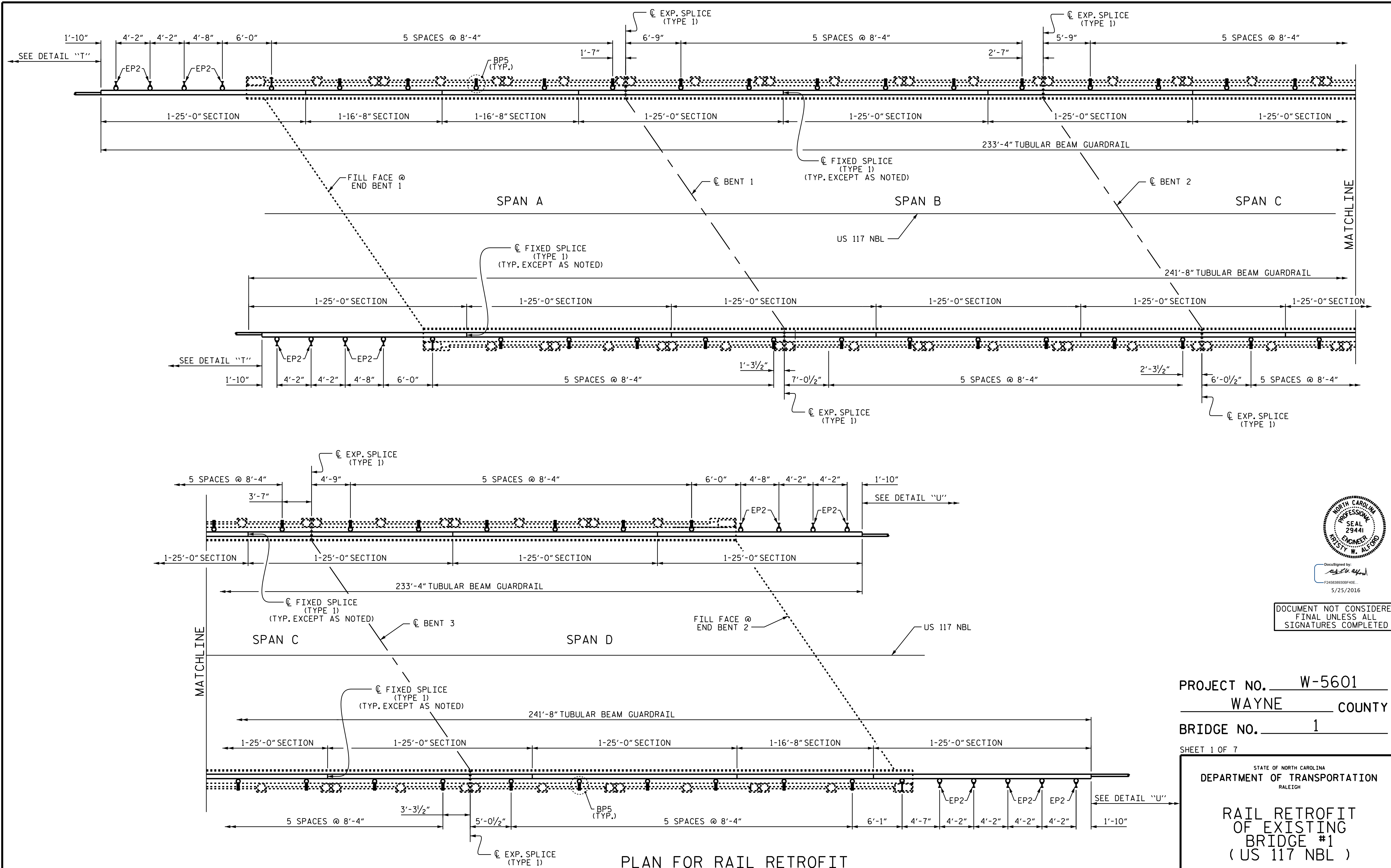


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**PLAN FOR RAIL RETROFIT**

SPACING FOR EP2'S MAY BE ADJUSTED AS NECESSARY IN ORDER TO AVOID EXISTING CURB  
 MAXIMUM SPACING FOR EP2'S IS 6'-0"  
 FOR DETAIL "T" AND DETAIL "U" SEE SHEET 3 OF 7  
 FOR LEGEND SEE SHEET 3 OF 7



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 Trusty W. Alford  
 F24683930BF40E  
 5/25/2016

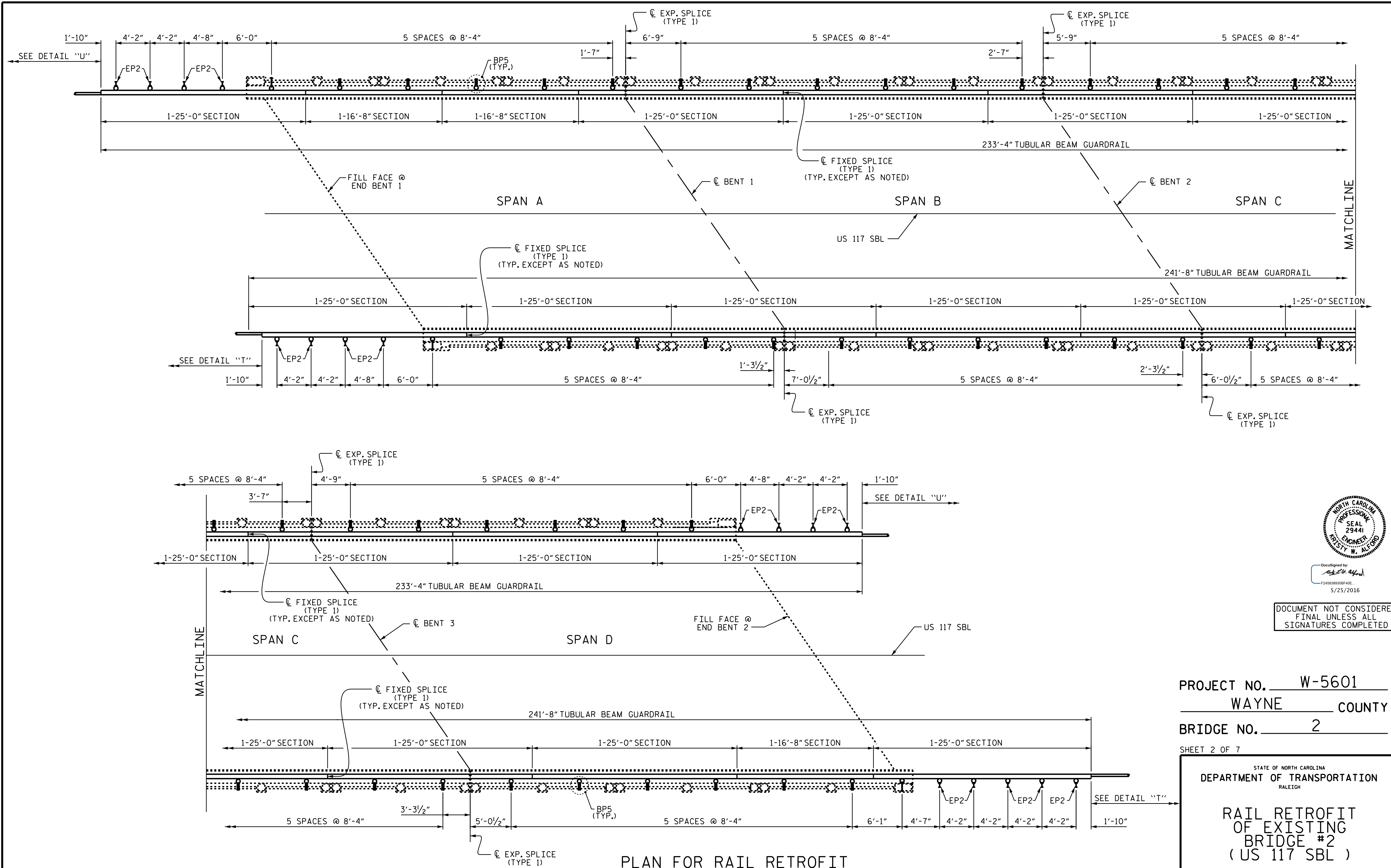
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PROJECT NO. W-5601  
WAYNE COUNTY  
 BRIDGE NO. 1  
 SHEET 1 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 RAIL RETROFIT  
 OF EXISTING  
 BRIDGE #1  
 (US 117 NBL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			7

DRAWN BY : J.P. ADAMS DATE : 5/2016  
 CHECKED BY : K.W. ALFORD DATE : 5/2016



**PLAN FOR RAIL RETROFIT**

SPACING FOR EP2'S MAY BE ADJUSTED AS NECESSARY IN ORDER TO AVOID EXISTING CURB  
 MAXIMUM SPACING FOR EP2'S IS 6'-0"  
 FOR DETAIL "T" AND DETAIL "U" SEE SHEET 3 OF 7  
 FOR LEGEND SEE SHEET 3 OF 7



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 W. Alford  
 F24888908F40E...  
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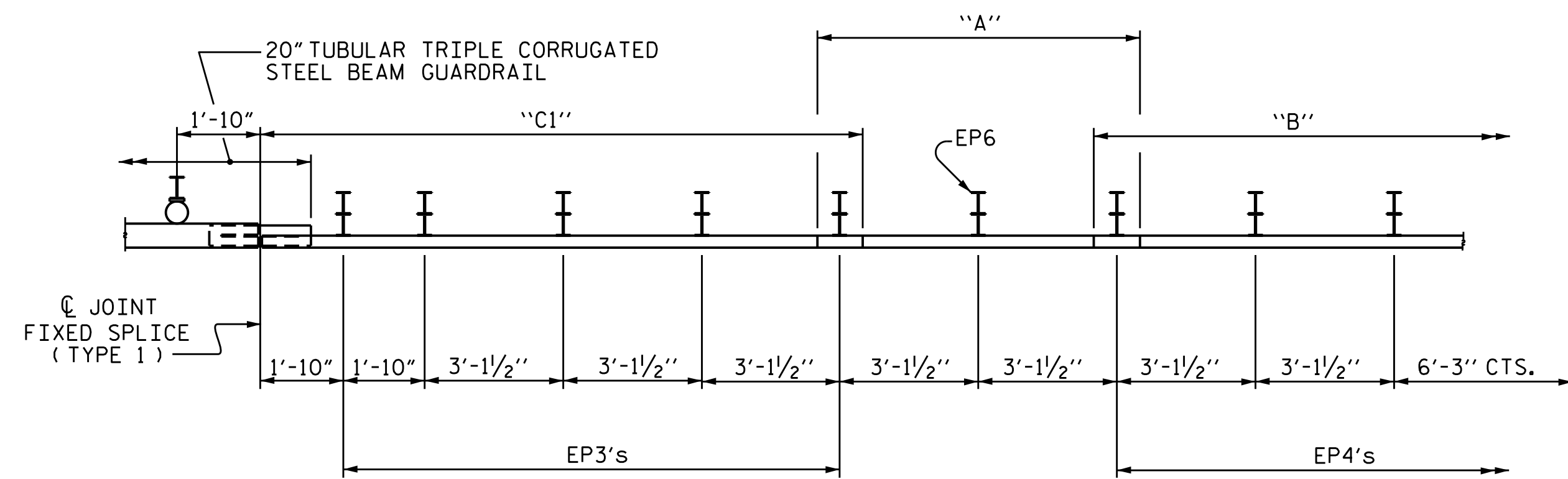
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PROJECT NO. W-5601  
WAYNE COUNTY  
 BRIDGE NO. 2  
 SHEET 2 OF 7

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 RAIL RETROFIT  
 OF EXISTING  
 BRIDGE #2  
 (US 117 SBL)

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-2	
1			3			TOTAL SHEETS	
2			4			7	

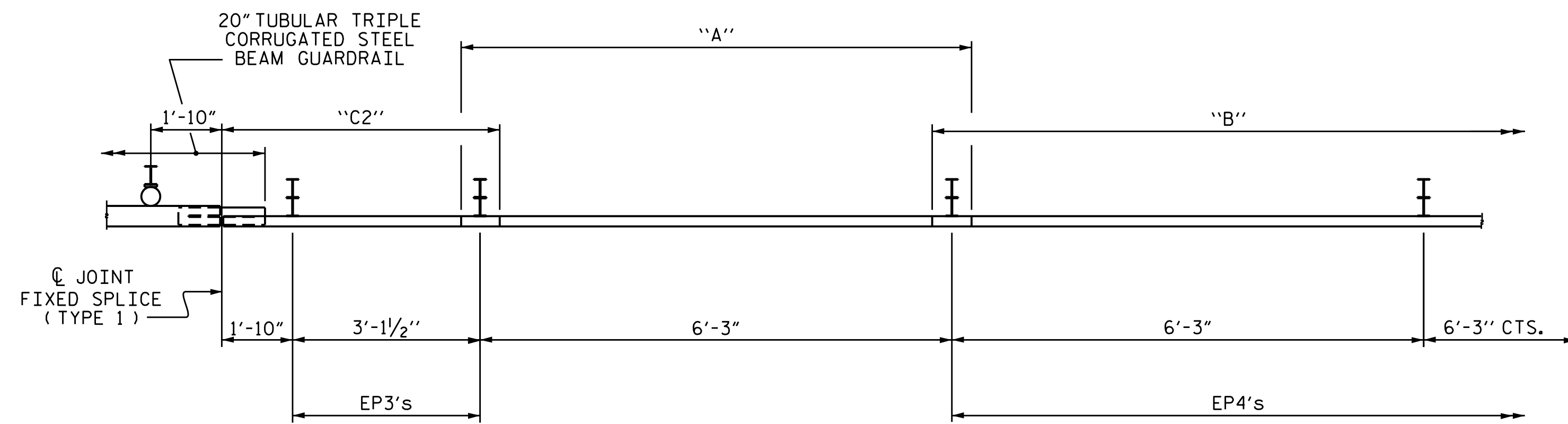
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 CHECKED BY : K.W. ALFORD DATE : 5/2016



DETAIL "T"

**LEGEND**

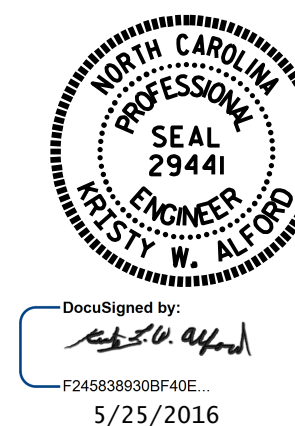
	USE	BP5
	USE	EP2
	USE	EP3, EP4 & EP6
"A"---	USE	W-TR GUARDRAIL TRANSITIONAL SECTION
"B"---	USE	STANDARD GUARDRAIL
"C1"---	USE	20" TRIPLE CORRUGATED STEEL BEAM GUARDRAIL
"C2"---	USE	20" TRIPLE CORRUGATED STEEL BEAM GUARDRAIL



DETAIL "U"

PROJECT NO. W-5601  
WAYNE COUNTY  
 BRIDGE NO. 1 & 2

SHEET 3 OF 7



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 DETAILS FOR RETROFIT  
 OF EXISTING BRIDGE  
 RAIL WITH TUBULAR  
 BEAM GUARDRAIL

DRAWN BY : J.P. ADAMS DATE : 5/2016  
 CHECKED BY : K.W. ALFORD DATE : 5/2016

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2			4			7



**GENERAL NOTES**

THE 20" TRIPLE TUBULAR CORRUGATED BEAM RAIL SECTION SHALL BE FABRICATED BY WELDING TWO (2) 20" TRIPLE CORRUGATED BEAM RAIL ELEMENTS AS SHOWN AND THE GUARDRAIL SHALL CONFORM TO THE NCDOT STANDARD SPECIFICATIONS EXCEPT AS NOTED AND SHOWN ON THE PLANS.

