

GENERAL NOTES

DESCRIPTION:

THIS ITEM CONSISTS OF FURNISHING AND INSTALLING VANDAL FENCING ON NEW AND EXISTING CONCRETE BRIDGE RAILINGS. CONSTRUCT IN A MANNER THAT PROVIDES A RIGID, TAUT FENCE CLOSELY CONFORMING TO THE TOP SURFACE OF THE CONCRETE PARAPET. UNLESS OTHERWISE SPECIFIED IN THE PLANS, INSTALL POSTS AND POST SLEEVES PLUMB.

(1) FENCE LINE POSTS AND END POSTS SHALL BE 2.880 INCH OUTSIDE DIAMETER GRADE 2 PIPE, 710.03 (TYPE 1), FY = 50,000 PSI, 4.64 LB/FT. THE PROTECTIVE COATING SHALL BE ACCORDING TO AASHTO M181 FOR GRADE 2 POSTS.

(2) FENCE TOP RAILS, BOTTOM RAILS AND LINE RAILS SHALL BE 1.660 INCH OUTSIDE DIAMETER GRADE 2 PIPE, 710.03 (TYPE 1), FY = 50,000 PSI, 1.84 LB/FT. THE PROTECTIVE COATING SHALL BE ACCORDING TO AASHTO M181 FOR GRADE 2 POSTS.

(3) BASE PLATES SHALL BE ASTM A709 GRADE 36 OR 50 STEEL GALVANIZED ACCORDING TO 711.02.

(4) FASTENERS: THE 3/4 INCH DIA. HIGH STRENGTH BOLTS, NUTS AND WASHERS SHALL BE IN ACCORDANCE WITH C&MS 711.09 (ASTM A 325) GALVANIZED.

THE 1/2 INCH DIA. THREADED ROD FOR ADHESIVE ANCHORS SHALL BE ASTM A 193, GRADE B7, WITH ASTM A 563 NUTS AND ASTM F 436 WASHERS. MECHANICALLY GALVANIZE ALL ANCHOR HARDWARE ACCORDING TO ASTM B 695, CLASS 65.

USE AN ANCHOR ADHESIVE EVALUATED ACCORDING TO ICCES REPORT AC308, "ACCEPTANCE CRITERIA FOR POST-INSTALLED ADHESIVE ANCHORS IN CONCRETE ELEMENTS", FOR CRACKED AND UNCRACKED CONCRETE APPLICATIONS. PUBLISHED ICCES REPORTS FOR ACCEPTABLE PRODUCTS ARE AVAILABLE AT:

WWW.ICC-ES.ORG/EVALUATION_REPORTS/INDEX.SHTML

SELECT FROM ONE OF THE FOLLOWING APPROVED PRODUCTS:

POWERS PE1000+ EPOXY ADHESIVE ANCHOR SYSTEM (ICCES REPORT ESR-2583)

CHEMOFAST C-RE 385 EPOXY ADHESIVE ANCHOR SYSTEM (ICCES REPORT ESR-2538)

SIMPSON STRONG-TIE SET-XP EPOXY ADHESIVE ANCHORS (ICCES REPORT ESR-2508)

WURTH WIT-PE500 EPOXY ADHESIVE ANCHORS (ICCES REPORT ESR-3051)

INSTALL ADHESIVE ANCHORS ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS PUBLISHED IN SECTION 4.3 OF THE ICCES REPORTS LISTED ABOVE. THE MINIMUM EMBEDMENT DEPTH (H_{EF}) FOR ANCHORS SHALL BE 7".

THE CONTRACTOR MAY SUBSTITUTE MECHANICAL ANCHORS IN LIEU OF INTERNALLY THREADED ADHESIVE ANCHORS FOR THE BP-3 HORIZONTAL ANCHORS. THE FACTORED LOADING ON THE TWO ANCHOR HORIZONTAL CONNECTION, AS SHOWN ON SHEET 4 OF 7, CONSISTS OF 7.1 KIPS OF TENSION & 1.4 KIPS OF SHEAR. THE MECHANICAL ANCHORS SHALL BE EVALUATED ACCORDING TO ICCES REPORT AC193, "ACCEPTANCE CRITERIA FOR MECHANICAL ANCHORS IN CONCRETE ELEMENTS", FOR CRACKED AND UNCRACKED APPLICATIONS. PUBLISHED ICCES REPORTS FOR ACCEPTABLE PRODUCTS ARE AVAILABLE AT:

WWW.ICC-ES.ORG/EVALUATION_REPORTS/INDEX.SHTML

THE CONTRACTOR SHALL SUPPLY DOCUMENTATION SEALED BY AN OHIO REGISTERED PROFESSIONAL ENGINEER ENSURING THAT THE SELECTED MECHANICAL ANCHORAGE PROVIDES SUFFICIENT CAPACITY FOR THIS APPLICATION IN ACCORDANCE WITH AC193. INSTALL ANCHORS ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS PUBLISHED IN THE ICCES REPORT.

FOR INSTALLATIONS IN NEW CONCRETE RAILINGS, THE ANCHORS MAY BE CAST-IN-PLACE WITH A MINIMUM 7 INCH EMBEDMENT LENGTH.

(5) TENSION BARS SHALL BE 3/8 INCH X 1/2 INCH STEEL GALVANIZED ACCORDING TO 711.02.

(6) TENSION BANDS AND BRACE BANDS SHALL BE 1/8 INCH X 1 INCH GALVANIZED STEEL ASSEMBLED WITH 3/8 INCH DIAMETER X 1/4 INCH GALVANIZED BOLTS. ONE TENSION BAND SHALL BE SUPPLIED FOR EACH FOOT OF FABRIC HEIGHT. BANDS SHALL BE GALVANIZED ACCORDING TO 711.02.

(7) LINE RAIL CLAMPS OR BOULEVARDS SHALL BE STEEL, GALVANIZED ACCORDING TO 711.02. THE CLAMPS SHALL BE USED TO CONNECT LINE RAILS OR TOP RAILS OF CURVED FENCES TO INTERIOR POSTS. INSTALL USING 3/8 INCH DIAMETER X 2 1/2 INCH BOLTS, GALVANIZED ACCORDING TO 711.02.

(8) MALLEABLE OR CAST IRON FITTINGS SHALL BE USED FOR END POST DOME CAPS, HALF BALL AND LOOP LINE POST CAPS AND LINE OR TOP RAIL ENDS. ALL FITTINGS SHALL BE GALVANIZED ACCORDING TO 711.02.

(9) TENSION WIRE SHALL BE ALUMINIZED 0.177 INCH DIAMETER STEEL COIL SPRING WIRE CONFORMING TO AASHTO M181. PLACE TENSION WIRE AS CLOSE TO THE CONCRETE PARAPET AS PRACTICAL BUT NOT MORE THAN 2 INCHES MAXIMUM. THE LOAD ON THE TENSION WIRE SHALL BE 800 LB MINIMUM.

(10) FABRIC TIES AND HOG RINGS SHALL BE 0.148 INCH CORE DIAMETER GALVANIZED PVC COATED STEEL WIRE AND 0.120 INCH ANNEALED STAINLESS STEEL WIRE CONFORMING TO ASTM A478 RESPECTIVELY. TO CONNECT THE FABRIC TO THE LINE POSTS, SUPPLY ONE FABRIC TIE FOR EACH ONE FOOT OF FABRIC HEIGHT. CONNECT THE FABRIC TO THE TENSION WIRE USING HOG RINGS 2-3 INCHES ON EACH SIDE OF THE POSTS AND AT SPACINGS NOT TO EXCEED 12 INCHES BETWEEN POSTS. THE PVC COATING SHALL BE THE SAME AS THAT FOR THE STEEL FABRIC.

(11) STAINLESS STEEL CLOSURE PLATES ARE REQUIRED FOR ALL FENCING INSTALLATIONS NOT USING A BOTTOM RAIL. REFER TO SHEET 7 OF 7 FOR MATERIAL AND INSTALLATION REQUIREMENTS FOR THE STAINLESS STEEL CLOSURE PLATES.

(12) ADJUSTABLE TRUSS RODS: IF THE FENCE FABRIC IS CONTINUOUS ACROSS A STRUCTURAL EXPANSION JOINT, INSTALL ADJUSTABLE TRUSS RODS IN THE PANEL SECTION ON EACH IMMEDIATE SIDE OF THE EXPANSION PANEL. OTHERWISE, INSTALL TRUSS RODS ONLY AS NECESSARY TO MEET THE REQUIREMENTS OF THIS DRAWING. ADJUSTABLE TRUSS RODS SHALL BE 3/8 INCH DIAMETER STEEL, GALVANIZED ACCORDING TO 711.02.

(13) DOUBLE WRAP FABRIC TIES SHALL BE 0.091 INCH CORE DIAMETER GALVANIZED PVC COATED STEEL WIRE, 15 1/4 INCHES LONG. TO CONNECT THE FABRIC TO THE LINE AND TOP RAILS, USE DOUBLE WRAP TIES 2-3 INCHES ON EACH SIDE OF THE POSTS AND AT SPACINGS NOT TO EXCEED 12 INCHES BETWEEN POSTS. THE PVC COATING SHALL BE THE SAME AS THAT FOR THE STEEL FABRIC.

