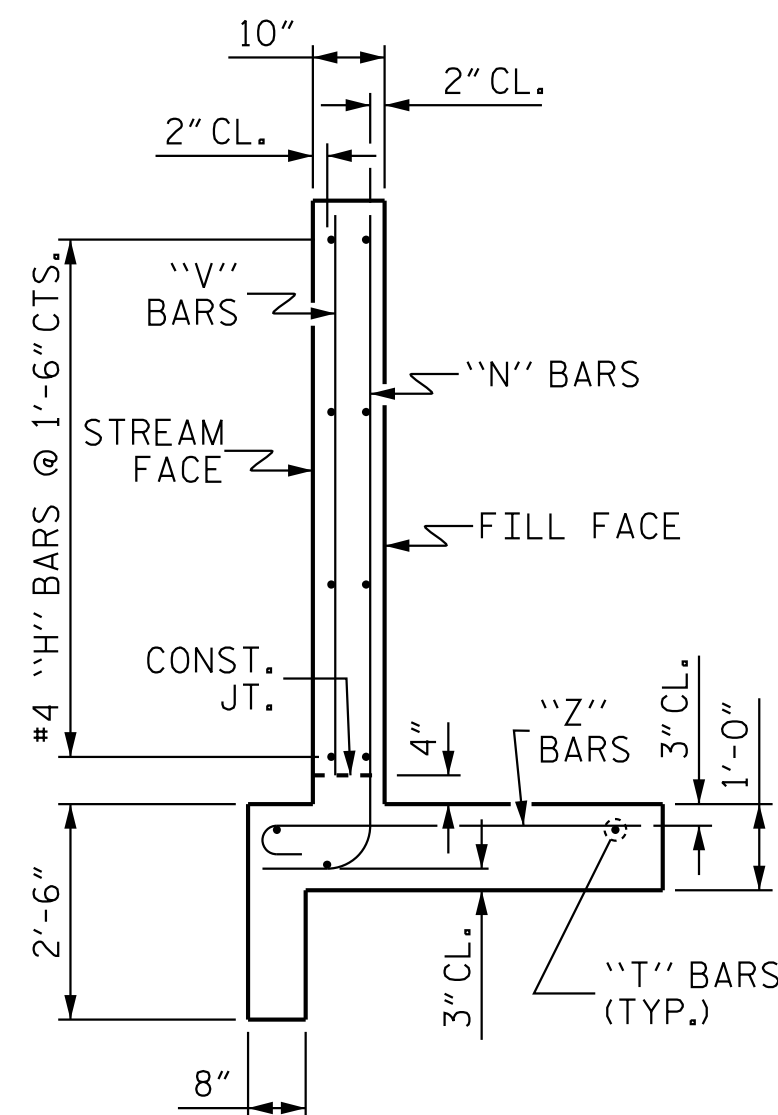
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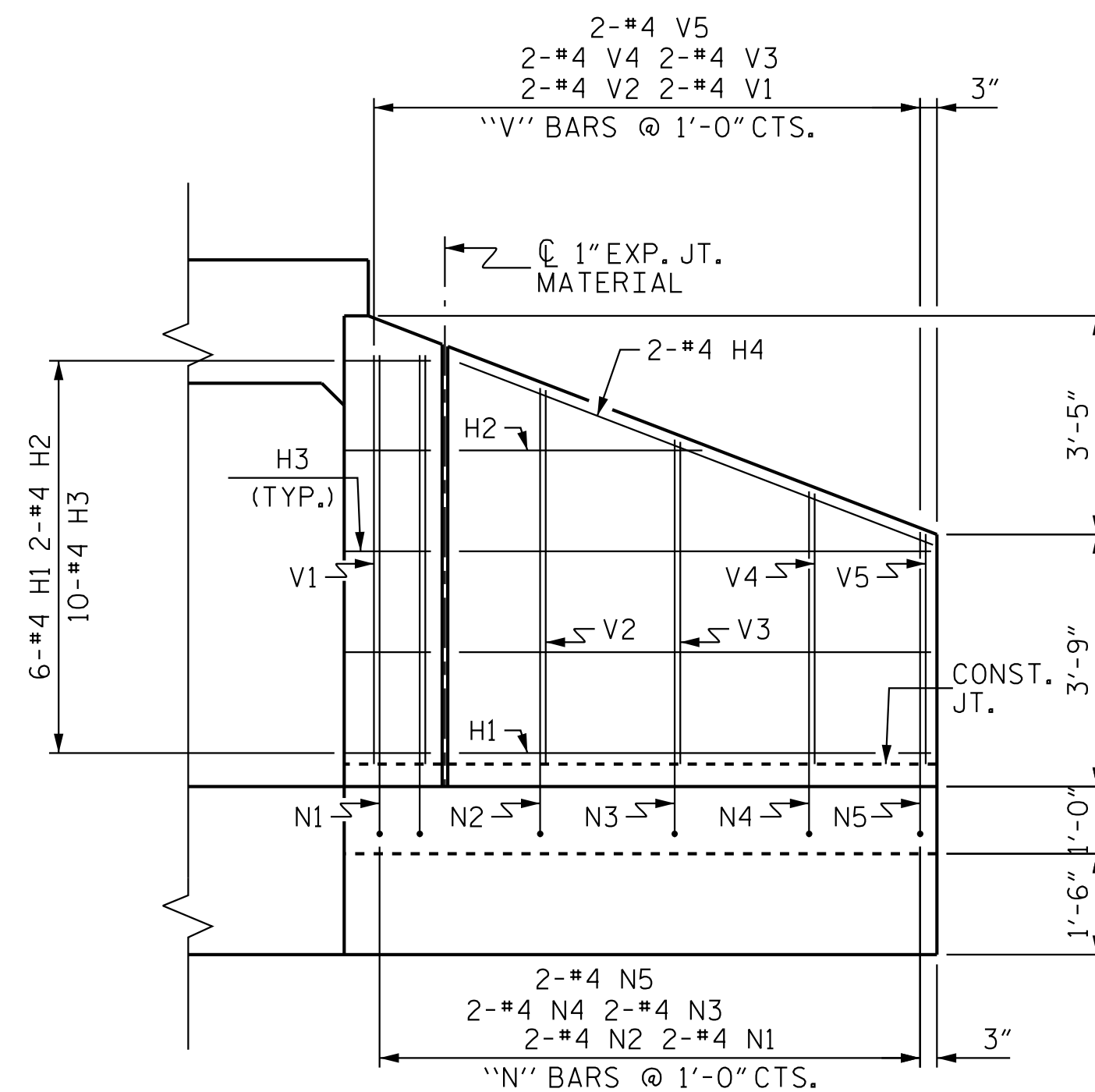


