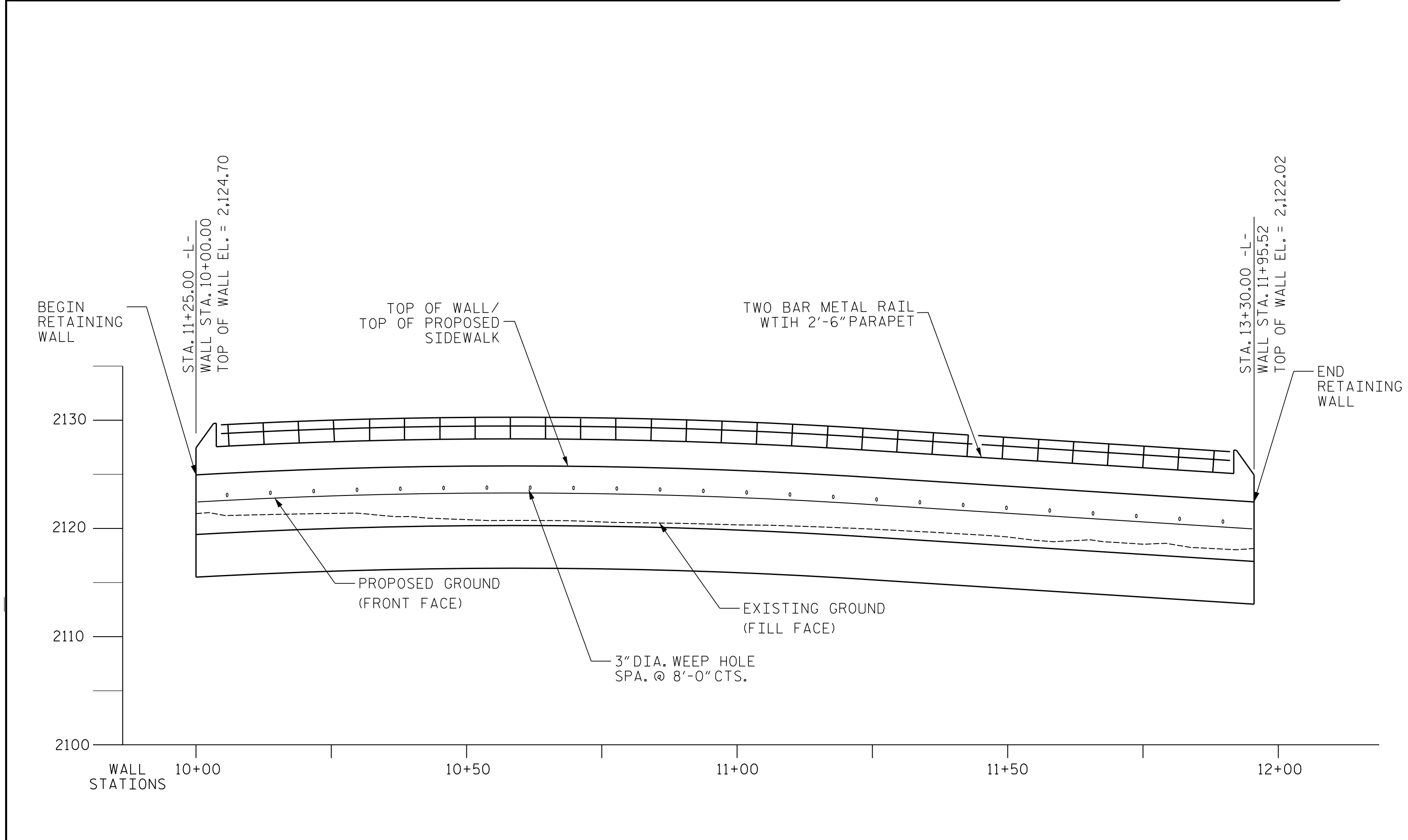


LOCATION SKETCH



RETAINING WALL PROFILE  
VIEWING FRONT FACE

RETAINING WALL ELEVATIONS				
* -L- STA	WALL STATIONS	* OFFSET FROM CL -L- (LEFT)	ELEV @ TOP OF WALL	BOTTOM OF FOOTING ELEVATION
11+25.00	10+00.00	30.00	2,124.70	2,116.70
11+35.00	10+10.00	29.90	2,124.88	2,116.88
11+45.00	10+19.82	29.97	2,125.00	2,117.00
11+55.00	10+29.15	30.04	2,125.08	2,117.08
11+65.00	10+38.48	30.07	2,125.12	2,117.12
11+75.00	10+47.81	30.04	2,125.16	2,117.16
11+85.00	10+57.17	29.63	2,125.19	2,117.19
11+95.00	10+66.59	28.54	2,125.21	2,117.21
12+05.00	10+76.03	27.44	2,125.18	2,117.18
12+15.00	10+85.5	26.34	2,125.12	2,117.12
12+25.00	10+94.99	25.23	2,125.01	2,117.01
12+35.00	11+04.5	24.13	2,124.86	2,116.86
12+45.00	11+14.04	23.03	2,124.67	2,116.67
12+55.00	11+23.61	21.93	2,124.43	2,116.43
12+65.00	11+33.19	20.83	2,124.16	2,116.16
12+75.00	11+42.81	19.73	2,123.86	2,115.86
12+85.00	11+52.42	19.00	2,123.55	2,115.55
12+95.00	11+62.00	19.00	2,123.21	2,115.21
13+05.00	11+71.58	19.00	2,122.87	2,114.87
13+15.00	11+81.15	19.00	2,122.53	2,114.53
13+25.00	11+90.73	19.00	2,122.19	2,114.19
13+30.00	11+95.52	19.00	2,122.02	2,114.02

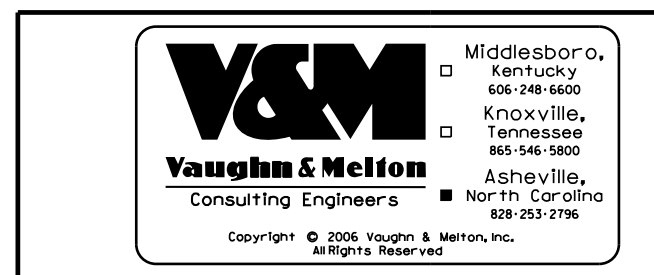
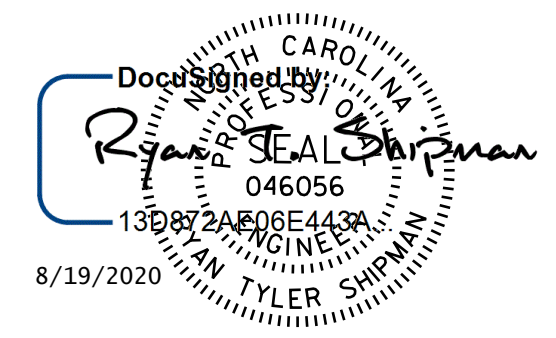
\* STATIONS AND OFFSETS ARE TO FILL FACE OF WALL.

PROJECT NO. U-5887  
HENDERSON COUNTY  
 STATION: 11+25.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

RETAINING WALL  
 DETAILS



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REVISIONS						SHEET NO. W-1
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

**NOTES:**

- 1) FOR STANDARD CAST-IN-PLACE (CIP) CANTILEVER RETAINING WALLS, SEE CAST-IN-PLACE CANTILEVER RETAINING WALL SPECIAL PROVISION.
- 2) THIS WALL IS TO RECEIVE ARCHITECTURAL SURFACE TREATMENT. FOR ARCHITECTURAL SURFACE TREATMENT, SEE SPECIAL PROVISIONS.
- 3) FOR ANODIZED 2-BAR METAL RAIL, SEE SPECIAL PROVISIONS.
- 4) FOR STEEL BEAM GUARDRAIL, SEE ROADWAY PLANS AND SECTION 862 OF THE STANDARD SPECIFICATIONS.
- 5) DRAIN PIPES ARE REQUIRED FOR RETAINING WALL.
- 6) SUBSURFACE INFORMATION IS BASED ON RETAINING WALL BORINGS RW-1 THRU RW-5 PERFORMED BY ECS SOUTHEAST, LLP AS PART OF THE U-5887 (N. HIGHLAND LAKE ROAD) ROADWAY REALIGNMENT PROJECT.
- 7) STANDARD DESIGN OF THE CIP RETAINING WALL IS BASED ON THE FOLLOWING PARAMETERS:
  - A) MAXIMUM FACTORED VERTICAL PRESSURE ON FOUNDATION MATERIAL = 1,620 LBS/SF FOR RETAINING WALL.
  - B) MINIMUM REQUIRED TOE COVER AT FRONT FACE OF RETAINING WALL = 3'-3".
- 8) DESIGN RETAINING WALL FOR A LIVE LOAD (TRAFFIC) SURCHARGE OF 260 LBS./SF.
- 9) DO NOT PLACE CONCRETE FOR FOOTINGS FOR RETAINING WALL UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIALS ARE APPROVED.
- 10) AT THE CONTRACTOR'S OPTION, TEMPORARY SHORING FOR WALL CONSTRUCTION MAY BE USED TO CONSTRUCT RETAINING WALL. SEE CAST-IN-PLACE CANTILEVER RETAINING WALL SPECIAL PROVISION FOR TEMPORARY SHORING FOR WALL CONSTRUCTION.
- 11) CONTRACTOR SHALL ENSURE THAT THE FOUNDATION BEARING MATERIAL ACHIEVES A MINIMUM BEARING CAPACITY OF 2,500 LBS./SF.

TOTAL RETAINING WALL QUANTITIES		
* CLASS 'A' CONCRETE	358.8	CY
* REINFORCING STEEL	27,083	LBS.
* EPOXY COATED REINFORCING STEEL	4,120	LBS.
ANODIZED TWO BAR METAL RAIL	188.0	LF.
* 4" Ø PERFORATED SCHEDULE 40 PVC DRAINAGE PIPE	196.0	LF.
* 4" Ø SCHEDULE 40 PVC OUTLET PIPE	30.0	LF.
* GEOTEXTILE	109	SY.
* #78M STONE BACKFILL	120	TONS
ARCHITECTURAL SURFACE TREATMENT	1,990	SF.

\* THESE QUANTITIES ARE FOR INFORMATION ONLY, WALL SHALL BE PAID FOR PER SQUARE FOOT OF WALL.

\*\* CIP CANTILEVER RETAINING WALLS  
978 SQ. FT.

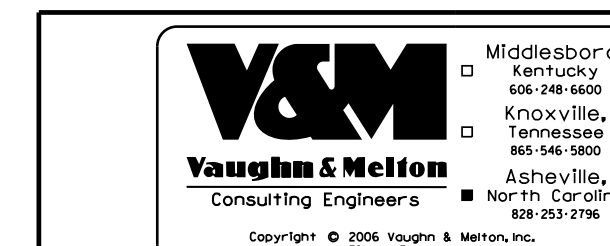
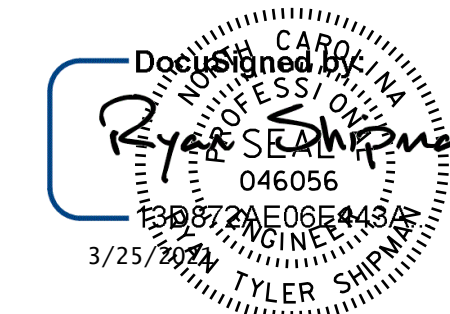
\*\* QUANTITY IS BASED ON TOTAL WALL AREA.

PROJECT NO. U-5887  
HENDERSON COUNTY  
 STATION: 11+25.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
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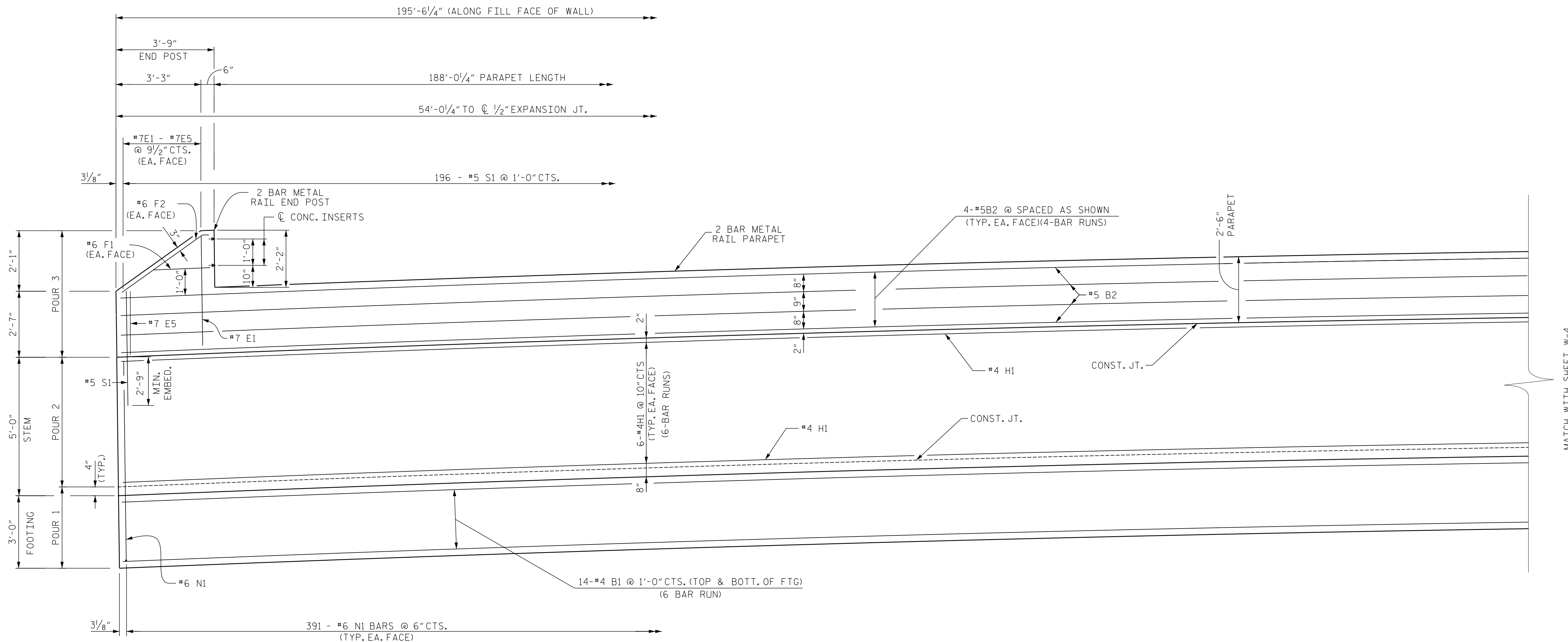
RETAINING WALL  
 DETAILS



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REVISIONS						SHEET NO. W-2	TOTAL SHEETS 36
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				



MATCH WITH SHEET W-4

**PARTIAL ELEVATION**

(WEEP HOLES NOT SHOWN FOR CLARITY)  
 (FOR SPLICE LENGTHS, SEE SHEET W-15)  
 (SPLICES NOT SHOWN FOR CLARITY)  
 (FOR WALL ELEVATIONS, SEE SHEET W-1)  
 (2 BAR METAL RAIL NOT SHOWN FOR CLARITY)

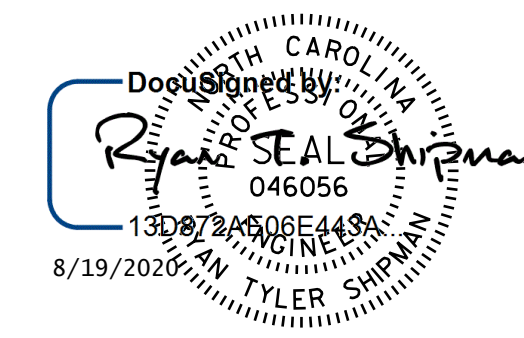
PROJECT NO. U-5887

HENDERSON COUNTY

STATION: 11+25.00 -L-

SHEET 1 OF 4

NOTES:  
 DIMENSIONS ARE GIVEN ALONG THE FILL FACE OF WALL  
 CONTRACTOR SHALL CUT REINFORCING BARS AND PROVIDE  
 MINIMUM 2" CLEAR OF THE EXPANSION JOINT EACH SIDE.