(14) FABRIC: SHALL CONSIST OF A 1 INCH DIAMOND MESH USING 0.120 INCH DIA. (11 GAGE) WIRE CONFORMING TO ASTM F668 CLASS 2A OR 2B EXCEPT AS NOTED. THE PVC COATING SHALL BE GRAY IN COLOR CLOSELY APPROACHING FEDERAL STANDARD NO. 595B-16251 UNLESS OTHERWISE SPECIFIED IN THE PLANS. SELVAGES SHALL BE KNUCKLED AT BOTH ENDS. HANDLE ALL PVC COATED FABRIC WITH CARE. IF THE PVC COATING IS DAMAGED, REPLACE THE DAMAGED PORTION OF THE FABRIC AT NO COST TO THE DEPARTMENT.

(15) FILLET WELDS SHALL CONFORM TO CMS 513.

(16) POST SLEEVES SHALL BE 3.500 INCH OUTSIDE DIAMETER PIPE, ASTM A53, 25,000 PSI MINIMUM YIELD STRENGTH, 7.58 LB/FT, GALVANIZED ACCORDING TO 711.02. HEXAGON SOCKET SET SCREWS SHALL BE SAE 4140 ALLOY STEEL, HEAT TREATED, WITH FLAT OR OVAL POINT.

(17) SHIM PLATES SHALL BE MADE FROM ANY MULTI-POLYMER PLASTIC WITH A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI. IN ORDER TO INSTALL POSTS PLUMB, ENDS OF POSTS AND SLEEVES MAY BE CUT ON A BIAS.

(18) TRAFFIC MAINTENANCE: MAINTAIN TRAFFIC ACCORDING TO THE PROJECT PLANS.

(19) CAULKING COMPOUND SHALL CONFORM TO FEDERAL SPECIFICATION TT-S-00230C TYPE II, CLASS A, ALUMINUM GRAY. WHEN APPLYING THE CAULK TO THE BASE PLATE, PROVIDE A 1 INCH OPENING THROUGH THE CAULKING ON LOW SIDE OF BASE PLATE.

(20) EXPANSION SLEEVES: PROVIDE EXPANSION SLEEVES AT LEAST 6 INCHES LONG IN FENCE PANELS SPANNING STRUCTURAL EXPANSION JOINTS. EXPANSION SLEEVES SHALL BE OUTSIDE TYPE WITH INTERNAL HEAVY SPRING AND GALVANIZED ACCORDING TO 711.02. THE SLEEVES SHOULD BE CAPABLE OF ACCOMMODATING THE MAXIMUM EXPANSION AND CONTRACTION MOVEMENTS OF THE STRUCTURE.

(21) CONSTRUCTION PROCEDURE:

1. FIELD VERIFY THE PLAN LOCATIONS OF ALL BASE PLATES AND MARK PARAPETS ACCORDINGLY.
2. MARK AND DRILL HOLES FOR THE 1/2 INCH HIGH STRENGTH THREADED ANCHORS OR 1/2 INCH BOLTS USING A BASE PLATE OR TEMPLATE.
3. INSTALL 1/2 INCH DIAMETER HIGH STRENGTH THREADED ANCHORS OR 1/2 INCH BOLTS.
4. INSTALL POSTS AND BASE PLATES AND SHIM WHERE REQUIRED.
5. CAULK EDGES OF BASE PLATES, SHIMS AND SLEEVES.
6. COMPLETE INSTALLATION OF FENCE.

(22) SPECIAL DESIGNS ARE REQUIRED FOR RAILINGS WITH 28 DAY CONCRETE STRENGTHS LESS THAN 4000 PSI. A SPECIAL DESIGN IS ALSO REQUIRED IF THE MIDPOINT OF THE EXPOSED FENCE HEIGHT IS GREATER THAN 50 FEET ABOVE THE NORMAL TERRAIN LEVEL.

(23) PROJECT PLANS: THE DESIGNER SHALL SPECIFY THE TYPE OF BASE PLATE AND POST SECTION TO BE USED AND PROVIDE A SCHEMATIC DECK PLAN SHOWING THE FENCE POST SPACING.

(24) METHOD OF MEASUREMENT: THE DEPARTMENT WILL MEASURE THE QUANTITY BY THE FOOT. THE DEPARTMENT WILL MEASURE ALONG THE BOTTOM OF THE FENCE FROM CENTER TO CENTER OF END POSTS.

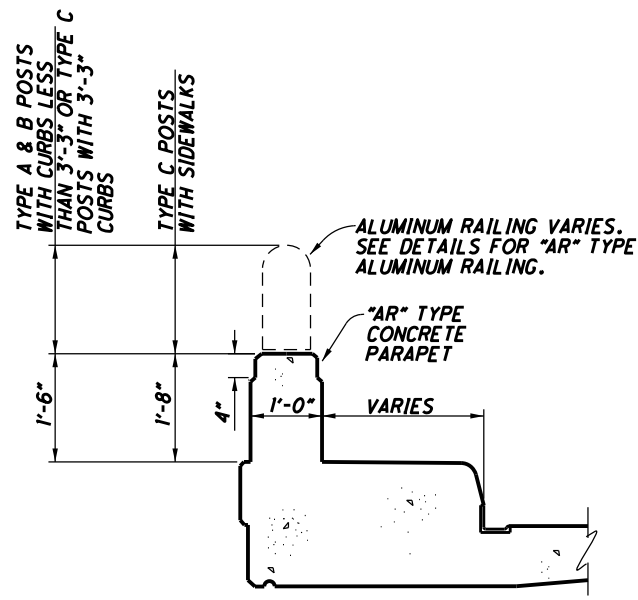
(25) BASIS OF PAYMENT: THE DEPARTMENT WILL MAKE PAYMENT FOR THE COMPLETED AND ACCEPTED QUANTITIES OF VANDAL FENCE AS FOLLOWS:

ITEM	UNIT	DESCRIPTION
607	FOOT	SPECIAL - VANDAL PROTECTION FENCE *
		*: 6 FT STRAIGHT, COATED FABRIC 8 FT STRAIGHT, COATED FABRIC 10 FT CURVED, COATED FABRIC 12 FT CURVED, COATED FABRIC

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
 09-26-90 DATE
 ADMINISTRATOR
 REVISIONS
 04-15-11
 07-19-02
 03-24-93
 02-01-92
 CHECKED RLD
 DESIGNED JCR
 OFFICE OF STRUCTURAL ENGINEERING
 STANDARD BRIDGE DRAWING
 VANDAL PROTECTION FENCE
 SC# NUMBER
 VPF-1-90
 1 / 7

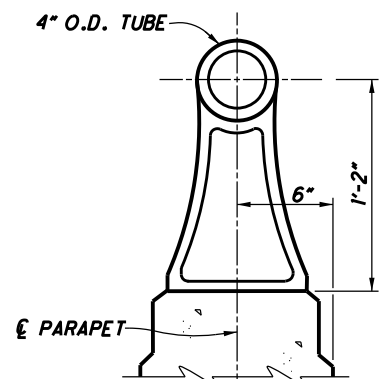
RAILING TYPES

NOTE: RET. = RETIRED STANDARD BRIDGE DRAWING

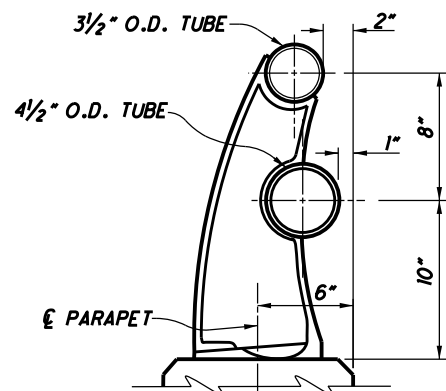


AR TYPE PARAPET

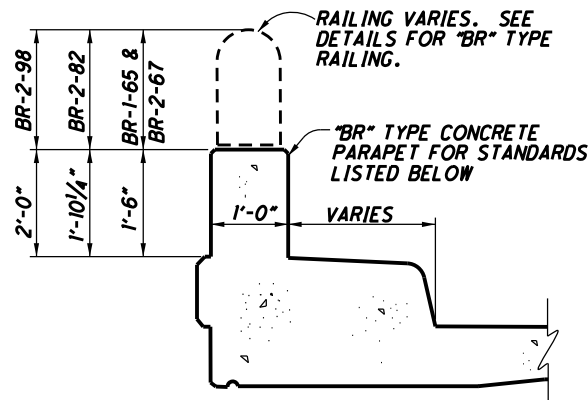
SEE STANDARD BRIDGE DRAWING AR-1-57 (RET.). USE CURVED FENCE OR STRAIGHT 8'-0" HIGH FENCE, AS DETERMINED BY CURB OR SIDEWALK WIDTH, AND BASE PLATES BP-1, BP-2, BP-3 OR BP-4.