PLAN W3

* S1 BARS @ BOTTOM OF FLOOR SLAB & FOOTING



TYPICAL WING SECTION

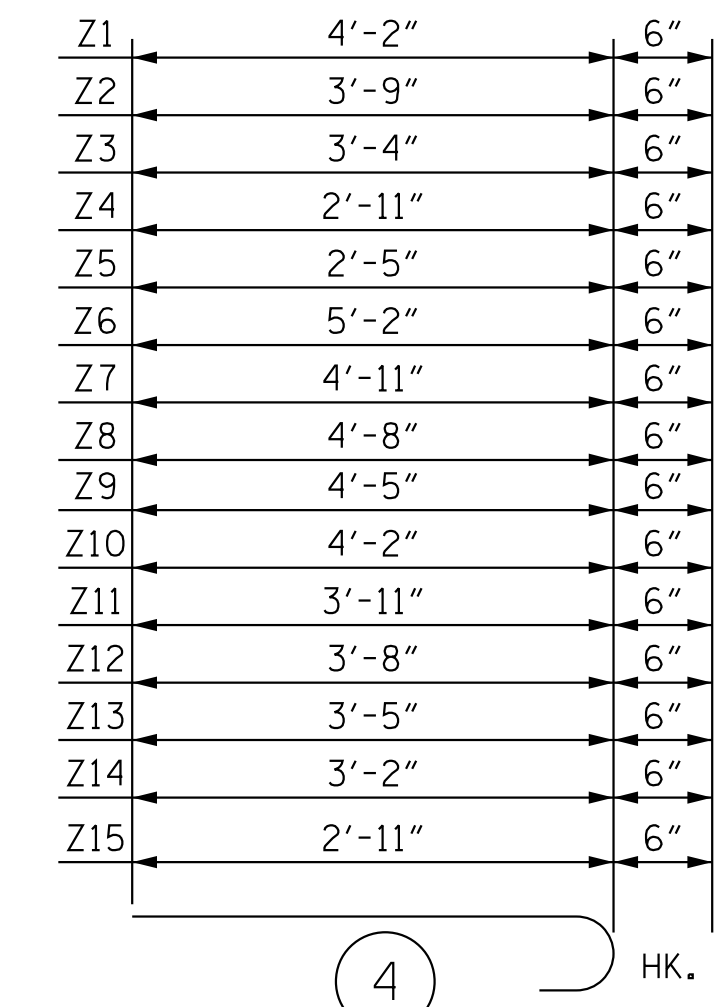
