

## AS CONSTRUCTED PLANS

SHEET NO.

## INDEX

PROJECT NO. :

*F. A. NO.:*

*T.I.P. NO.:*

BRIDGE NO.:

COUNTY:

*DESCRIPTION:*

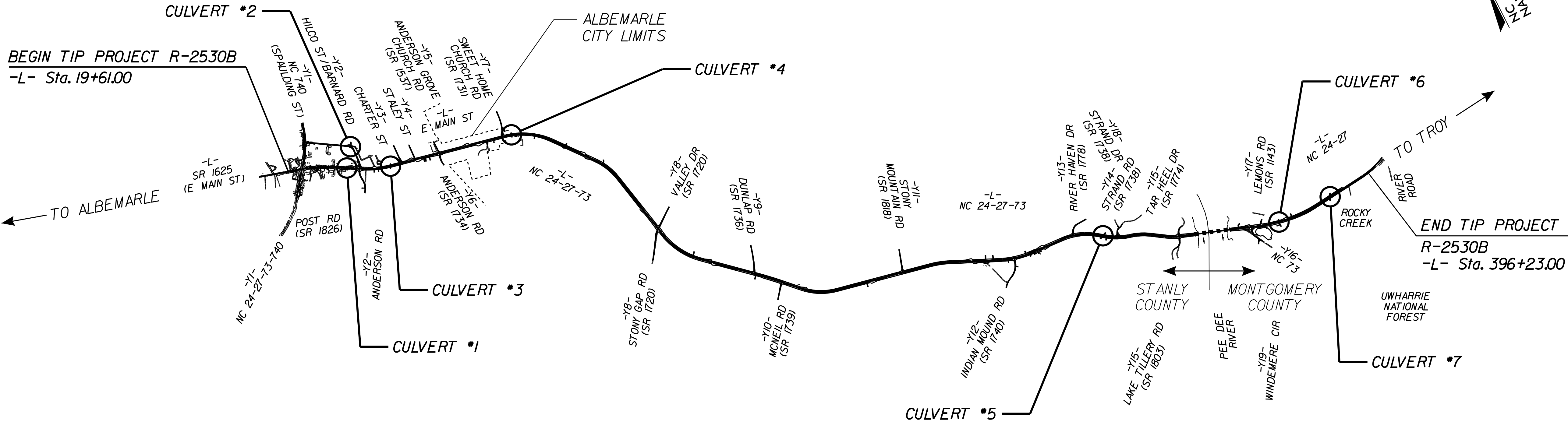
*DIVISION NO.:*

*CONTRACTOR:*

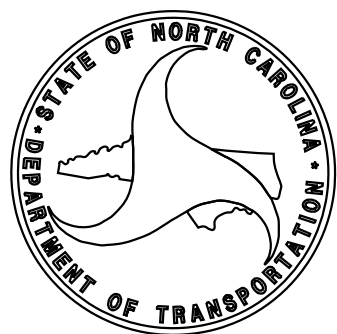
***DIVISION ENGINEER:***

*RESIDENT ENGINEER:*

**CONTRACT: C204181**



**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



**DESIGN DATA**

AADT 2019 =	16,400
AADT 2039 =	21,500
K =	9%
D =	55%
T =	10%*
V =	50/60 MPH

\* (TTST 4% + DUAL 6%)

**FUNCTIONAL  
CLASSIFICATION:**

**URBAN/RURAL ARTERIAL  
REGIONAL TIER**

### PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2530B	=	6.908 MILES
LENGTH STRUCTURE TIP PROJECT B-4974	=	0.225 MILES
TOTAL LENGTH TIP PROJECT R-2530B	=	7.133 MILES

**PLANS PREPARED FOR  
THE NCDOT BY:**

2018 STANDARD SPECIFICATIONS

**LETTING DATE:**  
**OCTOBER 15, 2019**

**Kimley»Horn**

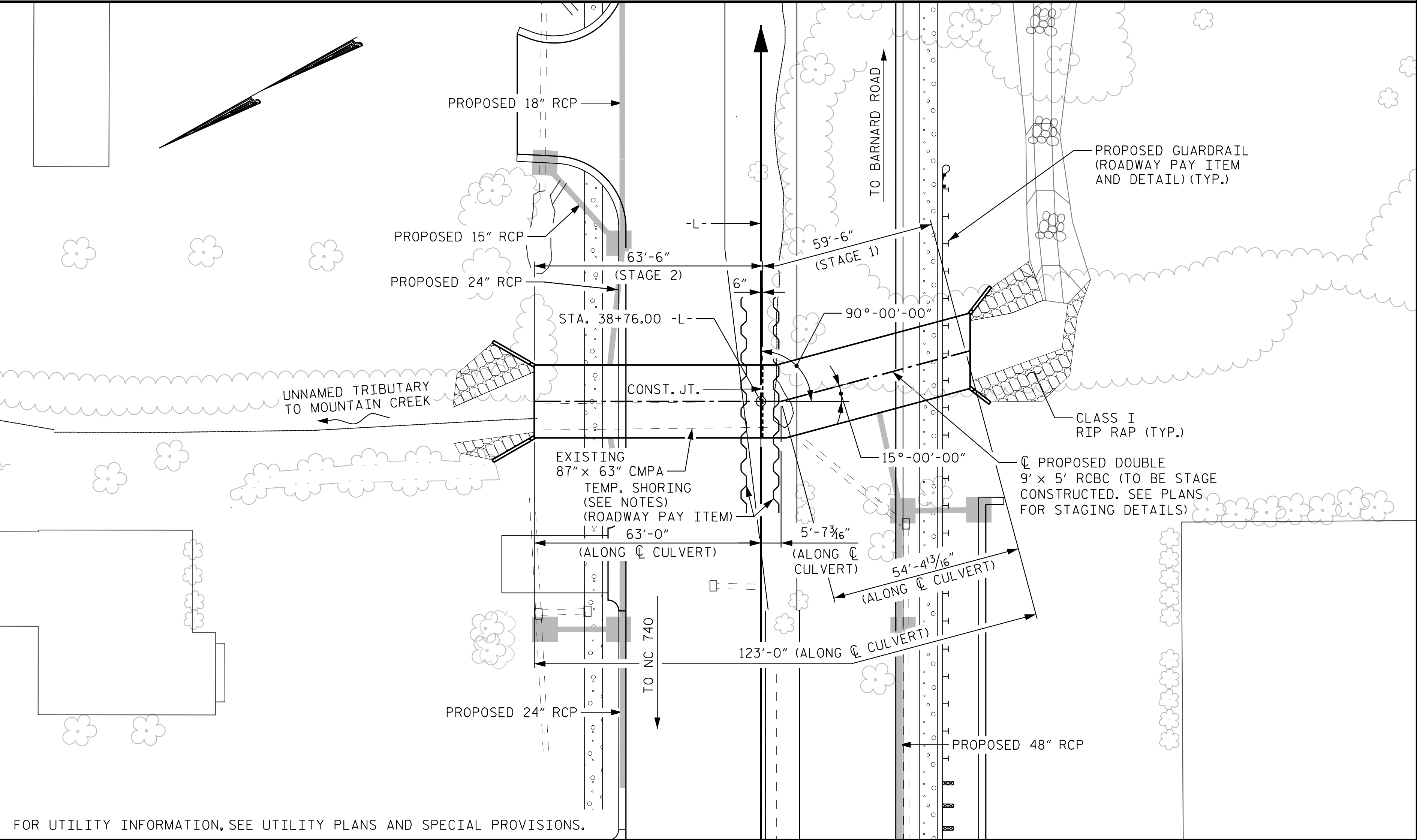
FAYETTEVILLE STREET, SUITE 600  
RALEIGH, NORTH CAROLINA 27601  
PHONE: (919) 877-2000

**ANDREW L. PHILLIPS, P.E.**  
**PROJECT ENGINEER**

**PATRICK D. COOKSEY, P.E.**  
**PROJECT DESIGN ENGINEER**



BENCHMARK: BM#5, -L- STA. 36+37.12, OFFSET 118.20' RT., EL. 559.85', CHISELED 'X' IN PARKING LOT CURB



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

ROADWAY DATA

GRADE POINT ELEV. @ STA 38+76.00 -L- = 558.33'  
BED ELEVATION @ STA 38+76.00 = 549.80'  
ROADWAY SLOPES VARIES

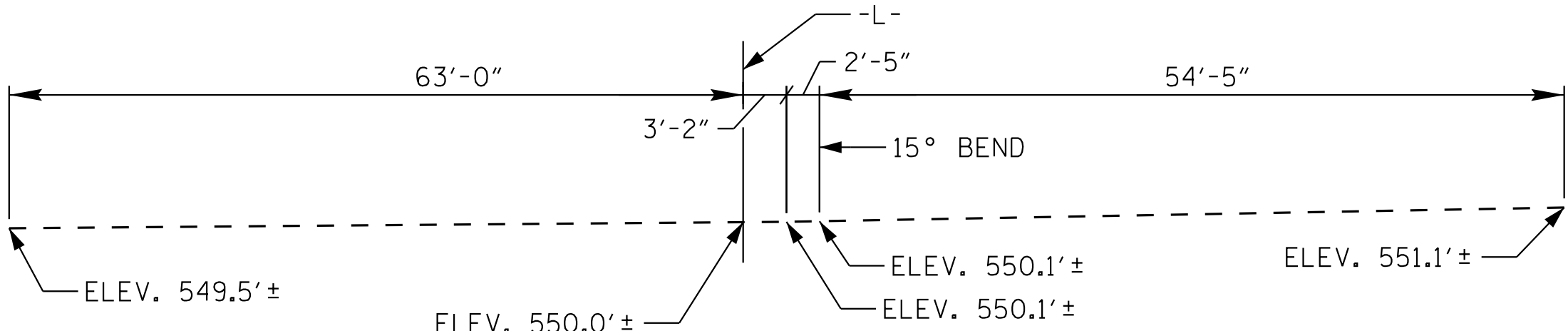
HYDRAULIC DATA

DESIGN DISCHARGE -----360 CFS  
FREQUENCY OF DESIGN FLOOD -----50 YR.  
DESIGN HIGH WATER ELEVATION-----555.1 FT.  
DRAINAGE AREA -----0.19 SQ. MI.  
BASE DISCHARGE (Q100) -----390 CFS  
BASE HIGH WATER ELEVATION -----555.4 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ----->420 CFS  
FREQUENCY OF OVERTOPPING FLOOD --->500 YR.  
OVERTOPPING FLOOD ELEVATION -----558.1 FT.

TOTAL STRUCTURE QUANTITIES					
STAGE 1			STAGE 2		
CLASS A CONCRETE			CLASS A CONCRETE		
BARREL @	2.050	CY/FT 122.0	BARREL @	2.050	CY/FT 130.2
WINGS ETC.	10.0	C.Y.	WINGS ETC.	13.2	C.Y.
TOTAL	132.0	C.Y.	TOTAL	143.4	C.Y.
REINFORCING STEEL			REINFORCING STEEL		
BARREL	16,970	LBS.	BARREL	17,639	LBS.
WINGS ETC.	375	LBS.	WINGS ETC.	563	LBS.
TOTAL	17,345	LBS.	TOTAL	18,202	LBS.
FOUNDATION CONDITIONING MATERIAL			FOUNDATION CONDITIONING MATERIAL		
102 TONS			109 TONS		
CULVERT EXCAVATION STA. 38+76.00 -L-			LUMP SUM		
REMOVAL OF EXISTING STRUCTURE STA. 38+76.00 -L-			LUMP SUM		



PROFILE ALONG CULVERT

ELEVATIONS TAKEN ALONG CENTERLINE CHANNEL

F.A. PROJECT NO. STBG-0024(083)

NOTES

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

DESIGN FILL ----- 3.2 FT.

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

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

CONCRETE IN STAGE 1 OR STAGE 2 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.

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.

THE 24"Ø R.C. PIPES AND 48"Ø R.C. PIPE THROUGH THE SIDEWALL OF THE CULVERT SHALL BE LOCATED BY THE ENGINEER. THE REINFORCING STEEL SHALL BE FIELD BENT AS NECESSARY TO CLEAR PIPE.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACES OF THE EXTERIOR WALLS AND BOTH FACES OF INTERIOR WALLS ABOVE THE 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 WILL BE PAID FOR BY THE CONTRACTOR.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAILED 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.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING 87"x 63" CORROGATED METAL PIPE ARCH LOCATED AT THE SAME LOCATION AS THE PROPOSED CULVERT SHALL BE REMOVED. THE EXISTING STRUCTURE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE STRUCTURE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED CULVERT, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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.

TRAFFIC ON NC 24/27/73 SHALL BE MAINTAINED. IN ORDER TO MAINTAIN TRAFFIC THE CULVERT SHALL BE CONSTRUCTED IN SECTIONS AS SHOWN ON THESE PLANS AS DIRECTED BY THE ENGINEER.

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.

BED MATERIAL PLACED BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER SILLS. THE MATERIAL SHALL BE NATIVE MATERIAL OR CLASS A RIP RAP TO SILL HEIGHT. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS. CLASS A RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE.

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.

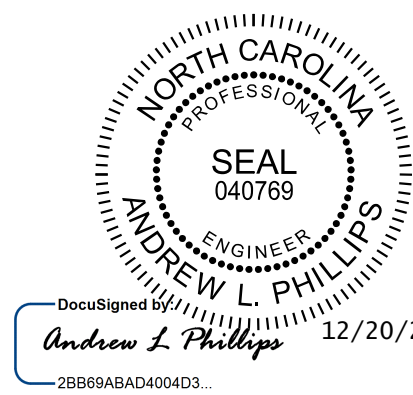
FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

\*PRECAST CONCRETE BOX CULVERT USED  
IN LIEU OF CAST-IN-PLACE. SEE SHEETS 4-9  
FOR APPROVED DESIGN DRAWINGS



**Kimley»Horn**

421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000 NC LICENSE # F-0102

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CULVERT #1

PROJECT NO. R-2530B

STANLY COUNTY

STATION: 38+76.00 -L-

SHEET 1 OF 10

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

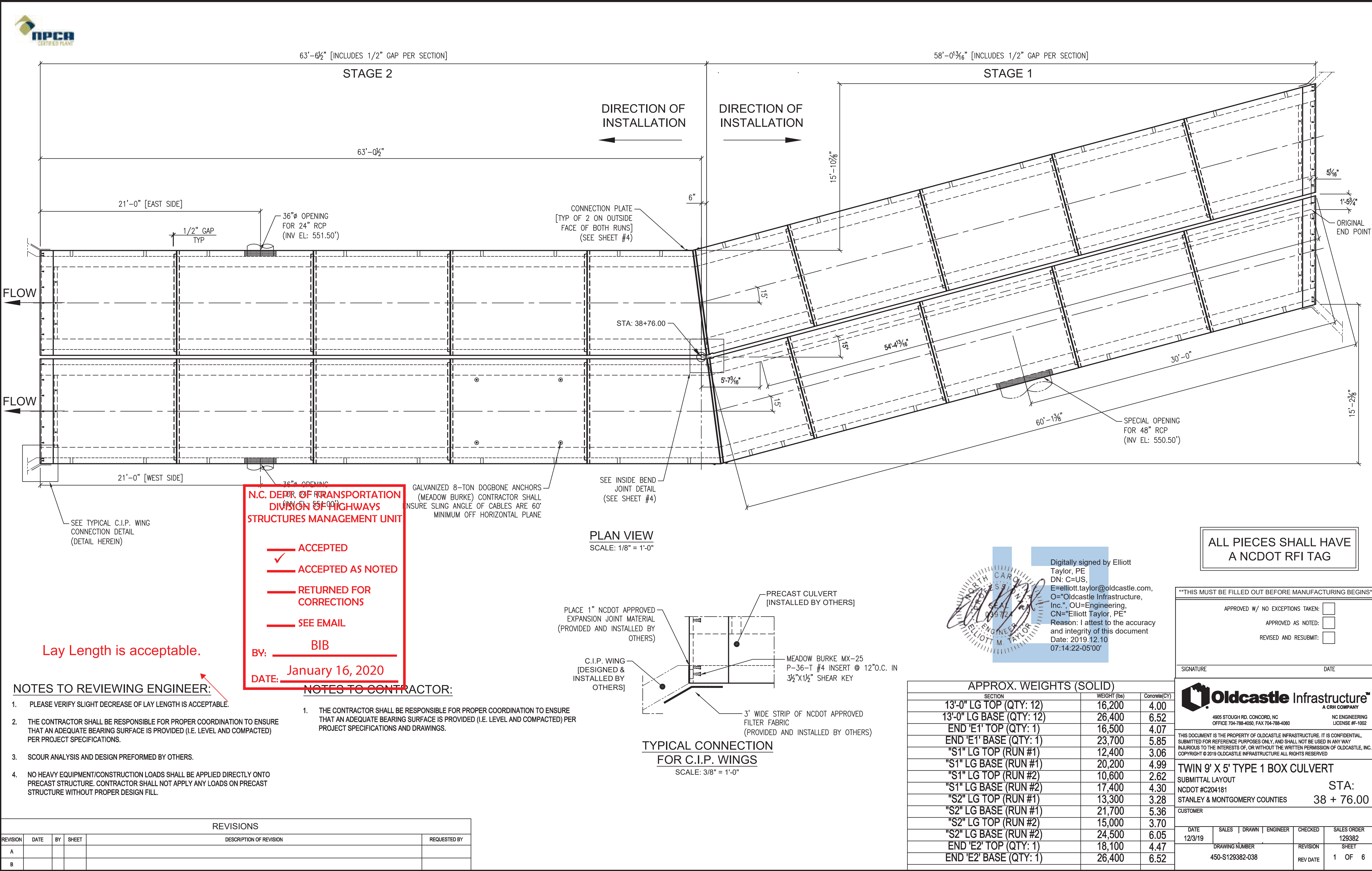
DOUBLE 9 FT. X 5 FT.  
CONCRETE BOX CULVERT  
90° SKEW

REVISIONS						SHEET NO. C01-1
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 10
2			4			

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DRAWN BY: D. D. LOWERY DATE: 12/18  
CHECKED BY: P. D. COOKSEY DATE: 12/18  
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 12/18







REVISIONS					
REVISION	DATE	BY	SHEET	DESCRIPTION OF REVISION	REQUESTED BY
A					
B					



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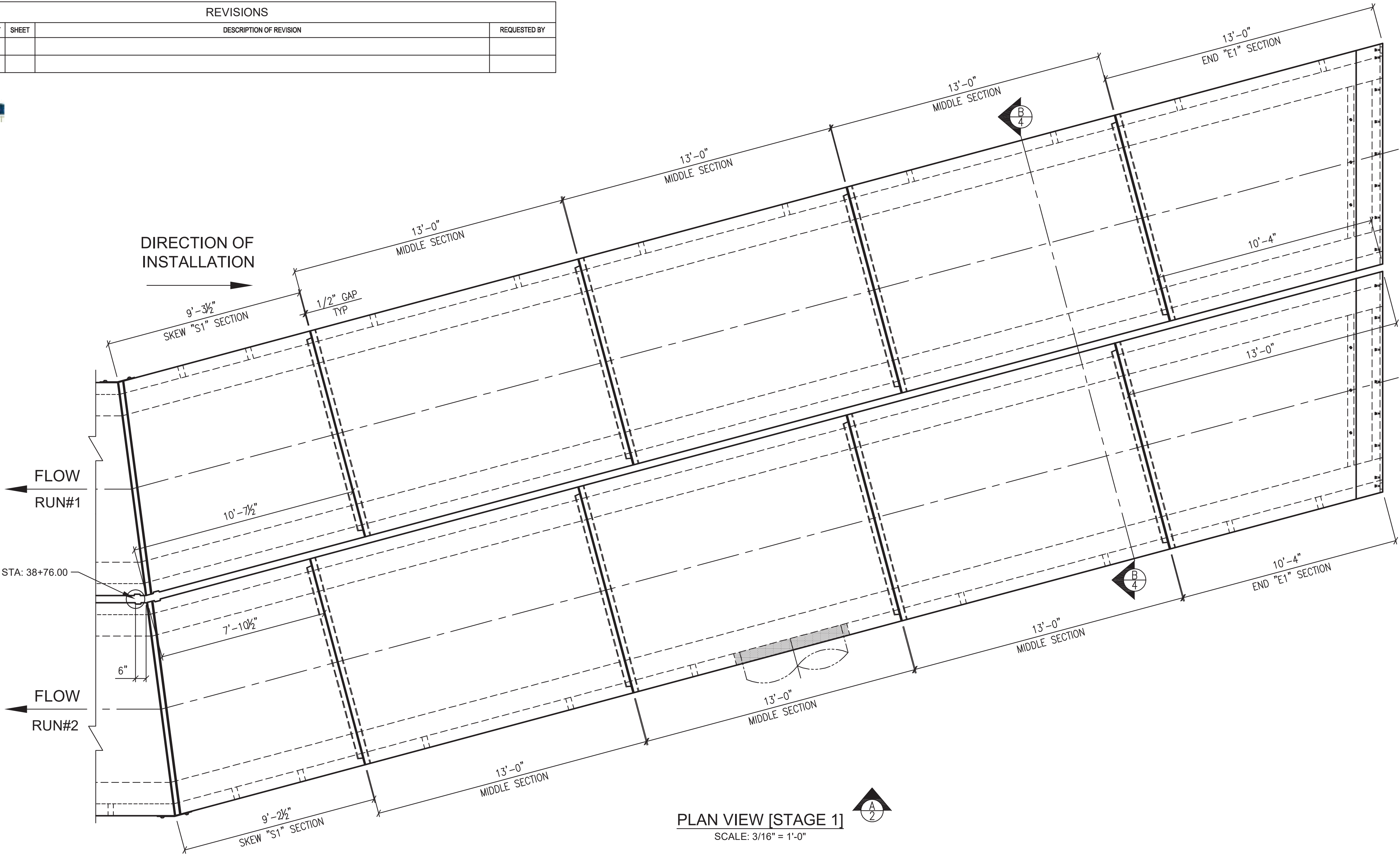
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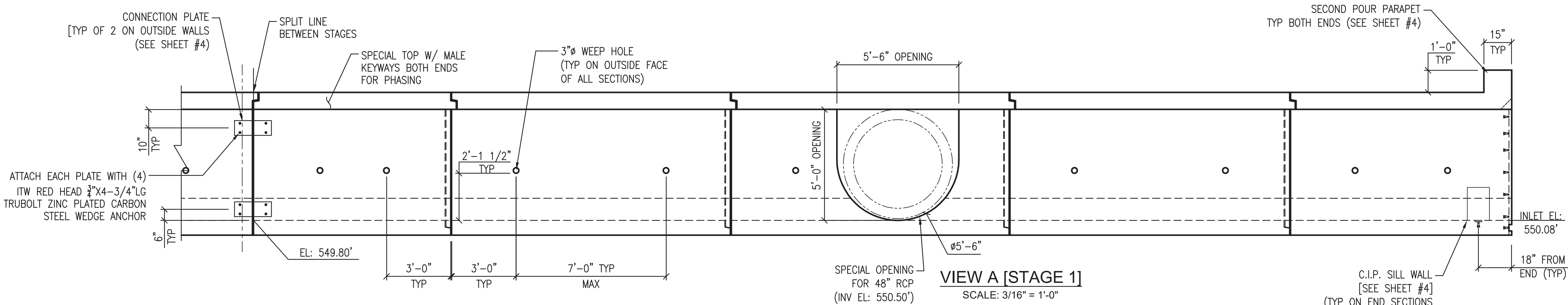
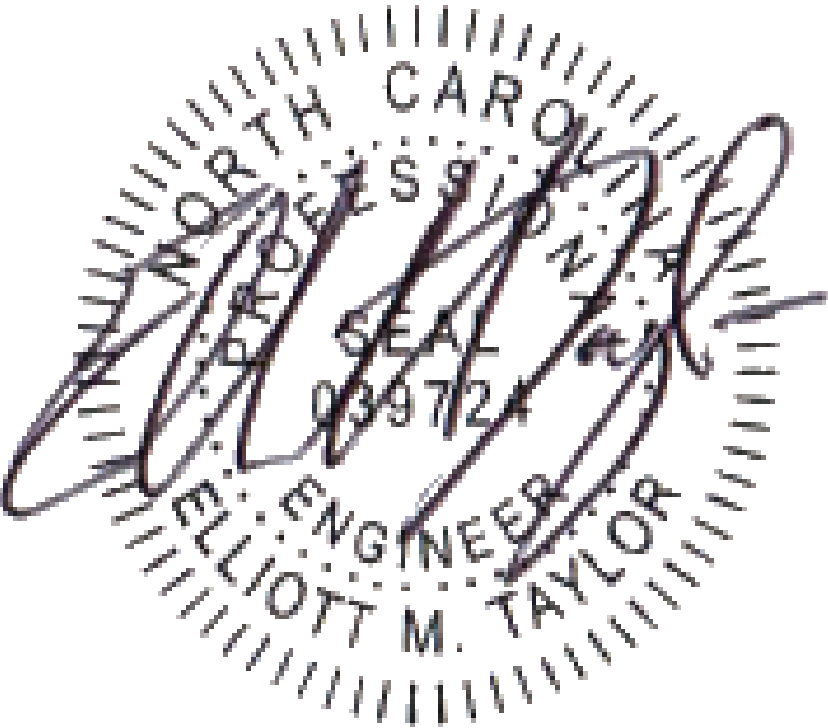
DATE



N.C. DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
STRUCTURES MANAGEMENT UNIT

