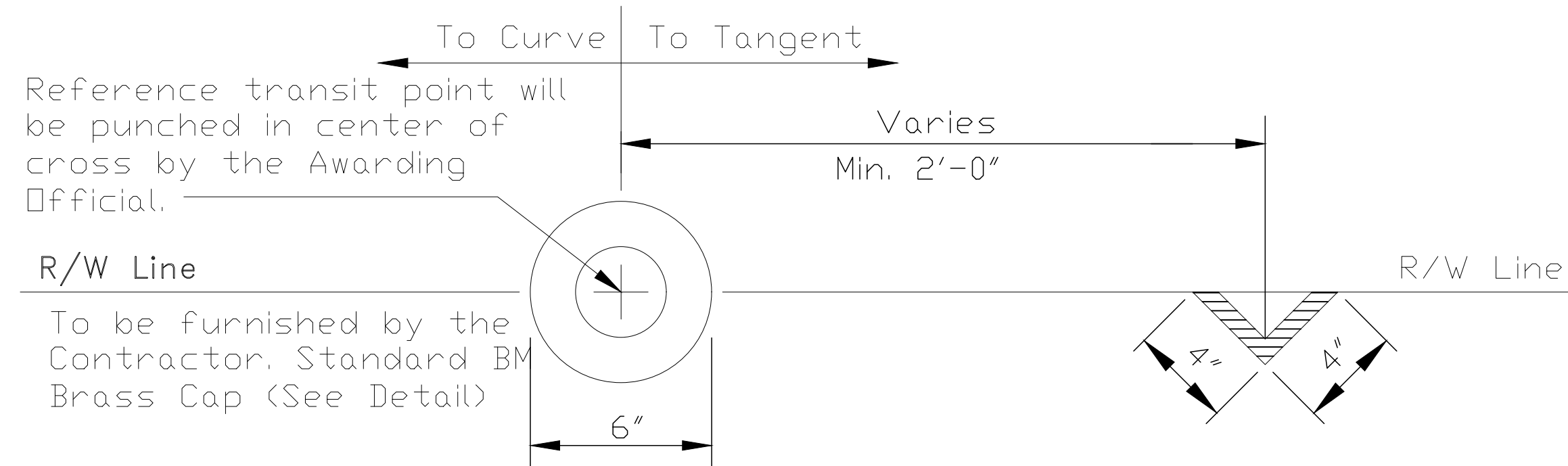
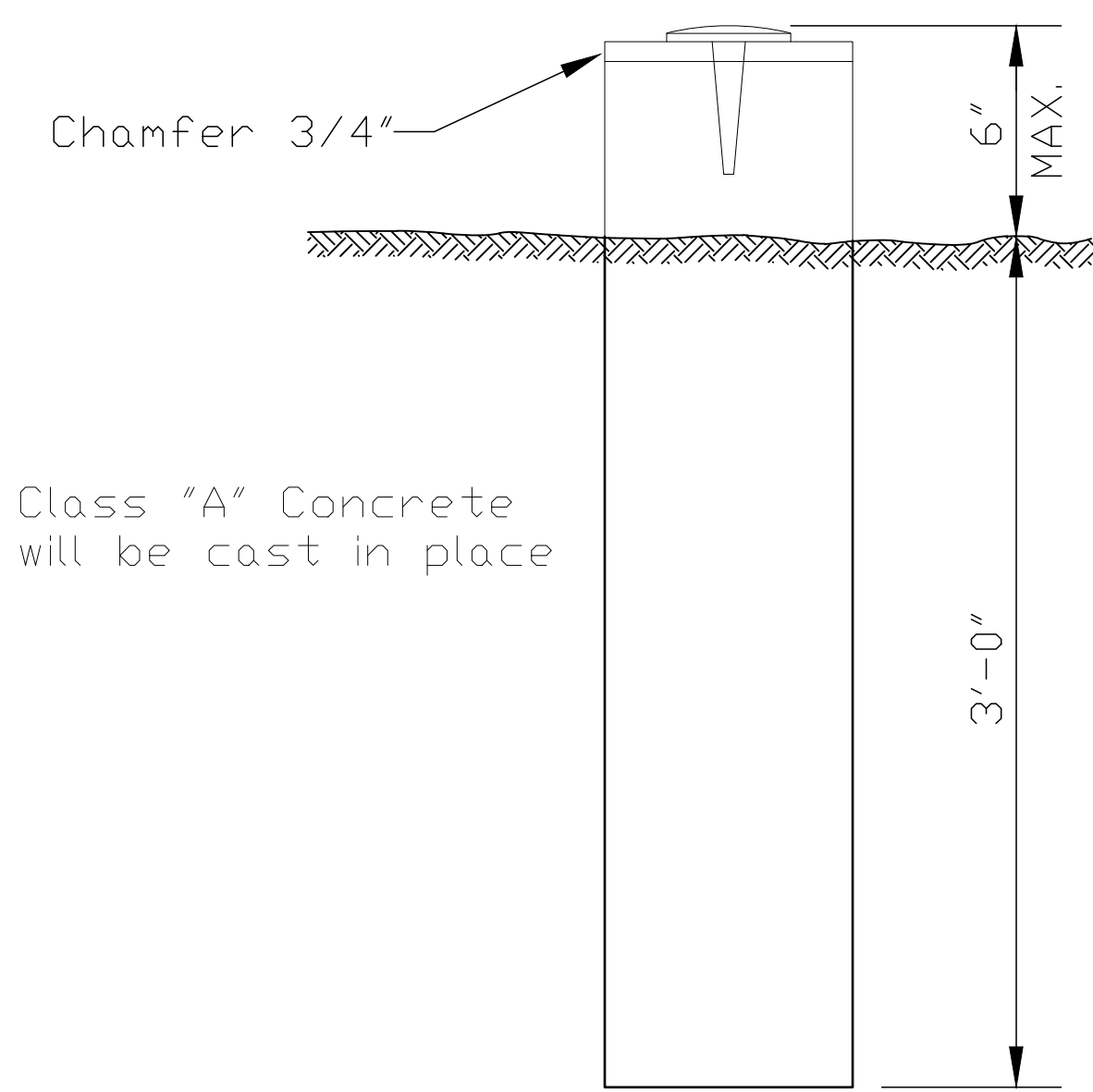


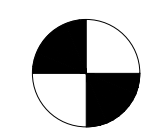
REGION	STATE	RESERVATION	ROUTE NO.	PROJECT NO.	SHEET NO.	TOTAL SHEETS
NORTH	NEW MEXICO	NAVAJO	N5012	N5012(1)1,2&4	120	75



R/W Line  
To be furnished by the Contractor. Standard BM Brass Cap (See Detail)

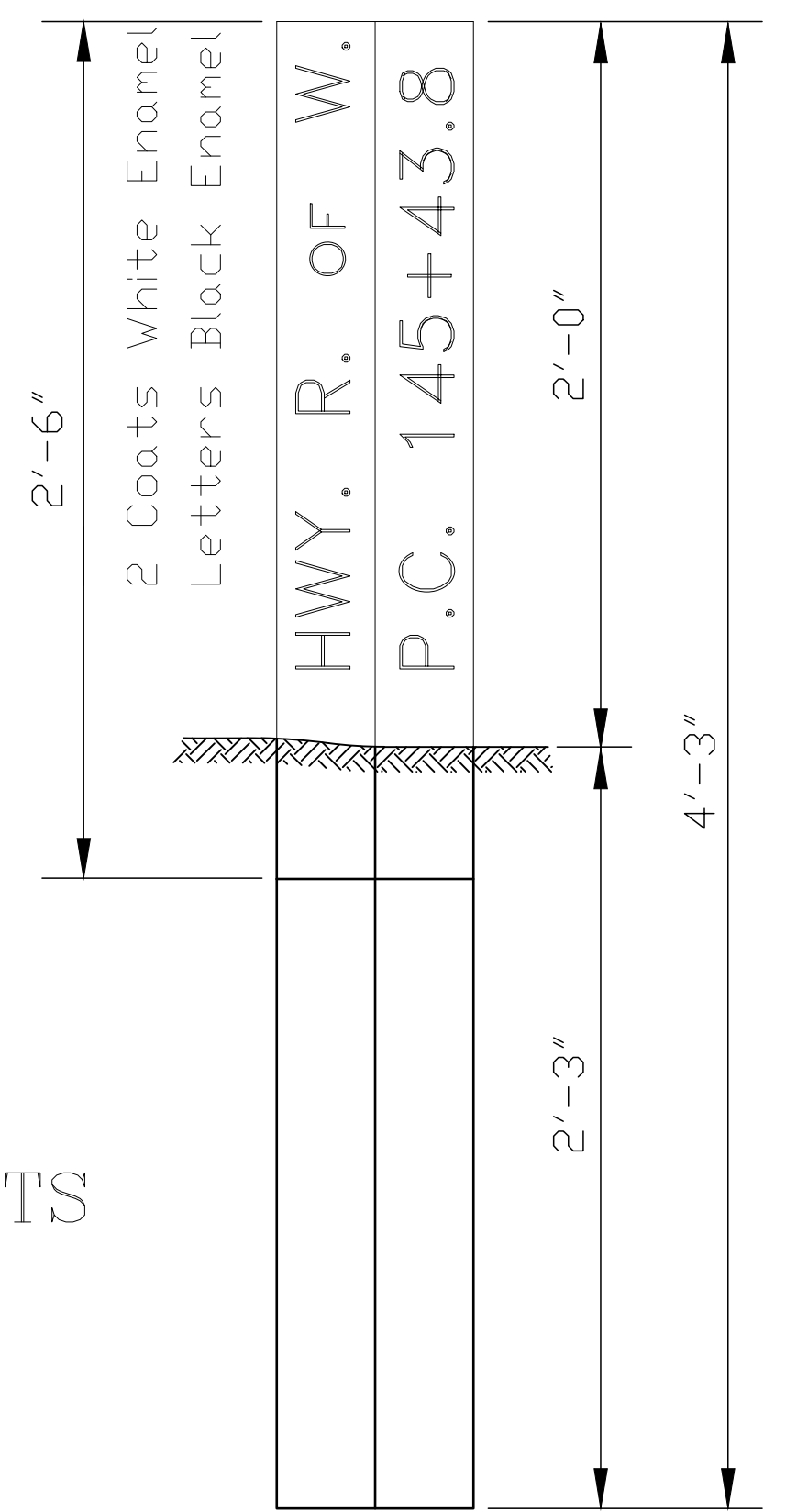


TRANSIT POINT MARKER

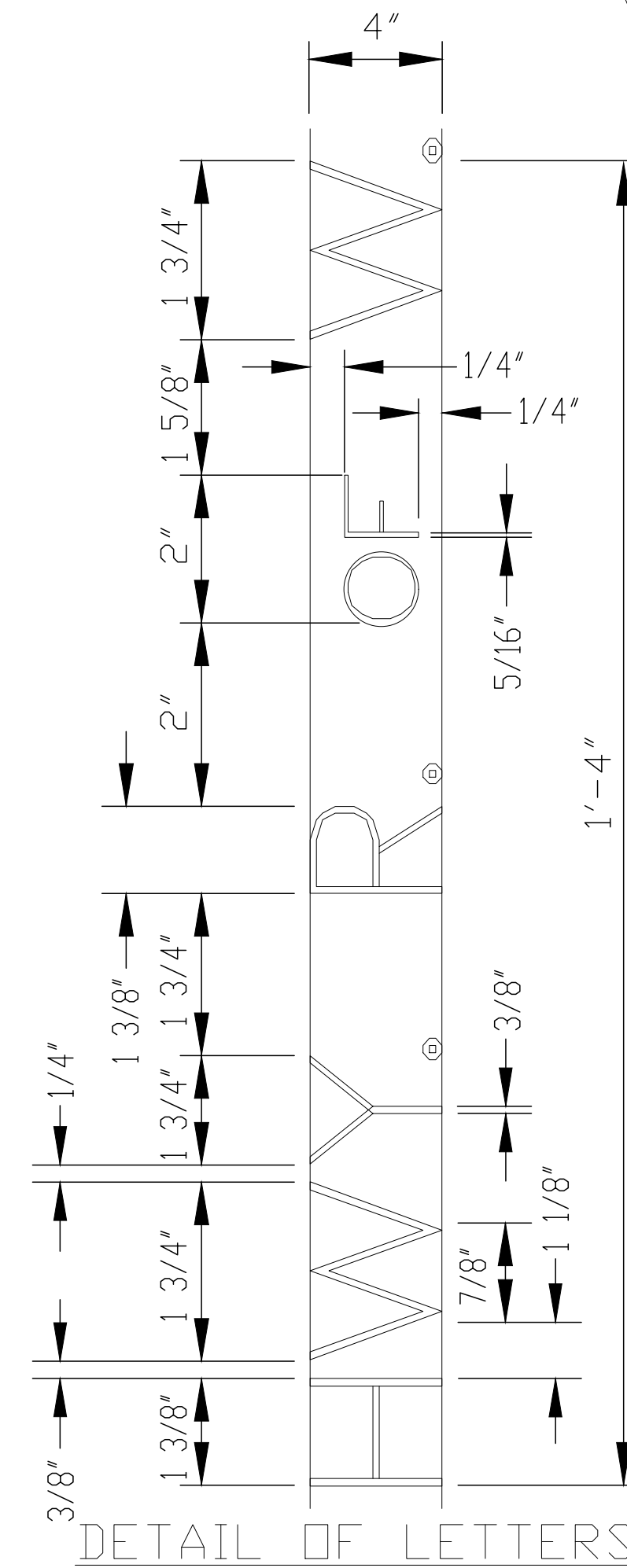


RIGHT-OF-WAY MONUMENTS

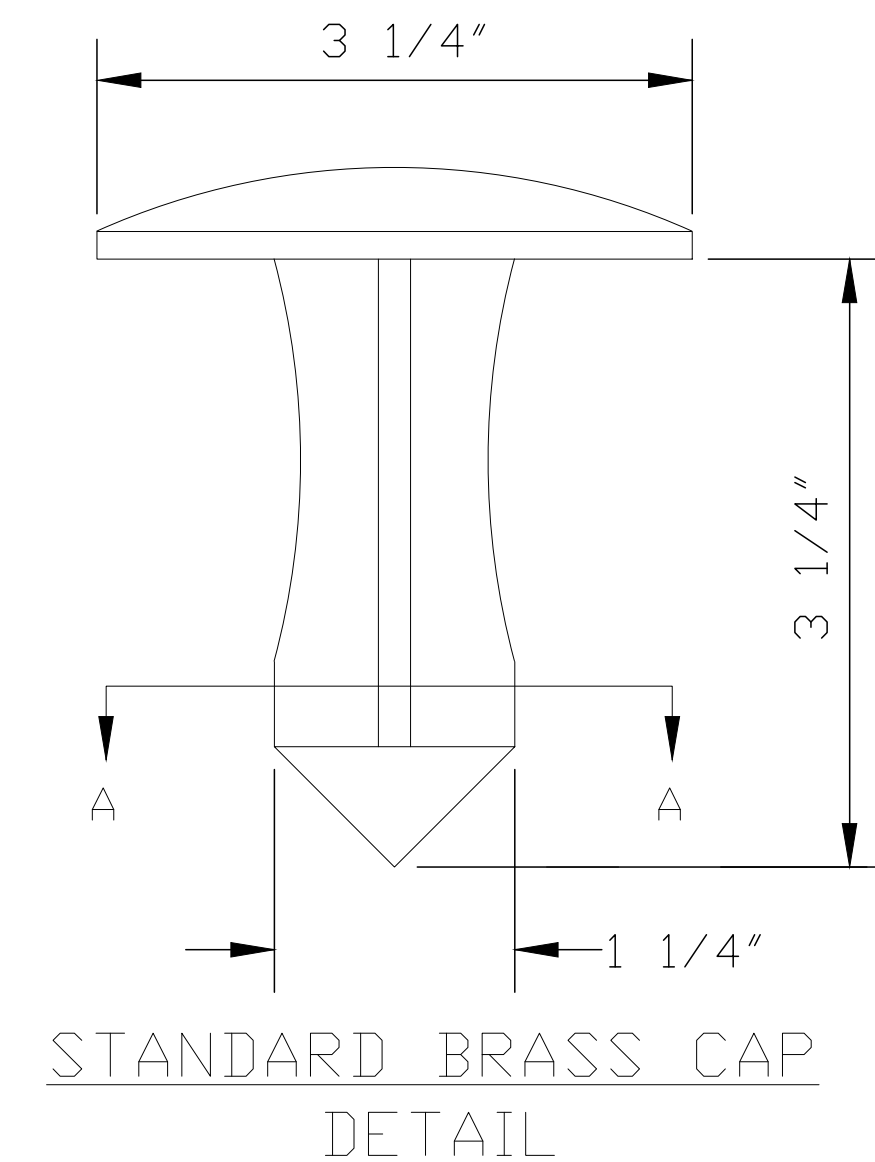
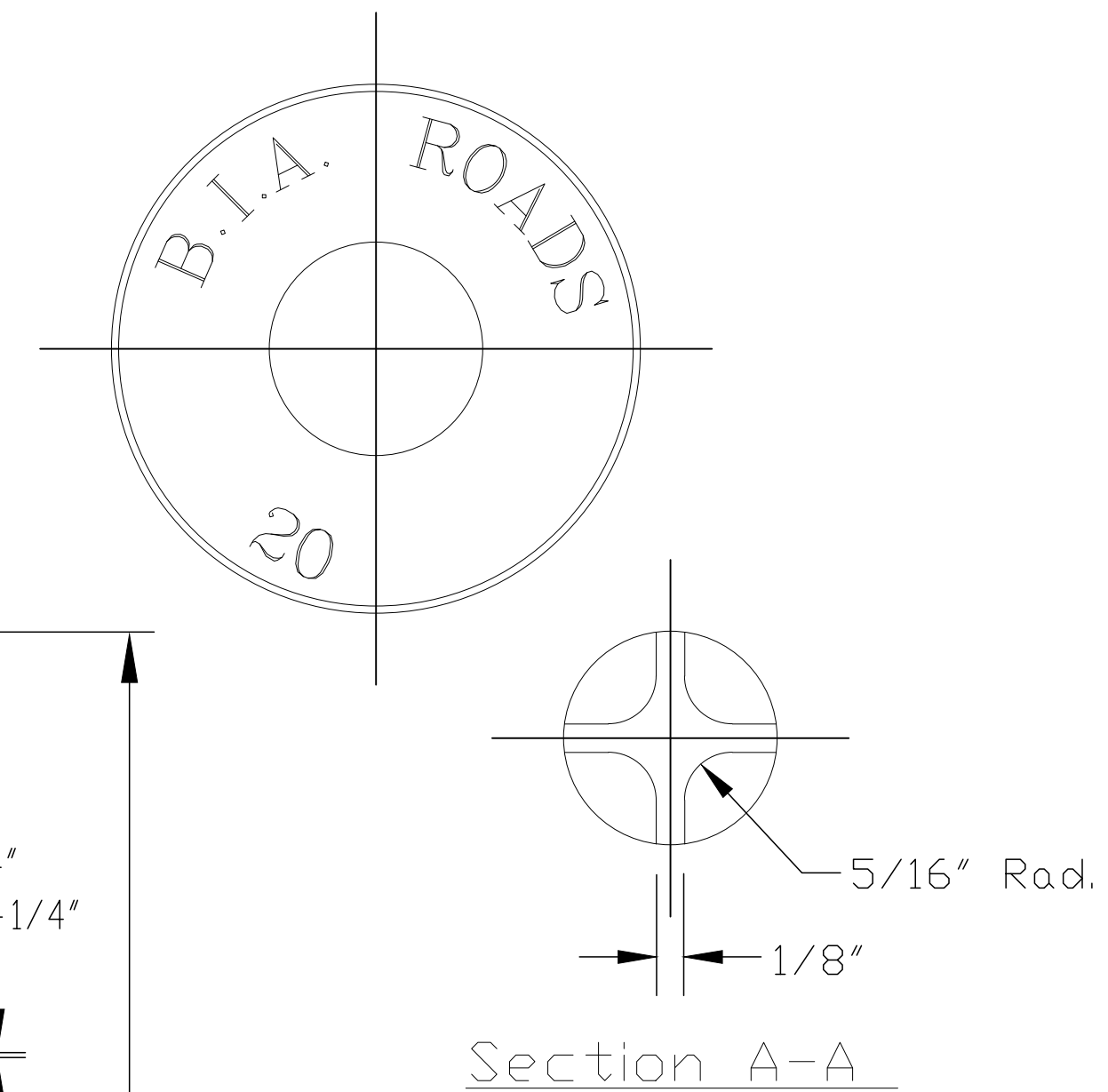
Complete in place, including Brass Cap.  
Note:  
R/W monuments will be placed where shown on plans or as directed by the Contracting Officer. R/W monuments will consist of transit point, and reference marker.



REFERENCE MARKER



DETAIL OF LETTERS



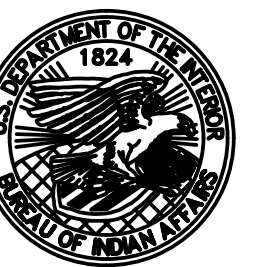
STANDARD BRASS CAP  
DETAIL



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF INDIAN AFFAIRS  
NAVAJO REGIONAL OFFICE \* DIVISION OF TRANSPORTATION

BIA STD 56B RIGHT OF MONUMENTS

DRAWN BY: NRDOT DATE: 07/2015  
DESIGNED BY: NRDOT DATE: 2/9/2015  
REVISED: ---/---/--- BY: DESIGN 1  
\$FILES\$



**SQUARE TUBE SELECTION, SINGLE POST - 280 mm THICKNESS**

POST SIZE	H = C + D/2 (meter)					SLEEVE SIZE
	152	183	213	244	274	
38 mm x 38 mm	0.51	0.43	0.37	0.31	n/a	44 mm x 44 mm
44 mm x 44 mm	0.81	0.68	0.58	0.47	0.41	50 mm x 50 mm
50 mm x 50 mm	1.14	0.95	0.84	0.70	0.58	57 mm x 57 mm
57 mm x 57 mm	1.49	1.27	1.07	0.95	0.84	64 mm x 64 mm
64 mm x 64 mm	1.88	1.68	1.41	1.25	1.07	70 mm x 70 mm

**SQUARE TUBE SELECTION, DOUBLE POST - 280 mm THICKNESS**

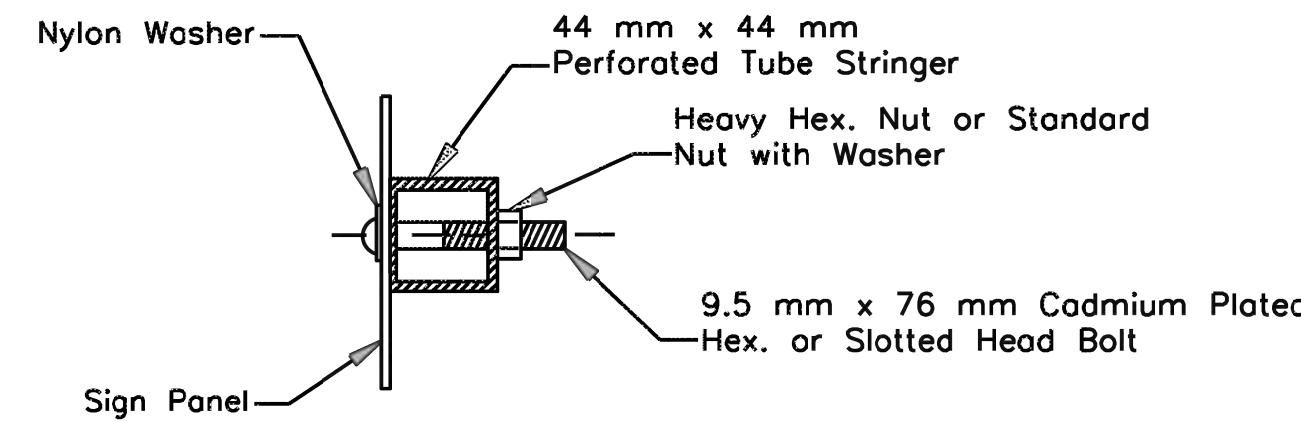
POST SIZE	H = C + D/2 (meter)					SLEEVE SIZE
	152	183	213	244	274	
57 mm x 57 mm	n/a	n/a	2.15	1.97	1.81	64 mm x 64 mm
64 mm x 64 mm	n/a	n/a	2.68	2.46	2.26	70 mm x 70 mm

**SQUARE TUBE SELECTION, TRIPLE POST - 280 mm THICKNESS**

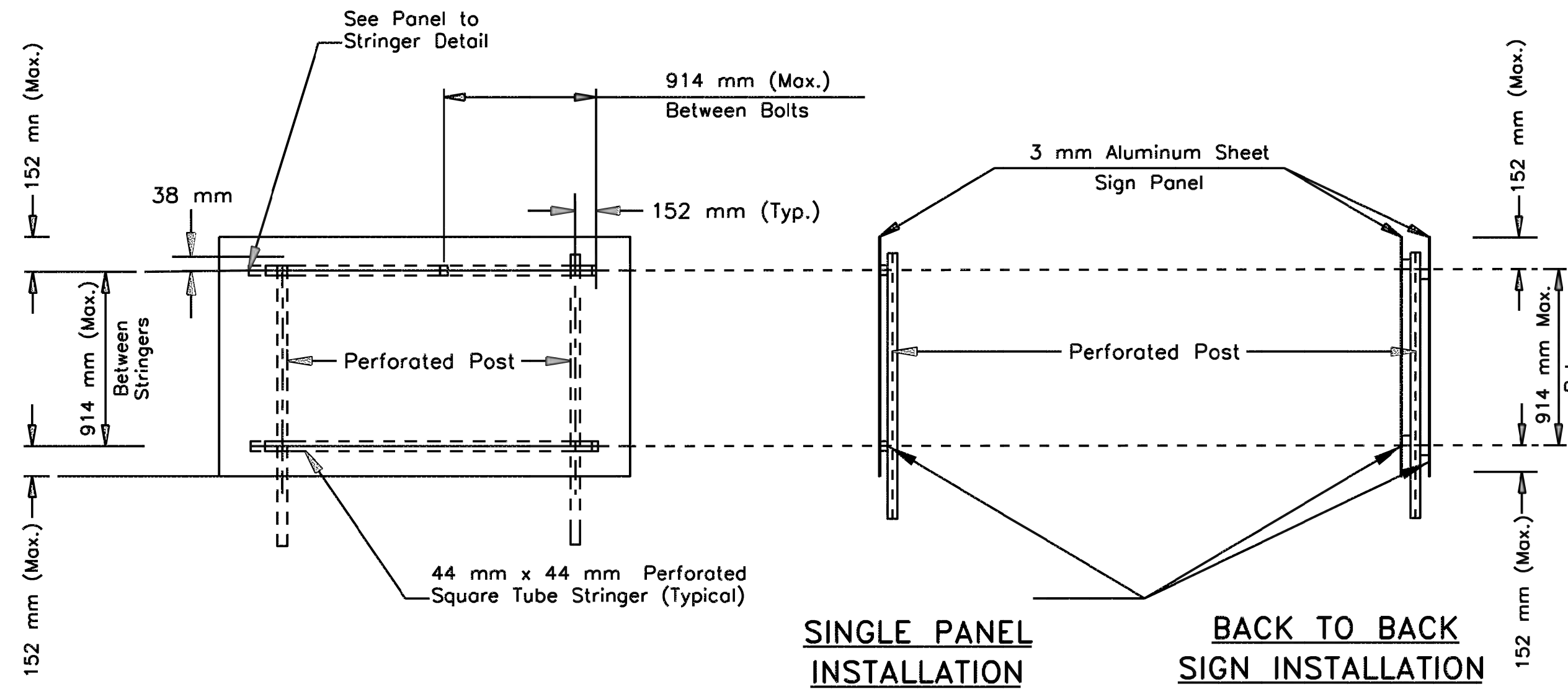
POST SIZE	H = C + D/2 (meter)					SLEEVE SIZE
	152	183	213	244	274	
57 mm x 57 mm	n/a	n/a	3.08	2.83	2.61	64 mm x 64 mm
64 mm x 64 mm	n/a	n/a	3.82	3.52	3.26	70 mm x 70 mm

**GUIDE SIGN POST DIMENSIONS  
(NOT FOR USE WITH WARNING, REGULATORY OR MARKER PANELS)**

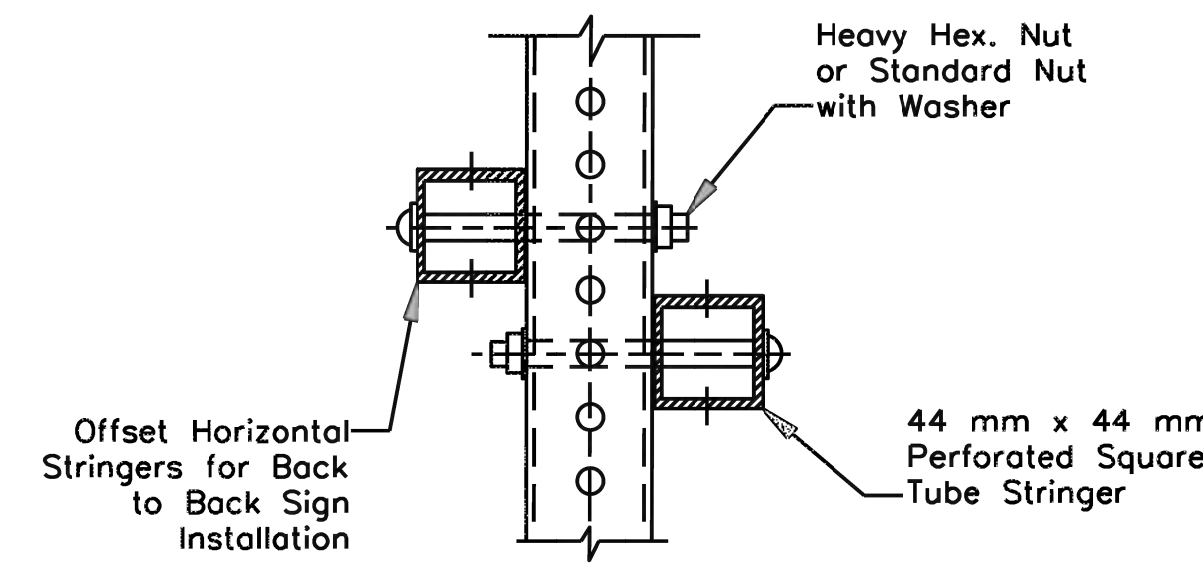
PANEL WIDTH	914 mm	122 m	152 m	183 m	213 m	244 m	274 m	305 m
TWO POSTS SPACING (A)	559 mm	711 mm	914 mm	112 m	127 m	147 m	163 m	183 m
BOLTS TO PANEL (PER STRINGER)	-	-	3	3	3	3	4	4
LENGTH OF EACH STRINGER	-	-	122 m	142 m	157 m	178 m	193 m	213 m
TWO POSTS SPACING (B)	-	-	533 mm	635 mm	737 mm	864 mm	965 mm	107 m
BOLTS TO PANEL (PER STRINGER)	-	-	3	3	3	4	4	4
LENGTH OF EACH STRINGER	-	-	137 m	157 m	178 m	203 m	224 m	244 m