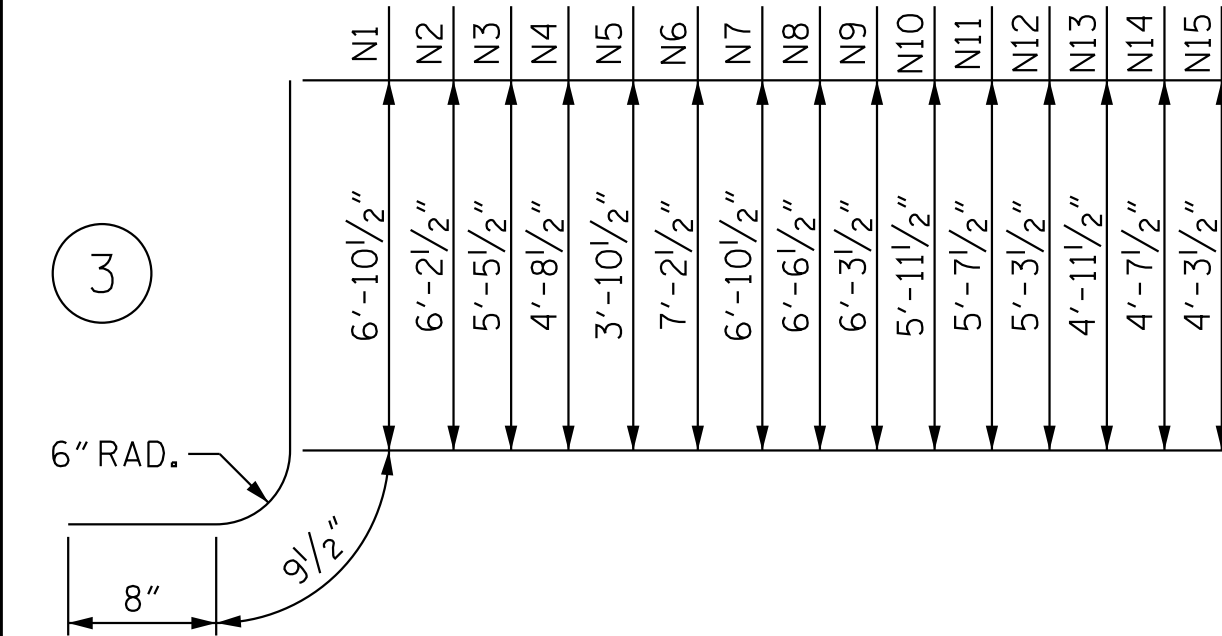
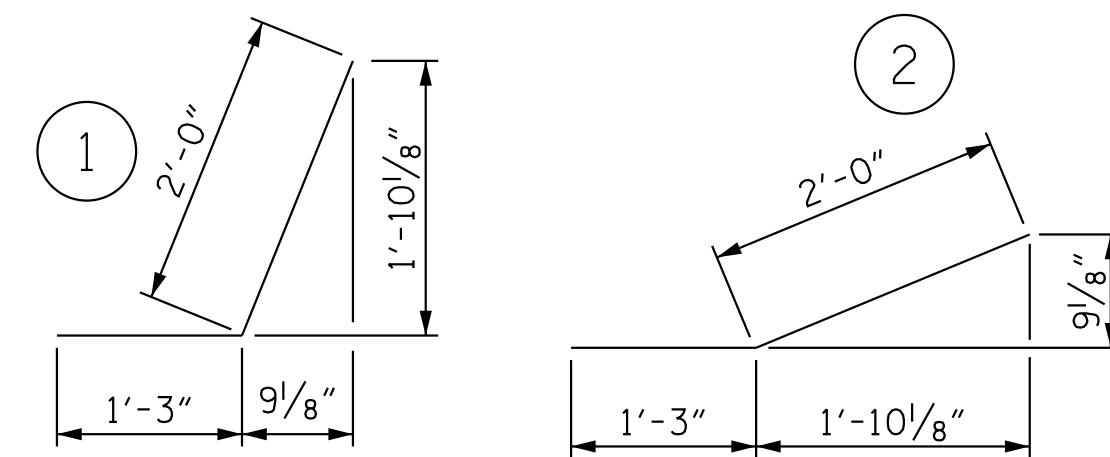