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

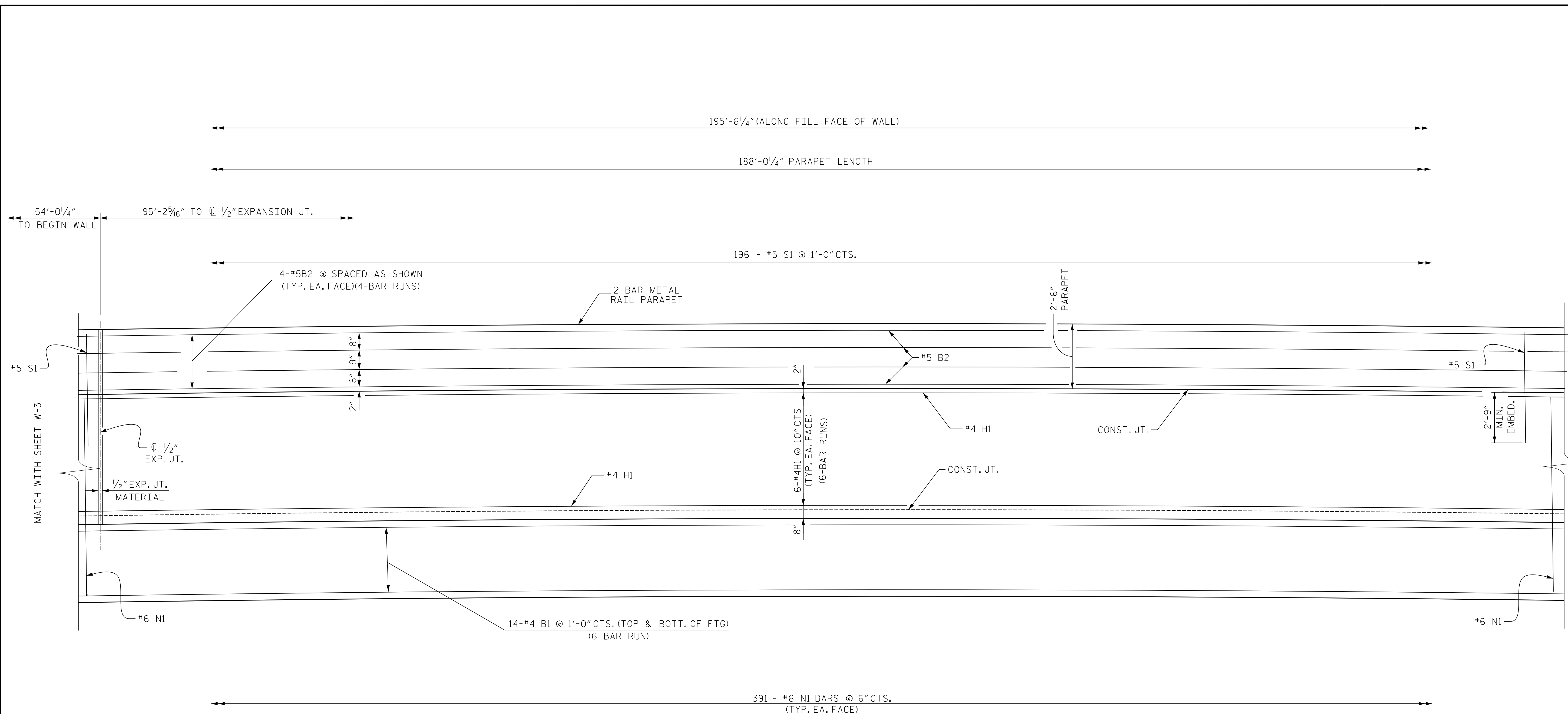
**RETAINING WALL  
 DETAILS**

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

SHEET NO.  
 W-3  
 TOTAL SHEETS  
 36



PARTIAL ELEVATION

(WEEP HOLES NOT SHOWN FOR CLARITY)  
 (FOR SPLICE LENGTHS, SEE SHEET W-15)  
 (SPLICES NOT SHOWN FOR CLARITY)  
 (FOR WALL ELEVATIONS, SEE SHEET W-1)  
 (2 BAR METAL RAIL NOT SHOWN FOR CLARITY)

PROJECT NO. U-5887

HENDERSON COUNTY

STATION: 11+25.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

RETAINING WALL  
 DETAIL

NOTES:  
 DIMENSIONS ARE GIVEN ALONG THE FILL FACE OF WALL  
 CONTRACTOR SHALL CUT REINFORCING BARS AND PROVIDE  
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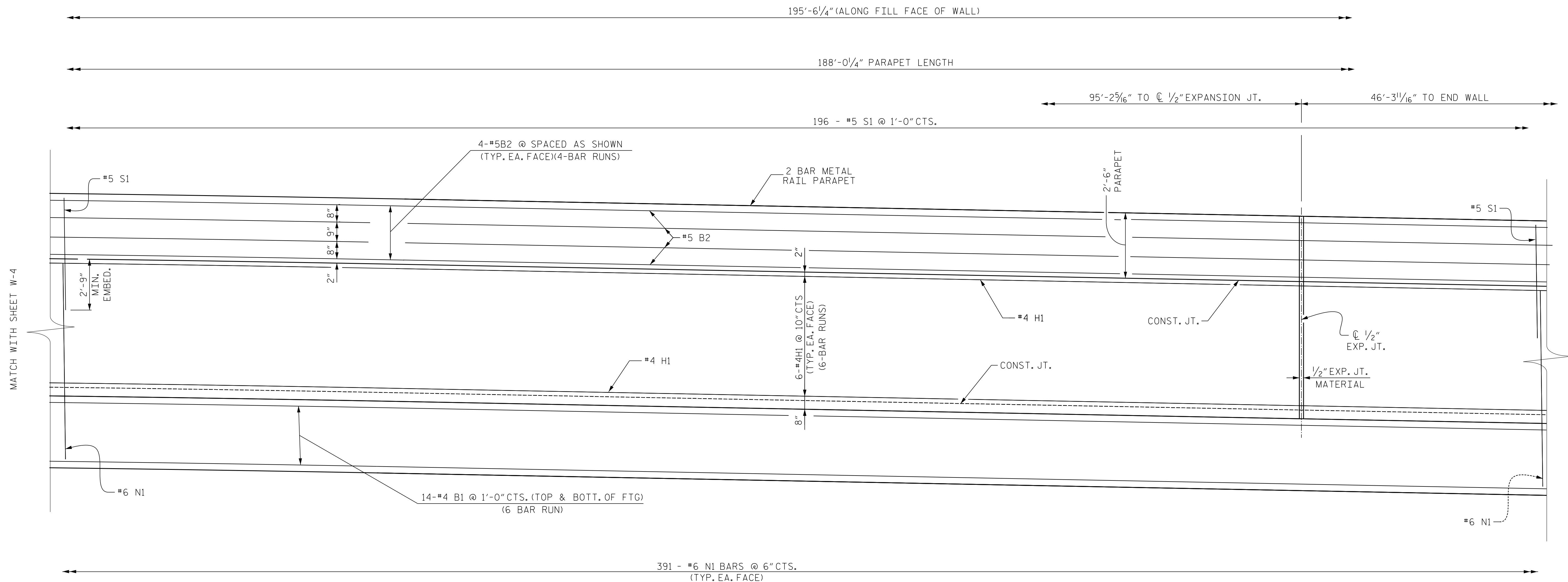
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 138822566E443A  
 8/19/2020



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REVISIONS						SHEET NO. W-4
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			



**PARTIAL ELEVATION**

(WEEP HOLES NOT SHOWN FOR CLARITY)  
 (FOR SPLICE LENGTHS, SEE SHEET W-15)  
 (SPLICES NOT SHOWN FOR CLARITY)  
 (FOR WALL ELEVATIONS, SEE SHEET W-1)  
 (2 BAR METAL RAIL NOT SHOWN FOR CLARITY)

PROJECT NO. U-5887

HENDERSON COUNTY

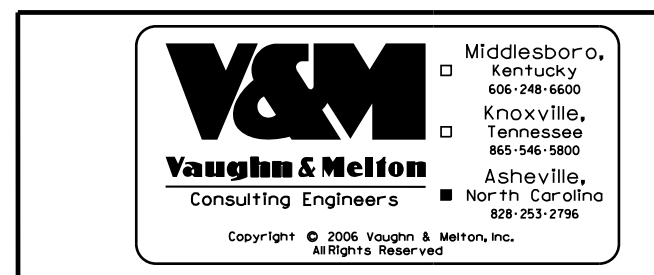
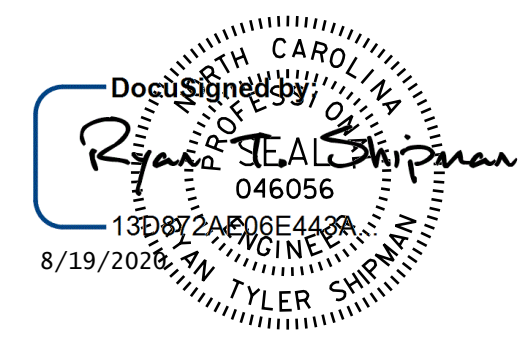
STATION: 11+25.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

RETAINING WALL  
 DETAIL

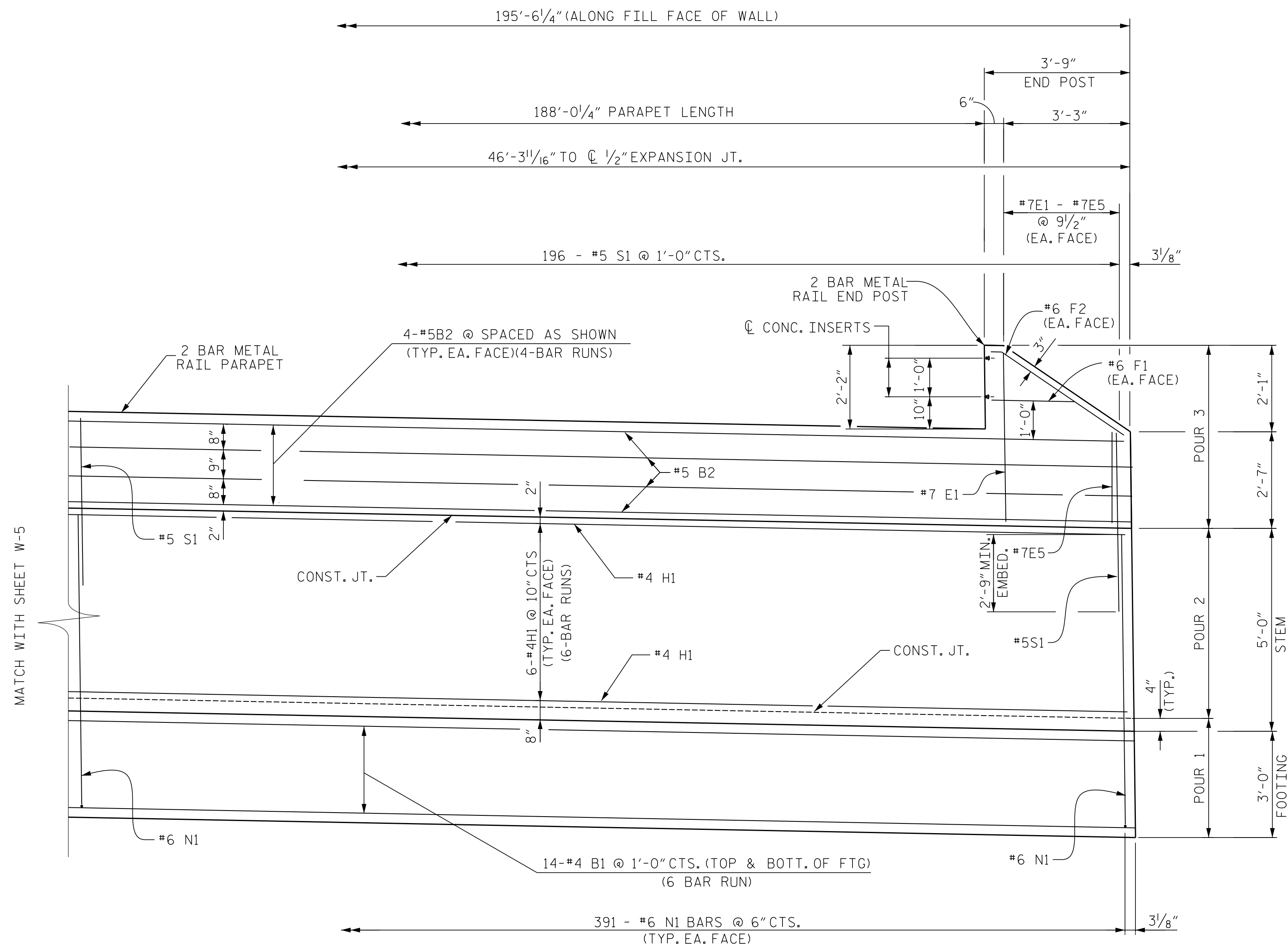
NOTES:  
 DIMENSIONS ARE GIVEN ALONG THE FILL FACE OF WALL  
 CONTRACTOR SHALL CUT REINFORCING BARS AND PROVIDE  
 MINIMUM 2" CLEAR OF THE EXPANSION JOINT EACH SIDE.



