

MITCHELL MILL BRIDGE
WAKE COUNTY, NC
MISCELLANEOUS SUPERSTRUCTURE
DETAILS, SUBSTRUCTURE
PLANS, AND WALL PLANS

PROJECT RESERVE @ MITCHELL MILL
WAKE COUNTY
LOCATION: NEAR ROLESVILLE

SHEET OF

PRELIMINARY PLANS
DO NOT USE
FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

MITCHELL MILL
BRIDGE

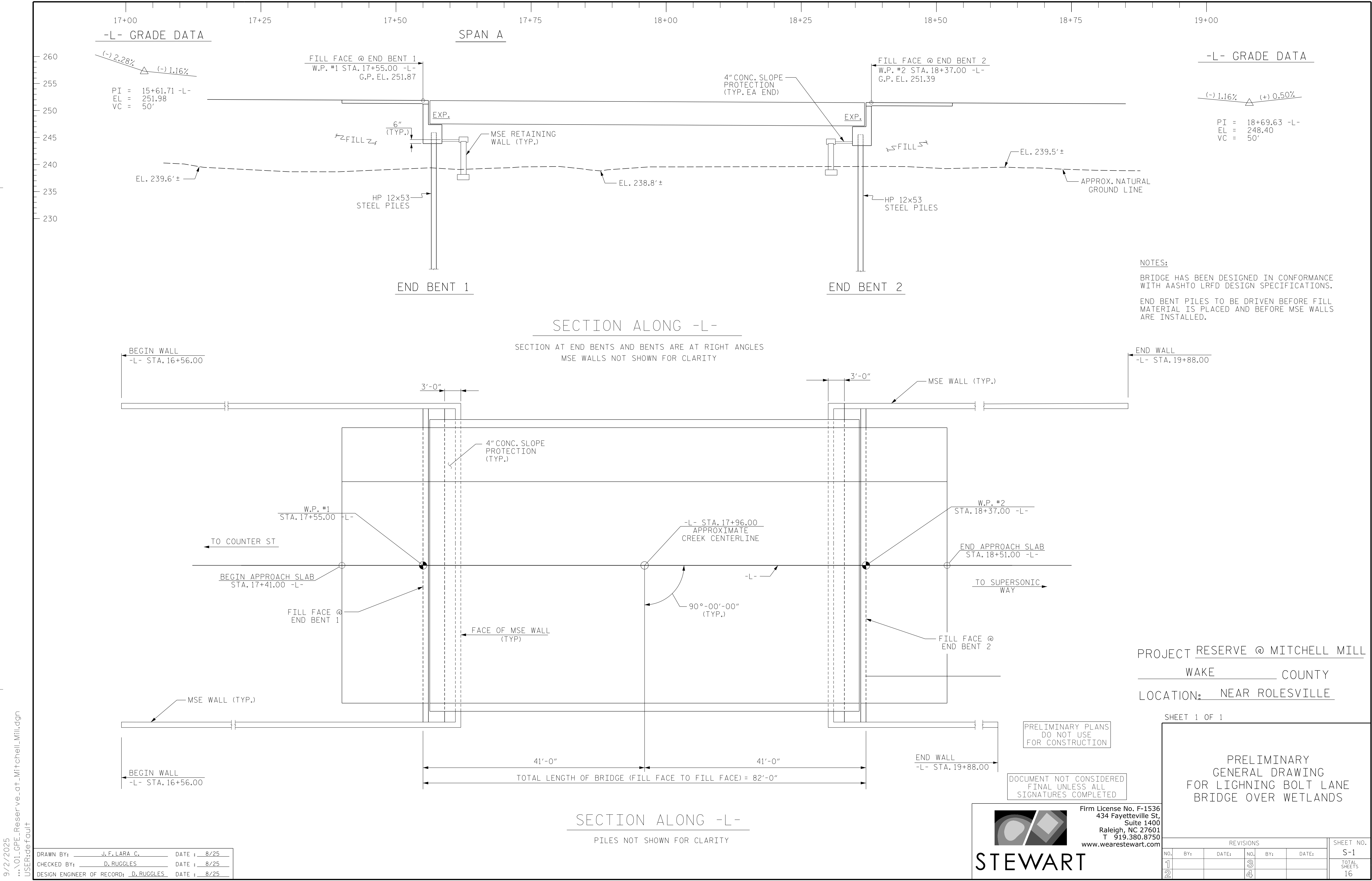


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STEWART

DRAWN BY:	J. F. LARA C.	DATE :	8/25
CHECKED BY:	D. RUGGLES	DATE :	8/25
DESIGN ENGINEER OF RECORD:	D. RUGGLES	DATE :	8/25

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-0
1			3			TOTAL SHEETS 16
2			4			



9/2/2025
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1			3			S-1
2			4			
TOTAL SHEETS						16



Technical drawing of a 1/2 inch thick plate with a central vertical slot and a horizontal slot. The plate has a total width of 7 1/4 inches and a total height of 7 1/2 inches. The central vertical slot is 1 1/16 inches wide and 3 inches deep. The horizontal slot is 1 3/4 inches wide and 1/4 inch deep. The plate is 1/2 inch thick. Dimensions are given in inches and millimeters (±0.015 inch and ±0.12 mm).

Technical drawing of a tapered wooden board. The drawing shows two views: a side elevation and a top view. The side elevation shows a board with a length of 2'-0 1/8" and a width of 2'-10 1/8". The top view shows a board with a thickness of 7 1/2" and a taper of 1". The board is shown with a wavy bottom edge, indicating it is a curved board.

Technical drawing of a three-piece metal assembly, likely a cover or plate, showing dimensions and specifications.

Overall Dimensions:

- Total Height: 3'-1"
- Total Width: 2'-10 1/8"

Individual Piece Dimensions:

- Top Piece Height: 1' 11/16"
- Middle Piece Height: 1' 11/16"
- Bottom Piece Height: 2'-0 1/8"

Internal Features and Details:

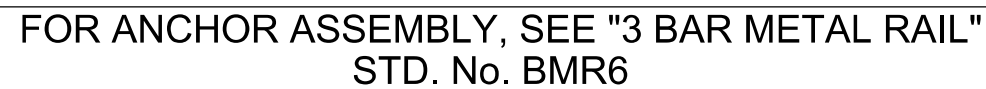
- Holes:** 6 - .825" Ø HOLES PUNCHED FOR RIVETS (indicated by circles with a cross).
- Slots:** 9/16" x 13/16" SLOTS (TYP.) (indicated by dashed lines).
- Drill Holes:** 5/16" Ø DRILL 1" DEEP & 3/8" Ø [16 THREAD] TAP (indicated by a small circle with a cross).

Dimensions for Holes and Slots:

- Top Piece: 2 9/16" (width of hole pattern), 2 9/16" (width of slot pattern), 1 11/16" (height of slot pattern).
- Middle Piece: 1 5/8" (height of hole pattern), 2 7/16" (height of slot pattern), 2 7/16" (height of slot pattern).
- Bottom Piece: 9" (height of hole pattern), 4 3/16" (height of slot pattern), 2'-0 1/8" (total height of bottom piece).

6 - .825" Ø HOLES
PUNCHED FOR RIVETS

5/16" Ø DRILL 1" DEEP &
3/8" Ø [16 THREAD] TAP
7/8" DEEP FOR 3/8" Ø x 1 1/2"
STAINLESS STEEL CAP SCREW



1.786"
($\pm .005$ ")

.811"
.806"

RIVET DETAIL

7 $\frac{1}{4}$ "

6 - .825 \varnothing
HOLES PUNCHED

8 $\frac{3}{4}$ "

2 $\frac{13}{16}$ " 5 $\frac{1}{8}$ " 2 $\frac{13}{16}$ "

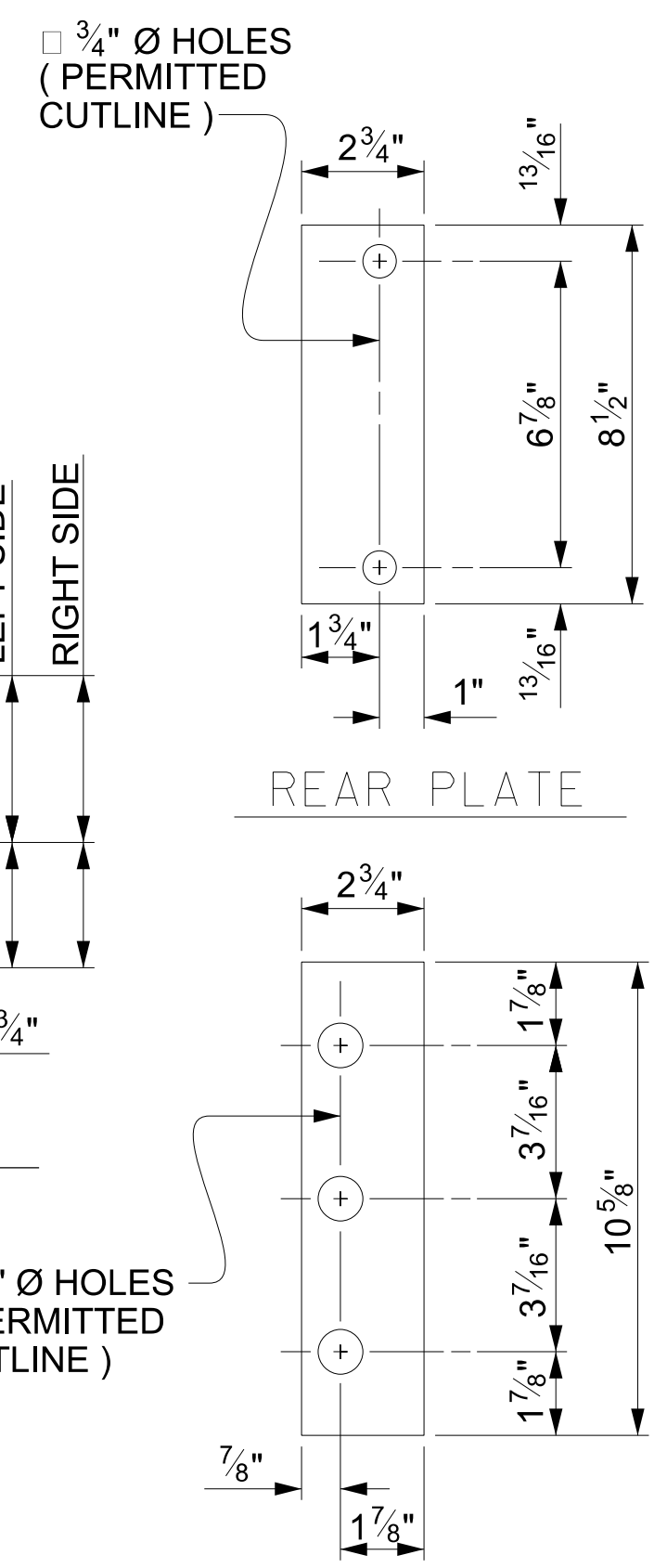
1 $\frac{5}{8}$ " 2 $\frac{7}{16}$ " 2 $\frac{7}{16}$ "

7 $\frac{7}{8}$ "

7 $\frac{7}{8}$ "

□ 1" Ø HOLES
(PERMITTED
CUTLINE)

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



AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: ASTM A36 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO ASTM A123.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT THEIR OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO ENSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAIN VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

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

PAY LENGTH = LIN.FT.

PROJECT NO. RESERVE @ MITCHELL MILL

WAKE COUNTY

LOCATION: NEAR ROLESVILLE

SHEET 1 OF 3

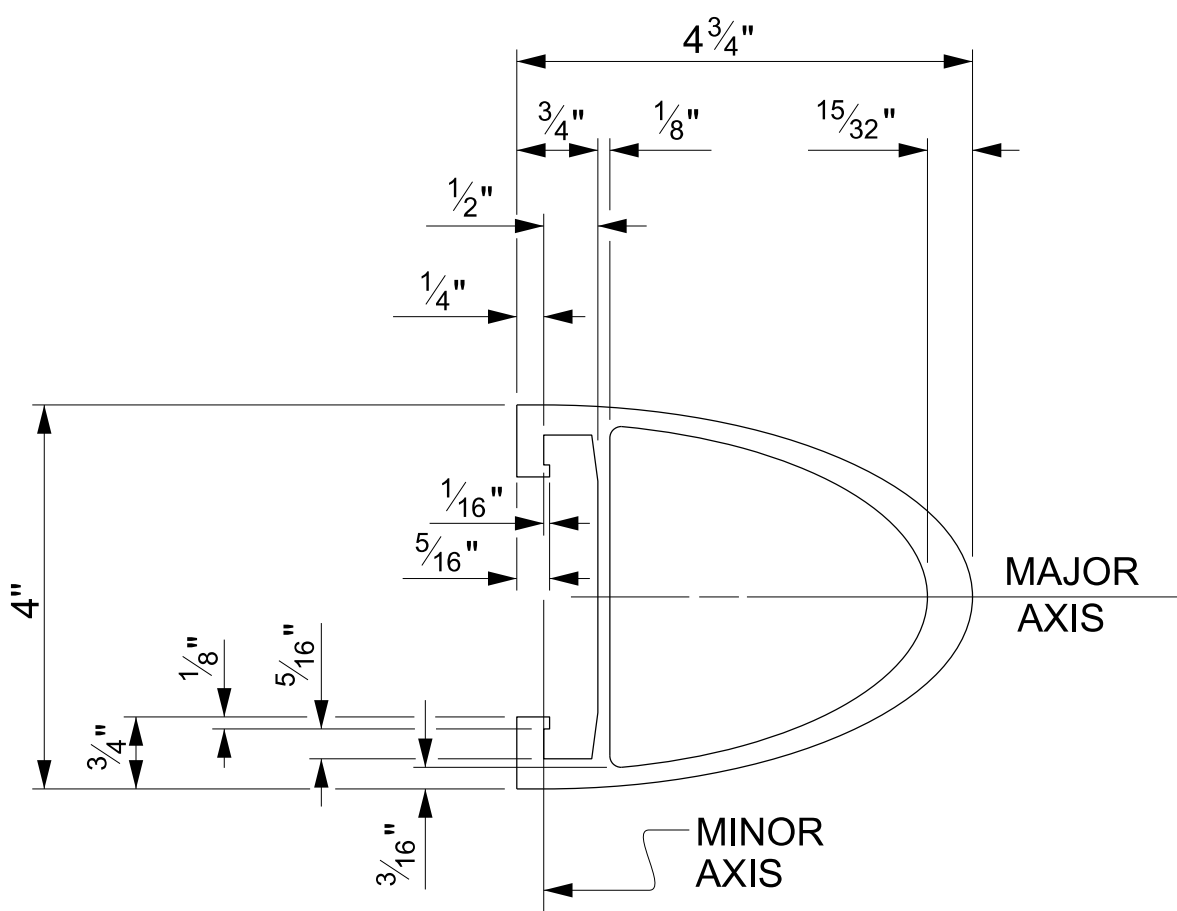
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

REVISIONS						SHEET NO. S-3
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 16
2			4			

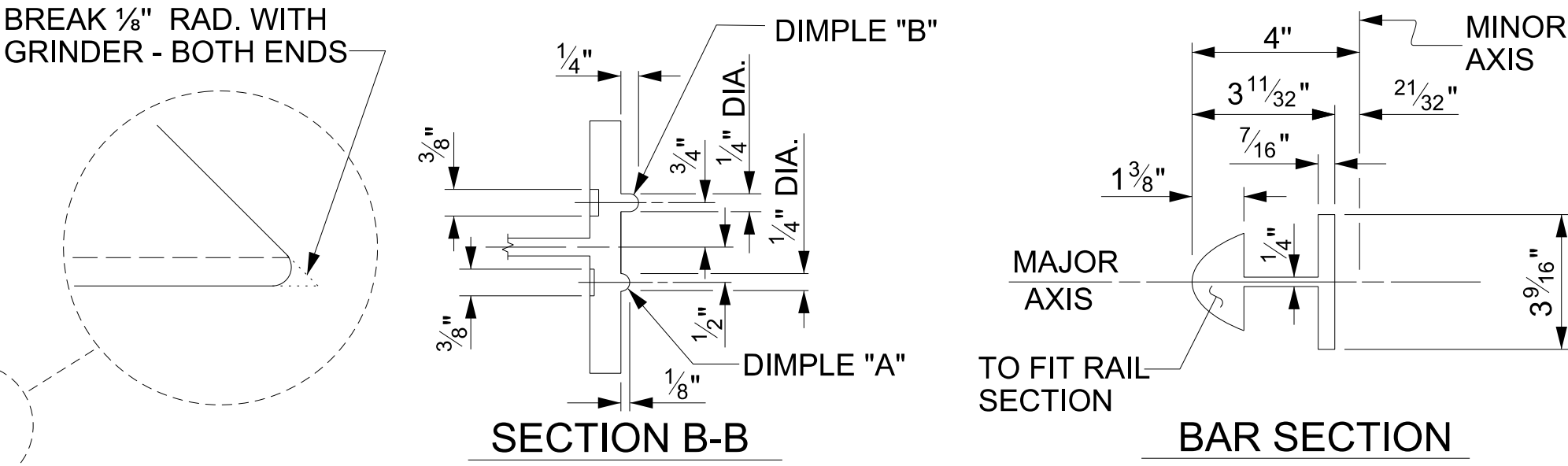
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Technical drawing of a mechanical part with the following dimensions and features:

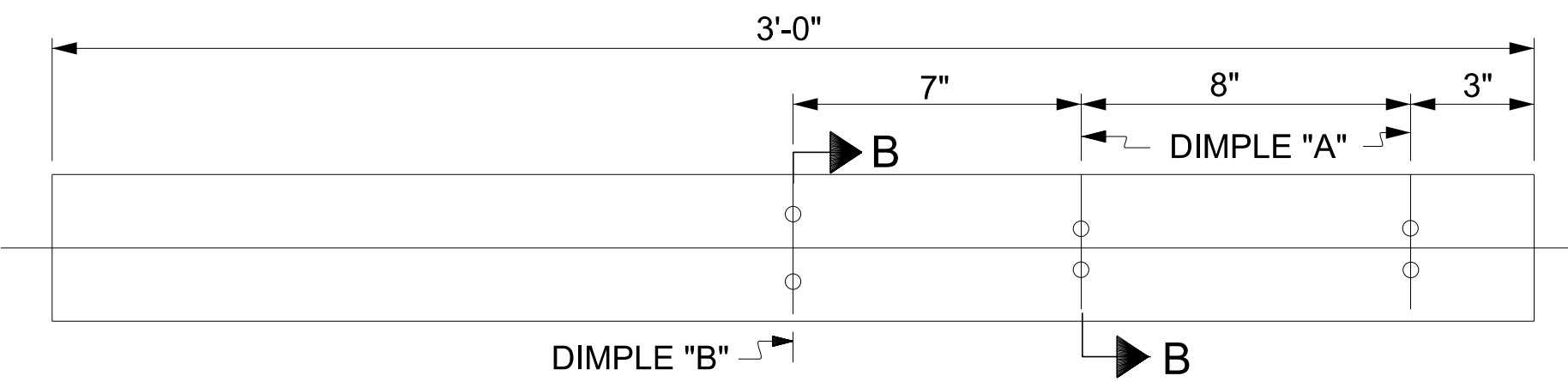
- Overall width: 5"
- Overall height: 12"
- Top left corner: 3/4" horizontal, 3/16" vertical.
- Left side: 1/16" horizontal, 5/16" vertical.
- Bottom left corner: 1/8" horizontal, 1/2" vertical.
- Right side: 3/32" horizontal, 1" vertical.
- Internal features: 1" RAD. (radius), 3" RAD. (TYP.) (typical radius), 10° (angle), 13/16" (dimension), .213" (TYP.) (typical dimension), 1" RAD. (radius).

