MaineDOT

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Standard Details

November 2014 Edition

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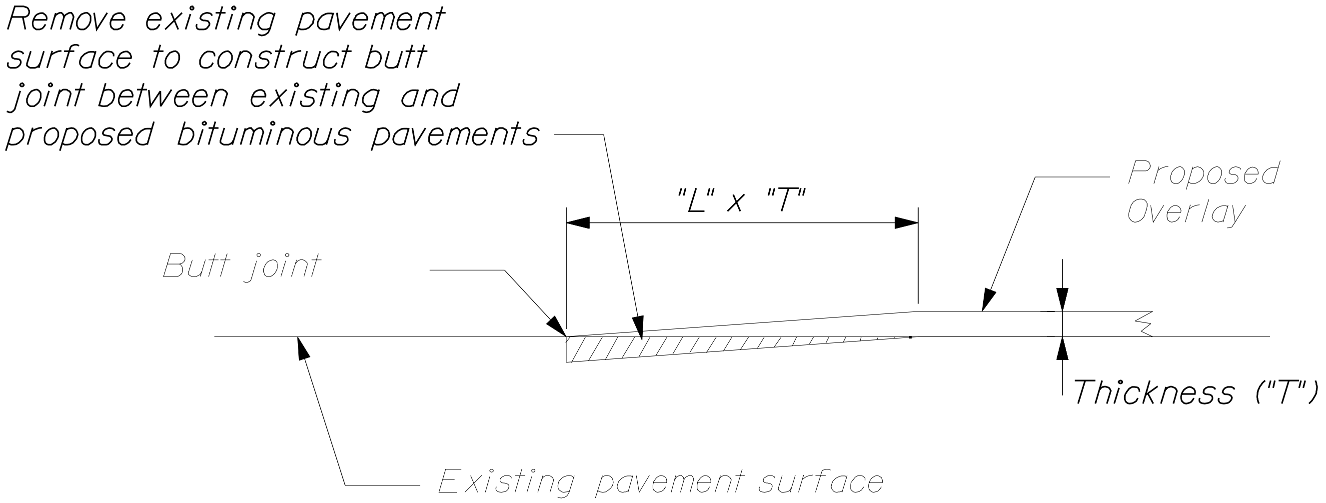
DIVISION 200

EARTHWORK



Design or posted speed (miles/h):	65	55	50	45	40	35	30	25
"L" in feet/inch of thickness:	65	55	50	45	40	35	30	25

NOTES:

1. The above lengths are intended for profile grades of 2% or less. When profile grades are greater than 2% "L" may be adjusted to suit field conditions when directed by the Resident.

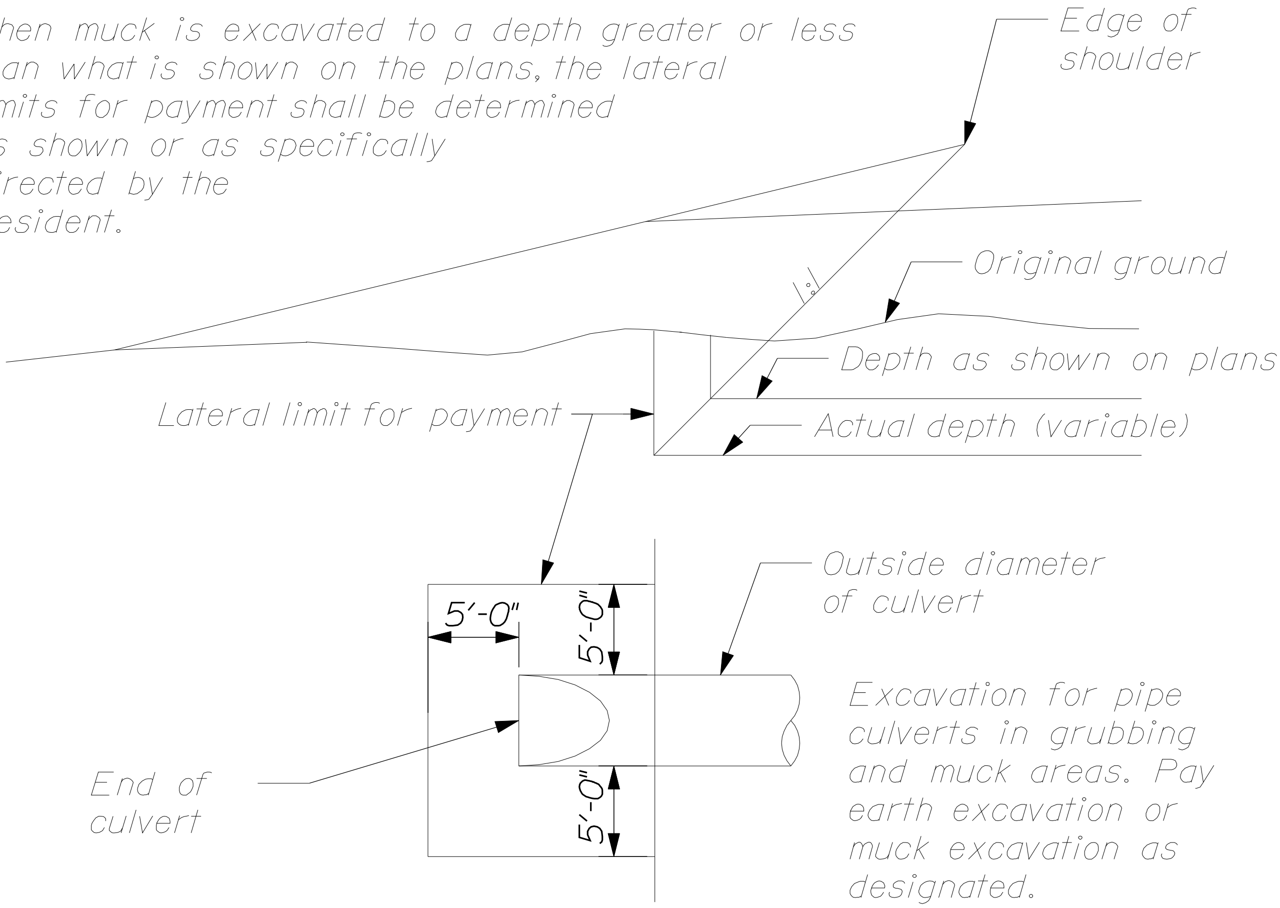
2. When constructing Butt Joints at intersections or ramps "L" shall be 15′/inch of thickness unless otherwise directed by the Resident.

3. Special attention shall be paid to curb sections to assure proper drainage and that there are no flat areas. "L" may be adjusted to suit field conditions when directed by the Resident.

PAVEMENT OVERLAY
BUTT JOINT DETAIL (ROADWAYS)

202(01)

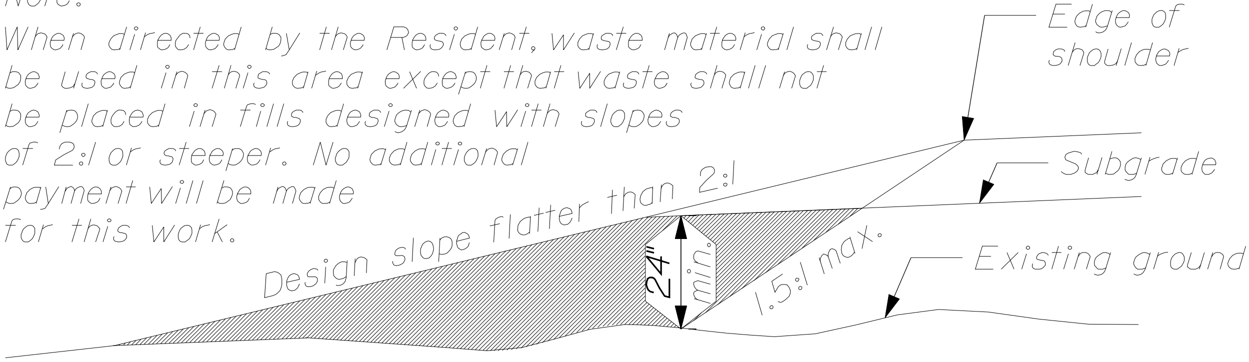
NOTE:
When muck is excavated to a depth greater or less than what is shown on the plans, the lateral limits for payment shall be determined as shown or as specifically directed by the Resident.



Excavation for pipe culverts in grubbing and muck areas. Pay earth excavation or muck excavation as designated.

~ MUCK EXCAVATION PAY LIMITS ~

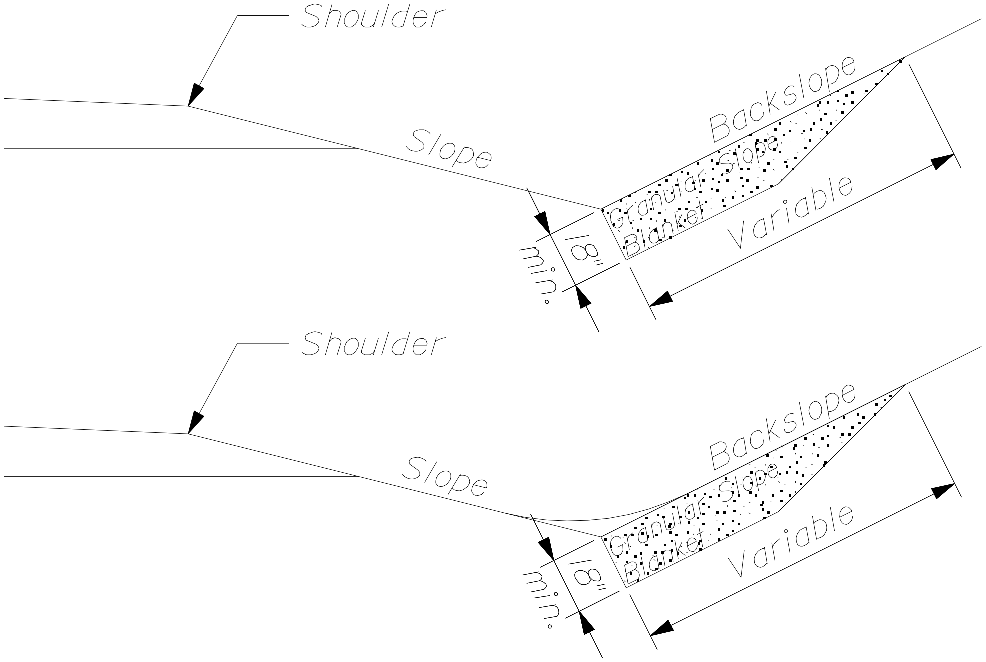
Note:
When directed by the Resident, waste material shall be used in this area except that waste shall not be placed in fills designed with slopes of 2:1 or steeper. No additional payment will be made for this work.



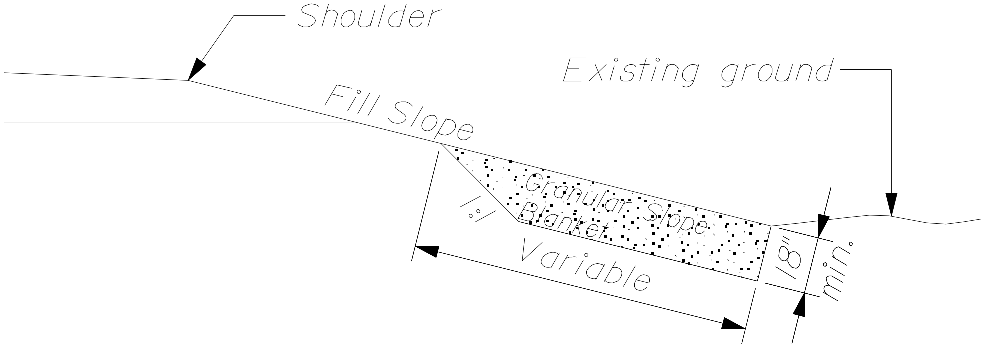
~ DISPOSAL OF WASTE MATERIALS ~
(Waste Storage Area)

MUCK EXCAVATION AND WASTE DISPOSAL

203(01)



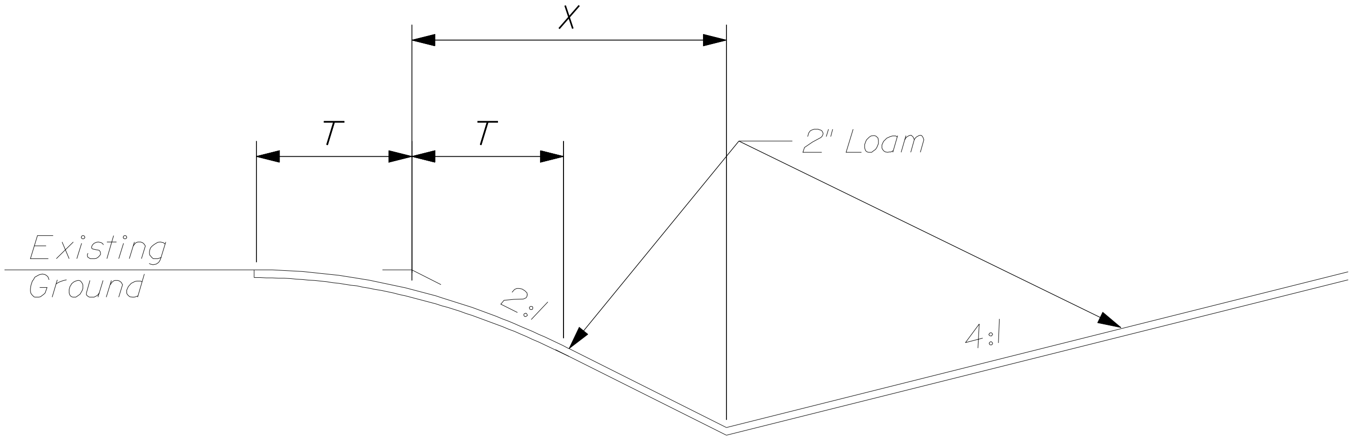
~ SLOPE BLANKET - BACKSLOPE ~



~ SLOPE BLANKET - FILL SLOPE ~

SLOPE BLANKETS

203(02)



When:

X > 5′, Then T= 5′

$X \leq 5'$, Then T= X

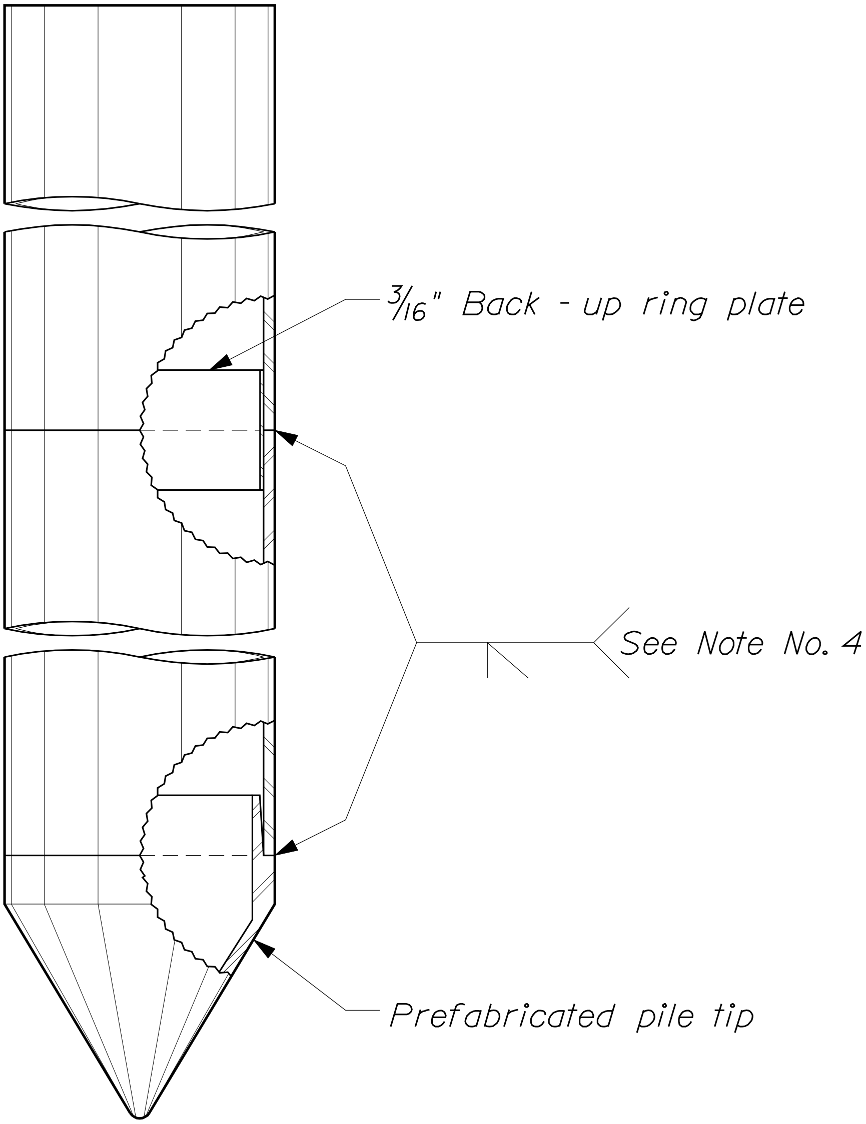
This formula may be modified in the field by the Resident to avoid property damage.

BACK-SLOPE ROUNDING DETAIL

203(03)

DIVISION 500

STRUCTURES



~ PIPE PILE DETAIL ~

NOTES:

1. Pile diameter and wall thickness shall be as indicated on the Design Drawings.

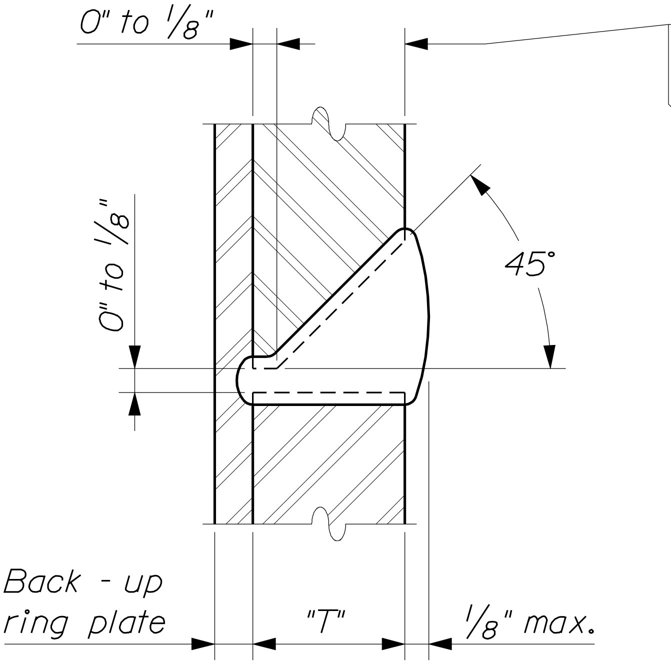
2. Pile tips shall be prefabricated cast steel tips with 60° conical points and internal flanges. Pile tips shall be approved by the Engineer.

3. Prefabricated internal splicer sleeves may be used if approved by the Engineer.

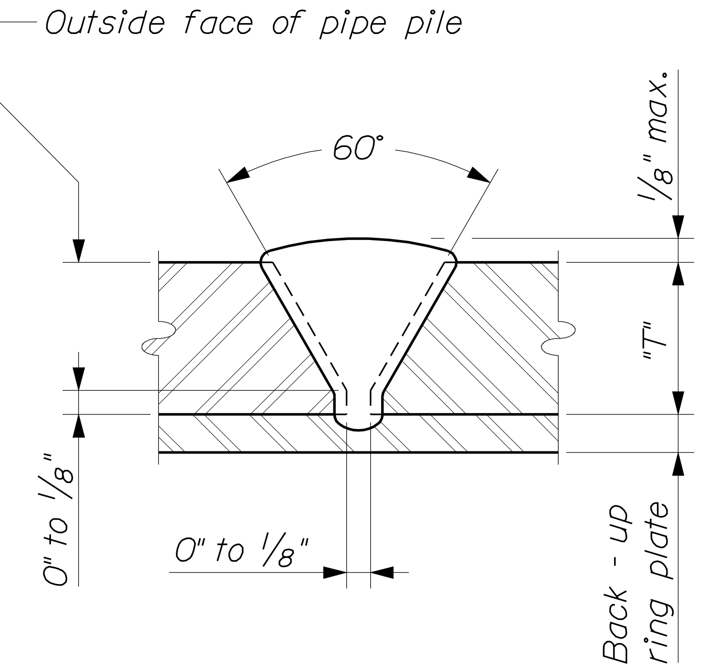
4. Refer to "Pipe Pile Splice" details for welding procedures.

PIPE PILES

501(01)



~ VERTICAL POSTION ~



~ HORIZONTAL POSITION ~

TABLE OF WELD SIZES	
Base Metal Thickness "T"	Minimum Number of Passes
3/8", 7/16"	3
1/2", 9/16", 5/8"	4
11/16", 3/4", 13/16"	5

NOTES:

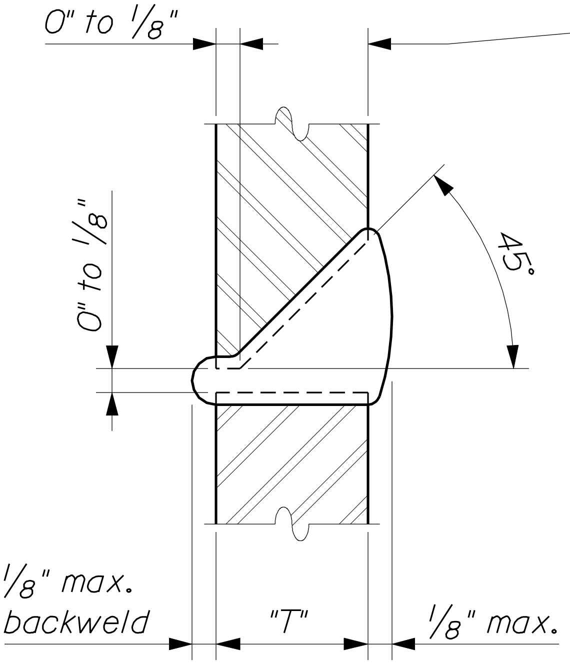
1. All cutting shall be done with the use of a mechanical guide.

2. Use Manual Shielded - Arc Process and 6010 or 6011 electrodes, unless a different process has been approved by the Engineer.

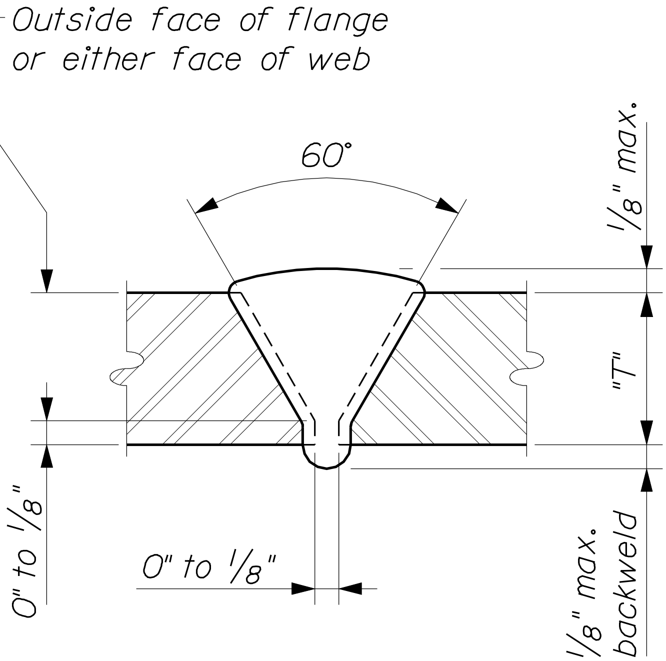
3. Electrodes shall be dry when used, in accordance with A.W.S. Specification D1.5, as amended by AASHTO.

PIPE PILE SPLICE

501(02)



~ VERTICAL POSTION ~



~ HORIZONTAL POSITION ~

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3/8", 7/16"	3
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NOTES:

1. All cutting shall be done with the use of a mechanical guide.

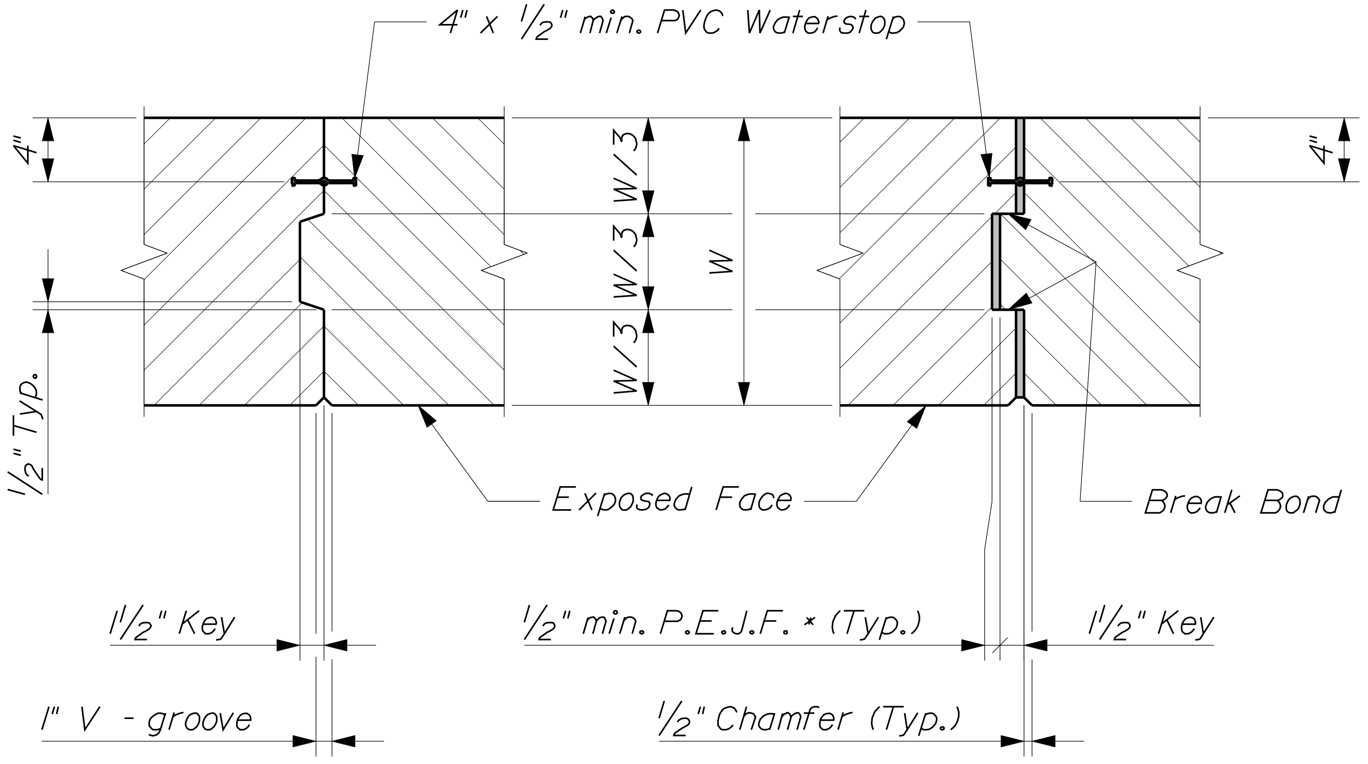
2. Use Manual Shielded - Arc Process and 6010 or 6011 electrodes, unless a different process has been approved by the Engineer.

3. Electrodes shall be dry when used, in accordance with A.W.S. Specification D1.5, as amended by AASHTO.

4. Gouge root before welding the second side.

H - PILE SPLICE

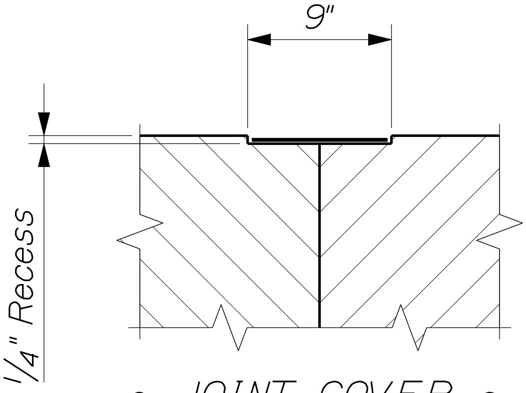
501(03)



~ VERTICAL CONSTRUCTION OR CONTRACTION JOINT ~

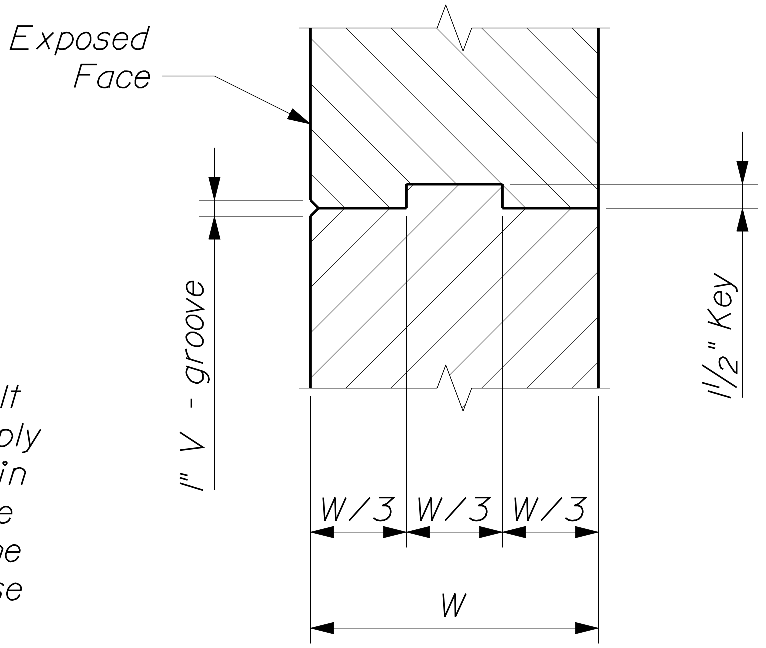
~ VERTICAL EXPANSION JOINT ~

* Preformed Expansion Joint Filler



~ JOINT COVER ~

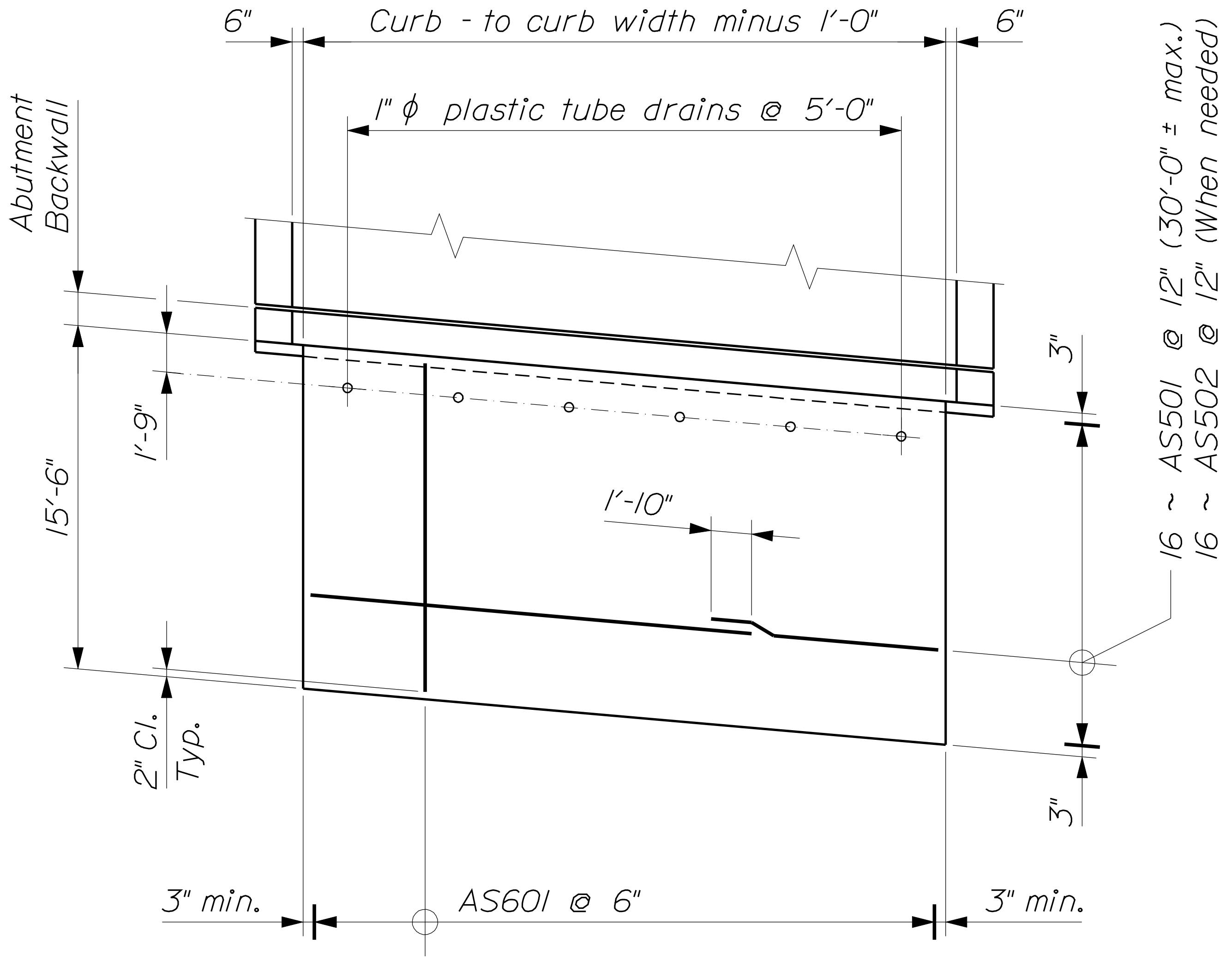
Apply 2 layers of heavy roofing felt using plastic roofing cement, or apply 1 layer of membrane waterproofing in accordance with Section 508 of the Standard Specifications. Recess the area to be covered unless otherwise indicated on the plans. Use where PVC waterstops cannnot be used and on horizontal joints where there is potential for leakage through the wall.



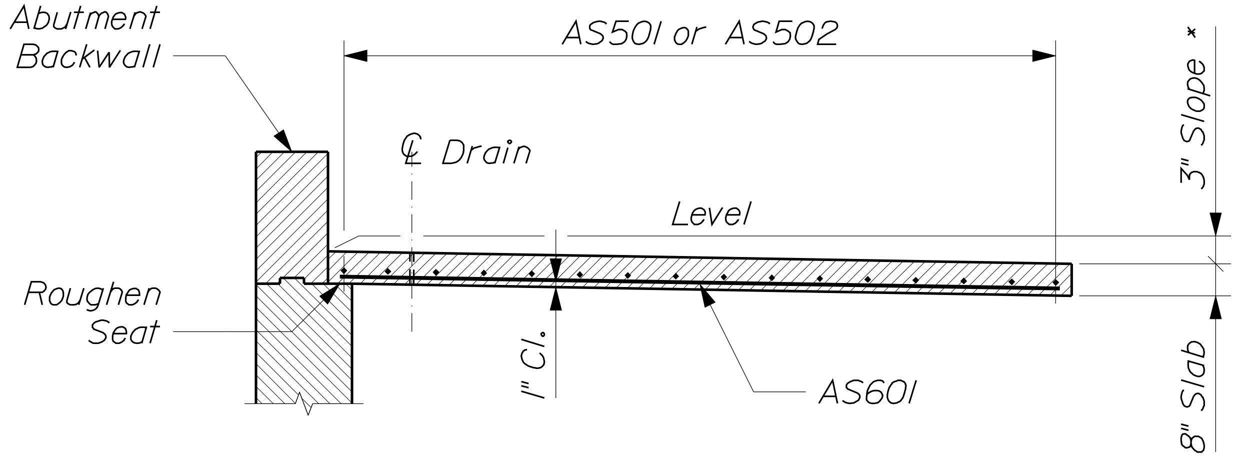
~ HORIZONTAL CONSTRUCTION JOINT ~

CONCRETE JOINTS

502(01)



~ PLAN ~

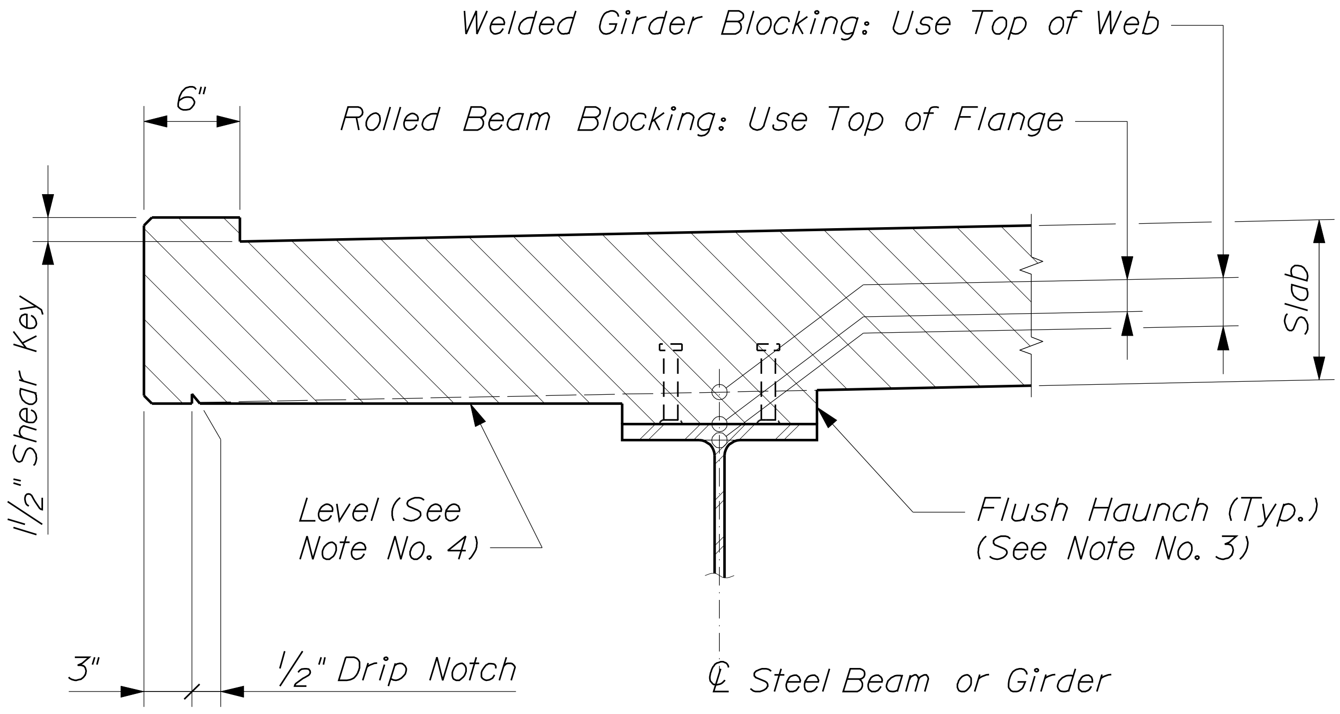


* or match roadway grade, whichever is greater

~ SECTION ~

CONCRETE APPROACH SLAB

502(02)



~ SLAB DETAILS ~

NOTES:

1. Shear key and drip notch details are typical for all superstructure designs.

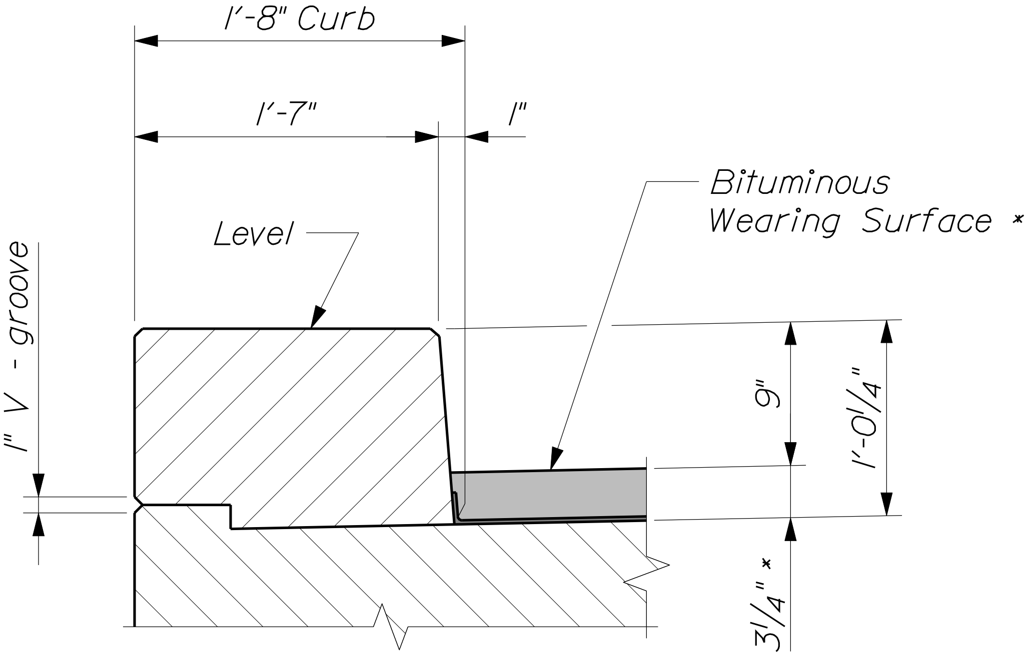
2. Blocking dimensions for construction shall be determined using the "Bottom of Slab Elevations" table shown on the Design Drawings. Theoretical Blocking will be given for reference purposes only. Do not use Theoretical Blocking for setting formwork.

3. Blocking on all beams shall be formed using the flush haunch detail shown.

4. On curved superelevated structures, where the distance between the exterior beam and the fascia varies over the length of the deck, the bottom of the slab overhang shall follow the superelevation cross - slope.

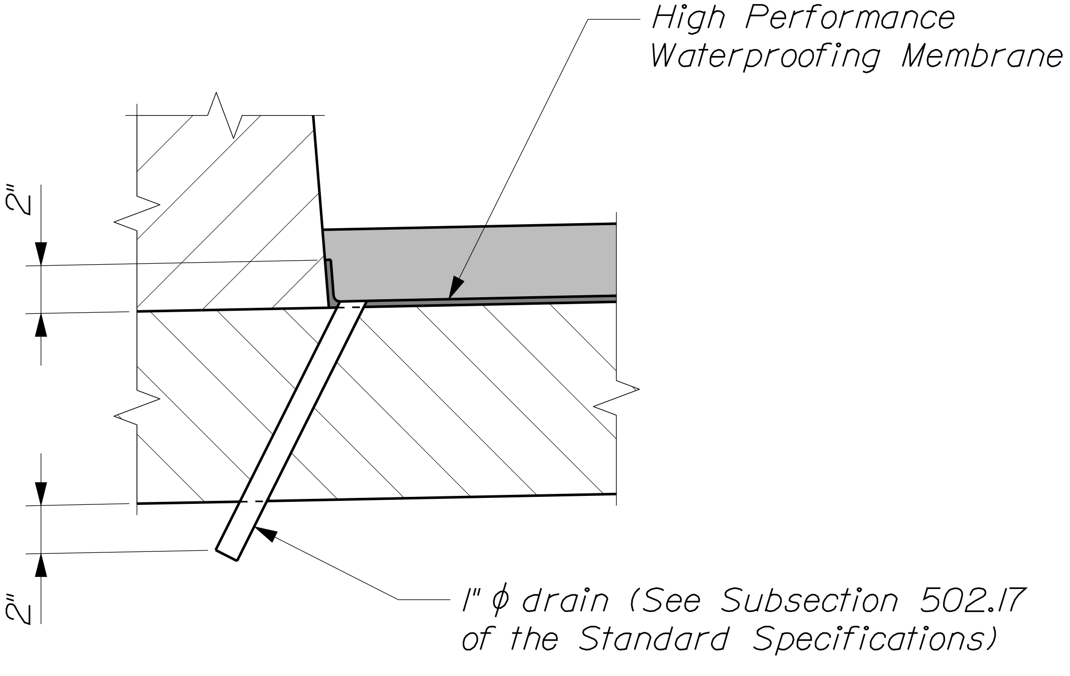
COMPOSITE CONCRETE SUPERSTRUCTURE SLAB

502(03)



~ CURB WITH BITUMINOUS WEARING SURFACE ~

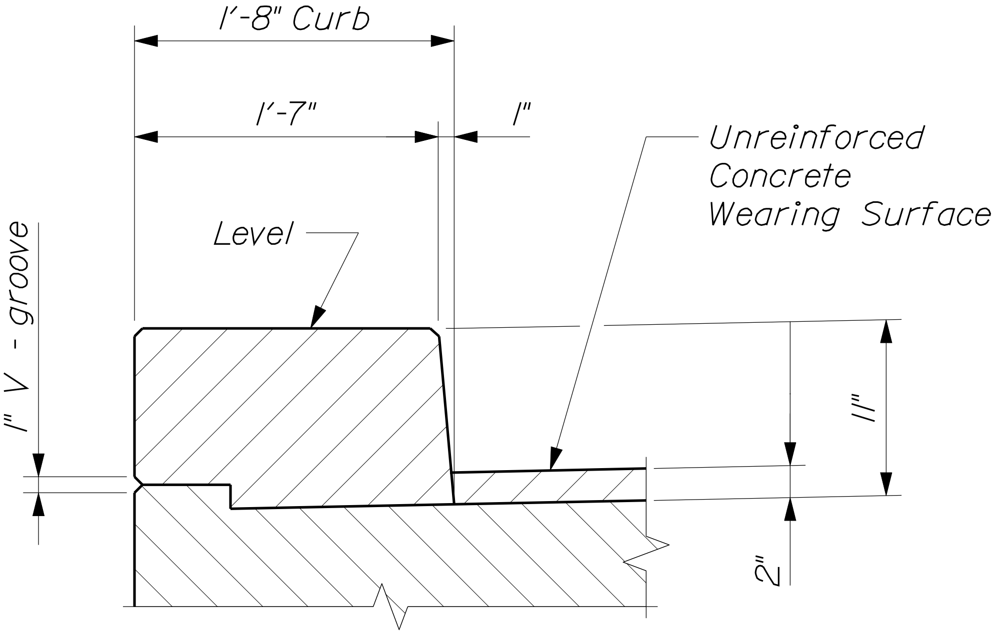
* 3" Hot Mix Asphalt + $1/4$" (nom.) High Performance Waterproofing Membrane



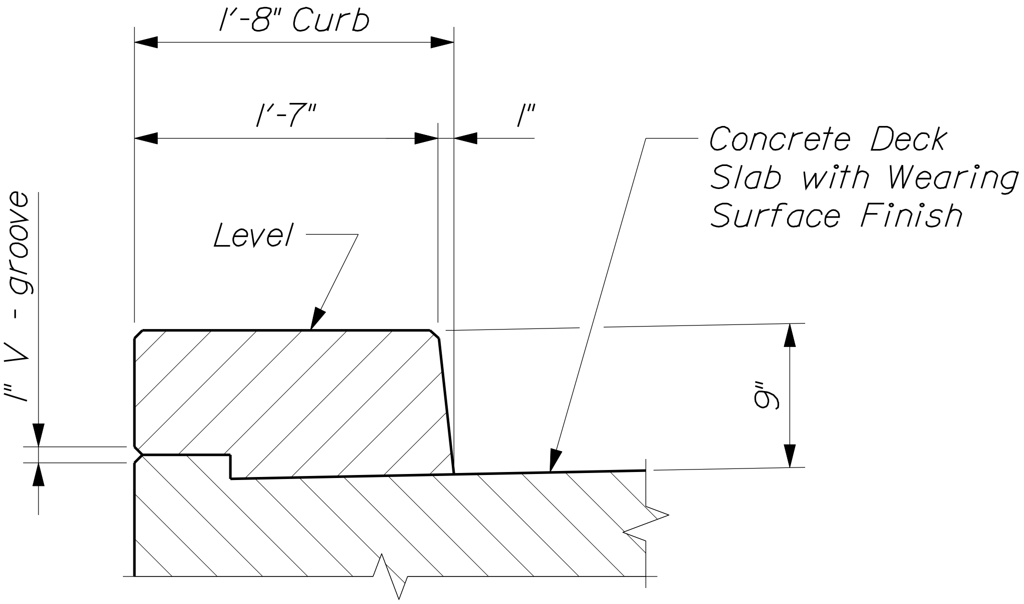
~ GUTTER DETAIL FOR BITUMINOUS W. S.~

CONCRETE CURB

502(04)



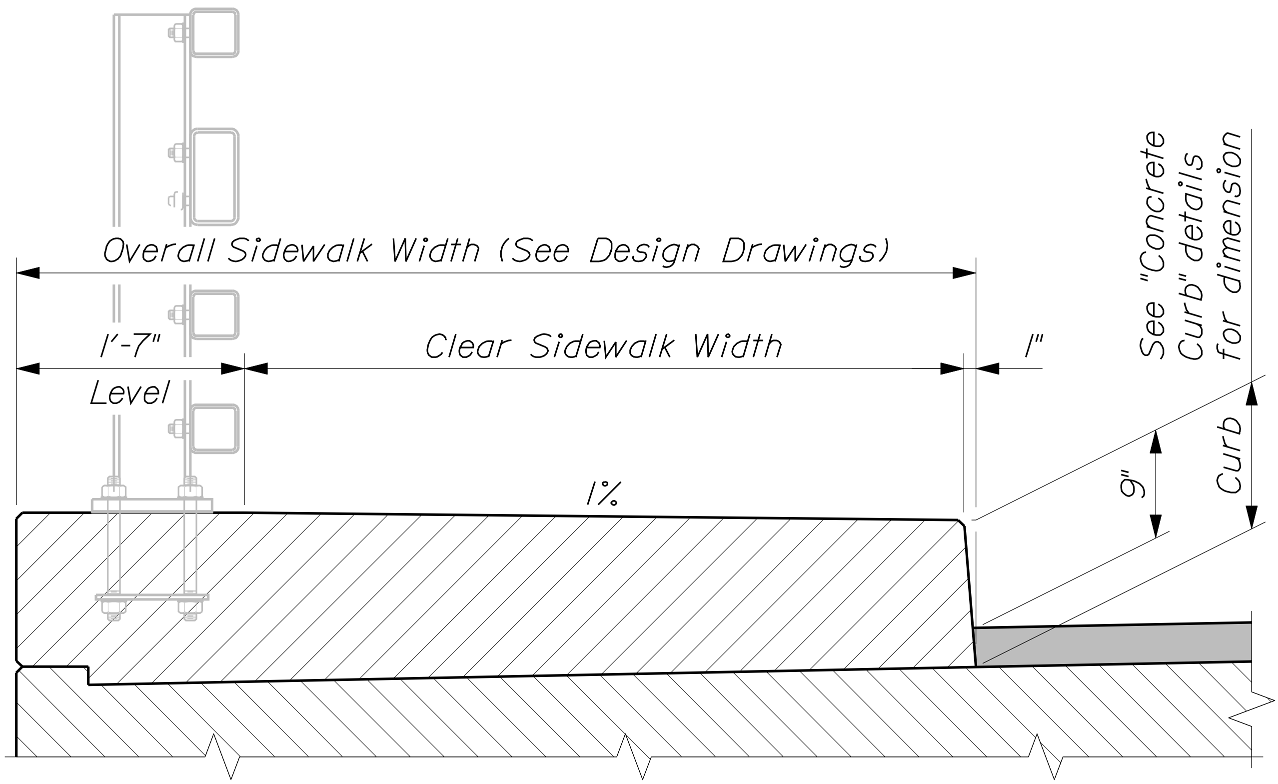
-- CURB WITH CONCRETE WEARING SURFACE --



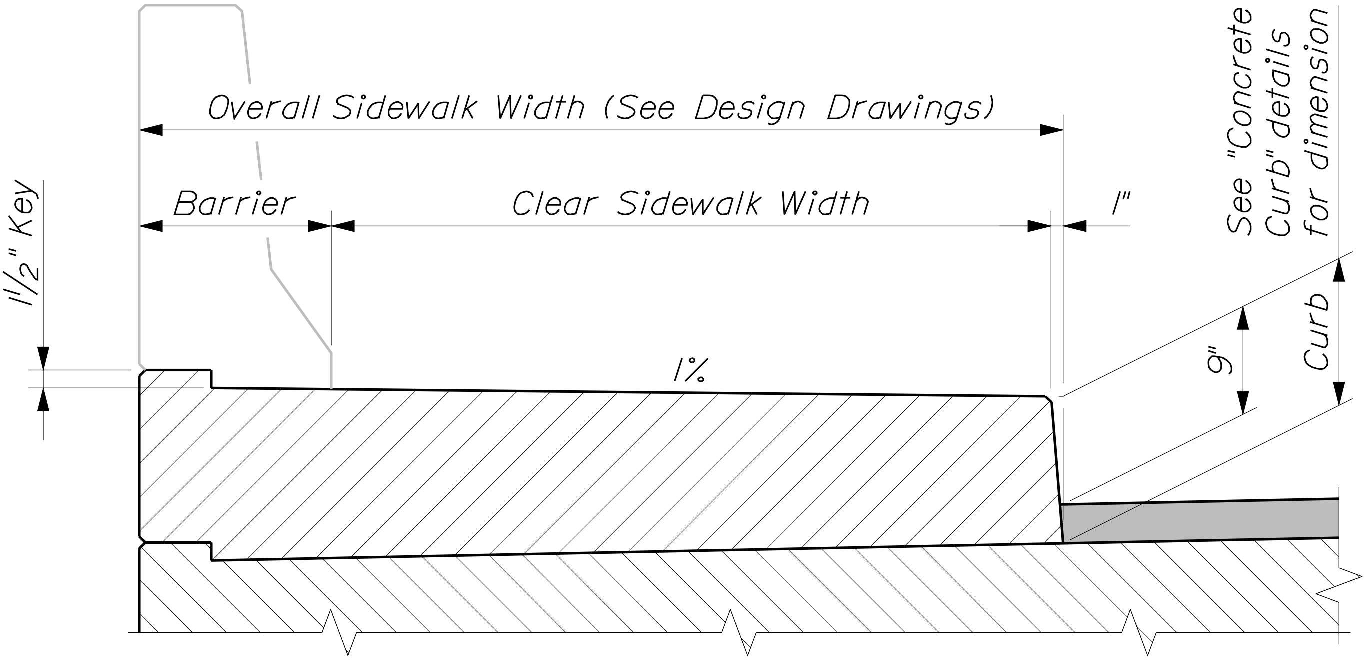
-- CURB WITH INTEGRAL WEARING SURFACE --

CONCRETE CURB

502(05)



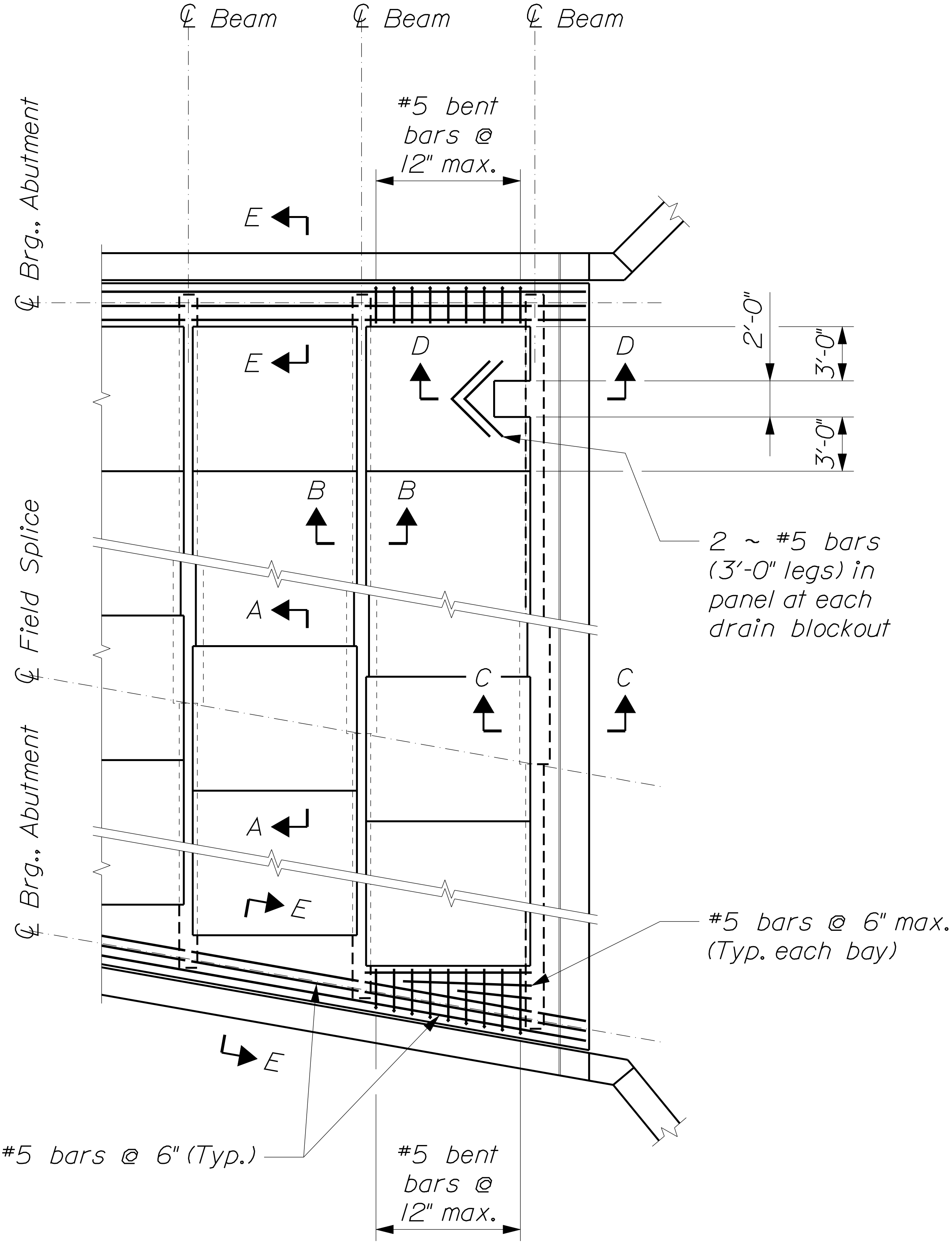
~ WITH STEEL BRIDGE RAILING ~



~ WITH PERMANENT CONCRETE BARRIER ~

CONCRETE SIDEWALK ON BRIDGES

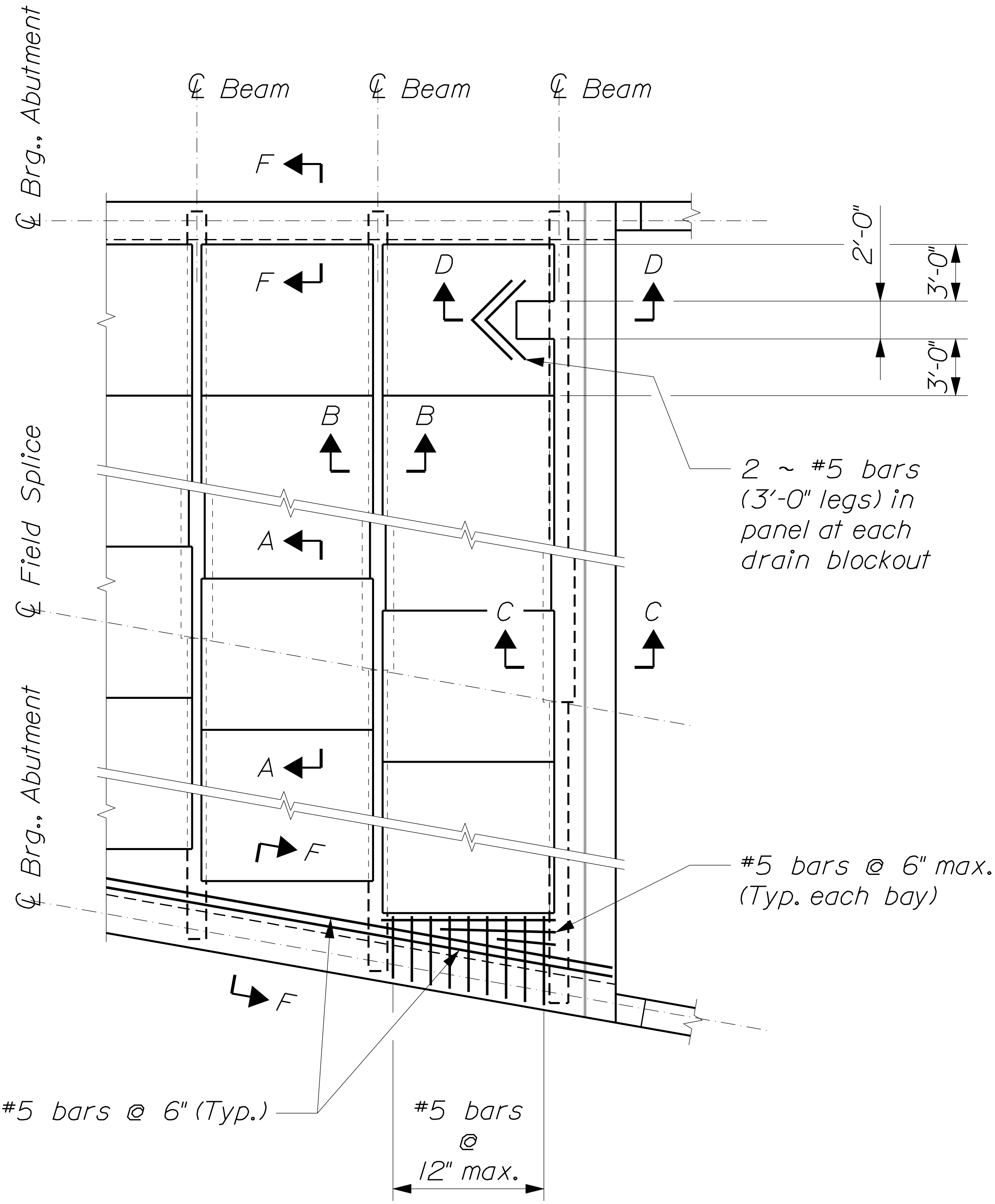
502(06)



~ LAYOUT PLAN (Cantilevered Abutments) ~

PRECAST CONCRETE DECK PANELS

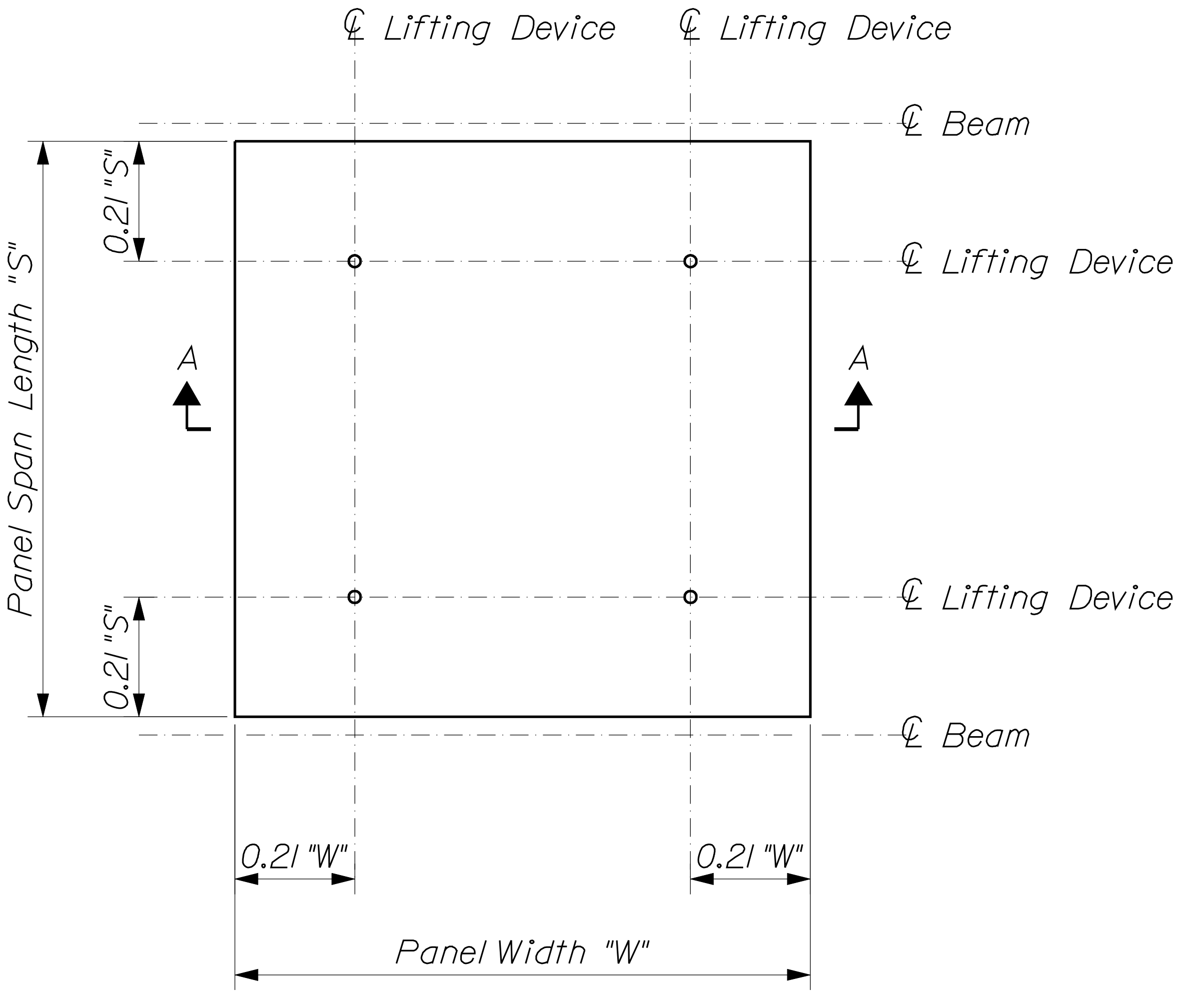
502(07)



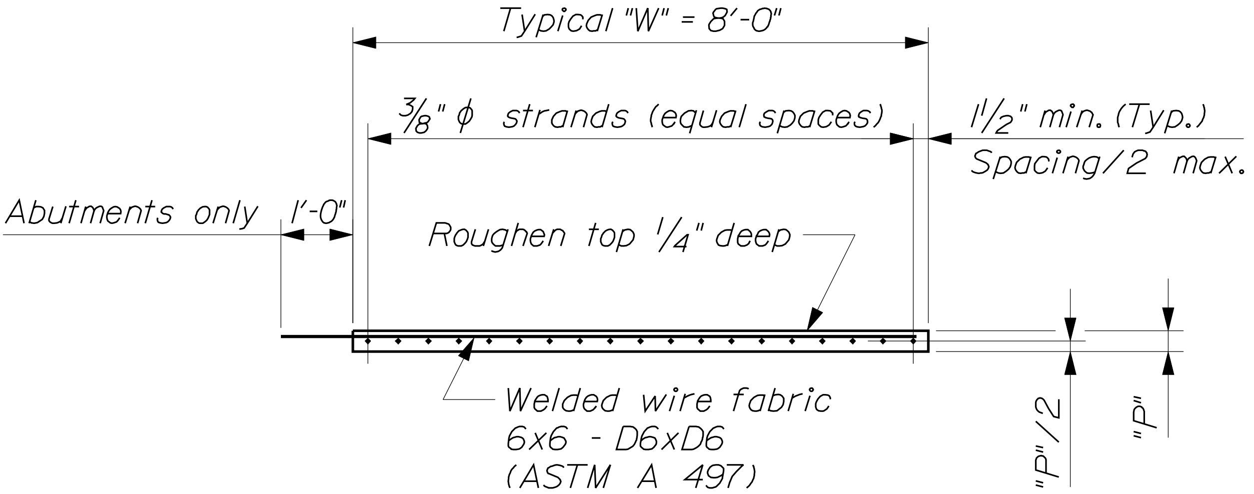
~ LAYOUT PLAN (Integral Abutments) ~

PRECAST CONCRETE DECK PANELS

502(08)



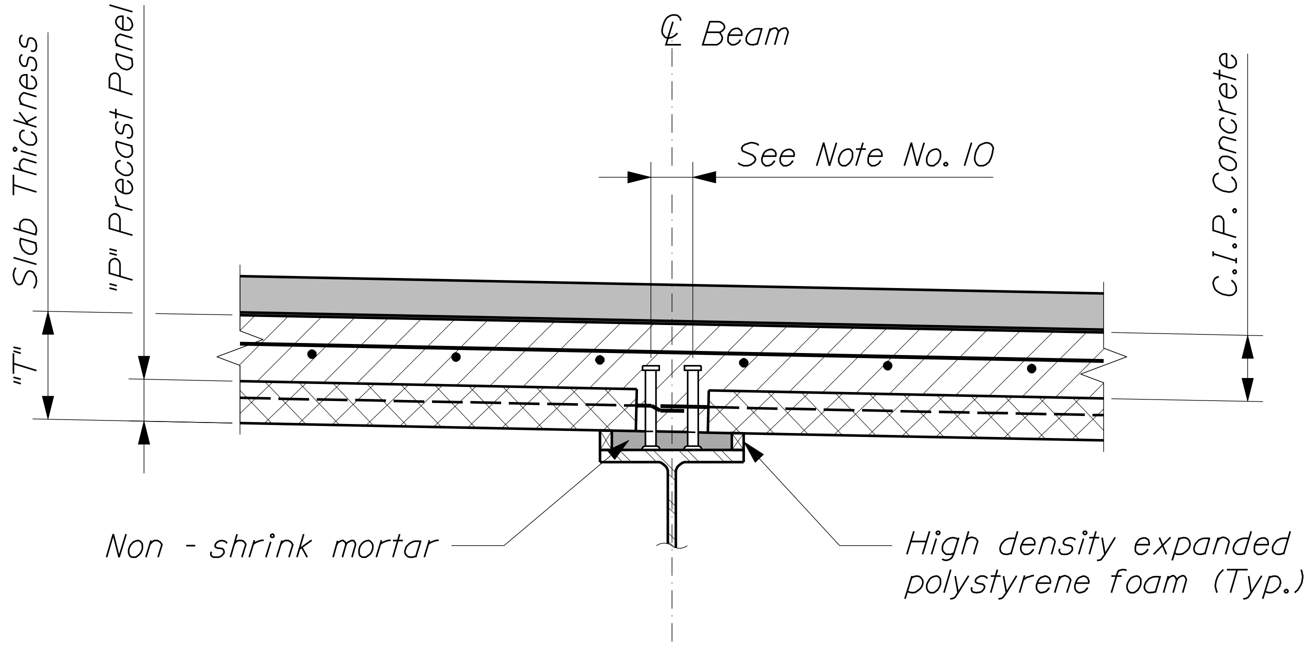
~ PRECAST PANEL PLAN ~



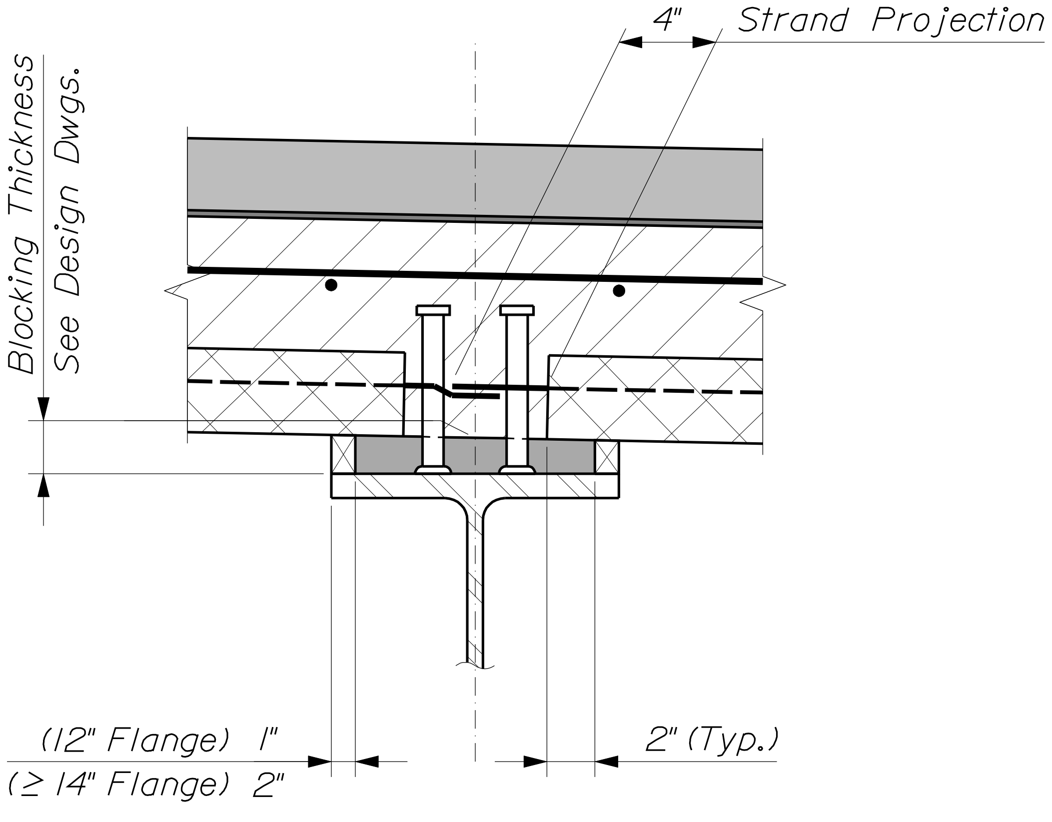
~ SECTION A-A ~

PRECAST CONCRETE DECK PANELS

502(09)



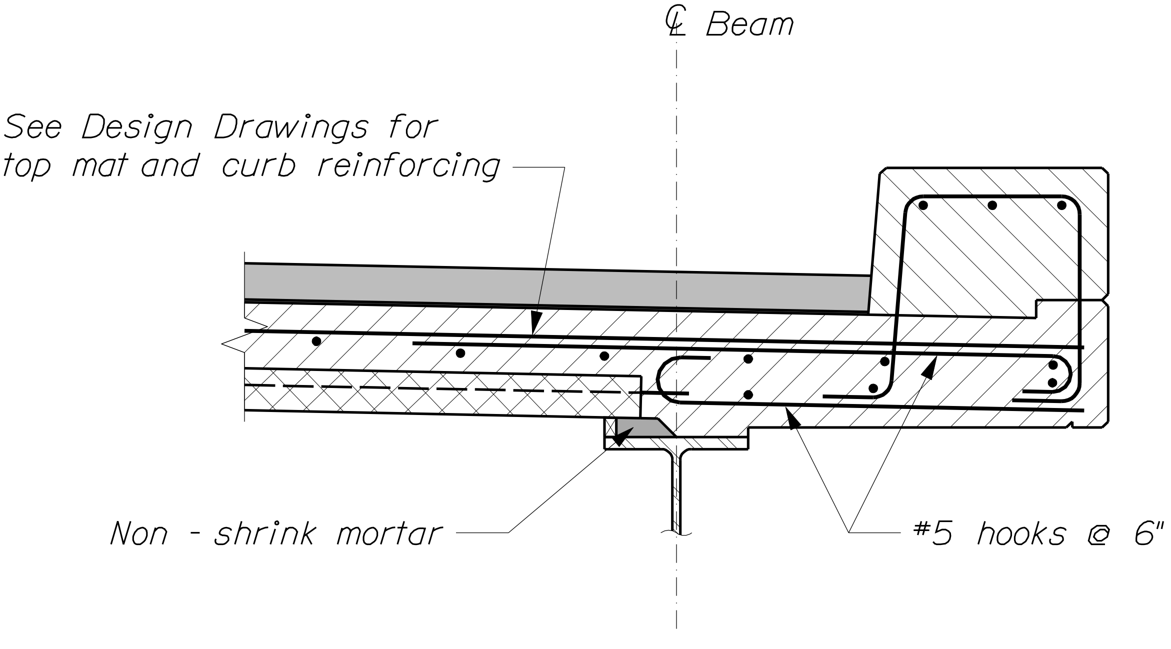
~ SECTION B-B ~



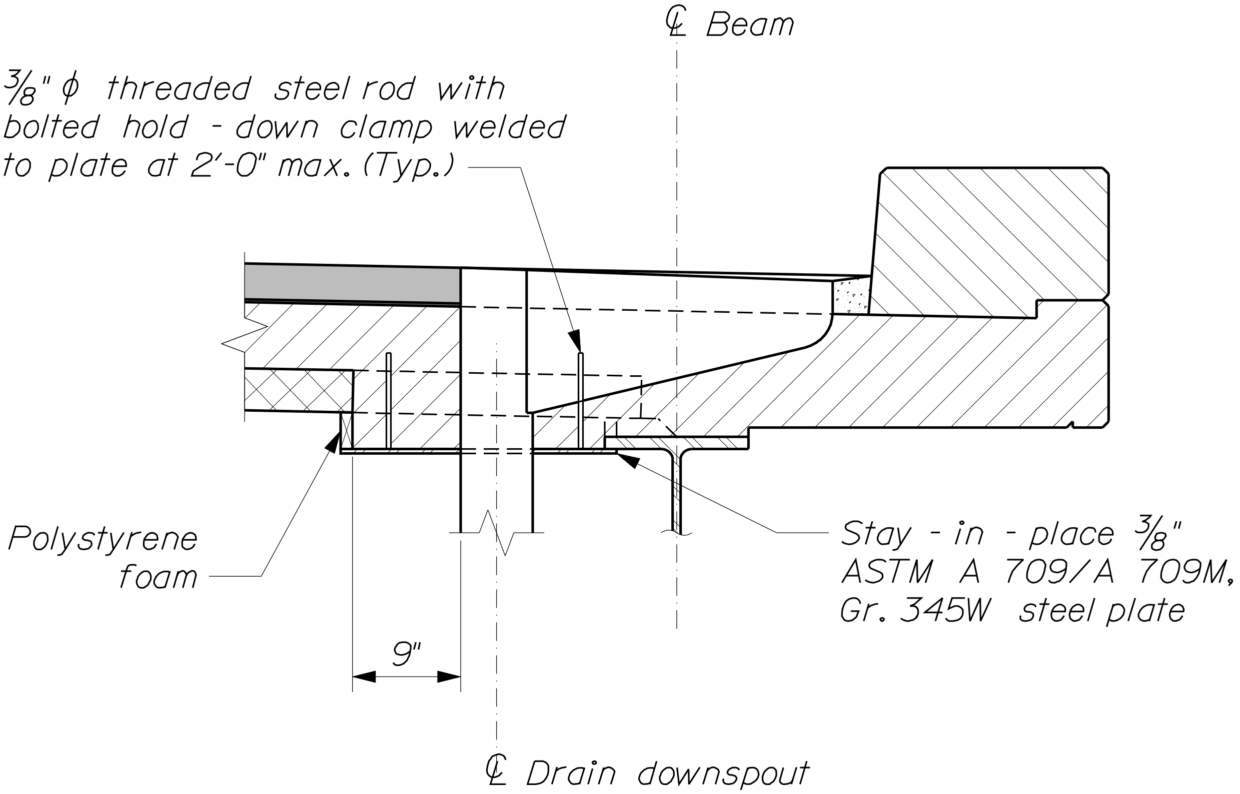
~ BLOCKING DETAIL ~

PRECAST CONCRETE DECK PANELS

502(10)



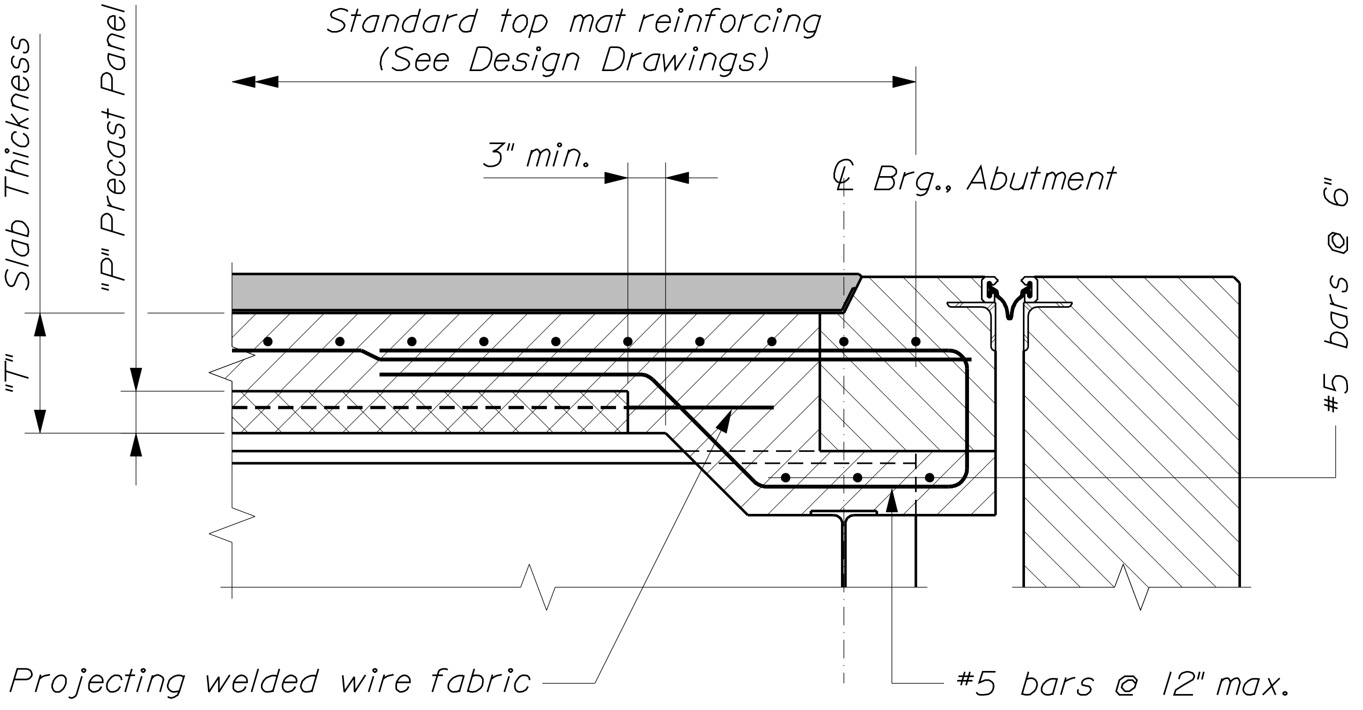
~ SECTION C-C ~



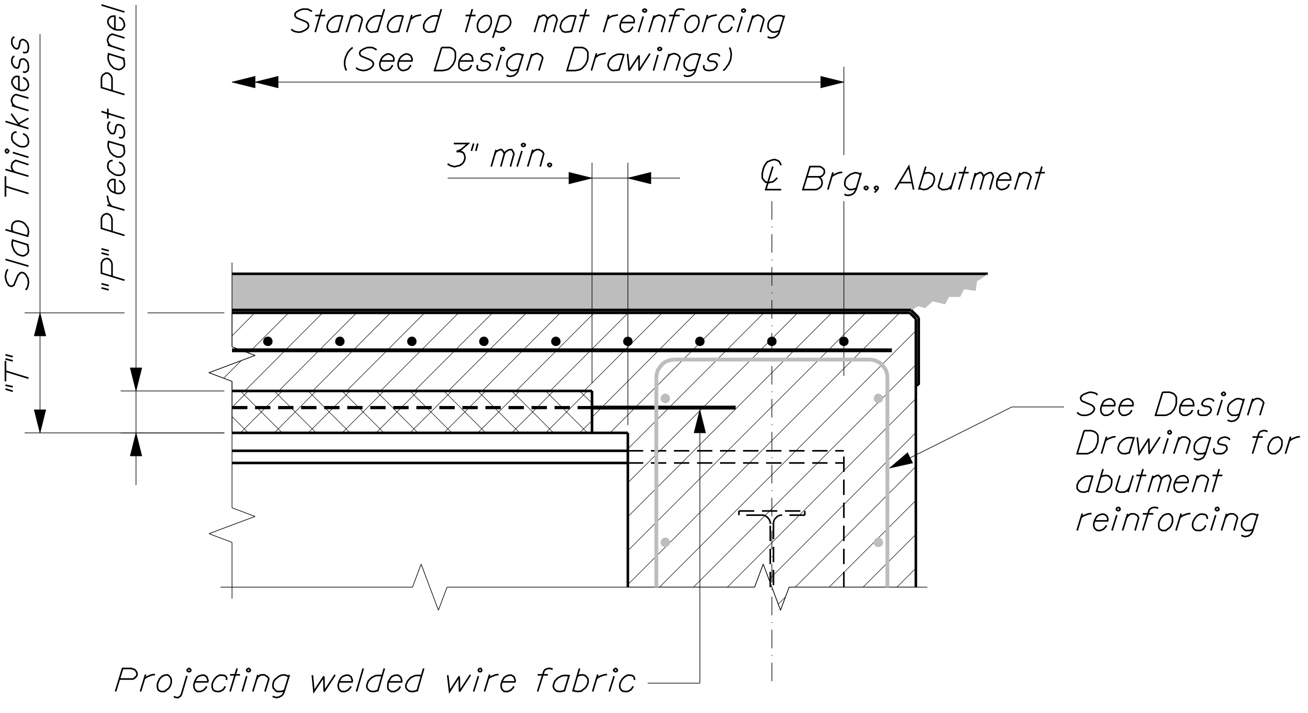
~ SECTION D-D ~

PRECAST CONCRETE DECK PANELS

502(II)



~ SECTION E-E (Cantilevered Abutment) ~



~ SECTION F-F (Integral Abutment) ~

PRECAST CONCRETE DECK PANELS

PRECAST PANELS ON STEEL GIRDERS

Panel Type	Maximum Girder Spacing	Slab "T"	Panel "P"	Number of Strands		
				Flange Width		
				1'-0"	≤ 1'-6"	≤ 2'-0"
A1	7'-6"	8"	3½"	15	15	15
A2	8'-0"	8"	3½"	15	15	15
A3	8'-6"	8"	3½"	17	16	16
A4	9'-0"	8"	3½"	19	17	17
A	9'-6"	8"	3½"	21	19	18
B	10'-0"	8½"	3½"	22	21	19
C	10'-6"	9"	3½"	24	22	20
D	11'-0"	9½"	3½"	27	24	22
E	11'-6"	10"	3½"	30	27	25
F	12'-0"	10½"	3½"	33	30	28

NOTES:

1. Precast Concrete Deck Panels shall be fabricated in accordance with Section 535 of the Standard Specifications.

2. The contractor shall submit working drawings showing the exact layout of panel types and sizes.

3. Refer to the Design Drawings for structures with curved beams or angled splices.

4. Joints at expansion piers shall be treated similarly to the abutment joint details.

5. Panel widths of less than 8'-0" may be used. Provide strands in the ratio of the smaller panel width to 8'-0", multiplied by the number of strands given in the table, rounding up to the next even number of strands. The minimum panel width is 3'-0"

6. Prestressing strands shall be ⅜-in. diameter Grade 270 seven - wire low relaxation strands conforming to the requirements of ASTM A 416. Initial tension shall be 17.2 kips per strand.

(Continued)

PRECAST CONCRETE DECK PANELS

502(13)

NOTES (Continued):

7. A mat of #3 reinforcing bars spaced at 6 inches O.C. in each direction may be substituted for welded wire fabric. The welded wire fabric or the reinforcing bars shall have the same corrosion resistance characteristics and/or coating system as the reinforcing steel used in the cast - in - place portion of the deck slab.

8. Concrete for panels shall have a minimum 28 day compressive strength of 5000 psi and a minimum release strength of 4000 psi. Permeability shall be as required for the cast - in - place portion of the deck slab.

9. Precast deck panels require the use of 7-in. long shear connectors rather than the standard 5-in. length. Payment for any additional costs will be considered incidental to the precast deck panel pay item.

10. Where 1'-0" wide girder flanges are specified on the Design Drawings, the transverse shear connector spacing shall be 3½ inches rather than the standard 6-in. spacing.

11. When flange thicknesses differ or flange cover plates are used, the temporary blocking thickness shall vary. Precast panels shall align vertically to within ¼ inch.