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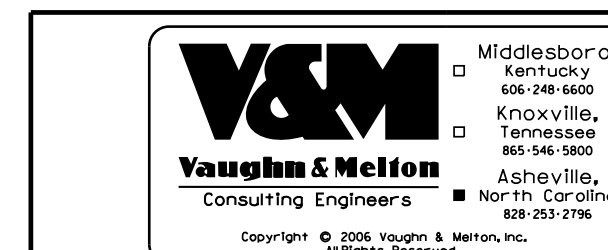
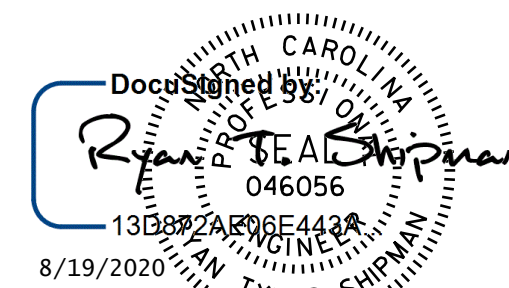
REVISIONS						SHEET NO. W-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			



**PARTIAL ELEVATION**

(WEEP HOLES NOT SHOWN FOR CLARITY)  
 (FOR SPLICE LENGTHS, SEE SHEET W-15)  
 (SPLICES NOT SHOWN FOR CLARITY)  
 (FOR WALL ELEVATIONS, SEE SHEET W-1)  
 (2 BAR METAL RAIL NOT SHOWN FOR CLARITY)

NOTES:  
 DIMENSIONS ARE GIVEN ALONG THE FILL FACE OF WALL  
 CONTRACTOR SHALL CUT REINFORCING BARS AND PROVIDE  
 MINIMUM 2" CLEAR OF THE EXPANSION JOINT EACH SIDE.



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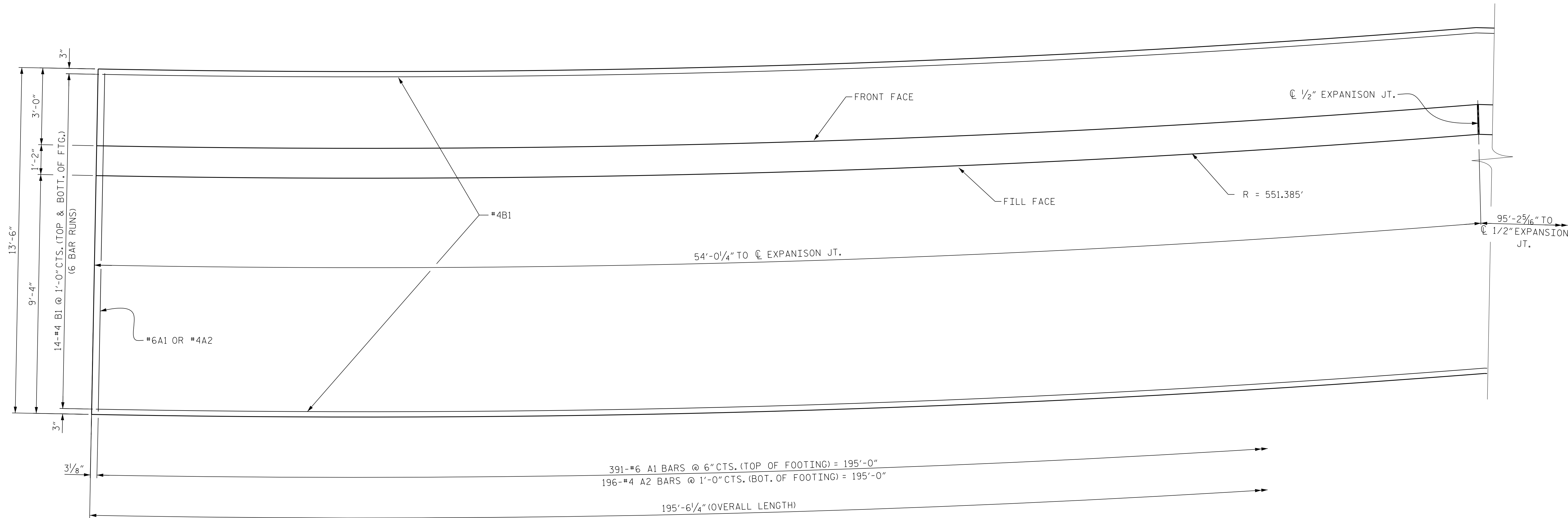
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HENDERSON COUNTY  
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SHEET 4 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**RETAINING WALL  
 DETAILS**

REVISIONS						SHEET NO. W-6
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			



**PARTIAL PLAN OF FOOTING**

(FOR SPLICE LENGTHS, SEE SHEET W-15)  
(SPLICES NOT SHOWN FOR CLARITY)

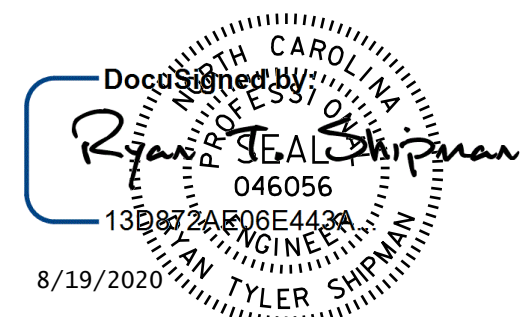
NOTES:  
DIMENSIONS ARE GIVEN ALONG THE FILL FACE OF WALL  
CONTRACTOR SHALL CUT REINFORCING BARS AND PROVIDE  
MINIMUM 2" CLEAR OF THE EXPANSION JOINT EACH SIDE.

PROJECT NO. U-5887  
HENDERSON COUNTY  
STATION: 11+25.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**WALL FOOTING  
DETAIL**

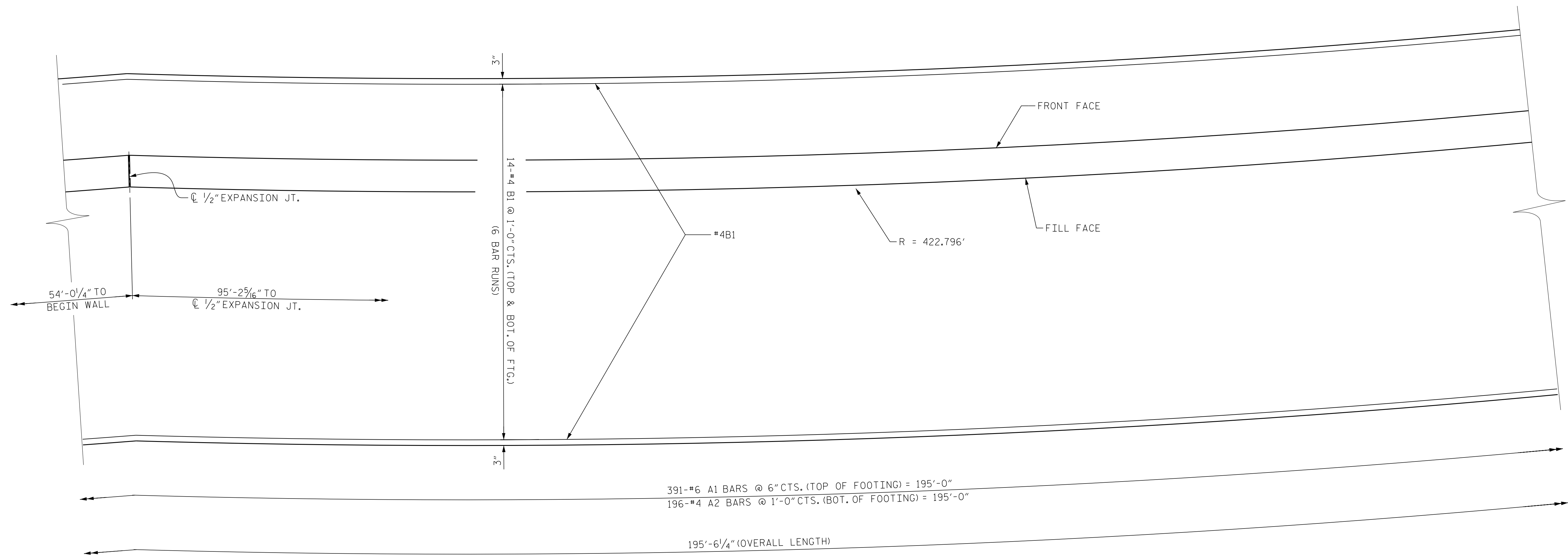


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NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
W-7  
TOTAL SHEETS  
36



### PARTIAL PLAN OF FOOTING

(FOR SPLICE LENGTHS, SEE SHEET W-15)  
(SPLICES NOT SHOWN FOR CLARITY)

NOTES:  
DIMENSIONS ARE GIVEN ALONG THE FILL FACE OF WALL  
CONTRACTOR SHALL CUT REINFORCING BARS AND PROVIDE  
MINIMUM 2" CLEAR OF THE EXPANSION JOINT EACH SIDE.

PROJECT NO. U-5887  
HENDERSON COUNTY  
STATION: 11+25.00 -L-  
SHEET 2 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

WALL FOOTING  
DETAIL

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*Ryan Seal*  
046056  
130872AE08E443  
8/19/2020 AM TYLER SHIRMAN

**V&M**  
Vaughn & Melton  
Consulting Engineers

Middlesboro, Kentucky 606-248-6600  
Knoxville, Tennessee 865-546-8800  
Asheville, North Carolina 828-253-5796

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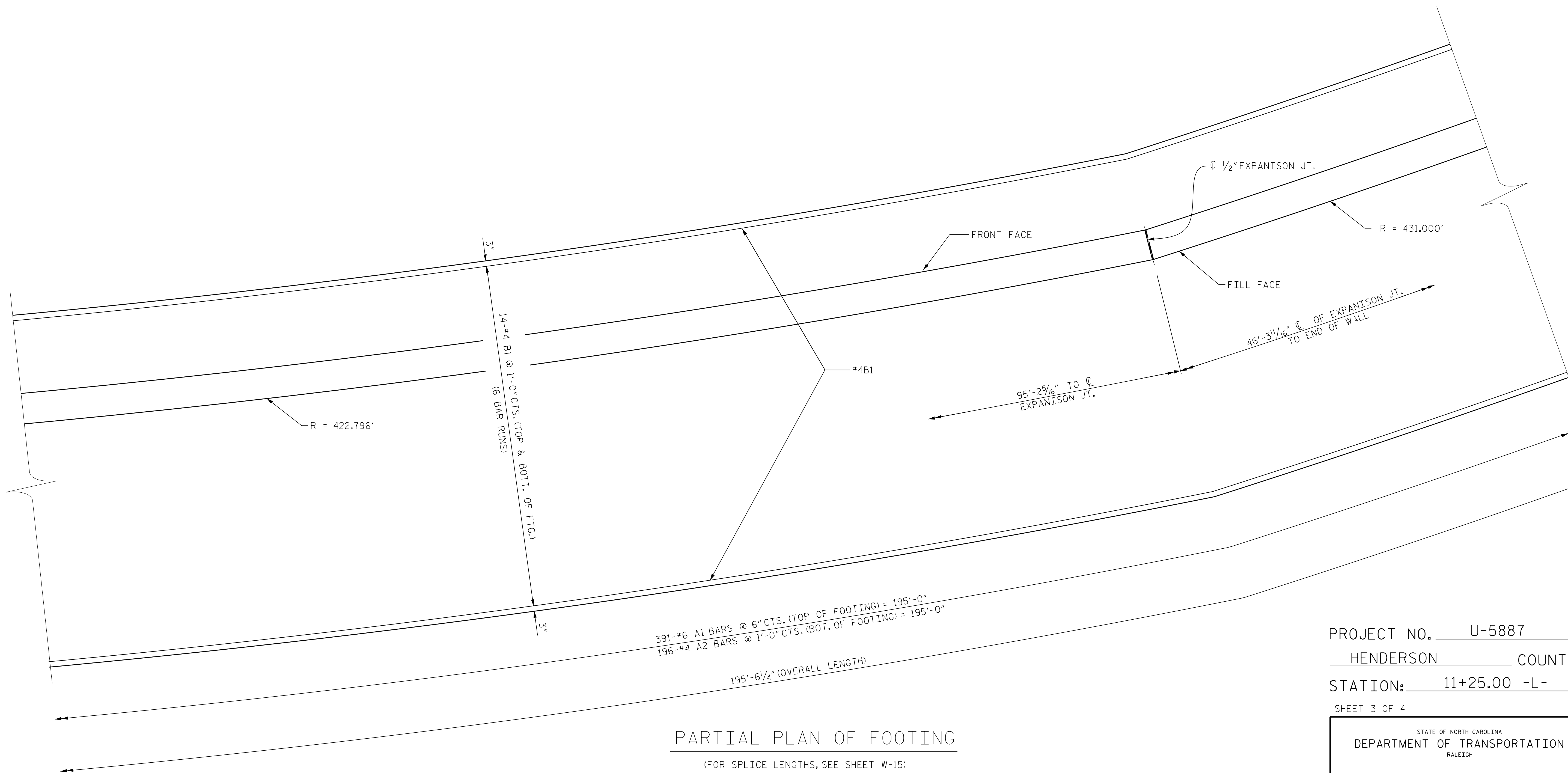
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1			3		
2			4		

SHEET NO. W-8  
TOTAL SHEETS 36





**PARTIAL PLAN OF FOOTING**  
 (FOR SPLICE LENGTHS, SEE SHEET W-15)  
 (SPLICES NOT SHOWN FOR CLARITY)

NOTES:  
 DIMENSIONS ARE GIVEN ALONG THE FILL FACE OF WALL  
 CONTRACTOR SHALL CUT REINFORCING BARS AND PROVIDE  
 MINIMUM 2" CLEAR OF THE EXPANSION JOINT EACH SIDE.

