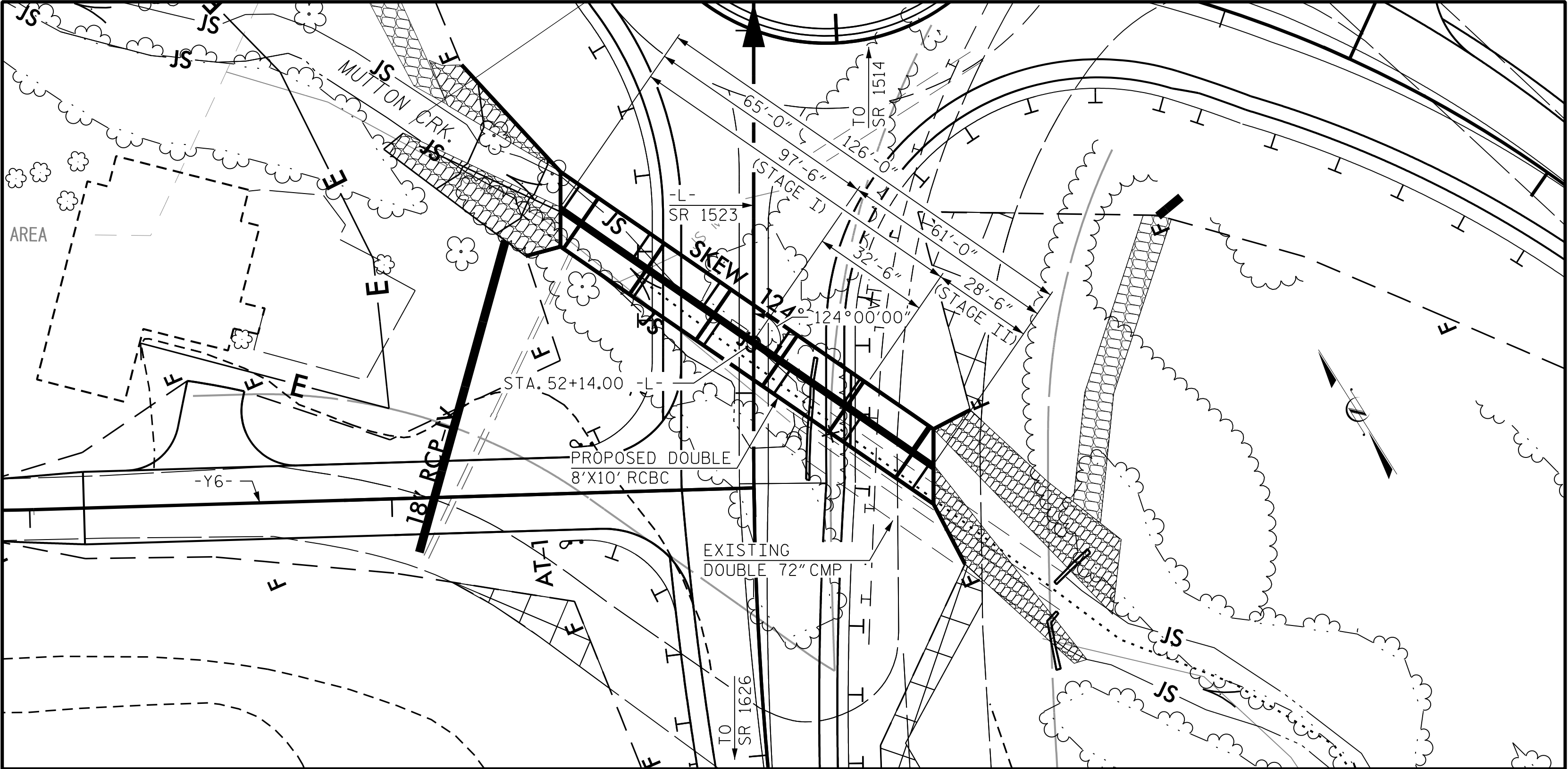


BENCH MARK: BM #2 -Y8A- STA. 11+28.9, 40.9' RT, RR SPIKE IN BASE OF 36" MAPLE, N 905550, E 11224459; EL. 3145.12, NAVD 88



LOCATION SKETCH

FOR UTILITY INFORMATION,SEE UTILITY PLANS AND SPECIAL PROVISIONS
GRADE POINT ELEVATION AT STA. 52+14.0 = 3138.4
INVERT ELEVATION AT STA. 52+14.0 = 3117.18
ROADWAY SLOPES = 2:1

STAGE I STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @	2.19	CY/FT	213.5 C.Y.
WING ETC.	29.4		C.Y.
SILLS/BAFFLES	3.6		C.Y.
TOTAL	246.5		C.Y.
REINFORCING STEEL			
BARREL	40,801		LBS.
WINGS ETC.	2,852		LBS.
TOTAL	43,653		LBS.
CULVERT EXCAVATION ----- LUMP SUM			
FOUNDATION CONDITIONING MATERIAL---- 151 TONS			

STAGE II STRUCTURE QUANTITIES			
CLASS A CONCRETE			
BARREL @	2.19	CY/FT	62.4 C.Y.
WING ETC.	19.6		C.Y.
SILLS/BAFFLES	1.8		C.Y.
TOTAL	83.8		C.Y.
REINFORCING STEEL			
BARREL	12,248		LBS.
WINGS ETC.	1,392		LBS.
TOTAL	13,640		LBS.
CULVERT EXCAVATION ----- LUMP SUM			
FOUNDATION CONDITIONING MATERIAL---- 44 TONS			

NOTES:

- ASSUMED LIVE LOAD ----- HL-93 OR ALTERNATE LOADING.
- DESIGN FILL----- 10.4 FT. (MAX.), 8.2 FT. (MIN.)
- 3"Ø WEEP HOLES INDICATED TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.
- FOR OTHER DESIGN DATA AND NOTES,SEE STANDARD NOTE SHEET.
- CONCRETE IN BOTH STAGE I AND STAGE II OF THE CULVERT TO BE POURED IN THE FOLLOWING ORDER:
1. WING FOOTINGS, CURTAIN WALL, AND FLOOR SLAB INCLUDING 4"OF VERTICAL WALLS.
 2. THE REMAINING PORTIONS OF THE WALLS TO THE PERMITTED CONSTRUCTION JOINT AND WINGS FULL HEIGHT.
 3. ROOF SLAB, HEADWALL, AND SILL/BAFFLE.

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

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

- AT THE CONTRACTOR'S OPTION,HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF THE EXTERIOR WALL 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.
- A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WINGS COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.
- 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.

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 CULVERT DIVERSION DETAILS AND PAY ITEM,SEE EROSION CONTROL PLANS.

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.

EXCAVATE 1 FT.BELOW CULVERT BEARING ELEVATION AND BACKFILL WITH SELECT MATERIAL,CLASS VI MEETING THE REQUIREMENTS OF SECTION 1016 OF THE STANDARD SPECIFICATIONS.

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.

HYDRAULIC DATA

DESIGN DISCHARGE-----900 C.F.S.

FREQUENCY OF DESIGN FLOOD-----25 YR.

DESIGN HIGH WATER ELEVATION-----3127.1

DRAINAGE AREA-----1.40 SQ.MI

BASE DISCHARGE (Q100)-----1695 C.F.S

BASE HIGH WATER ELEVATION-----3131.0

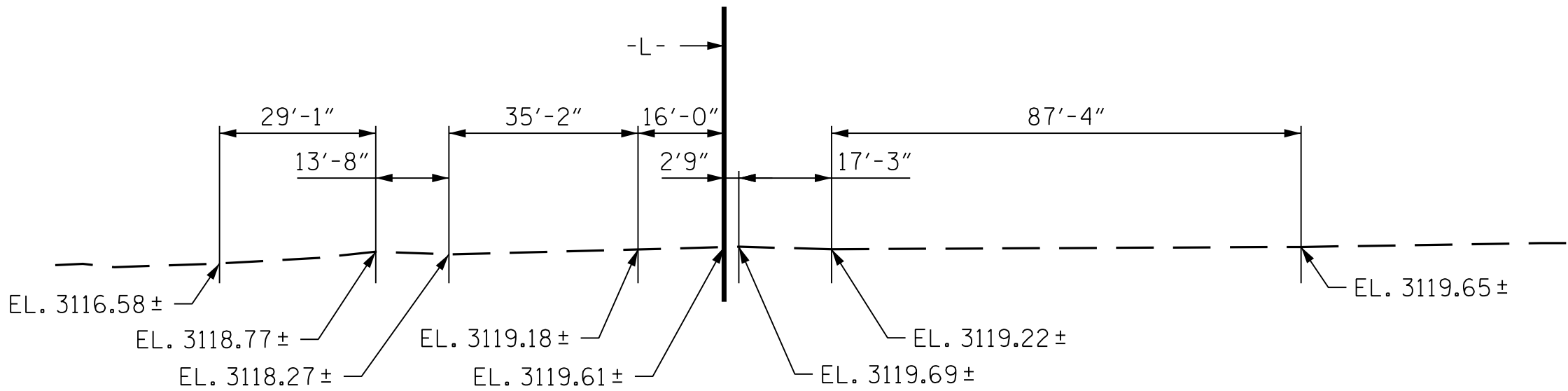
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE-----2700 C.F.S.