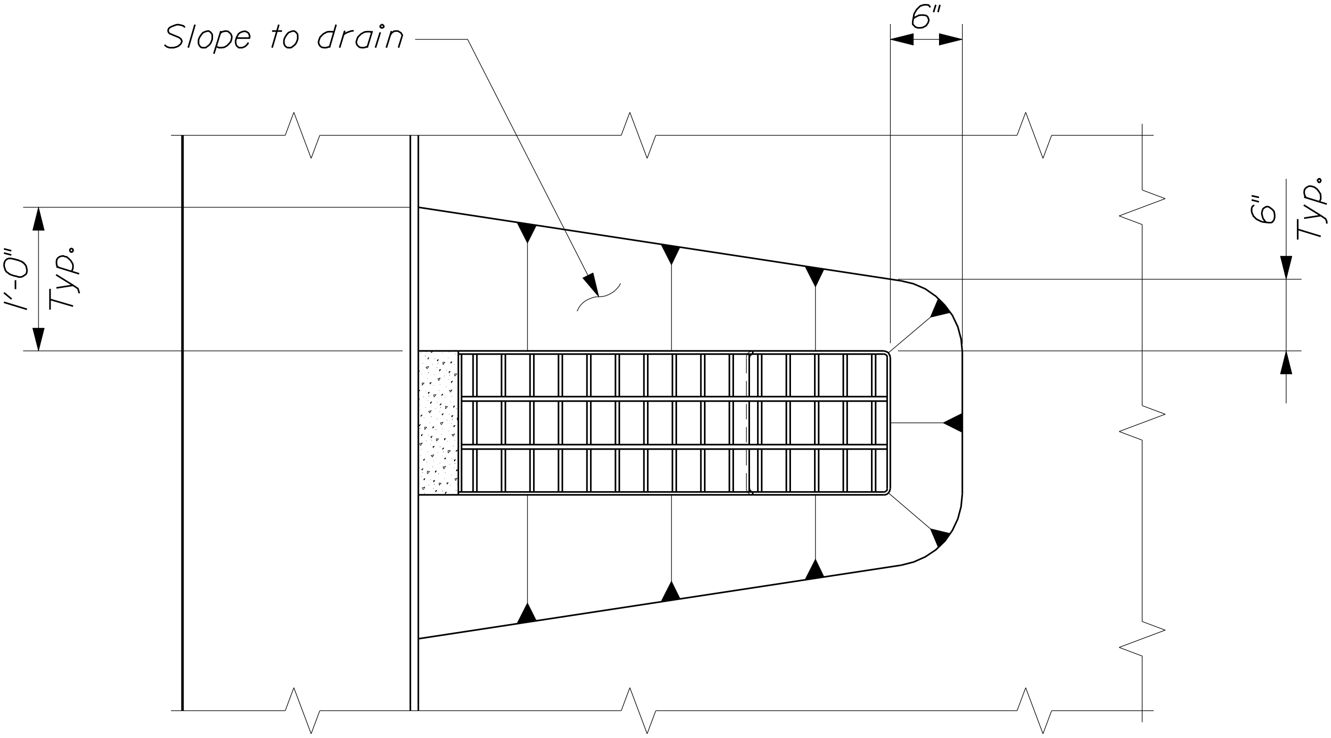
12. High - density expanded polystyrene foam shall be cut in the field to the required thickness.

13. Mortar to be used for support under the deck panels shall have an approved high range water reducing additive.

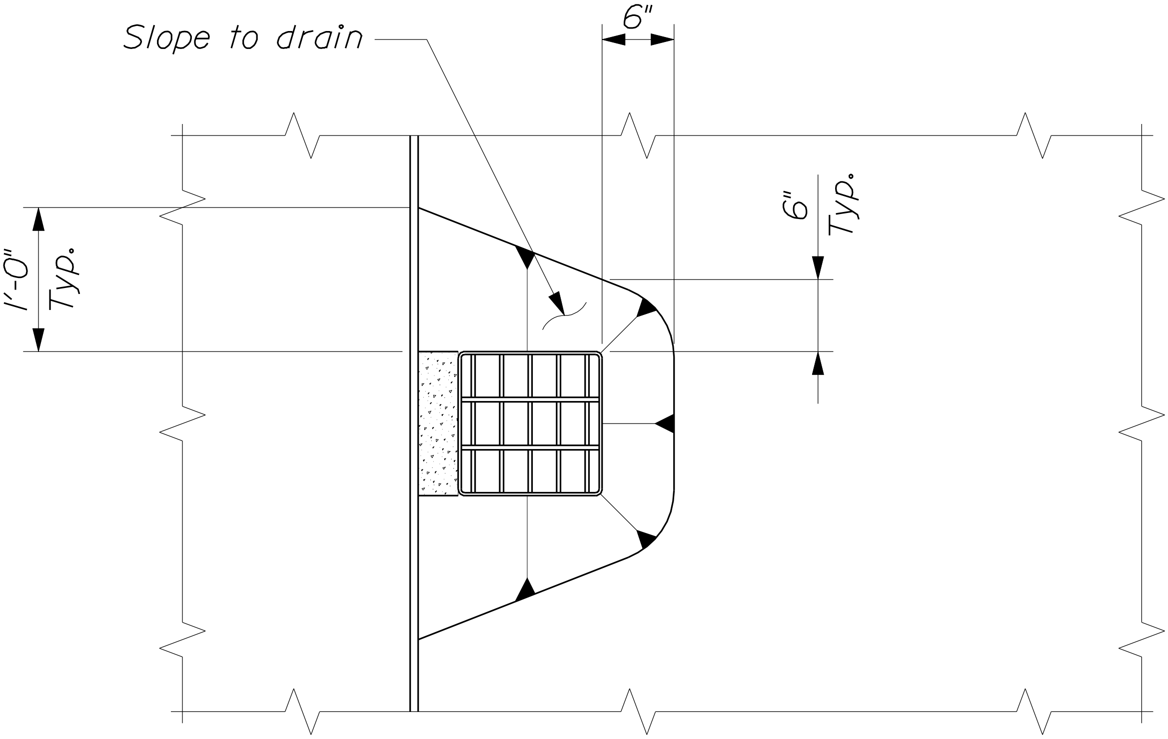
14. The specific reinforcing steel layout for the cast - in - place portions of the slab shall be as shown on the Design Drawings.

15. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

PRECAST CONCRETE DECK PANELS



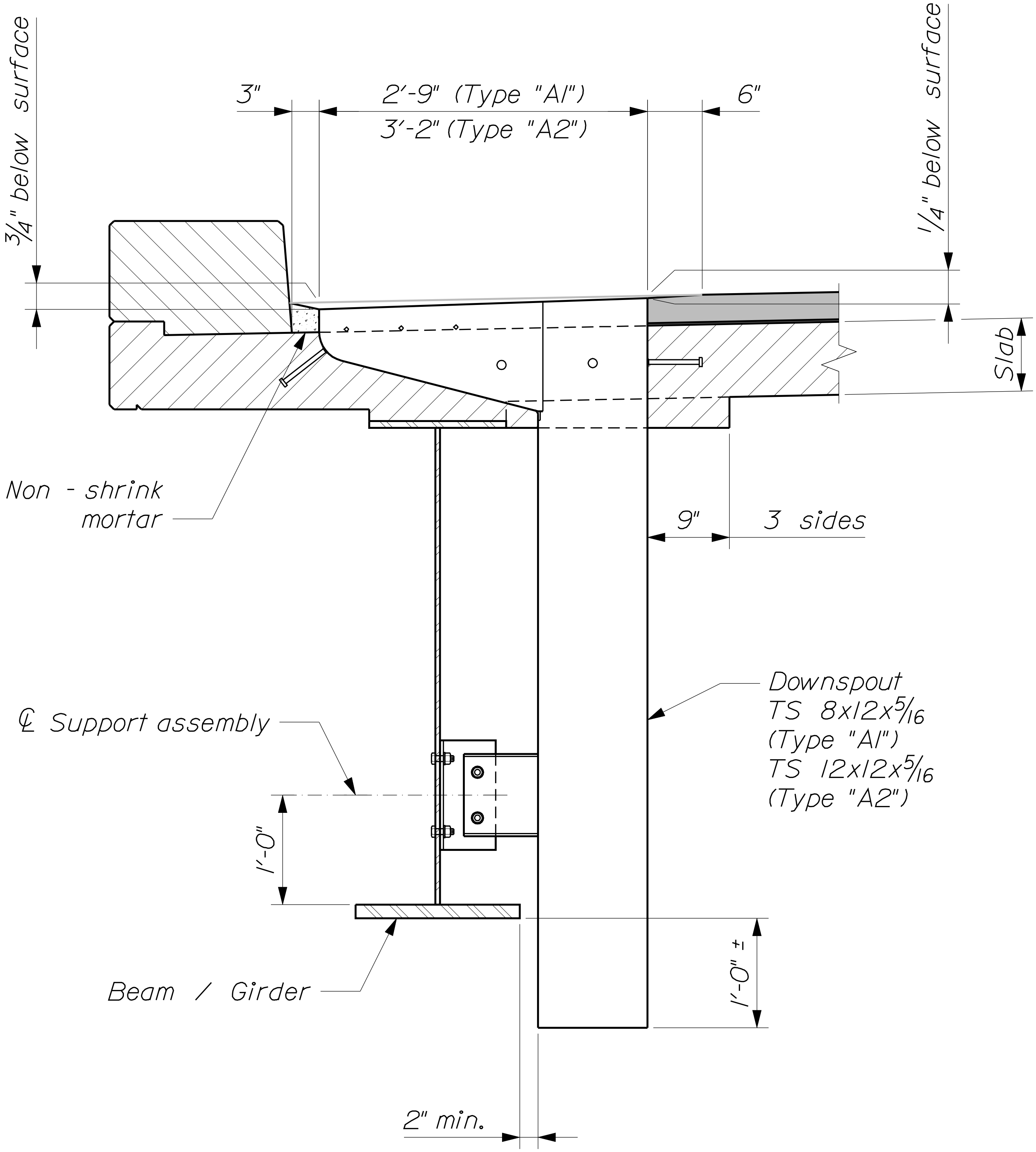
~ BRIDGE DRAIN TYPE "A1" OR "A2" PLAN ~



~ BRIDGE DRAIN TYPE " B" OR "C" PLAN ~

BRIDGE DRAINS

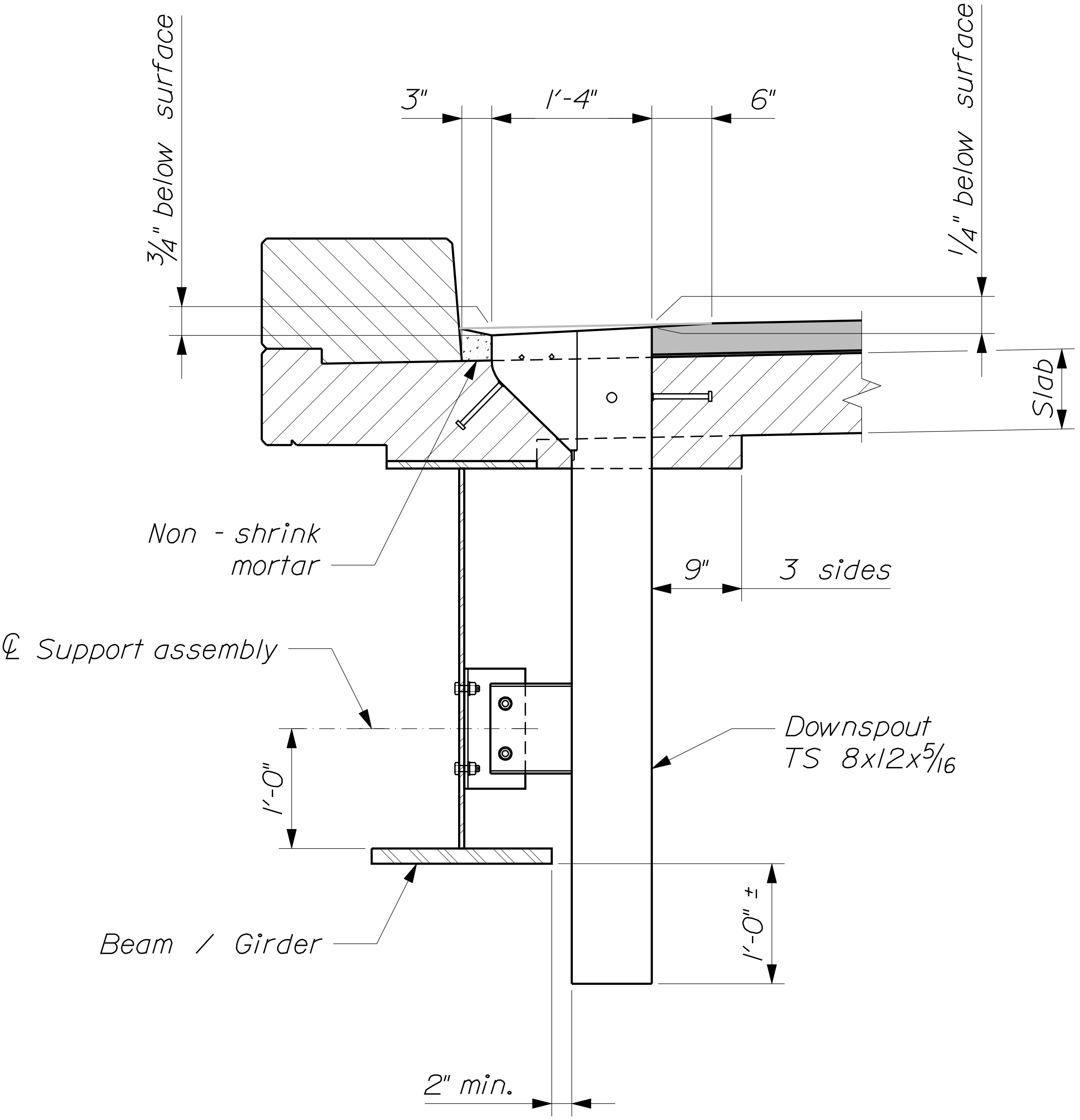
502(15)



~ BRIDGE DRAIN TYPE "A1" OR "A2" ELEVATION ~

BRIDGE DRAINS

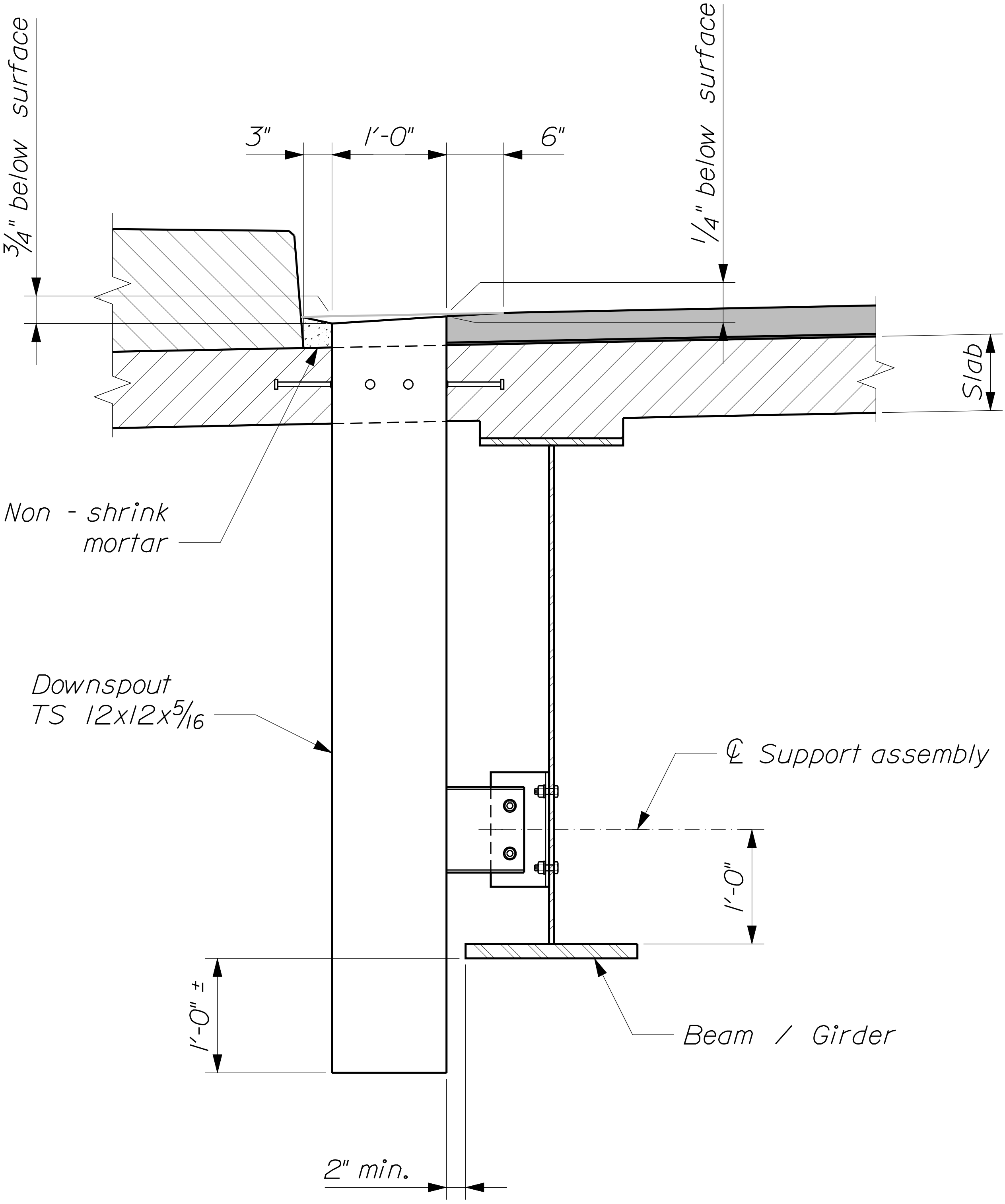
502(16)



~ BRIDGE DRAIN TYPE "B" ELEVATION ~

BRIDGE DRAINS

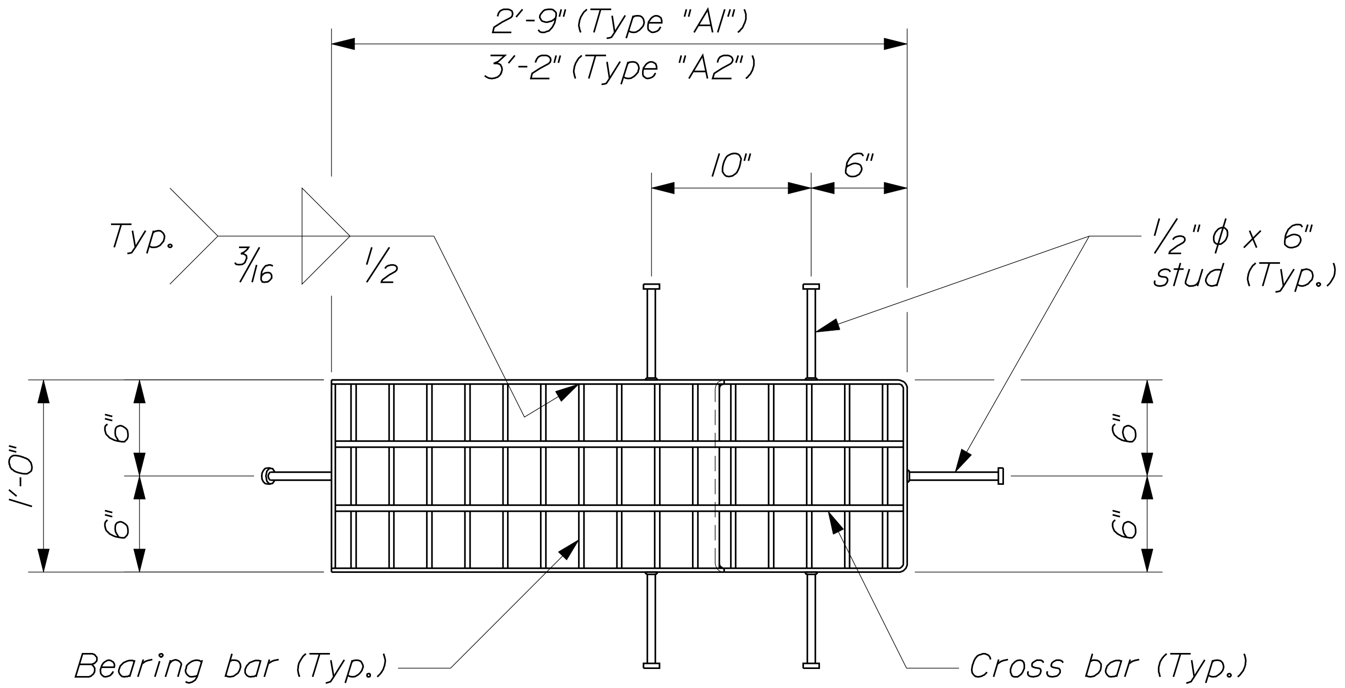
502(17)



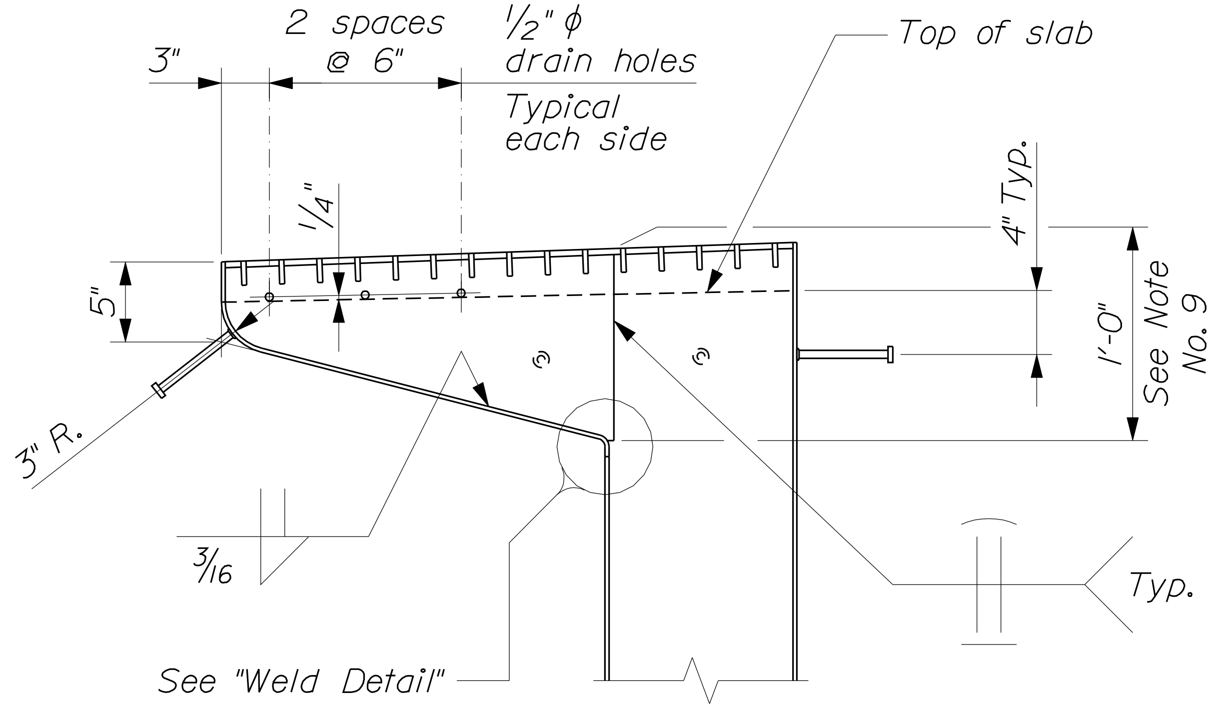
~ BRIDGE DRAIN TYPE "C" ELEVATION ~

BRIDGE DRAINS

502(18)



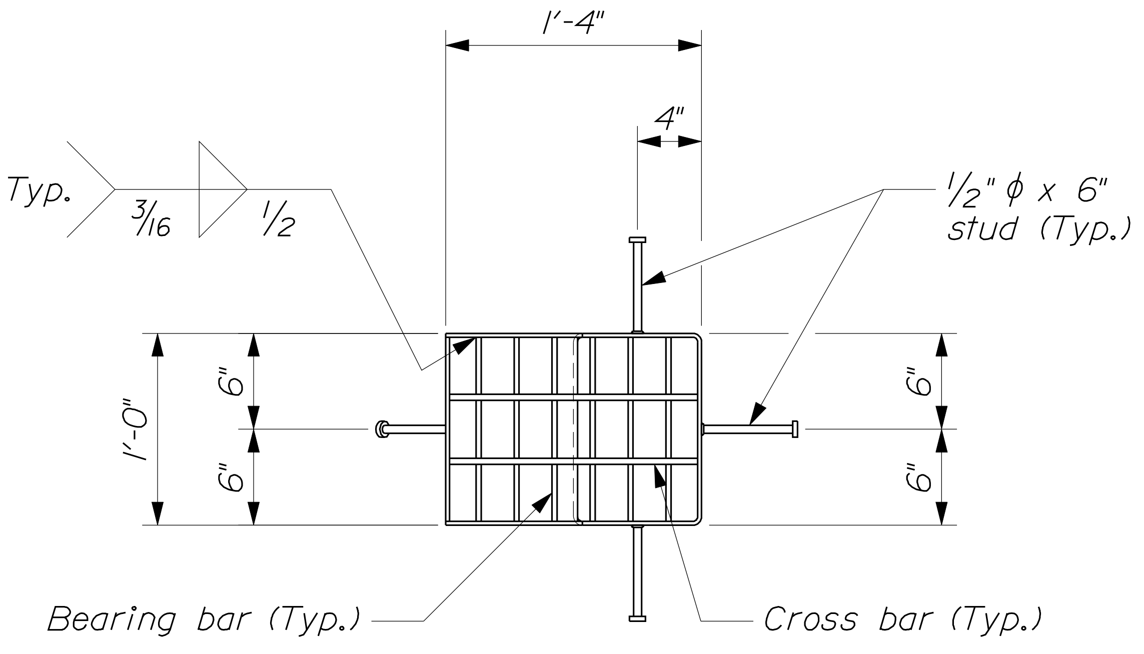
~ DRAIN TYPE "A1" OR "A2" TOP VIEW ~



~ DRAIN TYPE "A1" OR "A2" SECTION ~

BRIDGE DRAINS

502(19)



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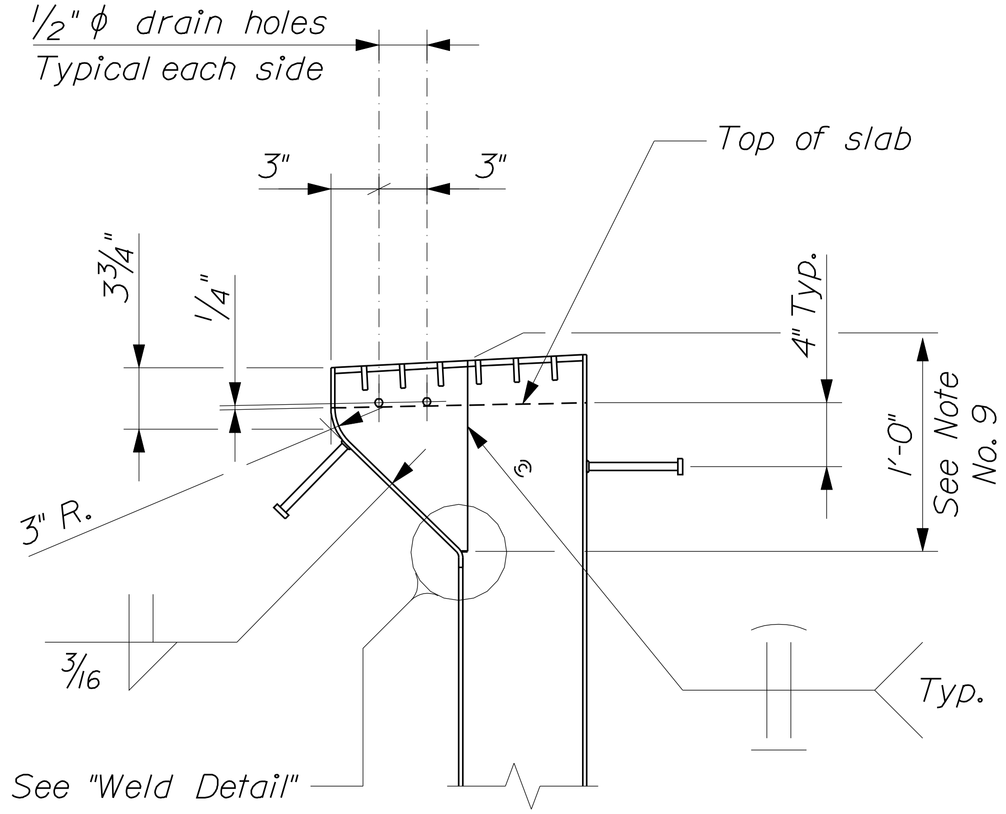
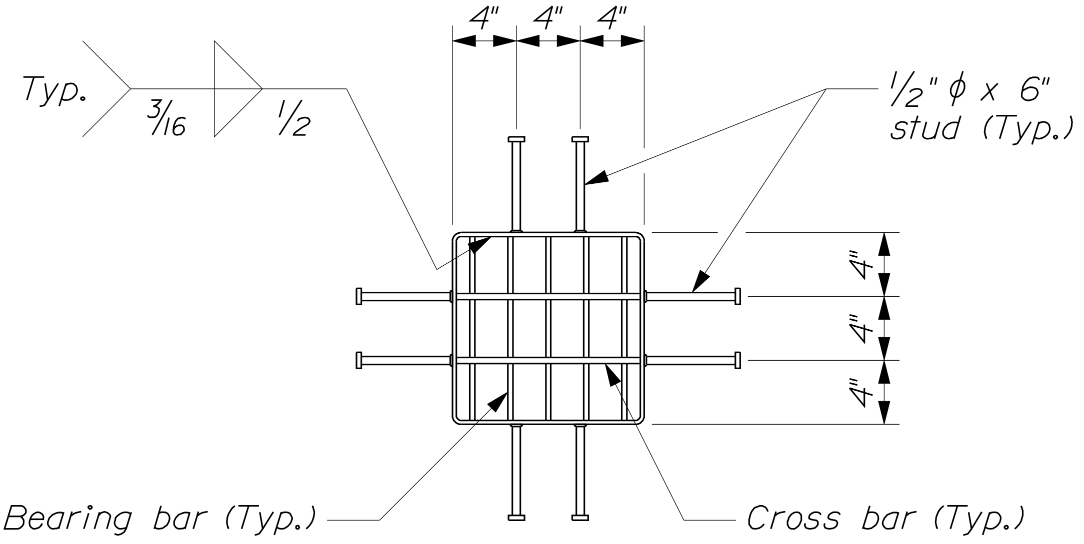


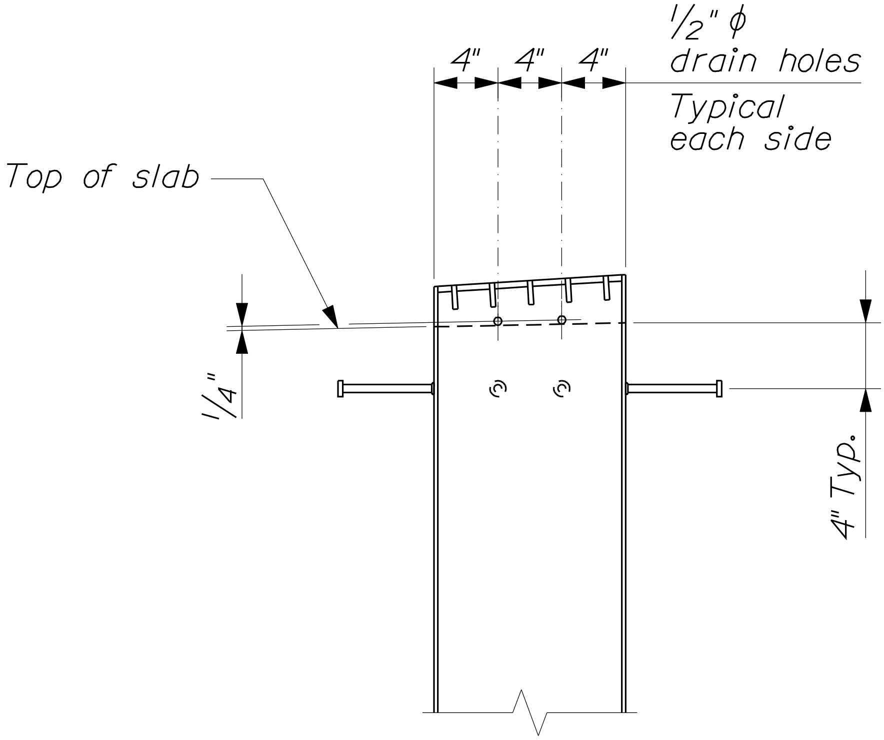
~ DRAIN TYPE "B" SECTION ~

BRIDGE DRAINS

502(20)



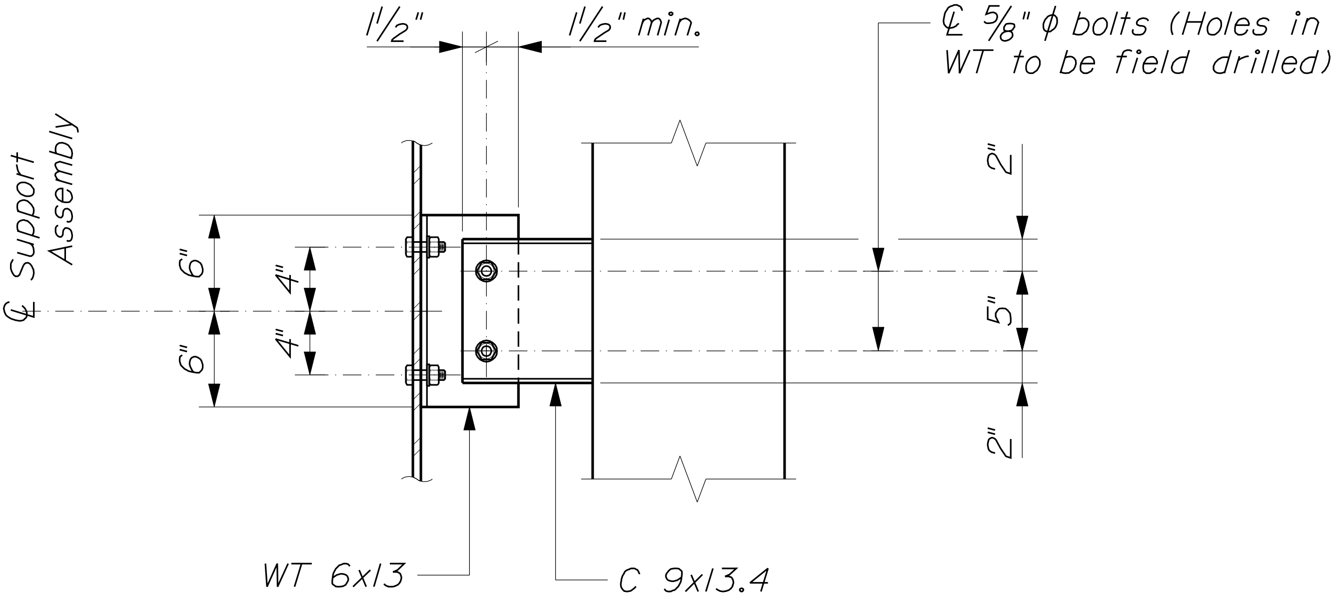
~ DRAIN TYPE "C" TOP VIEW ~



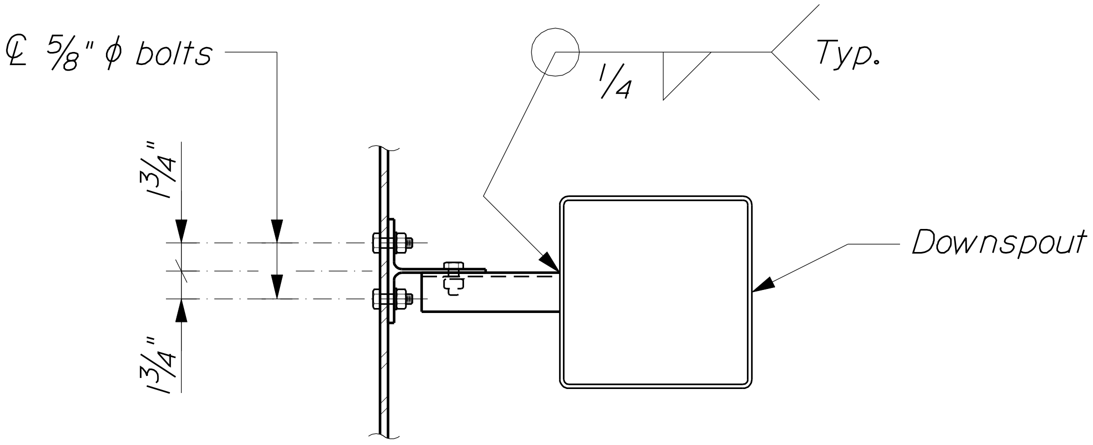
~ DRAIN TYPE "C" SECTION ~

BRIDGE DRAINS

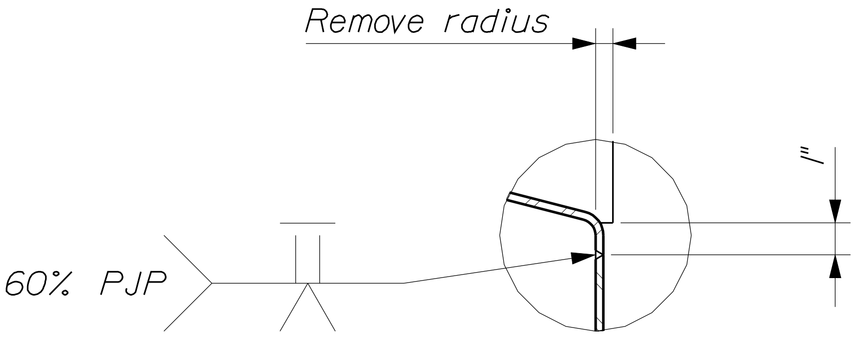
502(21)



~ SUPPORT ASSEMBLY DETAIL ~



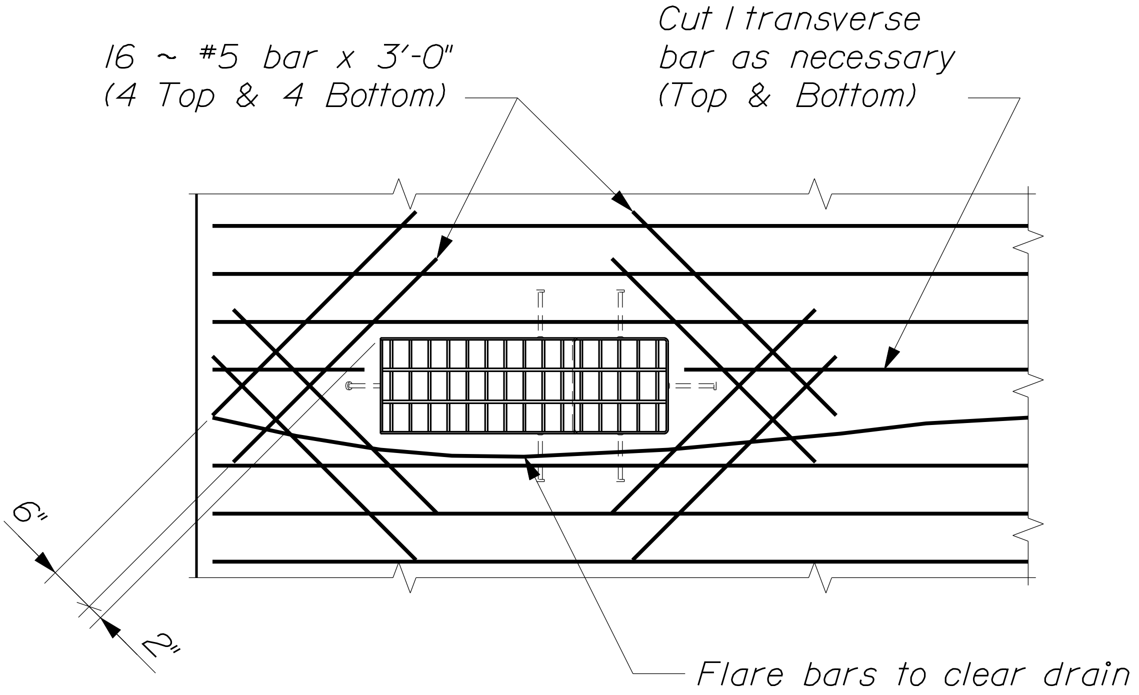
~ SUPPORT ASSEMBLY TOP VIEW ~



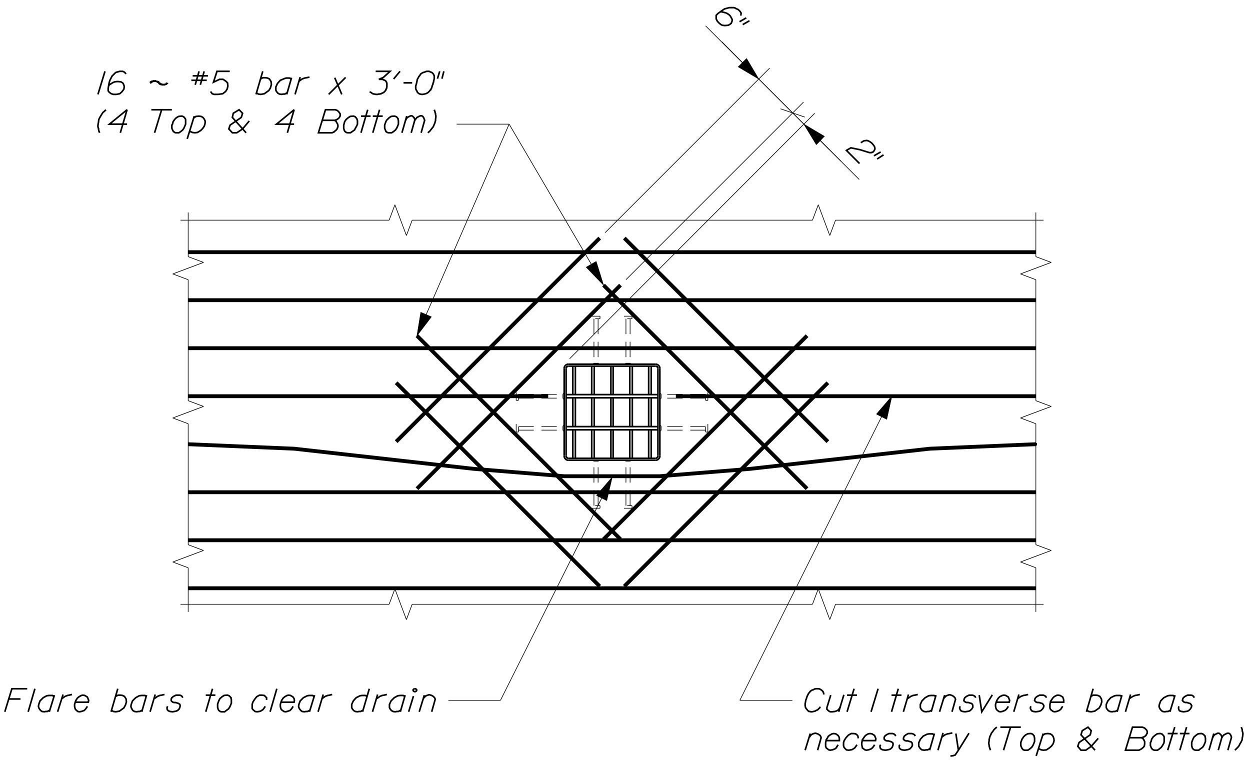
~ WELD DETAIL ~

BRIDGE DRAINS

502(22)



~ SLAB REINFORCING PLAN - DRAIN TYPE "A1" OR "A2" ~



~ SLAB REINFORCING PLAN - DRAIN TYPE "B" OR "C" ~

BRIDGE DRAINS

502(23)

NOTES

1. All plates shall be $\frac{1}{4}$ inch thick.

2. The grating shall be a commercial heavy - duty grating with $1\frac{1}{2}$" x $\frac{5}{16}$" bearing bars spaced at $2\frac{3}{8}$ inches and $\frac{3}{8}$" ϕ cross bars spaced at 4 inches. The grating shall be centered in the drain top.

3. The $\frac{1}{2}$" ϕ drain holes are not required with concrete wearing surfaces.

4. Drains, including C 9x13.4, shall be blast cleaned to the requirements of SSPC-SP6/NACE 3 and galvanized in accordance with ASTM A 123.

5. For structural steel beams / girders, the WT 6x13 and associated bolts shall meet the material and protective coating requirements of the structural steel.

6. For structural concrete beams / girders, the WT 6x13 shall be galvanized in accordance with ASTM A 123 and A 153 or B 695. Concrete anchors shall be selected from the MaineDOT Qualified Products List.

7. Shear connectors welded to the top flange of steel beams / girders may require adjustment to clear the bridge drains.

8. If the minimum thickness of concrete below the drain pan is 2 inches or less, the concrete haunch shall be extended as shown.

9. For drains installed on bridges with 1-inch thick integral concrete wearing surfaces, the drain pan depth shall be reduced from 1'-0" to 0'-9".

10. Payment for bridge drains will be as specified under Subsection 502.19 of the Standard Specifications.

11. Payment for adjusting and for providing the additional reinforcing steel at bridge drains will be considered incidental to Contract items.

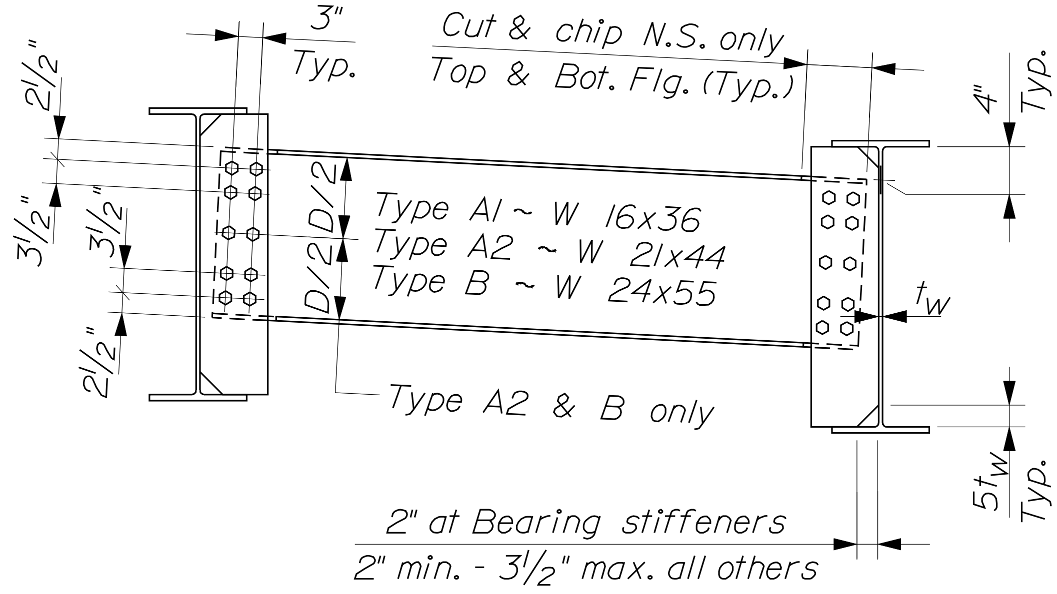
12. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

MATERIALS

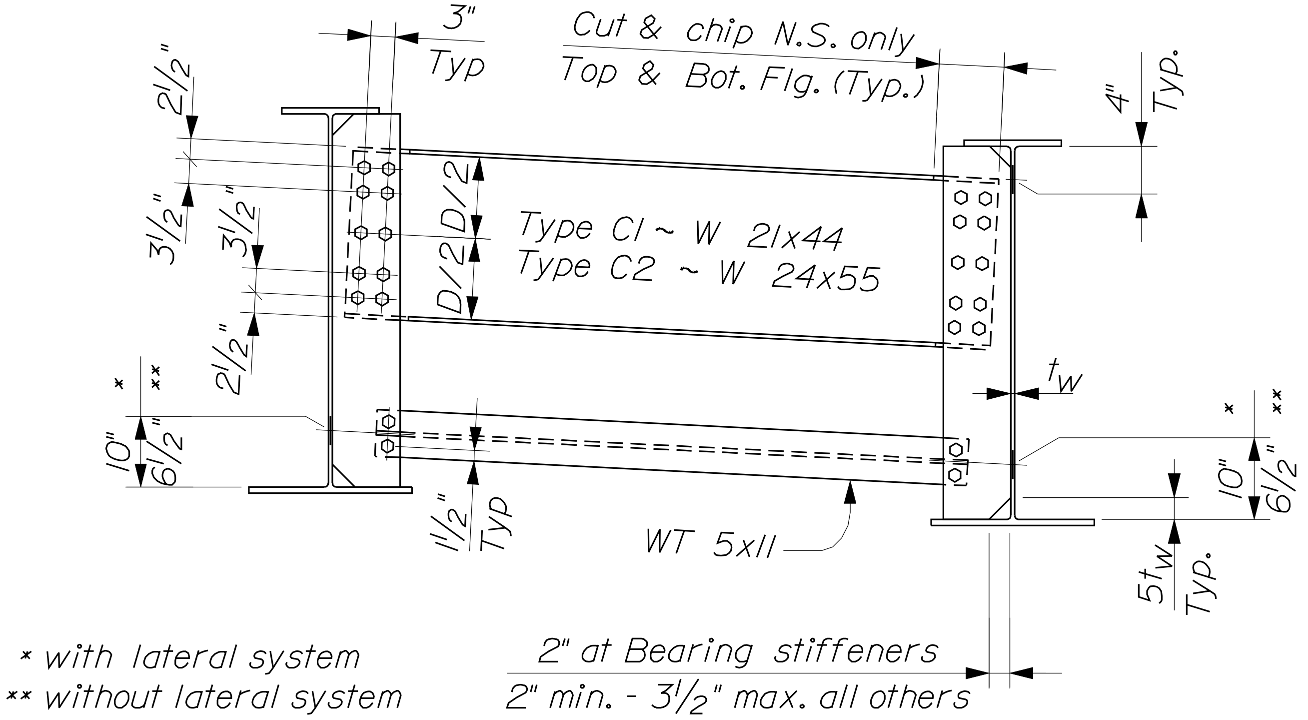
Downspout	ASTM A 500, Grade B.
Shapes & plates	AASHTO M 270M/M 270, Grade 50
Bolts and nuts	AASHTO A 307, Grade C

BRIDGE DRAINS

502(24)



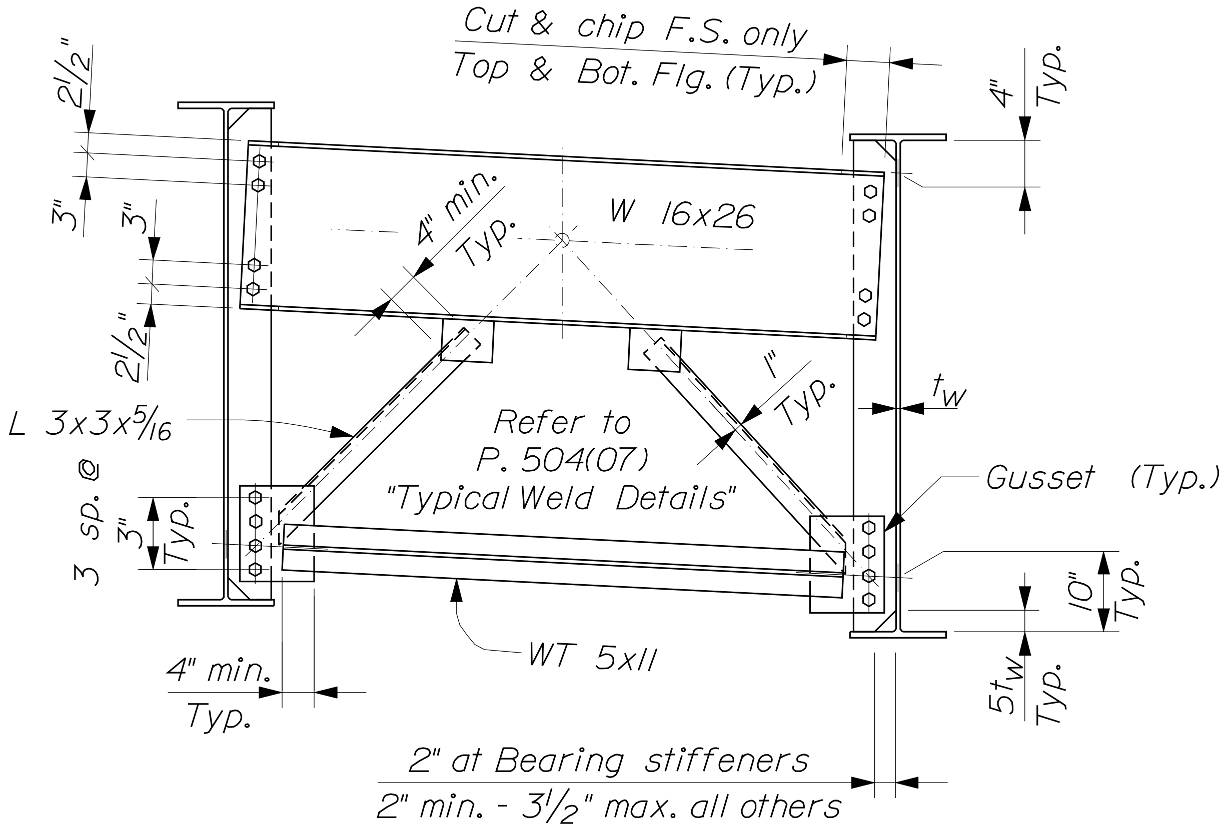
~ TYPE A1, A2, & B ~



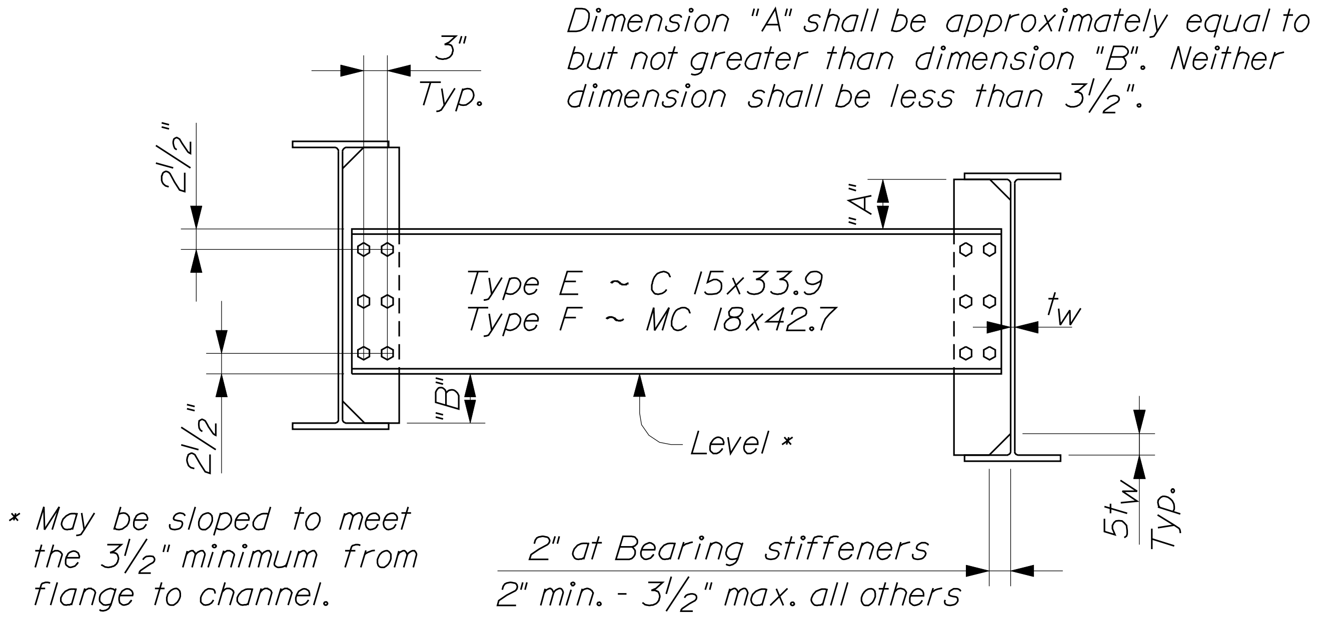
~ TYPE C1 & C2 ~

DIAPHRAGMS

504(01)



~ TYPE D ~



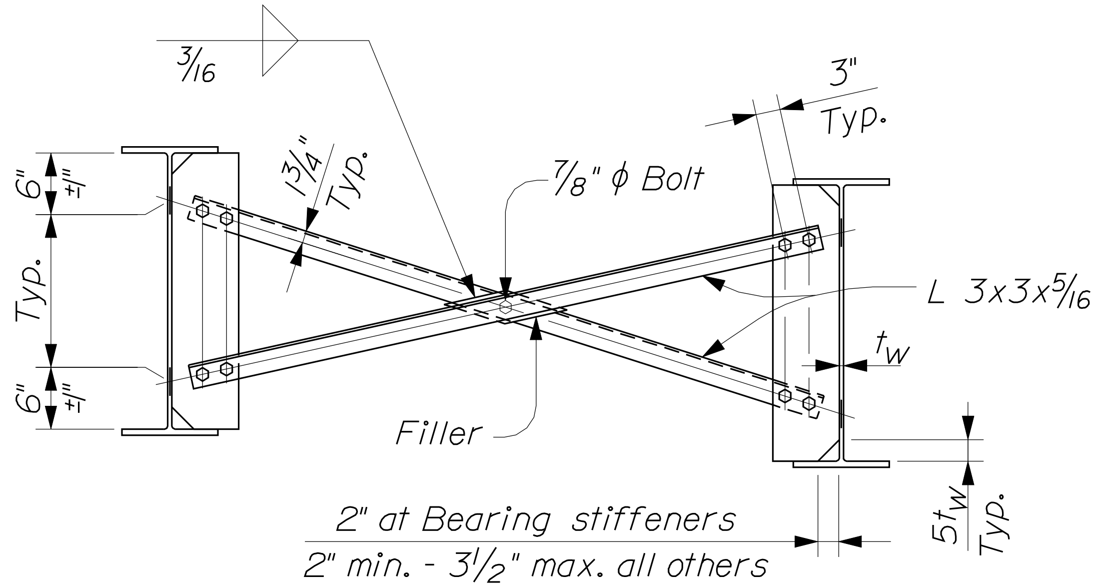
Dimension "A" shall be approximately equal to but not greater than dimension "B". Neither dimension shall be less than 3½".

* May be sloped to meet the 3½" minimum from flange to channel.

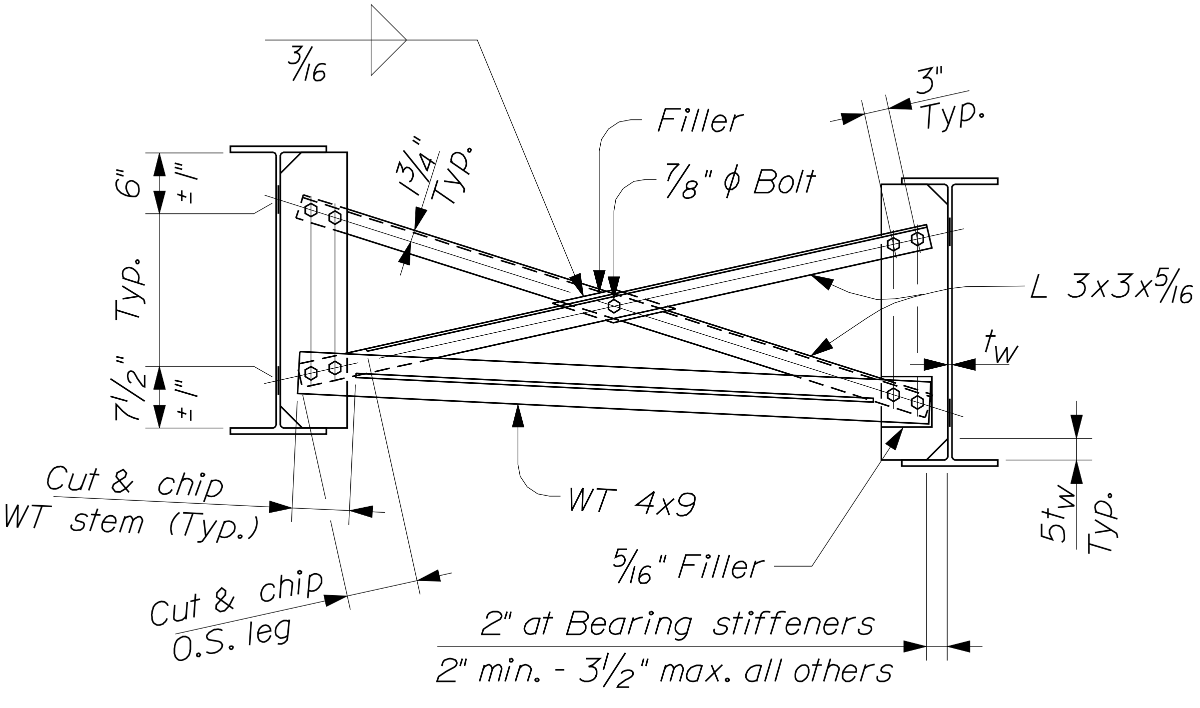
~ TYPE E & F ~

DIAPHRAGMS

504(02)



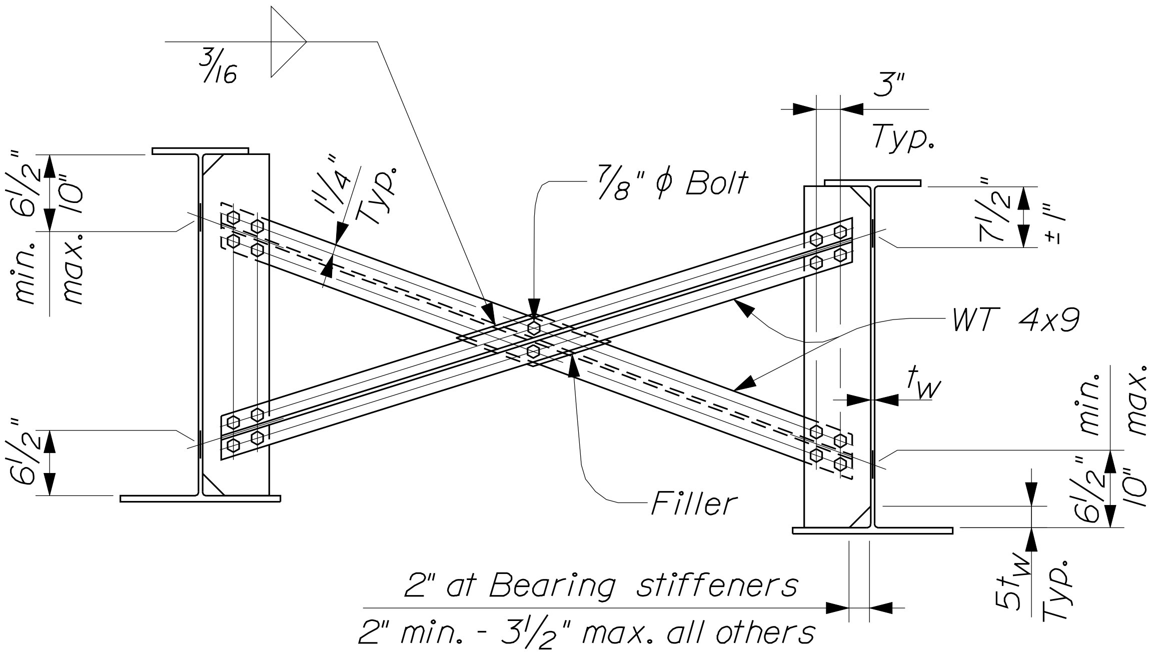
~ TYPE G ~



~ TYPE H ~

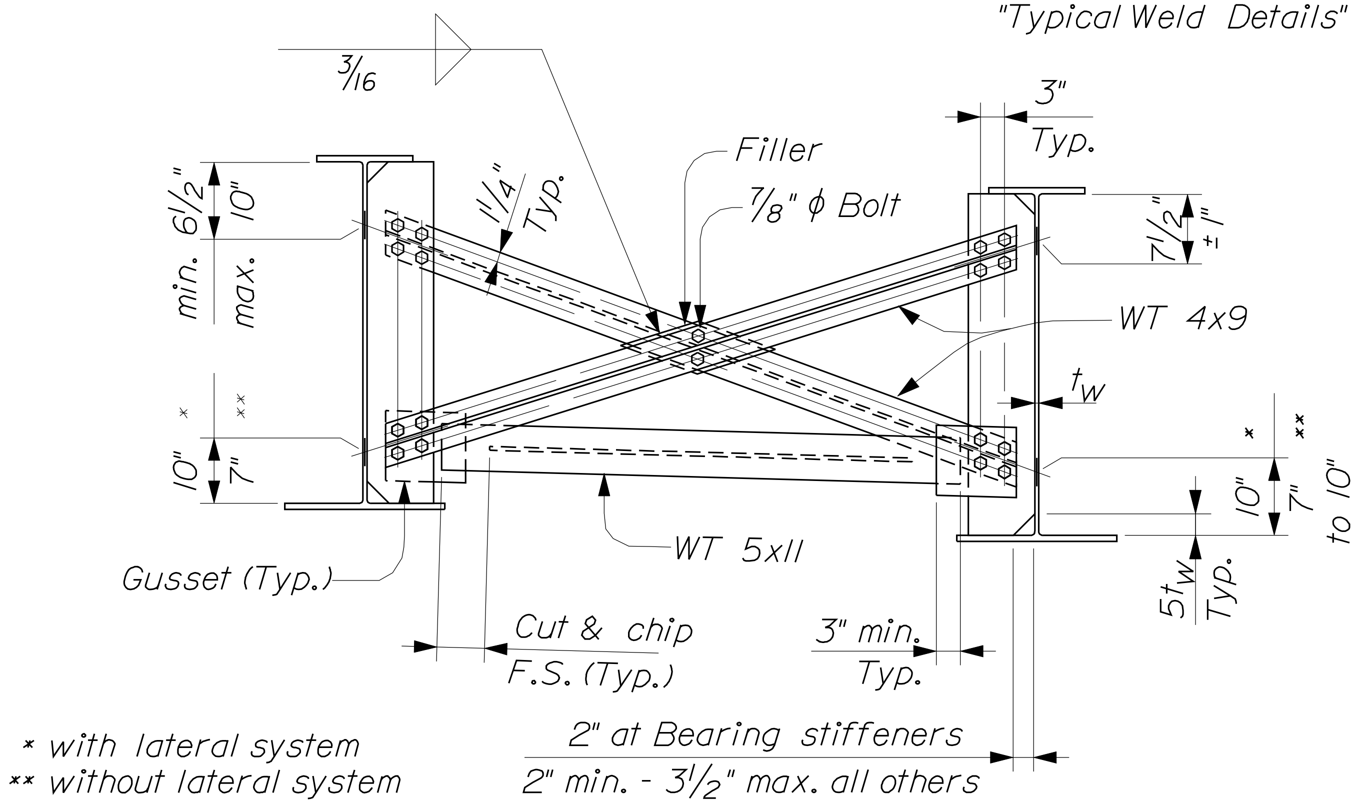
CROSSFRAMES

504(03)



~ TYPE J ~

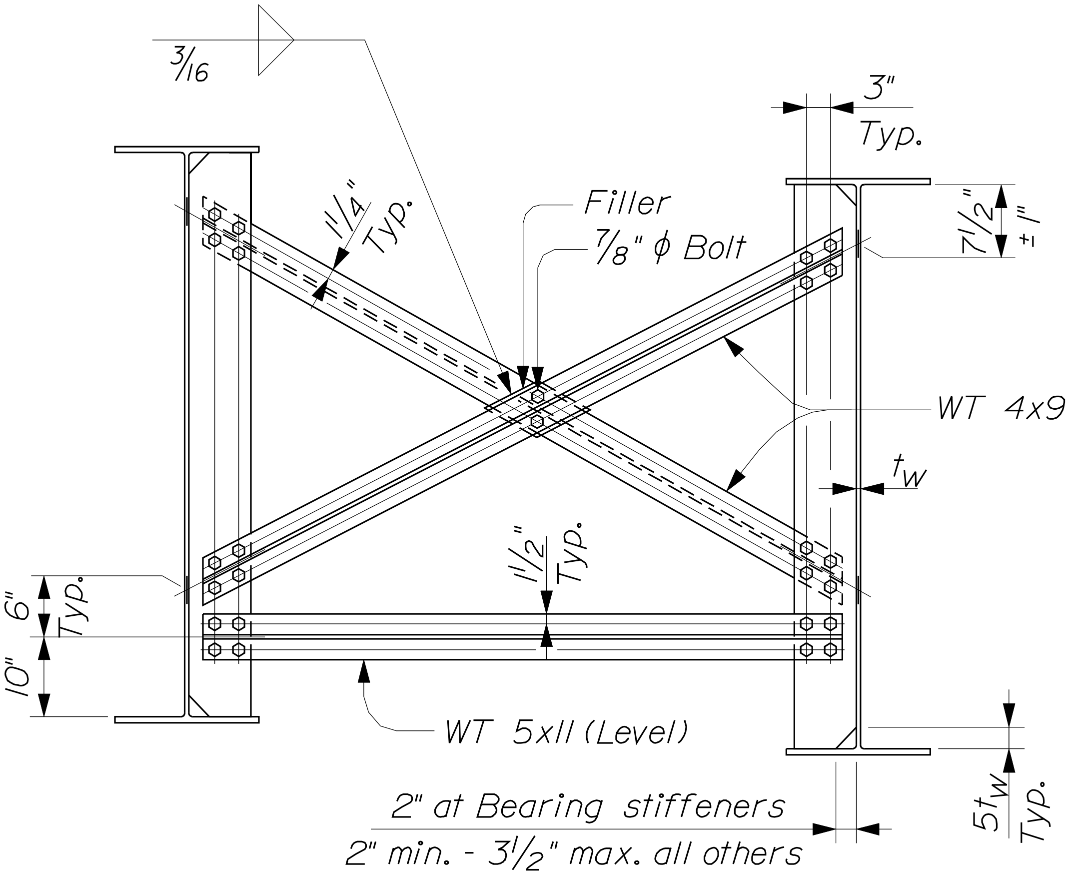
Refer to P. 504(07)
"Typical Weld Details"



~ TYPE K ~

CROSSFRAMES

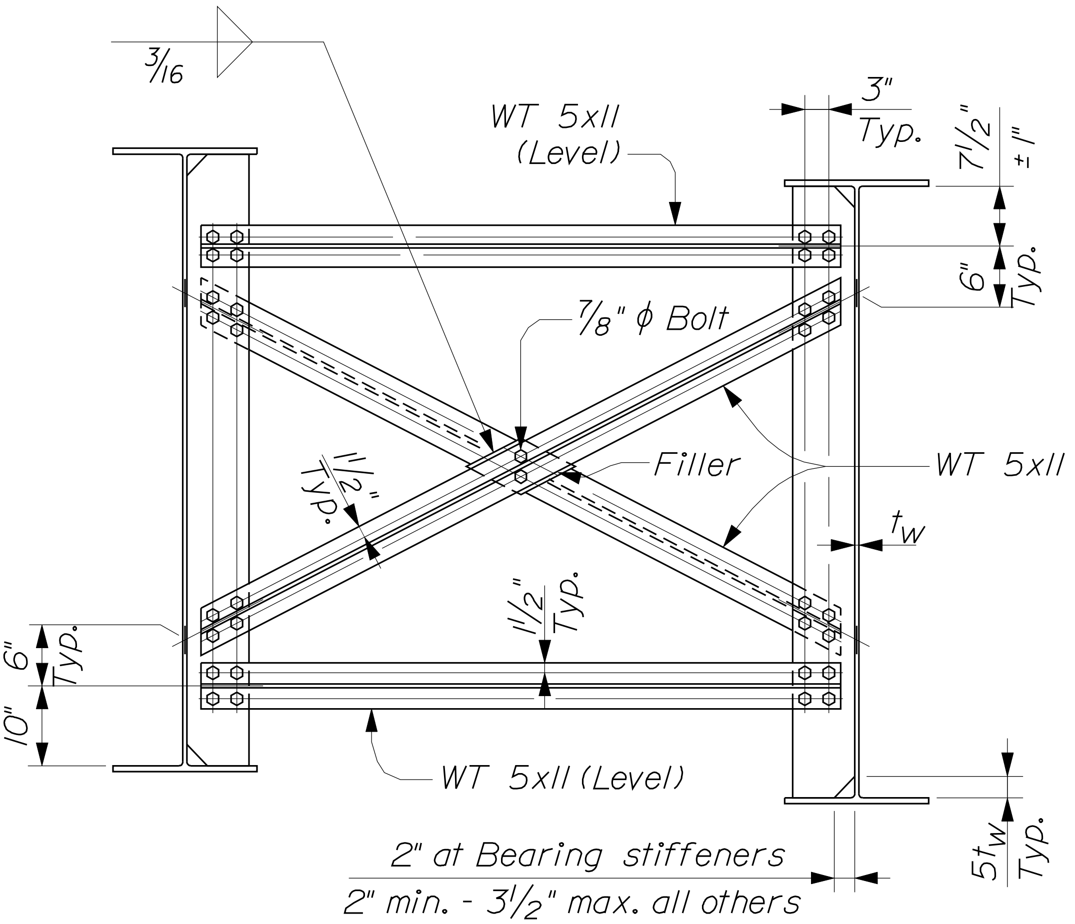
504(04)



~ TYPE L ~

CROSSFRAMES

504(05)



~ TYPE M ~

CROSSFRAMES

504(06)

NOTES:

1. Steel for diaphragms, crossframes, connection plates, gussets and stiffeners shall be as designated on the Design Drawings.

2. All welds for diaphragms, crossframes, connection plates, gussets and stiffeners shall terminate 5/8" ± 1/8" from the ends of the plates.

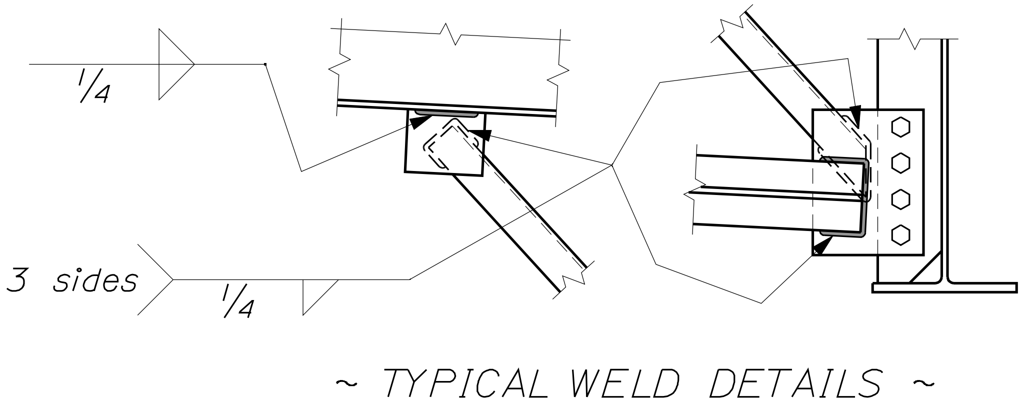
3. Bolt holes shall be 15/16". The minimum edge distance shall be 1 1/2" unless otherwise shown on the Design Drawings. Oversized holes may be used with the permission of the Resident.

4. Connection plates and gussets shall be 3/8" minimum thickness. Connection plates shall be 7" minimum width and full web depth. The plate thickness for stiffeners and bent connection plates shall be as shown on the Design Drawings.

5. Bearing stiffeners shall be mill - to - bear on the bottom flange and tight fit to the top flange.

6. Intermediate stiffeners not intended to carry concentrated loads shall be tight fit to both flanges. Intermediate stiffeners used as connection plates shall be detailed as connection plates.

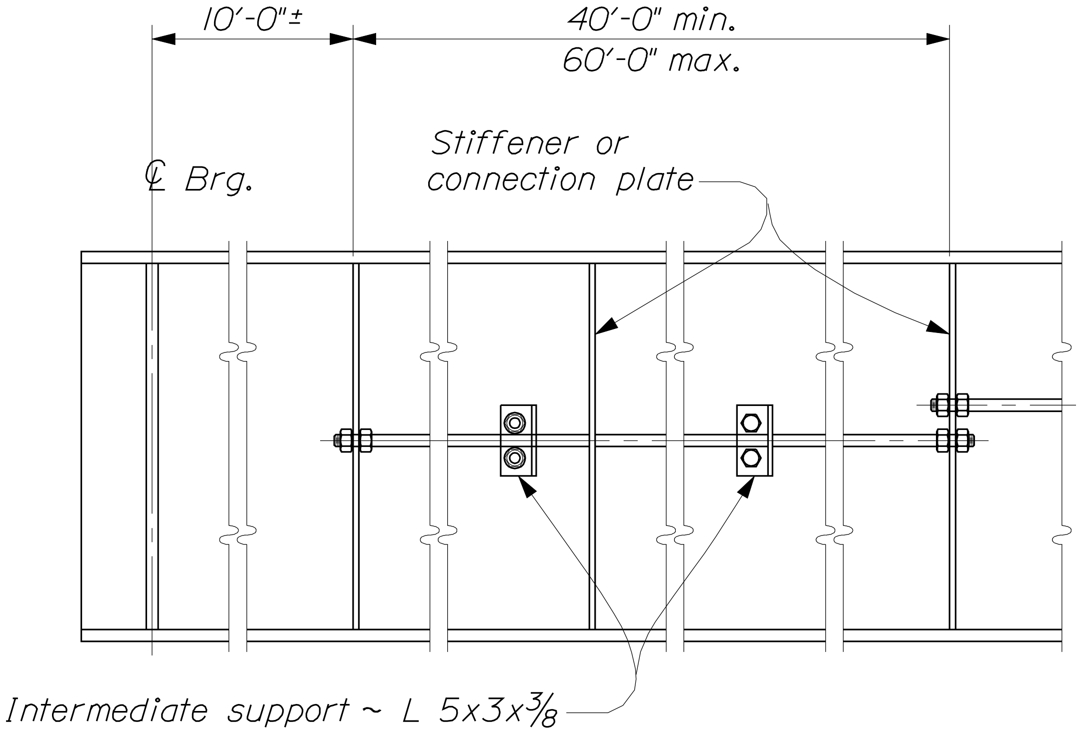
7. Connection plates and stiffeners used as connection plates shall be welded to the web and flanges on both sides of the plates.



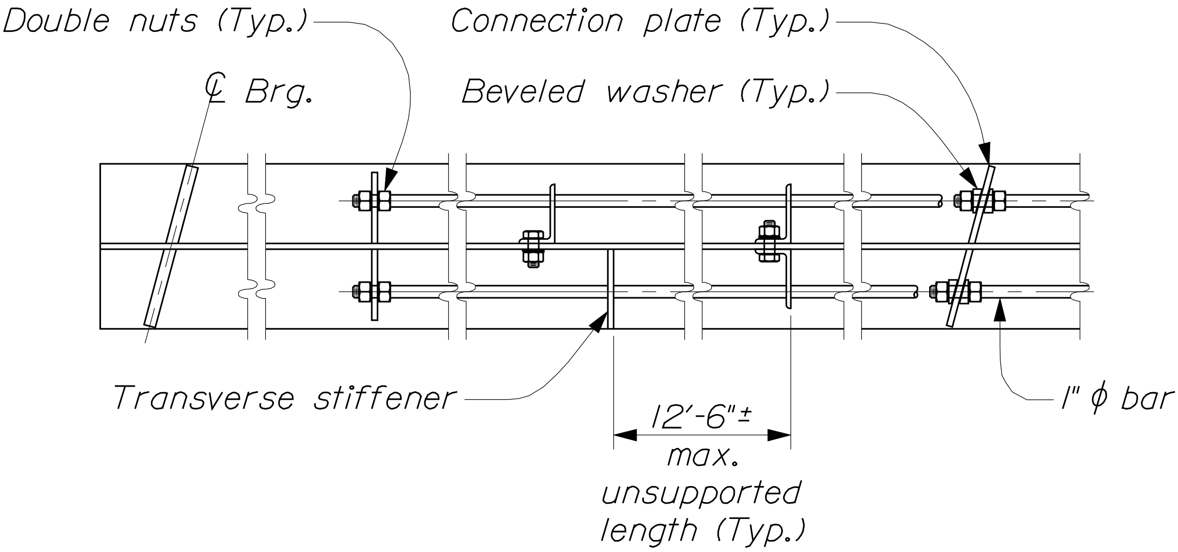
~ TYPICAL WELD DETAILS ~

DIAPHRAGM & CROSSFRAME NOTES

504(07)



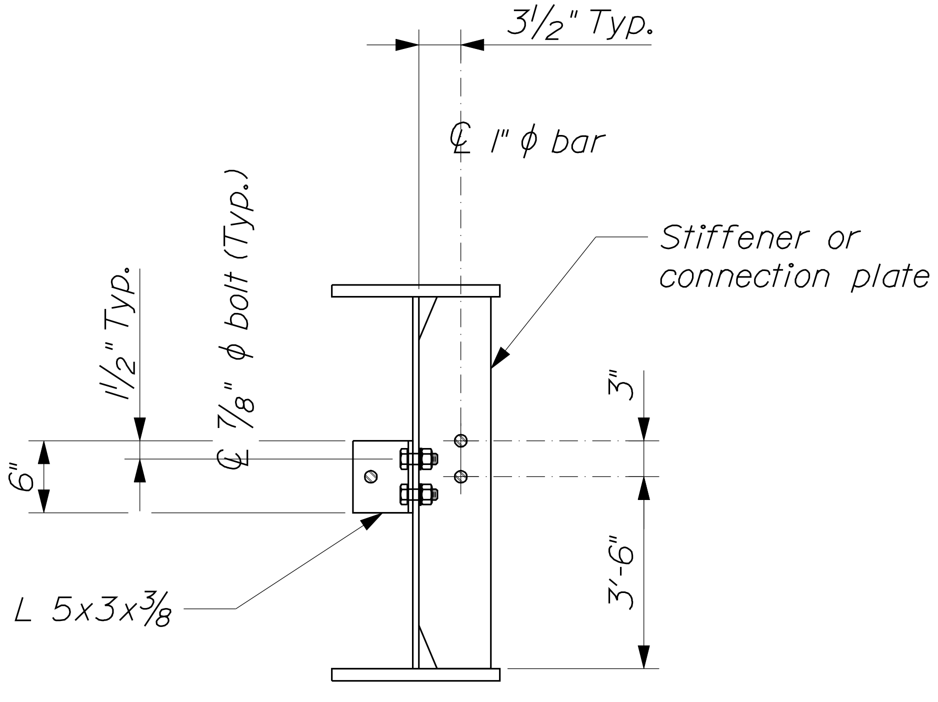
~ ELEVATION ~



~ PLAN ~

HAND - HOLD DETAILS

504(08)



~ TYPICAL SECTION ~

NOTES:

1. Hand - hold bars shall be installed on the inside of exterior beams and on both sides of interior beams when called for on the Design Drawings.

2. Termination and splicing of hand - hold bars shall occur at stiffeners or connection plates. Angle supports shall be used at intermediate locations only. All termination and splice plates shall be a minimum of ½ inch thick. Additional stiffeners shall be provided where necessary to meet the described requirements.

3. Hole sizes for bolts and hand - hold bars shall be 1/16 inch larger than the bolt / bar size. Edge distances for holes shall be 1½ inches unless otherwise shown.

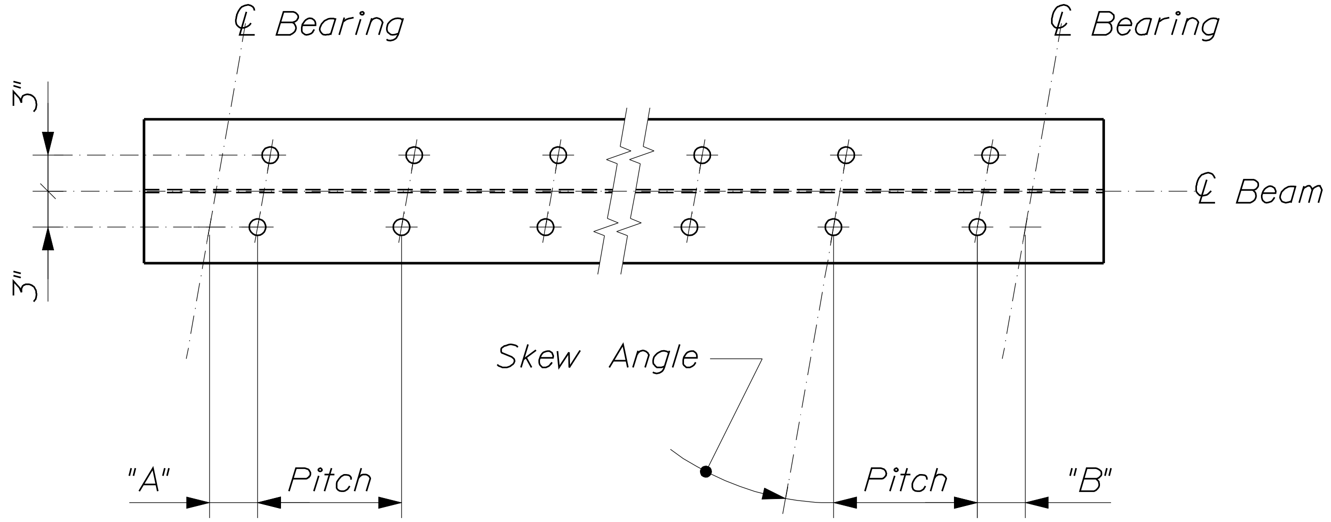
4. For unpainted applications, the hand - hold bar and nuts shall be galvanized to conform to ASTM M 111M/M 111.