PROJECT NO. U-5887  
HENDERSON COUNTY  
 STATION: 11+25.00 -L-  
 SHEET 3 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

**WALL FOOTING  
 DETAIL**

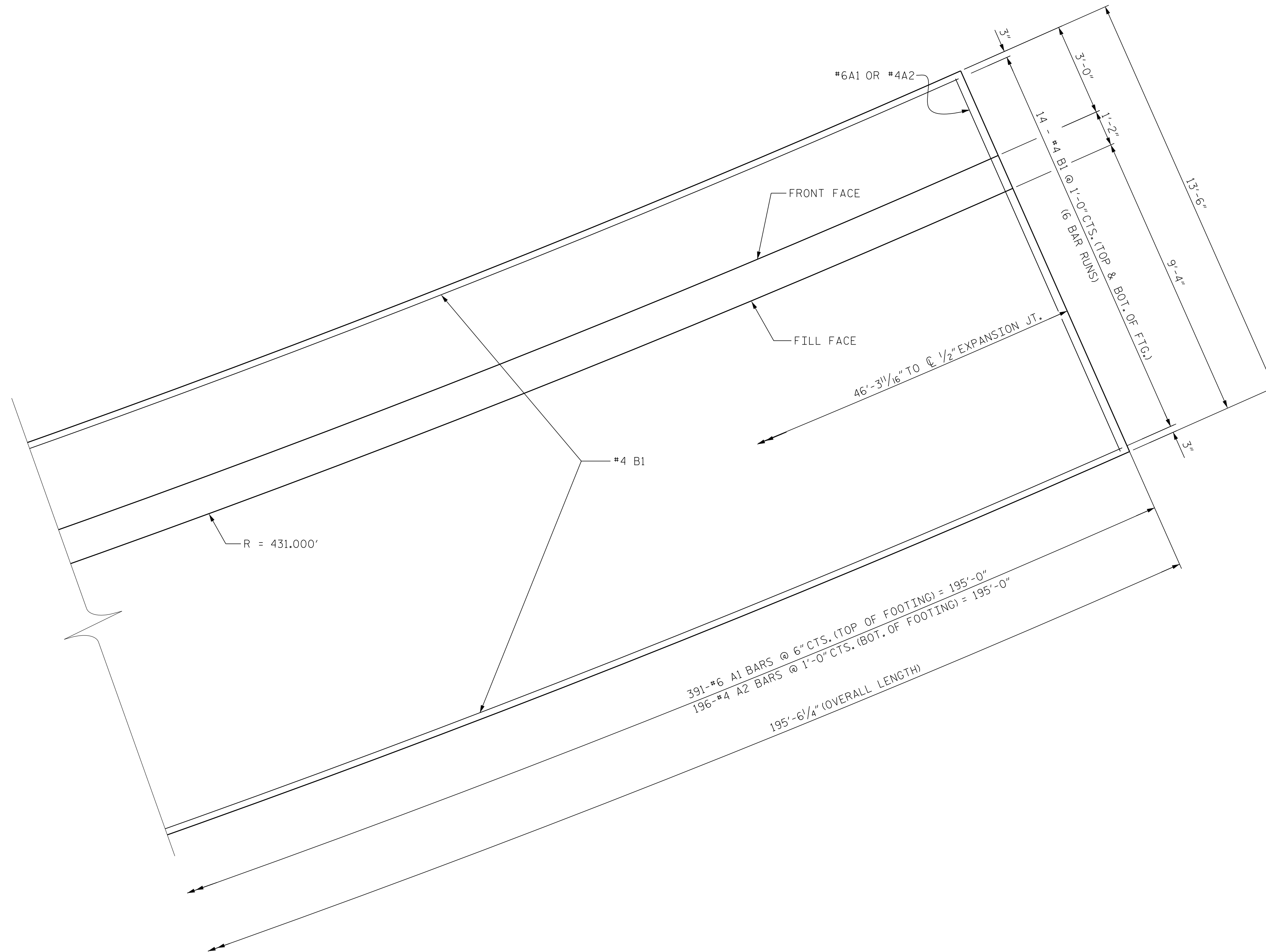
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 Ryan Seal  
 130872406E4438  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-9
1			3			TOTAL SHEETS
2			4			36



PARTIAL PLAN OF FOOTING

(FOR SPLICE LENGTHS, SEE SHEET W-15)  
(SPLICES NOT SHOWN FOR CLARITY)

NOTES:  
DIMENSIONS ARE GIVEN ALONG THE FILL FACE OF WALL  
CONTRACTOR SHALL CUT REINFORCING BARS AND PROVIDE  
MINIMUM 2" CLEAR OF THE EXPANSION JOINT EACH SIDE.

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Rajeev B. Shivan  
046056  
1398724F06E443A  
8/19/2020  
TYLER SHIPMAN



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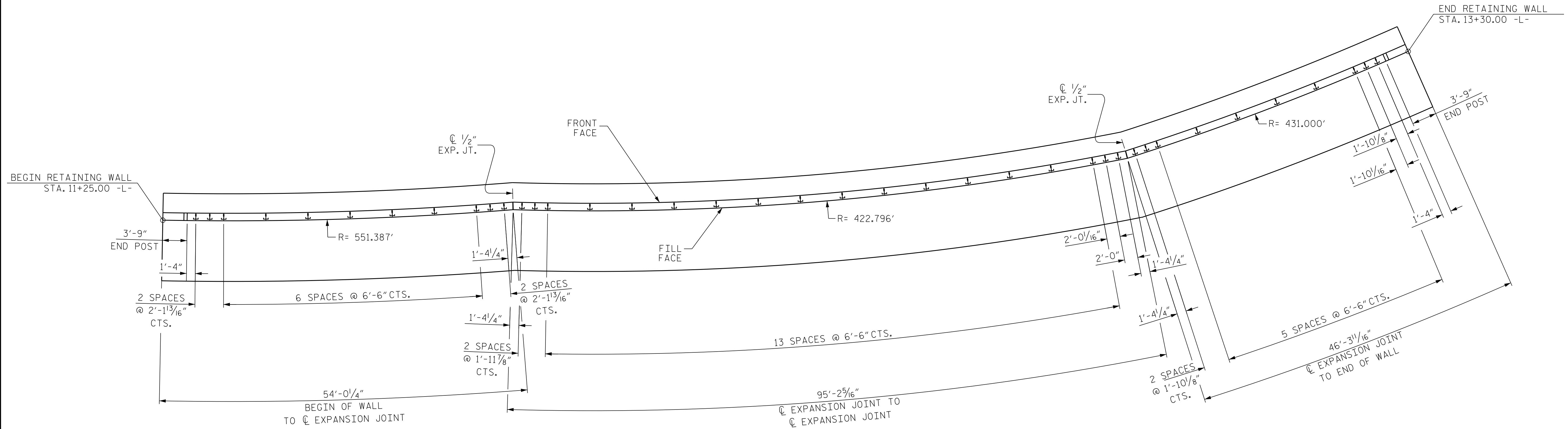
PROJECT NO. U-5887  
HENDERSON COUNTY  
STATION: 11+25.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

WALL FOOTING  
DETAIL

REVISIONS						SHEET NO. W-10
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			



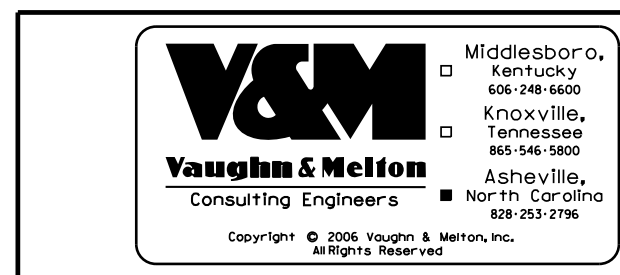
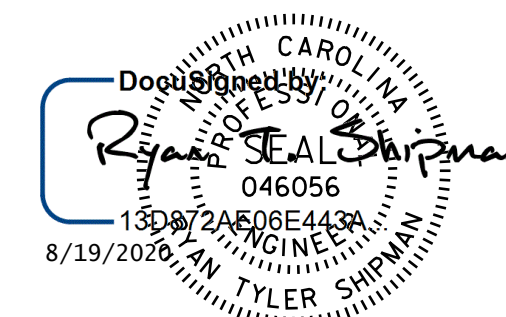
**PLAN OF RAIL POST SPACINGS**

(ALL DIMENSIONS ARE ALONG FILL FACE OF WALL)  
(ALL DIMENSIONS ARE ALONG ARC)

PROJECT NO. U-5887  
HENDERSON COUNTY  
 STATION: 11+25.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
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**PLAN OF RAIL  
 POST SPACINGS**

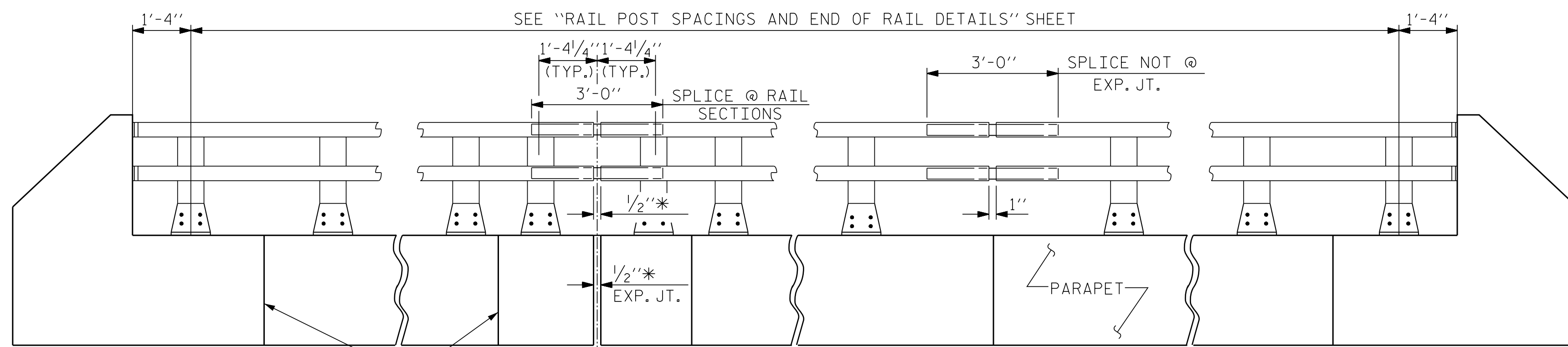


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REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.  
 W-11  
 TOTAL SHEETS  
 36



TOOLED CONTRACTION JT. (SEE NOTES)

**ELEVATION**

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.

\* LOCATIONS OF EXPANSION JOINTS IN THE TWO BAR METAL RAIL PARAPET AND IN THE METAL RAILING SHALL COINCIDE WITH THE LOCATIONS OF EXPANSION JOINTS IN RETAINING WALL.

**NOTES**

METAL RAIL SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 460 OF THE STANDARD SPECIFICATIONS AND METAL RAIL COMPONENTS SHALL MEET THE REQUIREMENTS OF ARTICLE 1074-5 OF THE STANDARD SPECIFICATIONS.

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STD. NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

ALLOY 6351-15 MAY BE SUBSTITUTED FOR ALLOY 6061-16 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-101B) OF THE STANDARD SPECIFICATIONS. CONTRACTION JOINTS SHALL BE LOCATED 9 FEET ON EACH SIDE OF PARAPET EXPANSION JOINTS WITH NO MORE THAN 12 FEET BETWEEN CONTRACTION JOINTS.

**ANODIZING**

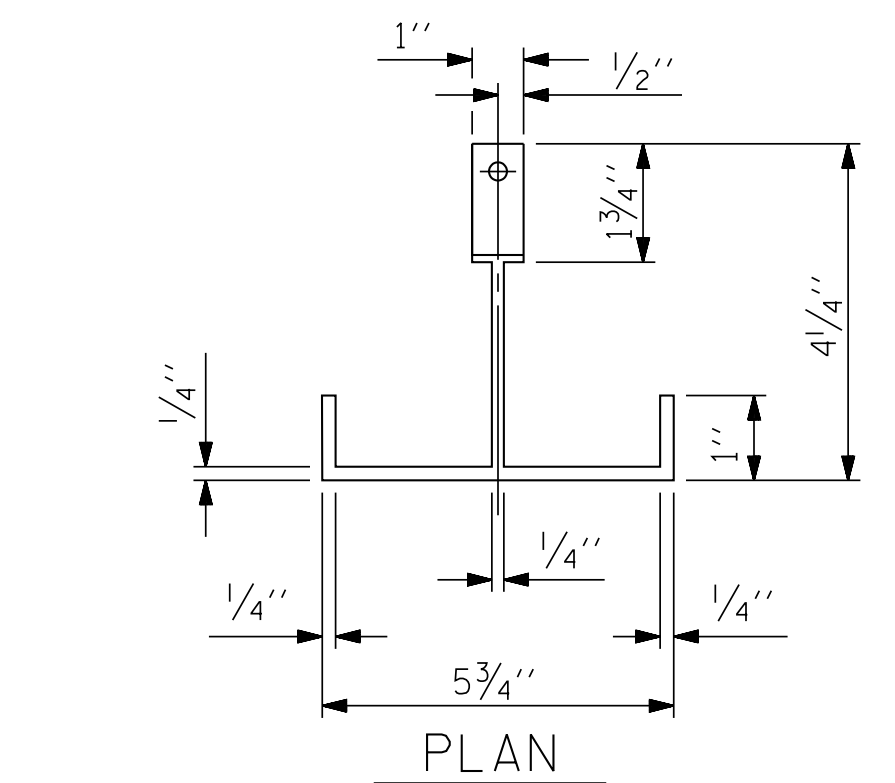
FOR ANODIZED 2 BAR METAL RAIL, SEE SPECIAL PROVISIONS.

ALUMINUM FOR POSTS, BASES, RAILS, EXPANSION BARS, RIVETS, CAPS, AND SHIMS SHALL BE ANODIZED. THE CONTRACTOR SHALL SUBMIT THREE SETS OF ASTM B-21 6061-T6 ALUMINUM SAMPLES ANODIZED MEDIUM BROWN, DARK BROWN, AND EXTRA DARK BROWN TO THE ENGINEER. THE ENGINEER SHALL SELECT THE COLOR FROM THE SAMPLES FURNISHED BY THE CONTRACTOR.