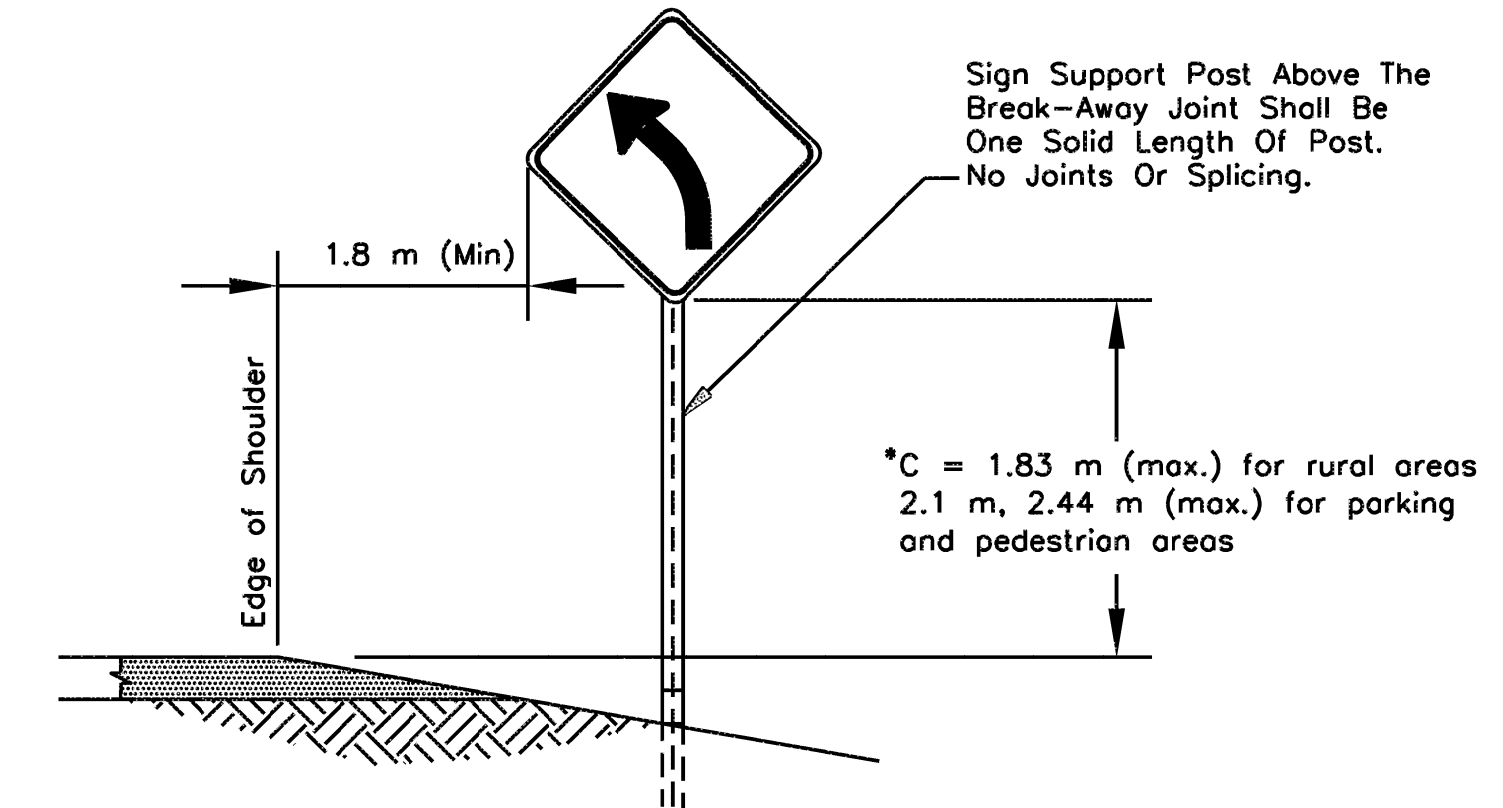
**PANEL TO STRINGER OR POST**



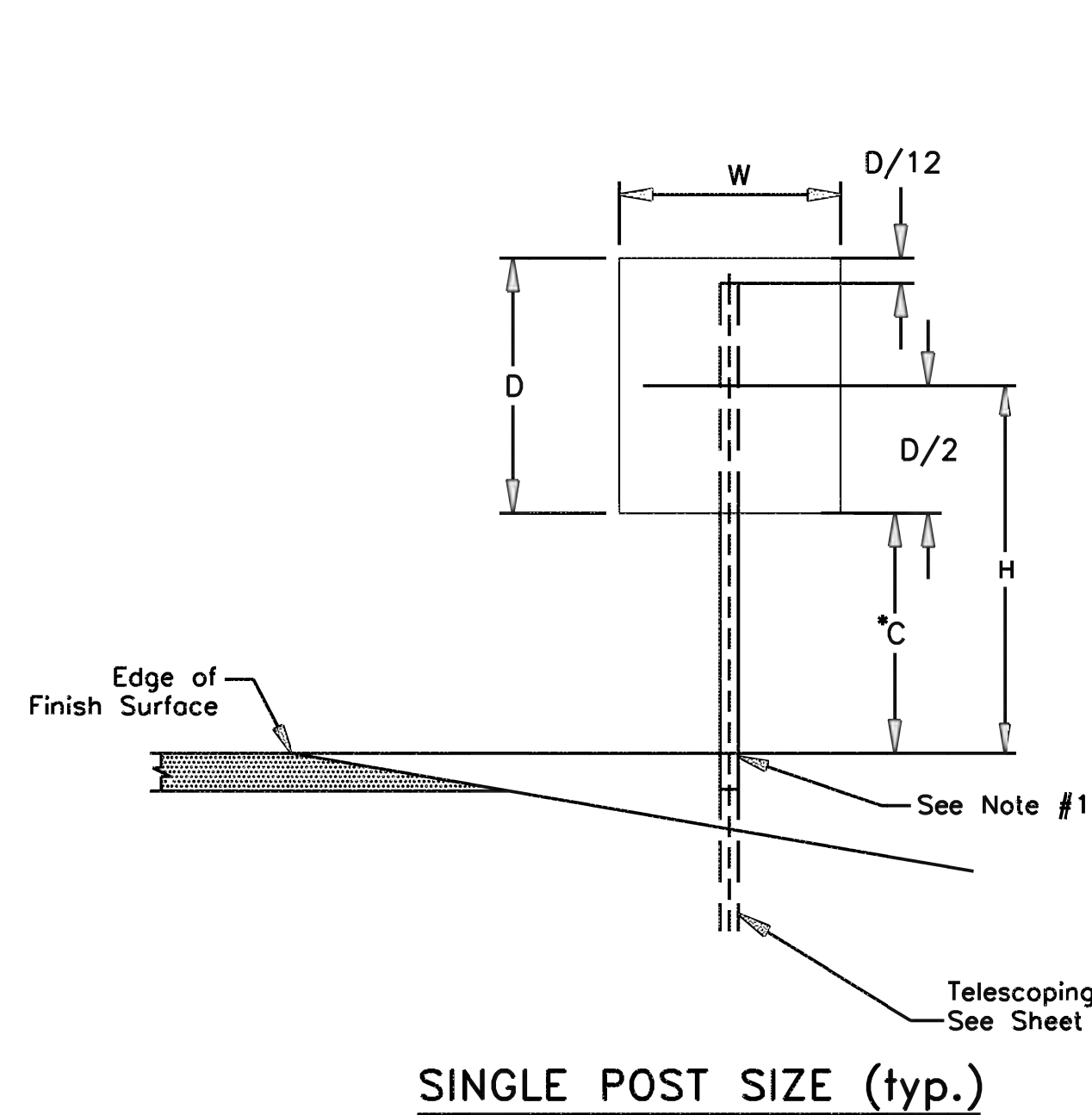
**STRINGER DETAILS (FOR GUIDE SIGNS UP TO AND INCLUDING 3.05 mm WIDE)**



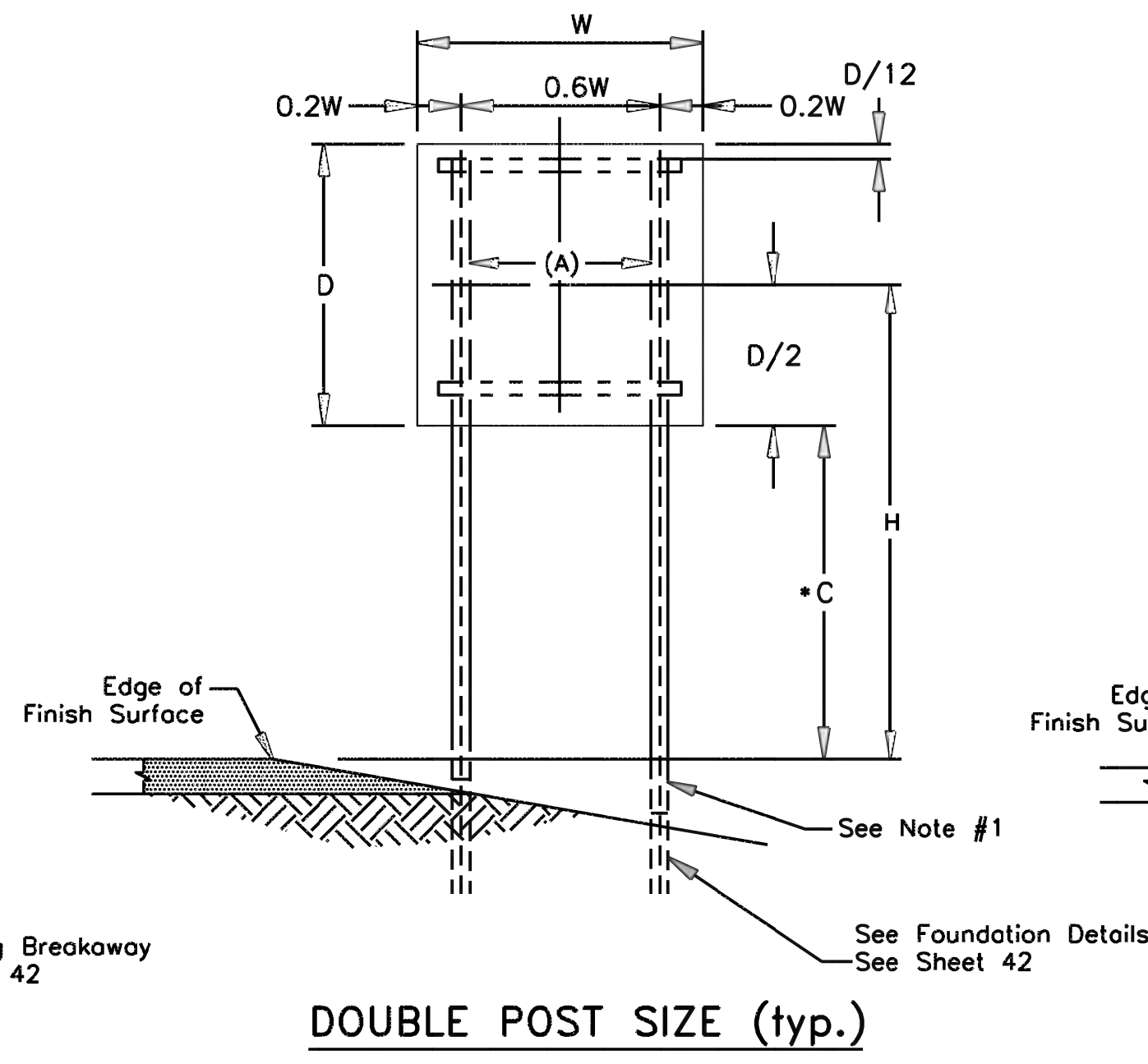
**STRINGER TO POST**



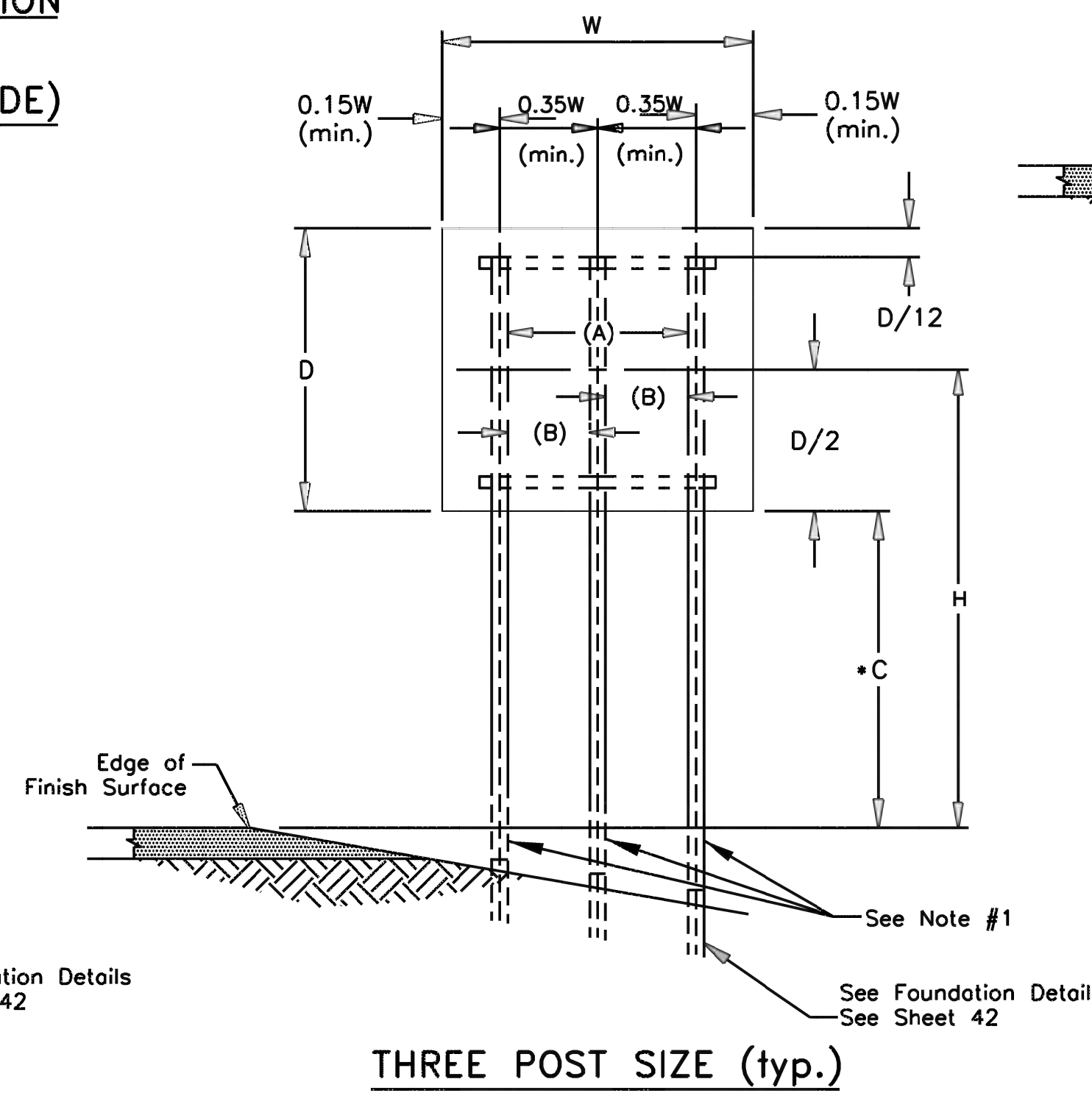
**TYPICAL ROADSIDE SIGN LOCATION**



**SINGLE POST SIZE (typ.)**



**DOUBLE POST SIZE (typ.)**



**THREE POST SIZE (typ.)**

**GENERAL NOTES:**

- THE CONTRACTOR SHALL BE REQUIRED TO ADJUST THE LENGTH OF SIGN SUPPORT POST(S). THIS WORK SHALL BE INCLUDED IN THE UNIT PRICE FOR THE APPROPRIATE BID ITEMS SHOWN IN THE BID SCHEDULE.
- SIGNS GREATER THAN 762 mm IN WIDTH SHALL BE MOUNTED ON TWO OR MORE POSTS.
- CONCRETE FOUNDATION SHOULD NOT BE USED IN LOCATIONS PROTECTED BY GUARDRAIL, BARRIER, OR OUTSIDE THE CLEAR ZONE.
- STEEL POSTS SHALL BE UNIFORM DESIGN. THE POST SHALL BE PUNCHED WITH CONTINUOUS 9mm HOLES ON 25mm INTERVAL ON CENTERS FOR THE ENTIRE LENGTH OF POST.
- STEEL POSTS SHALL BE MACHINED STRAIGHTENED TO HAVE A SMOOTH UNIFORM FINISH, FREE FROM DEFECTS AFFECTING STRENGTH, DURABILITY, AND APPEARANCE. ALL HOLES AND EDGES SHALL BE FREE OF BURRS. THE PERMISSIBLE TOLERANCE FOR STRAIGHTNESS SHALL BE WITHIN 6.35mm IN 1.52 METER.
- STEEL POSTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM 123. BOLTS, NUTS, AND WASHERS SHALL BE CADMIUM PLATED IN ACCORDANCE WITH ASTM A-165 OR ZINC PLATED IN ACCORDANCE WITH ASTM B-633.
- SPLICE HARDWARE SHALL CONSIST OF TWO FULLY THREADED, 8mm X 38mm GRADE-9 PLATED HEX HEAD BOLTS, FLAT WASHERS, AND SELF LOCKING HEX NUTS PER POST. IN ADDITION, ONE 19mm X 127mm PLATED SPACER BAR PER POST, TO STIFFEN THE SPLICE CONNECTION. EACH SPACER SHALL BE DRILLED AND TAPPED WITH 8mm-18 UNC THREADS. THE SPACER SHALL BE FABRICATED FROM HOT ROLLED CARBON STEEL BAR CONFORMING TO ASTM A-36 OR M-1020.
- BOLTS AND LOCK NUT HARDWARE FOR SIGN ATTACHMENT SHALL BE CARRIAGE HEAD TYPE, 8mm-18 UNC, AND SHALL BE CADMIUM PLATED CONFORMING TO ASTM B-766.
- AN APPROVED ALTERNATE BREAKAWAY SYSTEM AND SIGN SUPPORT POST ASSEMBLY MAY BE SUBMITTED TO THE CM. FOR REVIEW AND APPROVAL. PRIOR TO ITS USE.
- THE CONTRACTOR HAS THE OPTION TO USE "ANTI-THEIF" NUTS IN LIEU OF JAMMING THE BOLT THREADS. NO ADDITIONAL PAYMENT WILL BE MADE IN RELATION TO USING ANTI-THEIF BOLTS.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF INDIAN AFFAIRS  
NAVAJO REGIONAL OFFICE \* DIVISION OF TRANSPORTATION