(ASSEMBLIES REQUIRED)

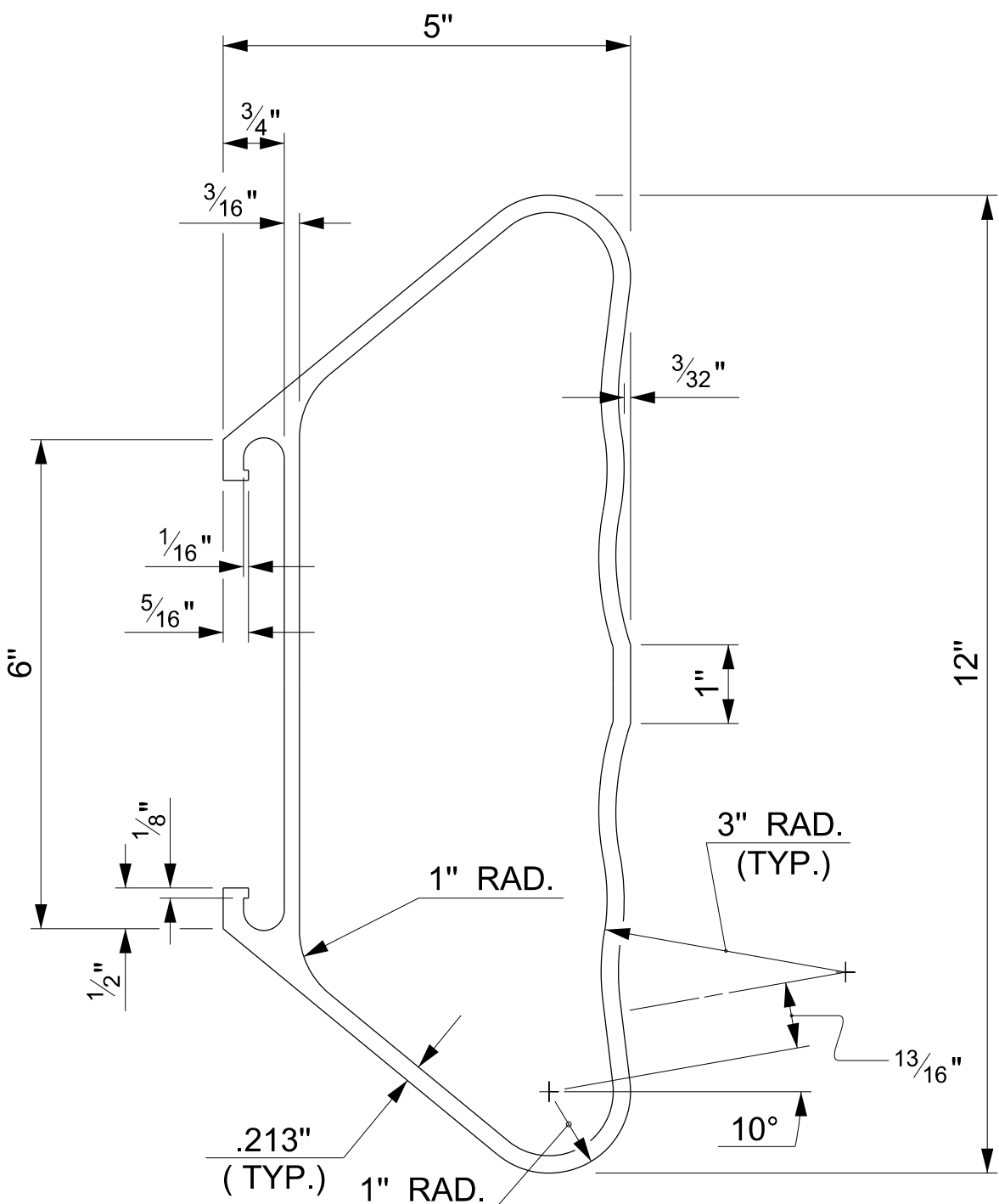


BAR SECTION

TOP & MIDDLE RAIL EXPANSION BAR



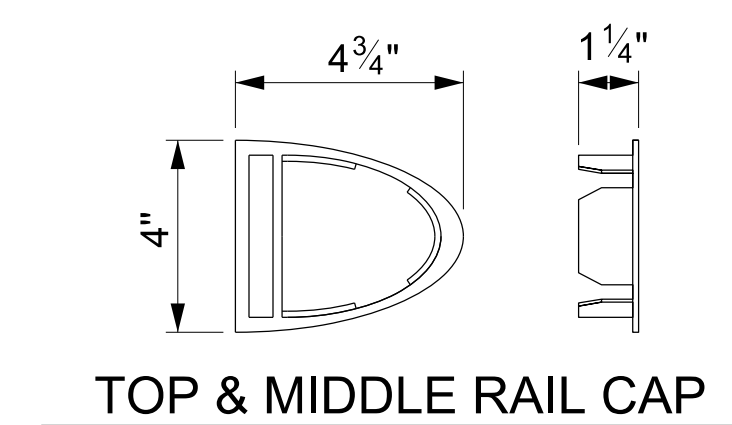
TOP & MIDDLE RAIL EXPANSION BAR



The technical drawing shows two views of a mechanical component:

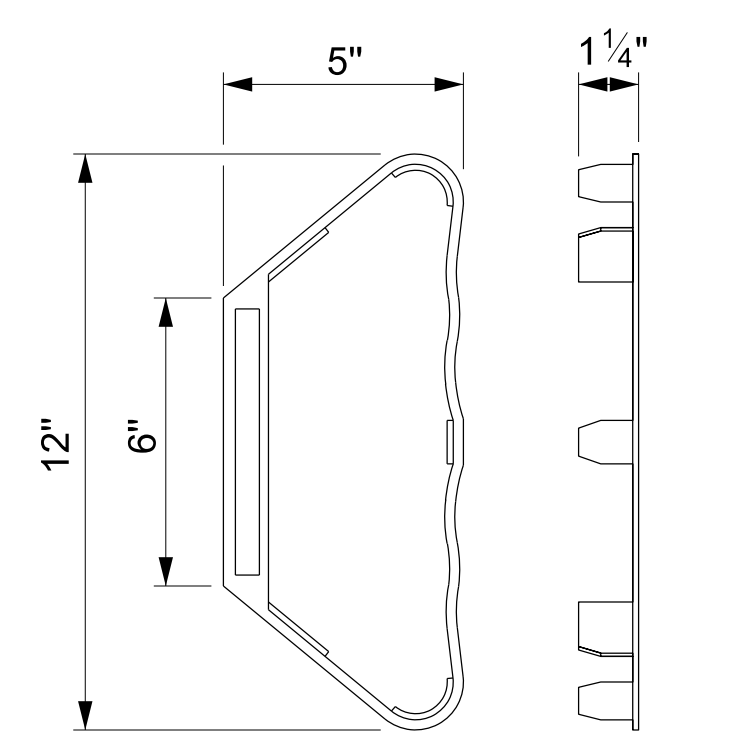
- Top View (Left):** A rectangular plate with overall dimensions of $\frac{7}{32}$ " by $2\frac{3}{32}$ ". It features a central slot that is $\frac{9}{32}$ " wide at its top edge and tapers to $\frac{1}{16}$ " at its bottom edge. The distance from the left edge to the start of the slot is $\frac{1}{32}$ ". There are additional vertical dimension lines indicating distances of $\frac{1}{2}$ ", $\frac{9}{16}$ ", and $\frac{11}{32}$ " from the top edge.
- Side View (Right):** Shows the profile of the part with a total height of $1\frac{21}{32}$ ". It includes a horizontal feature $\frac{1}{4}$ " thick and another section $\frac{9}{16}$ " high. The base has a width of $\frac{11}{32}$ ".

(6 REQUIRED PER POST)



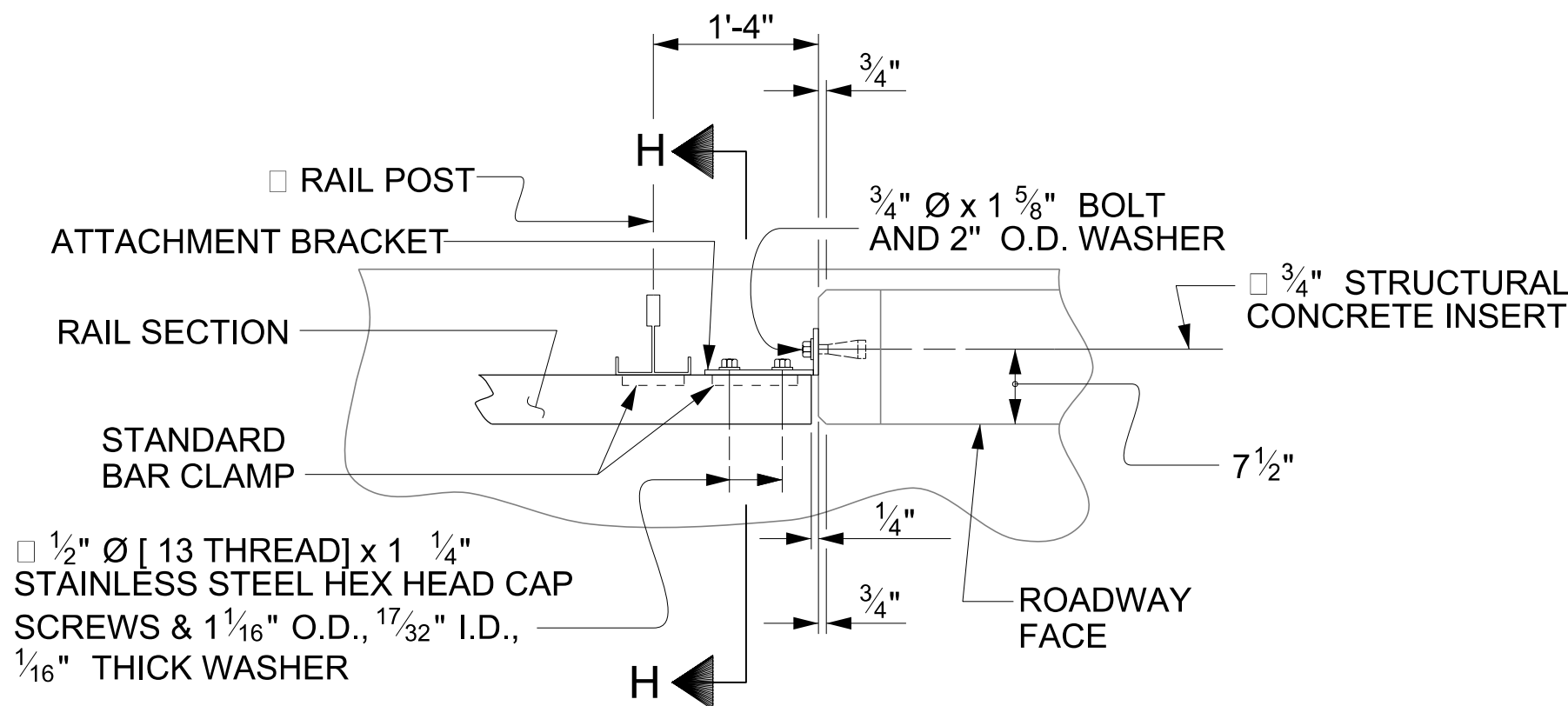
A technical drawing of a car seat headrest, labeled 'Fig. 1'. It shows a side profile of the headrest with a dashed line indicating the internal structure. The internal structure includes a central vertical support and two horizontal adjustment mechanisms, each with a spring and a locking pin. The drawing is a line drawing with no shading.

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)



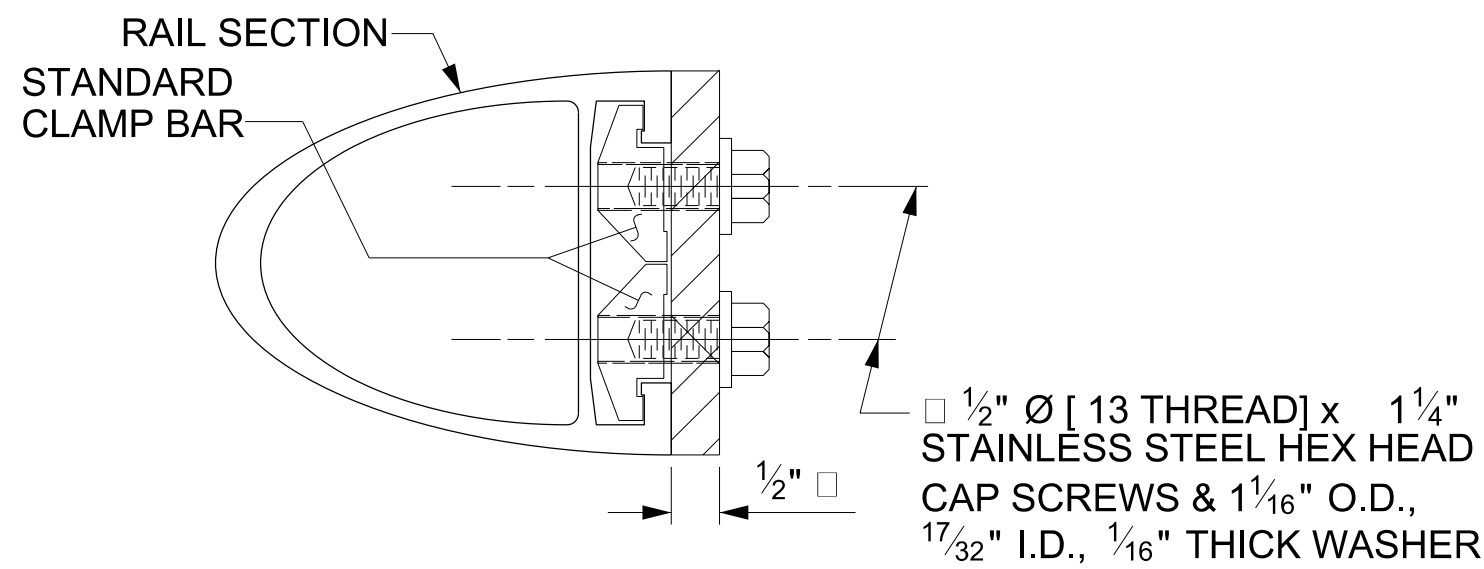
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STANDARD						SHEET NO.	
3 BAR METAL RAIL						S-4	
REVISIONS						TOTAL SHEETS 16	
NO.	BY:	DATE:	NO.	BY:	TOTAL DATE:		
1			3				
2			4				



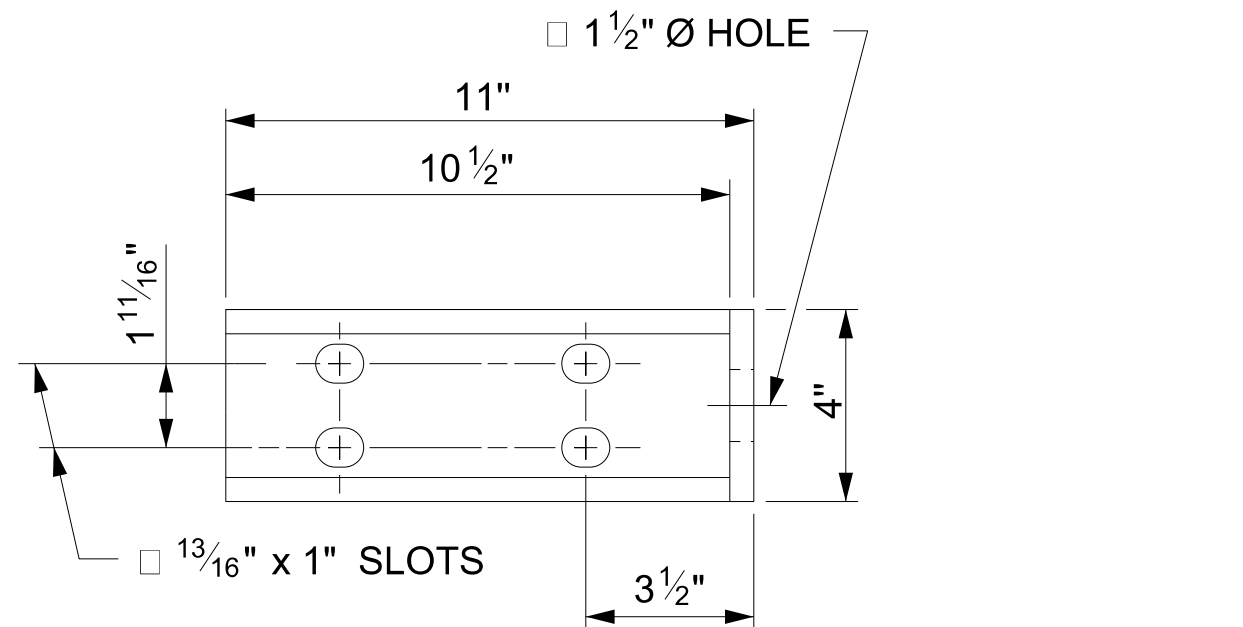
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" □ NOT SHOWN FOR CLARITY)

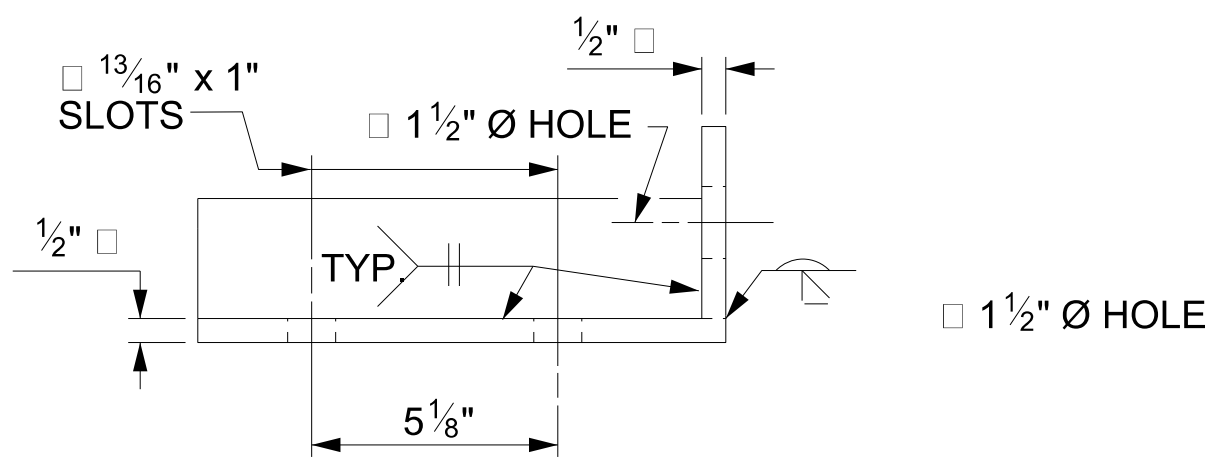


SECTION H-H

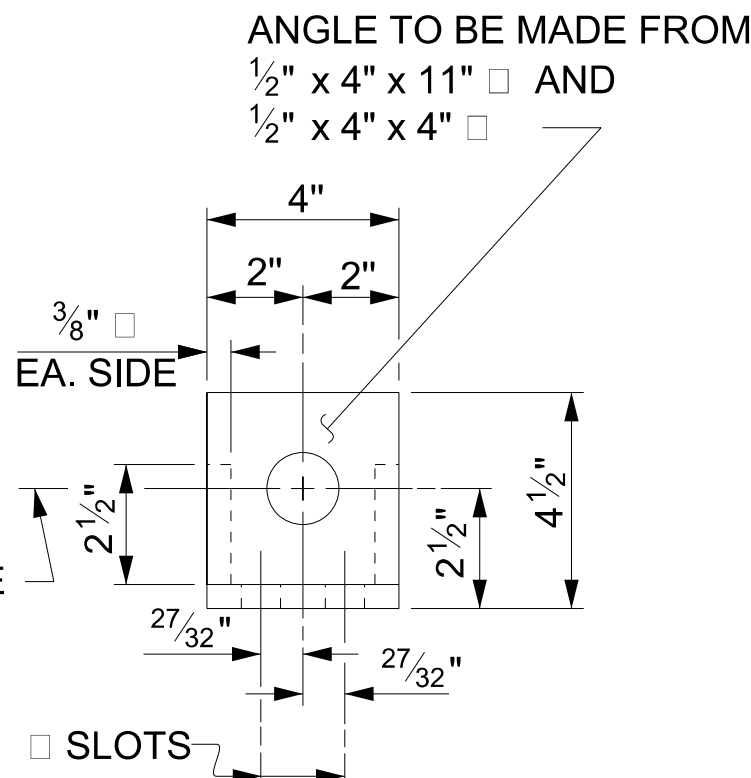
(FOR TOP & MIDDLE RAIL)



ELEVATION



PLAN



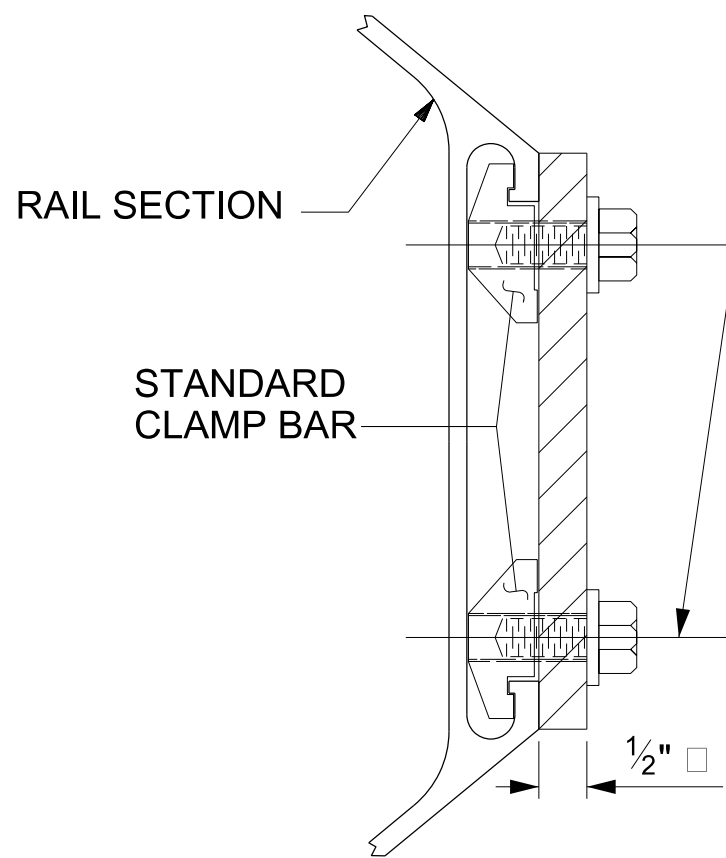
END VIEW

(FIX. AND EXP.)

DETAILS FOR ATTACHMENT BRACKET

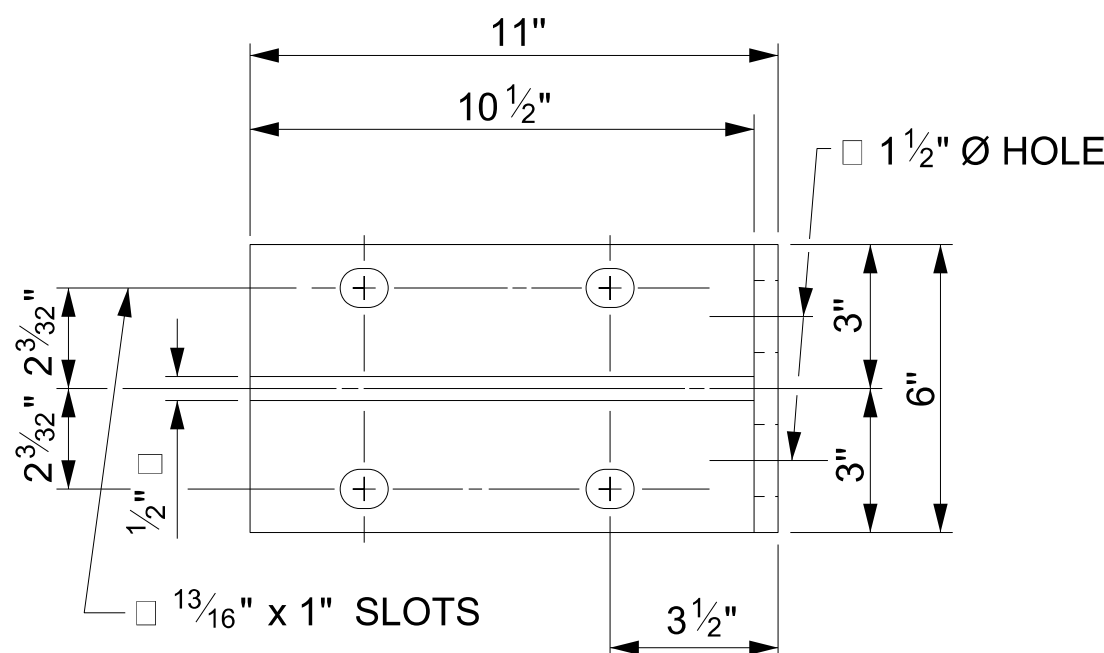
(TOP & MIDDLE RAIL ONLY)

1/2" Ø [13 THREAD] x 1 1/4" STAINLESS STEEL HEX HEAD CAP SCREWS & 1 1/16" O.D., 17/32" I.D., 1/16" THICK WASHER

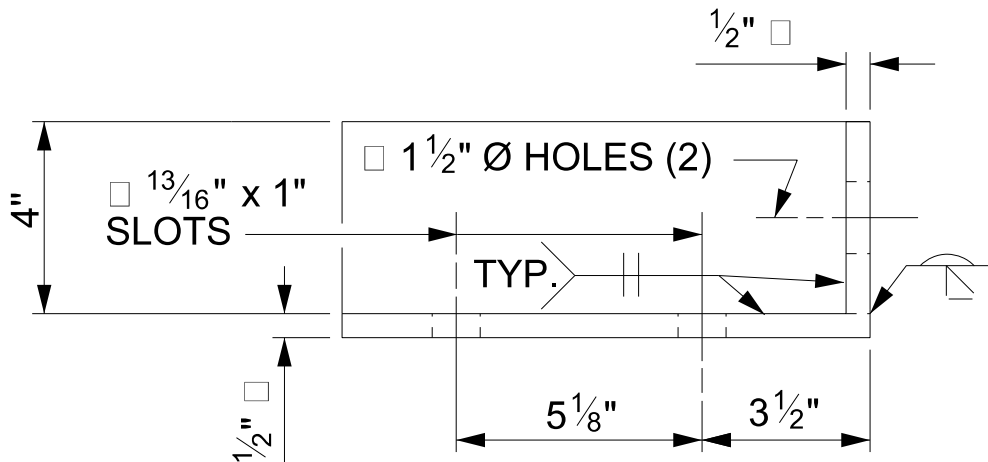


SECTION H-H

(FOR BOTTOM RAIL)



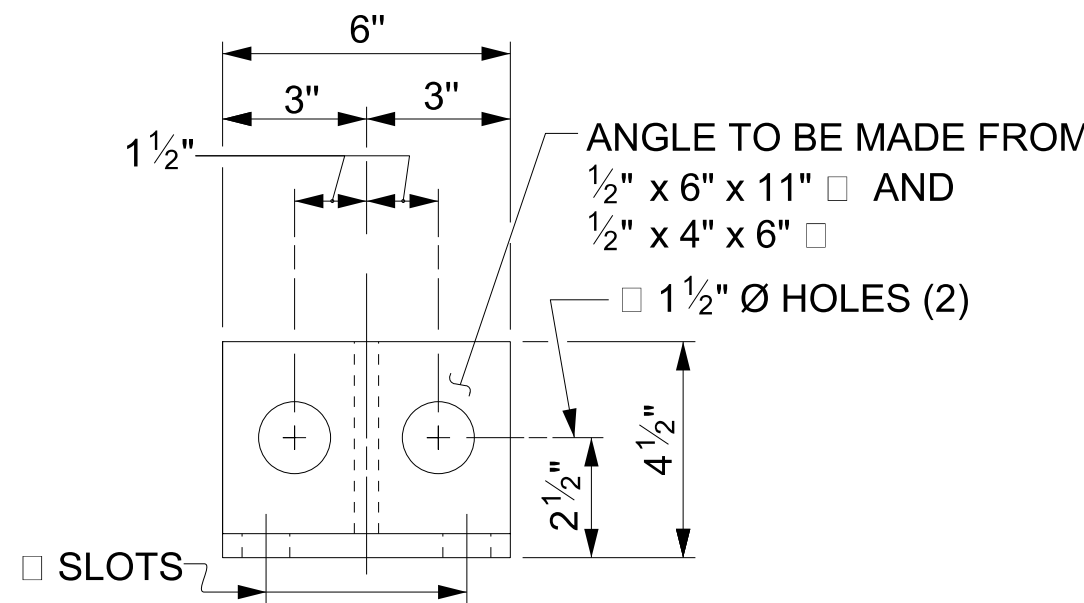
ELEVATION



PLAN

DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



END VIEW

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

- A. 1/2" PLATES SHALL CONFORM TO ASTM A36 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
- B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4,800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø x 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø x 1 5/8" BOLT SHALL HAVE N.C. THREADS.
- C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.
- D. STANDARD CLAMP BARS (STD. No. BMR6).