ALUMINUM RAILING FOR STANDARD BRIDGE DRAWING AR-1-57 (RET.) WITH TYPE A POSTS

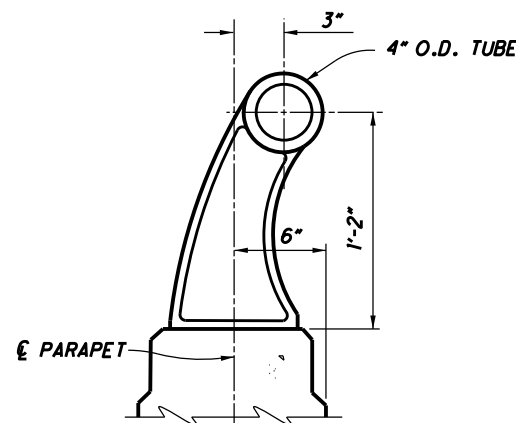


ALUMINUM RAILING FOR STANDARD BRIDGE DRAWING BR-2-82 (RET.), BR-2-67 (RET.) AND BR-1-65 (RET.) WITH TYPE 2 POSTS



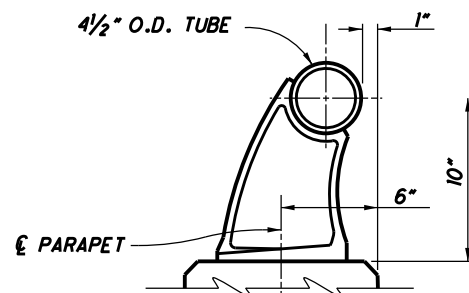
BR TYPE PARAPET

SEE STANDARD BRIDGE DRAWINGS BR-2-98, BR-2-82 (RET.), BR-2-67 (RET.) AND BR-1-65 (RET.). USE CURVED FENCE OR STRAIGHT 8'-0" HIGH FENCE, AS DETERMINED BY CURB OR SIDEWALK WIDTH, AND BASE PLATES BP-1 OR BP-3.



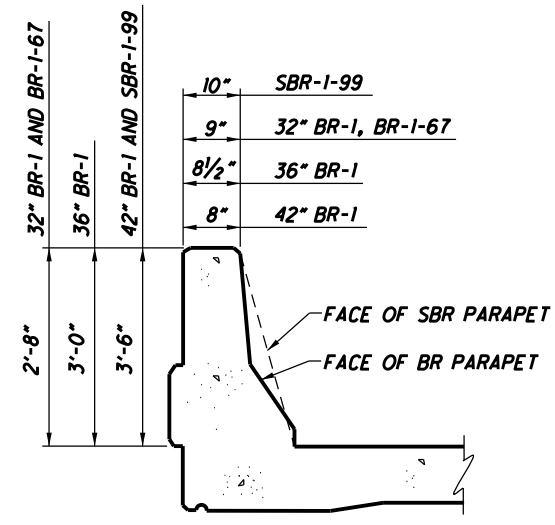
ALUMINUM RAILING FOR STANDARD BRIDGE DRAWING AR-1-57 (RET.) WITH TYPE B POSTS

AR TYPE ALUMINUM RAILING



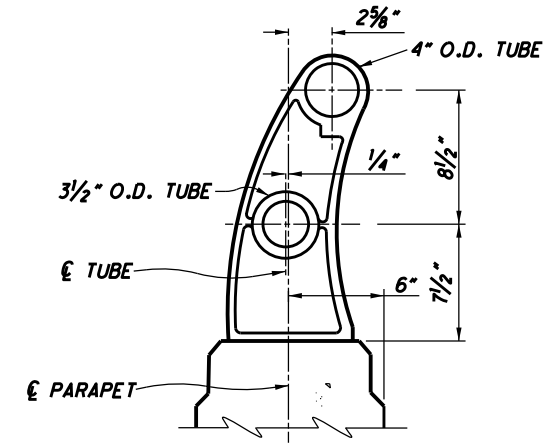
ALUMINUM RAILING FOR STANDARD BRIDGE DRAWING BR-1-65 (RET.) WITH TYPE 1 POSTS

BR TYPE RAILING

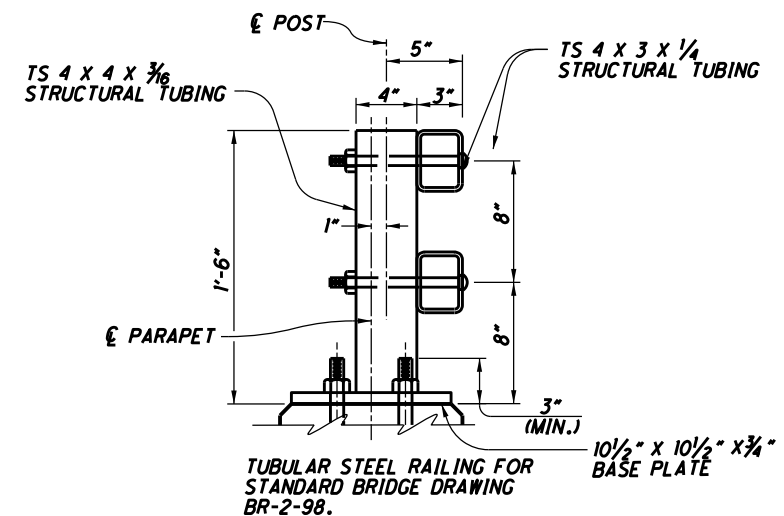


DEFLECTOR PARAPET

SEE STANDARD BRIDGE DRAWINGS BR-1, BR-1-67 (RET.) & SBR-1-99. USE STRAIGHT 6'-0" HIGH FENCE AND BASE PLATE BP-5.

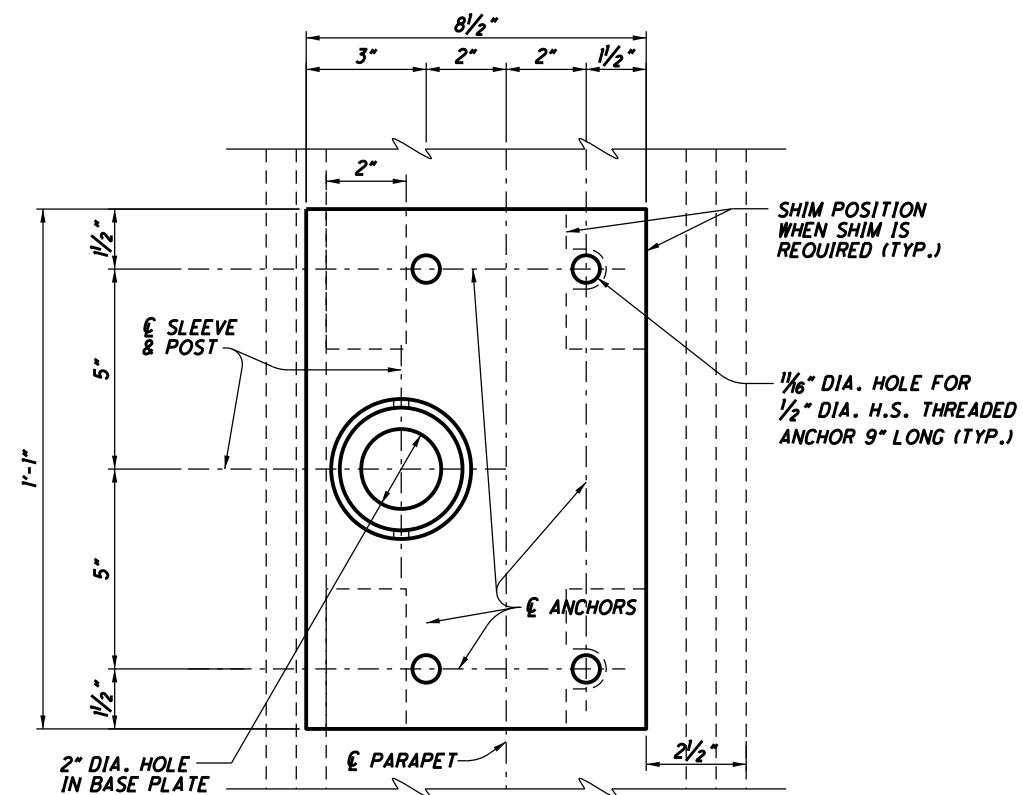


ALUMINUM RAILING FOR STANDARD BRIDGE DRAWING AR-1-57 (RET.) WITH TYPE C POSTS



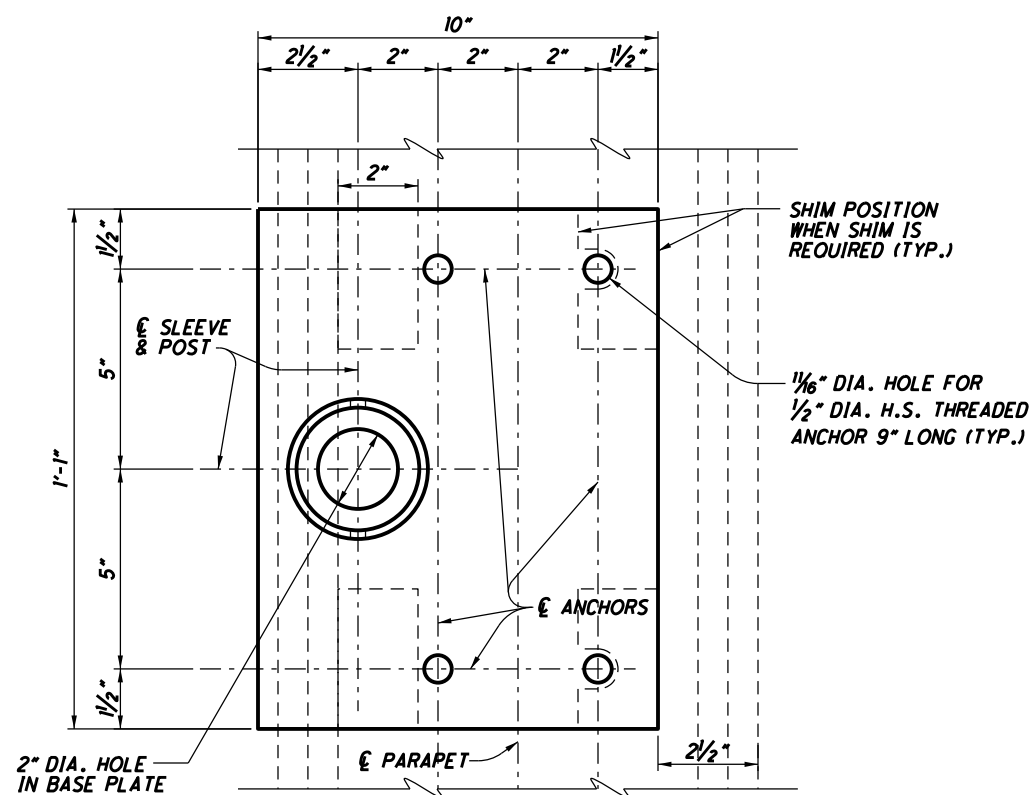
TUBULAR STEEL RAILING FOR STANDARD BRIDGE DRAWING BR-2-98.