MATERIALS:

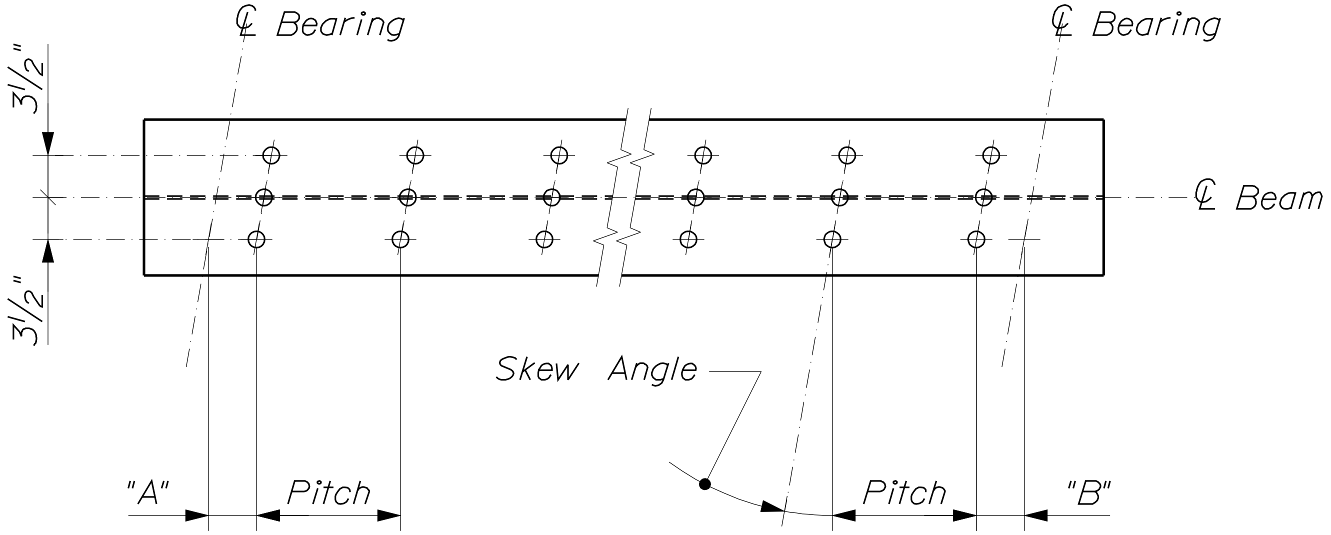
With unpainted structural steel - All steel	AASHTO M 270/M 270M, Gr. 50W
With painted structural steel - All steel	AASHTO M 270M/M 270, Gr. 36
Heavy hex nuts for 1" ϕ bar	AASHTO M 291

HAND - HOLD DETAILS

504(09)



~ DOUBLE STUD LAYOUT ~

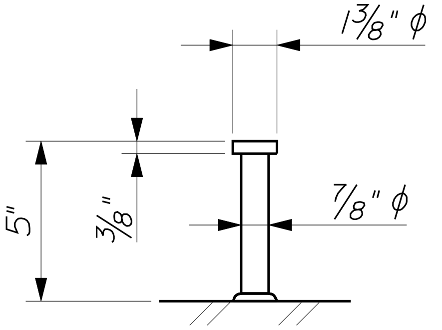


~ TRIPLE STUD LAYOUT ~

NOTES:

1. Refer to Design Drawings for dimensions "A" and "B", stud pitch and skew angle.

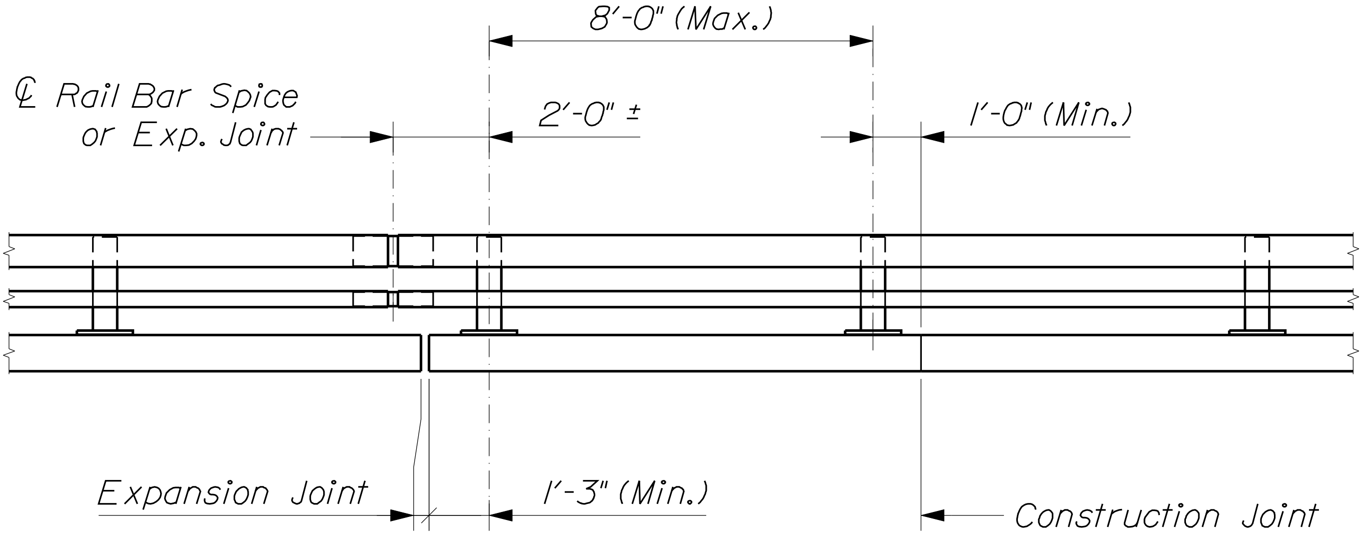
2. Studs shall project a minimum of 2" above the bottom of the slab.



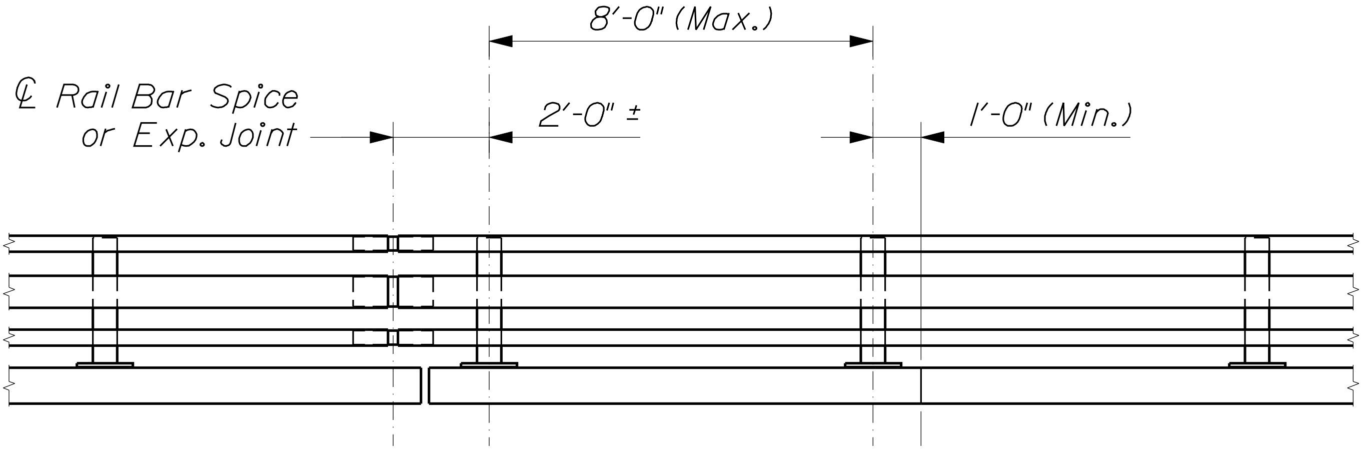
~ STUD DETAIL ~

SHEAR CONNECTORS

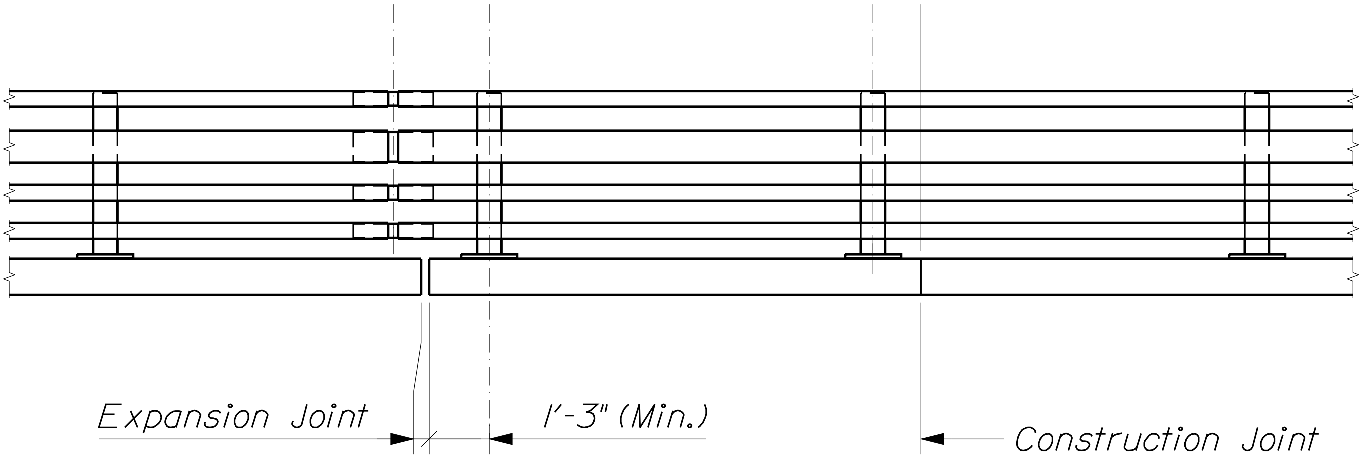
505(01)



~ 2 - BAR TRAFFIC RAILING ~



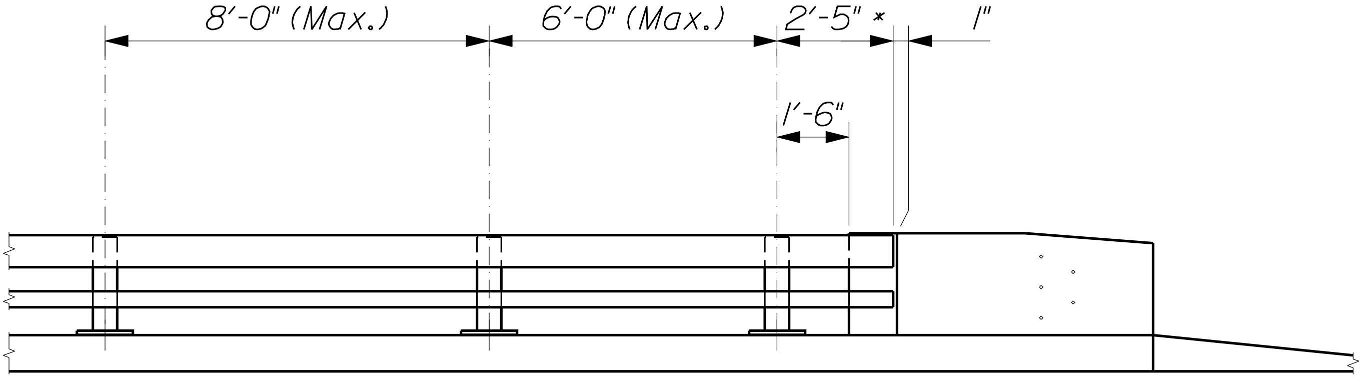
~ 3 - BAR TRAFFIC / BICYCLE RAILING ~
(4 - Bar Traffic / Bicycle Railing similar)



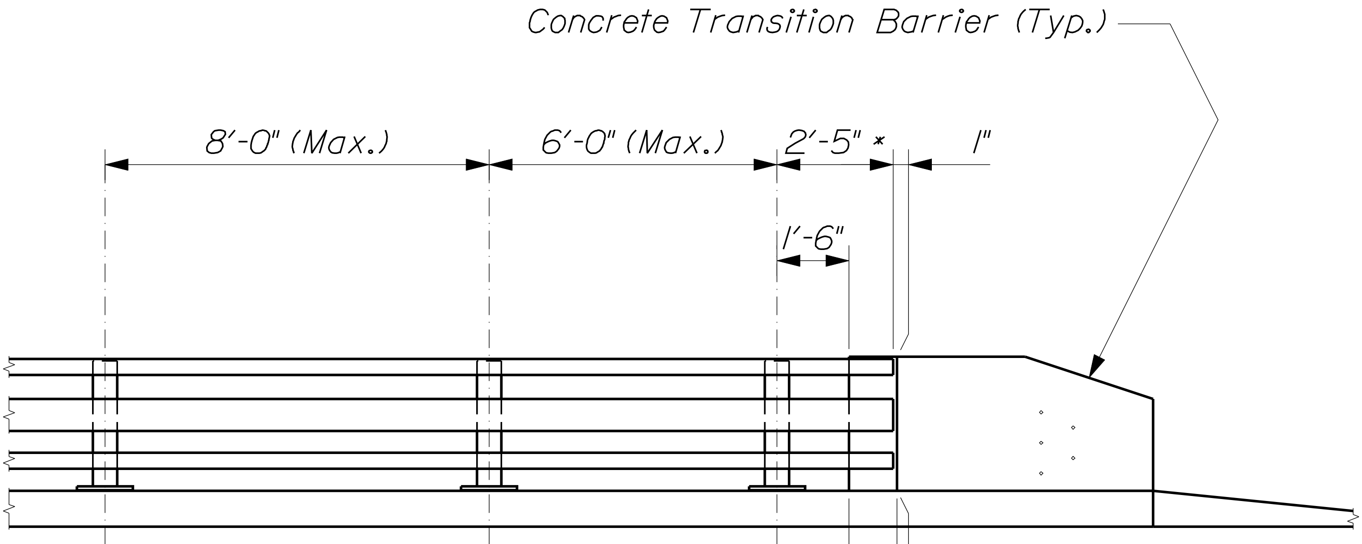
~ 4 - BAR TRAFFIC / PEDESTRIAN RAILING ~

STEEL BRIDGE RAILING

507(01)

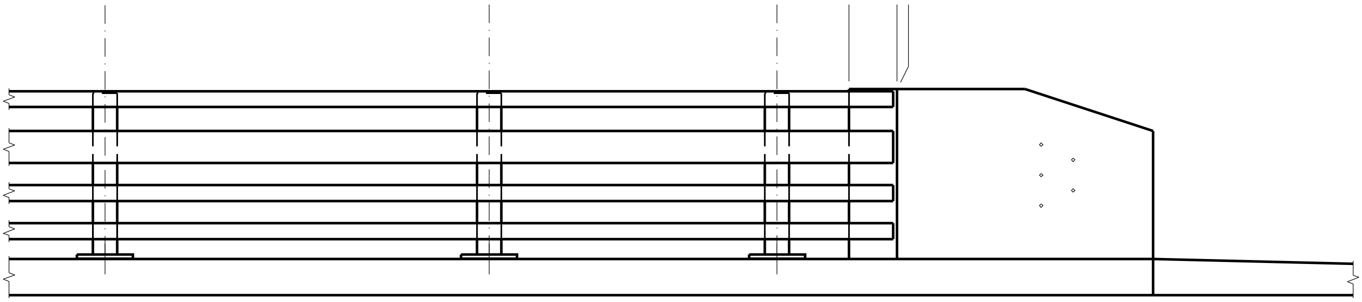


~ 2 - BAR TRAFFIC RAILING ~



~ 3 - BAR TRAFFIC / BICYCLE RAILING ~

(4 - Bar Traffic / Bicycle Railing similar)

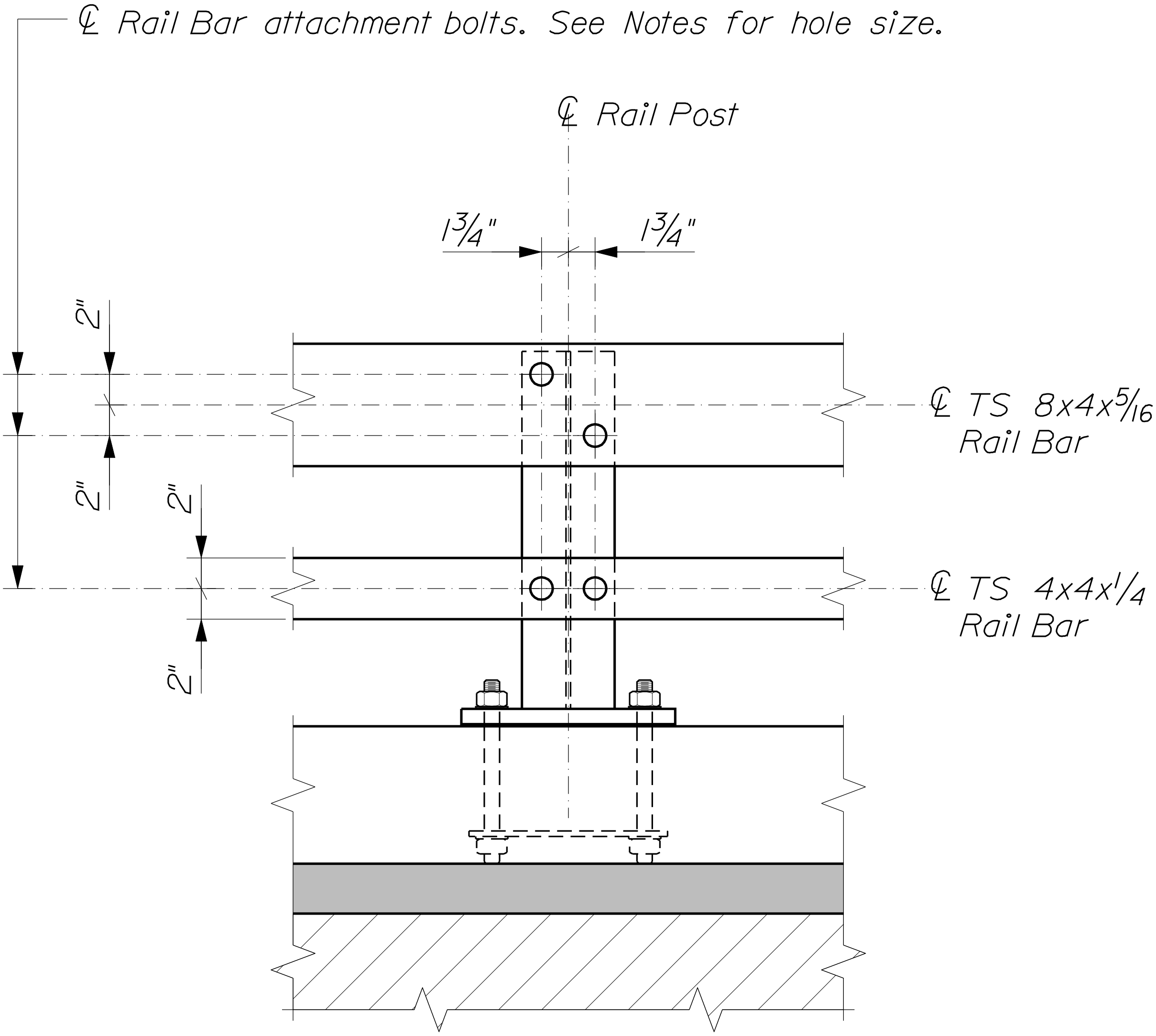


~ 4 - BAR TRAFFIC / PEDESTRIAN RAILING ~

* Including Rail Bar Cap (Typ.)

STEEL BRIDGE RAILING

507(02)

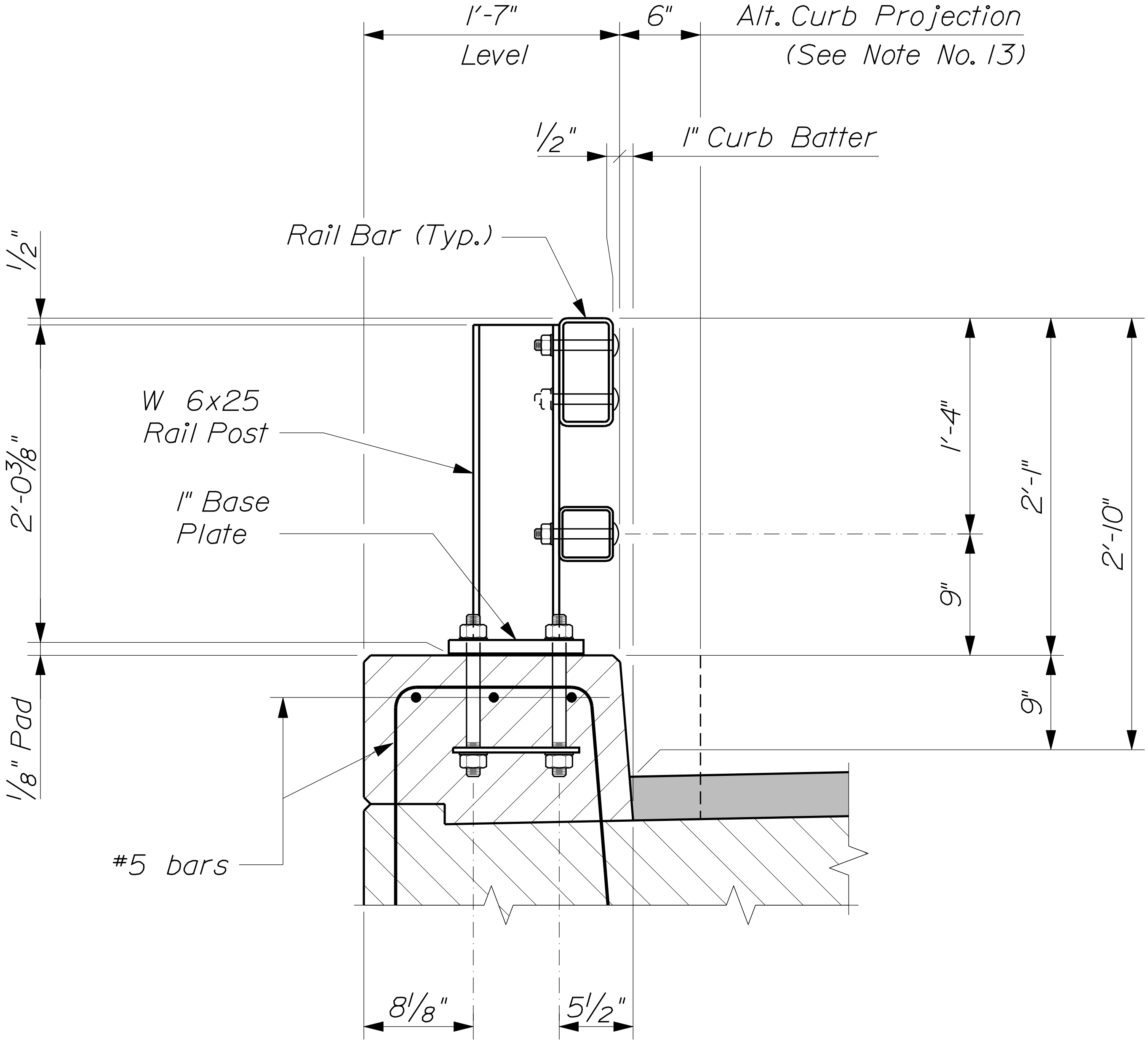


~ TYPICAL RAILING ELEVATION ~
2 - Bar Traffic Railing is shown.
Other railing configurations are similar.

STEEL BRIDGE RAILING

507(03)

Rail Bars:
TS 8x4x5/16 (1)
TS 4x4x1/4 (1)

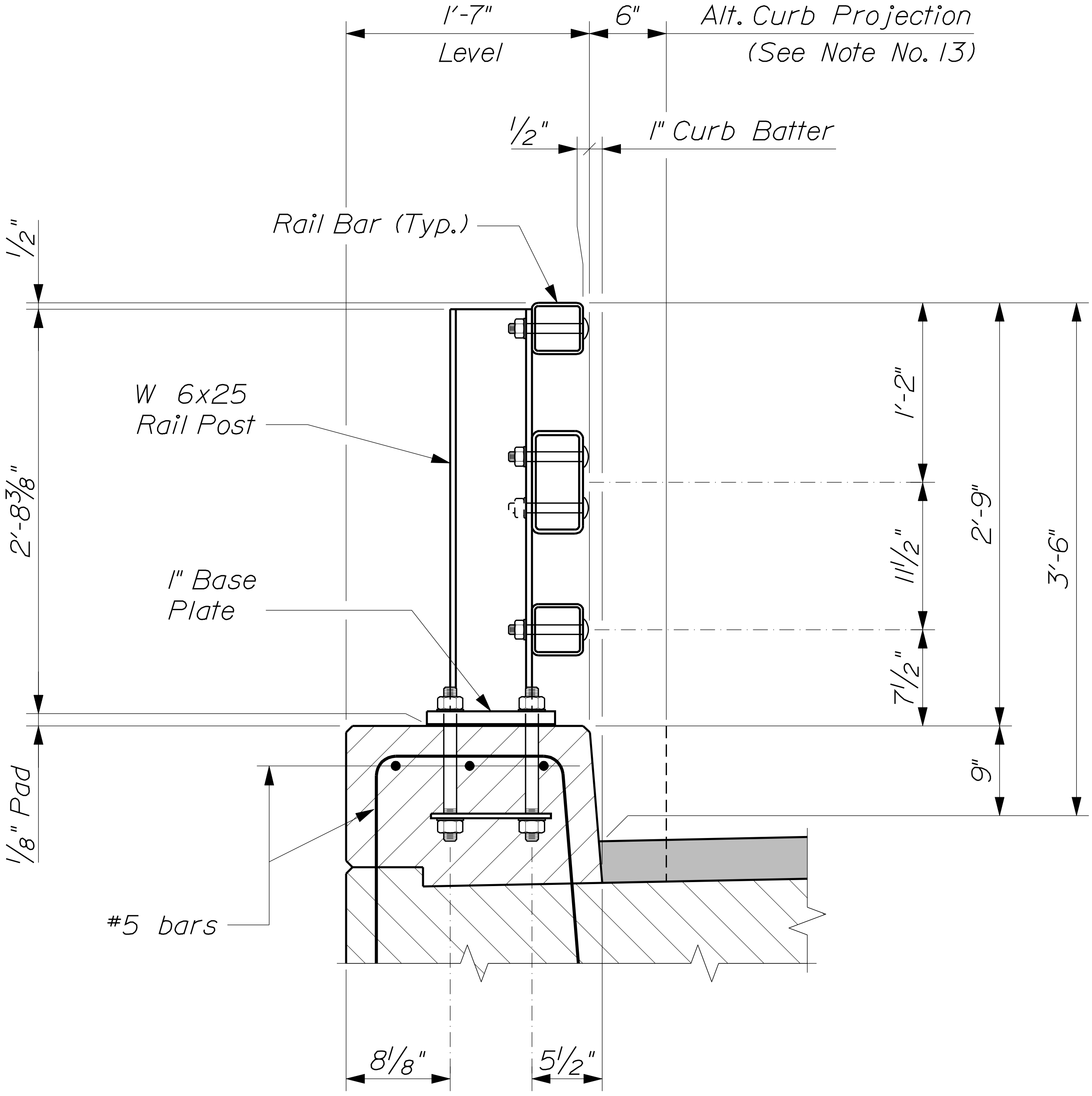


~ TYPICAL RAILING SECTION ~
(2 - Bar Traffic Railing)

STEEL BRIDGE RAILING

507(04)

Rail Bars:
TS 8x4x5/16 (1)
TS 4x4x1/4 (2)

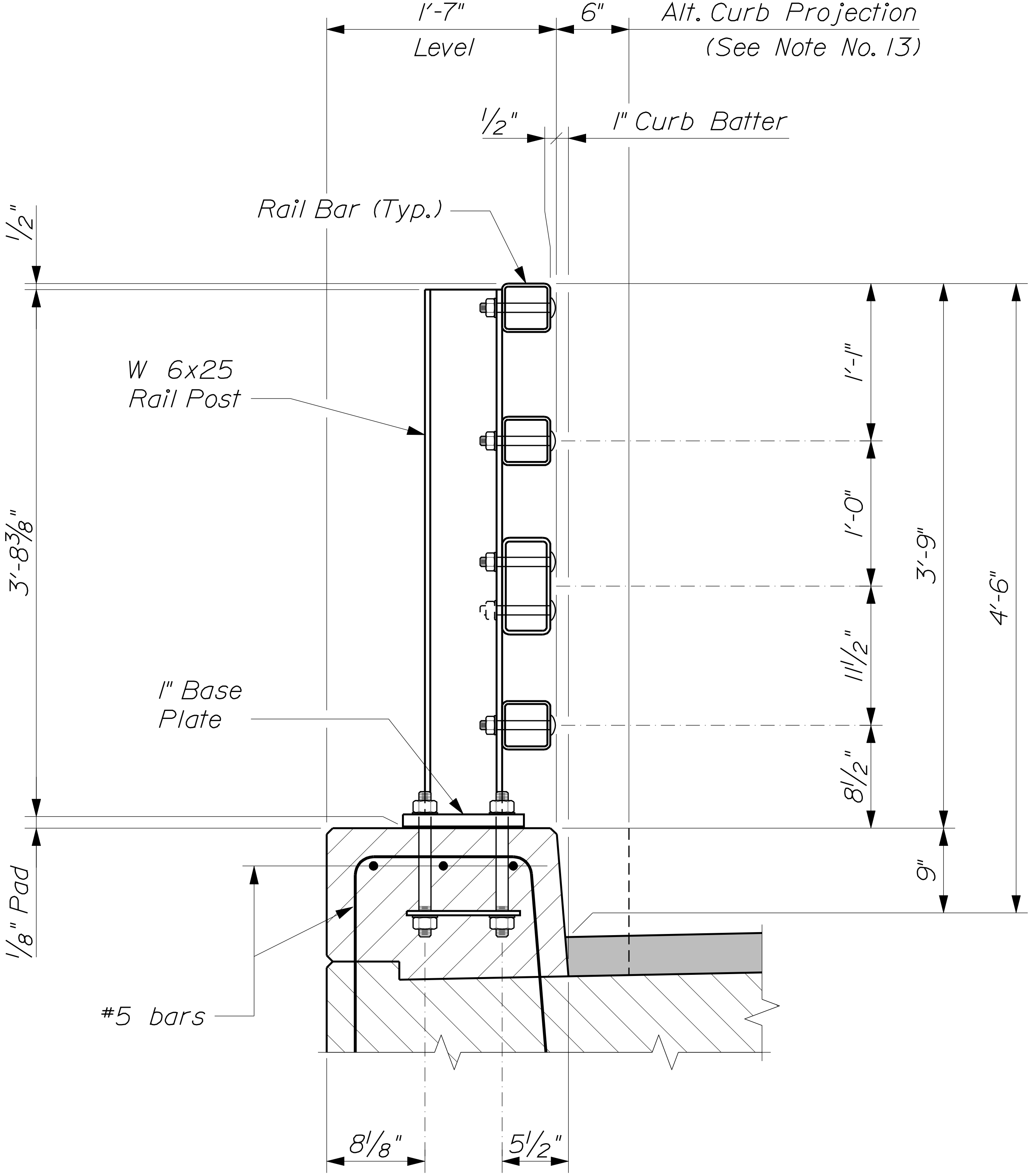


~ TYPICAL RAILING SECTION ~
(3 - Bar Traffic / Bicycle Railing)

STEEL BRIDGE RAILING

507(05)

Rail Bars:
TS 8x4x5/16 (1)
TS 4x4x1/4 (3)

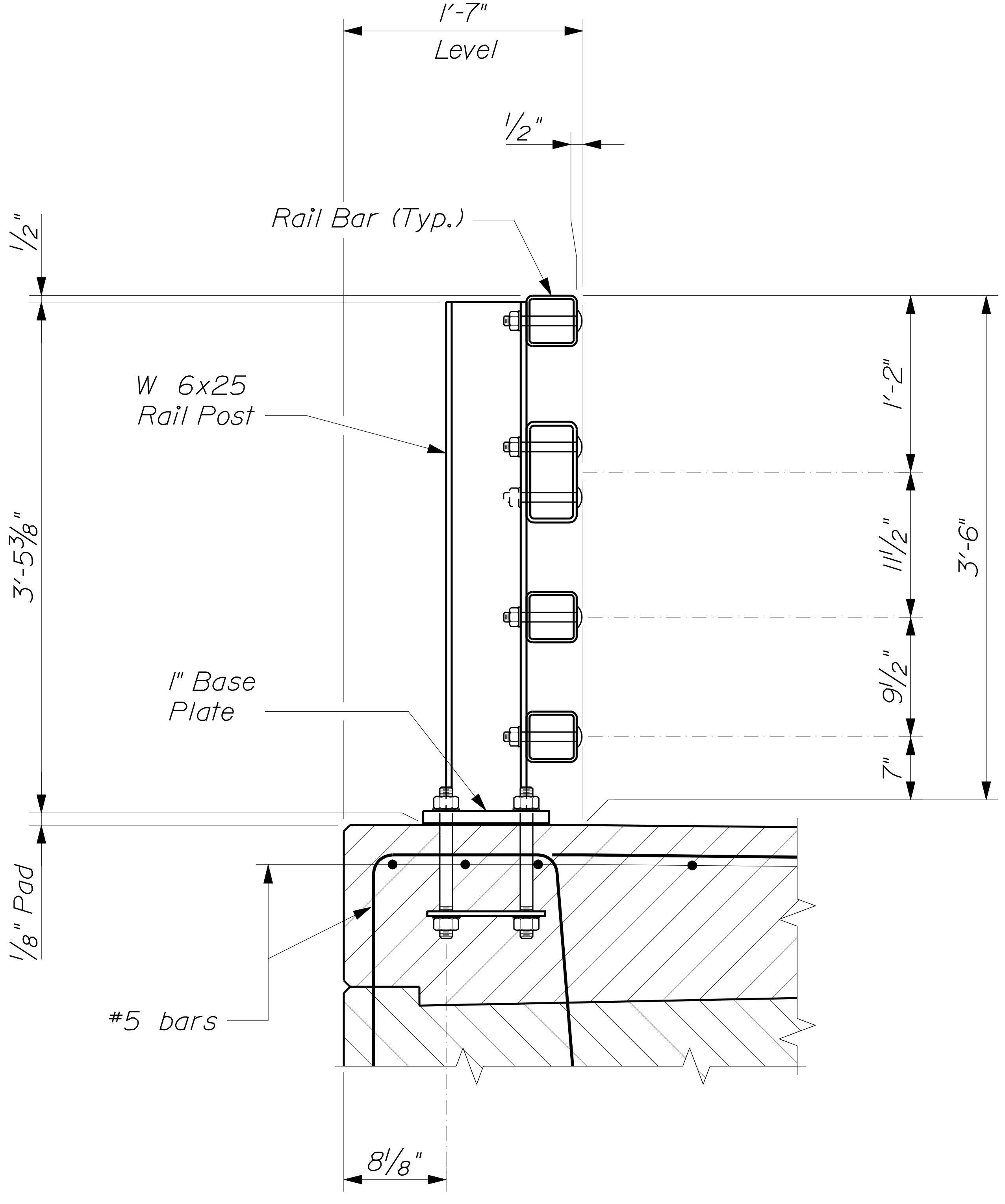


~ TYPICAL RAILING SECTION ~
(4 - Bar Traffic / Bicycle Railing)

STEEL BRIDGE RAILING

507(06)

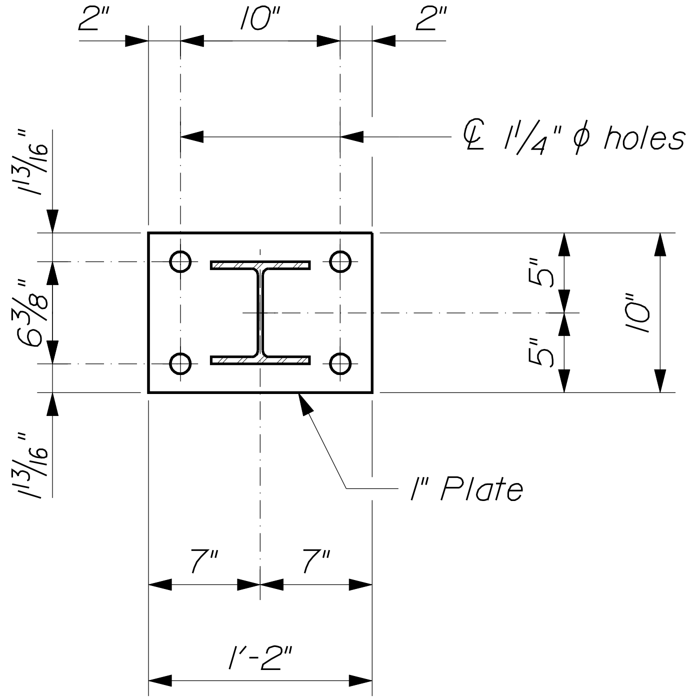
Rail Bars:
TS 8x4x5/16 (1)
TS 4x4x1/4 (3)



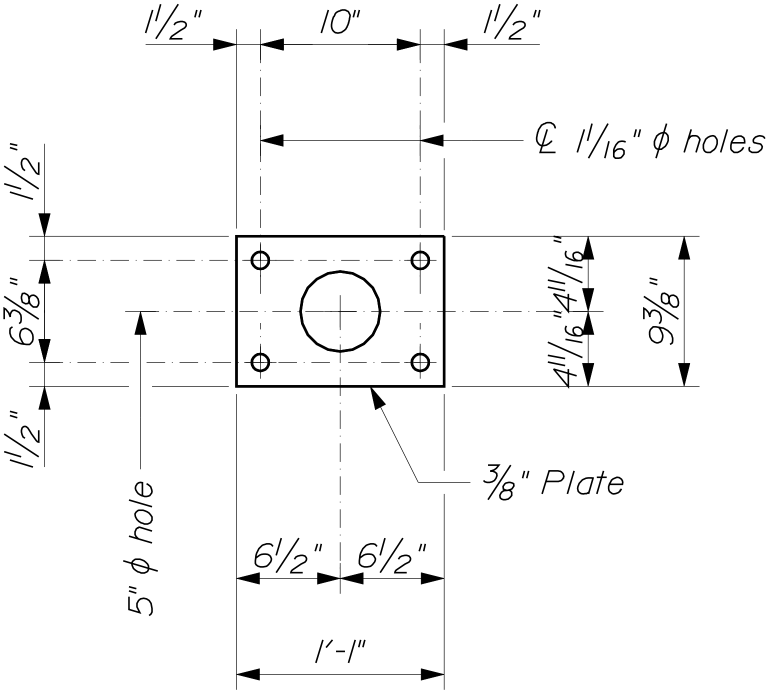
~ TYPICAL RAILING SECTION ~
(4 - Bar Traffic / Pedestrian Railing)

STEEL BRIDGE RAILING

507(07)



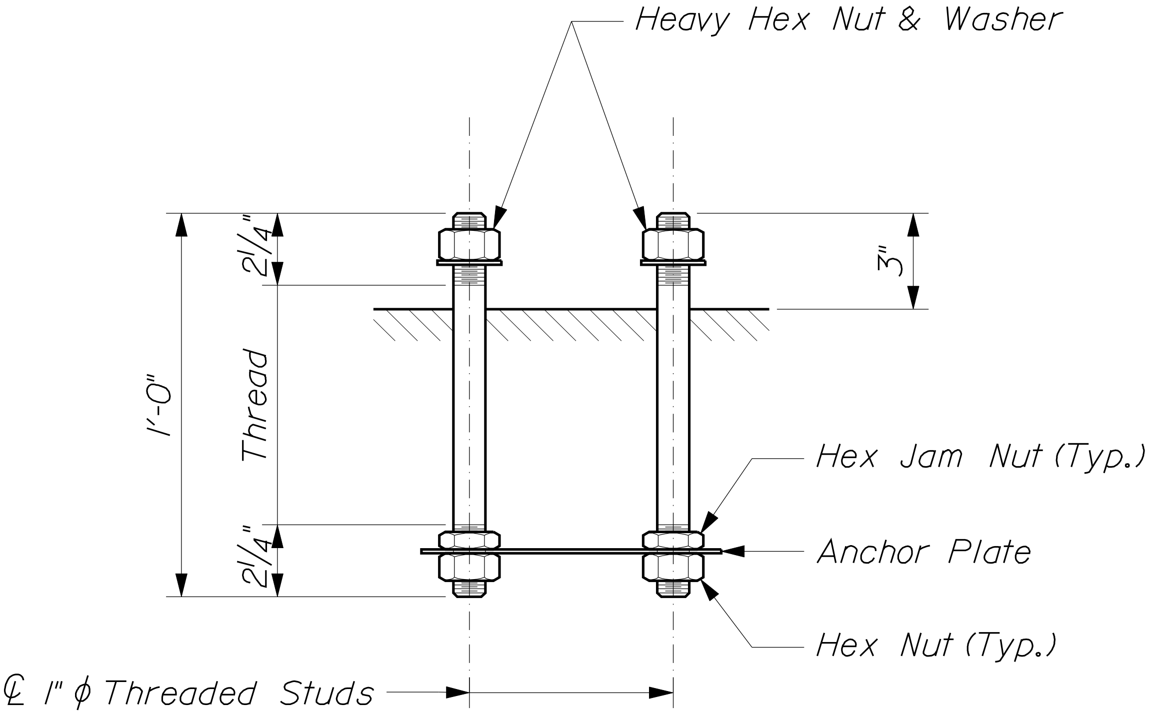
~ POST & BASE PLATE PLAN ~



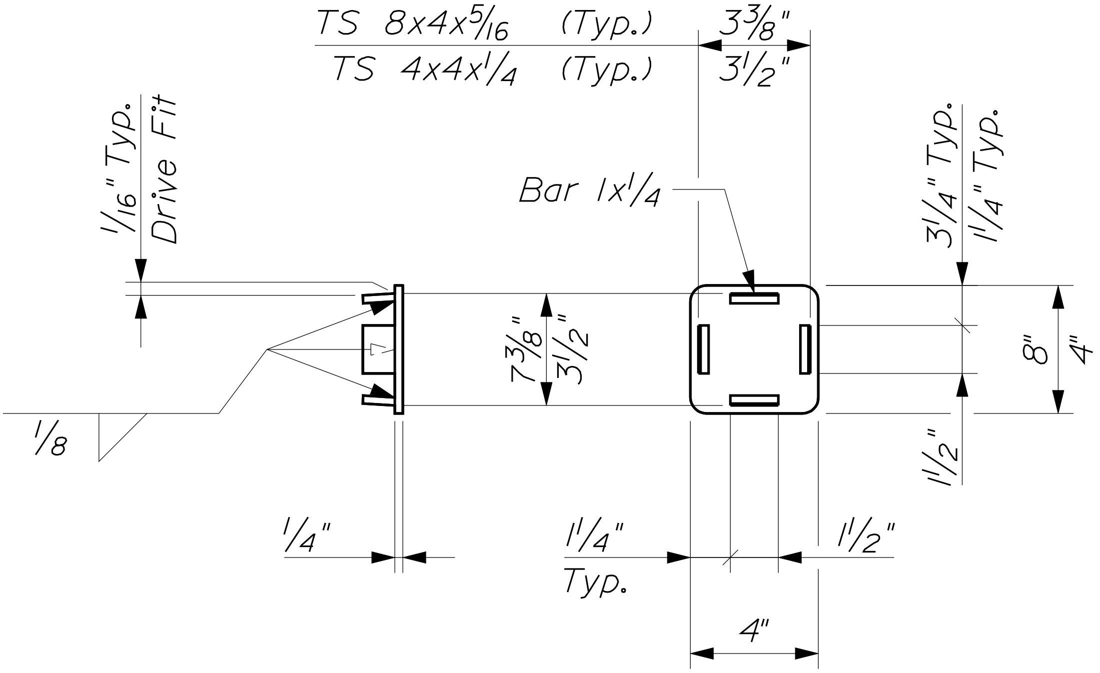
~ ANCHOR PLATE PLAN ~

STEEL BRIDGE RAILING

507(08)



~ RAIL POST ANCHORAGE ~

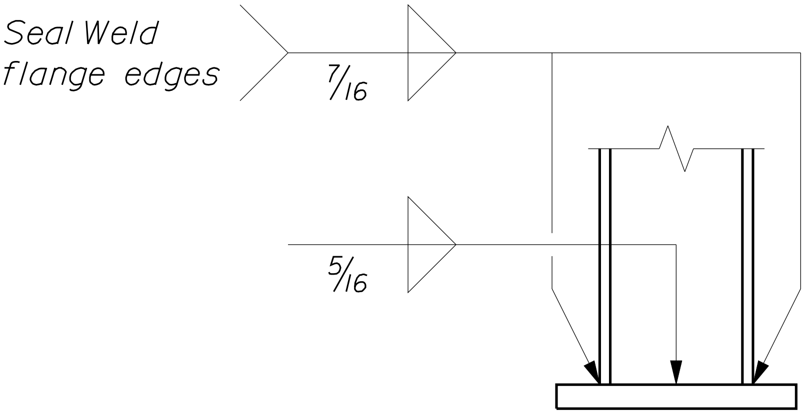


~ RAIL BAR CAP ~

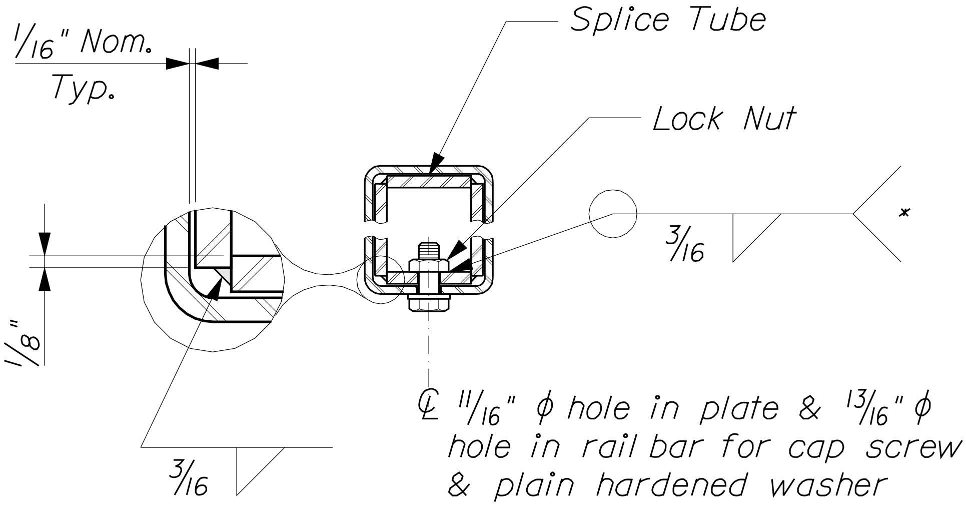
Note: Match corner radius of rail bar

STEEL BRIDGE RAILING

507(09)

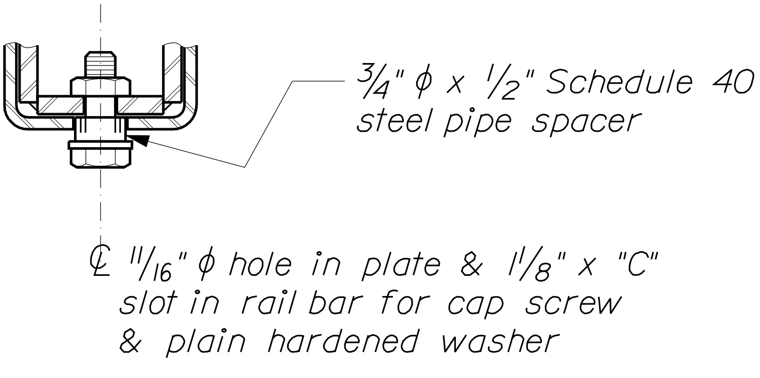


~ POST - TO - BASE WELD DETAIL ~



~ RAIL BAR SPLICE SECTION ~

* Weld nuts to plate before assembling splice tube

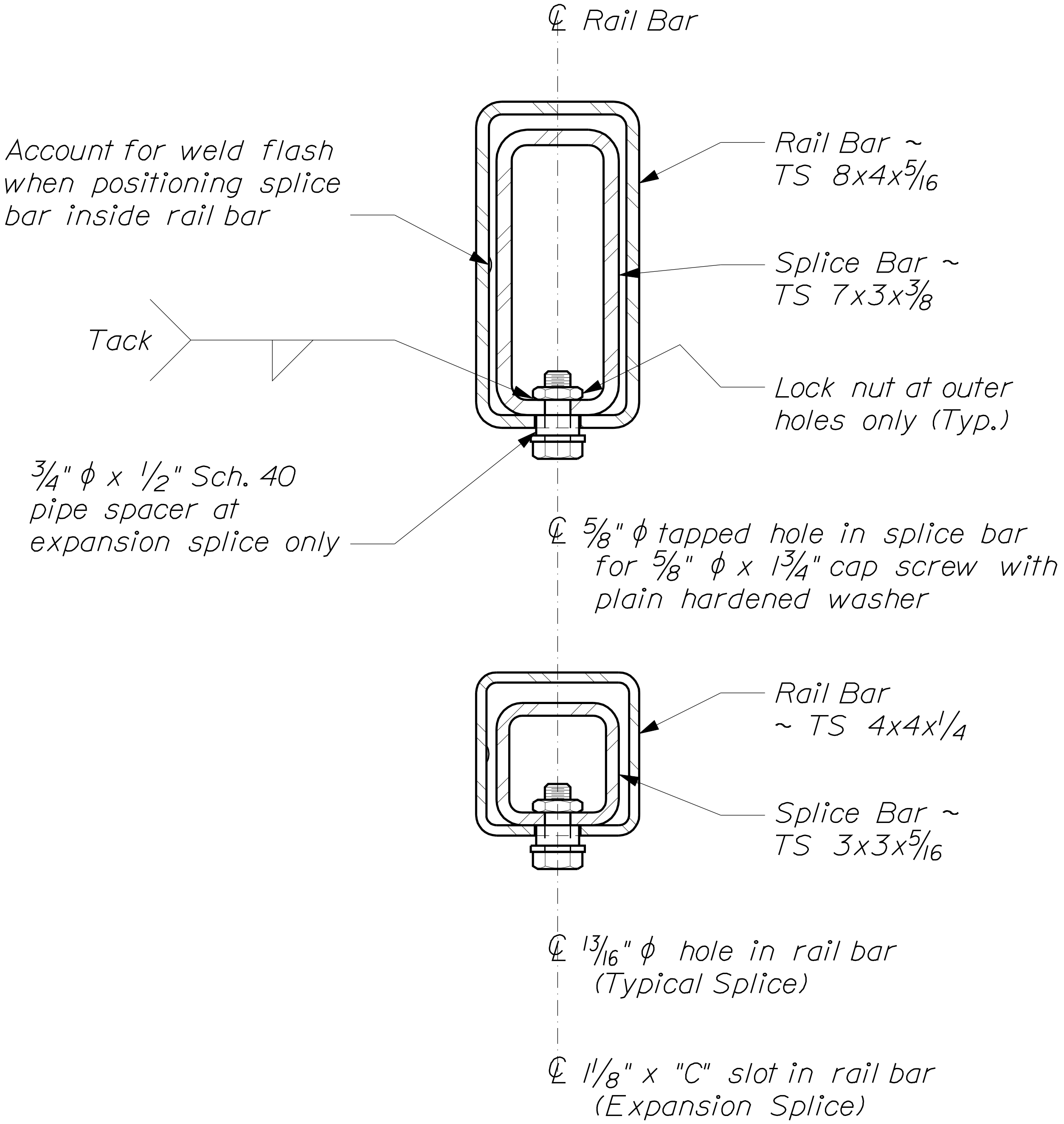


~ RAIL BAR EXPANSION JOINT SECTION ~

For details not shown, see "Rail Bar Splice Section"

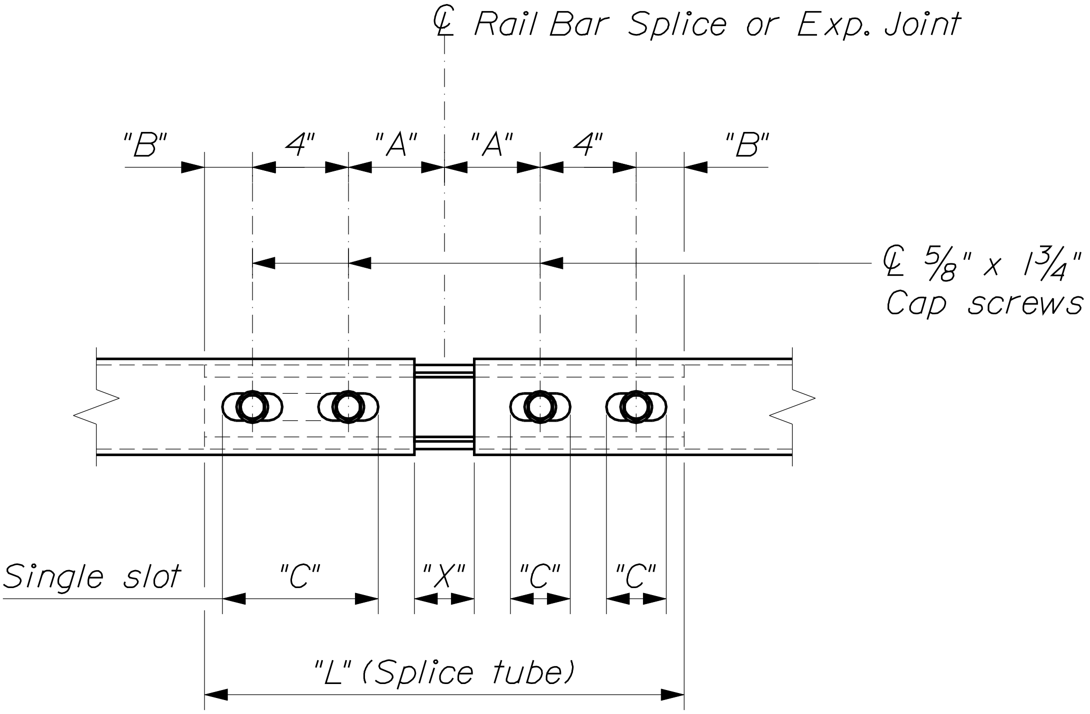
STEEL BRIDGE RAILING

507(10)



-- OPTIONAL RAIL BAR SPLICE SECTION --
(Details Typical for both rail bars)

STEEL BRIDGE RAILING
507(11)



~ RAIL BAR SPLICE & EXPANSION JOINT DETAIL ~

(Bottom View)

SPLICE TUBE DIMENSIONS		
	TS 8x4	TS 4x4
Top & Bot. Plates	2½ x ⅜ x "L"	2⅝ x ⅜ x "L"
Side Plates	6¾ x ⅜ x "L"	2⅞ x ⅜ x "L"

SPLICE & EXPANSION JOINT TABLE					
"T"	"A"	"B"	"C"	"L"	"X"
Splice	4"	2"	--	1'-8"	¾"
≤ 4"	4"	2"	2½"	1'-8"	2½"
> 4" ≤ 6½"	5½"	2½"	3½"	2'-0"	3¾"
> 6½" ≤ 9"	6½"	3½"	9" *	2'-4"	5"
> 9" ≤ 13"	8½"	4½"	11" *	2'-10"	7"

T = Total Movement

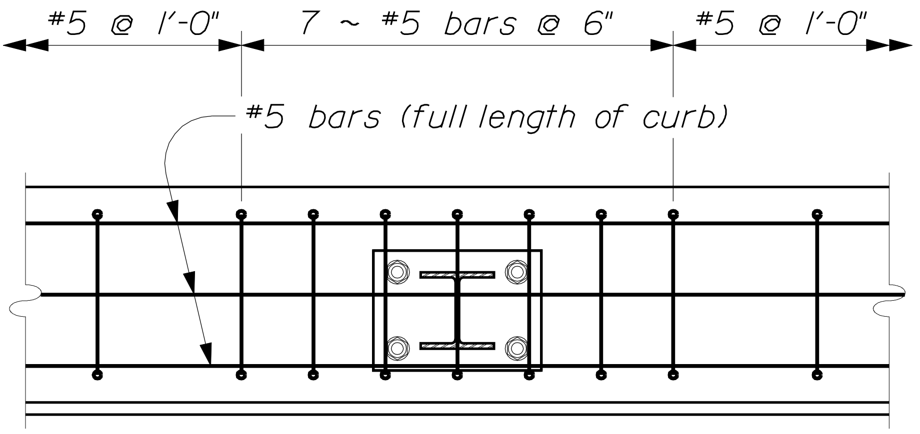
* = Single Slot

MATERIALS:

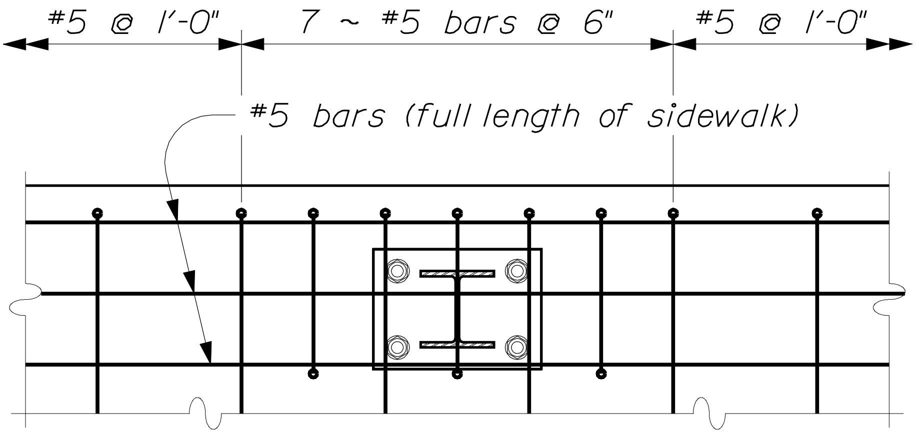
Rail bars	ASTM A 500, Grade B
Rail posts, shapes & plates	AASHTO M 270M/M 270, Grade 50
Anchor studs, washers & heavy hex nuts	AASHTO M 314, Grade 105
All other bolts & nuts (unless noted)	AASHTO A 307, Grade C

STEEL BRIDGE RAILING

507(12)



~ CURB REINFORCING PLAN ~



~ SIDEWALK REINFORCING PLAN ~

NOTES:

1. All work and materials shall conform to the provisions of Section 507 - Railings of the Standard Specifications.

2. Tubing shall meet the longitudinal CVN minimum requirements of 15 ft-lb at 0° F or proportional values of sub - size specimens. Testing shall be done in accordance with ASTM A 673. The H frequency shall be used and the material shall be as - rolled.

3. Twenty - five percent of the post - to - base welds in a production lot shall be tested by the Magnetic Particle Method. If rejectable discontinuities are found, another twenty - five percent of that production lot shall be tested. If rejectable discontinuities are found in the second twenty - five percent, all post - to - base welds in that lot shall be tested. Acceptance criteria shall be in accordance with the latest edition of the AWS D1.5 Bridge Welding Code.

STEEL BRIDGE RAILING

507(13)

NOTES (Continued):

4. All exposed cut or sheared edges shall be broken and free of burrs. The inside weld flash of tubing shall be removed at splices and expansion joints.

5. Rail posts shall be set normal to grade unless otherwise shown.

6. Lengths of rail bar shall be attached to a minimum of 2 rail posts and to at least 4 posts whenever possible.

7. Rail bar expansion joints shall be provided in any rail bay spanning a superstructure expansion joint. Expansion joint width shall be "X" at 45° F and will be adjusted in the field as directed by the Resident. Refer to detail and table on page 507(12) for dimension "X".

8. All parts shall be galvanized after fabrication in accordance with ASTM A 123, except that hardware shall meet the requirements of either ASTM A 153 or ASTM B 695, Class 50, Type I. Parts except hardware shall be blast - cleaned prior to galvanizing in accordance with SSPC - SP6.

9. Anchor bolts shall be set with a template. Nuts securing the post base plate shall be tightened to a snug fit and given an additional $\frac{1}{8}$ turn.

10. Rail bars shall be attached to posts using $\frac{3}{4}$" ϕ ~ ASTM A 307 bolts ($\frac{5}{8}$" ϕ ~ ASTM A 325 bolts may be substituted) inserted through the face of the rail bar. Bolts shall be round or dome head and may be rib neck, slotted, wrench head or tension control (TC or twist - off). Holes in posts shall be $\frac{1}{16}$" larger than the diameter of the bolt. Holes in rail bars shall be drilled to size as follows:

Slotted, wrench head or TC bolts: $\frac{1}{16}$" larger than bolt diameter
Rib neck bolts: Size appropriate to accomodate an interference fit

All bolts for fastening the rail bars to the posts shall be 6 inches in length and shall include a flat washer under the nut.

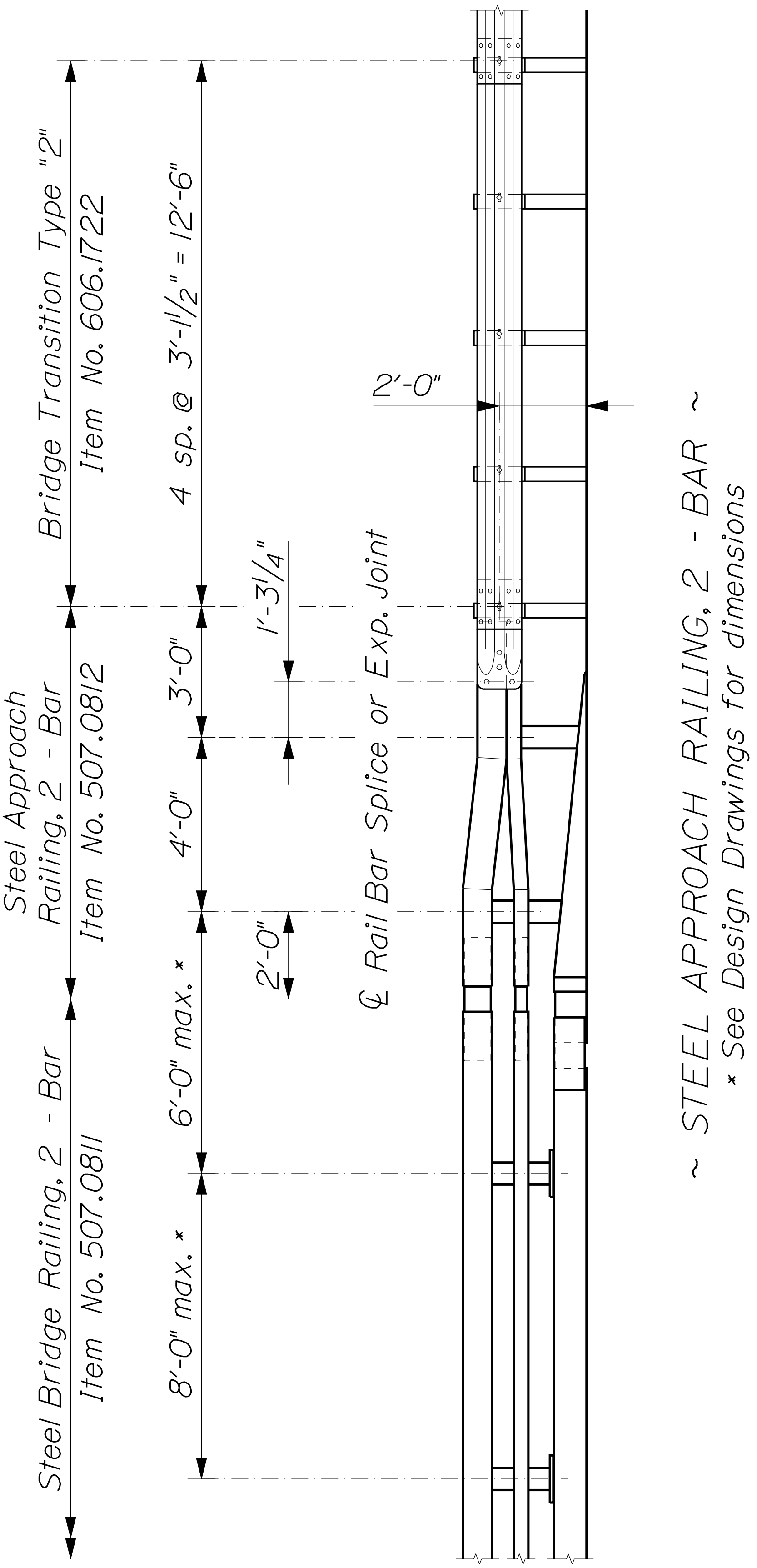
11. Holes in rail bars shall be field - drilled and shall be coated with an approved zinc - rich paint prior to erection.

12. Bolts in expansion joints shall be tightened only to a point that will allow rail movement.

13. The alternate curb projection shown for the curb - mounted railings is intended for use with granite bridge curb.

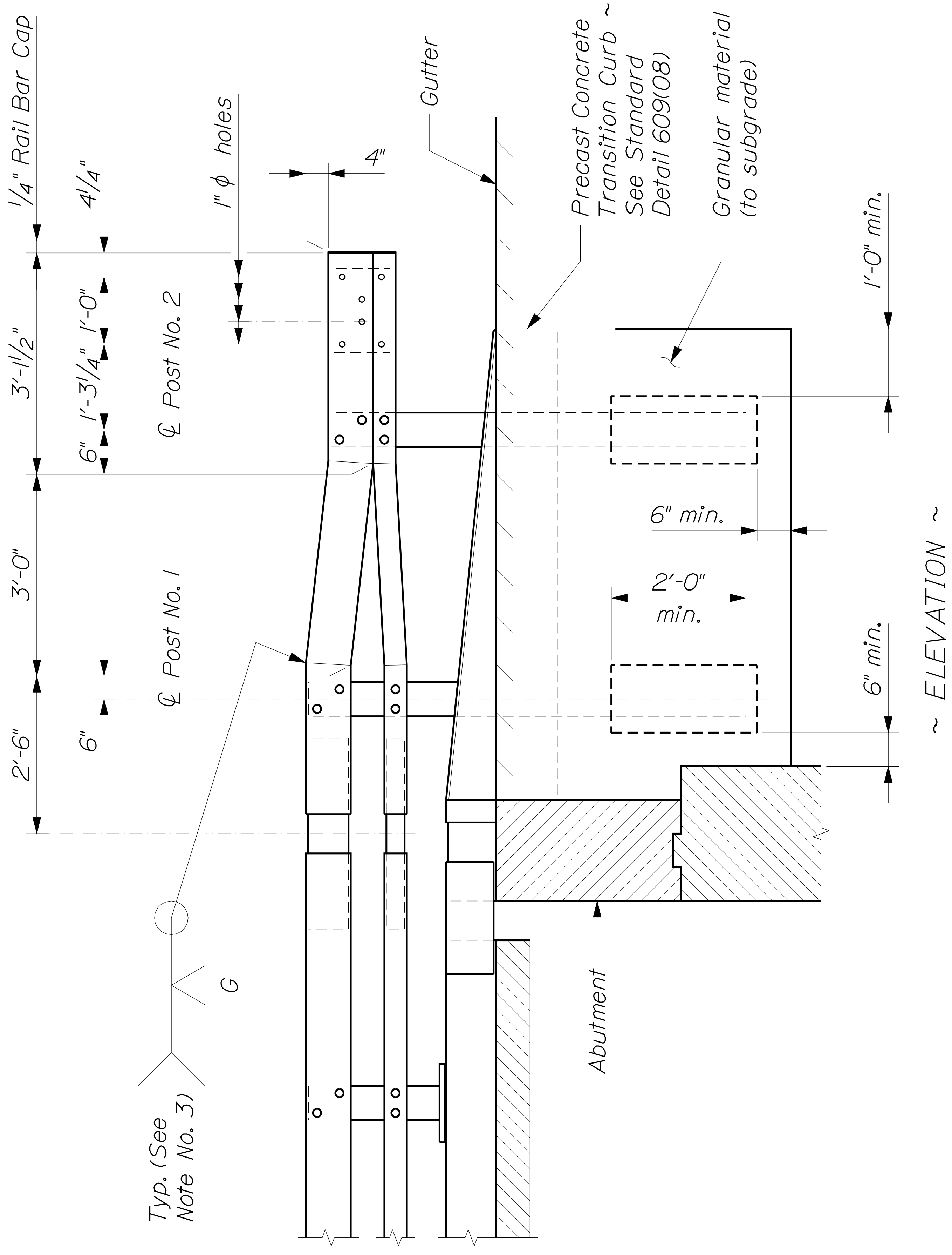
14. If there is a conflict between these Standard Details and the Design Drawings, the Contractor shall notify the Resident immediately.

STEEL BRIDGE RAILING



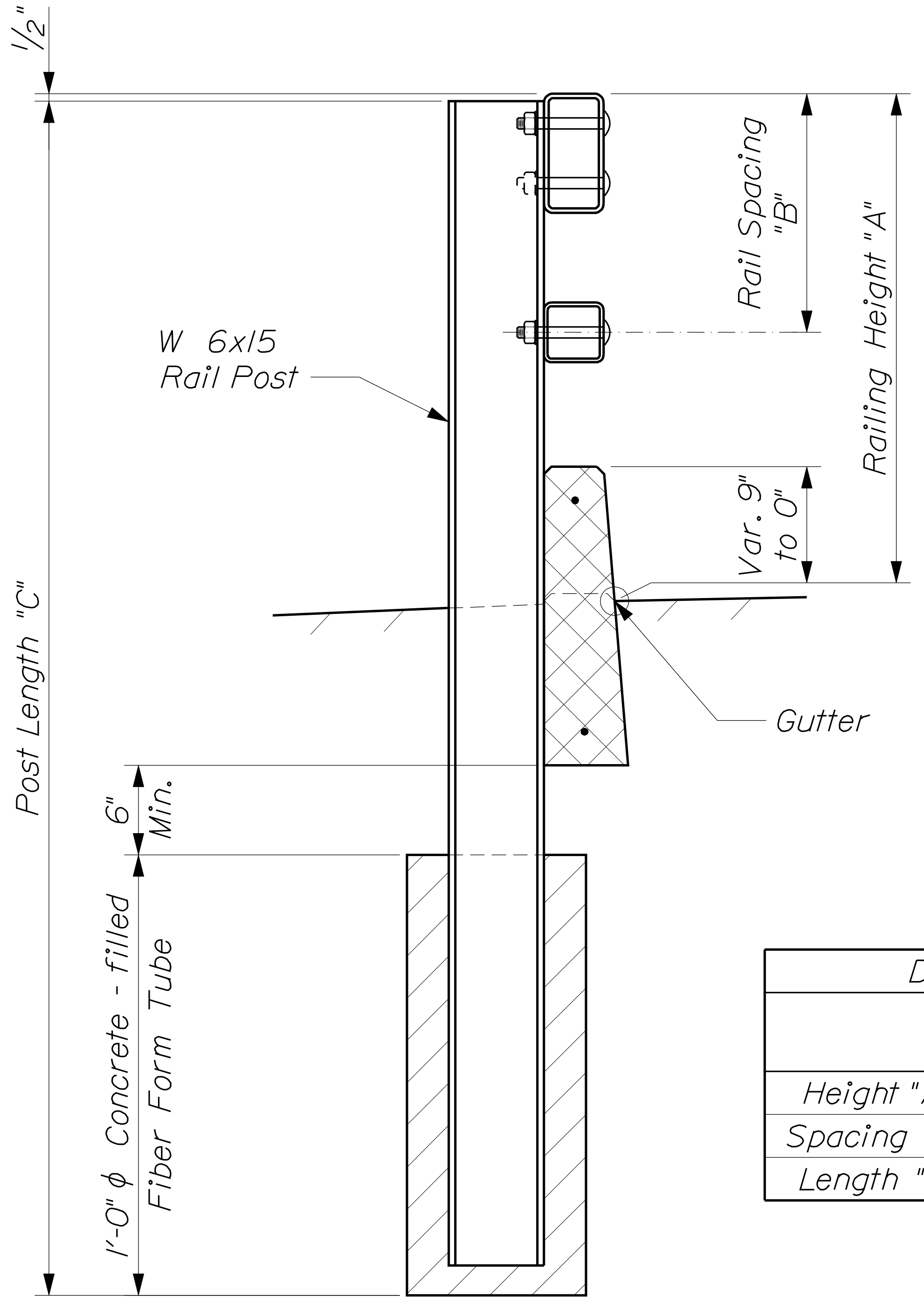
STEEL APPROACH RAILING

507(15)



STEEL APPROACH RAILING

507(16)

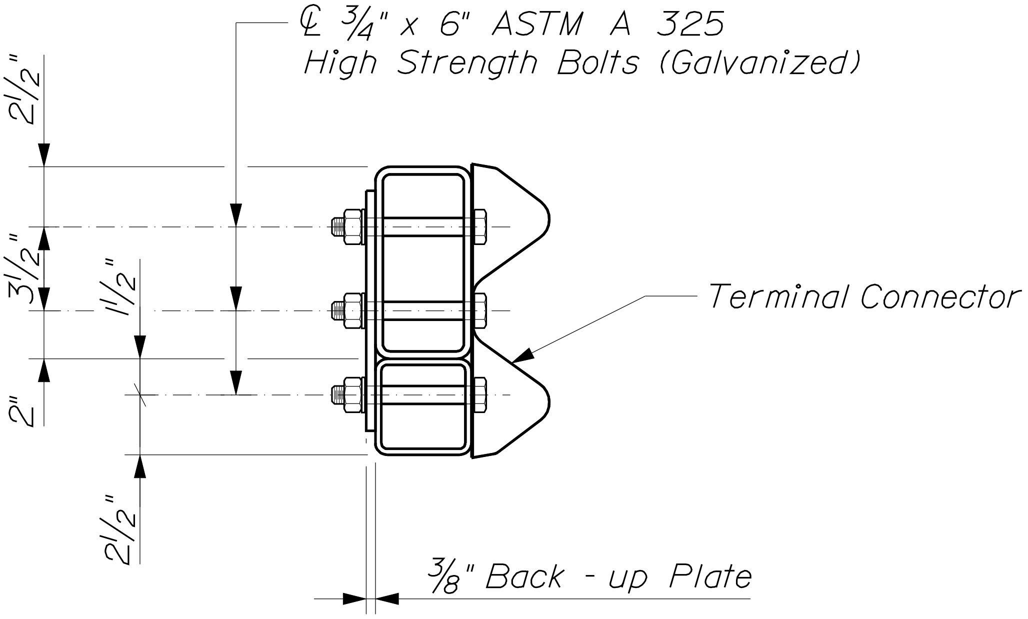


~ TYPICAL SECTION ~

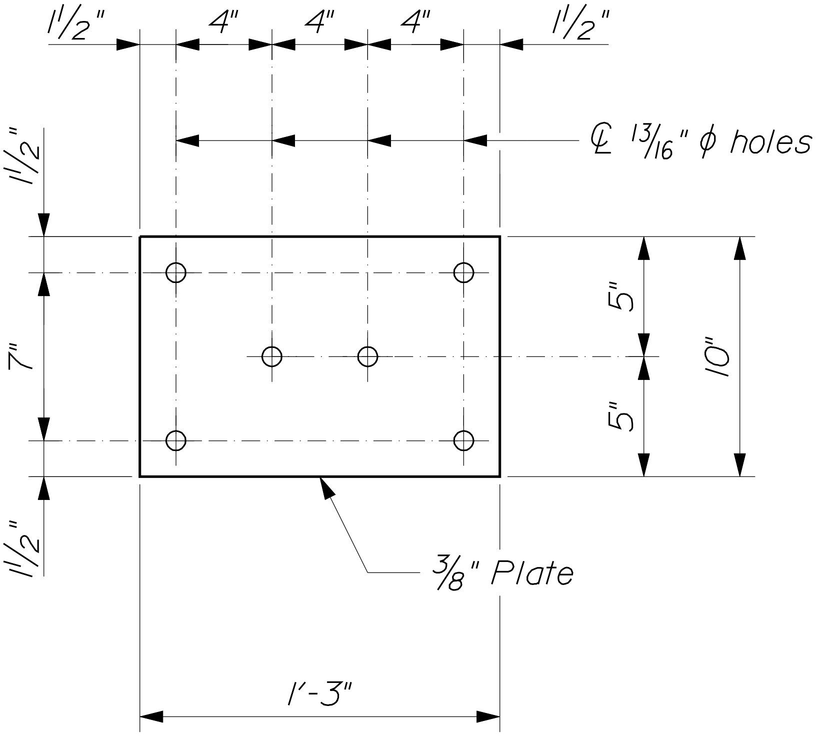
DIMENSIONS		
	Post No. 1	Post No. 2
Height "A"	2'-10"	2'-6"
Spacing "B"	1'-4"	10"
Length "C"	6'-6"	6'-2"

STEEL APPROACH RAILING

507(17)



~ SECTION THROUGH TERMINAL CONNECTOR ~



~ BACK - UP PLATE ~

STEEL APPROACH RAILING

507(18)

NOTES:

1. Refer to Steel Bridge Railing pages for additional details, notes and materials specifications.

2. The bottom rail bar may be bent to shape from one continuous length of stock provided that the fabricator can achieve the required geometry without deforming the tube.

3. Rail bar welds shall have a minimum penetration of 80% as demonstrated by a test weld performed by the fabricator.

4. To facilitate field fit - up of the approach railing, posts shall be set loosely into fiber form tubes while parts are being assembled. Post holes shall be backfilled with Class "S" or other concrete mix approved by the Resident. Payment will be considered incidental to the Steel Approach Railing pay item.

5. Granular material shall meet or exceed the requirements of Subsection 703.19, Granular Borrow. Payment for granular material and for any excavation necessary to install the rail posts will be considered incidental to the Steel Approach Railing pay item.

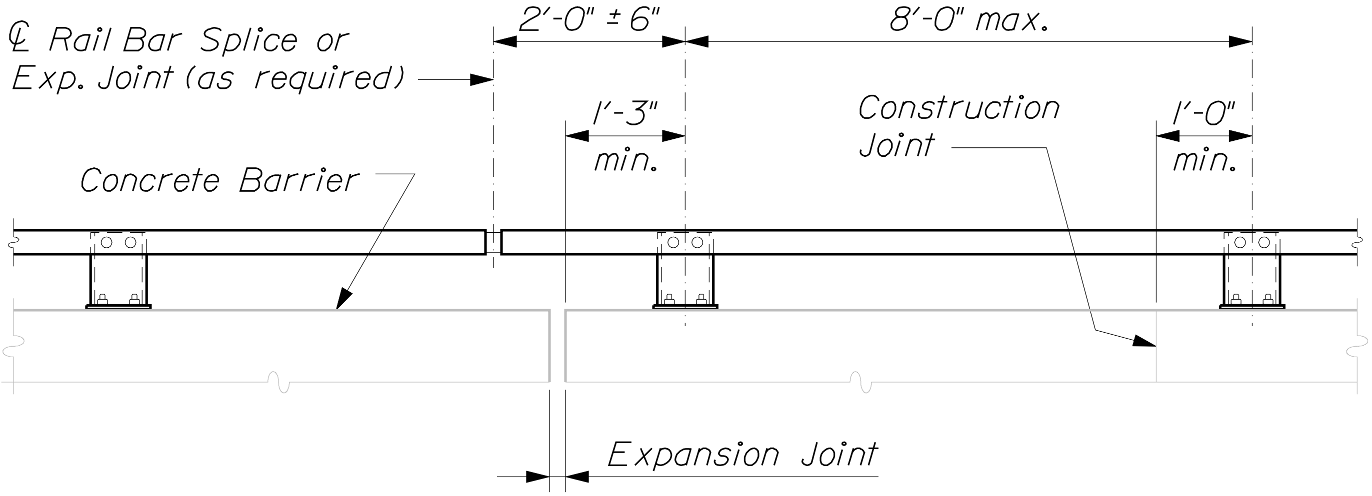
6. The precast concrete transition curb shall meet the provisions of Section 609 - Curbing of the Standard Specifications. The bridge end of the curb shall be saw - cut in the field to fit flush against the backwall, as dictated by the bridge skew angle and the profile grade. Where curbing is specified on the adjacent highway, the transition shall be modified accordingly. Payment for transition curb will be considered incidental to the Steel Approach Railing pay item.

7. The Bridge Transition Type "2" as shown is a slight modification of the standard Type "2" detail shown in Section 606. The ¾" ϕ bolts and back - up plate will be considered as part of the Steel Approach Railing pay item.

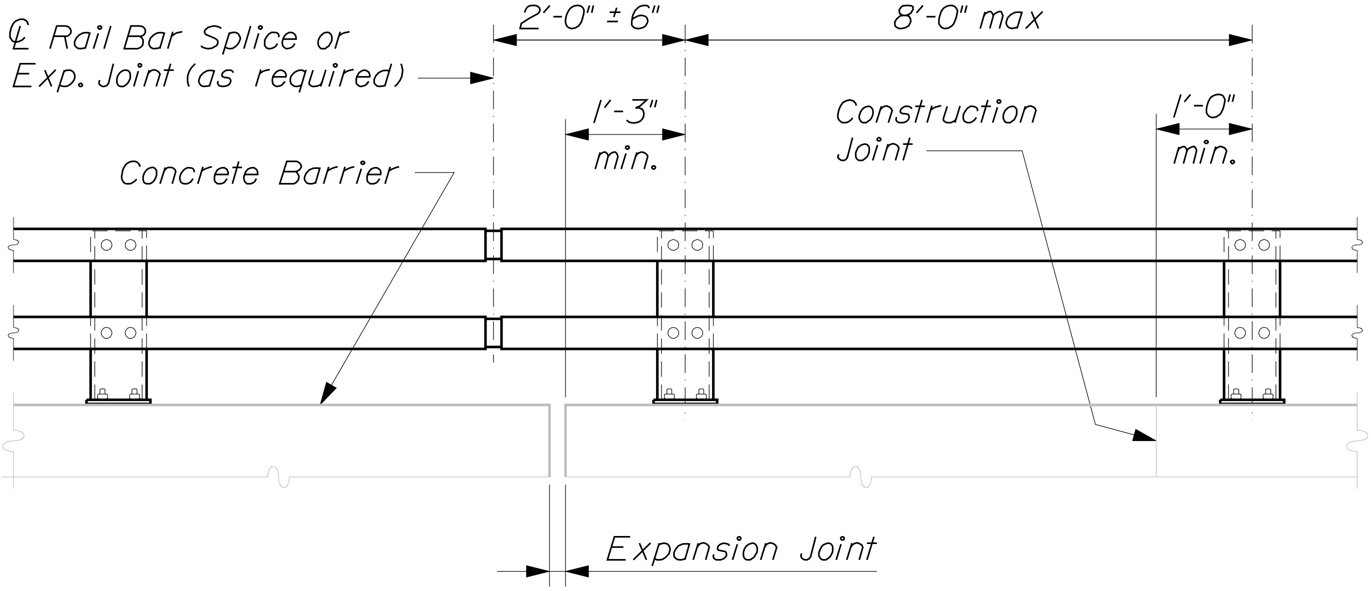
8. After installation of the guard rail is complete, upset the threads on the anchor bolts in three (3) places around each bolt, at the junction of the nut and the exposed thread, with a center punch or similar tool.

9. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

STEEL APPROACH RAILING



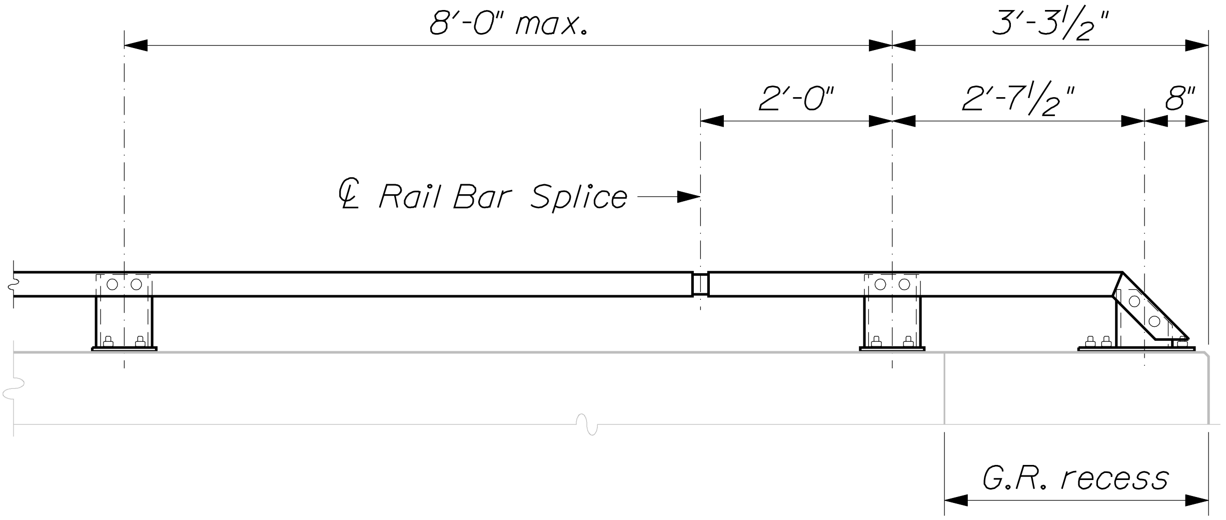
~ 1 - BAR PEDESTRIAN RAILING ~



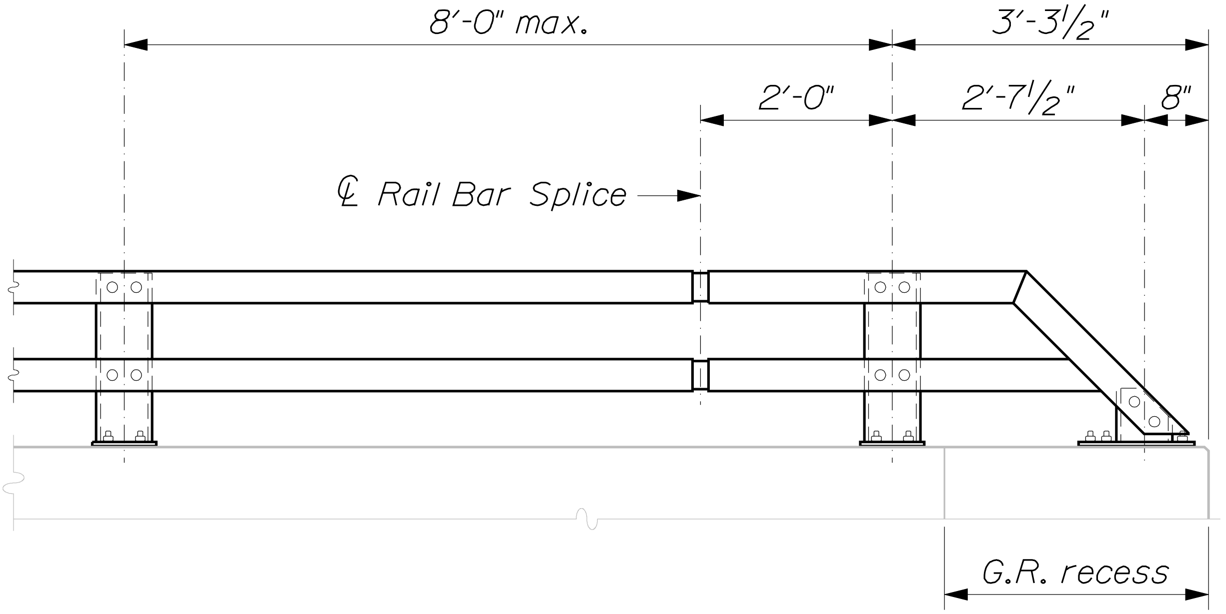
~ 2 - BAR BICYCLE RAILING ~

BARRIER - MOUNTED STEEL BRIDGE RAILING

507(20)



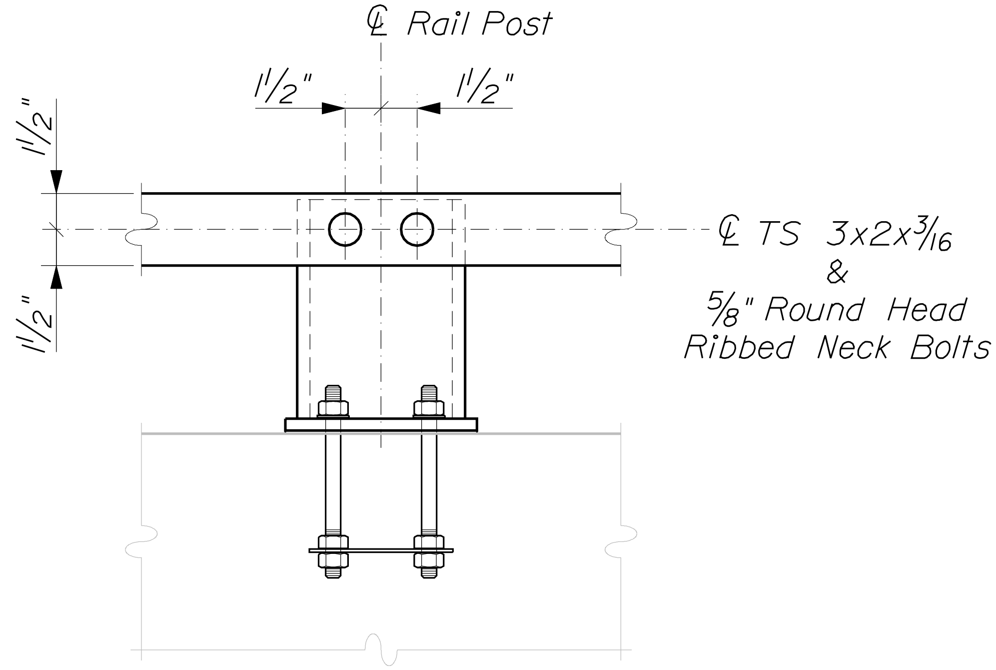
~ 1 - BAR PEDESTRIAN RAILING ~
(Showing End Treatment)



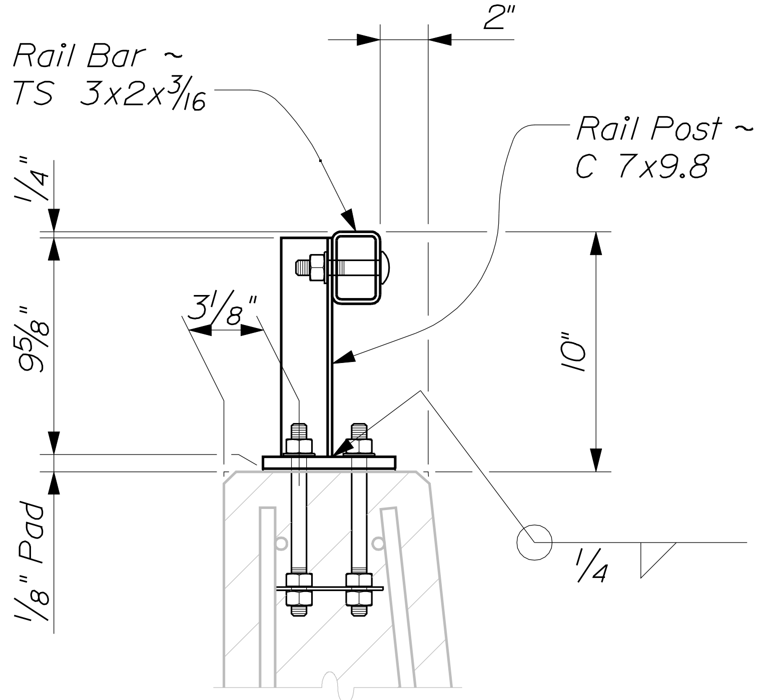
~ 2 - BAR BICYCLE RAILING ~
(Showing End Treatment)

BARRIER - MOUNTED STEEL BRIDGE RAILING

507(21)



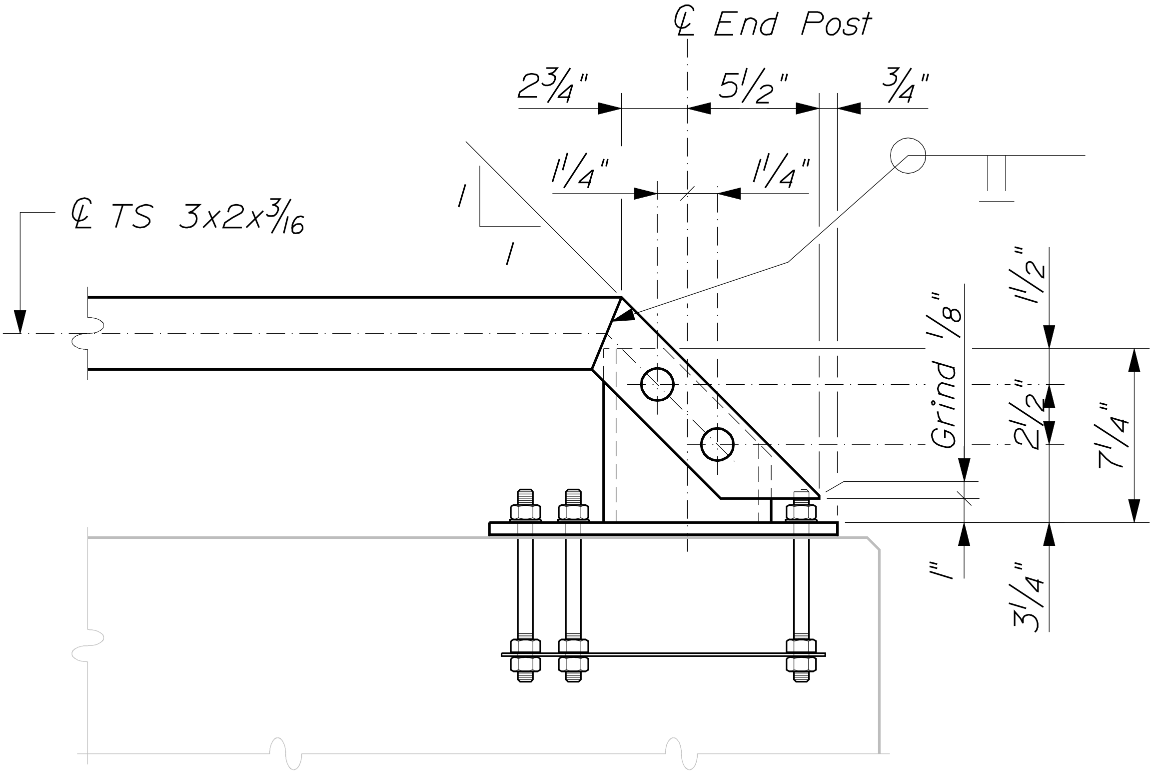
~ RAIL & POST ELEVATION ~
(1 - Bar Pedestrian Railing)



~ TYPICAL RAIL SECTION ~
(1 - Bar Pedestrian Railing)

BARRIER - MOUNTED STEEL BRIDGE RAILING

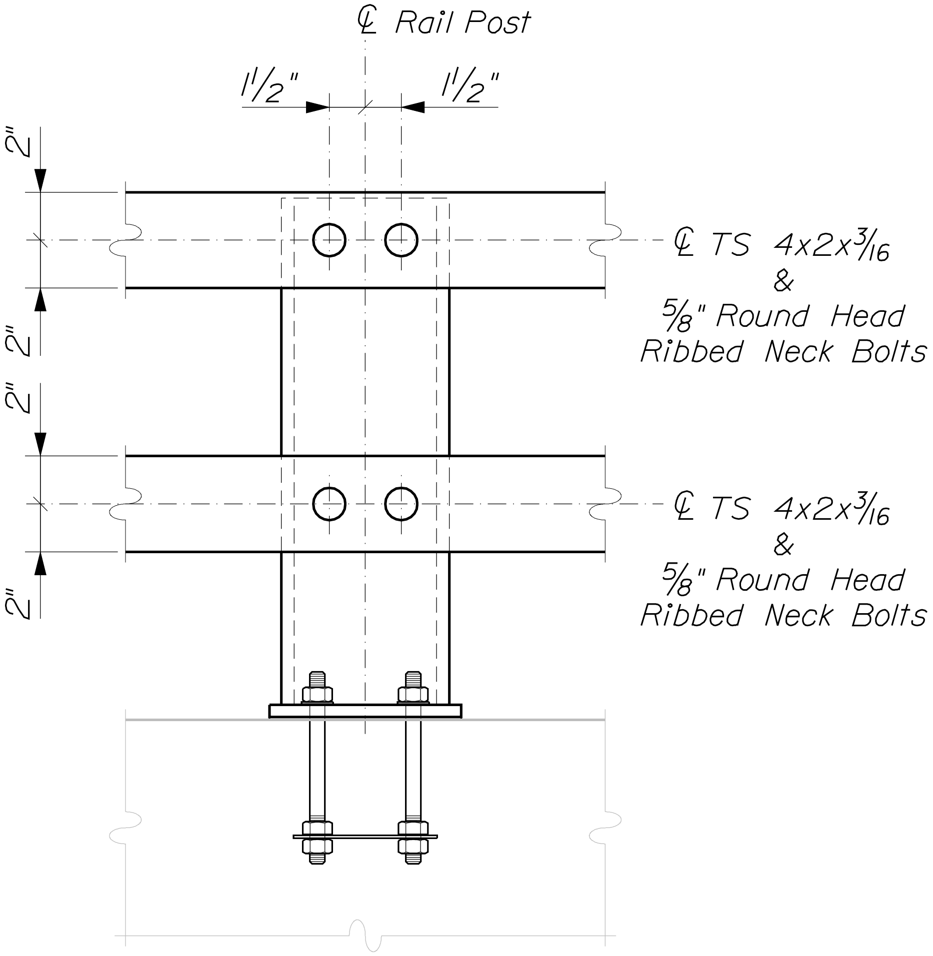
507(22)



~ RAIL END TREATMENT ~
(1 - Bar Pedestrian Railing)

BARRIER - MOUNTED STEEL BRIDGE RAILING

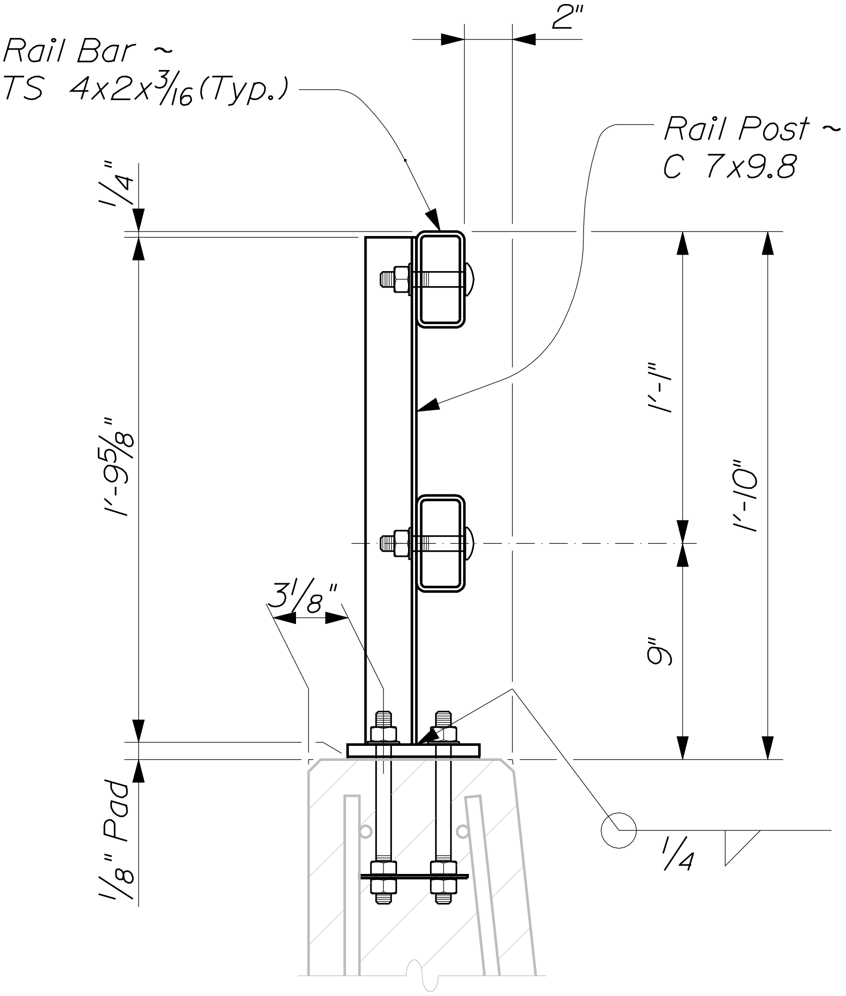
507(23)



~ RAIL & POST ELEVATION ~
(2 - Bar Bicycle Railing)

BARRIER - MOUNTED STEEL BRIDGE RAILING

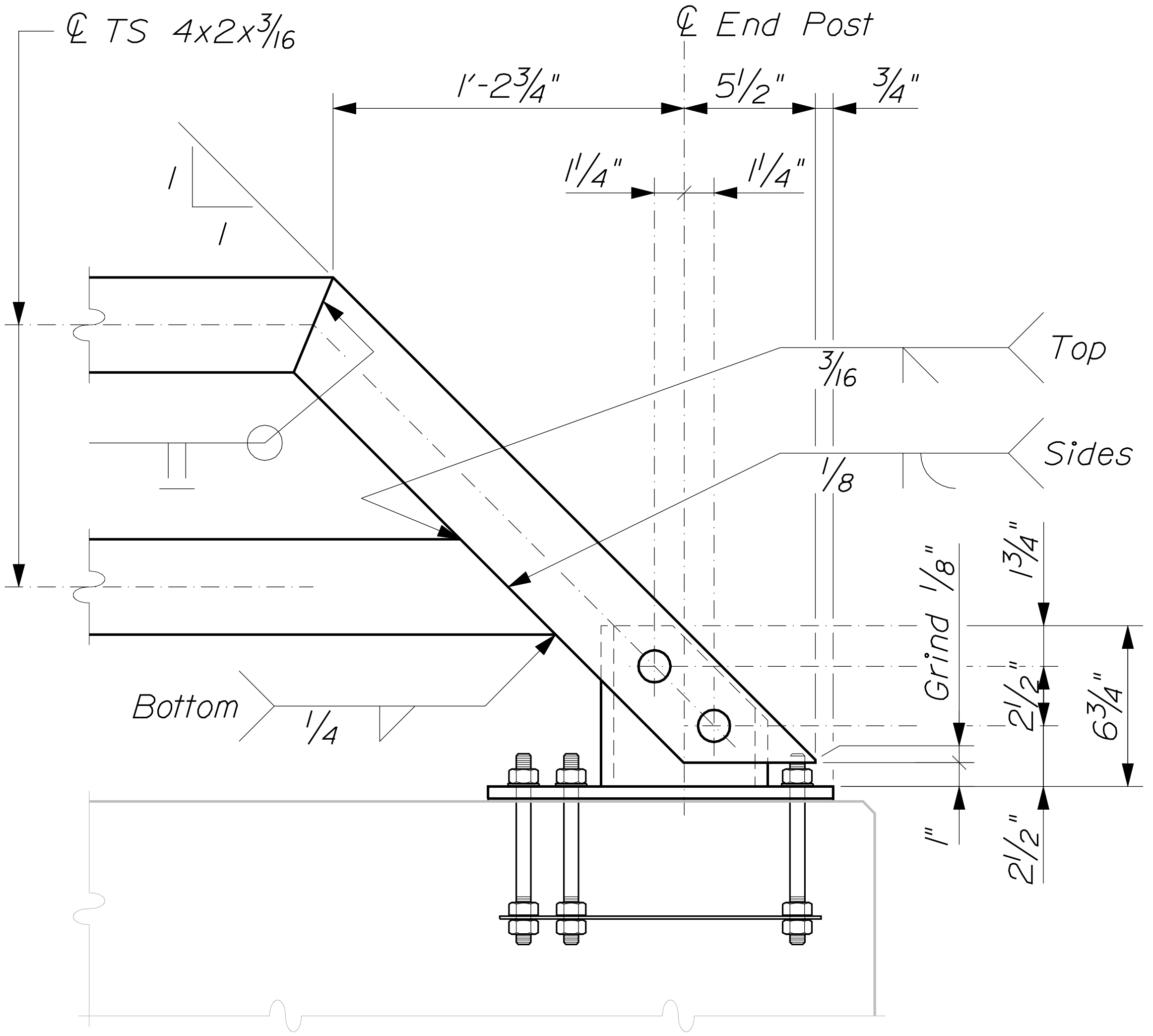
507(24)



~ TYPICAL RAIL SECTION ~
(2 - Bar Bicycle Railing)

BARRIER - MOUNTED STEEL BRIDGE RAILING

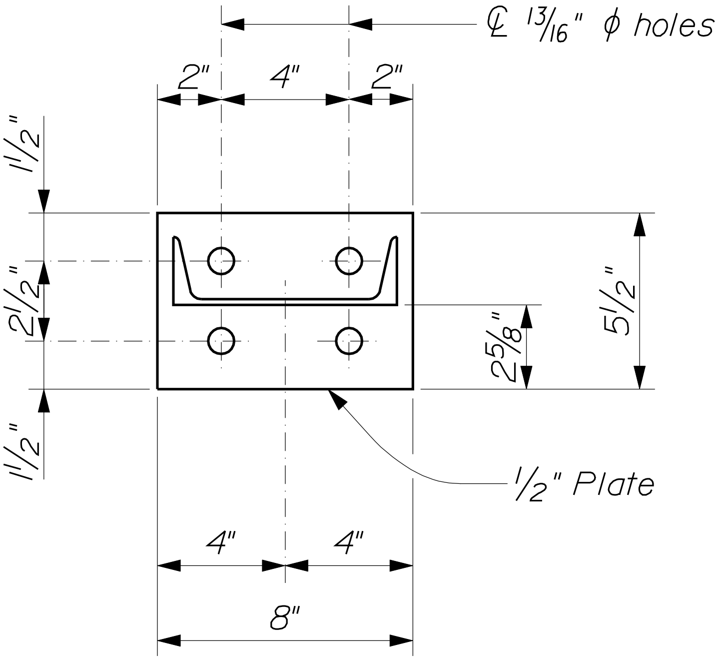
507(25)



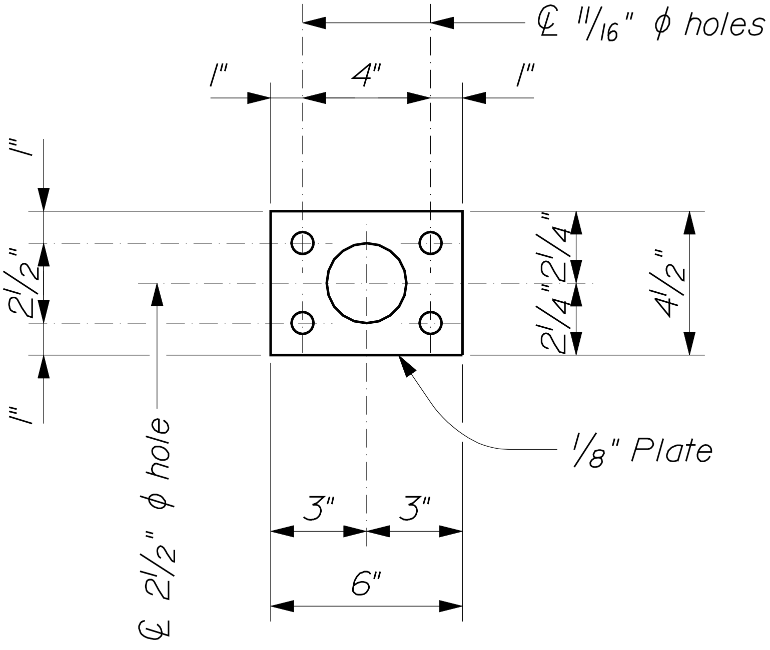
~ RAIL END TREATMENT ~
(2 - Bar Bicycle Railing)

BARRIER - MOUNTED STEEL BRIDGE RAILING

507(26)



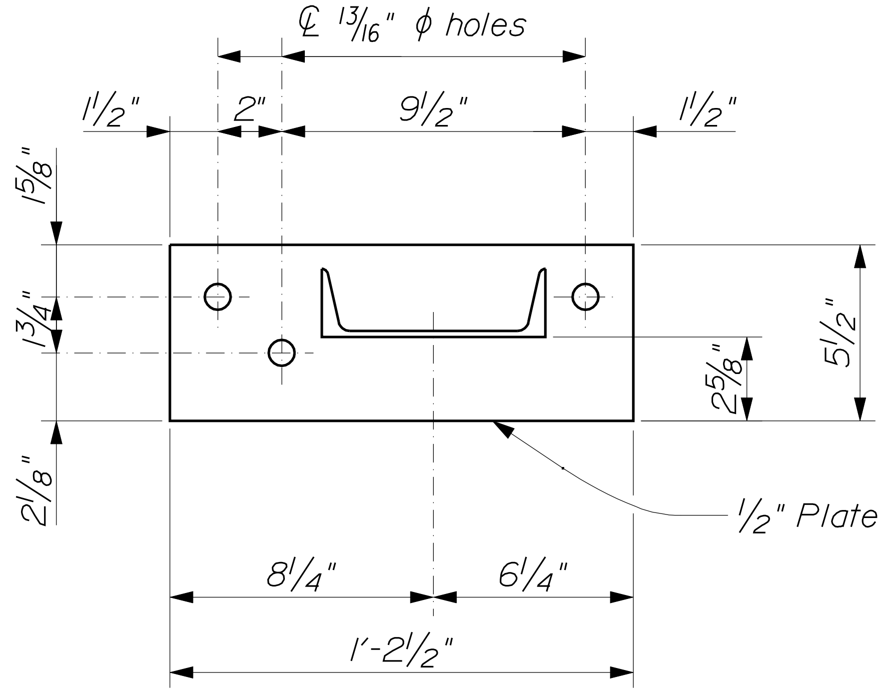
~ POST & BASE PLATE PLAN ~



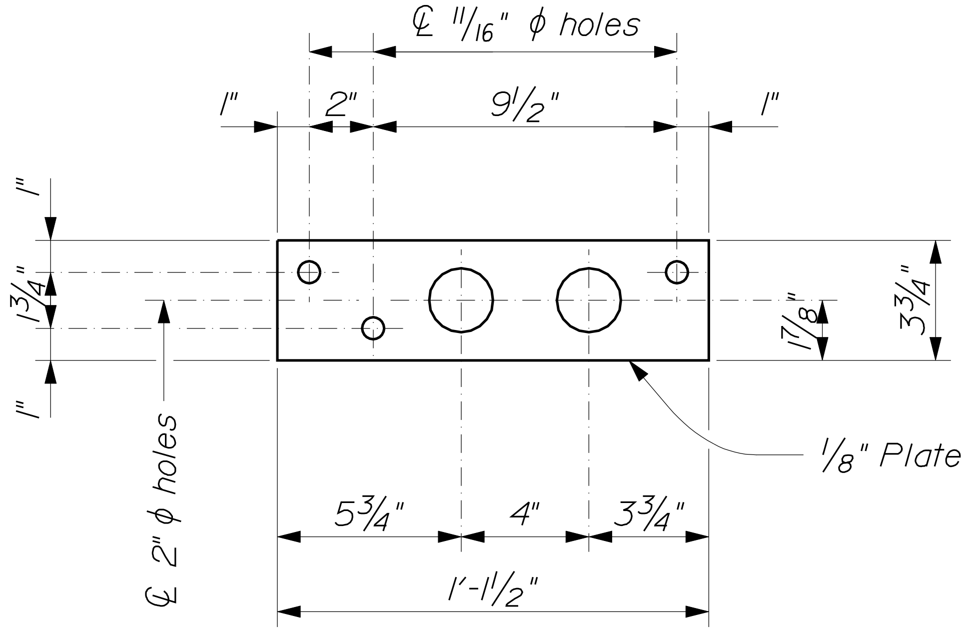
~ SPACER PLATE PLAN ~

BARRIER - MOUNTED STEEL BRIDGE RAILING

507(27)



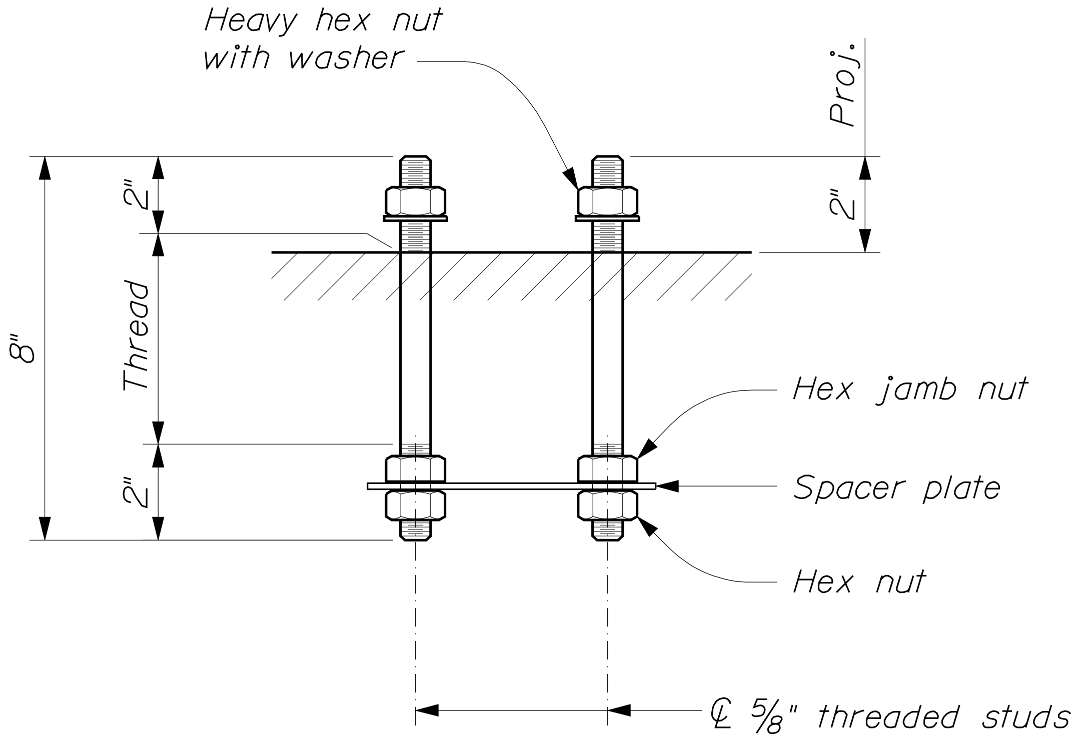
~ END POST & BASE PLATE PLAN ~



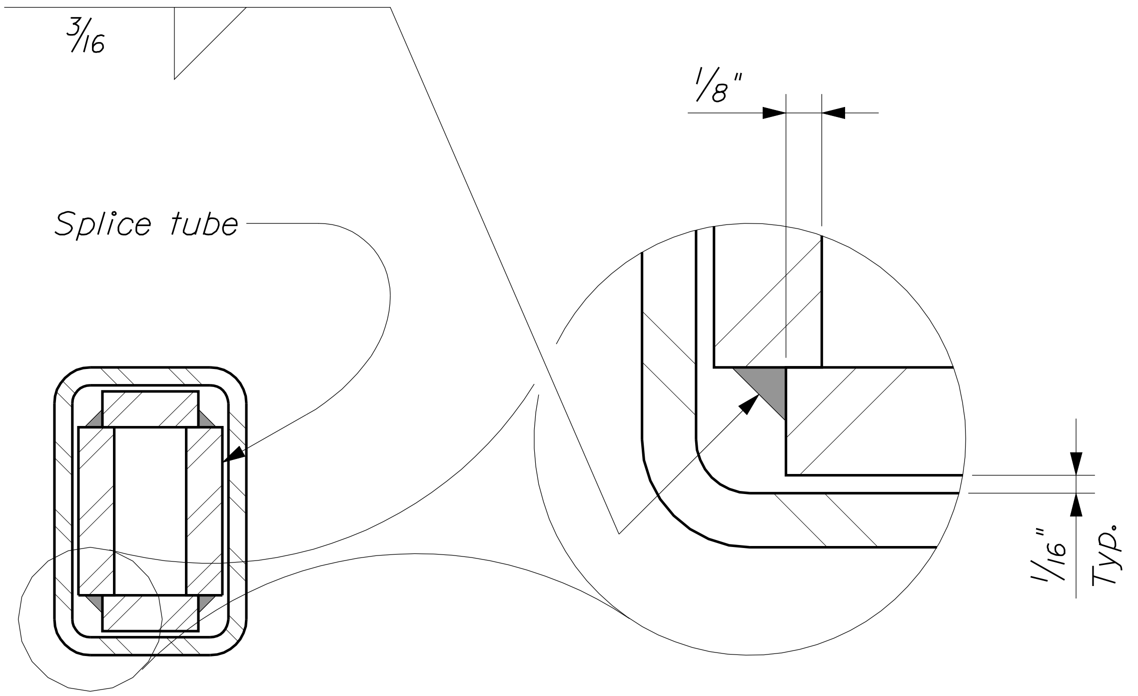
~ END SPACER PLATE PLAN ~

BARRIER - MOUNTED STEEL BRIDGE RAILING

507(28)



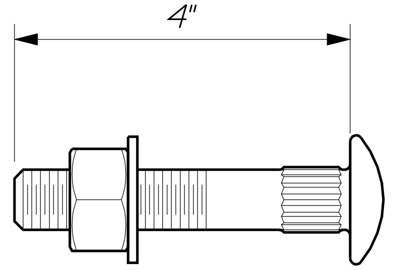
~ ANCHOR BOLT DETAIL ~



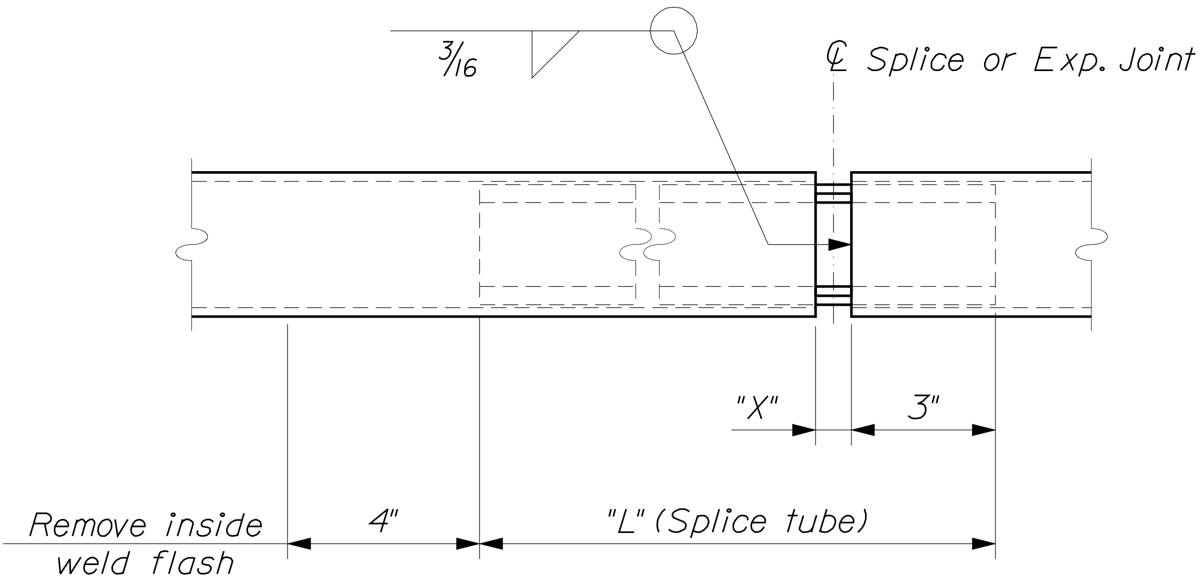
~ RAIL SPLICE SECTION ~

BARRIER - MOUNTED STEEL BRIDGE RAILING

507(29)



~ RIBBED NECK BOLT ~
(with washer & lock nut)



~ RAIL BAR SPLICE / EXPANSION JOINT ~

RAIL BAR SPLICE & EXPANSION JOINT TABLE

"T"	"L"	"X"
Splice	1'-8"	3/4"
≤ 4"	1'-8"	2 1/2"
> 4" ≤ 6 1/2"	2'-0"	4"
> 6 1/2" ≤ 9"	2'-4"	5"
> 9" ≤ 13"	2'-10"	7"

"T" = Total Movement

SPLICE TUBE (1 - Bar Railing)	
Top & Bot. Plates	Bar 1x3/8 x "L"
Side Plates	Bar 1 3/4x3/8 x "L"

SPLICE TUBE (2 - Bar Railing)	
Top & Bot. Plates	Bar 1x3/8 x "L"
Side Plates	Bar 2 3/4x3/8 x "L"

BARRIER - MOUNTED STEEL BRIDGE RAILING

NOTES:

1. All work and materials shall conform to the provisions of Standard Specifications Section 507 - Railings.

2. All exposed cut or sheared edges shall be rounded and free of burrs.

3. All parts shall be galvanized after fabrication in accordance with ASTM A 123, except that hardware shall meet the requirements of ASTM A 153. Parts shall be blast - cleaned prior to galvanizing in accordance with SSPC - SP6.

4. Rail posts shall be set normal to grade unless otherwise indicated.

5. Lengths of rail bar shall be attached to a minimum of 2 rail posts and to at least 4 posts whenever possible.

6. Rail bar expansion joints shall be provided in any rail bay spanning a superstructure expansion joint. Expansion joint width shall be "X" at 45 °F and will be adjusted as directed by the Resident.

7. Holes for ribbed - neck bolts shall be field - drilled to an appropriate size to produce an interference fit with the bolts.

8. Rail post anchoring nuts shall be tightened to a snug fit and given an additional 1/8 turn.

9. Ten percent of the post - to - base welds in a production lot shall be tested by the Magnetic Particle Method. If rejectable discontuities are found, another ten percent of that lot shall be tested. If rejectable discontuties are found in the second ten percent, all post - to - base welds shall be be tested. Acceptable criteria shall be in accordance with the in edition of the AWS D1.5 Bridge Welding Code.

10. All butt joint welds shall have a minimum penetration of 60 percent.

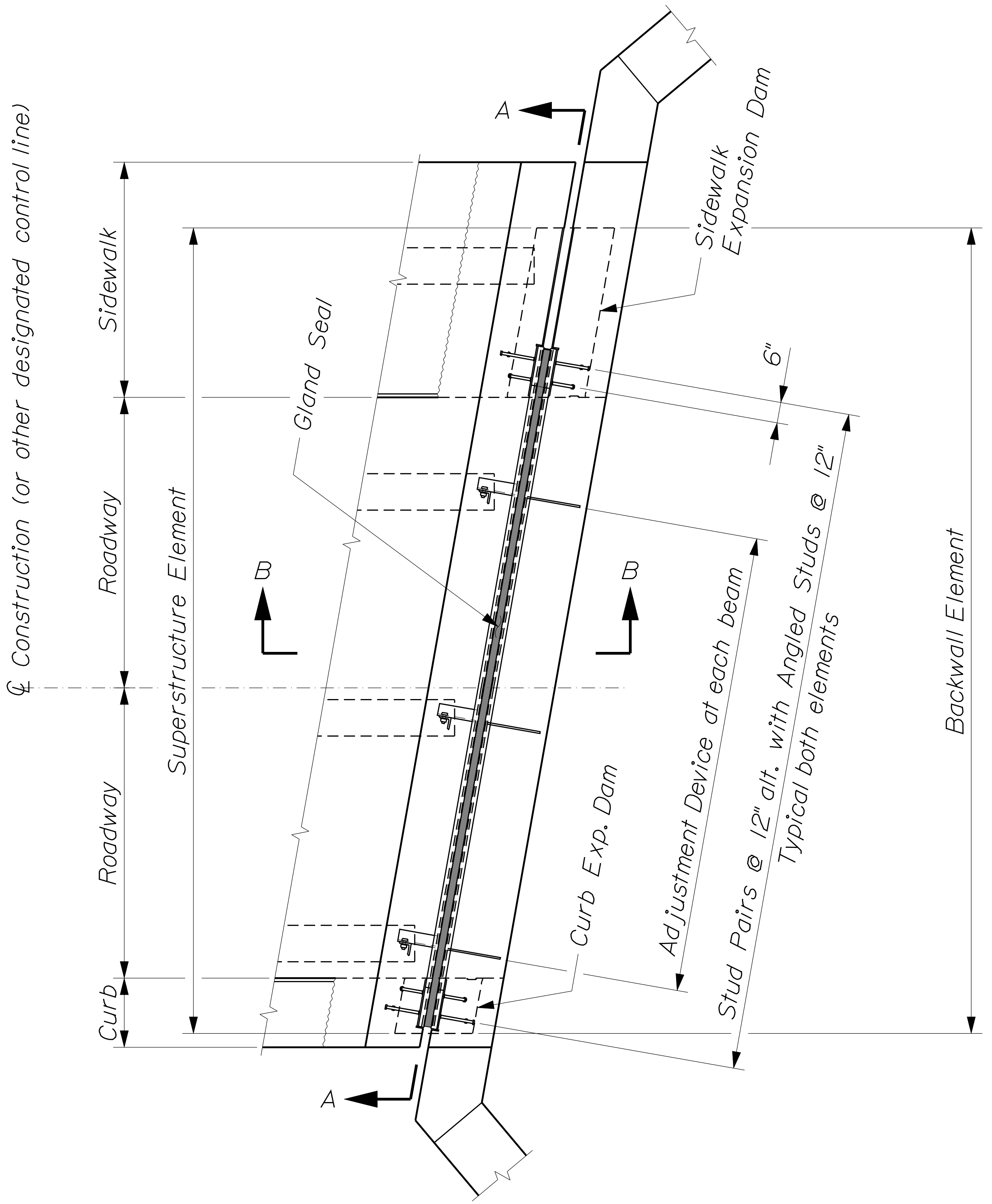
11. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

MATERIALS:

Rail bars	ASTM A500
All other shapes & plates	AASHTO M 270M/M 270, Grade 36
Threaded studs, washers & exposed heavy hex nuts	AASHTO M 314, Grade 105
All other bolts & nuts	ASTM A 307, Grade C

BARRIER - MOUNTED STEEL BRIDGE RAILING

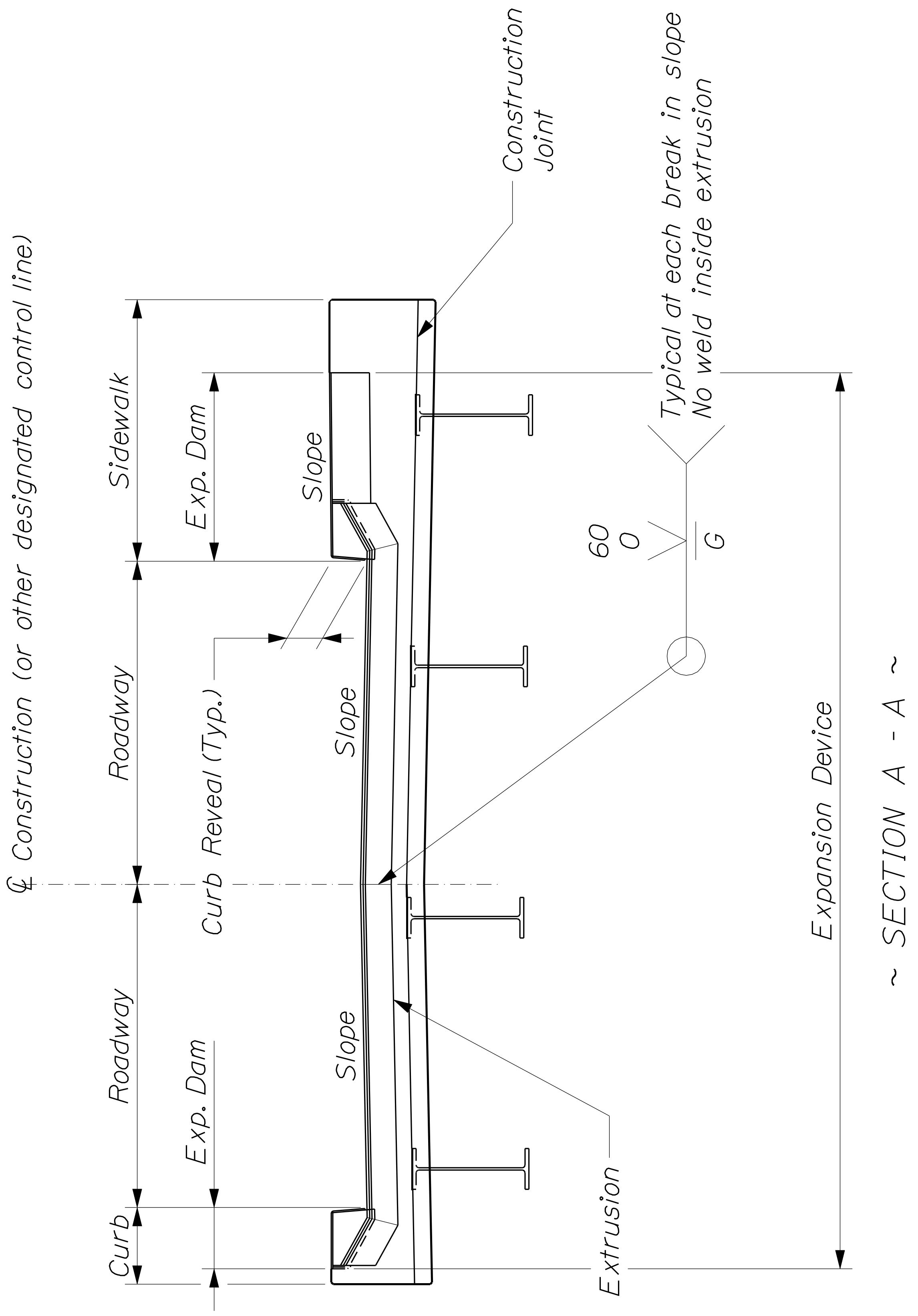
507(31)



~ EXPANSION DEVICE PLAN ~
(Typical installation)

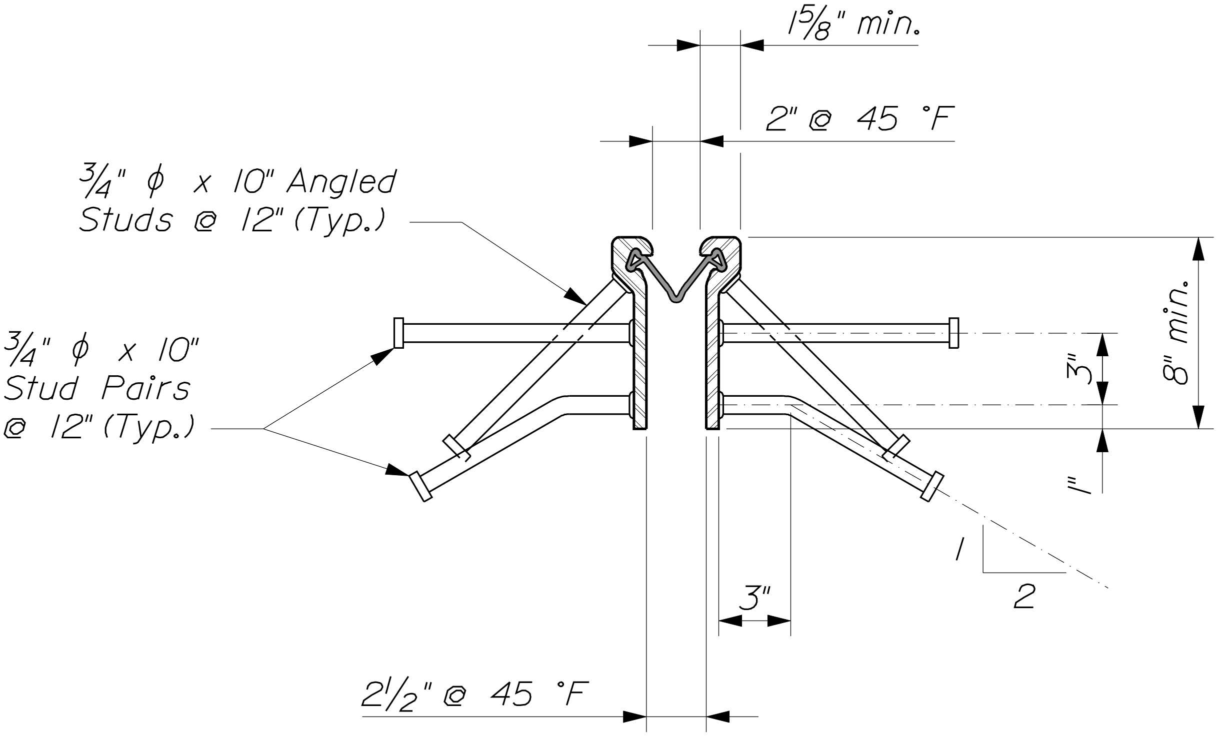
EXPANSION DEVICE - GLAND SEAL

520(01)

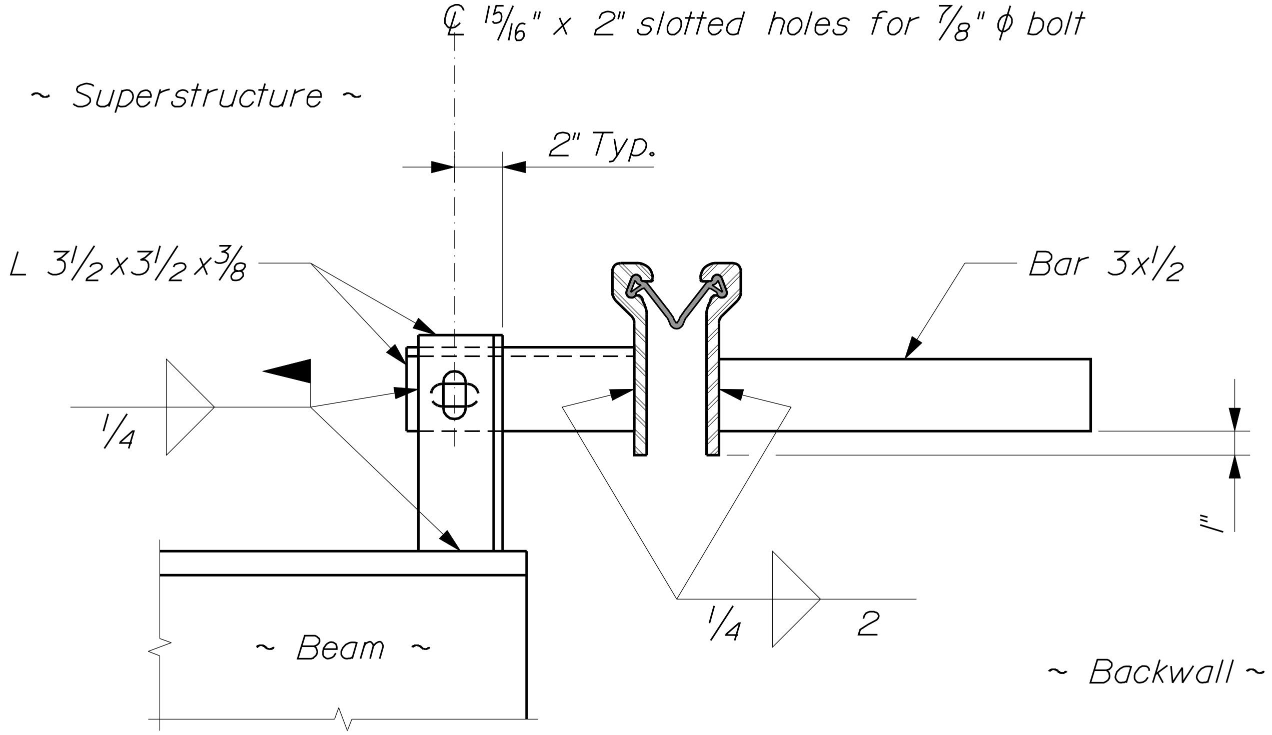


EXPANSION DEVICE - GLAND SEAL

520(02)



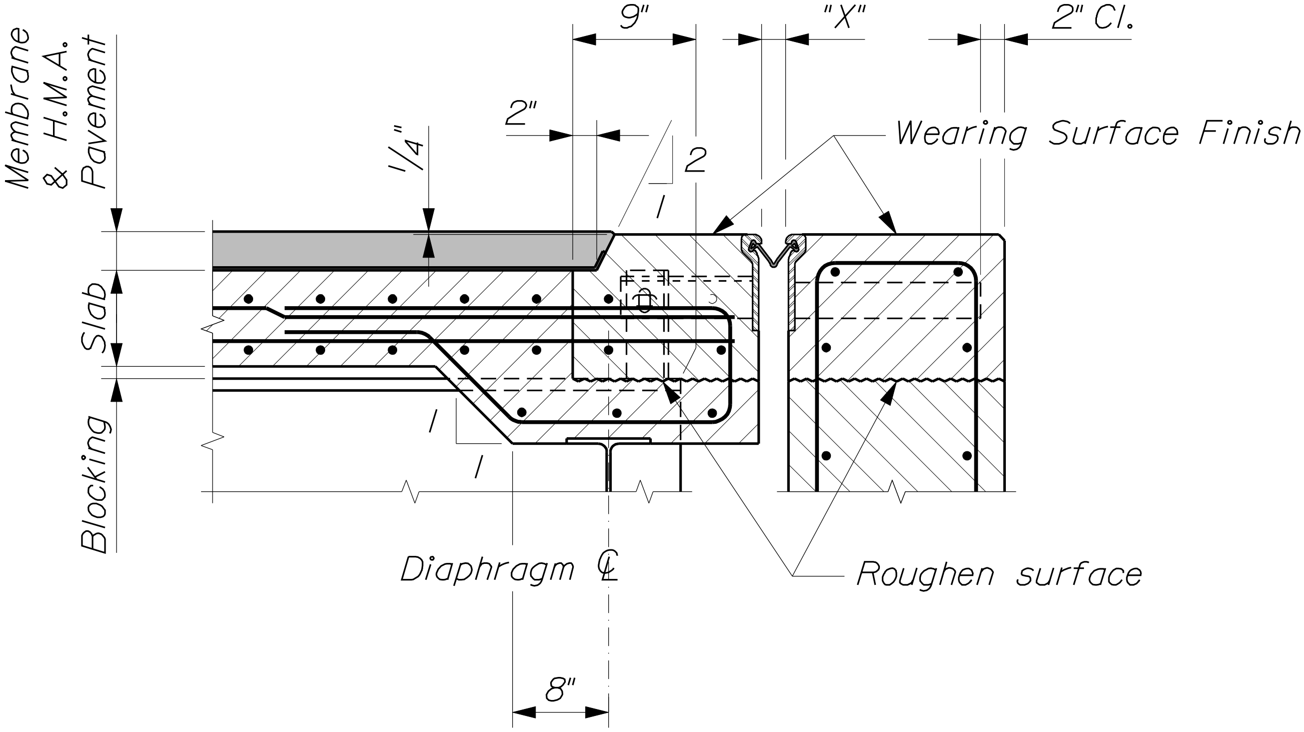
~ TYPICAL SECTION ~ EXPANSION DEVICE ~



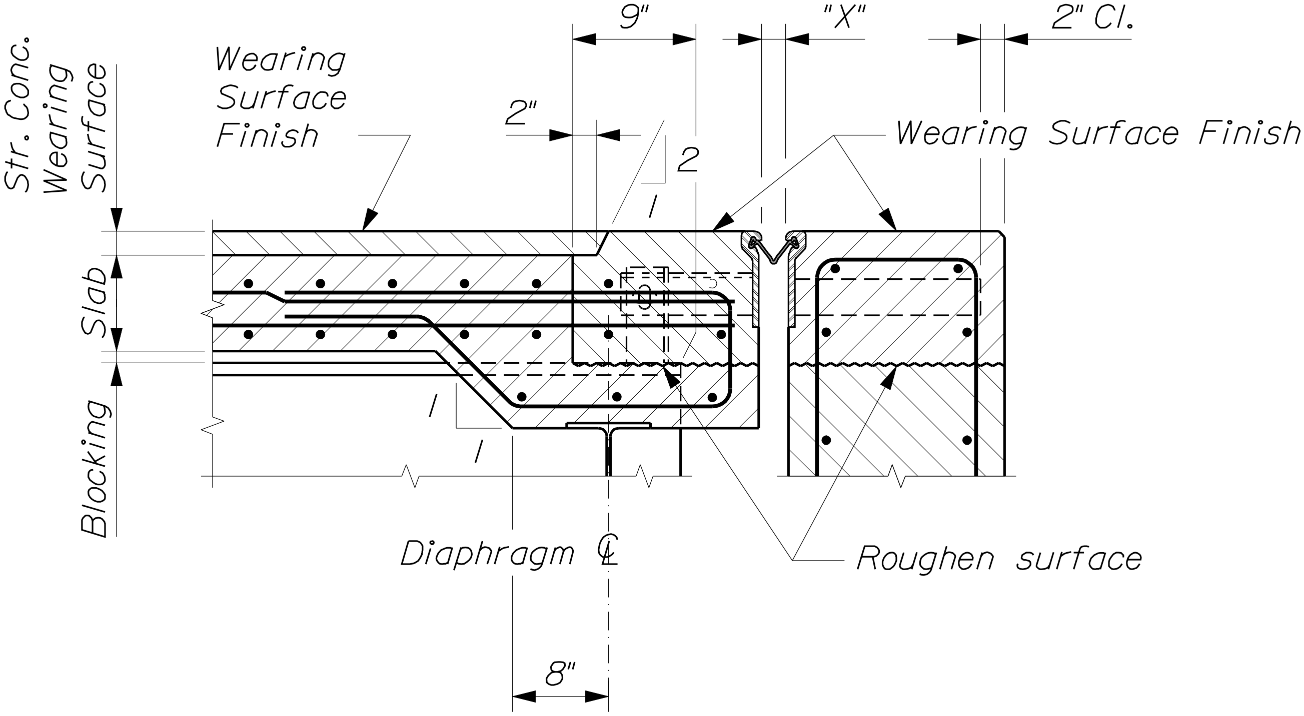
~ ADJUSTMENT DEVICE DETAIL ~

EXPANSION DEVICE - GLAND SEAL

520(03)



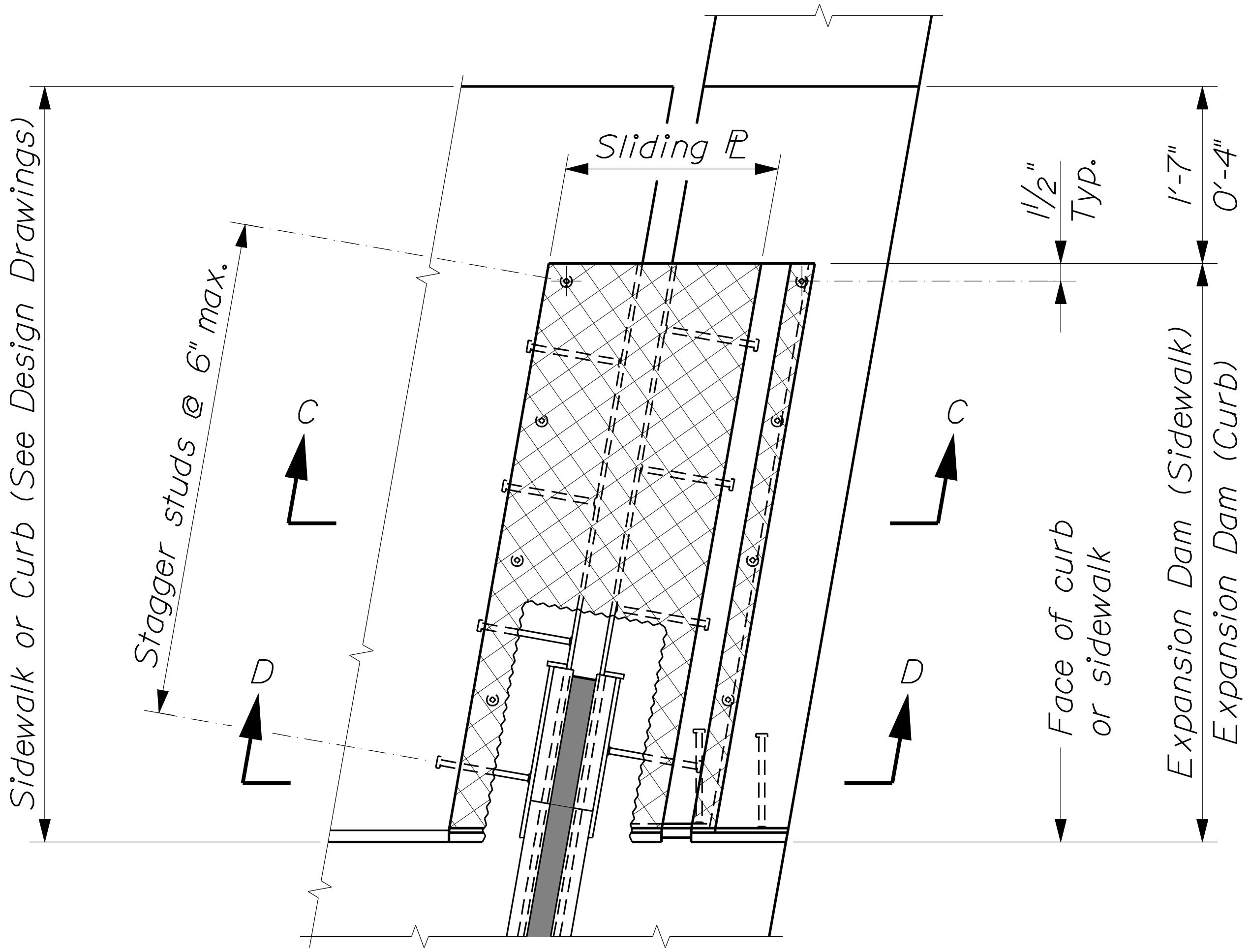
~ SECTION B - B ~
(Showing Hot Mix Asphalt Pavement Wearing Surface)



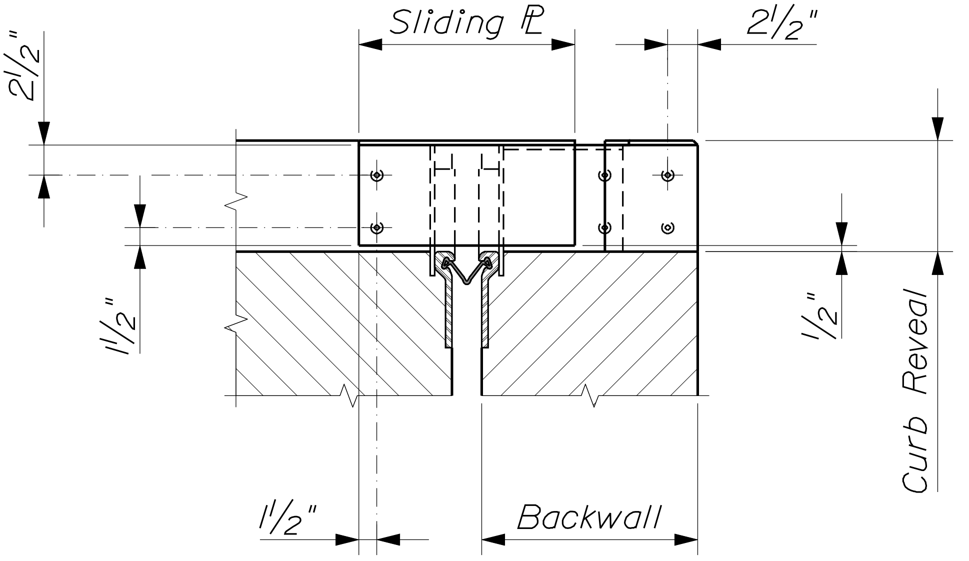
~ SECTION B - B ~
(Showing Structural Concrete Wearing Surface)

EXPANSION DEVICE - GLAND SEAL

520(04)



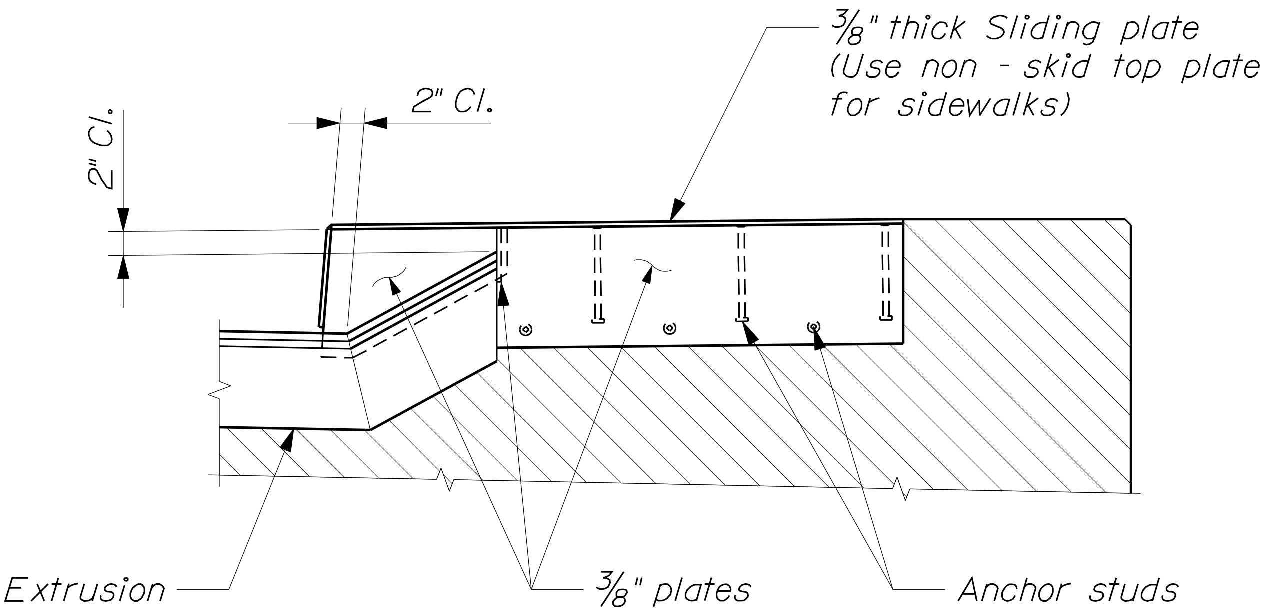
~ EXPANSION DAM PLAN ~



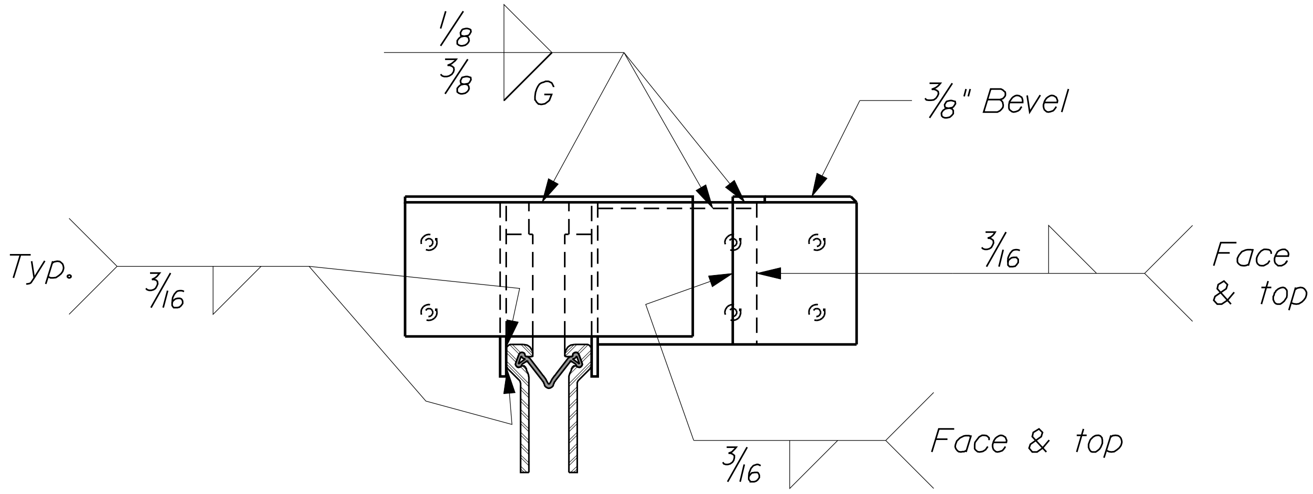
~ EXPANSION DAM ELEVATION ~

EXPANSION DEVICE - GLAND SEAL

520(05)



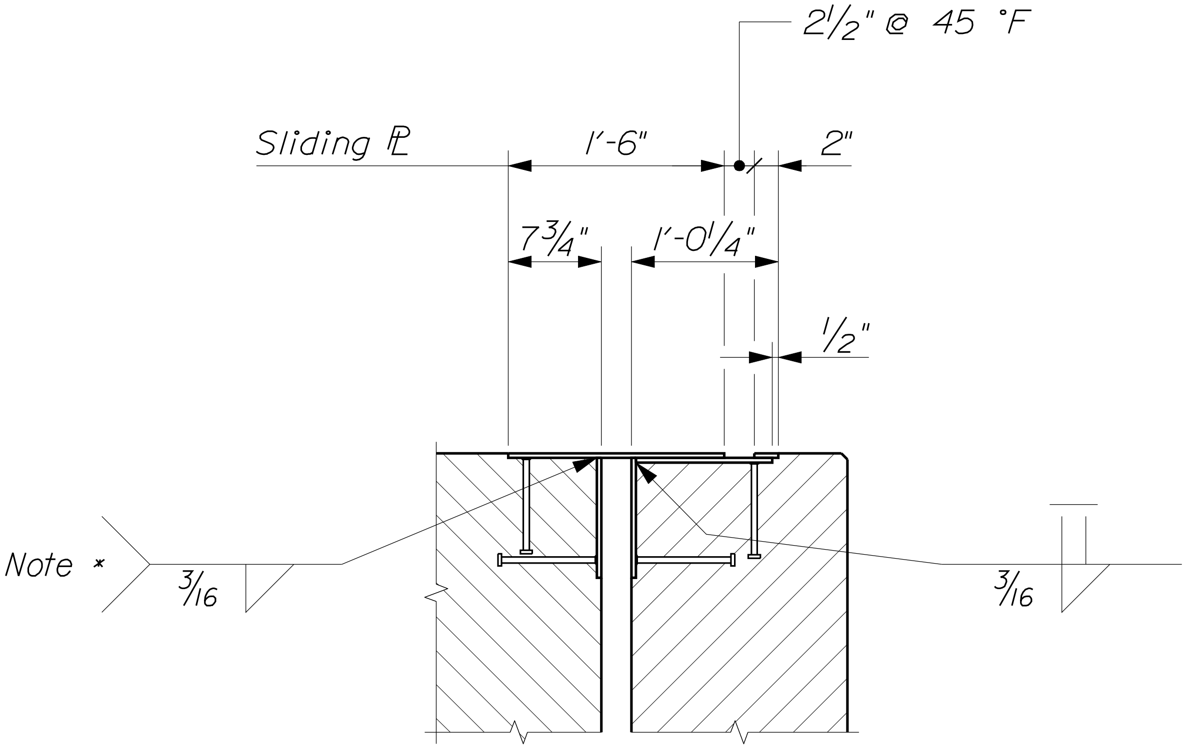
~ EXPANSION DAM SECTION ~



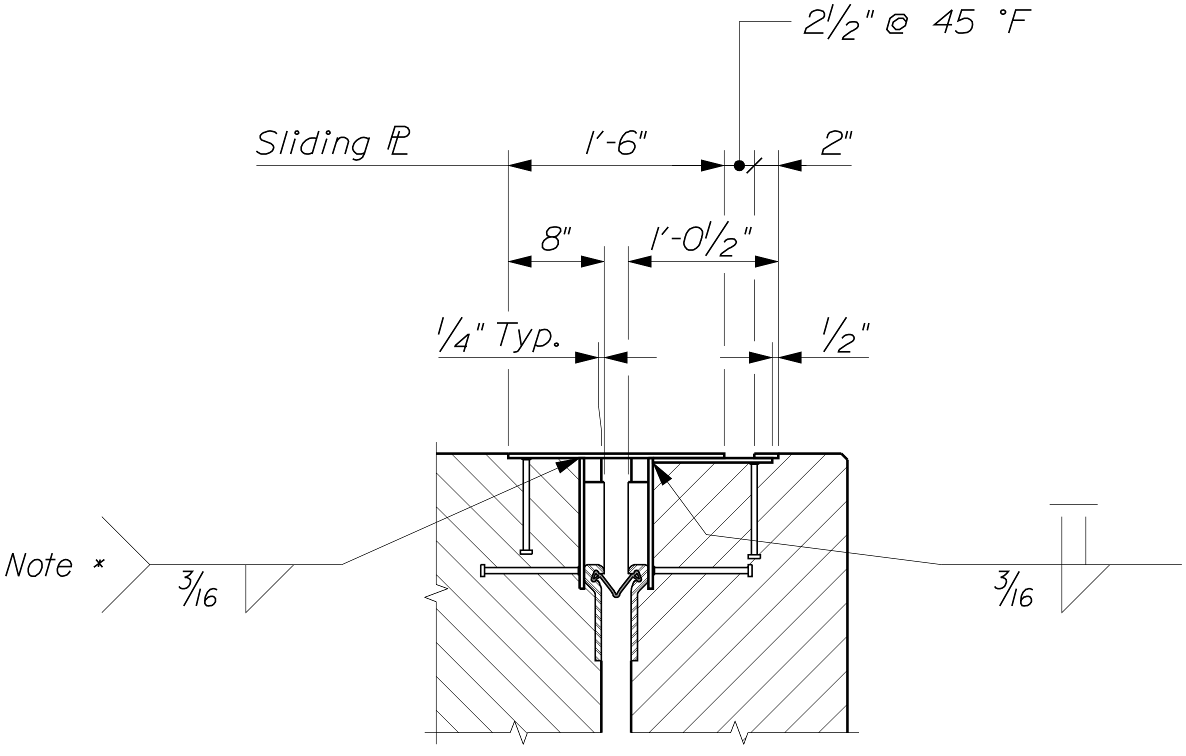
~ WELDING DETAIL ~

EXPANSION DEVICE - GLAND SEAL

520(06)



~ SECTION C - C ~



~ SECTION D - D ~

EXPANSION DEVICE - GLAND SEAL

520(07)

NOTES:

1. Each "Expansion Device - Gland Seal" consists of one backwall element and one superstructure element (or two superstructure elements over piers) with expansion dams as required.

2. Refer to Design Drawings for dimensions, slopes, skew and all other information necessary to fabricate and install each Expansion Device.

3. The Expansion Device shall be fabricated to be installed normal to grade.

4. Anchor studs shall be installed using automatically timed stud welding equipment.

5. The Expansion Device shall be set to an opening of two inches in the fabrication shop. The joint opening shall be adjusted for temperature in the field at the time of installation using the following formula:

$$0.00008 \times \text{"D"} \times \text{"}\Delta T\text{"} = \text{Adjustment (in inches)}$$

"D" is the distance in feet between the backwall and the nearest fixed bearings (for joints at abutments) or between the fixed bearings at either side of the expansion joint (for joints at piers). "Δ T" is the difference between the temperature of the structure and 45 °F.

A structure temperature above 45 °F will result in a smaller joint opening.

6. Welding to reinforcing steel will be allowed in the top of the abutment backwall above the block - out joint.

7. The slab and backwall concrete shall be in place before the Expansion Device is fixed in position. No allowance for movement due to dead load deflection is necessary.

8. The concrete in the block - out may be placed with the curb / sidewalk concrete. An approved epoxy bonding agent shall be applied to all vertical surfaces of the block - out before making the final concrete placement.

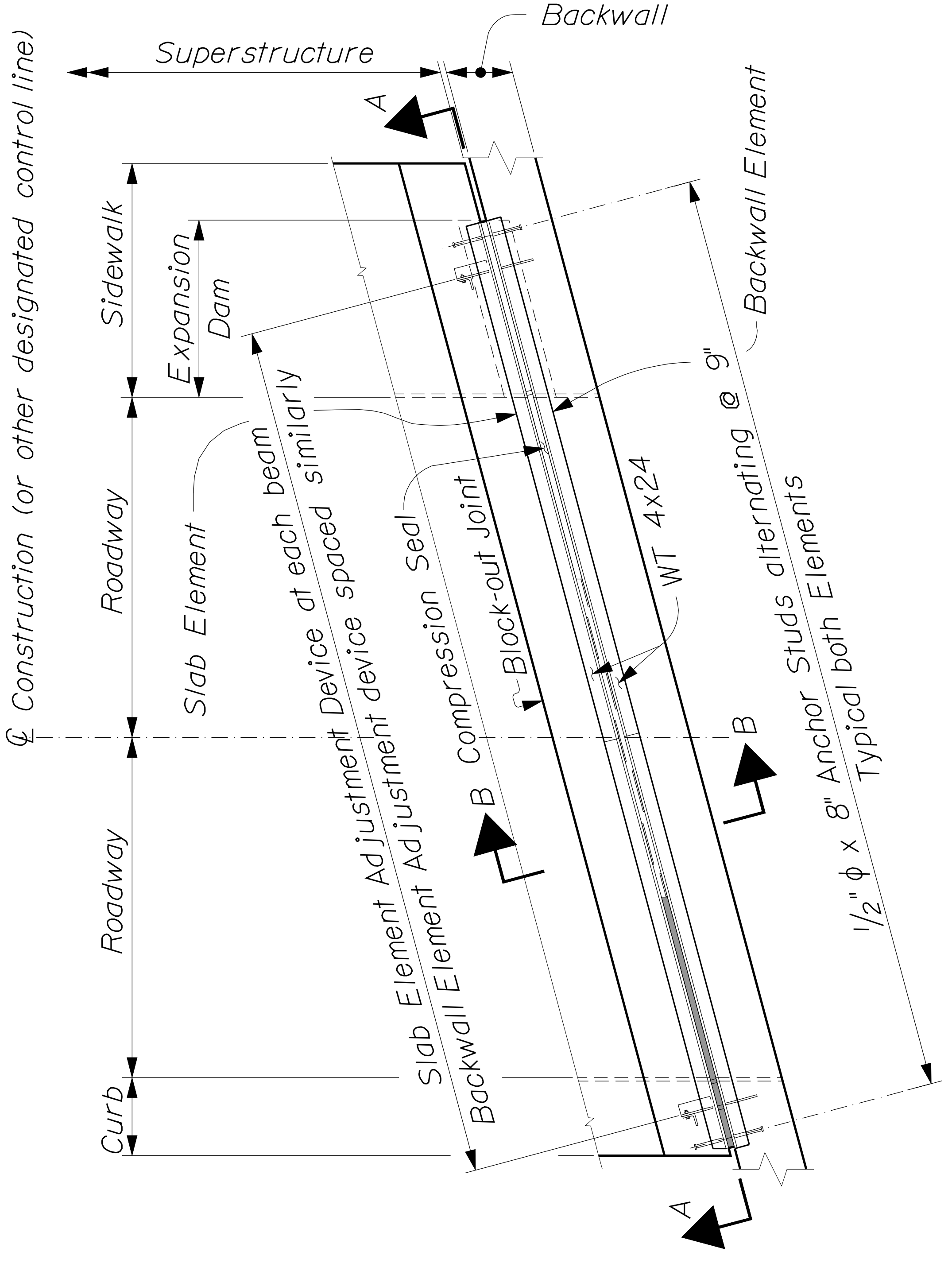
9. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

MATERIALS:

All shapes and plates ______________________ AASHTO M 270M/M 270, Grade 36

EXPANSION DEVICE - GLAND SEAL

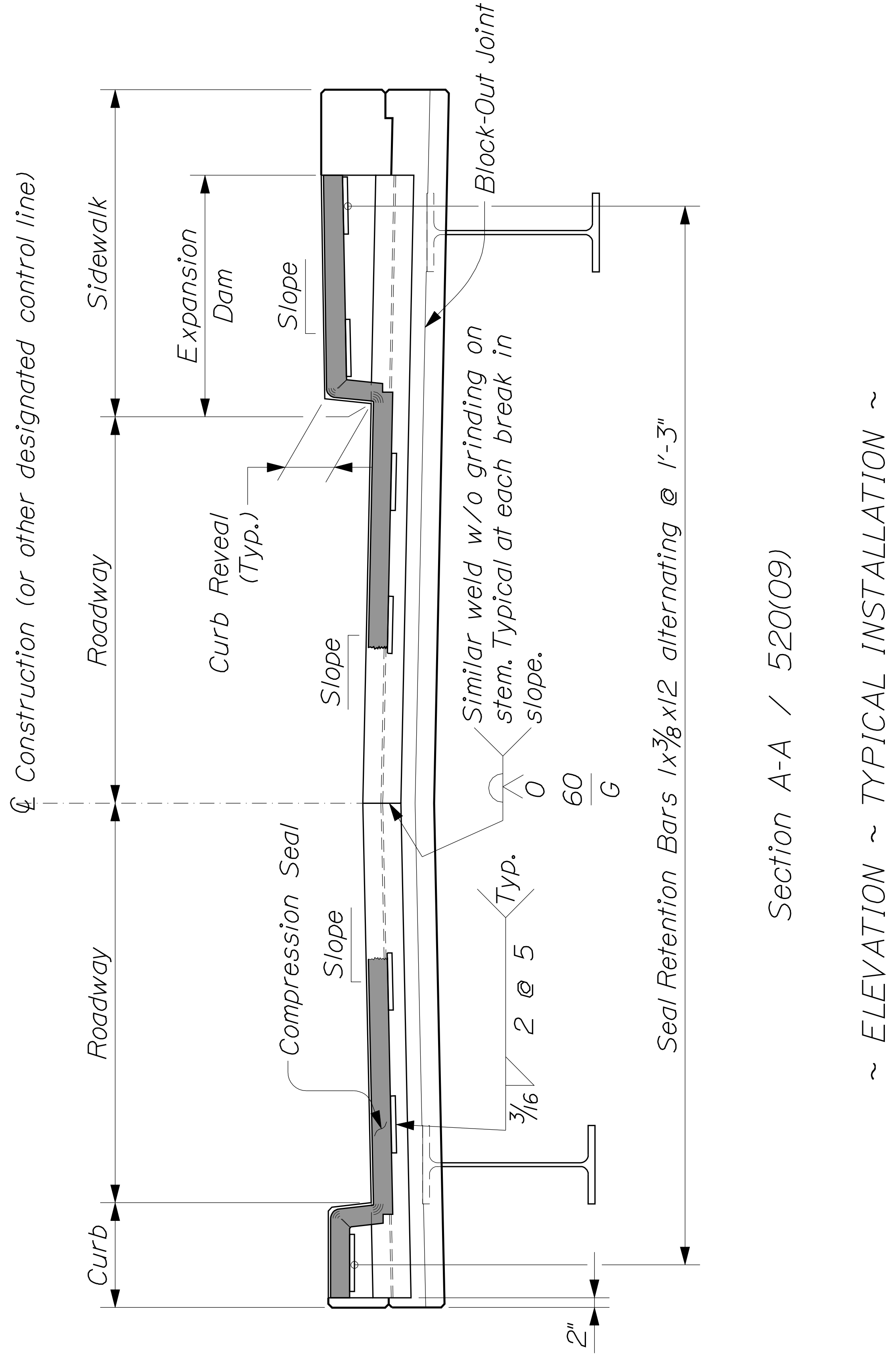
520(08)



-- PLAN ~ TYPICAL INSTALLATION --
(Expansion Dam not shown for clarity)

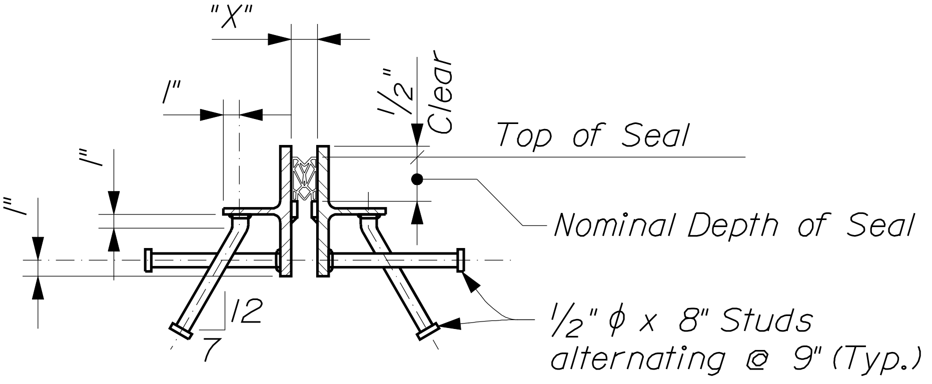
EXPANSION DEVICE - COMPRESSION SEAL

520(09)

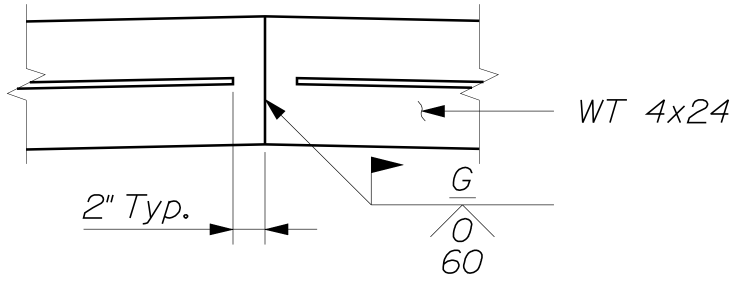


EXPANSION DEVICE - COMPRESSION SEAL

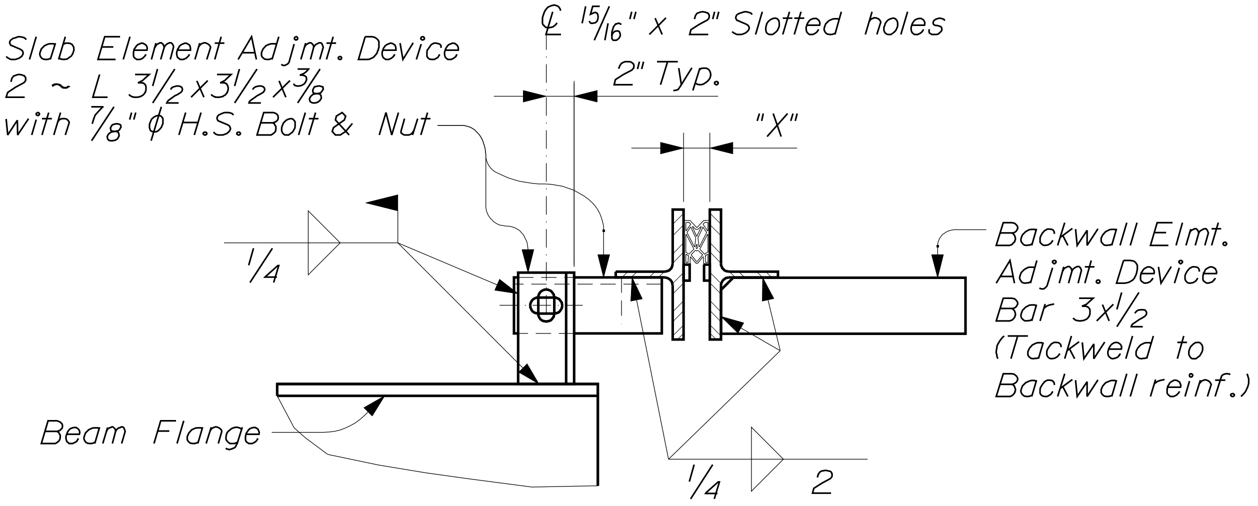
520(10)



~ TYPICAL SECTION ~



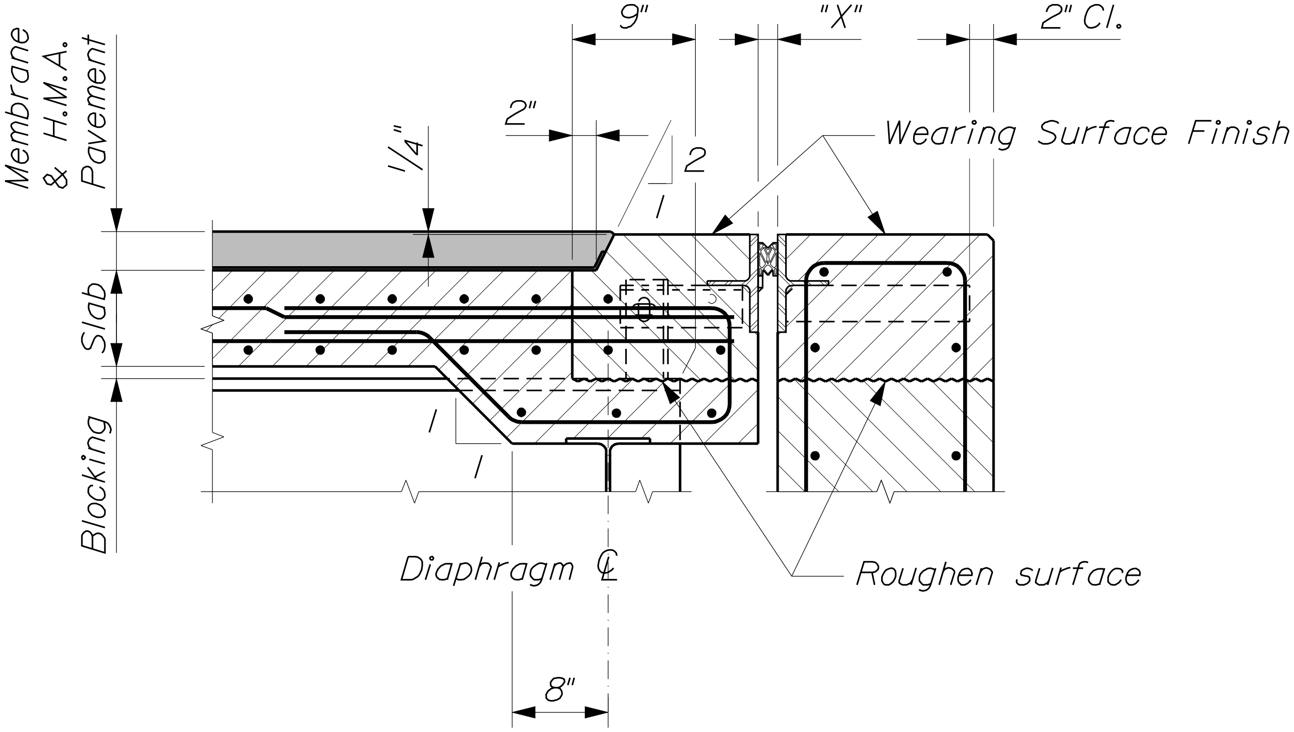
~ JOINT ARMOR FIELD SPLICE ~
(for Stage Construction)



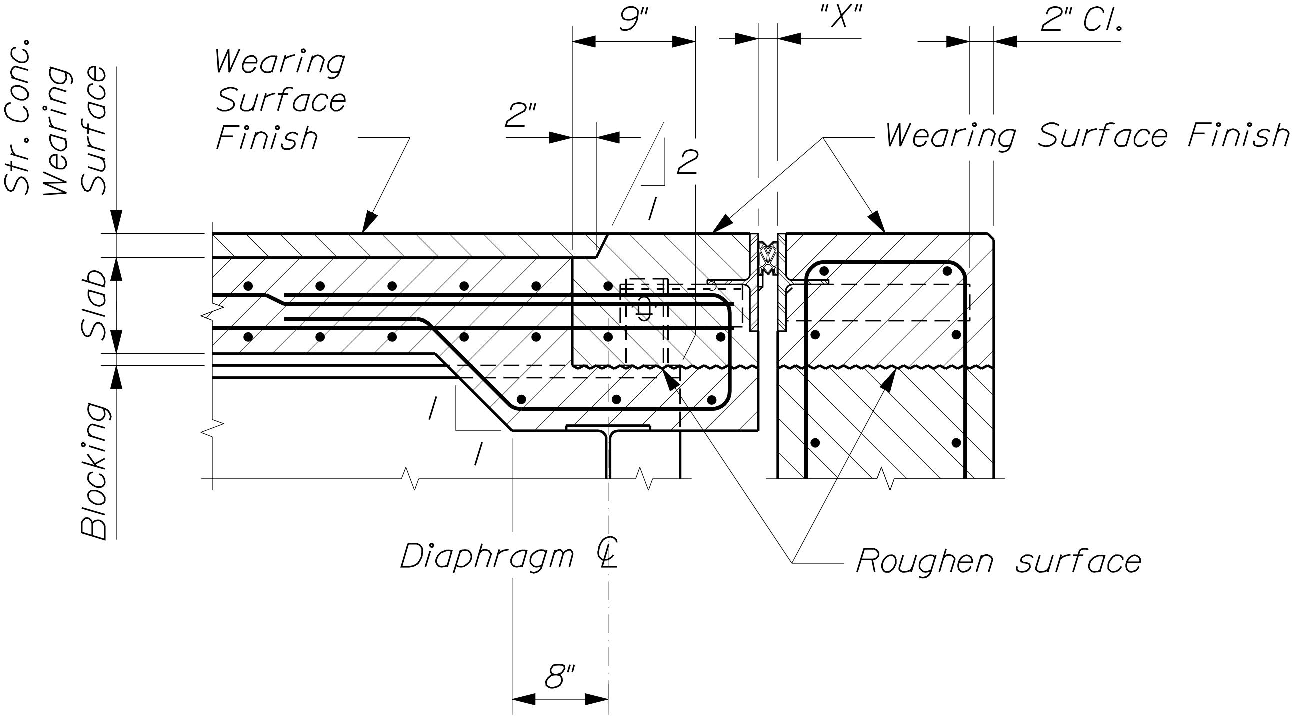
~ ADJUSTMENT DEVICE ~

EXPANSION DEVICE - COMPRESSION SEAL

520(II)



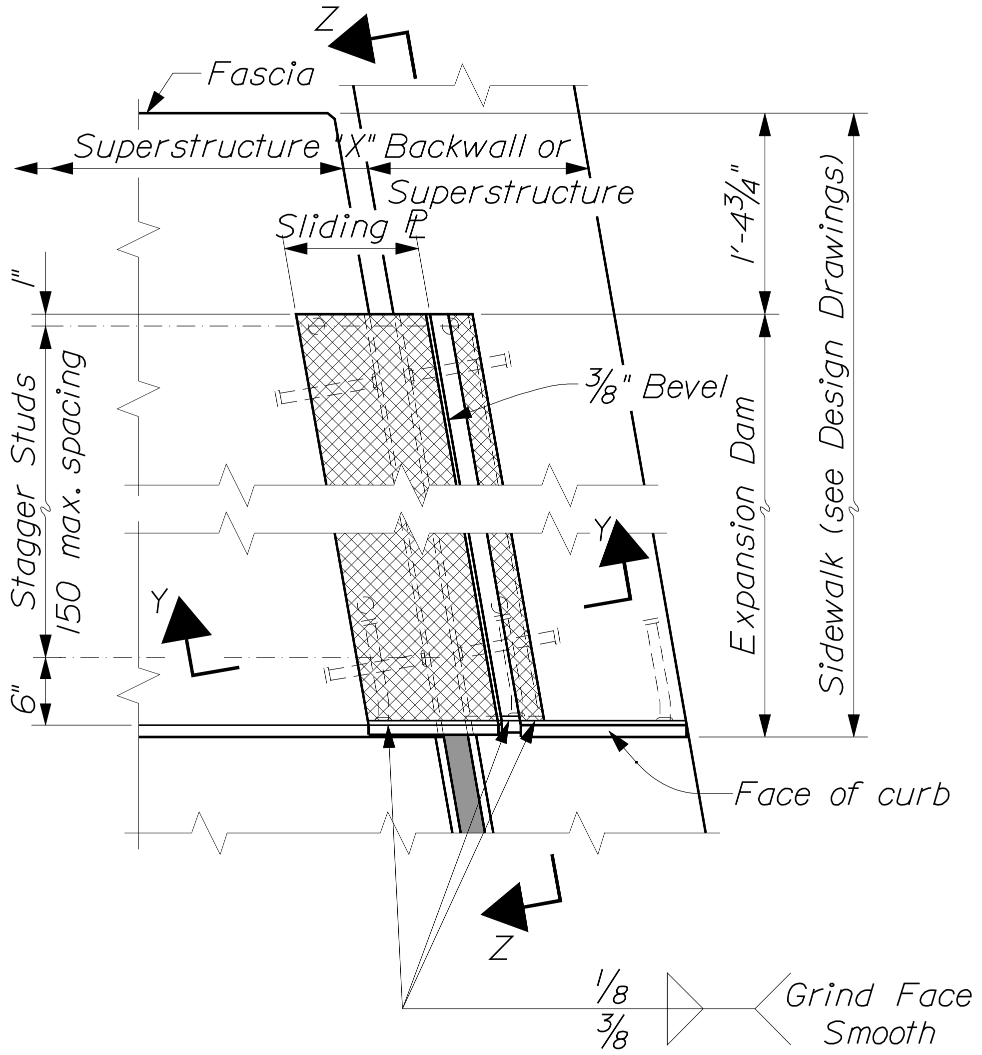
~ SECTION B - B ~
(Showing Hot Mix Asphalt Pavement Wearing Surface)



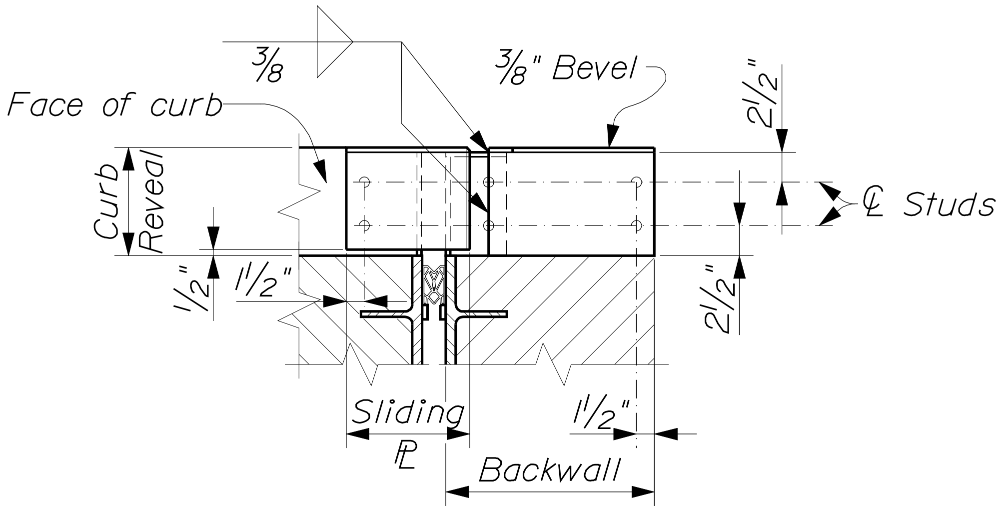
~ SECTION B - B ~
(Showing Structural Concrete Wearing Surface)

EXPANSION DEVICE - COMPRESSION SEAL

520(12)



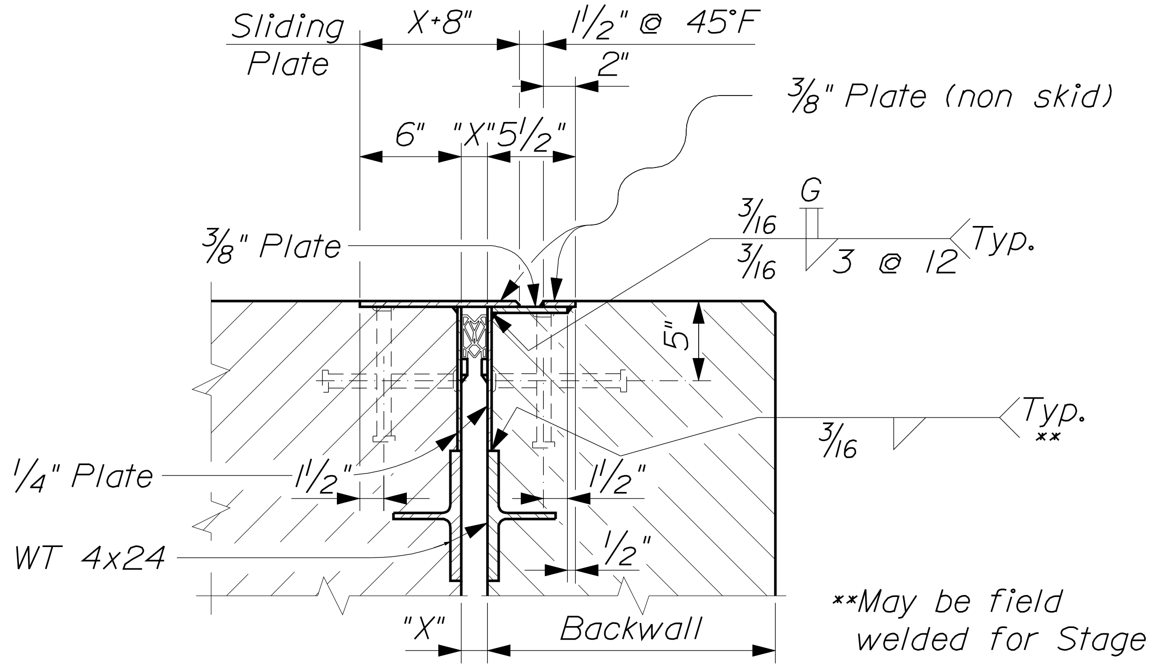
~ PLAN - SIDEWALK EXPANSION DAM ~



~ ELEVATION - SIDEWALK EXPANSION DAM ~

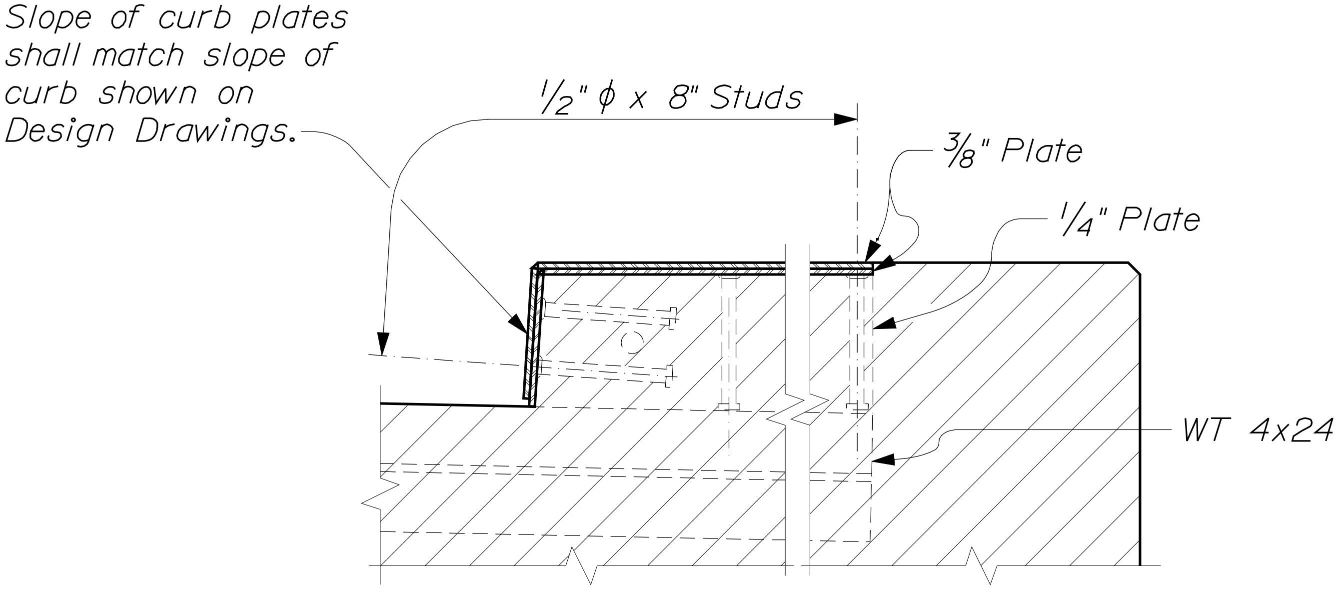
EXPANSION DEVICE - COMPRESSION SEAL

520(13)



**May be field welded for Stage Construction.

Section Y-Y / 520(13)



Section Z-Z / 520(13)

~ SIDEWALK EXPANSION DAM SECTIONS ~

EXPANSION DEVICE - COMPRESSION SEAL

NOTES:

1. Each "Expansion Device - Compression Seal" consists of one backwall element and one superstructure element (or two superstructure elements over piers) with expansion dams as required.