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

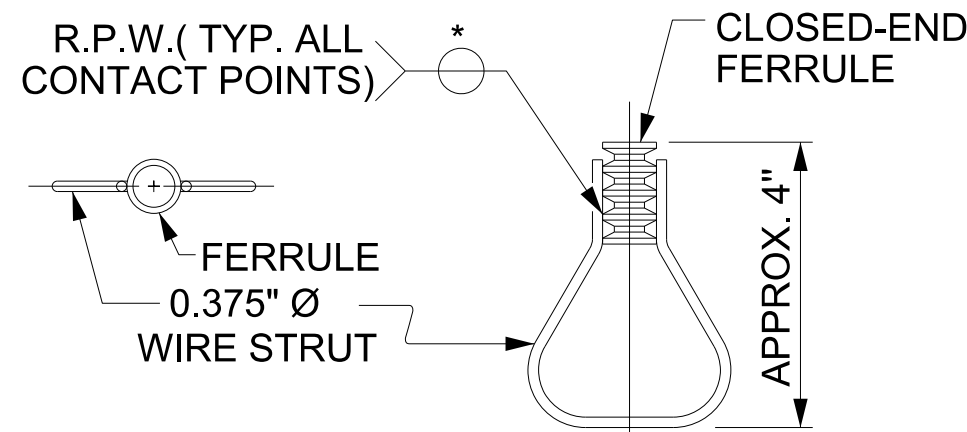
THE CONTRACTOR, AT THEIR OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø x 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø x 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø x 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø x 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT 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 1 1/2".
- B. 1 - 3/4" Ø x 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø x 1 5/8" GALVANIZED BOLT AND WASHER. 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 INSERT 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.



PLAN

ELEVATION

STRUCTURAL CONCRETE INSERT

* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. RESERVE @ MITCHELL MILL

WAKE COUNTY

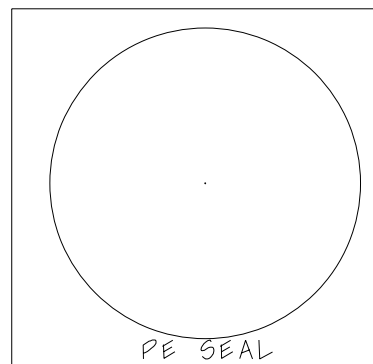
LOCATION: NEAR ROLESVILLE

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL



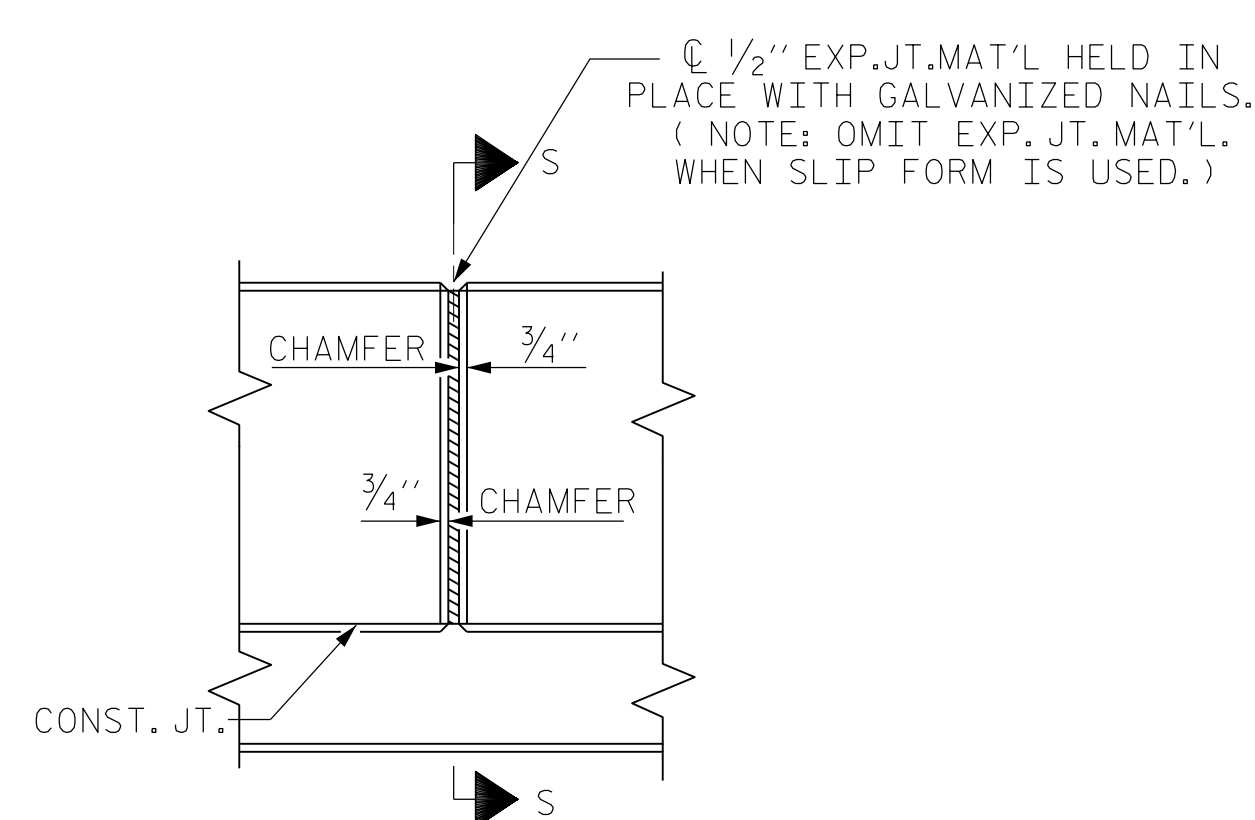
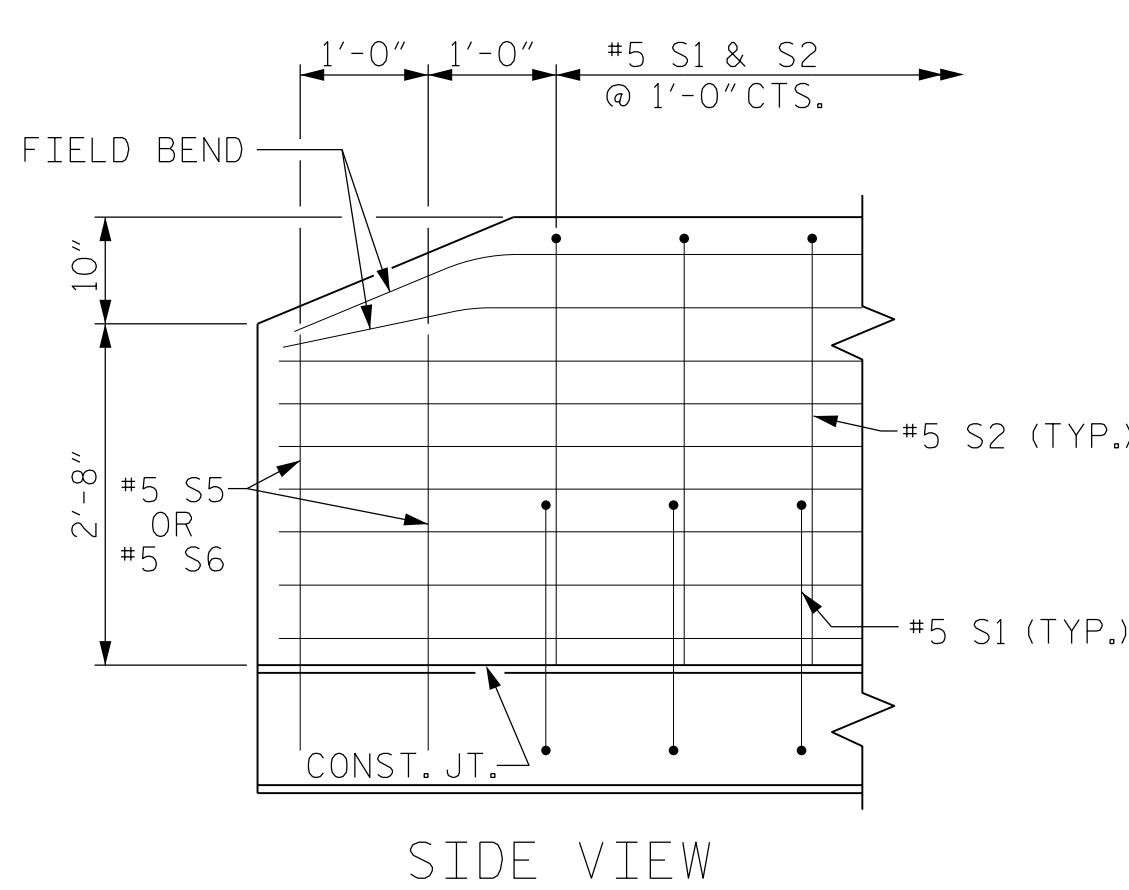
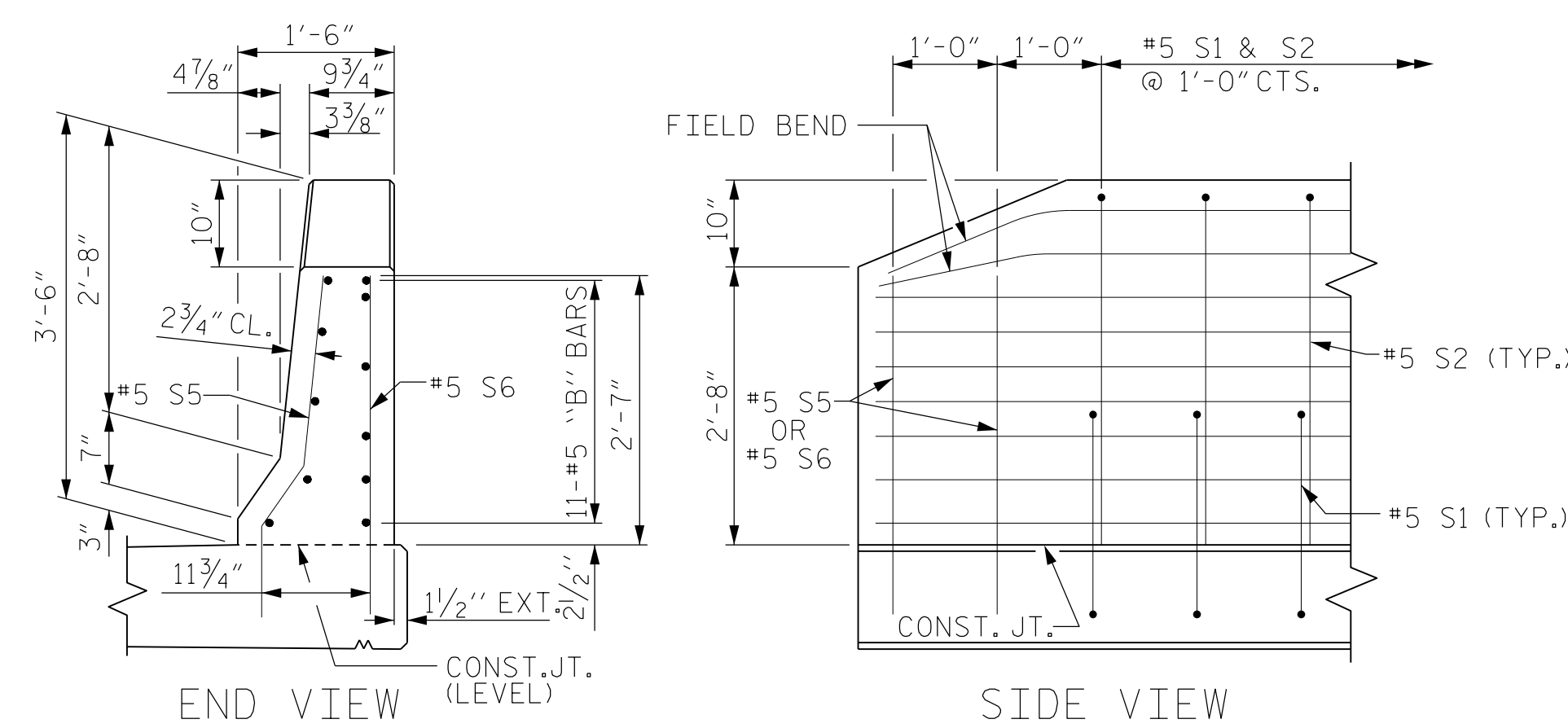
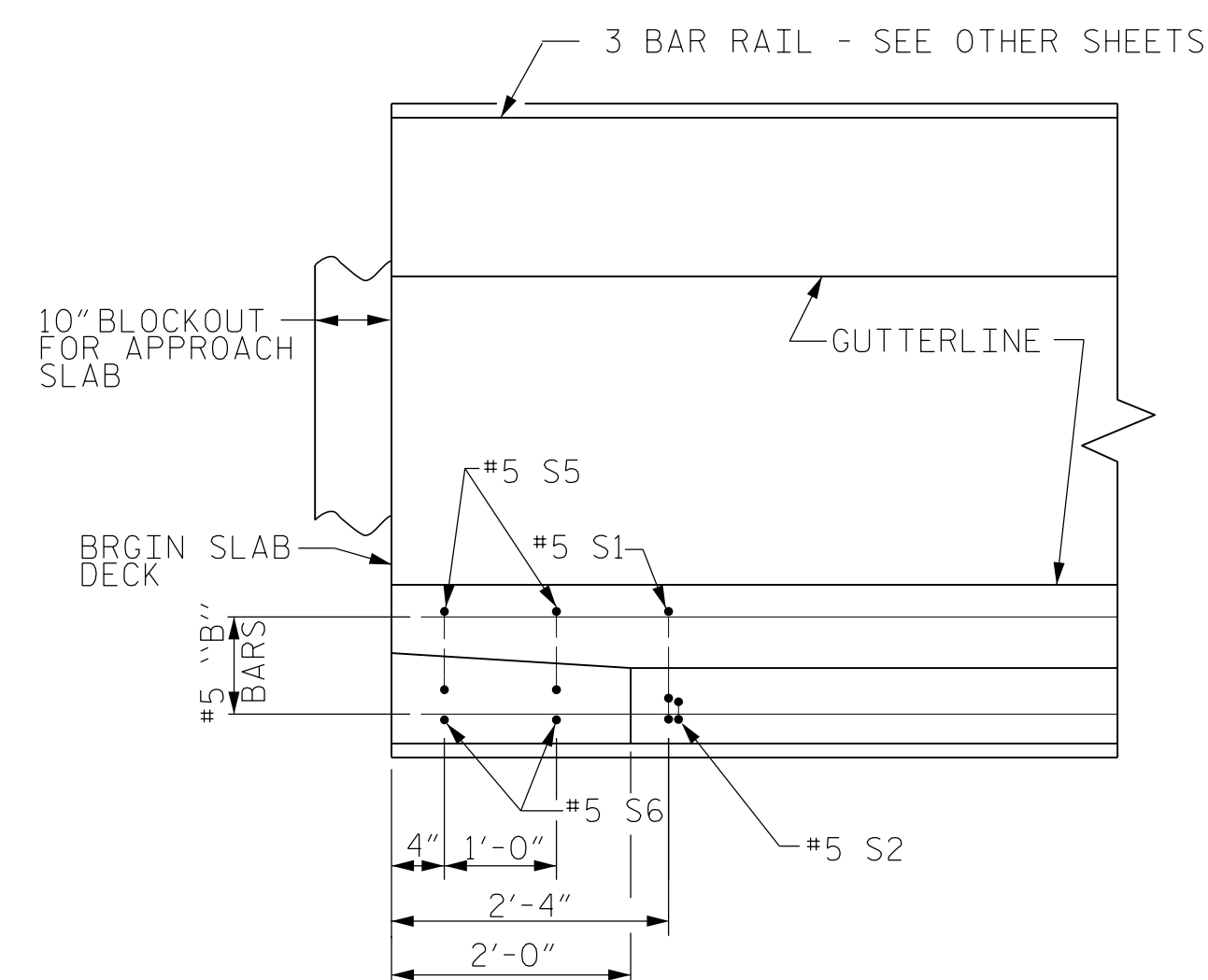
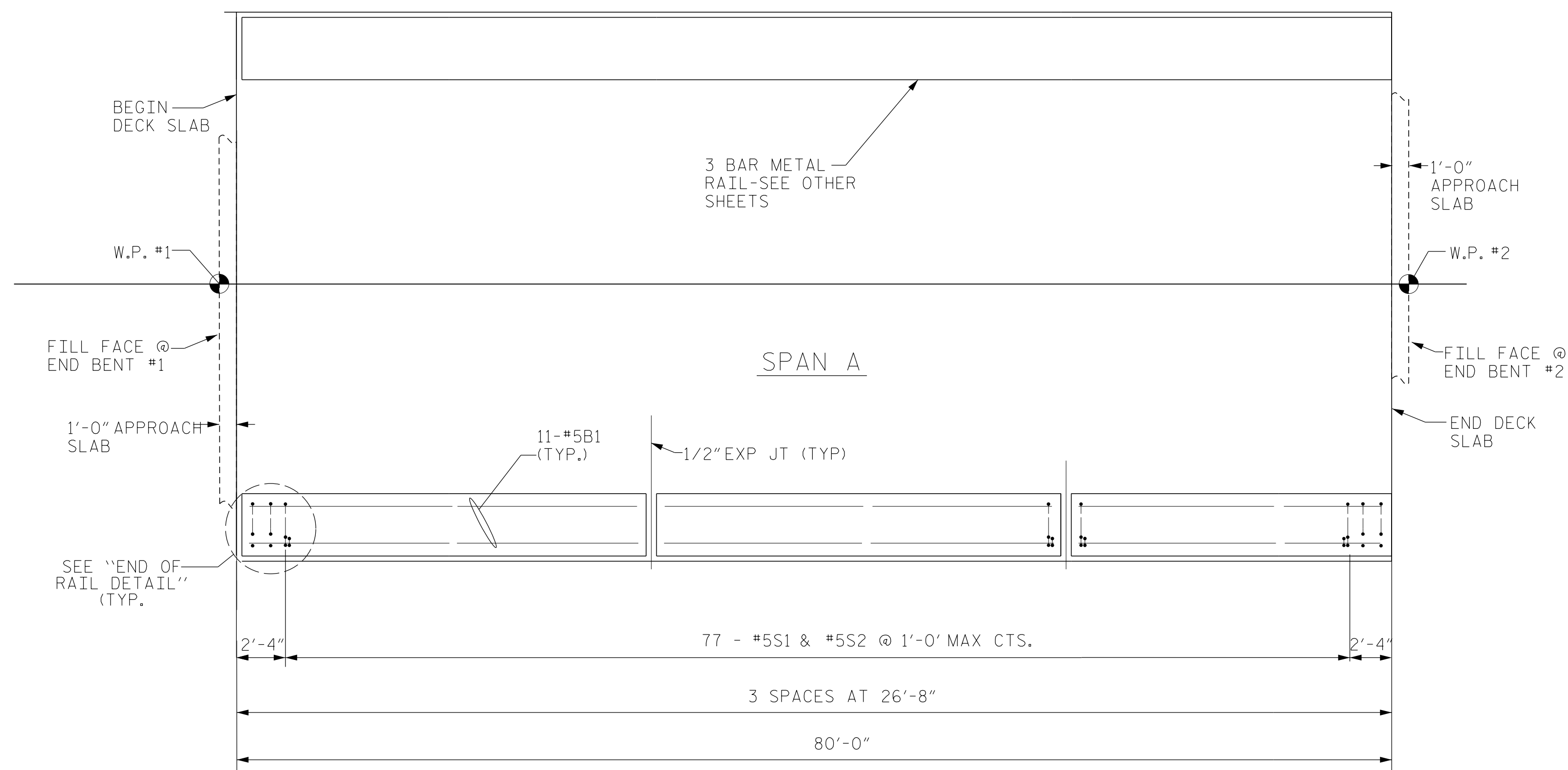
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REVISIONS						SHEET NO. S-5
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 16
2			4			