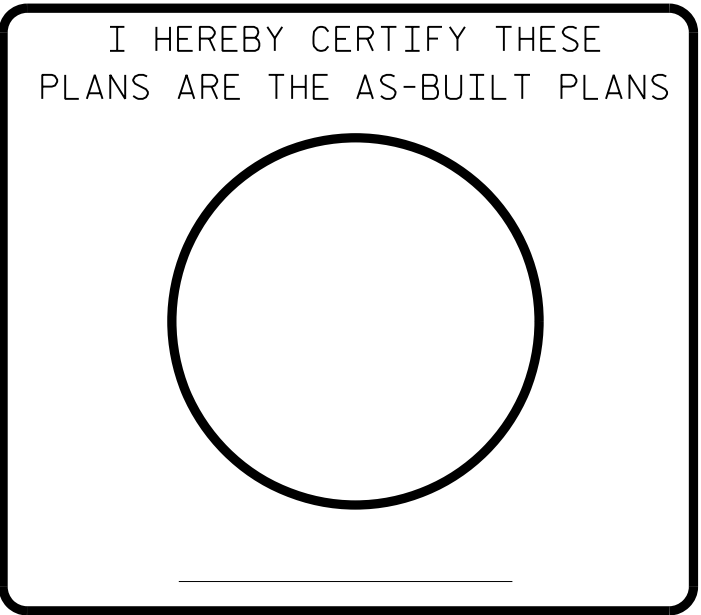
FREQUENCY OF OVERTOPPING FLOOD-----500 YR. +

OVERTOPPING FLOOD ELEVATION-----3138.6

@ STA. 51+94.4 -L-



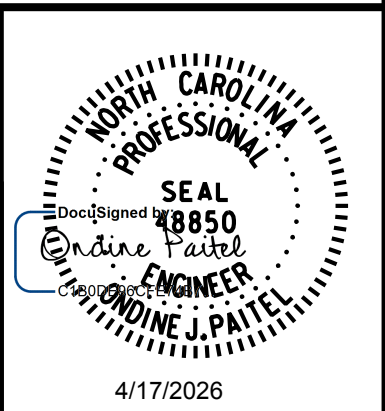
PROFILE ALONG CULVERT



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PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 52+14.00 -L-

CULVERT NO. 940390

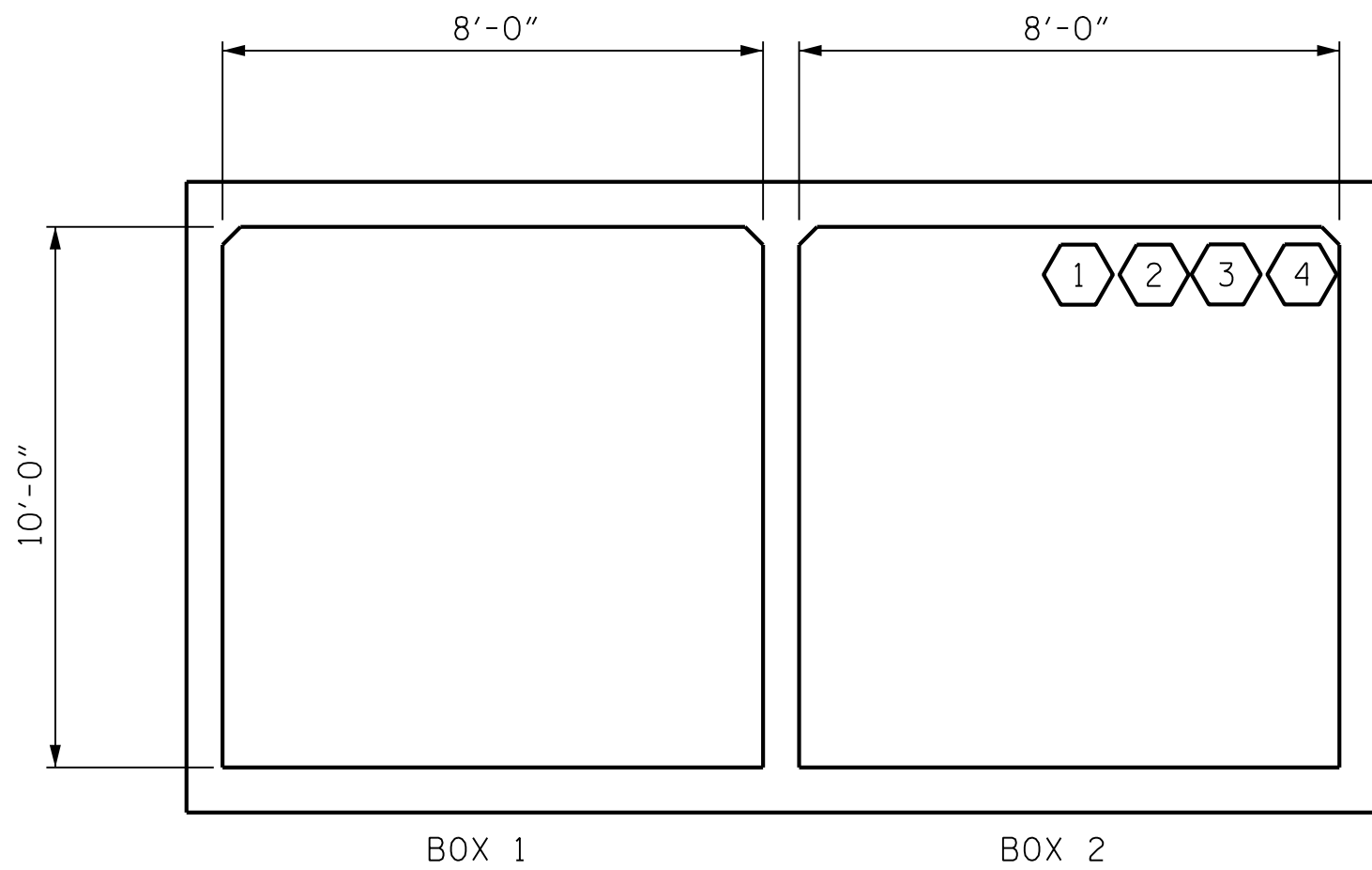
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 8 FT. X 10 FT.
CONCRETE BOX CULVERT
124° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			C-1 TOTAL SHEETS 13
2			4			

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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS																
LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING ⬡	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE									COMMENT NUMBER	
						LIVE-LOAD, FACTORS (γ _{LL})	MOMENT				SHEAR					
							RATING FACTOR	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	2.37	--	1.75	2.37	2	EXT. WALL	0.1	2.40	1	EXT. WALL	9.9		
	HL-93 (OPERATING)	N/A		3.08	--	1.35	3.08	2	EXT. WALL	0.1	3.11	1	EXT. WALL	9.9		
	HS-20 (INVENTORY)	36,000	⬡2	2.37	85,320	1.75	2.37	2	EXT. WALL	0.1	2.40	1	EXT. WALL	9.9		
	HS-20 (OPERATING)	36,000		3.08	110,880	1.35	3.08	2	EXT. WALL	0.1	3.11	1	EXT. WALL	9.9		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13,500		2.98	40,230	1.40	3.12	1	EXT. WALL	9.9	2.98	1	EXT. WALL	9.9	
		SNGARBS2	20,000		2.98	59,600	1.40	3.10	1	EXT. WALL	9.9	2.98	1	EXT. WALL	9.9	
		SNAGRIS2	22,000		2.98	65,560	1.40	3.11	1	EXT. WALL	9.9	2.98	1	EXT. WALL	9.9	
		SNCOTTS3	27,250		2.79	76,028	1.40	2.79	2	EXT. WALL	0.1	3.04	1	EXT. WALL	9.9	
		SNAGGRS4	34,925		2.78	97,092	1.40	2.78	2	EXT. WALL	0.1	3.04	1	EXT. WALL	9.9	
		SNS5A	35,550	⬡3	2.76	98,118	1.40	2.76	2	EXT. WALL	0.1	3.04	1	EXT. WALL	9.9	
		SNS6A	39,950	⬡3	2.76	110,262	1.40	2.76	2	EXT. WALL	0.1	3.04	1	EXT. WALL	9.9	
		SNS7B	42,000	⬡3	2.76	115,920	1.40	2.76	2	EXT. WALL	0.1	3.04	1	EXT. WALL	9.9	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33,000		2.99	98,670	1.40	2.99	2	EXT. WALL	0.1	3.01	1	EXT. WALL	9.9	
		TNT4A	33,075		2.91	96,248	1.40	2.91	2	EXT. WALL	0.1	3.02	1	EXT. WALL	9.9	
		TNT6A	41,600		2.82	117,312	1.40	2.82	2	EXT. WALL	0.1	3.03	1	EXT. WALL	9.9	
		TNT7A	42,000		2.87	120,540	1.40	2.87	2	EXT. WALL	0.1	3.02	1	EXT. WALL	9.9	
		TNT7B	42,000		2.80	117,600	1.40	2.80	2	EXT. WALL	0.1	3.03	1	EXT. WALL	9.9	
		TNAGRIT4	43,000		2.90	124,700	1.40	2.90	2	EXT. WALL	0.1	3.01	1	EXT. WALL	9.9	
		TNAGT5A	45,000		2.90	130,500	1.40	2.90	2	EXT. WALL	0.1	3.02	1	EXT. WALL	9.9	
		TNAGT5B	45,000		2.91	130,950	1.40	2.91	2	EXT. WALL	0.1	3.01	1	EXT. WALL	9.9	
EMERGENCY VEHICLE (EV)	EV2	28,750		3.00	86,250	1.30	3.05	1	EXT. WALL	9.9	3.00	1	EXT. WALL	9.9		
	EV3	43,000	⬡4	2.63	113,090	1.30	2.63	2	EXT. WALL	0.1	3.06	1	EXT. WALL	9.9		



LRFR SUMMARY
(LOOKING DOWNSTREAM)

DRAWN BY : T. K. BOYD DATE : MAR. 2026
CHECKED BY : R. V. KEITH DATE : MAR. 2026
DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : MAR. 2026

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. MAXIMUM FILL CONTROLS.
2. “LEFT END” OF VERTICAL ELEMENTS ARE ASSUMED TO BE AT TOP OF WALL.
3.
4.