2. Refer to Design Drawings for dimensions, slopes, skew and all other information necessary to fabricate and install each Expansion Device.

3. The Expansion Device shall be fabricated to be installed normal to grade.

4. Anchor studs shall be installed using automatically timed stud welding equipment.

5. Dimension "X" at 45 °F shall be determined as follows:

$$(0.85 \times \text{nominal seal width}) - \tfrac{1}{2}MR$$

The Movement Rating (MR) for each seal shall be as determined by MaineDOT for the make and type of seal to be provided. Dimension "X" at 45 °F and the make and type of seal shall be shown on the Shop Detail Drawings.

6. Final adjustment for temperature shall be made in the field according to the "Compression Seal Adjustment Chart" shown on the Design Drawings. The adjustment shall be measured parallel to the centerline of construction.

7. Welding to reinforcing steel will be allowed in the top of the abutment backwall above the block - out joint.

8. The slab and backwall concrete shall be in place before the Expansion Device is fixed in position. No allowance for movement due to dead load deflection is necessary.

9. The concrete in the block - out may be placed with the curb / sidewalk concrete. An approved epoxy bonding agent shall be applied to all vertical surfaces of the block - out before making the final concrete placement.

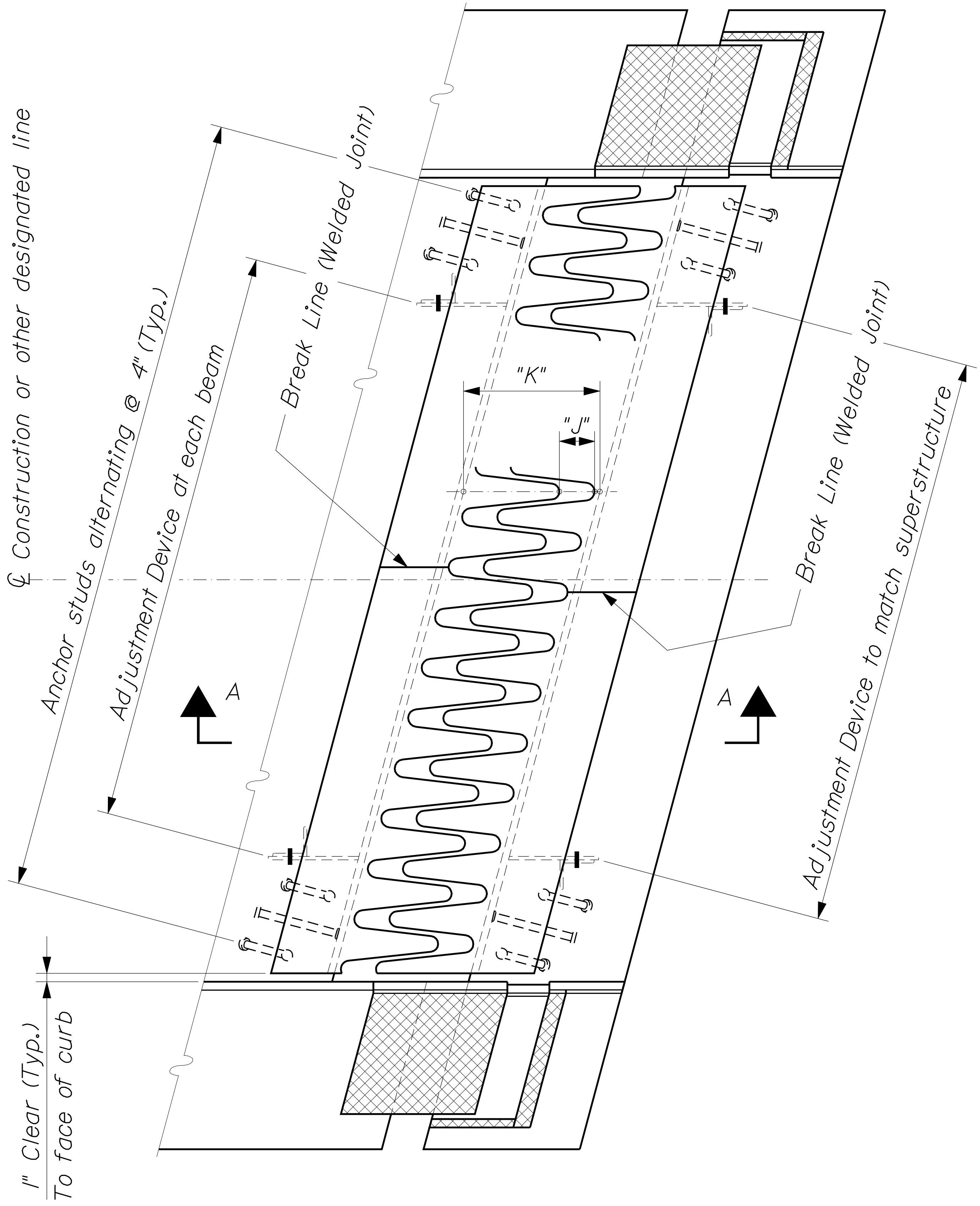
10. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

MATERIALS:

All shapes and plates ______________________ AASHTO M 270M/M 270, Grade 36

EXPANSION DEVICE - COMPRESSION SEAL

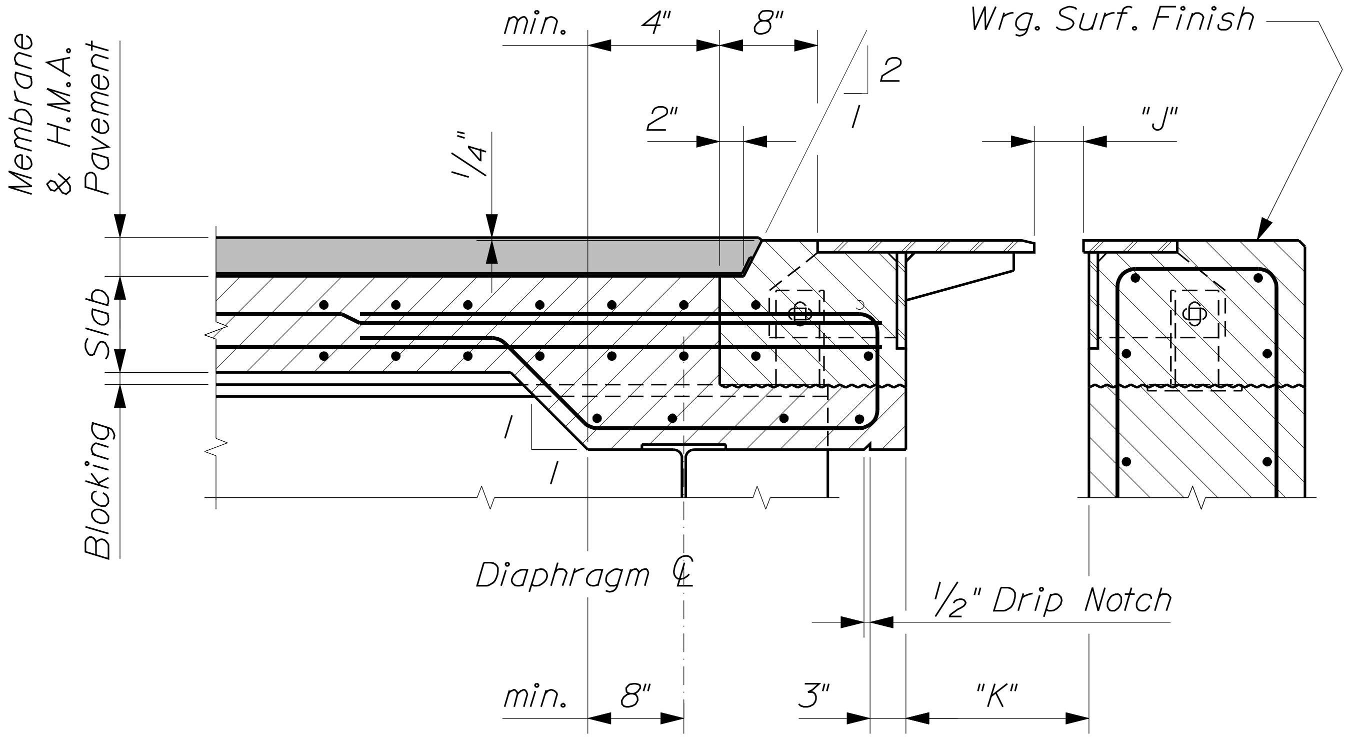
520(15)



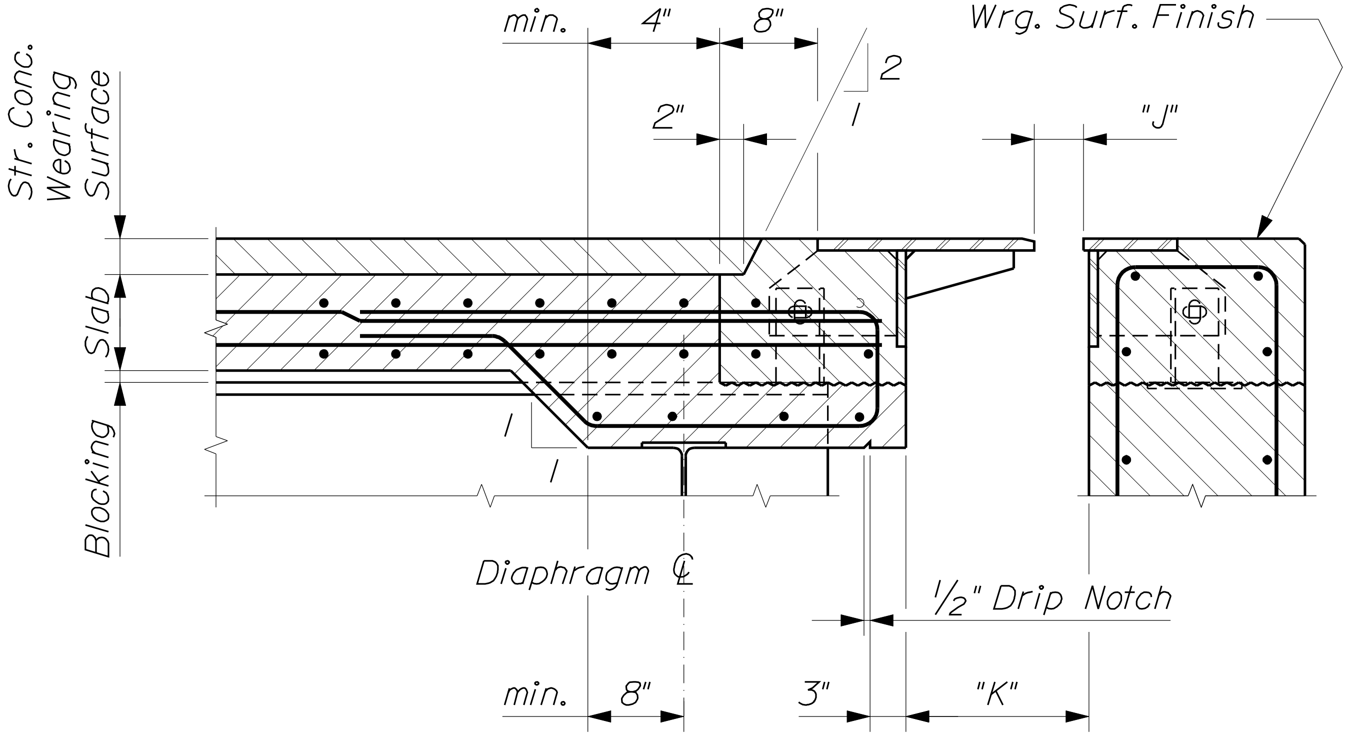
~ FINGER JOINT PLAN ~

EXPANSION DEVICE - FINGER JOINT

521(01)



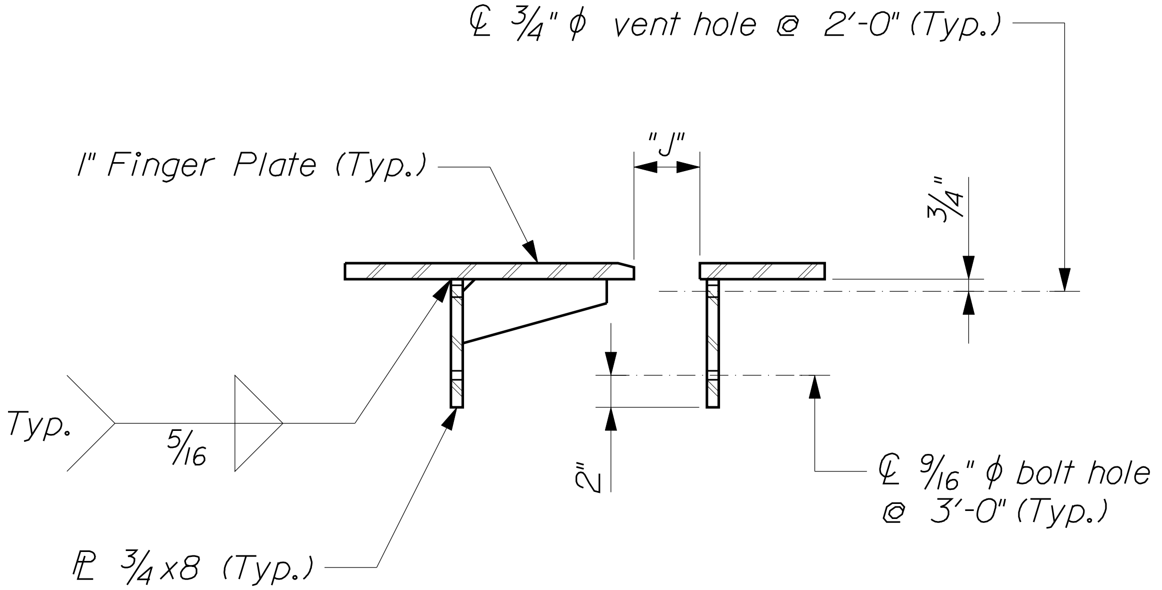
~ SECTION A - A ~
(Showing Hot Mix Asphalt Pavement Wearing Surface)



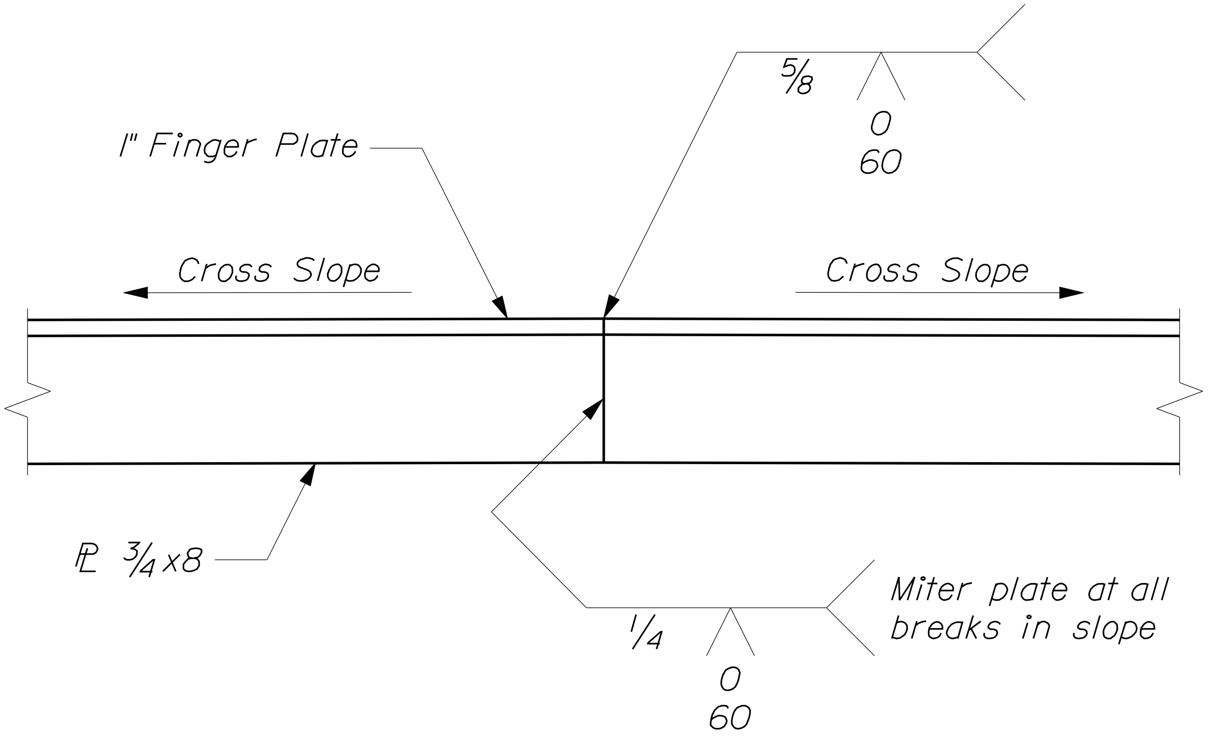
~ SECTION A - A ~
(Showing Structural Concrete Wearing Surface)

EXPANSION DEVICE - FINGER JOINT

521(02)



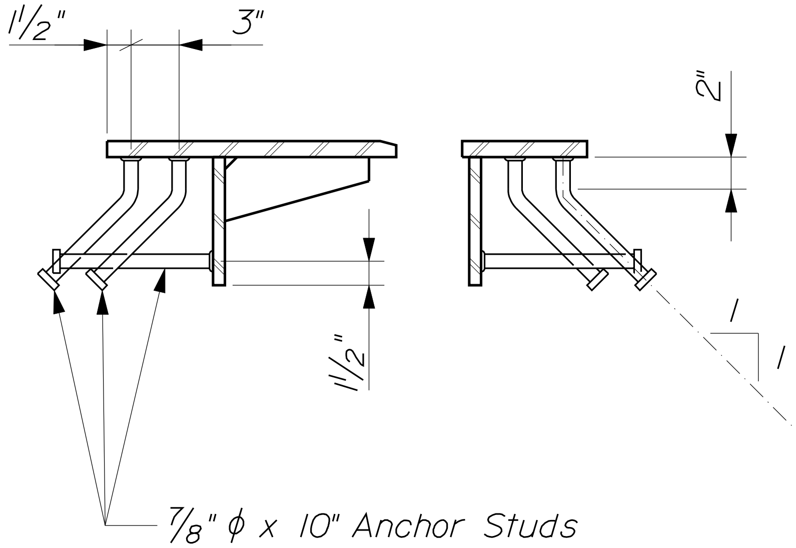
-- TYPICAL FINGER JOINT SECTION --



-- FINGER JOINT ELEVATION AT BREAK IN CROSS SLOPE --

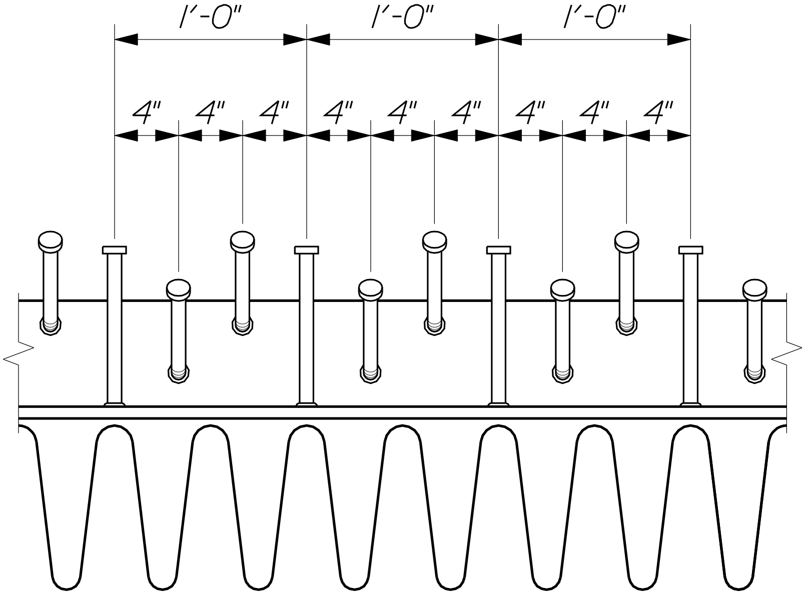
EXPANSION DEVICE - FINGER JOINT

521(03)



7/8" φ x 10" Anchor Studs alternating @ 4" (Typ.)

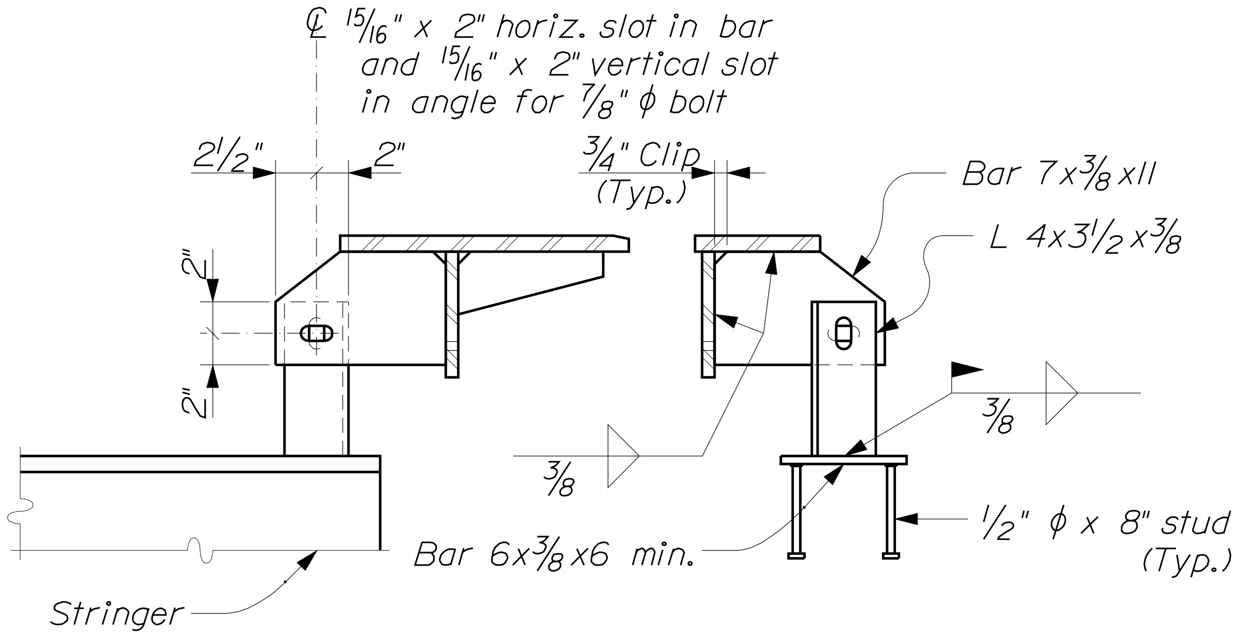
-- ANCHOR STUD DETAIL --



-- ANCHOR STUD LAYOUT PLAN (BOTTOM VIEW) --

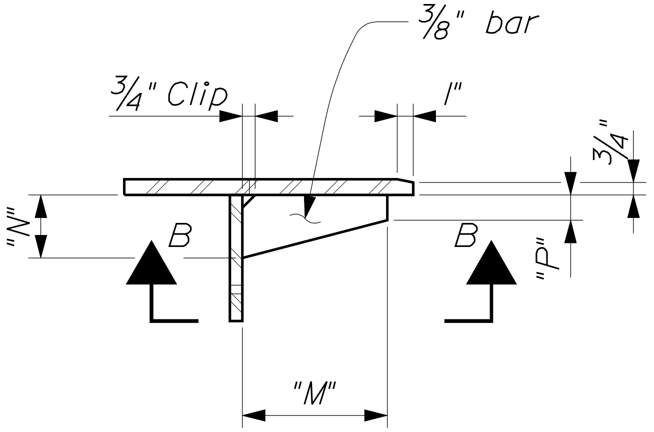
EXPANSION DEVICE - FINGER JOINT

521(04)



~ ADJUSTMENT DEVICES ~

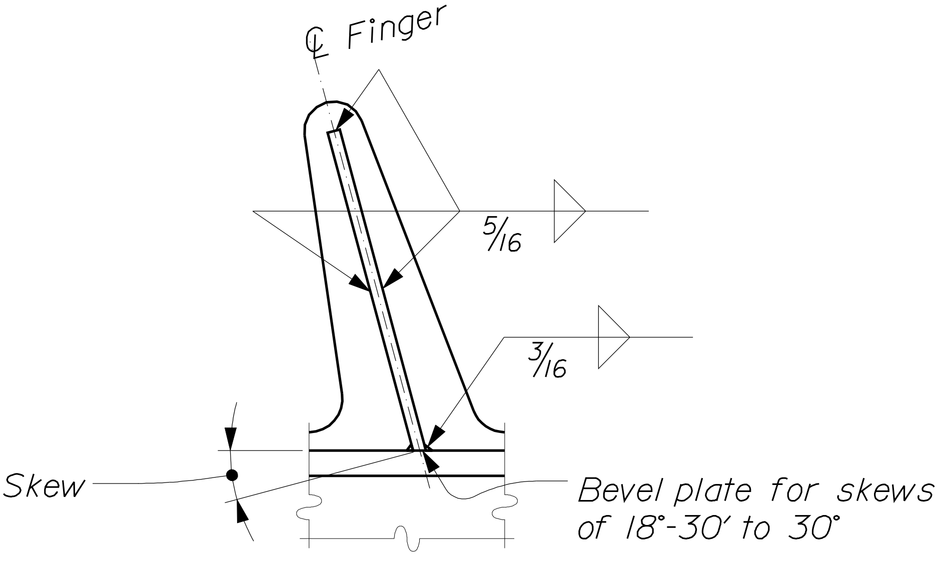
Symmetical both sides of joint except as shown



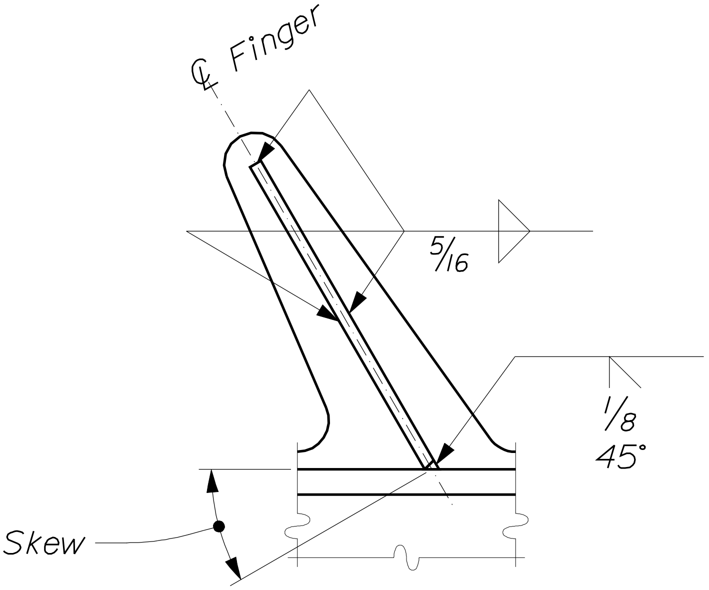
~ FINGER DETAIL ~

EXPANSION DEVICE - FINGER JOINT

521(05)



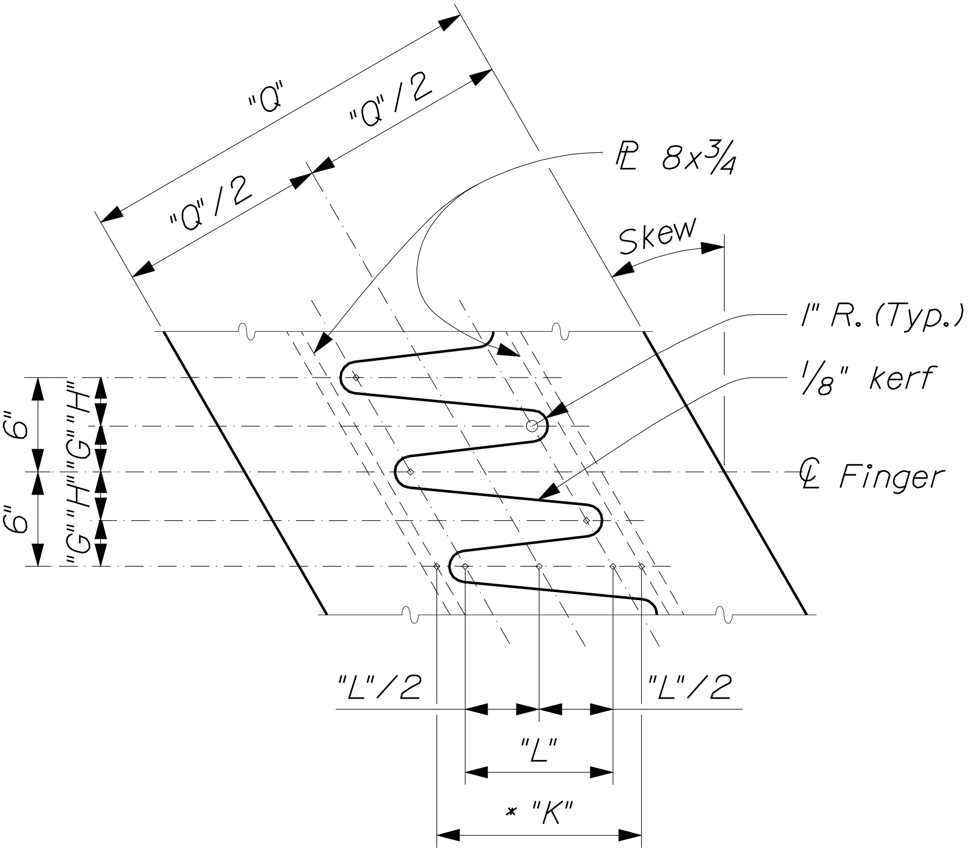
~ VIEW B-B ~
Skew 0° to 30°



~ VIEW B-B ~
Skew over 30°

EXPANSION DEVICE - FINGER JOINT

521(06)



~ FINGER CUTTING DETAIL ~

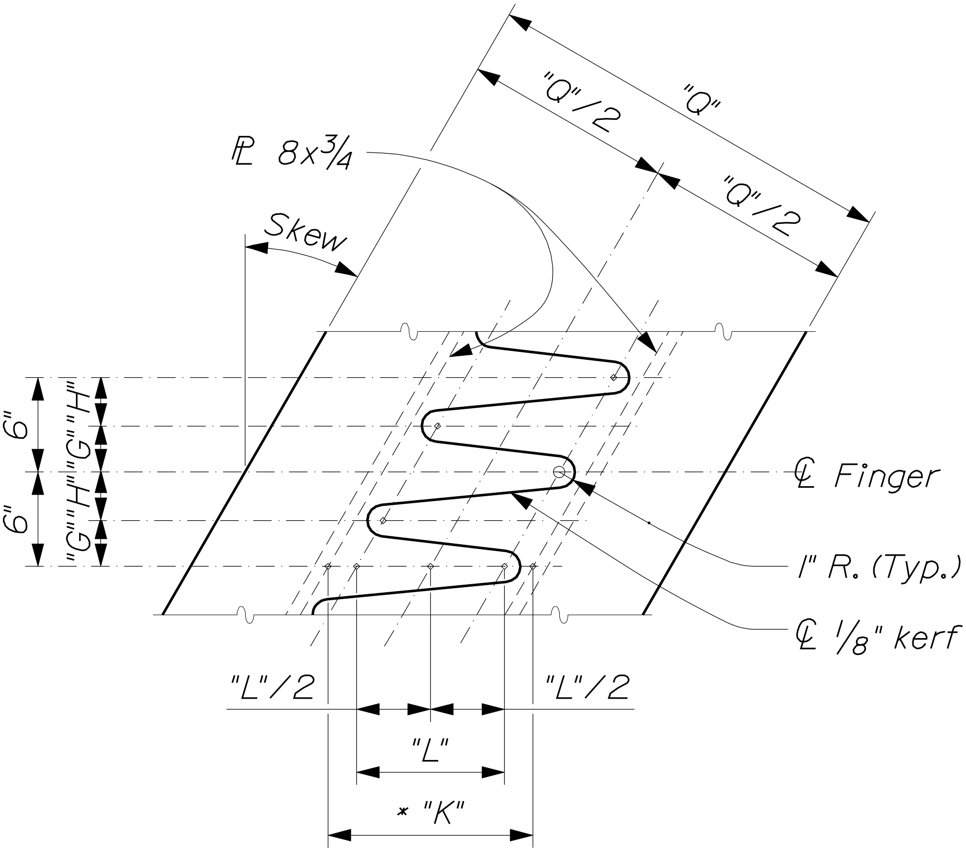
(Skew back on left)

Note; Cut from one plate and match mark

* "K" is "K" dimension prior to cutting plate

EXPANSION DEVICE - FINGER JOINT

521(07)

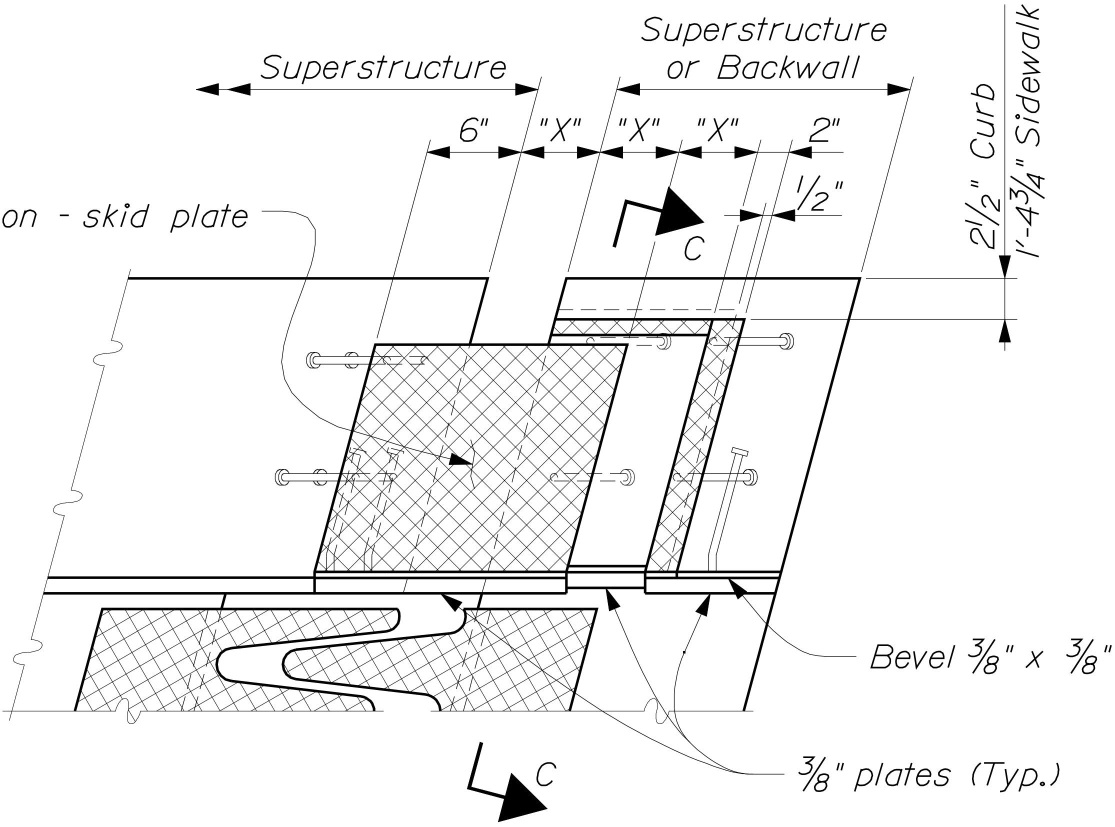


~ FINGER CUTTING DETAIL ~
(Skew ahead on left)

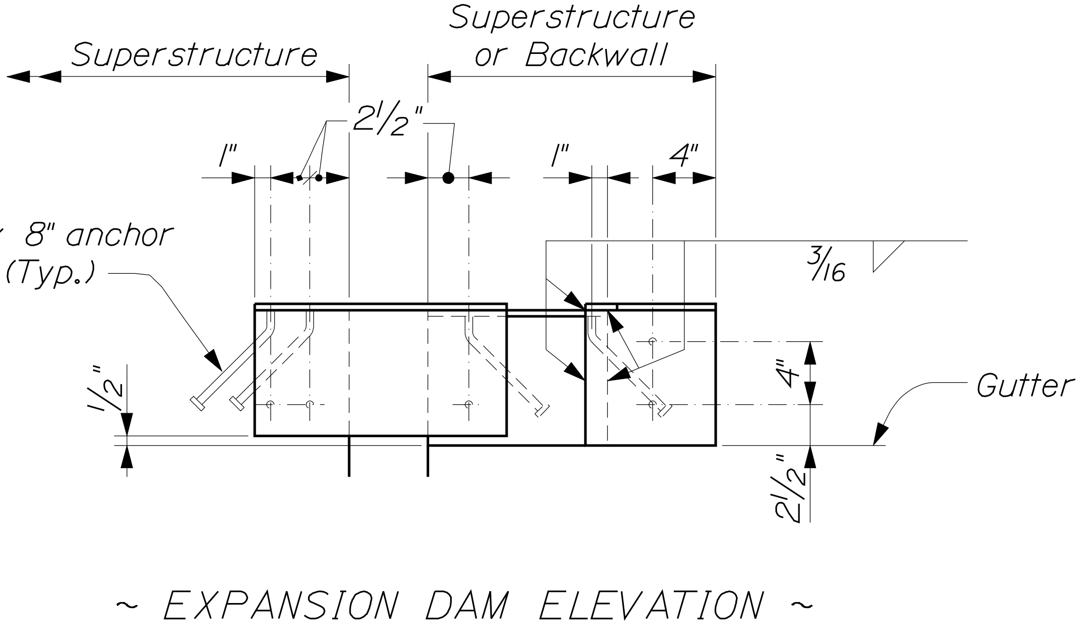
Note; Cut from one plate and match mark
* "K" is "K" dimension prior to cutting plate

EXPANSION DEVICE - FINGER JOINT

521(08)



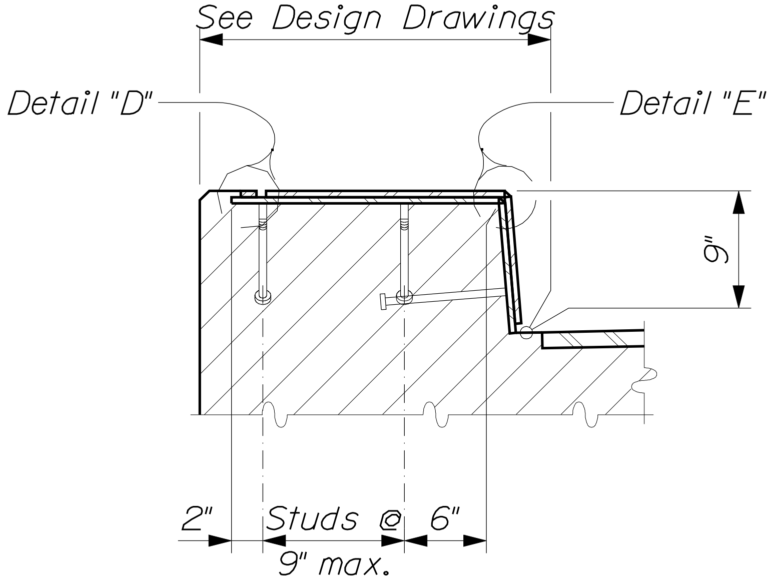
~ EXPANSION DAM PLAN ~



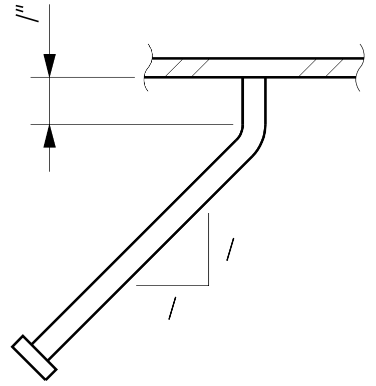
~ EXPANSION DAM ELEVATION ~

EXPANSION DEVICE - FINGER JOINT

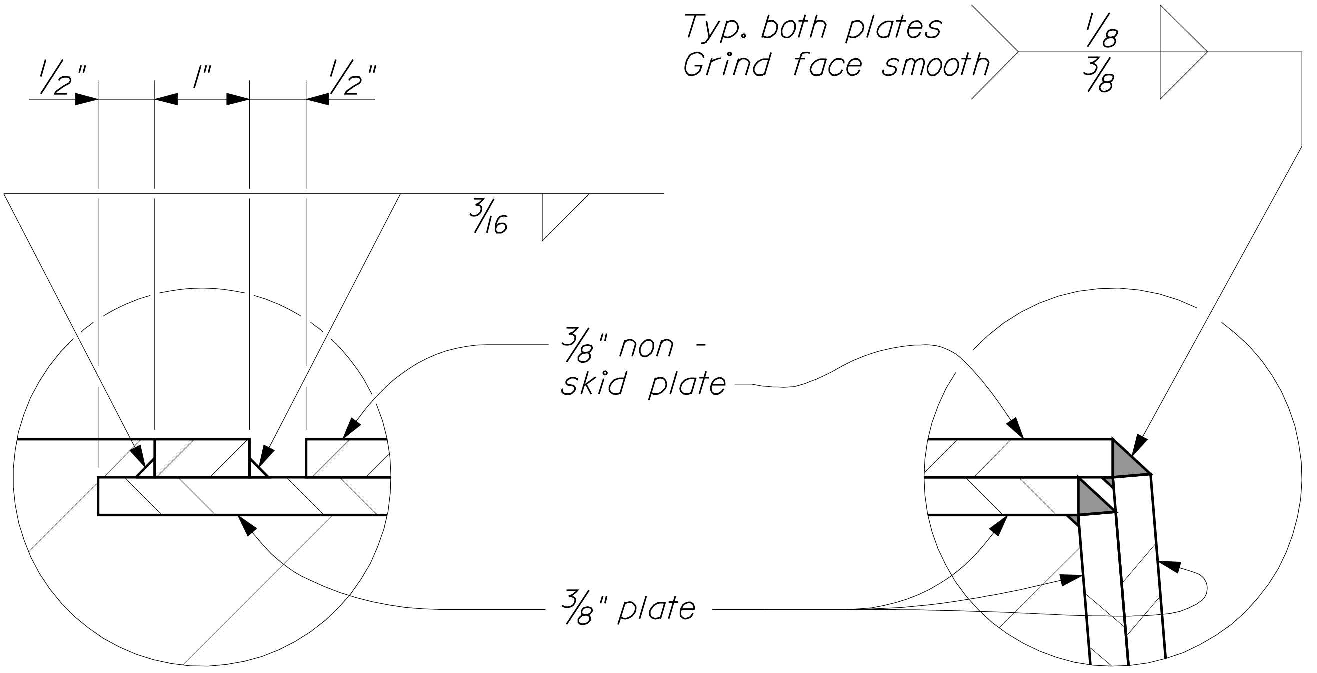
521(09)



~ SECTION C-C ~



~ BENT STUD DETAIL ~



~ DETAIL "D" ~

~ DETAIL "E" ~

EXPANSION DEVICE - FINGER JOINT

521(10)

TABLE OF DIMENSIONS

Type	Exp. Length	Skew	* "K"	"L"	"G"	"H"	"K"@45°	"J"@45°	"M"	"N"	"P"	"Q"	"X"@45°
A	100′ to 280′	0° to 5°	7"	4"	3"	3"	9"	2 1/8"	--	--	--	21"	3"
		> 5° to 10°	7 1/4"	4 1/4"	2 7/8"	3 1/8"	9 1/4"	2 1/8"	--	--	--	22"	3"
		> 10° to 20°	8"	4 3/4"	2 7/8"	3 1/8"	10"	2 1/8"	--	--	--	22"	3"
		> 20° to 30°	8 3/4"	5 1/4"	2 3/4"	3 1/4"	10 3/4"	2 1/8"	--	--	--	23"	3"
		> 30° to 40°	9 3/4"	5 3/4"	2 5/8"	3 3/8"	11 3/4"	2 1/8"	--	--	--	23"	3"
		> 40° to 50°	11 1/4"	6 1/2"	2 1/2"	3 1/2"	13 1/4"	2 1/8"	--	--	--	23"	3"
B	280′ to 440′	0° to 5°	9"	6"	3"	3"	12"	3 1/8"	--	--	--	23"	4"
		> 5° to 10°	9 1/4"	6 1/4"	2 7/8"	3 1/8"	12 1/4"	3 1/8"	--	--	--	24"	4"
		> 10° to 20°	10"	6 3/4"	2 7/8"	3 1/8"	13"	3 1/8"	--	--	--	24"	4"
		> 20° to 30°	10 3/4"	7 1/4"	2 3/4"	3 1/4"	13 3/4"	3 1/8"	--	--	--	25"	4"
		> 30° to 40°	12"	8"	2 3/4"	3 1/4"	15"	3 1/8"	--	--	--	25"	4"
		> 40° to 50°	13 1/2"	8 3/4"	2 5/8"	3 3/8"	16 1/2"	3 1/8"	--	--	--	25"	4"
C	440′ to 600′	0° to 10°	11 1/4"	8 1/4"	3"	3"	15 1/4"	4 1/8"	9"	4"	1 1/2"	26"	5"
		> 10° to 20°	12"	8 3/4"	2 7/8"	3 1/8"	16"	4 1/8"	10"	4"	1 1/2"	26"	5"
		> 20° to 30°	12 3/4"	9 1/4"	2 7/8"	3 1/8"	16 3/4"	4 1/8"	11"	4"	1 1/2"	26"	5"
		> 30° to 40°	14"	10"	2 3/4"	3 1/4"	18"	4 1/8"	11"	4"	1 1/2"	26"	5"
		> 40° to 50°	15 1/2"	10 3/4"	2 3/4"	3 1/4"	19 1/2"	4 1/8"	12"	4"	1 1/2"	26"	5"
D	600′ to 760′	0° to 10°	13 1/4"	10 1/4"	3"	3"	18 1/4"	5 1/8"	11"	5"	2"	30"	6"
		> 10° to 20°	14"	10 3/4"	2 7/8"	3 1/8"	19"	5 1/8"	12"	5"	2"	30"	6"
		> 20° to 30°	14 3/4"	11 1/4"	2 7/8"	3 1/8"	19 3/4"	5 1/8"	13"	5"	2"	30"	6"
		> 30° to 40°	16"	12"	2 7/8"	3 1/8"	21"	5 1/8"	13"	5"	2"	30"	6"
		> 40° to 50°	17 3/4"	13"	2 3/4"	3 1/4"	22 3/4"	5 1/8"	15"	5"	2"	30"	6"
E	760′ to 920′	0° to 10°	15 1/4"	12 1/4"	3"	3"	21 1/4"	6 1/8"	13"	6"	2 1/2"	36"	7"
		> 10° to 20°	16"	12 3/4"	2 7/8"	3 1/8"	22"	6 1/8"	14"	6"	2 1/2"	36"	7"
		> 20° to 30°	16 3/4"	13 1/4"	2 7/8"	3 1/8"	22 3/4"	6 1/8"	15"	6"	2 1/2"	36"	7"
		> 30° to 40°	18"	14"	2 7/8"	3 1/8"	24"	6 1/8"	15"	6"	2 1/2"	36"	7"
		> 40° to 50°	19 3/4"	15"	2 3/4"	3 1/4"	25 3/4"	6 1/8"	17"	6"	2 1/2"	36"	7"

EXPANSION DEVICE - FINGER JOINT

NOTES:

1. Each "Expansion Device - Finger Joint" consists of one backwall element and one superstructure element (or two superstructure elements over piers) with expansion dams as required.

2. Refer to Design Drawings for dimensions, slopes, skew and all other information necessary to fabricate and install each Expansion Device.

3. The Expansion Device shall be fabricated to be installed normal to grade.

4. Anchor studs shall be installed using automatically timed stud welding equipment.

5. The Expansion Device shall be installed with a joint opening of "J" at 45 °F. The joint opening shall be adjusted for temperature in the field at the time of installation using the following formula:

$$0.00008 \times \text{"D"} \times \text{"}\Delta T\text{"} = \text{Adjustment (in inches)}$$

"D" is the distance in feet between the backwall and the nearest fixed bearings (for joints at abutments) or between the fixed bearings at either side of the expansion joint (for joints at piers). "ΔT" is the difference between the temperature of the structure and 45 °F.

A structure temperature above 45 °F will result in a smaller joint opening.

6. Welding to reinforcing steel will be allowed in the top of the abutment backwall above the block - out joint.

7. After the Expansion Device is in final position, weld the bar and angle of the adjustment devices together with a $\frac{1}{4}$-in. fillet weld.

8. The slab and backwall concrete shall be in place before the Expansion Device is fixed in position. No allowance for movement due to dead load deflection is necessary.

9. The concrete in the block - out may be placed with the curb / sidewalk concrete. An approved epoxy bonding agent shall be applied to all vertical surfaces of the block - out before making the final concrete placement.

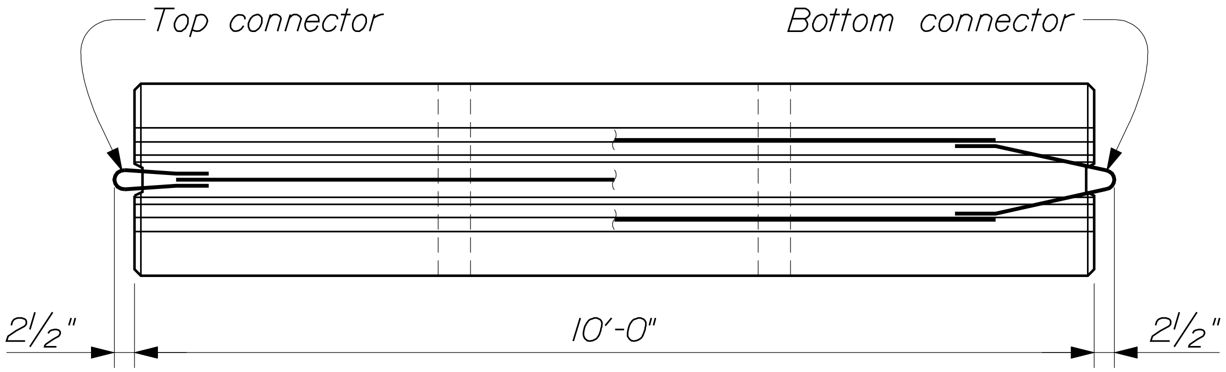
10. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

MATERIALS:

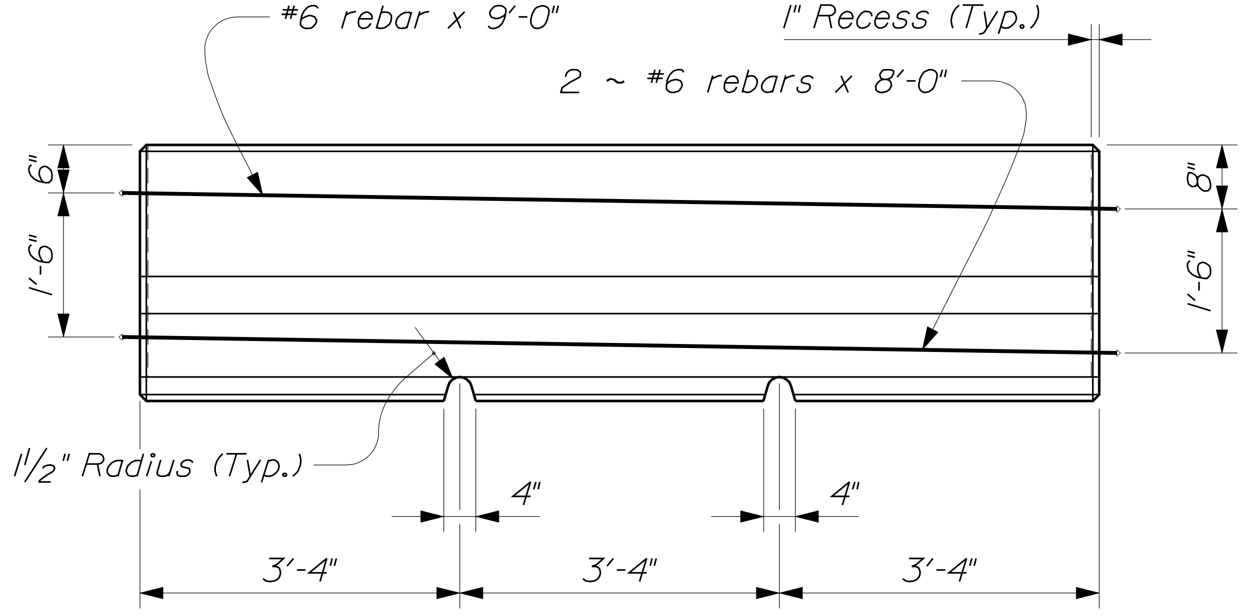
All shapes and plates ______________________ AASHTO M 270M/M 270, Grade 36

EXPANSION DEVICE - FINGER JOINT

521(12)



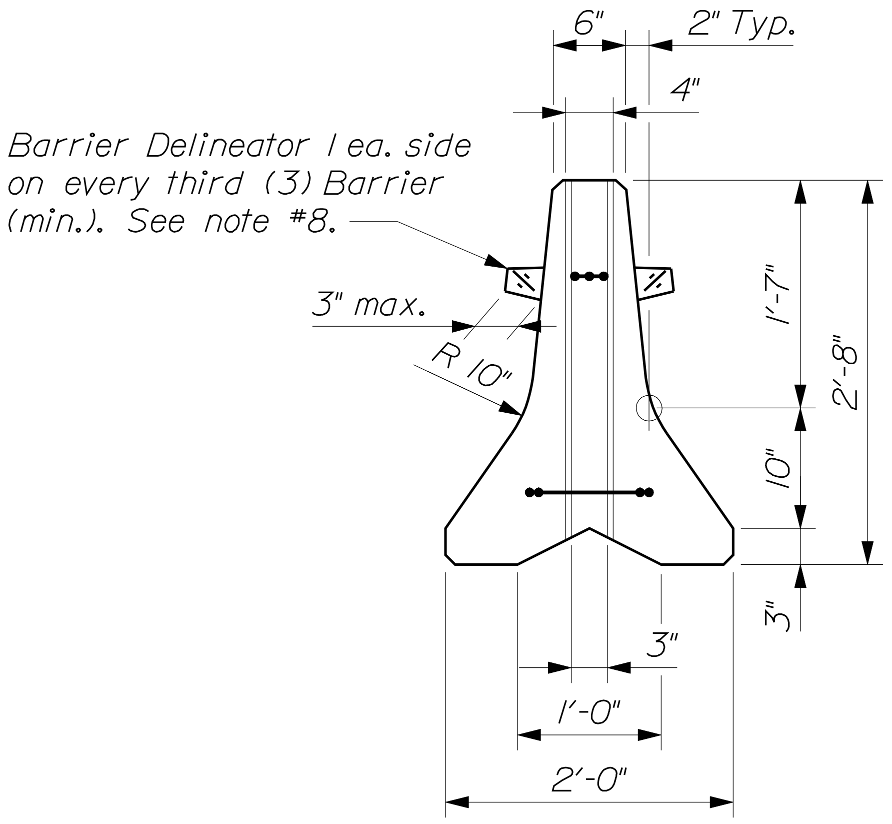
~ PLAN ~



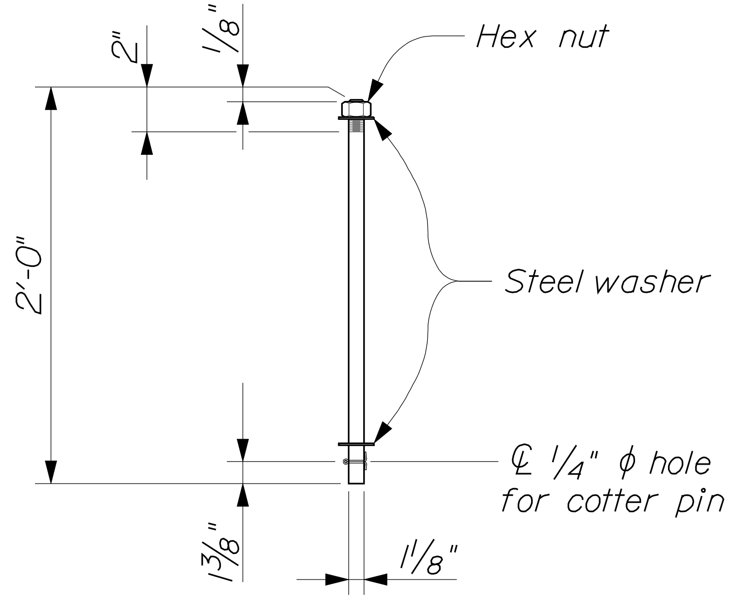
-- ELEVATION --

TEMPORARY CONCRETE BARRIER

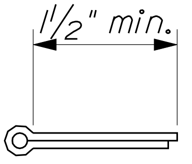
526(01)



~ END VIEW ~

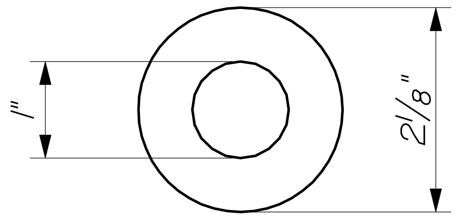


~ CONNECTING PIN ~



~ COTTER PIN DETAIL ~

3/16" SAE Standard

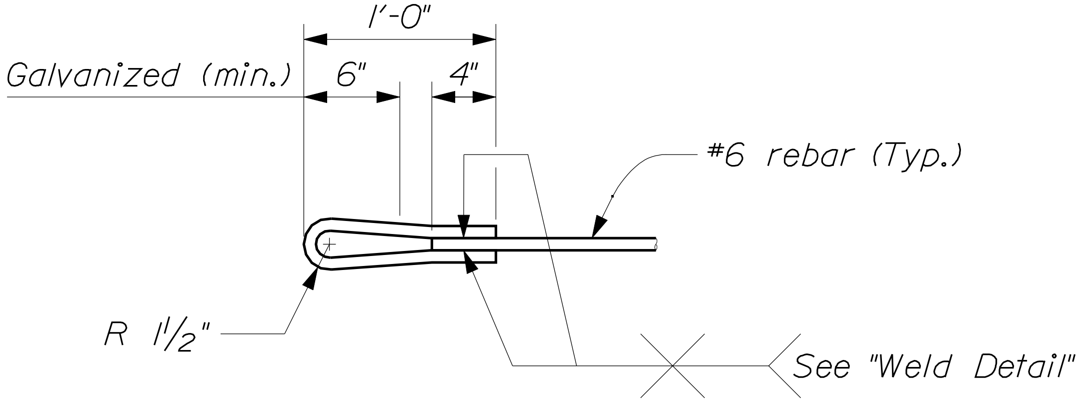


~ WASHER DETAIL ~

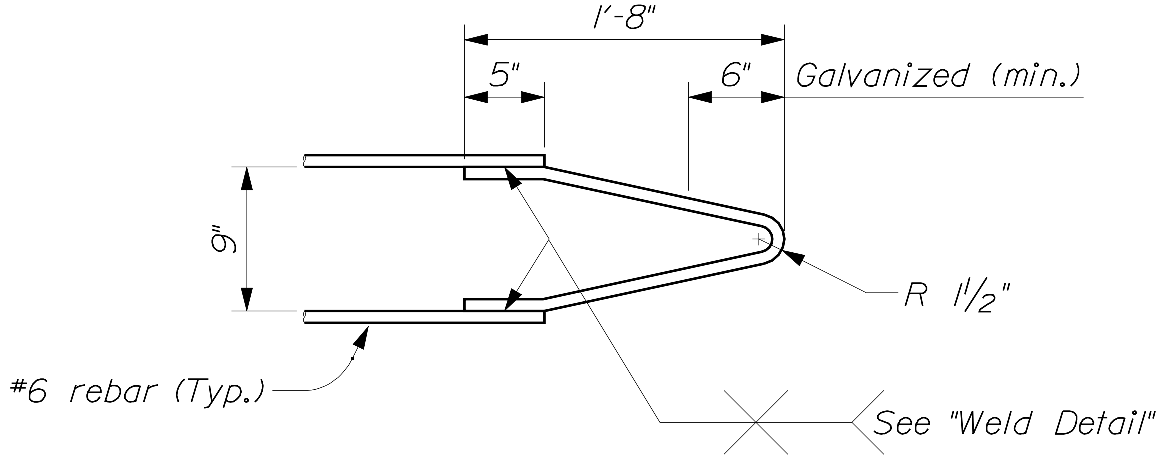
3/16" thick galvanized steel

TEMPORARY CONCRETE BARRIER

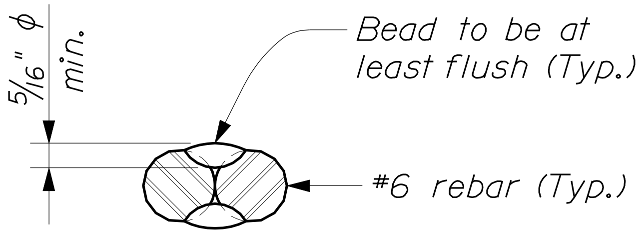
526(02)



~ TOP CONNECTOR ~



~ BOTTOM CONNECTOR ~



~ WELD DETAIL ~

TEMPORARY CONCRETE BARRIER

526(03)

NOTES:

1. Alternate barrier designs may be submitted for approval by the Resident.

2. Form a 3/4- in. chamfer or radius on all exposed edges.

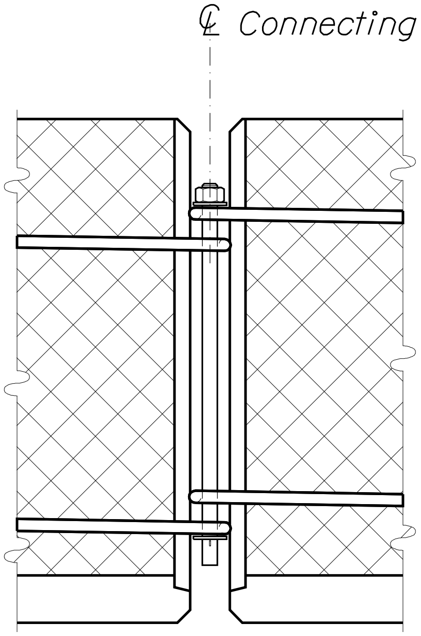
3. Galvanize connectors after forming. Connectors may be completely galvanized.

4. Galvanize the connector pin assembly after fabrication. Burr the threads on the pin after installing the nut.

5. The reinforcement shown is primarily for the impact performance of the barrier. Additional reinforcement may be advisable for handling the barrier and for ensuring its integrity over its service life.

6. When serving the additional function of channelizing traffic, the barrier shall be supplemented by standard delineators, channelizing devices or pavement markings.

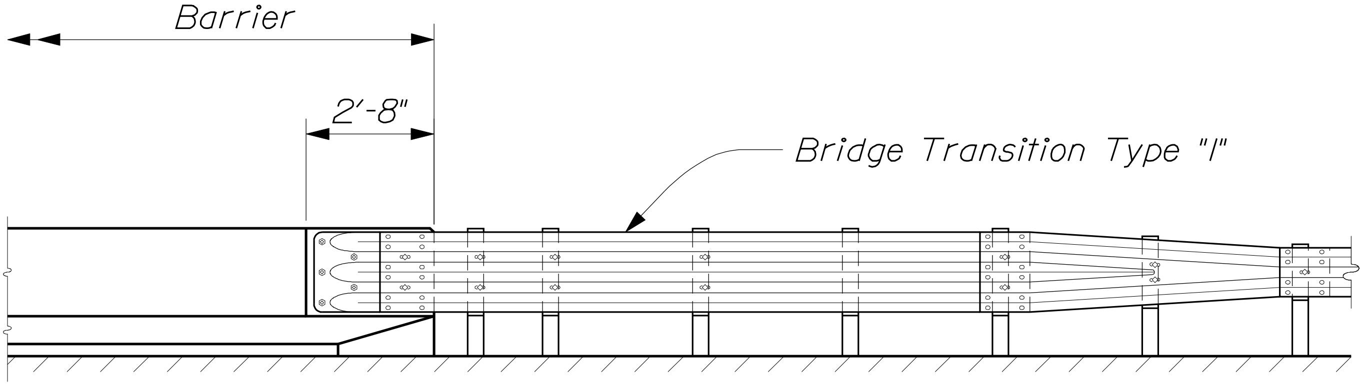
7. Barrier Deliniators shall be Bi-Directional with a minimum effective reflective area of 8.0 in.^{2} as approved by the Resident. The reflector shall preferably be of Methyl Methacrylate, and the housing of Acrylonitaile Butadiene Styrene. As an alternative reflectors may be mounted on the top of the barrier.



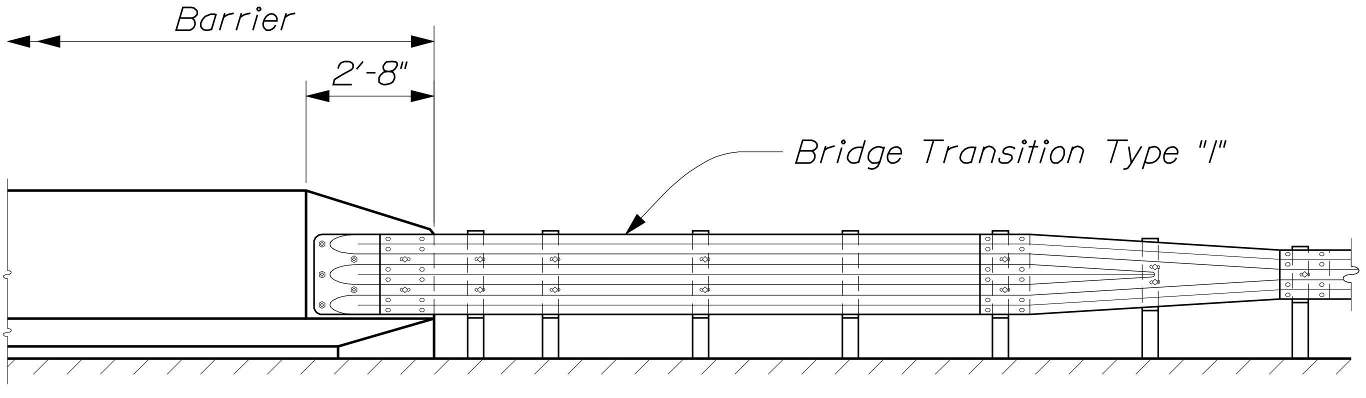
~ CONNECTION DETAIL ~

TEMPORARY CONCRETE BARRIER

526(04)



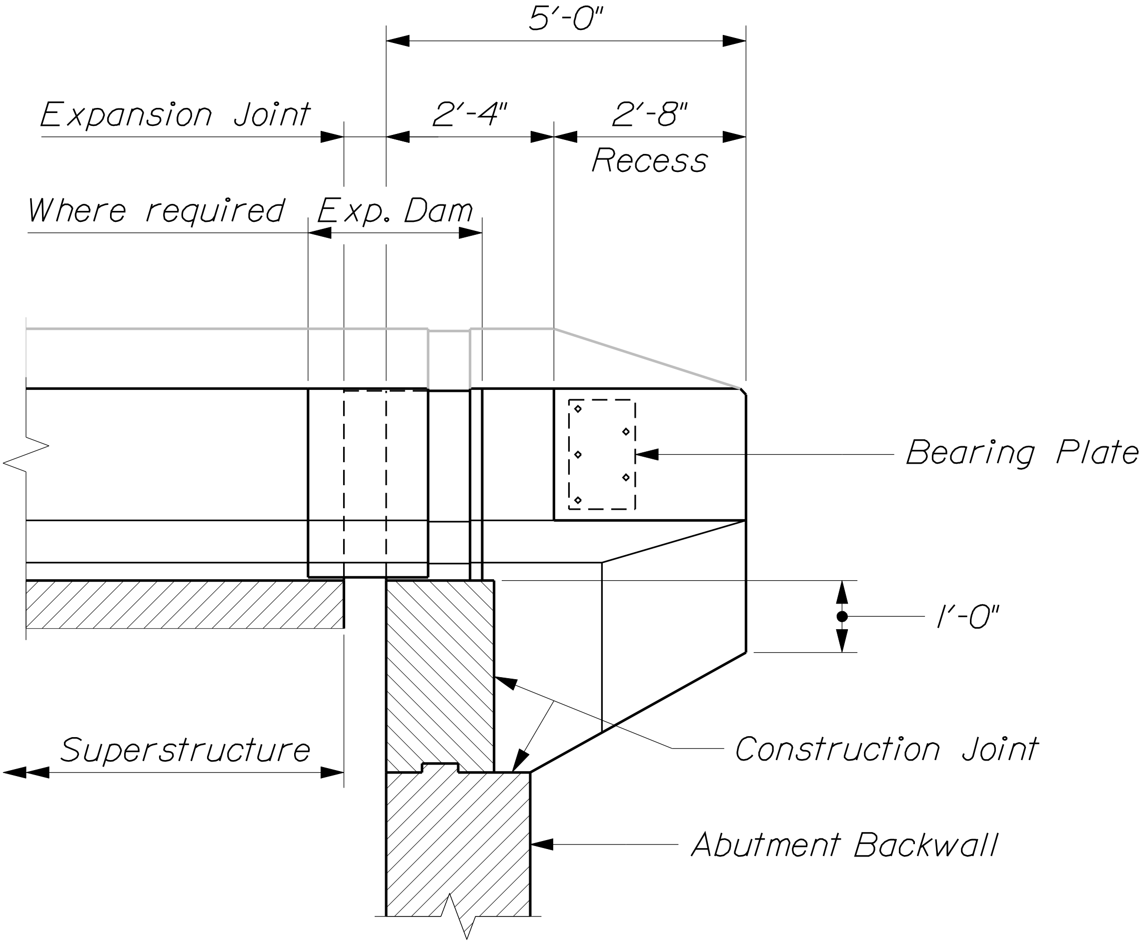
~ PERMANENT CONCRETE BARRIER TYPE IIIA ~



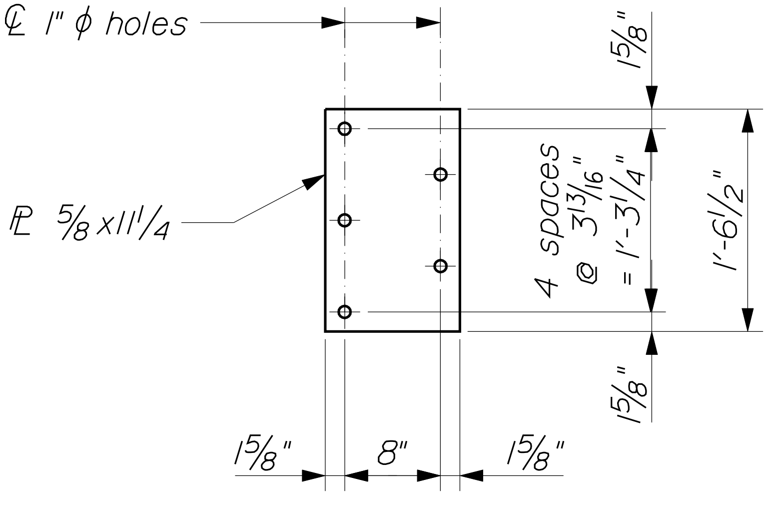
~ PERMANENT CONCRETE BARRIER TYPE IIIB ~

PERMANENT CONCRETE BARRIER

526(05)



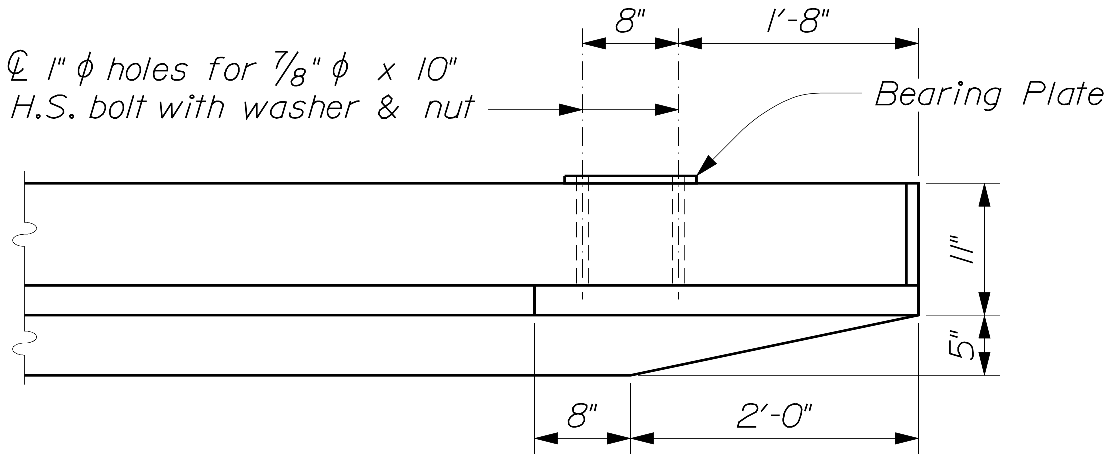
~ CANTILEVERED END AT EXPANSION JOINT ~



~ BEARING PLATE ~

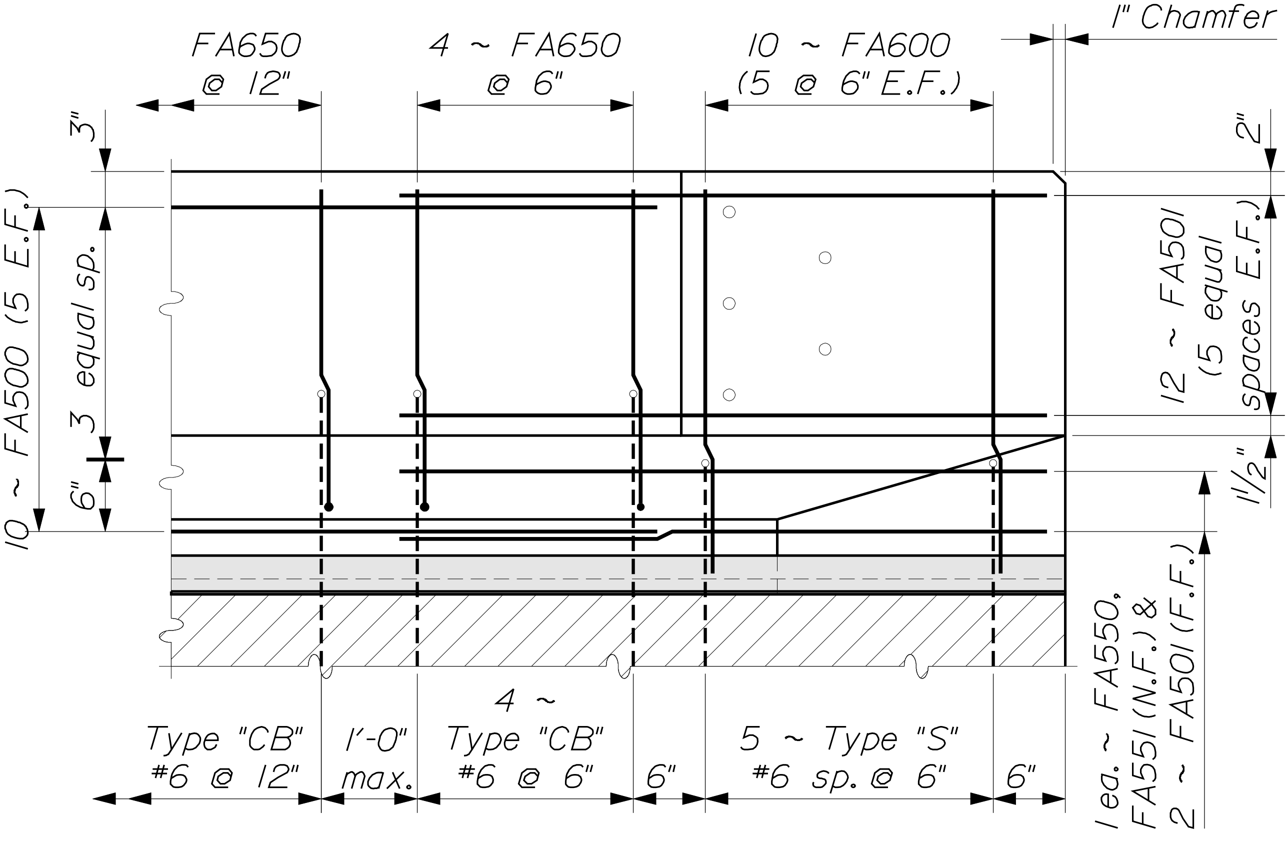
PERMANENT CONCRETE BARRIER

526(06)



~ PLAN ~

(Type IIIA)