20" TRIPLE TUBULAR CORRUGATED BEAM RAIL SHALL BE 10 GAGE.

POSTS, BASE ANGLES AND/OR BASE PLATES, 6" DIA. TUBES AND OFFSET BLOCKS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-36. SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A-570 GRADE 33 OR A-611 GRADE C.

POSTS, BASE ANGLES AND/OR BASE PLATES, TUBES, BLOCKS AND SHIMS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-123.

POSTS ARE TO BE PLUMB. SHIMS MAY BE USED BENEATH THE ROADWAY EDGE OF THE BASE ANGLES AND/OR BASE PLATES AS NECESSARY FOR POST ALIGNMENT. PROVIDE ONE 1/8" AND TWO 1/16" STEEL SHIMS FOR 25% OF THE POSTS ON THE BRIDGE.

"BP" POST HEIGHT TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR.

PROPOSED RAIL POST MAY BE SHIFTED SLIGHTLY TO CLEAR REINFORCING STEEL. STANDARD SLOTS MAY BE USED IN THE RAIL TO ALLOW ADJUSTMENT.

HOLES SHALL BE DRILLED HORIZONTAL OR VERTICAL USING A ROTARY DRILL OR A ROTARY IMPACT DRILL. IMPACT TOOLS WILL NOT BE PERMITTED. CARBIDE TIPPED BITS SHALL BE USED UNLESS REINFORCING STEEL IS ENCOUNTERED. AN APPROPRIATE BIT FOR DRILLING THROUGH REINFORCING STEEL SHALL BE USED WHEN NECESSARY. THE CONTRACTOR SHALL BE PREPARED TO DRILL THROUGH REINFORCING STEEL AT TIMES.

POST SPACINGS AS SHOWN ON THE PLANS SHALL BE CHECKED BEFORE HOLES ARE DRILLED IN THE 20" TRIPLE TUBULAR CORRUGATED BEAM RAIL. STANDARD SLOTS WILL BE ALLOWED. FIELD PUNCHING OF THE HOLES OR SLOTS WILL NOT BE PERMITTED.

A SEALANT WILL BE REQUIRED IN THE AREA OF THE ANCHOR BOLTS AND WILL BE PLACED IN THE FOLLOWING MANNER:

- BEFORE THE BASE PLATE HAS BEEN SET IN PLACE. IF THE GROUT DOES NOT COMPLETELY FILL THE ANCHOR HOLE, SEAL THE AREA AROUND EACH CONCRETE ANCHOR BOLT TO KEEP MOISTURE FROM ENTERING THE HOLE.
- AFTER THE BASE PLATE HAS BEEN SET IN PLACE AND BEFORE THE WASHERS AND NUTS HAVE BEEN PLACED ON THE BOLT, SEAL THE HOLE REMAINING AROUND THE ANCHOR BOLT.

THE SEALANT SHALL BE A ONE-COMPONENT POLYSULFIDE GUN GRADE MEETING FEDERAL SPECIFICATIONS TT-S-230. SEALANT SHALL BE GRAY IN COLOR AND APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATION.

- "SONOLASTIC ONE PART", MANUFACTURED BY SONNEBORN-DESOTO CO., DES PLAINES, ILLINOIS, 60018.
- "THORSPAN ONE COMPONENT", MANUFACTURED BY STANDARD DRY WALL PRODUCTS, INC., MIAMI, FLORIDA, 33166.
- "HORNFLEX ONE COMPONENT" MANUFACTURED BY W. R. GRACE AND CO., CAMBRIDGE, MASSACHUSETTS, 02140.

ALL CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

VERTICAL SLOTS IN THE 6" TUBE ALLOW FOR SOME VERTICAL ADJUSTMENT OF RAIL HEIGHT IN ORDER TO OBTAIN THE CENTERLINE OF RAIL HEIGHT OF 1'-10" ABOVE RIDING SURFACE.

THE SIZE OF THE FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

LAP BEAM RAIL JOINTS IN DIRECTION OF TRAFFIC.

PROJECT NO. W-5601

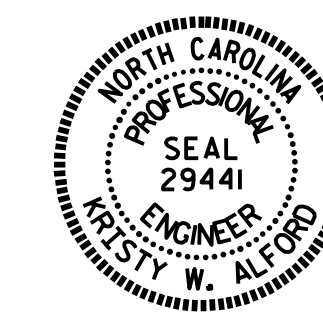
WAYNE COUNTY

BRIDGE NO. 1 & 2

SHEET 4 OF 7

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

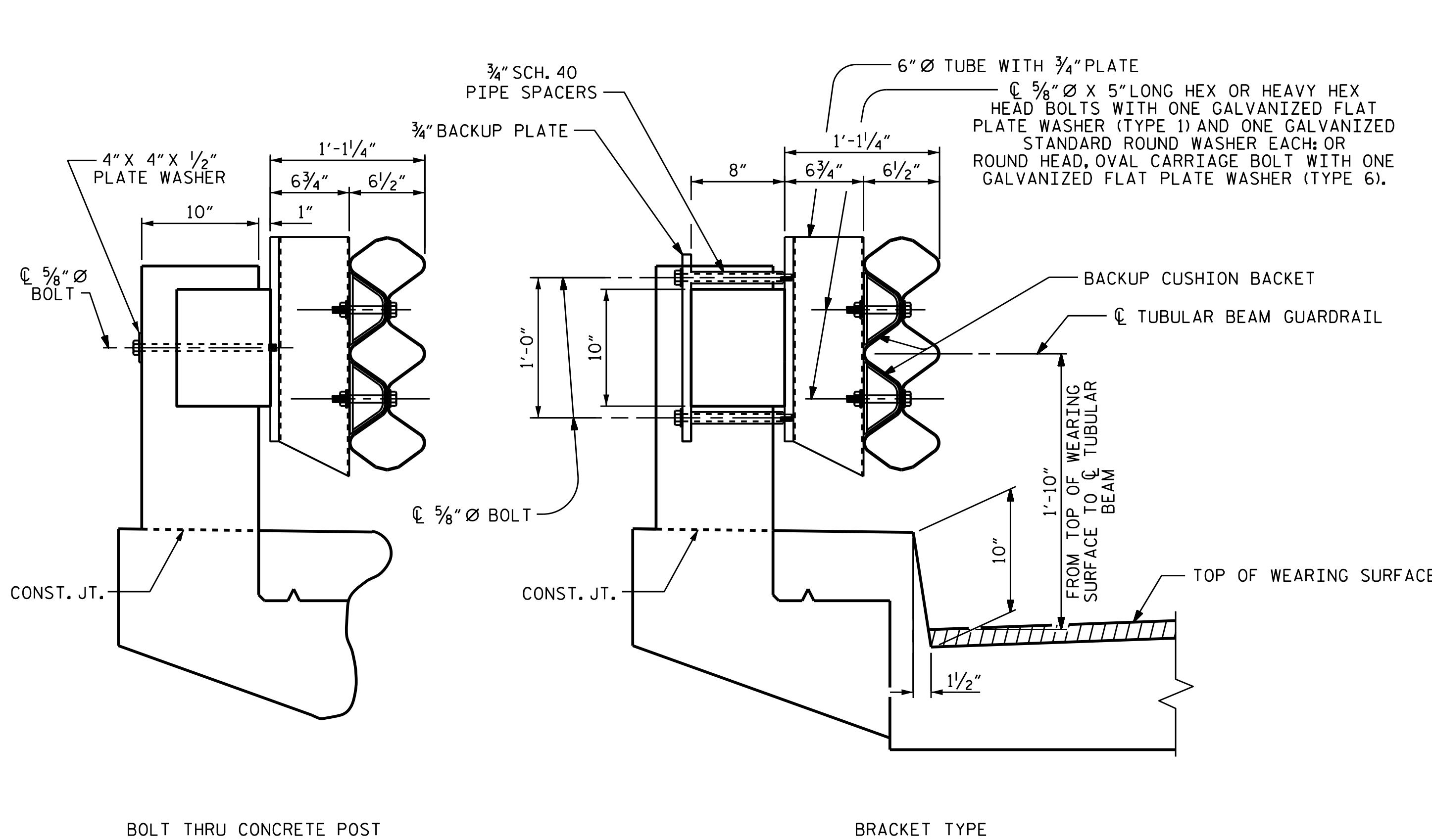
DETAILS FOR RETROFIT  
OF EXISTING BRIDGE  
RAIL WITH TUBULAR  
BEAM GUARDRAIL



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W. Alford  
5/25/2016

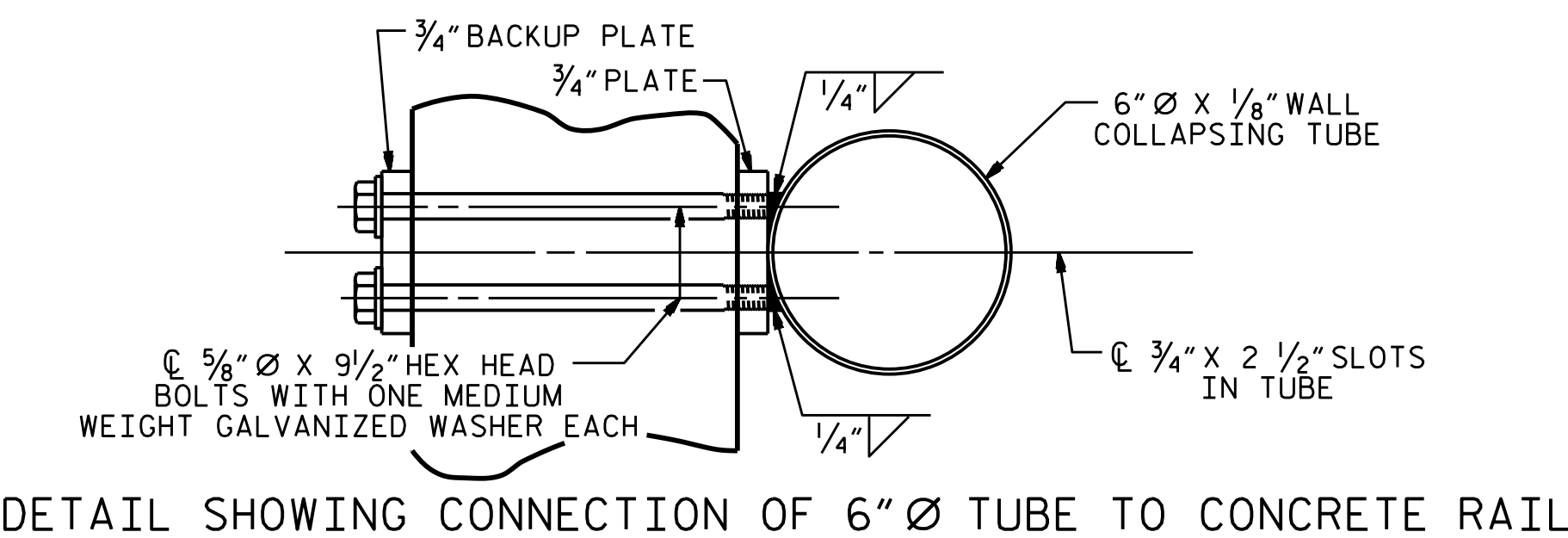
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1			3			TOTAL SHEETS
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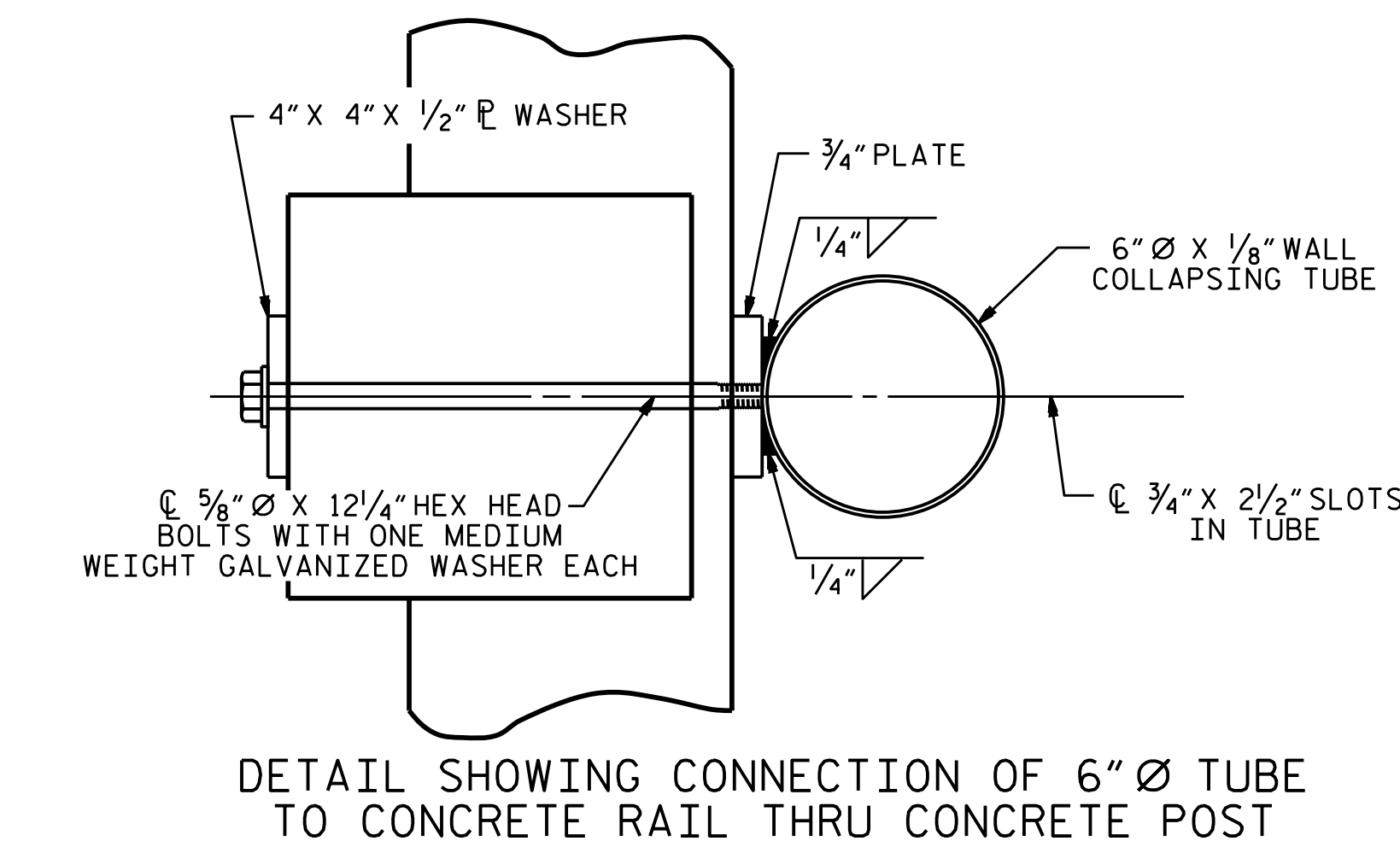