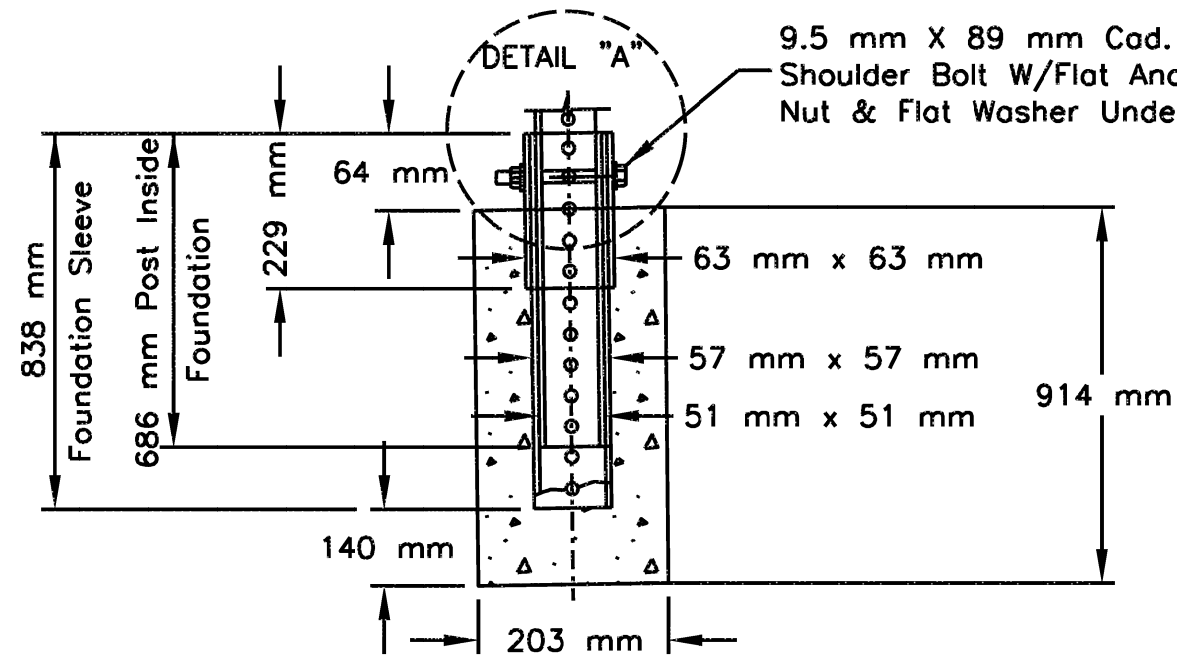
**SQUARE TUBE POST SELECTION AND SIGN MOUNTING DETAILS**

DRAWN BY: NRDOT	DATE: 02/2015
DESIGNED BY: NRDOT	DATE: 02/2015
REVISED: --/---	BY: DESIGN 1
FILES	

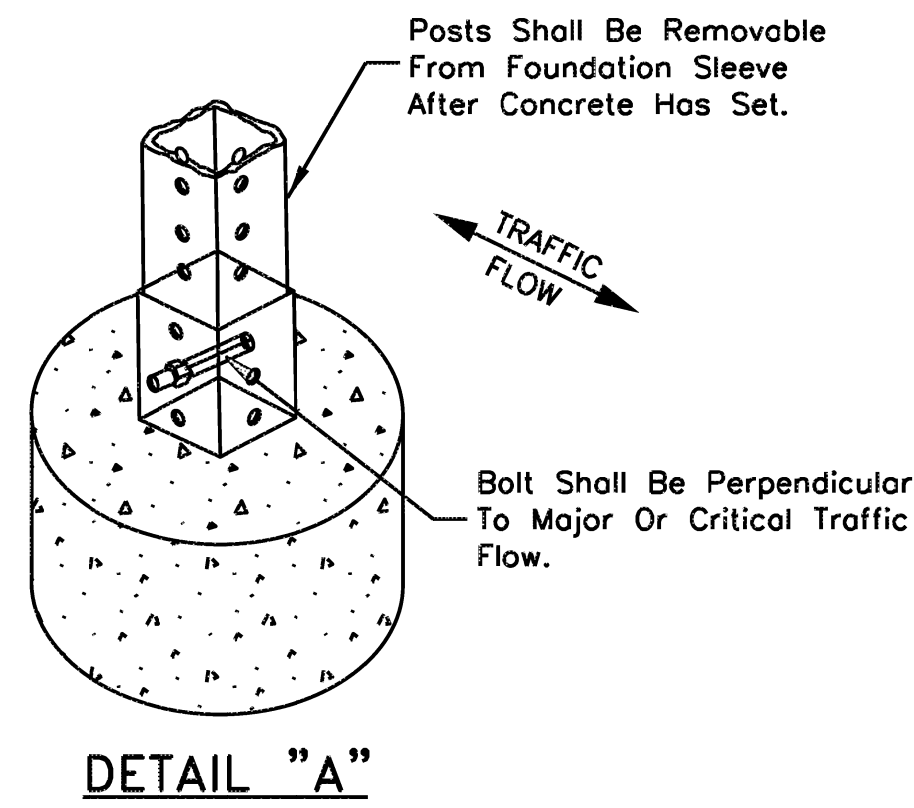


NOTE: THIS  
DETAIL IS  
METRIC

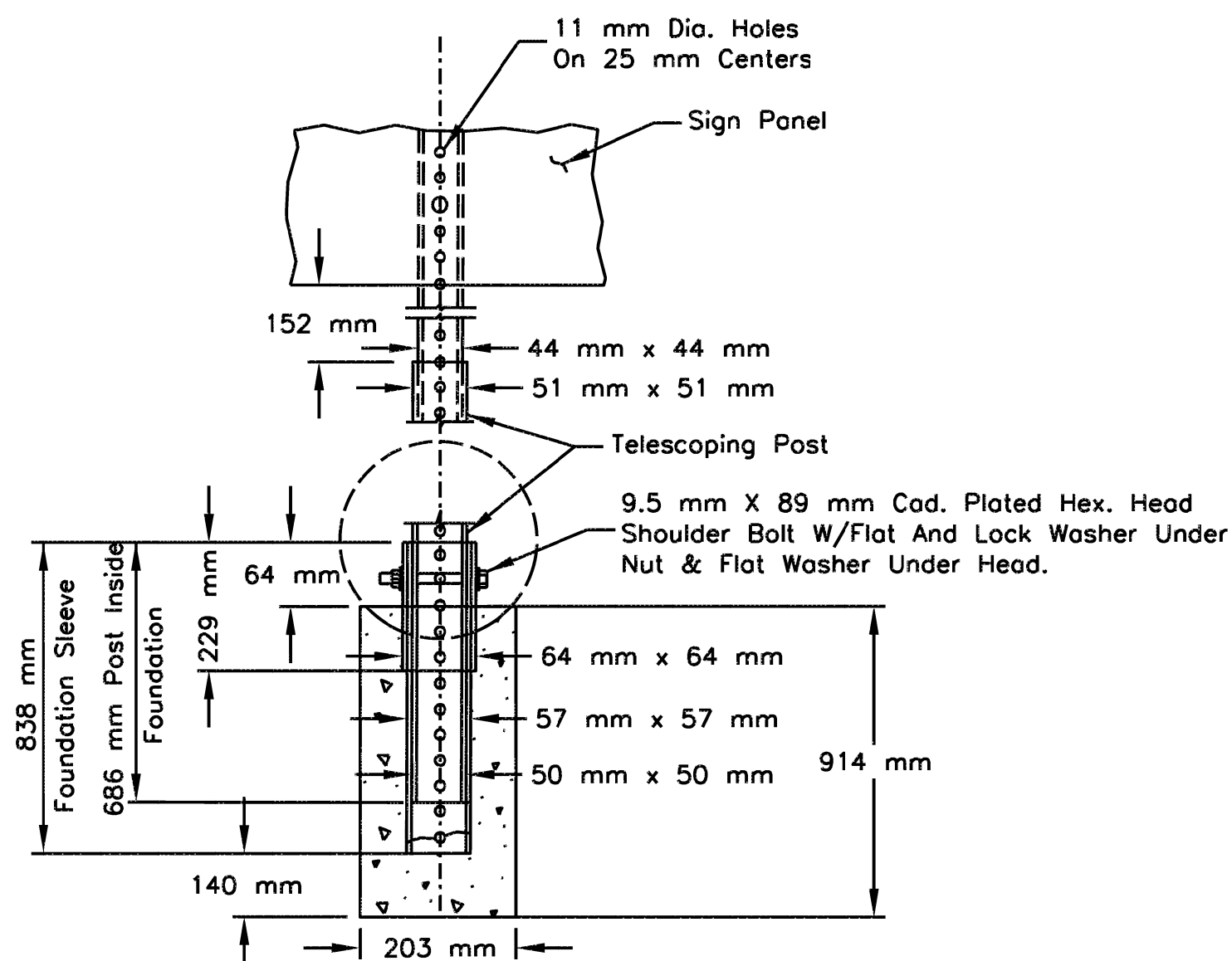




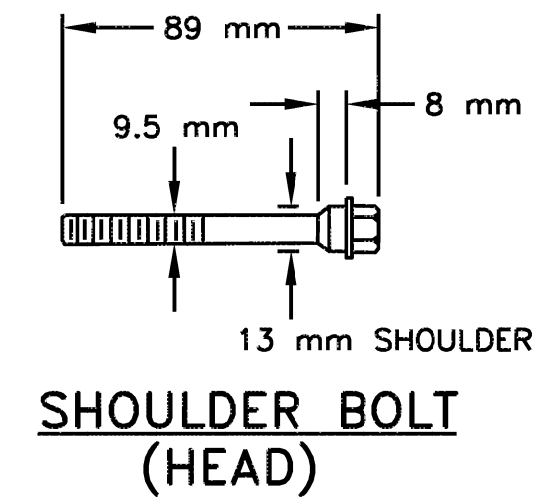
**SINGLE POST FOUNDATION DETAIL**



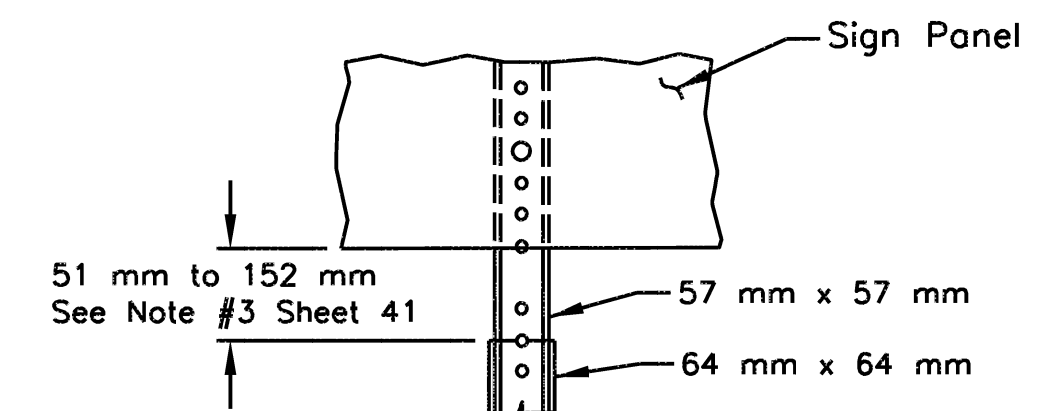
**DETAIL "A"**



**TELESCOPING POST DETAIL**



**SHOULDER BOLT (HEAD)**

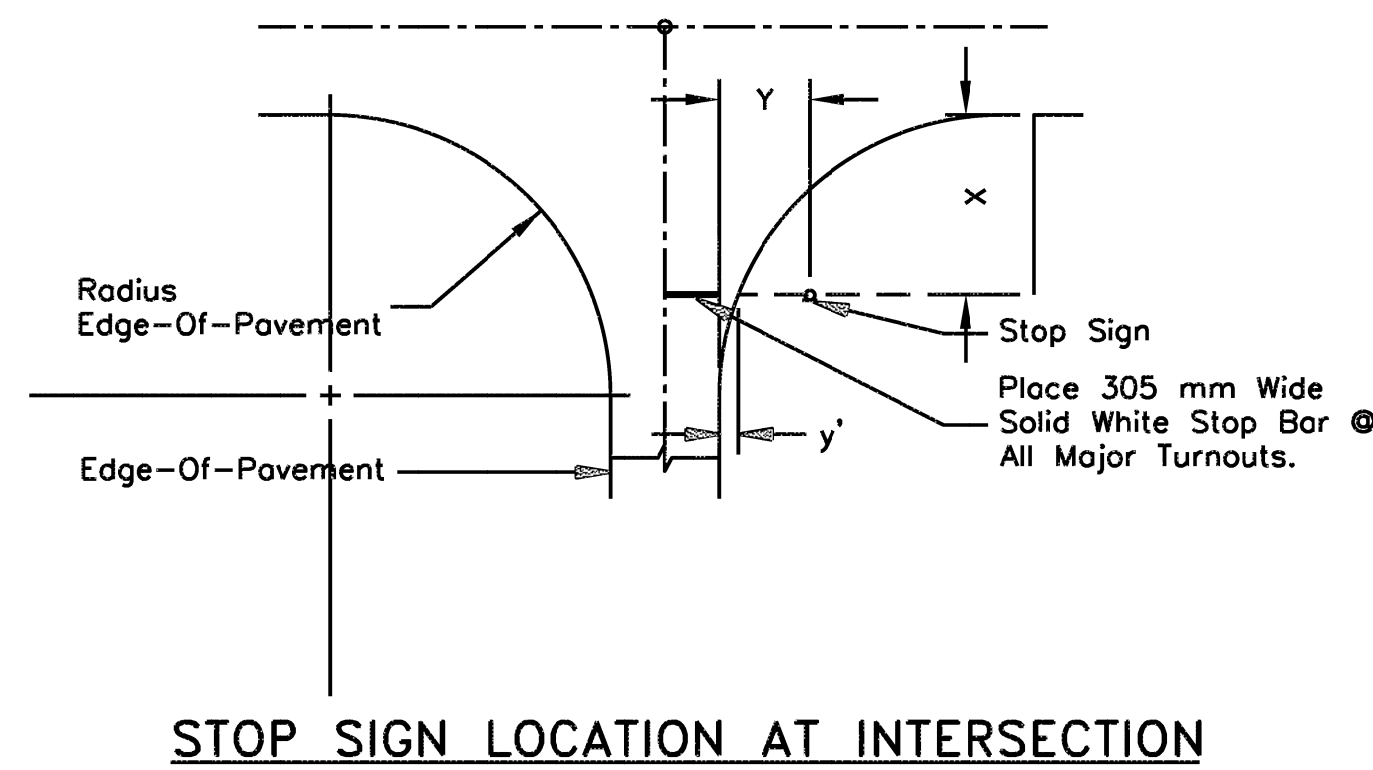


**TELESCOPING POST INSTALLATION**

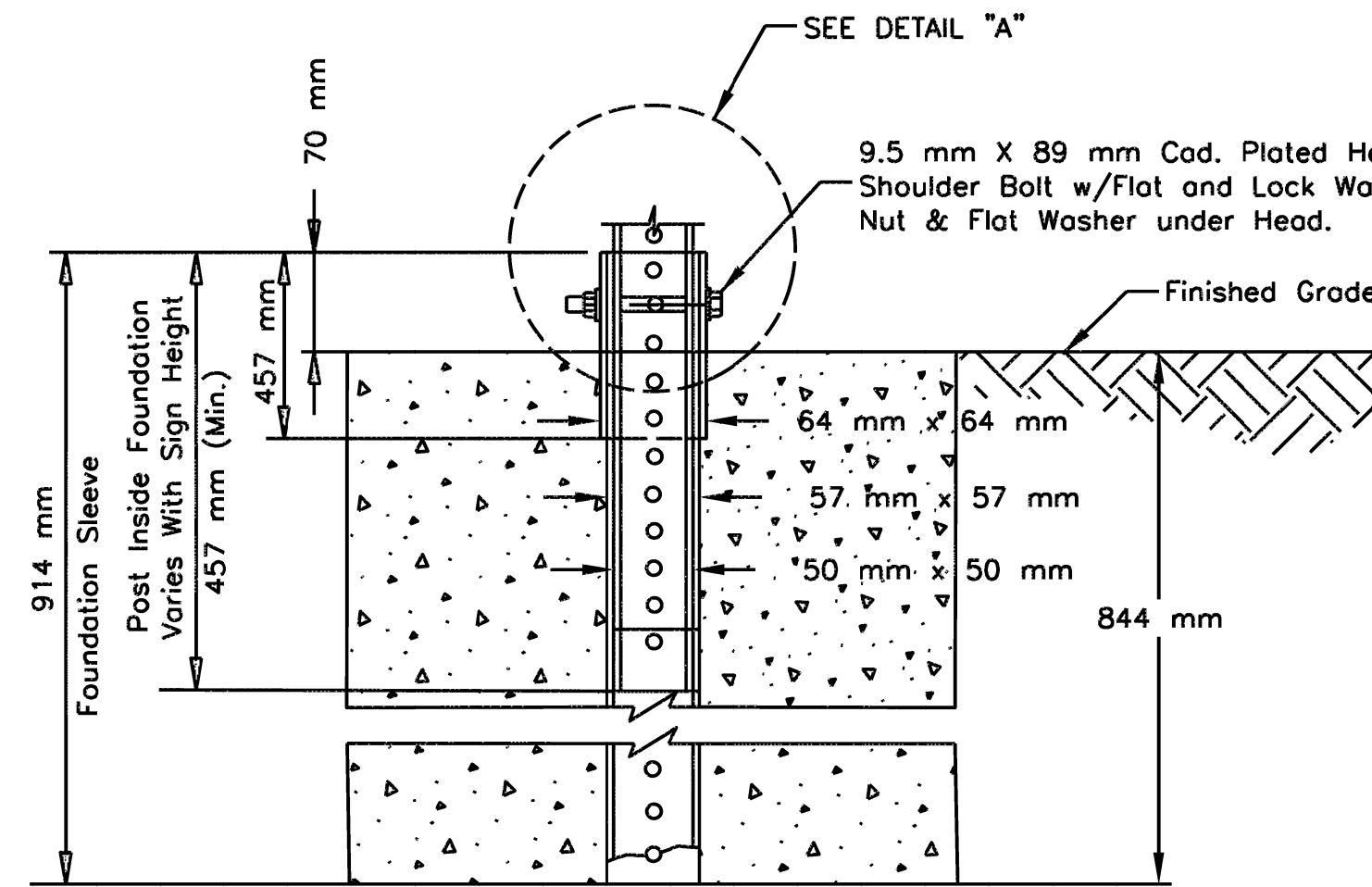
**STOP SIGN AND LINE LOCATION TABLE**

RADIUS OF TURNOUT (m)	X (m)	Y' (m)	Y (m) = Y' + LO (m)	LENGTH of STOP BAR
3.00	1.80	0.25	2.05	1/2 ROADWAY WIDTH + Y'
6.00	3.00	0.80	2.60	1/2 ROADWAY WIDTH + Y'
9.00	4.50	1.21	3.01	1/2 ROADWAY WIDTH + Y'
12.00	6.00	1.61	3.41	1/2 ROADWAY WIDTH + Y'
15.00	7.50	2.01	3.81	1/2 ROADWAY WIDTH + Y'

Y' = DISTANCE FROM ROADWAY EOP TO RADIUS EOP. LATERAL OFFSET (LO) FROM EOP (m) = 180

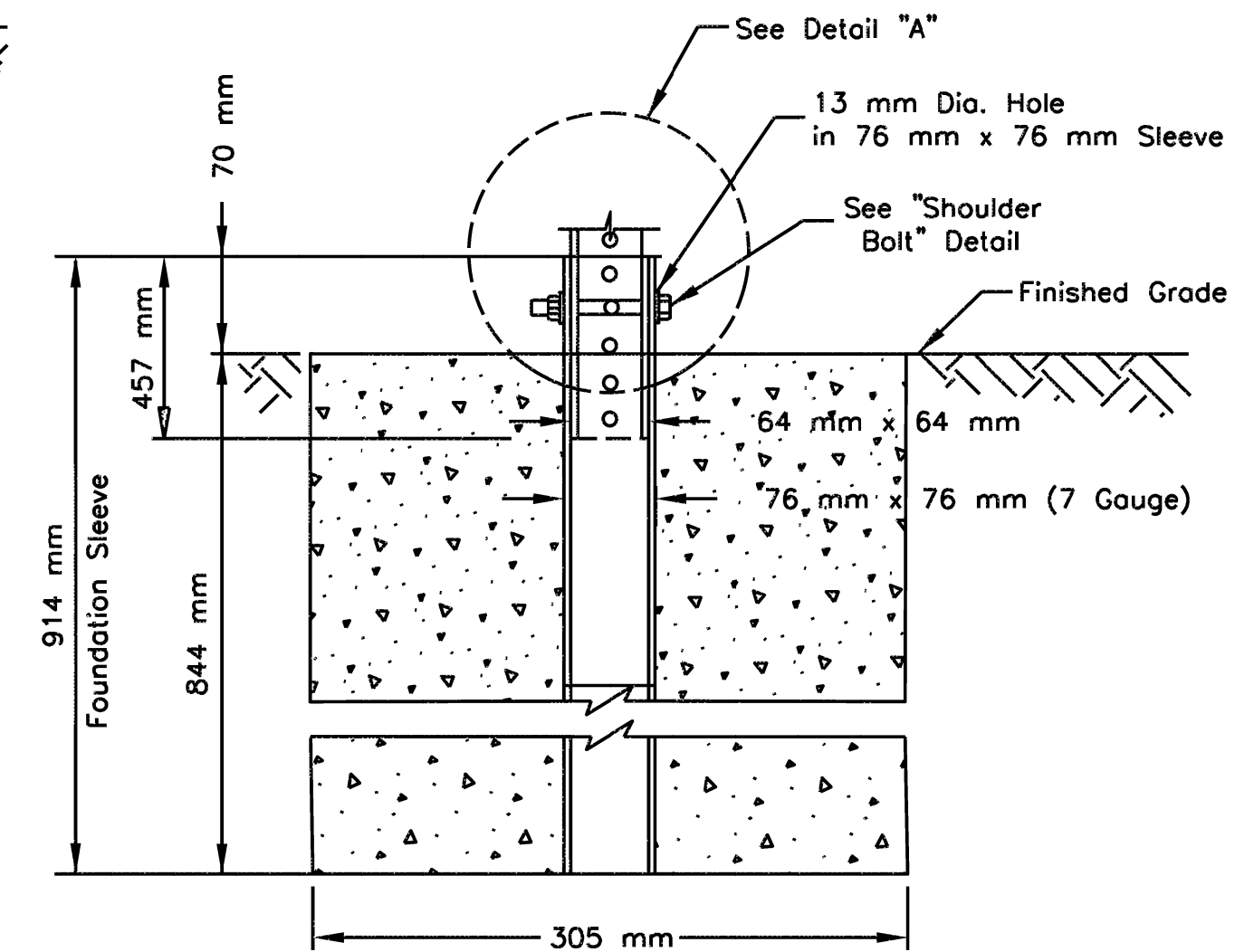


**STOP SIGN LOCATION AT INTERSECTION**

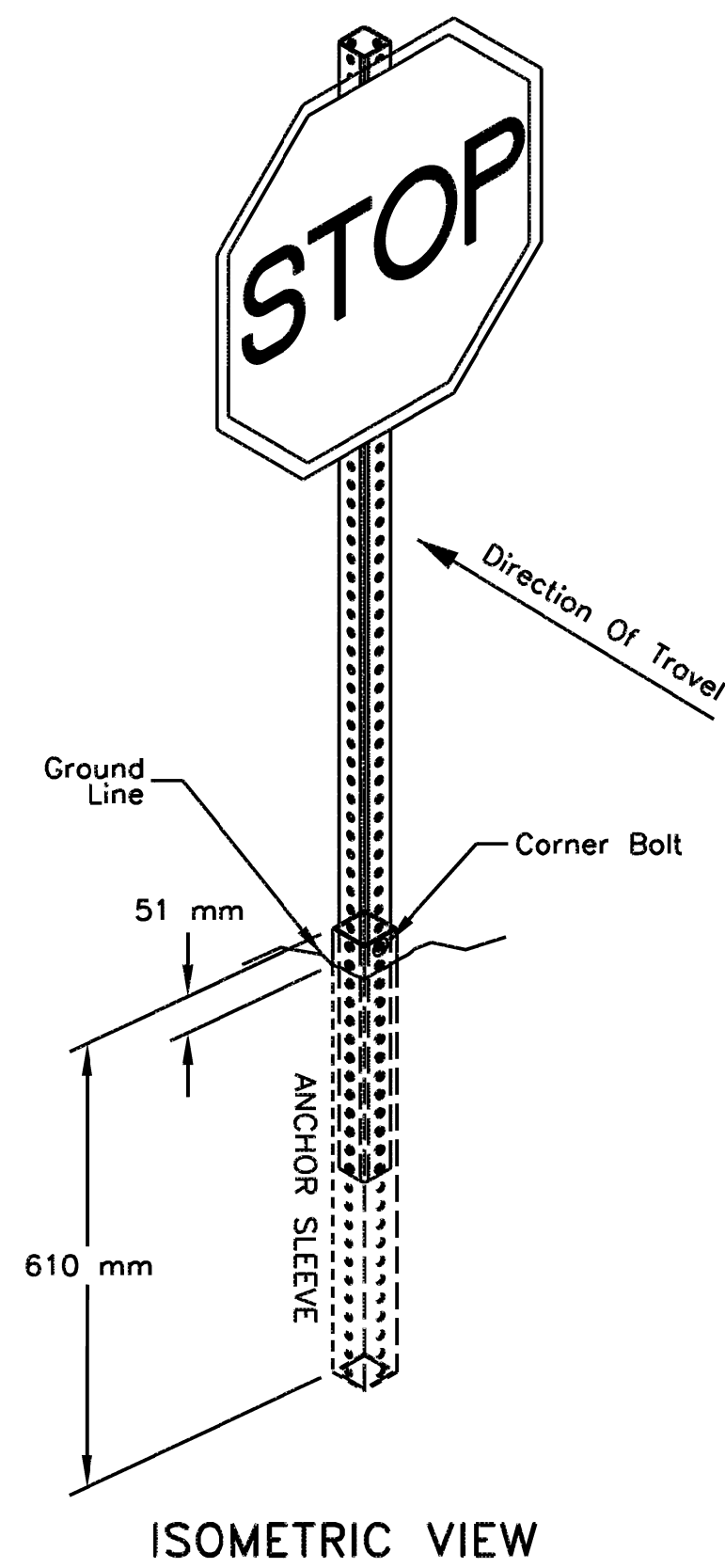


**51 mm SINGLE POST CONCRETE FOUNDATION DETAIL (IN WEAK SOILS)**

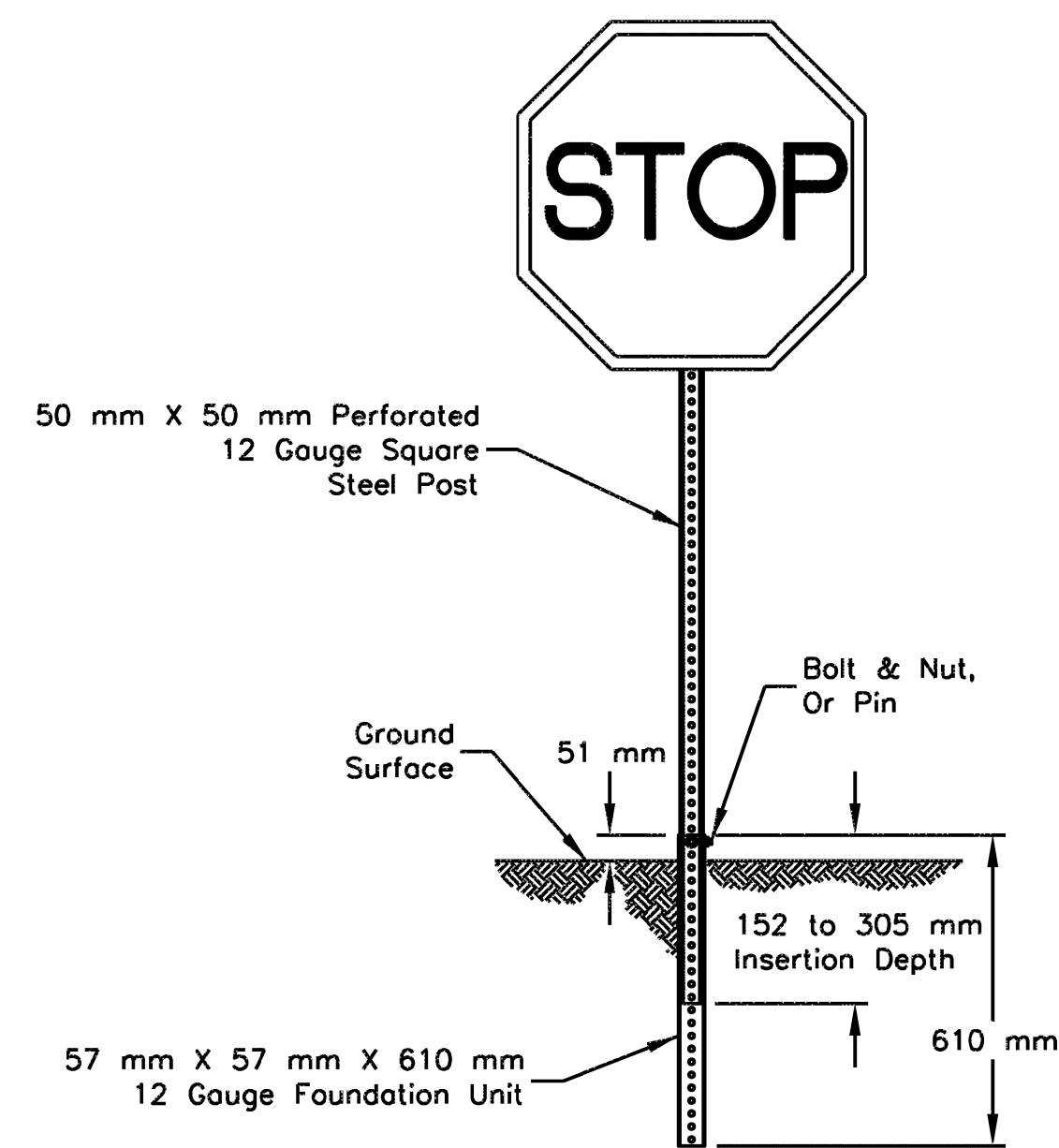
See Sheet 41 For General Notes



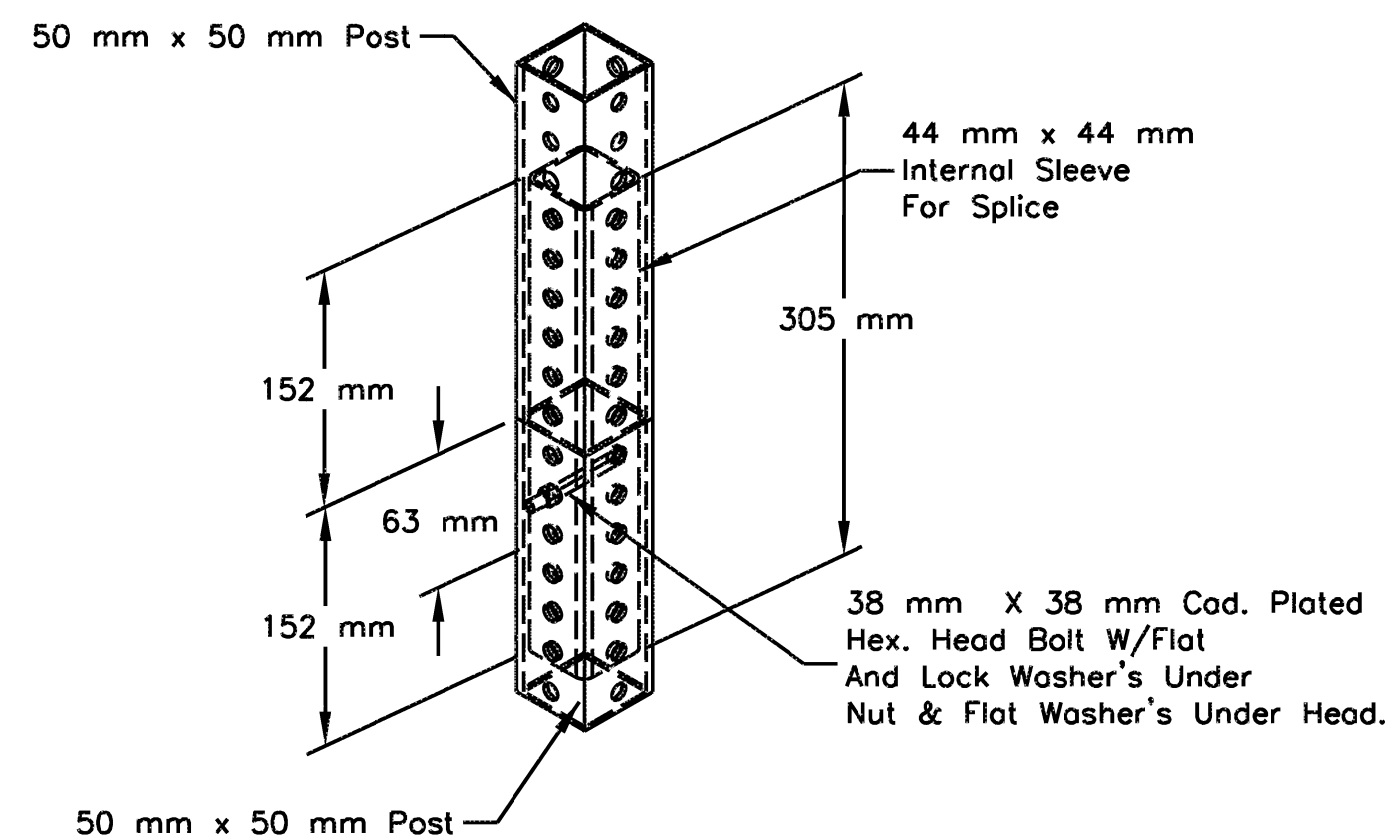
**64 mm SINGLE POST CONCRETE FOUNDATION DETAIL (IN WEAK SOILS)**



**ISOMETRIC VIEW**



**TELESCOPING BREAKAWAY ASSEMBLY (Single Post)**



**SINGLE POST PERMISSIBLE FIELD SPLICE (Not Allowed On Telescoping Post)**



NOTE: THIS DETAIL IS METRIC

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
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NAVAJO REGIONAL OFFICE \* DIVISION OF TRANSPORTATION

POST SELECTION AND  
SIGN MOUNTING DETAILS

DRAWN BY: NRDOT DATE: 02/2015

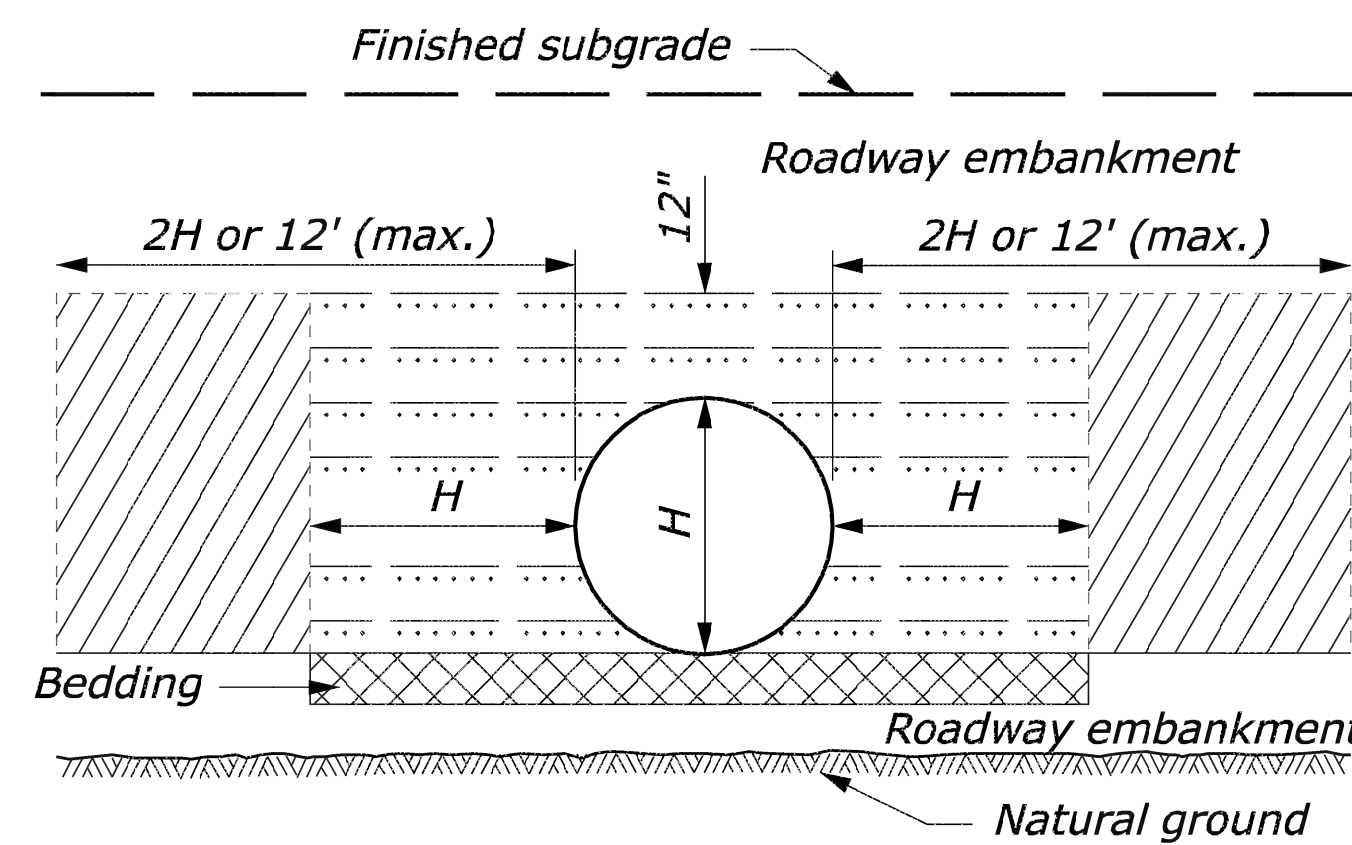
DESIGNED BY: NRDOT DATE: 02/2015

REVISED: --/--- BY: DESIGN 1

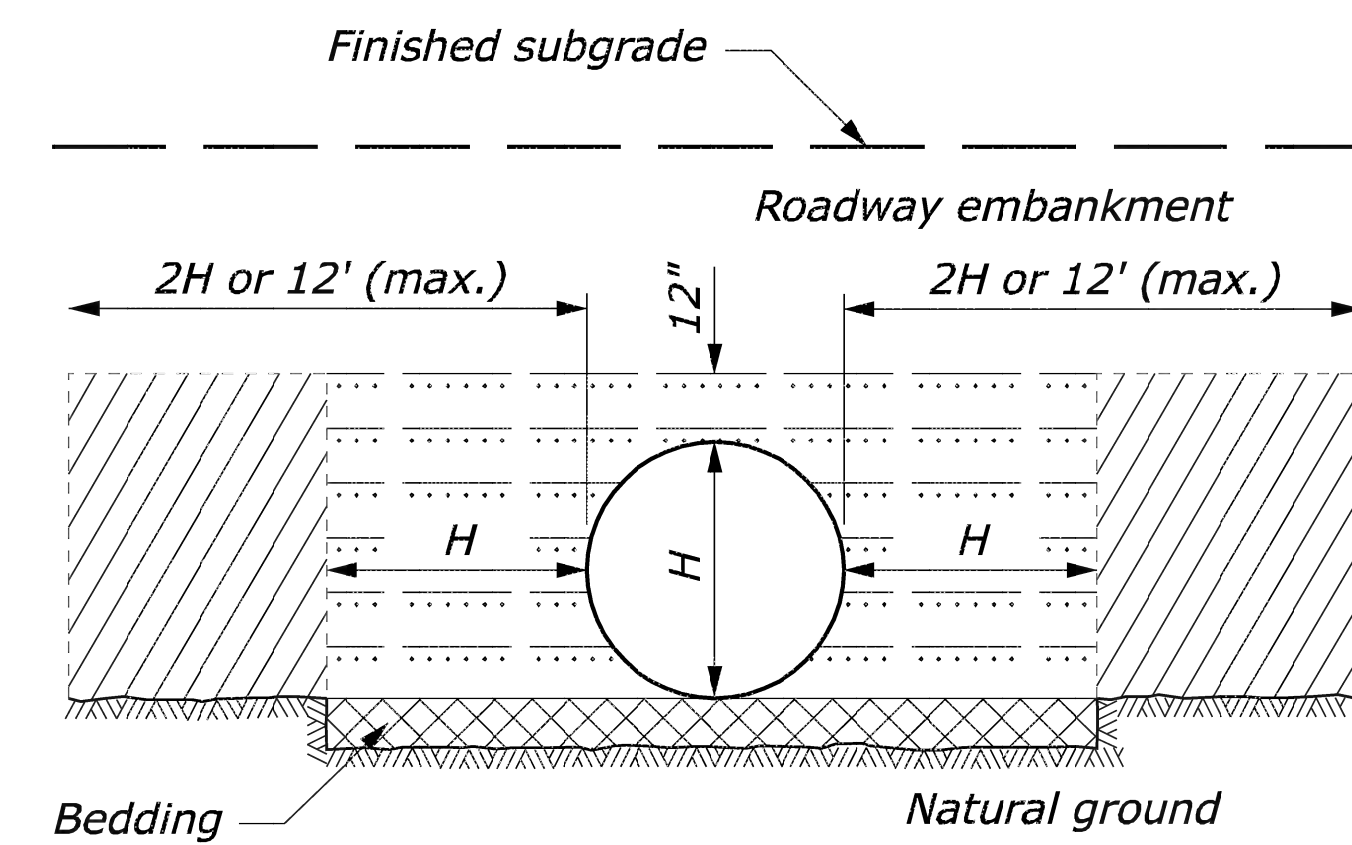
FILES



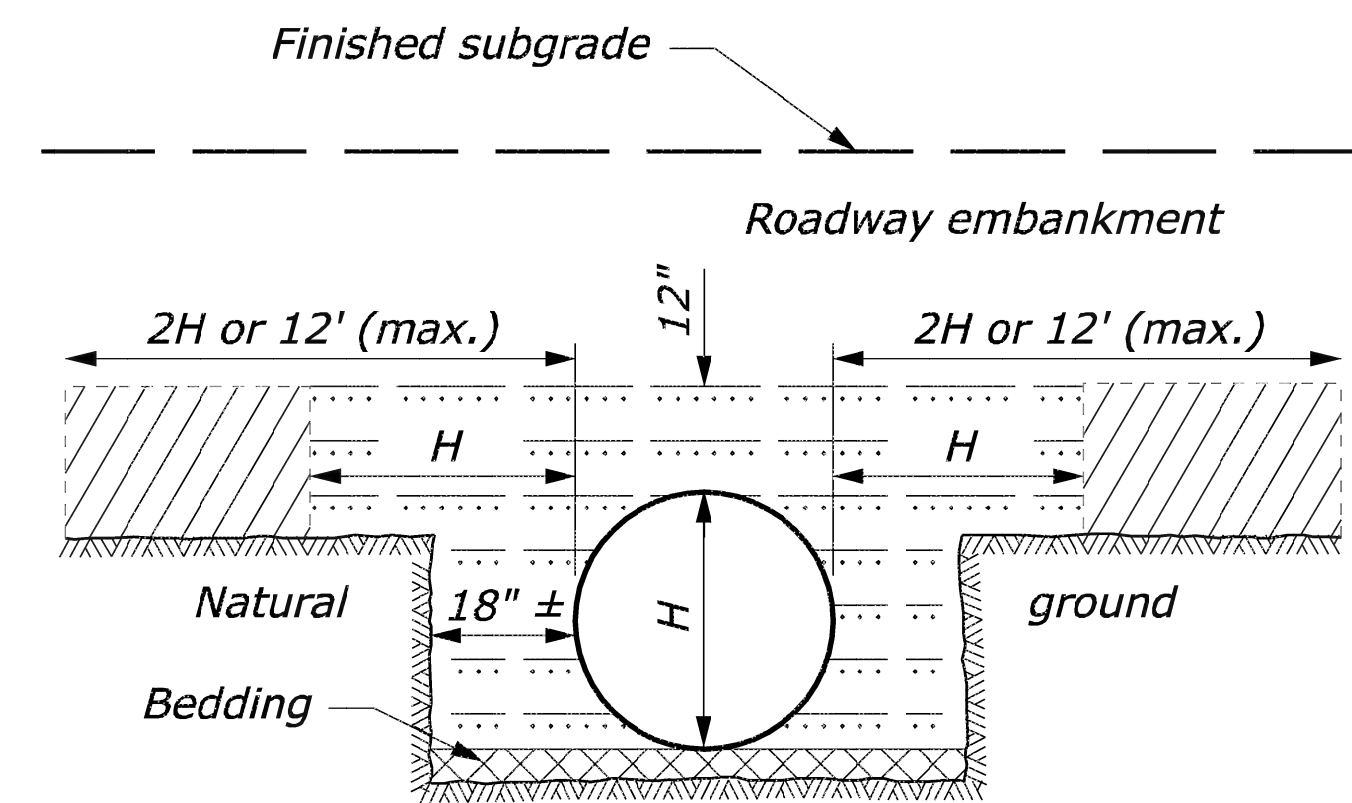
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	ARIZONA	NAVAJO	N12	N12 1,2&4		120