STD. NO. BMR7

ASSEMBLED BY : JFL	DATE : 8/25
CHECKED BY : DRR	DATE : 8/25
DRAWN BY : JMB 1/88	REV. 10/1/11 MAA/GM
CHECKED BY : GGH 1/88	REV. 12/17 MAA/THC
	REV. 10/23 BNB/SNM

*****SYTIME*****
*****SDON*****
*****USERNAME*****



PRELIMINARY PLANS
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www.wearestewart.com

STEWART

PROJECT RESERVE @ MITCHELL MILL
WAKE COUNTY
 LOCATION: NEAR ROLESVILLE

STANDARD
CONCRETE
BARRIER RAIL

m	REVISIONS						SHEET NO.
	NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
	1			3			TOTAL SHEETS
	2			4			16

STD. NO. CBR1

NOTES

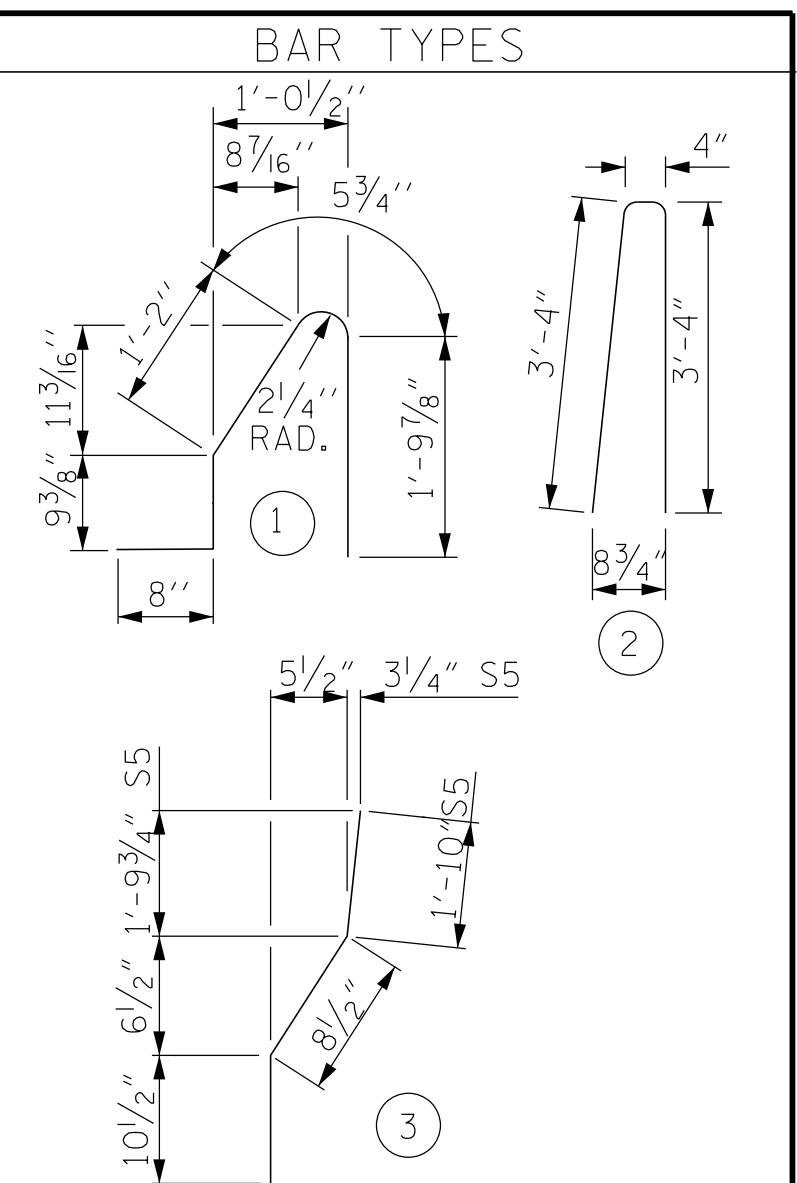
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS, THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL						
FOR CONCRETE BARRIER RAIL ONLY						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* S1	77	#5	1	4'-11"	395	
* S2	77	#5	2	7'-0"	562	
* S5	4	#5	3	3'-5"	14	
* S6	4	#5	STR	3'-3"	14	
* B1	33	#5	STR	26'-4"	580	
* EPOXY COATED REINFORCING STEEL					1,565 LBS.	
CLASS AA CONCRETE				10.9 CU. YDS.		
CONCRETE BARRIER RAIL				80.00 LIN.FT.		

* EPOXY COATED REINFORCING STEEL	1,565 LBS.
CLASS AA CONCRETE	10.9 CU. YDS
CONCRETE BARRIER RAIL	80.00 LIN. FT.

NOTES

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

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.)

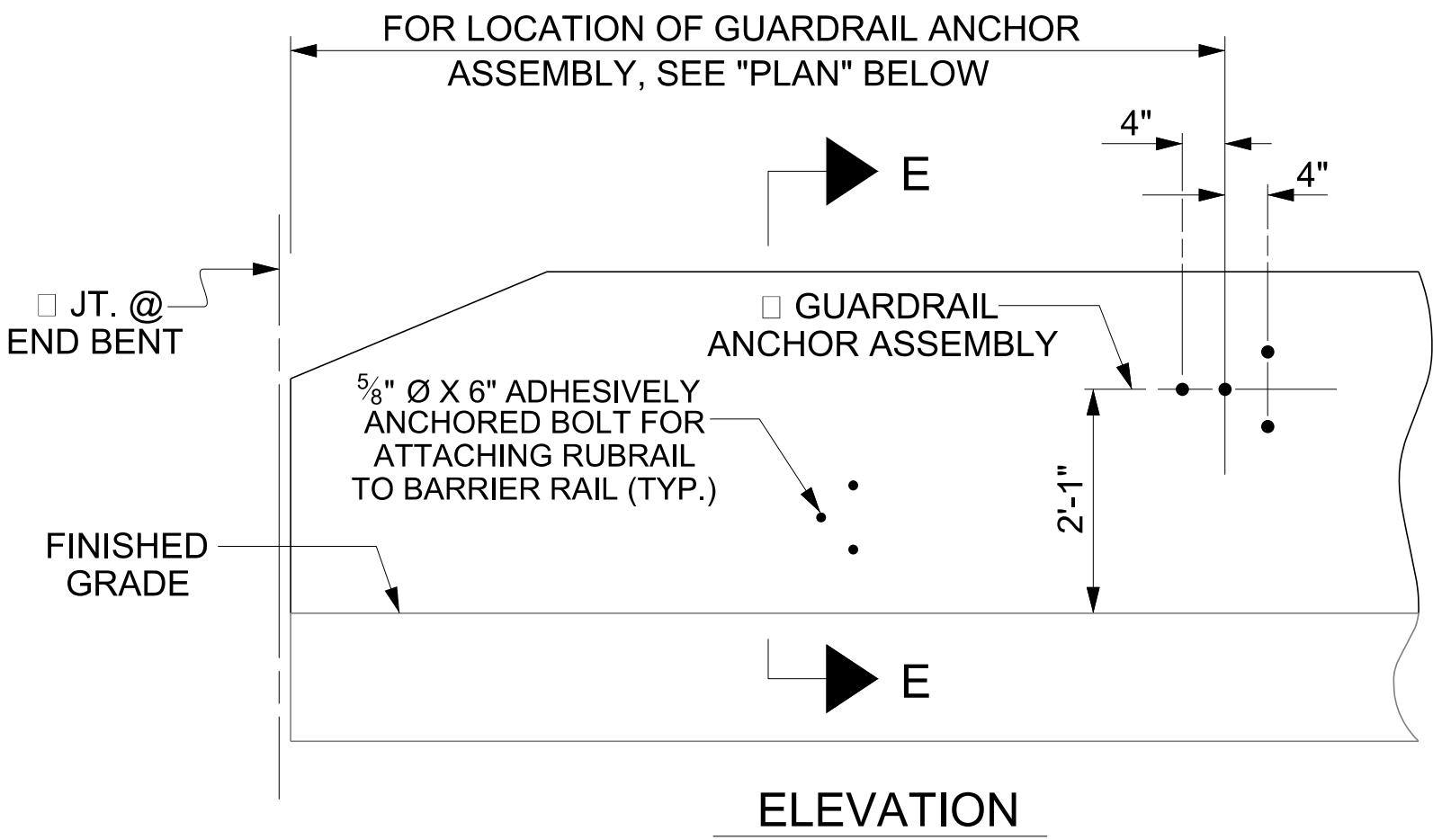
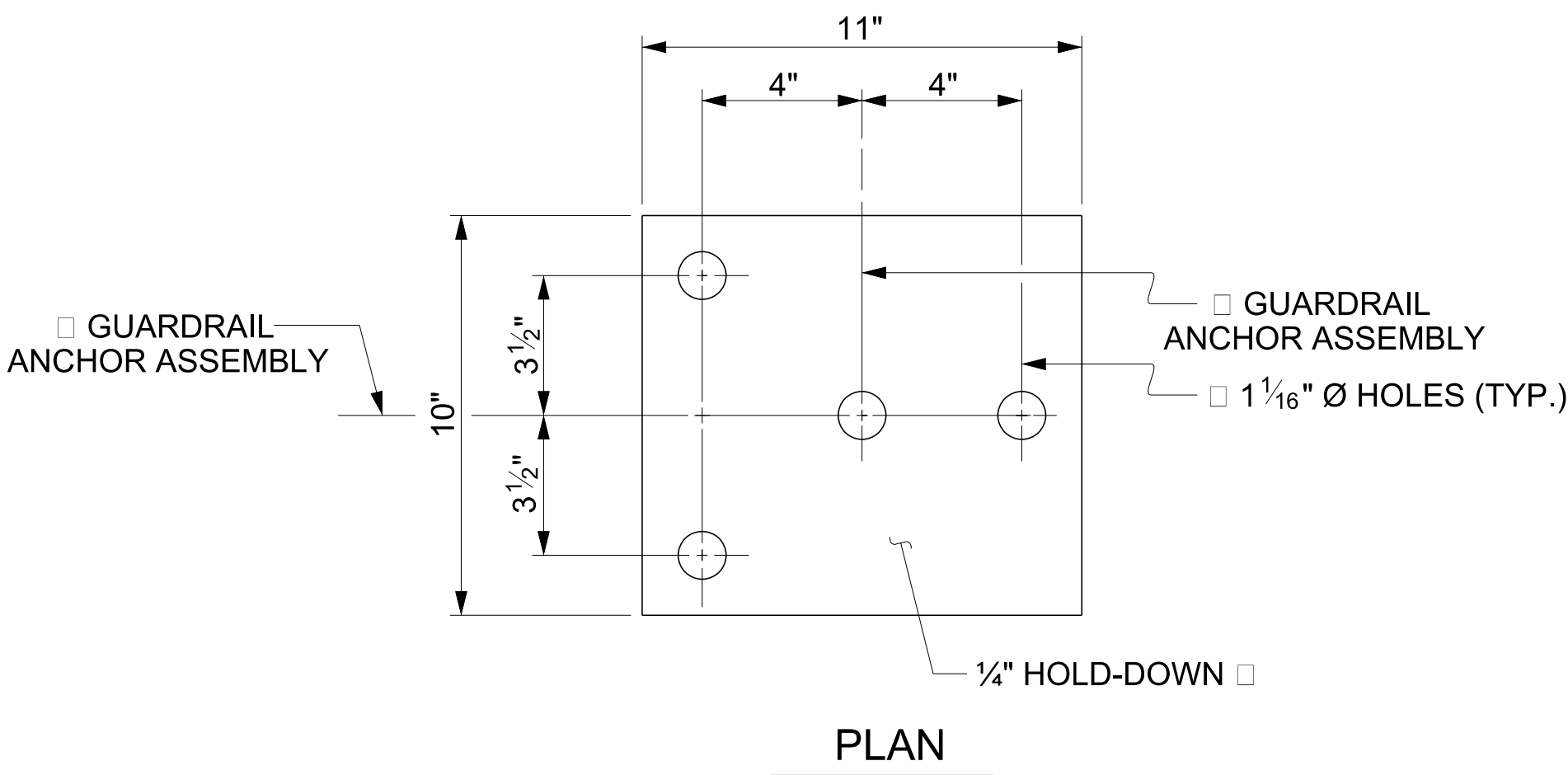
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

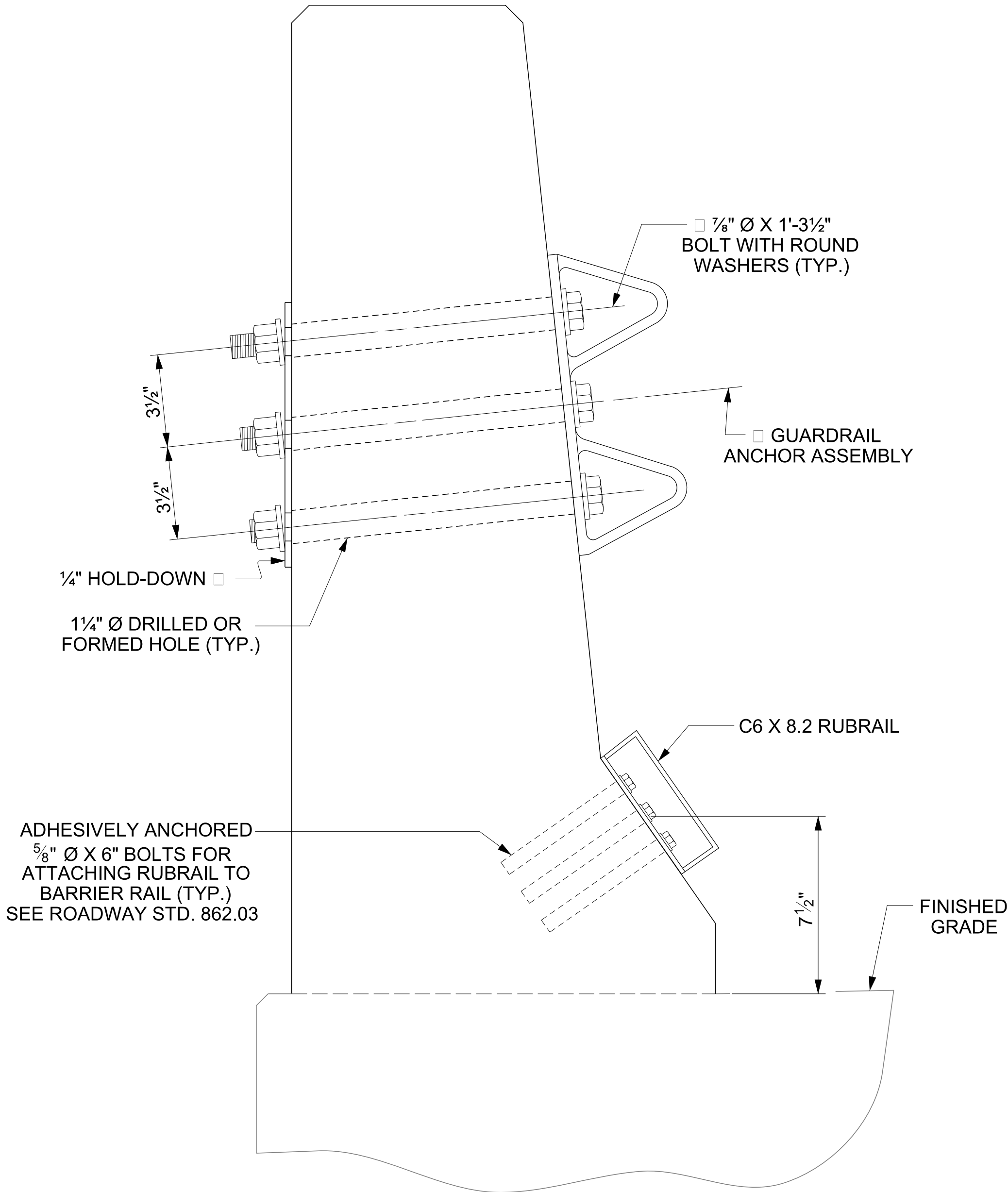
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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.

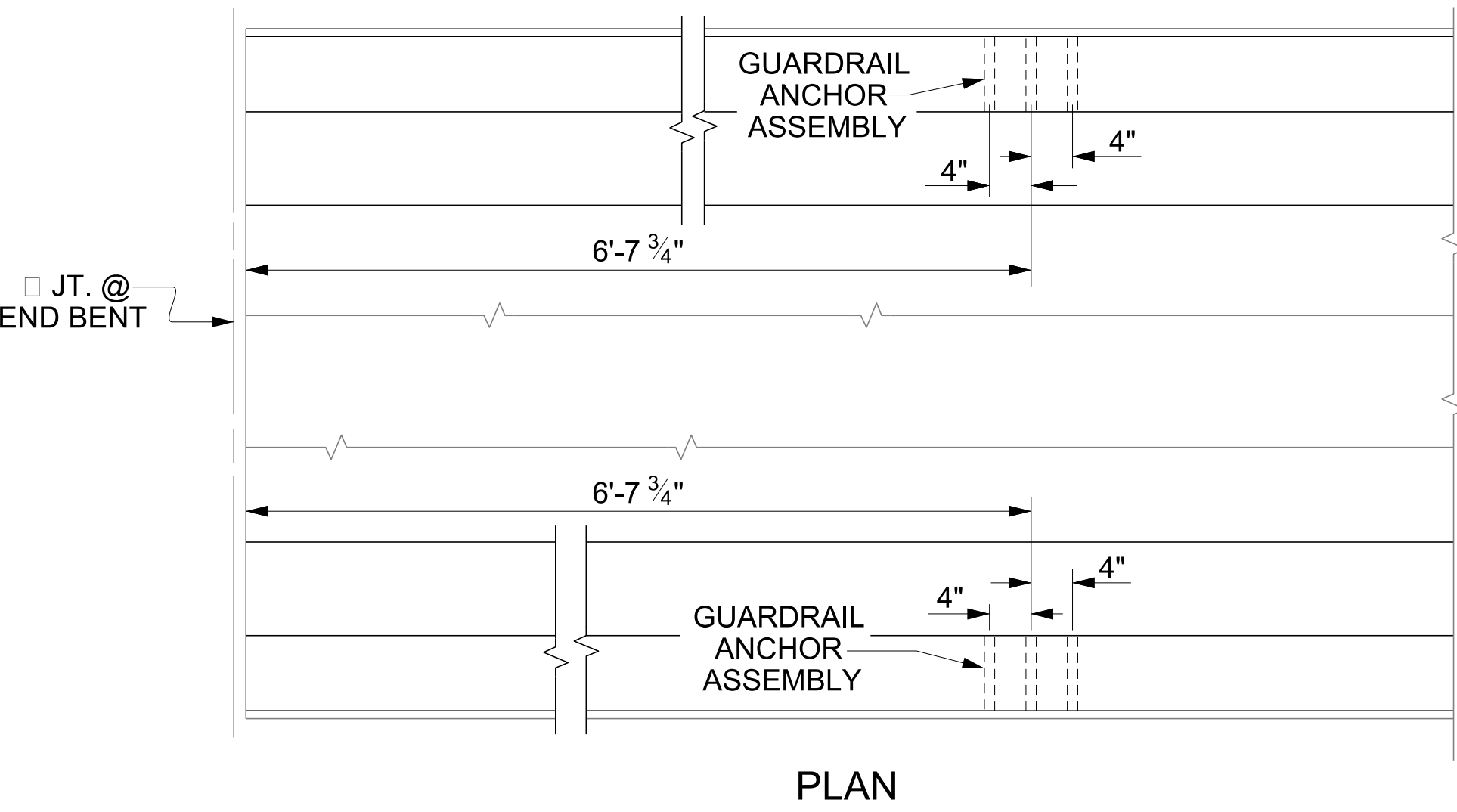
THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 5/8" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 5/8" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



END BENT #1 SHOWN, END BENT #2 SIMILAR.



SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

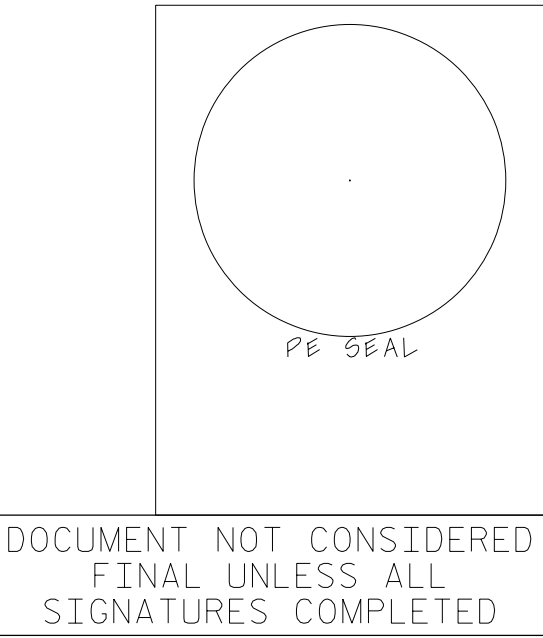
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. RESERVE @ MITCHELL MILL
WAKE COUNTY
STATION: -L- STA. 17+96.00



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE
FOR BARRIER RAIL

ASSEMBLED BY : JFL	DATE : 8/25
CHECKED BY : DRR	DATE : 8/25
DRAWN BY : TLA 5/06	REV. 6/13 MAA/GM
CHECKED BY : GM 5/06	REV. 12/17 MAA/THC
	REV. 6/22 BNB/AAI

*****SYSTEM*****
*****\$DCN*****
\$USERNAME

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NOTES

FOR BEARING DETAILS, SEE CONTECH DRAWINGS.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

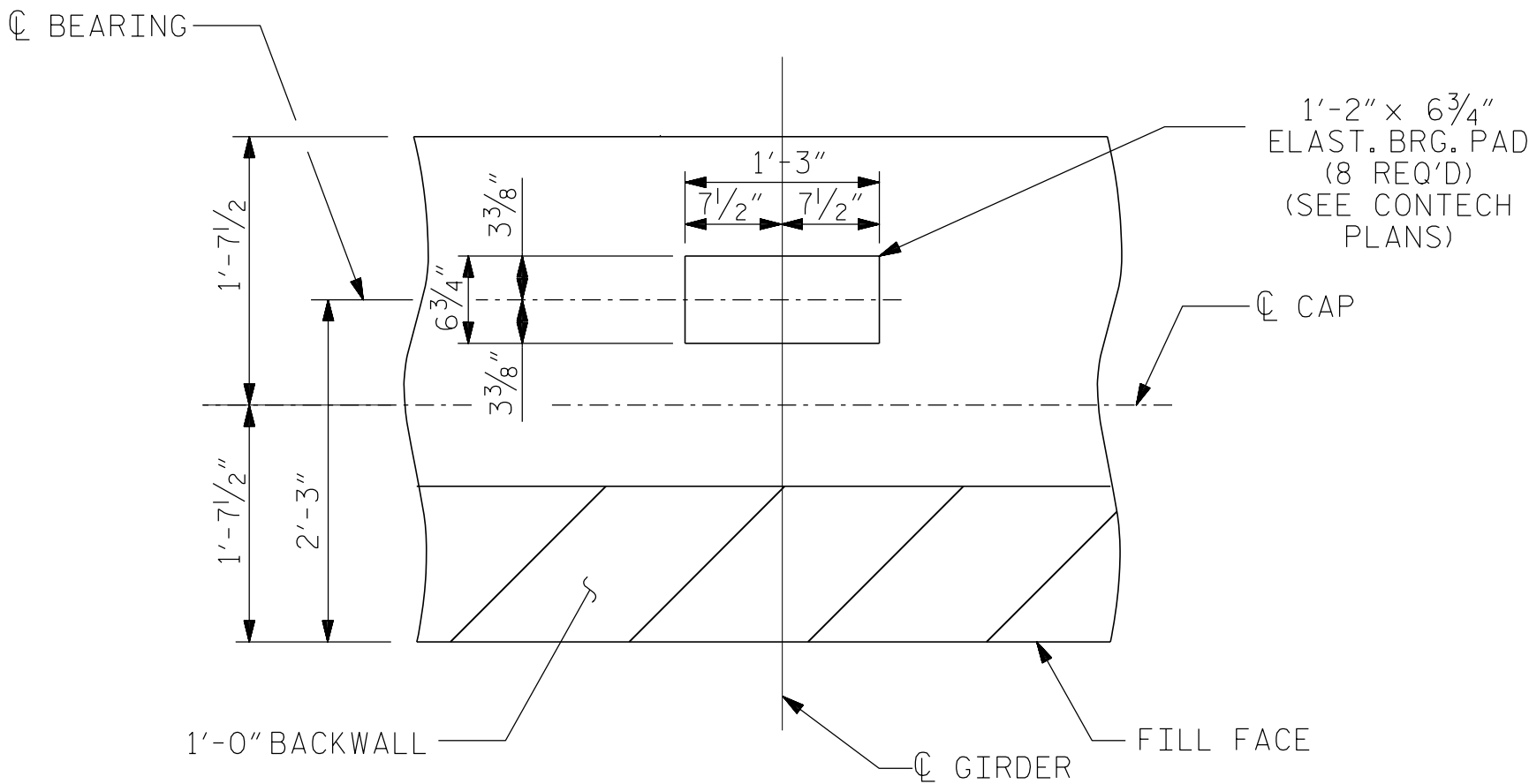
FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

PILES AT END BENTS 1 & 2 ARE DESIGNED FOR AN ALLOWABLE AXIAL (COMPRESSION) CAPACITY OF 70 TONS PER PILE.

2. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 100 TONS PER PILE.

3. PILE DRIVING CRITERIA SHOULD BE ESTABLISHED BY A QUALIFIED ENGINEER. THE DRIVING CRITERIA AND PILE DRIVING EQUIPMENT INFORMATION SHALL BE SUBMITTED TO THE OWNER'S TESTING AGENCY NO LESS THAN FIVE (5) BUSINESS DAYS PRIOR TO THE START OF PILE DRIVING OPERATIONS.

LAP SPLICE CHART	
BAR SIZE	MINIMUM LAP SPLICE
#4	2'-5"
#5	3'-0"
#9	5'-4"



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH GIRDER)
(HP 12X53 PILES NOT SHOWN FOR CLARITY)

PROJECT RESERVE @ MITCHELL MILL
WAKE COUNTY
LOCATION: NEAR ROLESVILLE

SHEET 1 OF 3

SUBSTRUCTURE
END BENT No. 1

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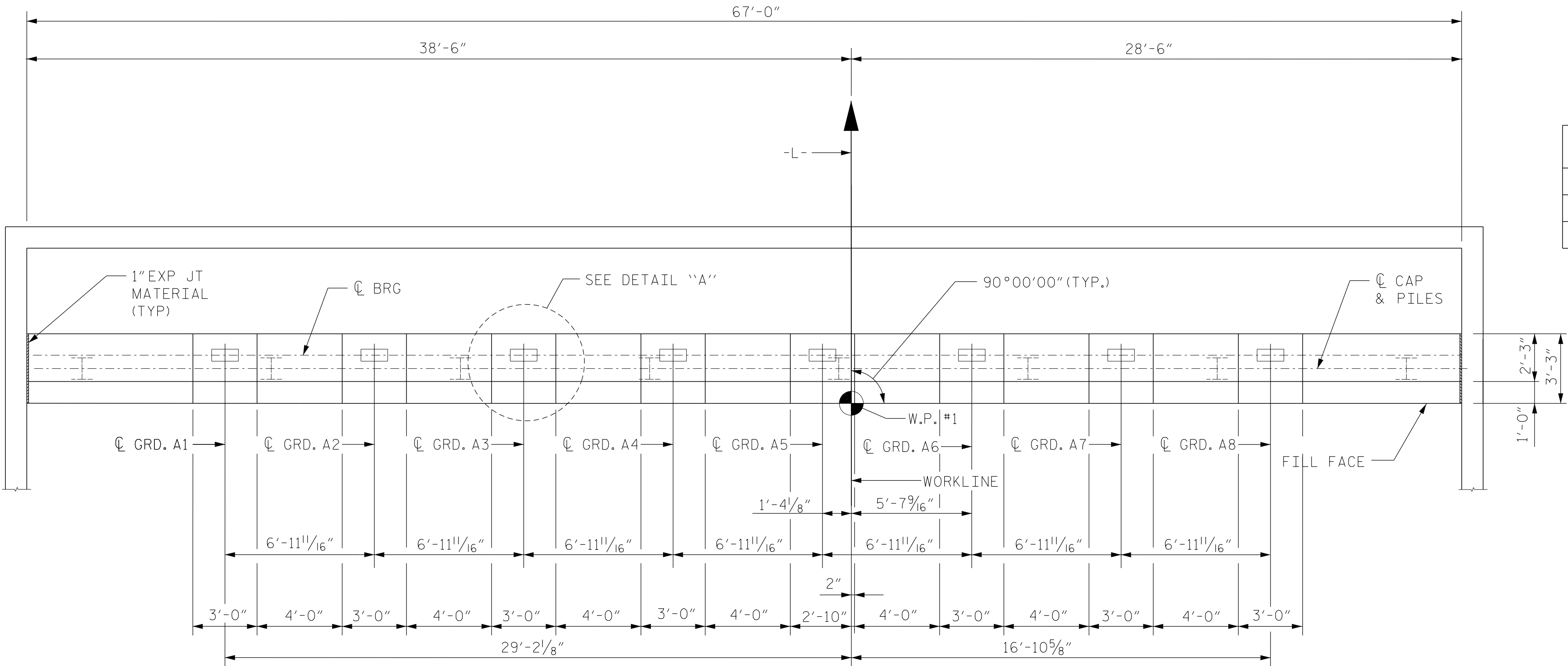
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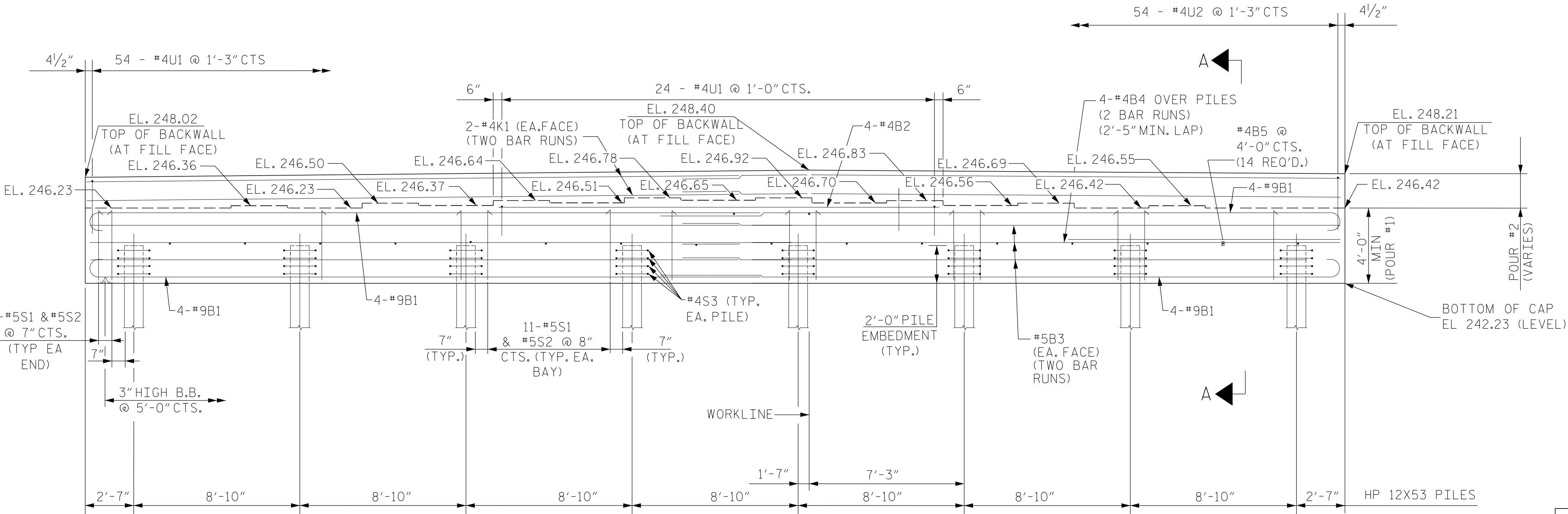
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PLAN



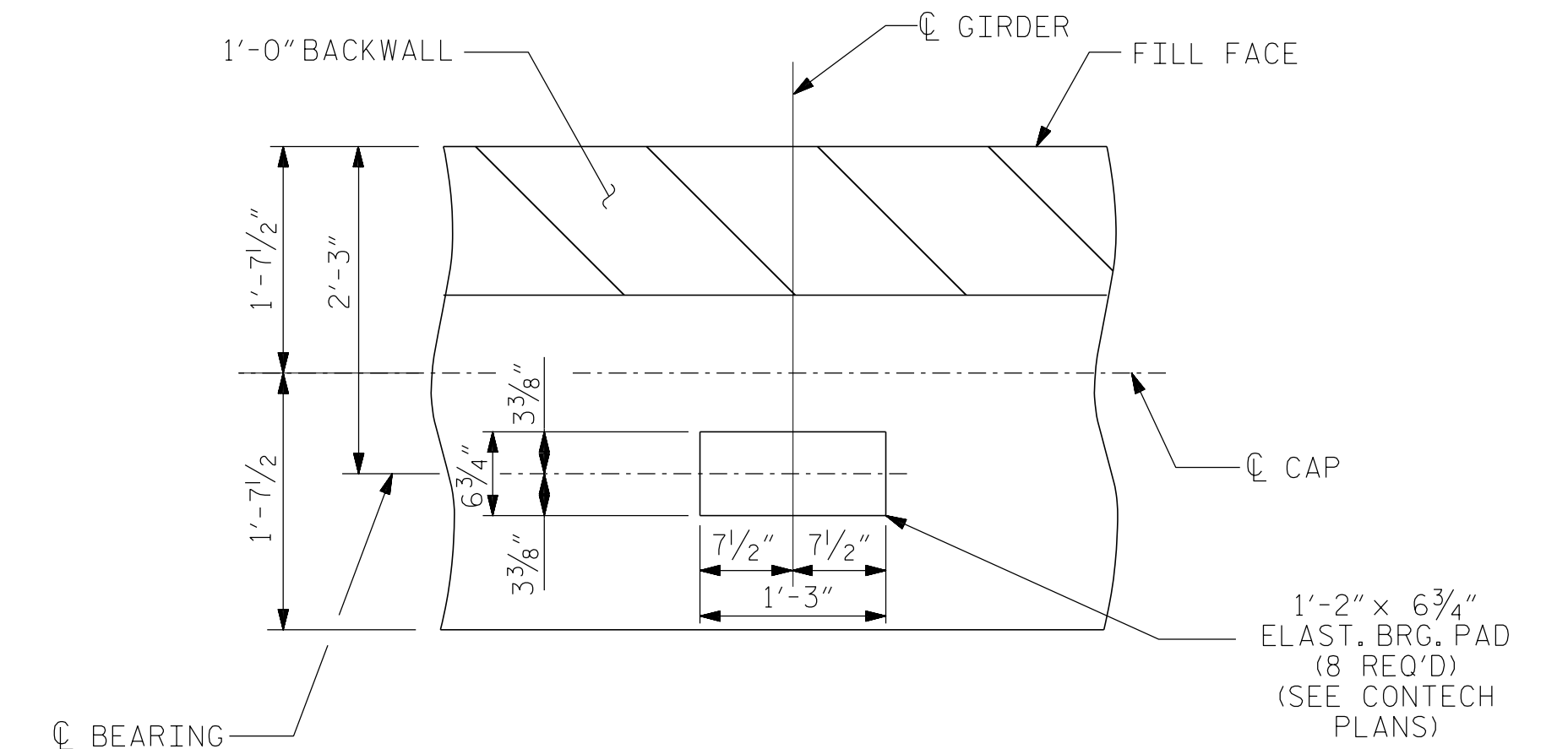
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CHECKED BY: D. RUGGLES	DATE: 8/25
DESIGN ENGINEER OF RECORD: D. RUGGLES	DATE: 8/25

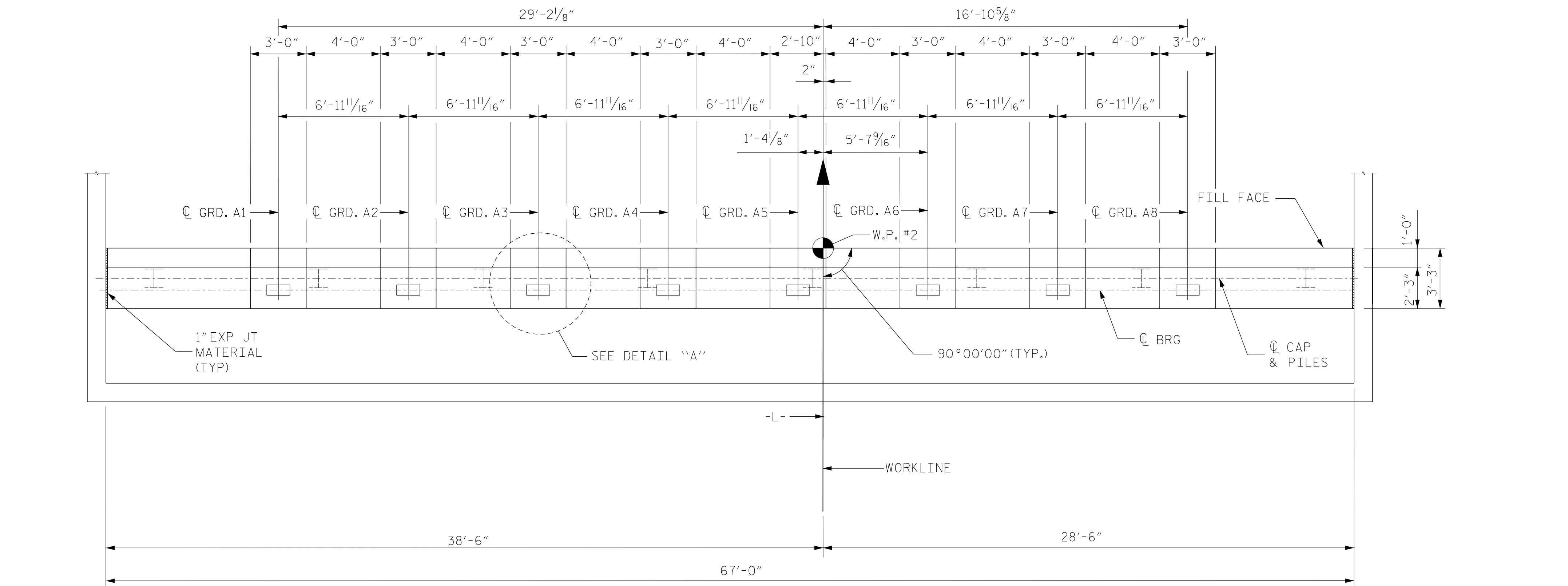
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FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

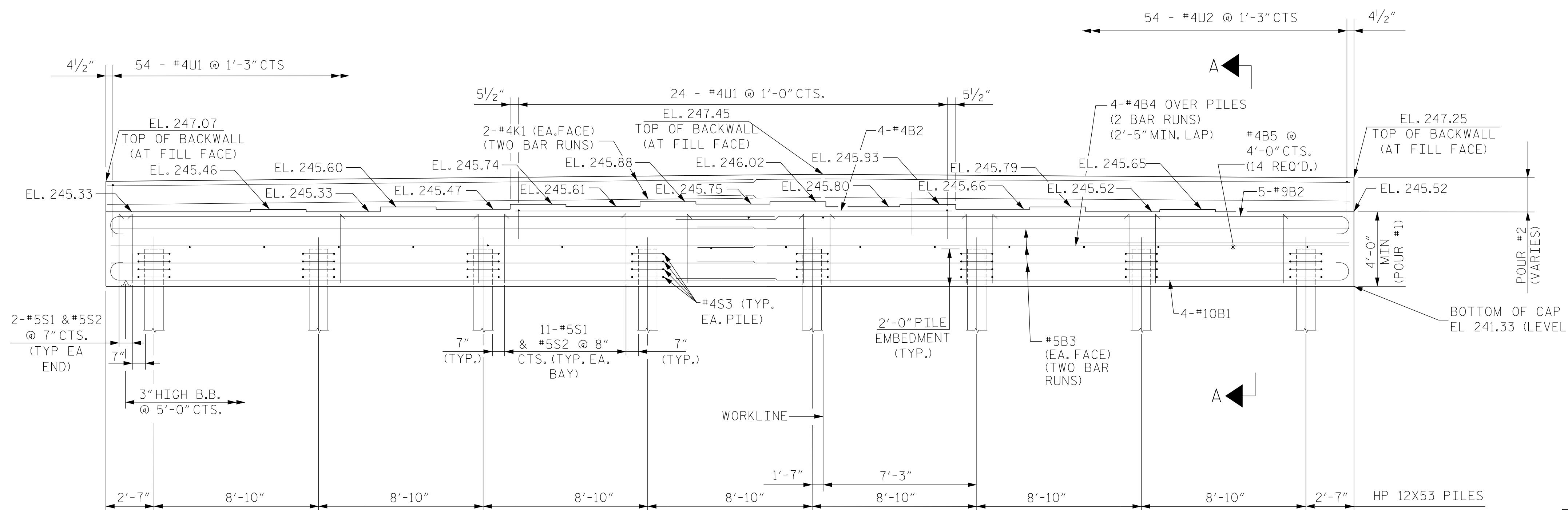
BAR SIZE	MINIMUM LAP SPLICE
#4	2'-5"
#5	3'-0"
#9	5'-4"



(DIMENSIONS ARE TYPICAL EACH GIRDER)
(HP 12X53 PILES NOT SHOWN FOR CLARITY)



PLAN



ELEVATION

PRELIMINARY PLANS
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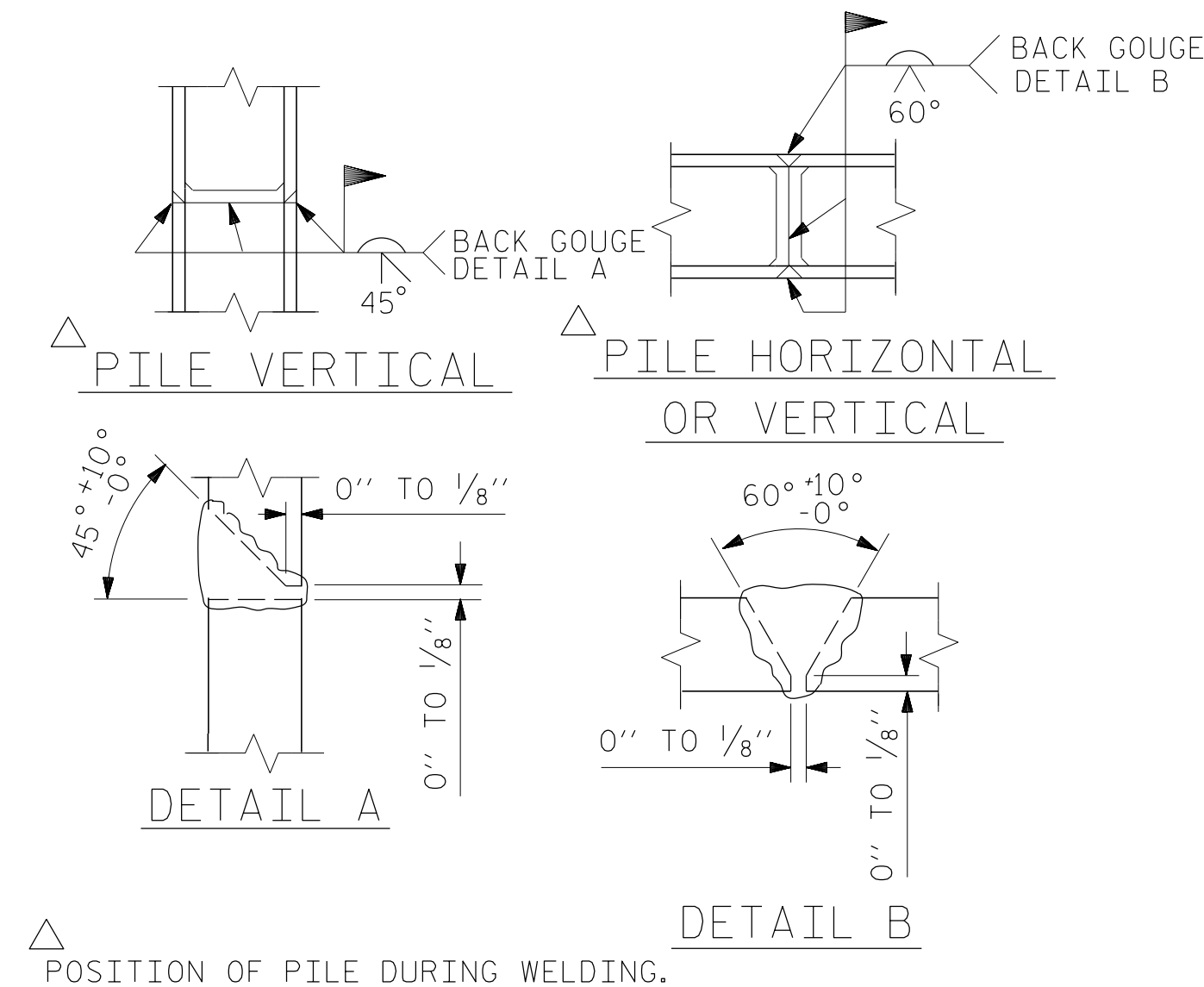
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WAKE COUNTY
 LOCATION: NEAR ROLESVILLE