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04-15-11		
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CHECKED	RLD	WTF
DESIGNED	JCR	GFJ
OFFICE OF STRUCTURAL ENGINEERING		
STANDARD BRIDGE DRAWING		
VANDAL PROTECTION FENCE		
SCD NUMBER	VPF-1-90	
		2/7



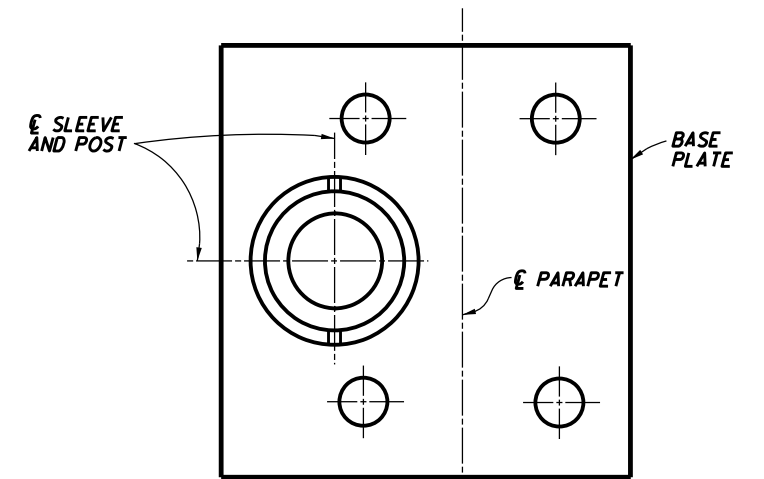
PLAN BP-1

SHIM POSITIONS ARE SHOWN, POST AND SET SCREWS ARE NOT SHOWN



PLAN BP-2

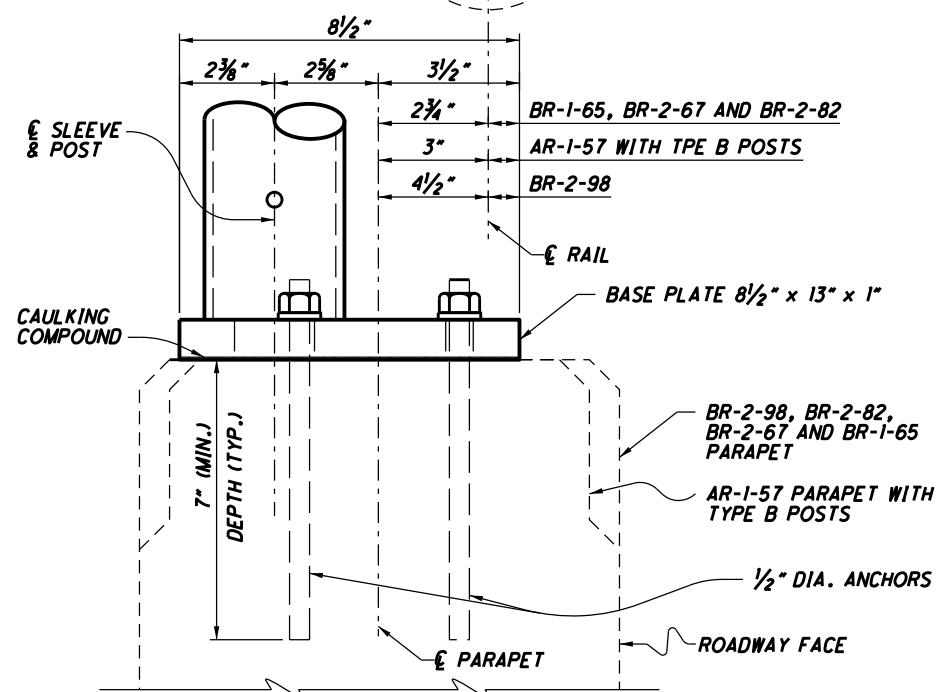
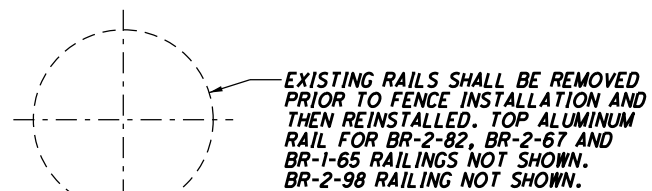
SHIM POSITIONS ARE SHOWN, POST AND SET SCREWS ARE NOT SHOWN



POST SLEEVE PLAN

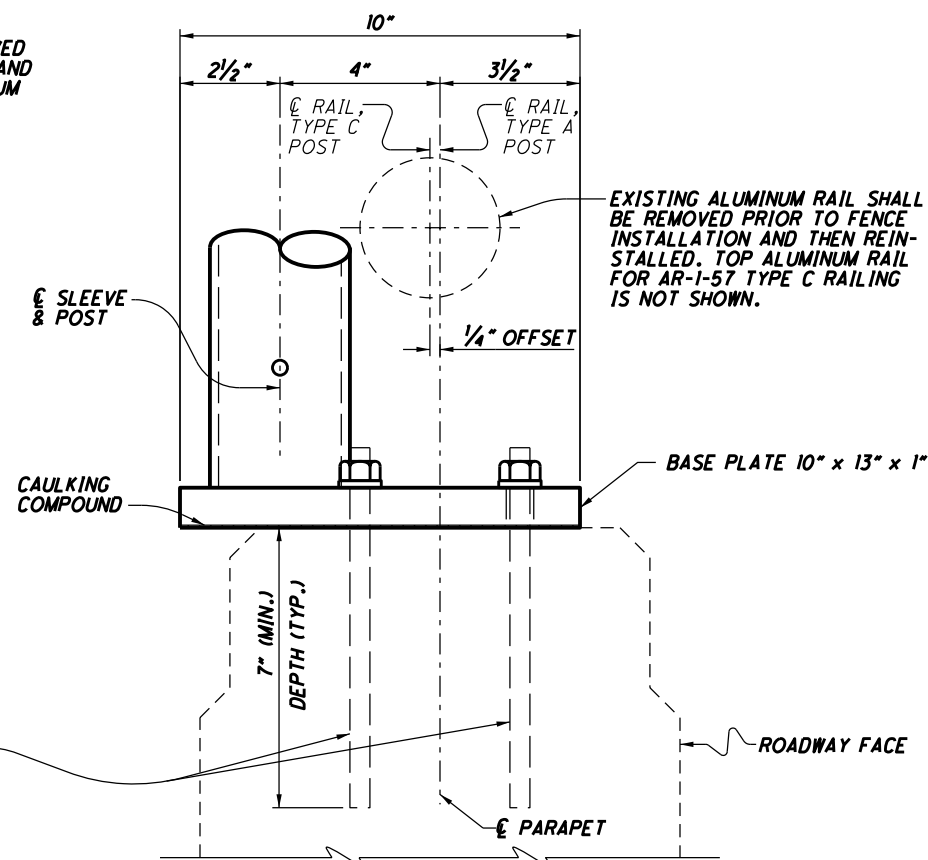
POST AND SET SCREWS NOT SHOWN

SEE GENERAL NOTES FOR OPTIONAL ANCHORAGE IN NEW CONCRETE



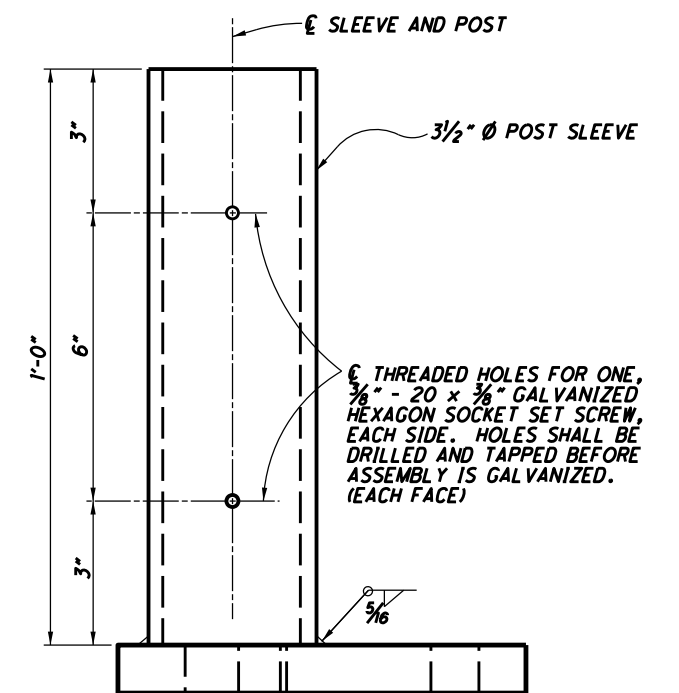
END VIEW BP-1

BP-1 SHALL BE USED WITH PS-3 OR PS-4 POST SECTIONS ON CONCRETE PARAPETS WITH HORIZONTAL RAIL ELEMENTS AS SHOWN ON STANDARD BRIDGE DRAWING BR-2-98, BR-2-82, BR-2-67, BR-1-65 AND AR-1-57 WITH TYPE B POSTS. DO NOT USE WITH PS-1 AND PS-2 POST SECTIONS. INSTALL FENCE BY REMOVING AND REINSTALLING THE HORIZONTAL RAIL ELEMENTS BP-1 REQUIRES A SLEEVE. SEE POST SLEEVE DETAILS ON THIS SHEET.