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

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 52+14.00 -L-

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Seal

DocuSigned by

49850

ENGINEER

PAITEL

4/16/2026

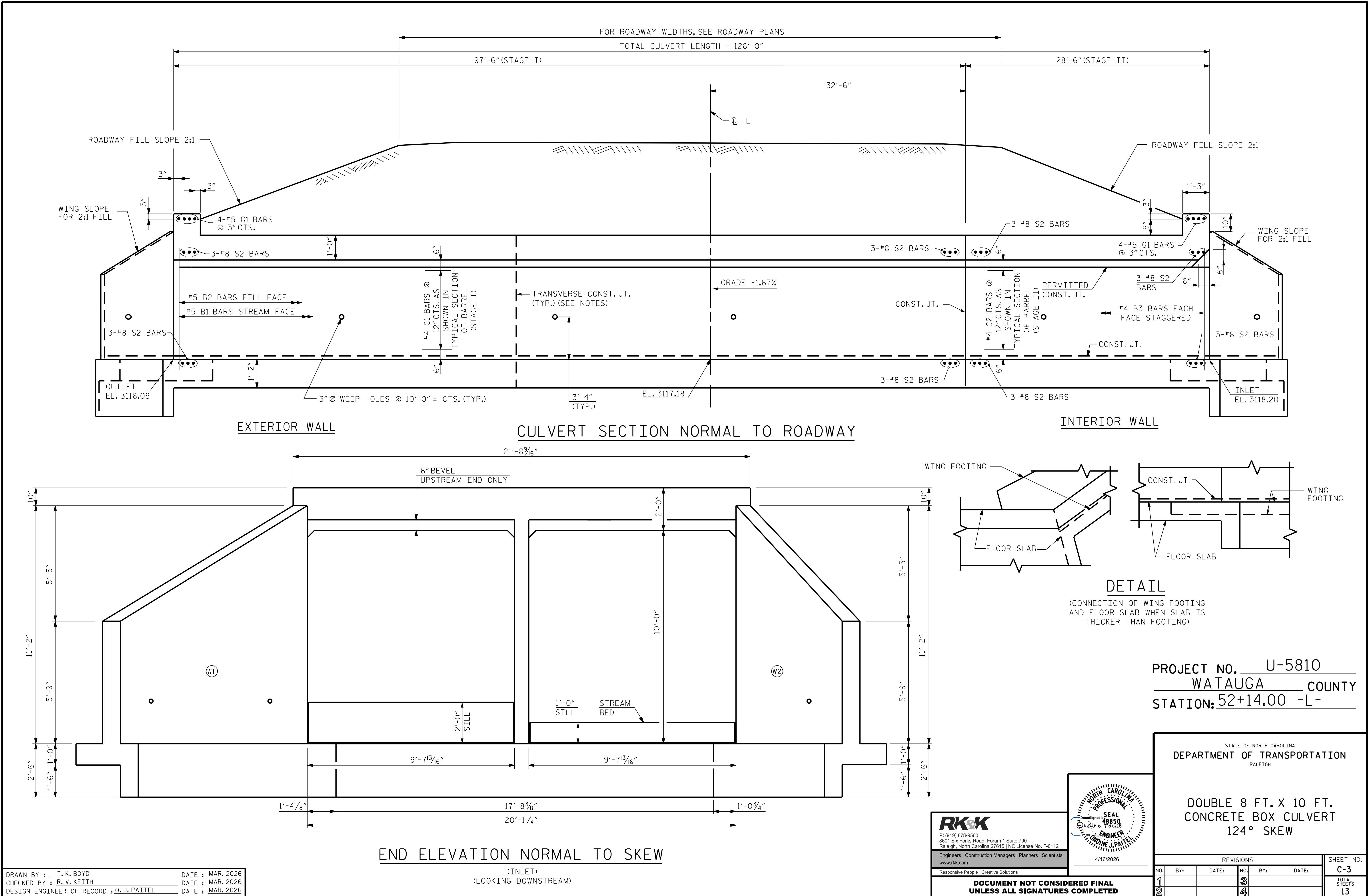
STATE OF NORTH CAROLINA
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RALEIGH

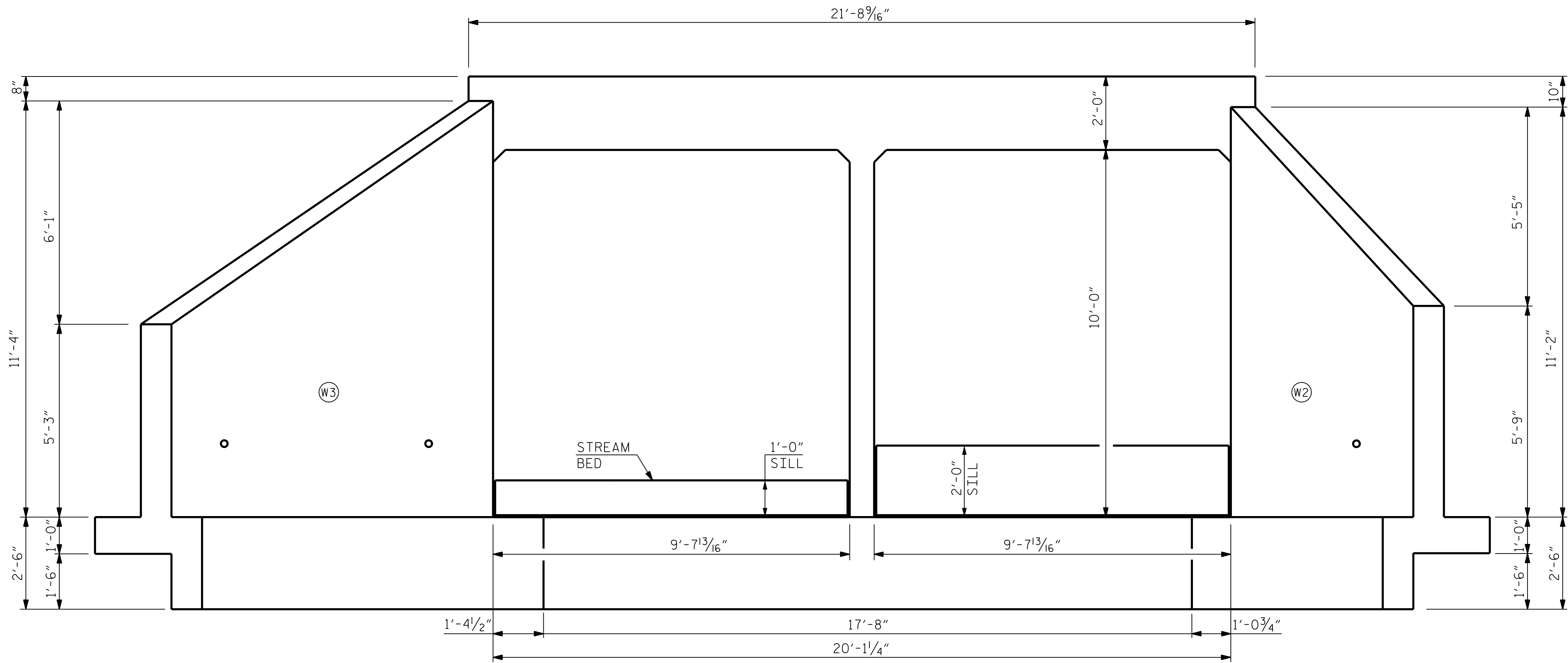
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERT
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-2 TOTAL SHEETS 13
1			3			
2			4			

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END ELEVATION NORMAL TO SKEW

(OUTLET)
(LOOKING UPSTREAM)

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WATAUGA COUNTY
STATION: 52+14.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 8 FT. X 10 FT.
CONCRETE BOX CULVERT
124° SKEW

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			13

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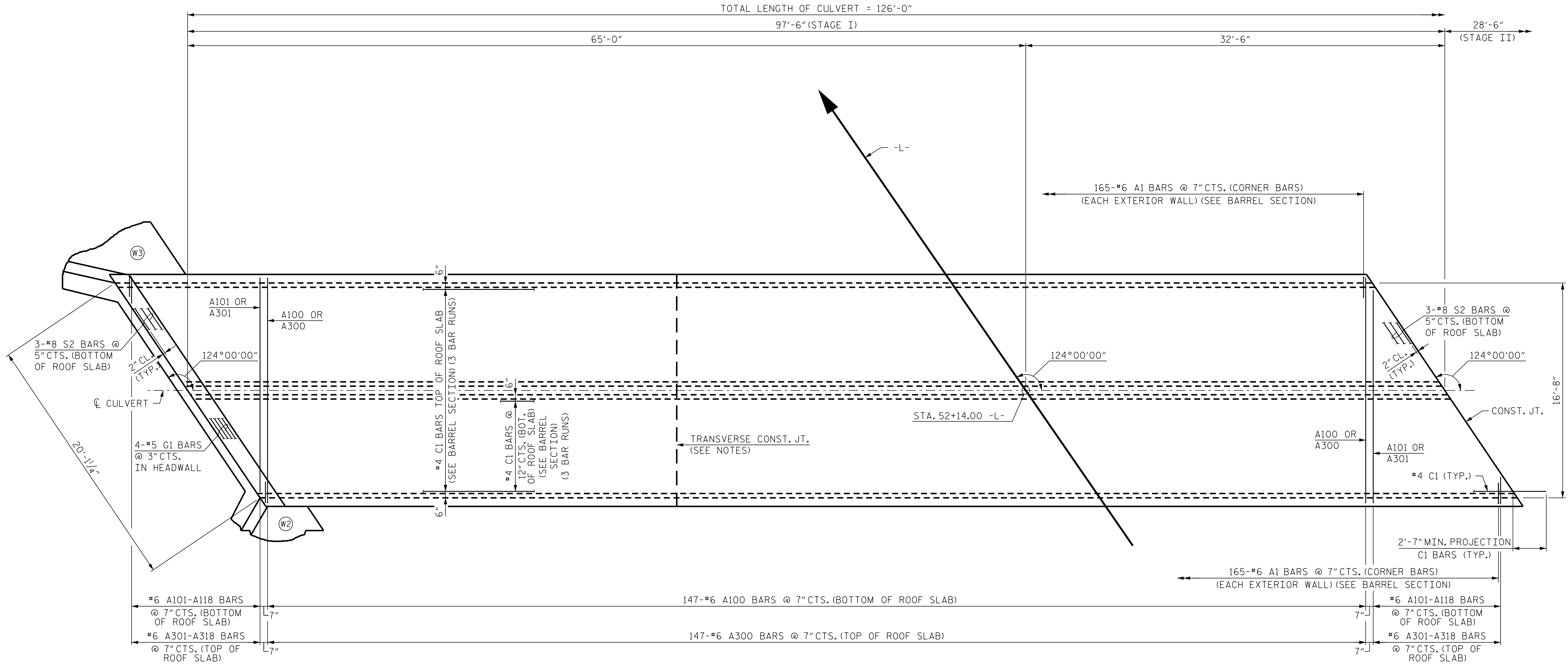
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Q. J. PAITEL

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CHECKED BY : R. V. KEITH DATE : MAR. 2026
DESIGN ENGINEER OF RECORD : Q. J. PAITEL DATE : MAR. 2026

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PLAN - ROOF SLAB
STAGE I

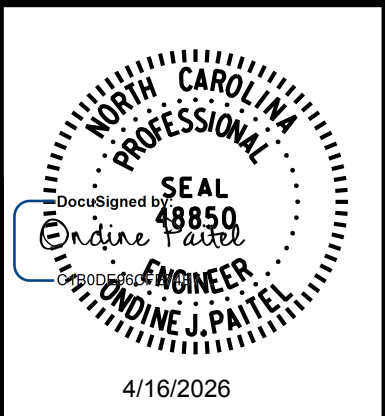
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STATION: 52+14.00 -L-