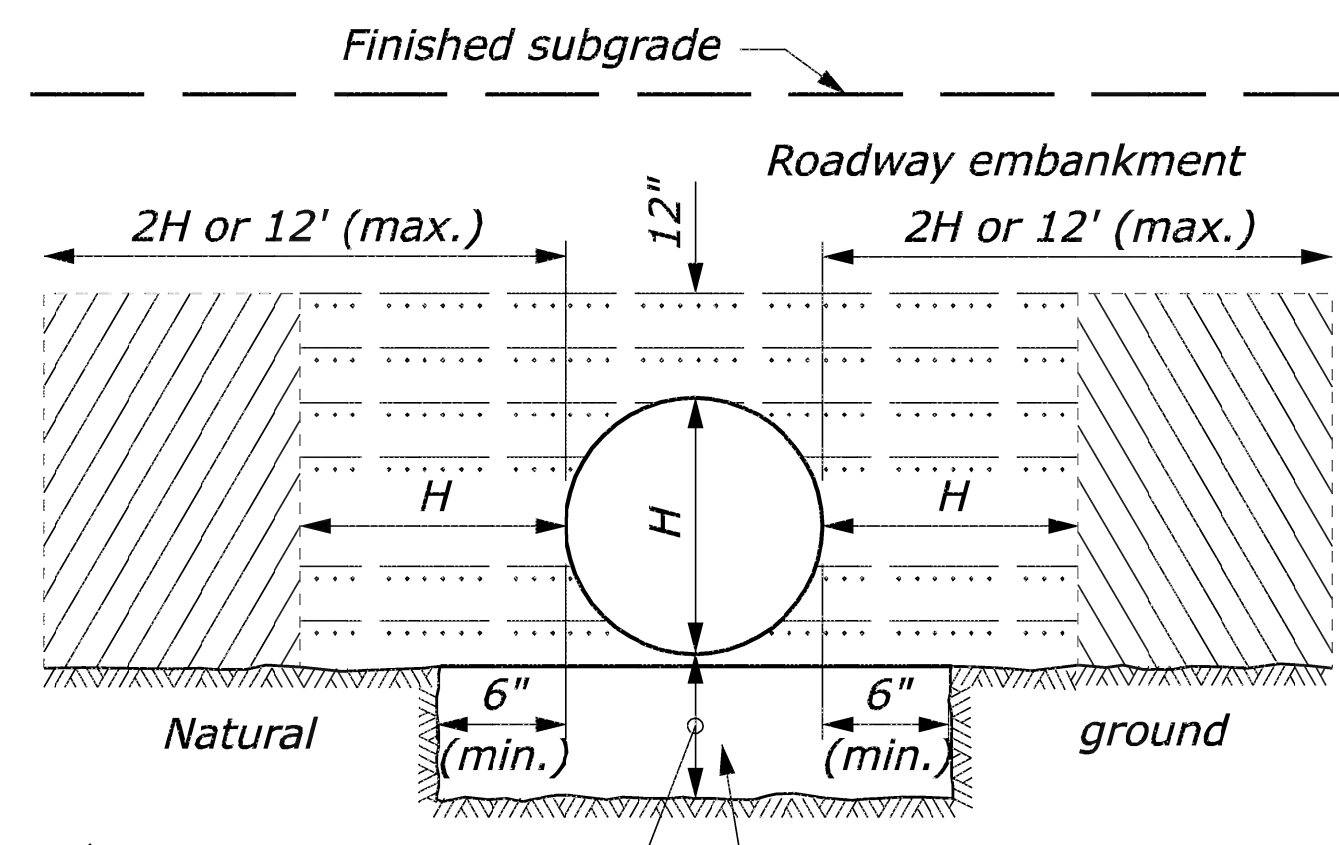
**ABOVE NATURAL GROUND**



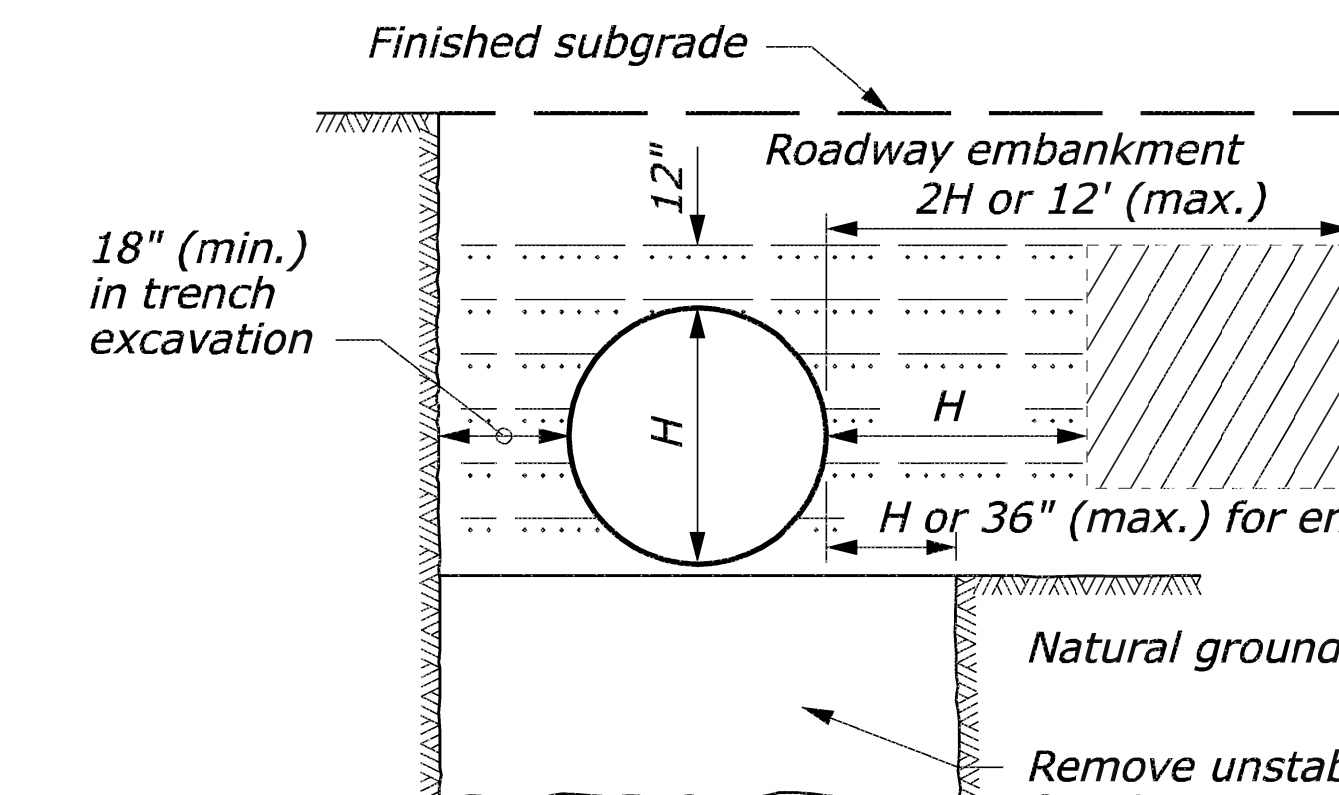
**ON NATURAL GROUND**



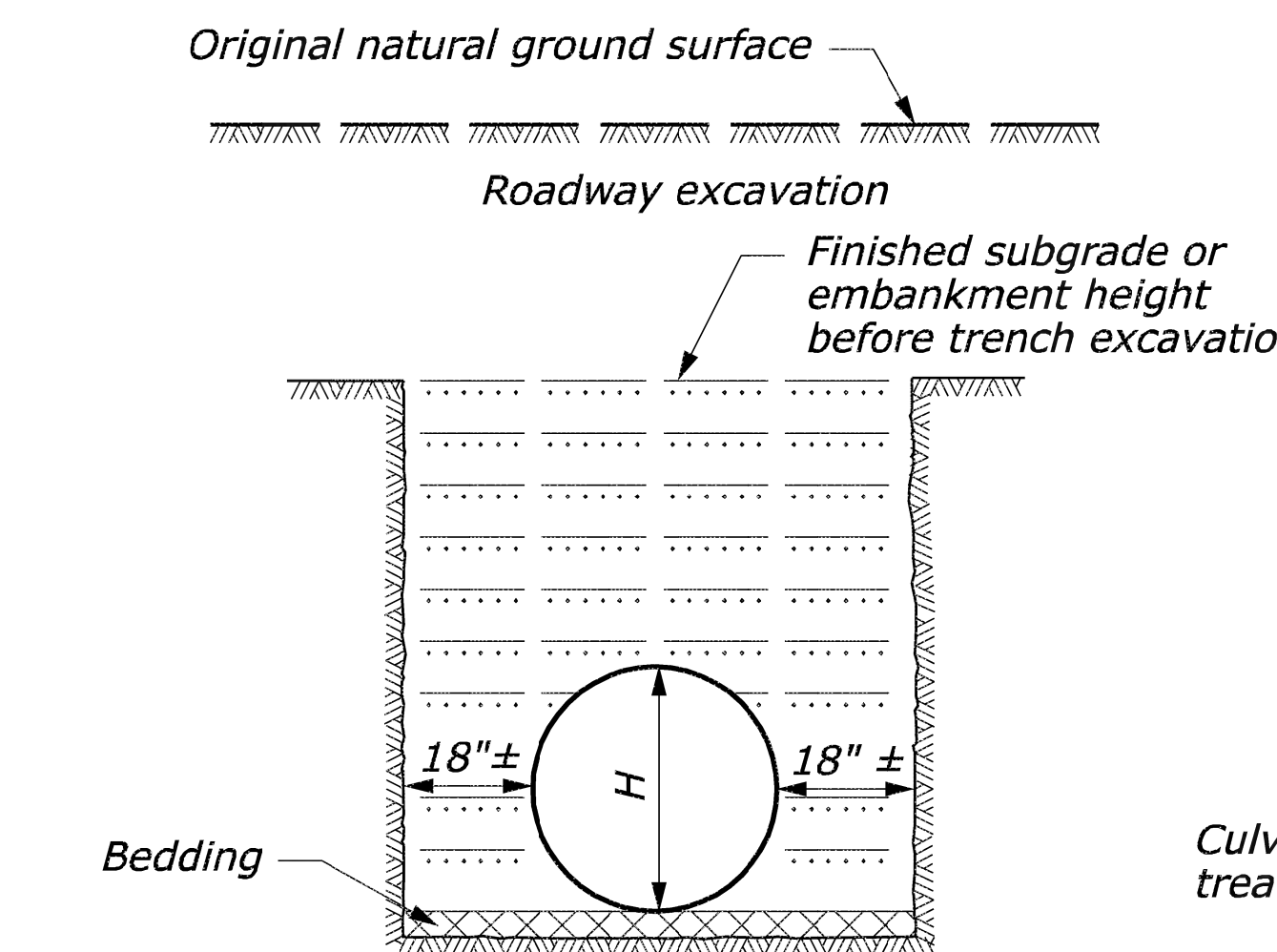
**ABOVE AND BELOW NATURAL GROUND**



**ON UNYIELDING MATERIAL**

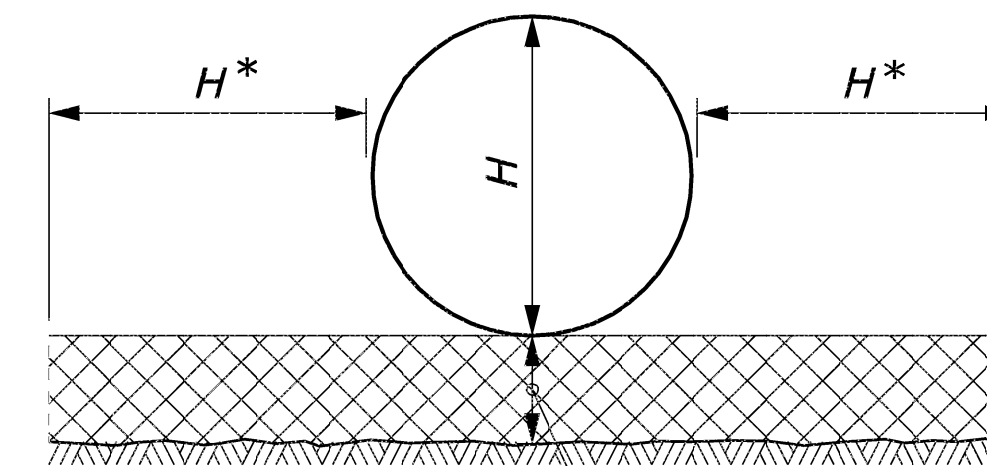


**ON UNSTABLE MATERIAL**



**BELOW NATURAL GROUND OR TRENCH EXCAVATION IN EMBANKMENT**

BEDDING DEPTH	
PIPE SIZE (H)	DEPTH
12" to 54"	4"
> 54"	6"



**PIPE BEDDING**

\* Reduce to 18" for trench excavations See bedding depth table

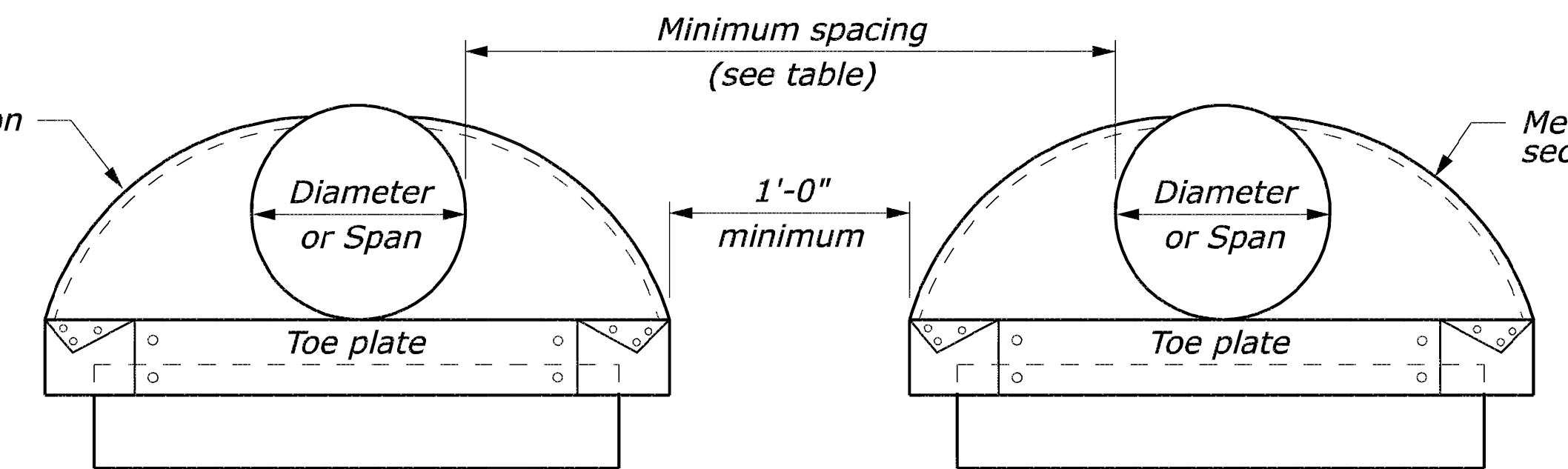
- Bedding material (uncompacted)
- Embankment material placed in layers not exceeding 6" compacted depth.
- Compacted backfill material placed in layers not exceeding 6" compacted depth meeting the following:  
 Metal Pipe: Maximum particle size = 3"  
 Soil classification: A-1, A-2, or A-3  
 Plastic Pipe: Maximum particle size: 1 1/2"  
 Soil classification: A-1, A-2-4, A-2-5, or A-3  
 Or lean concrete backfill in accordance with Section 614.

**NOTE:**

- When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
- H equals the diameter of all round pipe culverts or the rise dimension of all pipe arch culverts.

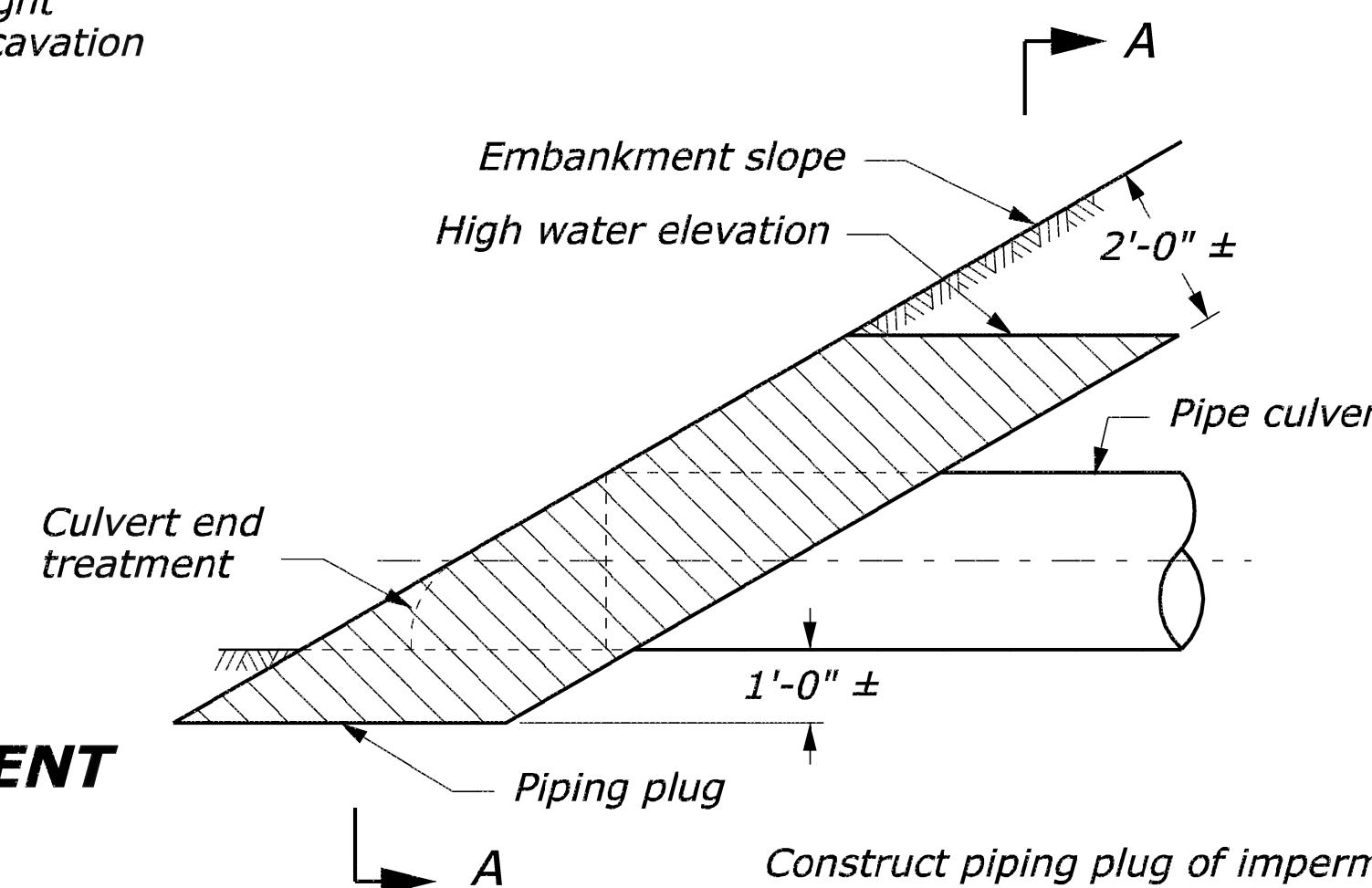
MINIMUM SPACING	
DIAMETER or SPAN	SPACING
UP to 48"	24"
48" and UP	Half diameter or span OR 36" whichever is less

Metal end section



**ELEVATION**

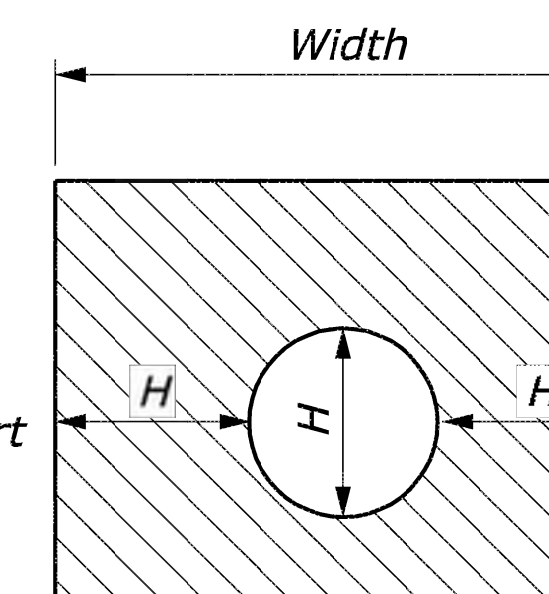
**MULTIPLE PIPE INSTALLATION**



Construct piping plug of impermeable backfill material at the pipe culvert inlet where granular material is used for backfill. Width may be adjusted to tie into impervious material.

**PIPING PLUG**

NO SCALE



**SECTION A-A**



NAVAJO DIVISION OF TRANSPORTATION

**USDOT FED STD 1 PIPE PLACEMENT DETAILS**

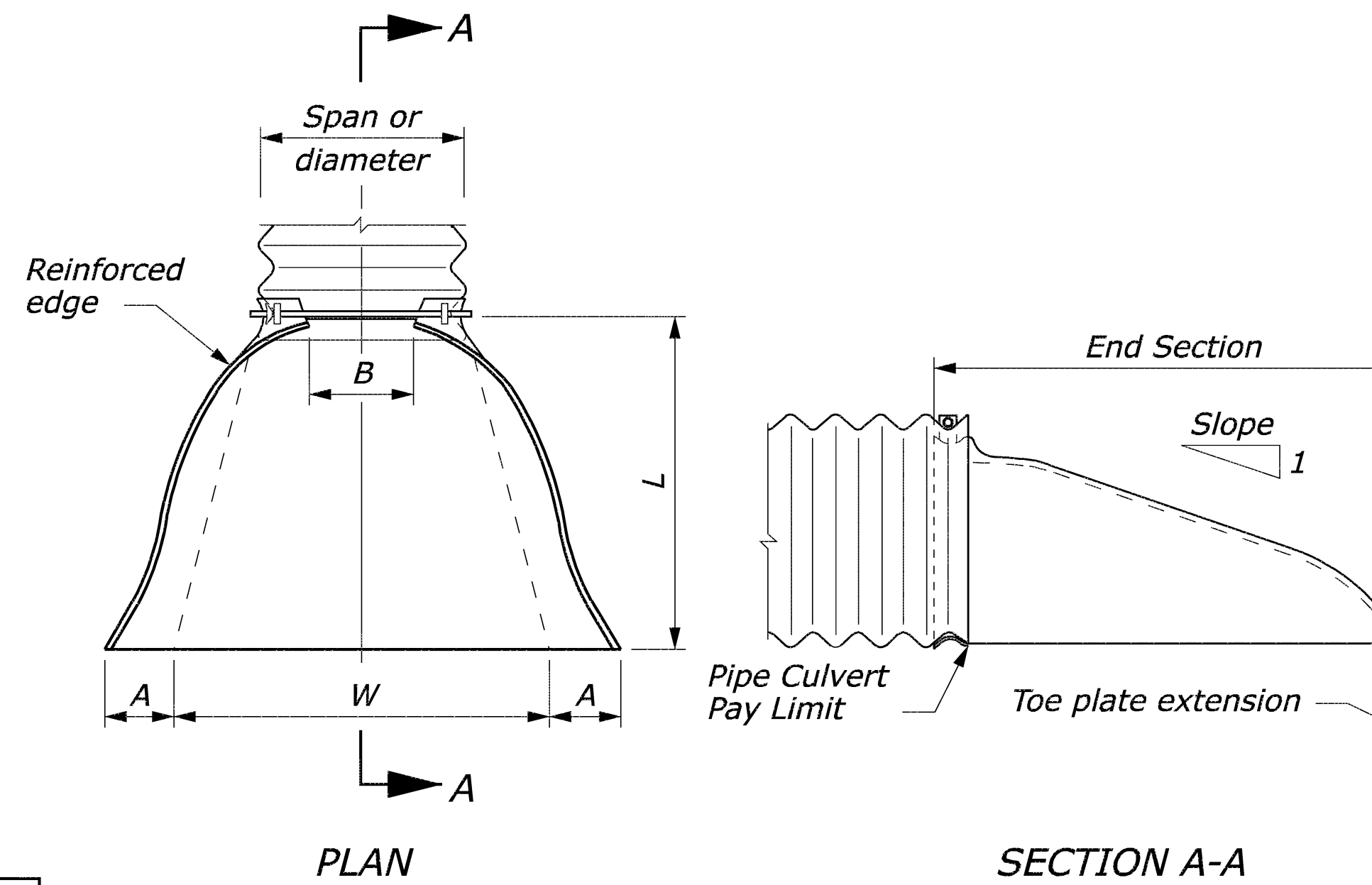
Designed by: JEB	Date: 11/21
Drawn by: ERG	Date: 11/21
Checked by: ASF	Date: 11/21
File Name: C:\NMDOT-STD N12.DWG	



REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	ARIZONA	NAVAJO	N12	N12 1,2&4		120

### END SECTIONS FOR ROUND PIPE CULVERT

PIPE SIZE DIAMETER INCHES	METAL THICKNESS				DIMENSIONS INCHES					SLOPE Approx.
	STEEL		ALUMINUM		A (min)	B (max)	H (min)	L (±2")	W (max)	
	INCHES	GAGE	INCHES	GAGE						
12	0.064	16	0.060	16	5	7	6	21	44	2¼
15	0.064	16	0.060	16	6	8	6	26	52	2¼
18	0.064	16	0.060	16	7	10	6	31	58	2½
21	0.064	16	0.060	16	8	12	6	36	66	2½
24	0.064	16	0.060	16	9	13	6	41	72	2½
30	0.079	14	0.075	14	11	16	8	51	88	2½
36	0.079	14	0.075	14	13	19	9	60	105	2
42	0.109	12	0.105	12	15	25	10	69	122	2½
48	0.109	12	0.105	12	17	29	12	78	131	2
54	0.109	12	0.105	12	17	33	12	84	143	2
60	0.109	12	0.105	12	17	36	12	87	157	1⅞
66	0.109	12	0.105	12	17	39	12	87	162	1⅞
72	0.109	12	0.105	12	17	44	12	87	169	1½
78	0.109	12	0.105	12	17	48	12	87	178	1⅞
84	0.109	12	0.105	12	17	52	12	87	184	1⅓
90	0.109	12	0.105	12	17	58	12	87	188	1¼
96	0.109	12	0.105	12	17	58	12	87	197	1⅞



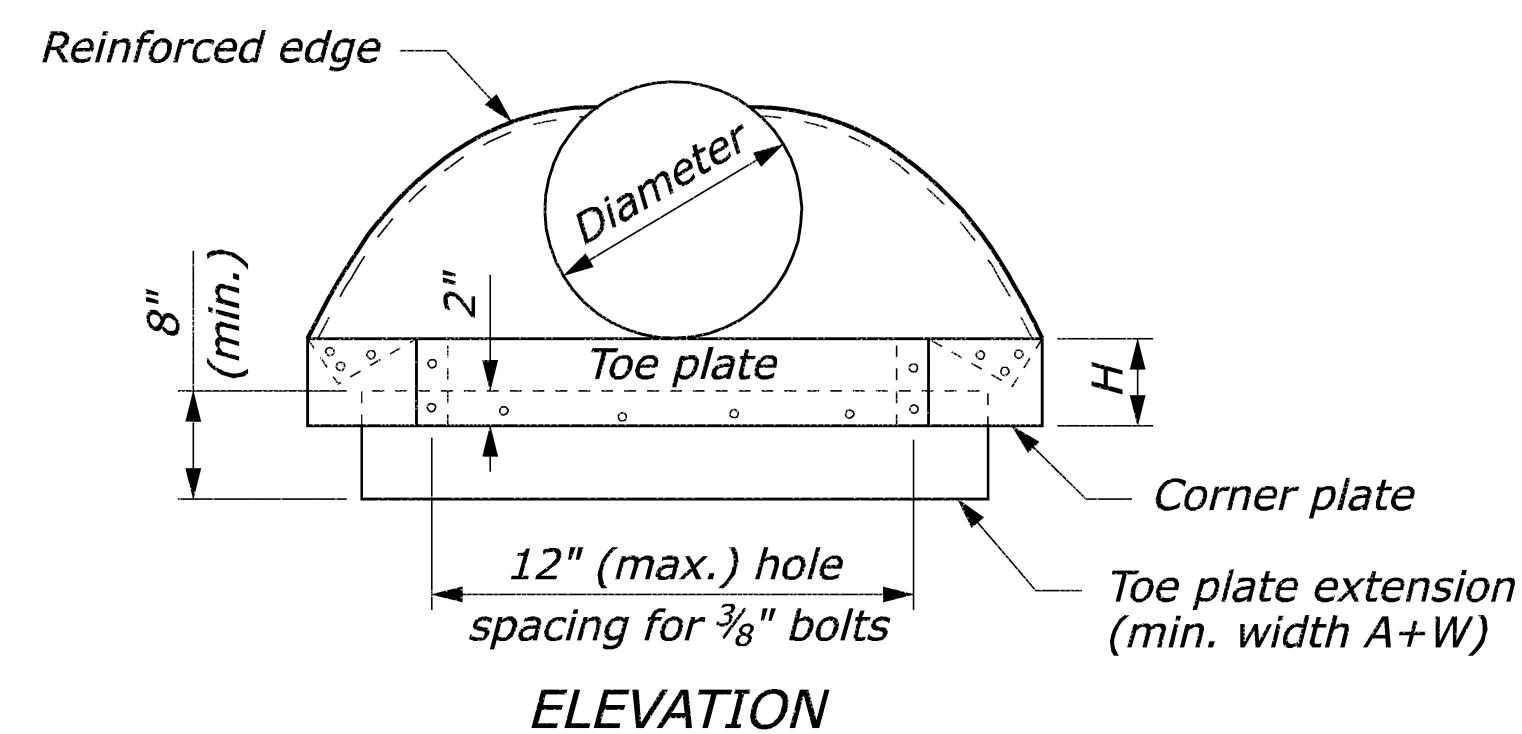
PLAN SECTION A-A  
ROUND OR PIPE ARCH CULVERT

**NOTE:**

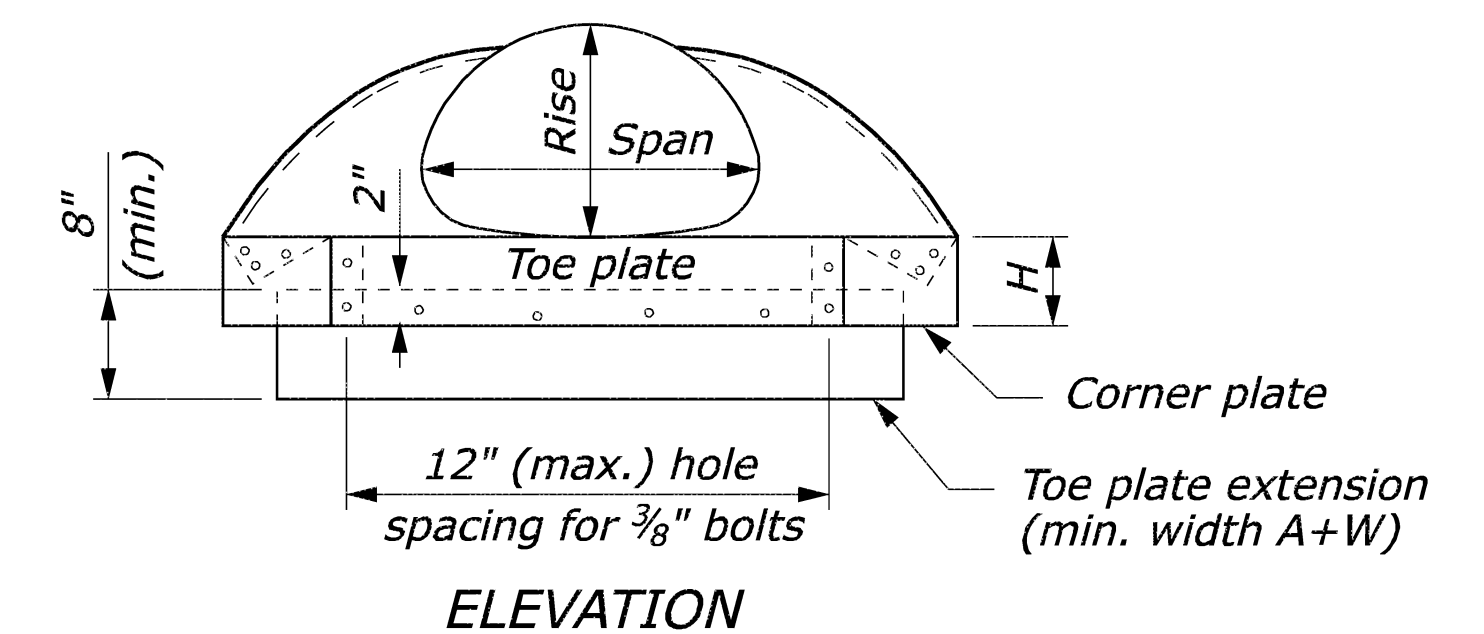
- Variations in design and dimensions are permitted to allow for manufacturer's standards.
- Fabricate the diameter of the end section of Design B to match the inside diameter of the concrete pipe culvert.
- Design C may be used in lieu of design A for all metal pipe culvert sizes. Coupling bands may be any acceptable type for the pipe culvert specified.
- Fabricate multiple piece bodies with lap seams tightly joined by ⅜" rivets or bolts. Fabricate end section center panels for 60" and larger diameter pipe and equivalent pipe arch from 0.138 inch steel or 0.135 inch aluminum.
- On end section center panels for 66" and larger equivalent pipe arch provide 2½" x 2½" x ¼" angle reinforcement bolted or riveted under the center panel seam.
- Supplement the reinforced edges of end sections for 60" and larger diameter pipe and 66" and larger equivalent pipe arch with 2½" x 2½" x ¼" stiffener angles attached with bolts or rivets.
- Fabricate connector section, corner plate and toe plate extensions from the same metal thickness as the panel body. Use toe plate extension where shown on the plans.
- Warp embankment slopes to match the slope of the flared end sections.