- ACCEPTED
- ACCEPTED AS NOTED
- RETURNED FOR CORRECTIONS
- SEE EMAIL

BY: **BIB**  
DATE: **January 16, 2020**



**Oldcastle Infrastructure**  
A CRH COMPANY

4905 STOUGH RD. CONCORD, NC  
OFFICE 704-788-4050, FAX 704-788-4060

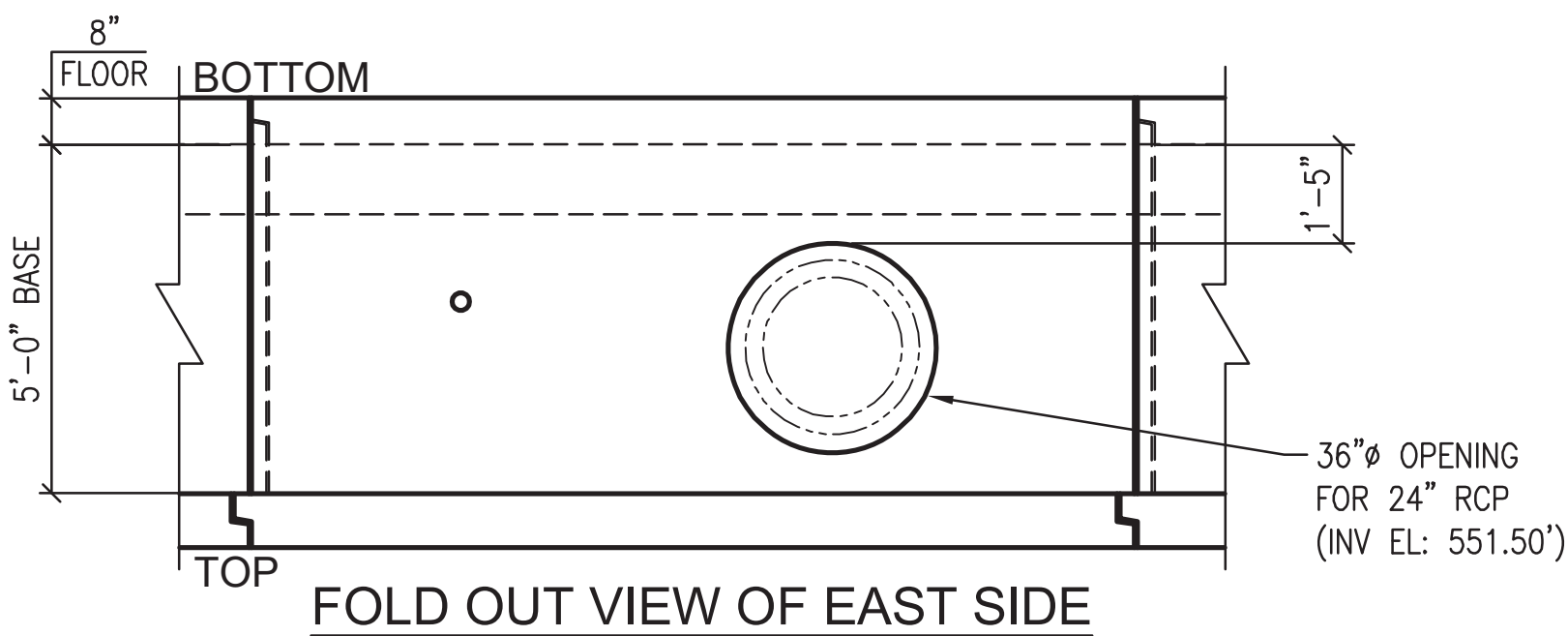
NC ENGINEERING  
LICENSE #F-1002

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TWIN 9' X 5' TYPE 1 BOX CULVERT  
SUBMITTAL LAYOUT  
NCDOT #C204181  
STANLEY & MONTGOMERY COUNTIES

STA: 38 + 76.00

CUSTOMER				
DATE 12/3/19	SALES	DRAWN	ENGINEER	CHECKED
DRAWING NUMBER 450-S129382-038				SALES ORDER 129382
REV DATE				SHEET 2 OF 6



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REVISION	DATE	BY	SHEET	DESCRIPTION OF REVISION	REQUESTED BY
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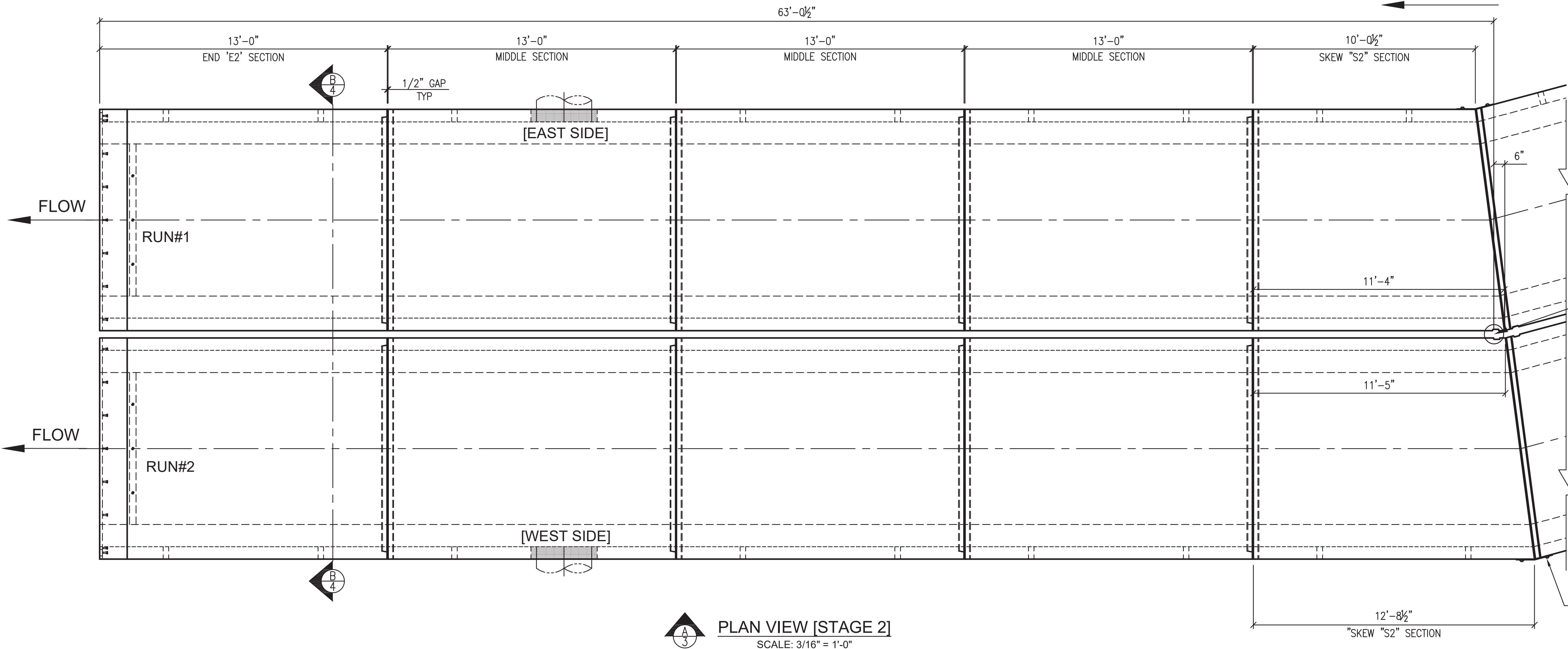
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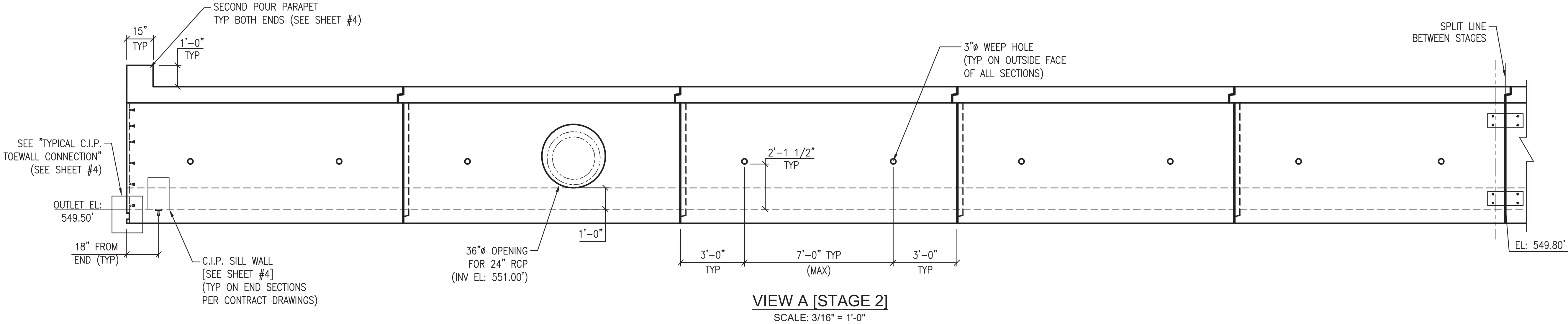
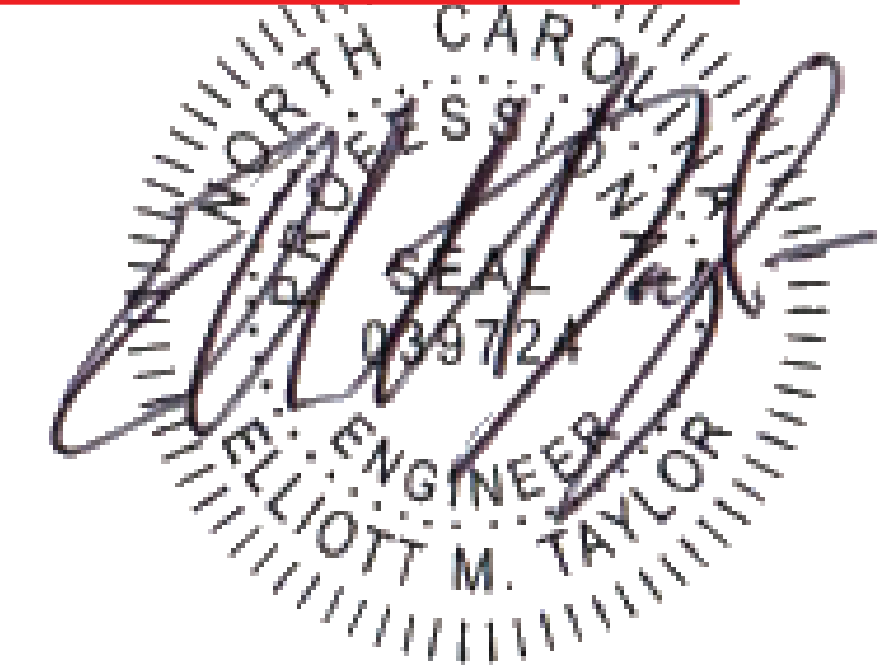
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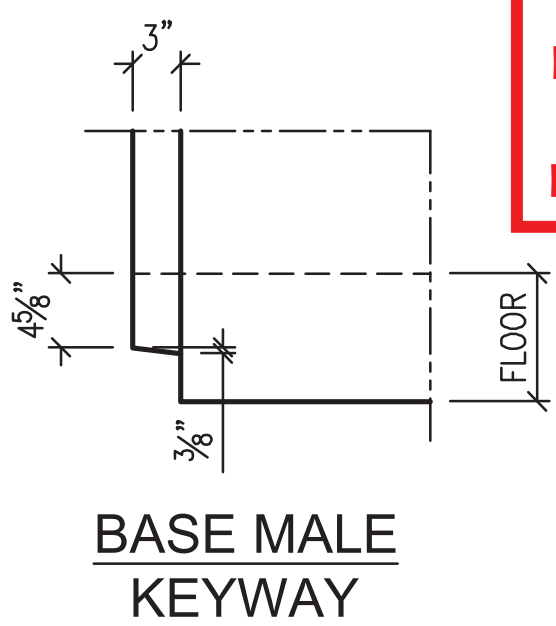
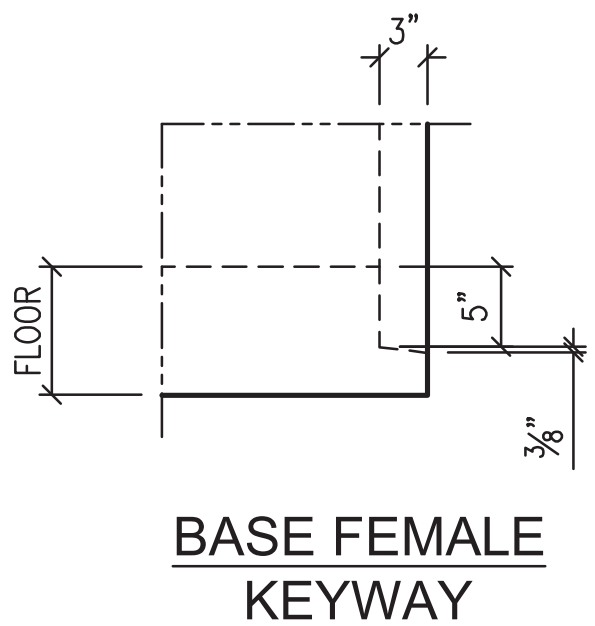
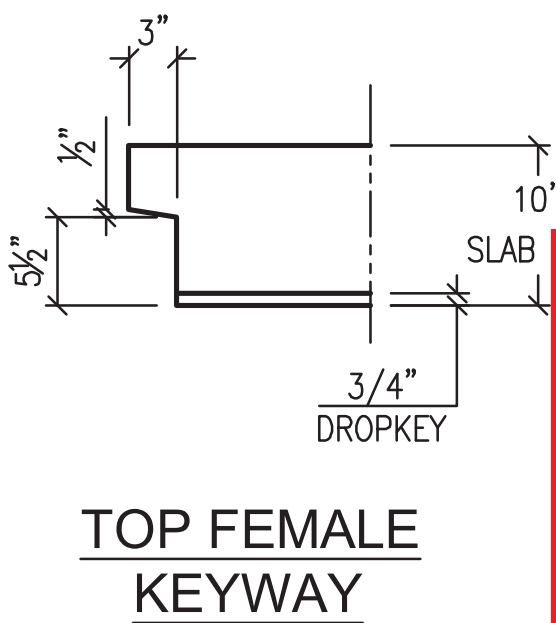
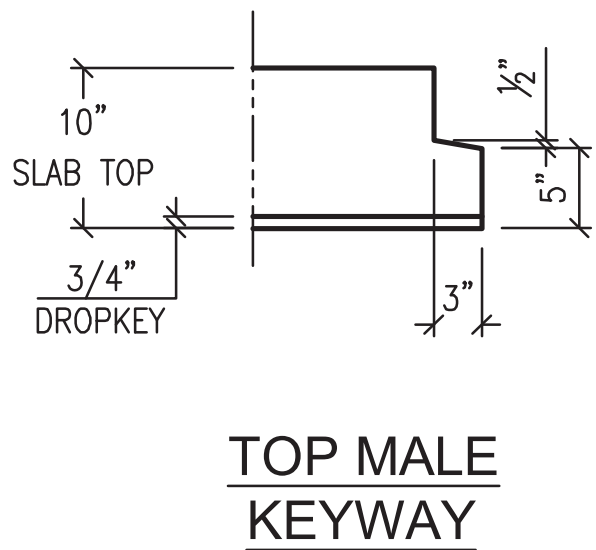
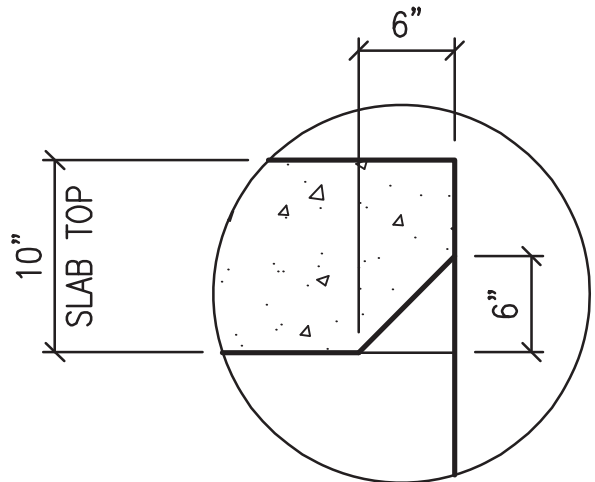
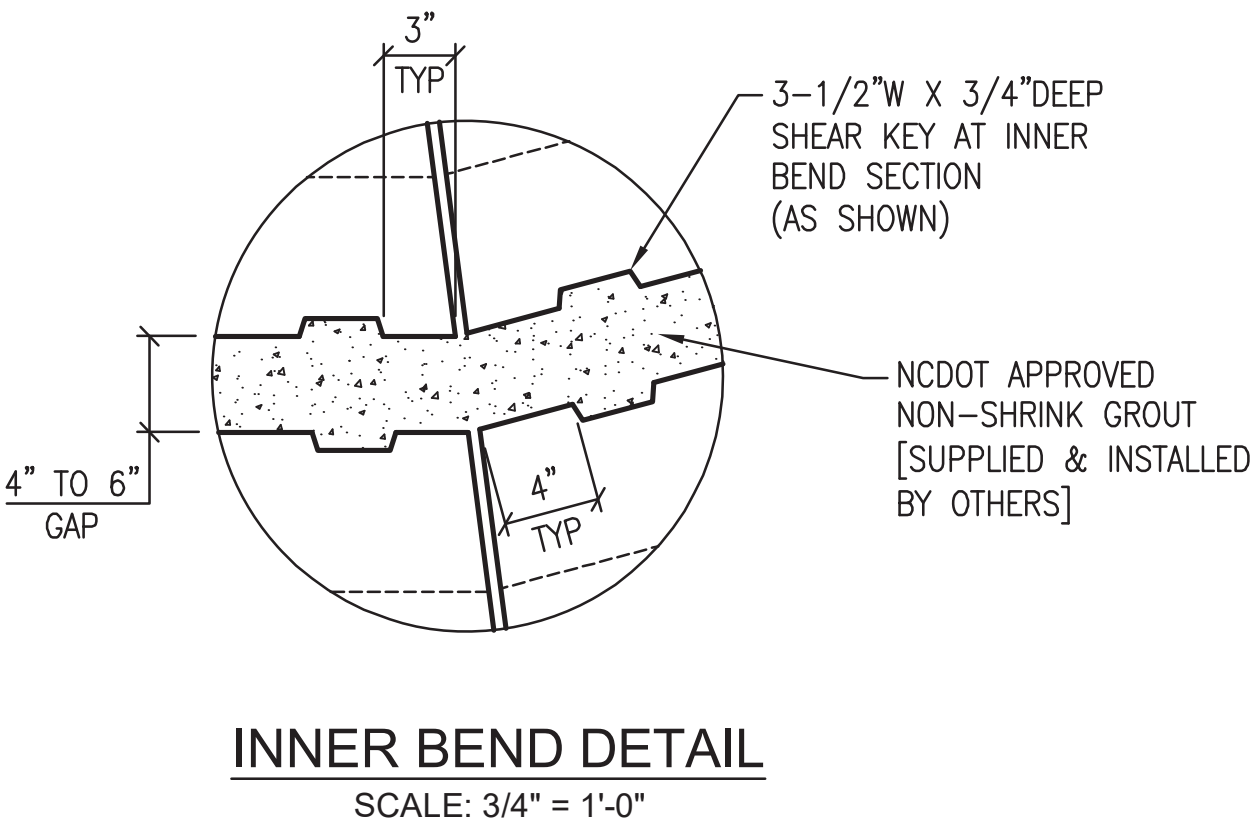
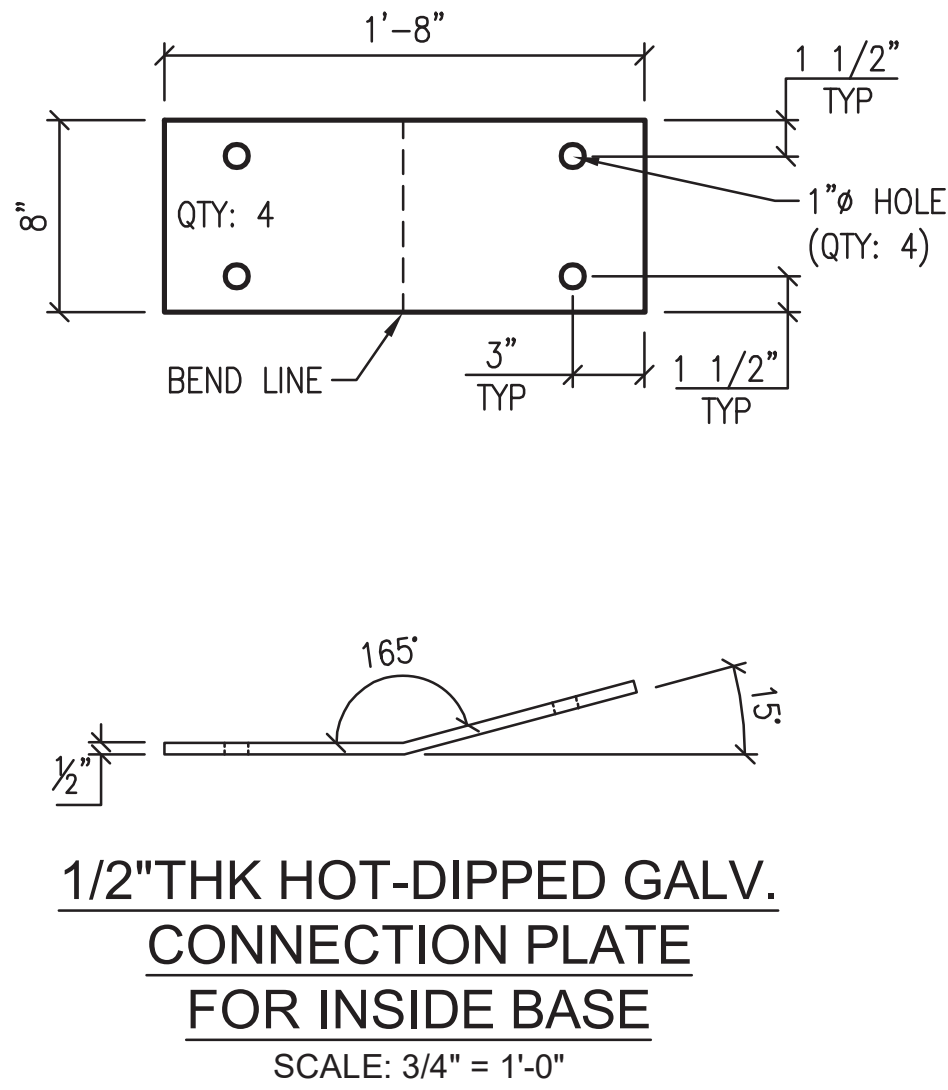
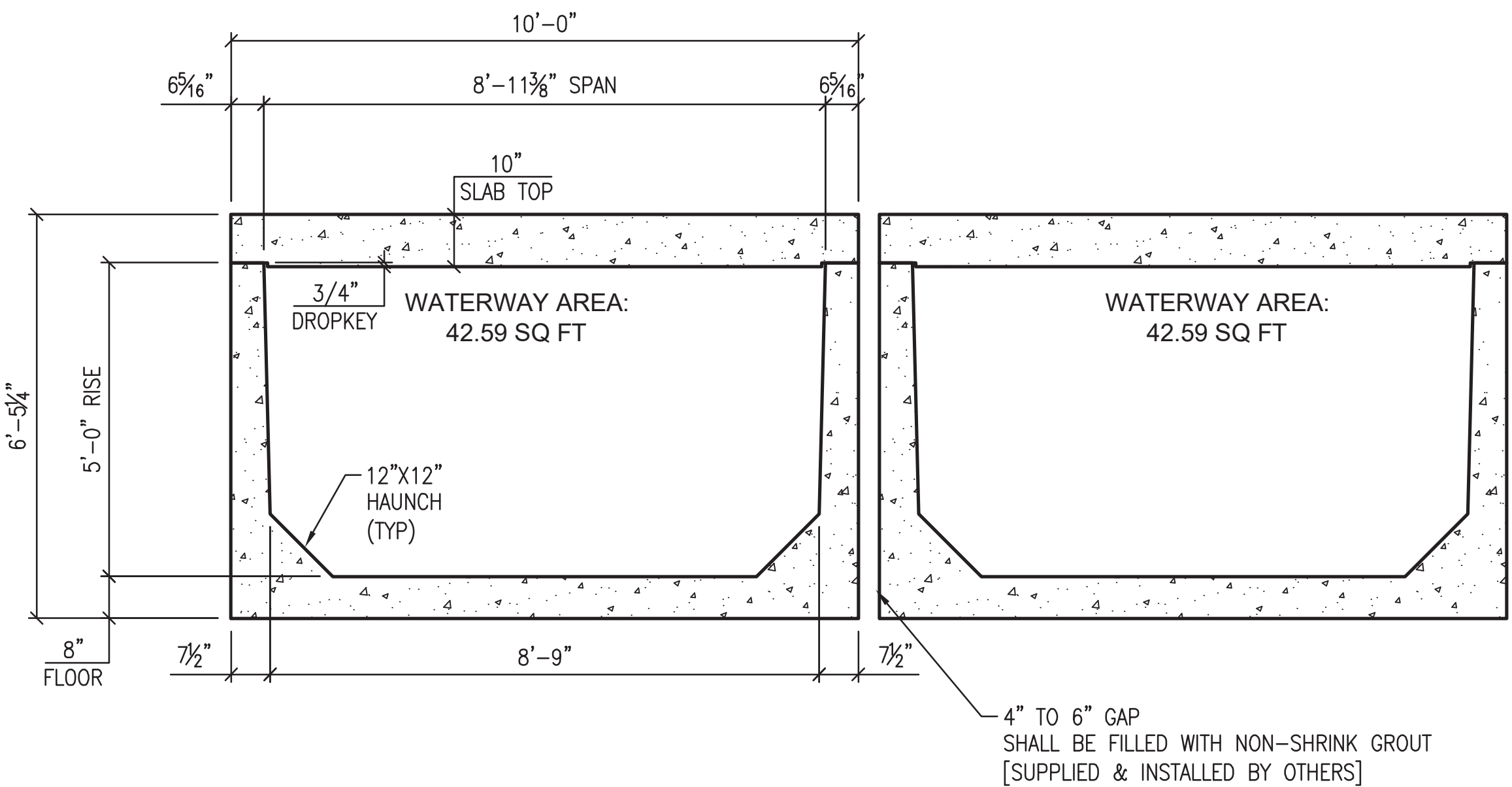
**TWIN 9' X 5' TYPE 1 BOX CULVERT**  
SUBMITTAL LAYOUT  
NCDOT #C204181  
STANLEY & MONTGOMERY COUNTIES

STA: **38 + 76.00**

CUSTOMER

DATE 12/3/19	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER 129382
DRAWING NUMBER 450-S129382-038				REVISION REV DATE	SHEET 3 OF 6