ELEVATION W3

BILL OF MATERIAL-W3 & W4											
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	4	STR	7'-4"	29	V1	2	4	STR	6'-4"	8
H2	2	4	STR	3'-10"	5	V2	2	4	STR	5'-7"	7
H3	10	4	1	3'-3"	22	V3	2	4	STR	4'-10"	6
H4	2	4	STR	7'-11"	11	V4	2	4	STR	4'-1"	5
H5	6	4	STR	26'-1"	105	V5	2	4	STR	3'-4"	4
H6	2	4	STR	17'-9"	24	V6	2	5	STR	6'-7"	14
H7	10	4	2	3'-3"	22	V7	3	5	STR	6'-4"	20
H8	2	4	STR	26'-3"	35	V8	3	5	STR	6'-0"	19
						V9	3	5	STR	5'-8"	18
N1	2	4	3	8'-4"	11	V10	3	5	STR	5'-4"	17
N2	2	4	3	7'-8"	10	V11	3	5	STR	5'-0"	16
N3	2	4	3	6'-11"	9	V12	3	5	STR	4'-8"	15
N4	2	4	3	6'-2"	8	V13	3	5	STR	4'-5"	14
N5	2	4	3	5'-4"	7	V14	3	5	STR	4'-1"	13
N6	2	5	3	8'-8"	18	V15	3	5	STR	3'-9"	12
N7	3	5	3	8'-4"	26						
N8	3	5	3	8'-0"	25	Z1	2	4	4	4'-8"	6
N9	3	5	3	7'-9"	24	Z2	2	4	4	4'-3"	6
N10	3	5	3	7'-5"	23	Z3	2	4	4	3'-10"	5
N11	3	5	3	7'-1"	22	Z4	2	4	4	3'-5"	5
N12	3	5	3	6'-9"	21	Z5	2	4	4	2'-11"	4
N13	3	5	3	6'-5"	20	Z6	2	5	4	5'-8"	12
N14	3	5	3	6'-1"	19	Z7	3	5	4	5'-5"	17
N15	3	5	3	5'-9"	18	Z8	3	5	4	5'-2"	16
						Z9	3	5	4	4'-11"	15
S1	3	6	STR	6'-0"	27	Z10	3	5	4	4'-8"	15
S2	3	6	STR	7'-6"	34	Z11	3	5	4	4'-5"	14
						Z12	3	5	4	4'-2"	13
T1	2	5	STR	8'-7"	18	Z13	3	5	4	3'-11"	12
T2	1	5	STR	9'-10"	10	Z14	3	5	4	3'-8"	11
T3	3	5	STR	27'-11"	87	Z15	3	5	4	3'-5"	11

REINFORCING STEEL FOR 2 WINGS	1,040 LBS
CLASS A CONCRETE	
2 WINGS	14.1 CY
1 HEADWALLS	0.7 CY
1 END CURTAIN WALLS	0.8 CY
TOTAL	16.2 CY