### END SECTIONS FOR PIPE ARCH CULVERT

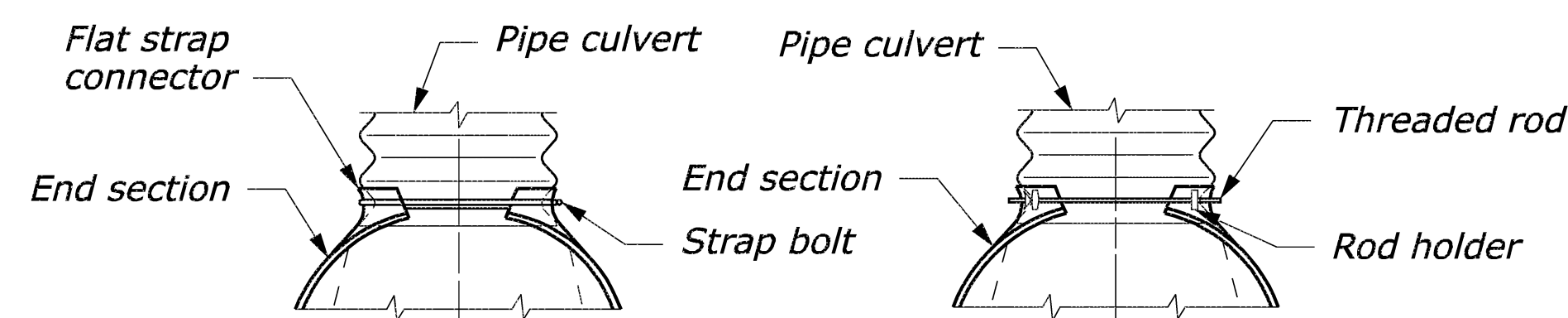
PIPE SIZE SPAN x RISE INCHES	METAL THICKNESS				DIMENSIONS INCHES					SLOPE Approx.
	STEEL		ALUMINUM		A (min)	B (max)	H (min)	L (±2")	W (max)	
	INCHES	GAGE	INCHES	GAGE						
17 x 13	0.064	16	0.060	16	5	9	6	20	52	2⅞
21 x 15	0.064	16	0.060	16	6	11	6	24	58	2
24 x 18	0.064	16	0.060	16	7	12	6	28	58	2⅞
28 x 20	0.064	16	0.060	16	7	16	6	32	66	2
35 x 24	0.079	14	0.075	14	9	16	6	39	72	1⅞
42 x 29	0.079	14	0.075	14	11	18	7	46	88	1⅞
49 x 33	0.109	12	0.105	12	12	21	9	53	105	1¾
57 x 38	0.109	12	0.105	12	16	26	12	62	122	1⅞
60 x 46	0.109	12	0.105	12	17	36	12	70	142	1⅞
64 x 43	0.109	12	0.105	12	17	30	12	69	131	1⅞
66 x 51	0.109	12	0.105	12	17	36	12	77	156	1¾
71 x 47	0.109	12	0.105	12	17	36	12	77	143	1⅞
73 x 55	0.109	12	0.105	12	17	36	12	77	168	1½
77 x 52	0.109	12	0.105	12	17	36	12	77	157	1⅞
81 x 59	0.109	12	0.105	12	17	44	12	77	179	1⅞
83 x 57	0.109	12	0.105	12	17	44	12	77	162	1½
87 x 63	0.109	12	0.105	12	17	44	12	77	186	1½
95 x 67	0.109	12	0.105	12	17	44	12	87	210	1½
103 x 71	0.109	12	0.105	12	17	44	12	87	222	1⅓
112 x 75	0.109	12	0.105	12	17	44	12	87	226	1¼



ELEVATION  
ROUND PIPE CULVERT

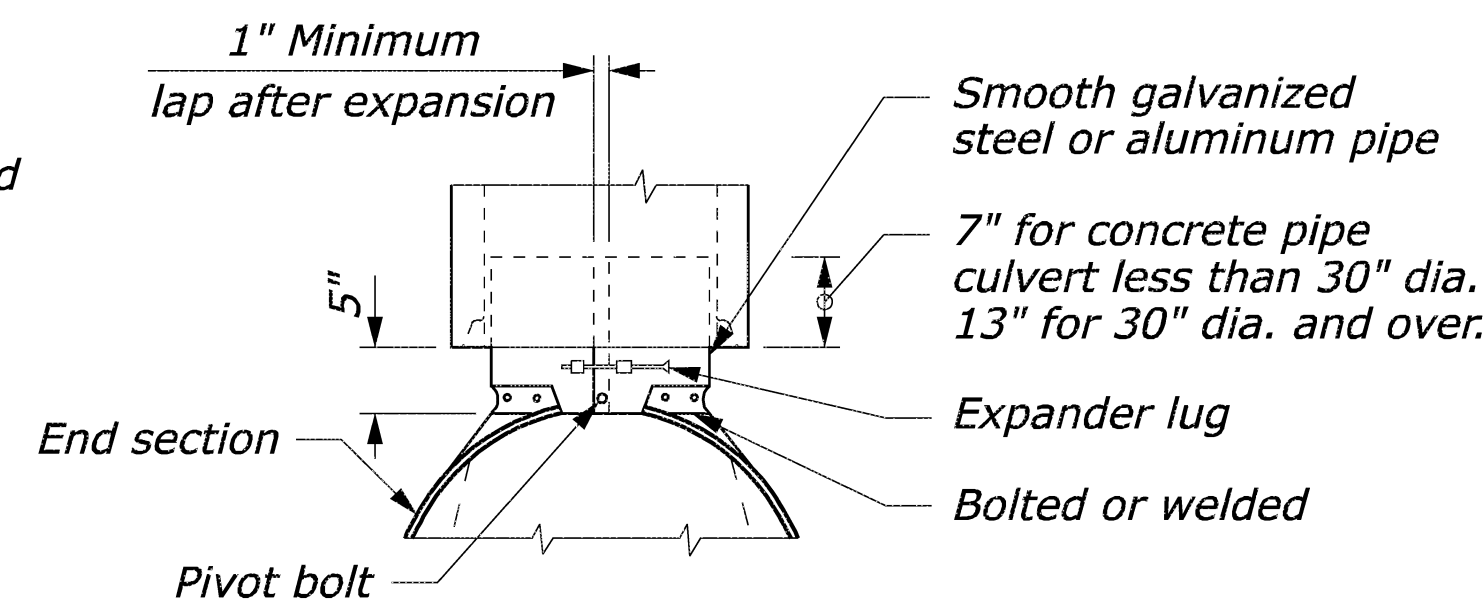


ELEVATION  
PIPE ARCH CULVERT

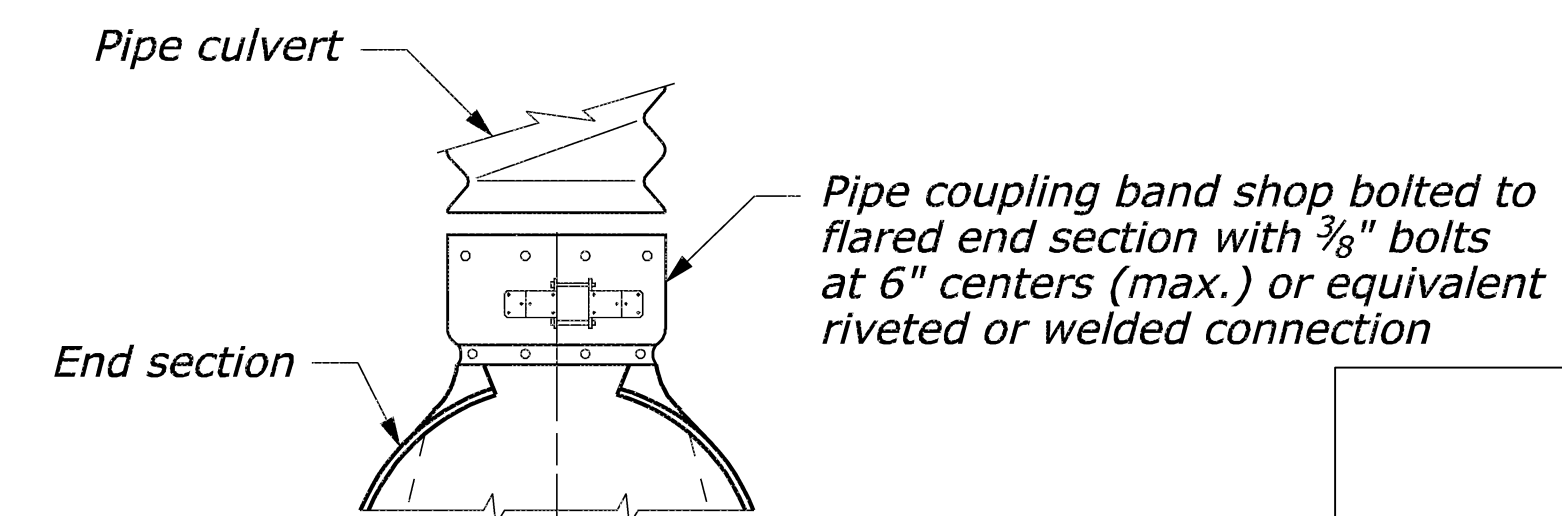


For 12" thru 24" round pipe and 17" x 13" thru 28" x 20" pipe arch For 30" thru 60" round pipe and 35" x 24" thru 66" x 51" pipe arch

**DESIGN A**  
CONNECTION TO ANNULAR  
CORRUGATED METAL PIPE



**DESIGN B**  
CONNECTION TO CONCRETE  
PIPE INLET END



For all sizes of round pipe and pipe arch  
**DESIGN C**  
CONNECTION TO METAL PIPE  
OR OUTLET END OF CONCRETE PIPE  
NO SCALE

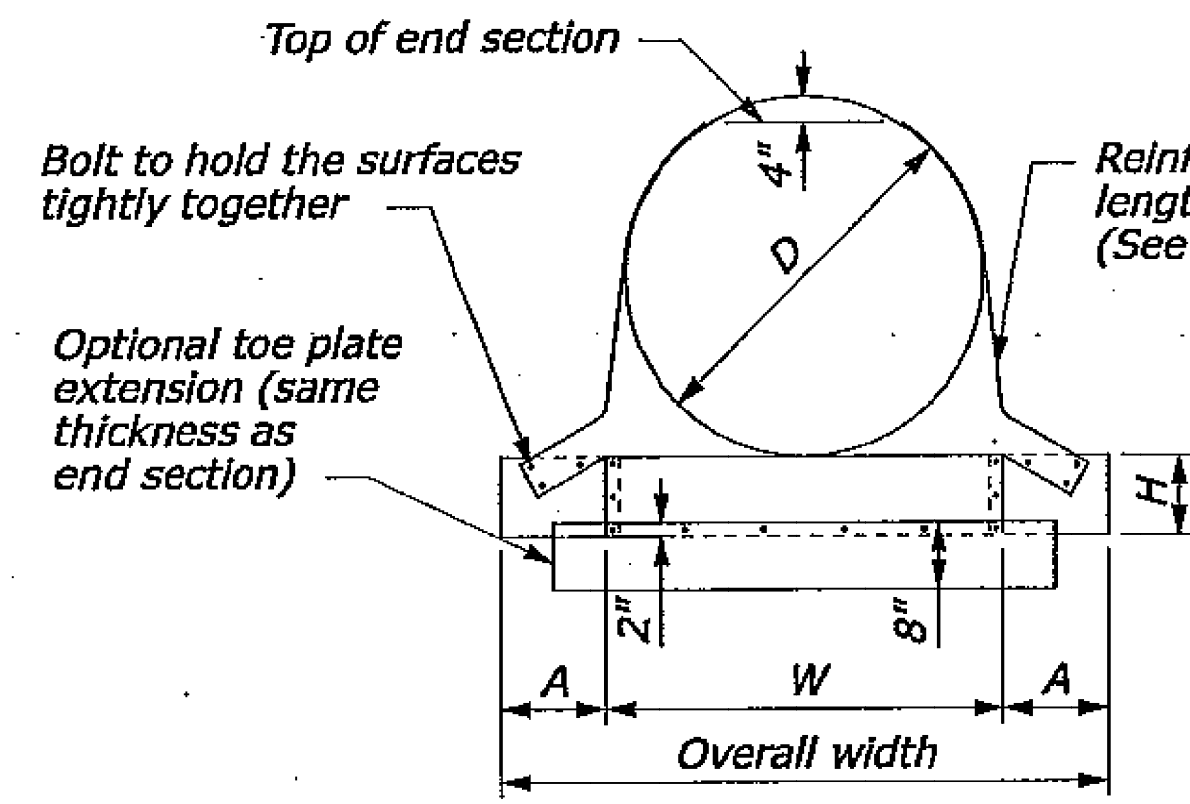


NAVAJO DIVISION OF  
TRANSPORTATION

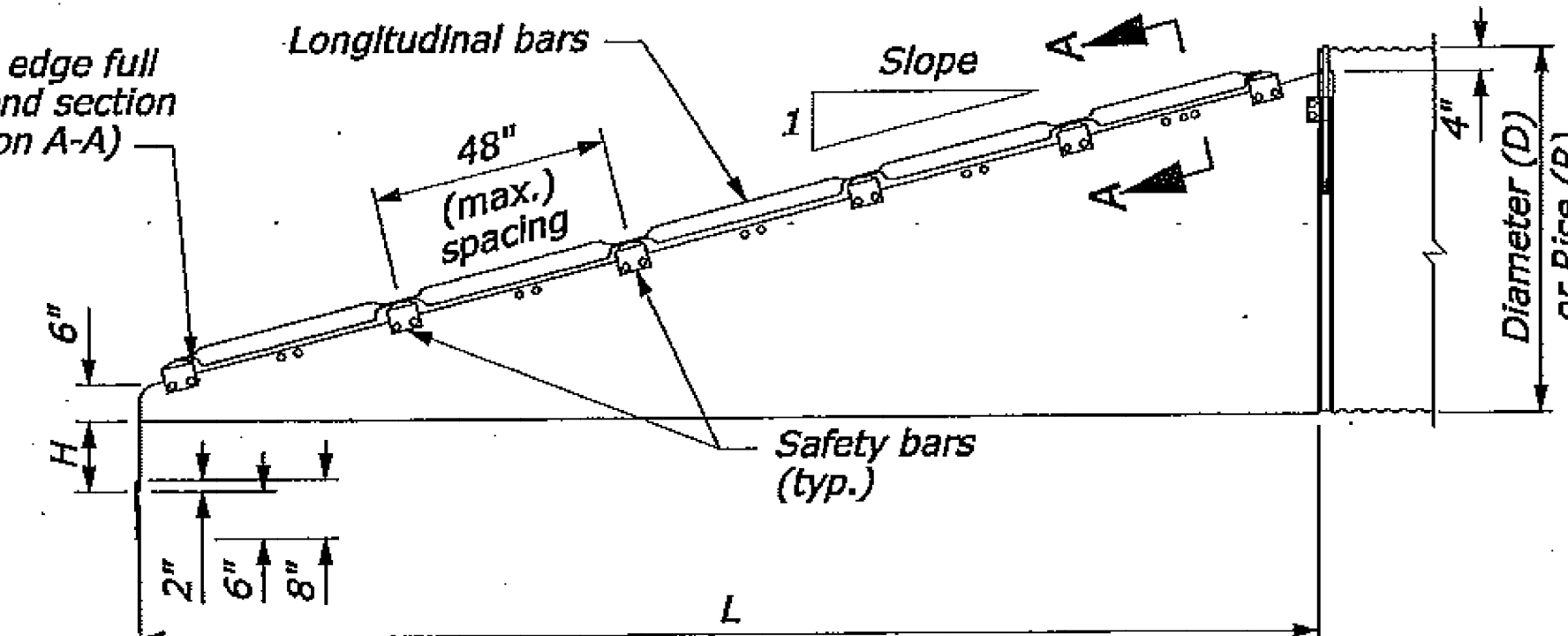
USDOT FED STD 3 END  
SECTION DETAIL 1

Designed by: JEB	Date: 11/21
Drawn by: ERG	Date: 11/21
Checked by: ASF	Date: 11/21
File Name: C-NMDOT-STD N12.DWG	

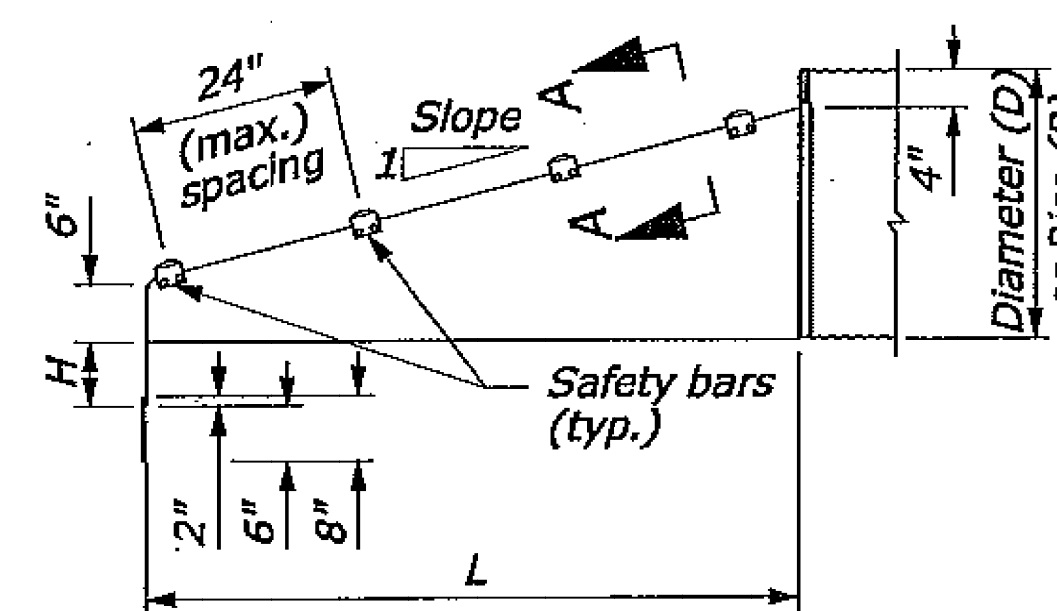




**FRONT VIEW  
ROUND PIPE CULVERT**

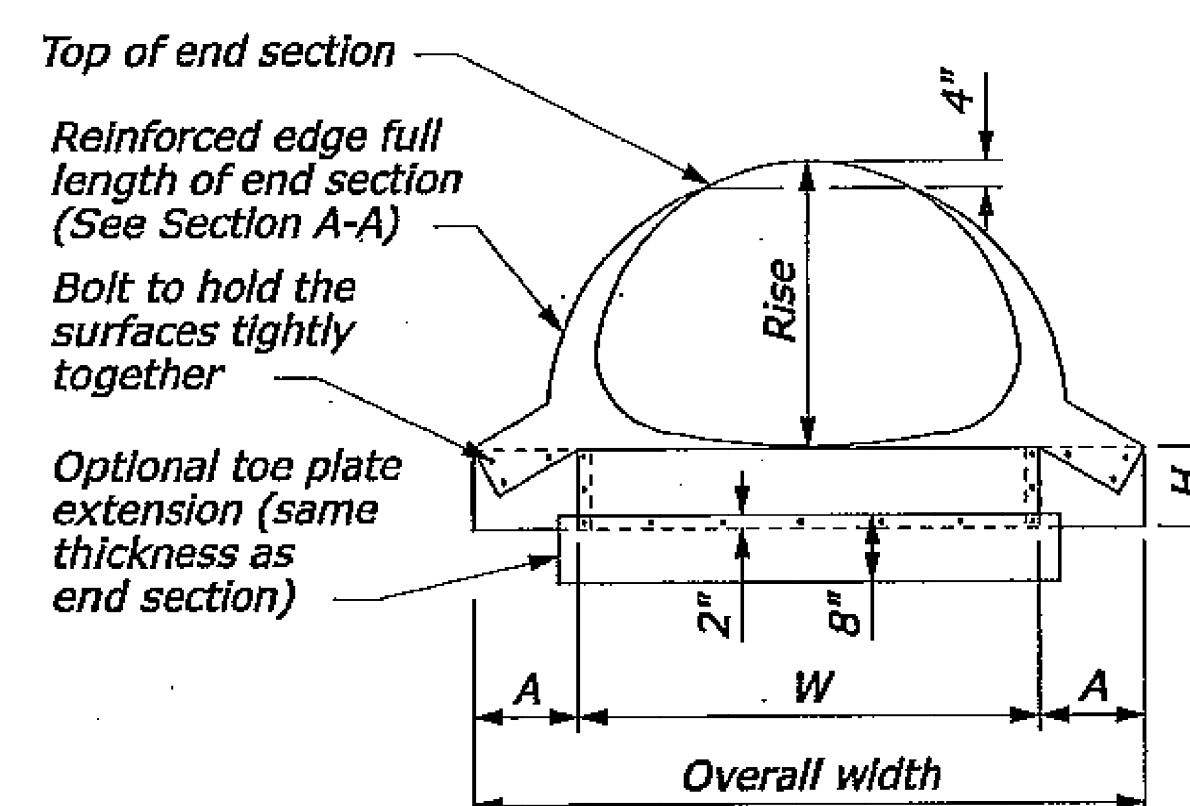


**ELEVATION  
CROSS DRAINAGE END SECTION**

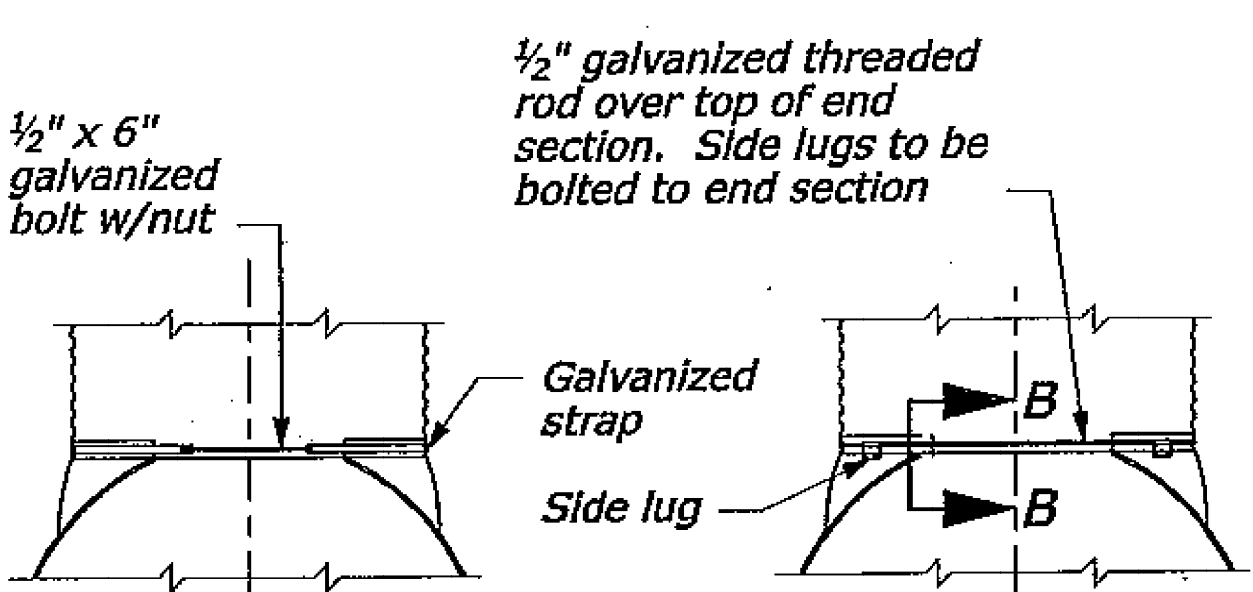


**ELEVATION  
PARALLEL DRAINAGE END SECTION**

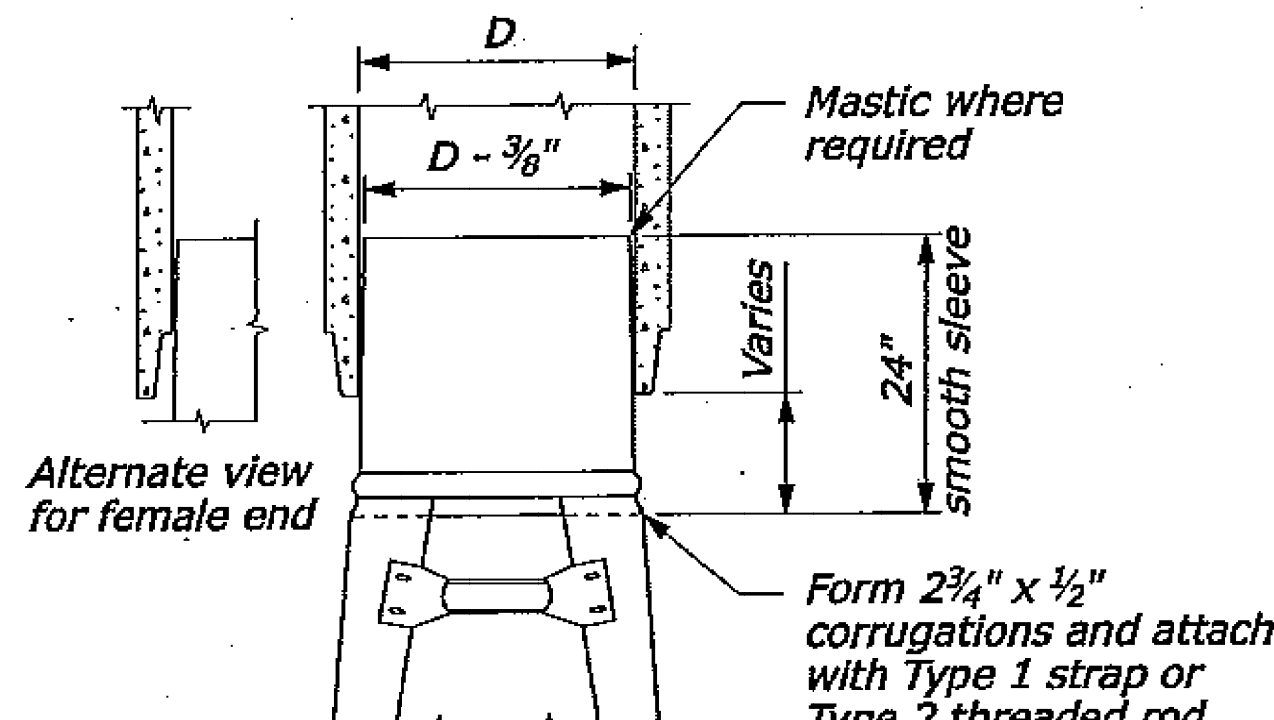
- NOTE:**
1. Use end sections on 1V:4H to 1V:6H slopes only. Use toe plate extension where shown on the plans.
  2. Fabricate safety and longitudinal bars from steel pipe conforming to ASTM A53 schedule 40 specifications. Galvanize bars hot dipped after fabrication.
  3. A longitudinal bar is required for cross drainage end sections when the span is greater than 30". Use additional longitudinal bars if spacing exceeds 30" on larger end sections.
  4. Safety and longitudinal bars are not required on 30" and smaller cross drainage end sections.
  5. Safety bars are not required on 18" and smaller parallel drainage end sections.
  6. 18" diameter sleeves have a thickness of 0.079", all others are 0.109".