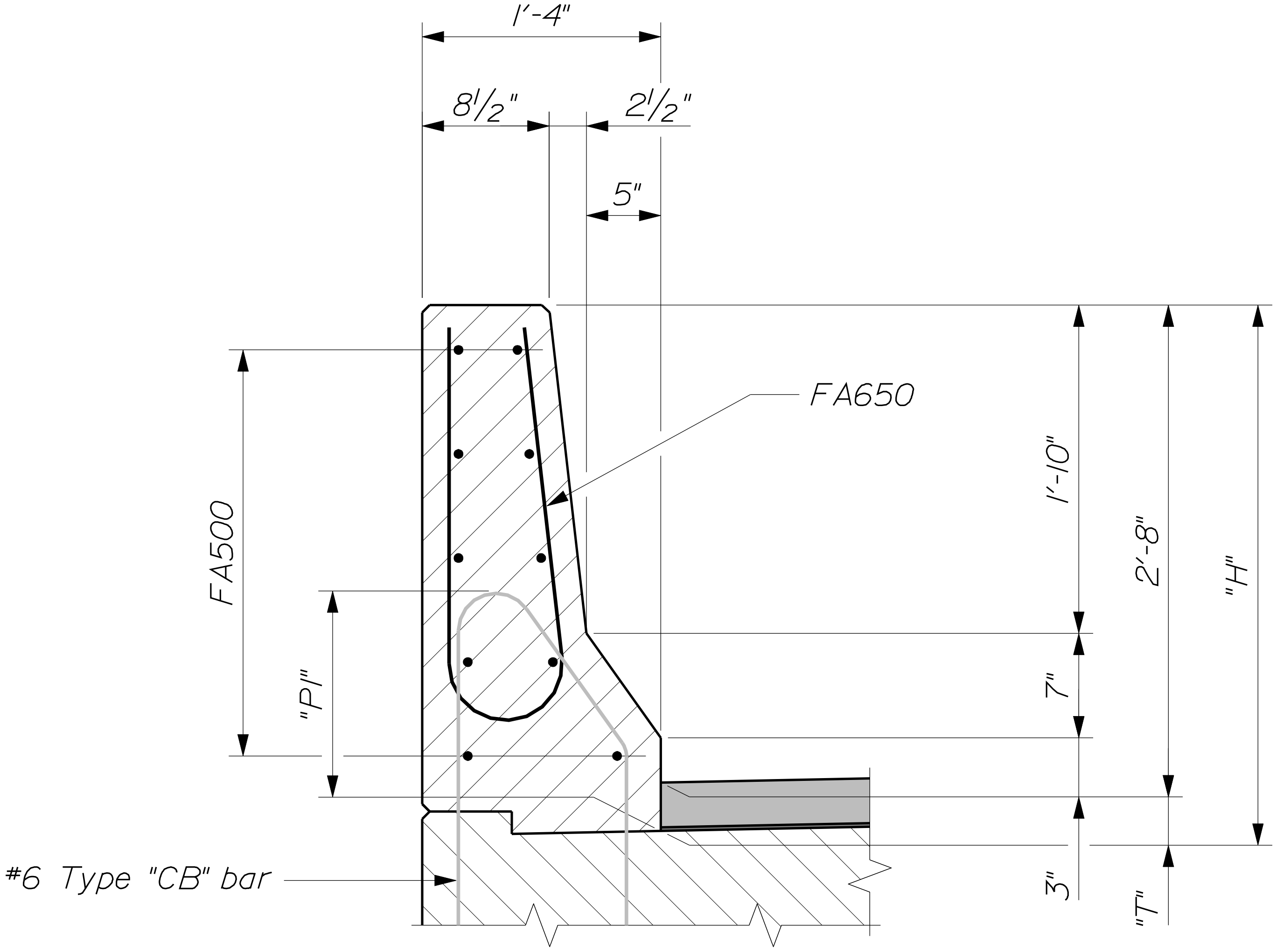


~ ELEVATION ~

(Type IIIA)

PERMANENT CONCRETE BARRIER

526(07)



~ TYPICAL BARRIER SECTION ~

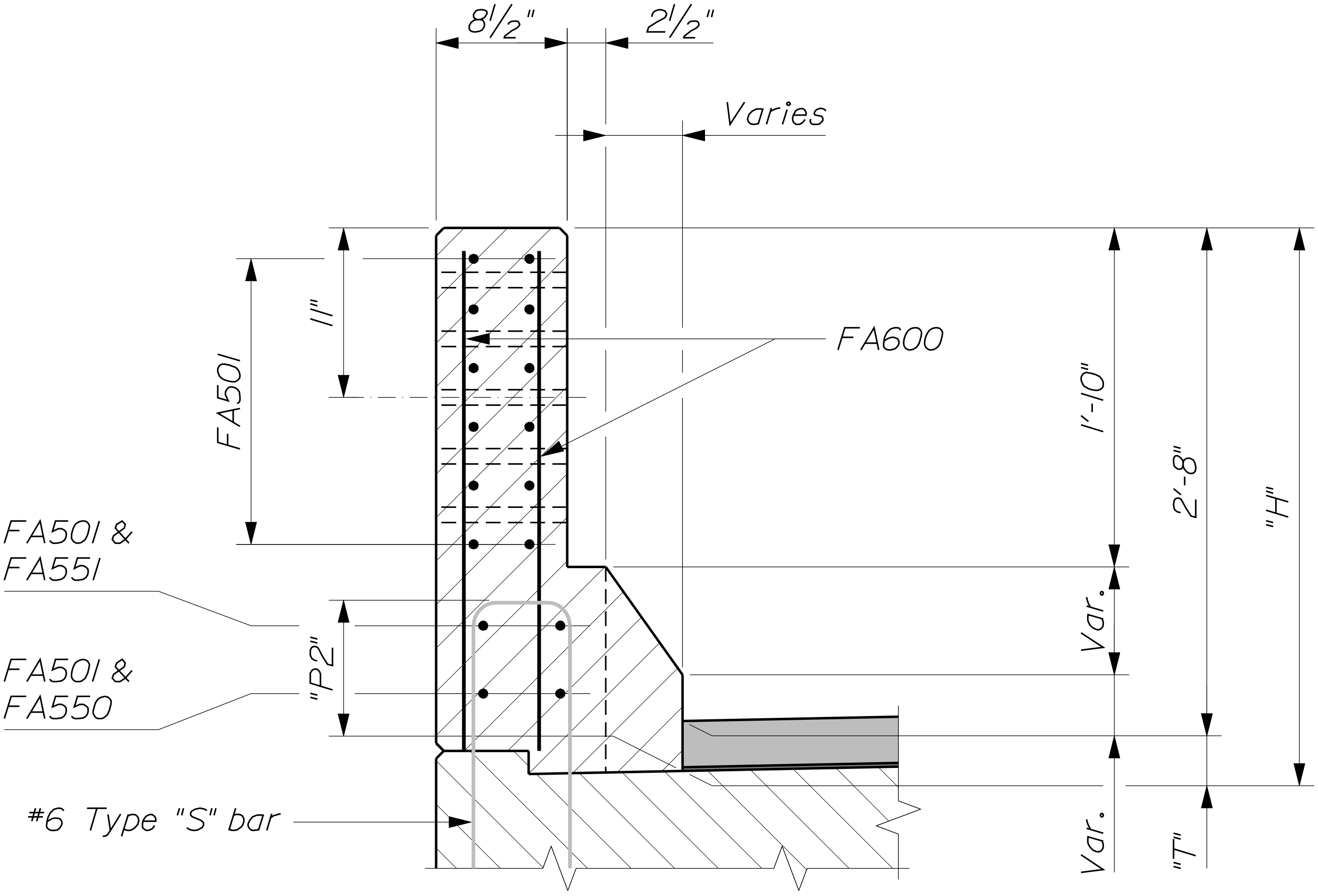
(Type IIIA)

For Wearing Surface ("T") details, refer to Section 502 ~ Concrete Curb

TABLE OF DIMENSIONS - TYPE IIIA				
Wearing Surface Type	"P1"	"P2"	"T"	"H"
Bituminous	1'-4¼"	11¼"	3¼"	2'-11¼"
Unreinforced Concrete	1'-3"	10"	2"	2'-10"
Integral	1'-1"	8"	0"	2'-8"

PERMANENT CONCRETE BARRIER

526(08)



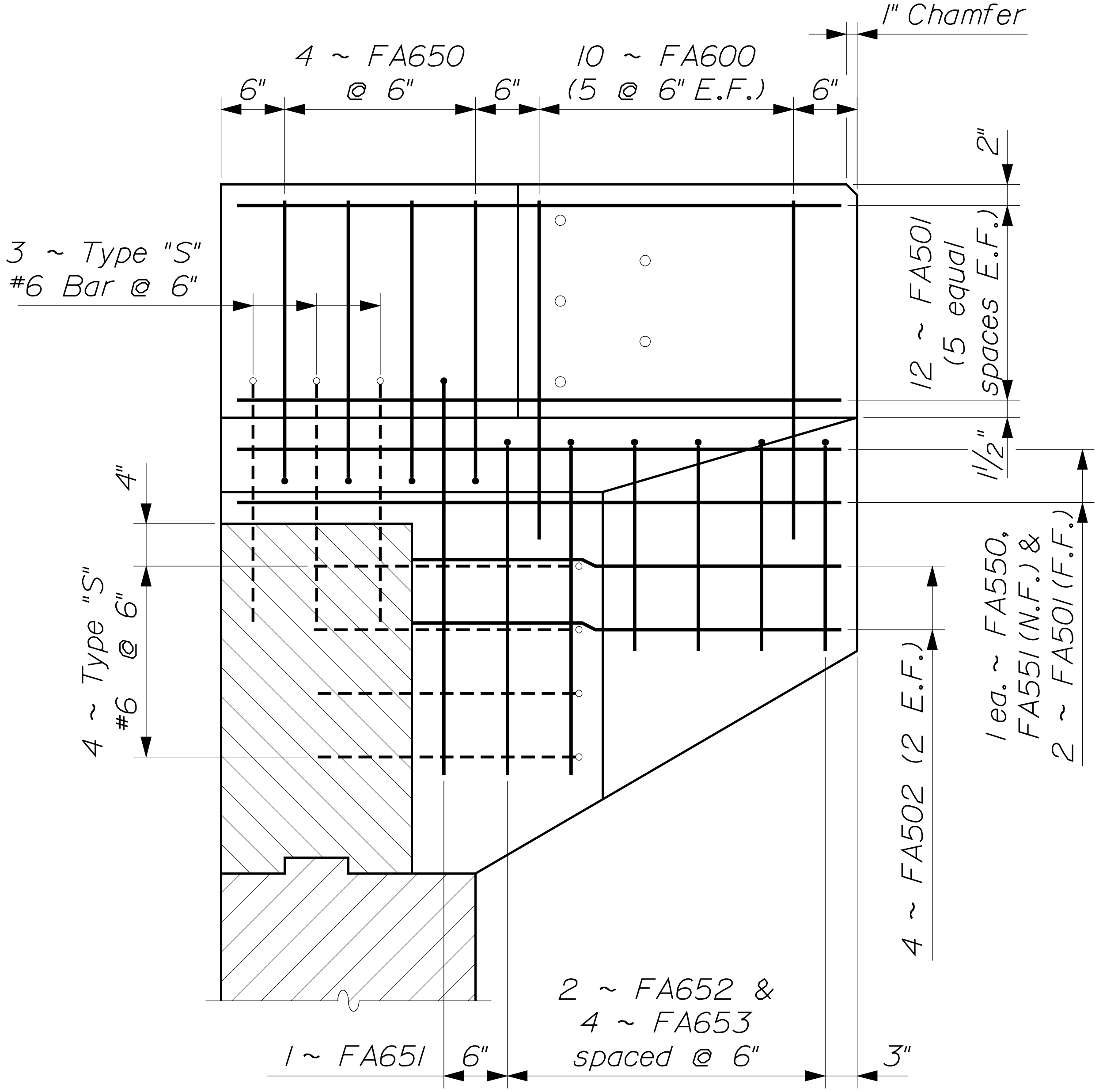
~ BARRIER RECESS SECTION ~

(Type IIIA)

For Wearing Surface ("T") details, refer to Section 502 ~ Concrete Curb

PERMANENT CONCRETE BARRIER

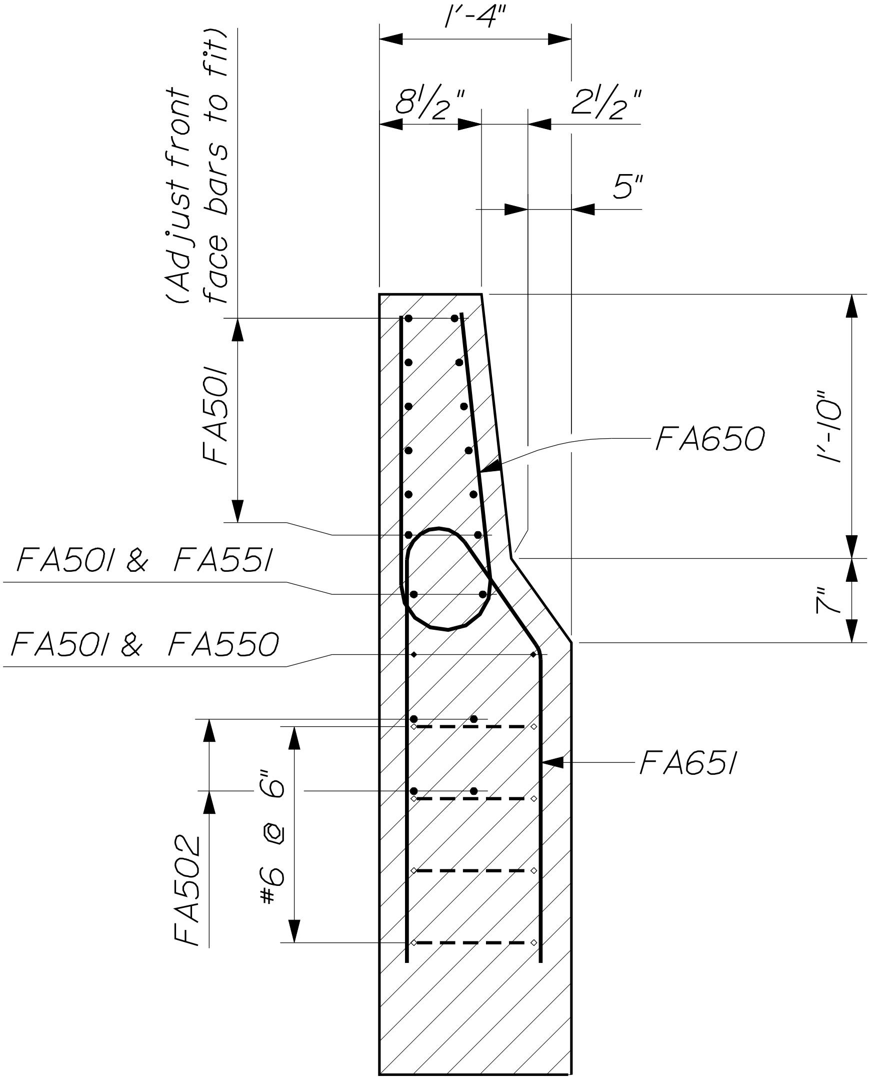
526(09)



~ CANTILEVERED REINFORCING ELEVATION ~
(Type IIIA)

PERMANENT CONCRETE BARRIER

526(10)

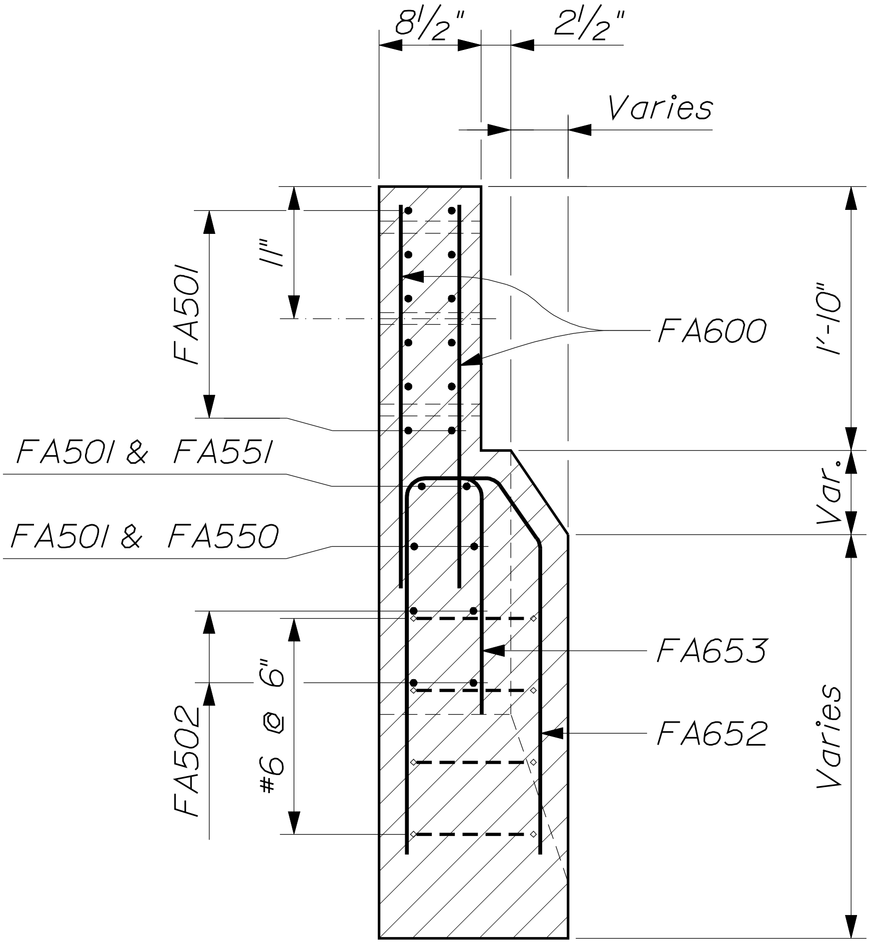


~ CANTILEVERED SECTION ~

(Type IIIA)

PERMANENT CONCRETE BARRIER

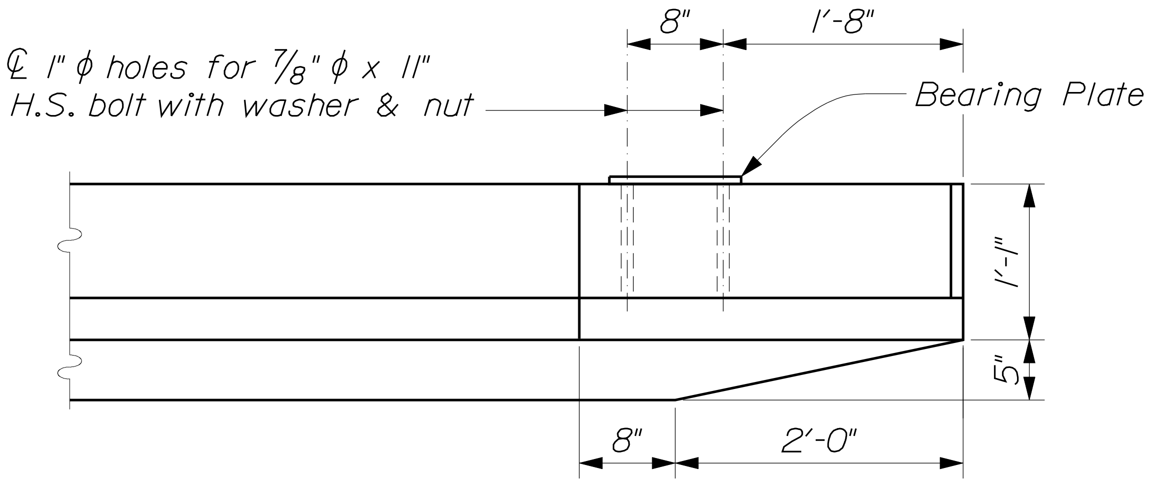
526(II)



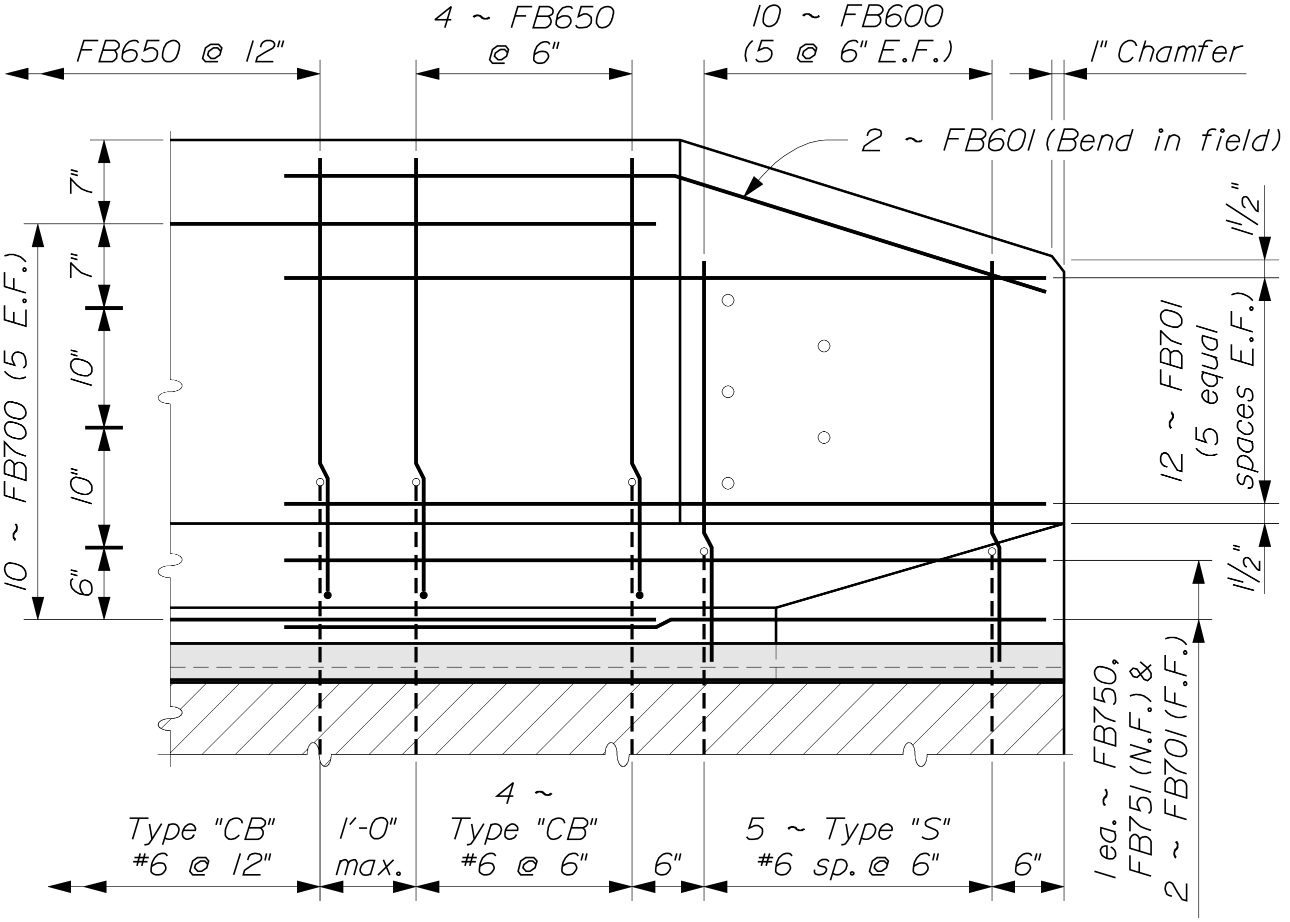
~ CANTILEVERED RECESS SECTION ~
(Type IIIA)

PERMANENT CONCRETE BARRIER

526(12)



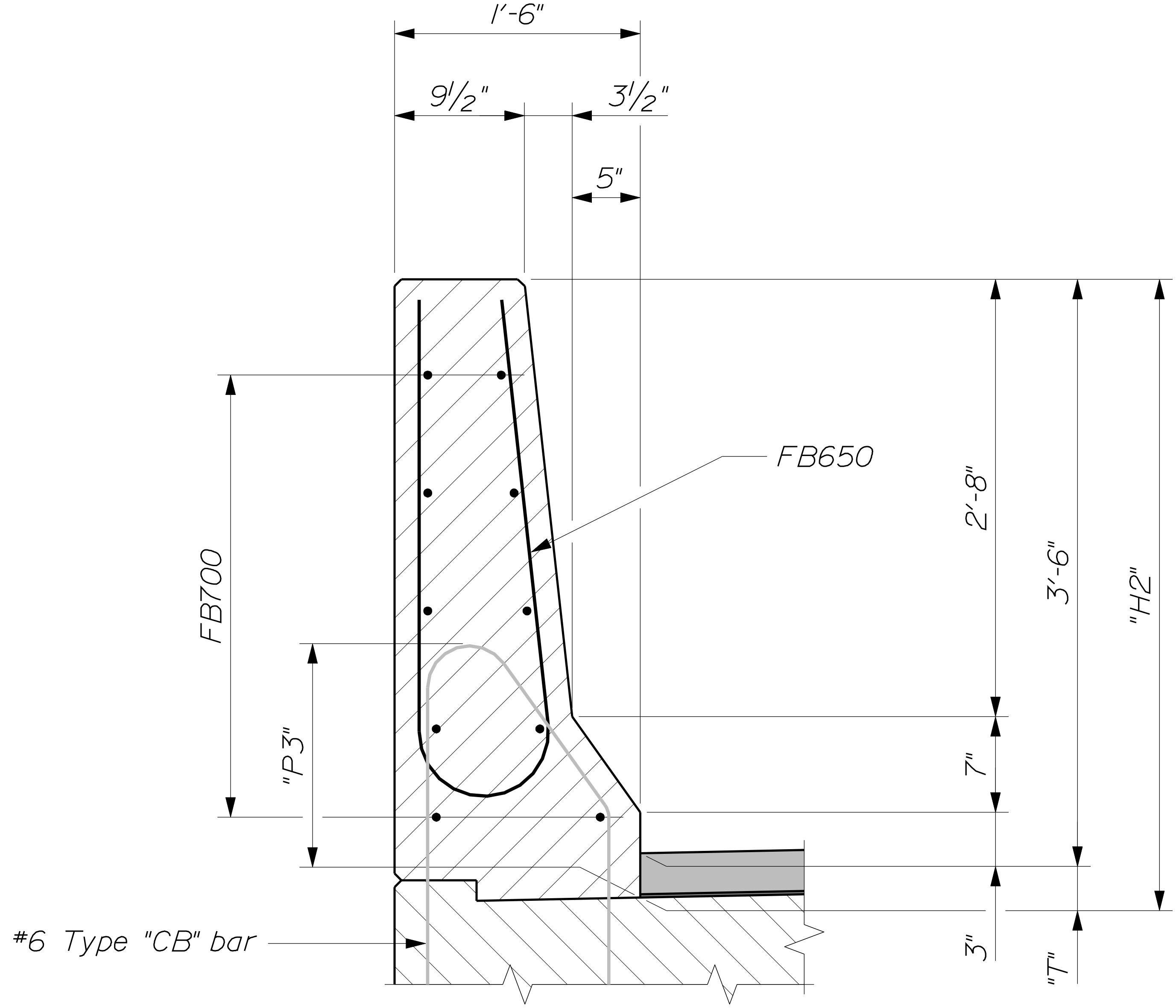
~ PLAN ~
(Type IIIB)



~ ELEVATION ~
(Type IIIB)

PERMANENT CONCRETE BARRIER

526(13)



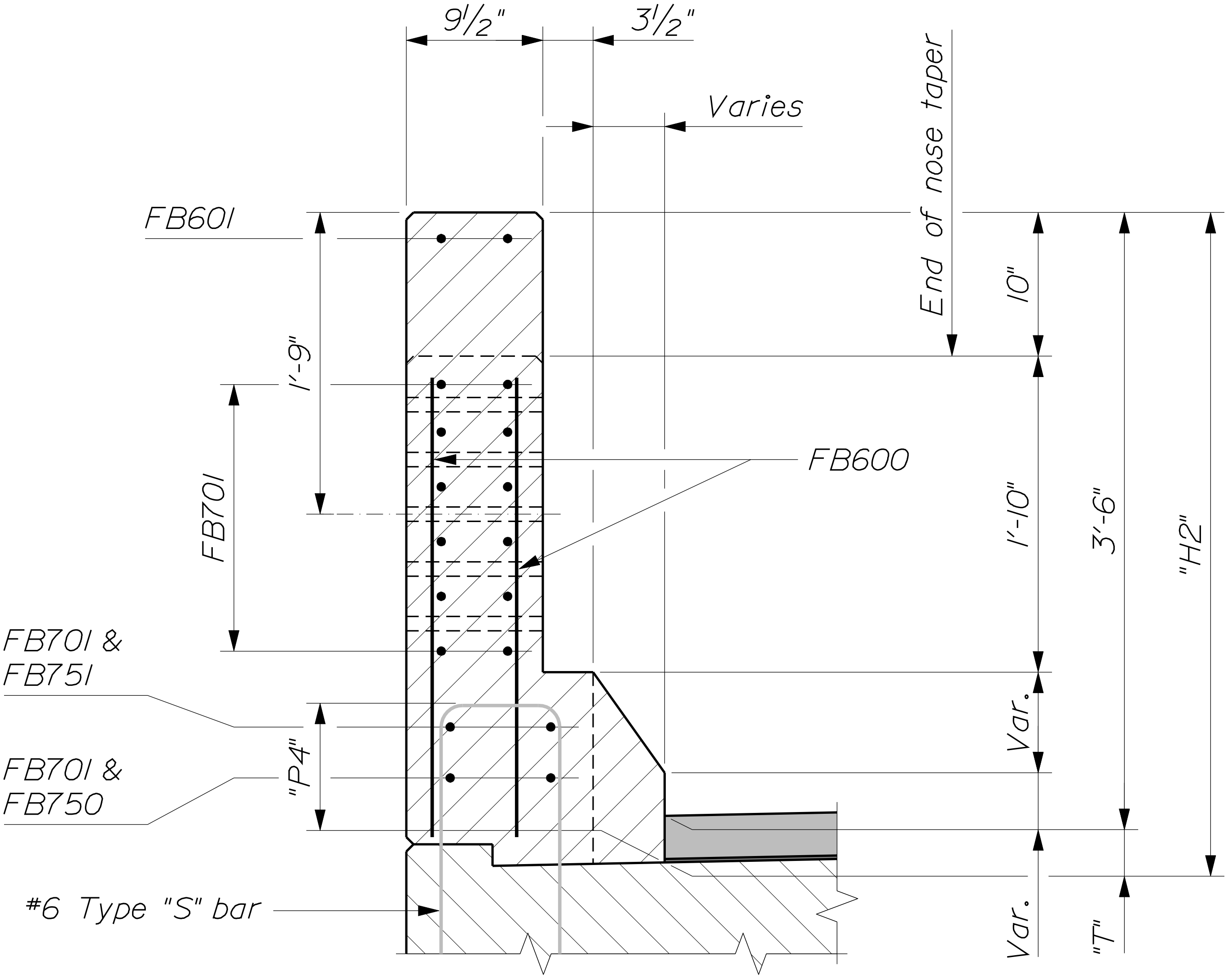
~ TYPICAL BARRIER SECTION ~

(Type IIIB)

For Wearing Surface ("T") details, refer to Section 502 ~ Concrete Curb

TABLE OF DIMENSIONS - TYPE IIIB				
Wearing Surface Type	"P3"	"P4"	"T"	"H2"
Bituminous	1'-6¾"	11¼"	3¼"	3'-9¼"
Unreinforced Concrete	1'-5½"	10"	2"	3'-8"
Integral	1'-3½"	8"	0"	3'-6"

PERMANENT CONCRETE BARRIER



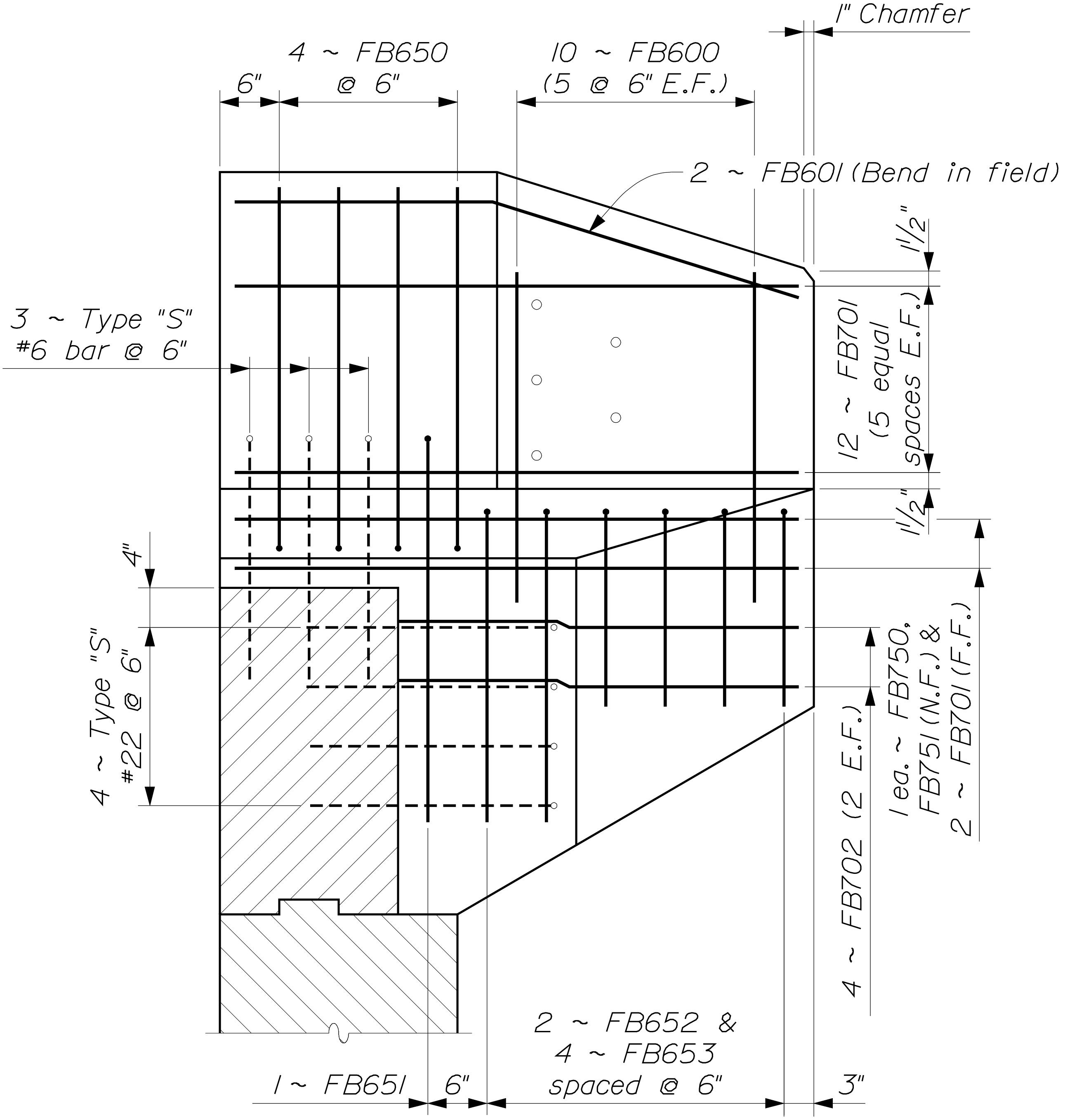
~ TYPICAL END SECTION ~

(Type IIIB)

For Wearing Surface ("T") details, refer to Section 502 ~ Concrete Curb

PERMANENT CONCRETE BARRIER

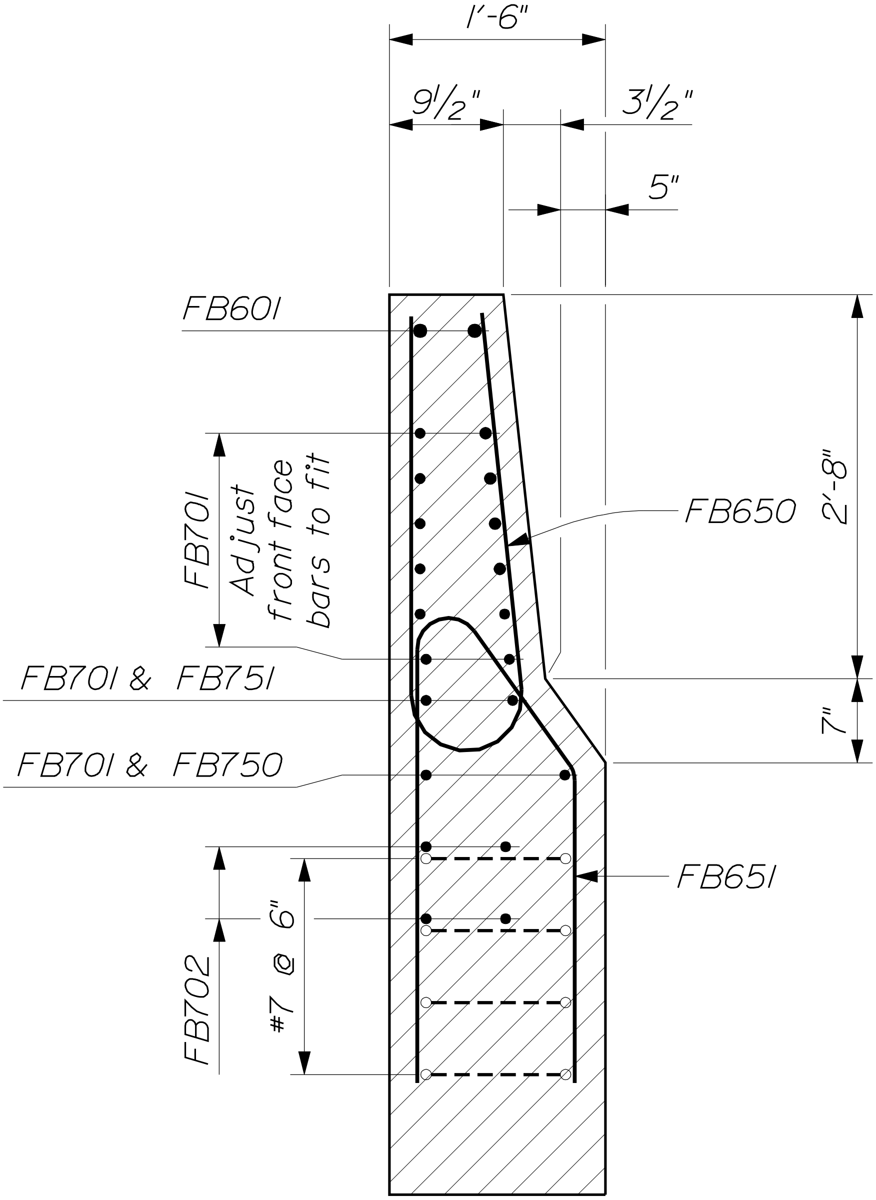
526(15)



~ CANTILEVER REINFORCING ELEVATION ~
(Type IIB)

PERMANENT CONCRETE BARRIER

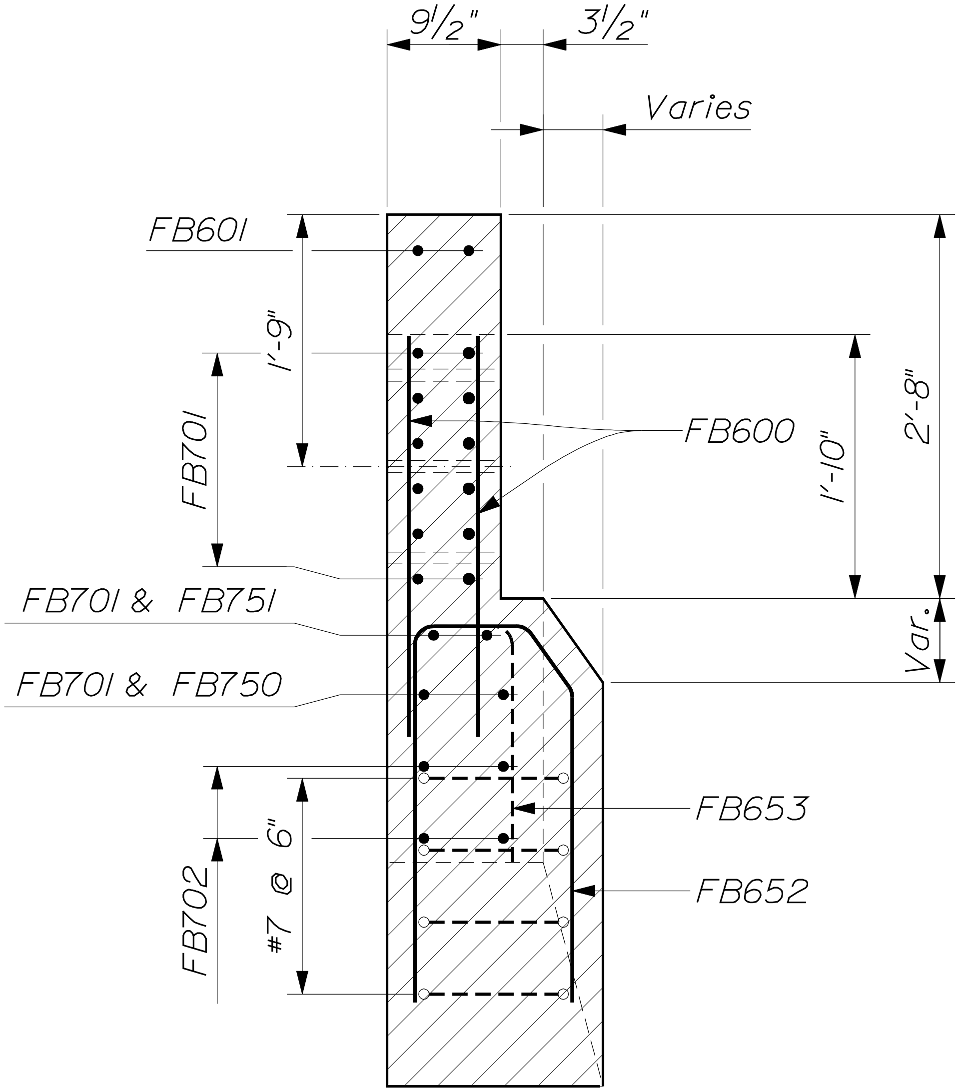
526(I6)



~ CANTILEVERED SECTION ~
(Type IIIB)

PERMANENT CONCRETE BARRIER

526(17)



~ CANTILEVERED END SECTION ~
(Type IIIB)

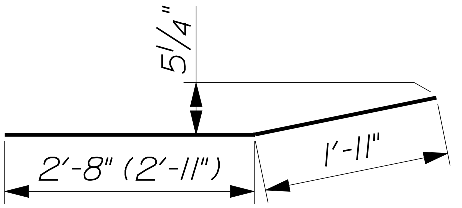
PERMANENT CONCRETE BARRIER

526(18)

BARRIER TYPE IIIA REINFORCING STEEL

Mark	With Normal End		With Cantilevered End	
	Quantity	Length	Quantity	Length
FA500	As req'd	30'-0" max.	As req'd	30'-0" max.
FA501	14	4'-6"	14	4'-8"
FA550	1	4'-7"	1	4'-10"
FA551	1	4'-7"	1	4'-10"
FA600	10	2'-8"	10	2'-8"
FA650	As req'd	4'-10"	As req'd	4'-11"
FA651	--	--	1	6'-6"
FA652	--	--	2	6'-1"
FA653	--	--	4	3'-11"

(X) denotes cantilevered end dimension



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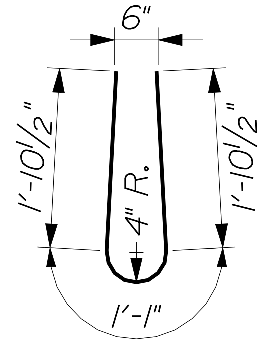

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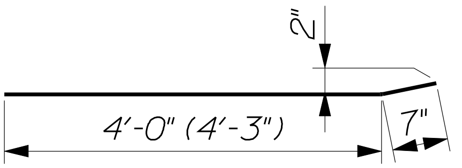

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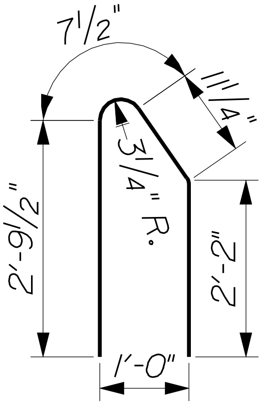

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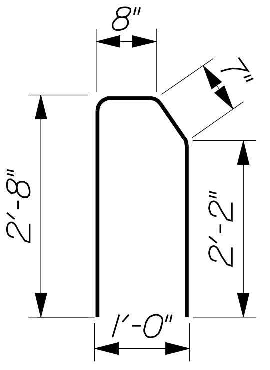

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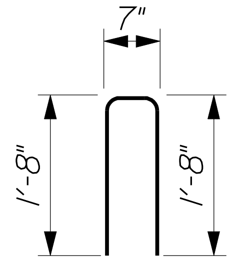


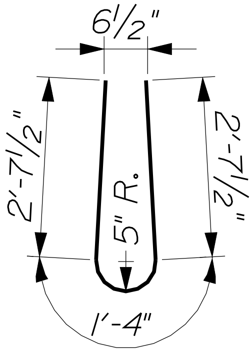
~ FA653 ~

PERMANENT CONCRETE BARRIER

BARRIER TYPE IIIB REINFORCING STEEL

Mark	With Normal End		With Cantilevered End	
	Quantity	Length	Quantity	Length
FB600	10	2'-10"	10	2'-10"
FB601	2	5'-5"	2	4'-9"
FB650	As req'd	6'-7"	As req'd	6'-7"
FB651	--	--	1	7'-0"
FB652	--	--	2	6'-3"
FB653	--	--	4	4'-1"
FB700	As req'd	60'-0" max.	As req'd	60'-0" max.
FB701	16	5'-4"	16	4'-8"
FB702	--	--	4	3'-4"
FB750	1	5'-5"	1	4'-10"
FB751	1	5'-5"	1	4'-10"

(X) denotes cantilevered end dimension



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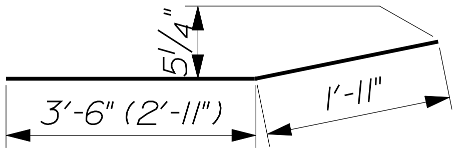

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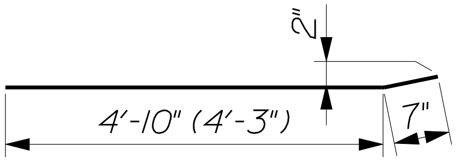
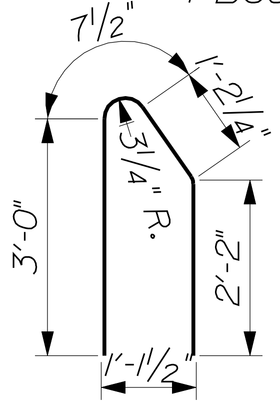


~ FB751 ~



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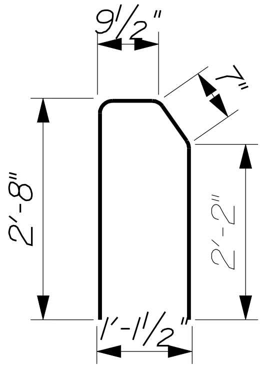

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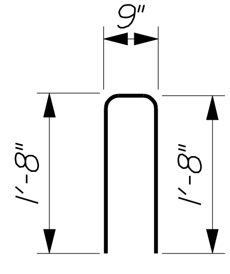


~ FB653 --

NOTES:

1. All work and materials shall conform to the provisions of Standard Specifications Section 526 - Concrete Barrier.

2. Reinforcing bar designations Type "S" and "CB" refer to type - bending diagrams as shown on the main Reinforcing Steel Schedule. These bars are detailed on the Design Drawings and are included for payment in the Reinforcing Steel pay items.

3. Reinforcing steel shall have a minimum concrete cover of 1½ inches, except that stirrups Type "S" and "CB" shall have a minimum concrete cover of 2 inches. .

4. The first digit following the letters of the mark indicates the size of the reinforcing bar. (FA600 = #6 bar.) All dimensions are out - to - out of bar.

5. Minimum lap splice lengths are 1'-9" for FA500 and 2'-7" for FB700.

6. The quantities of reinforcing bars shown are for one barrier end only.

7. Bolt holes in concrete shall be formed by a method approved by the Resident.

8. Payment for anchor bolts and bearing plates will be considered incidental to the concrete barrier pay item. Class 8.8.3 bolts shall be used when corrosion - resistant steel guardrail is specified on the approach roadway.

9. Permanent Concrete Barrier is designed for attachment of Bridge Transition Type "1" unless otherwise indicated on the Design Drawings. Refer to Section 606 for details.

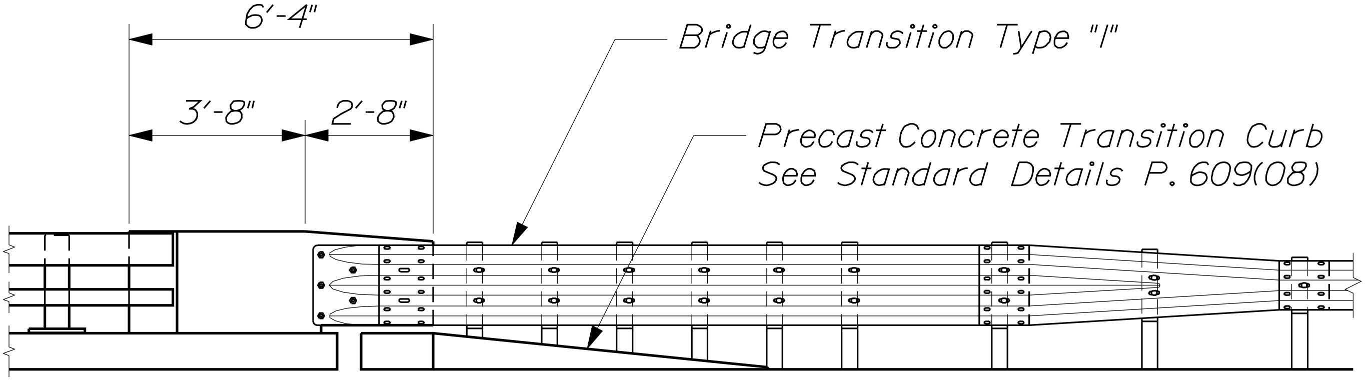
10. After installation of the guardrail is complete, upset the threads on the anchor bolts in 3 places around each bolt, at the junction of the nut and the exposed thread, with a center punch or similar tool.

11. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

MATERIALS:

Concrete	Class "LP"
Reinforcing Steel	AASHTO M 31M/M 31, Grade 60
Bearing Plate	AASHTO M 270M/M 270, Grade 36 (Galvanized)
Bolts	AASHTO M 314, Grade 105 (Galvanized)

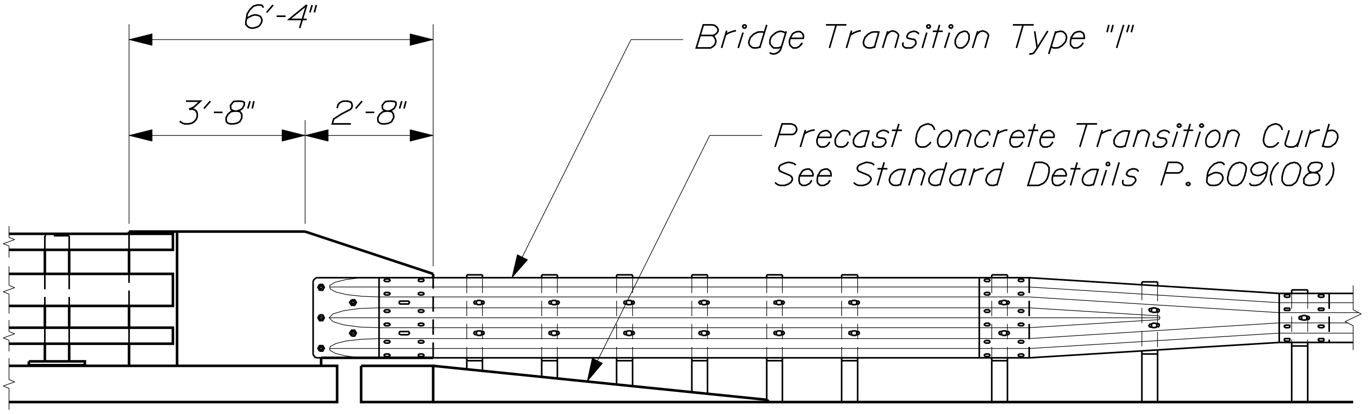
PERMANENT CONCRETE BARRIER



Bridge Transition Type "I"

Precast Concrete Transition Curb
See Standard Details P. 609(08)

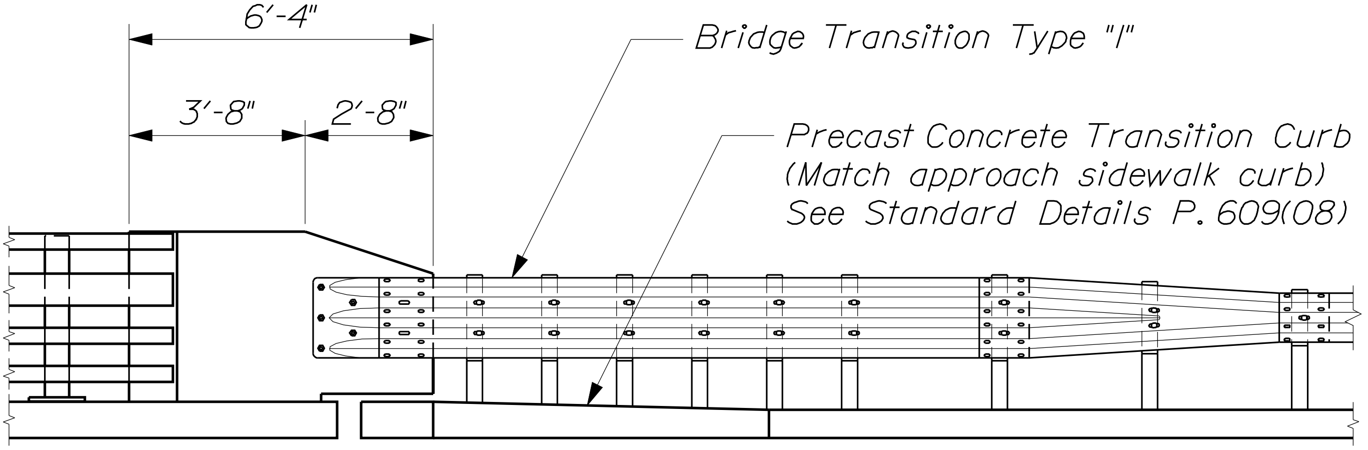
~ CONCRETE TRANSITION BARRIER ~
(2 - Bar Traffic Railing)



Bridge Transition Type "I"

Precast Concrete Transition Curb
See Standard Details P. 609(08)

~ CONCRETE TRANSITION BARRIER ~
(3 - Bar Traffic / Bicycle Railing)
(4 - Bar Traffic / Bicycle Railing similar)



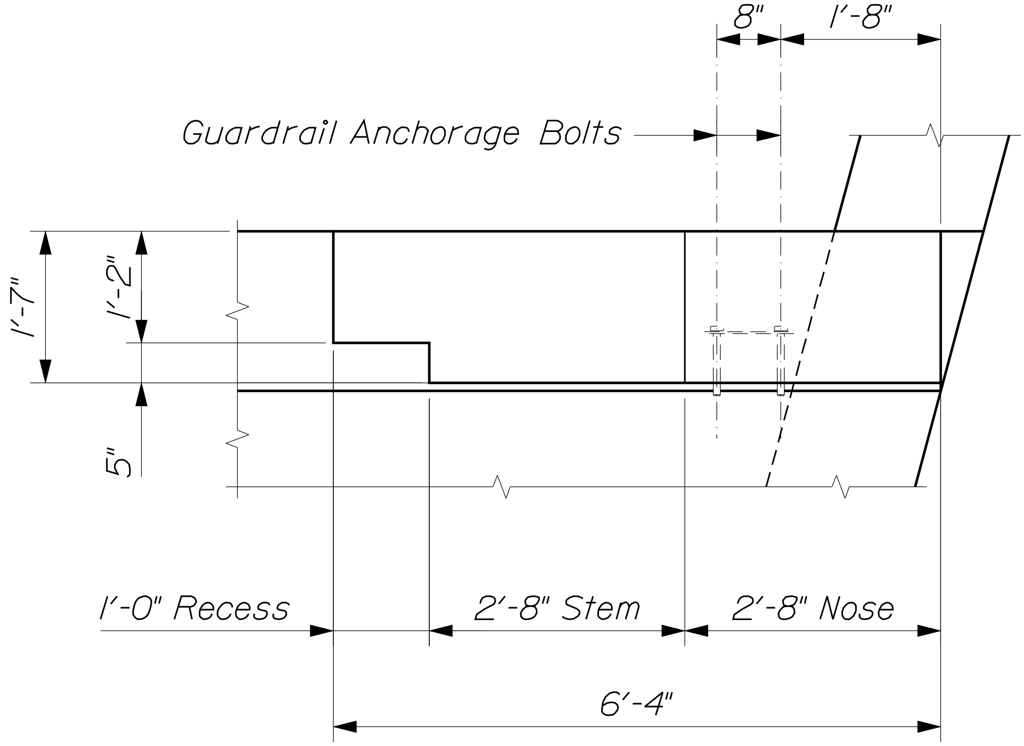
Bridge Transition Type "I"

Precast Concrete Transition Curb
(Match approach sidewalk curb)
See Standard Details P. 609(08)

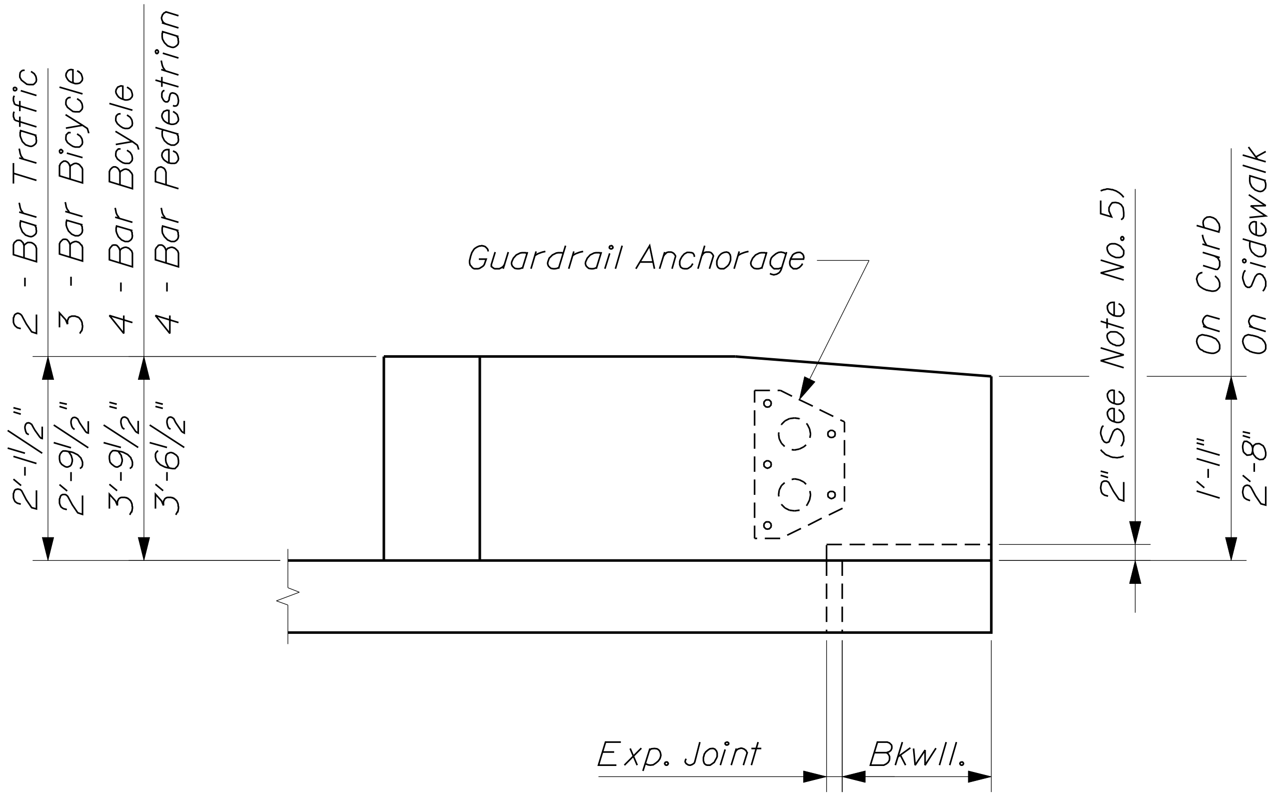
~ CONCRETE TRANSITION BARRIER ~
(4 - Bar Traffic / Pedestrian Railing)

CONCRETE TRANSITION BARRIER

526(22)



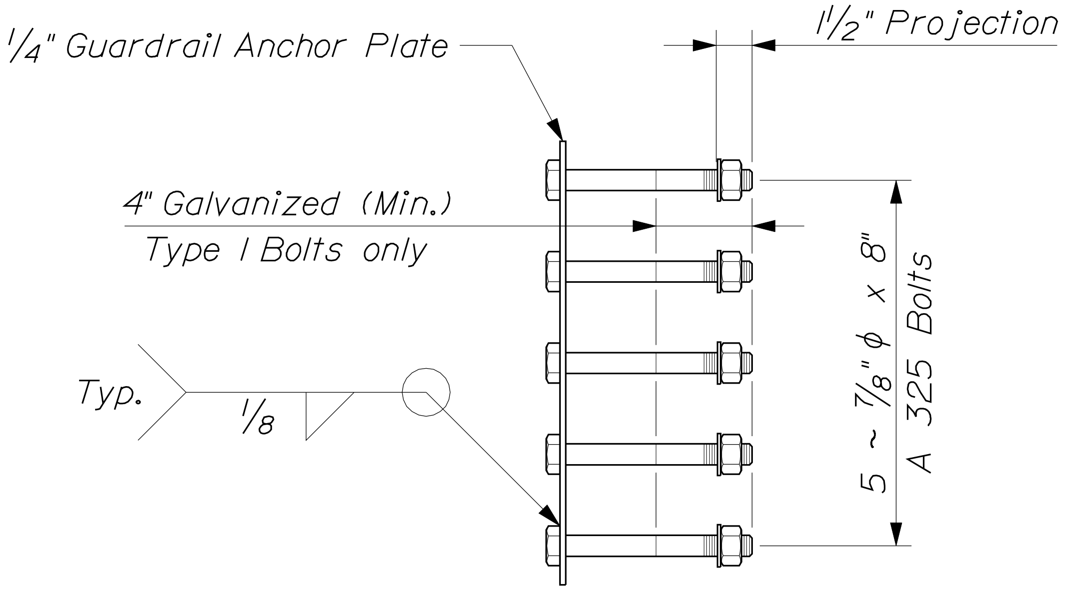
~ TRANSITION BARRIER PLAN ~



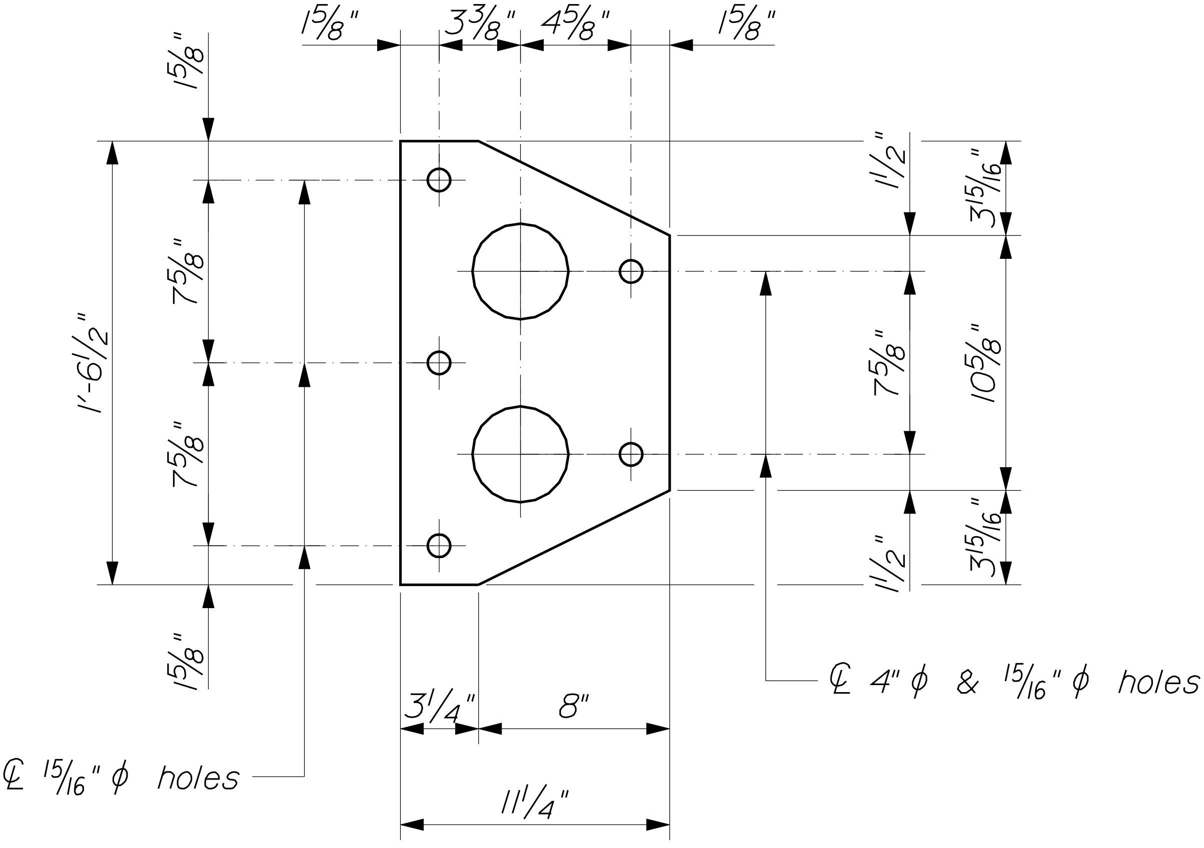
~ TRANSITION BARRIER ELEVATION ~

CONCRETE TRANSITION BARRIER

526(23)



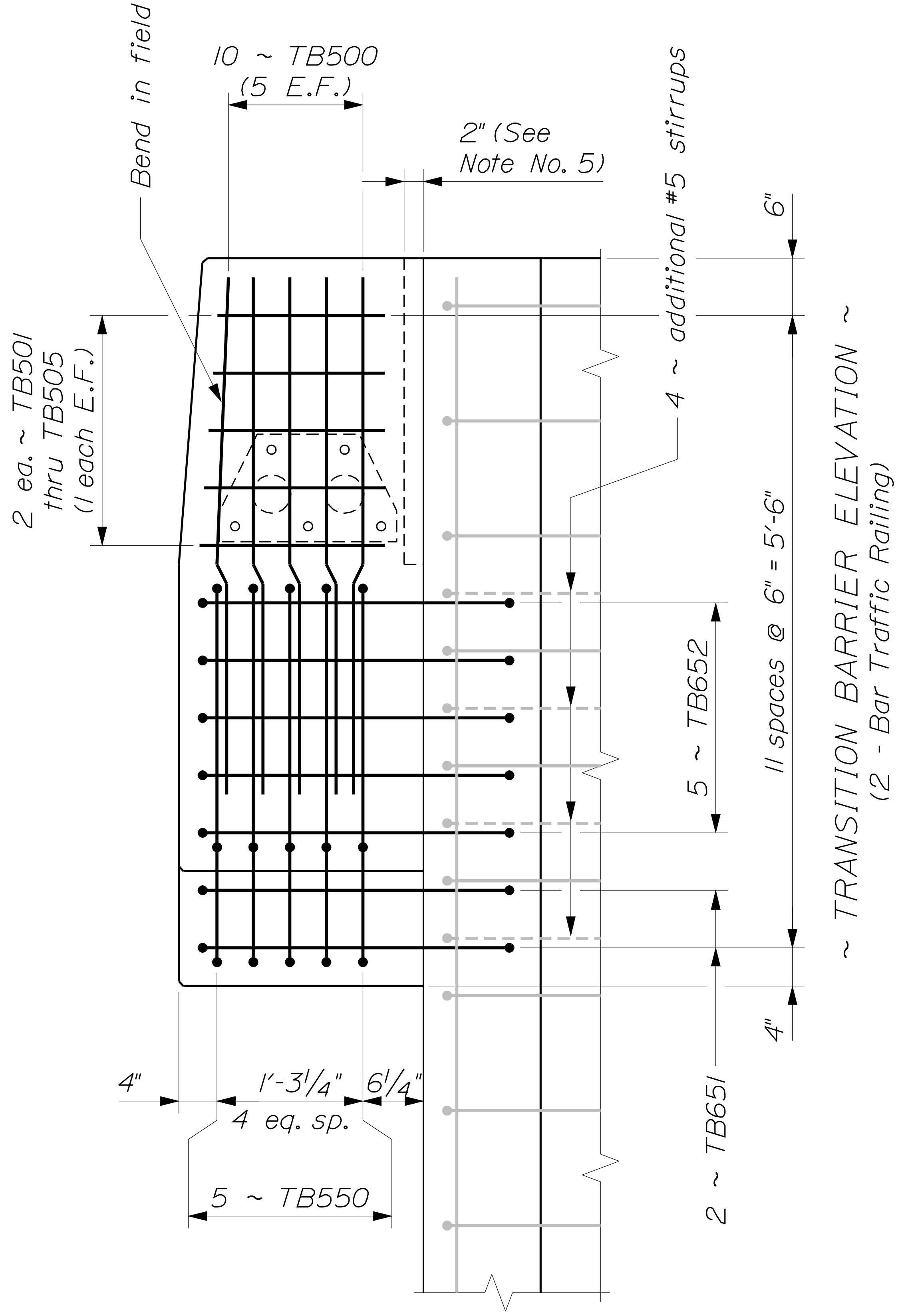
~ GUARDRAIL ANCHORAGE SECTION ~



~ GUARDRAIL ANCHOR PLATE ~

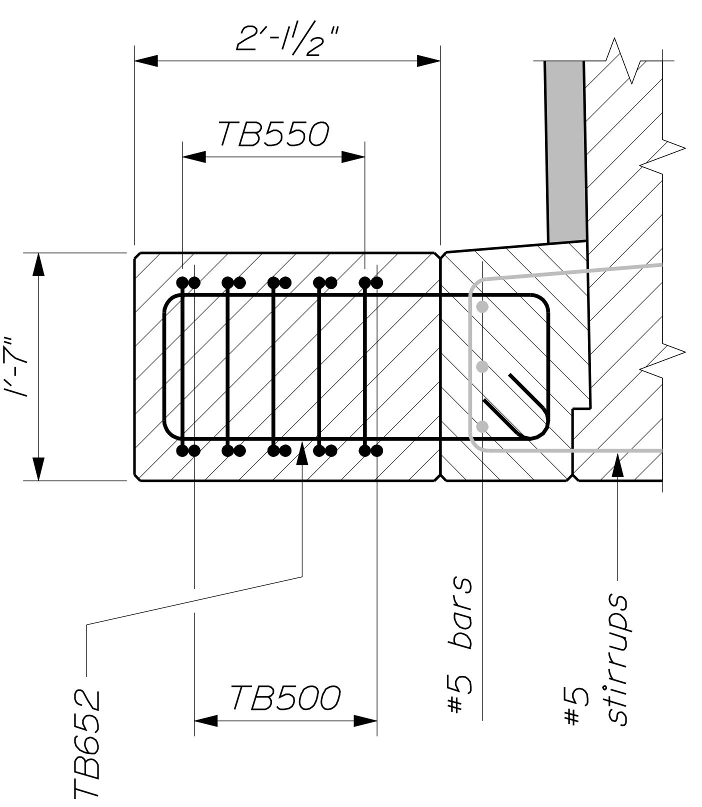
CONCRETE TRANSITION BARRIER

526(24)

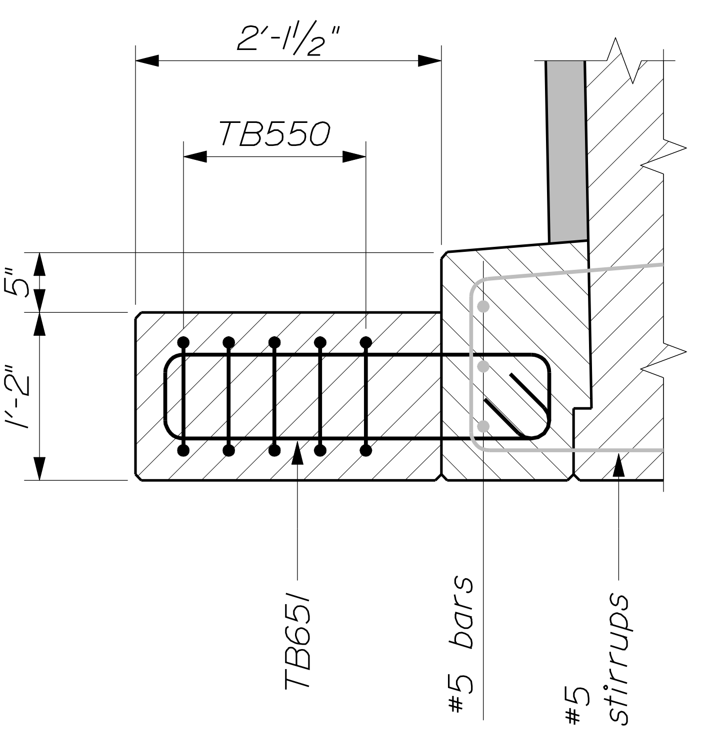


CONCRETE TRANSITION BARRIER

526(25)



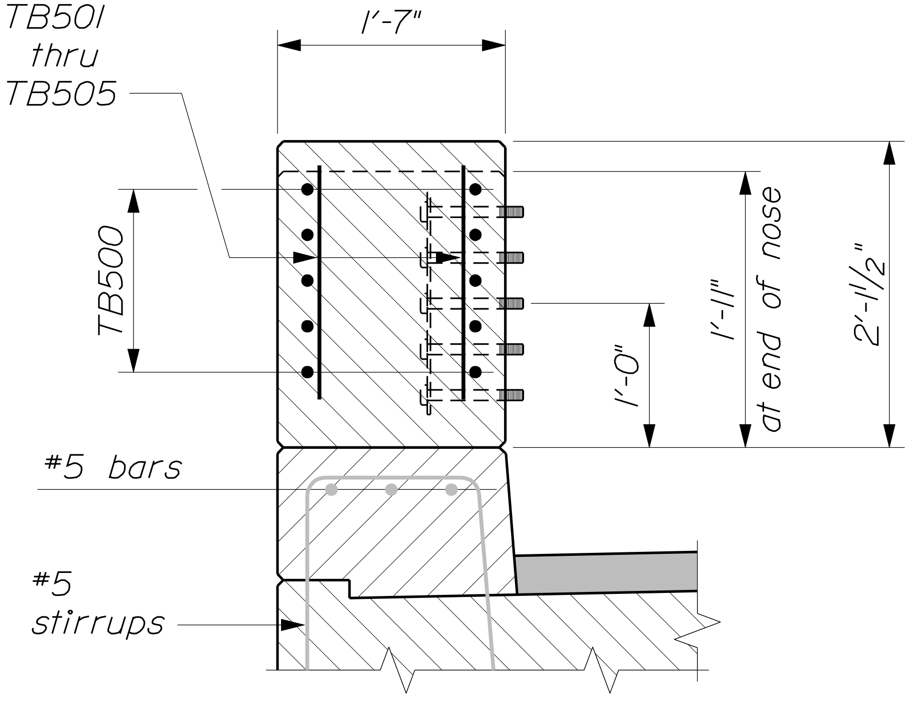
~ SECTION THRU STEM ~
(2 - Bar Traffic Railing)



~ SECTION THRU RECESS ~
(2 - Bar Traffic Railing)

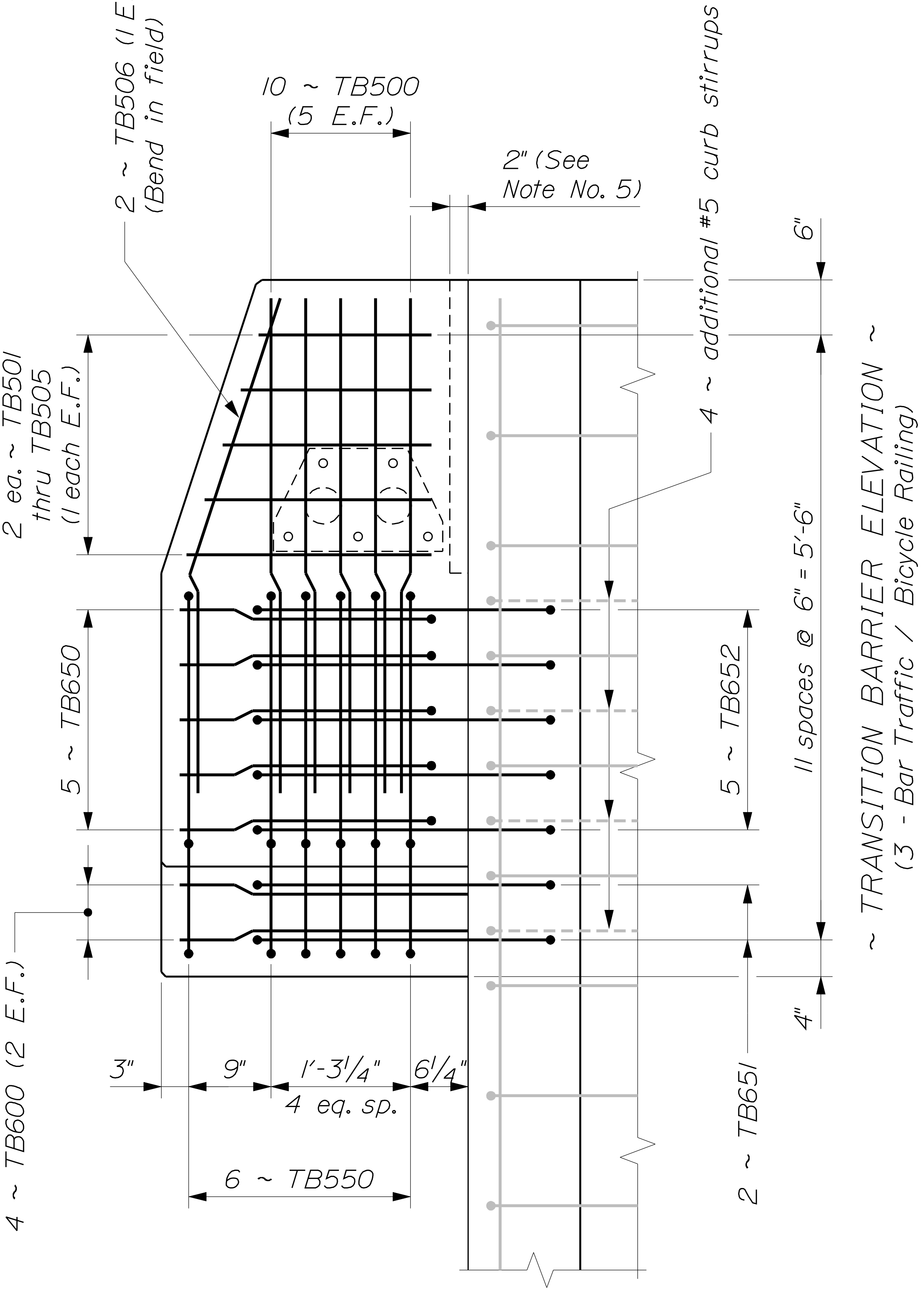
CONCRETE TRANSITION BARRIER

526(26)



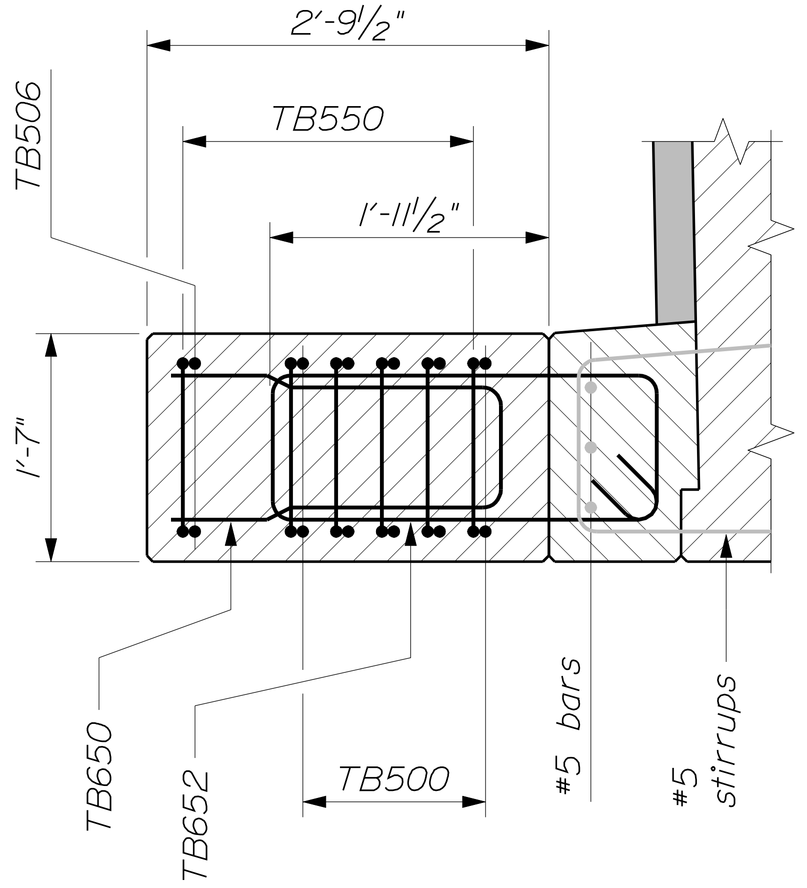
~ SECTION THRU NOSE ~
(2 - Bar Traffic Railing)

CONCRETE TRANSITION BARRIER

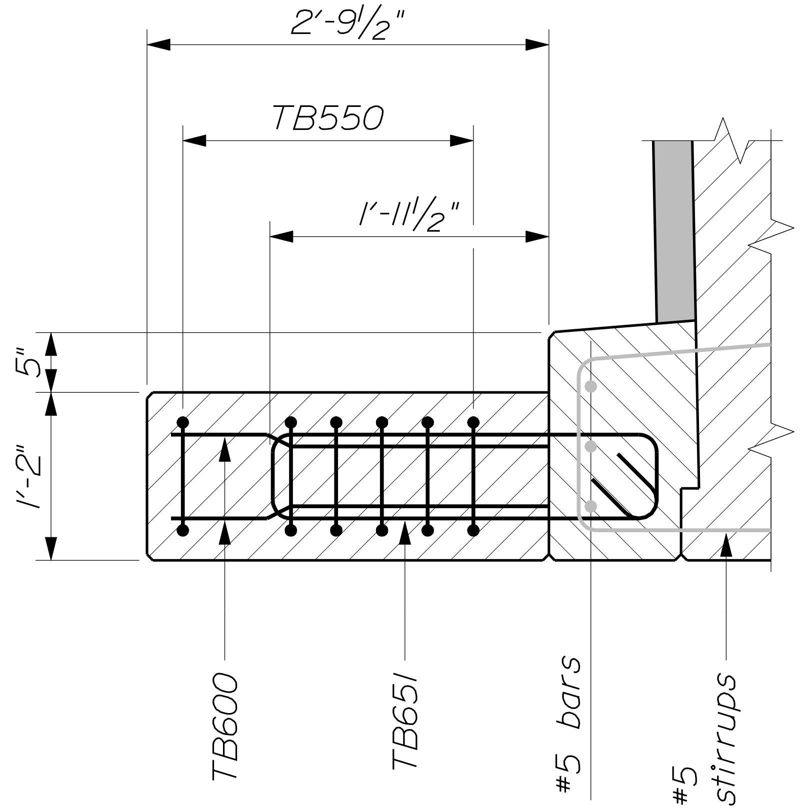


~ TRANSITION BARRIER ELEVATION ~
(3 - Bar Traffic / Bicycle Railing)

CONCRETE TRANSITION BARRIER
526(28)



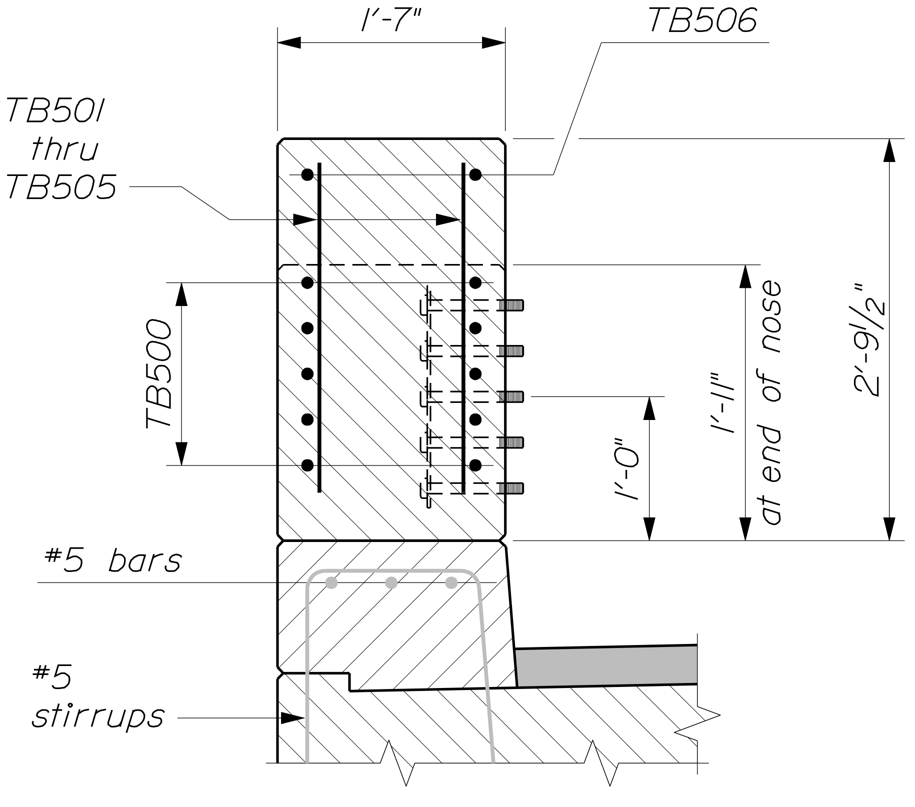
~ SECTION THRU STEM ~
(3 - Bar Traffic / Bicycle Railing)



~ SECTION THRU RECESS ~
(3 - Bar Traffic / Bicycle Railing)

CONCRETE TRANSITION BARRIER

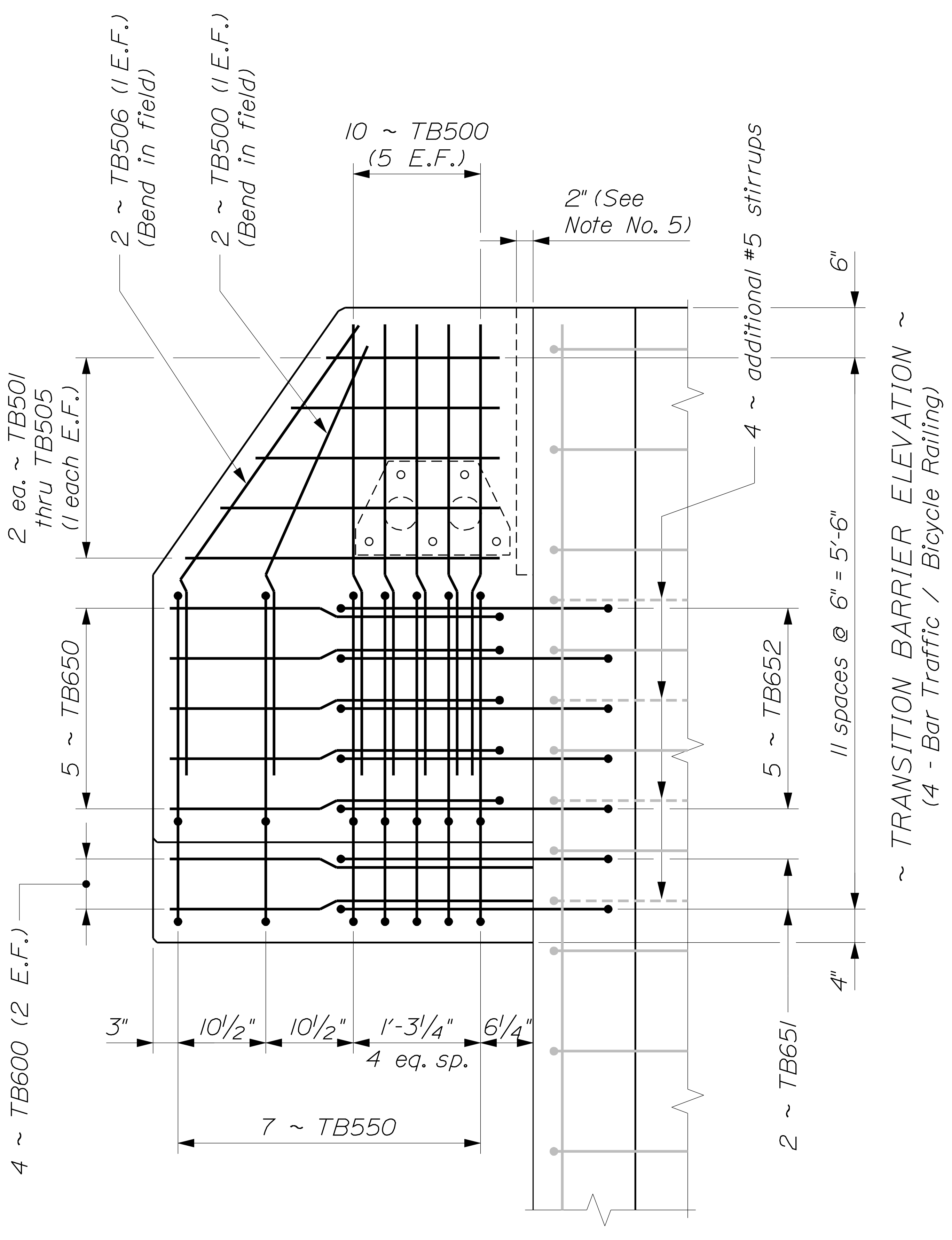
526(29)