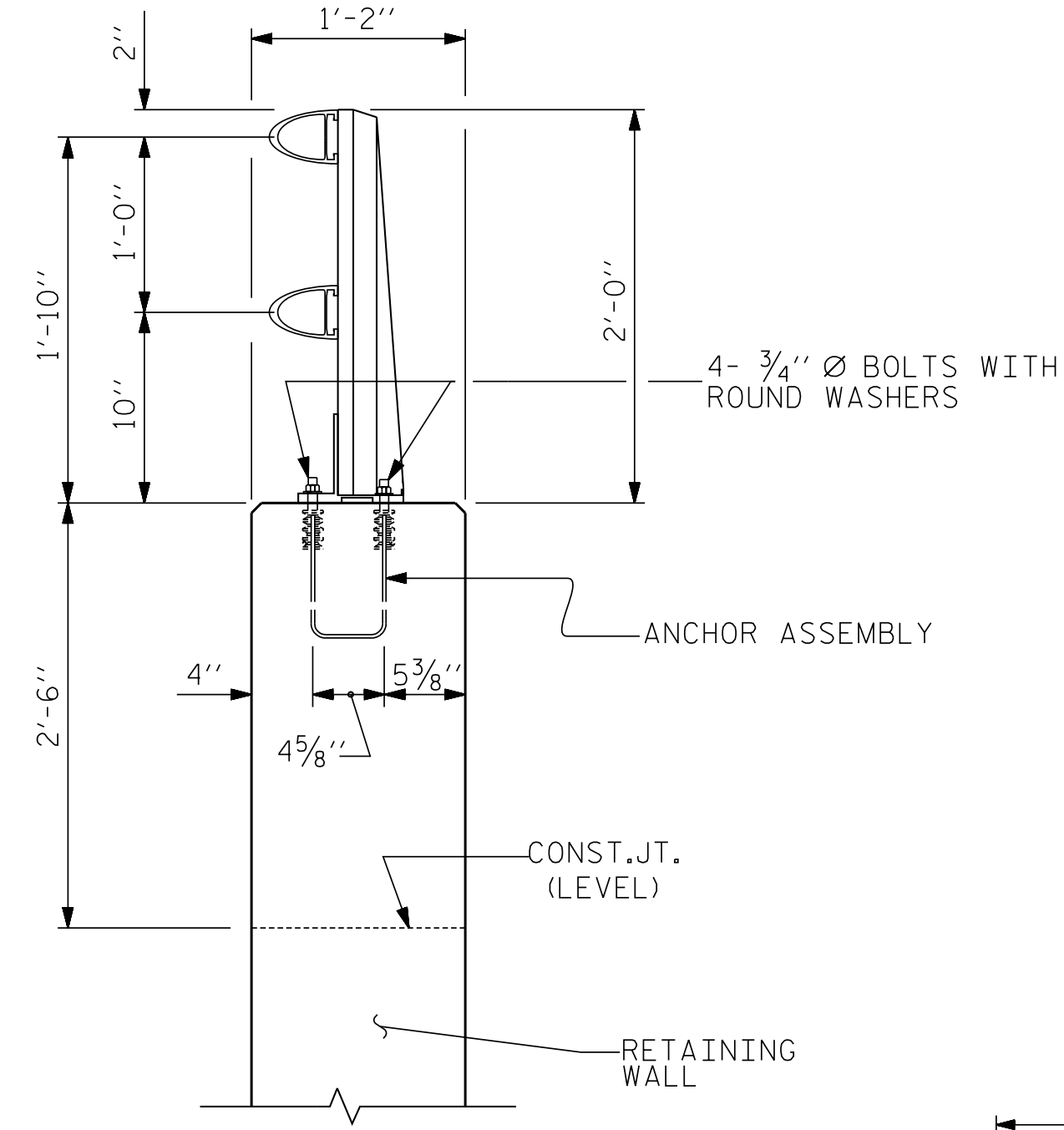
AFTER A SHADE OF BROWN HAS BEEN SELECTED FOR THE RAILING, THE CONTRACTOR SHALL SUBMIT A SAMPLE OF COMPATIBLE EXTERIOR ACRYLIC HOUSE PAINT TO THE ENGINEER. THIS PAINT SHALL MATCH THE ANODIZED RAIL COLOR AS CLOSELY AS POSSIBLE. AFTER ERECTION OF THE ANODIZED ALUMINUM RAILING, ALL EXPOSED ANCHOR BOLTS, NUTS, WASHERS, MACHINE SCREWS, CAP SCREWS, BOLTS, ATTACHMENT BRACKETS, HOLD-DOWN PLATES, AND BUILT UP ANGLES SHALL BE COATED WITH TWO COATS OF THIS ACTYLIC PAINT.

ANY DAMAGE TO THE ANODIZED SURFACES OF THE RAIL OR COMPONENTS DURING THE CONSTRUCTION SHALL BE REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AT THE DIRECTION OF THE ENGINEER AND AT THE CONTRACTOR'S EXPENSE.

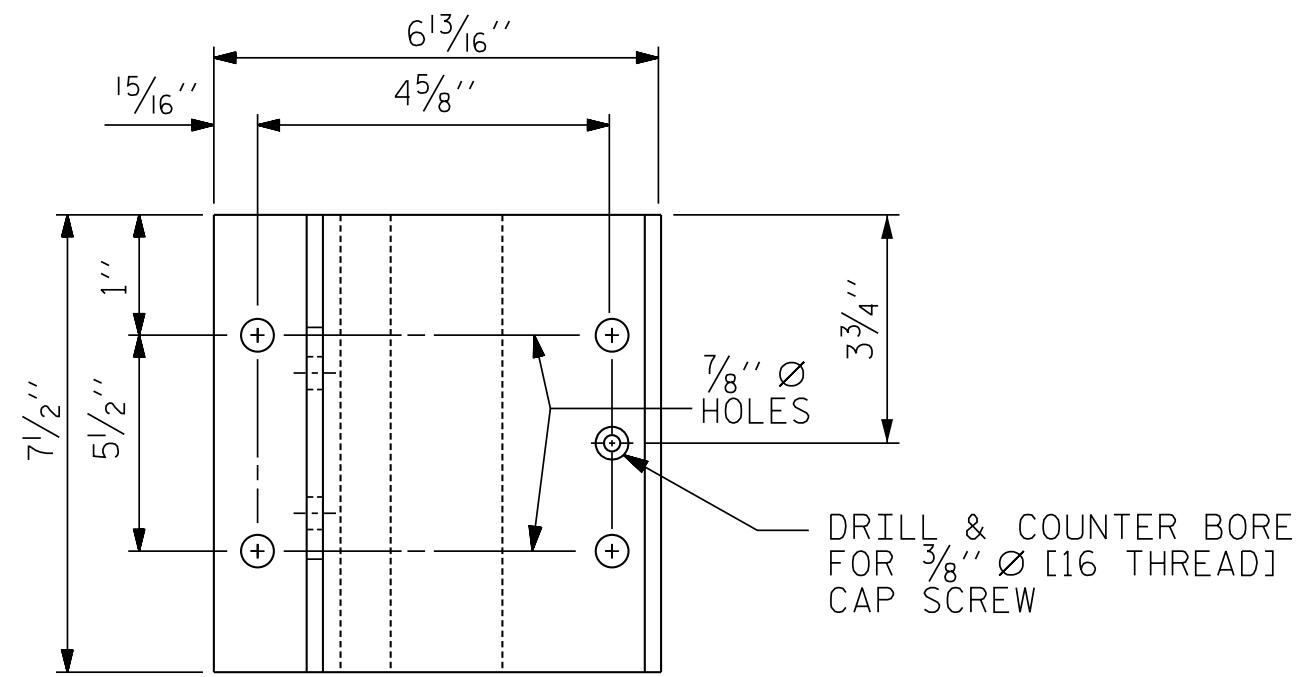
PAY LENGTH = 188.0 LIN. FT.



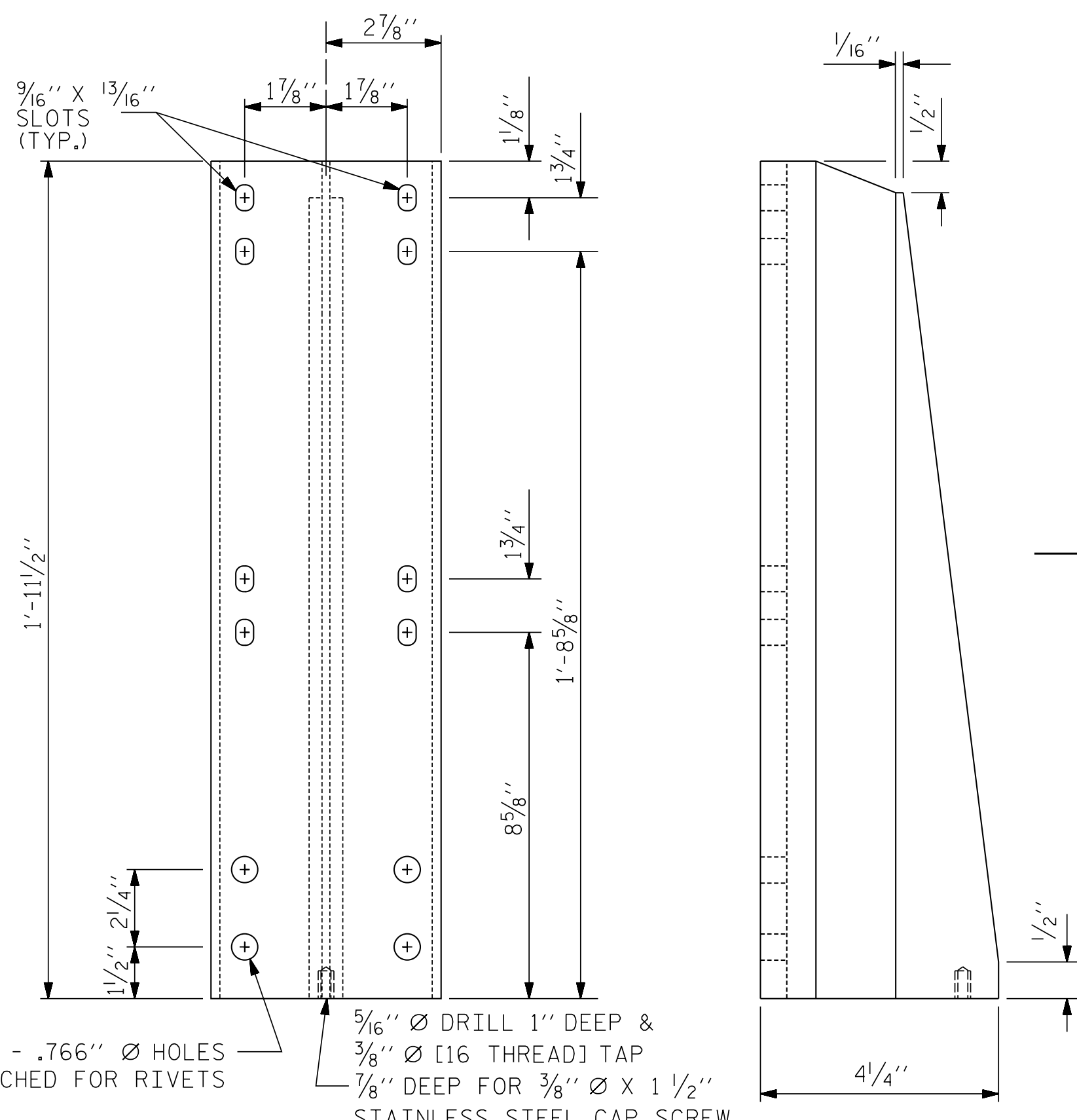
PLAN



SECTION THRU PARAPET AND RAIL



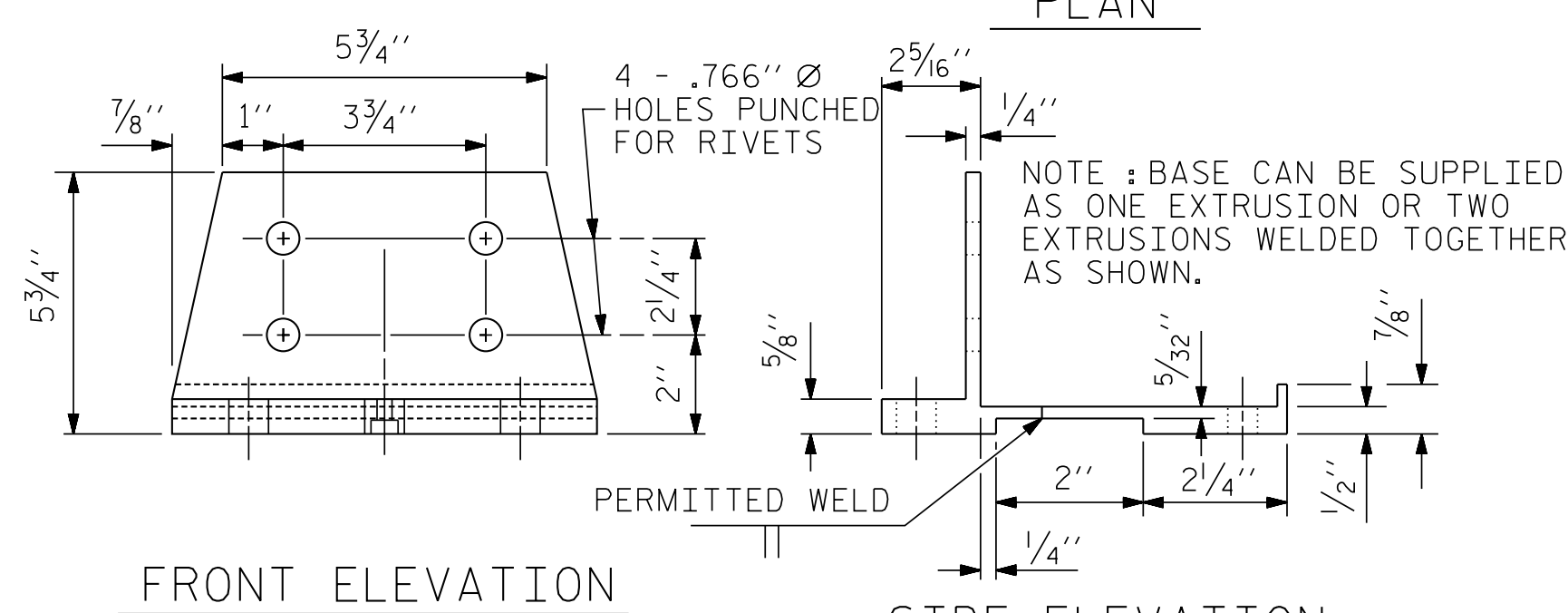
PLAN



FRONT ELEVATION

SIDE ELEVATION

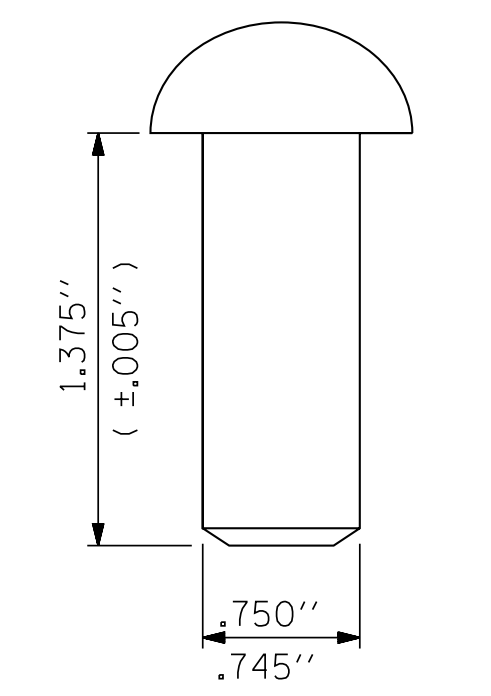
DETAILS OF POST



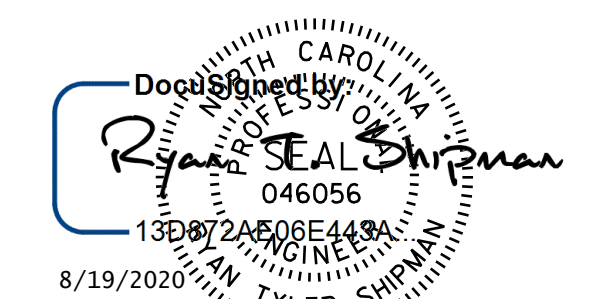
FRONT ELEVATION

SIDE ELEVATION

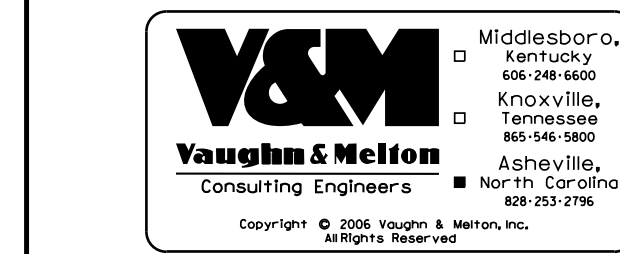
POST BASE DETAILS



RIVET DETAIL



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PROJECT NO. U-5887  
 HENDERSON COUNTY  
 STATION: 11+25.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
<b>ANODIZED 2 BAR METAL RAIL</b>					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. W-12
					TOTAL SHEETS 36