**RETROFIT EXISTING RAIL WITH TUBULAR BEAM GUARDRAIL**

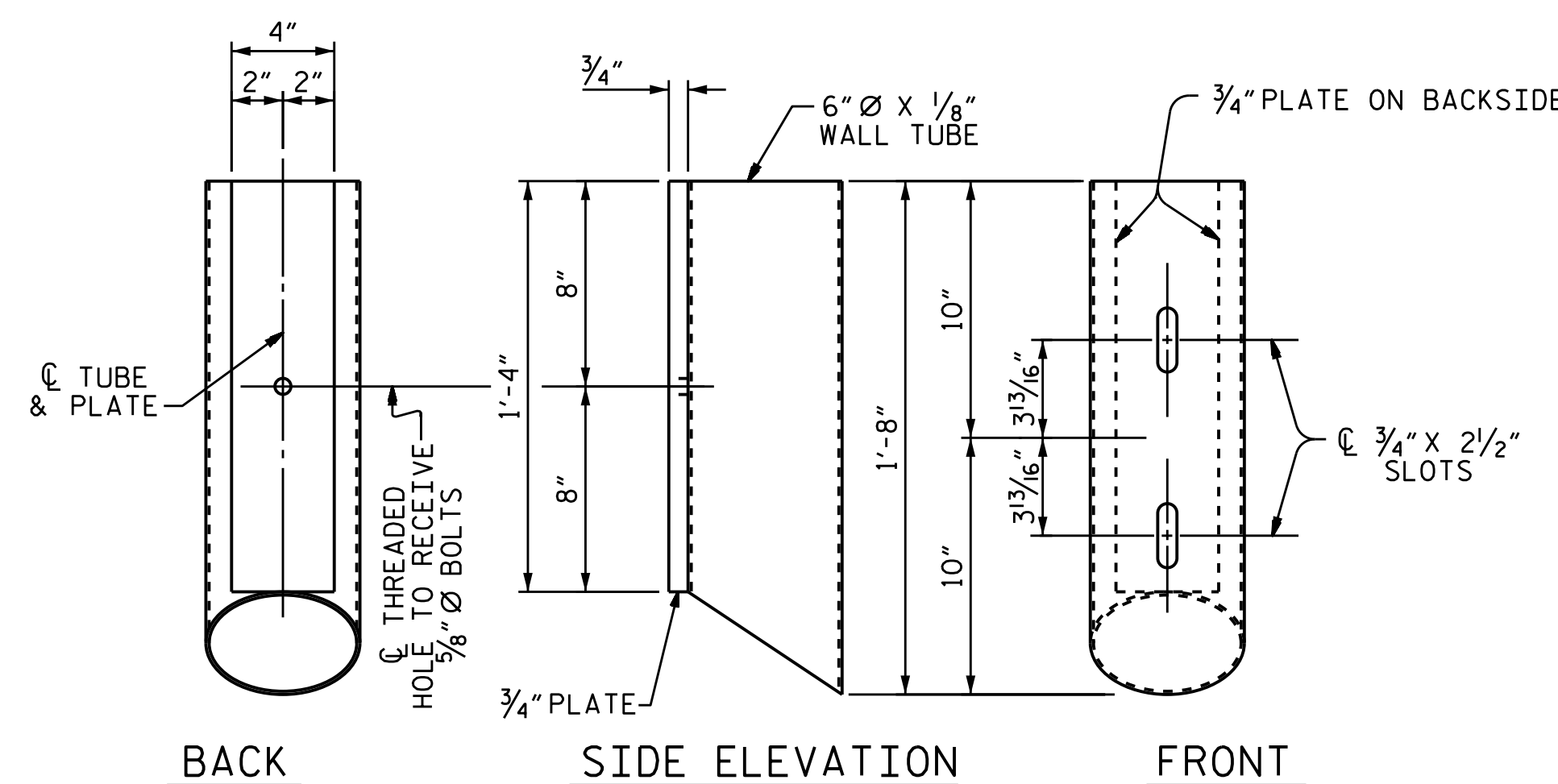
**BP5**



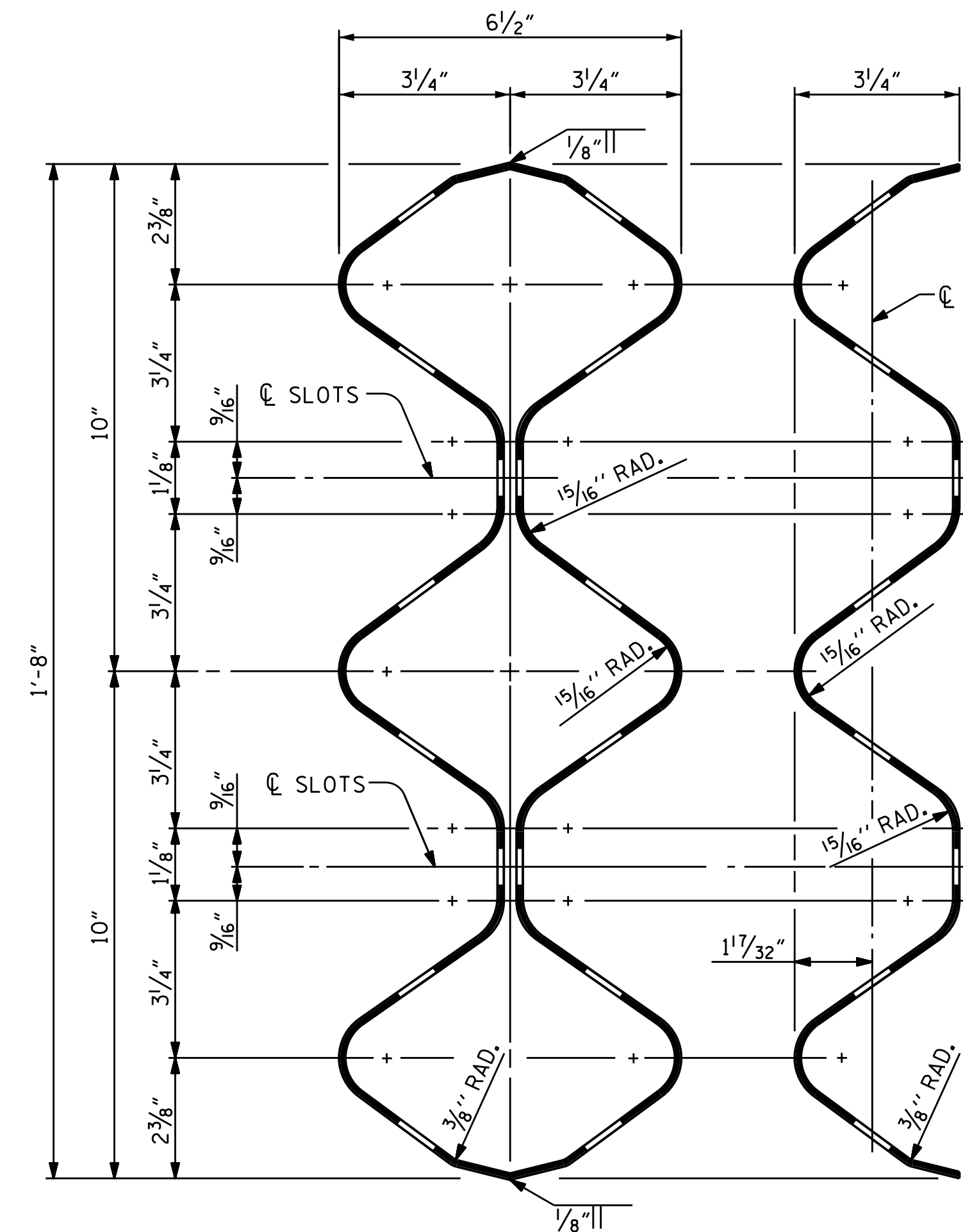
DETAIL SHOWING CONNECTION OF 6" Ø TUBE TO CONCRETE RAIL



DETAIL SHOWING CONNECTION OF 6" Ø TUBE TO CONCRETE RAIL THRU CONCRETE POST



**6" Ø TUBE DETAILS**



SECTION THRU TUBULAR BEAM

SECTION THRU 20" TRIPLE CORRUGATED BEAM

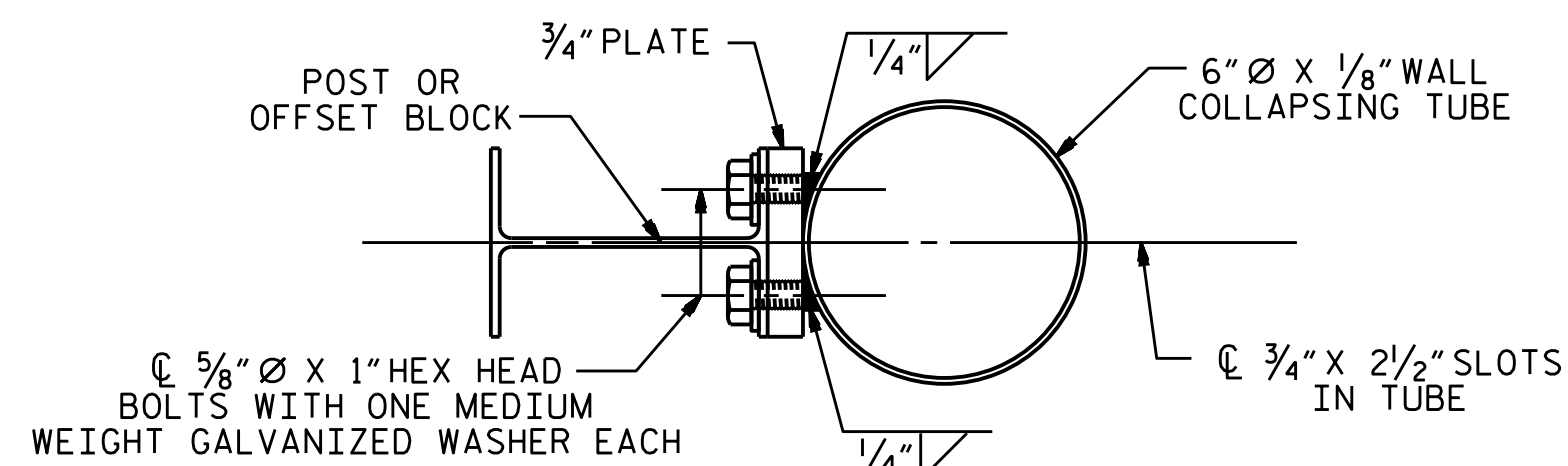
**NOTES**

THE 6" Ø TUBE WITH 3/4" BACKING PLATE TO BE MOUNTED AGAINST THE EXISTING CONCRETE RAIL.

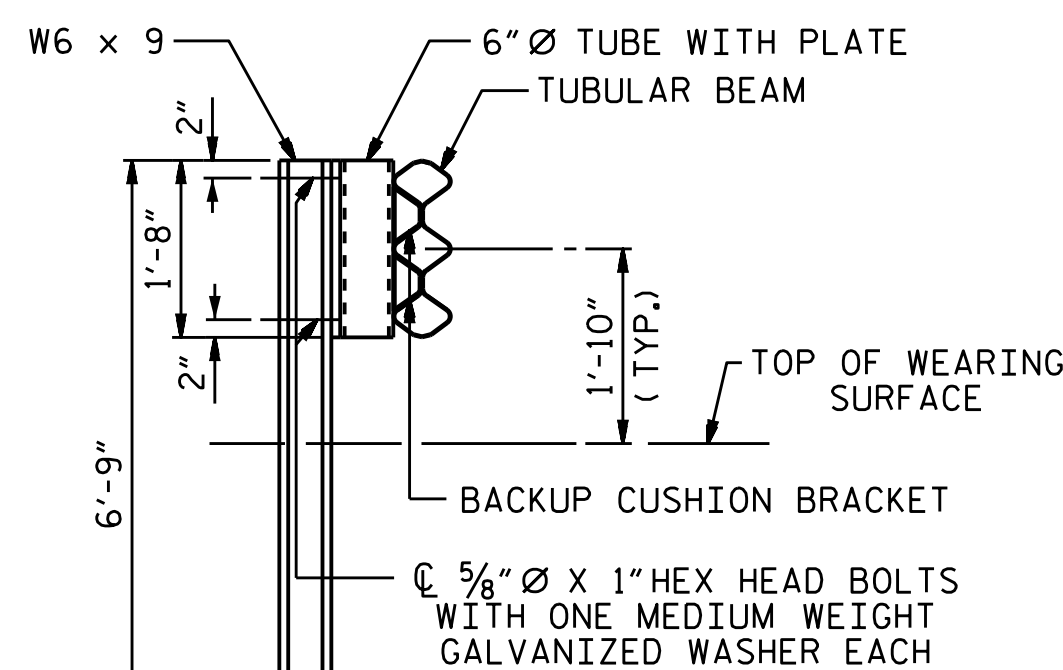
HOLES FOR THE 5/8" DIAMETER BOLTS, THRU THE EXISTING CONCRETE RAIL OR POST, SHALL BE 3/4" DIAMETER.

5/8" DIAMETER BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-307 AND SHALL BE GALVANIZED TO CONFORM TO THE REQUIREMENTS OF ASTM A-153.