**FRONT VIEW  
PIPE ARCH CULVERT**



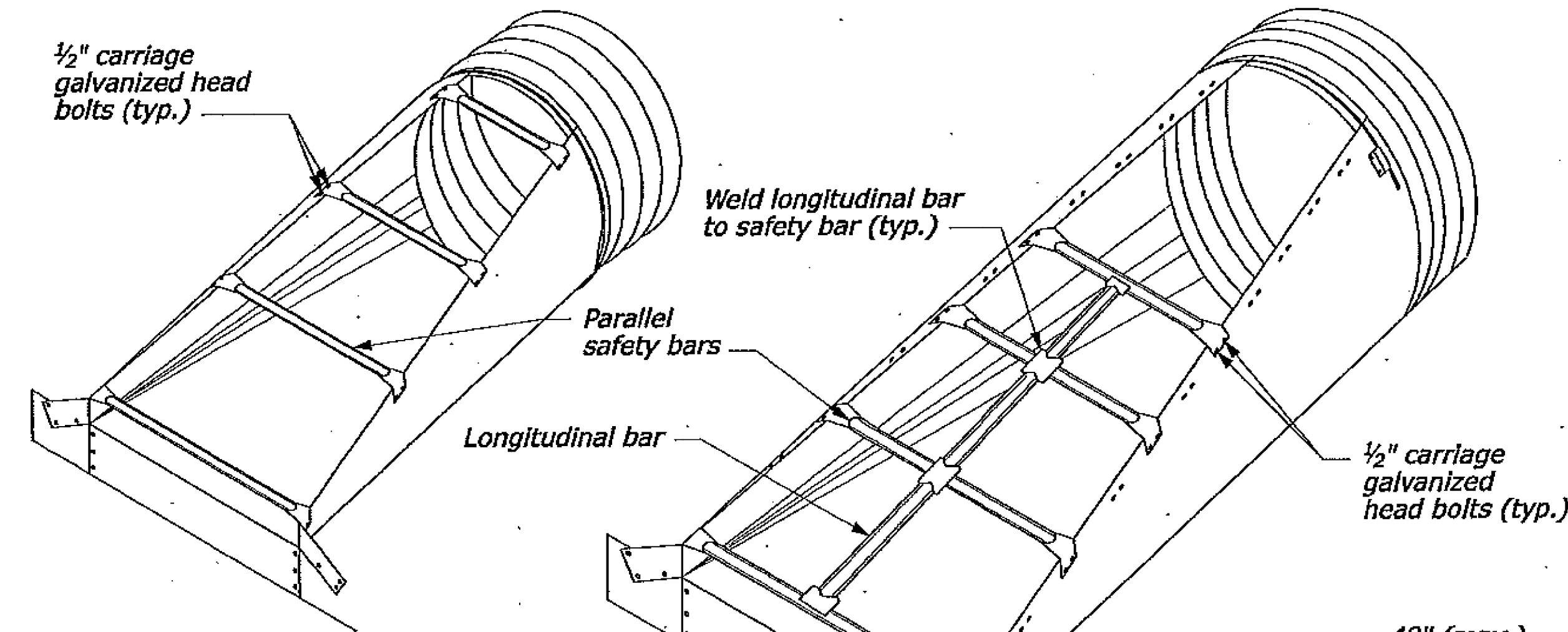
**CONNECTOR DETAILS**  
TYPE #1 FOR METAL ROUND PIPES 15" THRU 24"  
TYPE #2 FOR METAL ROUND PIPES 30" AND LARGER. FOR PIPE ARCHES 21" X 15" AND LARGER



**TYPE #3**  
FOR ALL SIZES OF CONCRETE ROUND OR PIPE ARCHES

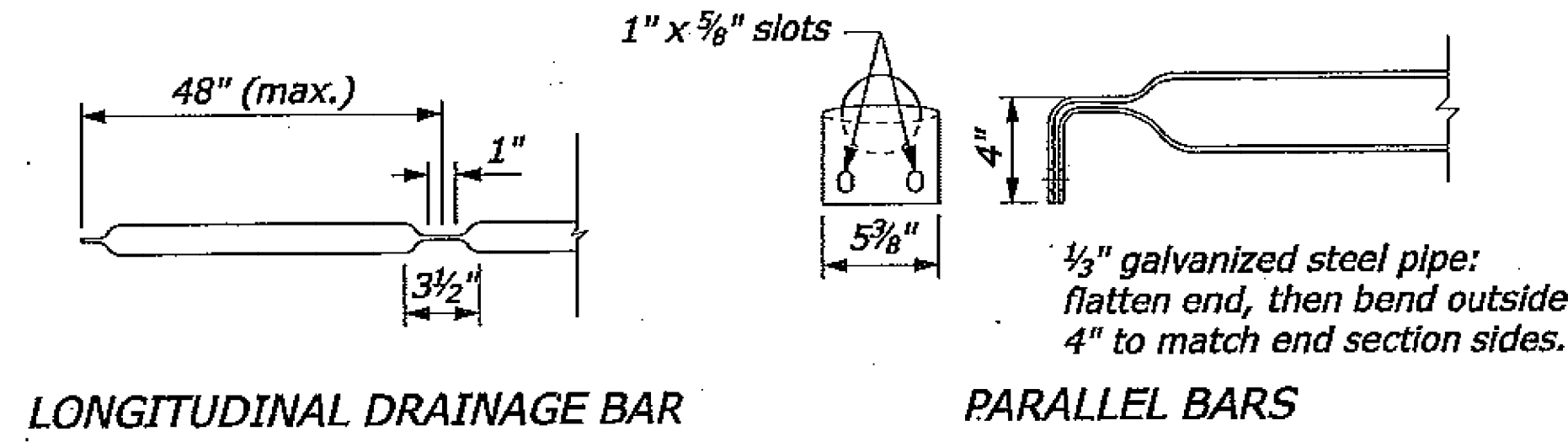
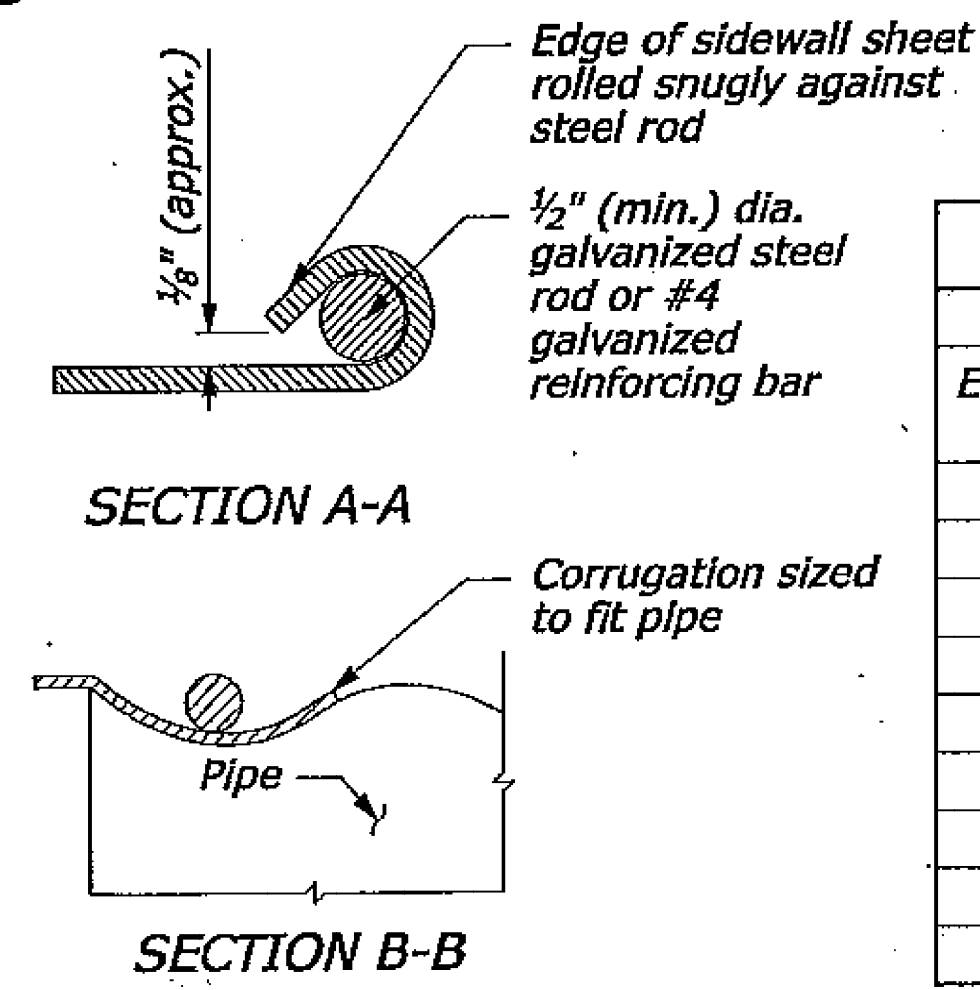
**METAL END SECTIONS FOR ROUND PIPE CULVERT**

PIPE SIZE Ø INCHES	METAL THICK (MIN.) INCH/GAGE	DIMENSIONS IN INCHES				
		A	H	W	OVERALL WIDTH	L Slope=4    Slope=6
18	0.064/16	8	6	24	40	32    47
24	0.064/16	8	6	30	46	55    83
30	0.109/12	12	9	36	60	79    118
36	0.109/12	12	9	42	66	102    154
42	0.109/12	16	12	48	80	126    189
48	0.109/12	16	12	54	86	150    224
54	0.109/12	16	12	60	92	173    260
60	0.109/12	16	12	66	98	197    295



**PARALLEL DRAINAGE  
END SECTION**

**CROSS DRAINAGE END SECTION**



**SAFETY BAR DETAILS**

**METAL END SECTIONS FOR PIPE ARCH CULVERT**

PIPE SIZE (INCHES)	EQUIV. Ø	SPAN	RISE	METAL THICK (MIN.) INCH/GAGE	DIMENSIONS (INCHES)				
					A	H	W	OVERALL WIDTH	L Slope=4    Slope=6
18	21	15	0.064/16	8	6	27	43	20	30
24	28	20	0.064/16	8	6	33	49	40	60
30	35	24	0.109/12	12	9	40	64	55	83
36	41	29	0.109/12	12	9	47	71	75	112
42	48	32	0.109/12	16	12	54	86	90	136
48	56	37	0.109/12	16	12	62	94	110	165
54	63	42	0.109/12	16	12	69	101	130	195
60	70	46	0.109/12	16	12	76	107	146	218
72	82	56	0.109/12	16	12	88	120	185	278



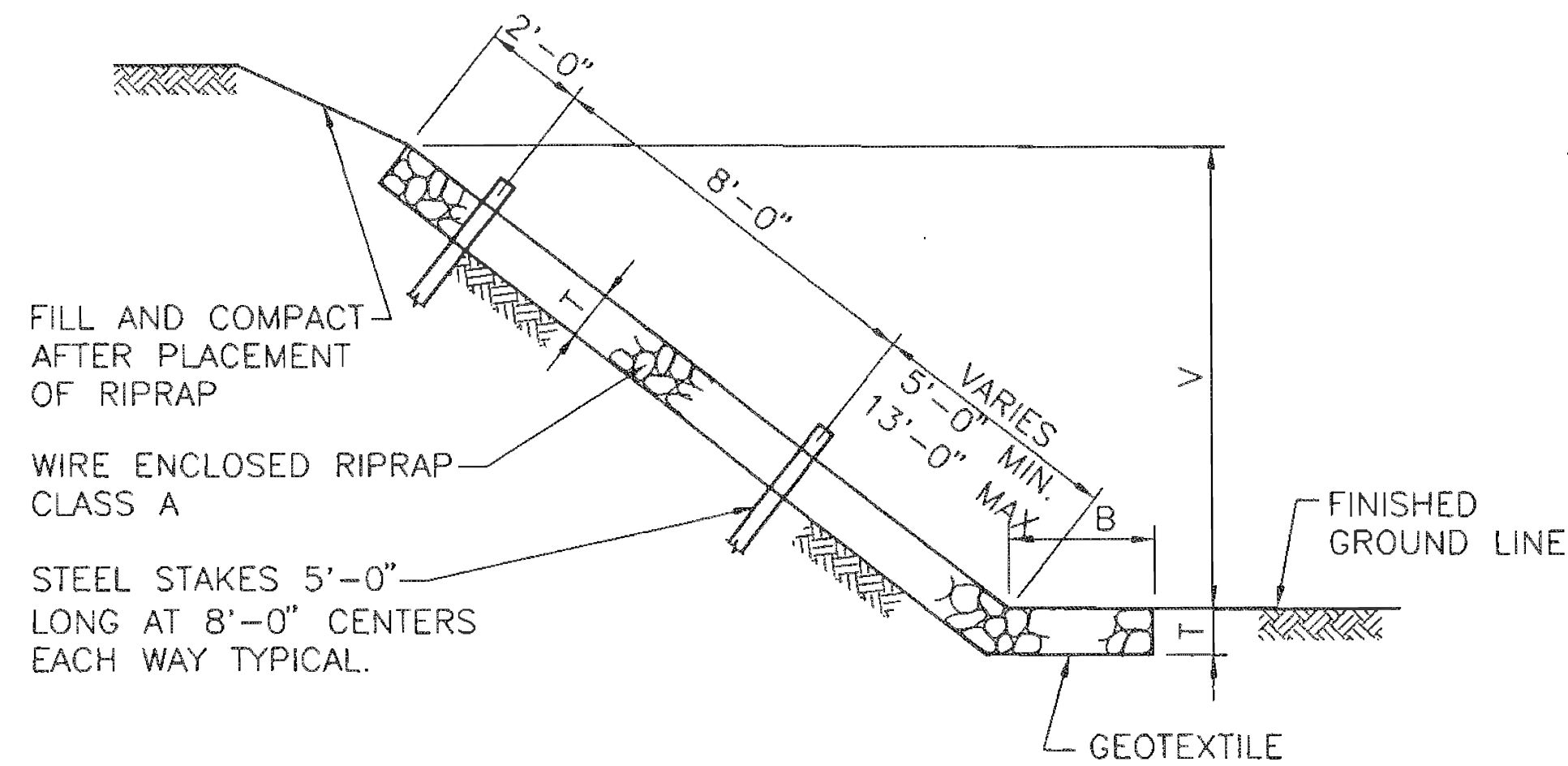
NAVAJO DIVISION OF TRANSPORTATION

USDOT FED STD 5 END SECTION  
DETAIL 2

Designed by: JEB	Date: 11/21
Drawn by: ERG	Date: 11/21
Checked by: ASF	Date: 11/21
File Name: c-nmdot-std N12.dwg	

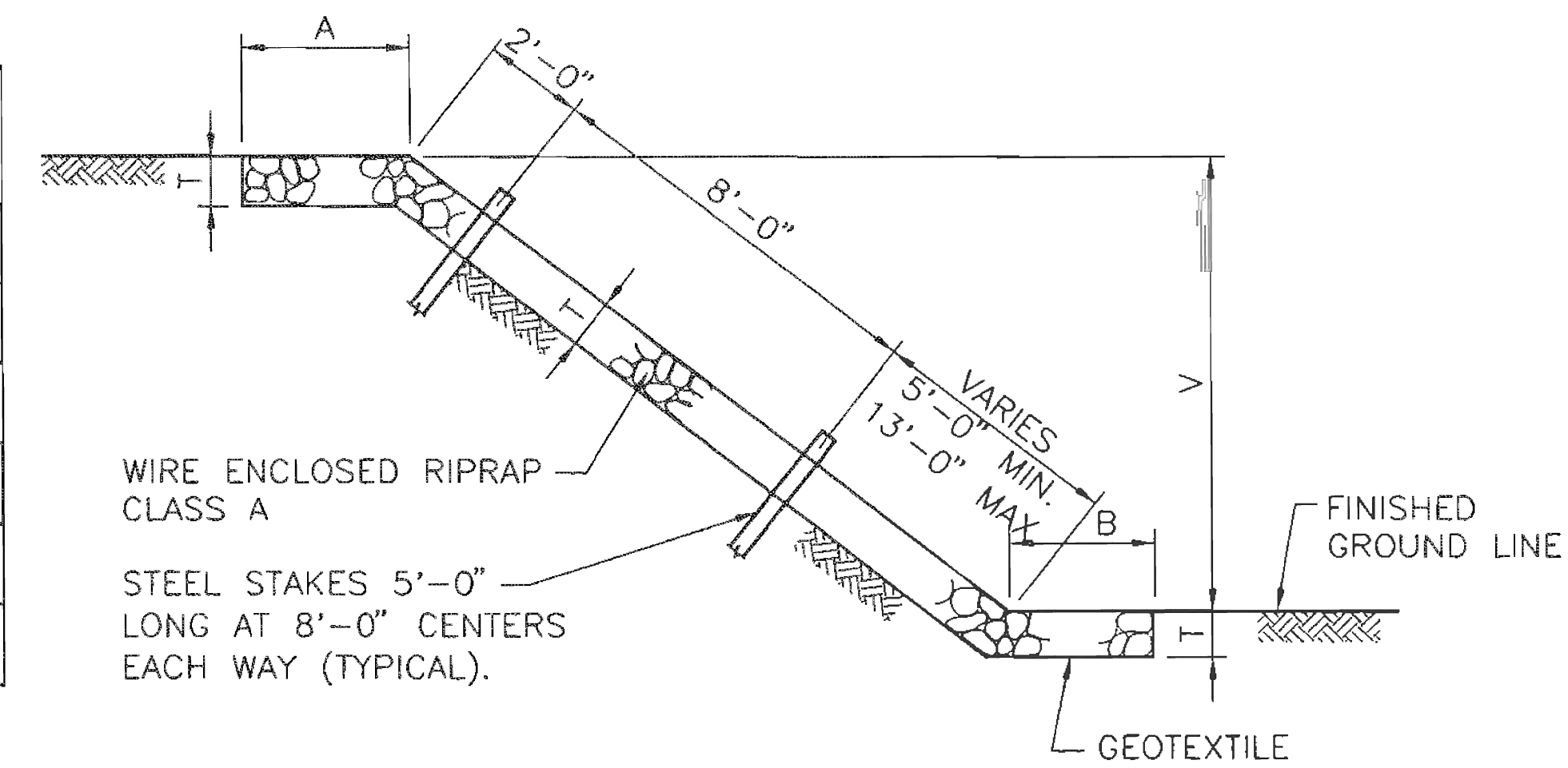
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2/26/2025 1:07 AM

NO SCALE



**SECTION TYPE I**

QUANTITIES PER LINEAR FOOT	
SLOPE	RIPRAP (CU. YDS.)
1.5 : 1	$\frac{T}{27} (B + 1.803 V + 0.303 T)$
1.75 : 1	$\frac{T}{27} (B + 2.016 V + 0.266 T)$
2 : 1	$\frac{T}{27} (B + 2.236 V + 0.236 T)$
3 : 1	$\frac{T}{27} (B + 3.162 V + 0.162 T)$
4 : 1	$\frac{T}{27} (B + 4.123 V + 0.123 T)$

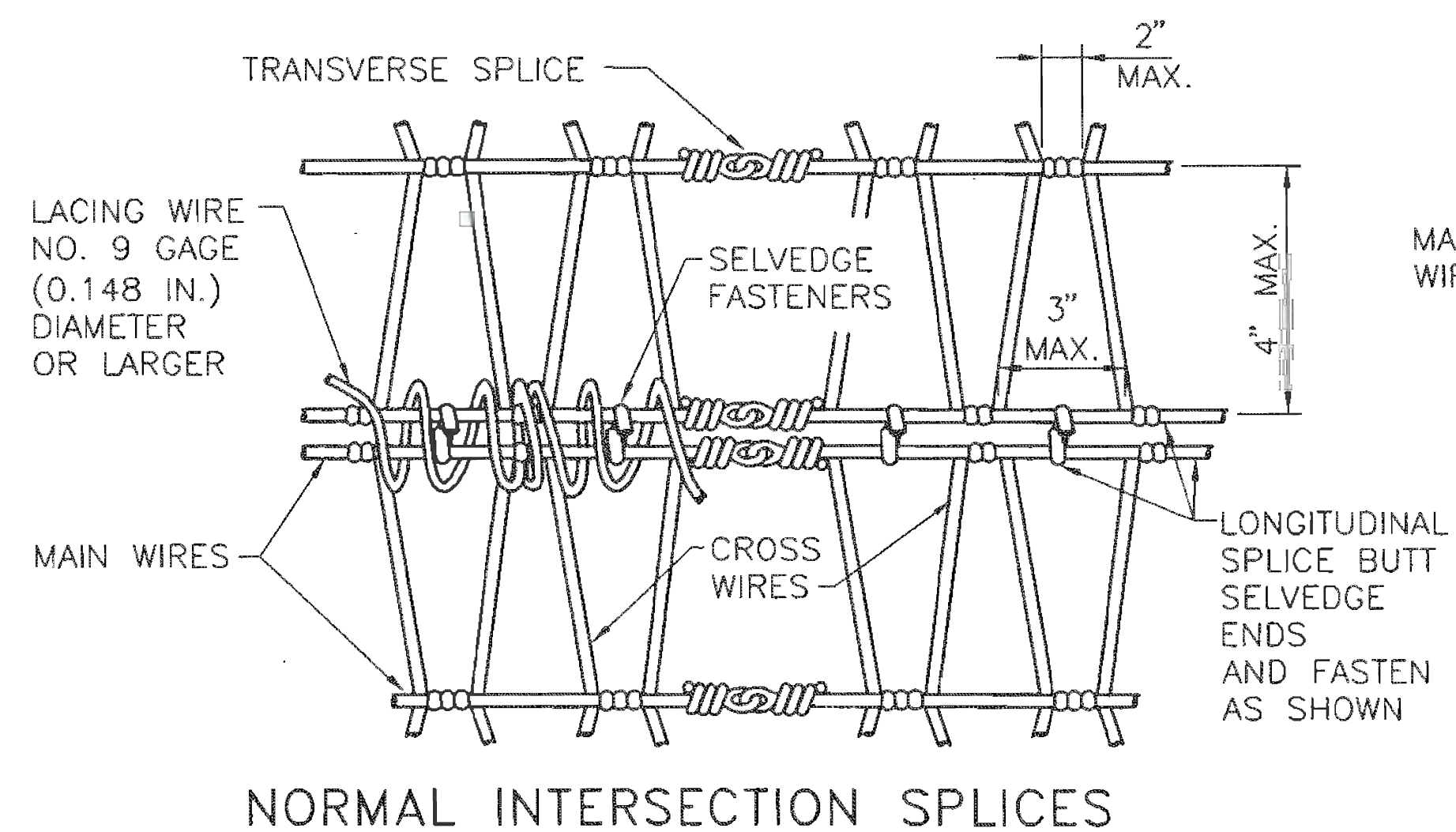


**SECTION TYPE II**

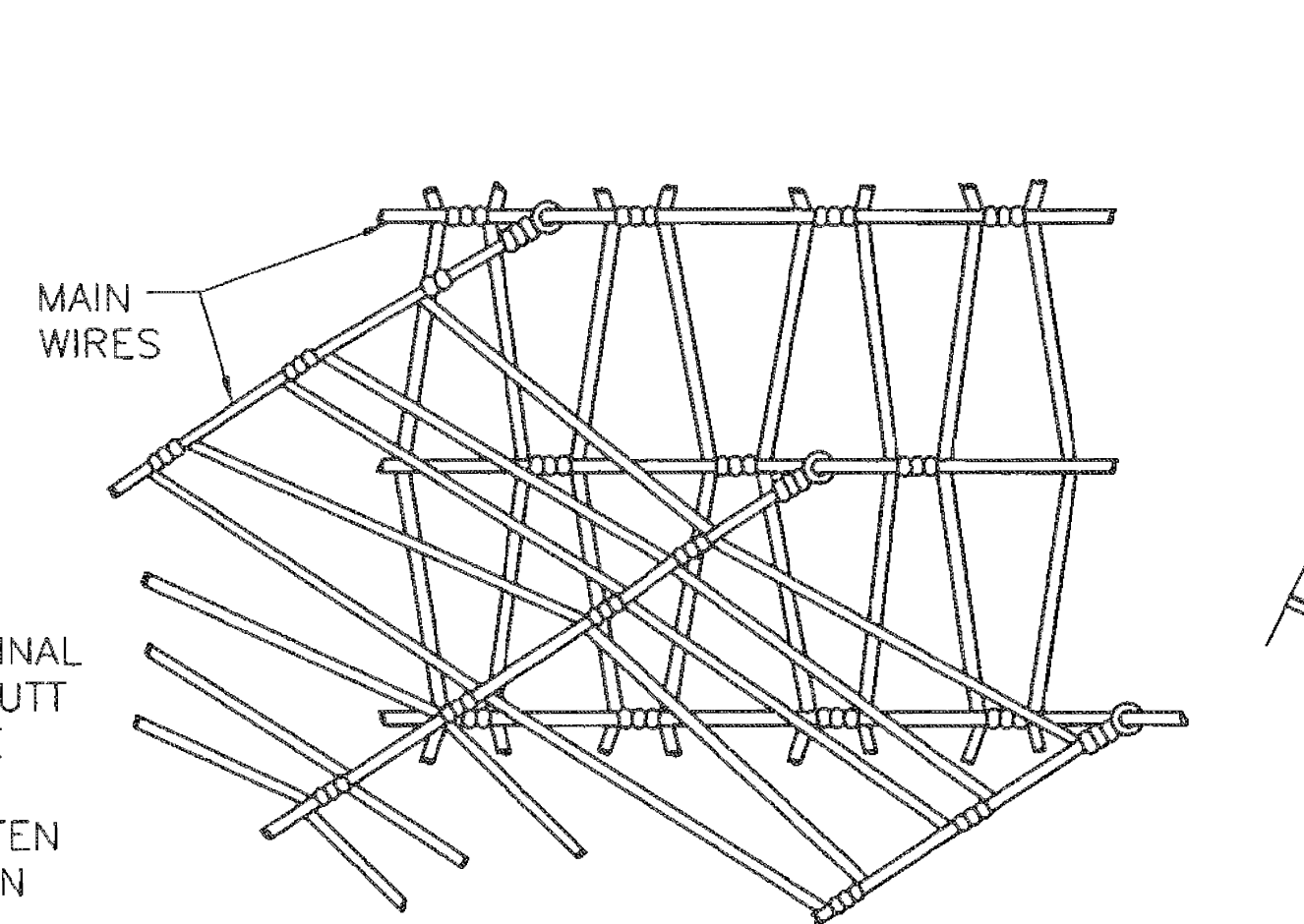
QUANTITIES PER LINEAR FOOT	
SLOPE	RIPRAP (CU. YDS.)
1 : 1	$\frac{T}{27} (A + B + 1.414V)$
1.5 : 1	$\frac{T}{27} (A + B + 1.803V)$
1.75 : 1	$\frac{T}{27} (A + B + 2.016V)$
2 : 1	$\frac{T}{27} (A + B + 2.236V)$
3 : 1	$\frac{T}{27} (A + B + 3.162V)$
4 : 1	$\frac{T}{27} (A + B + 4.123V)$

**GENERAL NOTES**

1. WIRE FABRIC FOR RIP RAP SHALL BE "W" OR HEXAGONAL MESH AND MEET THE REQUIREMENTS LISTED IN SECTION 602 OF THE NMDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, CURRENT EDITION.
2. STEEL STAKES MAY BE RAILROAD RAILS WEIGHING NOT LESS THAN 30 LBS. PER YARD, 4" NOMINAL DIAMETER STANDARD STRENGTH GALVANIZED STEEL PIPE, OR L 4" x 4" x 3/8" STEEL ANGLES. STEEL STAKES SHALL PROJECT 6" ABOVE TOP OF RIPRAP. STEEL STAKES ARE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE WORK AND NO DIRECT MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE.
3. IF LENGTH OF SLOPE IS 15 FEET OR LESS, ONLY ONE ROW OF STEEL STAKES 2 FEET FROM THE TOP EDGE OF RIPRAP WILL BE REQUIRED UNLESS OTHERWISE NOTED ON PLANS.
4. FOR DIMENSIONS A, B, V, & T. SEE BRIDGE OR ROADWAY PLANS.
5. T=12" UNLESS OTHERWISE SHOWN ON PLANS; T=18" AT BRIDGES.
6. FASTENERS FOR SPLICES AND/OR SELVEDGE END CONNECTORS MAY BE WIRE TIES, INTERLOCKING WIRE CLIPS, HOG RINGS, OR LACING WIRE. ONLY FASTENERS WHICH APPEAR ON THE DEPARTMENT'S "APPROVED PRODUCTS LIST" MAY BE USED.
7. LACING SHALL BE CONTINUOUS AS FAR AS IS PRACTICAL AND SHALL PASS THROUGH EACH MESH OPENING.
8. WHERE SPLICING IS NECESSARY, AN OVERLAP OF LACING OF AT LEAST 1 FOOT SHALL BE PROVIDED.