NOTES

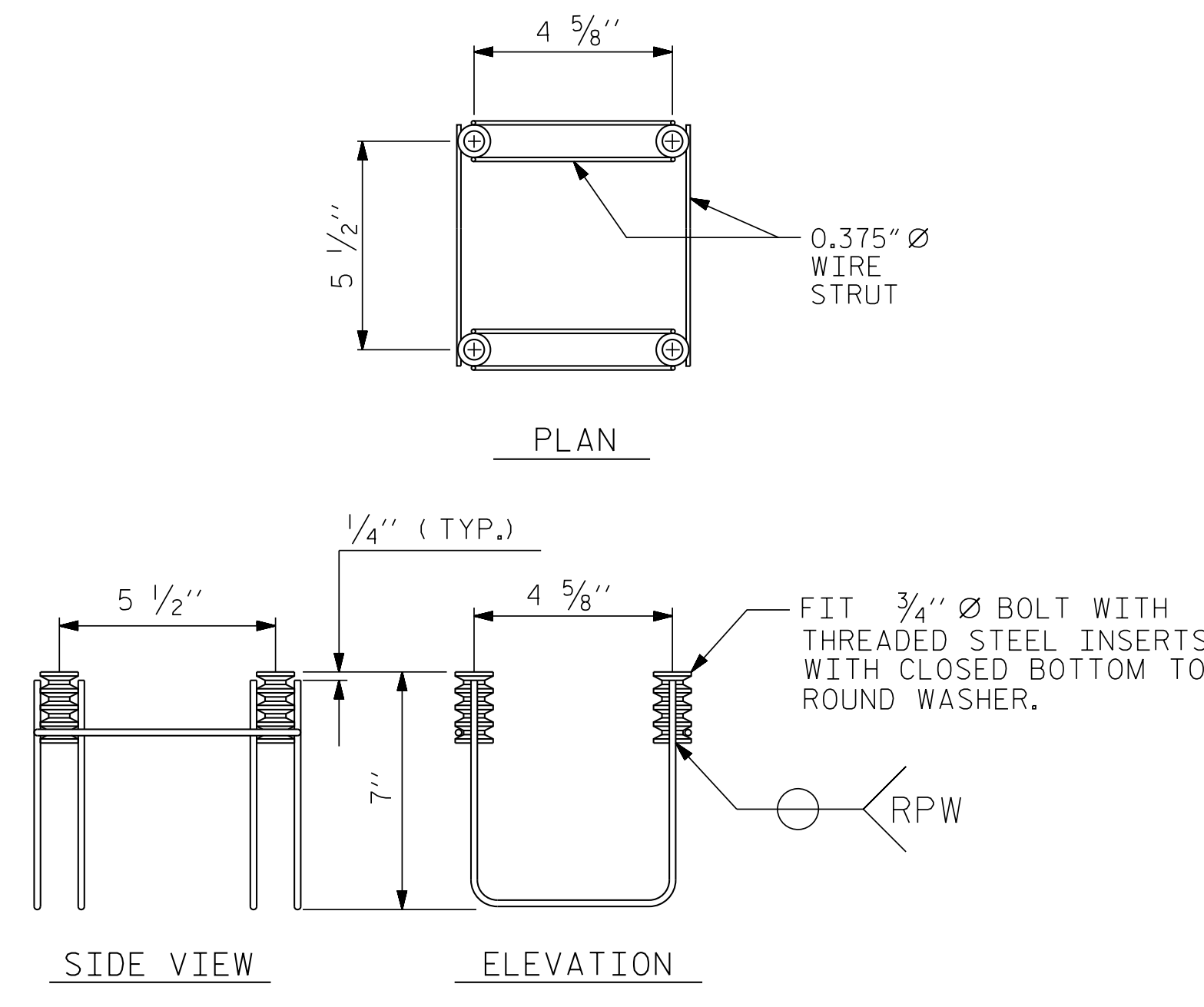
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

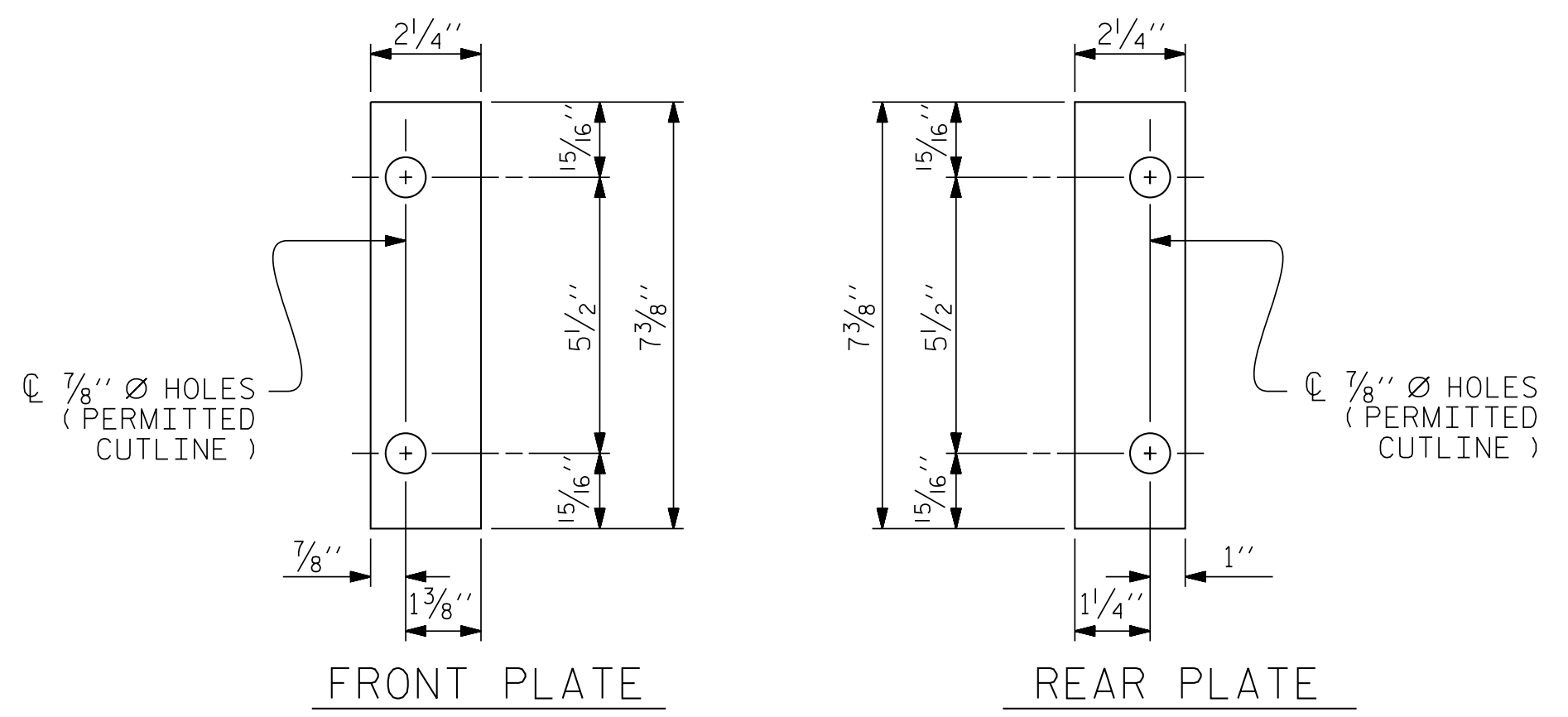
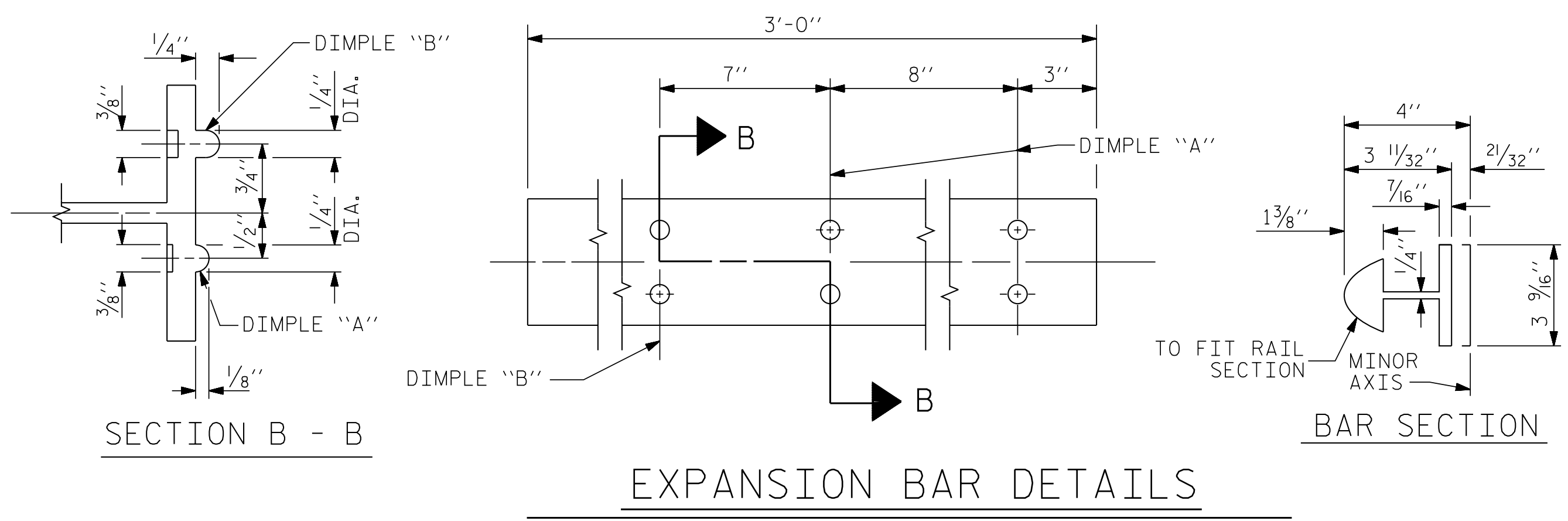
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



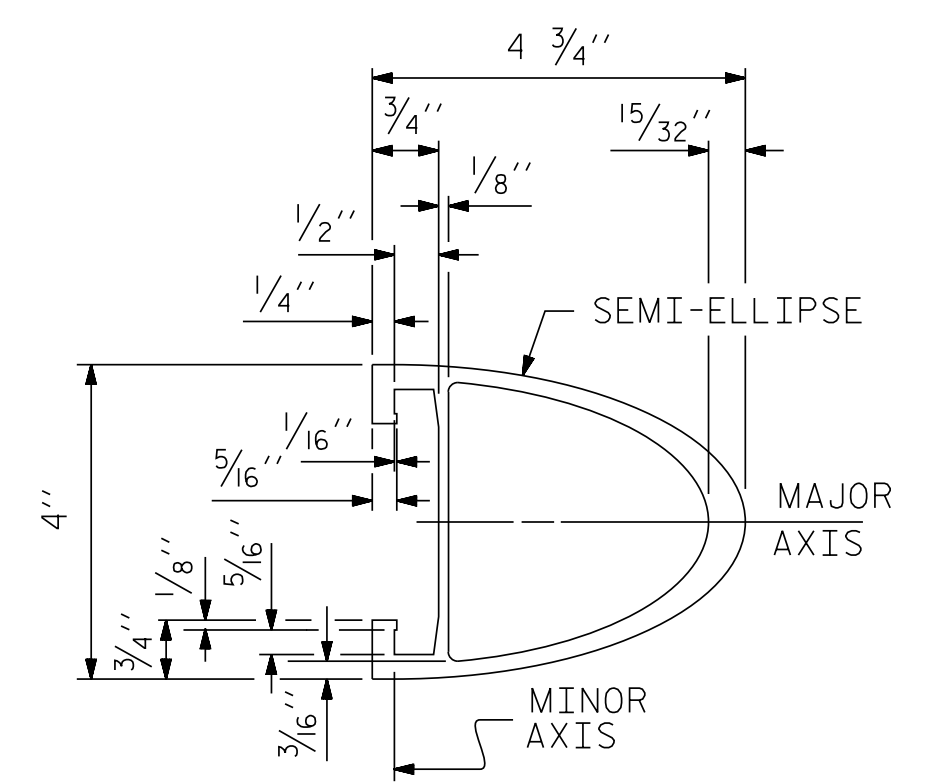
4-BOLT METAL RAIL ANCHOR ASSEMBLY

( 39 ASSEMBLIES REQUIRED )