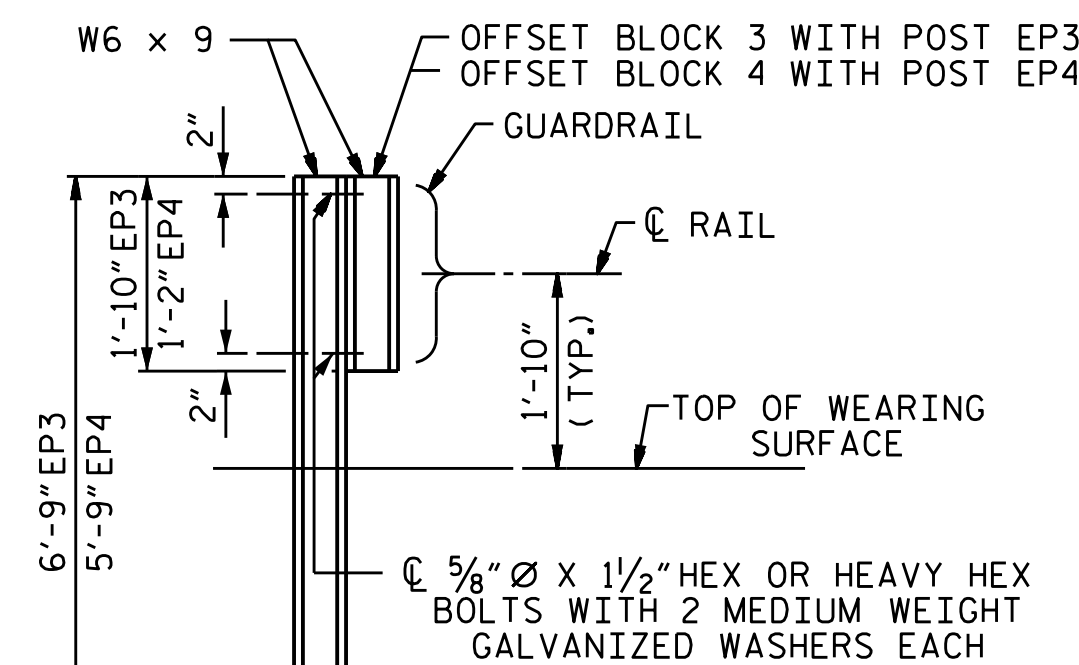
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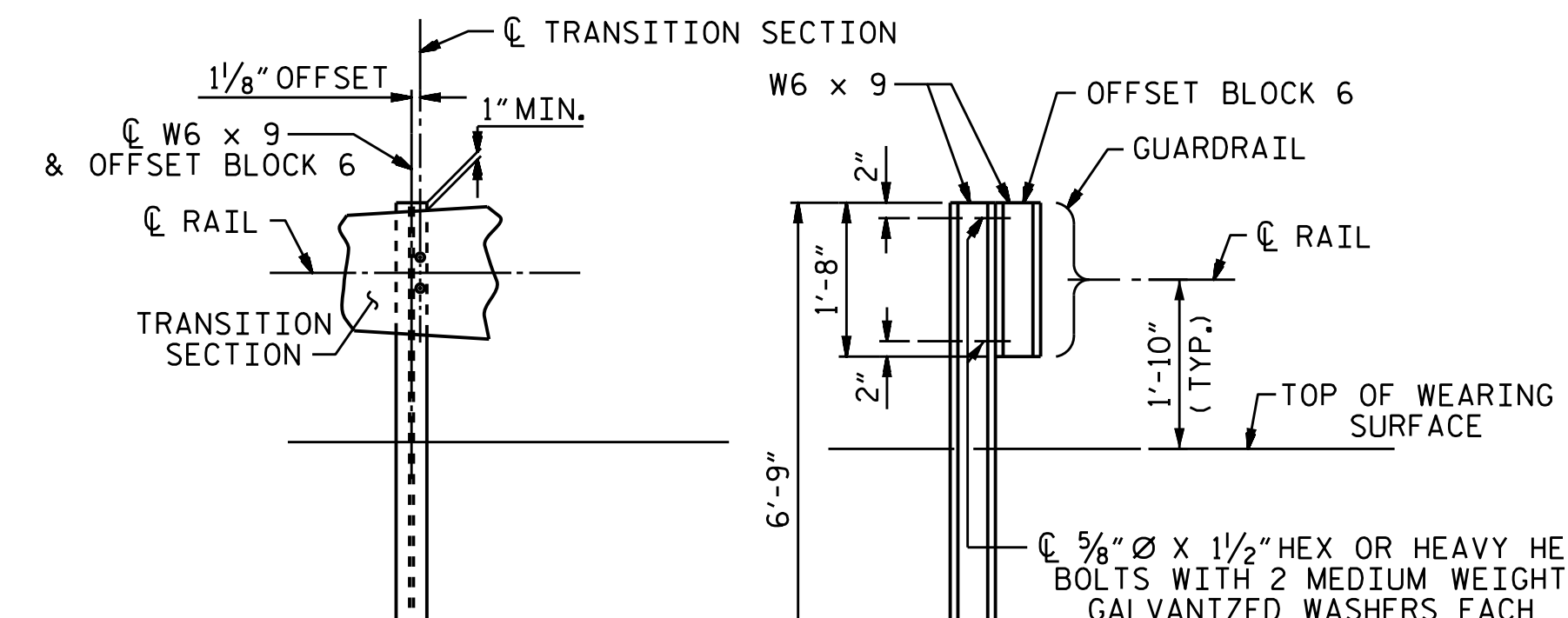
DETAIL SHOWING CONNECTION OF 6" Ø TUBE TO POST OR OFFSET BLOCK