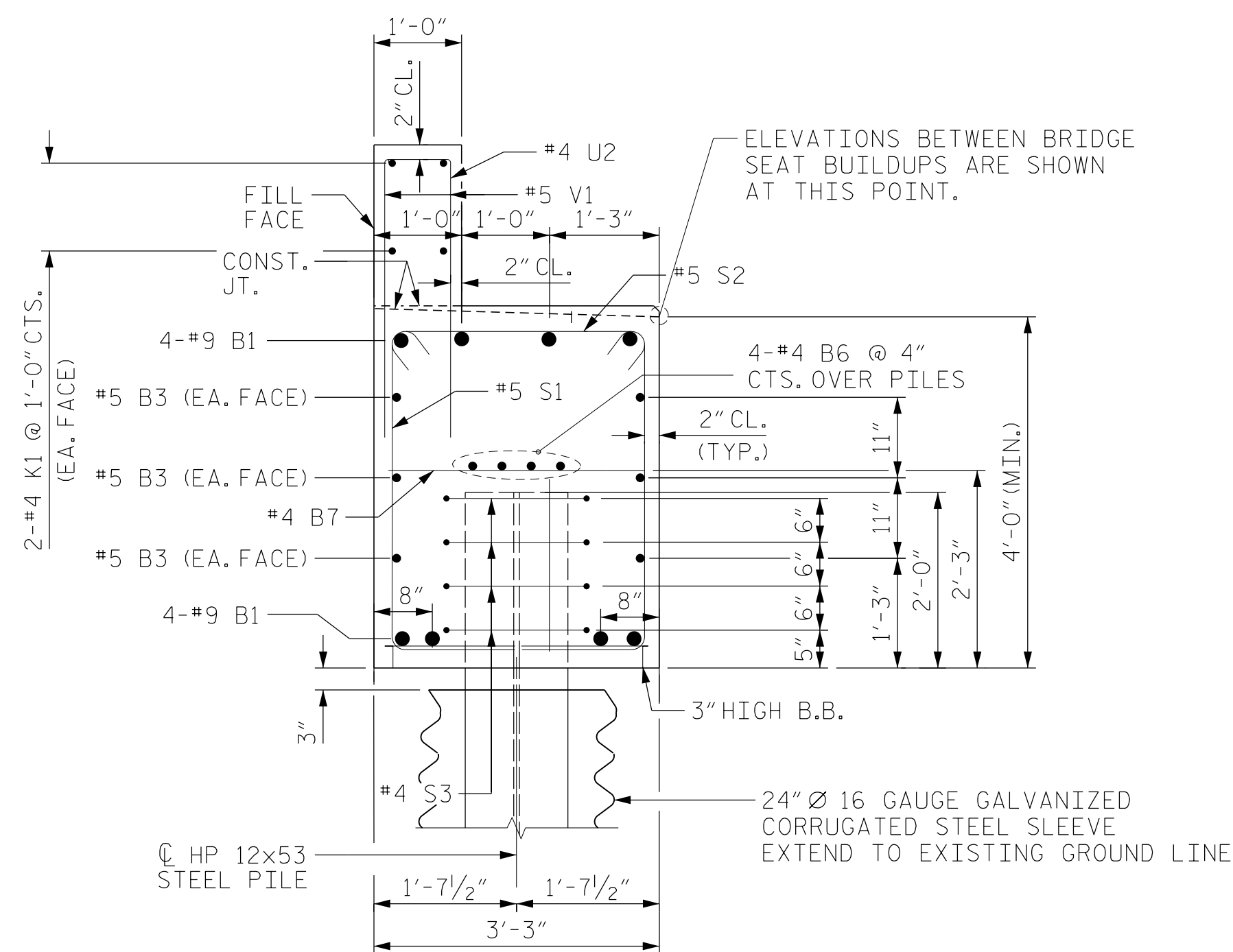
SHEET 1 OF 3

SUBSTRUCTURE
END BENT No. 1

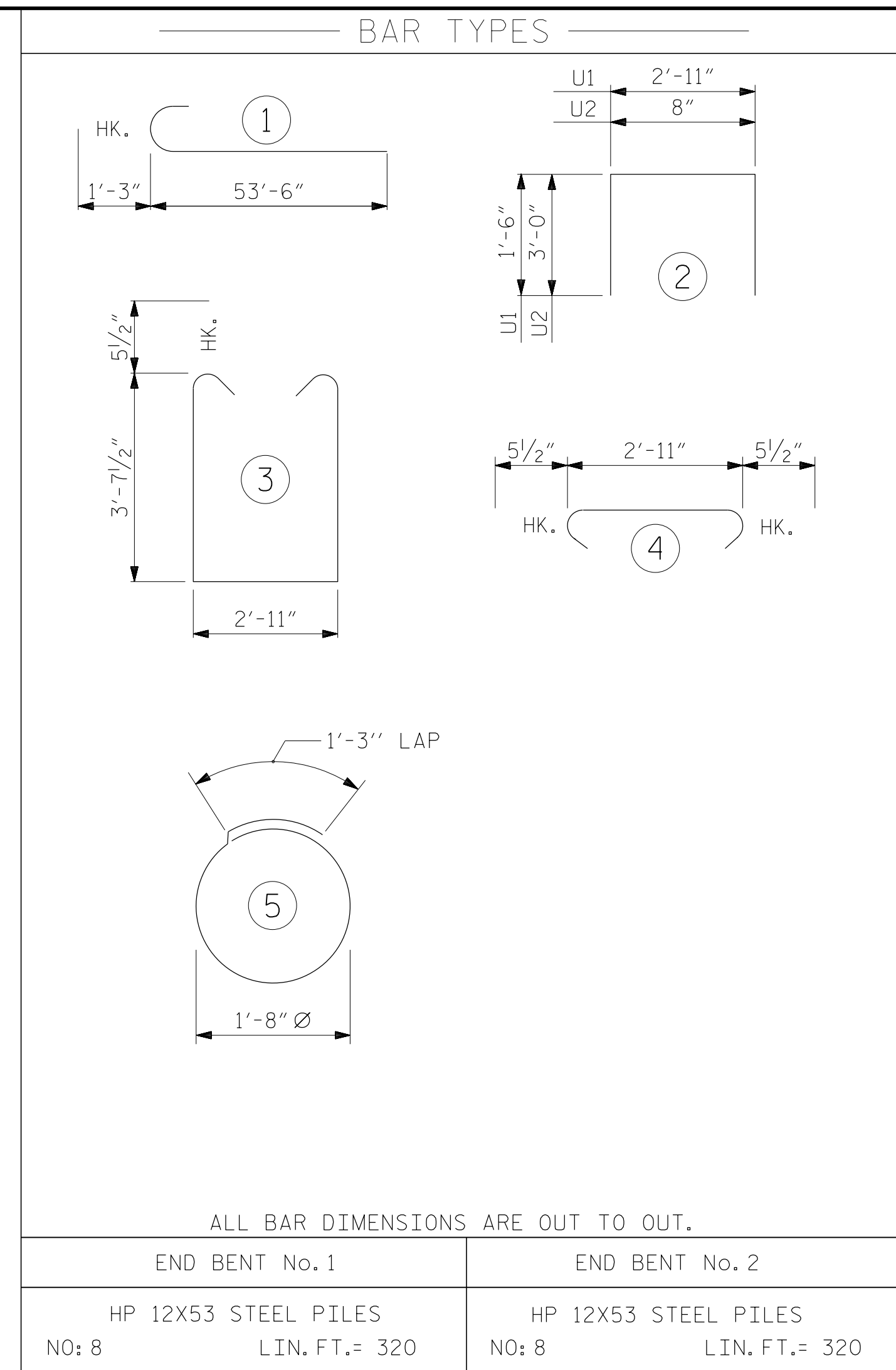
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2			4			



PILE SPLICE DETAILS



SECTION A-A



BILL OF MATERIAL FOR ONE END BENT					
(2 REQ'D)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#9	1	37'-3"	2,026
B2	4	#4	STR	23'-8"	63
B3	12	#5	STR	34'-10"	436
B4	8	#4	STR	34'-7"	185
B5	14	#4	STR	2'-11"	27
K1	8	#4	STR	3'-7"	185
S1	81	#5	3	11'-1"	936
S2	81	#5	4	3'-10"	324
S3	32	#4	5	6'-6"	139
U1	23	#4	7	5'-11"	95
U2	23	#4	7	6'-8"	240
REINFORCING STEEL (FOR ONE END BENT)					4,656 LBS.
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)					
POUR #1	CAP & LOWER PART OF BACKWALL				32.6 C.Y.
POUR #2	UPPER PART OF BACKWALL				4.3 C.Y.
TOTAL CLASS A CONCRETE					36.9 C.Y.

NOTES

THIS SET OF PLANS FOLLOWS THE 2024 NCDOT STANDARD SPECIFICATIONS.

PROJECT RESERVE @ MITCHELL MILL
WAKE COUNTY
 LOCATION: NEAR ROLESVILLE

SHEET 4 OF 4

SUBSTRUCTURE
END BENT 1 & 2
DETAILS

0	REVISIONS						SHEET NO.
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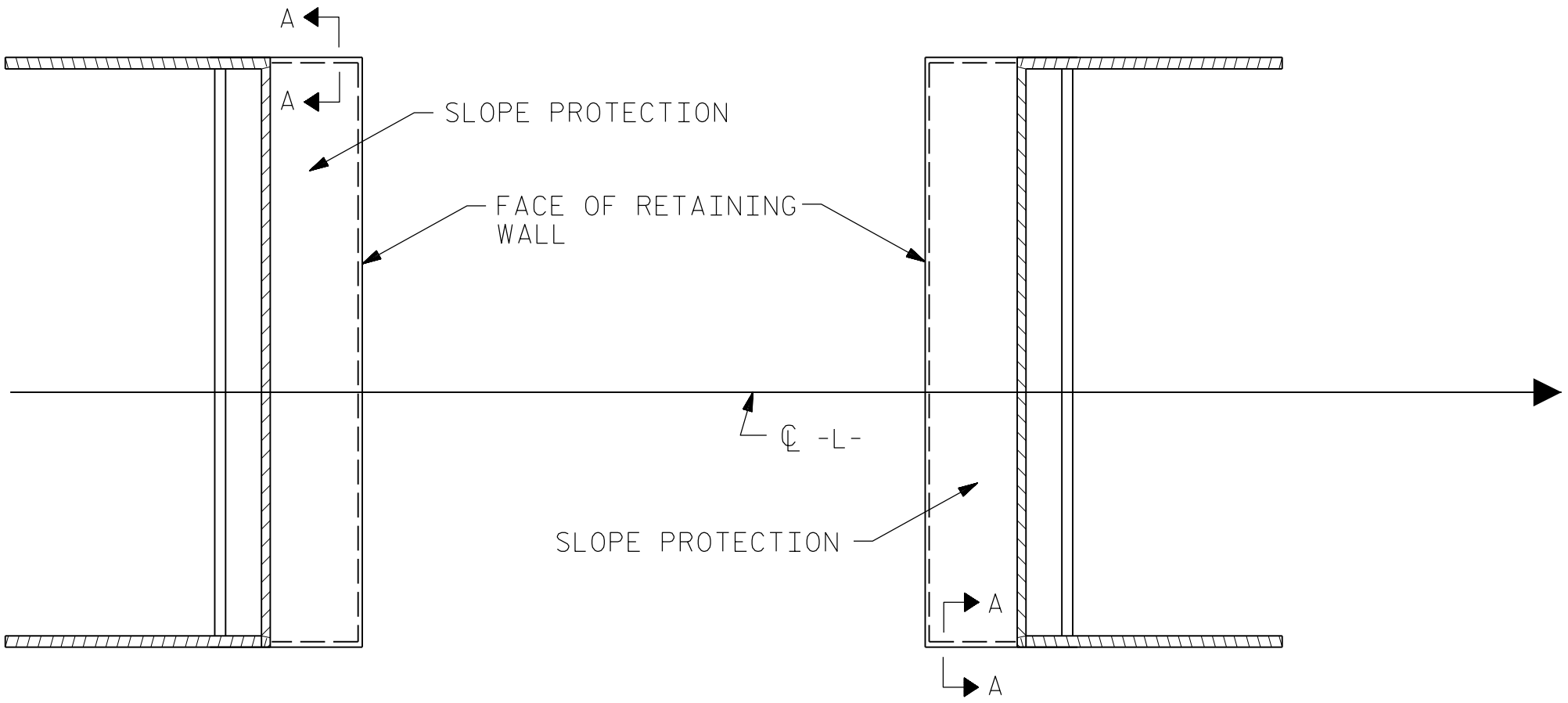
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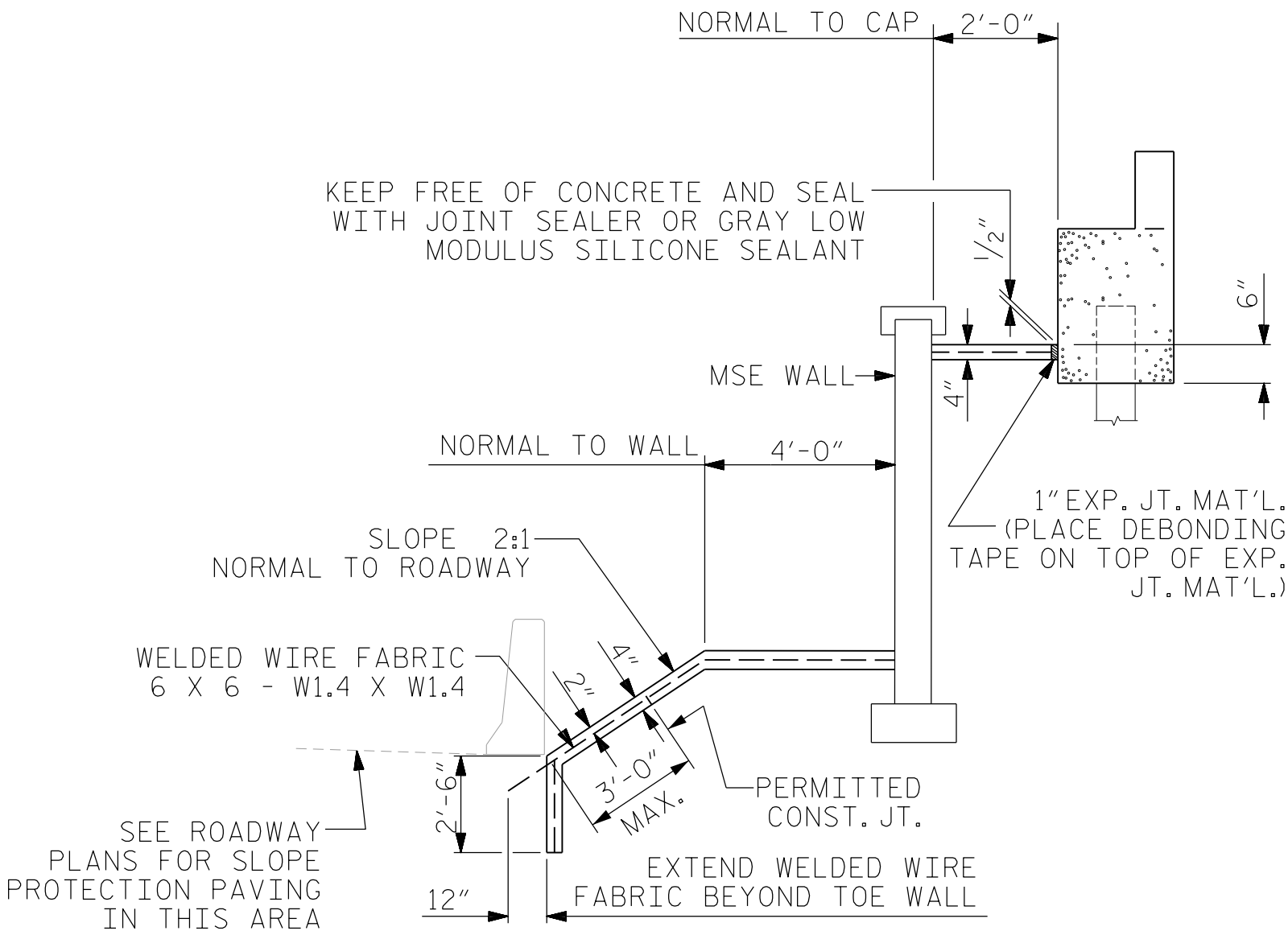
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ALTERNATE "A"

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



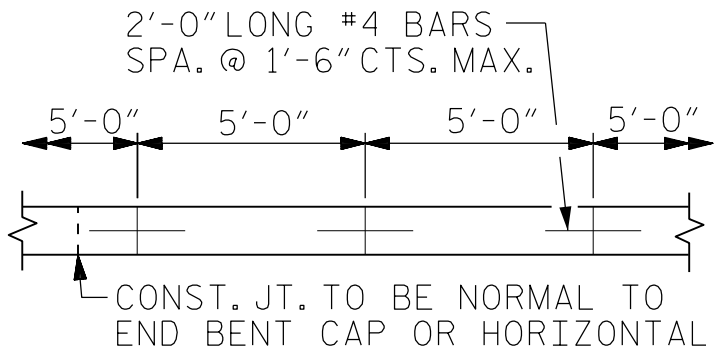
PLAN



SECTION ALONG CL ROADWAY WHEN FILL CATCHES AGAINST BARRIER RAIL

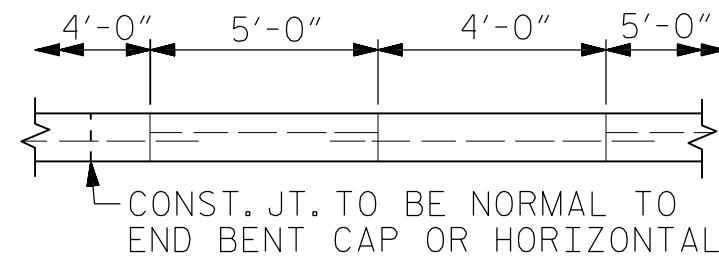
DETAILS FOR ALTERNATE "A"

END BENT #2 SHOWN, END BENT #1 SIMILAR



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

BRIDGE @ STA. 17+96.00 -L-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	24	50
END BENT 2	24	50

* QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT RESERVE @ MITCHELL MILL

WAKE COUNTY

LOCATION: NEAR ROLESVILLE

SHEET 1 OF 2

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SLOPE PROTECTION
DETAILS

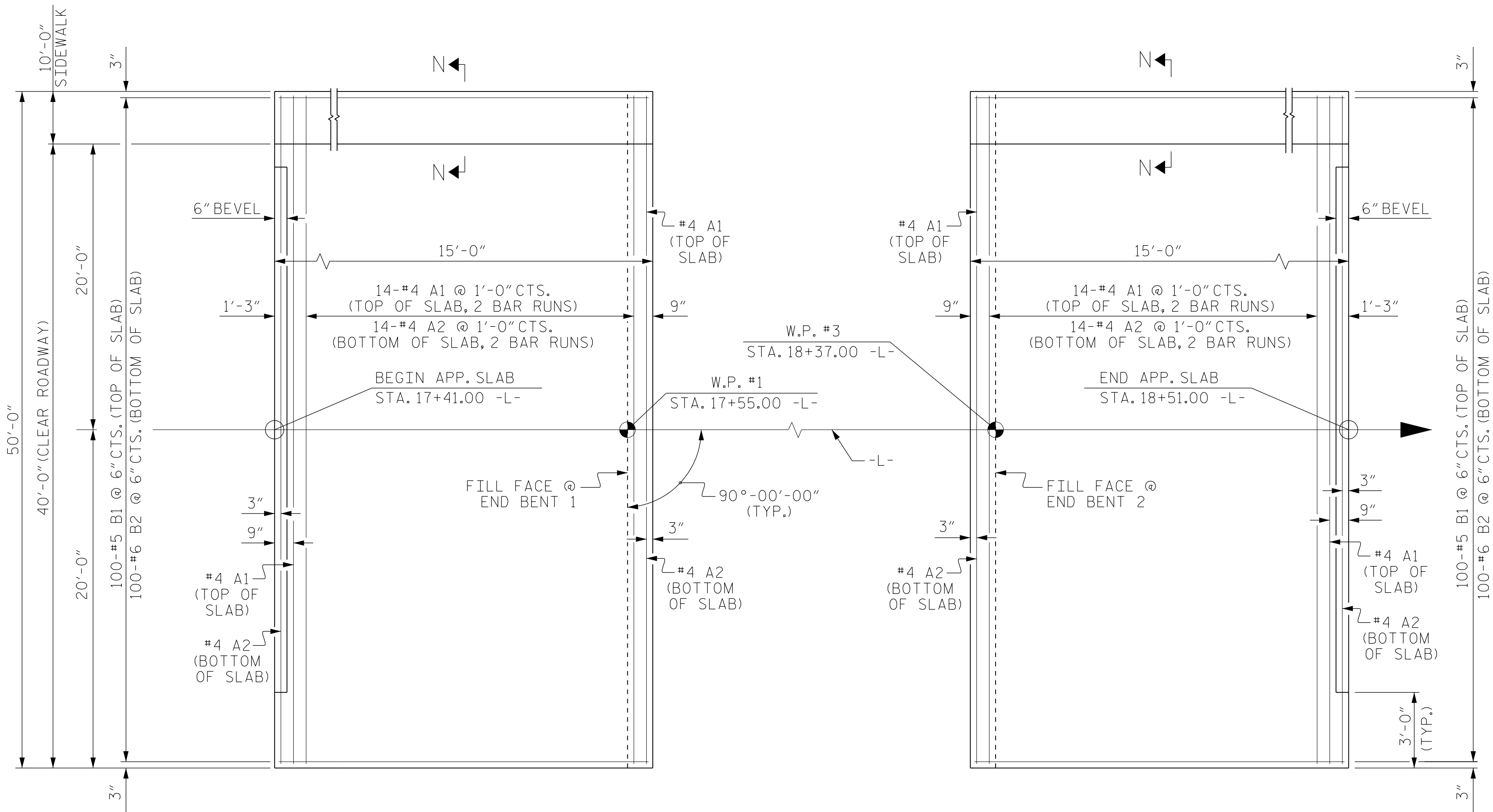
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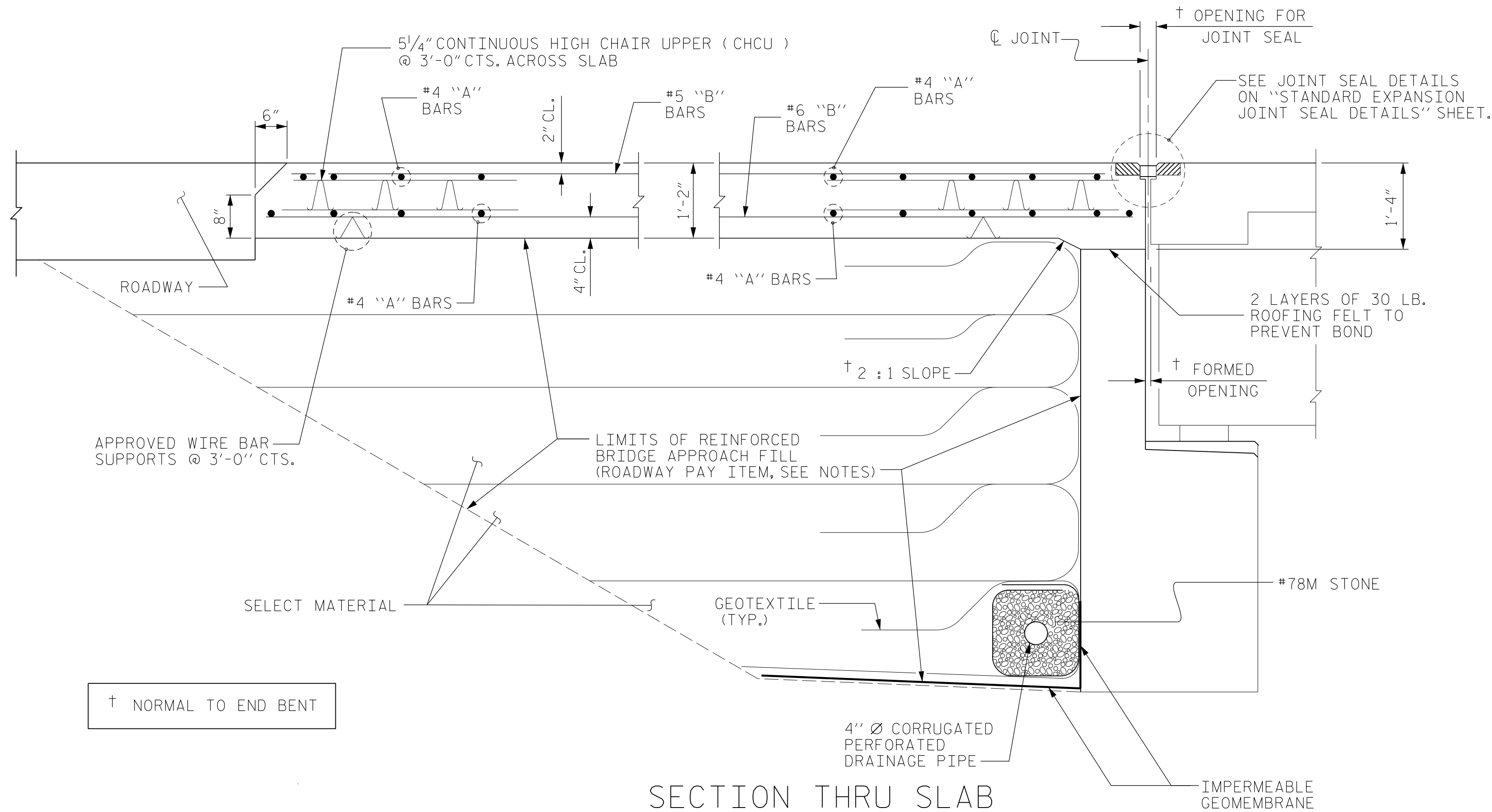
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PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE JOINT OPENING AT THE APPROACH SLAB/CONCRETE WEARING SURFACE INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

SEE SHEET 2 OF 2 FOR SECTION N-N.