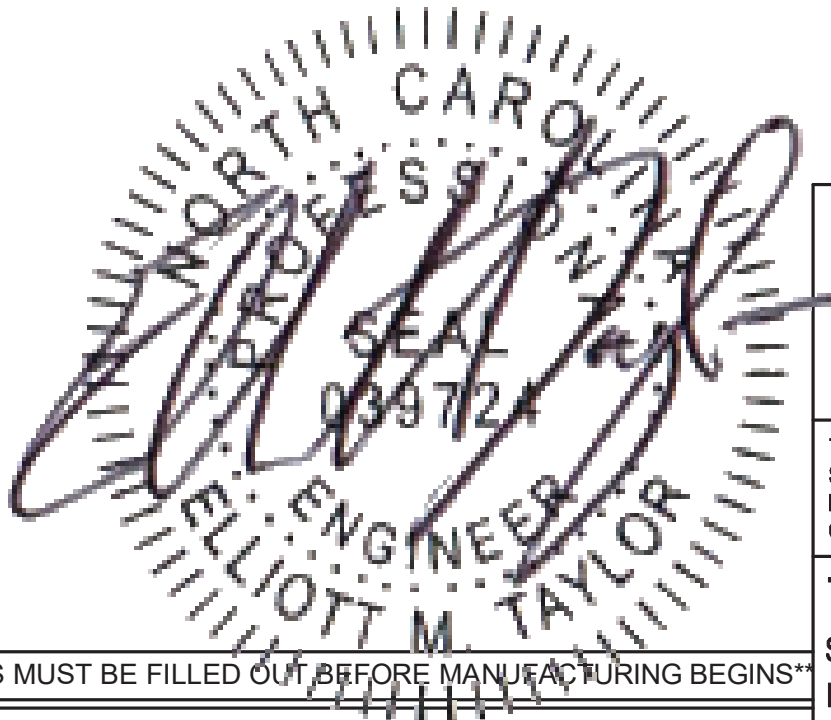
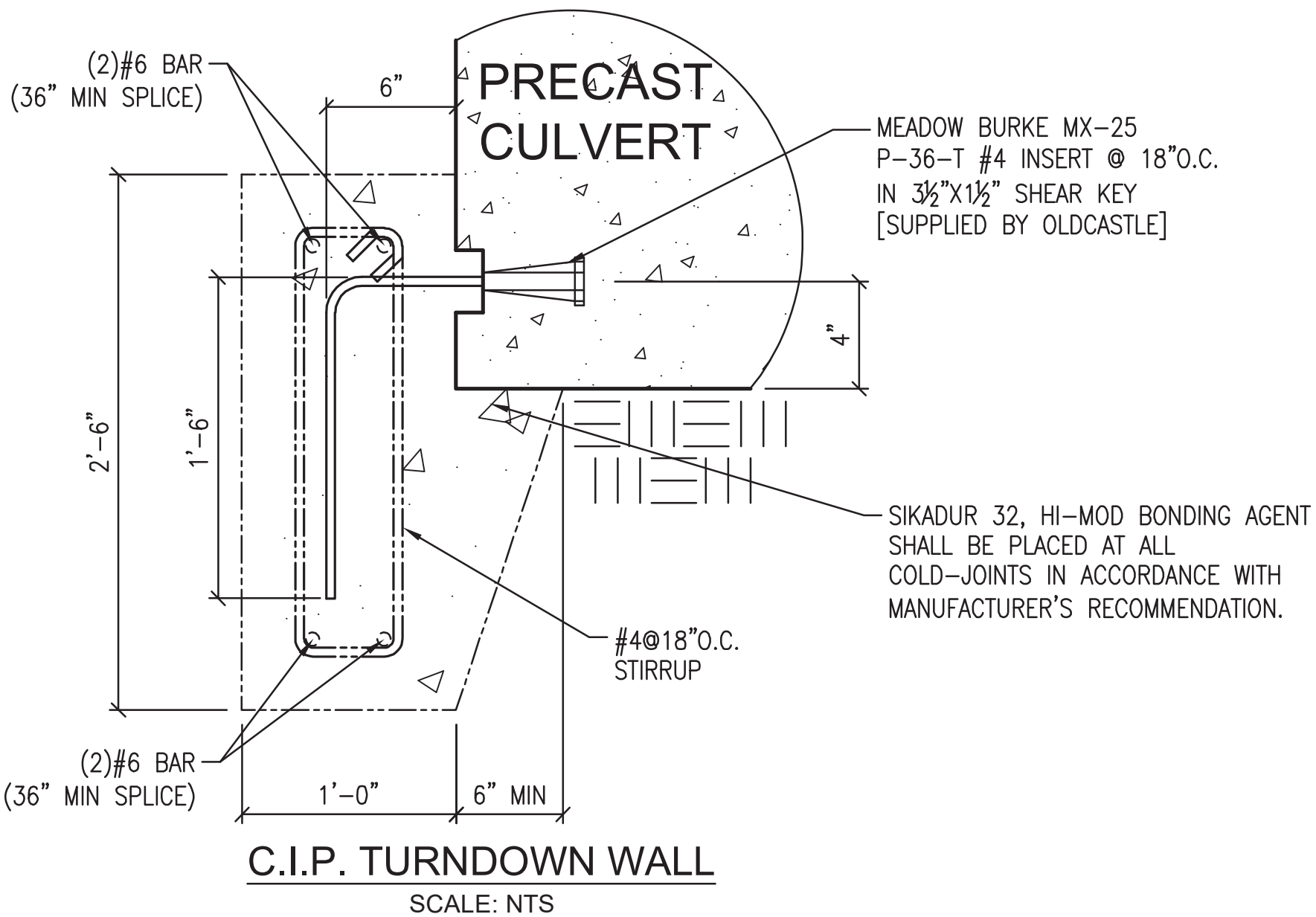
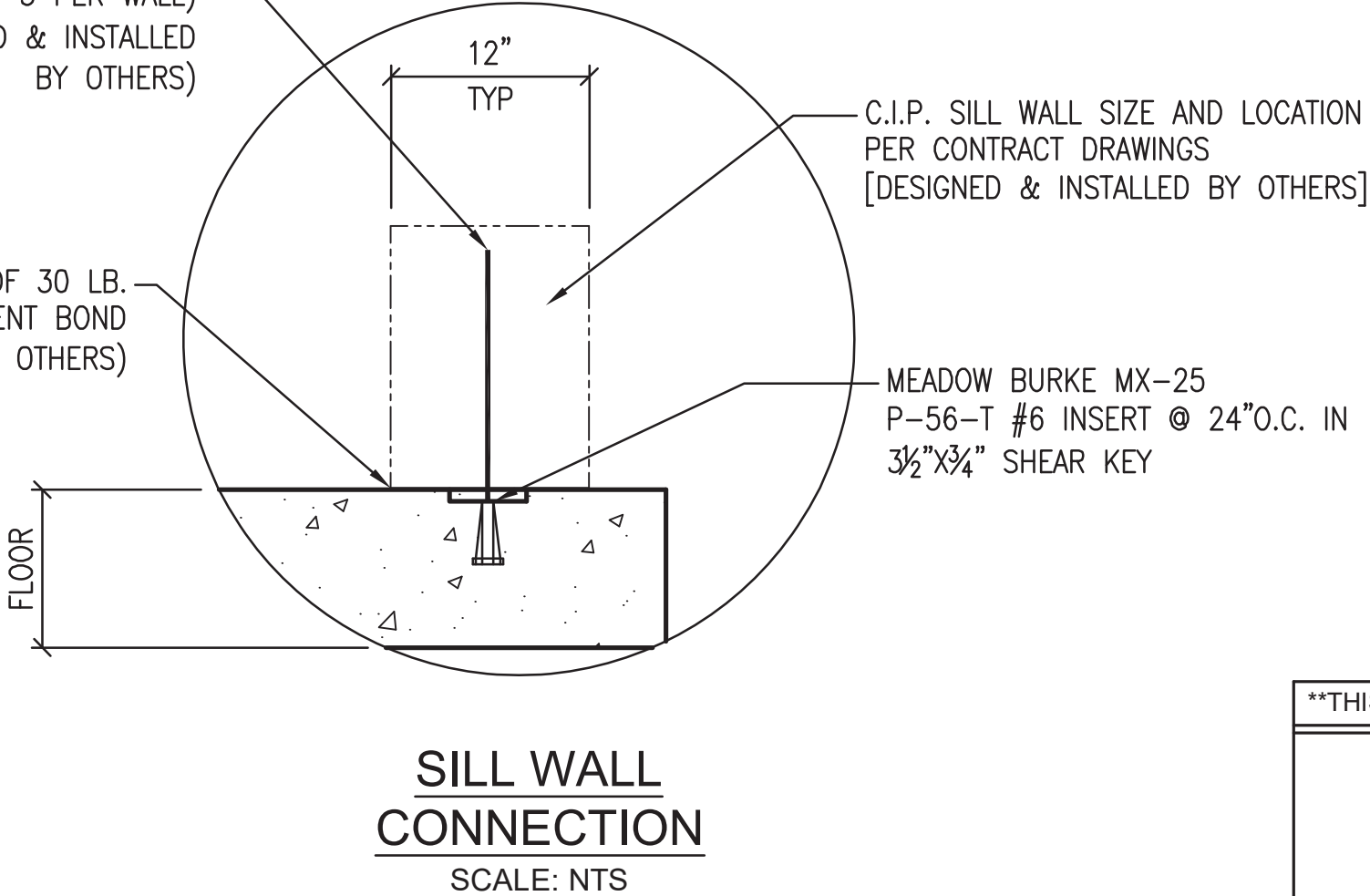
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THREADED #6 BAR (TYP OF 3 PER WALL) (SUPPLIED & INSTALLED BY OTHERS)

APPLY 2 LAYERS OF 30 LB. ROOFING FELT TO PREVENT BOND (SUPPLIED & INSTALLED BY OTHERS)



REVISIONS					REQUESTED BY
REVISION	DATE	BY	SHEET	DESCRIPTION OF REVISION	
A					
B					

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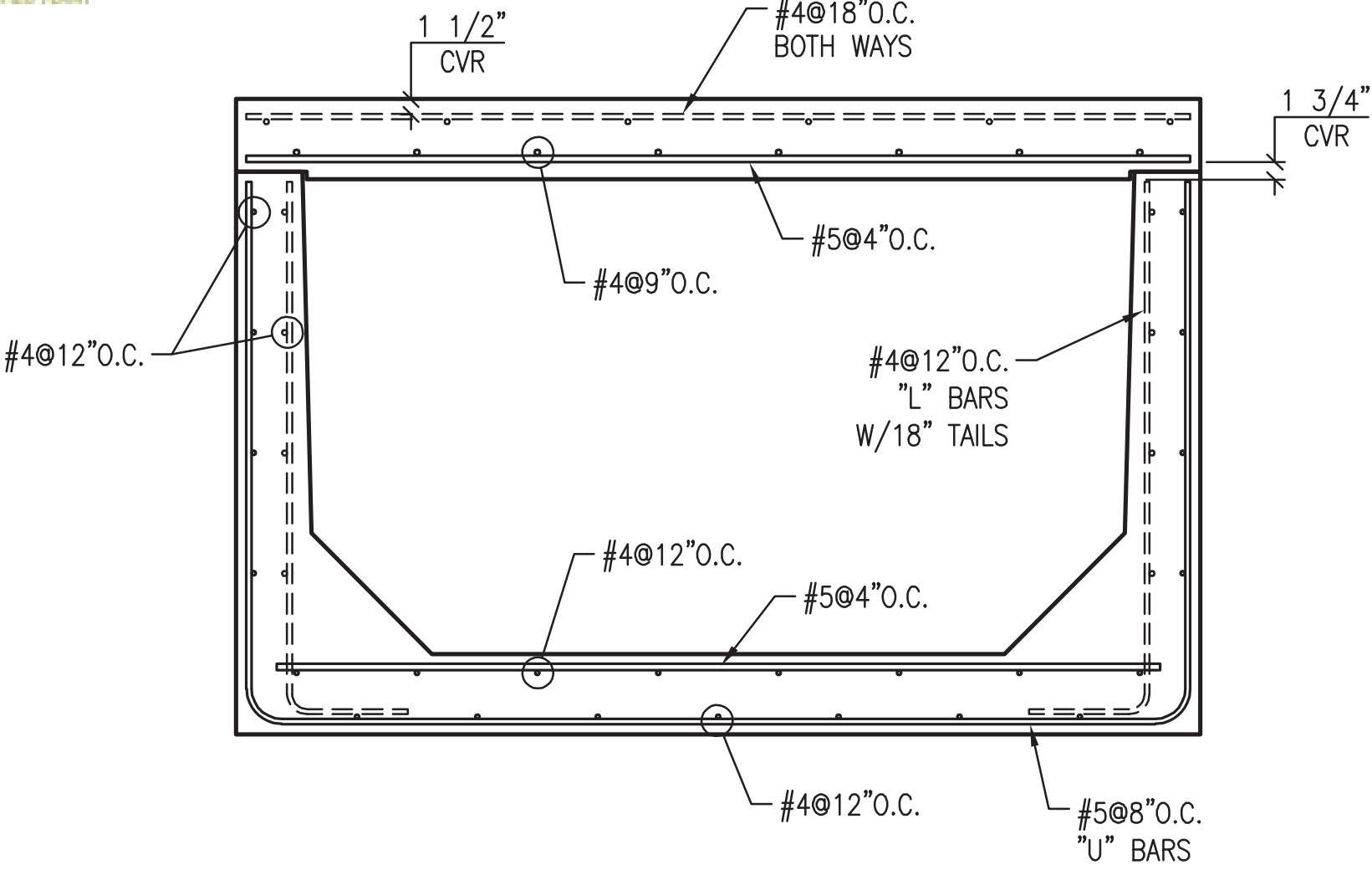
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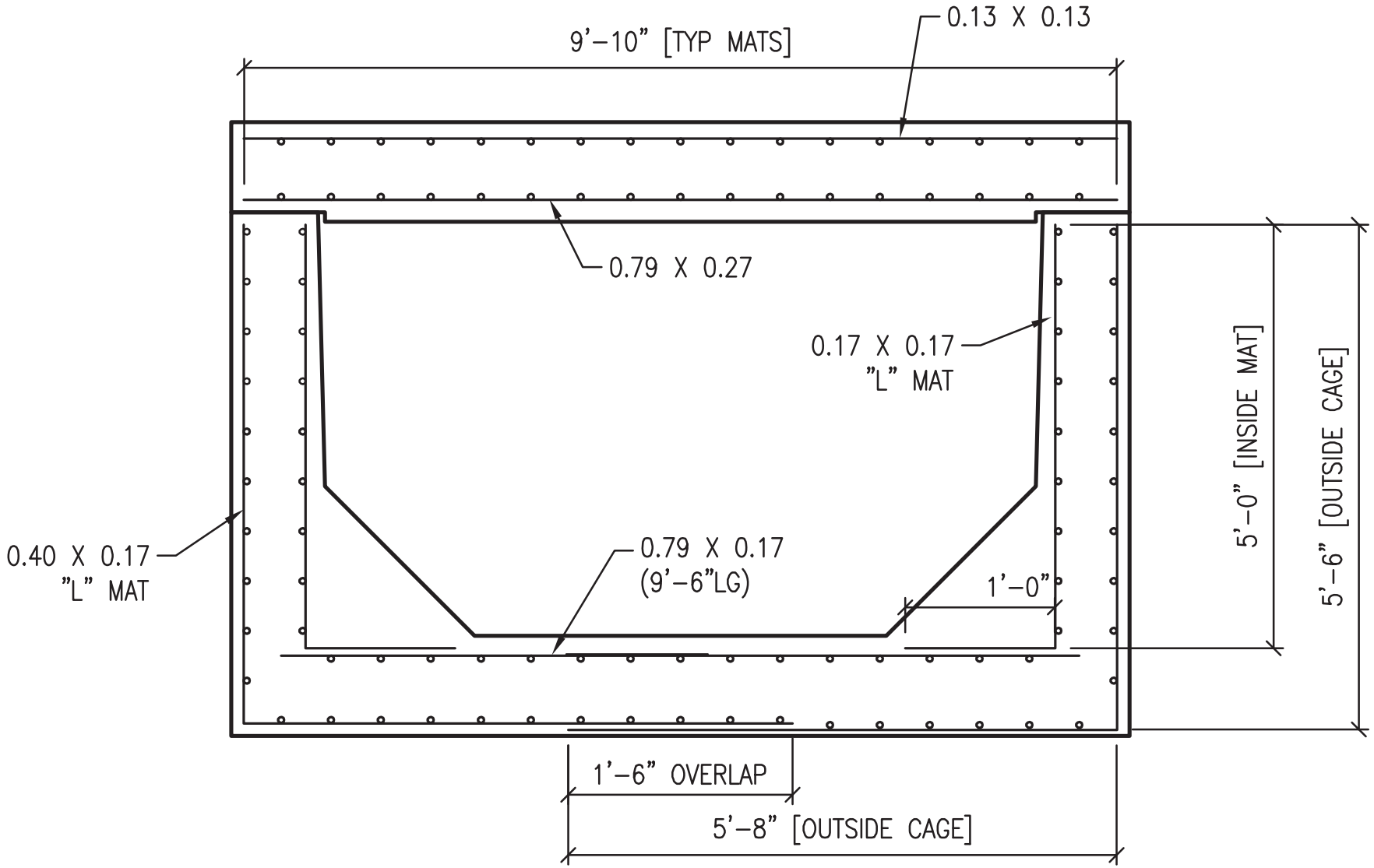
TWIN 9' X 5' TYPE 1 BOX CULVERT  
SUBMITTAL LAYOUT  
NCDOT #C204181  
STANLEY & MONTGOMERY COUNTIES  
CUSTOMER

STA: 38 + 76.00

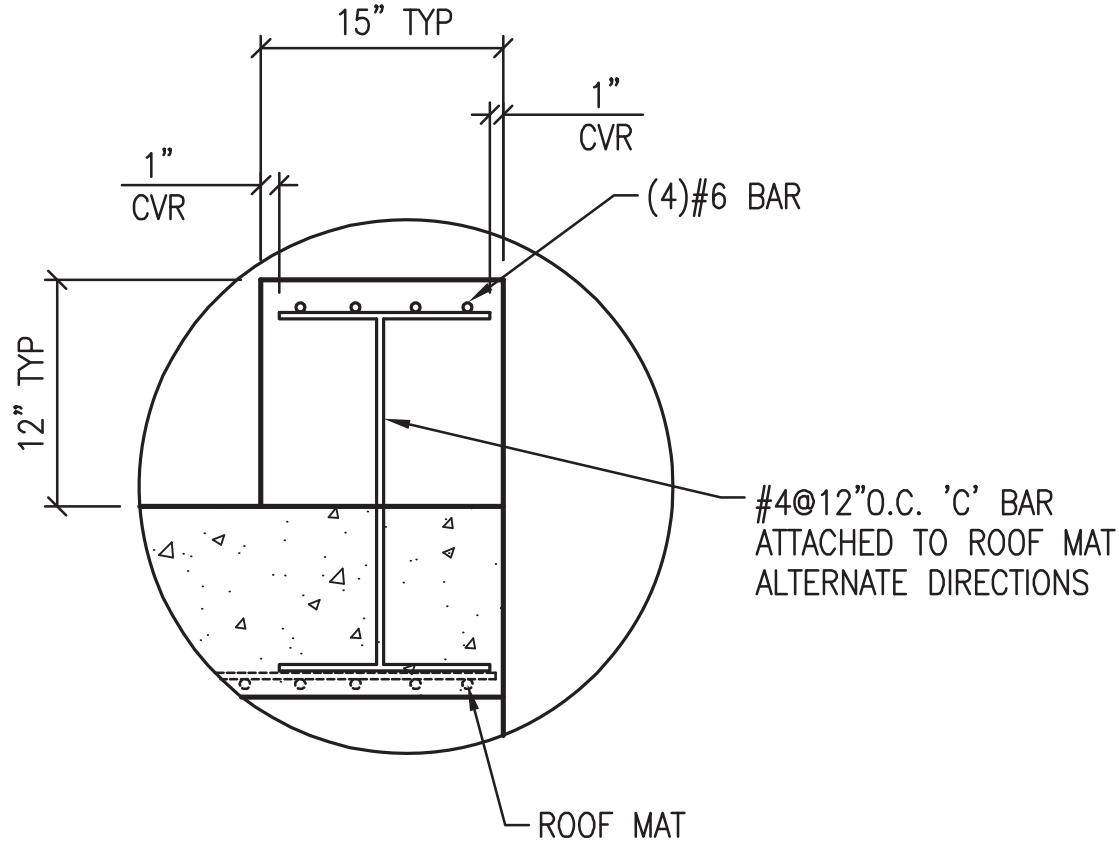
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REBAR LAYOUT



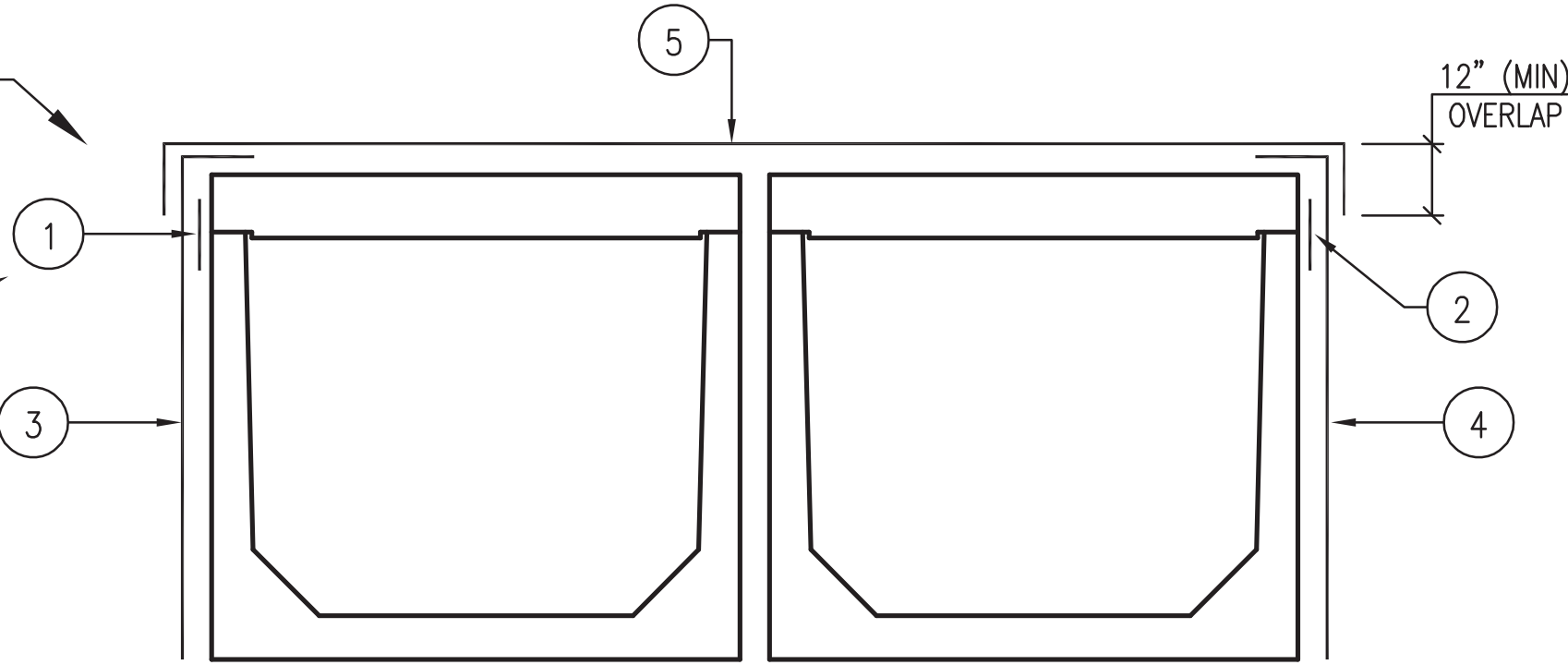
ALTERNATIVE MESH EQUIV.



PRECAST HEADWALL  
(TYP BOTH ENDS)  
SCALE: NTS

CLEAN AND PRIME THE AREAS RECEIVING THE OUTSIDE SEALER WRAP IN ACCORDANCE WITH THE SEALER WRAP MANUFACTURER RECOMMENDATIONS

THE 12"W(MIN) EXTERNAL JOINT WRAP SHALL BE INSTALLED IN PIECES AS SHOWN



TYPICAL EXTERNAL JOINT WRAP LAYOUT  
SCALE: NTS

WRAP ALL VERTICAL AND HORIZONTAL JOINTS (EXCEPT BENEATH CULVERT) WITH 12" WIDE CS-212 EXTERNAL JOINT WRAP

ACCEPTED

✓

ACCEPTED AS NOTED

—

RETURNED FOR CORRECTIONS

—

SEE EMAIL

—

BY: **BIB**

DATE: **January 16, 2020**

FLOW

TOP SLAB

BASE SET 1st

PLACE 1 1/4" SEALANT IN SHOULDER OF JOINT AS SHOWN (PROVIDED BY

TYPICAL JOINT LAYOUT  
SCALE: NTS

GENERAL DESIGN NOTES:

- LOAD AND RESISTANCE FACTOR DESIGN METHOD IN ACCORDANCE WITH (I.A.W.) AASHTO LFRD BRIDGE DESIGN SPECIFICATIONS.
- APPLICABLE DESIGN DOCUMENTS (CURRENT EDITIONS):
  - AASHTO LFRD BRIDGE DESIGN SPECIFICATION (MAIN DESIGN SPECIFICATION),
  - ACI 318 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (SUPPLEMENTARY SPECIFICATION).
- PRECAST RATED FOR AASHTO HL-93 TRUCK LIVE LOAD W/ IMPACT I.A.W. AASHTO LFRD SPEC..
- DESIGN FILL: 2'(MIN) TO 4'(MAX)
- GROUND WATER TABLE FOR STRUCTURAL CALCULATIONS IS BASED UPON GROUND WATER TABLE AT OR BELOW INVERT OF BOX. IF DESIGN (OR ACTUAL) WATER TABLE IS LESS THAN ASSUMED, REVIEWING ENGINEER/AUTHORITY
- LATERAL DESIGN PRESSURES (AS APPLICABLE TO DESIGN, SEE CALCULATIONS):
  - MIN EQUIV SOIL FLUID PRESSURE = 30 PCF.
  - MAX EQUIV SOIL FLUID PRESSURE = 60 PCF.
  - LIVE LOAD SURCHARGE PRESSURE = PER AASHTO DESIGN SPECIFICATION REFERENCE HEREIN.
- DESIGN CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS,  $f_c = 5,000$  PSI (MIN).
- REINFORCEMENT: OLDCASTLE PE (DESIGN ENGINEER) MAY SUBSTITUTE THE REINFORCEMENT SHOWN HEREIN TO AN EQUIVALENT REINFORCEMENT ALTERNATIVE NOTED BELOW.
  - CARBON-STEEL DEFORMED BARS: ASTM A615,  $f_y = 60$  KSI (MIN).
  - WELDED WIRE REINFORCEMENT - DEFORMED: ASTM A1064,  $f_y = 70$  KSI (MIN).
  - WELDED WIRE REINFORCEMENT - PLAIN: ASTM A1064,  $f_y = 65$  KSI (MIN).
- JOINT SEALANT (AS DETAILED AND NOTED IN DRAWINGS HEREIN):
  - CS-102 CONSEAL BUTYL RUBBER SEALANT (OR EQUIV.) I.A.W. ASTM C990 FED. SPEC. SS-S-210,
  - CS-212 CONSEAL EXTERIOR JOINT WRAP (OR EQUIV.) I.A.W. ASTM C877 AND ASTM C990,
  - CS-50 CONSEAL LIQUID BUTYL PRIMER (OR EQUIV.)
- THESE CALCULATIONS DO NOT INCLUDE ANY HEAVY EQUIPMENT/CONSTRUCTION LOADS ON CULVERT.