END VIEW BP-2

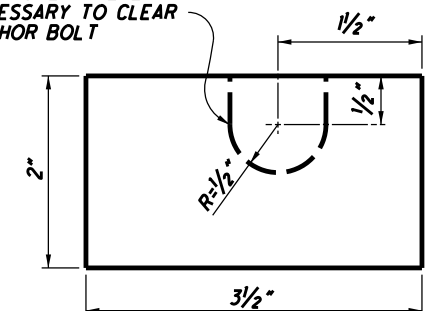
BP-2 SHALL BE USED WITH PS-3 OR PS-4 POST SECTIONS ON CONCRETE PARAPETS WITH HORIZONTAL RAIL ELEMENTS AS SHOWN ON STANDARD BRIDGE DRAWING AR-1-57 WITH TYPE A AND TYPE C POSTS. DO NOT USE WITH PS-1 AND PS-2 POST SECTIONS. INSTALL FENCE BY REMOVING AND REINSTALLING THE HORIZONTAL RAIL ELEMENTS BP-1 REQUIRES A SLEEVE. SEE POST SLEEVE DETAILS ON THIS SHEET.



POST SLEEVE ELEVATION

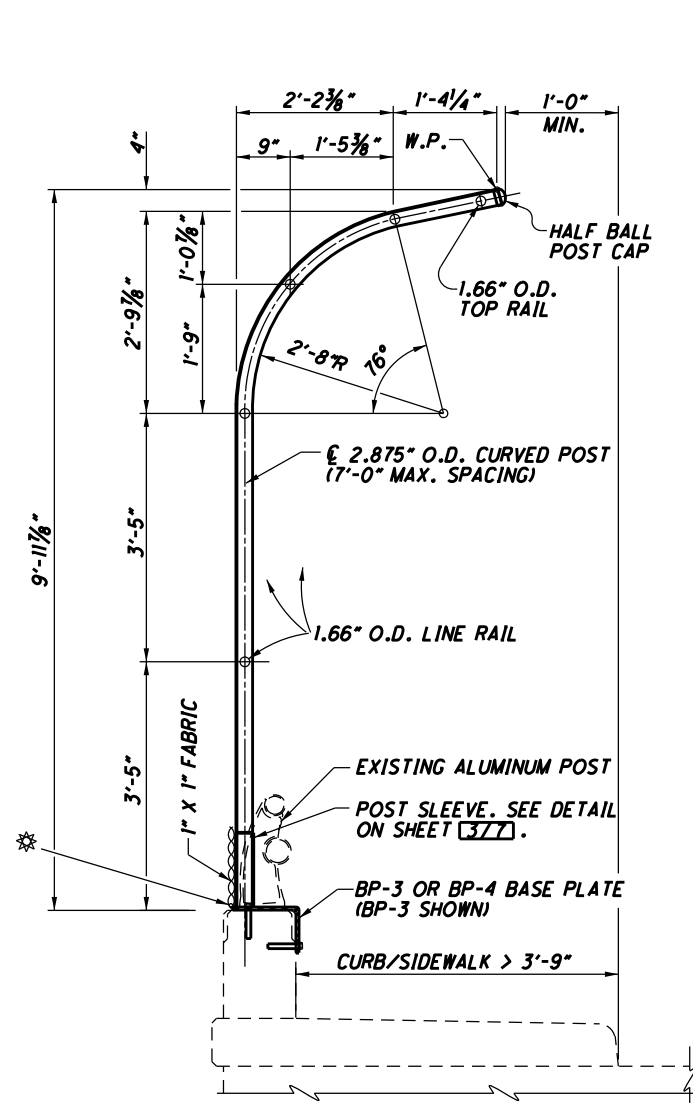
POST AND SET SCREWS NOT SHOWN

SLOT ONLY WHERE NECESSARY TO CLEAR ANCHOR BOLT



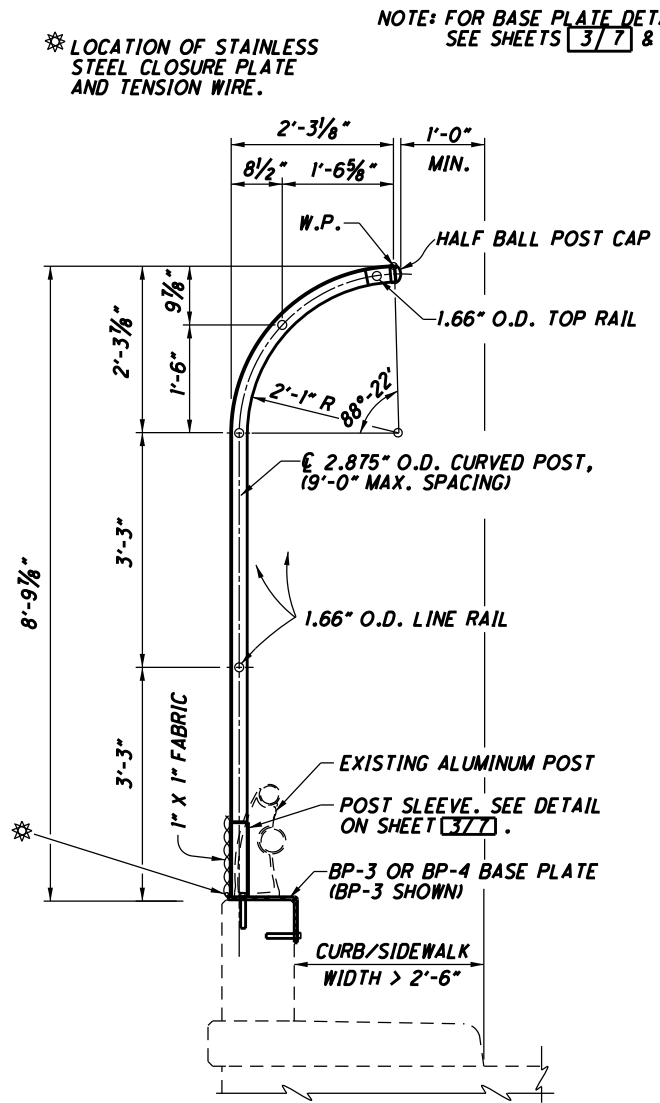
BASE PLATE SHIMS

1/16", 1/8" AND 1/4" THICK



POST SECTION PS-1
(12'-0" CURVED FENCE)

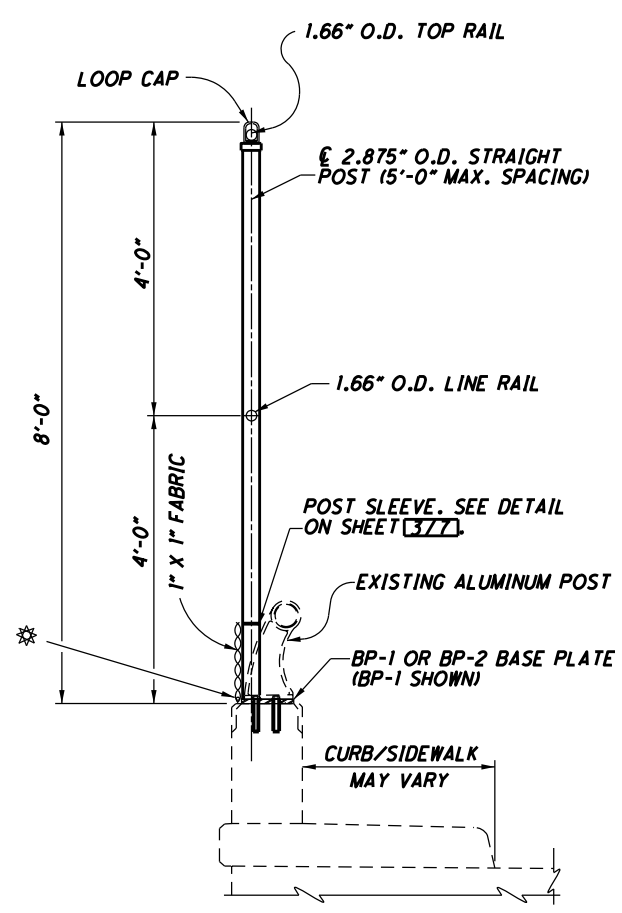
NOTE: BEGIN FABRIC AT BASE PLATE. (MAXIMUM GAP BETWEEN FABRIC AND CONCRETE PARAPET = 1")



POST SECTION PS-2
(10'-0" CURVED FENCE)