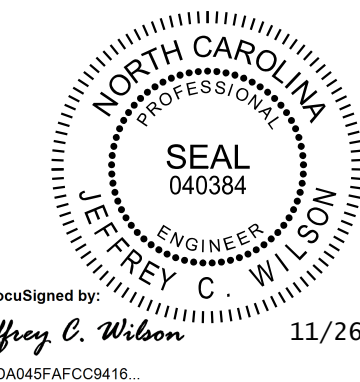
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. U-5724
 WAYNE COUNTY
 STATION: 44+87.00 -Y2-

SHEET 6 OF 8



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 OUTLET WING (W3)
 DETAILS FOR
 CONCRETE BOX CULVERT
 H = 6'-0" SLOPE = 3:1
 136° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-6
1			3			TOTAL SHEETS
2			4			8

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K:\BIDI_Structures\Calver\NC\01036333 U-5724 Goldboro\Co\Ugn\U5724_SMU_C006.dgn 11/26/2019

DRAWN BY: J. I. KIMBLE DATE: 11/19
 CHECKED BY: C. T. POOLE DATE: 11/19
 DESIGN ENGINEER OF RECORD: J. C. WILSON DATE: 11/19

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 (γ _{L1})	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	1.07	--	1.75	1.07	1	TOP SLAB	5.38	1.25	1	TOP SLAB	0.75		
	HL-93 (OPERATING)	N/A		1.39	--	1.35	1.39	1	TOP SLAB	5.38	1.62	1	TOP SLAB	0.75		
	HS-20 (INVENTORY)	36,000	②	1.16	41.76	1.75	1.16	1	TOP SLAB	5.38	1.38	1	TOP SLAB	0.75		
	HS-20 (OPERATING)	36,000		1.50	54.00	1.35	1.50	1	TOP SLAB	5.38	1.79	1	TOP SLAB	0.75		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.11	28.49	1.40	2.11	1	TOP SLAB	5.38	2.95	1	TOP SLAB	0.75	
		SNGARBS2	20,000		1.97	39.40	1.40	1.97	1	TOP SLAB	5.38	2.69	1	TOP SLAB	0.75	
		SNAGRIS2	22,000		2.11	46.42	1.40	2.11	1	TOP SLAB	5.38	2.95	1	TOP SLAB	0.75	
		SNCOTTS3	27,250	③	1.47	40.06	1.40	1.51	1	TOP SLAB	5.38	1.47	1	TOP SLAB	0.75	
		SNAGGRS4	34,925		1.47	51.34	1.40	1.47	1	BOTTOM SLAB	5.38	2.09	1	BOTTOM SLAB	0.75	
		SNS5A	35,550		1.55	55.10	1.40	1.55	1	BOTTOM SLAB	5.38	1.87	1	TOP SLAB	0.75	
		SNS6A	39,950		1.54	61.52	1.40	1.54	1	BOTTOM SLAB	5.38	1.87	1	TOP SLAB	0.75	
		SNS7B	42,000		1.55	65.10	1.40	1.55	1	BOTTOM SLAB	5.38	1.88	1	TOP SLAB	0.75	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		1.94	64.02	1.40	1.94	1	BOTTOM SLAB	5.38	2.71	1	BOTTOM SLAB	0.75	
		TNT4A	33,075		1.80	59.54	1.40	1.80	1	TOP SLAB	5.38	1.89	1	TOP SLAB	0.75	
		TNT6A	41,600		1.56	64.90	1.40	1.56	1	BOTTOM SLAB	5.38	1.93	1	TOP SLAB	0.75	
		TNT7A	42,000		1.68	70.56	1.40	1.68	1	BOTTOM SLAB	5.38	1.95	1	TOP SLAB	0.75	
		TNT7B	42,000		1.55	65.10	1.40	1.55	1	BOTTOM SLAB	5.38	1.88	1	TOP SLAB	0.75	
		TNAGRIT4	43,000		1.80	77.40	1.40	1.80	1	TOP SLAB	5.38	1.89	1	TOP SLAB	0.75	
TNAGT5A	45,000		1.81	81.45	1.40	1.81	1	BOTTOM SLAB	5.38	1.94	1	TOP SLAB	0.75			
TNAGT5B	45,000		1.80	81.00	1.40	1.80	1	TOP SLAB	5.38	1.89	1	TOP SLAB	0.75			