ALL PIECES SHALL HAVE  
A NCDOT RFI TAG

TYPICAL REINFORCEMENT  
FOR OPENINGS  
SCALE: N.T.S.

**Oldcastle Infrastructure**  
A CRH COMPANY

4905 STOUGH RD. CONCORD, NC  
OFFICE 704-788-4060, FAX 704-788-4060

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TWIN 9' X 5' TYPE 1 BOX CULVERT

SUBMITTAL LAYOUT NCDOT #C204181 STA: 38 + 76.00

DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
12/3/19					129382
DRAWING NUMBER	REVISION	SHEET	REV DATE	5	OF 6
450-S129382-038					

REINFORCEMENT NOTES:

- REINFORCEMENT NOT DRAWN TO SCALE FOR CLARITY ~ USE EXACT BAR SIZE AND SPACING AS NOTED ABOVE.
- ALL COVER TO REINFORCEMENT IS 1", UNLESS OTHERWISE NOTED.
- ALL STEEL CUT OUT FOR OPENINGS WILL BE REPLACED, HALF REINFORCEMENT ON EACH SIDE OF OPENING. INCLUDE (1) ADDITIONAL (2) #5 DIAGONAL BARS AROUND OPENING (SEE TYPICAL REINFORCEMENT FOR ALL OPENINGS).

REVISIONS					
REVISION	DATE	BY	SHEET	DESCRIPTION OF REVISION	REQUESTED BY
A					
B					



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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTOR (RF)	TONS = W x RF	STRENGTH I LIMIT STATE						COMMENT NUMBER*	
							LIVE-LOAD FACTORS	MOMENT			SHEAR			
								RATING FACTOR	DEPTH OF FILL (FT)	LOCATION	RATING FACTOR	DEPTH OF FILL (FT)		LOCATION
DESIGN LOAD RATING		HL-93 (INV)	NA	1	1.14	--	1.75	1.14	2.00	E	1.43	2.00	F	
		HL-93 (OPR)	NA		1.48	--	1.35	1.48	2.00	E	1.85	2.00	F	
		HS-20 (INV)	36.000	2	1.14	41.04	1.75	1.14	2.00	E	1.43	2.00	F	1
		HS-20 (OPR)	36.000		1.48	53.20	1.35	1.48	2.00	E	1.85	2.00	F	1
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		2.98	40.23	1.40	2.98	2.00	E	3.75	2.00	F	
		SNGARBS2	20.000		2.79	55.80	1.40	2.79	2.00	E	3.51	2.00	F	
		SNAGRIS2	22.000		2.98	65.56	1.40	2.98	2.00	E	3.75	2.00	F	
		SNCOTTS3	27.250	3	1.88	51.23	1.40	1.88	2.00	E	2.23	2.00	F	
		SNAGGRS4	34.925		2.43	84.87	1.40	2.43	2.00	E	2.93	2.00	F	
		SNS5A	35.550		2.23	79.28	1.40	2.23	2.00	E	2.63	2.00	F	
		SNS6A	39.950		2.23	89.09	1.40	2.23	2.00	E	2.63	2.00	F	
		SNS7B	42.000		2.23	93.66	1.40	2.23	2.00	E	2.63	2.00	F	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.98	98.34	1.40	2.98	2.00	E	3.74	2.00	F	
		TNT4A	33.075		2.24	74.09	1.40	2.24	2.00	E	2.65	2.00	F	
		TNT6A	41.600		2.23	92.77	1.40	2.23	2.00	E	2.65	2.00	F	
		TNT7A	42.000		2.23	93.66	1.40	2.23	2.00	E	2.65	2.00	F	
		TNT7B	42.000		2.23	93.66	1.40	2.23	2.00	E	2.65	2.00	F	
		TNAGRIT4	43.000		2.24	96.32	1.40	2.24	2.00	E	2.65	2.00	F	
		TNAGT5A	45.000		2.24	100.80	1.40	2.24	2.00	E	2.65	2.00	F	
		TNAGT5B	45.000		2.24	100.80	1.40	2.24	2.00	E	2.65	2.00	F	

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	0.50
LS	1.75	---
LL	1.75	---

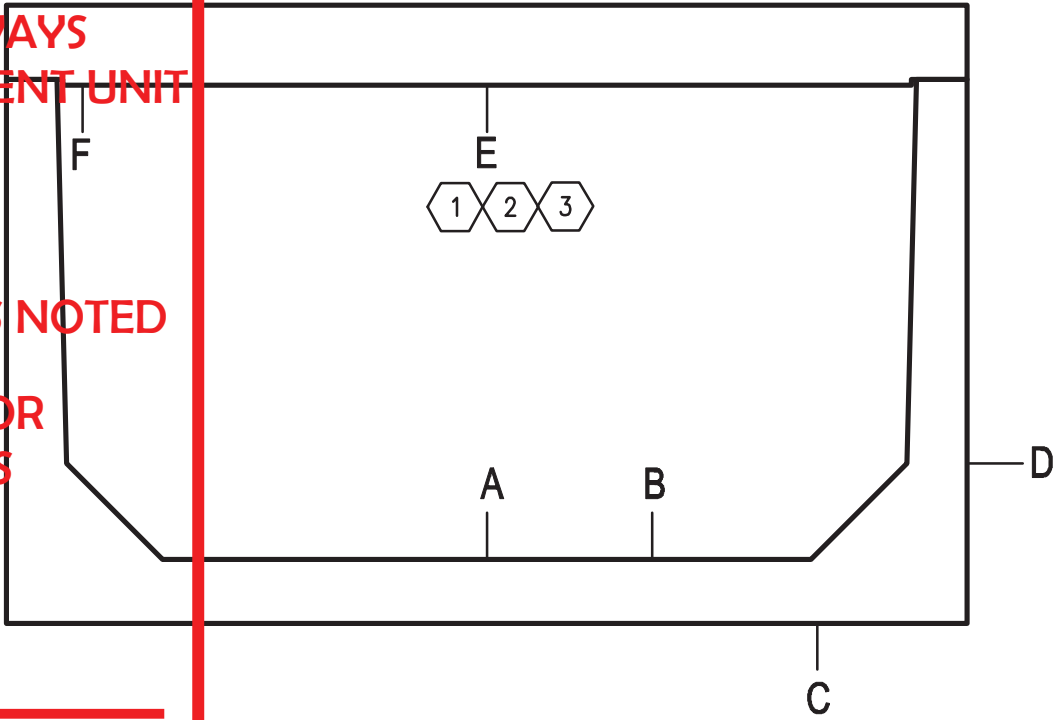
NOTE:  
0.5 MIN EH LOAD FACTOR USED IN ACCORDANCE WITH SECTION 3.11.7.

N.C. DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
STRUCTURES MANAGEMENT UNIT

- ☒ ACCEPTED
- ☒ ACCEPTED AS NOTED
- ☐ RETURNED FOR CORRECTIONS
- ☐ SEE EMAIL

BY: BIB

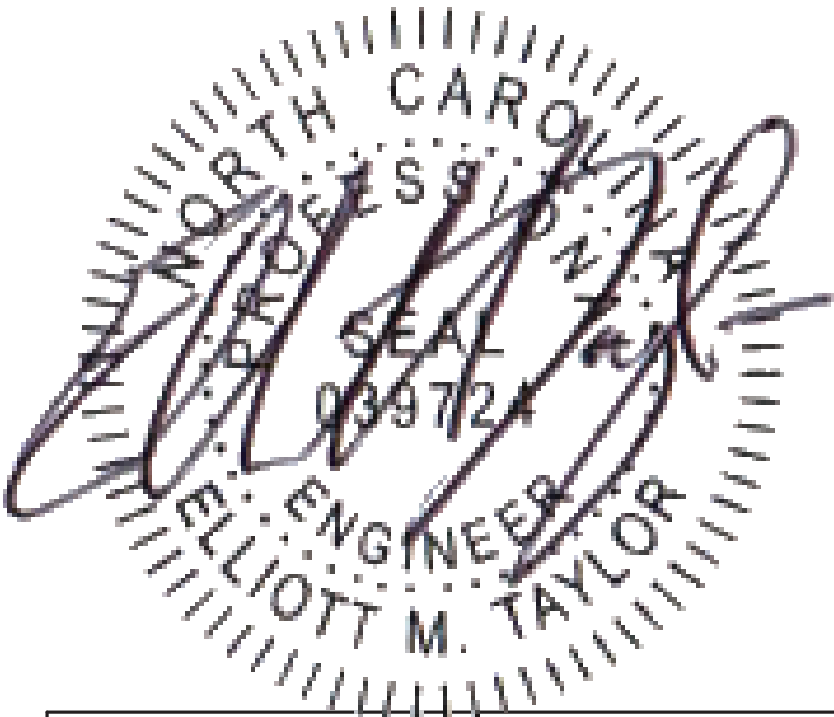
DATE: January 16, 2020



LRFR SUMMARY

\*NOTE: EXACT LOCATION DETERMINED BASED ON POINT OF INFLECTION.

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



\*\*THIS MUST BE FILLED OUT BEFORE MANUFACTURING BEGINS\*\*

APPROVED W/ NO EXCEPTIONS TAKEN: <input type="checkbox"/>
APPROVED AS NOTED: <input type="checkbox"/>
REVISED AND RESUBMIT: <input type="checkbox"/>
SIGNATURE _____
DATE _____

4905 STOUGH RD. CONCORD, NC  
OFFICE 704-788-4050, FAX 704-788-4060

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TWIN 9' X 5' TYPE 1 BOX CULVERT

SUBMITTAL LAYOUT

NCDOT #C204181

STANLEY & MONTGOMERY COUNTIES

CUSTOMER

STA: 38 + 76.00

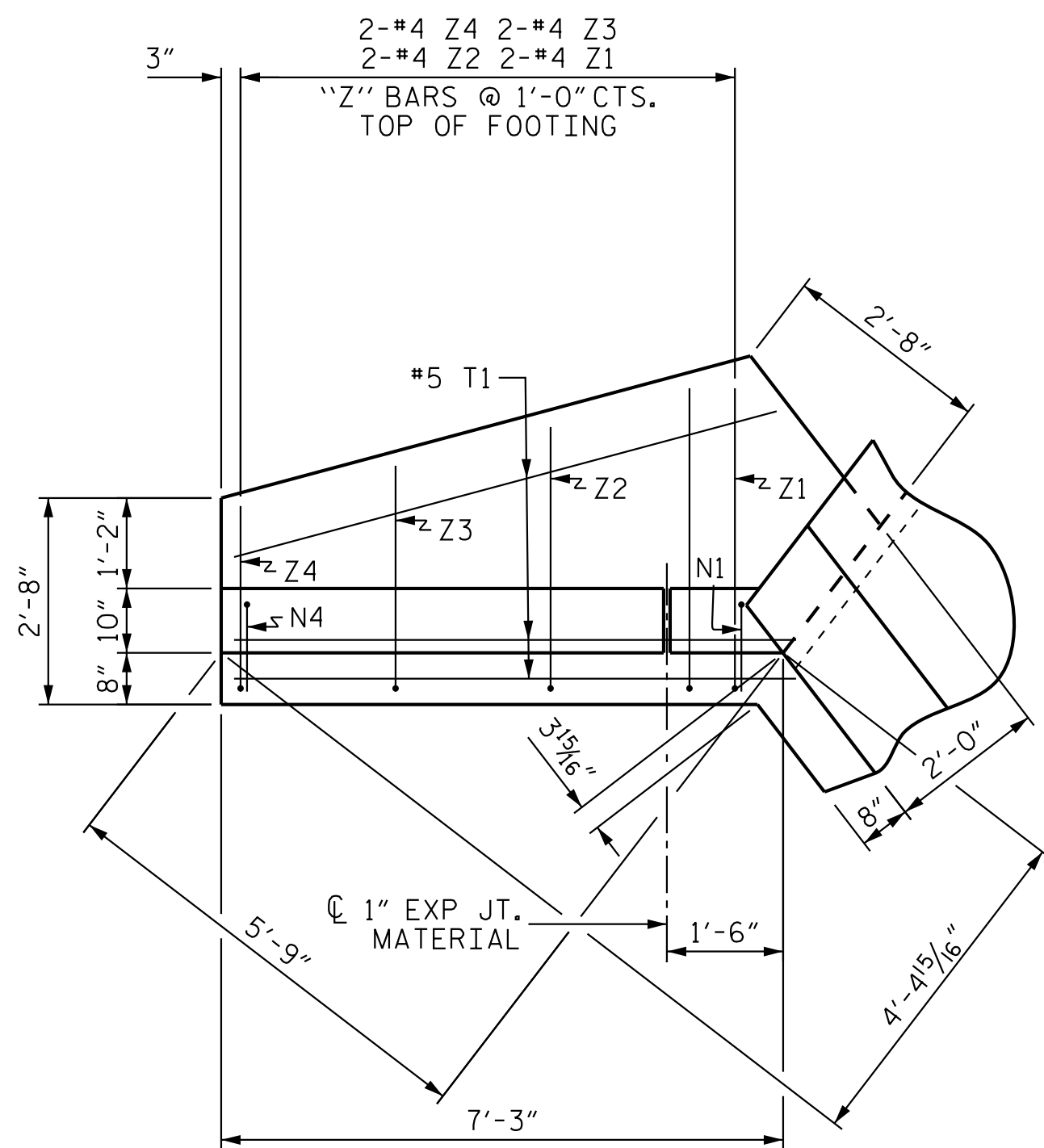
DATE 12/3/19	SALES   DRAWN   ENGINEER	CHECKED	SALES ORDER 129382
DRAWING NUMBER 450-S129382-038		REVISION REV DATE	SHEET 6 OF 6

COMMENT:

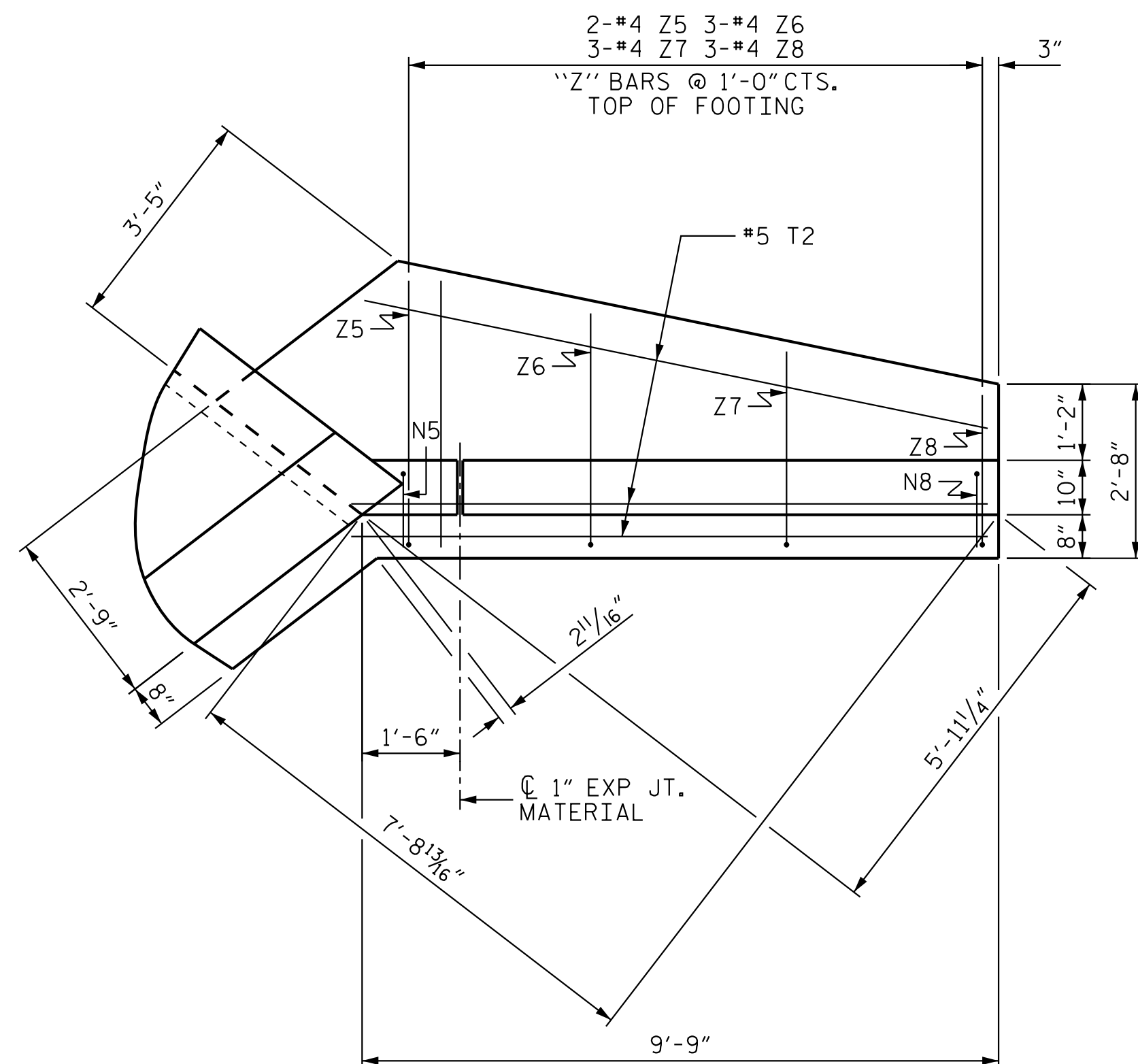
1. HS-20 LOAD RATING FACTORS ARE EQUAL TO HL-93, SINCE ONLY THE AXLE LOADS OF THE DESIGN TRUCK WITHOUT THE LOANE LOAD SHALL BE APPLIED PER LRFR SEC. 6A.5.12.10.3