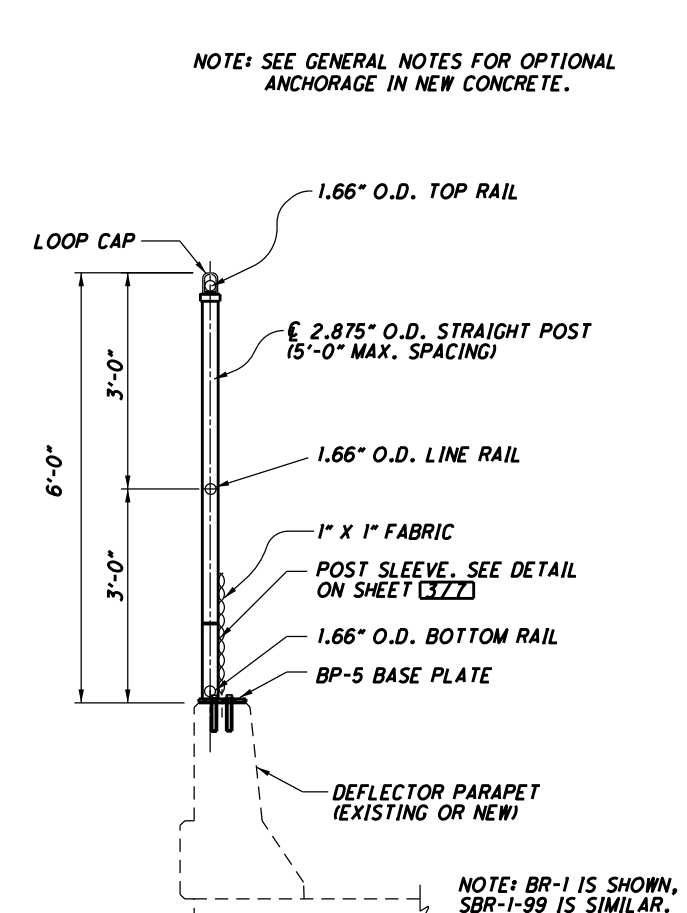
NOTE: FOR BASE PLATE DETAILS, SEE SHEETS 3/7 & 4/7.

* LOCATION OF STAINLESS STEEL CLOSURE PLATE AND TENSION WIRE.



POST SECTION PS-3
(18'-0" STRAIGHT FENCE)

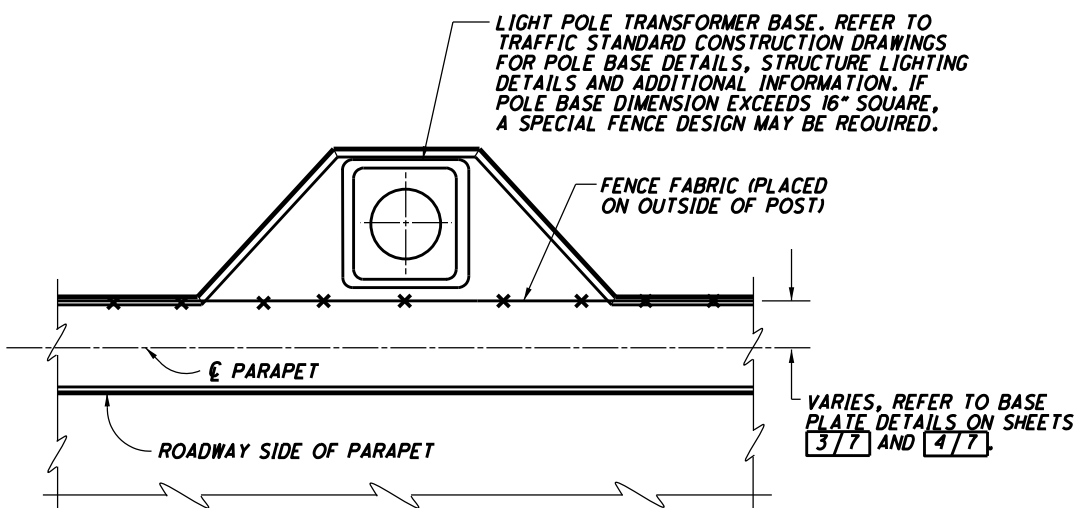
NOTE: INSTALL 1.66" O.D. BOTTOM RAIL AND LOCATE FENCE FABRIC ALONG INSIDE FACE OF POSTS FOR POSTS SECTIONS PS-1, PS-2 AND PS-3 PLACED ON NEW CONCRETE PARAPETS WITHOUT HORIZONTAL RAIL ELEMENTS.



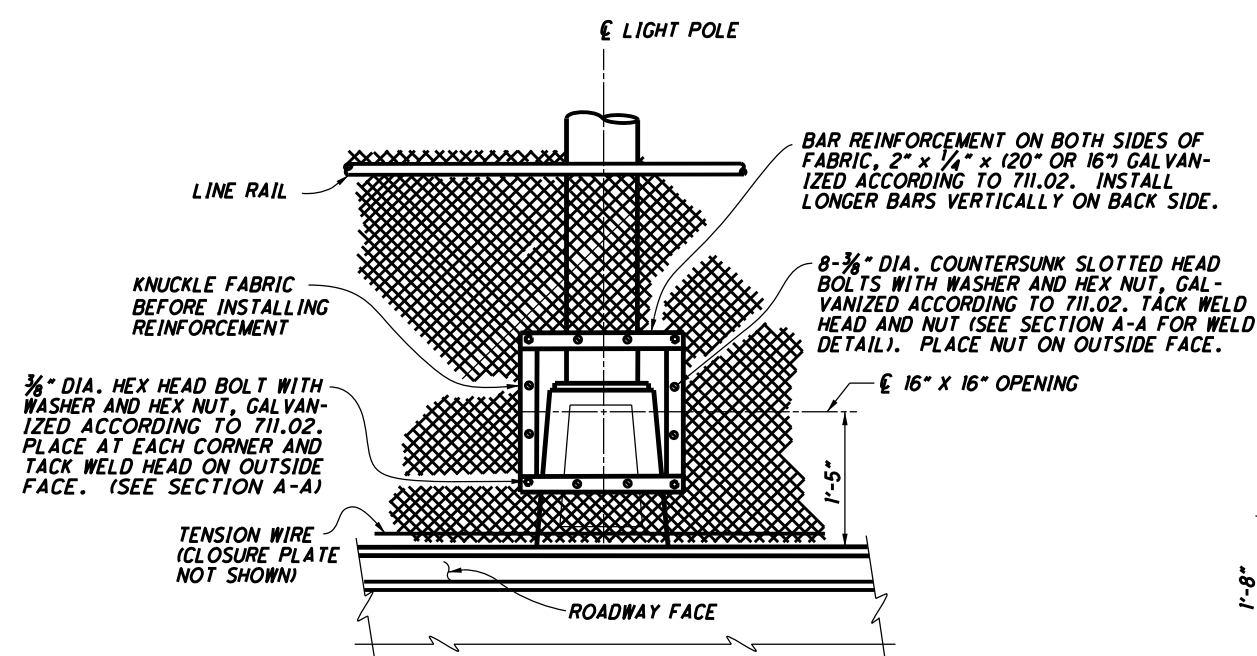
POST SECTION PS-4
(16'-0" STRAIGHT FENCE)

NOTE: SEE GENERAL NOTES FOR OPTIONAL ANCHORAGE IN NEW CONCRETE.

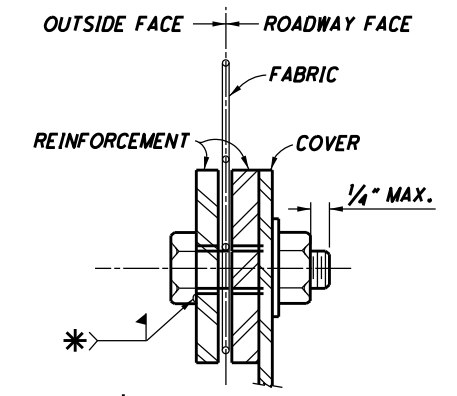
NOTE: BR-1 IS SHOWN, SBR-1-99 IS SIMILAR.



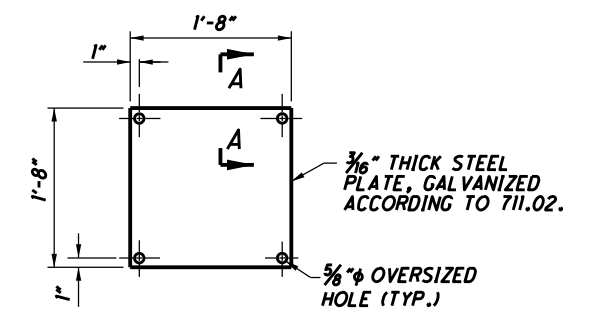
FENCE DETAILS AT TYPICAL LIGHT POLE PILASTER
(RAIL(S) NOT SHOWN)



ACCESS OPENING AT LIGHT POLE
(COVER NOT SHOWN)