~ SECTION THRU NOSE ~
(3 - Bar Traffic / Bicycle Railing)

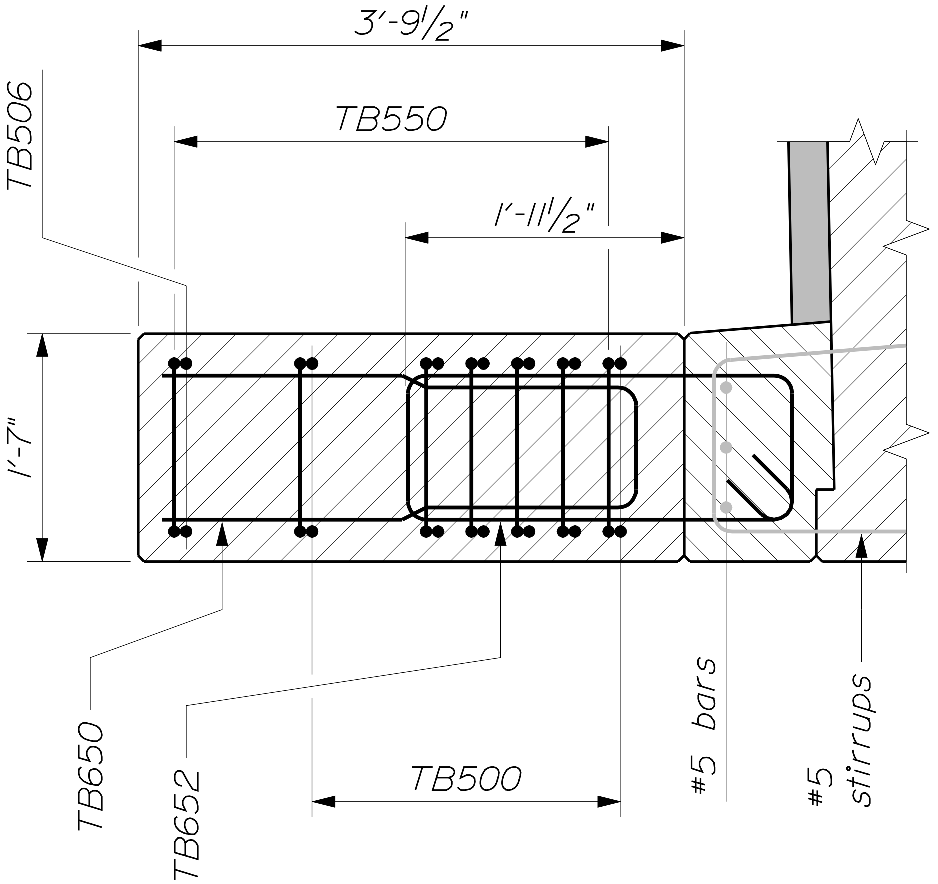
CONCRETE TRANSITION BARRIER

526(30)

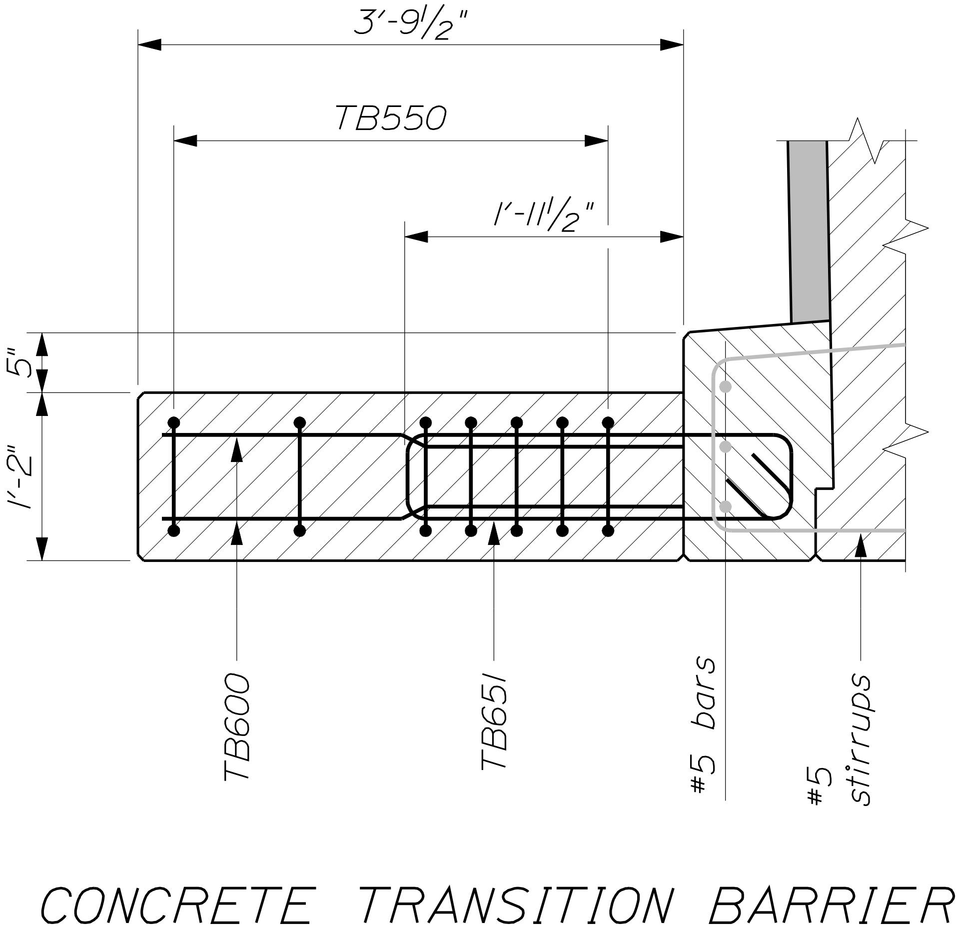


CONCRETE TRANSITION BARRIER

526(31)



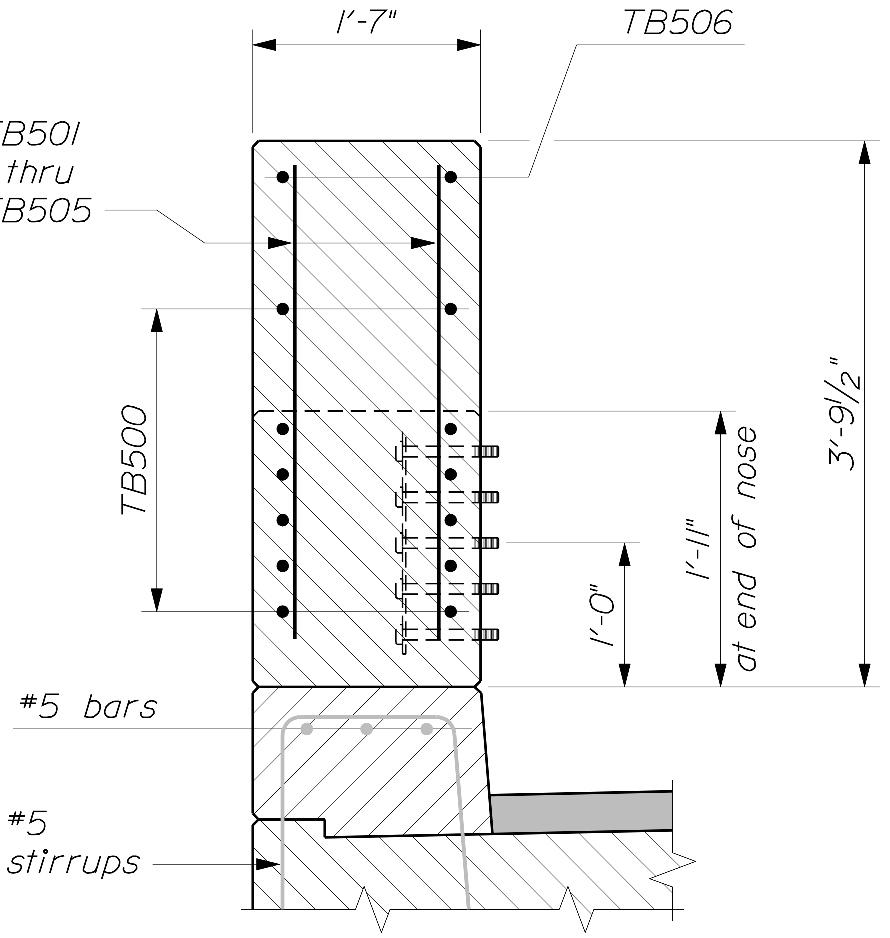
~ SECTION THRU STEM ~
(4 - Bar Traffic / Bicycle Railing)



~ SECTION THRU RECESS ~
(4 - Bar Traffic / Bicycle Railing)

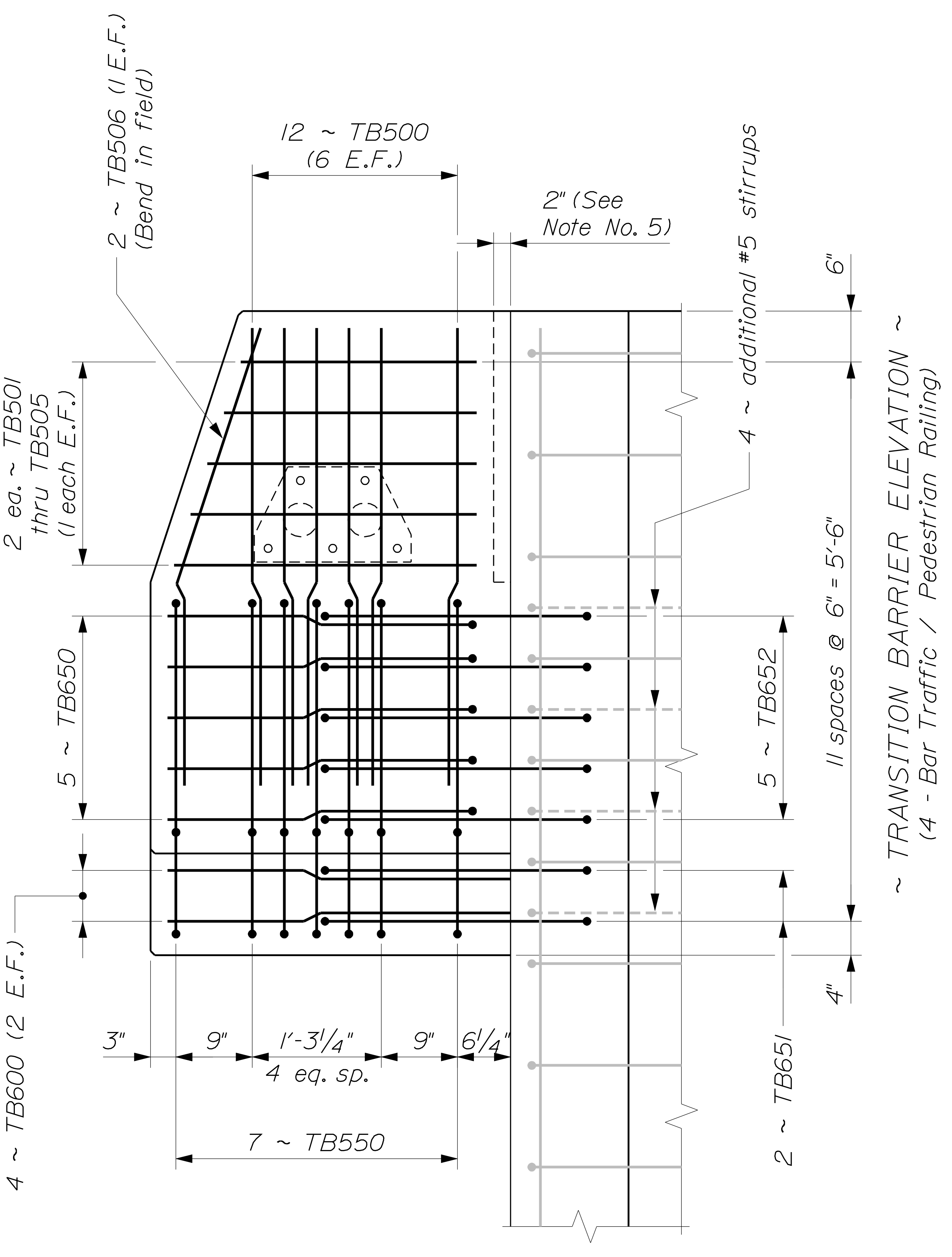
CONCRETE TRANSITION BARRIER

526(32)



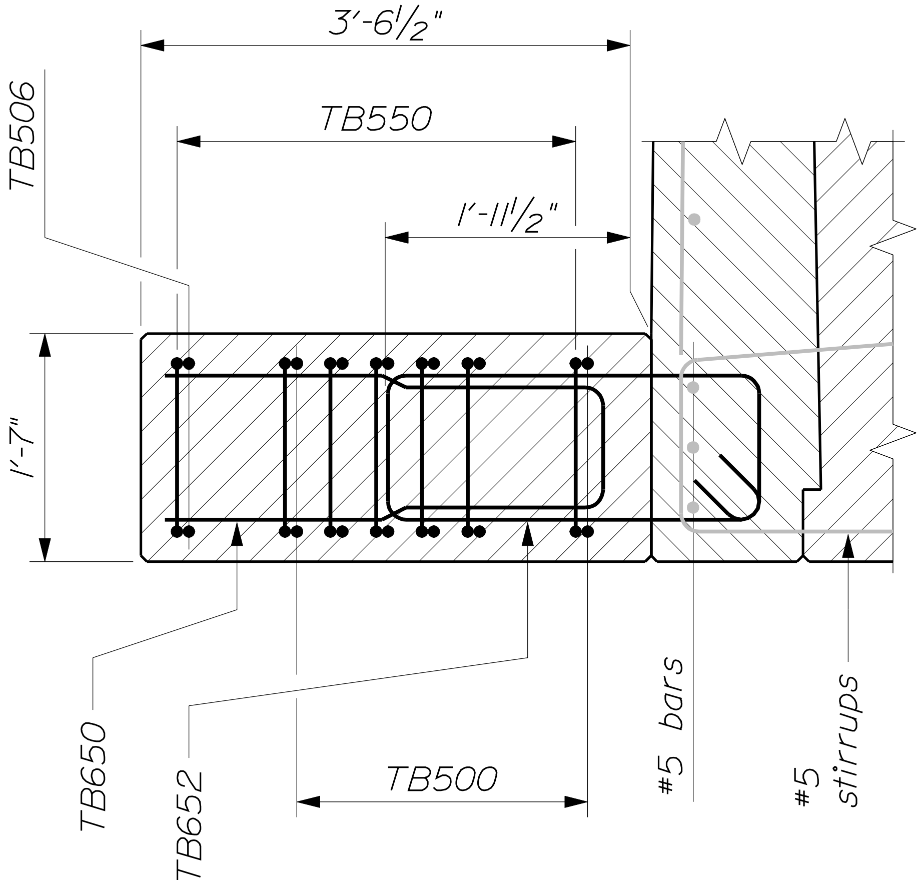
~ SECTION THRU NOSE ~
(4 - Bar Traffic / Bicycle Railing)

CONCRETE TRANSITION BARRIER
526(33)

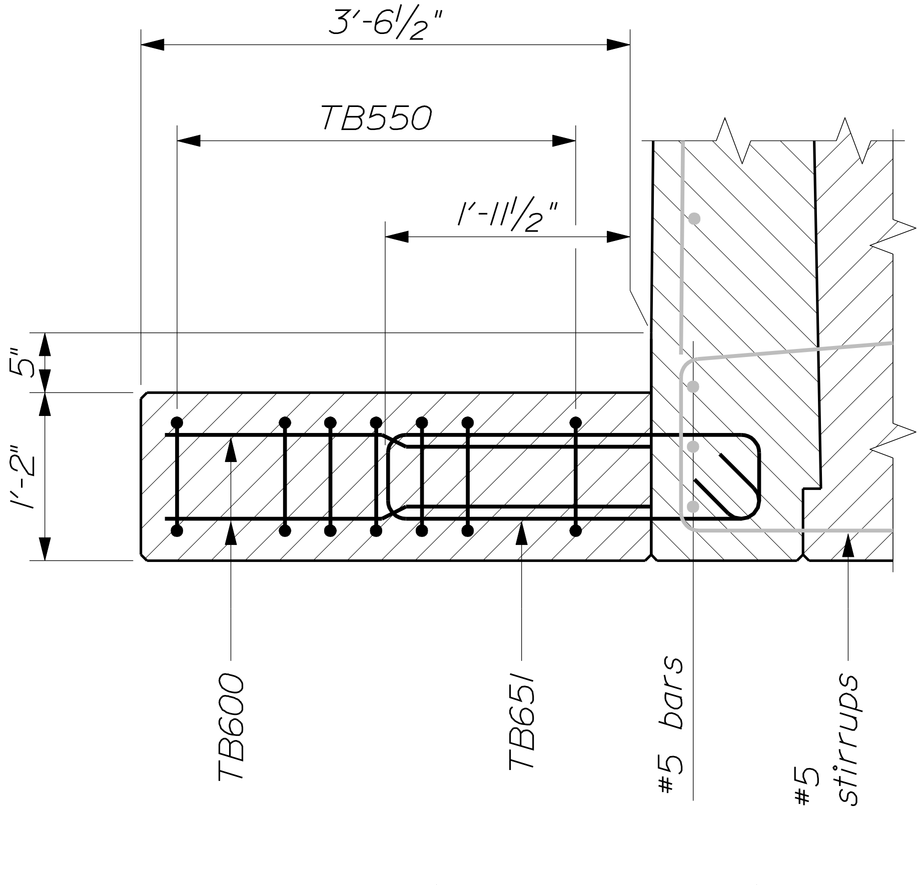


CONCRETE TRANSITION BARRIER

526(34)



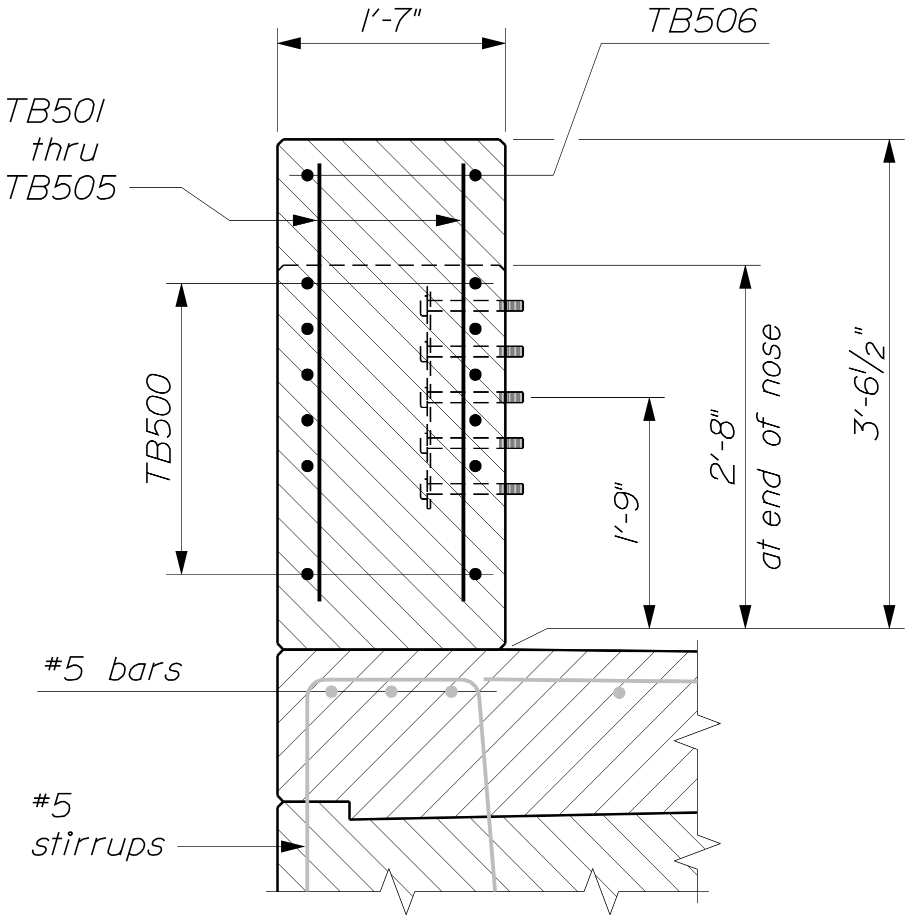
~ SECTION THRU STEM ~
(4 - Bar Traffic / Pedestrian Railing)



~ SECTION THRU RECESS ~
(4 - Bar Traffic / Pedestrian Railing)

CONCRETE TRANSITION BARRIER

526(35)



~ SECTION THRU NOSE ~

(4 - Bar Traffic / Pedestrian Railing)

CONCRETE TRANSITION BARRIER

526(36)

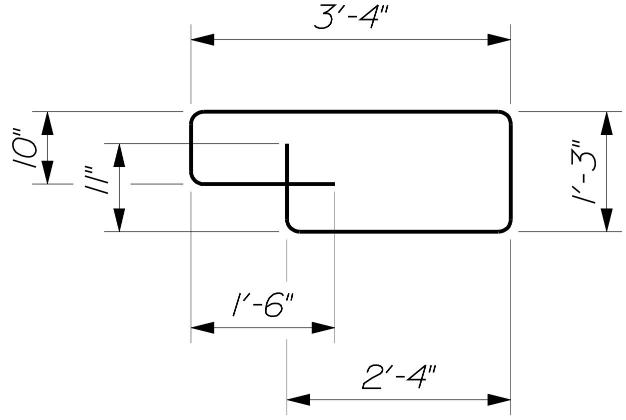
REINFORCING STEEL SCHEDULE

	2 - Bar Traffic		3 - Bar Bike		4 - Bar Bike		4 - Bar Ped.	
	Qty.	Length	Qty.	Length	Qty.	Length	Qty.	Length
TB500	10	4'-6"	10	4'-6"	12	4'-6"	12	4'-6"
TB501	2	1'-8"	2	2'-2"	2	3'-2"	2	2'-11"
TB502	2	1'-7"	2	2'-0"	2	2'-10"	2	2'-9"
TB503	2	1'-7"	2	1'-10"	2	2'-6"	2	2'-7"
TB504	2	1'-6"	2	1'-8"	2	2'-2"	2	2'-5"
TB505	2	1'-6"	2	1'-6"	2	1'-10"	2	2'-3"
TB506	--	--	2	4'-8"	2	5'-1"	2	4'-8"
TB550	5	10'-2"	6	10'-2"	7	10'-2"	7	10'-2"
TB600	--	--	4	2'-7"	4	3'-7"	4	3'-4"
TB650	--	--	5	5'-10"	5	7'-10"	5	7'-4"
TB651	2	7'-11"	2	7'-11"	2	7'-11"	2	7'-11"
TB652	5	8'-9"	5	8'-9"	5	8'-9"	5	8'-9"

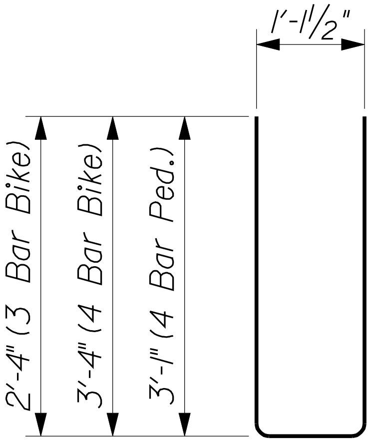
Notes:

The first digit following the letters of the mark indicate the size of the reinforcing bar. (TB500 = bar size #5.) All dimensions are out - to - out of bar.

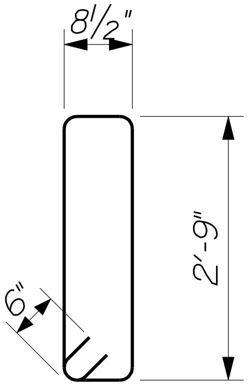
Quantities given are for one Transition Barrier.



~ TB550 ~



~ TB650 ~



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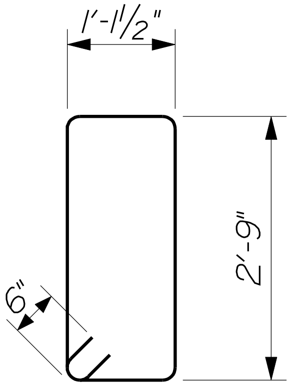


~ TB652 ~

CONCRETE TRANSITION BARRIER

526(37)

NOTES:

1. All work and materials shall conform to the provisions of Standard Specifications Section 526 - Concrete Barrier.

2. The Contractor is responsible for ensuring that vertical reinforcing bars TB651 and TB652 are installed prior to placement of the curb or sidewalk concrete. Payment for these bars will be considered incicdental to Item No. 526.34, Permanent Concrete Transition Barrier.

3. Reinforcing steel shall have a minimum concrete cover of 2 inches.

4. Quantities of reinforcing bars shown are for one transition barrier only.

5. When the Concrete Transition Barrier is cantilevered over an expansion joint, the nose shall be blocked out as shown.

6. Payment for guardrail anchorage will be considered incidental to the transition barrier pay item. Class 8.8.3 bolts shall be used when corrosion - resistant steel guardrail is specified on the approach roadway

7. Precast Concrete Transition Curb shall meet the requirements of Standard Specifications Section 609 - Curb. The bridge end of the curb shall be saw cut in the field to fit flush against the backwall, as dictated by the bridge skew angle and the profile grade. Where curbing is specified on the adjacent highway, the transition shall be modified accordingly. Payment for transition curb will be considered incidental to the Concrete Transition Barrier pay item.

8. Concrete Transition Barrier is designed for attachment of Bridge Transition Type "1" unless otherwise indicated on the Design Drawings. Refer to Section 606 for details.

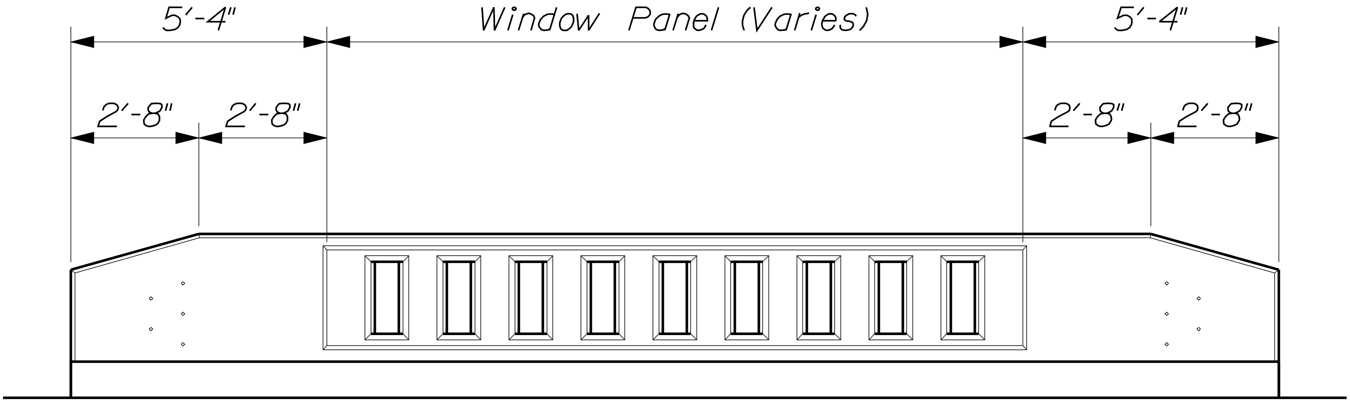
9. After installation of the guardrail is complete, upset the threads on the anchor bolts in three (3) places around each bolt, at the junction of the nut and the exposed thread, with a center punch or similar tool.

10. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

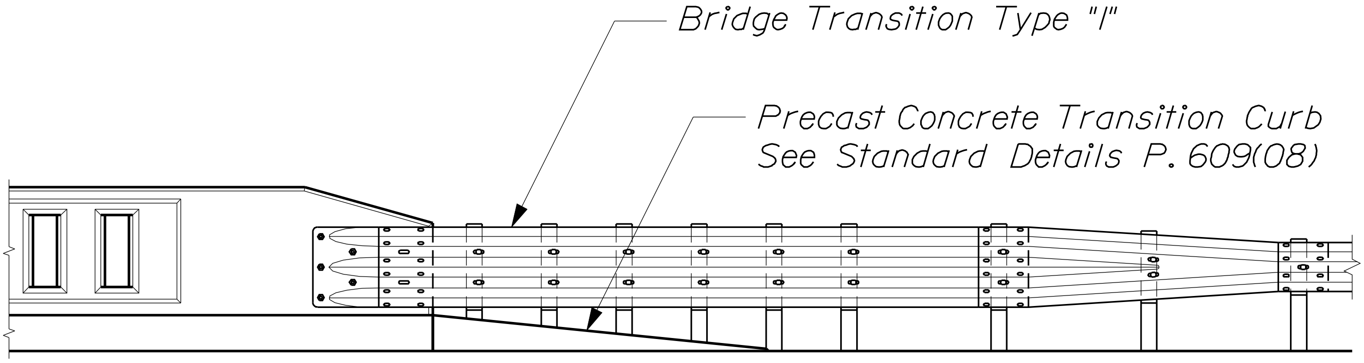
MATERIALS:

Concrete	Class "LP"
Reinforcing Steel	AASHTO M 31M/M 31, Grade 60
Spacer Plate	AASHTO M 270M/M 270, Grade 36 (Galvanized)
Bolts	AASHTO M 314, Grade 105 (Galvanized)

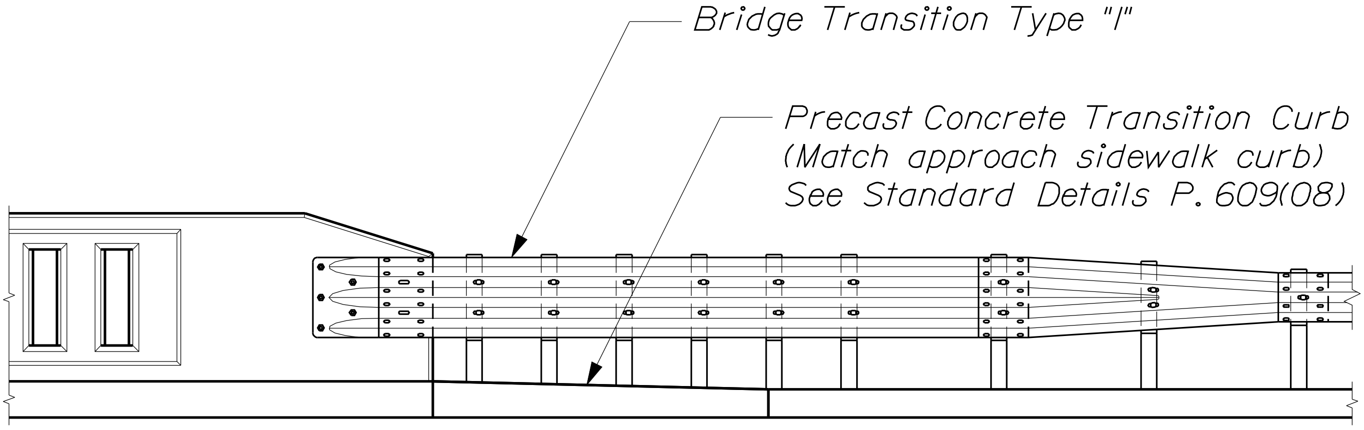
CONCRETE TRANSITION BARRIER



~ RAIL ELEVATION ~
(Traffic Rail shown; Sidewalk Rail similar)



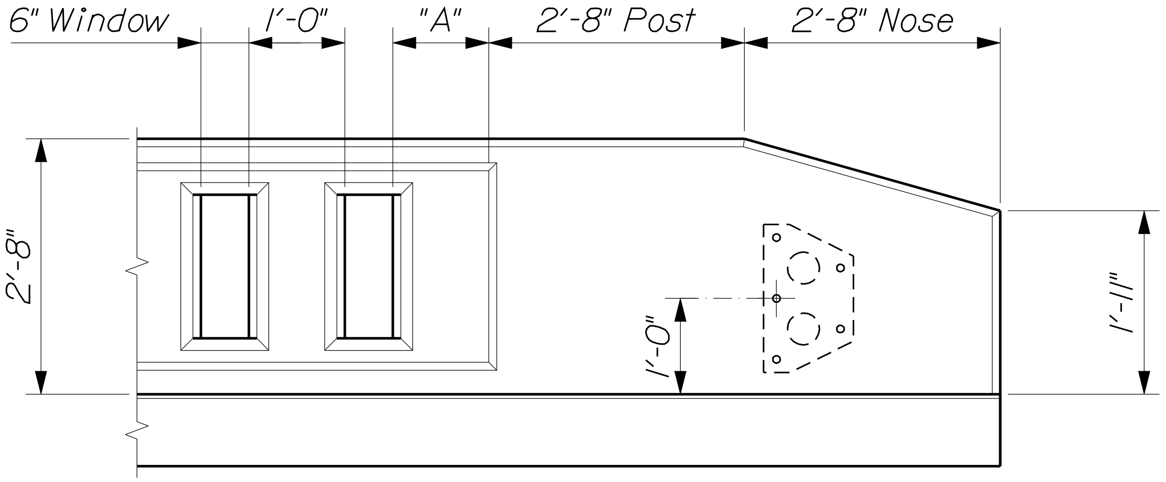
~ GUARDRAIL CONNECTION ~
(Traffic Rail)



~ GUARDRAIL CONNECTION ~
(Sidewalk Rail)

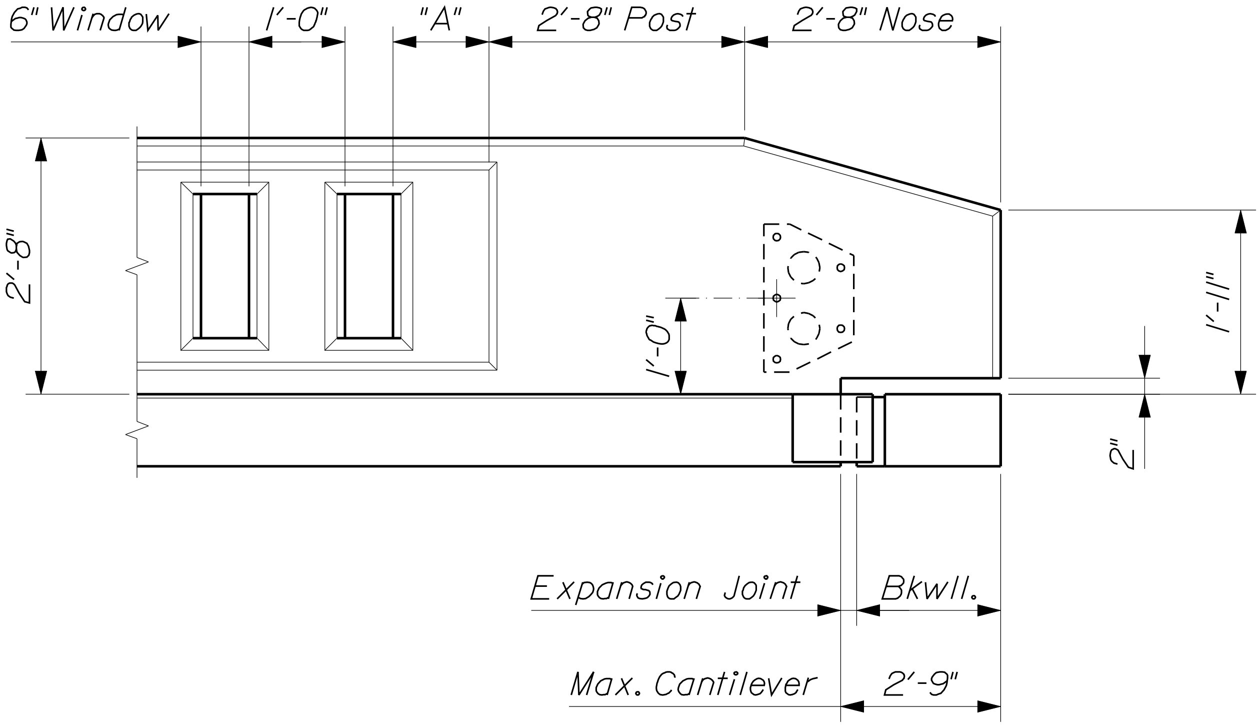
TEXAS CLASSIC RAIL

526(39)



~ TRAFFIC RAIL END ELEVATION ~
(Non - cantilevered)

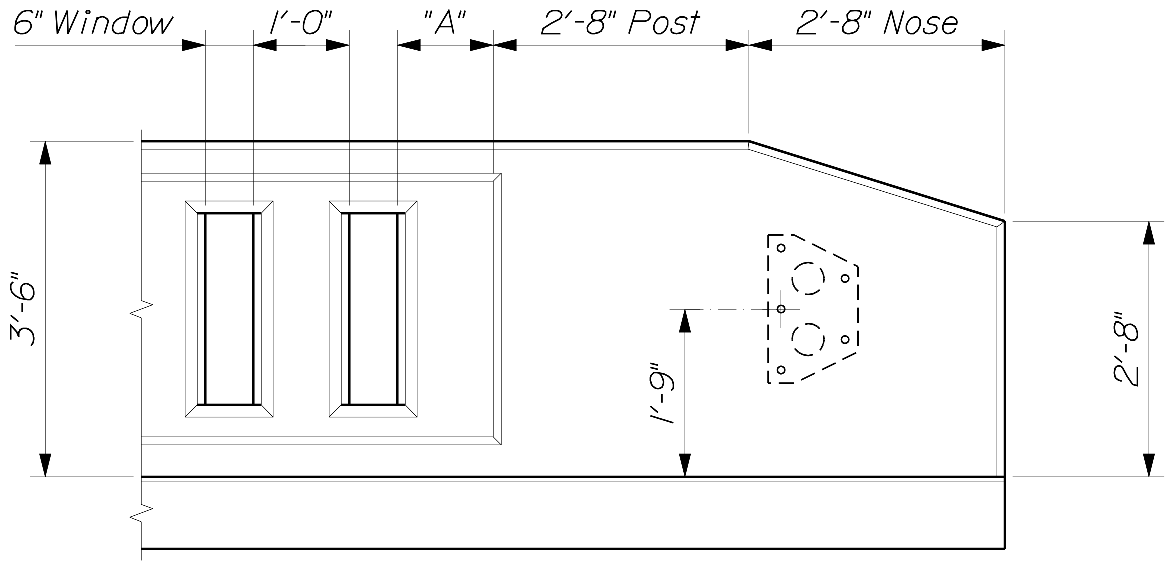
Dim. "A" = 6" min., 15" max.



~ TRAFFIC RAIL END ELEVATION ~
(Cantilevered)

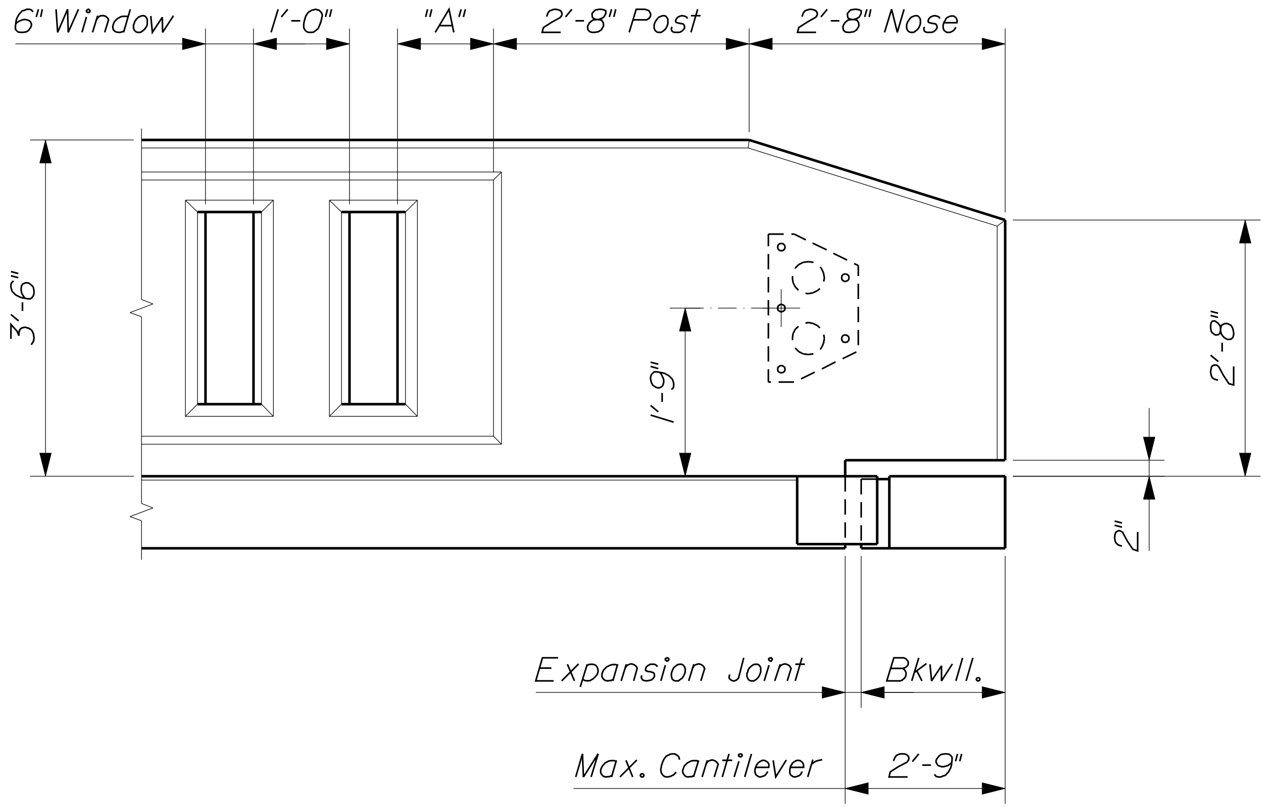
TEXAS CLASSIC RAIL

526(40)



~ SIDEWALK RAIL END ELEVATION ~
(Non - cantilevered)

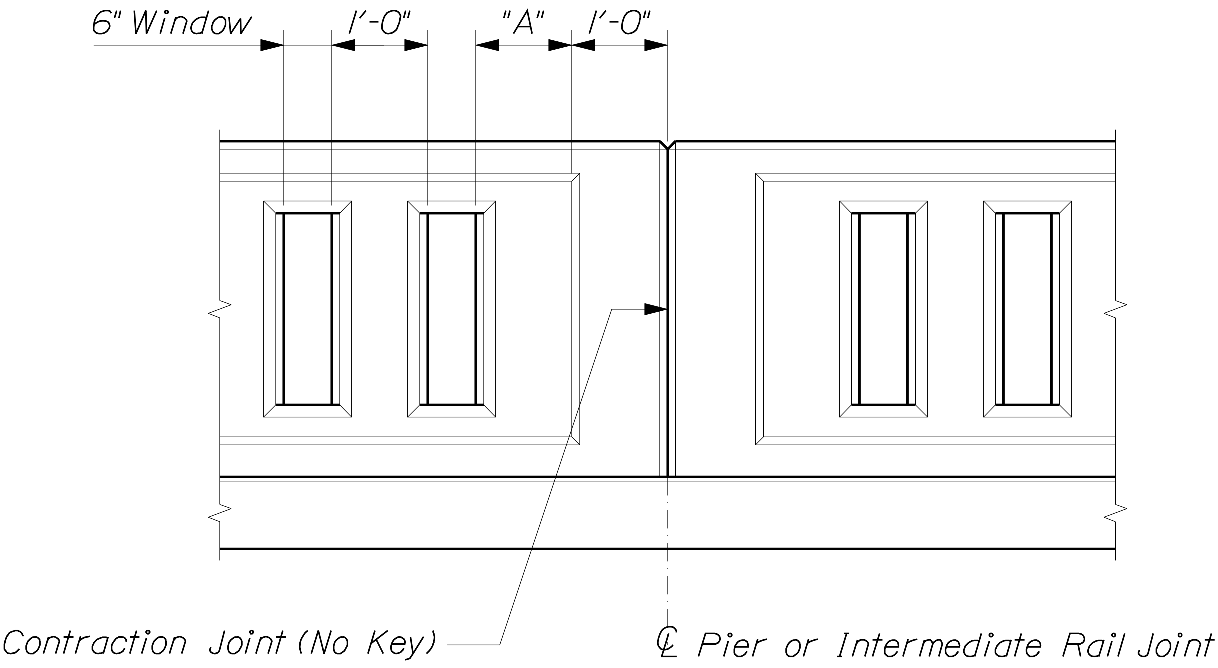
Dim. "A" = 6" min., 15" max.



~ SIDEWALK RAIL END ELEVATION ~
(Cantilevered)

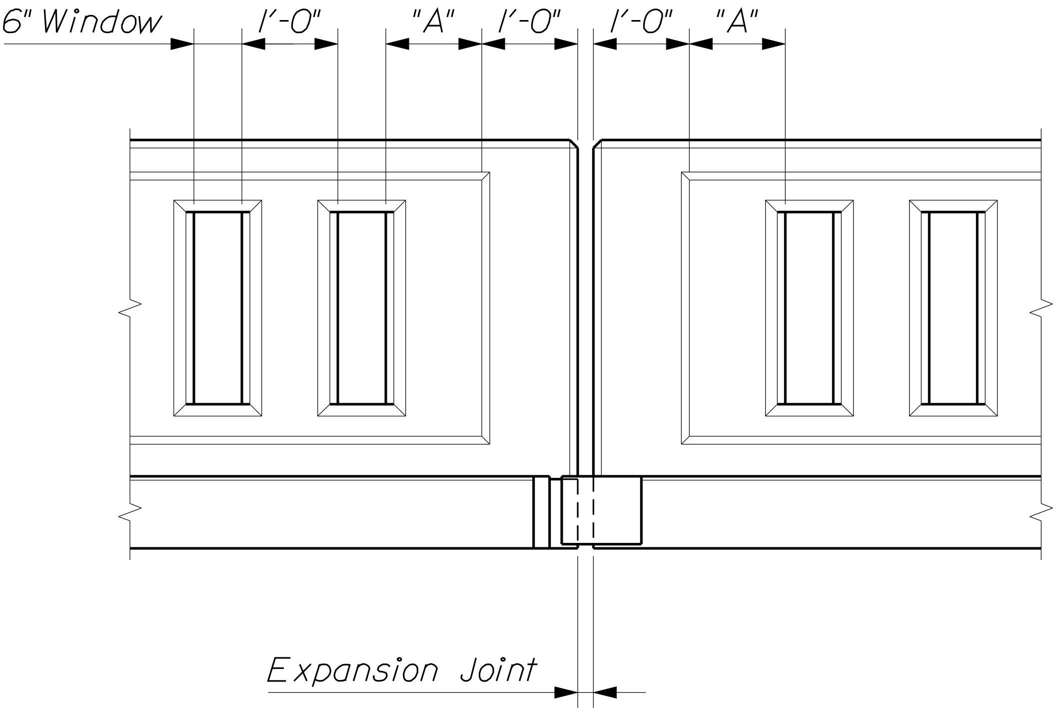
TEXAS CLASSIC RAIL

526(41)



~ CONTRACTION JOINT ELEVATION ~
(Sidewalk Rail shown)

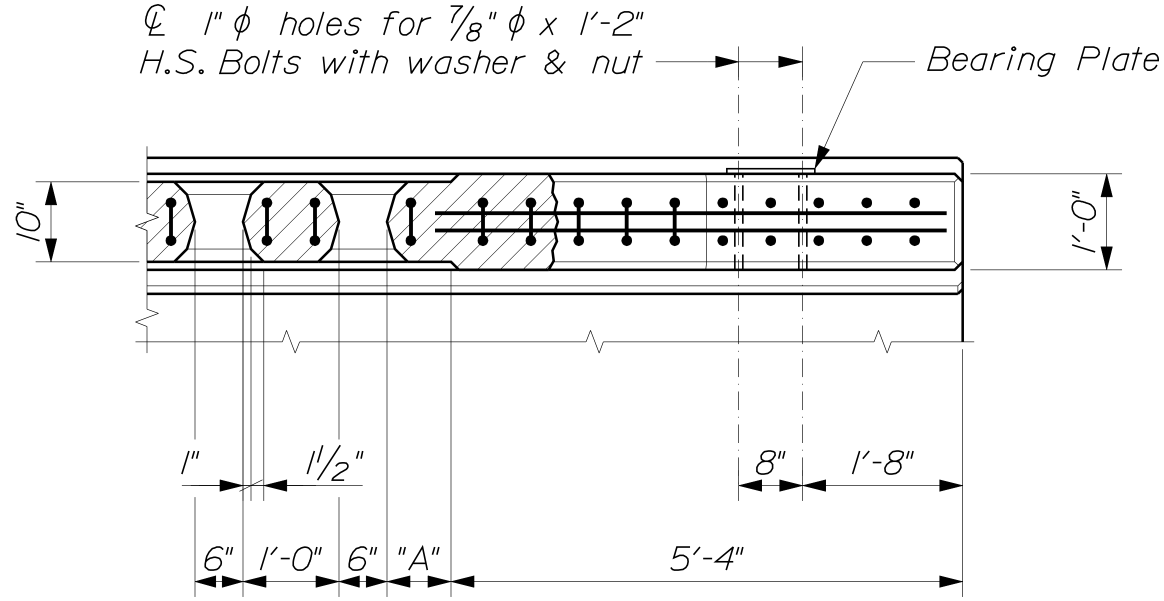
Dim. "A" = 6" min., 15" max.



~ EXPANSION JOINT ELEVATION ~
(Sidewalk Rail shown)

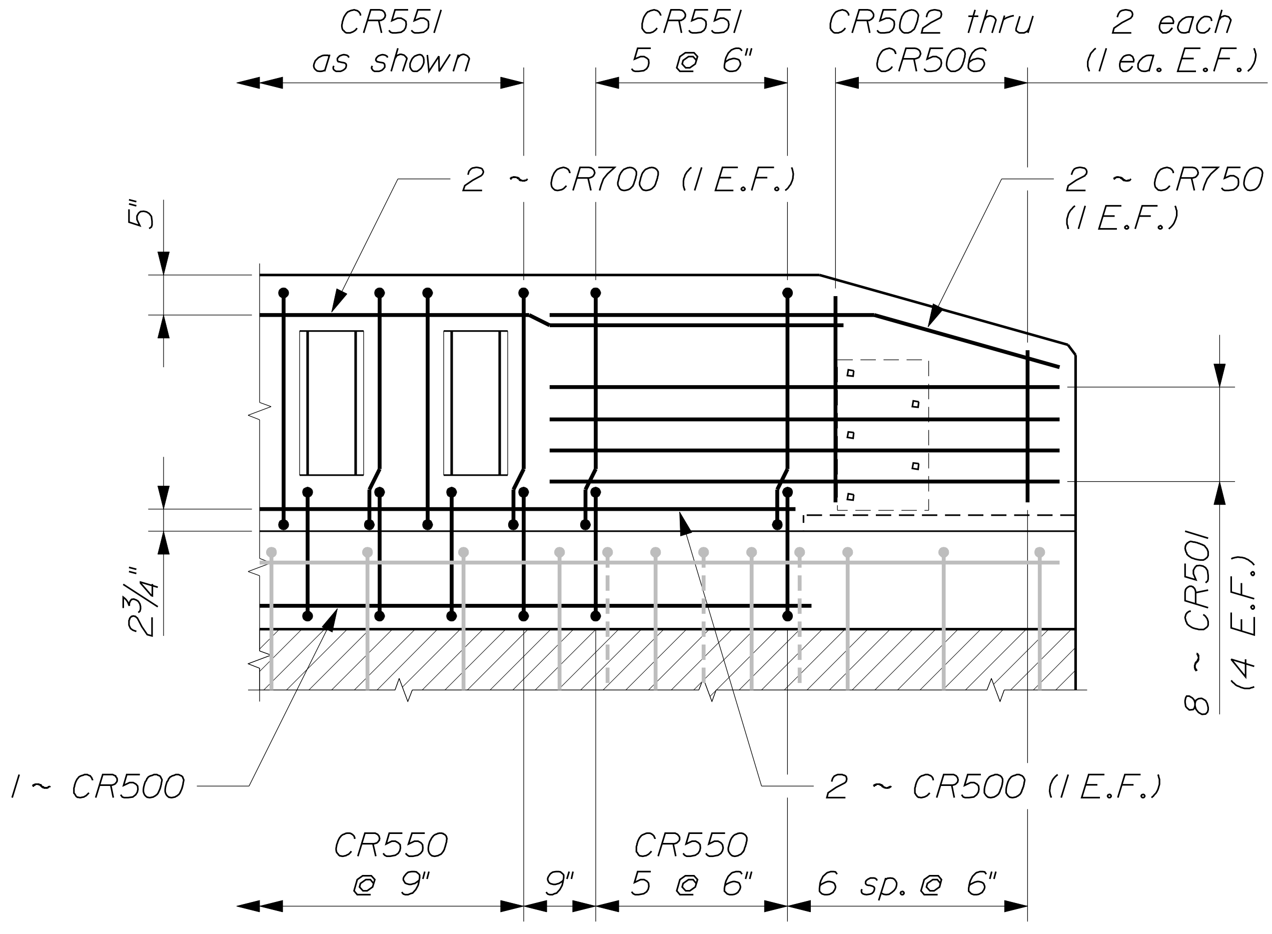
TEXAS CLASSIC RAIL

526(42)



~ TRAFFIC RAIL PLAN ~

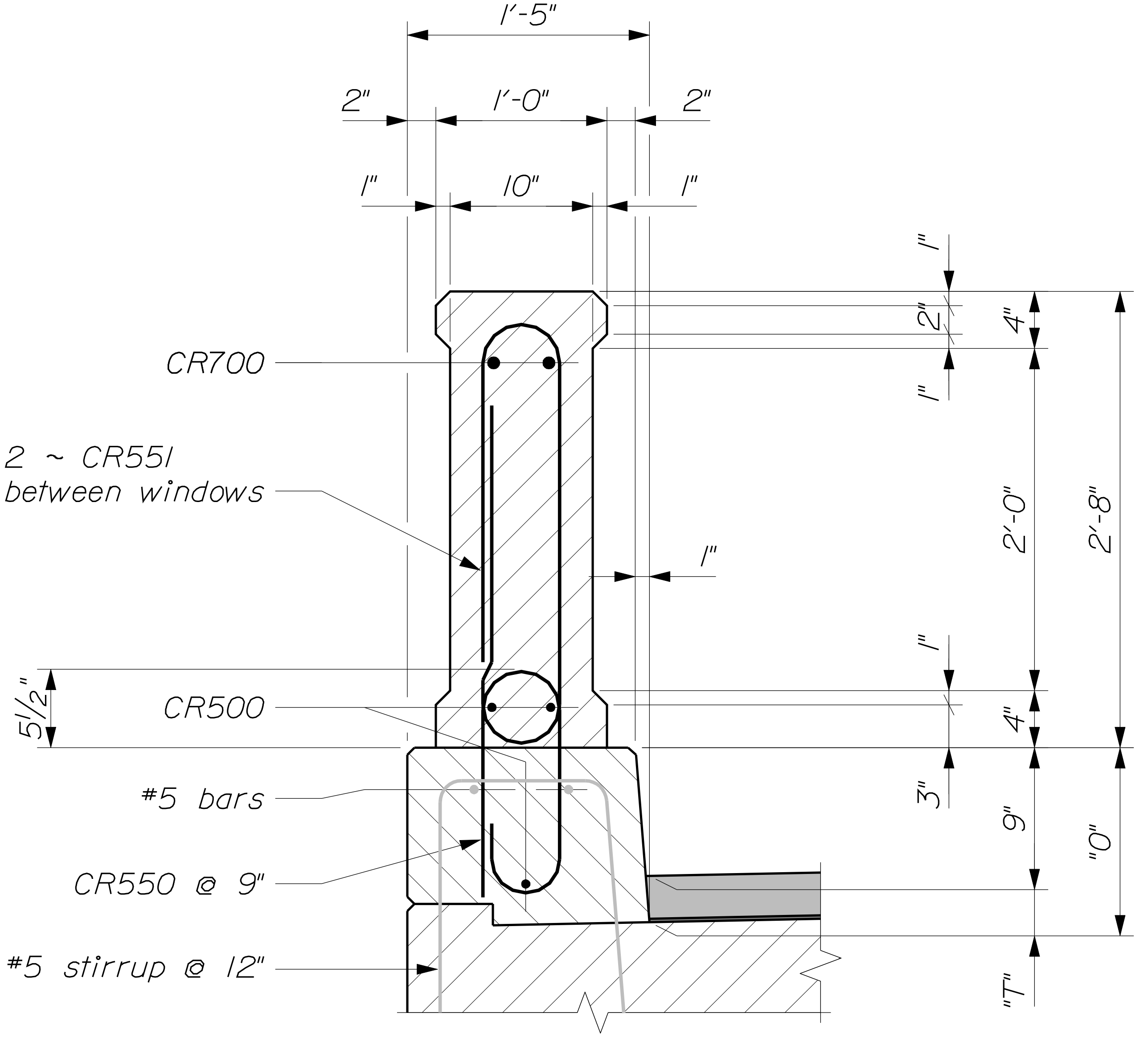
E.F. = Each Face



~ TRAFFIC RAIL ELEVATION ~

TEXAS CLASSIC RAIL

526(43)



~ SECTION BETWEEN WINDOWS ~

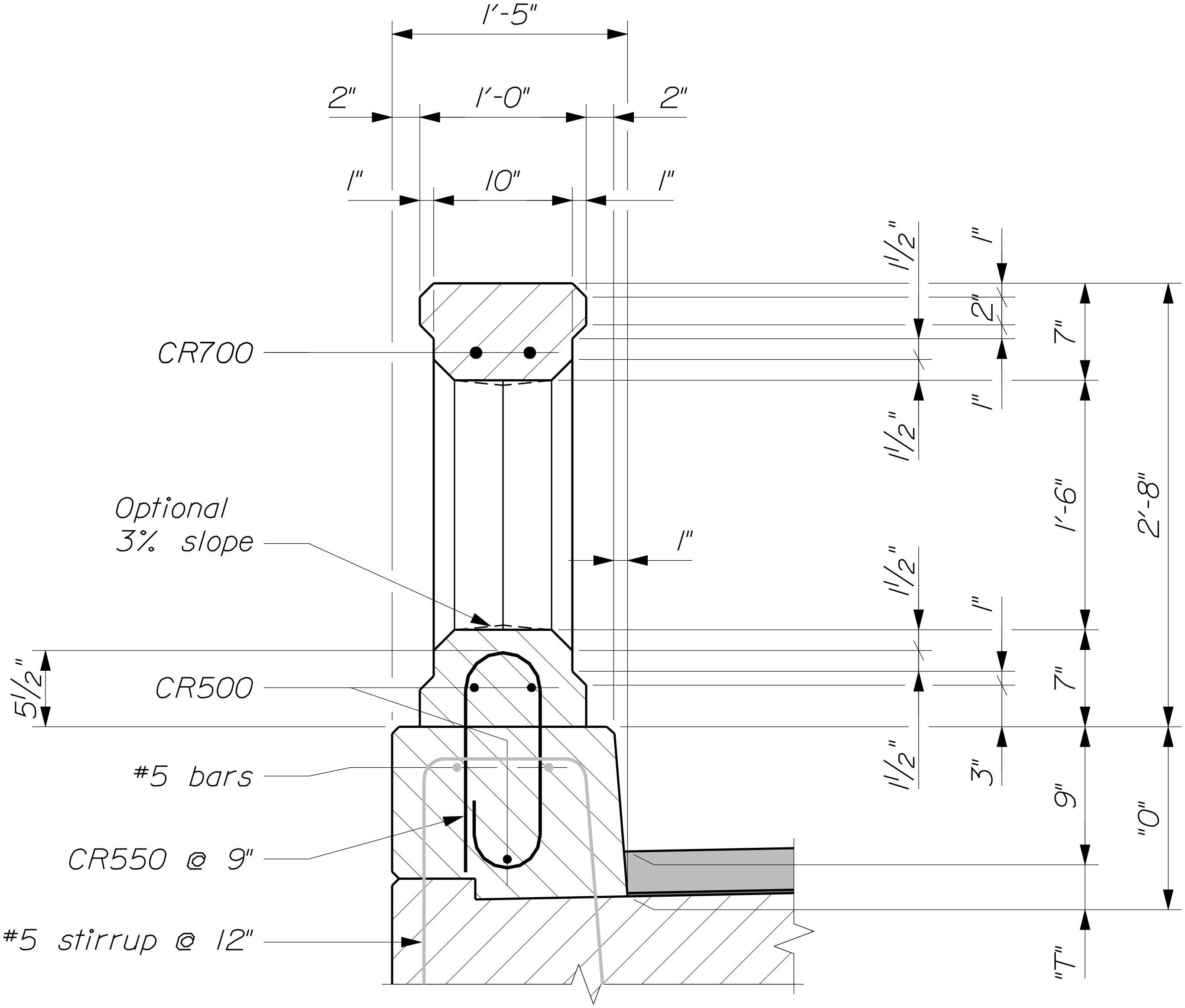
(Traffic Rail)

For Wearing Surface ("T") details, refer to Section 502 - Concrete Curb

TABLE OF DIMENSIONS ⚠1		
Wearing Surface Type	"T"	"O"
Bituminous	3¼"	1'-0¼"
Unreinforced Concrete	2"	11"
Integral	0"	9"

TEXAS CLASSIC RAIL

526(44)



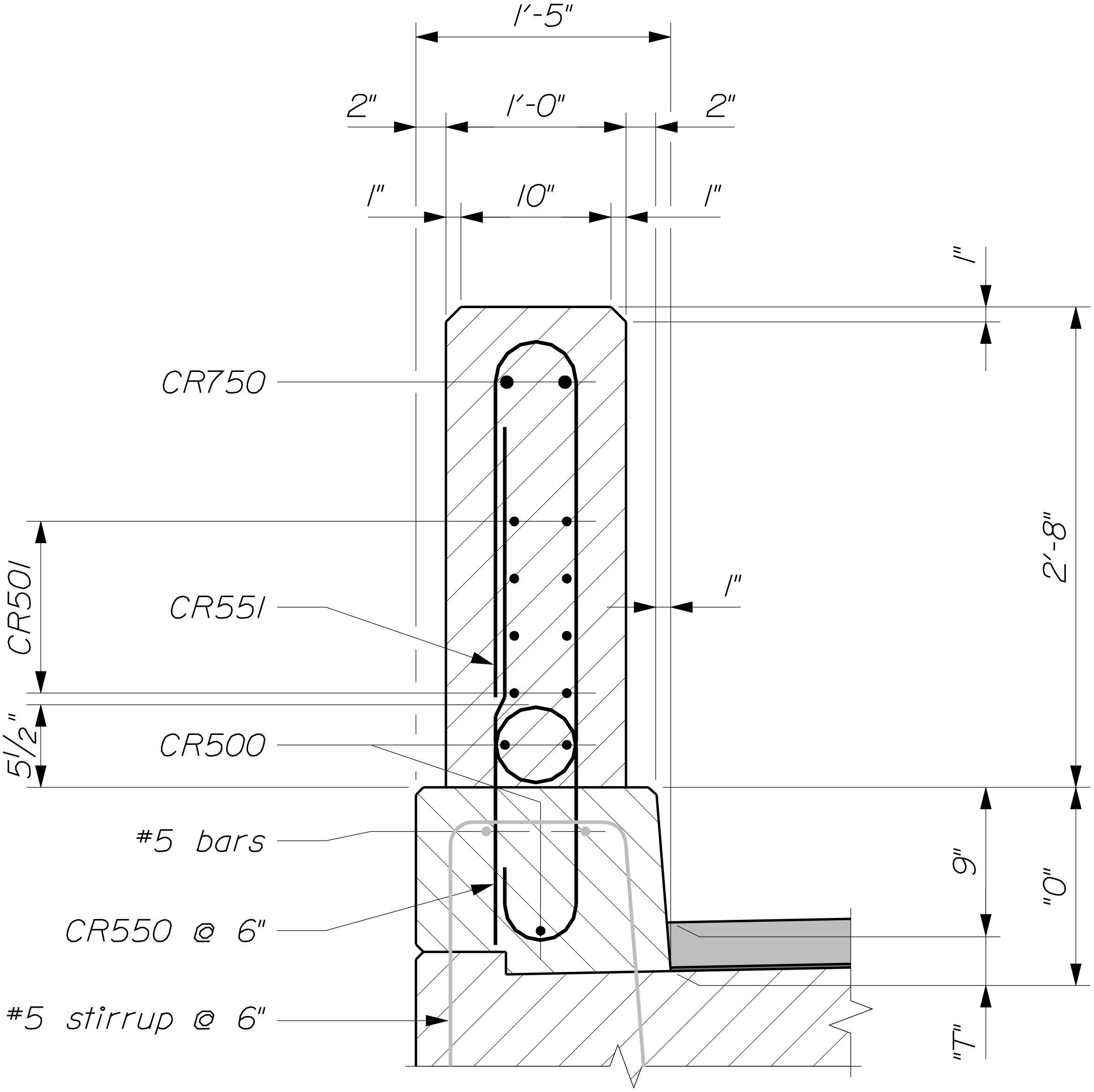
~ SECTION THROUGH WINDOW ~

(Traffic Rail)

For Wearing Surface ("T") details, refer to Section 502 - Concrete Curb

TEXAS CLASSIC RAIL

526(45)



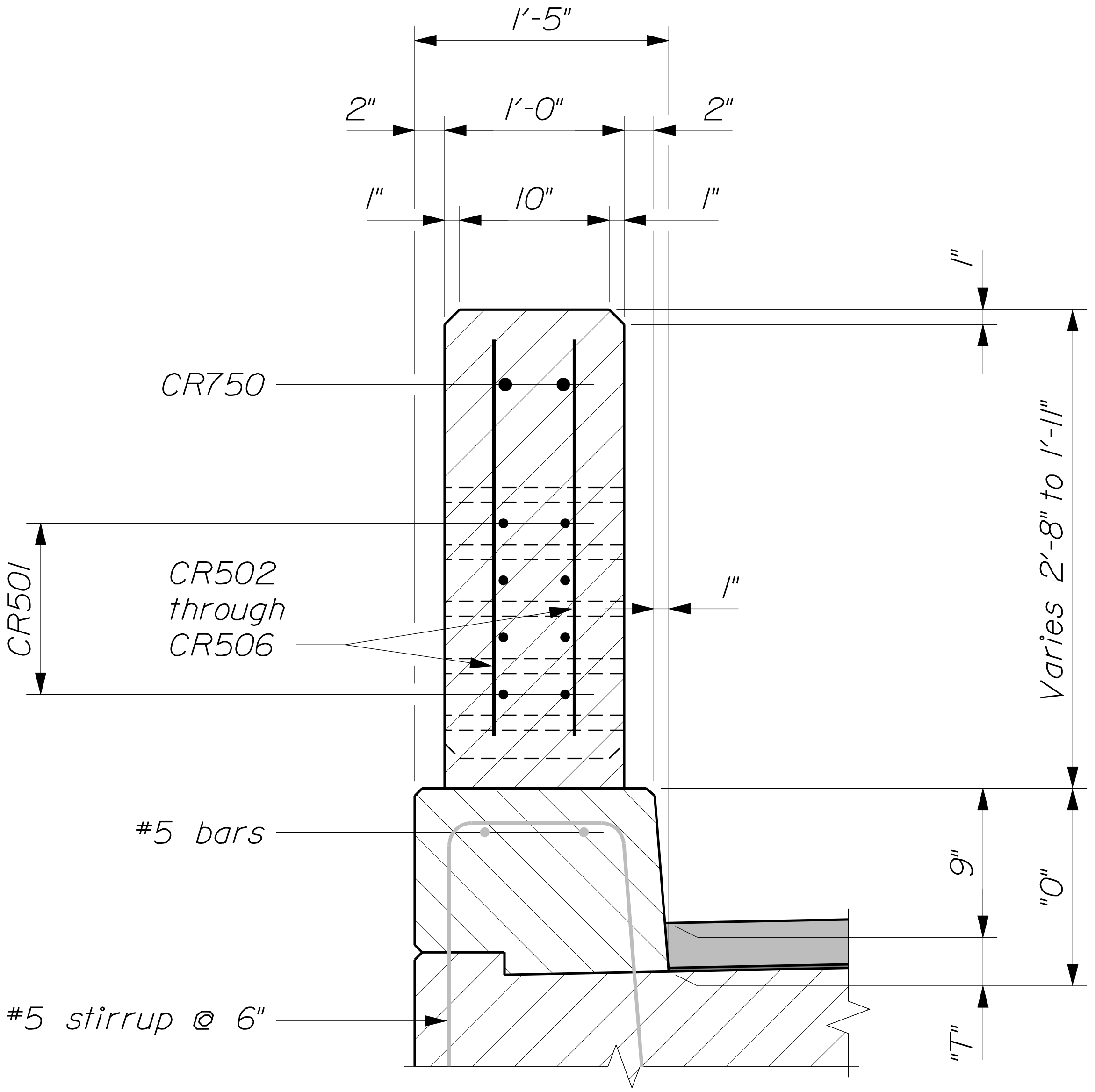
~ SECTION THROUGH POST ~

(Traffic Rail)

For Wearing Surface ("T") details, refer to Section 502 - Concrete Curb

TEXAS CLASSIC RAIL

526(46)



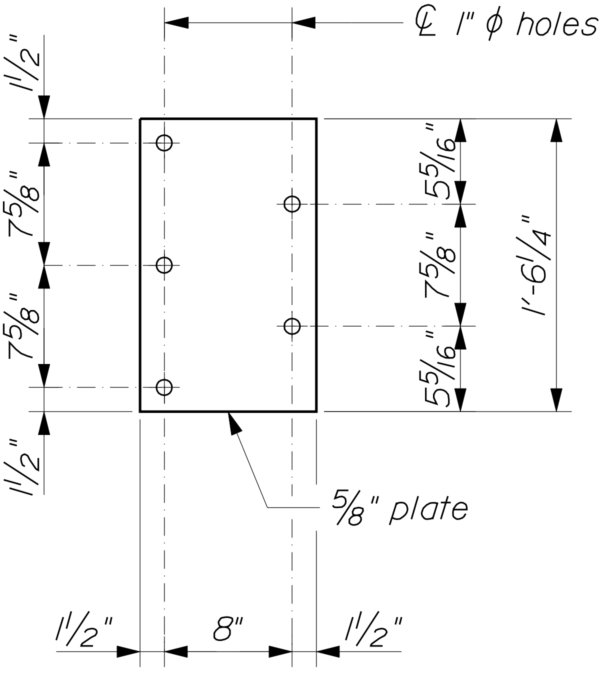
~ SECTION THROUGH NOSE ~

(Traffic Rail)

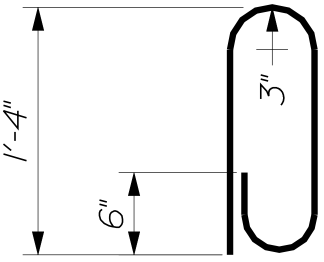
For Wearing Surface ("T") details, refer to Section 502 - Concrete Curb

TEXAS CLASSIC RAIL

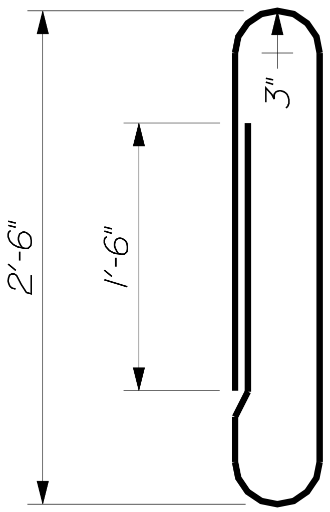
526(47)



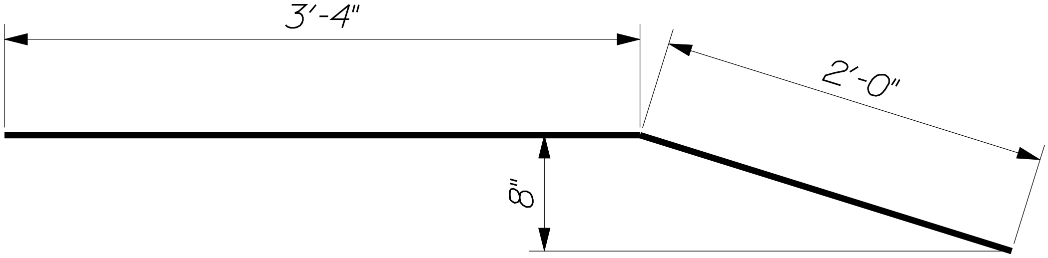
~ BEARING PLATE ~



~ CR550 ~



~ CR551 ~

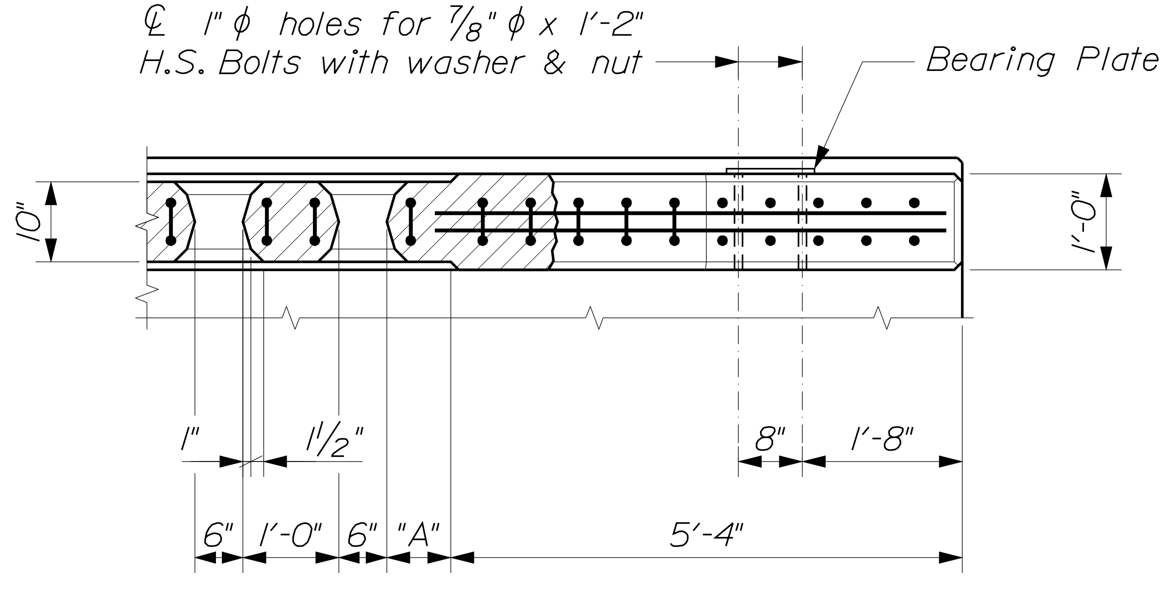


~ CR750 ~

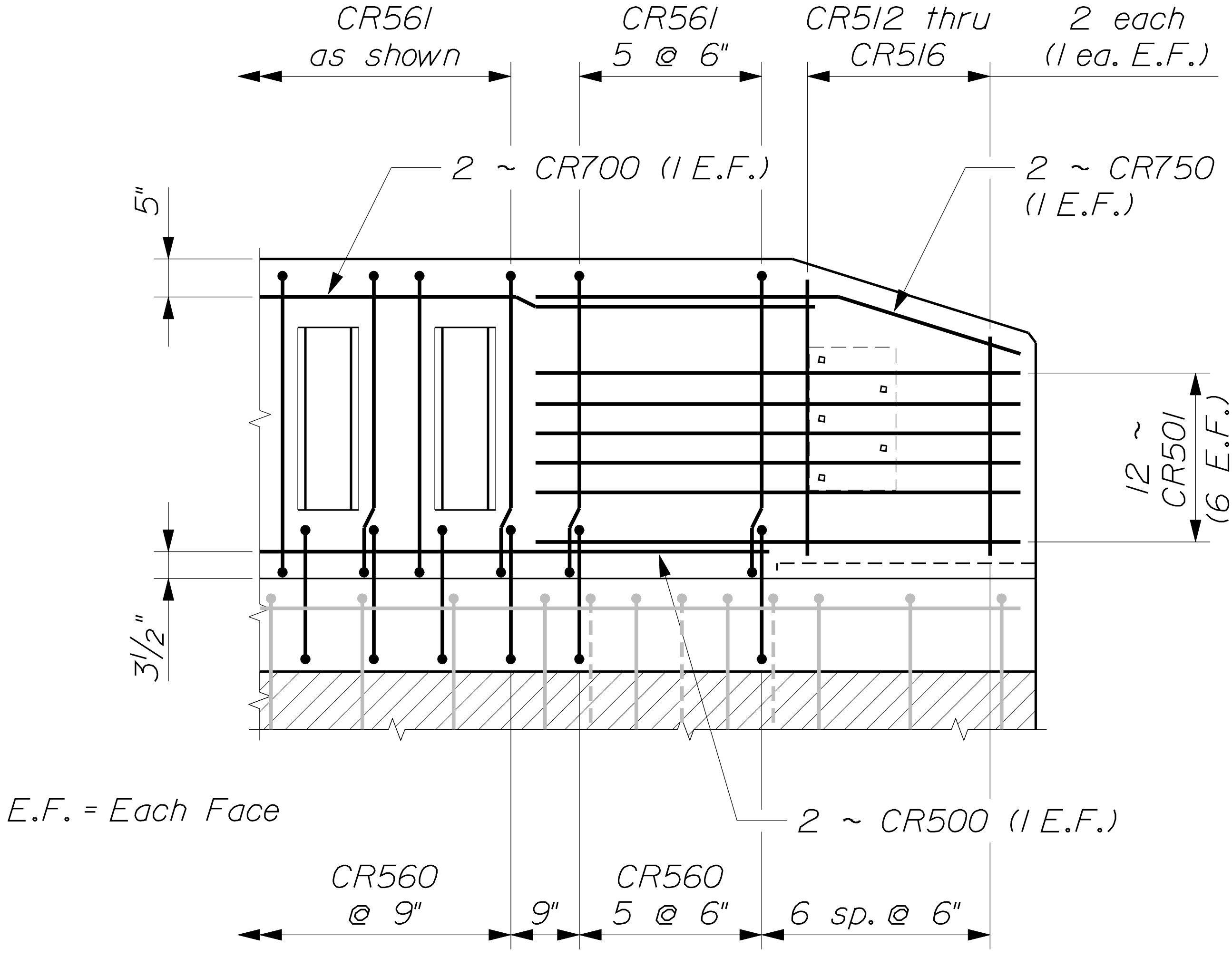
TRAFFIC RAIL REINFORCING STEEL SCHEDULE					
Horizontal			Vertical		
Mark	Length	Location	Mark	Length	Location
CR500	30' max.	Rail Bot. & Curb	CR502	2'-2"	Nose
CR501	5'-3"	Nose/Post	CR503	2'-0"	Nose
			CR504	1'-10"	Nose
CR700	30' max.	Rail Top	CR505	1'-8"	Nose
CR750	5'-4"	Nose	CR506	1'-6"	Nose
			CR550	3'-9"	Rail & Post
			CR551	7'-1"	Rail & Post

TEXAS CLASSIC RAIL

526(48)



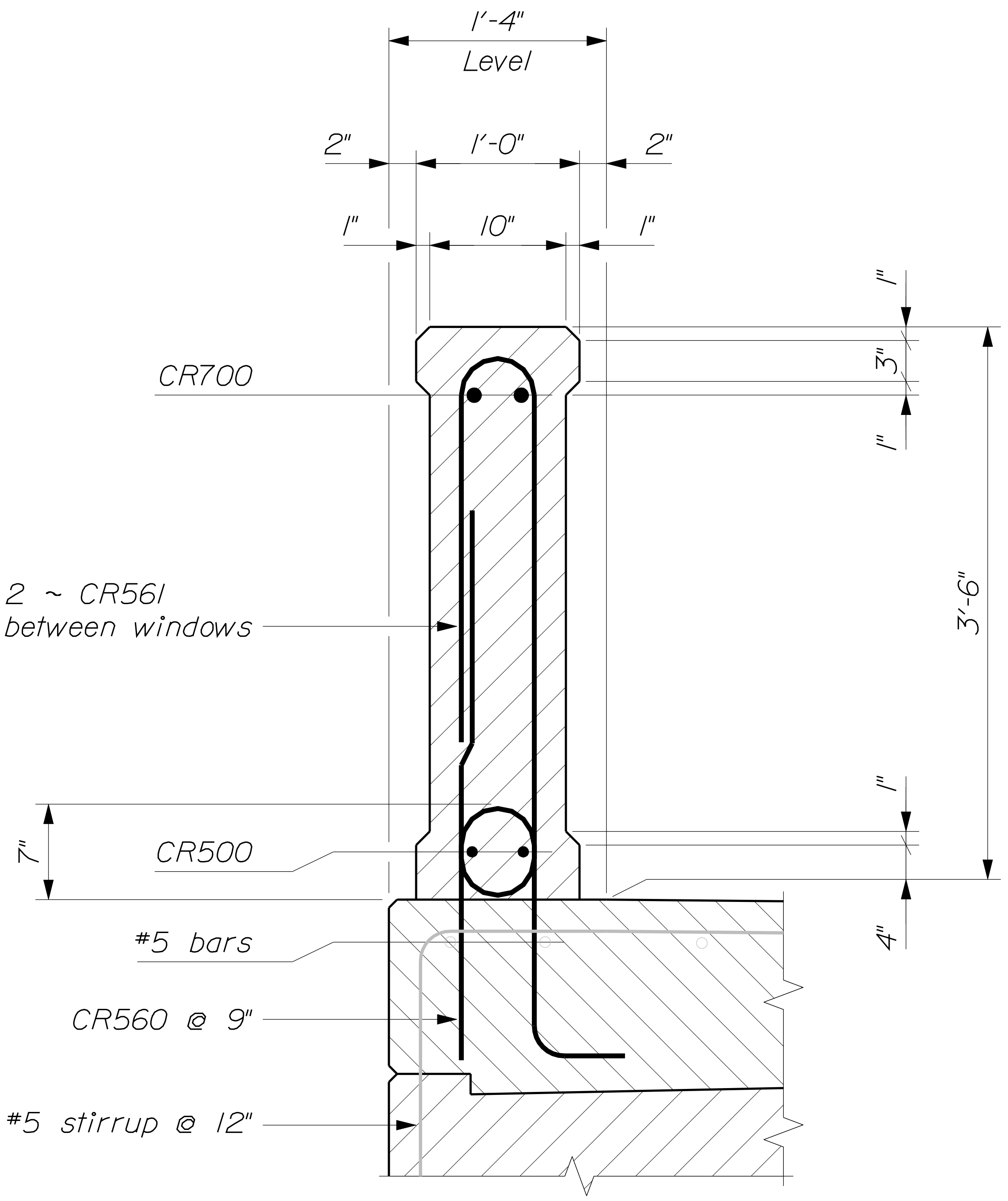
~ SIDEWALK RAIL PLAN ~



~ SIDEWALK RAIL ELEVATION ~

TEXAS CLASSIC RAIL

526(49)

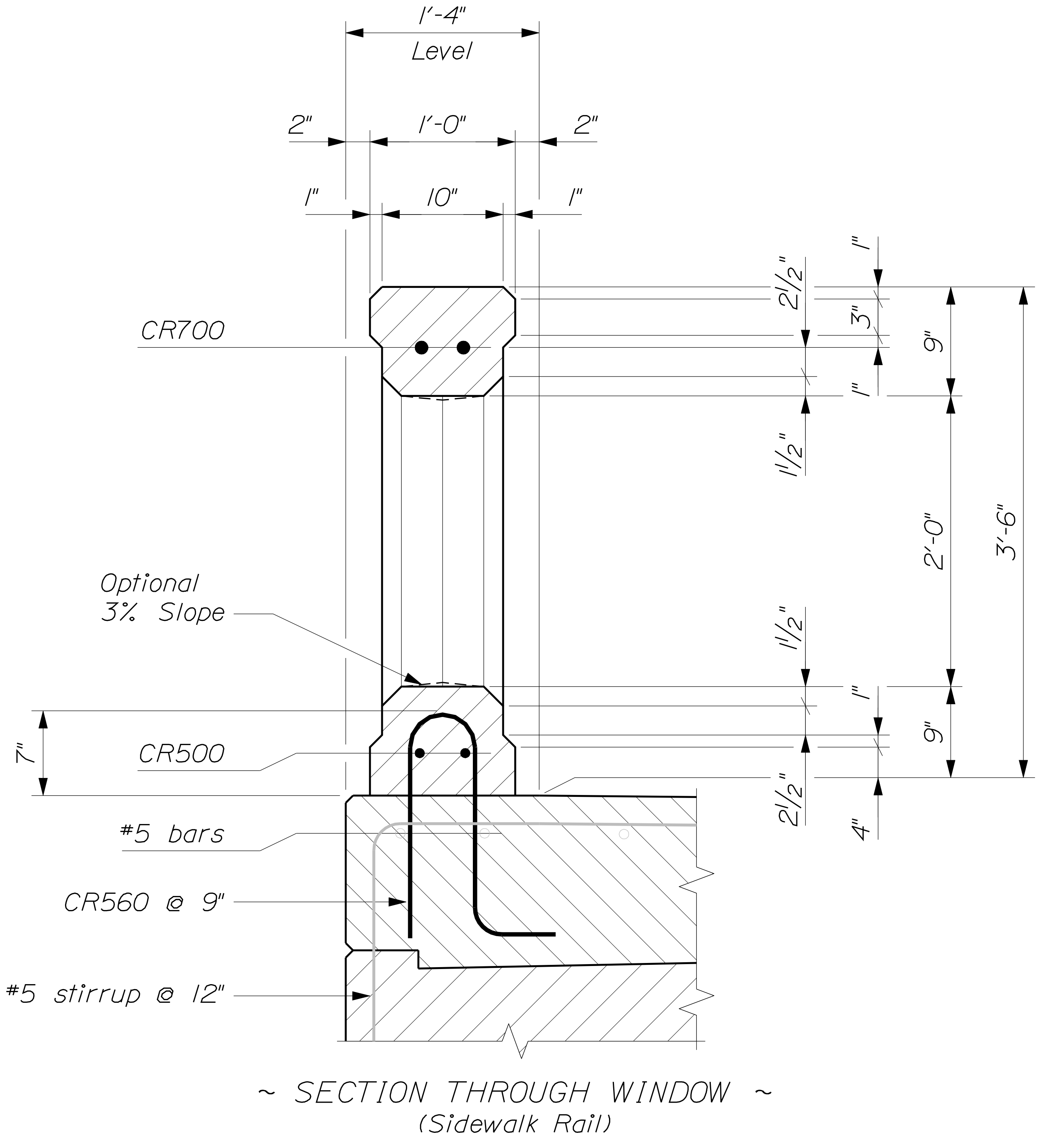


~ SECTION BETWEEN WINDOWS ~

(Sidewalk Rail)

TEXAS CLASSIC RAIL

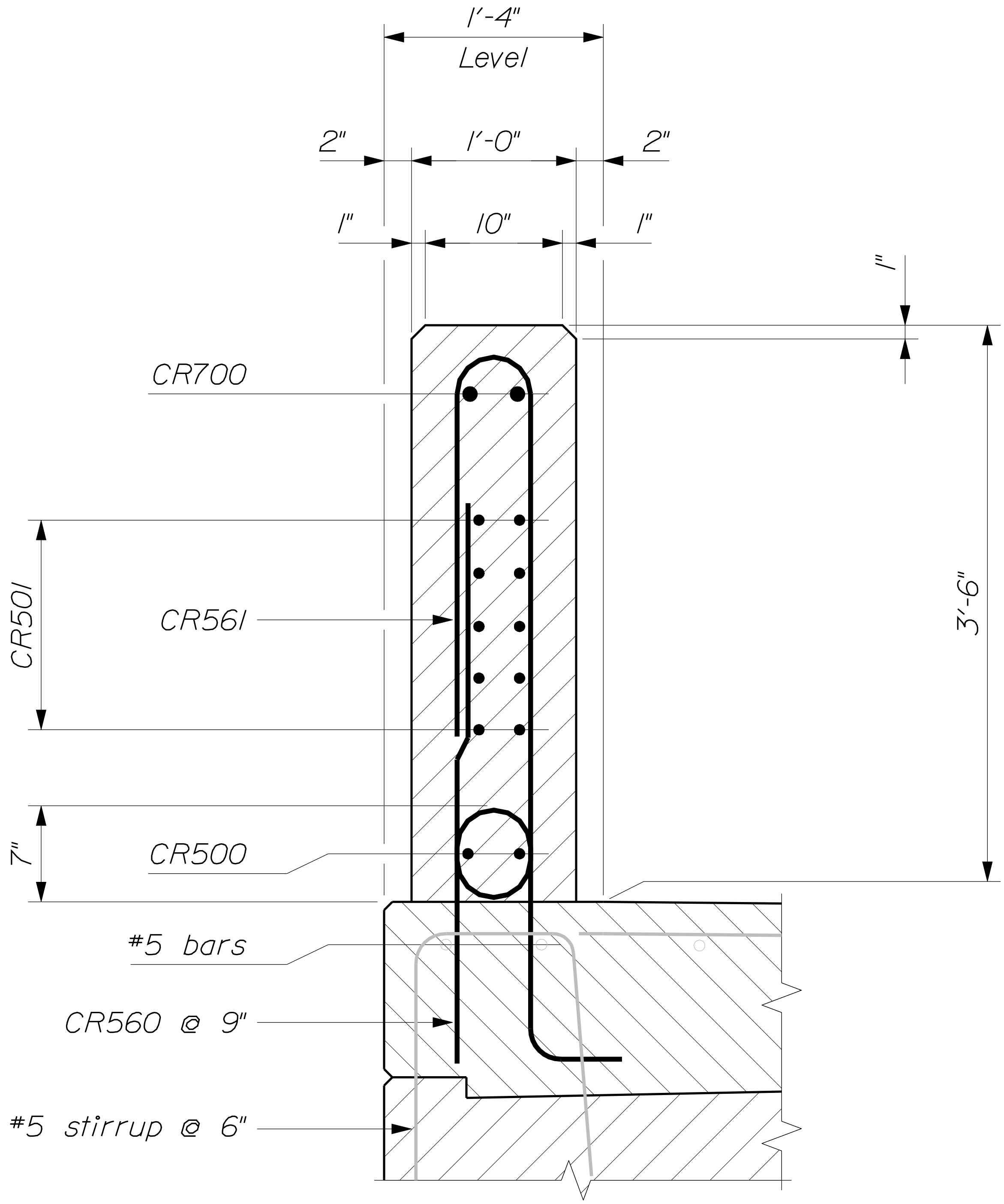
526(50)



~ SECTION THROUGH WINDOW ~
(Sidewalk Rail)

TEXAS CLASSIC RAIL

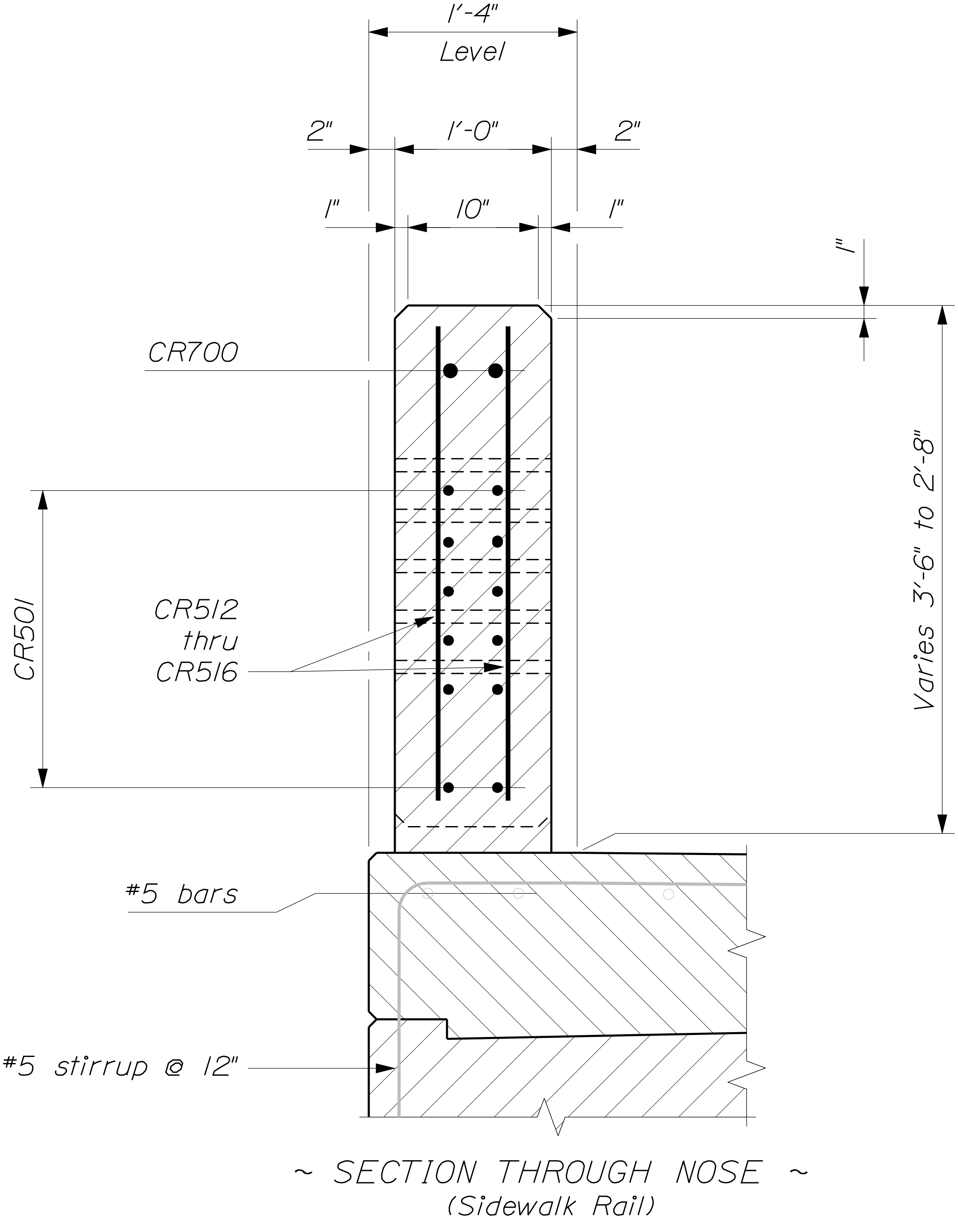
526(51)



~ SECTION THROUGH POST ~
(Sidewalk Rail)

TEXAS CLASSIC RAIL

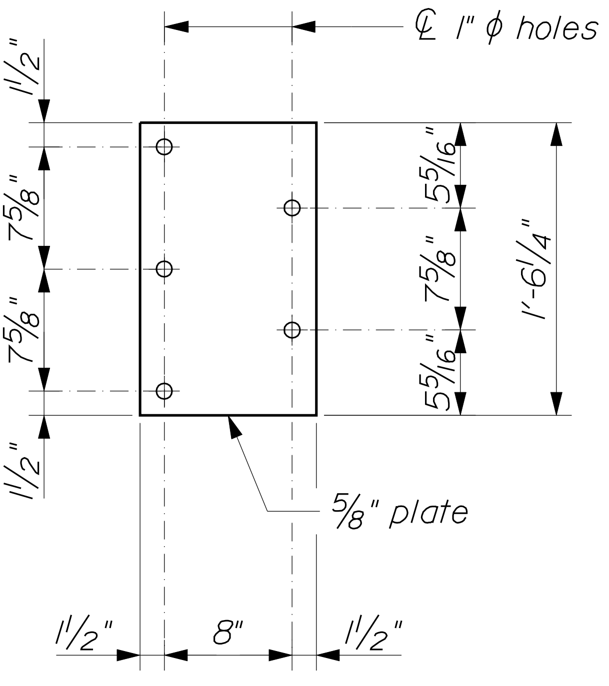
526(52)



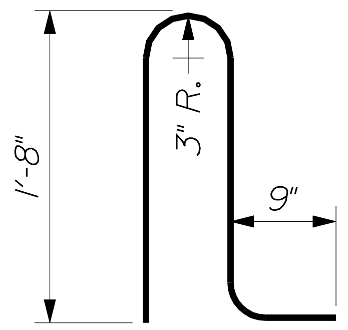
~ SECTION THROUGH NOSE ~
(Sidewalk Rail)

TEXAS CLASSIC RAIL

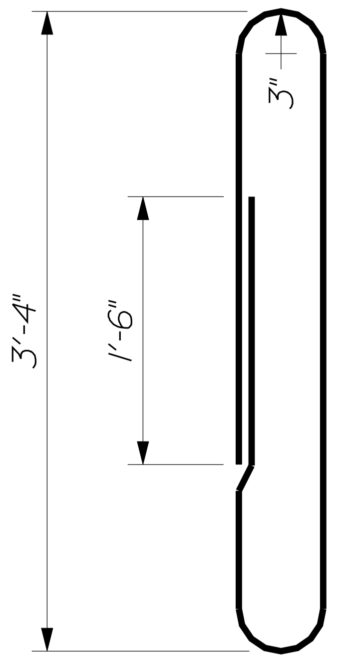
526(53)



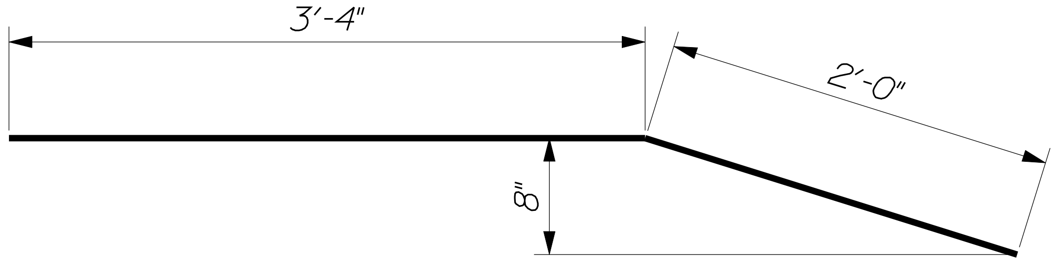
~ BEARING PLATE ~



~ CR560 ~



~ CR561 ~



~ CR750 ~

TRAFFIC RAIL REINFORCING STEEL SCHEDULE					
Horizontal			Vertical		
Mark	Length	Location	Mark	Length	Location
CR500	30' max.	Rail Bot. & Curb	CR512	2'-11"	Nose
CR501	5'-3"	Nose/Post	CR513	2'-9"	Nose
			CR514	2'-7"	Nose
CR700	30' max.	Rail Top	CR515	2'-5"	Nose
CR750	5'-4"	Nose	CR516	2'-3"	Nose
			CR560	4'-0"	Rail & Post
			CR561	8'-9"	Rail & Post

TEXAS CLASSIC RAIL

526(54)

NOTES:

1. All work and materials shall conform to the provisions of Standard Specifications Section 526 - Concrete Barrier.

2. Vertical surfaces and recesses shall be plumb. Tops and bottoms of window openings may be level or parallel to the grade of the rail.