REVISIONS					
REVISION	DATE	BY	SHEET	DESCRIPTION OF REVISION	REQUESTED BY
A					
B					

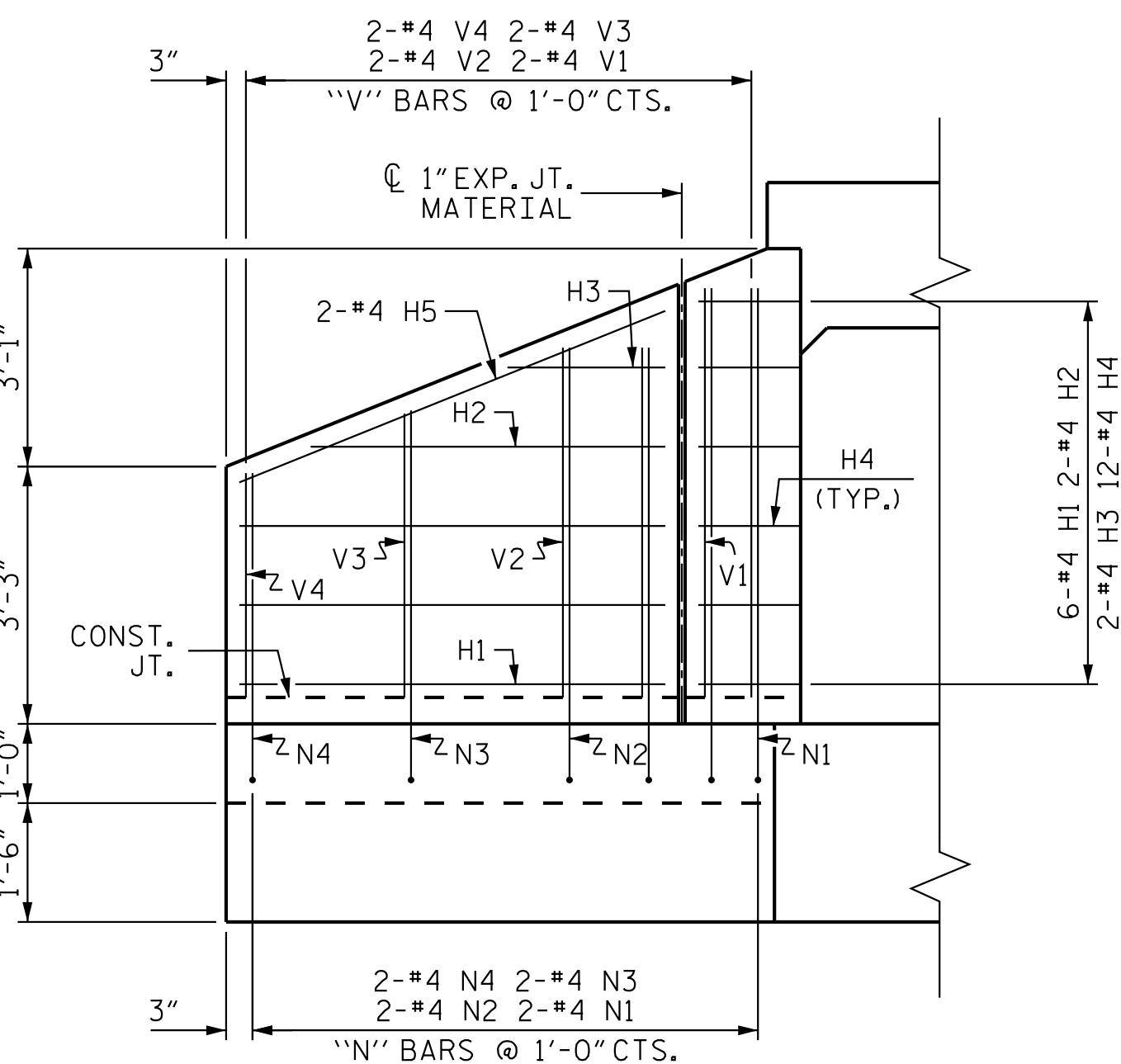




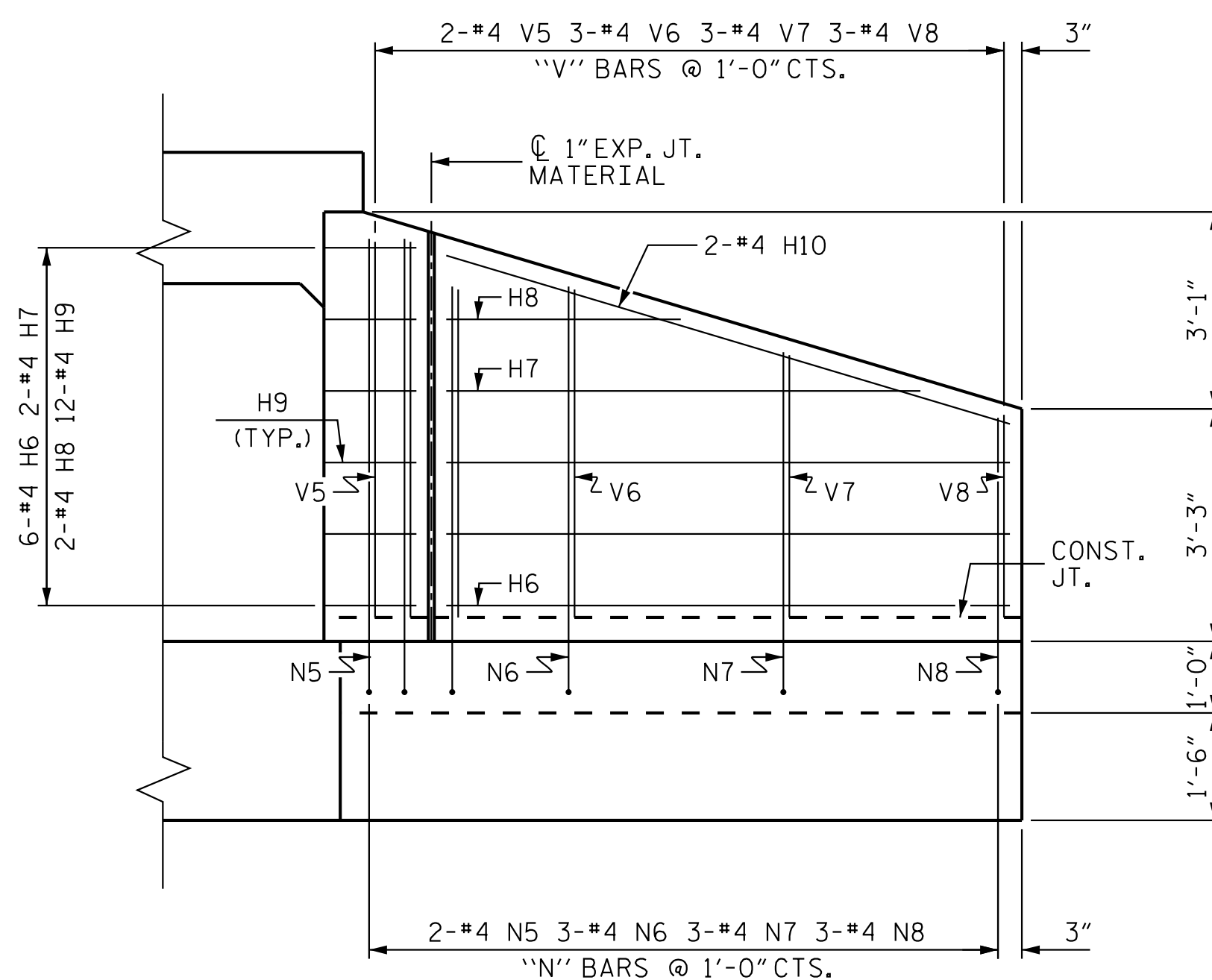
PLAN W2



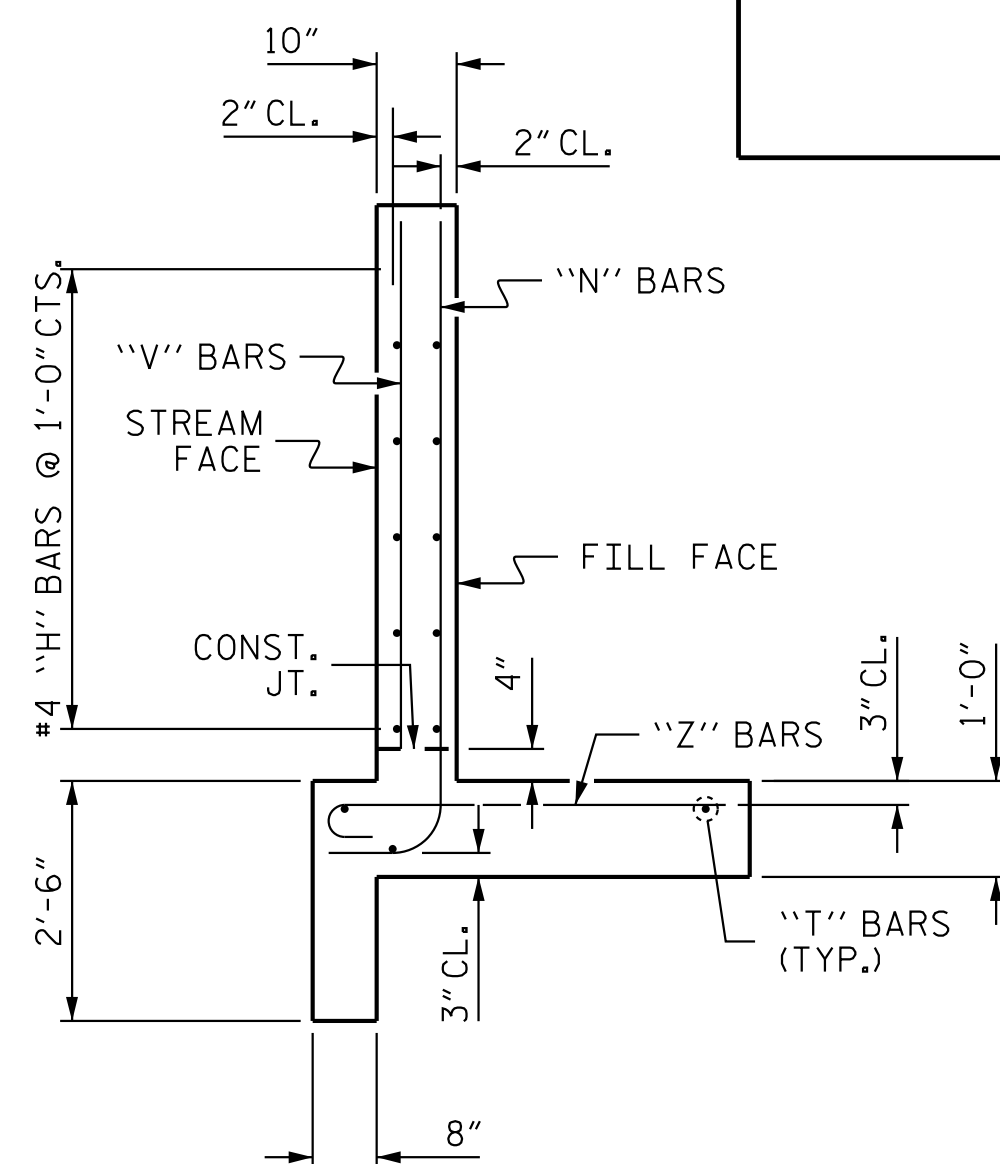
PLAN W1



ELEVATION W2



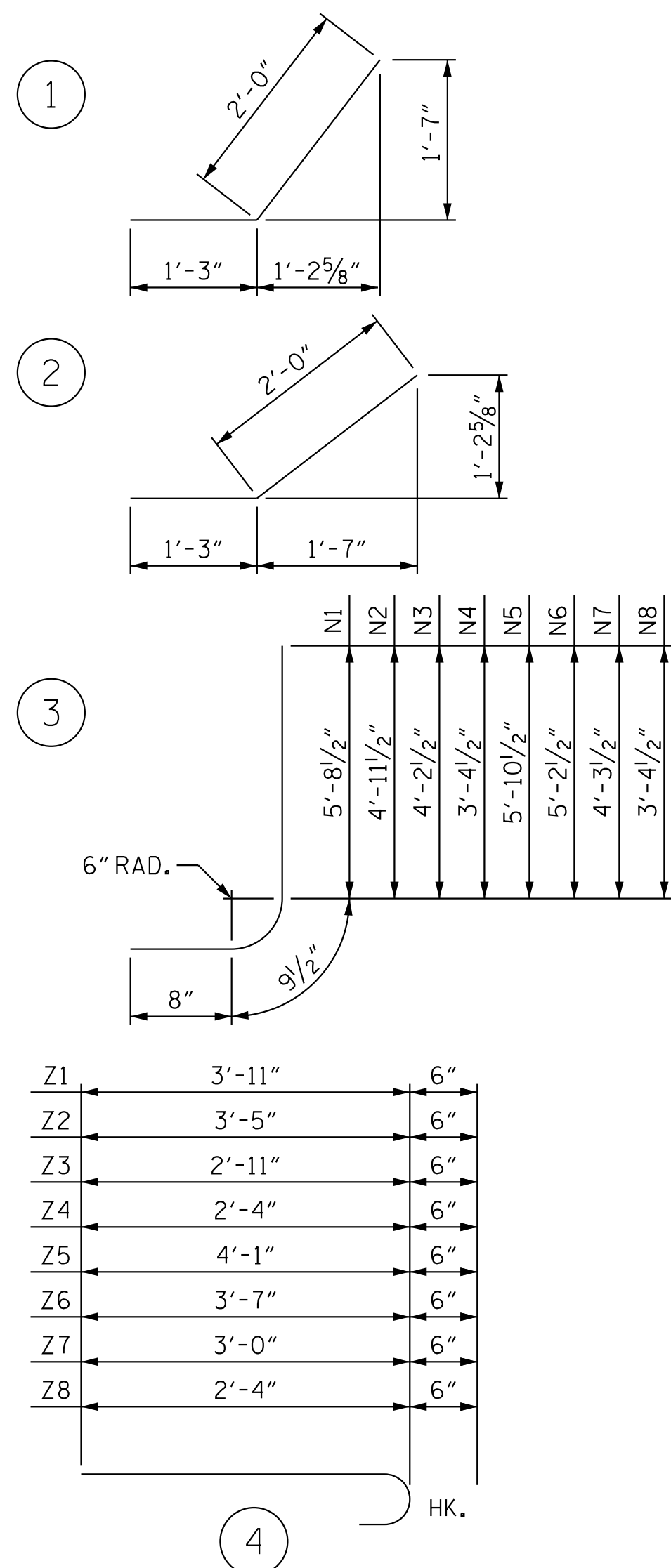
ELEVATION W1



# TYPICAL WING SECTION

## BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



## BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	6	#4	STR	5'-4"	21
H2	2	#4	STR	4'-5"	6
H3	2	#4	STR	2'-0"	3
H4	12	#4	1	3'-3"	26
H5	2	#4	STR	5'-9"	8
H6	6	#4	STR	7'-10"	31
H7	2	#4	STR	6'-7"	9
H8	2	#4	STR	3'-3"	4
H9	12	#4	2	3'-3"	26
H10	2	#4	STR	8'-2"	11
N1	2	#4	3	7'-2"	10
N2	2	#4	3	6'-5"	9
N3	2	#4	3	5'-8"	8
N4	2	#4	3	4'-10"	6
N5	2	#4	3	7'-4"	10
N6	3	#4	3	6'-8"	13
N7	3	#4	3	5'-9"	12
N8	3	#4	3	4'-10"	10
T1	3	#5	STR	7'-3"	23
T2	3	#5	STR	9'-9"	31
V1	2	#4	STR	5'-2"	7
V2	2	#4	STR	4'-5"	6
V3	2	#4	STR	3'-7"	5
V4	2	#4	STR	2'-10"	4
V5	2	#4	STR	5'-3"	7
V6	3	#4	STR	4'-7"	9
V7	3	#4	STR	3'-8"	7
V8	3	#4	STR	2'-10"	6
Z1	2	#4	4	4'-5"	6
Z2	2	#4	4	3'-11"	5
Z3	2	#4	4	3'-5"	5
Z4	2	#4	4	2'-10"	4
Z5	2	#4	4	4'-7"	6
Z6	3	#4	4	4'-1"	8
Z7	3	#4	4	3'-6"	7
Z8	3	#4	4	2'-10"	6
REINFORCING STEEL FOR 2 WINGS					375 LBS
CLASS A CONCRETE					
2 WINGS					5.6 CY
1 HEADWALLS					1.0 CY
1 END CURTAIN WALLS					1.2 CY
TOTAL					7.8 CY

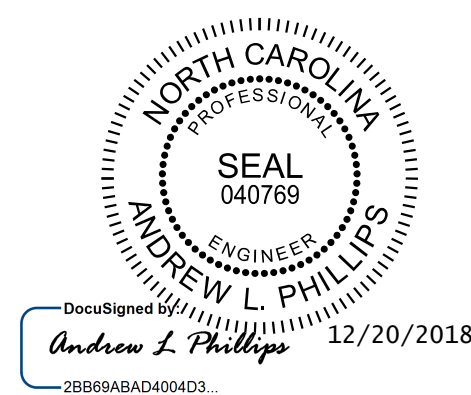
CULVERT #1

PROJECT NO. R-2530B

STANLY COUNTY

STATION: 38+76.00 -L-

SHEET 8 OF 10



# Kimley»»Horn

421 Fayetteville Street, Suite 600

Raleigh, NC 27601-1772  
Phone (919) 633-2000

NC LICENSE #

F-0102

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD WINGS  
FOR STAGE 1  
CONCRETE BOX CULVERT

H = 5'-0" SLOPE = 2:1  
75° OR 105° SKEW

REVISIONS						SHEET NO. C01-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 10
2			4			

STD. NO. CW7505

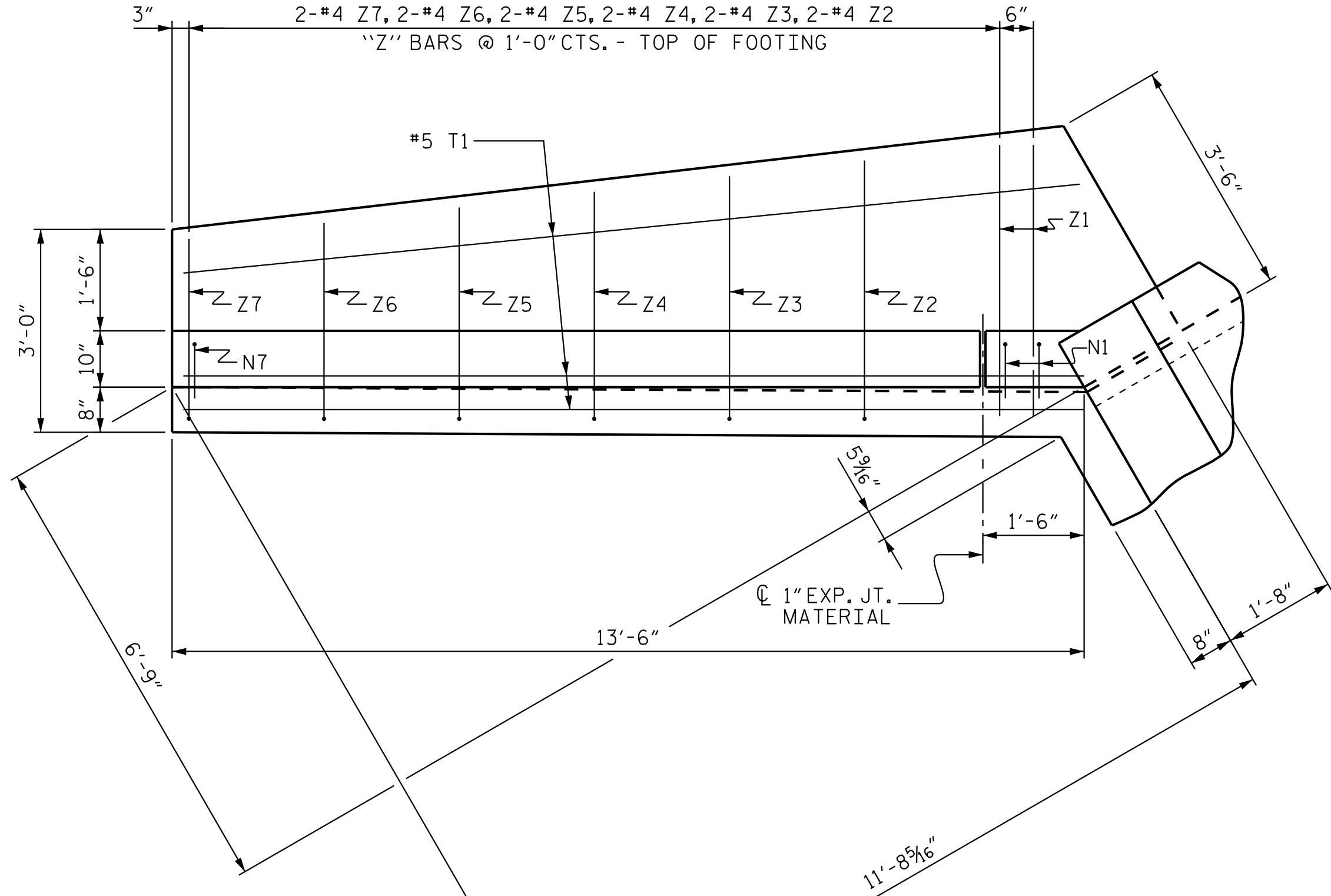
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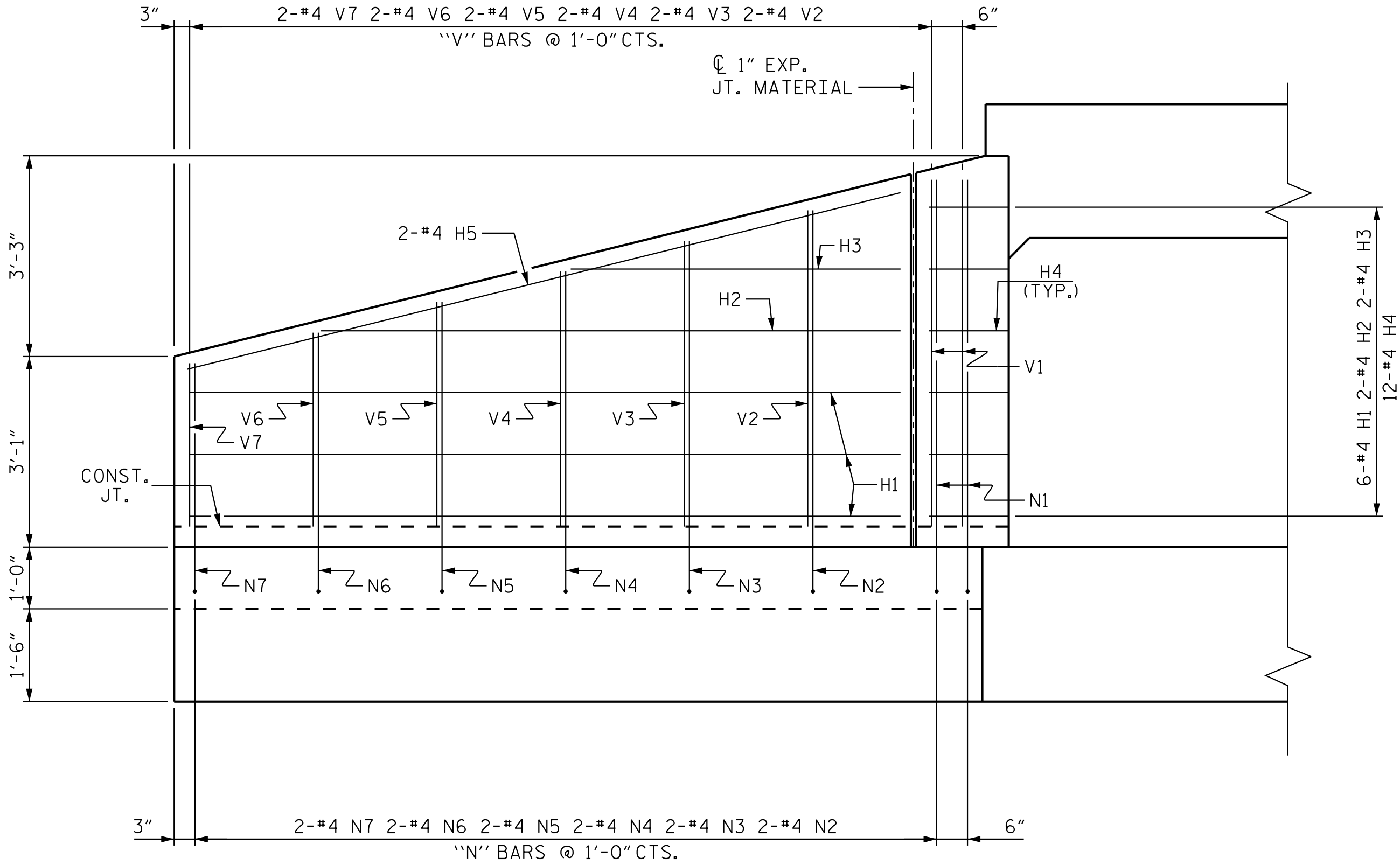
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K:\PDT-Structures\Culvert\NC\01036489 - B-2530B\Cad\Drawn\Culvert-1\441-017\_R2530B\_SML\_CUL\_009.dgn 12/20/2018

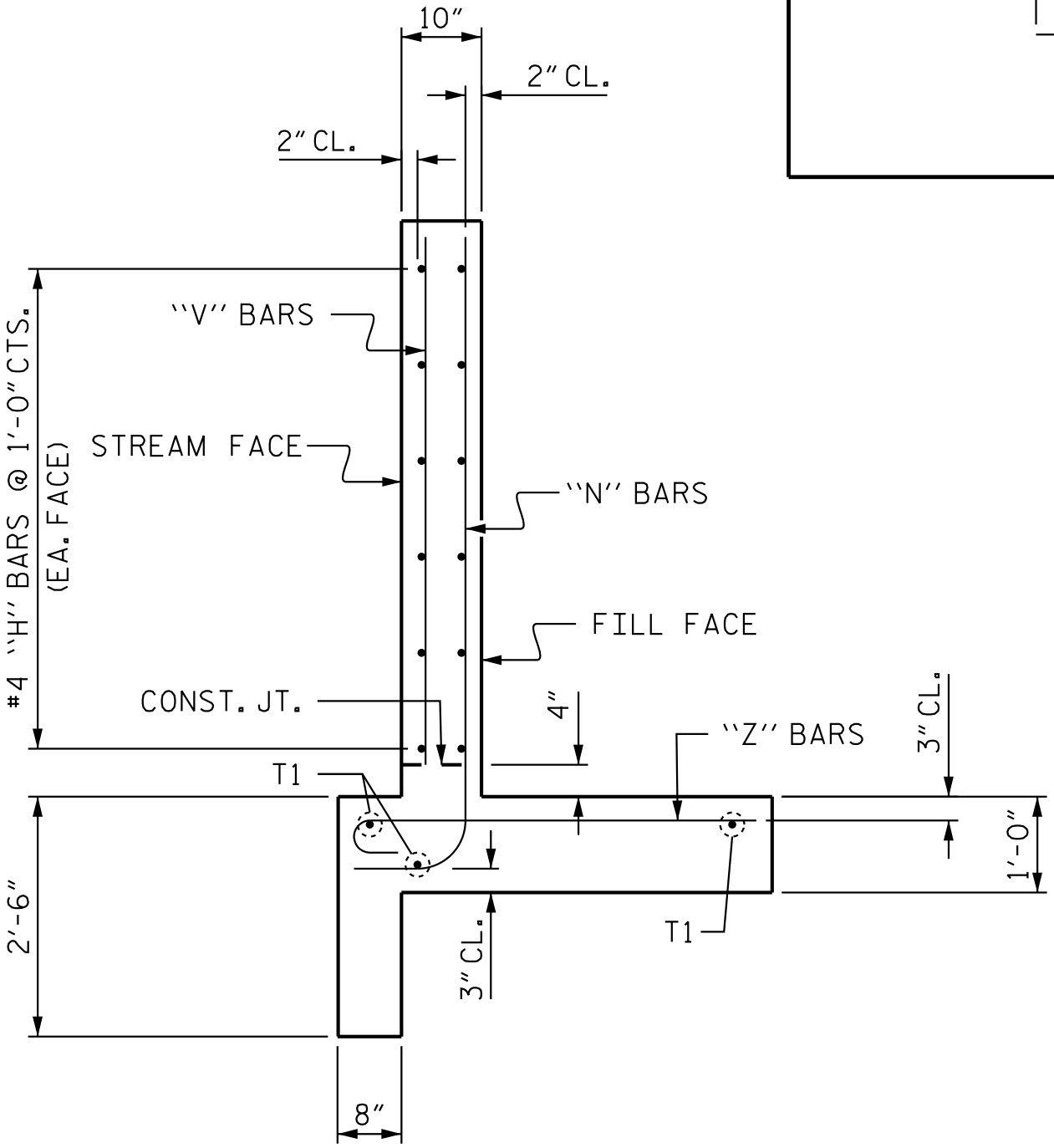


PLAN W3



ELEVATION W3

DRAWN BY: D. D. LOWERY DATE: 12/18  
CHECKED BY: P. D. COOKSEY DATE: 12/18  
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 12/18

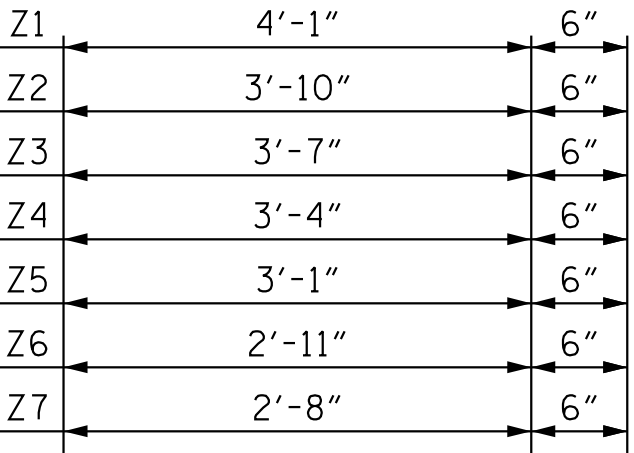
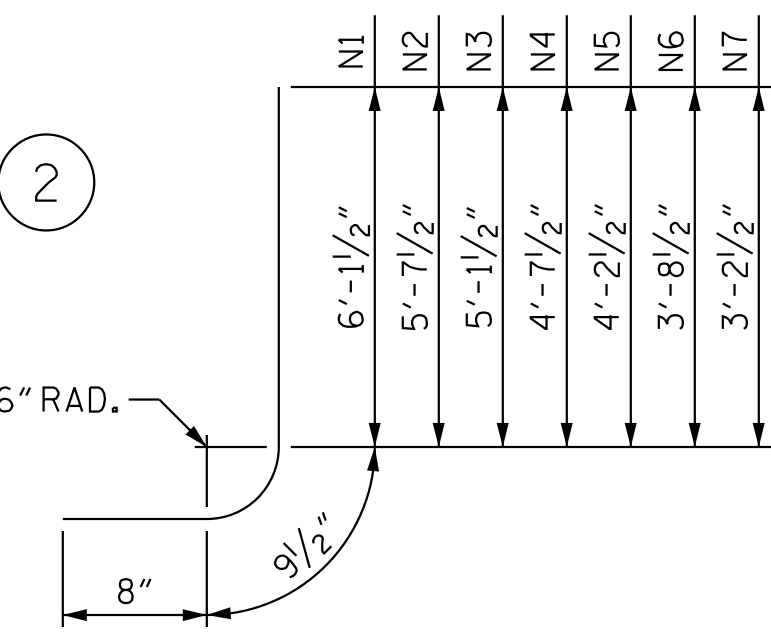
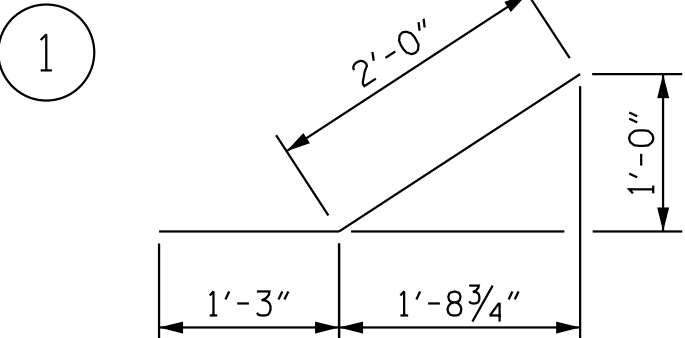


TYPICAL WING SECTION

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



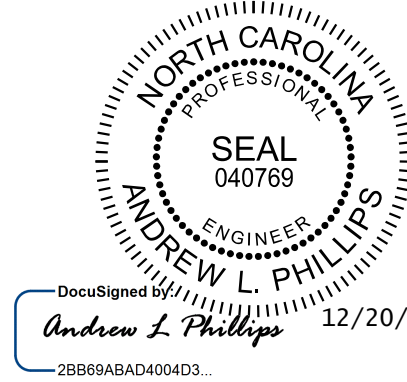
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	12	4	STR	11'-7"	93
H2	4	4	STR	9'-4"	25
H3	4	4	STR	5'-4"	14
H4	24	4	1	3'-3"	52
H5	4	4	STR	11'-11"	32
N1	4	4	2	7'-7"	20
N2	4	4	2	7'-1"	19
N3	4	4	2	6'-7"	18
N4	4	4	2	6'-1"	16
N5	4	4	2	5'-8"	15
N6	4	4	2	5'-2"	14
N7	4	4	2	4'-8"	12
T1	6	5	STR	13'-6"	84
V1	4	4	STR	5'-7"	15
V2	4	4	STR	5'-1"	14
V3	4	4	STR	4'-7"	12
V4	4	4	STR	4'-1"	11
V5	4	4	STR	3'-7"	10
V6	4	4	STR	3'-1"	8
V7	4	4	STR	2'-7"	7
Z1	4	4	3	4'-7"	12
Z2	4	4	3	4'-4"	12
Z3	4	4	3	4'-1"	11
Z4	4	4	3	3'-10"	10
Z5	4	4	3	3'-7"	10
Z6	4	4	3	3'-5"	9
Z7	4	4	3	3'-2"	8
REINFORCING STEEL				563	LBS
FOR 2 WINGS					
CLASS A CONCRETE					
2 WINGS				9.0	CY
1 HEADWALL				0.9	CY
1 END CURTAIN WALL				1.1	CY
TOTAL				11.0	CY

CULVERT #1

PROJECT NO. R-2530B  
STANLY COUNTY  
STATION: 38+76.00 -L-

SHEET 9 OF 10



**Kimley»Horn**  
421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000 NC LICENSE # F-0102

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
OUTLET WING DETAILS FOR STAGE 2 CONCRETE BOX CULVERT H = 5'-0" SLOPE = 3:1 90° SKEW					
REVISIONS					SHEET NO. C01-9
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					10



PLAN SHEETS FOR CULVERTS #2-6 OMITTED FOR SIMPLICITY OF THIS EXAMPLE



BENCHMARK: BM#48, -L- STA. 372+36.42, OFFSET 10.33' LT., EL. 314.38', RR SPIKE IN BASE 18" OAK

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

F.A. PROJECT NO. STBG-0024(083)

NOTES

ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.  
DESIGN FILL ----- 20.2 FT.  
FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.  
3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN STAGE 1 OR STAGE 2 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.