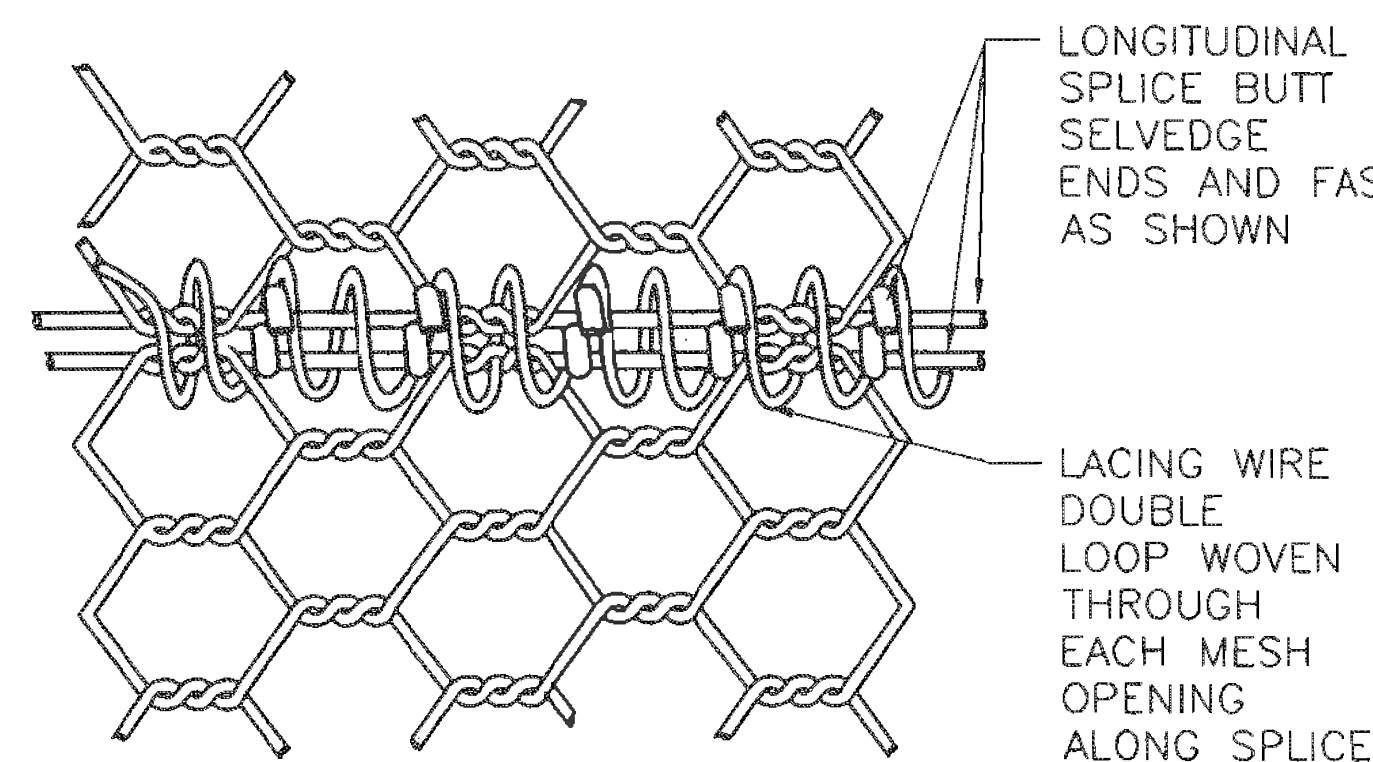
**NORMAL INTERSECTION SPLICES**



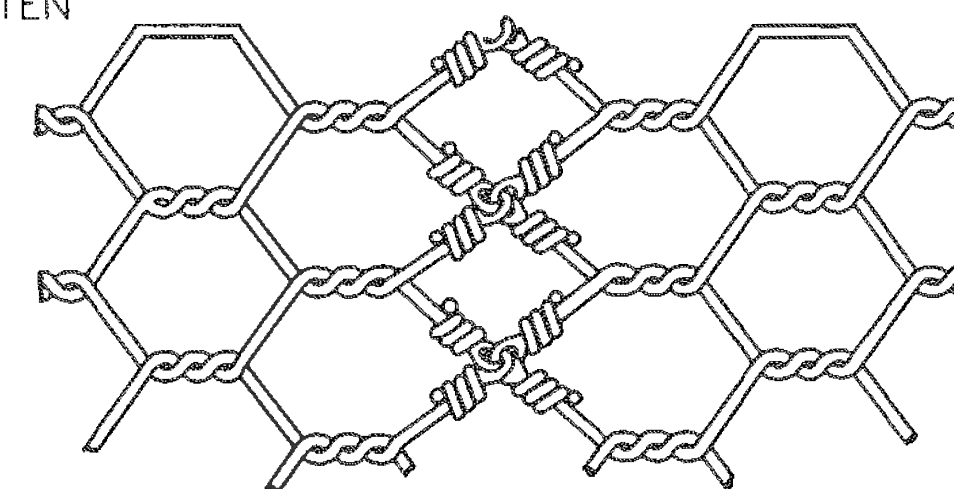
**SKEWED INTERSECTION SPLICE**

**"W" MESH**

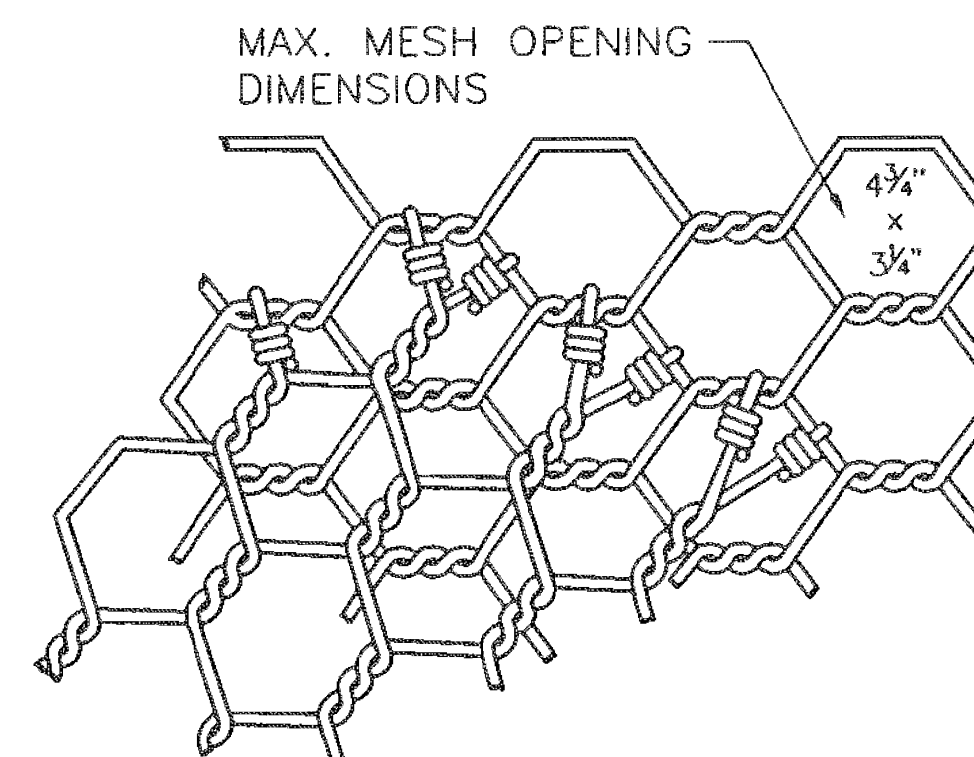
**TYPICAL SECTION**



**NORMAL INTERSECTION SPLICE**



**TRANSVERSE SPLICE  
HEXAGONAL MESH**



**SKEWED INTERSECTION SPLICE**



NAVAJO DIVISION OF TRANSPORTATION

WIRE ENCLOSE RIPRAP CLASS A  
NMDOT 602-01

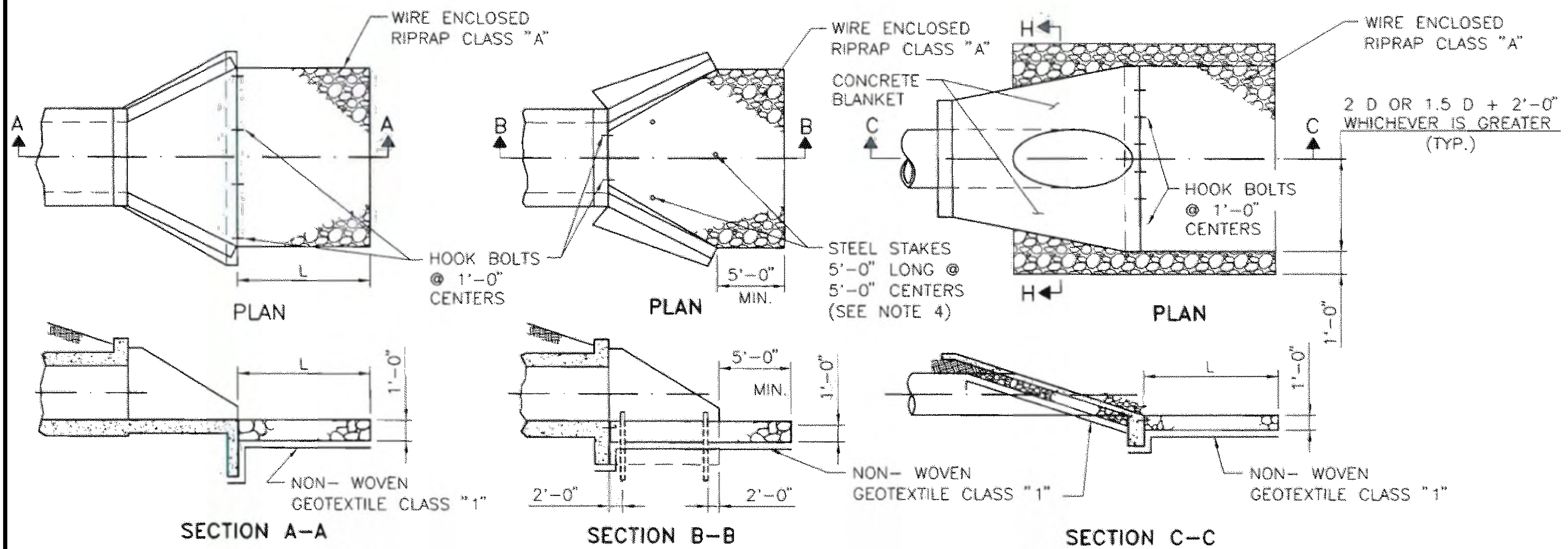
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Drawn by: ERG	Date: 11/21
Checked by: ASF	Date: 11/21
File Name: c-nmdot-std N12.dwg	



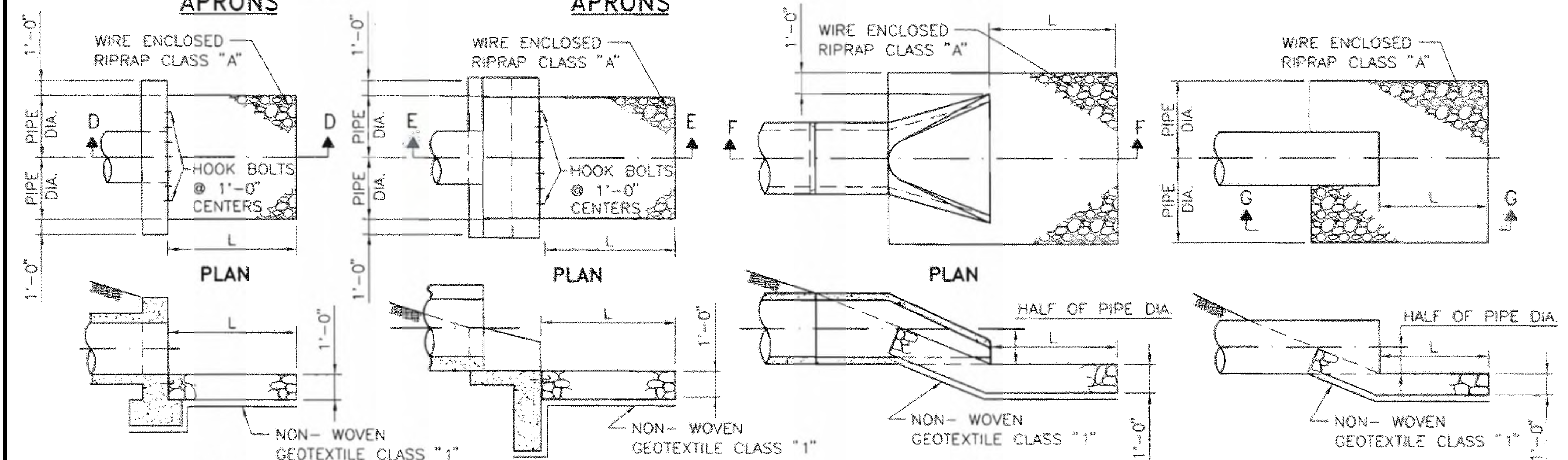
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NORTH	ARIZONA	NAVAJO	N12	N12 1,2&4		120

### GENERAL NOTES

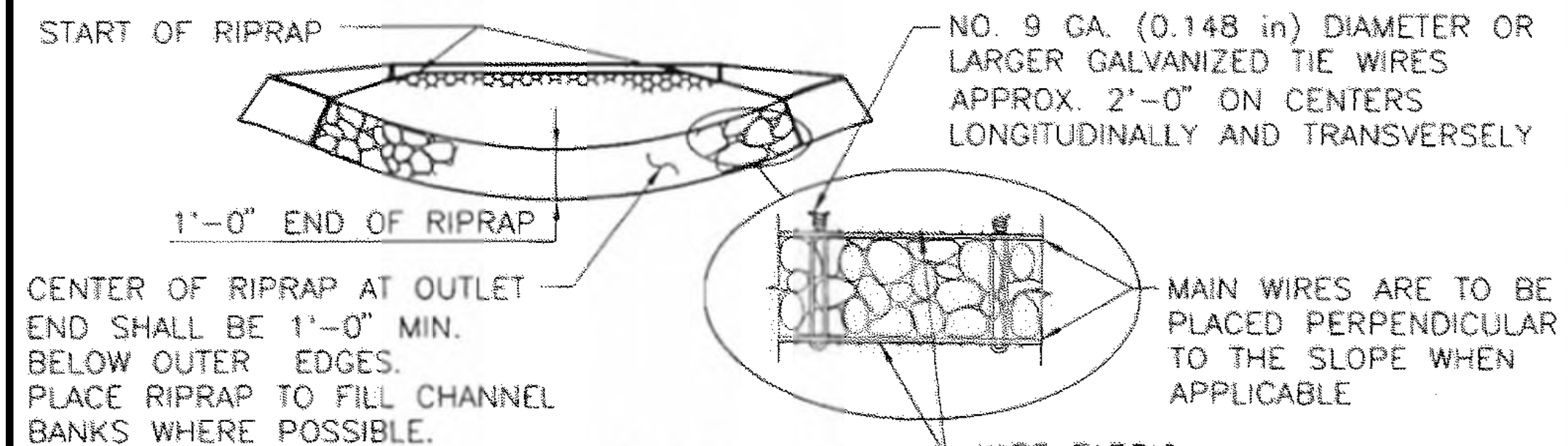
- ALL RIPRAP SHALL BE CLASS "A" UNLESS SPECIFIED OTHERWISE IN THE PLANS. DIMENSIONS OF RIPRAP CLASS "A" SHALL BE VERIFIED IN FIELD.
- RIPRAP ON THIS STANDARD IS SHOWN FOR SINGLE PIPES AND CULVERTS ONLY. FOR MULTIPLE PIPE AND CULVERT INSTALLATIONS, EXTEND RIPRAP BEYOND OUTLET OPENING AS SHOWN IN PLAN DETAILS AND PLACE RIPRAP BETWEEN OUTLET OPENINGS AS SHOWN IN ELEVATION DETAILS.
- SERIAL 602-02-1/1 MAY BE REFERENCED FOR DESCRIPTIONS OF WIRE MESH AND ALTERNATE PATTERNS.
- STEEL STAKES MAY BE RAILROAD RAILS WEIGHING NOT LESS THAN 30 LBS. PER YARD, 4" NOMINAL DIAMETER STANDARD STRENGTH GALVANIZED STEEL PIPE, OR L 4" X 4" X 3/8" STEEL ANGLES. STEEL STAKES SHALL PROJECT 6" ABOVE TOP OF RIPRAP. STEEL STAKES ARE CONSIDERED INCIDENTAL TO THE COMPLETION OF THE WORK AND NO DIRECT MEASUREMENT OR PAYMENT WILL BE MADE THEREFORE.
- CONTRACTOR MAY SUBSTITUTE CONCRETE CHEMICAL ANCHORS WITH HOOK GEOMETRY SHOWN, WHICH MEET REQUIREMENTS OF SECTION 522.
- TOE-IN OR PLACE EROSION CONTROL GEOTEXTILE UNDER FOOTINGS OR CUT-OFF WALL.
- $L$  (MIN.) = 10'-0" OR 1.5 x DIAMETER OR RISE, WHICHEVER IS GREATER.



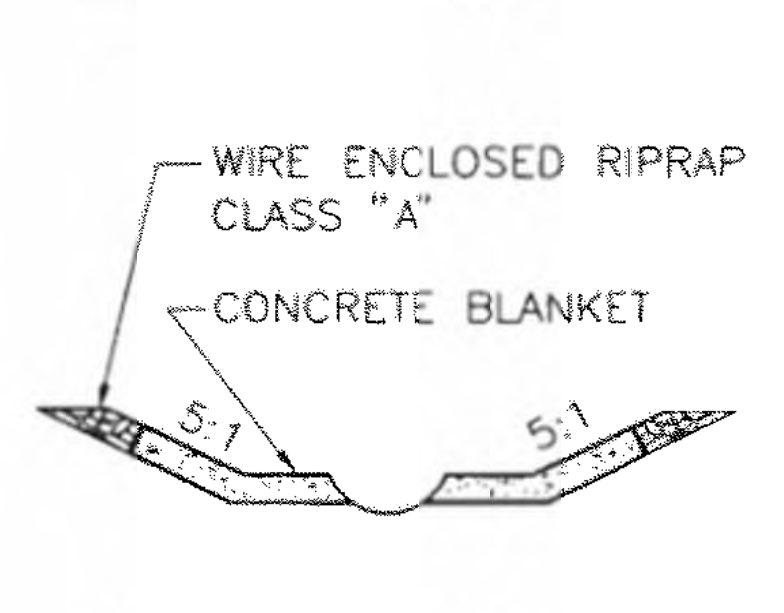
### BOX CULVERTS WITH APRONS      BOX CULVERTS WITHOUT APRONS      CONCRETE BLANKETS



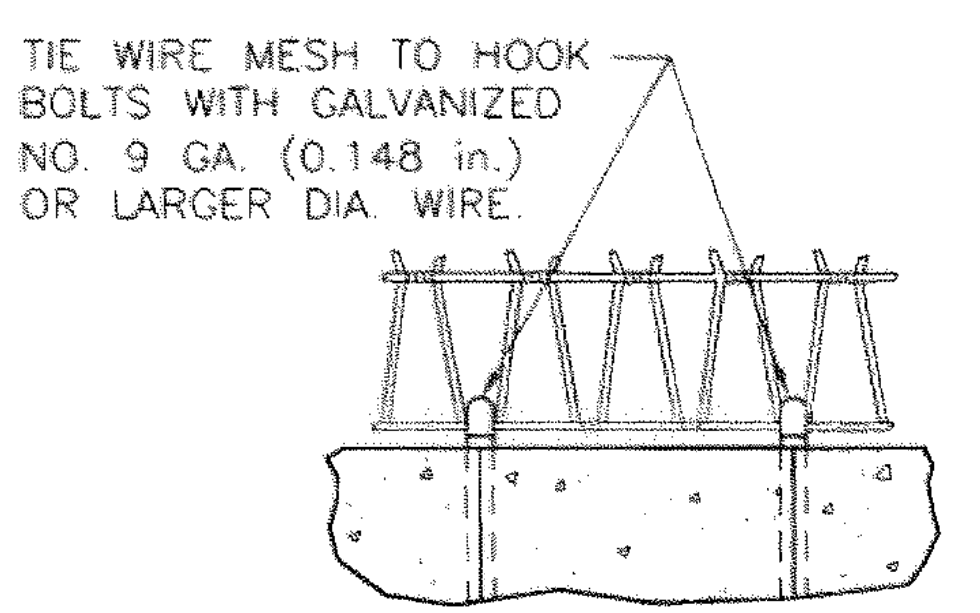
### H-1 HEADWALL      H-2 HEADWALL      PIPE WITH END SECTIONS      PIPE WITHOUT HEADWALLS



### TYPICAL SECTION AT END OF RIPRAP

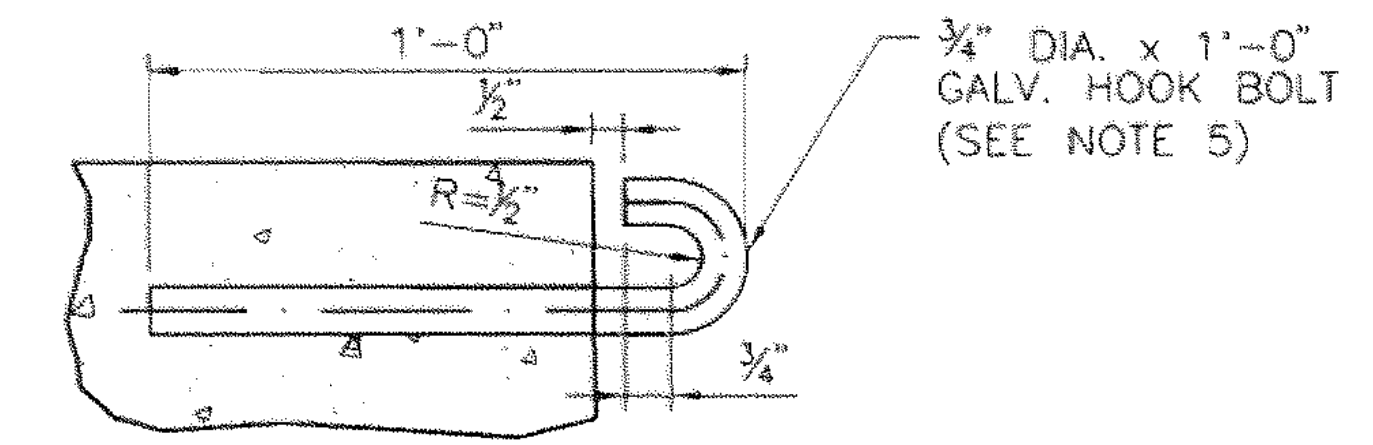


### SECTION H-H

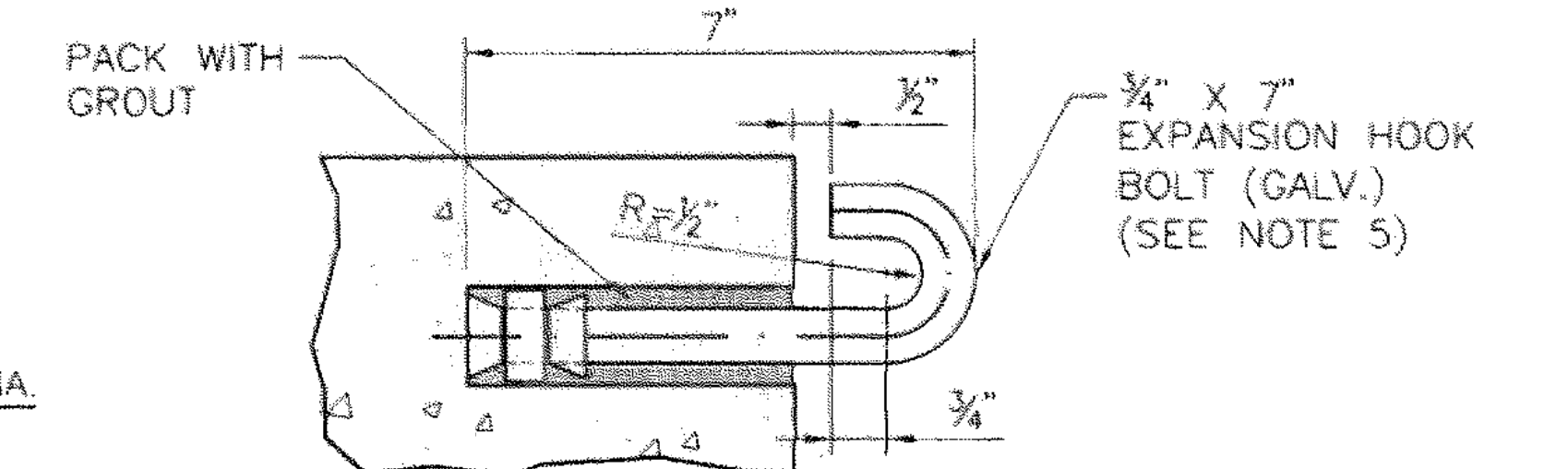


### WIRE MESH ANCHOR

NOTE: SEE SHEET 602-01-1/1 FOR WIRE MESH SPLICE DETAILS.



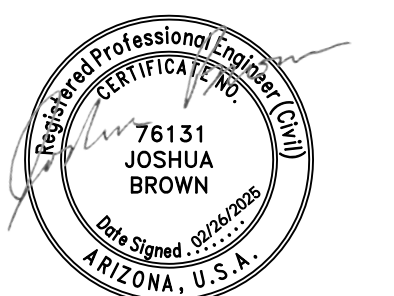
### ANCHOR TO NEW STRUCTURE



### ANCHOR TO EXISTING STRUCTURE

### HOOK BOLT DETAILS

COST OF HOOK BOLT IN PLACE TO BE INCLUDED IN UNIT BID PRICE FOR RIPRAP.



NAVAJO DIVISION OF TRANSPORTATION

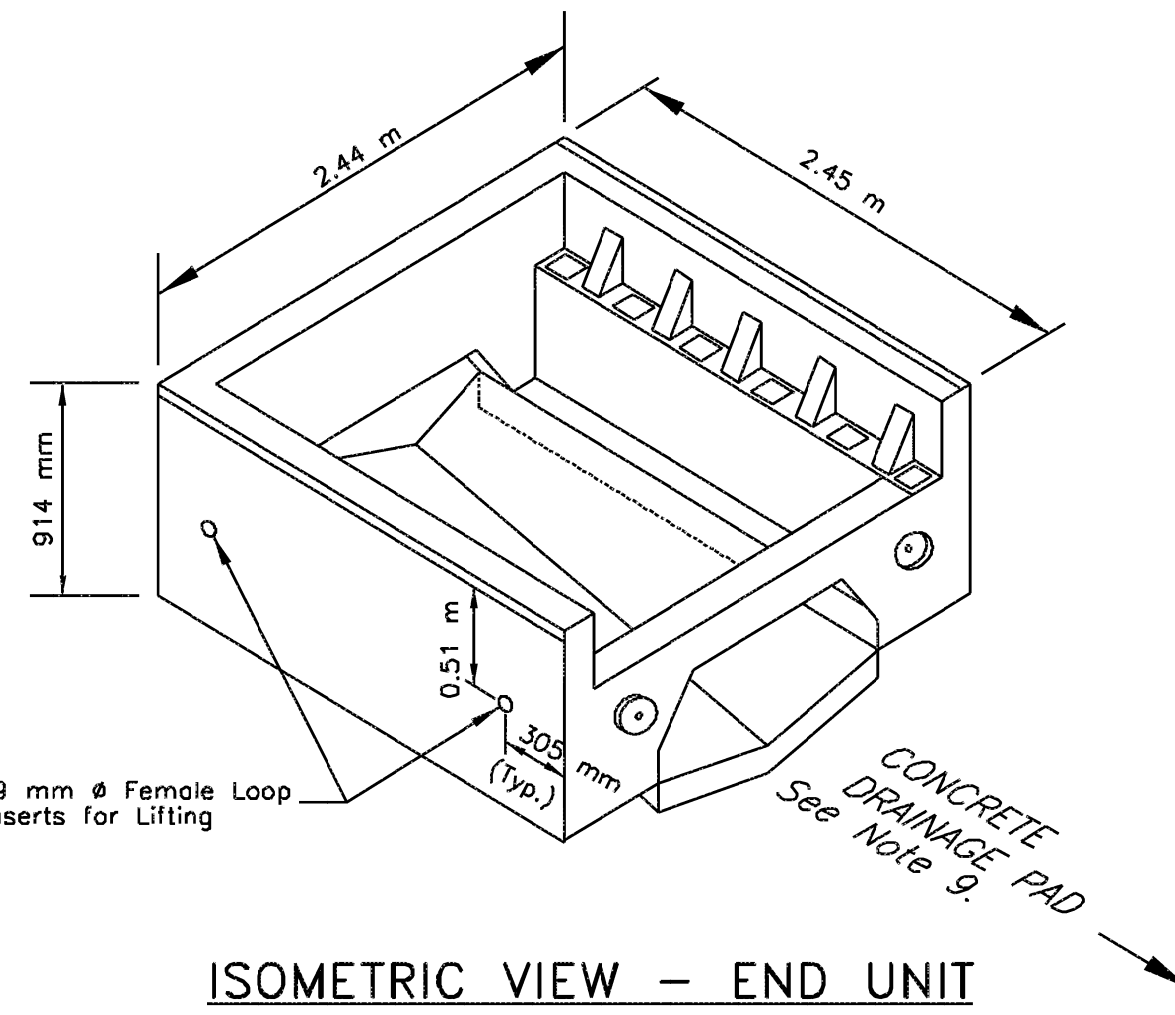
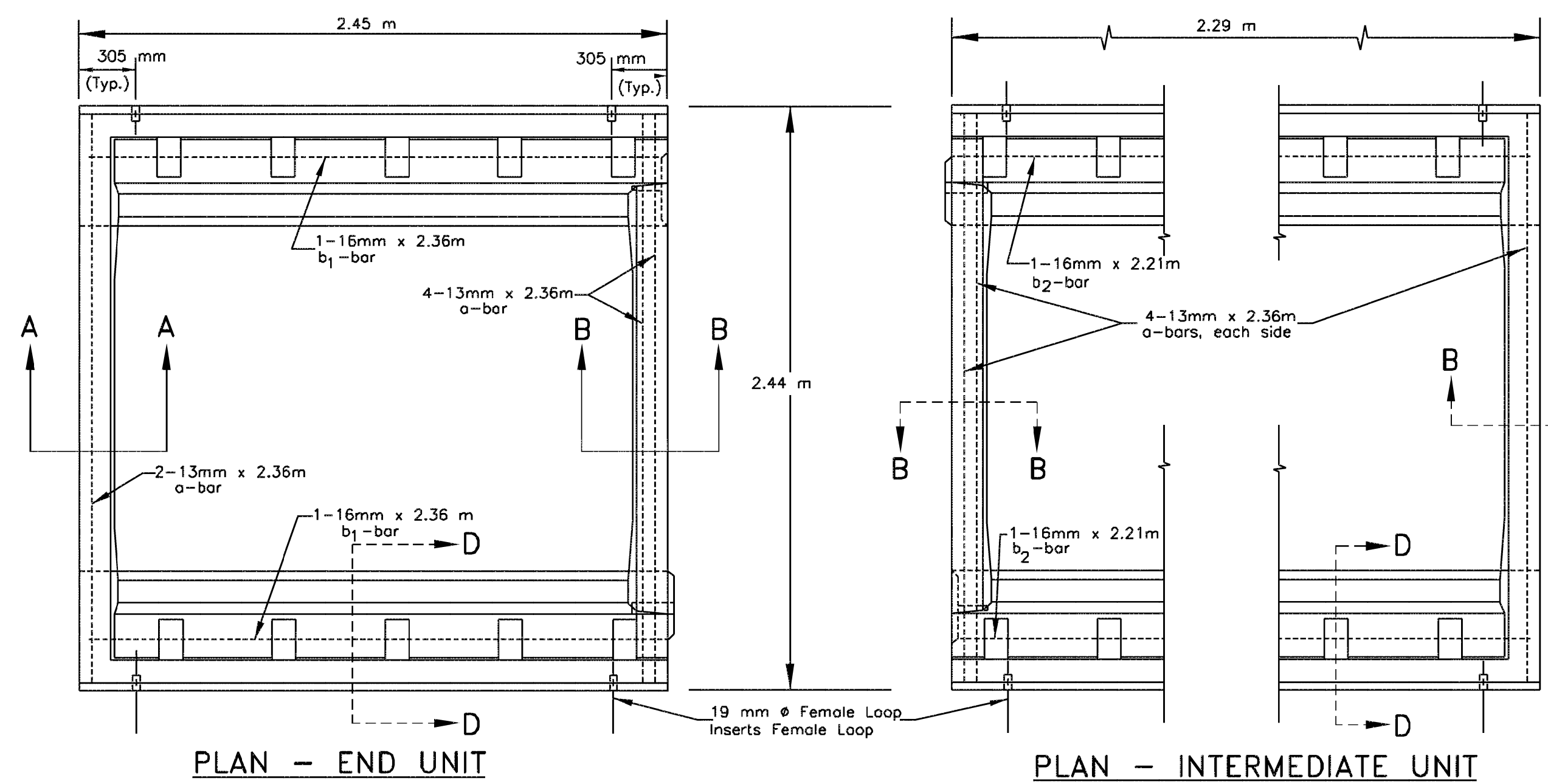
### EROSION CONTROL AT CULVERT OUTLETS NMDOT 602-02

Designed by: JEB	Date: 11/21
Drawn by: ERG	Date: 11/21
Checked by: ASF	Date: 11/21
File Name: c-nmdot-std n12.dwg	