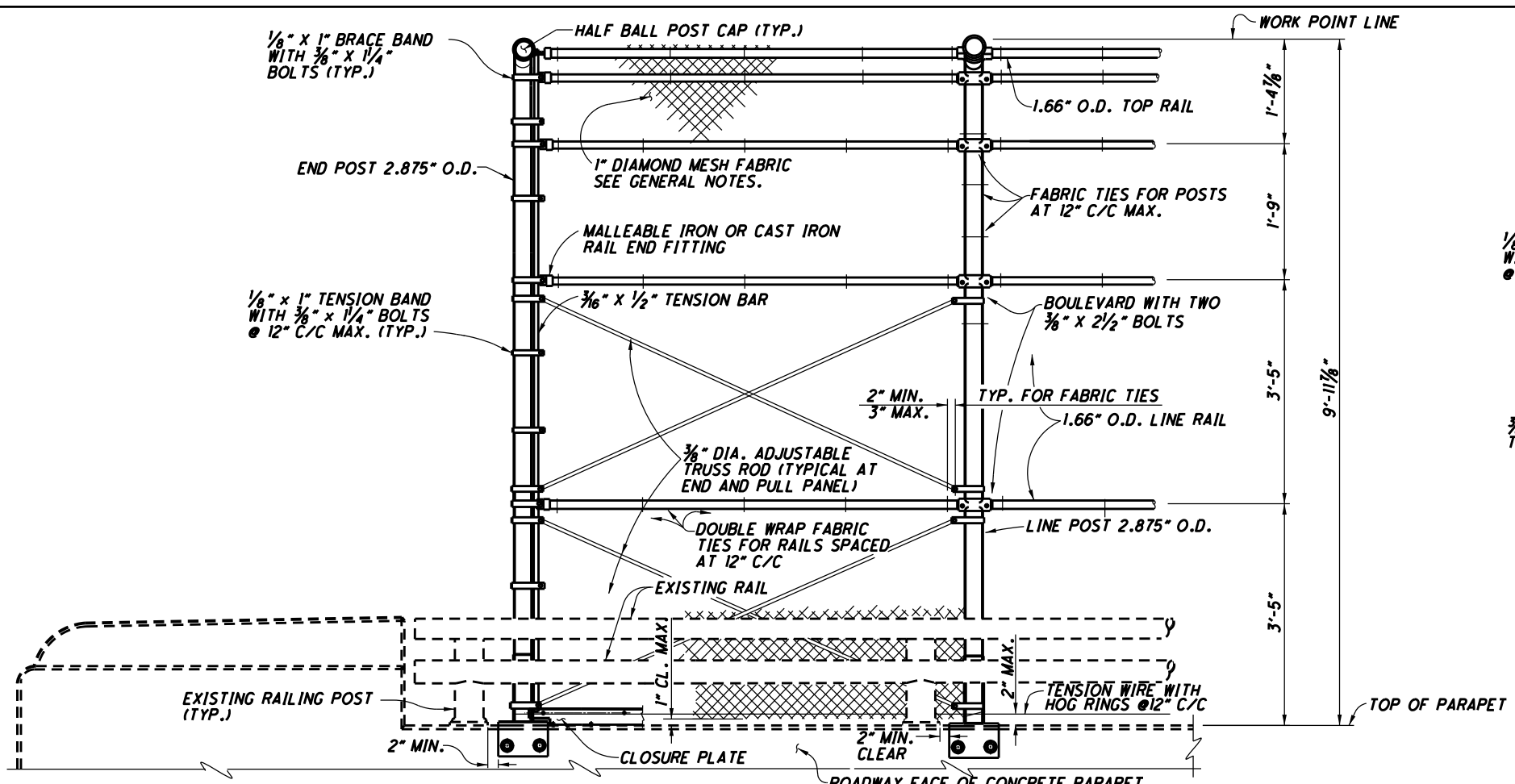


SECTION A-A
(SHOWING CORNER BOLT)

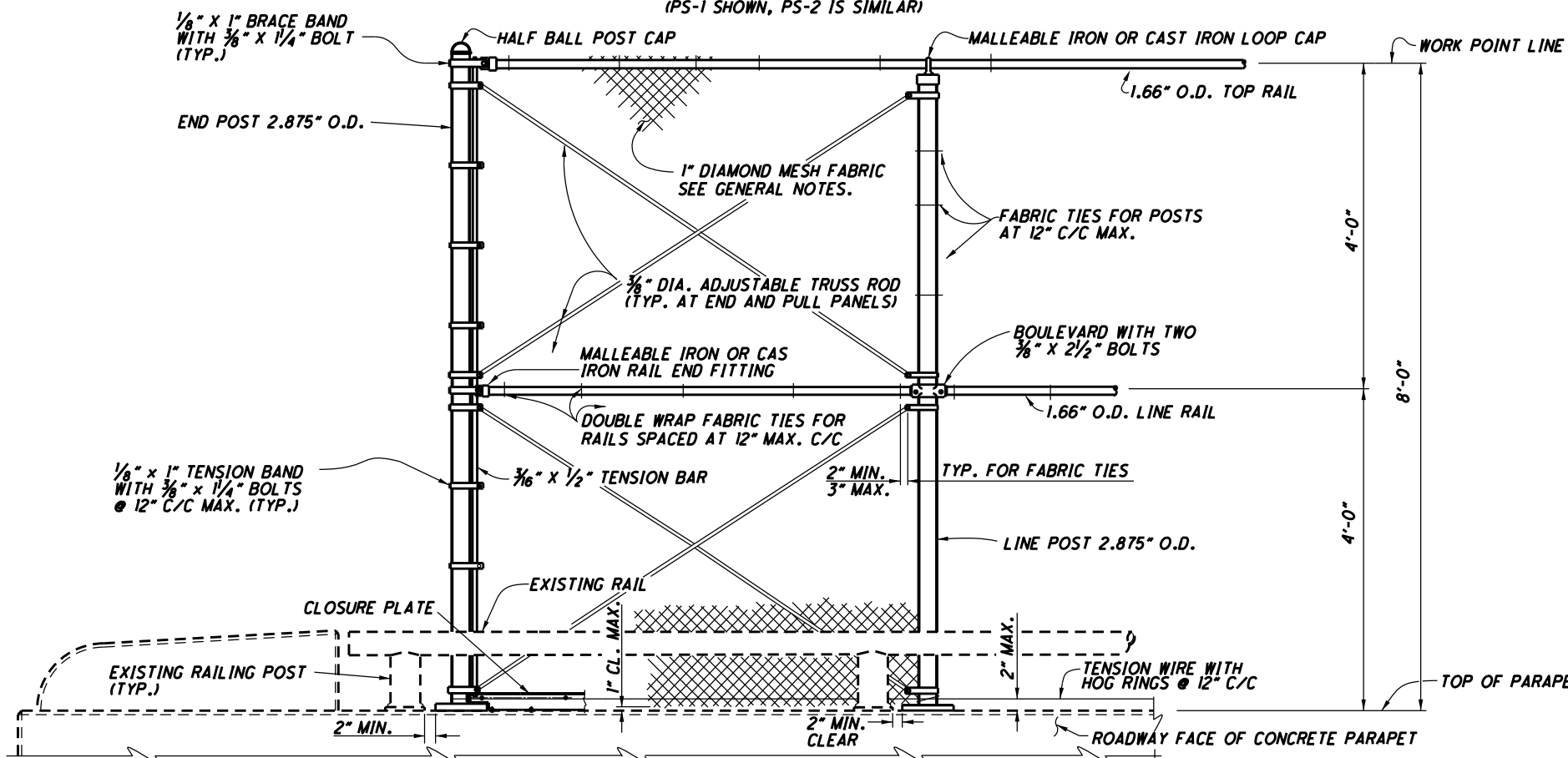


ACCESS COVER

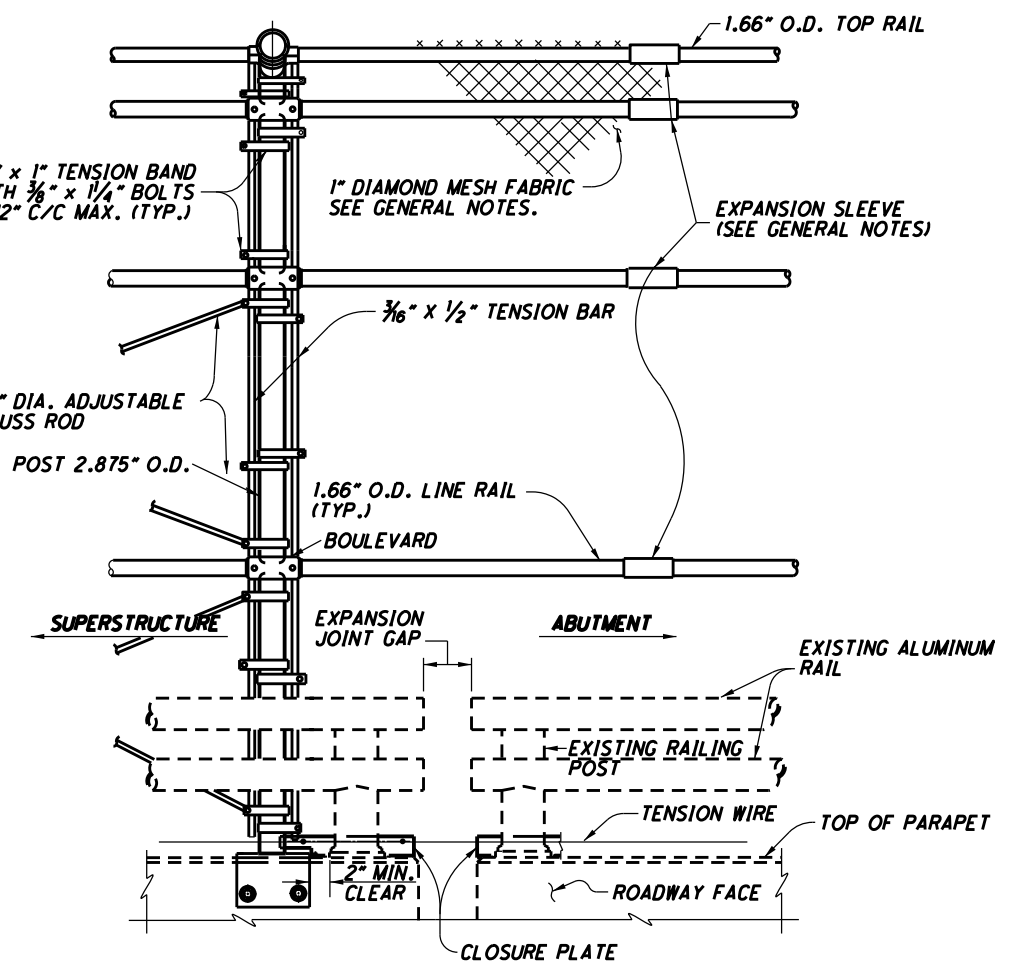
STATE OF OHIO DEPARTMENT OF TRANSPORTATION	DATE
ADMINISTRATOR	09-26-90
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04-15-11	
07-19-02	
03-24-93	
02-01-92	
DESIGNED	JCR
CHECKED	RJD
DRAWN	GFJ
REVIEWED	WTF
OFFICE OF STRUCTURAL ENGINEERING	
STANDARD BRIDGE DRAWING	
VANDAL PROTECTION FENCE	
SCD NUMBER	VPF-1-90
	5 / 7