BILL OF MATERIAL

FOR ONE APPROACH SLAB
(2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	32	#4	STR	25'-10"	552
* A2	32	#4	STR	25'-10"	552

* B1	100	#5	STR	14'-2"	1,478
* B2	100	#6	STR	14'-8"	2,203
* B3	8	#4	STR	14'-8"	78

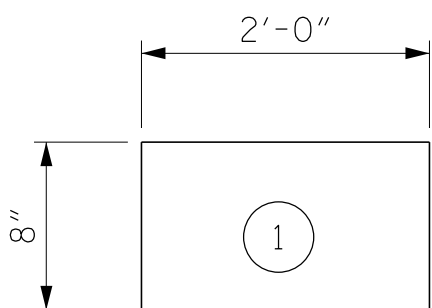
* G1	15	#4	STR	9'-4"	94
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* U1	9	#4	1	3'-4"	20
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* EPOXY COATED REINFORCING STEEL 4,977 LBS.

CLASS AA CONCRETE
POUR 1 32.7 C.Y.
POUR 2 (SIDEWALK) 2.9 C.Y.
TOTAL 35.6 C.Y.

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

PROJECT RESERVE @ MITCHELL MILL

WAKE COUNTY

LOCATION: NEAR ROLESVILLE

SHEET 1 OF 2

BRIDGE APPROACH SLAB
FOR PRESTRESSED
CONCRETE CORED SLAB

PRELIMINARY PLANS
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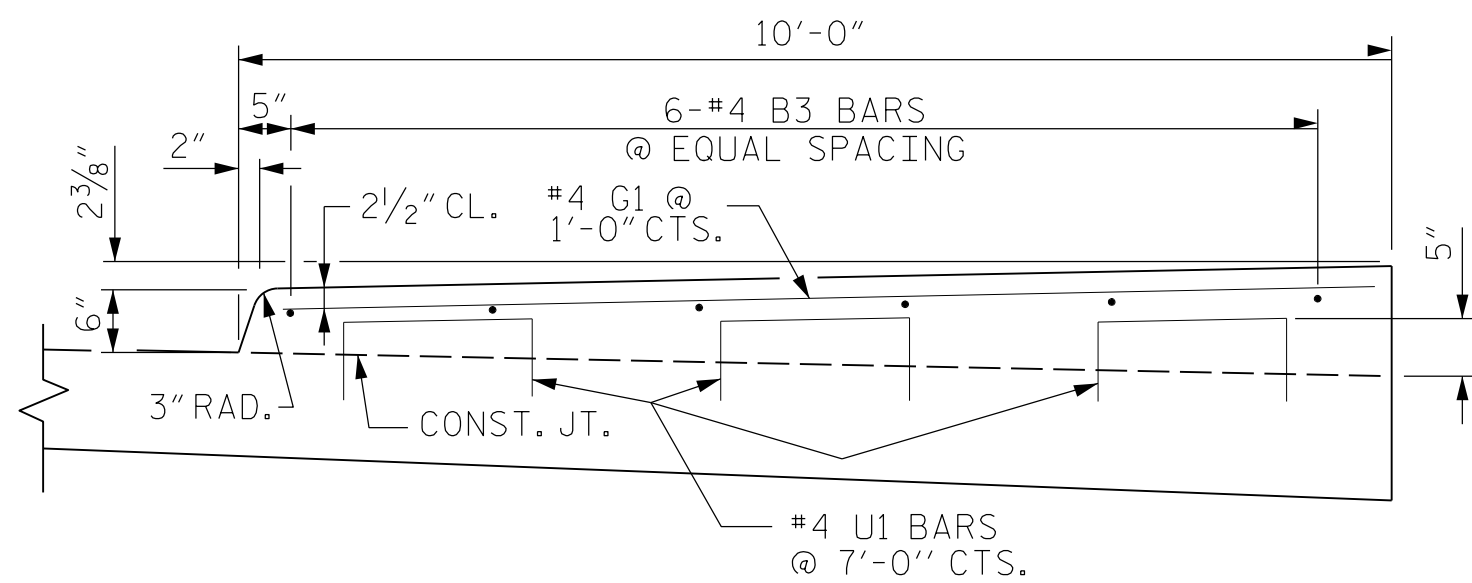
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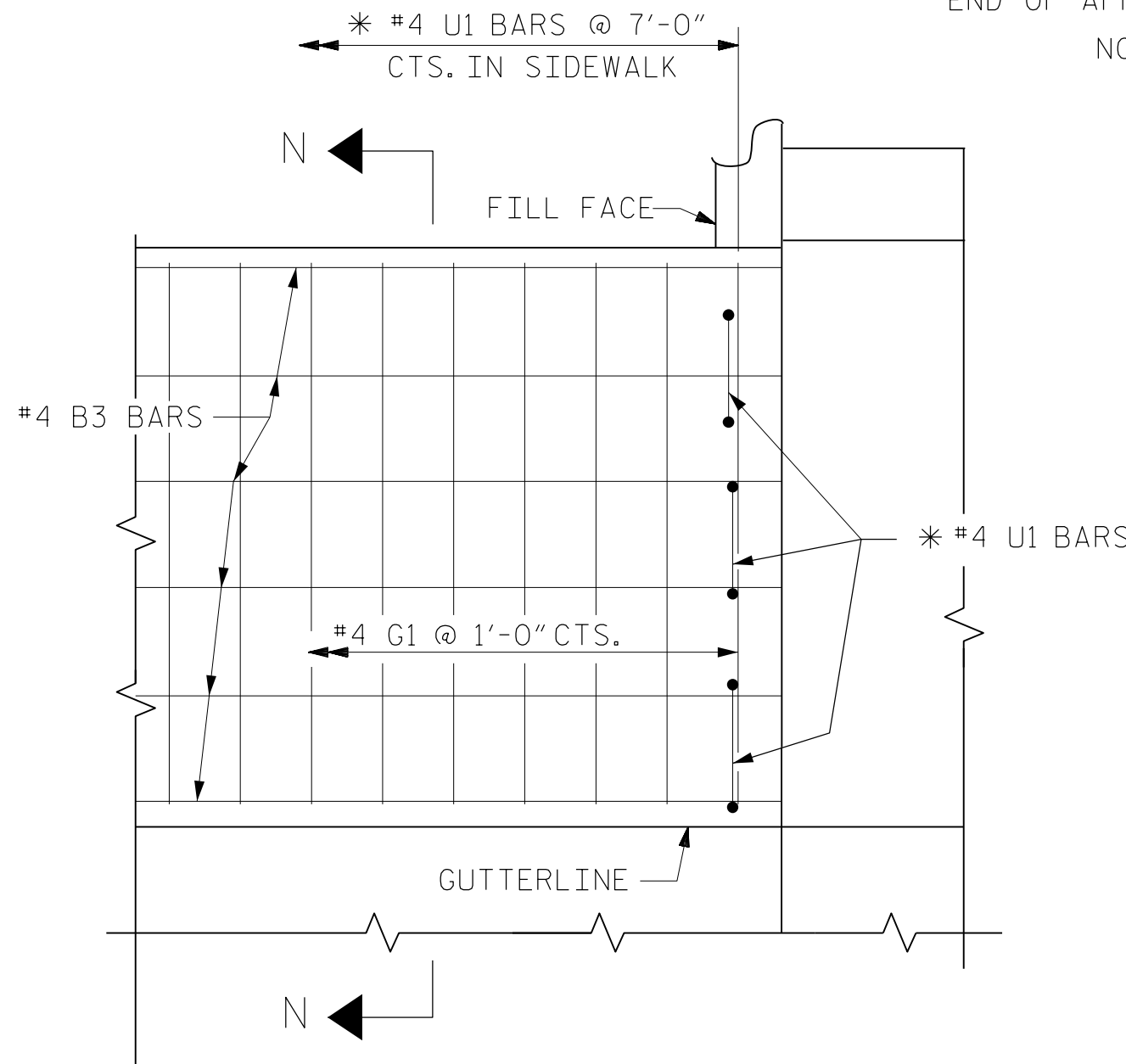
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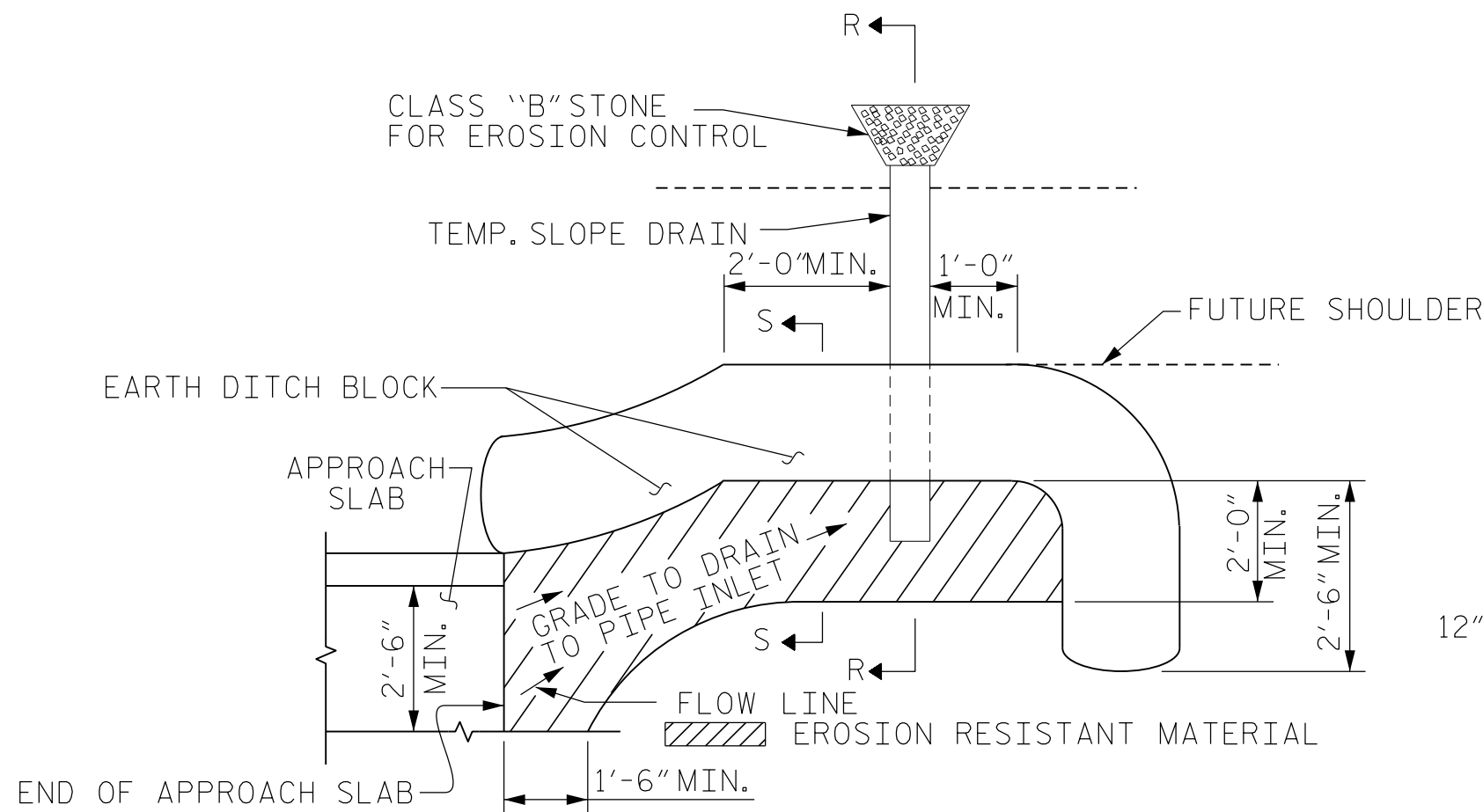
SECTION N-N



PLAN

* THE #4 U1 BARS MAY BE PUSHED INTO GREEN CONCRETE AFTER APPROACH SLAB HAS BEEN SCREEDED OFF.

DETAILS OF SIDEWALK
ON APPROACH SLAB

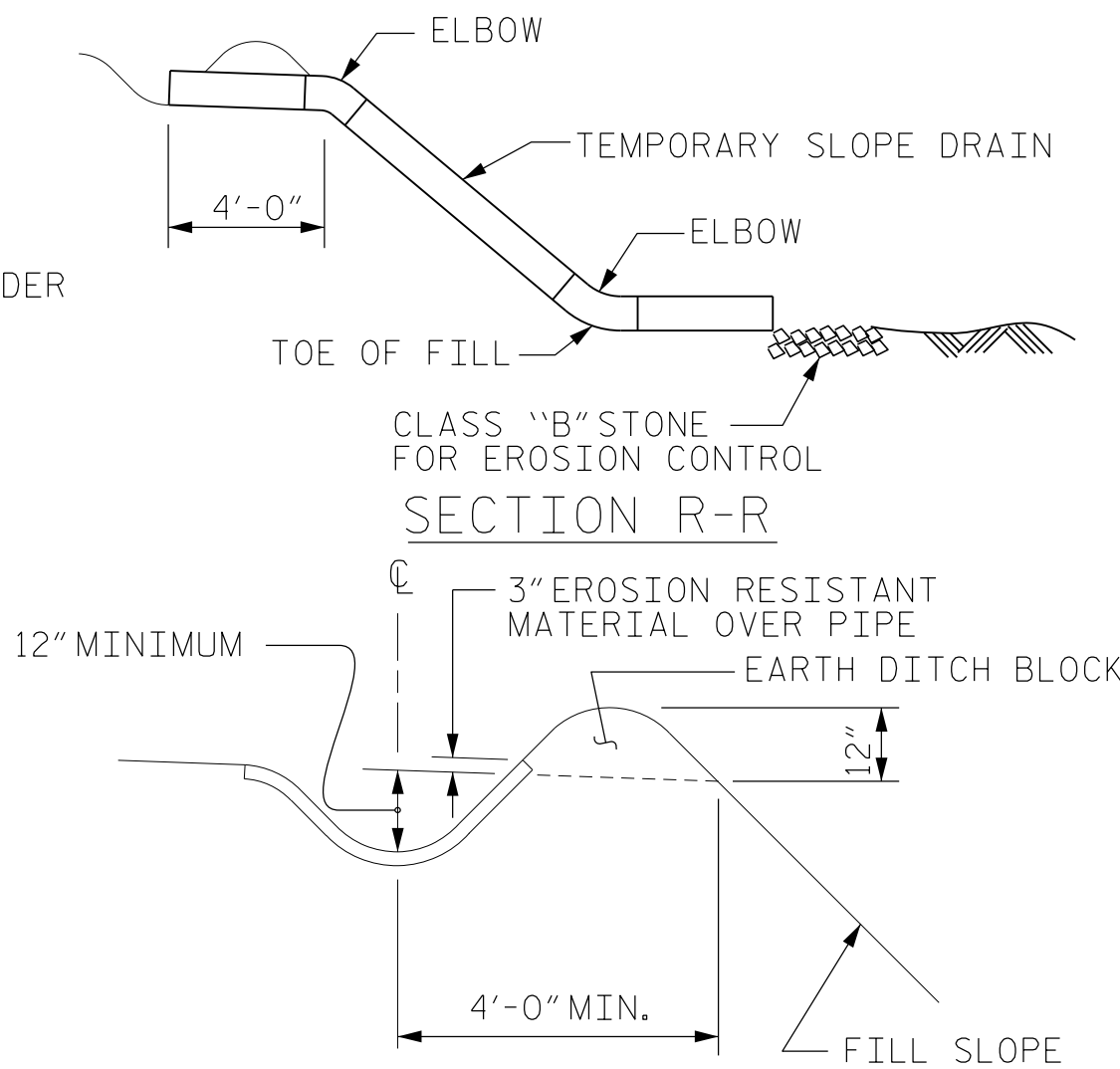


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

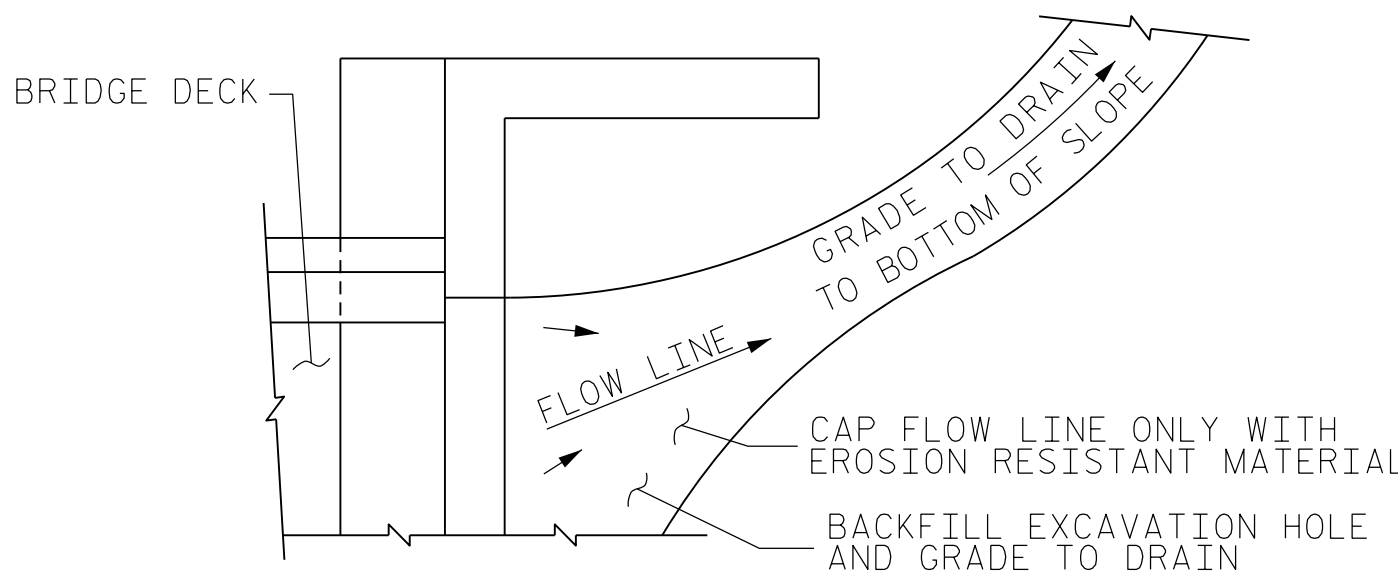
PLAN VIEW

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



SECTION S-S



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

PROJECT RESERVE @ MITCHELL MILL

WAKE COUNTY

LOCATION: NEAR ROLESVILLE

SHEET 2 OF 2

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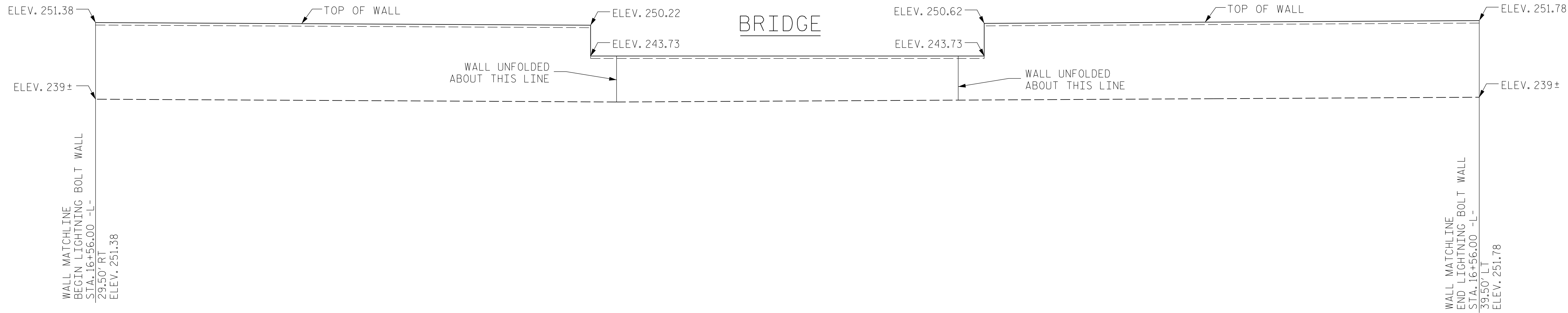
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BRIDGE APPROACH
SLAB DETAILS