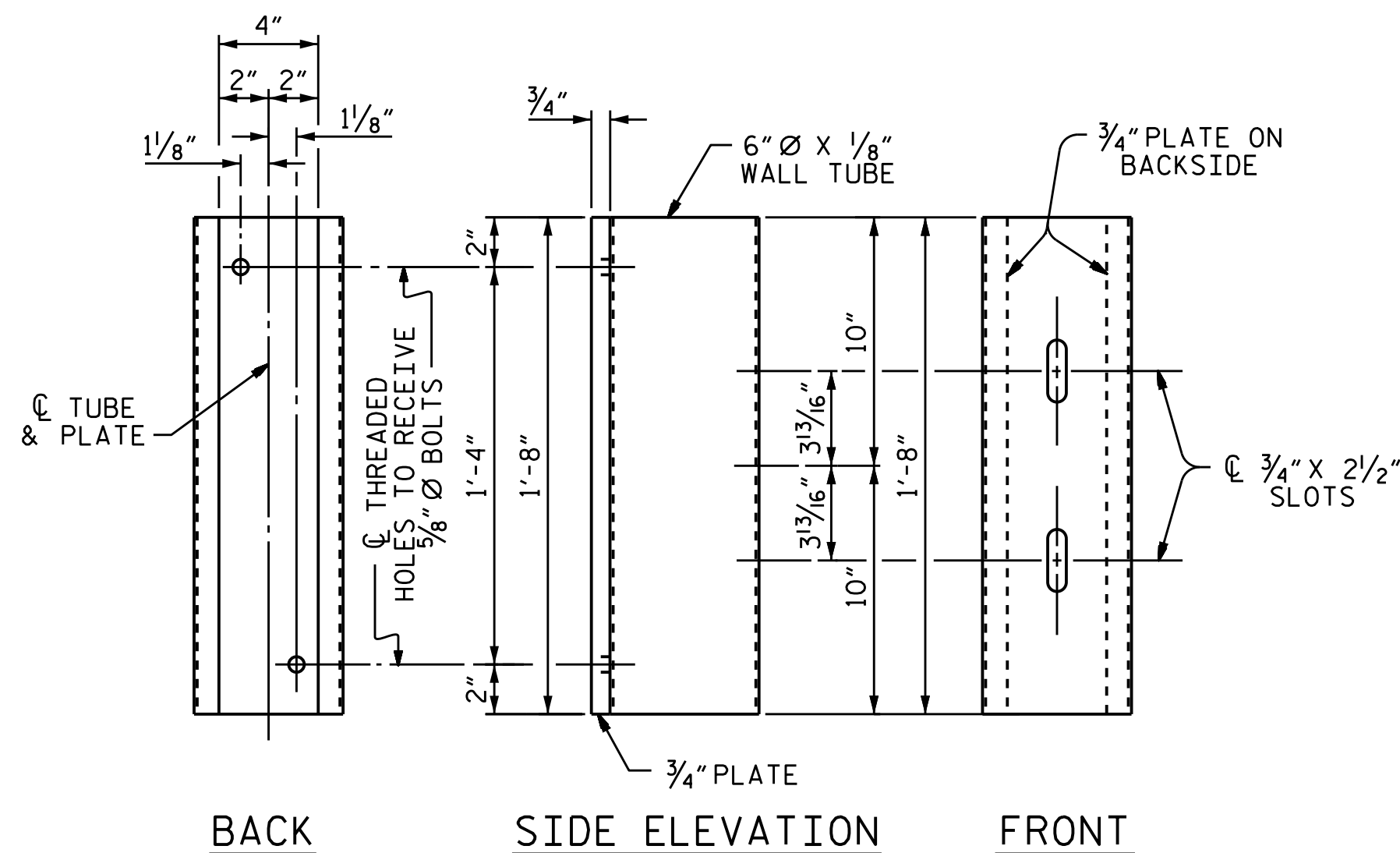
EP2



EP3 & EP4

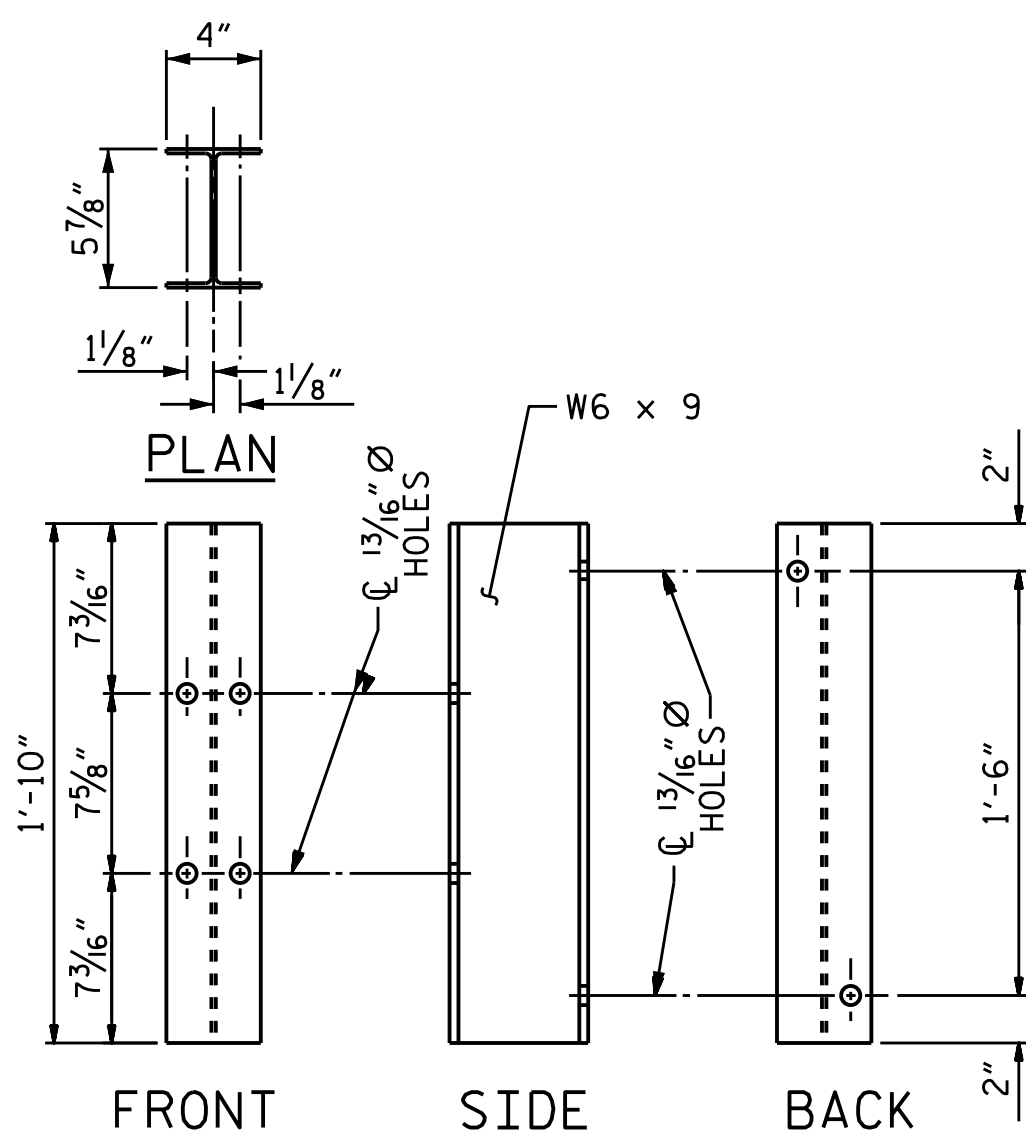


EP6



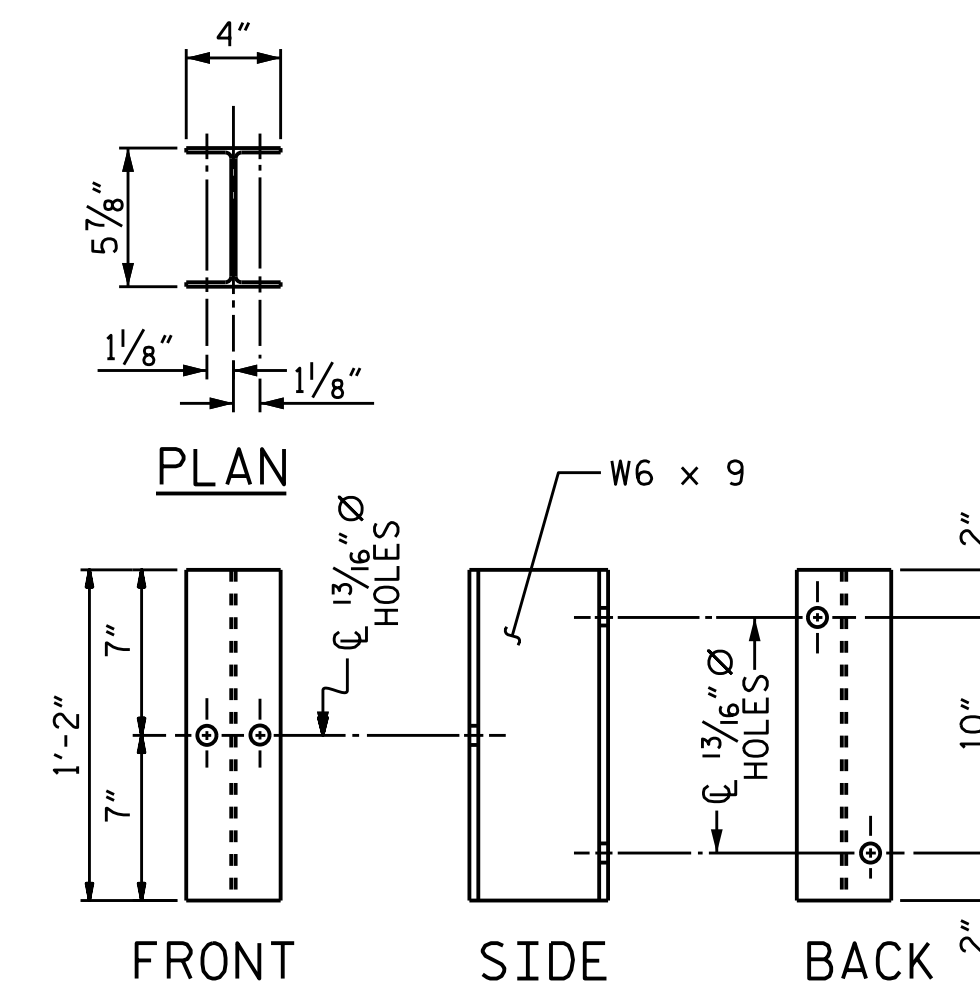
6" Ø TUBE DETAILS

USE WITH POST EP2



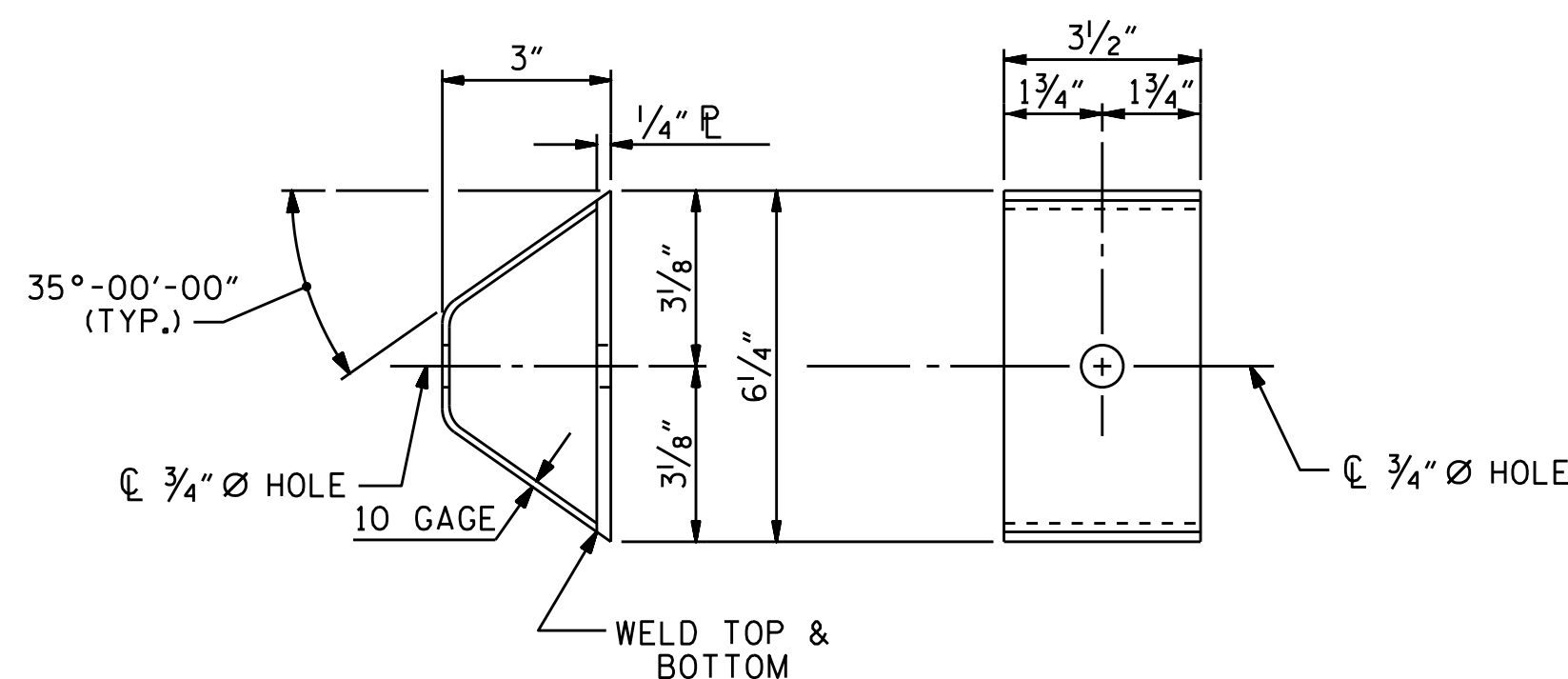
DETAILS OF OFFSET BLOCK 3

USE WITH EP3

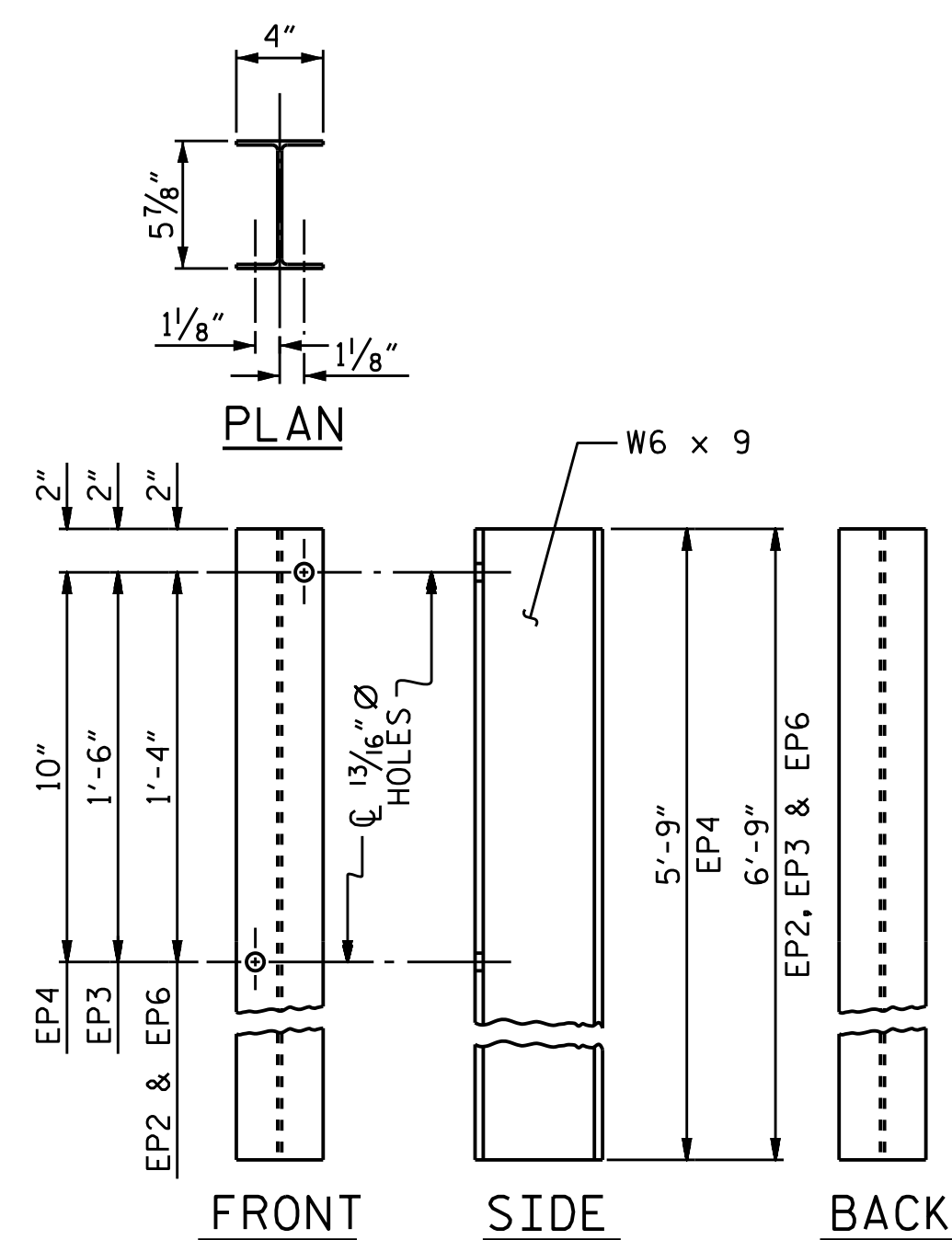


DETAILS OF OFFSET BLOCK 4

USE WITH EP4

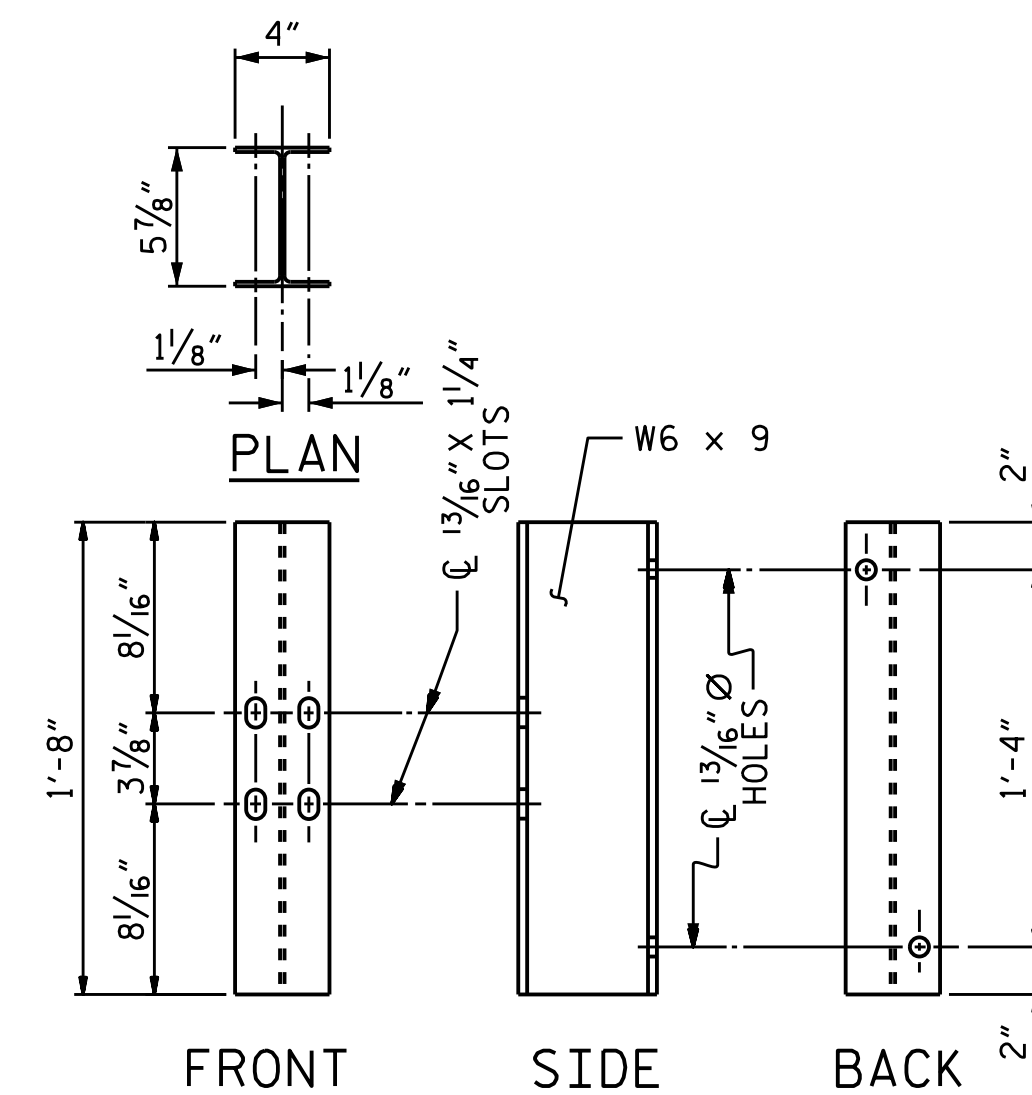


BACKUP CUSHION BRACKET



DETAIL OF POST

EP2, EP3, EP4 & EP6