INSIDE ELEVATION OF CURVED VANDAL PROTECTION FENCE
(IPS-1 SHOWN, PS-2 IS SIMILAR)



INSIDE ELEVATION OF STRAIGHT VANDAL PROTECTION FENCE
(IPS-3 SHOWN, PS-4 IS SIMILAR)

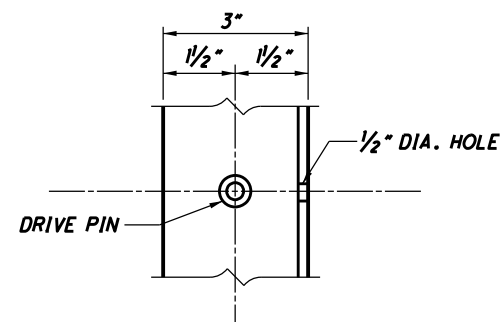


INSIDE ELEVATION OF FENCE AT EXPANSION JOINT
(IPS-2 IS SHOWN, ALL OTHER TYPES ARE SIMILAR)

NOTES

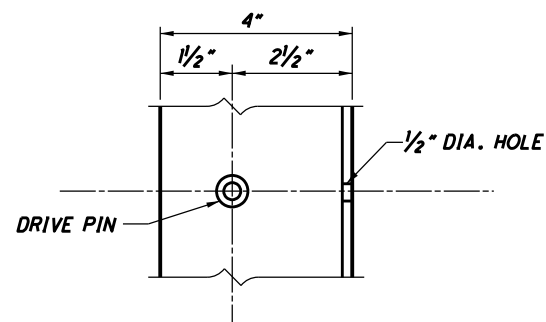
- BASE PLATES SHALL CLEAR PARAPET DEFLECTION CONTROL JOINTS BY 2\"/>

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OFFICE OF STRUCTURAL ENGINEERING		
STANDARD BRIDGE DRAWING		
VANDAL PROTECTION FENCE		
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VPF-1-90		
6		7



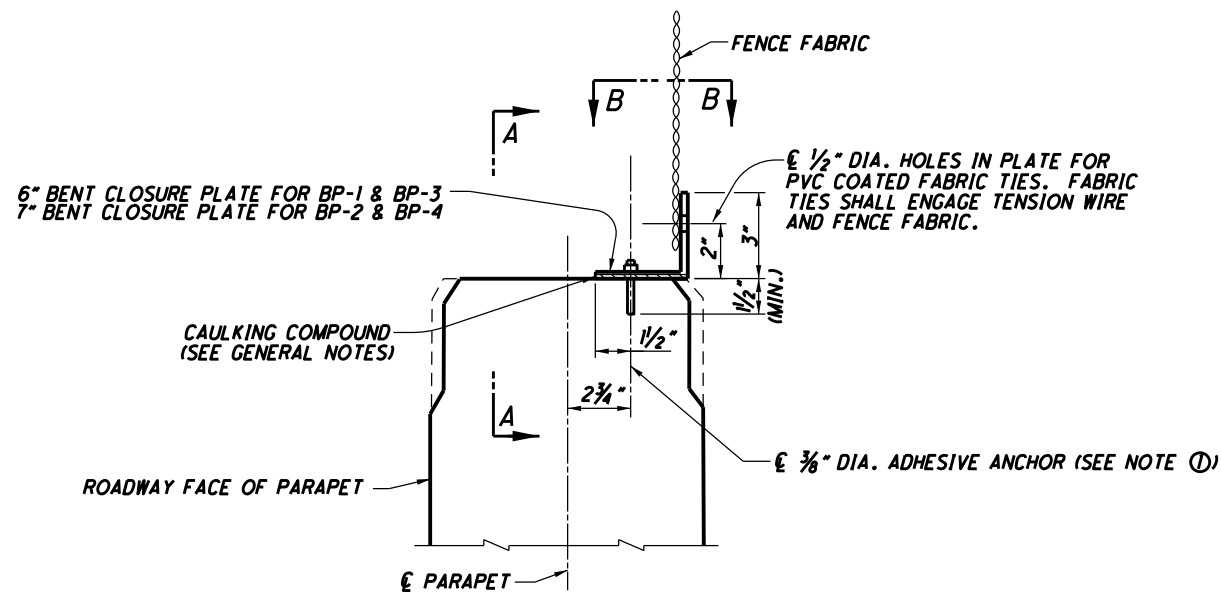
VIEW B-B

(FOR BP-1 & BP-3 BASE PLATES)

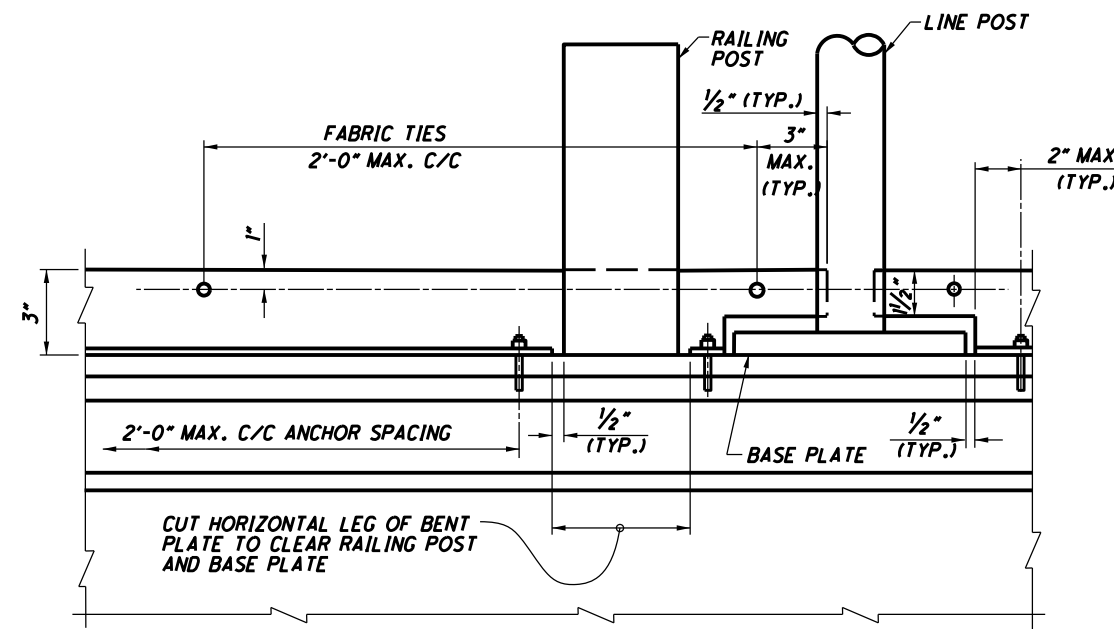


VIEW B-B

(FOR BP-2 & BP-4 BASE PLATES)



SECTION THRU PARAPET SHOWING FENCE CLOSURE PLATE ELEVATION



VIEW A-A

NOTES

STAINLESS STEEL CLOSURE PLATES: INSTALL CLOSURE PLATES FOR PS-1, PS-2 AND PS-3 POST SECTIONS, EXCEPT CLOSURE PLATES ARE NOT REQUIRED ON PS-4 OR SPECIAL INSTALLATIONS OF OTHER POST SECTIONS WITH BOTTOM RAILS ADDED AS NOTED ON SHEET 577.

- ① **ADHESIVE ANCHORS** SHALL BE STAINLESS STEEL, 3/8" x 1/2" (DIA. X LENGTH) WITH NUT AND WASHER. ANCHOR ADHESIVE SHALL BE ICCES REPORT AC308 COMPLIANT FOR USE IN CRACKED OR UNCRACKED APPLICATIONS. PROVIDE DOCUMENTATION THAT PRODUCT IS AC308 COMPLIANT. INSTALL ANCHORS ACCORDING TO MANUFACTURER'S INSTALLATION PROCEDURES PROVIDED IN THE ICCES AC308 PRODUCT EVALUATION REPORT.
- ② **STAINLESS STEEL BENT CLOSURE PLATES**, 6" (FOR BP-1 & BP-3) OR 7" (FOR BP-2 & BP-4), SHALL BE 10 GAGE ASTM A240, TYPE 304 WITH A NO. 1 FINISH.