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.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACES OF THE EXTERIOR WALLS AND BOTH FACES OF INTERIOR WALLS ABOVE THE 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 WILL BE PAID FOR BY THE CONTRACTOR.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING DOUBLE 10' X 7' REINFORCED CONCRETE BOX CULVERT LOCATED AT THE SAME LOCATION AS THE PROPOSED CULVERT SHALL BE REMOVED. THE EXISTING STRUCTURE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE STRUCTURE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED CULVERT, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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.

TRAFFIC ON NC 24/27/73 SHALL BE MAINTAINED. IN ORDER TO MAINTAIN TRAFFIC THE CULVERT SHALL BE CONSTRUCTED IN SECTIONS AS SHOWN ON THESE PLANS AS DIRECTED BY THE ENGINEER.

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.

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.

BED MATERIAL PLACED BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL BETWEEN THE LOWER SILLS. THE MATERIAL SHALL BE NATIVE MATERIAL OR CLASS A RIP RAP TO SILL HEIGHT. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS. CLASS A RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE.

DETAILED DRAWINGS FOR FALSEWORK AND FORMS FOR THIS CULVERT TOP SLAB SHALL BE SUBMITTED. SEE SHEET SN.

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.

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:  
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi.

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



Kimley»Horn

421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000 NC LICENSE # F-0102

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CULVERT #7

PROJECT NO. R-2530B

MONTGOMERY COUNTY

STATION: 381+64.00 -L-

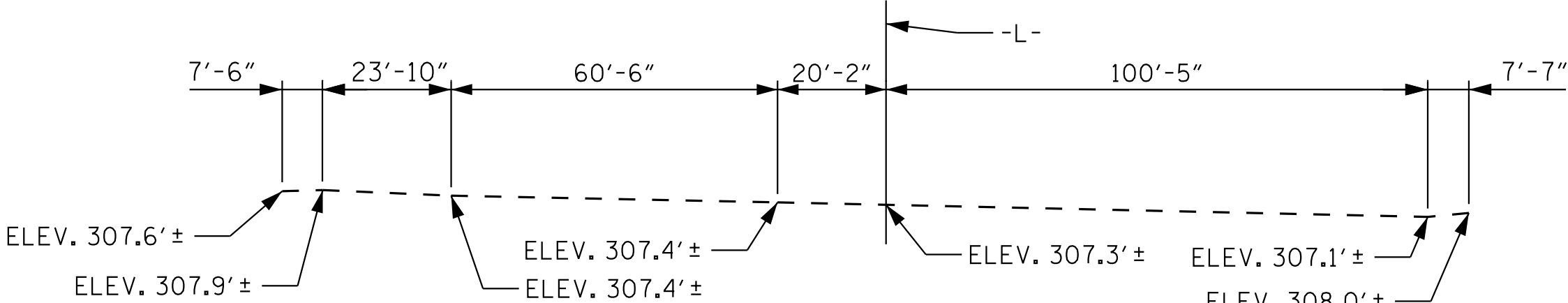
SHEET 1 OF 11 REPLACES STRUCTURE 267

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

DOUBLE 11 FT. X 9 FT.  
CONCRETE BOX CULVERT  
121° SKEW

REVISIONS					SHEET NO. C07-1
NO.	BY:	DATE:	NO.	BY:	
1			3		TOTAL SHEETS
2			4		11

TOTAL STRUCTURE QUANTITIES					
STAGE 1			STAGE 2		
CLASS A CONCRETE			CLASS A CONCRETE		
BARREL @	4.133	CY/FT	477.4	C.Y.	
WINGS ETC.			21.2	C.Y.	
TOTAL	498.6	C.Y.	453.2	C.Y.	
REINFORCING STEEL			REINFORCING STEEL		
BARREL	62,312	LBS.	56,268	LBS.	
WINGS ETC.	1,074	LBS.	1,074	LBS.	
TOTAL	63,386	LBS.	57,342	LBS.	
FOUNDATION CONDITIONING MATERIAL			FOUNDATION CONDITIONING MATERIAL		
	234	TONS		212	TONS
CULVERT EXCAVATION STA. 381+64.00 -L-			LUMP SUM		
REMOVAL OF EXISTING STRUCTURE STA. 381+64.00 -L-			LUMP SUM		



PROFILE ALONG CULVERT

ELEVATIONS TAKEN ALONG CENTERLINE CHANNEL

\*FEMA REQUIREMENTS IN BLUE

ROADWAY DATA

GRADE POINT ELEV. @ STA 381+64.00 -L- = 334.99'  
BED ELEVATION @ STA 381+64.00 -L- = 306.89'  
ROADWAY SLOPES 2:1

HYDRAULIC DATA

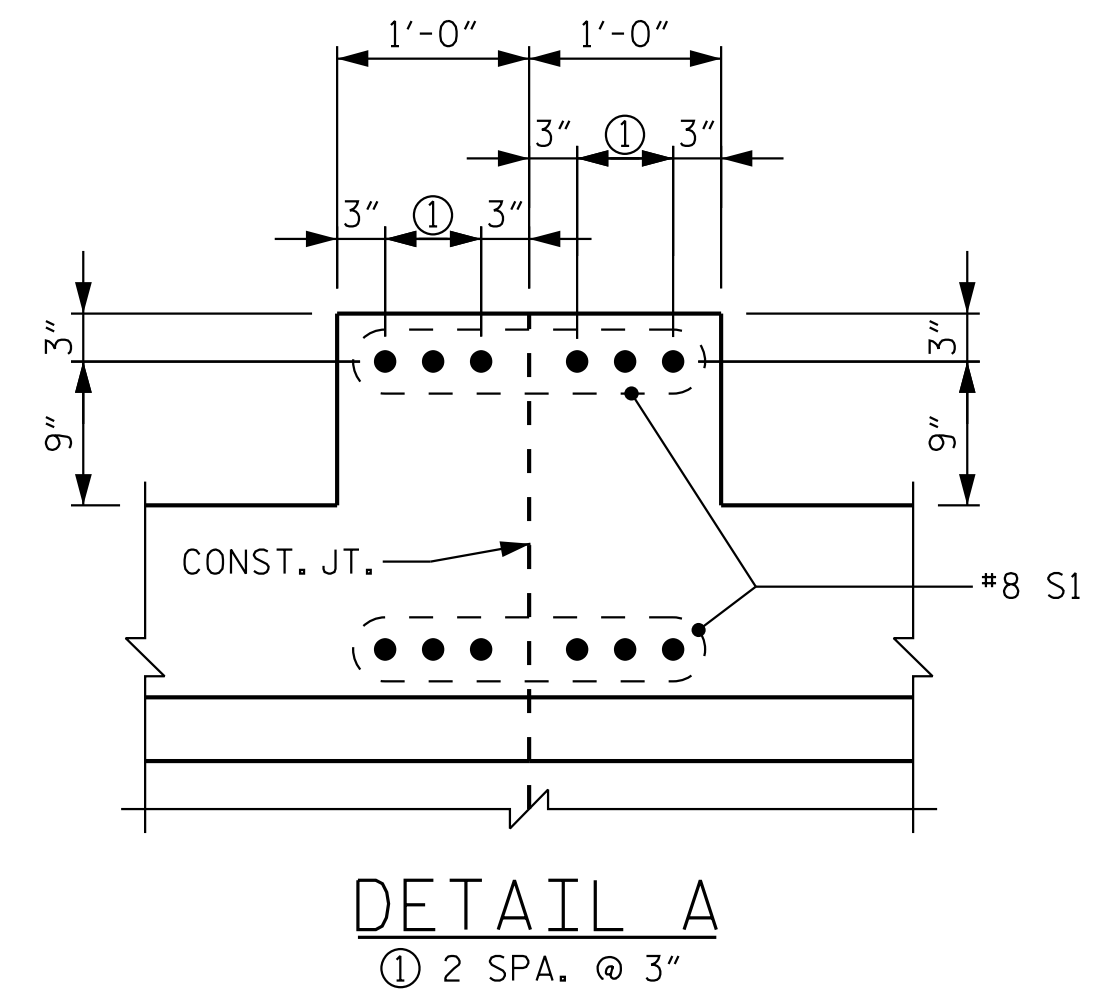
DESIGN DISCHARGE -----1400 CFS  
FREQUENCY OF DESIGN FLOOD -----50 YR.  
DESIGN HIGH WATER ELEVATION-----316.5 FT.  
DRAINAGE AREA -----3.48 SQ. MI.  
BASE DISCHARGE (Q100) -----1600 CFS  
BASE HIGH WATER ELEVATION -----317.8 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE -----3700 CFS  
FREQUENCY OF OVERTOPPING FLOOD --->500YR.  
OVERTOPPING FLOOD ELEVATION -----331.3 FT.

DRAWN BY: D.D. LOWERY DATE: 12/18  
CHECKED BY: P.D. COOKSEY DATE: 12/18  
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 12/18



[illegible]

PROJECT NO. R-2530B  
MONTGOMERY COUNTY  
 STATION: 381+64.00 -L-

421 Fayetteville Street, Suite 600  
Raleigh, NC 27601-1772  
Phone (919) 677-2000 NC LICENSE #

DOUBLE 11 FT. X 9 FT.  
CONCRETE BOX CULVERT  
121° SKEW

REVISIONS						SHEET NO. C07-2
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1			3			TOTAL SHEETS 11
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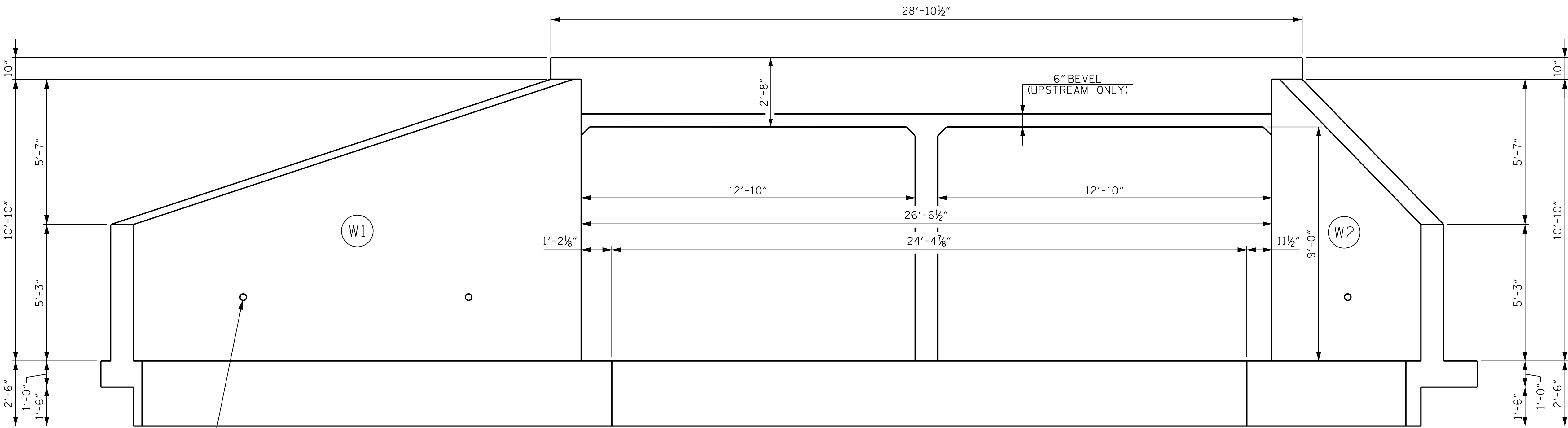
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\*FEMA REQUIREMENTS IN BLUE

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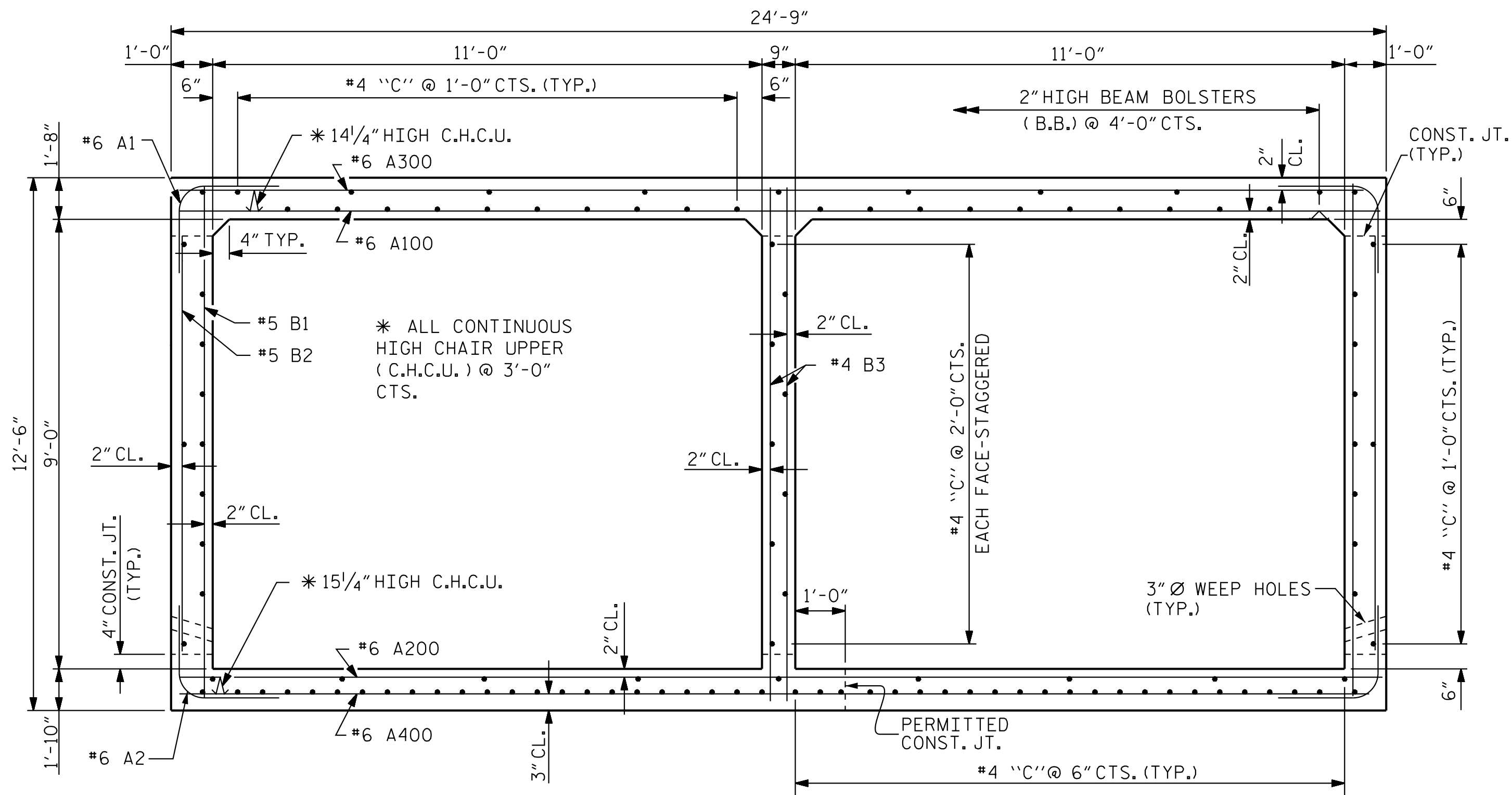
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DESIGN ENGINEER OF RECORD: <u>A. L. PHILLIPS</u>	DATE: <u>12/18</u>



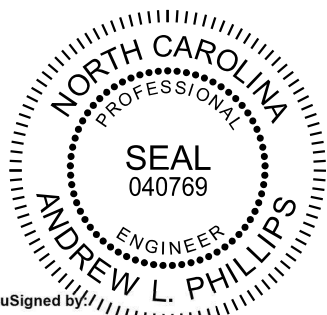


END ELEVATION NORMAL TO SKEW  
FOR SILL DETAILS, SEE SHEET C07-8 & C07-9.

VERIFY CULVERT SIZE,  
NUMBER OF BARRELS,  
AND SILL DIMENSIONS  
IF APPLICABLE



RIGHT ANGLE SECTION OF BARREL  
THERE ARE 115 "C" BARS IN SECTION OF BARREL.



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CULVERT #7  
PROJECT NO. R-2530B  
MONTGOMERY COUNTY  
STATION: 381+64.00 -L-

SHEET 3 OF 11

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

DOUBLE 11 FT. X 9 FT.  
CONCRETE BOX CULVERT  
121° SKEW

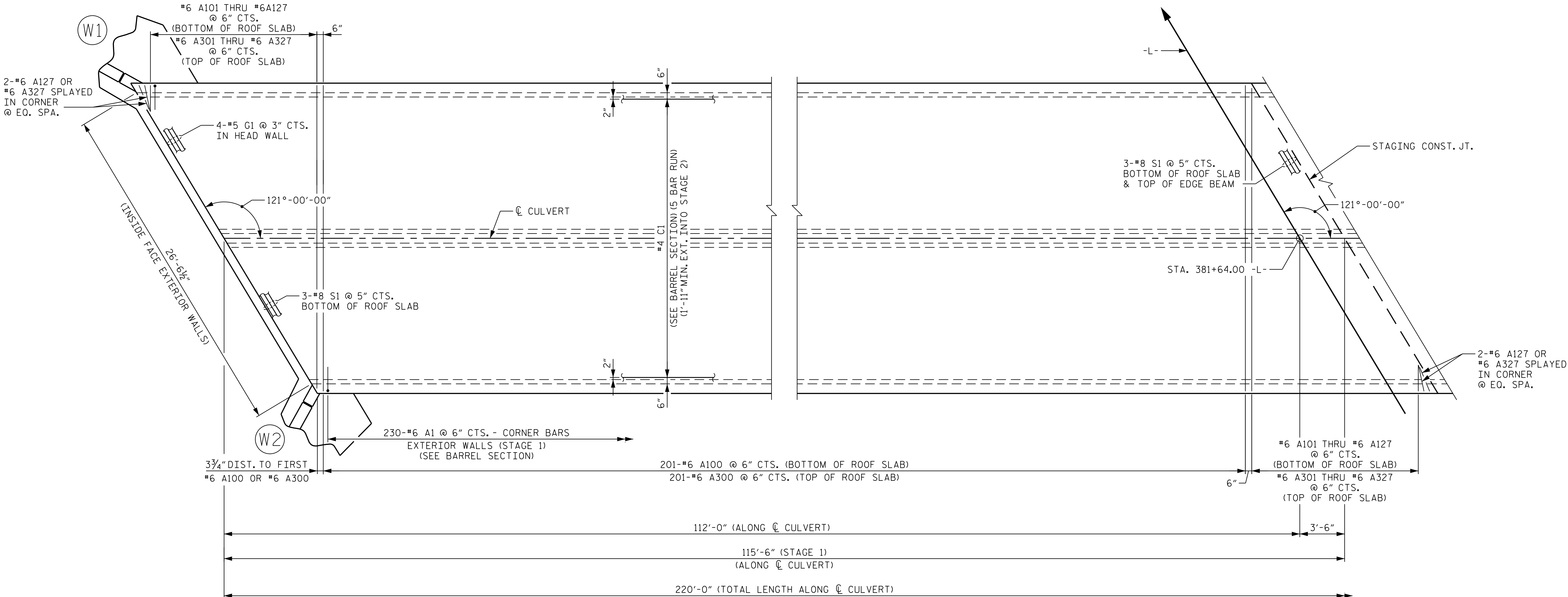
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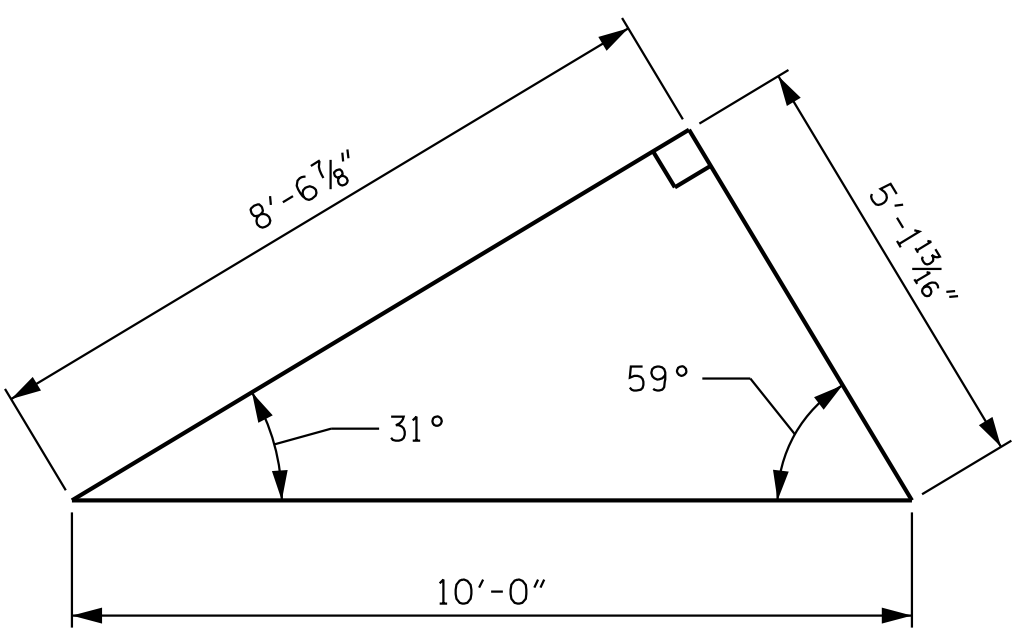
\*FEMA REQUIREMENTS IN BLUE

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DRAWN BY: D.D. LOWERY DATE: 12/18  
CHECKED BY: P.D. COOKSEY DATE: 12/18  
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 12/18



ROOF SLAB PLAN - STAGE 1



SKREW TRIANGLE

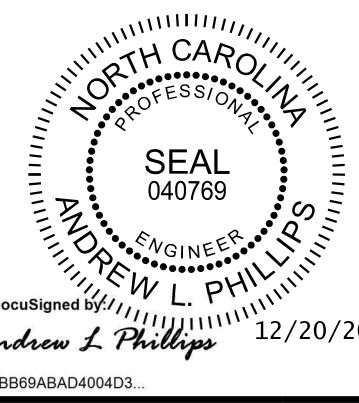
CULVERT #7

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MONTGOMERY COUNTY

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SHEET 4 OF 11



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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STAGE 1 DOUBLE 11 FT. X 9 FT. CONCRETE BOX CULVERT 121° SKEW					
REVISIONS					
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1			3		
2			4		
SHEET NO. C07-4					TOTAL SHEETS 11

DRAWN BY: D.D. LOWERY DATE: 12/18

CHECKED BY: P.D. COOKSEY DATE: 12/18

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SEE SHEET C07-4 FOR SKEW TRIANGLE.



CULVERT #7

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SHEET 5 OF 11



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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STAGE 1  
DOUBLE 11 FT. X 9 FT.  
CONCRETE BOX CULVERT  
121° SKEW

\*FEMA REQUIREMENTS IN BLUE

SEE SHEET C07-4 FOR SKEW TRIANGLE.