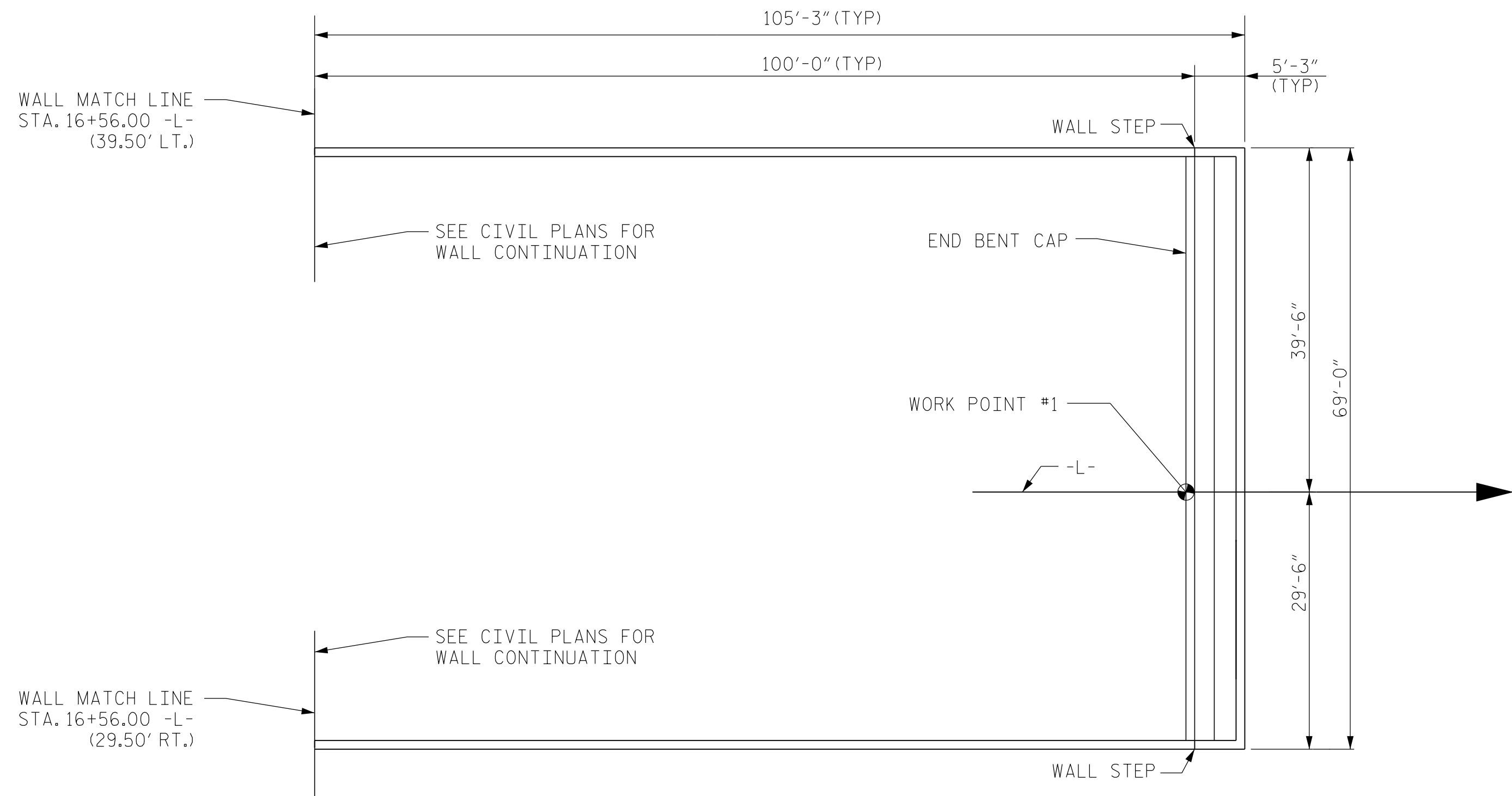
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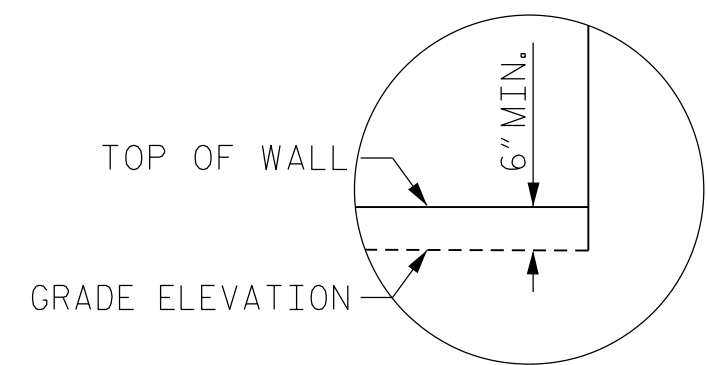


WALL 1 ELEVATION

WALL UNFOLDED AT 90 DEGREE WALL TURN POINTS



WALL 1 PLAN VIEW



ELEVATION DETAIL

- NOTES:
- 1.PROVIDE MINIMUM WALL EMBEDMENT AS PER GEOTECHNICAL STANDARDS.
 - 2.SEE CIVIL PLANS FOR CONTINUATION OF WALL AT WEST END BEGIN WALL POINT.

PROJECT RESERVE @ MITCHELL MILL
WAKE COUNTY
LOCATION: NEAR ROLESVILLE

SHEET OF

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RETAINING WALL 1
WALL ENVELOPE

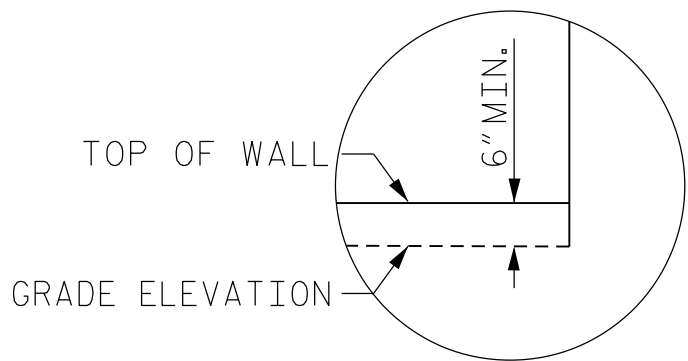
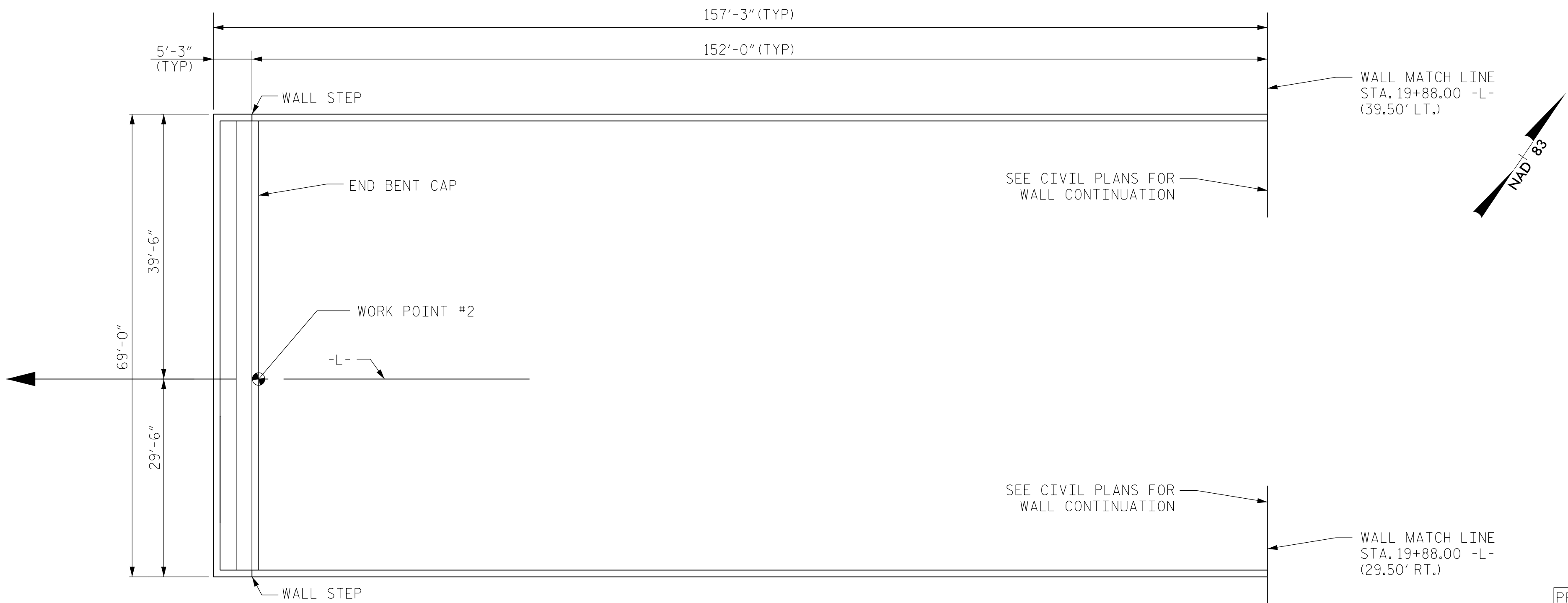
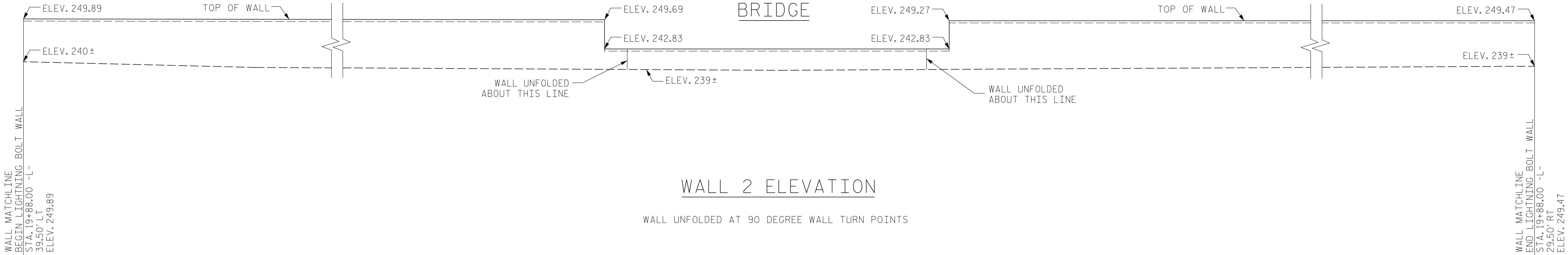
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9/2/2025

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DESIGN ENGINEER OF RECORD:	D. RUGGLES	DATE :	8/25



- NOTES:
- 1.PROVIDE MINIMUM WALL EMBEDMENT AS PER GEOTECHNICAL STANDARDS.
 - 2.SEE CIVIL PLANS FOR CONTINUATION OF WALL AT WEST END BEGIN WALL POINT.

PROJECT RESERVE @ MITCHELL MILL

WAKE COUNTY

LOCATION: NEAR ROLESVILLE

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FINAL UNLESS ALL
SIGNATURES COMPLETED

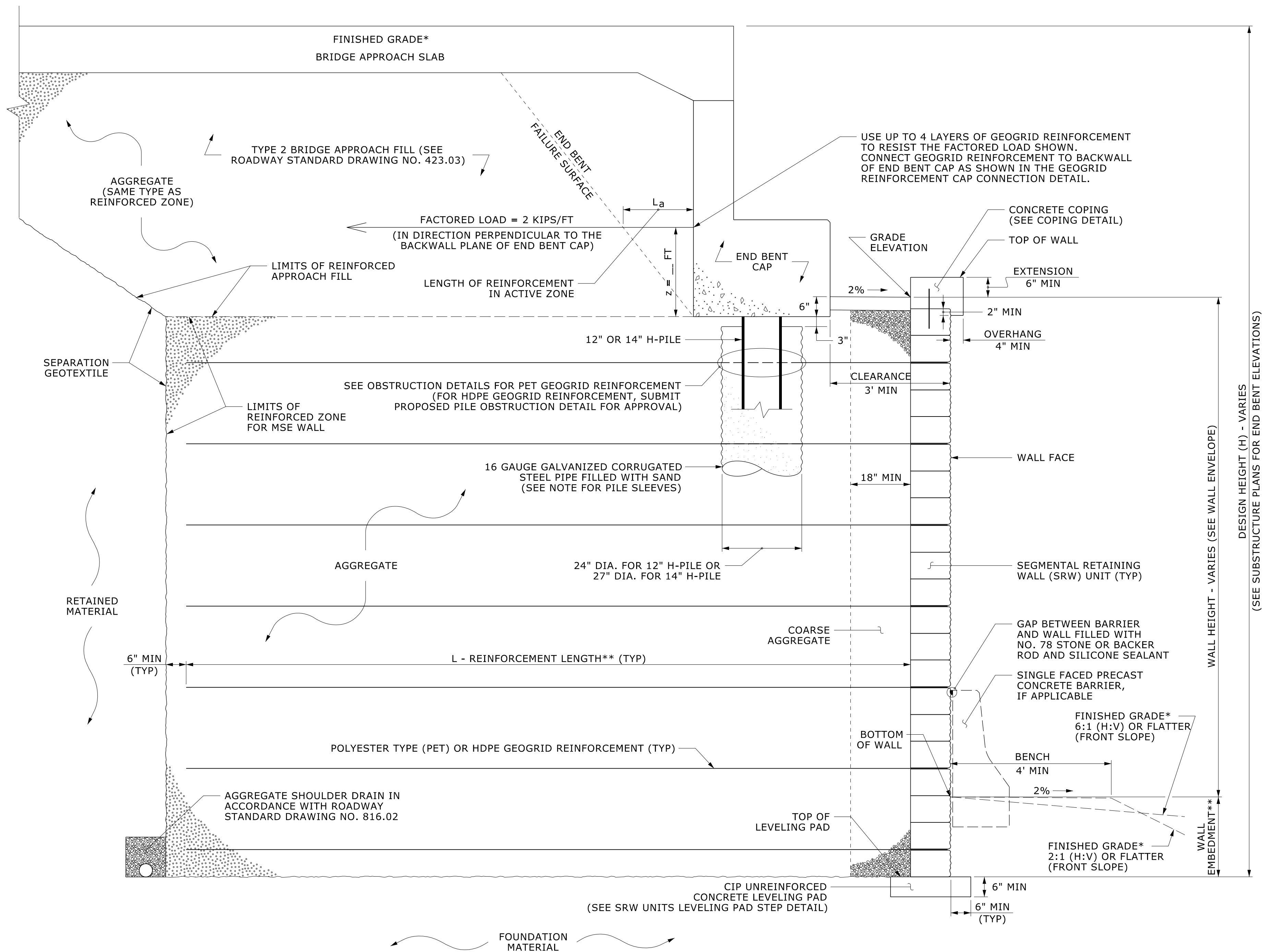


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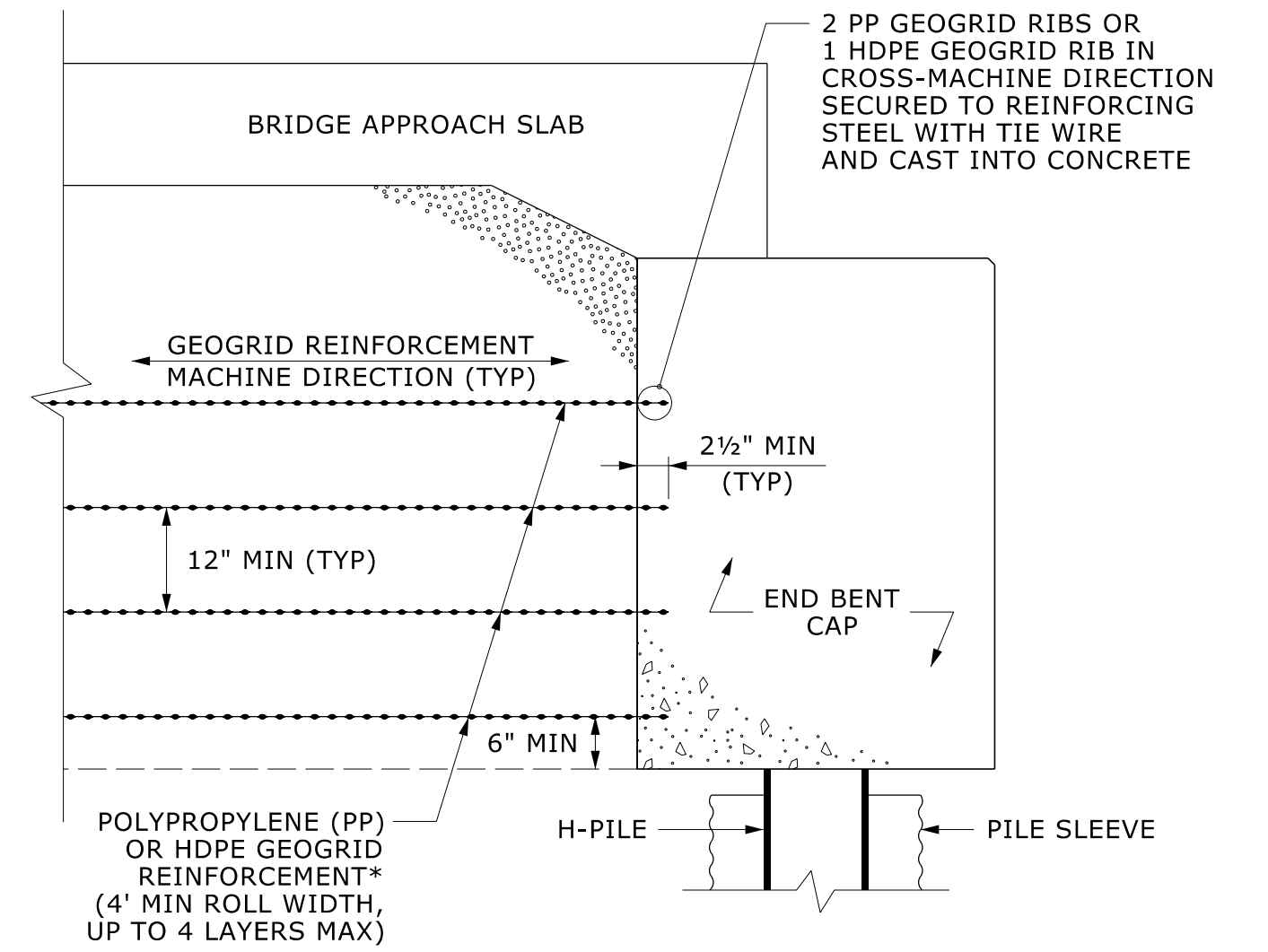
RETAINING WALL 2
WALL ENVELOPE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-15
2			4			
TOTAL SHEETS						16



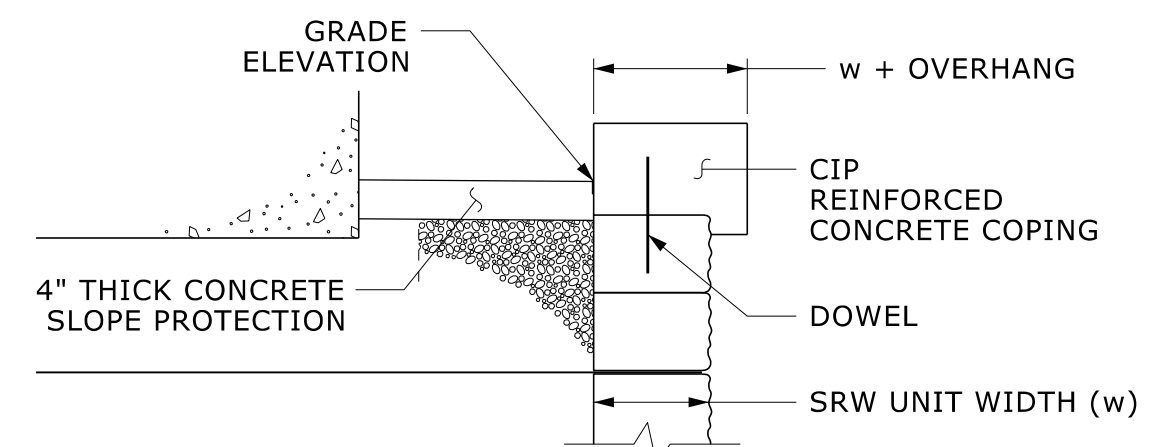
MSE ABUTMENT WALL WITH SRW UNITS - TYPICAL SECTION

*SEE ROADWAY PLANS FOR FINISHED GRADE DETAILS.
**SEE MSE RETAINING WALLS PROVISION AND IF APPLICABLE, MSE WALL
NOTES FOR WALL EMBEDMENT AND REINFORCEMENT LENGTH REQUIREMENTS.



GEOGRID REINFORCEMENT CAP CONNECTION DETAIL

*HDPE GEOGRID IS REQUIRED FOR GEOGRID REINFORCEMENT
CONNECTED TO BACKWALL OF END BENT CAP WHEN HDPE
GEOGRID REINFORCEMENT IS CONNECTED TO SRW UNITS.
PP OR HDPE GEOGRID IS REQUIRED FOR GEOGRID
REINFORCEMENT CONNECTED TO BACKWALL OF END BENT
CAP WHEN PET GEOGRID REINFORCEMENT IS CONNECTED
TO SRW UNITS. IF NECESSARY, SPLIT PP OR HDPE GEOGRID
REINFORCEMENT IN THE MACHINE DIRECTION (MD) BY
CUTTING RIBS IN THE CROSS-MACHINE DIRECTION (CD) TO
ACCOMMODATE VERTICAL SUPPORTS FOR END BENT FORMWORK
(MINIMUM 2' SPACING IN CD BETWEEN CUTS). DO NOT SPLICE
PP GEOGRIDS; CONTINUOUS PP GEOGRID REINFORCEMENT IN
THE MD IS REQUIRED.



COPING DETAIL

PROJECT RESERVE @ MITCHELL MILL
WAKE COUNTY
LOCATION: NEAR ROLESVILLE

SHEET OF

WALL DETAILS

PRELIMINARY PLANS
DO NOT USE
FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



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DRAWN BY: J. F. LARA C. DATE : 8/25
CHECKED BY: D. RUGGLES DATE : 8/25
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE : 8/25