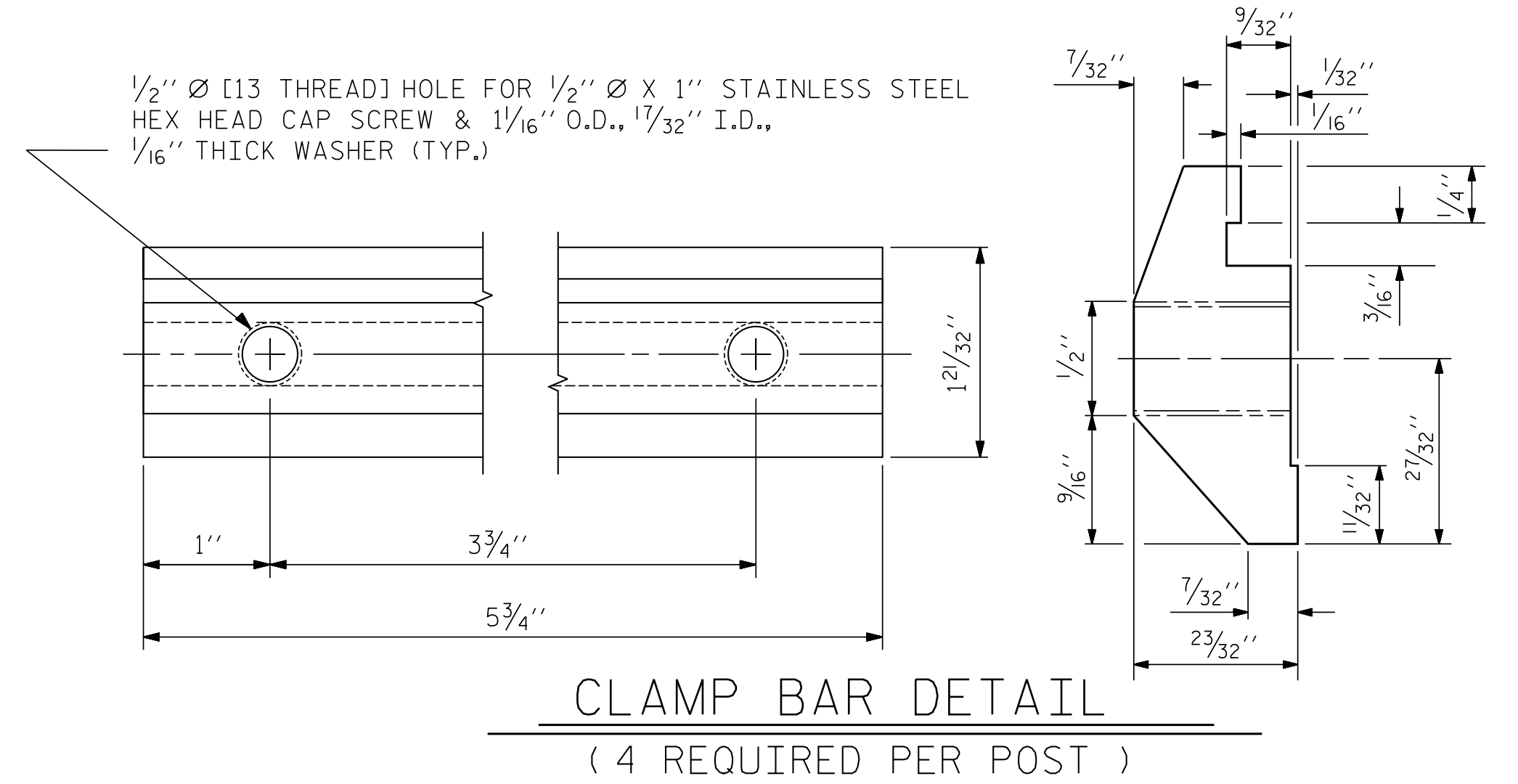


SHIM DETAILS

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

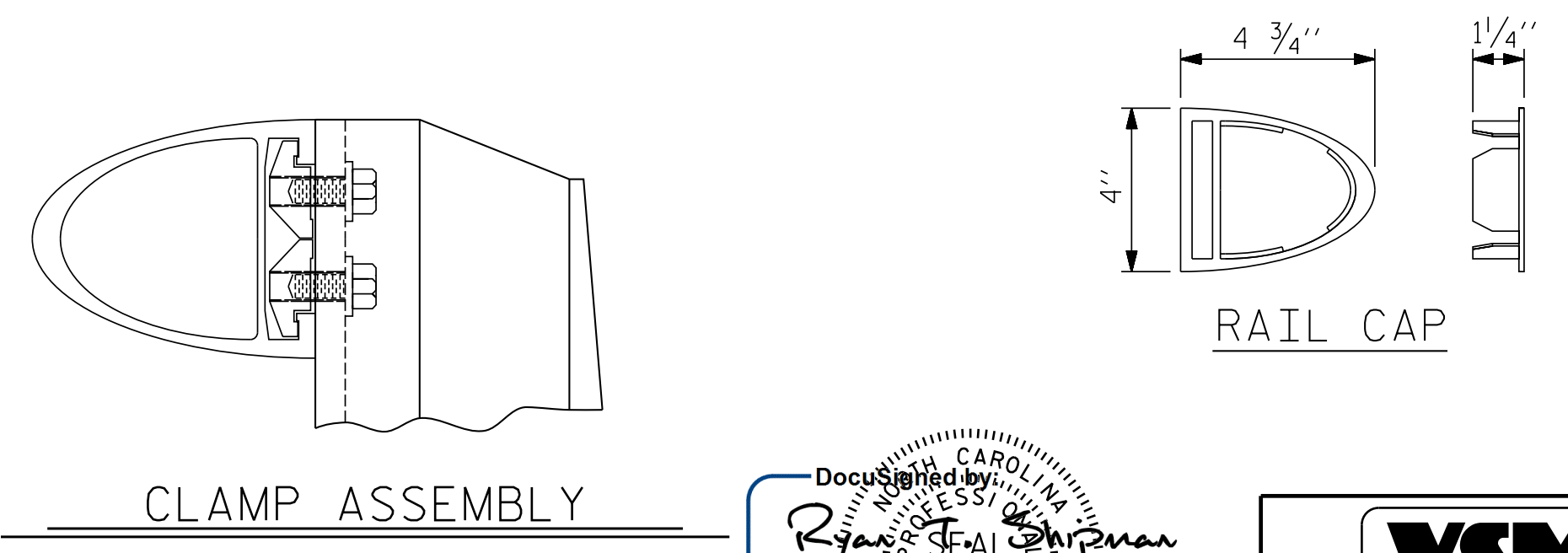


RAIL SECTION



CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



PROJECT NO. U-5887  
 HENDERSON COUNTY  
 STATION: 11+25.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD  
 2 BAR METAL RAIL

REVISIONS						SHEET NO. W-13
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			36

DRAWN BY : EEM 6/94  
 CHECKED BY : RCW 6/94

REV. 5/1/06R  
 REV. 10/1/11  
 REV. 12/17

KMM/GM  
 MAA/GM  
 MAA/THC

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8/19/2020 10:41 AM TYLER SHIPMAN

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NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

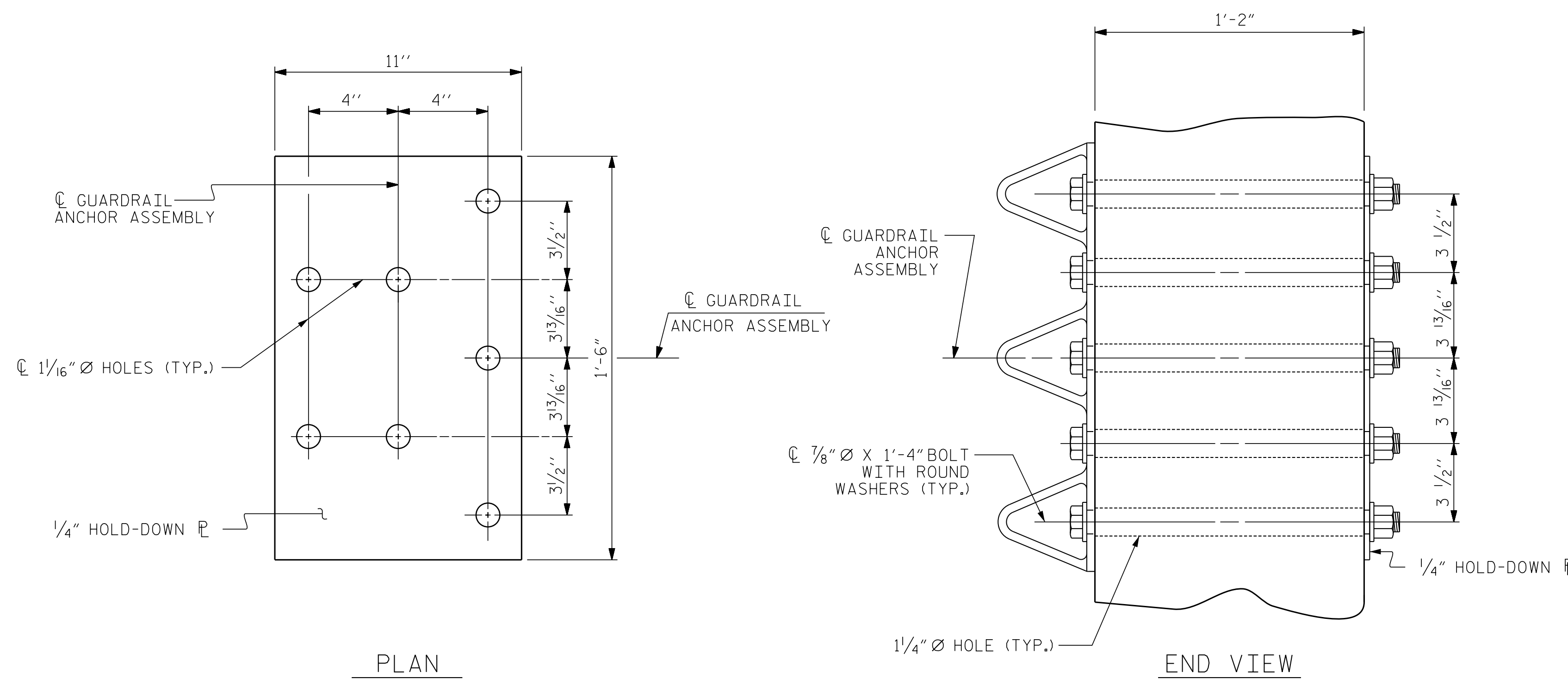
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

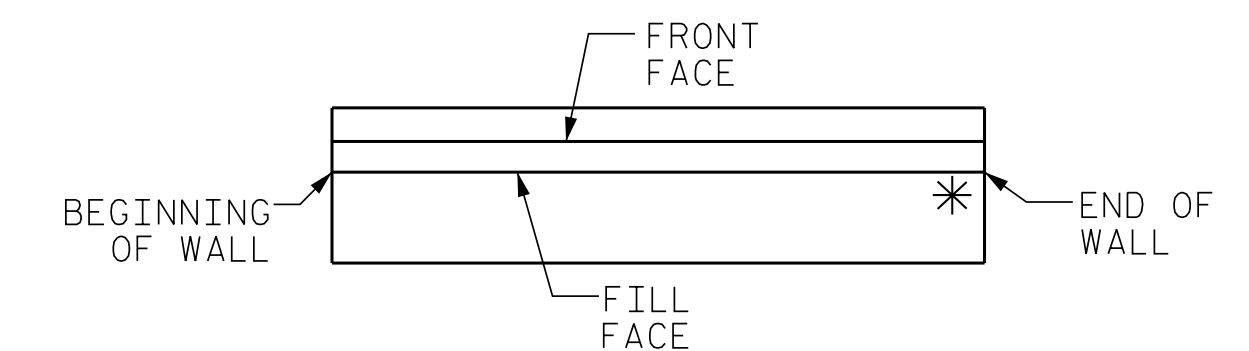
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



PLAN

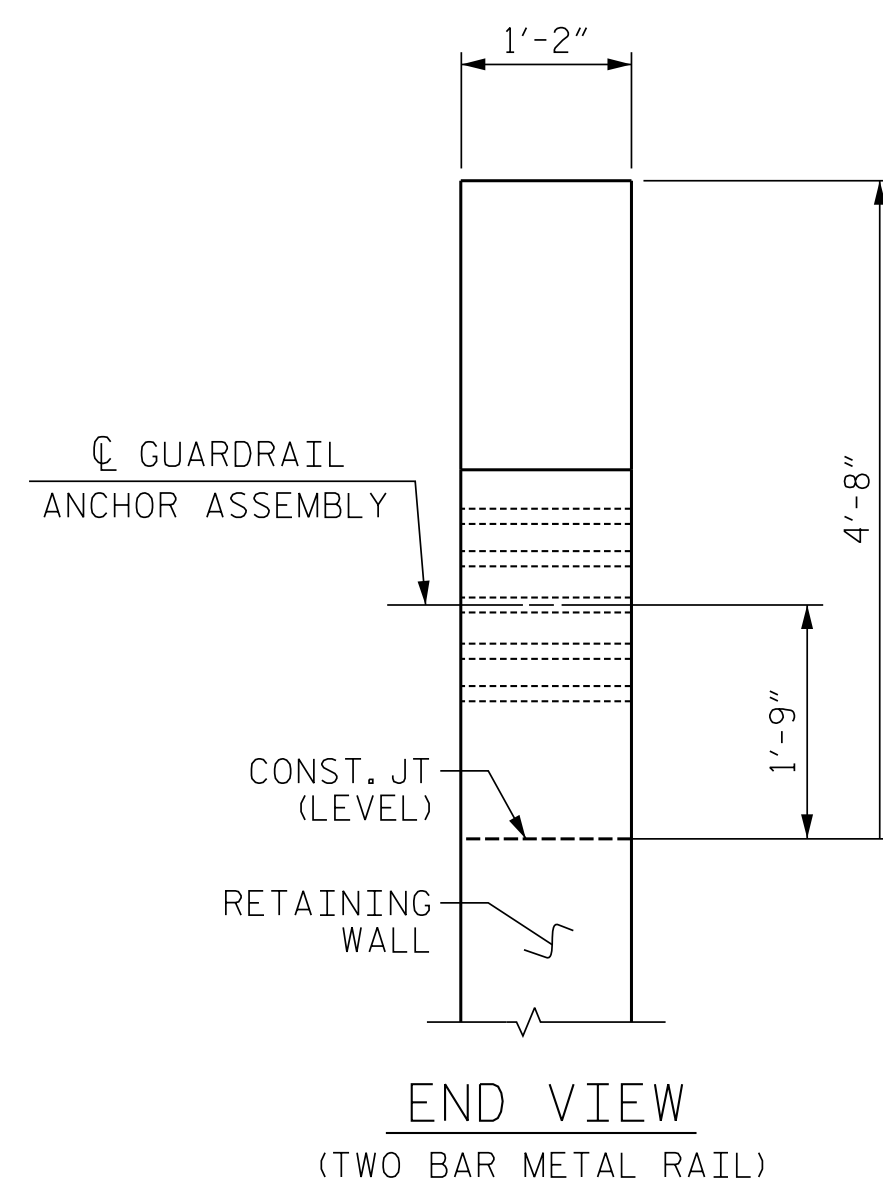
END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