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

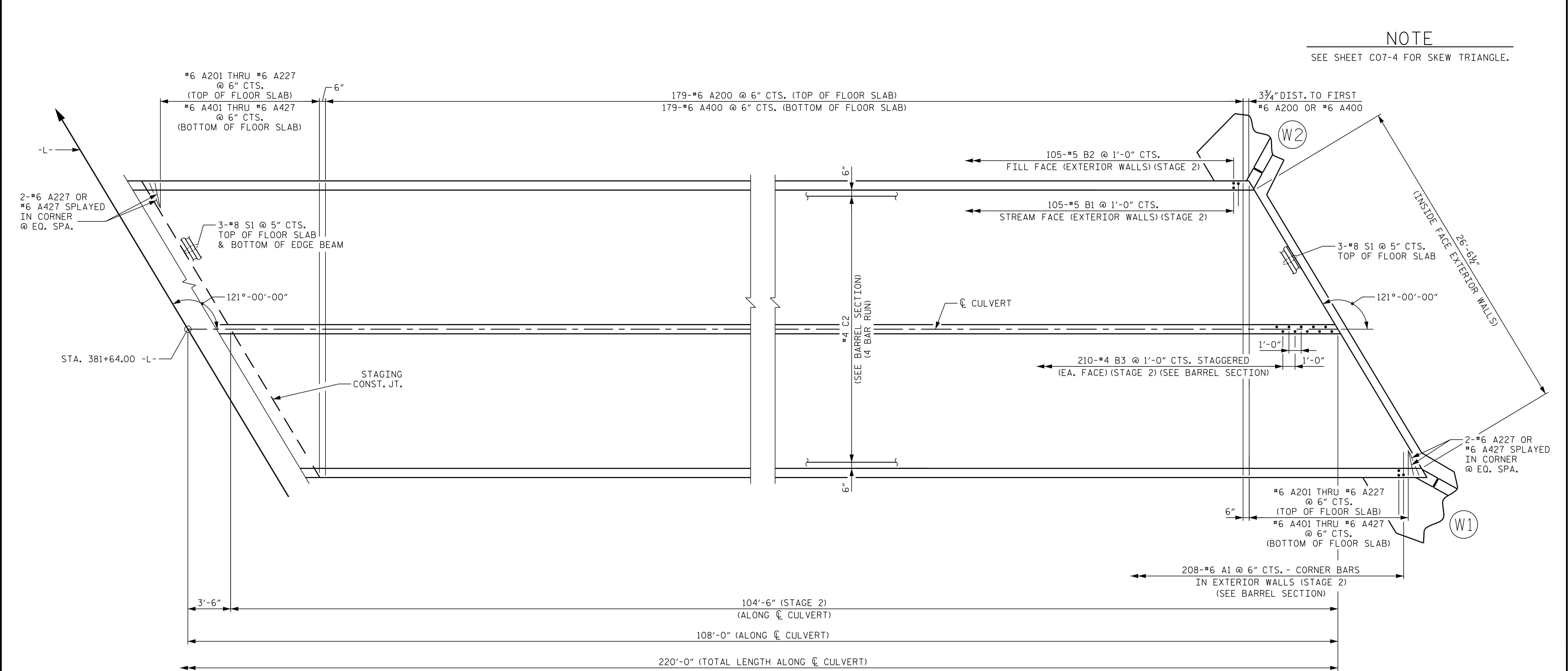
STAGE 2  
 DOUBLE 11 FT. X 9 FT.  
 CONCRETE BOX CULVERT  
 121° SKEW

REVISIONS						SHEET NO. C07-6
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CHECKED BY: <u>P. D. COOKSEY</u>	DATE: <u>12/18</u>
DESIGN ENGINEER OF RECORD: <u>A. L. PHILLIPS</u>	DATE: <u>12/18</u>



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FLOOR SLAB PLAN - STAGE 2

NOTE: FOR S2 BARS IN THE FLOOR SLAB & WING FOOTINGS, SEE SHEET C07-10.

NOTE: FOR S2 BARS IN THE FLOOR SLAB & WING FOOTINGS, SEE SHEET C07-10.

NOTE

SEE SHEET C07-4 FOR SKEW TRIANGLE.

CULVERT #7

PROJECT NO. R-2530B

MONTGOMERY COUNTY

STATION: 381+64.00 -L-

SHEET 7 OF 11

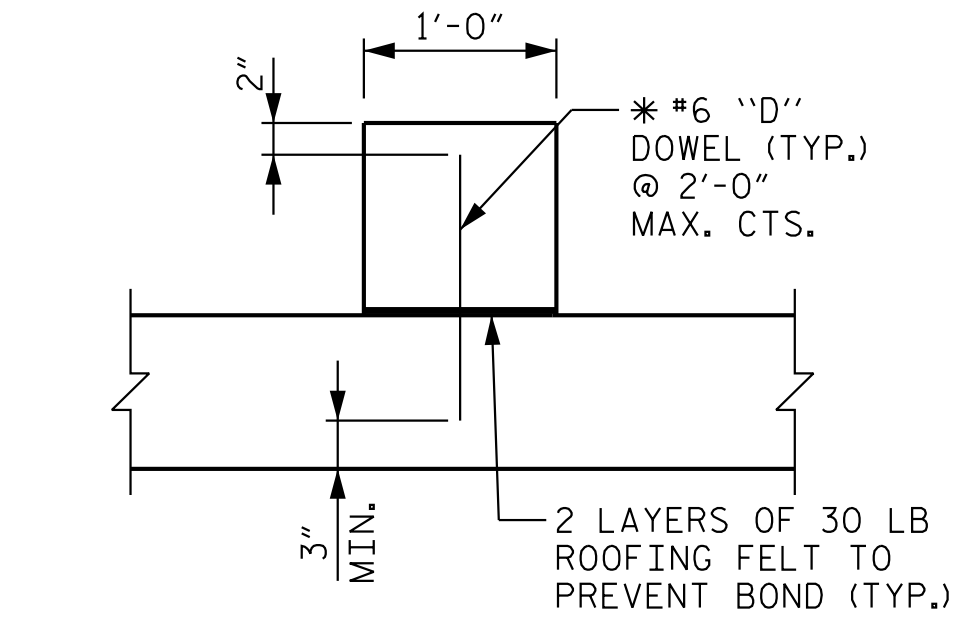


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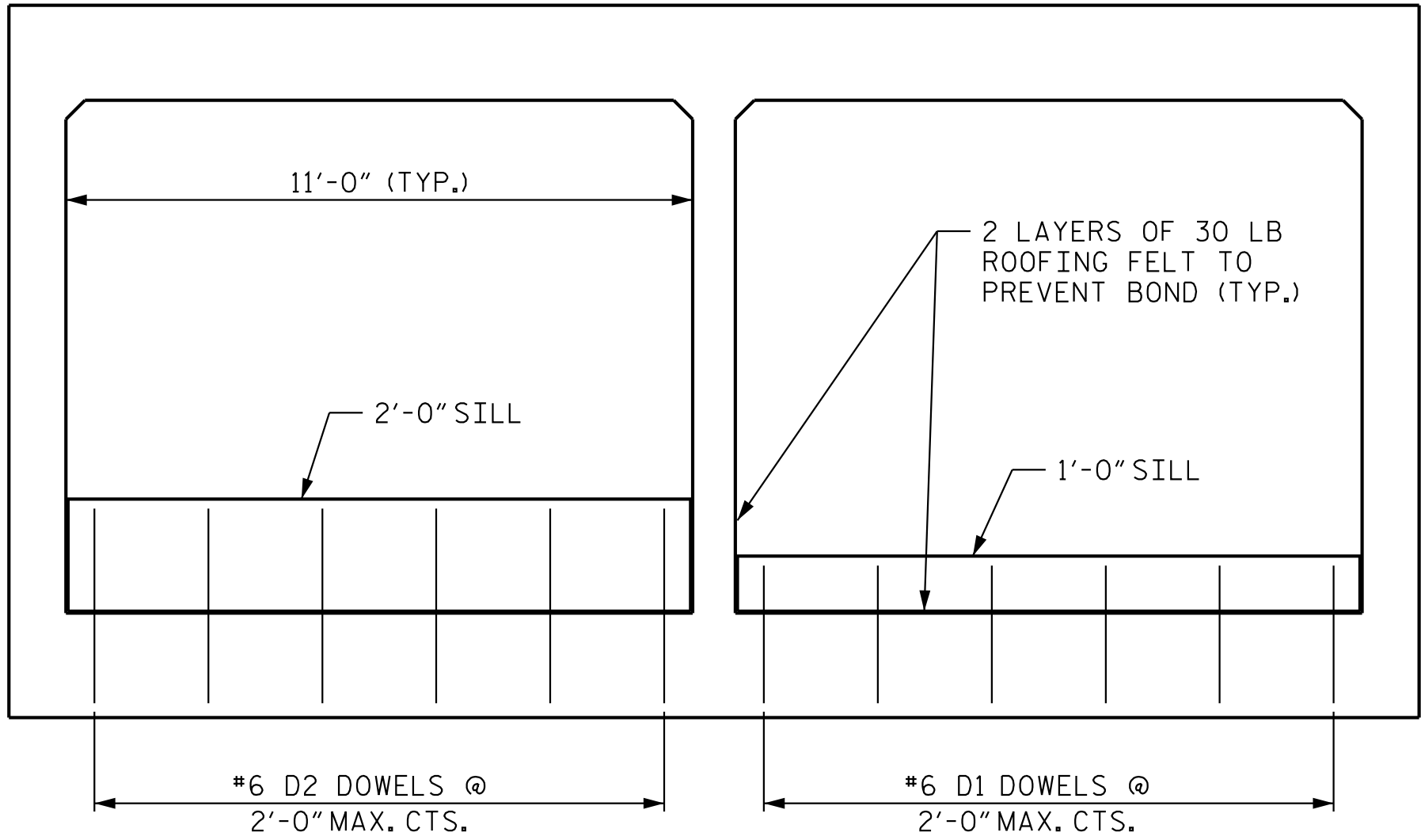
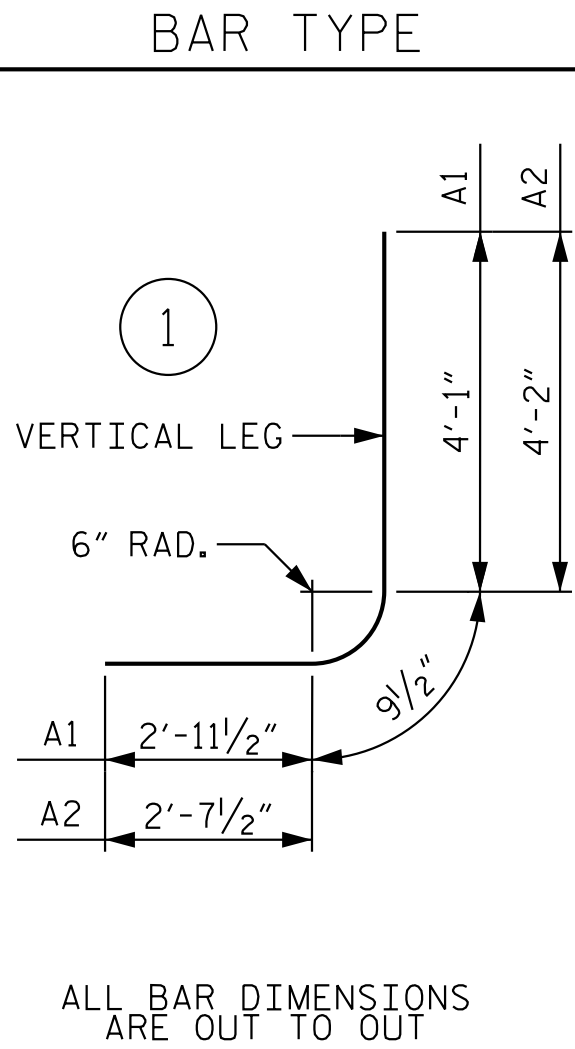
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. C07-7
STAGE 2 DOUBLE 11 FT. X 9 FT. CONCRETE BOX CULVERT 121° SKEW						
REVISIONS						
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1			3			
2			4			



SECTION THROUGH SILL

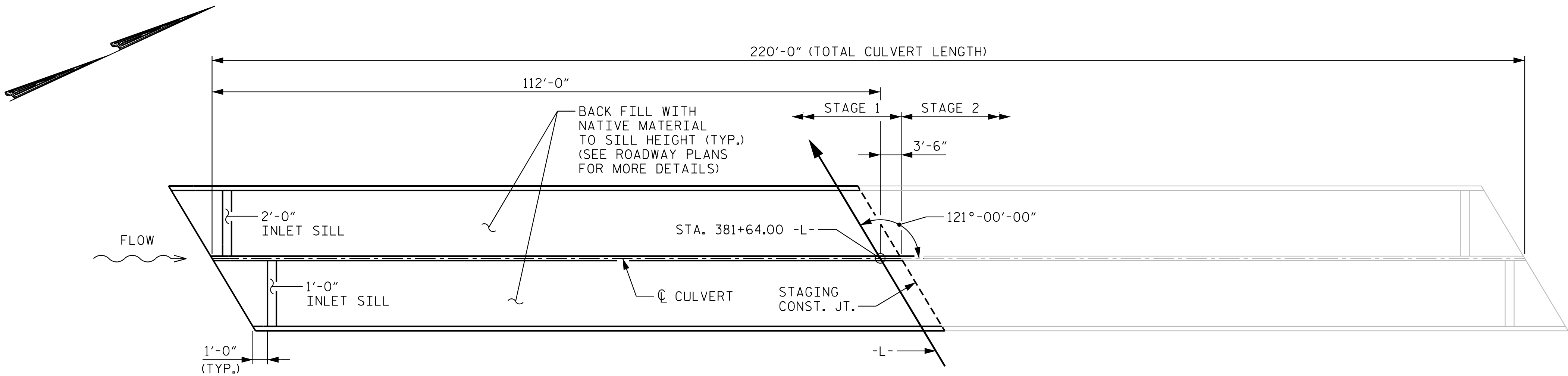
\* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.



ELEVATION

CULVERT SILL DETAILS - INLET

(LOOKING DOWNSTREAM)



PLAN VIEW SHOWING SILL LOCATIONS - STAGE 1

DRAWN BY: D.D. LOWERY DATE: 12/18  
CHECKED BY: P.D. COOKSEY DATE: 12/18  
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 12/18

BILL OF MATERIAL																									
STAGE 1																									
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
A1	460	6	1	7'-10"	5,412	A206	2	6	STR	19'-9"	59	A315	2	6	STR	12'-3"	37	A424	2	6	STR	4'-9"	14		
A2	460	6	1	7'-7"	5,239	A207	2	6	STR	18'-11"	57	A316	2	6	STR	11'-5"	34	A425	2	6	STR	3'-11"	12		
						A208	2	6	STR	18'-1"	54	A317	2	6	STR	10'-7"	32	A426	2	6	STR	3'-1"	9		
A100	201	6	STR	24'-4"	7,346	A209	2	6	STR	17'-3"	52	A318	2	6	STR	9'-9"	29	A427	6	6	STR	2'-3"	20		
A101	2	6	STR	23'-11"	72	A210	2	6	STR	16'-5"	49	A319	2	6	STR	8'-11"	27								
A102	2	6	STR	23'-1"	69	A211	2	6	STR	15'-7"	47	A320	2	6	STR	8'-1"	24	B1	232	5	STR	12'-0"	2,904		
A103	2	6	STR	22'-3"	67	A212	2	6	STR	14'-9"	44	A321	2	6	STR	7'-3"	22	B2	232	5	STR	8'-4"	2,016		
A104	2	6	STR	21'-5"	64	A213	2	6	STR	13'-11"	42	A322	2	6	STR	6'-5"	19	B3	232	4	STR	12'-0"	1,860		
A105	2	6	STR	20'-7"	62	A214	2	6	STR	13'-1"	39	A323	2	6	STR	5'-7"	17								
A106	2	6	STR	19'-9"	59	A215	2	6	STR	12'-3"	37	A324	2	6	STR	4'-9"	14	C1	575	4	STR	25'-2"	9,667		
A107	2	6	STR	18'-11"	57	A216	2	6	STR	11'-5"	34	A325	2	6	STR	3'-11"	12								
A108	2	6	STR	18'-1"	54	A217	2	6	STR	10'-7"	32	A326	2	6	STR	3'-1"	9	D1	6	6	STR	2'-5"	22		
A109	2	6	STR	17'-3"	52	A218	2	6	STR	9'-9"	29	A327	6	6	STR	2'-3"	20	D2	6	6	STR	3'-5"	31		
A110	2	6	STR	16'-5"	49	A219	2	6	STR	8'-11"	27														
A111	2	6	STR	15'-7"	47	A220	2	6	STR	8'-1"	24	A400	201	6	STR	24'-4"	7,346	G1	4	5	STR	28'-5"	119		
A112	2	6	STR	14'-9"	44	A221	2	6	STR	7'-3"	22	A401	2	6	STR	23'-11"	72								
A113	2	6	STR	13'-11"	42	A222	2	6	STR	6'-5"	19	A402	2	6	STR	23'-1"	69	S1	18	8	STR	28'-5"	1,366		
A114	2	6	STR	13'-1"	39	A223	2	6	STR	5'-7"	17	A403	2	6	STR	22'-3"	67								
A115	2	6	STR	12'-3"	37	A224	2	6	STR	4'-9"	14	A404	2	6	STR	21'-5"	64								
A116	2	6	STR	11'-5"	34	A225	2	6	STR	3'-11"	12	A405	2	6	STR	20'-7"	62								
A117	2	6	STR	10'-7"	32	A226	2	6	STR	3'-1"	9	A406	2	6	STR	19'-9"	59								
A118	2	6	STR	9'-9"	29	A227	6	6	STR	2'-3"	20	A407	2	6	STR	18'-11"	57								
A119	2	6	STR	8'-11"	27							A408	2	6	STR	18'-1"	54								
A120	2	6	STR	8'-1"	24	A300	201	6	STR	24'-4"	7,346	A409	2	6	STR	17'-3"	52								
A121	2	6	STR	7'-3"	22	A301	2	6	STR	23'-11"	72	A410	2	6	STR	16'-5"	49								
A122	2	6	STR	6'-5"	19	A302	2	6	STR	23'-1"	69	A411	2	6	STR	15'-7"	47								
A123	2	6	STR	5'-7"	17	A303	2	6	STR	22'-3"	67	A412	2	6	STR	14'-9"	44								
A124	2	6	STR	4'-9"	14	A304	2	6	STR	21'-5"	64	A413	2	6	STR	13'-11"	42								
A125	2	6	STR	3'-11"	12	A305	2	6	STR	20'-7"	62	A414	2	6	STR	13'-1"	39								
A126	2	6	STR	3'-1"	9	A306	2	6	STR	19'-9"	59	A415	2	6	STR	12'-3"	37								
A127	6	6	STR	2'-3"	20	A307	2	6	STR	18'-11"	57	A416	2	6	STR	11'-5"	34								
						A308	2	6	STR	18'-1"	54	A417	2	6	STR	10'-7"	32								
A200	201	6	STR	24'-4"	7,346	A309	2	6	STR	17'-3"	52	A418	2	6	STR	9'-9"	29								
A201	2	6	STR	23'-11"	72	A310	2	6	STR	16'-5"	49	A419	2	6	STR	8'-11"	27								
A202	2	6	STR	23'-1"	69	A311	2	6	STR	15'-7"	47	A420	2	6	STR	8'-1"	24								
A203	2	6	STR	22'-3"	67	A312	2	6	STR	14'-9"	44	A421	2	6	STR	7'-3"	22								
A204	2	6	STR	21'-5"	64	A313	2	6	STR	13'-11"	42	A422	2	6	STR	6'-5"	19								
A205	2	6	STR	20'-7"	62	A314	2	6	STR	13'-1"	39	A423	2	6	STR	5'-7"	17	REINFORCING STEEL				LBS.	62,312		

BAR SIZE	SPLICE LENGTH
#6 A200	2'-9"
#6 A400	2'-9"
#5 B1	1'-9"
#4 B3	1'-5"
#4 C1	1'-11"

STAGE 1 QUANTITIES	
CLASS A CONCRETE	
BARREL @ 4.133 C.Y./FT.	477.4 C.Y.
WINGS, ETC.	17.9 C.Y.
SILLS	1.2 C.Y.
EDGE BEAMS	2.1 C.Y.
TOTAL	498.6 C.Y.
REINFORCING STEEL	
BARREL, SILLS & EDGE BEAMS	62,312 LBS.
WINGS, ETC.	1,074 LBS.
TOTAL	63,386 LBS.

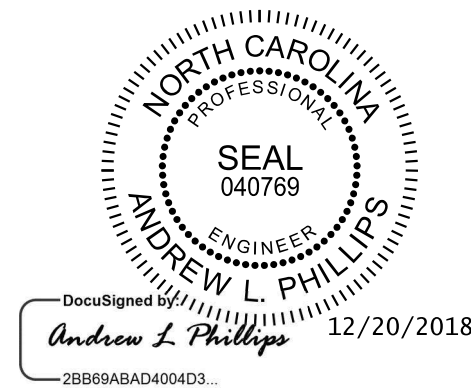
CULVERT #7

PROJECT NO. R-2530B

MONTGOMERY COUNTY

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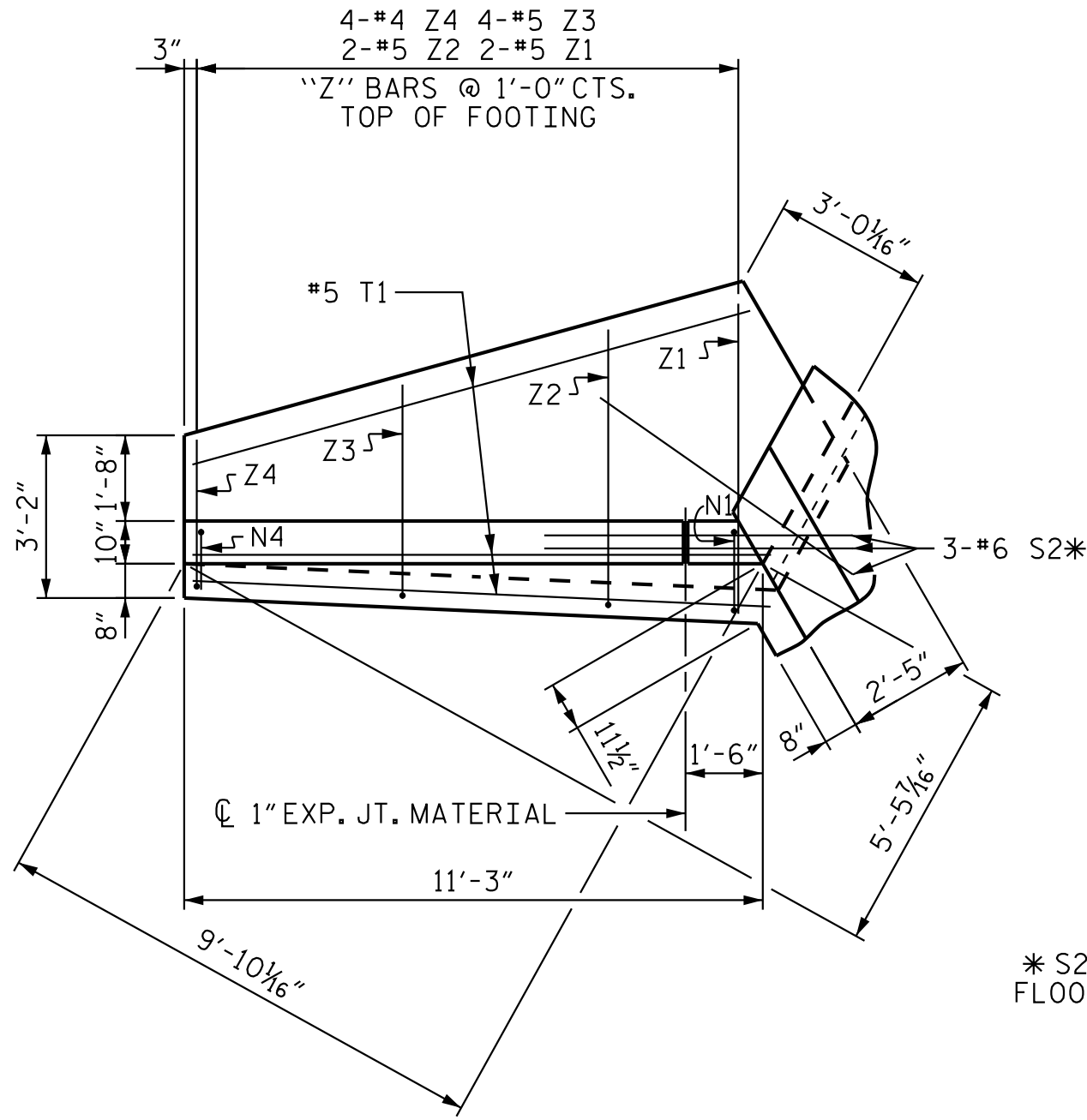
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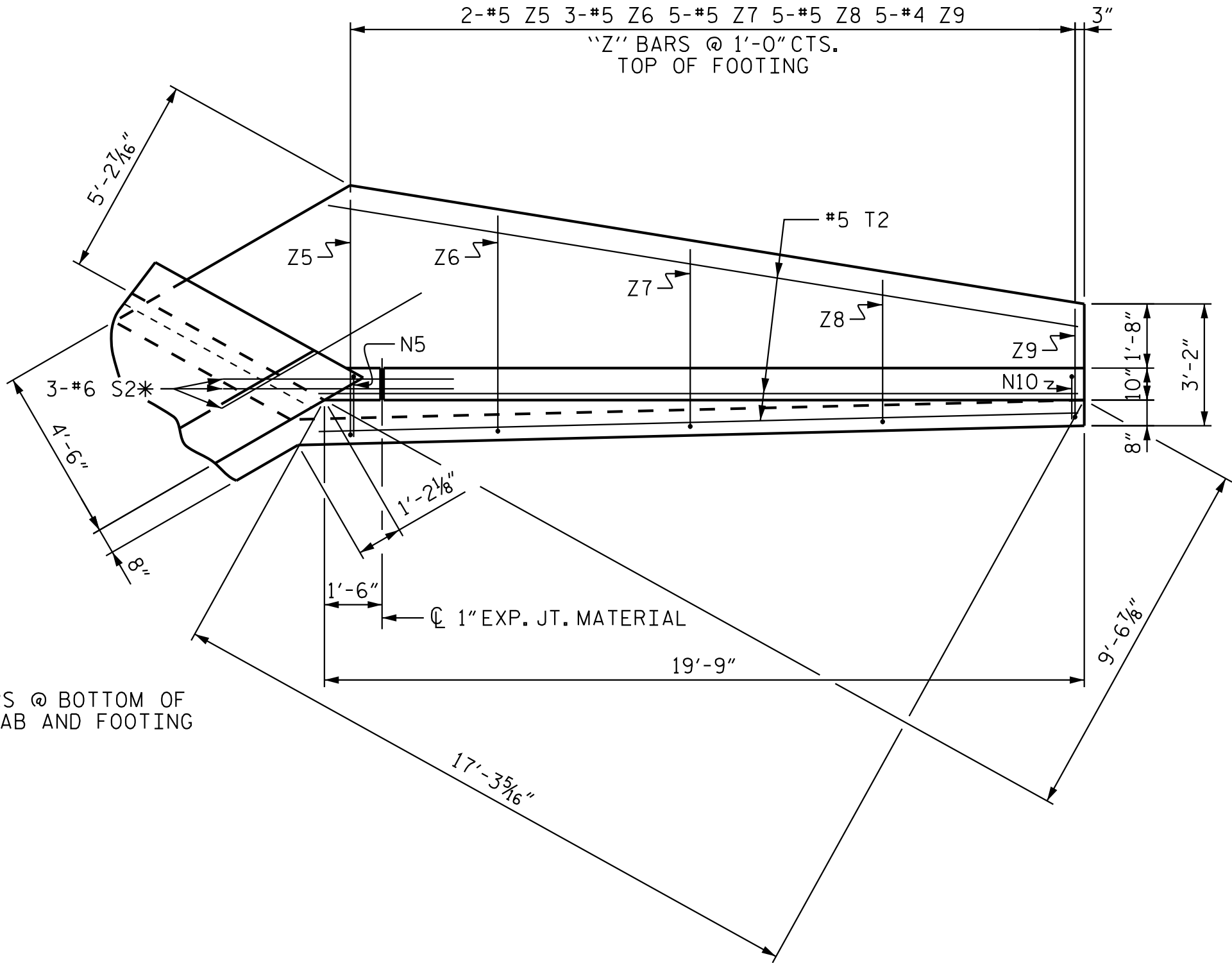