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DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 8 FT. X 10 FT.
CONCRETE BOX CULVERT
STAGE I
124° SKEW

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

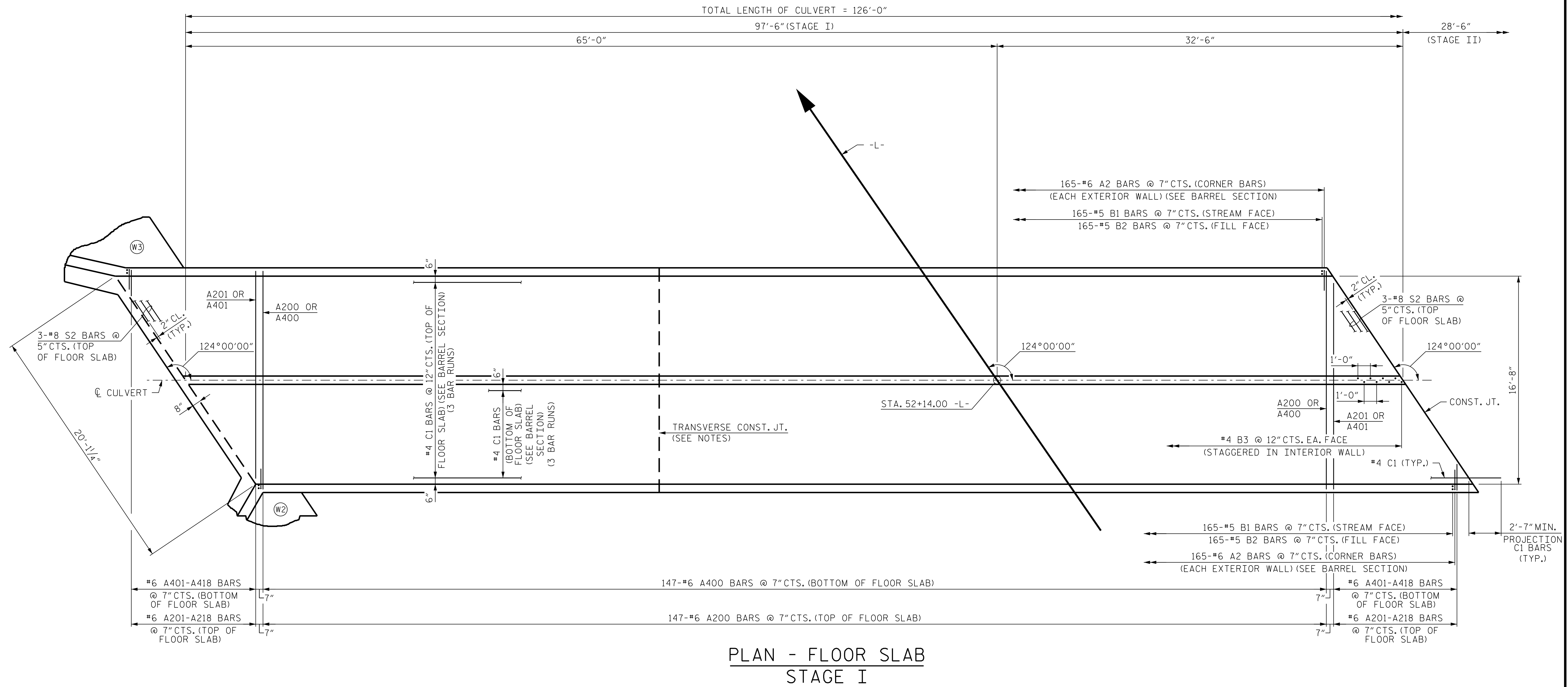
SHEET NO.
C-5
TOTAL SHEETS
13



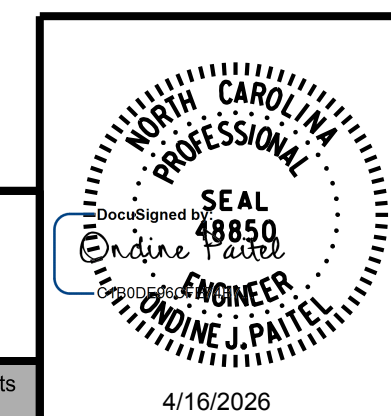
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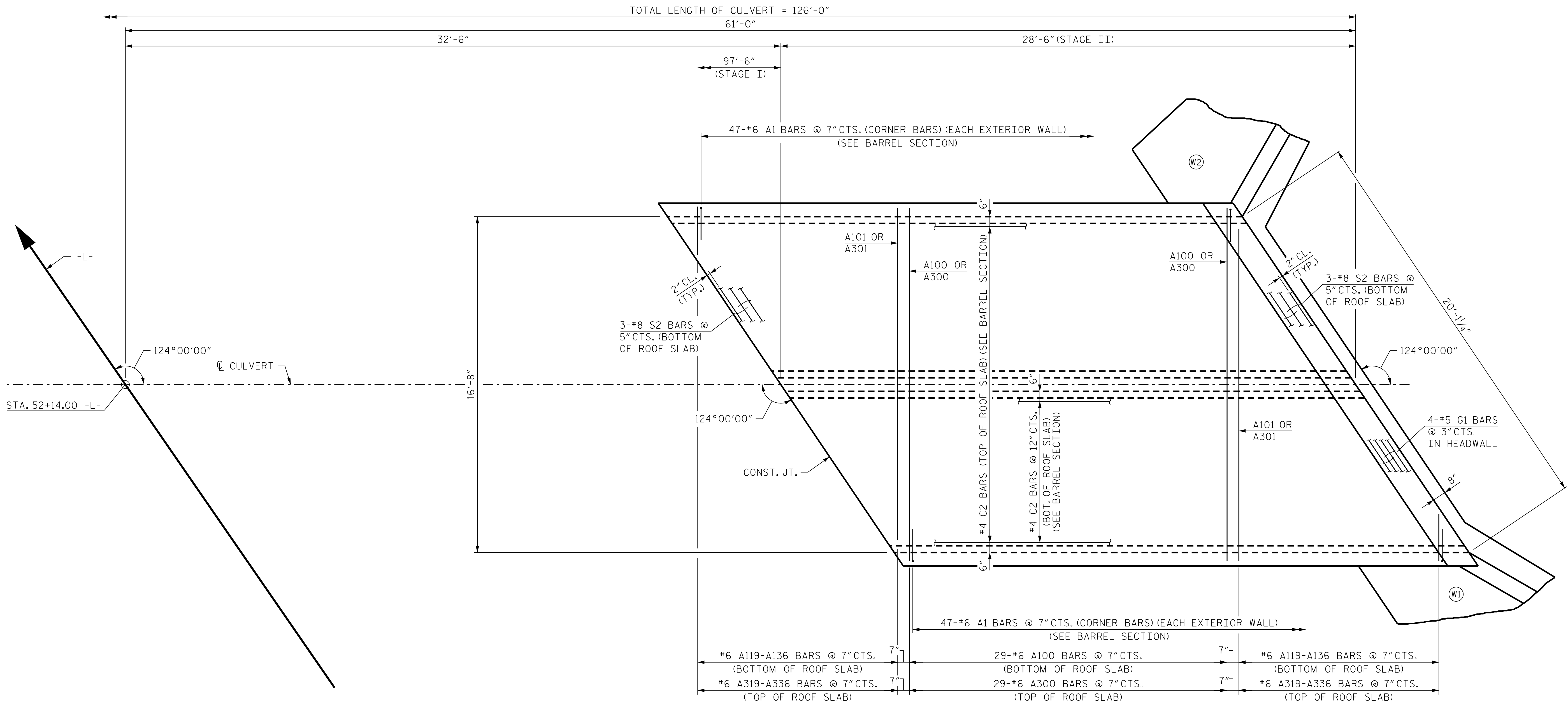
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DOUBLE 8 FT. X 10 FT.
CONCRETE BOX CULVERT
STAGE I
124° SKEW

REVISIONS						SHEET NO. C-6
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1			3			TOTAL SHEETS 13
2			4			



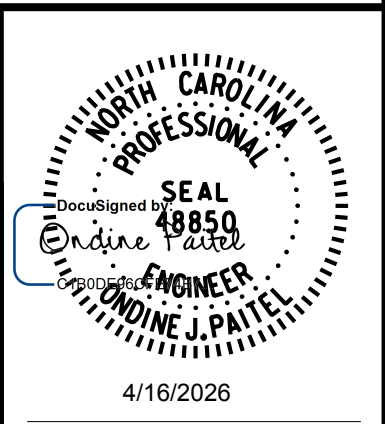
PLAN - ROOF SLAB
STAGE II

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 52+14.00 -L-

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DOUBLE 8 FT. X 10 FT.
CONCRETE BOX CULVERT
STAGE II
124° SKEW

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1			3			C-7 TOTAL SHEETS 13
2			4			