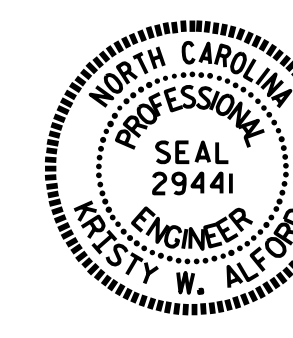


DETAILS OF OFFSET BLOCK 6

USE WITH EP6

PROJECT NO. W-5601  
 WAYNE COUNTY  
 BRIDGE NO. 1 & 2

SHEET 5 OF 7



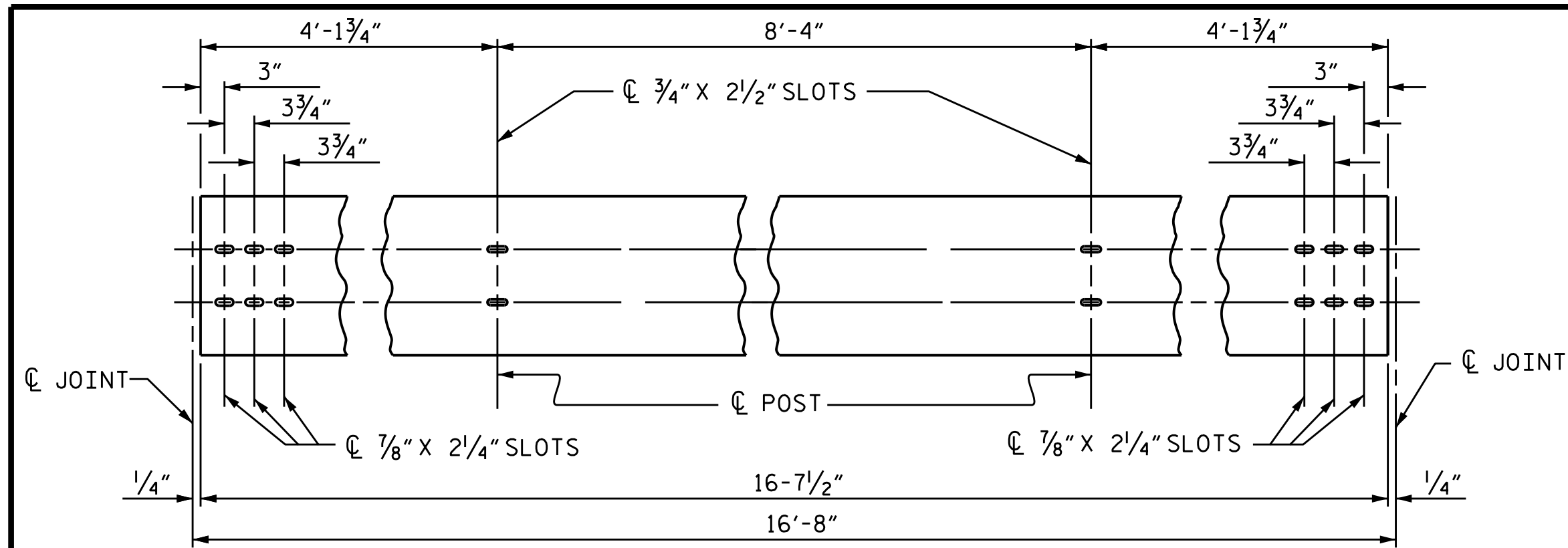
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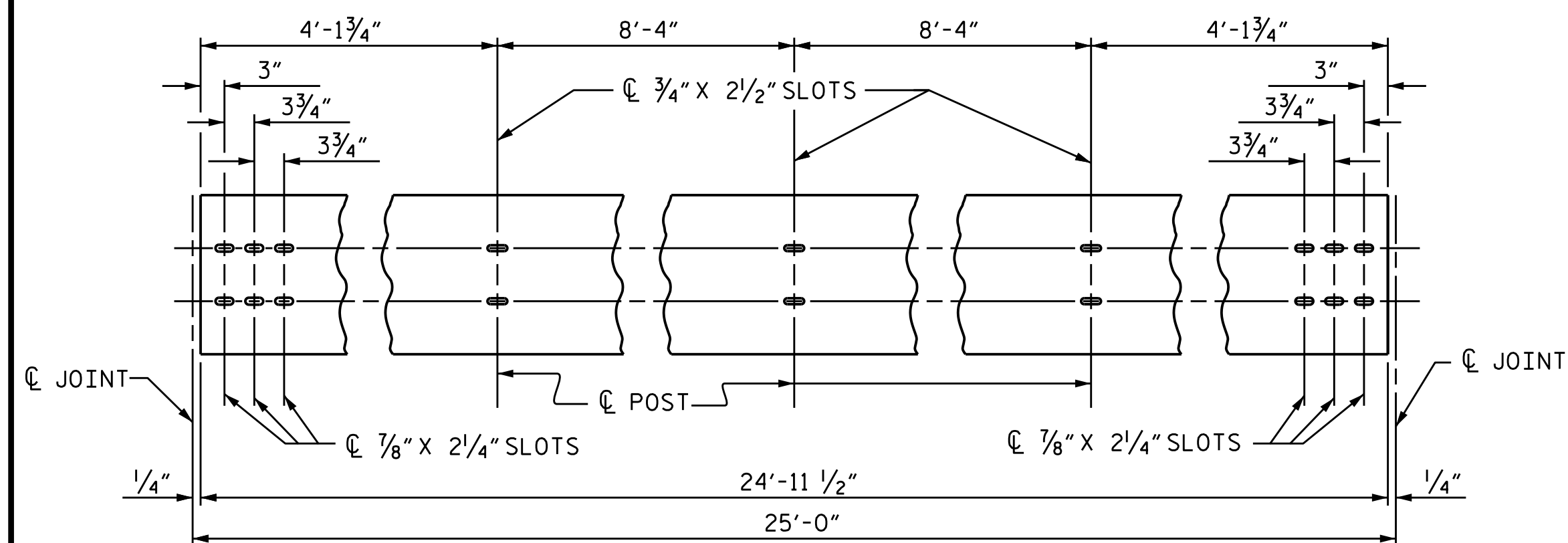
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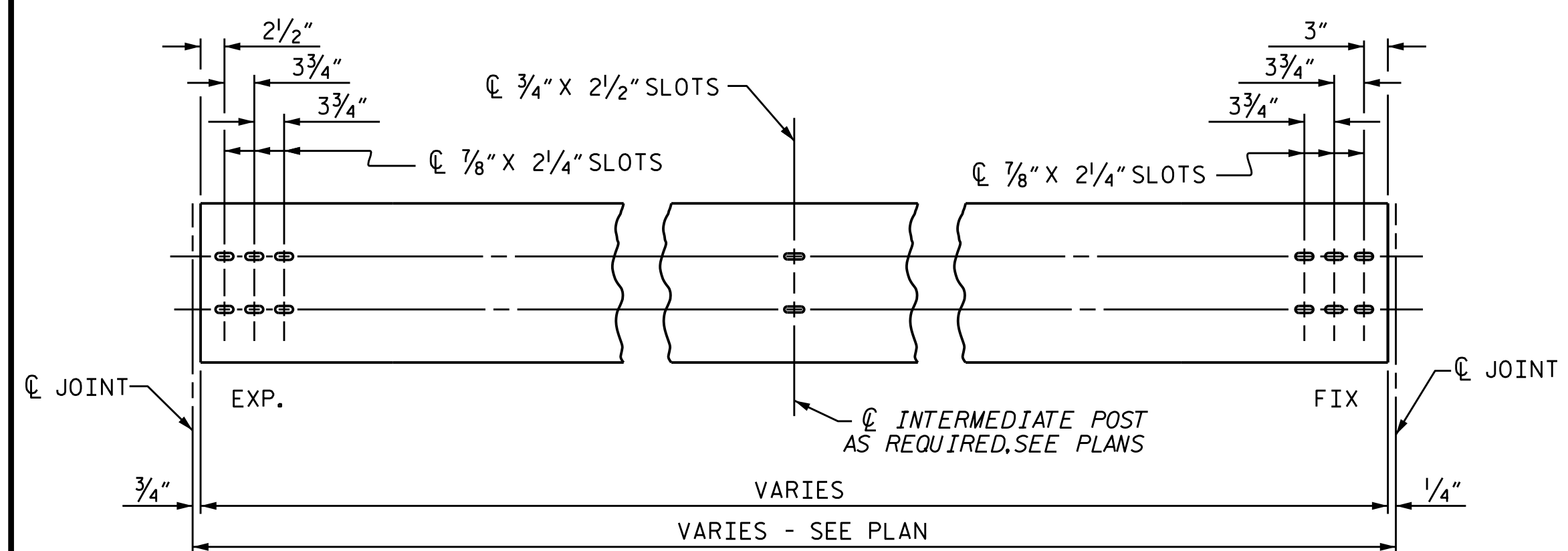




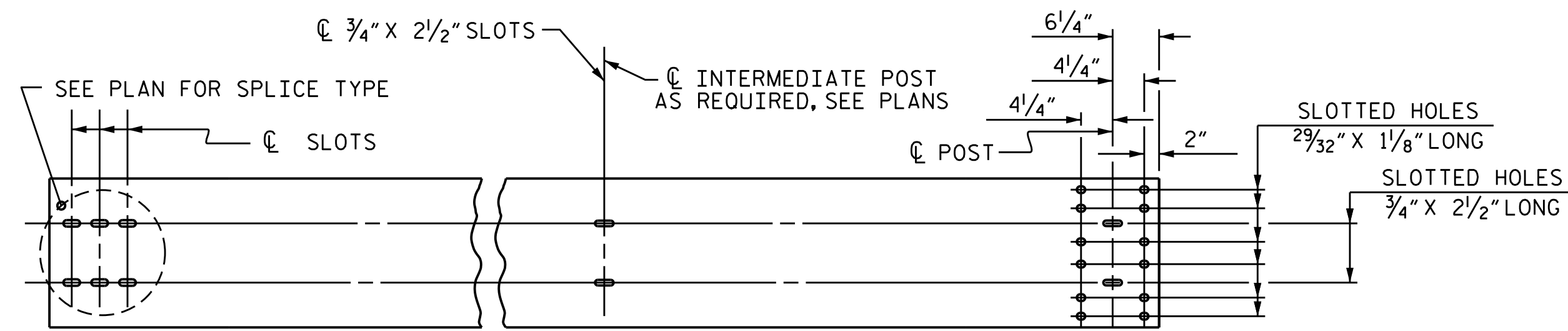
ELEVATION TUBULAR BEAM STANDARD 16'-8" RAIL