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CONSTRUCTION PLANS APPROVED  
DATE: 09/03/2008

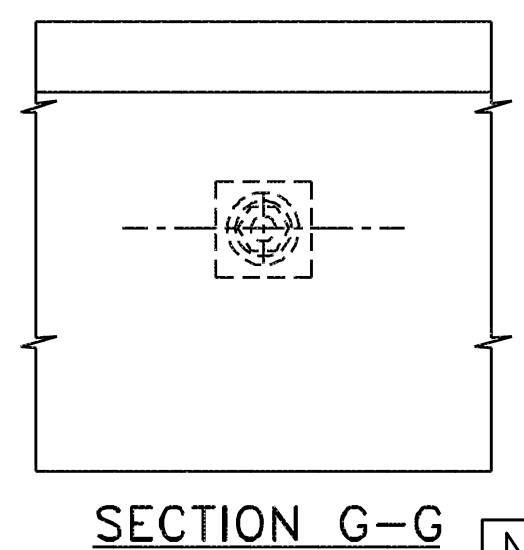
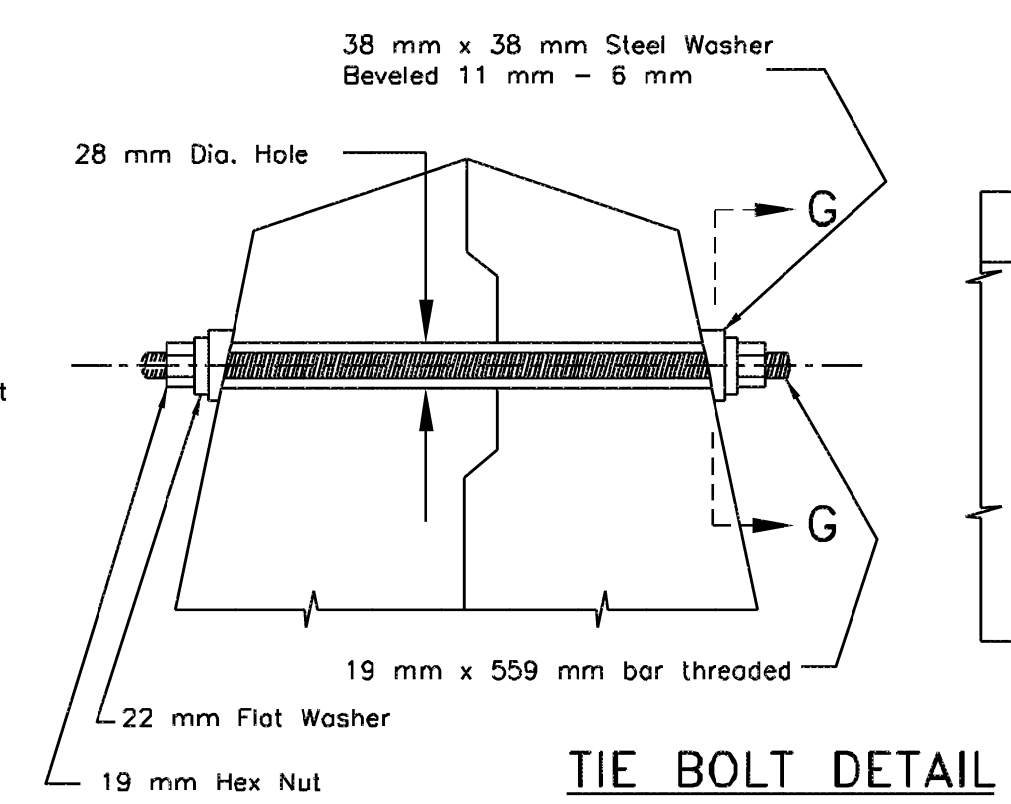
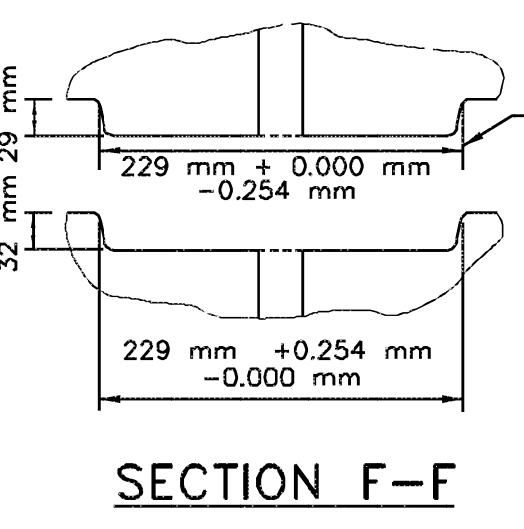
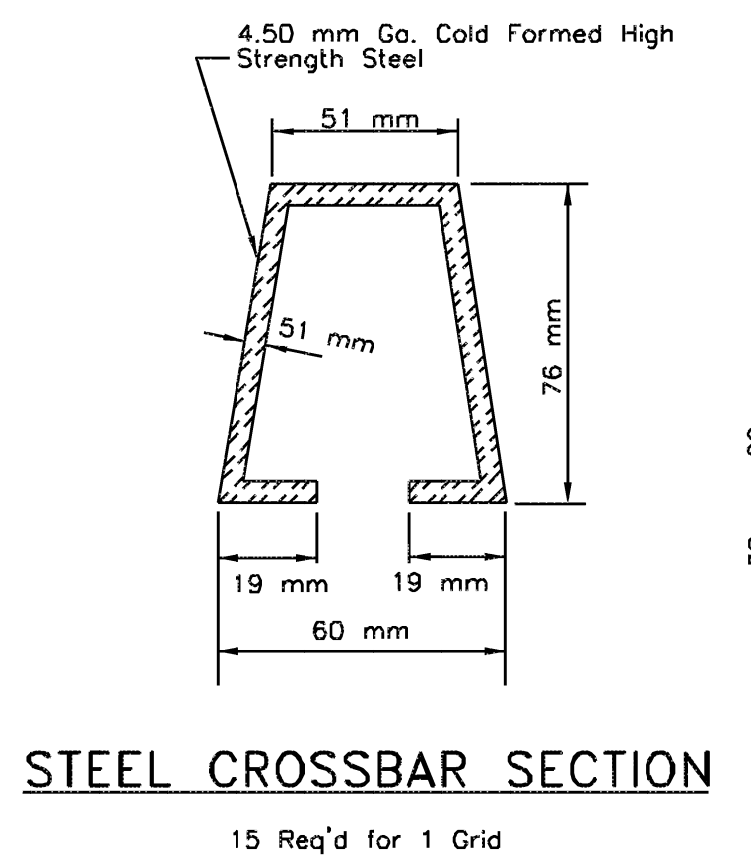
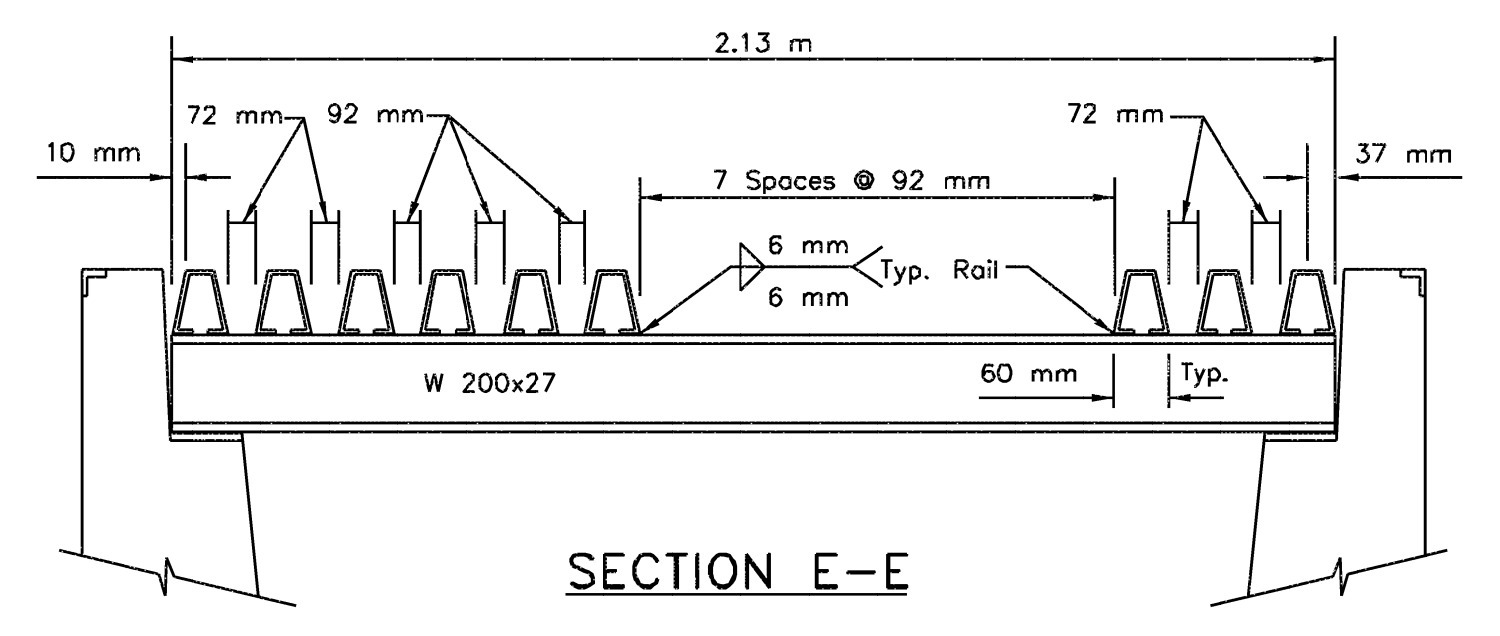
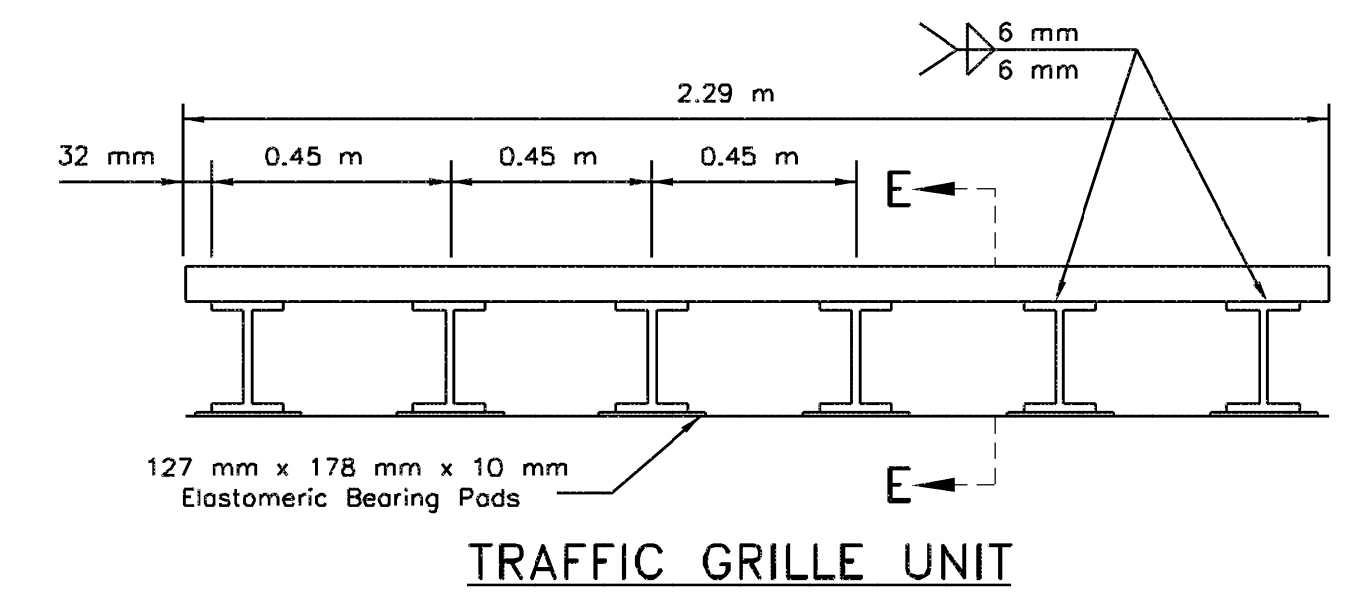
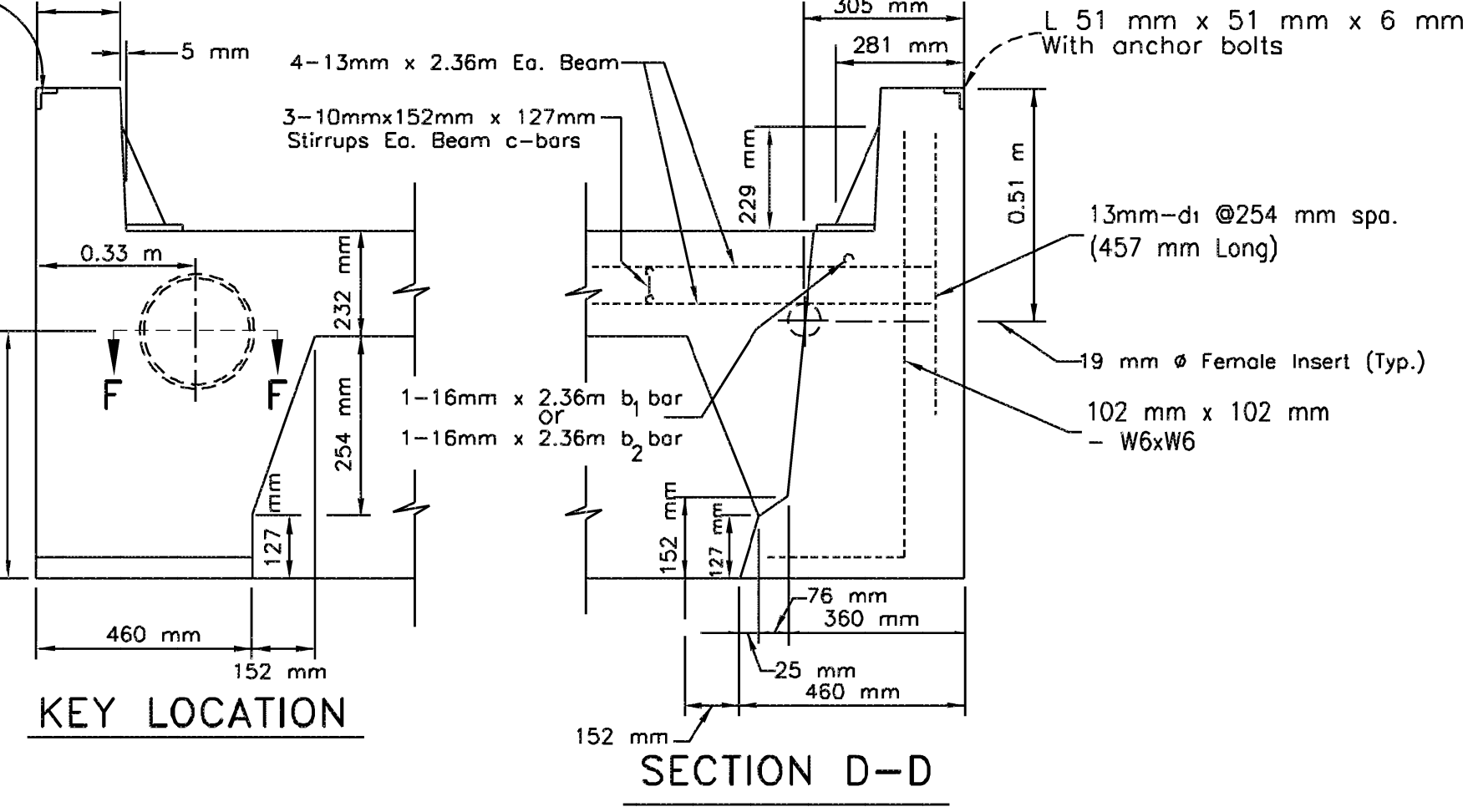
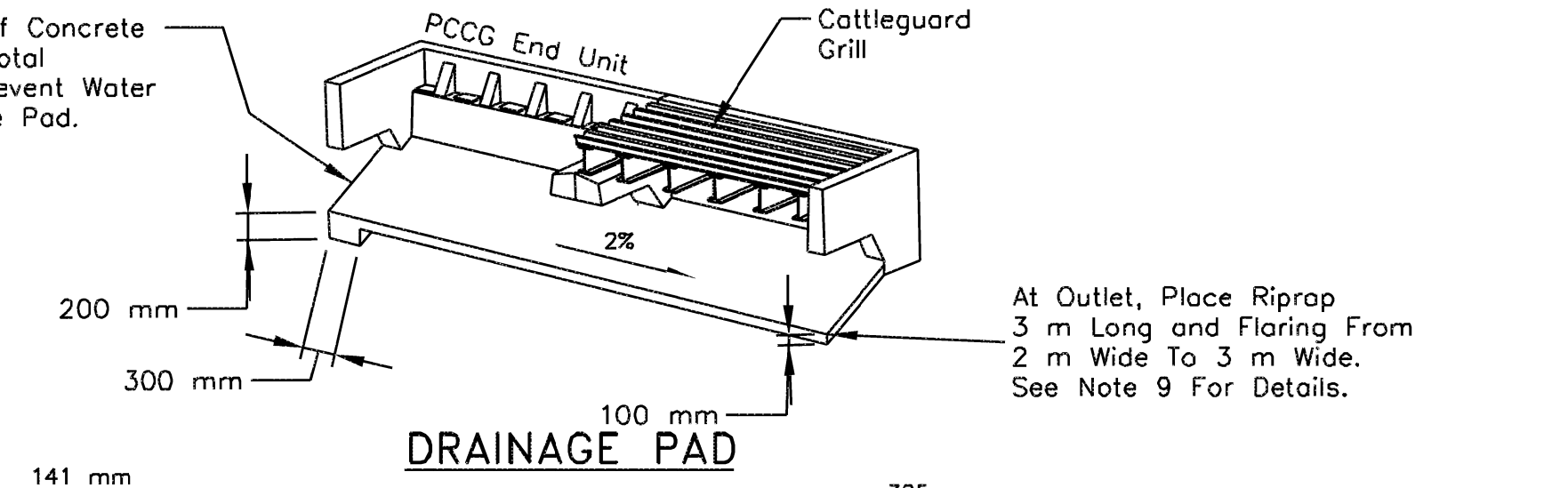
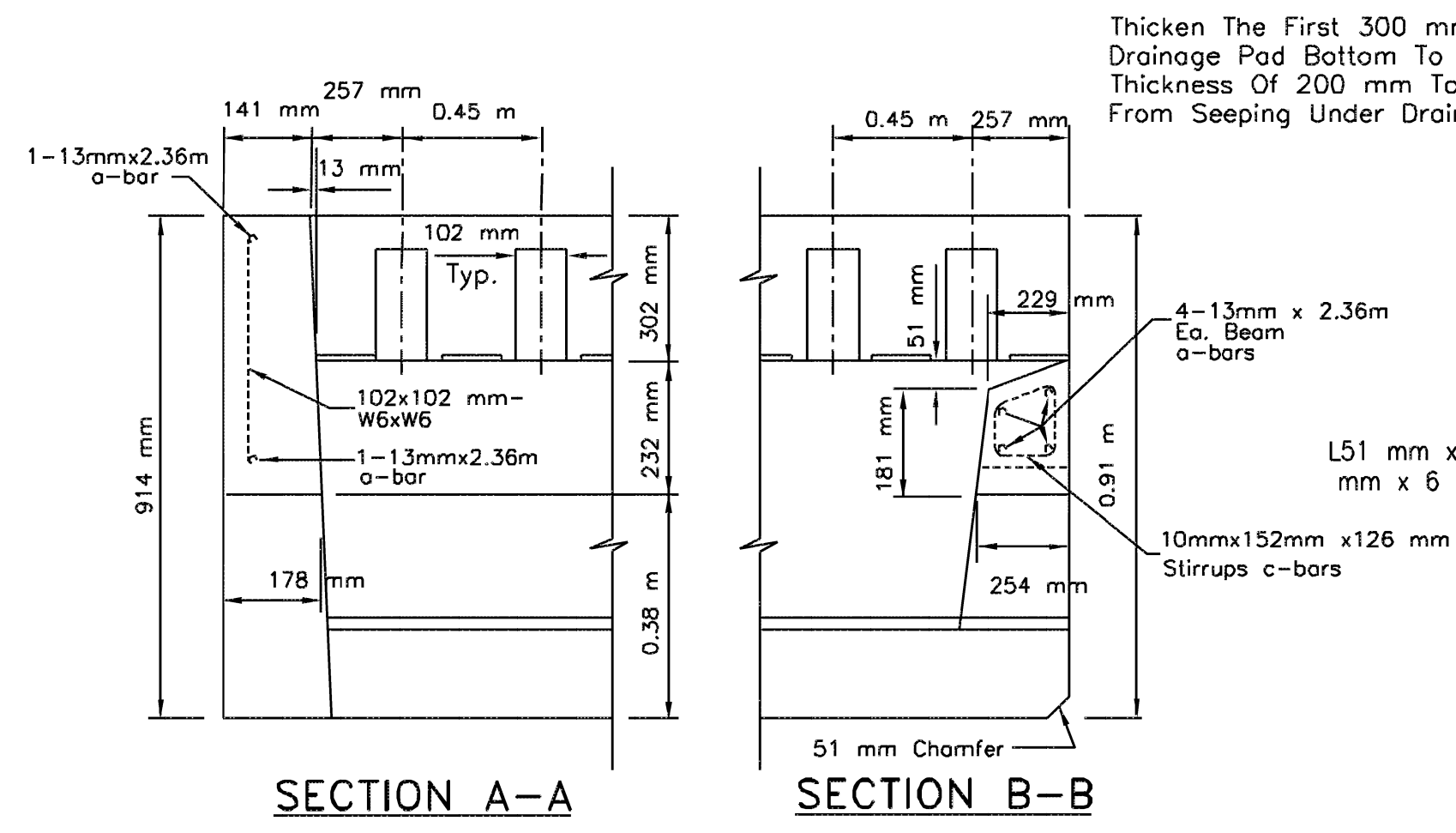


**REINFORCING STEEL SCHEDULE**

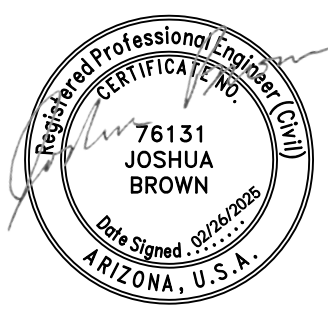
STRAIGHT BARS				BENT BARS				BENDING DIAGRAMS	
MARK	NO.	SIZE	LENGTH	MARK	NO.	SIZE	LENGTH	ALL DIMENSIONS ARE OUT TO OUT	
<b>END UNIT</b>									
a	6	13	2.36 m					b <sub>2</sub> bar 2.21 m	
b <sub>1</sub>	2	16	2.36 m					a bar 2.36 m	
D <sub>1</sub>	20	13	0.46 m	c	3	10	0.61 m	b <sub>1</sub> bar 2.36 m	
<b>INTERMEDIATE UNIT</b>									
a	8	13	2.36 m					c bar	
b <sub>2</sub>	2	16	2.21 m					76 mm x 126 mm	
D <sub>1</sub>	18	13	0.46 m	c	6	10	0.61 m	152 mm	

**GENERAL NOTES**

1. PRECAST CONCRETE SHALL ATTAIN A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 27.6 MPa, IN ACCORDANCE WITH AASHTO T22 (ASTM C-39). THE CONCRETE SHALL BE CLASS A(AE) CONFORMING TO SECTION 552 OF THE FP-03.
2. REINFORCING STEEL SHALL CONFORM TO ASTM SPECIFICATION A615, GRADE 300. ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M270M, GRADE 250.
3. EACH UNIT SHALL CONFORM TO THE AASHTO MS-18 HIGHWAY LOADING REQUIREMENTS.
4. EACH UNIT SHALL BE FABRICATED TO CONFORM TO THE ROADWAY CROWN AS SHOWN ON THE PLANS, OR AS DESIGNATED BY THE CM.
5. BOLTS, WASHER, AND NUTS, SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M-111.
6. ALL TRAFFIC GRILL UNIT, INCLUDING STEEL ANGLES SHALL BE SHOP PAINTED WITH ONE (1) PRIMER COAT, ONE (1) INTERMEDIATE COAT, AND ONE (1) FINISH COAT IN ACCORDANCE WITH SECTION 563, PAINT SYSTEM 2 OF FP-03.
7. WING BRACES SHALL BE CONSIDERED SUBSIDIARY ITEMS TO THE CATTLEGUARD UNIT.
8. NO STEEL CATTLEGUARDS TO BE USED AT PCC DRAINAGE PAD CATTLEGUARD LOCATIONS.
9. SEE PLANS FOR CONCRETE DRAINAGE PAD LOCATIONS AND NOTES.
10. ALL STEEL CATTLEGUARDS MAYBE SUBSTITUTED PROVIDED THE CONTRACTOR CAN SHOW THEY ARE MORE COST EFFECTIVE WITH SUPPORTING DATA. THE CONTRACTOR IS RESPONSIBLE FOR PATENT PROTECTION RIGHTS AND ALL SHOP DRAWINGS AND MATERIAL CERTIFICATIONS.




**NOTE: THIS DETAIL IS METRIC**



**NAVAJO DIVISION OF TRANSPORTATION**

**BIA STD 6 CATTLE GUARD DETAILS**

Designed by: JEB	Date: 11/21
Drawn by: ERG	Date: 11/21
Checked by: ASF	Date: 11/21
File Name: C-NM001-STD N12.DWG	



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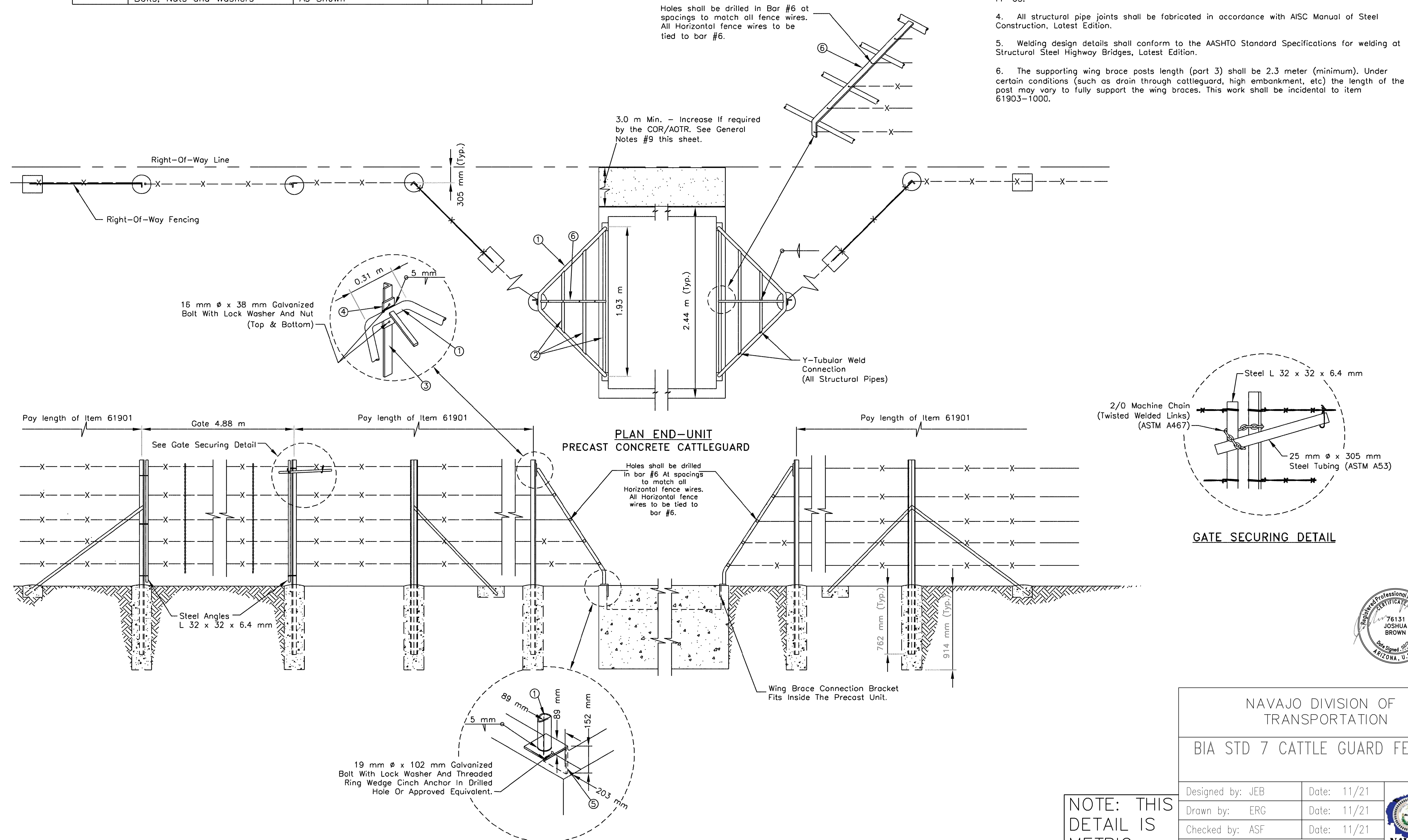
REGION	STATE	RESERVATION	ROUTE	PROJECT NO.	SHEET	TOTAL SHEETS
NORTH	ARIZONA	NAVAJO	N12	N12 1,2&4		120

**ESTIMATED MATERIAL LIST**

PART NO.	MATERIAL	SIZE AND THICKNESS	LENGTH	QUANTITY
1	Structural Steel Pipe	64 mm $\phi$ Nominal	4.23 m	2
2	Structural Steel Pipe	32 mm $\phi$ Nominal	4.19 m	2
3	Steel Angle (See Note 6 & 7)	L 64 x 64 x 9.5 mm	2.29 m	2
4	Steel Plate	89 mm x 10 mm	178 mm	2
5	Steel Angle	L 152 x 89 x 9.5 mm	89 mm	4
6	Bar	25 mm x 6 mm	1.68 m	2
	Bolts, Nuts and Washers	As Shown		

**GENERAL NOTES**

- Structural pipe shall conform to ASTM A53-93a, Grade B. All other structural steel shall conform to ASTM-A36.
- Bolts, nuts, and washers shall be galvanized in accordance with AASHTO M111 (ASTM A123).
- All wing brace structural steel and pipe shall receive one (1) primer coat, one (1) intermediate coat, and one (1) finish coat in accordance with Section 563, Paint System 2 of FP-03.
- All structural pipe joints shall be fabricated in accordance with AISC Manual of Steel Construction, Latest Edition.
- Welding design details shall conform to the AASHTO Standard Specifications for welding at Structural Steel Highway Bridges, Latest Edition.
- The supporting wing brace posts length (part 3) shall be 2.3 meter (minimum). Under certain conditions (such as drain through cattleguard, high embankment, etc) the length of the post may vary to fully support the wing braces. This work shall be incidental to item 61903-1000.



NOTE: THIS  
DETAIL IS  
METRIC

NAVAJO DIVISION OF TRANSPORTATION	
BIA STD 7 CATTLE GUARD FENCING	
Designed by: JEB	Date: 11/21
Drawn by: ERG	Date: 11/21
Checked by: ASF	Date: 11/21
File Name: c-nmd01-std N12.dwg	