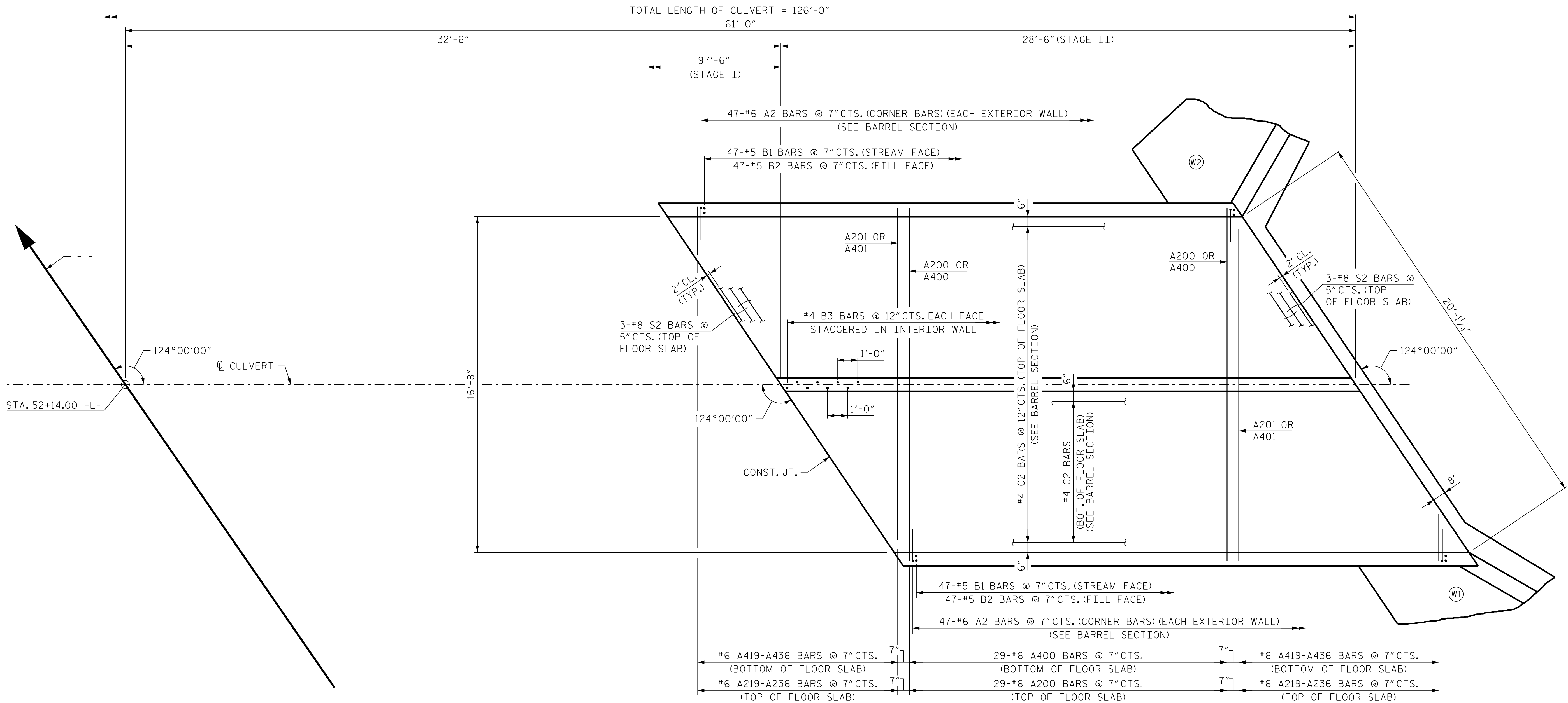
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PLAN - FLOOR SLAB
STAGE II

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WATAUGA COUNTY
STATION: 52+14.00 -L-

STATE OF NORTH CAROLINA
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DOUBLE 8 FT. X 10 FT.
CONCRETE BOX CULVERT
STAGE II
124° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-8
1			3			TOTAL SHEETS
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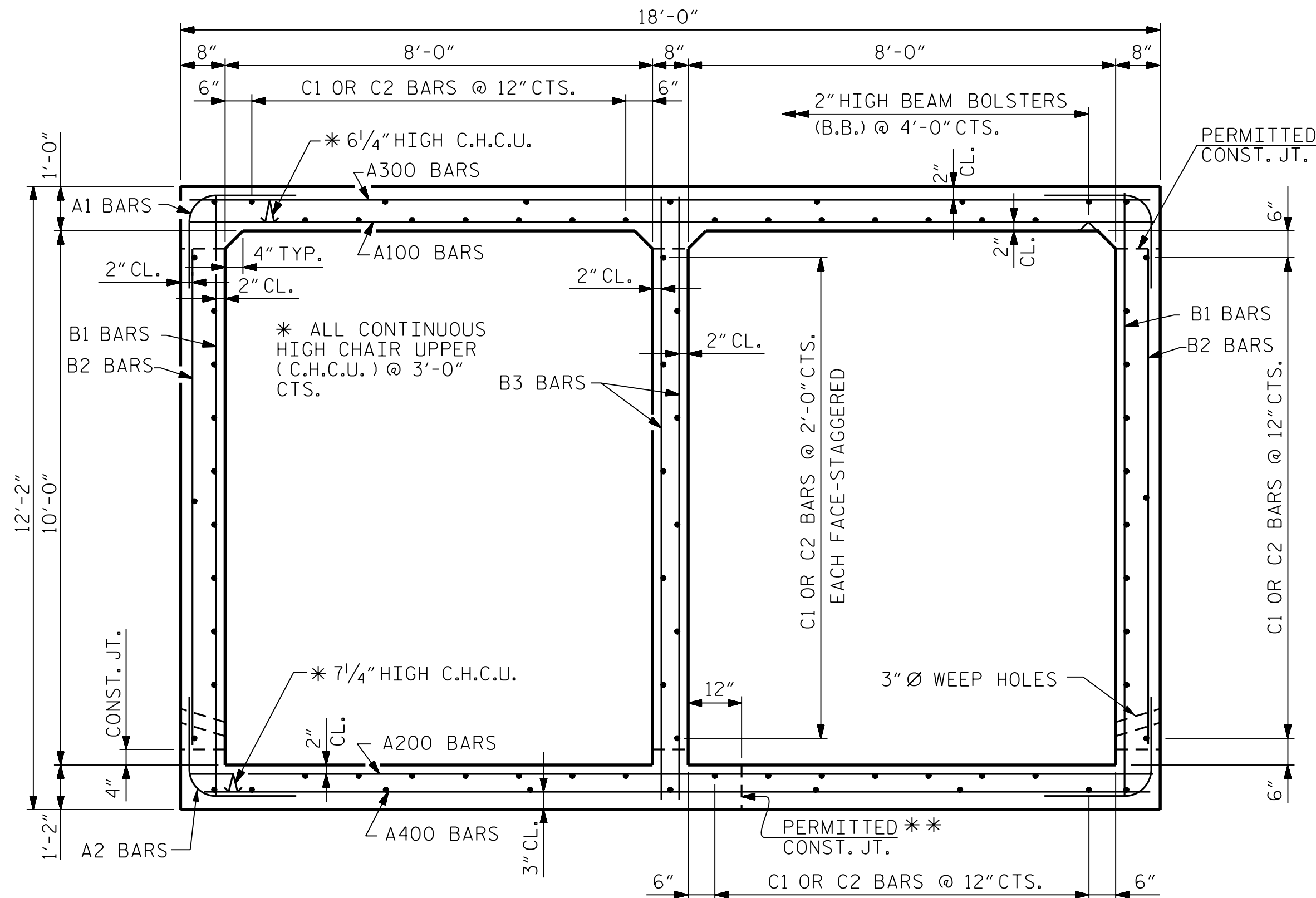
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DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : MAR. 2026

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RIGHT ANGLE SECTION OF BARREL

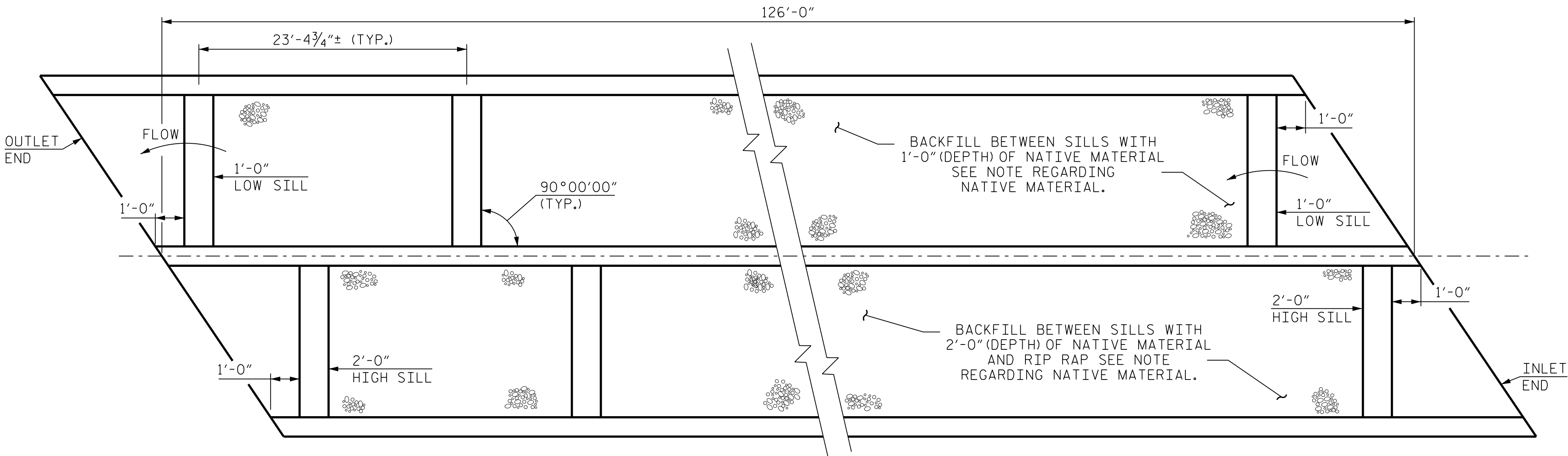
(THERE ARE 78 "C" BARS IN SECTION OF BARREL)

**STEEL IN THE BOTTOM SLAB MAY BE SPliced AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO SPLICES WILL BE PAID FOR BY THE CONTRACTOR.

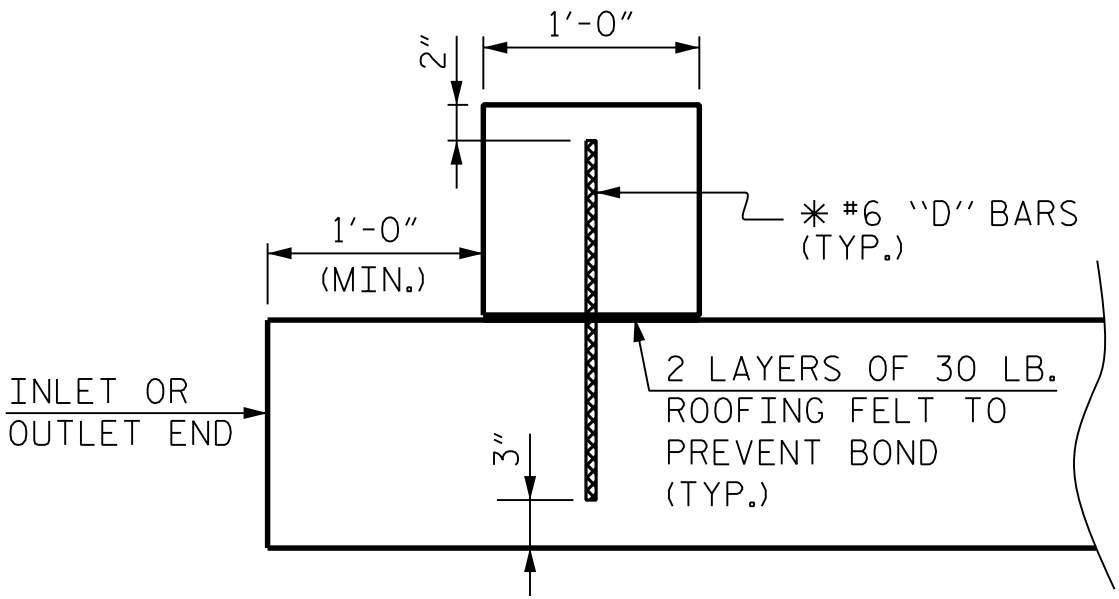
NOTE:
NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAMBED MAY BE USED TO LINE THE LOW FLOW BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL.