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	--

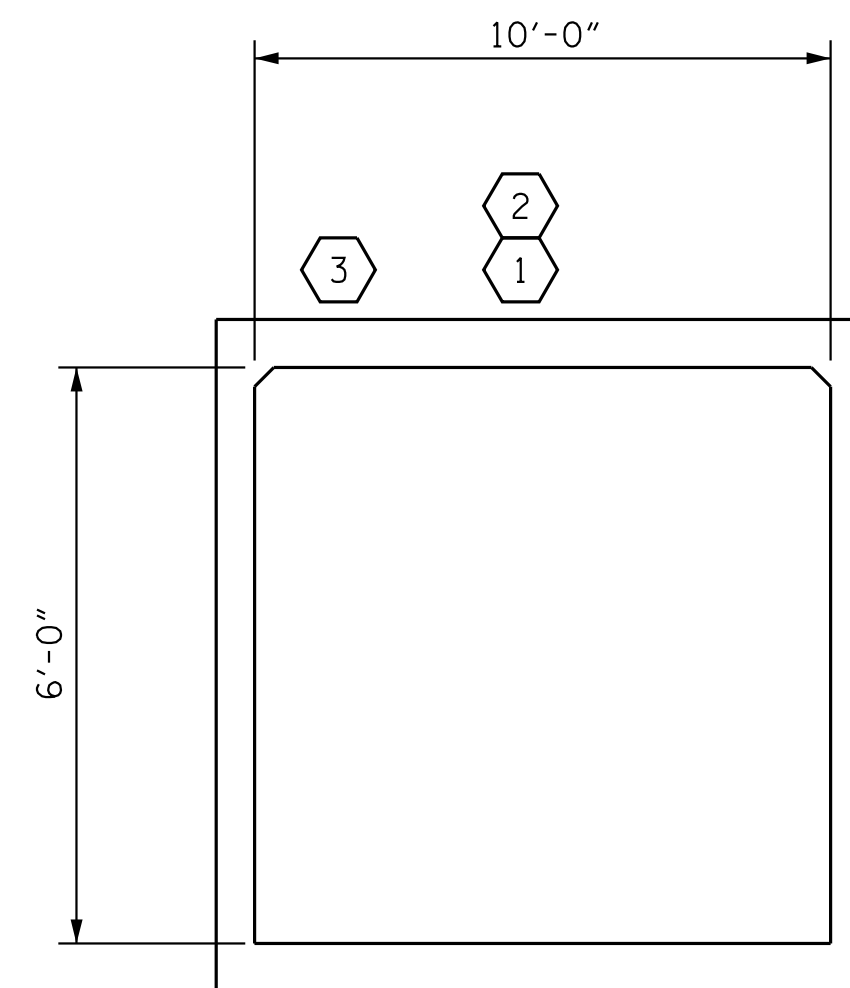
NOTE:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATE.

COMMENTS:

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

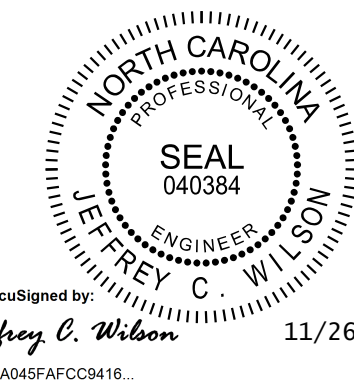
#	CONTROLLING LOAD RATING
①	DESIGN LOAD RATING (HL-93)
②	DESIGN LOAD RATING (HS-20)
③	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. U-5724
WAYNE COUNTY
 STATION: 44+87.00 -Y2-

SHEET 8 OF 8



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-8
1			3			TOTAL SHEETS
2			4			8

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ASSEMBLED BY : J.J. KIMBLE	DATE : 11/19
CHECKED BY : J.C. WILSON	DATE : 11/19
DRAWN BY : WMC 7/11	REV. 10/1/11 MAA/GM
CHECKED BY : GM 7/11	REV. 12/17 MAA/THC

STD. NO. LRFR5

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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 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. FINIS 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