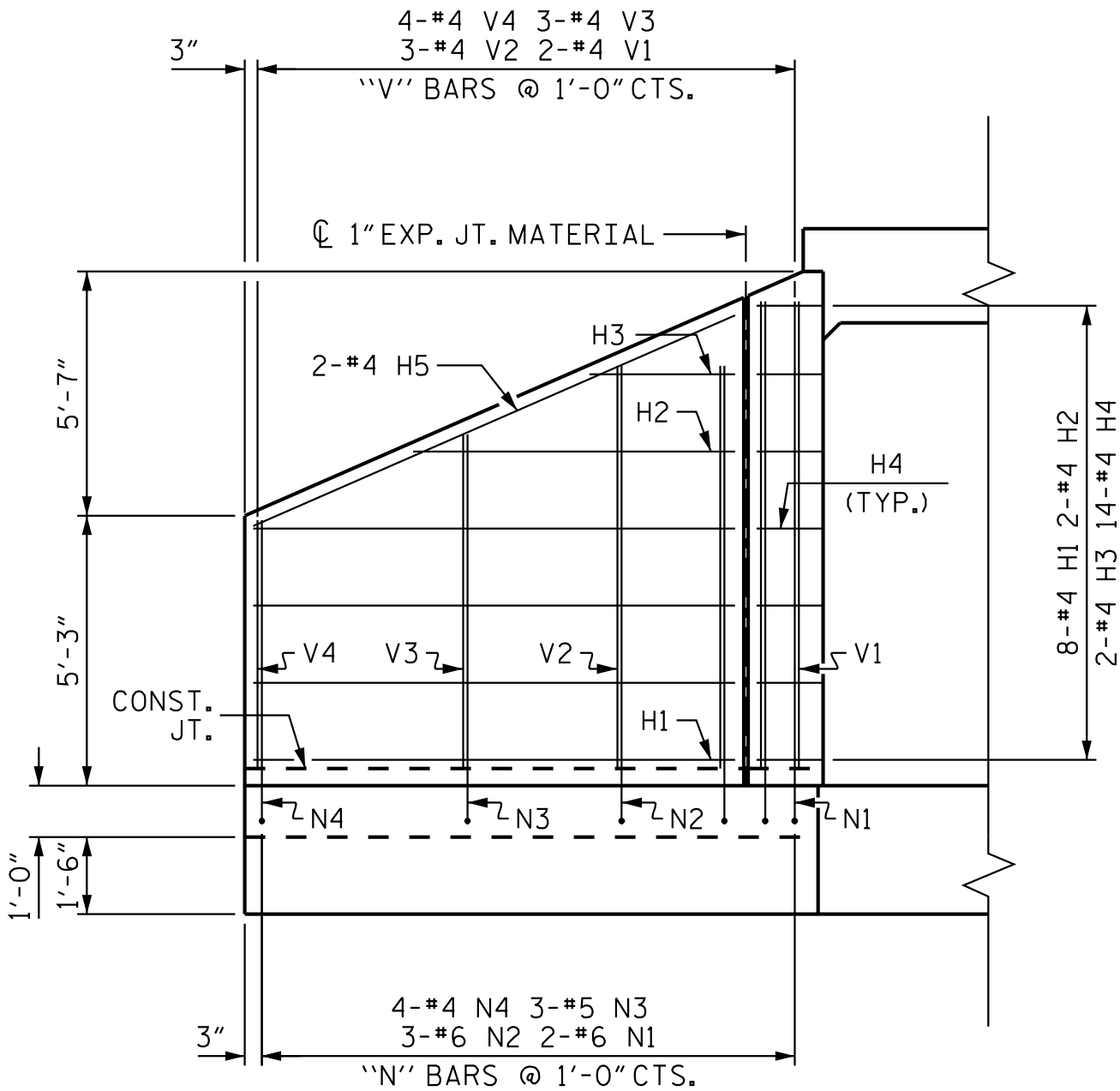




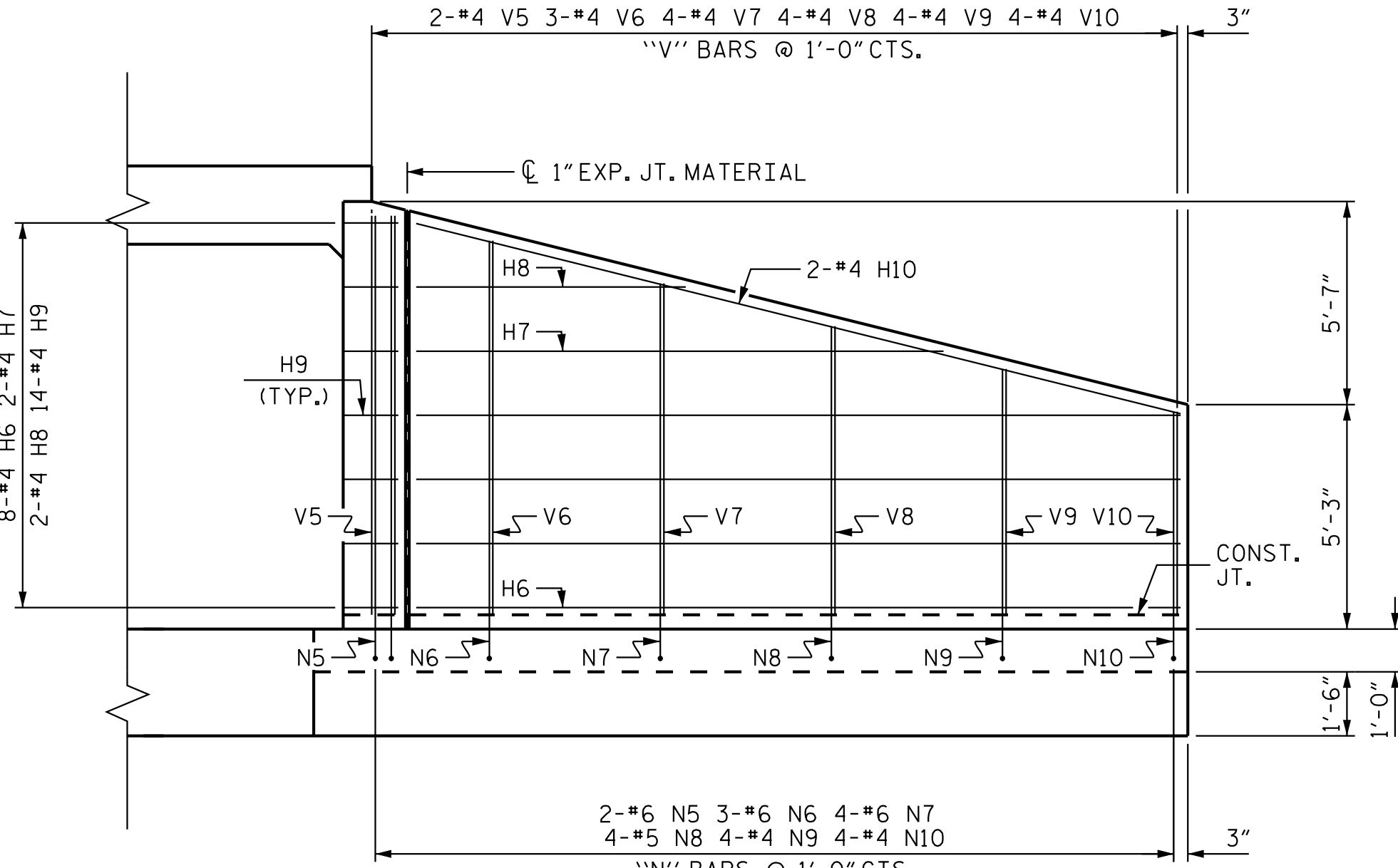
PLAN W2



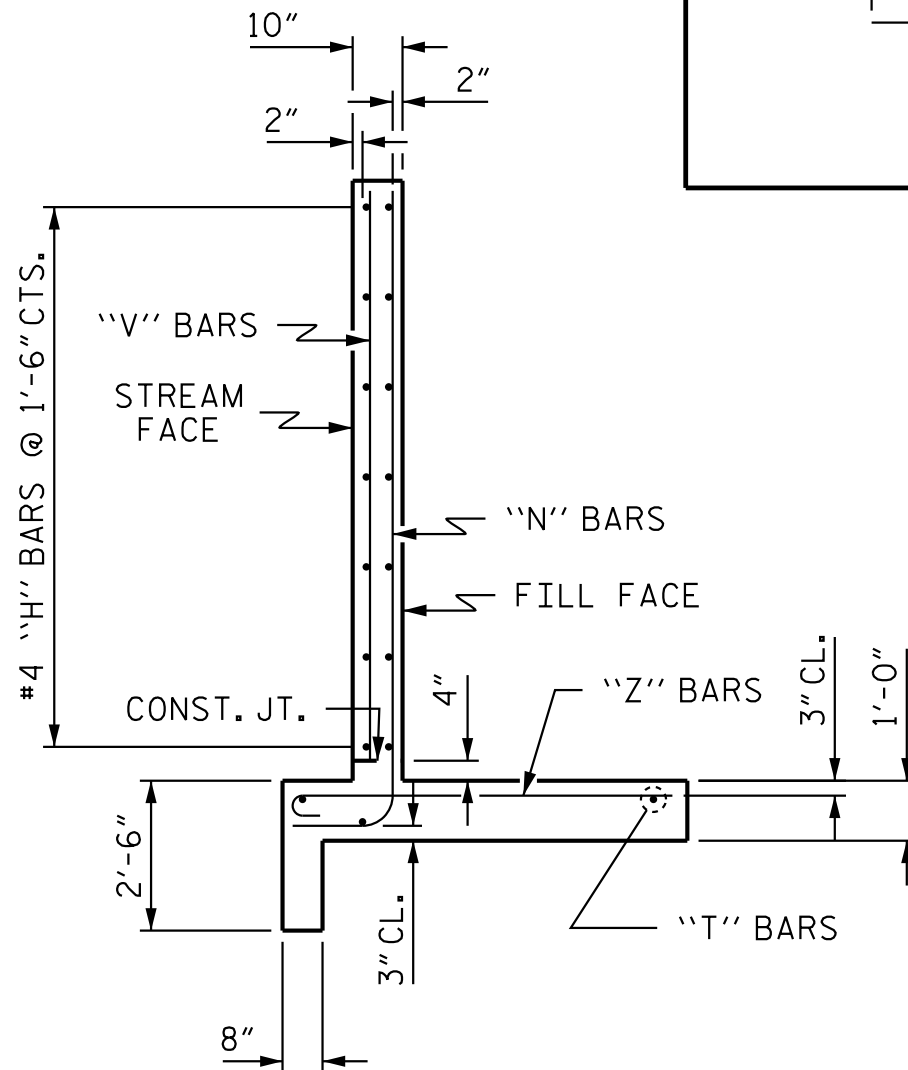
PLAN W1



ELEVATION W2



ELEVATION W1

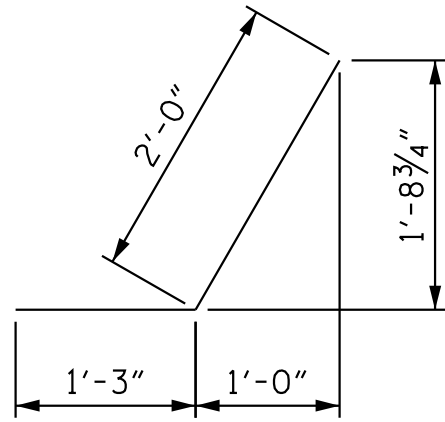


TYPICAL WING SECTION

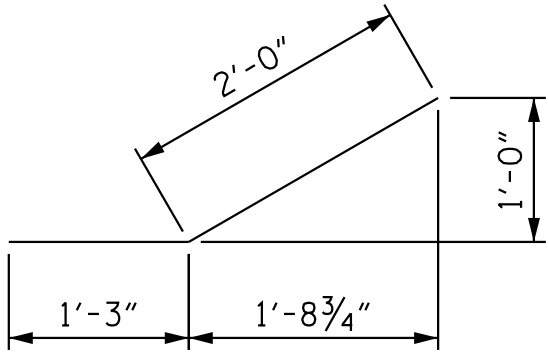
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

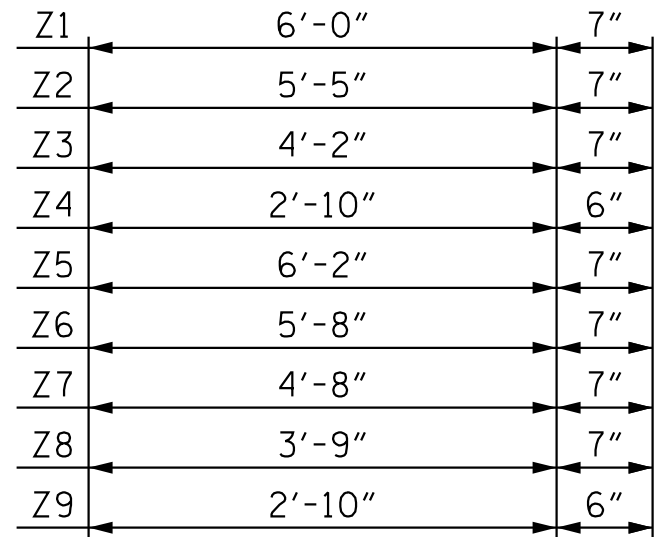
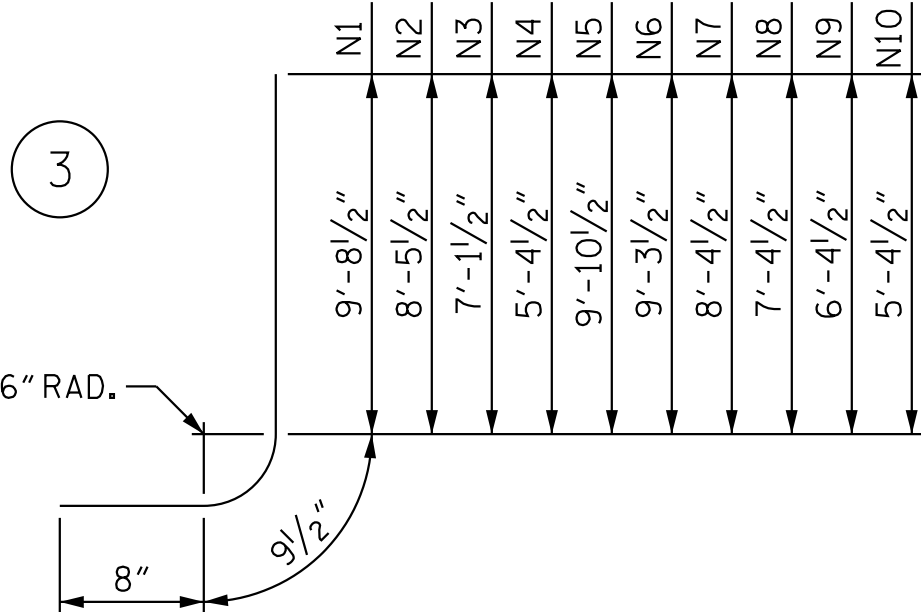
1



2



3



4

HK.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
H1	16	#4	STR	9'-4"	100
H2	4	#4	STR	6'-3"	17
H3	4	#4	STR	2'-10"	8
H4	28	#4	1	3'-3"	61
H5	4	#4	STR	10'-2"	27
H6	16	#4	STR	17'-10"	191
H7	4	#4	STR	12'-4"	33
H8	4	#4	STR	6'-3"	17
H9	28	#4	2	3'-3"	61
H10	4	#4	STR	18'-5"	49
N1	4	#6	3	11'-2"	67
N2	6	#6	3	9'-11"	89
N3	6	#5	3	8'-"	54
N4	8	#4	3	6'-0"	37
N5	4	#6	3	11'-4"	68
N6	6	#6	3	10'-9"	97
N7	8	#6	3	9'-10"	118
N8	8	#5	3	8'-10"	74
N9	8	#4	3	7'-10"	42
N10	8	#4	3	6'-10"	37

S2	12	#6	STR	6'-0"	108
T1	6	#5	STR	11'-3"	70
T2	6	#5	STR	19'-9"	124

V1	4	#4	STR	9'-1"	24
V2	6	#4	STR	7'-10"	31
V3	6	#4	STR	6'-6"	26
V4	8	#4	STR	4'-10"	26
V5	4	#4	STR	9'-4"	25
V6	6	#4	STR	8'-9"	35
V7	8	#4	STR	7'-9"	41
V8	8	#4	STR	6'-9"	36
V9	8	#4	STR	5'-9"	31
V10	8	#4	STR	4'-9"	25

Z1	4	#5	4	6'-7"	27
Z2	4	#5	4	6'-0"	25
Z3	8	#5	4	4'-9"	40
Z4	8	#4	4	3'-4"	18
Z5	4	#5	4	6'-9"	28
Z6	6	#5	4	6'-3"	39
Z7	10	#5	4	5'-3"	55
Z8	10	#5	4	4'-4"	45
Z9	10	#4	4	3'-4"	22

REINFORCING STEEL				2148 LBS
FOR 4 WINGS				
CLASS A CONCRETE				
4 WINGS				30.2 CY
2 HEADWALLS				2.7 CY
2 END CURTAIN WALLS				3.0 CY
TOTAL				35.9 CY

CULVERT #7

PROJECT NO. R-2530B

MONTGOMERY COUNTY

STATION: 381+64.00 -L-

SHEET 10 OF 11

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

WING DETAILS  
FOR  
CONCRETE BOX CULVERT  
H = 9'-0" SLOPE = 2:1  
121° SKEW

REVISIONS						SHEET NO. C07-10
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DocuSigned by  
Andrew L. Phillips  
12/20/2018  
2B8B9ABAD404D3

**Kimley»Horn**

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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 THE EXTERIOR EDGE OF EXTERIOR WALL.

# CONTROLLING LOAD RATING

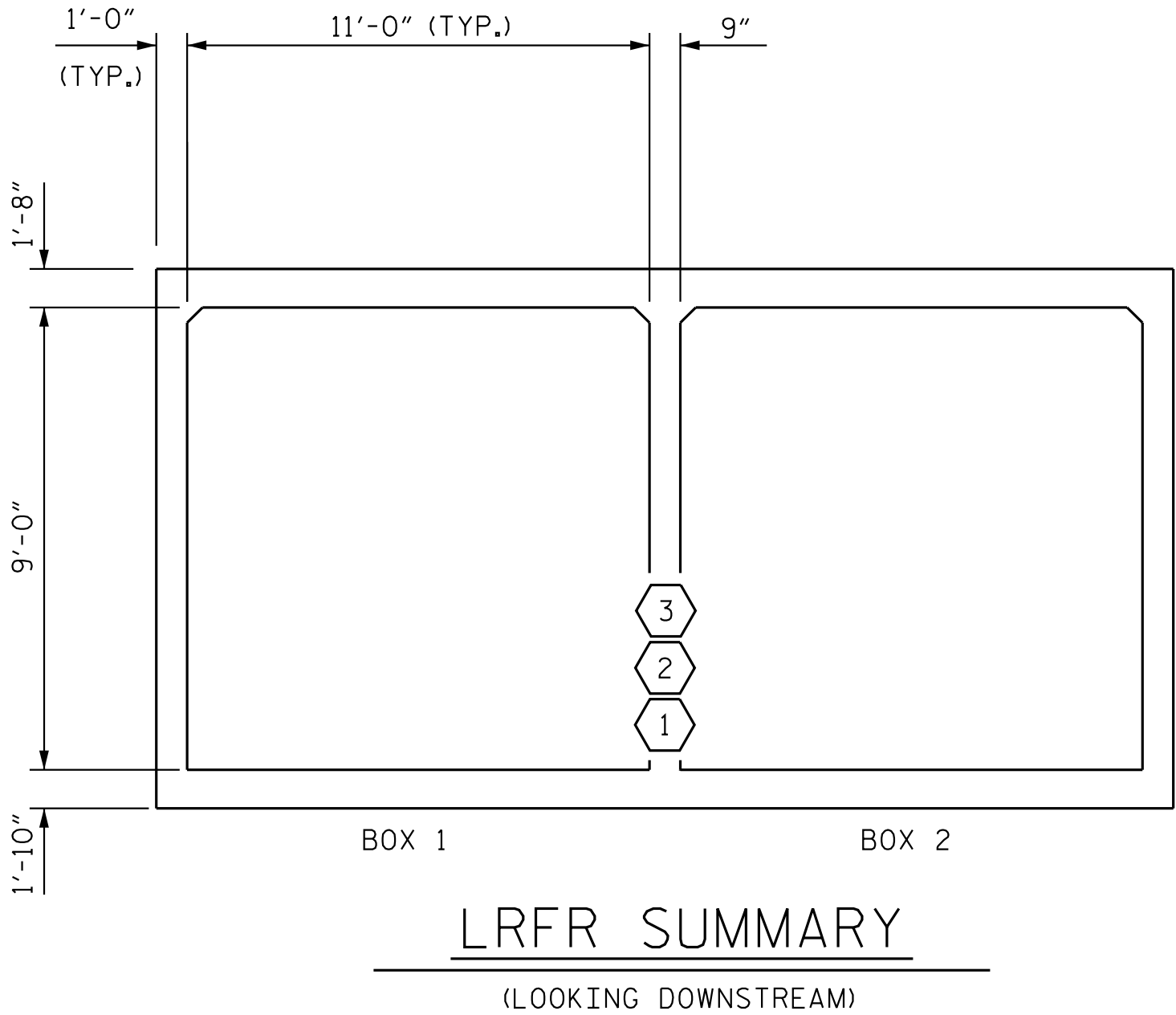
1 DESIGN LOAD RATING (HL-93)

2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS															
LEVEL	VEHICLE	WEIGHT (W) (TONS)	<div>#</div> CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER
						LIVE-LOAD FACTORS (γ <sub>LL</sub> )	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	<div>1</div>	2.78	--	1.75	2.78	1	BOTTOM SLAB	12.38	5.06	1	TOP SLAB	12.00	
	HL-93 (OPERATING)	N/A		3.60	--	1.35	3.60	1	BOTTOM SLAB	12.38	6.55	1	TOP SLAB	12.00	
	HS-20 (INVENTORY)	36.000	<div>2</div>	3.59	129.24	1.75	3.59	1	BOTTOM SLAB	12.38	6.22	1	TOP SLAB	12.00	
	HS-20 (OPERATING)	36.000		4.66	167.76	1.35	4.66	1	BOTTOM SLAB	12.38	8.06	1	TOP SLAB	12.00	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH		9.20	124.20	1.40	9.20	1	BOTTOM SLAB	12.38	18.03	1	TOP SLAB	12.00	
		SNGARBS2		7.17	143.40	1.40	7.17	1	BOTTOM SLAB	12.38	12.40	1	TOP SLAB	12.00	
		SNAGRIS2		6.93	152.46	1.40	6.93	1	BOTTOM SLAB	12.38	11.35	1	TOP SLAB	12.00	
		SNCOTTS3		4.48	122.08	1.40	4.48	1	BOTTOM SLAB	12.38	8.86	1	TOP SLAB	12.00	
		SNAGGRS4		3.92	136.91	1.40	3.92	1	BOTTOM SLAB	12.38	7.35	1	TOP SLAB	12.00	
		SNS5A		3.85	136.87	1.40	3.85	1	BOTTOM SLAB	12.38	7.63	1	TOP SLAB	12.00	
		SNS6A		3.63	145.02	1.40	3.63	1	BOTTOM SLAB	12.38	7.15	1	TOP SLAB	12.00	
		SNS7B		3.43	144.06	1.40	3.43	1	BOTTOM SLAB	12.38	6.76	1	TOP SLAB	12.00	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3		4.48	147.84	1.40	4.48	1	BOTTOM SLAB	12.38	8.41	1	TOP SLAB	12.00	
		TNT4A		4.50	148.84	1.40	4.50	1	BOTTOM SLAB	12.38	8.81	1	TOP SLAB	12.00	
		TNT6A		3.71	154.34	1.40	3.71	1	BOTTOM SLAB	12.38	7.45	1	TOP SLAB	12.00	
		TNT7A		3.81	160.02	1.40	3.81	1	BOTTOM SLAB	12.38	7.37	1	TOP SLAB	12.00	
		TNT7B		3.94	165.48	1.40	3.94	1	BOTTOM SLAB	12.38	8.00	1	TOP SLAB	12.00	
		TNAGRIT4		3.73	160.39	1.40	3.73	1	BOTTOM SLAB	12.38	7.35	1	TOP SLAB	12.00	
TNAGT5A			3.49	157.05	1.40	3.49	1	BOTTOM SLAB	12.38	7.25	1	TOP SLAB	12.00		
TNAGT5B		<div>3</div>	3.41	153.45	1.40	3.41	1	BOTTOM SLAB	12.38	6.21	1	TOP SLAB	12.00		



CULVERT #7

PROJECT NO. R-2530B

MONTGOMERY COUNTY

STATION: 381+64.00 -L-

SHEET 11 OF 11



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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. C07-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 11
2			4			

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UNLESS ALL SIGNATURES COMPLETED

12/20/2018 K:\B01\_Structures\Box\_Culvert\NC\01036489 - B-2530B\Cad\Draw\Culvert+T\A17\_021.R2530B.SW\CU\_01.dgn

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	- - - - -	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	- - - - -	SEE PLANS
IMPACT ALLOWANCE	- - - - -	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	- -	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	- -	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	- -	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	- - -	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	- - - - -	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	- - - - -	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	- - -	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	- - - - -	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	- - - - -	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 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 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 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 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