IF RIP RAP IS USED TO LINE THE HIGH FLOW BARREL, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE.

NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

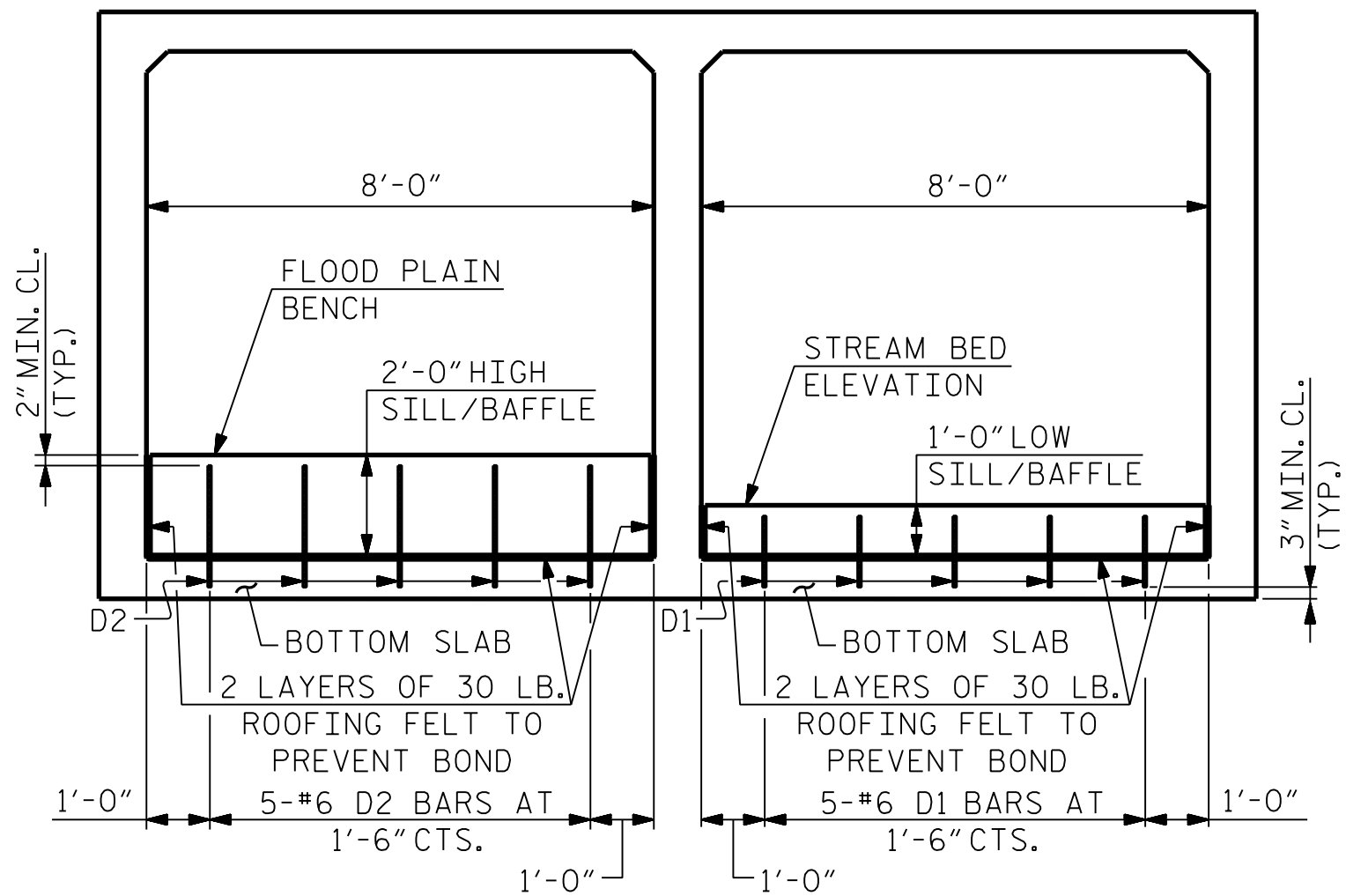


SILL/BAFFLE PLAN



SECTION THROUGH SILL/BAFFLE

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



SILL ELEVATION

DOWEL SPACING SHOWN PERPENDICULAR TO CULVERT BARREL
LOOKING DOWNSTREAM

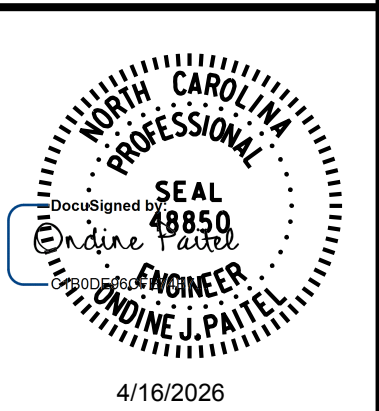
SPLICE LENGTHS		
BAR	SIZE	SPLICE LENGTHS
A1	#6	3'-7"
A2	#6	2'-9"
* A200	#6	3'-7"
A300	#6	3'-7"
* A400	#6	2'-9"
* B2	#5	2'-4"
C1	#4	2'-5"

* SEE NOTES ON SHEET C-1

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 52+14.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 8 FT. X 10 FT.
CONCRETE BOX CULVERT
124° SKEW

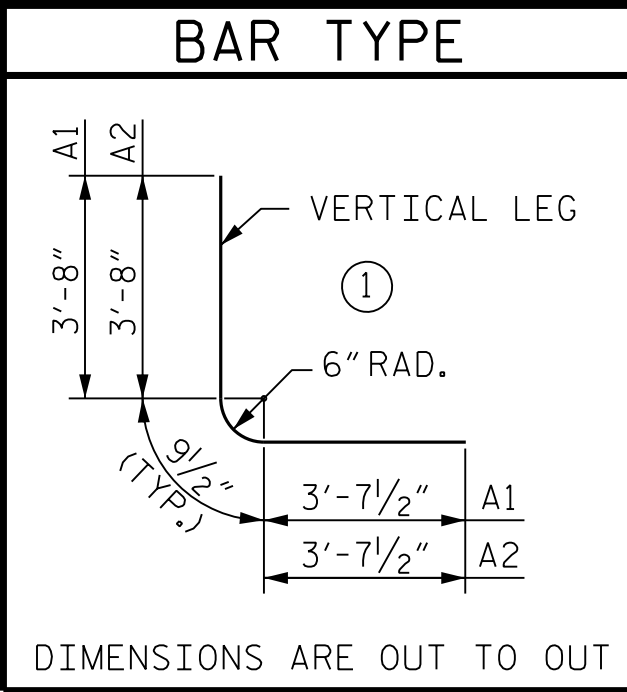


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2			4			

DRAWN BY : T. K. BOYD DATE : MAR. 2026
CHECKED BY : R. V. KEITH DATE : MAR. 2026
DESIGN ENGINEER OF RECORD : O. J. PAITEI DATE : MAR. 2026

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BILL OF MATERIAL (STAGE I)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	330	#6	1	8'-1"	4,007
A2	330	#6	1	8'-1"	4,007
A100	147	#6	STR.	17'-8"	3,901
A101	2	#6	STR.	16'-9"	50
A102	2	#6	STR.	15'-11"	48
A103	2	#6	STR.	15'-0"	45
A104	2	#6	STR.	14'-2"	43
A105	2	#6	STR.	13'-4"	40
A106	2	#6	STR.	12'-5"	37
A107	2	#6	STR.	11'-7"	35
A108	2	#6	STR.	10'-8"	32
A109	2	#6	STR.	9'-10"	30
A110	2	#6	STR.	9'-0"	27
A111	2	#6	STR.	8'-1"	24
A112	2	#6	STR.	7'-3"	22
A113	2	#6	STR.	6'-5"	19
A114	2	#6	STR.	5'-6"	17
A115	2	#6	STR.	4'-8"	14
A116	2	#6	STR.	3'-9"	11
A117	2	#6	STR.	2'-11"	9
A118	2	#6	STR.	2'-1"	6
A200	147	#6	STR.	17'-8"	3,901
A201	2	#6	STR.	16'-9"	50
A202	2	#6	STR.	15'-11"	48
A203	2	#6	STR.	15'-0"	45
A204	2	#6	STR.	14'-2"	43
A205	2	#6	STR.	13'-4"	40
A206	2	#6	STR.	12'-5"	37
A207	2	#6	STR.	11'-7"	35
A208	2	#6	STR.	10'-8"	32
A209	2	#6	STR.	9'-10"	30
A210	2	#6	STR.	9'-0"	27
A211	2	#6	STR.	8'-1"	24
A212	2	#6	STR.	7'-3"	22
A213	2	#6	STR.	6'-5"	19
A214	2	#6	STR.	5'-6"	17
A215	2	#6	STR.	4'-8"	14
A216	2	#6	STR.	3'-9"	11
A217	2	#6	STR.	2'-11"	9
A218	2	#6	STR.	2'-1"	6
A300	147	#6	STR.	17'-8"	3,901
A301	2	#6	STR.	16'-9"	50
A302	2	#6	STR.	15'-11"	48
A303	2	#6	STR.	15'-0"	45
A304	2	#6	STR.	14'-2"	43
A305	2	#6	STR.	13'-4"	40
A306	2	#6	STR.	12'-5"	37
A307	2	#6	STR.	11'-7"	35
A308	2	#6	STR.	10'-8"	32
A309	2	#6	STR.	9'-10"	30
A310	2	#6	STR.	9'-0"	27
A311	2	#6	STR.	8'-1"	24
A312	2	#6	STR.	7'-3"	22
A313	2	#6	STR.	6'-5"	19
A314	2	#6	STR.	5'-6"	17
A315	2	#6	STR.	4'-8"	14
A316	2	#6	STR.	3'-9"	11
A317	2	#6	STR.	2'-11"	9
A318	2	#6	STR.	2'-1"	6

BILL OF MATERIAL (STAGE I)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A400	147	#6	STR.	17'-8"	3,901
A401	2	#6	STR.	16'-9"	50
A402	2	#6	STR.	15'-11"	48
A403	2	#6	STR.	15'-0"	45
A404	2	#6	STR.	14'-2"	43
A405	2	#6	STR.	13'-4"	40
A406	2	#6	STR.	12'-5"	37
A407	2	#6	STR.	11'-7"	35
A408	2	#6	STR.	10'-8"	32
A409	2	#6	STR.	9'-10"	30
A410	2	#6	STR.	9'-0"	27
A411	2	#6	STR.	8'-1"	24
A412	2	#6	STR.	7'-3"	22
A413	2	#6	STR.	6'-5"	19
A414	2	#6	STR.	5'-6"	17
A415	2	#6	STR.	4'-8"	14
A416	2	#6	STR.	3'-9"	11
A417	2	#6	STR.	2'-11"	9
A418	2	#6	STR.	2'-1"	6
B1	330	#5	STR.	11'-9"	4,044
B2	330	#5	STR.	9'-2"	3,155
B3	196	#4	STR.	11'-9"	1,538
C1	234	#4	STR.	35'-0"	5,471
D1	25	#6	STR.	1'-9"	66
D2	25	#6	STR.	2'-9"	103
G1	4	#5	STR.	21'-3"	89
S2	12	#8	STR.	21'-3"	681

REINFORCING STEEL 40,801 LBS.