ELEVATION TUBULAR BEAM STANDARD 25'-0" RAIL

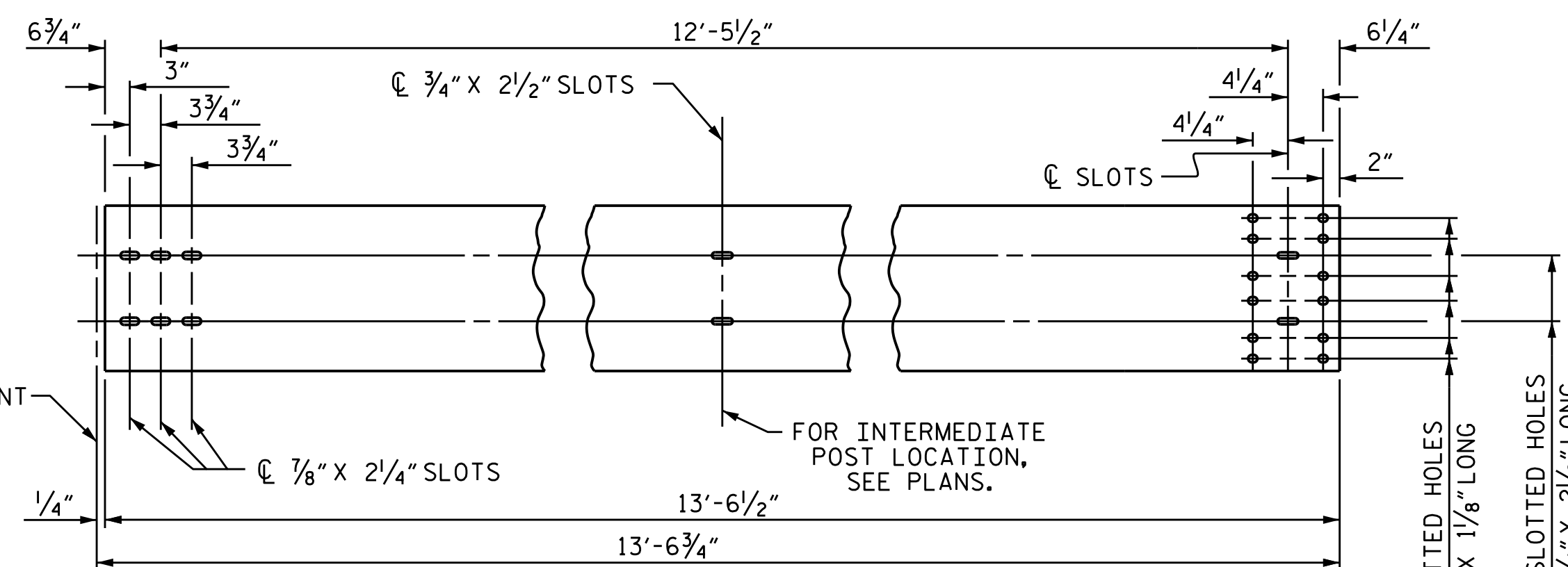


ELEVATION TUBULAR BEAM EXPANSION RAIL FOR TYPE 1 SPLICE

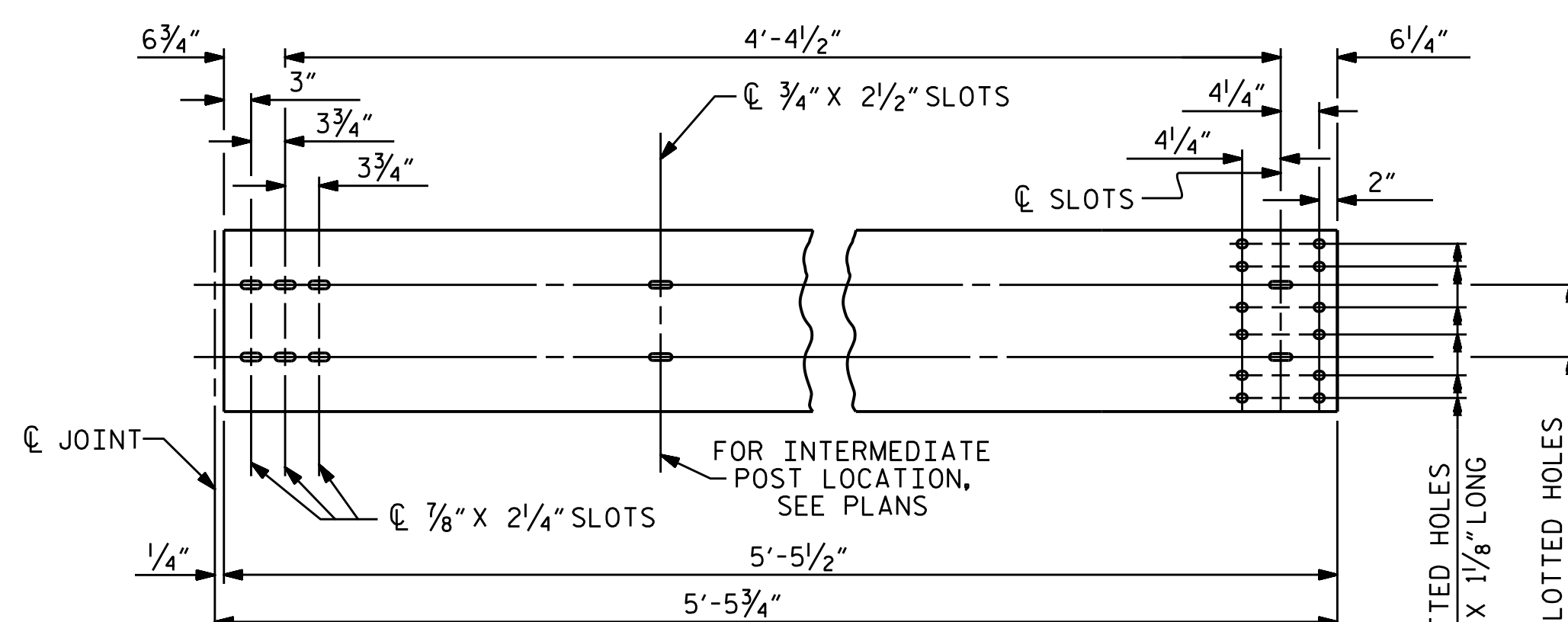


ELEVATION TUBULAR BEAM SHOWING CONNECTION OF TUBULAR BEAM TO TERMINAL SECTION

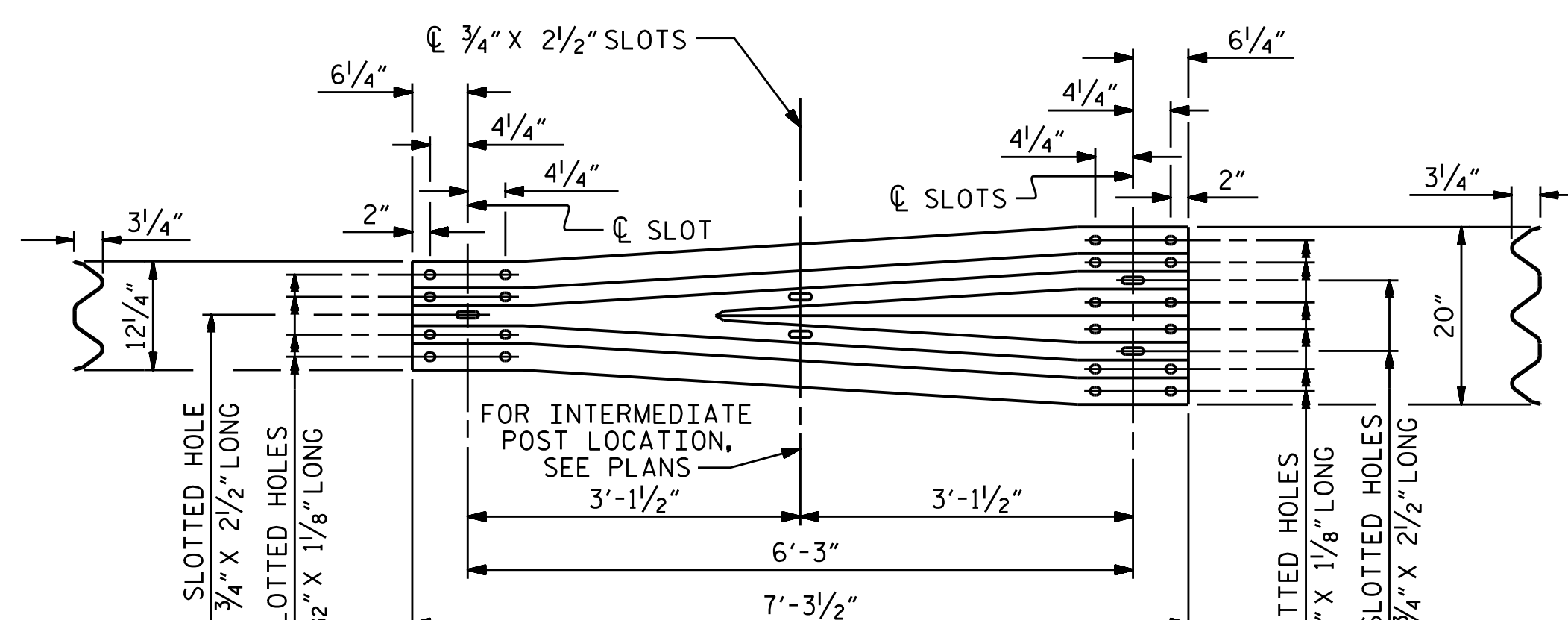
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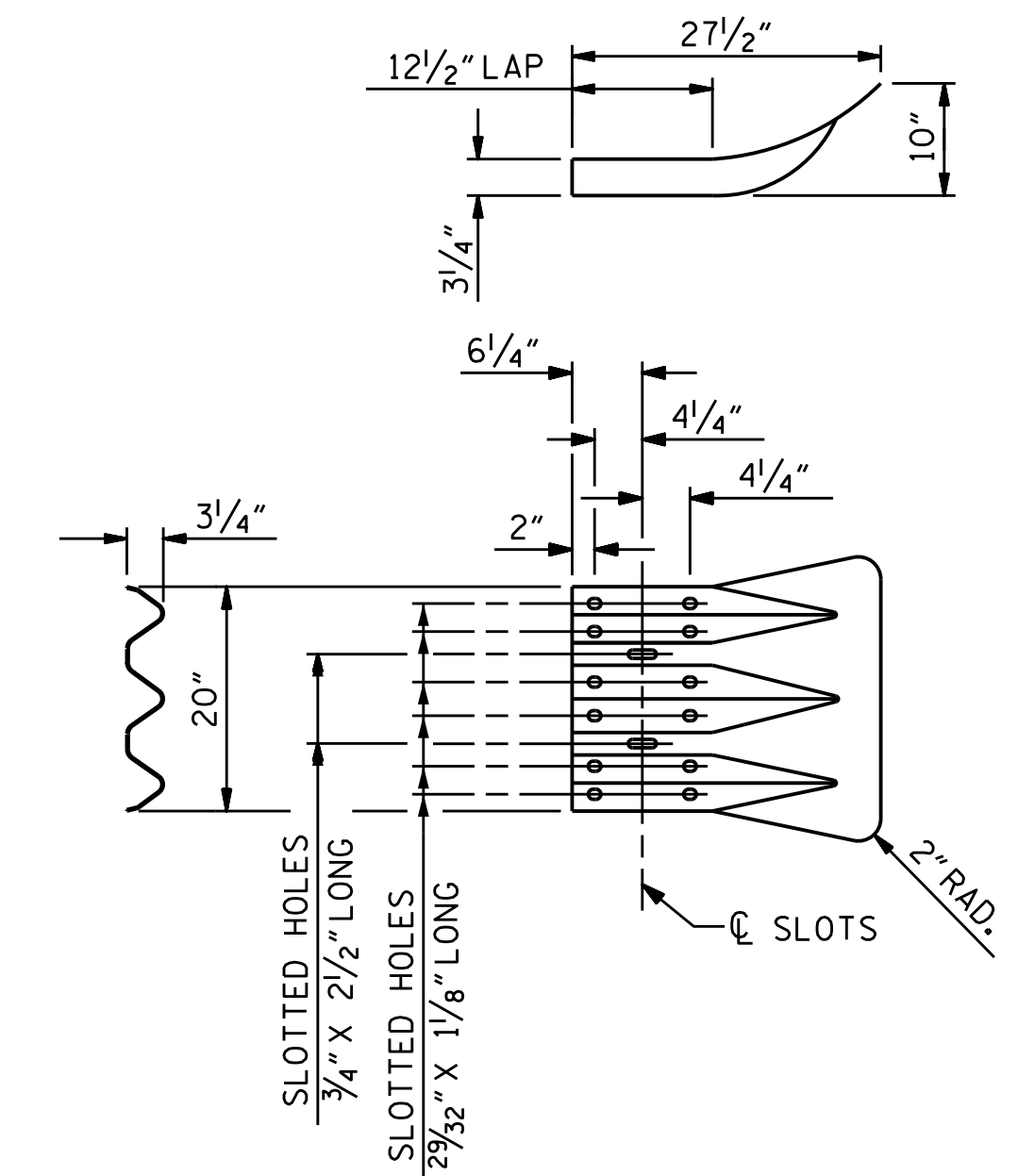
20" TRIPLE CORRUGATED STEEL BEAM GUARDRAIL - "C1"



20" TRIPLE CORRUGATED STEEL BEAM GUARDRAIL - "C2"

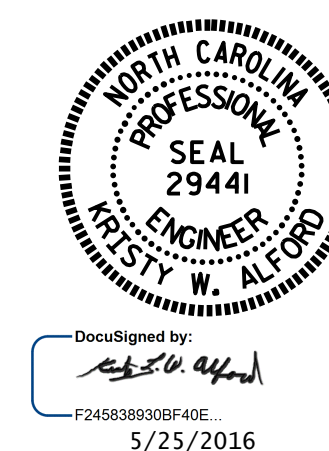


W-TR GUARDRAIL TRANSITIONAL SECTION



TRIPLE CORRUGATED GUARDRAIL TERMINAL SECTION

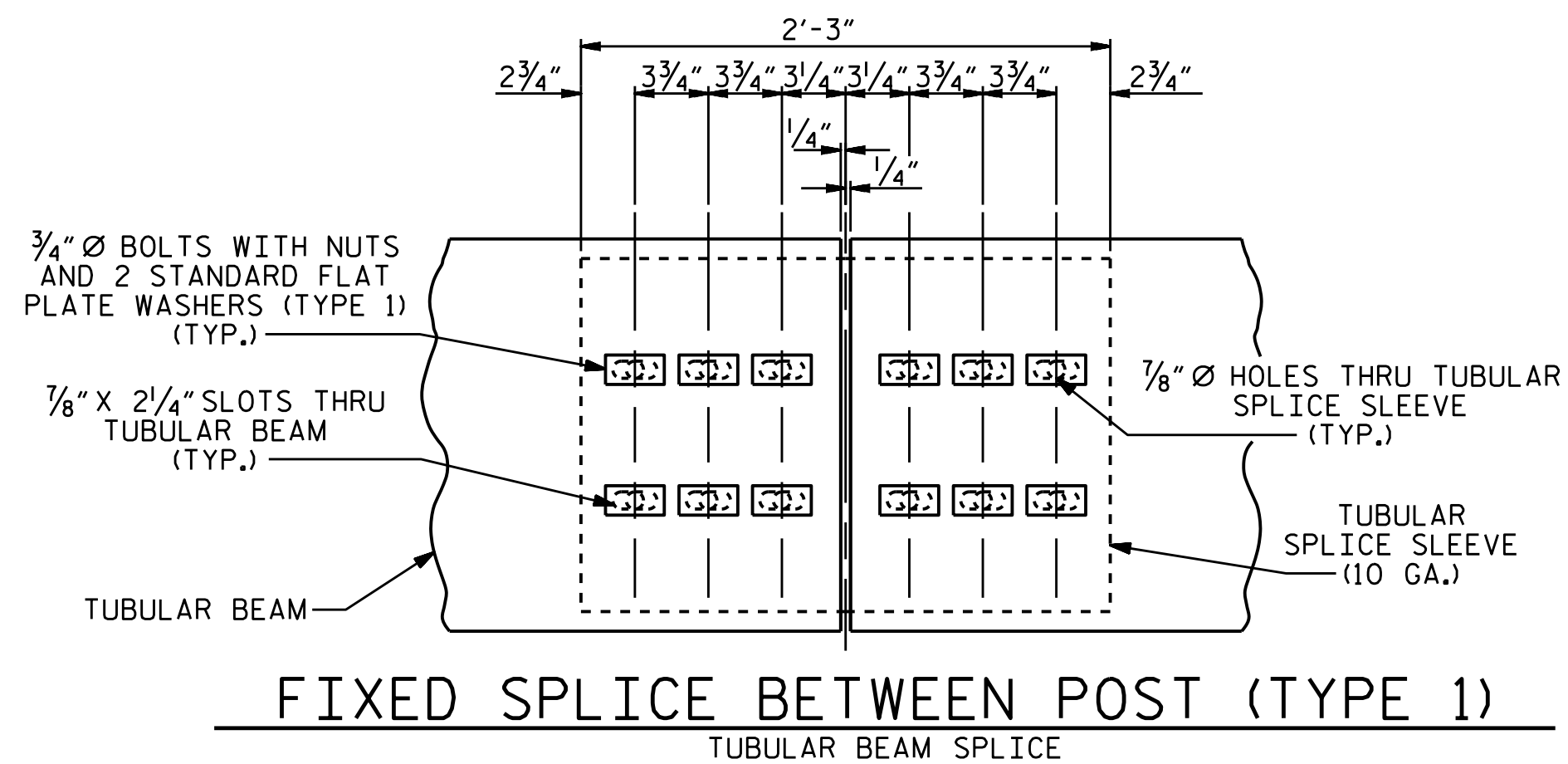
PROJECT NO. W-5601  
 WAYNE COUNTY  
 BRIDGE NO. 1 & 2  
 SHEET 6 OF 7



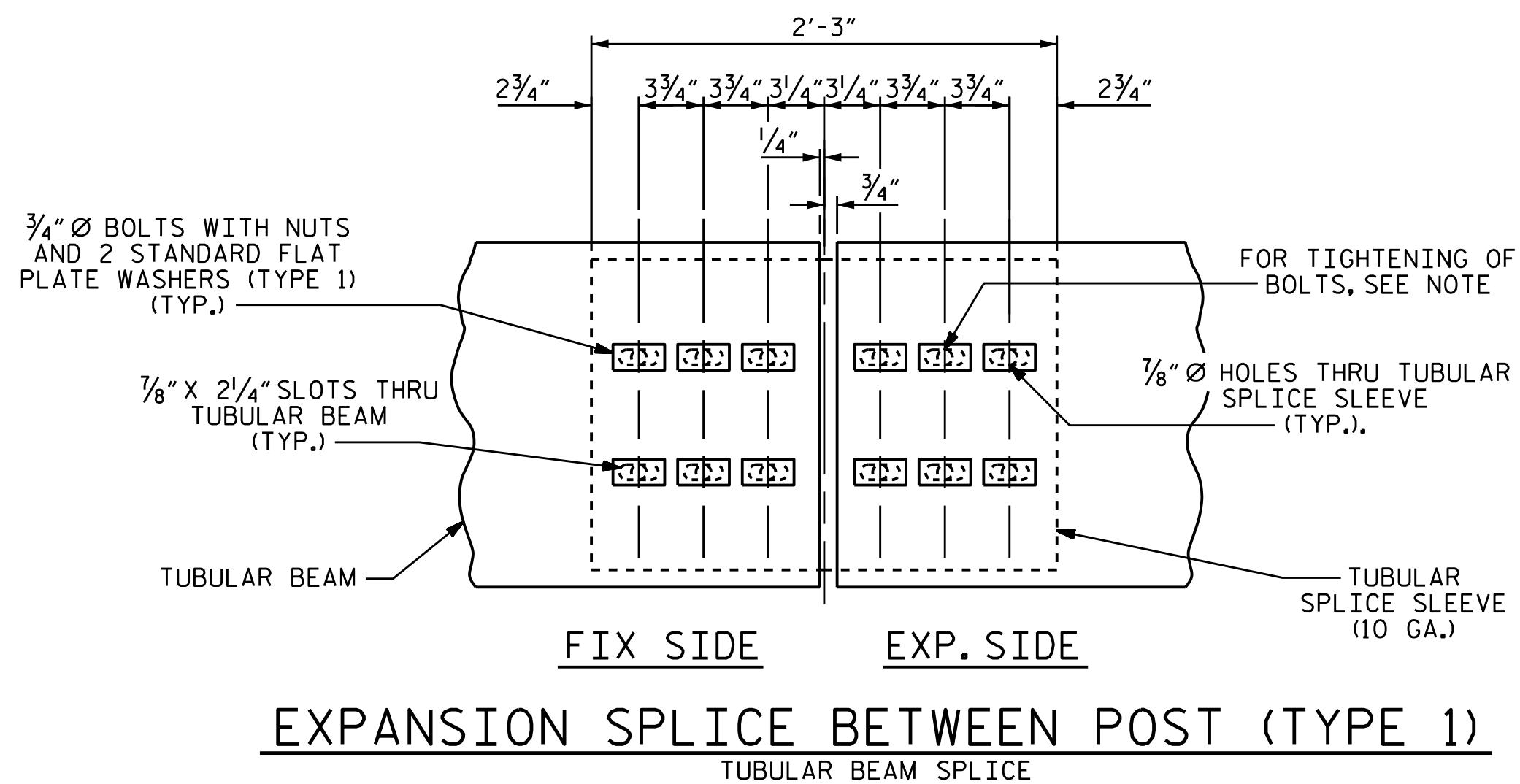
STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 DETAILS FOR RETROFIT  
 OF EXISTING BRIDGE  
 RAIL WITH TUBULAR  
 BEAM GUARDRAIL