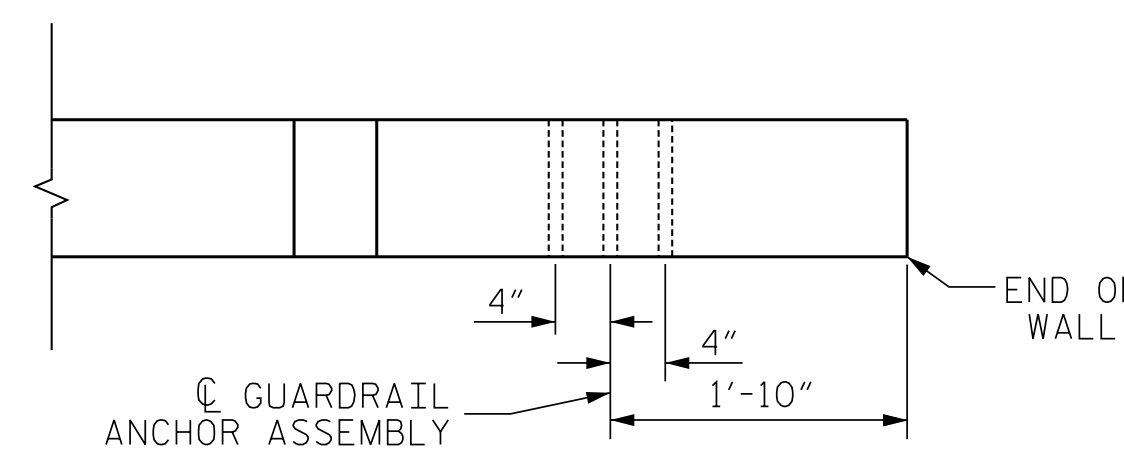


SKETCH SHOWING POINTS OF ATTACHMENT

\*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW  
(TWO BAR METAL RAIL)



PLAN  
(FOOTING NOT SHOWN FOR CLARITY)

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-5887  
 HENDERSON COUNTY  
 STATION: 11+25.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS

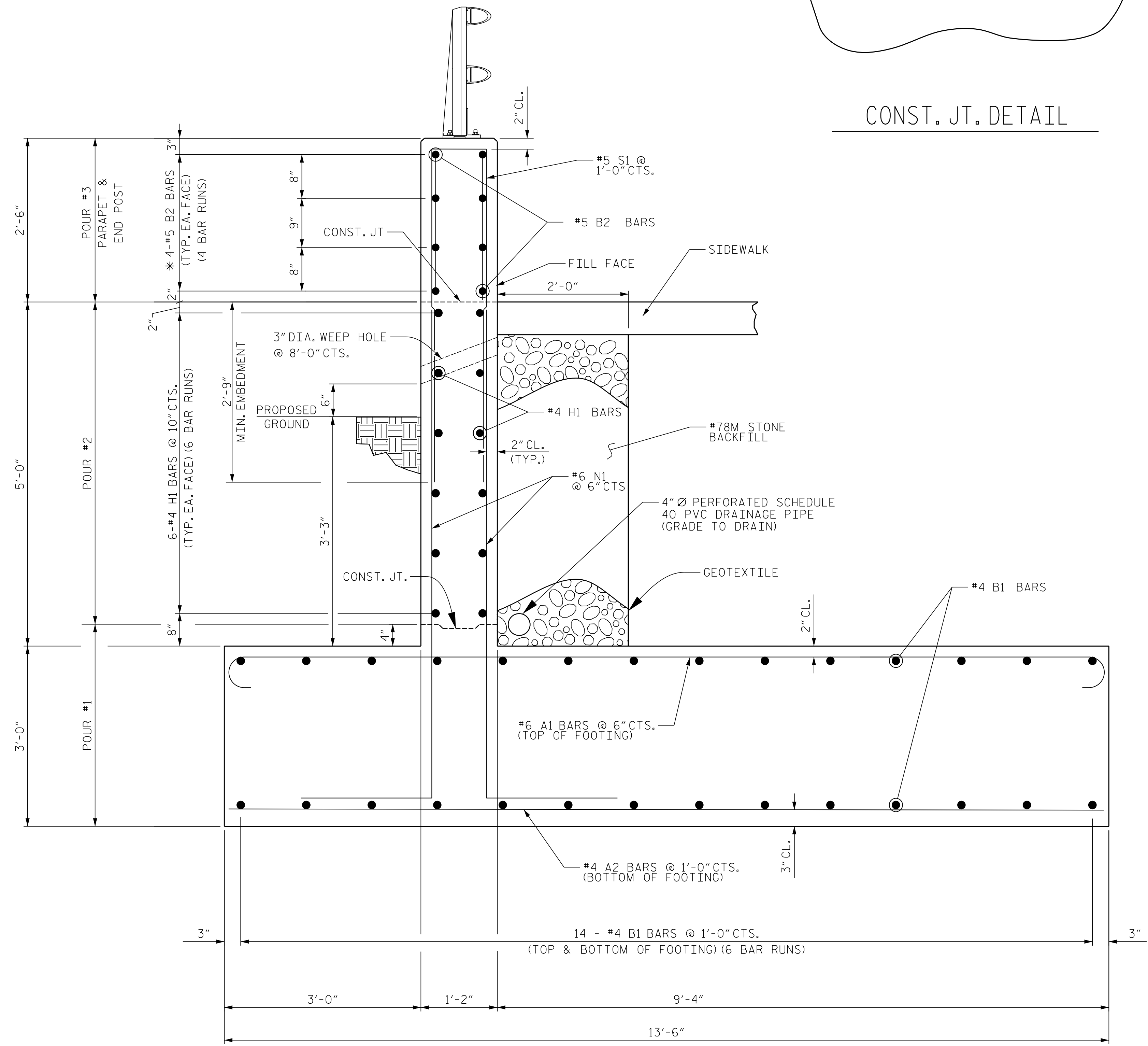
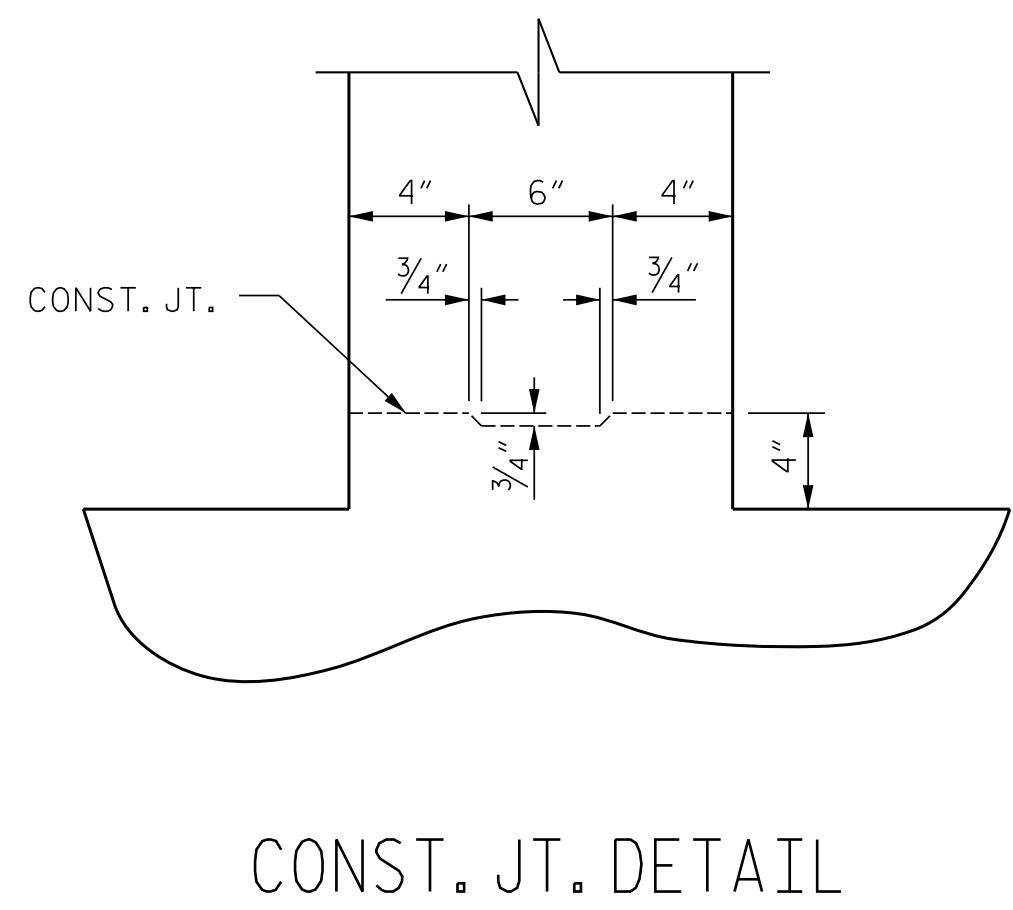
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 Ryan A. Teasdale  
 046056  
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 TYLER SHIPMAN

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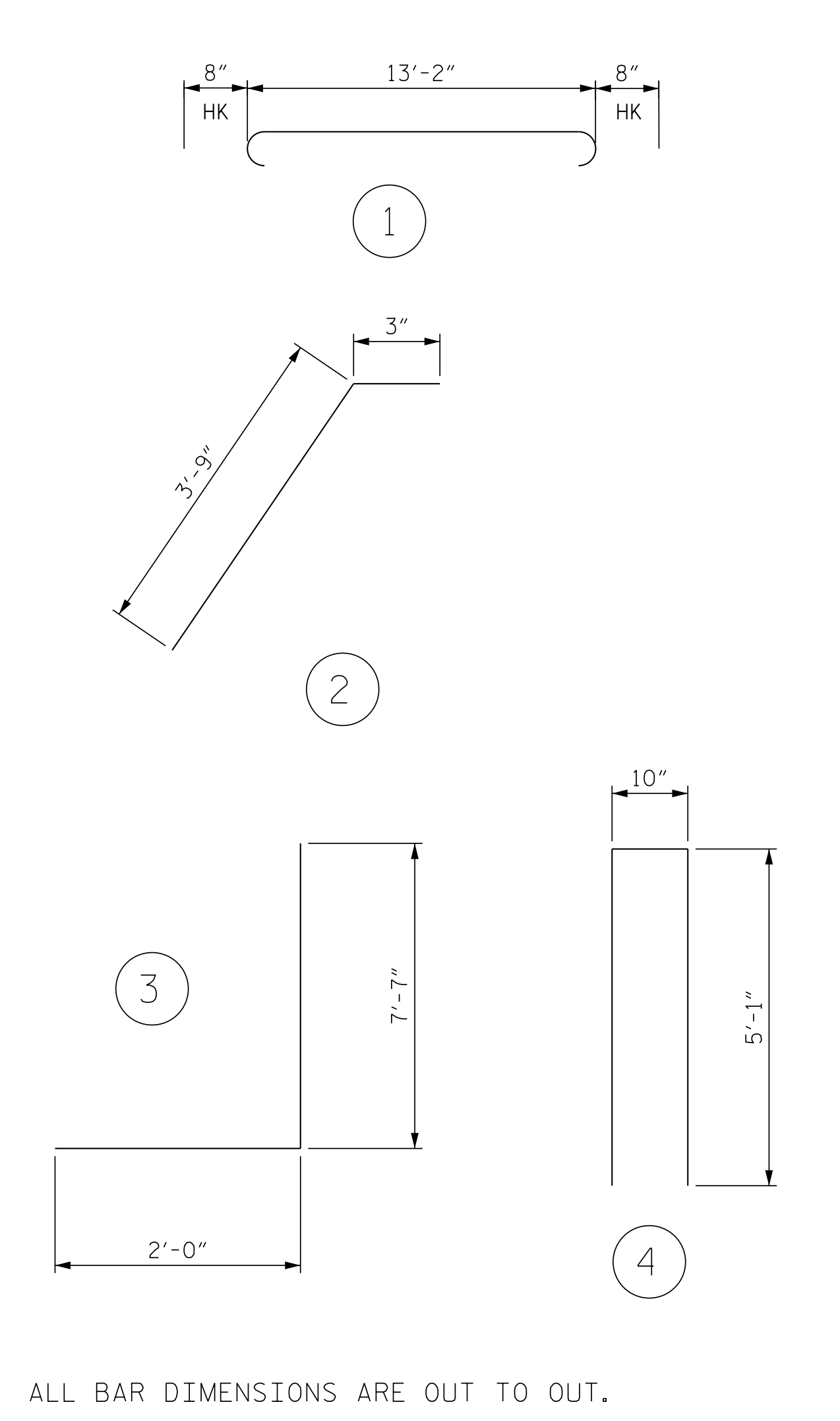
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	W-14
1			3			TOTAL SHEETS
2			4			36

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BAR TYPES



BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	391	#6	1	14'-6"	8516
A2	196	#4	STR	13'-2"	1724
B1	168	#4	STR	35'-0"	3928
*B2	32	#5	STR	50'-11"	1699
*E1	4	#7	STR	4'-4"	35
*E2	4	#7	STR	3'-10"	31
*E3	4	#7	STR	3'-4"	27
*E4	4	#7	STR	2'-10"	23
*E5	4	#7	STR	2'-4"	19
*F1	4	#6	STR	2'-2"	13
*F2	4	#6	2	4'-0"	24
H1	72	#4	STR	34'-6"	1659
N1	782	#6	3	9'-7"	11256
*S1	196	#5	4	11'-0"	2249
REINFORCING STEEL				27,083 LBS	
*EPOXY COATED REINFORCING STEEL				4120 LBS	
CLASS A CONCRETE					
POUR #1				297.8 CY	
POUR #2				39.5 CY	
POUR #3				21.5 CY	
TOTAL				358.8 CY	

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-3"
#6	3'-10"	2'-7"
#7	5'-3"	3'-6"
#8	6'-10"	4'-7"

PROJECT NO. U-5887  
 HENDERSON COUNTY  
 STATION: 11+25.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

RETAINING WALL  
 DETAILS

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 Ryan J. Shipman  
 046056  
 1358724964468  
 AN TYLER SHIPMAN  
 8/19/2020

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REVISIONS						SHEET NO. W-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 36
2			4			

## 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.
	--	27,000 LBS. PER SQ. IN.
	--	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	----	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

### MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

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

### CONCRETE:

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

### CONCRETE CHAMFERS:

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

### DOWELS:

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

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

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

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

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

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

### REINFORCING STEEL:

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

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

### STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE  $\frac{7}{8}$ "  $\emptyset$  SHEAR STUDS FOR THE  $\frac{3}{4}$ "  $\emptyset$  STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 -  $\frac{7}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF  $\frac{7}{8}$ "  $\emptyset$  STUDS ALONG THE BEAM AS SHOWN FOR  $\frac{3}{4}$ "  $\emptyset$  STUDS BASED ON THE RATIO OF 3 -  $\frac{7}{8}$ "  $\emptyset$  STUDS FOR 4 -  $\frac{3}{4}$ "  $\emptyset$  STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST  $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY  $\frac{1}{16}$ " INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

### HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

### SPECIAL NOTES:

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

DocuSigned by:  
*Christopher B. Cordell*  
50BE3A274F4E438  
9/2/2020

ENGLISH

JANUARY, 1990

STD. NO. SN