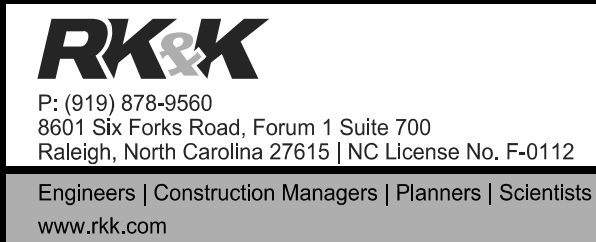
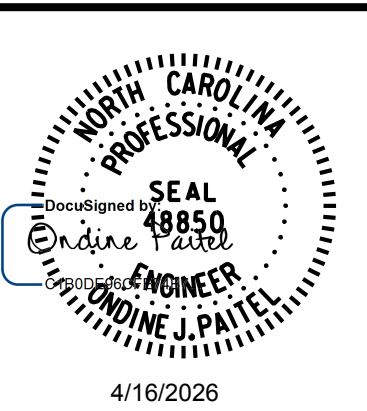
BILL OF MATERIAL (STAGE II)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	94	#6	1	8'-1"	1,141
A2	94	#6	1	8'-1"	1,141
A100	29	#6	STR.	17'-8"	770
A119	2	#6	STR.	17'-1"	51
A120	2	#6	STR.	16'-3"	49
A121	2	#6	STR.	15'-4"	46
A122	2	#6	STR.	14'-6"	44
A123	2	#6	STR.	13'-7"	41
A124	2	#6	STR.	12'-9"	38
A125	2	#6	STR.	11'-11"	36
A126	2	#6	STR.	11'-0"	33
A127	2	#6	STR.	10'-2"	31
A128	2	#6	STR.	9'-4"	28
A129	2	#6	STR.	8'-5"	25
A130	2	#6	STR.	7'-7"	23
A131	2	#6	STR.	6'-8"	20
A132	2	#6	STR.	5'-10"	18
A133	2	#6	STR.	5'-0"	15
A134	2	#6	STR.	4'-1"	12
A135	2	#6	STR.	3'-3"	10
A136	2	#6	STR.	2'-5"	7
A200	29	#6	STR.	17'-8"	770
A219	2	#6	STR.	17'-1"	51
A220	2	#6	STR.	16'-3"	49
A221	2	#6	STR.	15'-4"	46
A222	2	#6	STR.	14'-6"	44
A223	2	#6	STR.	13'-7"	41
A224	2	#6	STR.	12'-9"	38
A225	2	#6	STR.	11'-11"	36
A226	2	#6	STR.	11'-0"	33
A227	2	#6	STR.	10'-2"	31
A228	2	#6	STR.	9'-4"	28
A229	2	#6	STR.	8'-5"	25
A230	2	#6	STR.	7'-7"	23
A231	2	#6	STR.	6'-8"	20
A232	2	#6	STR.	5'-10"	18
A233	2	#6	STR.	5'-0"	15
A234	2	#6	STR.	4'-1"	12
A235	2	#6	STR.	3'-3"	10
A236	2	#6	STR.	2'-5"	7
A300	29	#6	STR.	17'-8"	770
A319	2	#6	STR.	17'-1"	51
A320	2	#6	STR.	16'-3"	49
A321	2	#6	STR.	15'-4"	46
A322	2	#6	STR.	14'-6"	44
A323	2	#6	STR.	13'-7"	41
A324	2	#6	STR.	12'-9"	38
A325	2	#6	STR.	11'-11"	36
A326	2	#6	STR.	11'-0"	33
A327	2	#6	STR.	10'-2"	31
A328	2	#6	STR.	9'-4"	28
A329	2	#6	STR.	8'-5"	25
A330	2	#6	STR.	7'-7"	23
A331	2	#6	STR.	6'-8"	20
A332	2	#6	STR.	5'-10"	18
A333	2	#6	STR.	5'-0"	15
A334	2	#6	STR.	4'-1"	12
A335	2	#6	STR.	3'-3"	10
A336	2	#6	STR.	2'-5"	7

REINFORCING STEEL 12,248 LBS.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 52+14.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE 8 FT. X 10 FT.
CONCRETE BOX CULVERT
124° SKEW



DRAWN BY : T. K. BOYD DATE : MAR. 2026
CHECKED BY : R. V. KEITH DATE : MAR. 2026
DESIGN ENGINEER OF RECORD : O. J. PAITEL DATE : MAR. 2026

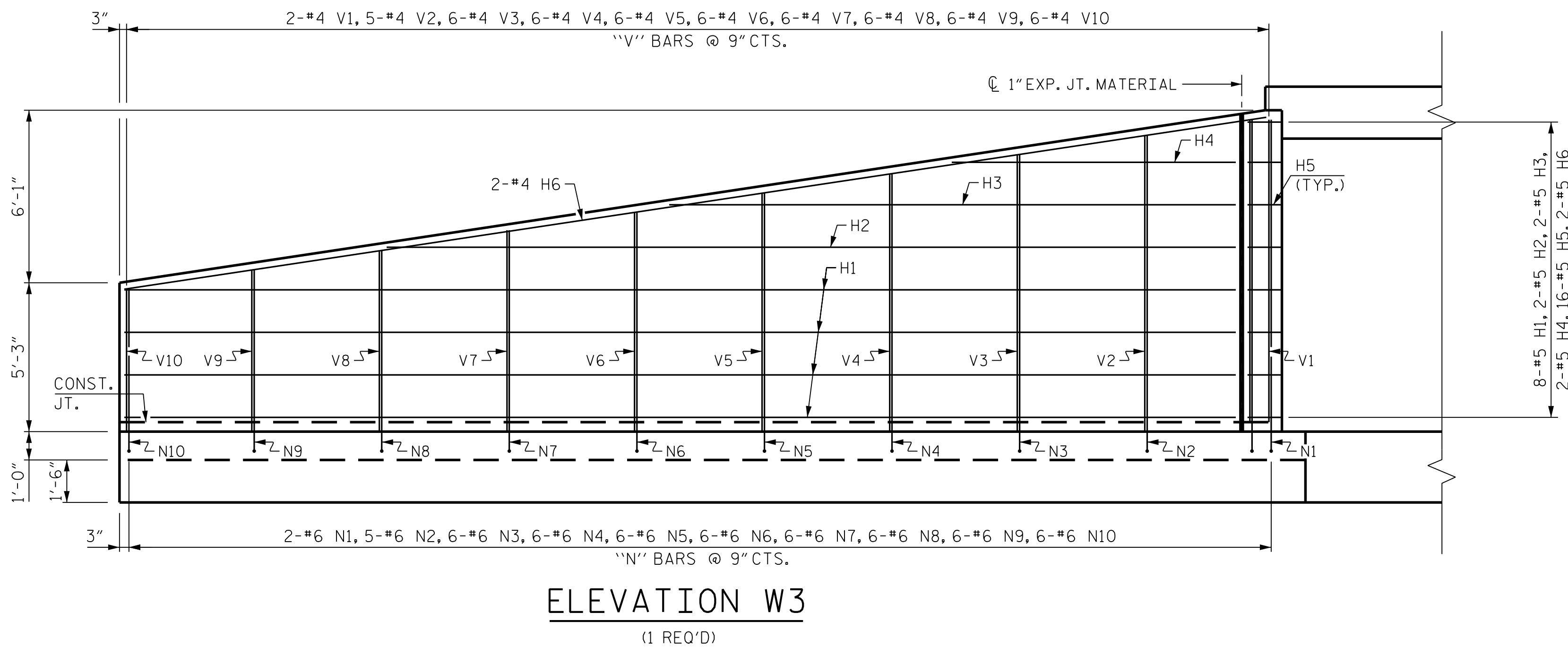
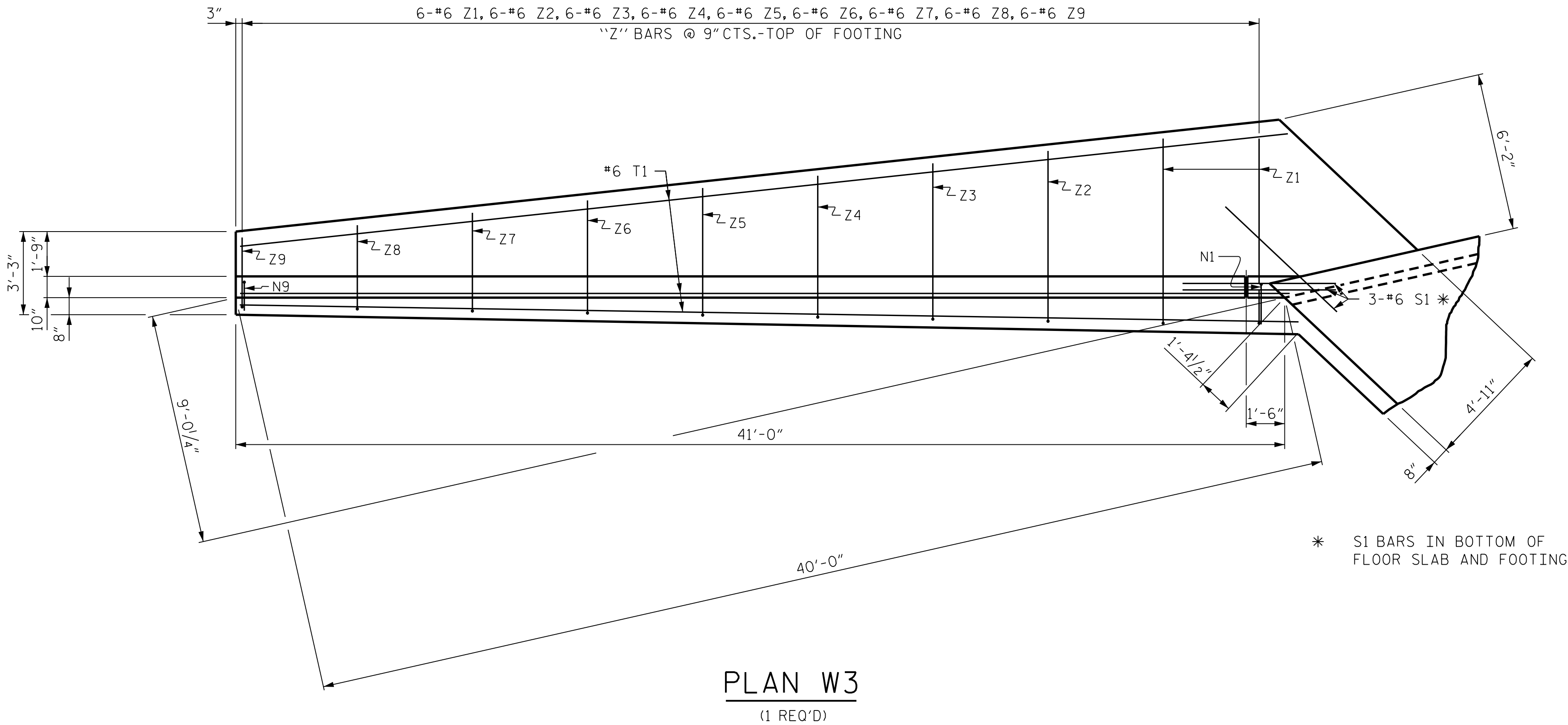
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UNLESS ALL SIGNATURES COMPLETED**