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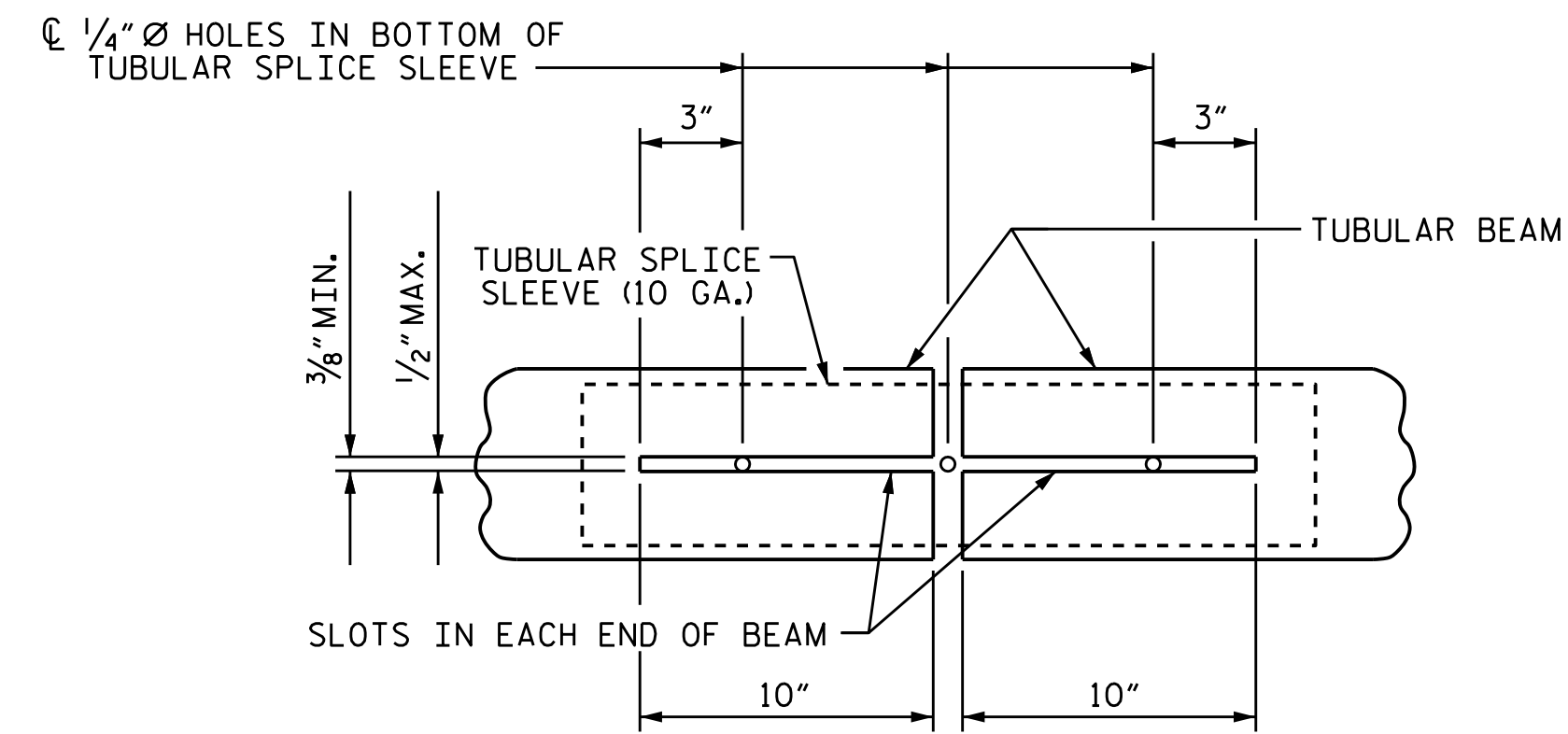


**FIXED SPLICE BETWEEN POST (TYPE 1)**  
TUBULAR BEAM SPLICE

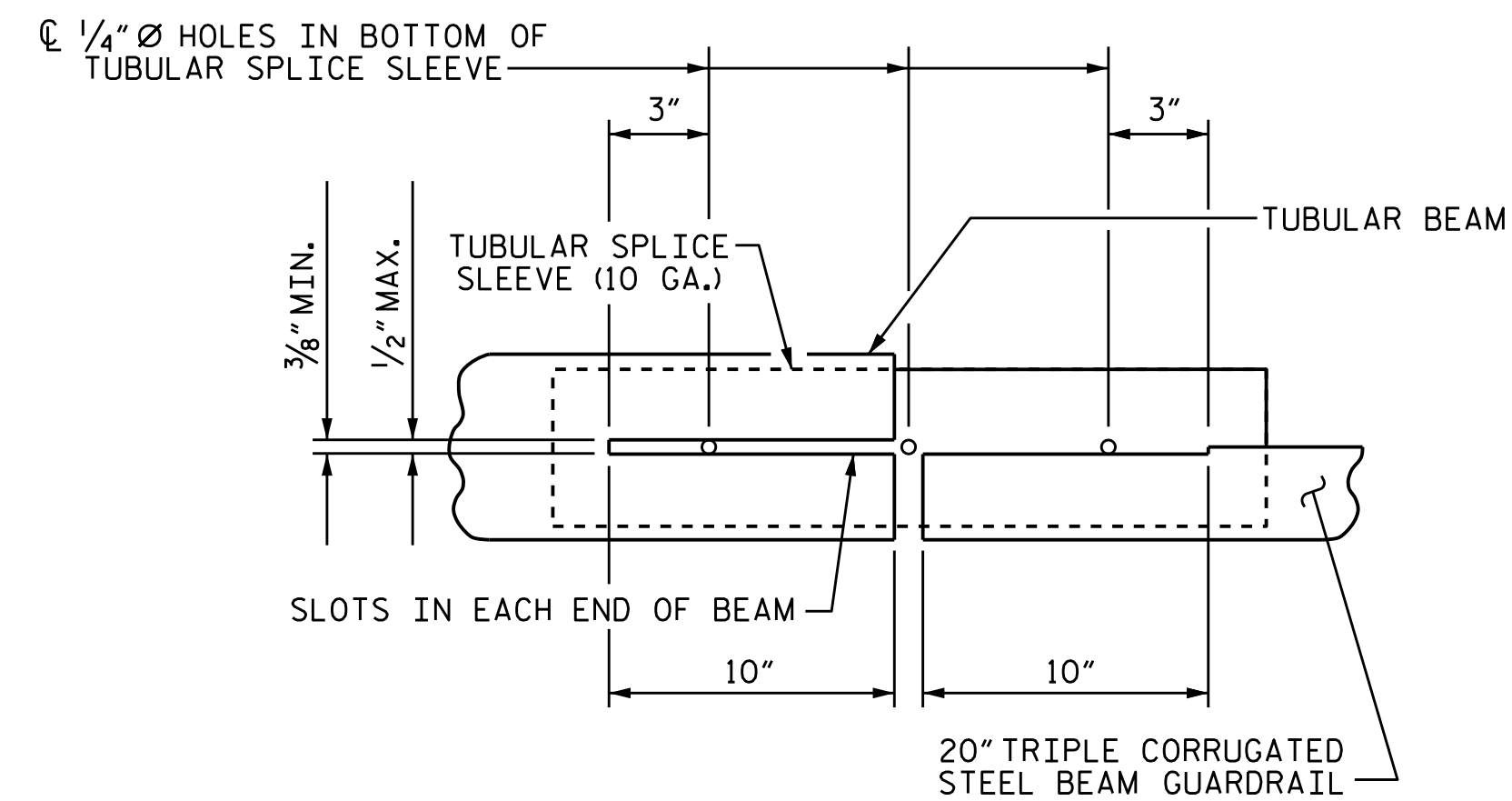


**EXPANSION SPLICE BETWEEN POST (TYPE 1)**  
TUBULAR BEAM SPLICE

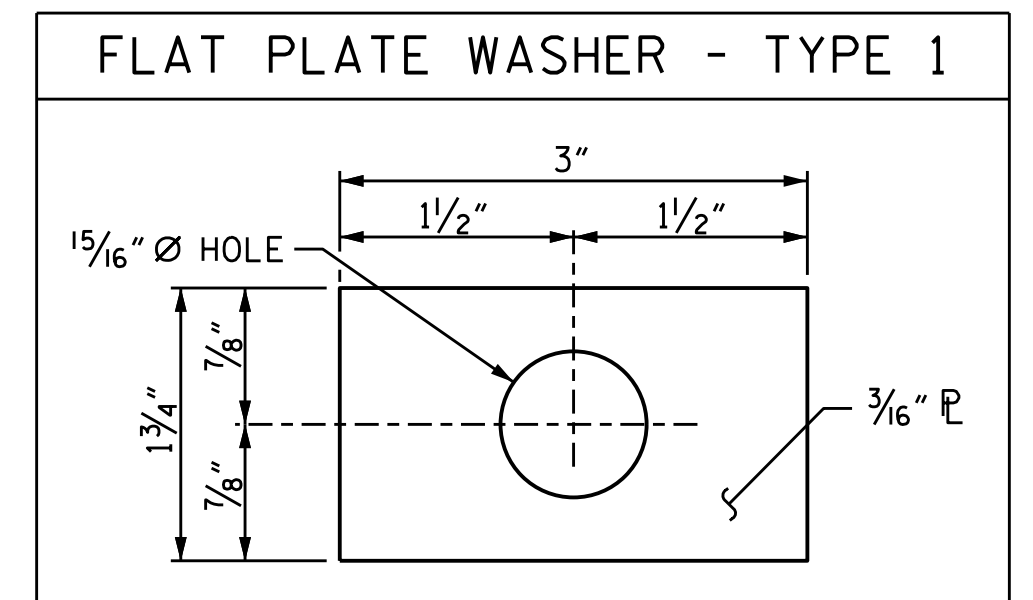
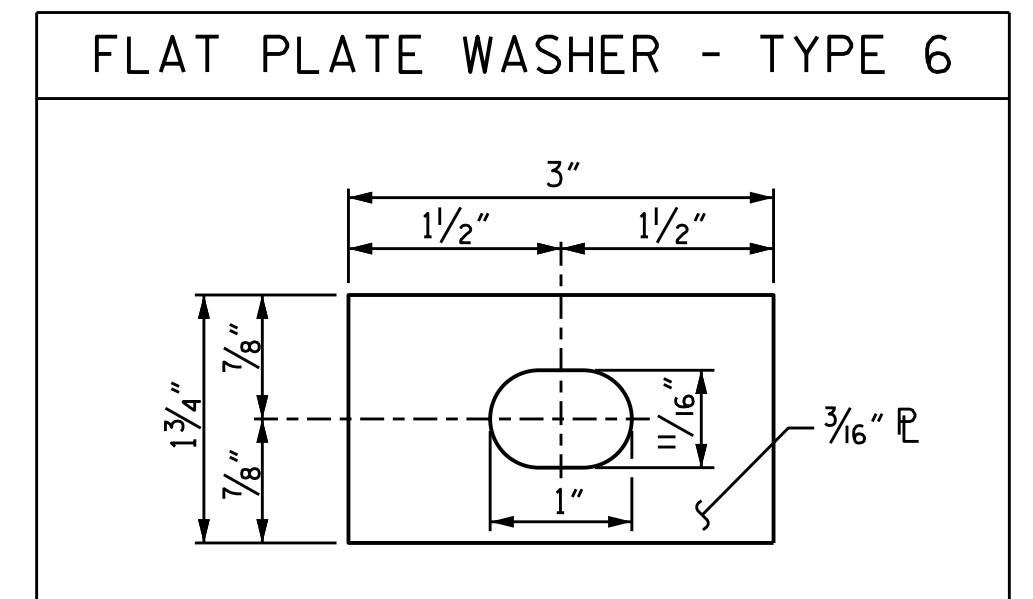
NOTE:  
BOLTS ON EXPANSION SIDE OF TUBULAR BEAM SPLICE SHALL BE TIGHTENED FINGER TIGHT. DOUBLE NUTS SHALL BE USED AND TIGHTENED AGAINST EACH OTHER TO PREVENT THE NUTS FROM BECOMING LOOSE ON THE BOLT.



**BOTTOM VIEW OF TUBULAR BEAM SPLICE**

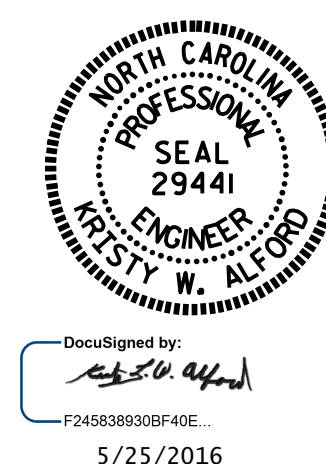


**BOTTOM VIEW OF TUBULAR AND 20" TRIPLE CORRUGATED STEEL BEAM SPLICE**



PROJECT NO. W-5601  
WAYNE COUNTY  
BRIDGE NO. 1 & 2

SHEET 7 OF 7



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. 7	
DETAILS FOR RETROFIT OF EXISTING BRIDGE RAIL WITH TUBULAR BEAM GUARDRAIL						TOTAL SHEETS 7	
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	7	
1			3			7	
2			4			7	

DRAWN BY : J.P. ADAMS DATE : 5/2016  
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