REVISIONS						SHEET NO. C-10
NO.	BY:	DATE:	NO.	BY:	DATE:	
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2			4			

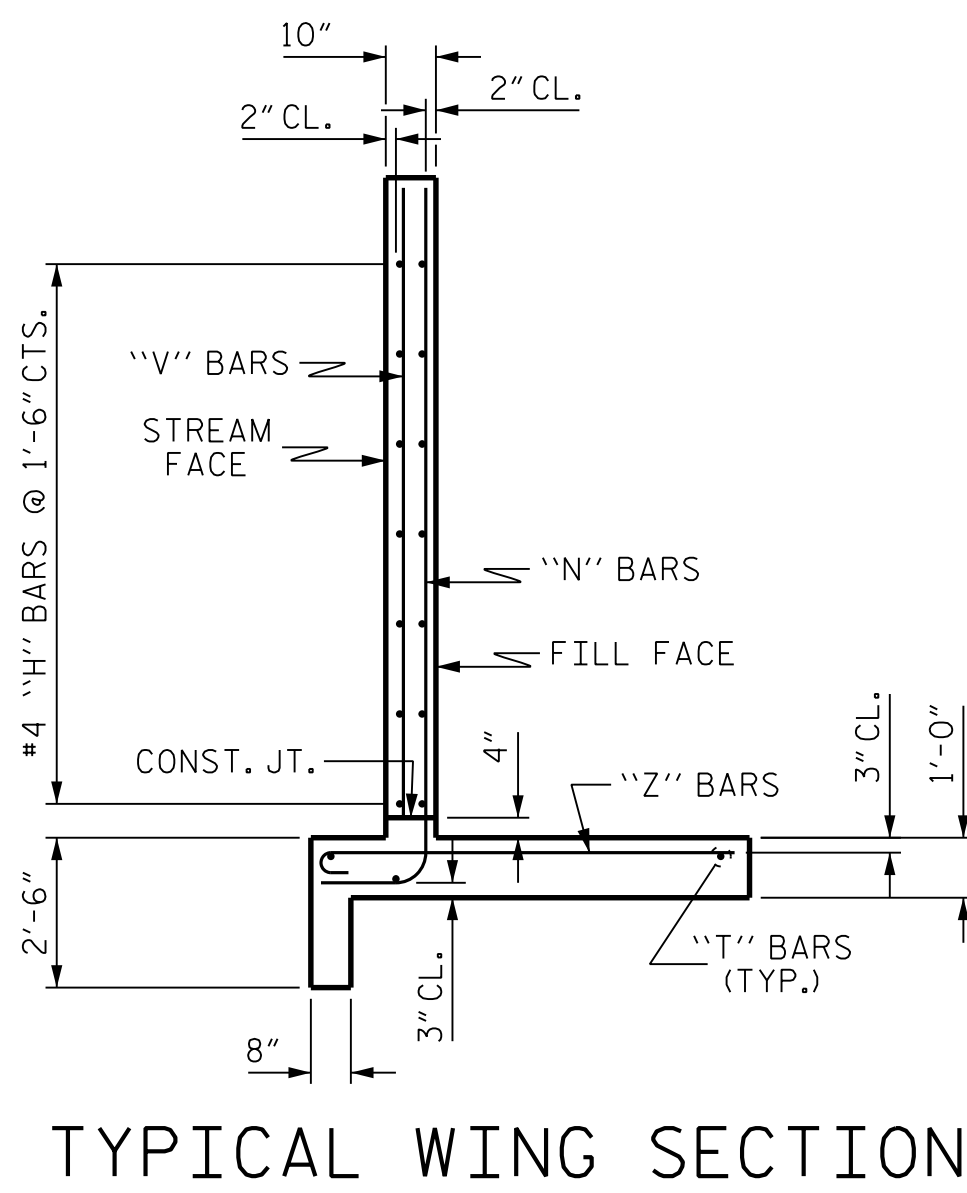
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4/14/2026 4:14/2026 bgonfa

DRAWN BY : T. K. BOYD
CHECKED BY : R. V. KEITH
DESIGN ENGINEER OF RECORD : O. J. PAITEL

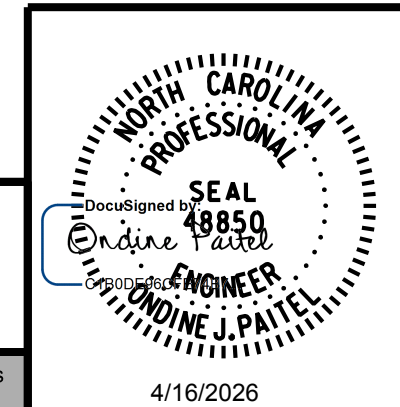
DATE : MAR. 2026
DATE : MAR. 2026
DATE : MAR. 2026



BAR TYPES		BILL OF MATERIAL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
H1	8	#5	STR.	39'-2"	327		
H2	2	#5	STR.	29'-4"	61		
H3	2	#5	STR.	19'-5"	41		
H4	2	#5	STR.	9'-5"	20		
H5	16	#5	2	3'-3"	54		
H6	2	#5	STR.	39'-7"	83		
N1	2	#6	3	13'-0"	39		
N2	5	#6	3	12'-4"	93		
N3	6	#6	3	11'-8"	105		
N4	6	#6	3	11'-0"	99		
N5	6	#6	3	10'-4"	93		
N6	6	#6	3	9'-7"	86		
N7	6	#6	3	8'-11"	80		
N8	6	#6	3	8'-3"	74		
N9	6	#6	3	7'-7"	68		
N10	6	#6	3	6'-11"	62		
S1	3	#6	STR.	6'-0"	27		
T1	3	#6	STR.	41'-0"	185		
V1	2	#4	STR.	10'-10"	14		
V2	5	#4	STR.	10'-2"	34		
V3	6	#4	STR.	9'-6"	38		
V4	6	#4	STR.	8'-10"	35		
V5	6	#4	STR.	8'-2"	33		
V6	6	#4	STR.	7'-5"	30		
V7	6	#4	STR.	6'-9"	27		
V8	6	#4	STR.	6'-1"	24		
V9	6	#4	STR.	5'-5"	22		
V10	6	#4	STR.	4'-9"	19		
Z1	6	#6	4	8'-1"	73		
Z2	6	#6	4	7'-6"	68		
Z3	6	#6	4	6'-11"	62		
Z4	6	#6	4	6'-5"	58		
Z5	6	#6	4	5'-10"	53		
Z6	6	#6	4	5'-3"	47		
Z7	6	#6	4	4'-8"	42		
Z8	6	#6	4	4'-2"	38		
Z9	6	#6	4	3'-7"	31		
REINFORCING STEEL				2,345	LBS		
CLASS A CONCRETE				20.0	CY		
TOTAL				20.0	CY		



RK&K
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PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 52+14.00 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
WING 3 FOR CONCRETE BOX CULVERT					
H = 10'-0"			SLOPE = 2:1		
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. C-12					TOTAL SHEETS 13

bgonfa 4/14/2026 R:\Structures\DCN\Final_Culvert\U-5810_CU.13.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 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 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:

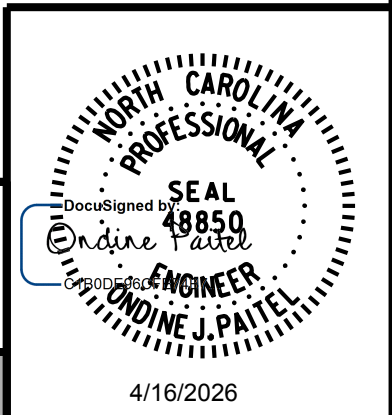
GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

PROJECT NO. U-5810
WATAUGA COUNTY
STATION: 52+14.00 -L-

DRAWN BY : T. K. BOYD	DATE : MAR. 2026
CHECKED BY : R. V. KEITH	DATE : MAR. 2026
DESIGN ENGINEER OF RECORD : O. J. PAITEL	DATE : MAR. 2026

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD NOTES					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					C-13
					TOTAL SHEETS 13