3. Dim. "A" shall be approximately equal at all locations in any length of railing.

4. Contraction joints shall be located over piers on continuous structures and at 30-ft ± intervals along the length of all bridges. Do not extend reinforcing steel through the contraction joints.

5. Reinforcing steel shall have a minimum concrete cover of 2 inches.

6. The first digit following the letters of the bar mark indicates the size of the reinforcing bar. (CR500 = #5 bar.) All dimensions are out - to - out of bar.

7. Minimum lap splice lengths are 1'-9" for CR500 and 3'-0" for CR700.

8. When the end post is cantilevered over an expansion joint, provide a block - out as shown.

9. For details of curb / sidewalk expansion dams where necessary, refer to the Standard Detail for the appropriate Expansion Device.

10. Bolt holes in concrete shall be formed by a method approved by the Resident.

11. Payment for anchor bolts and bearing plates will be considered incidental to the Texas Classic Rail pay item.

12. For details of the Concrete Transition Curb, refer to Standard Details Section 609, Precast Concrete Transition Curb. Payment for the transition curb will be considered incidental to the Texas Classic Rail pay item.

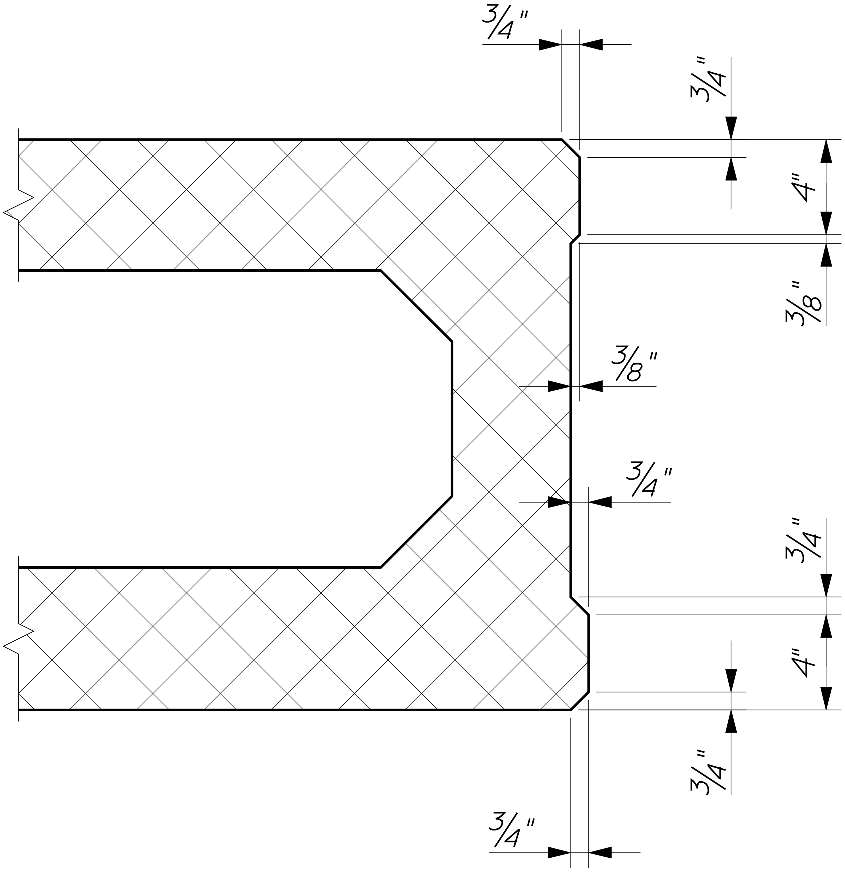
13. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

MATERIALS:

Concrete	Class "LP"
Reinforcing Steel	AASHTO M 31M/M 31, Grade 60
Bearing Plate	AASHTO M 270M/M 270, Grade 36 (Galvanized)
Bolts	AASHTO M 314, Grade 105 (Galvanized)

TEXAS CLASSIC RAIL

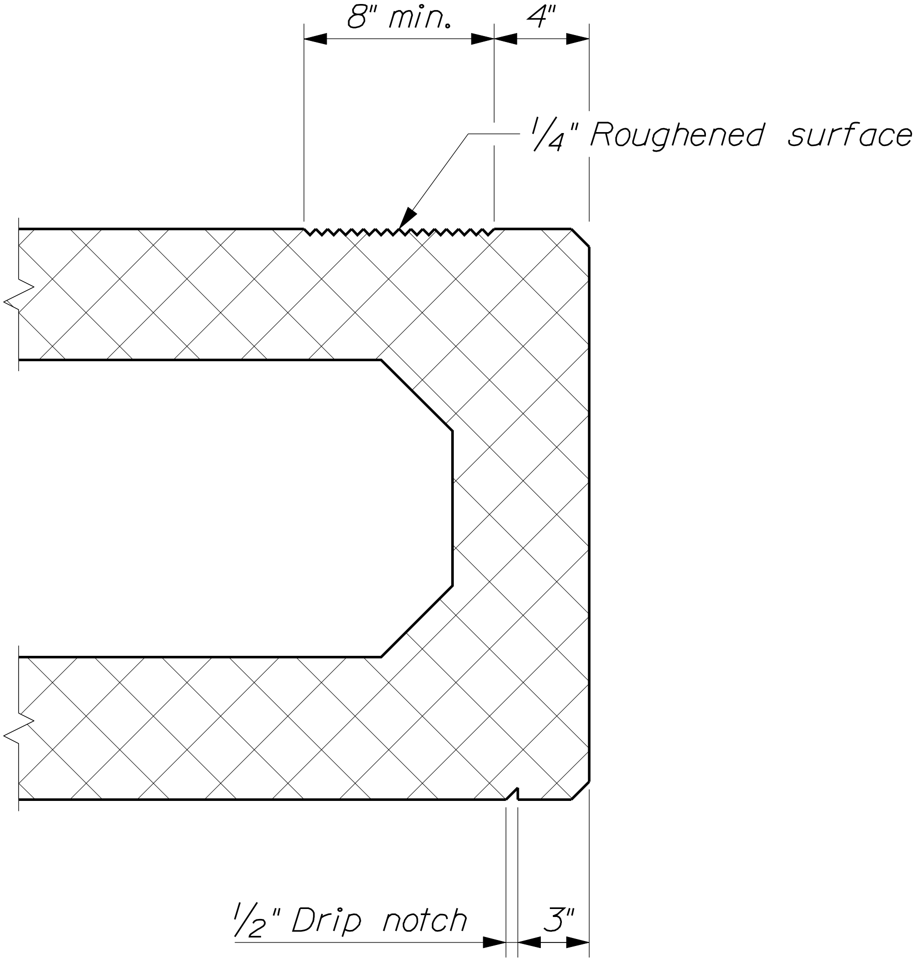
526(55)



~ SHEAR KEY DIMENSIONS ~
(Typical for all precast slabs and box beams)

PRECAST SUPERSTRUCTURE

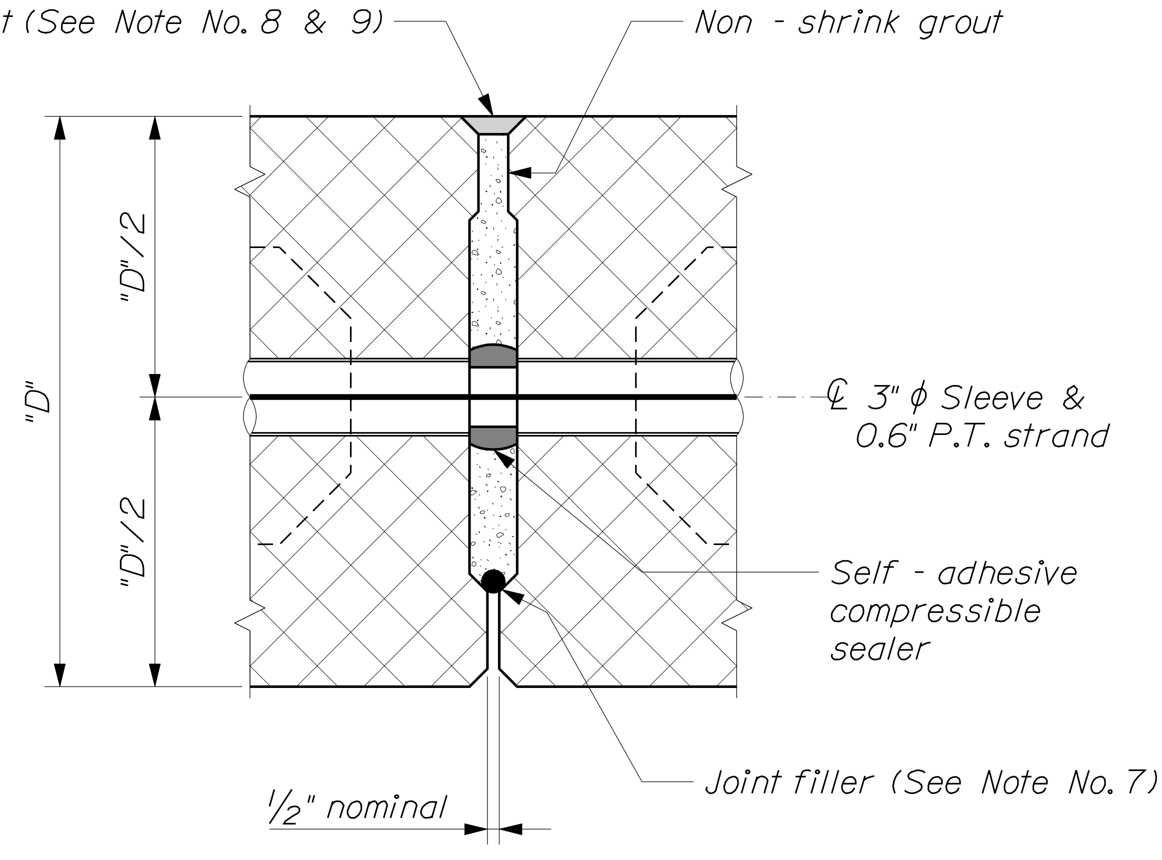
535(01)



~ FASCIA DETAILS ~
(Exterior units only)
(Entire top surface is roughened with reinforced C.I.P. slab)

PRECAST SUPERSTRUCTURE

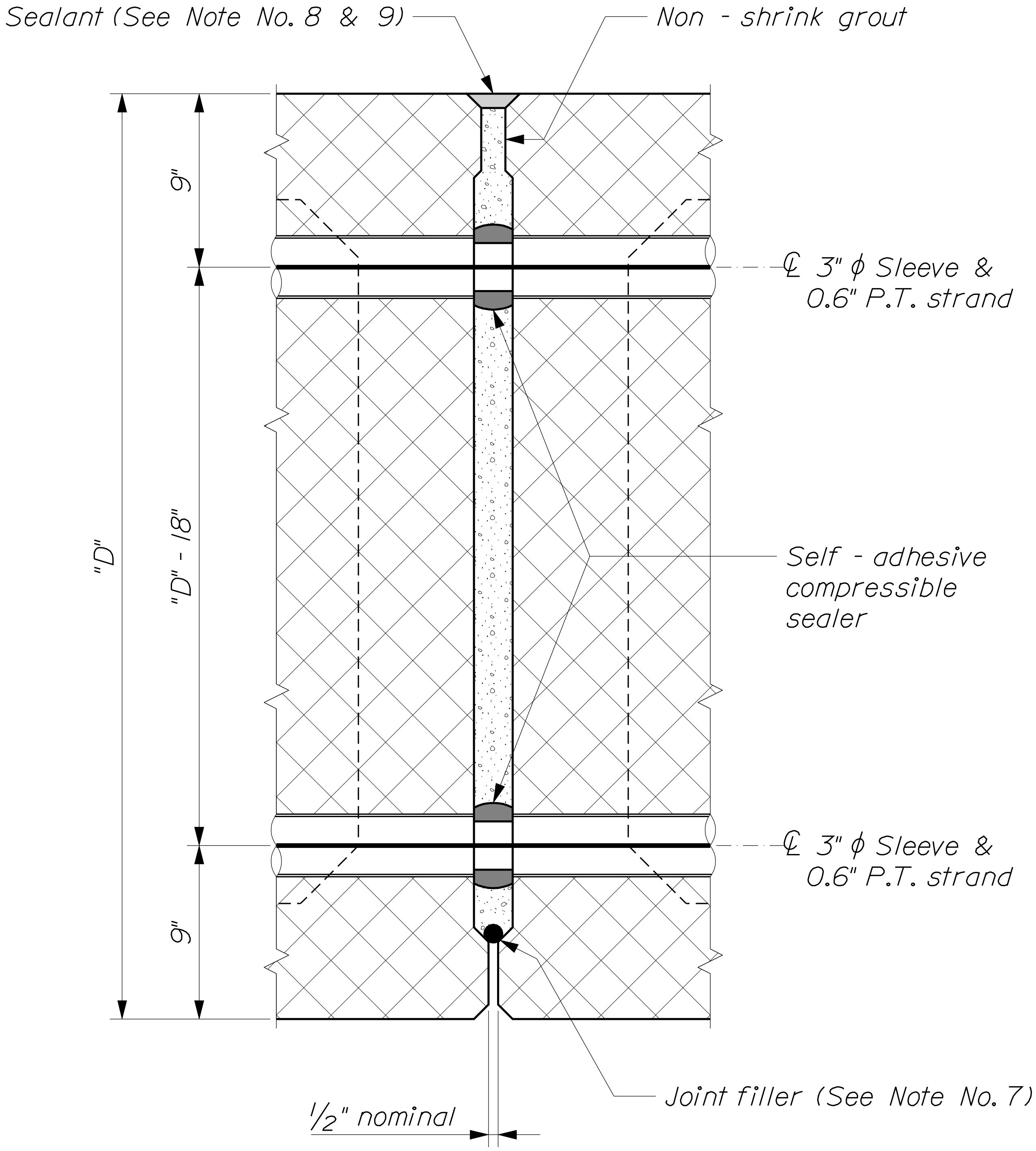
535(02)



~ SHEAR KEY DETAIL ~
(For precast slabs and box beams where "D" ≤ 24")

PRECAST SUPERSTRUCTURE

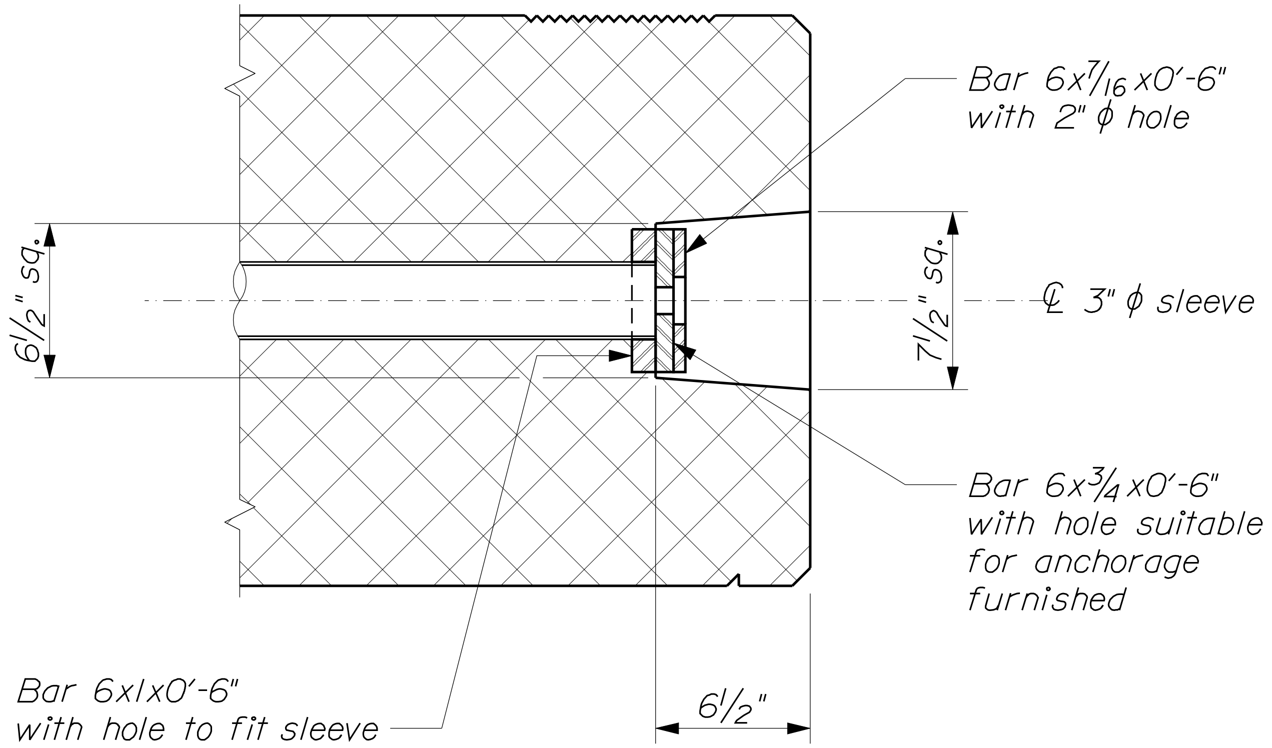
535(03)



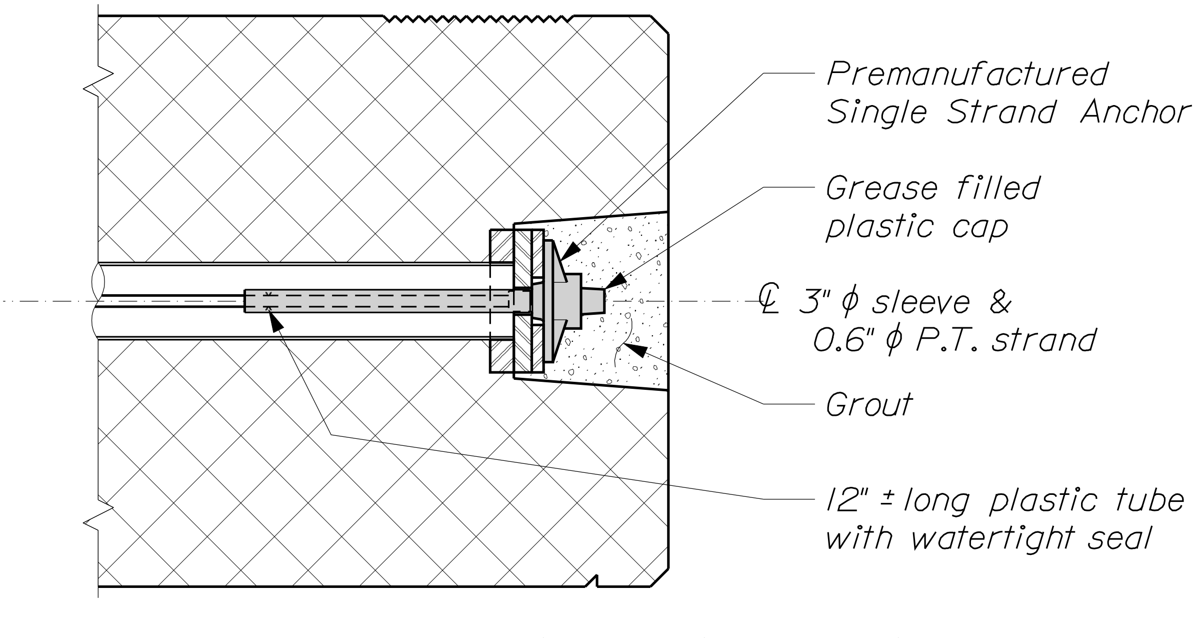
~ SHEAR KEY DETAIL ~
(For precast box beams where "D" ≥ 27")

PRECAST SUPERSTRUCTURE

535(04)



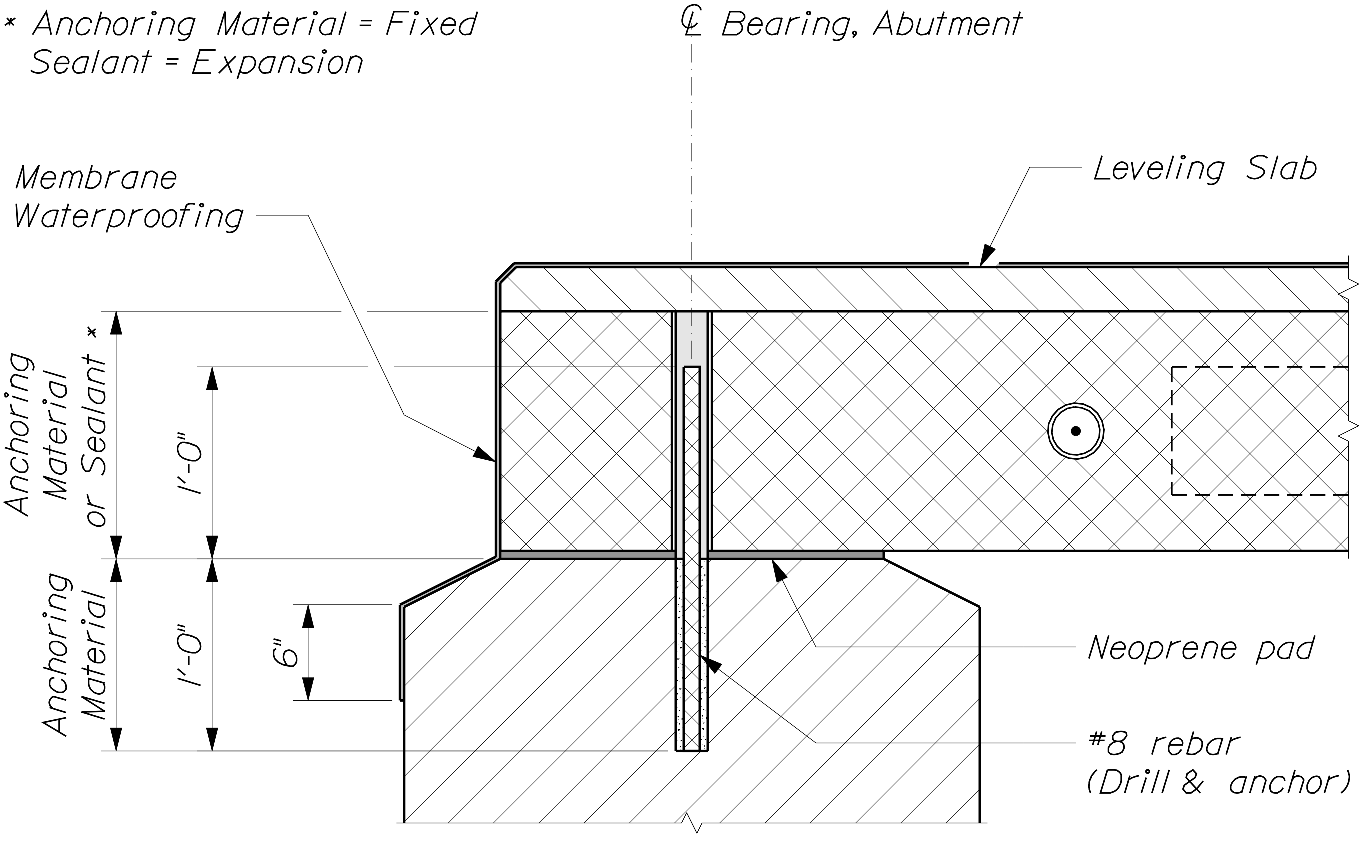
-- POST - TENSIONING BLOCK - OUT DETAIL --



-- POST - TENSIONING ANCHORAGE DETAIL --

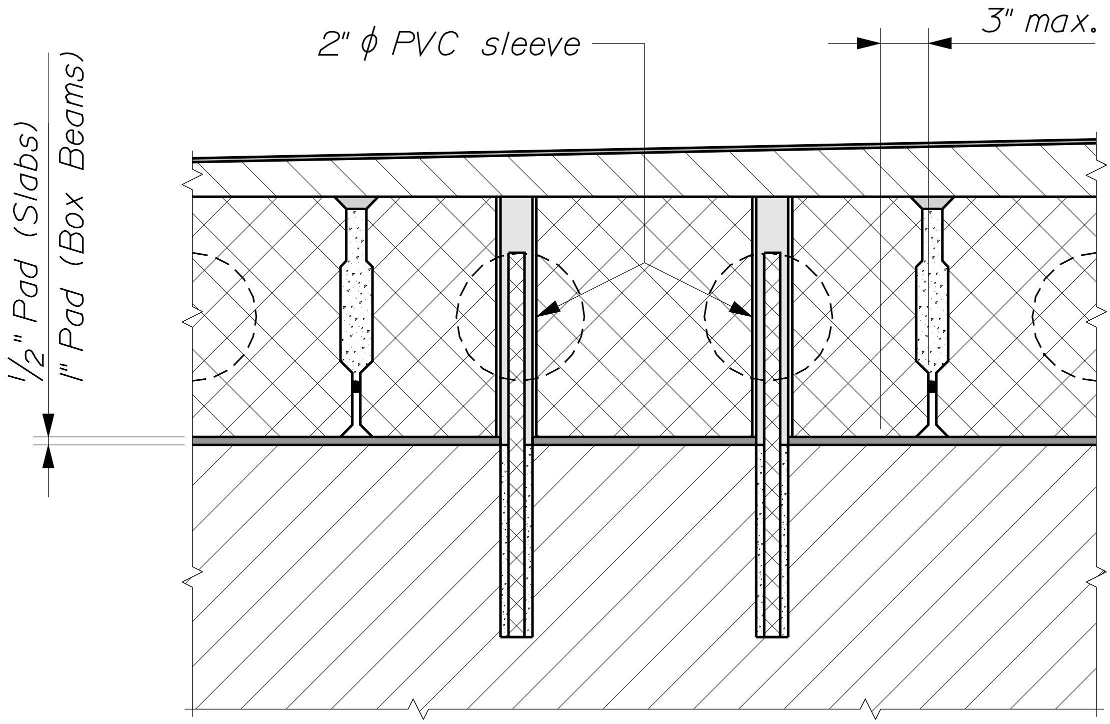
PRECAST SUPERSTRUCTURE

535(05)



* Anchoring Material = Fixed
Sealant = Expansion

~ LONGITUDINAL SECTION ~



~ TRANSVERSE SECTION ~

PRECAST SUPERSTRUCTURE

535(06)

PRECAST SLABS

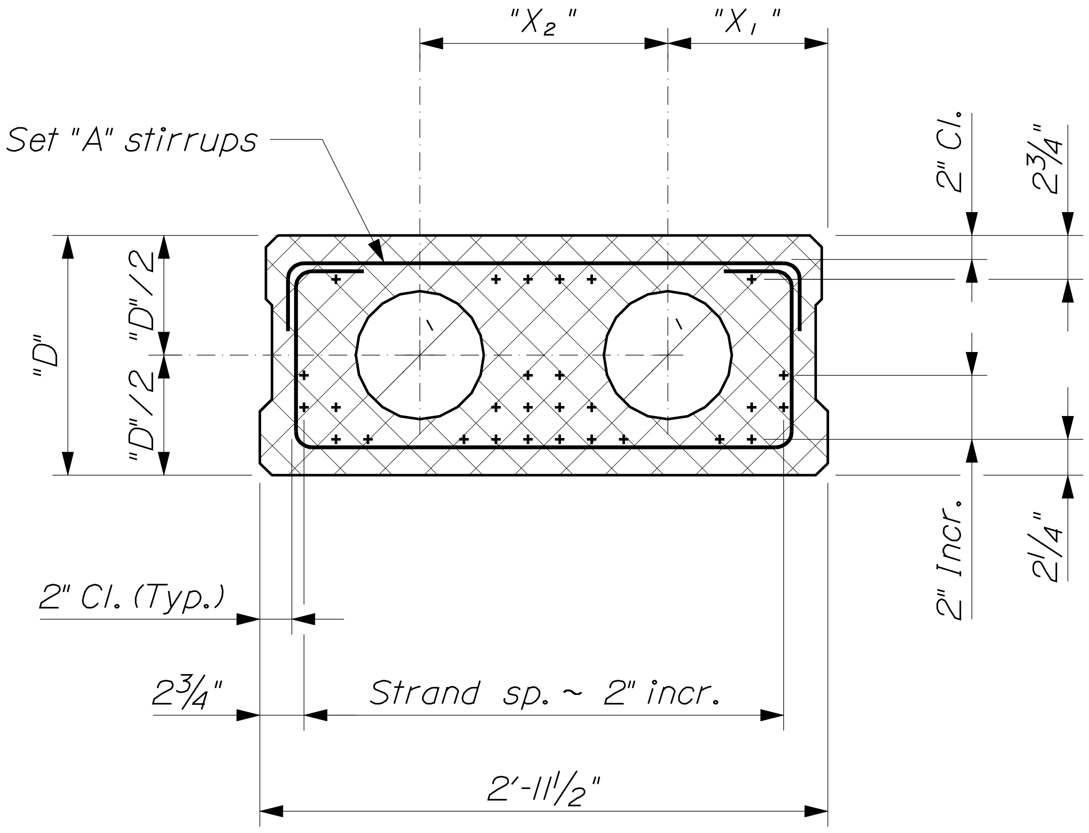
Slab Type	Nom. Width	Depth "D"	Void "ϕ_1"	Void "ϕ_2"	Spacing "X_1"	Spacing "X_2"
S36-12	36"	12"	--	--	--	--
S36-15	36"	15"	8"	--	10"	$15\frac{1}{2}$"
S36-18	36"	18"	10"	--	10"	$15\frac{1}{2}$"
S36-21	36"	21"	12"	--	10"	$15\frac{1}{2}$"
S48-12	48"	12"	--	--	--	--
S48-15	48"	15"	8"	8"	10"	$13\frac{3}{4}$"
S48-18	48"	18"	10"	10"	$9\frac{1}{2}$"	$14\frac{1}{4}$"
S48-21	48"	21"	12"	10"	$9\frac{1}{2}$"	$14\frac{1}{4}$"

PRECAST BOX BEAMS

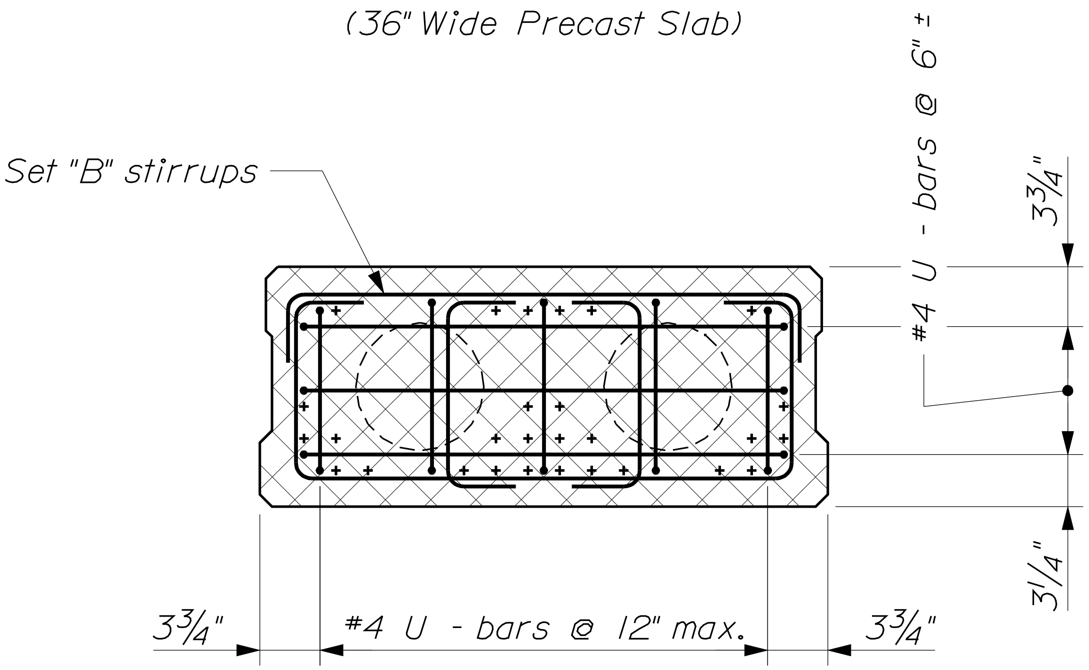
Box Type	Nom. Width	Depth "D"	Box Type	Nom. Width	Depth "D"
B36-24	36"	24"	B48-24	48"	24"
B36-27	36"	27"	B48-27	48"	27"
B36-30	36"	30"	B48-30	48"	30"
B36-33	36"	33"	B48-33	48"	33"
B36-36	36"	36"	B48-36	48"	36"
B36-39	36"	39"	B48-39	48"	39"
B36-42	36"	42"	B48-42	48"	42"
B36-45	36"	45"	B48-45	48"	45"
B36-48	36"	48"	B48-48	48"	48"

PRECAST SUPERSTRUCTURE

535(07)



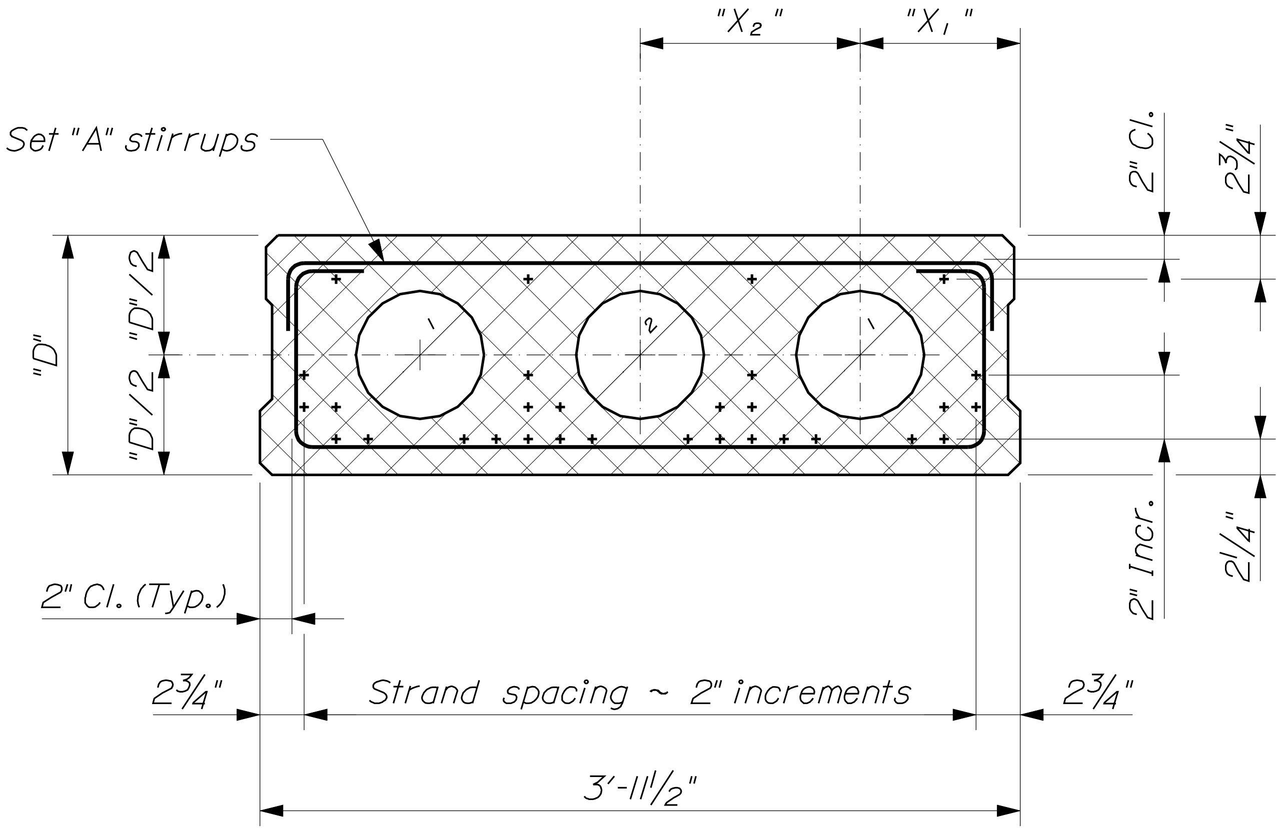
~ TYPICAL SECTION ~
(36" Wide Precast Slab)



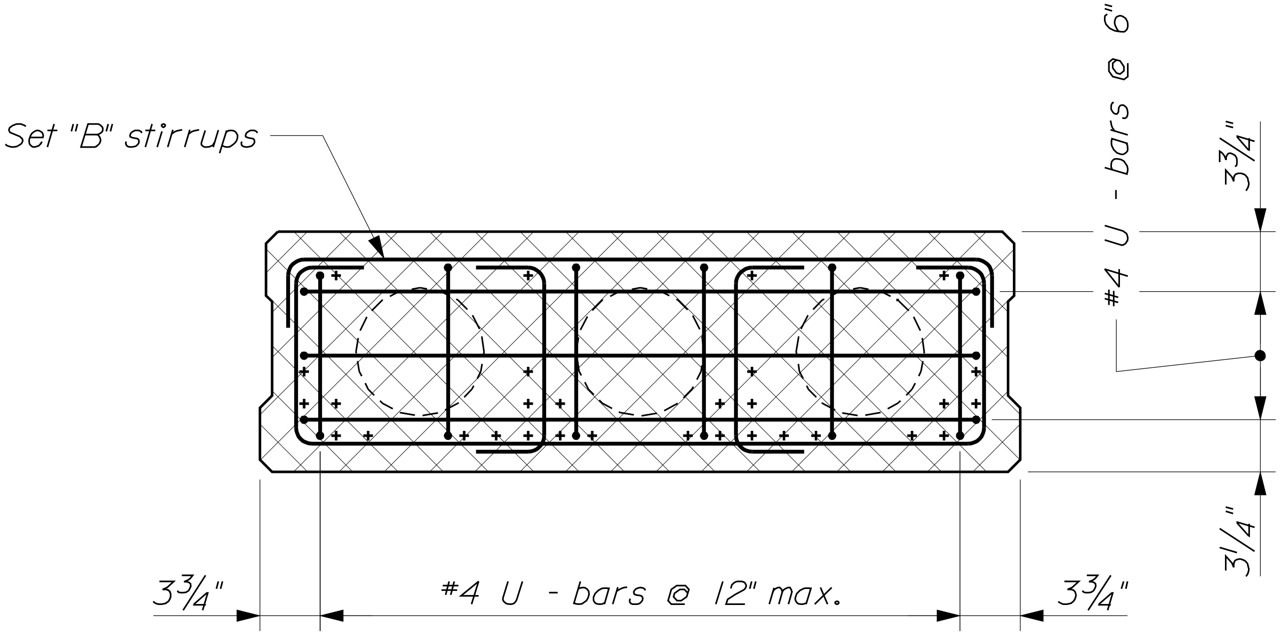
~ END BLOCK SECTION ~
(36" Wide Precast Slab)

PRECAST SUPERSTRUCTURE

535(08)



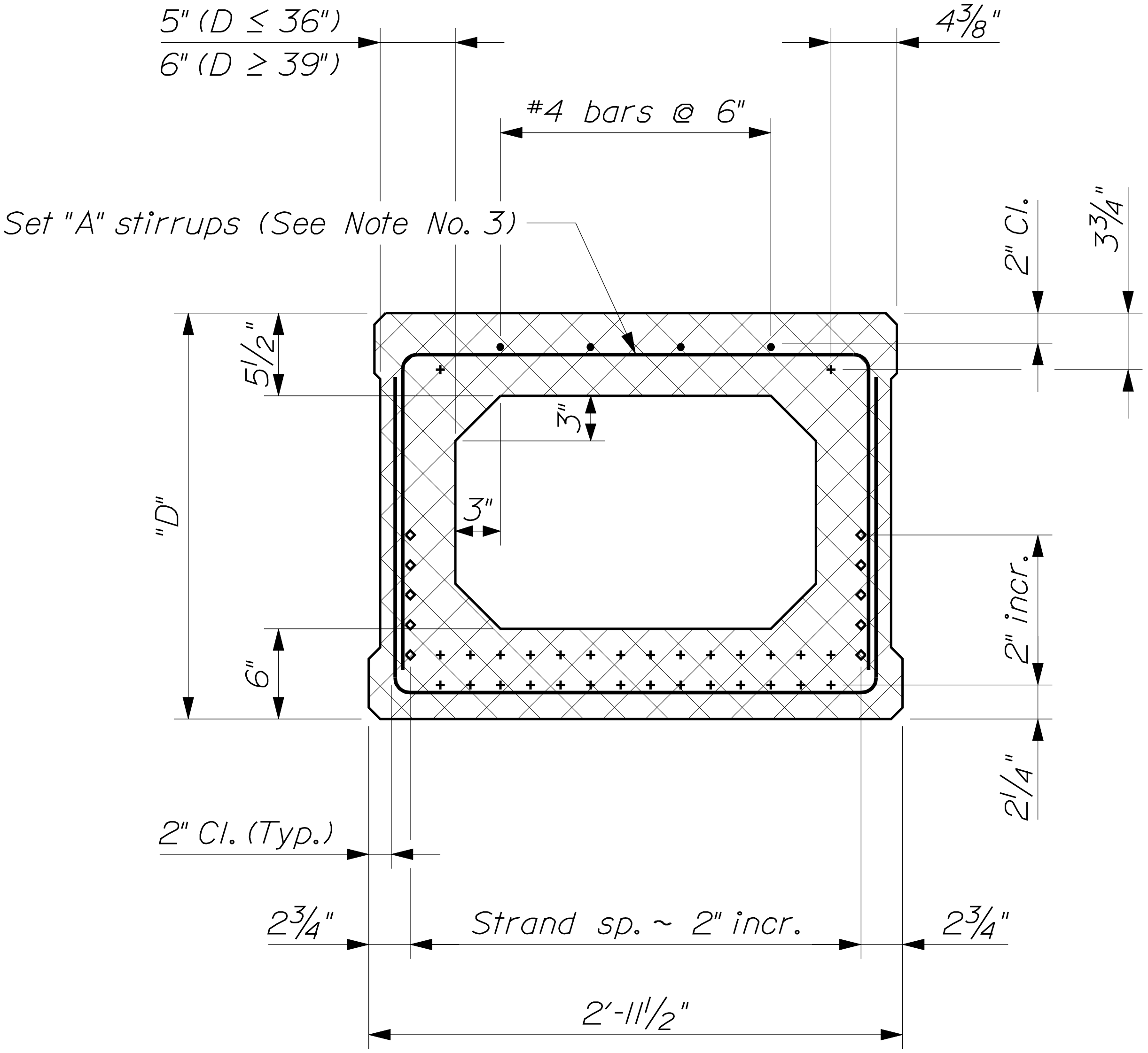
~ TYPICAL SECTION ~
(48" Wide Precast Slab)



~ END BLOCK SECTION ~
(48" Wide Precast Slab)

PRECAST SUPERSTRUCTURE

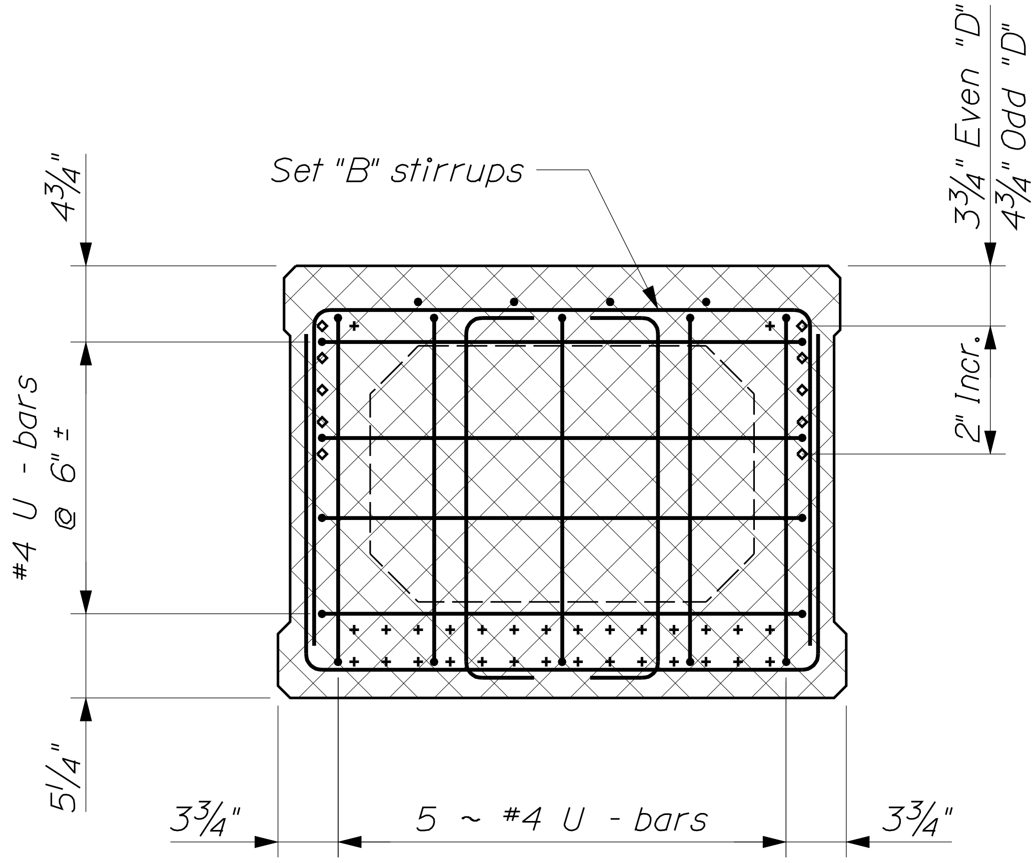
535(09)



~ TYPICAL SECTION ~
(36" Wide Precast Box Beam)

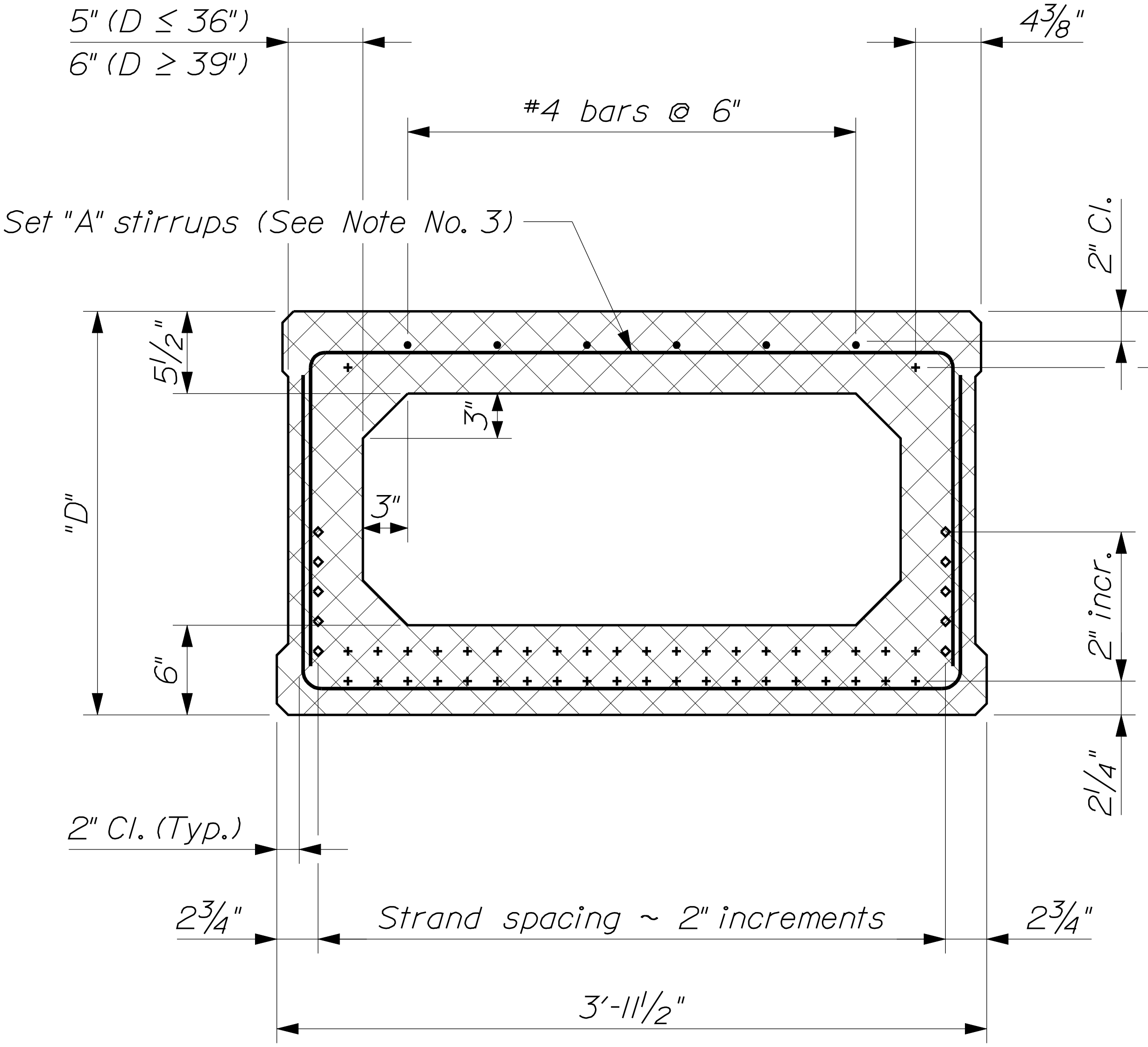
+ Straight Strands
◇ Draped Strands

PRECAST SUPERSTRUCTURE
535(10)



~ END BLOCK SECTION ~
(36" Wide Precast Box Beam)

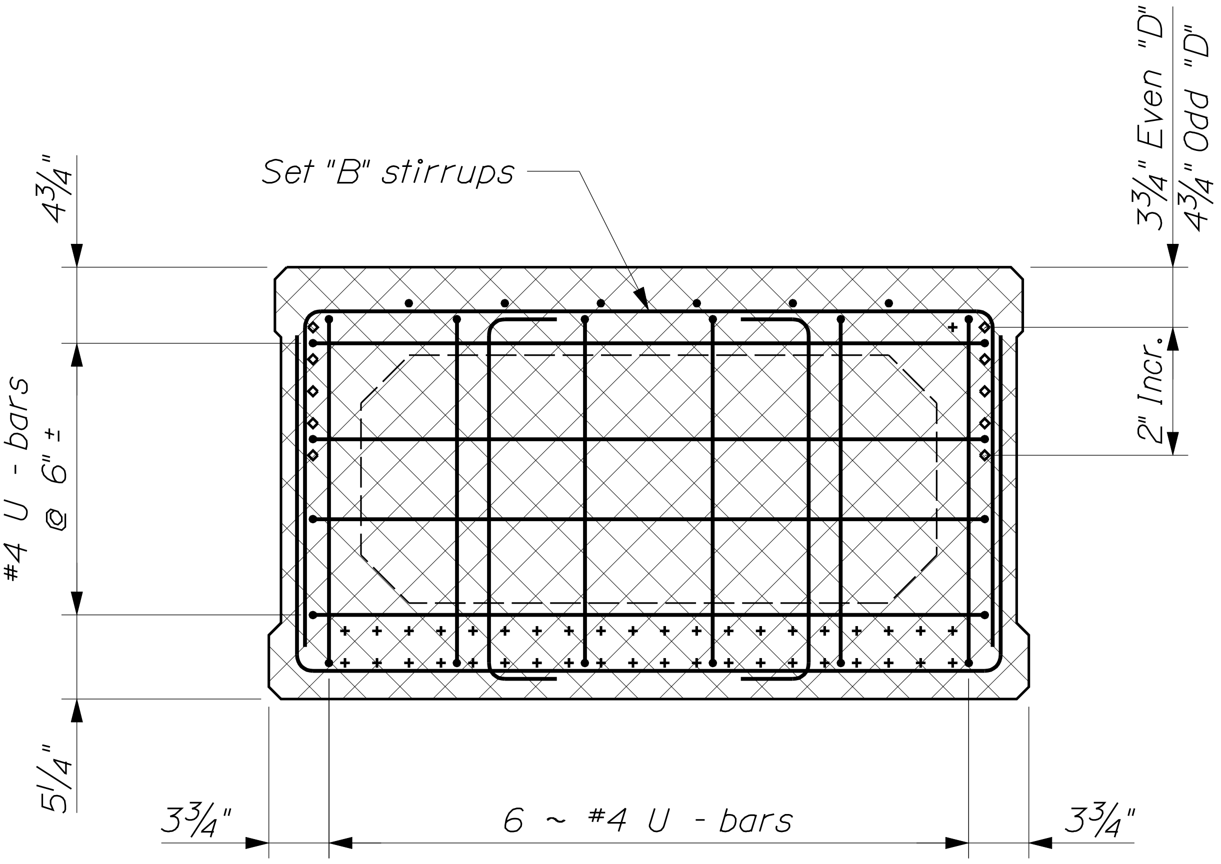
+ Straight Strands
◇ Draped Strands



~ TYPICAL SECTION ~
(48" Wide Precast Box Beam)

- \+ Straight Strands
- ◇ Draped Strands

PRECAST SUPERSTRUCTURE
535(12)

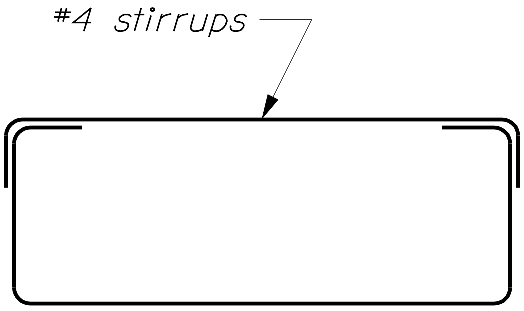


~ END BLOCK SECTION ~
(48" Wide Precast Box Beam)

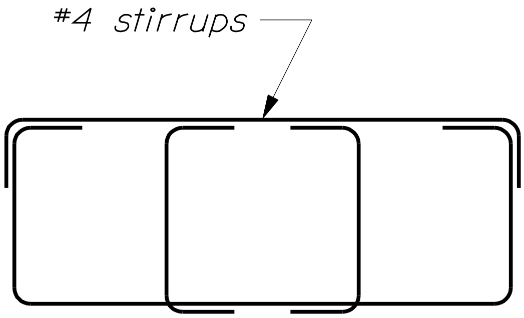
+ Straight Strands
◇ Draped Strands

PRECAST SUPERSTRUCTURE

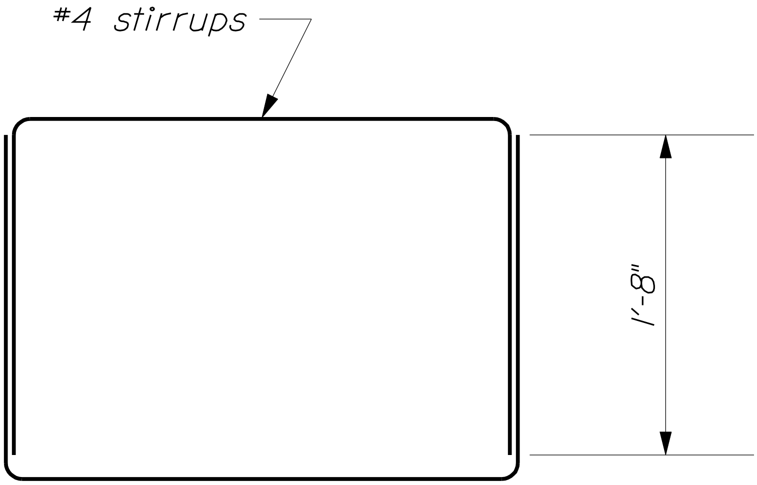
535(13)



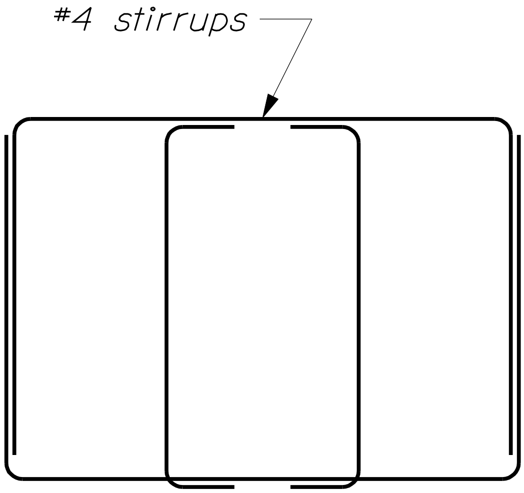
~ SET "A" STIRRUPS ~
(Precast Slab)



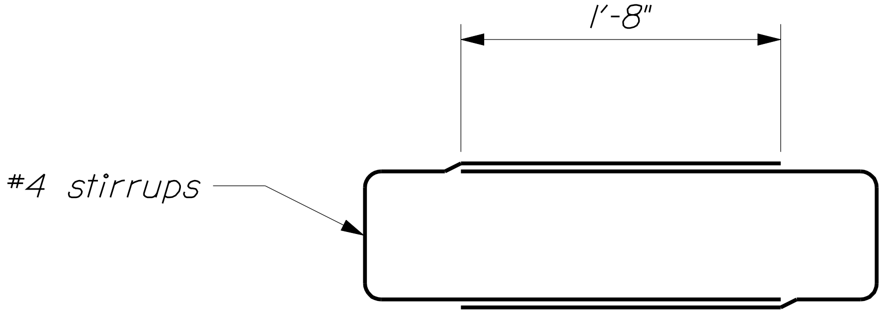
~ SET "B" STIRRUPS ~
(Precast Slab)



~ SET "A" STIRRUPS ~
(Precast Box Beam)



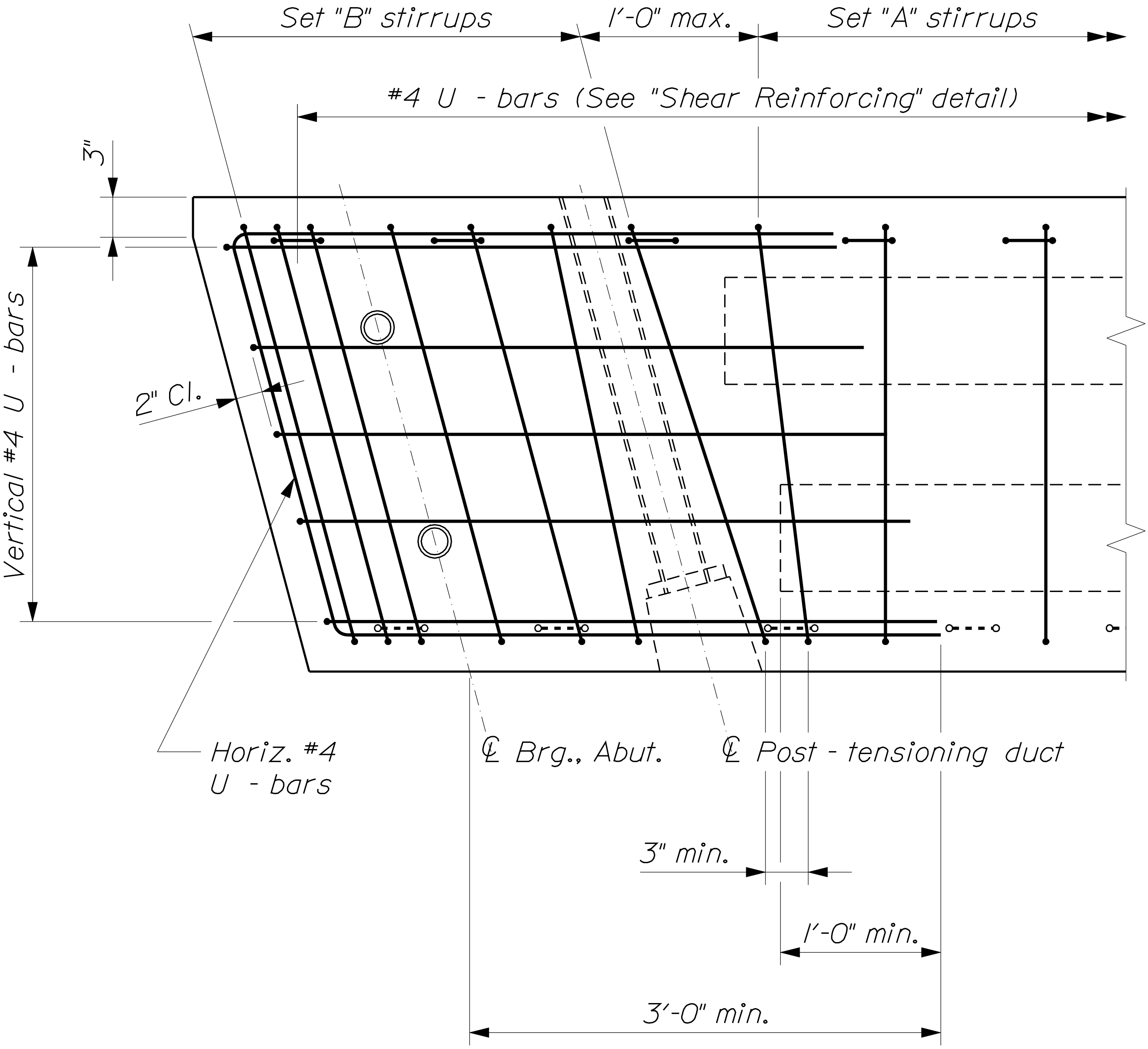
~ SET "B" STIRRUPS ~
(Precast Box Beam)



~ ALTERNATE STIRRUP CONFIGURATION ~
(Always use for S36-12 and S48-12 slabs)

PRECAST SUPERSTRUCTURE

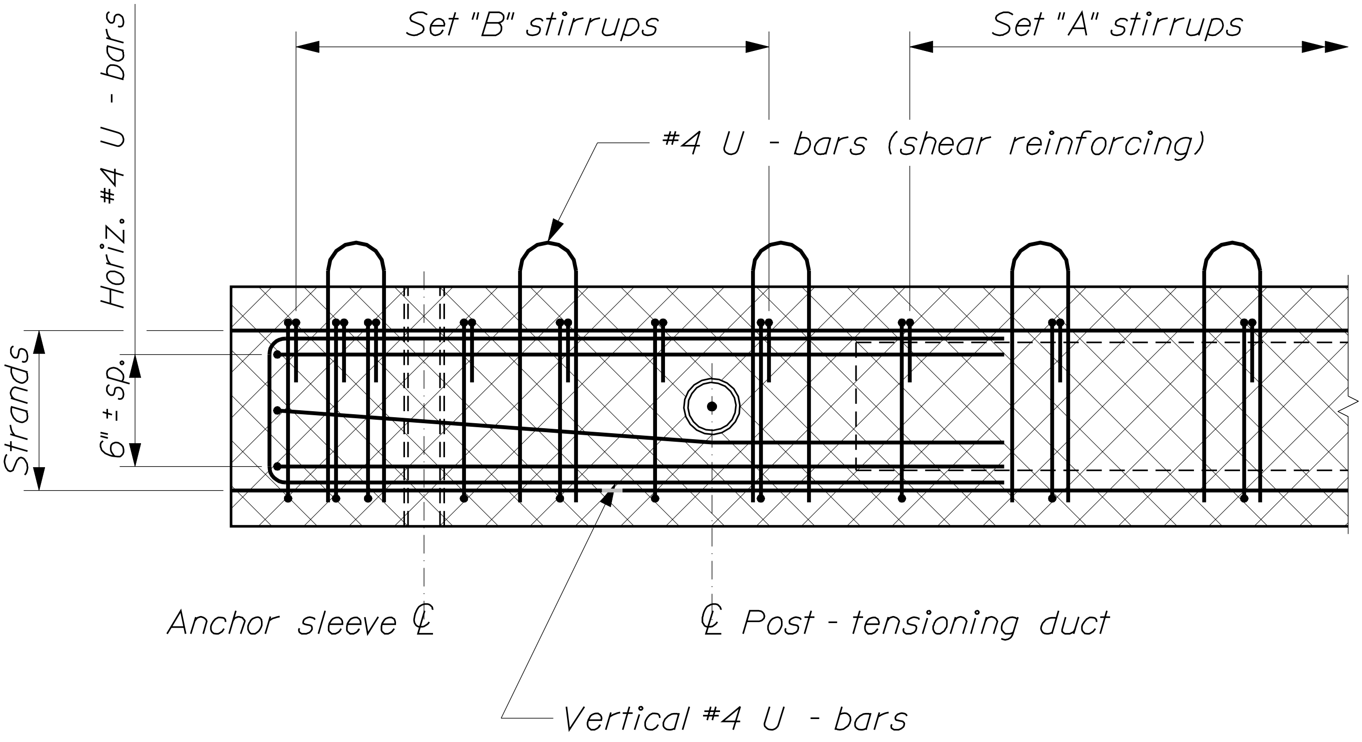
535(14)



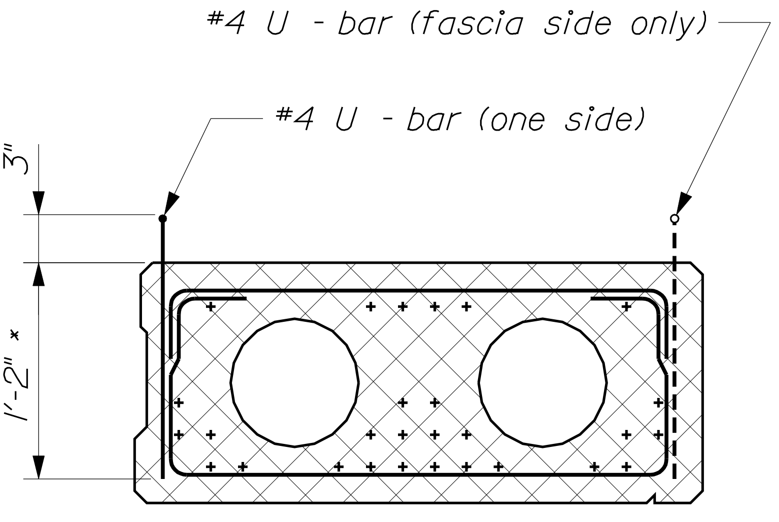
~ TYPICAL PRECAST UNIT PLAN ~
(Voided Slab shown; Box Beam similar)

PRECAST SUPERSTRUCTURE

535(15)



~ TYPICAL LONGITUDINAL SECTION ~



~ SHEAR REINFORCING ~
(For use with reinforced C.I.P. slab)

* 10" for S12 slabs
12" for S15 slabs

PRECAST SUPERSTRUCTURE

535(16)

NOTES:

1. Prestressing strands shown in the various details are schematic in nature and do not represent any specific design requirements.

2. Reinforcing steel shown is the required minimum. Individual designs may vary. Bending details and hooks shall conform to the recommendations of the current revision of ACI Standards 315 and 318.

3. For box beams, unless the design drawings specify a separate reinforced concrete slab to be constructed over the box beams, additional upper #4 stirrups shall be provided such that the maximim spacing of the upper stirrups over the voided areas is 12 inches.

4. All plates in the post - tensioning block - out detail shall be galvanized in accordance with ASTM A 123.

5. Concrete around lifting devices shall be recessed a minimum of one inch below the surface. The recess shall be patched with an approved grout after removal of the lifting device.

6. For bridge skew angles up to 15°, the neoprene pad at the bearing area shall cover the entire bridge seat. Seams perpendicular to the centerline of bearing will be allowed provided that the seam occurs near the center of a precast unit with the unit bearing approximately equally on both pad pieces. For bridge skew angles greater than 15°, other bearing area treatment may be shown on the design drawings.

7. The Contractor will be responsible for providing a joint filler system adequate to contain the keyway grout during placement. No extra payment will be made for such system or for necessary repairs or other extra work if the joint filler system fails.

8. The shear key sealant shall be one of the polyurethane - based products listed on the MaineDOT Qualified Products List of Pour - In - Place Joint Sealant.

9. When a high - performance waterproofing membrane is to be applied directly to the top of the precast units, eliminate the shear key sealant and fill the shear key to the top of the unit with non - shrink grout.

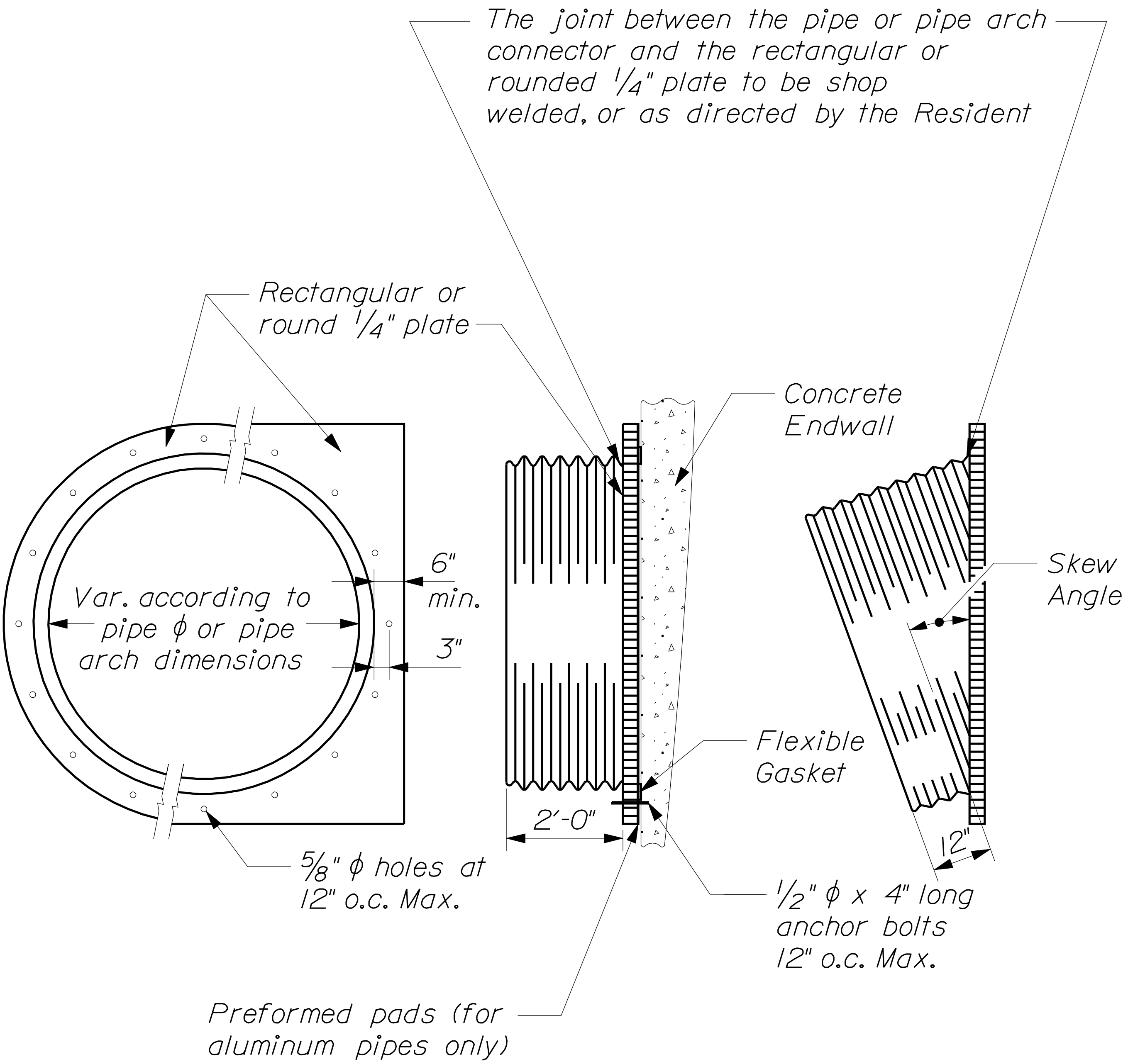
10. If there is a conflict between these Standard Details and the Design Drawings, the requirements of the Design Drawings shall be followed.

PRECAST SUPERSTRUCTURE

535(17)

DIVISION 600

MISCELLANEOUS CONSTRUCTION

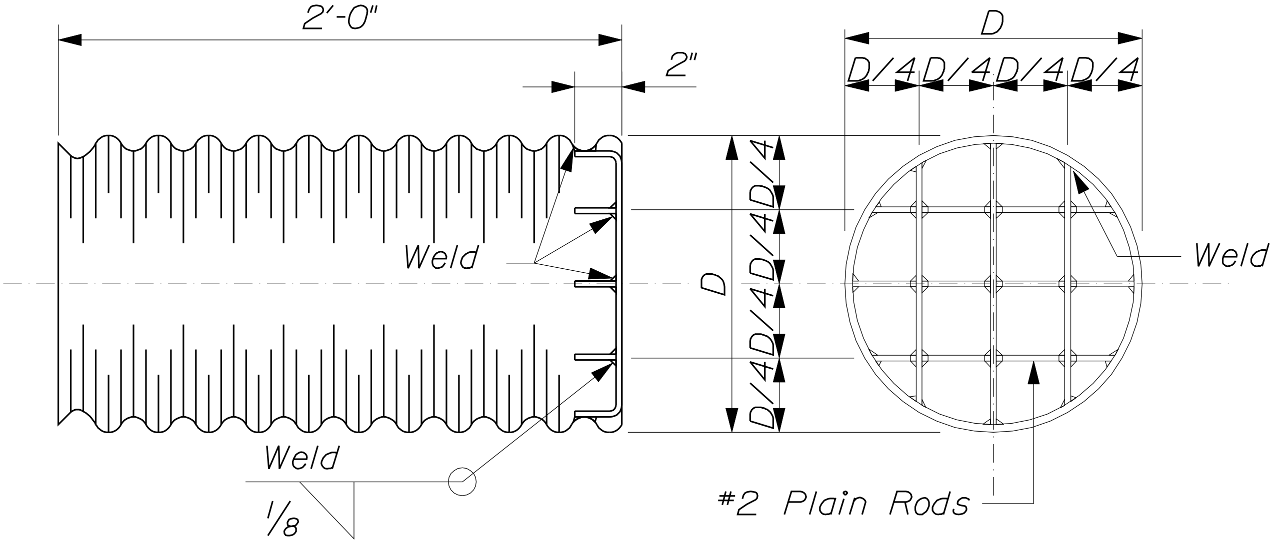


~ METAL CULVERT CONNECTOR ~

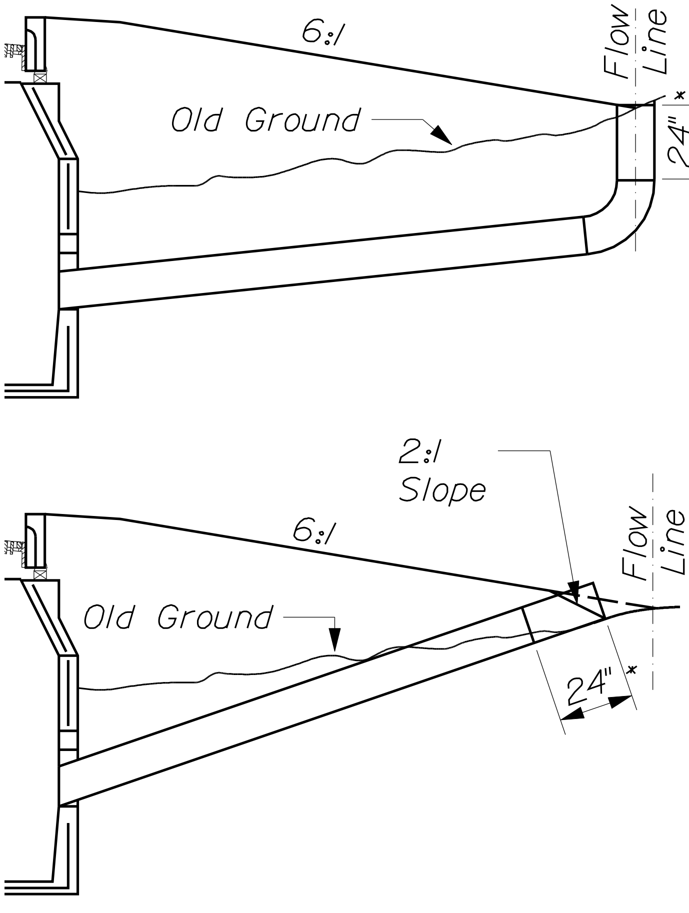
~ CONNECTOR FOR SKEWED PIPE ~

CONCRETE BOX CULVERT EXTENSION USING CORRUGATED METAL PIPE & PIPE ARCHES

603(01)



~ INLET GRATE UNIT ~



NOTES:

1. All units to be complete shop assembly.

2. All units to have one shop coat of approved aluminum paint.

3. An elbow shall be installed if directed by the Resident to provide a horizontal grate, it shall be paid for as 3 additional feet of the type and size of pipe involved. (In addition to the length measured through the elbow which shall be measured along the top of the pipe.)

4. Rods shall conform to the requirements of Section 709.01 of the Standard Specifications.

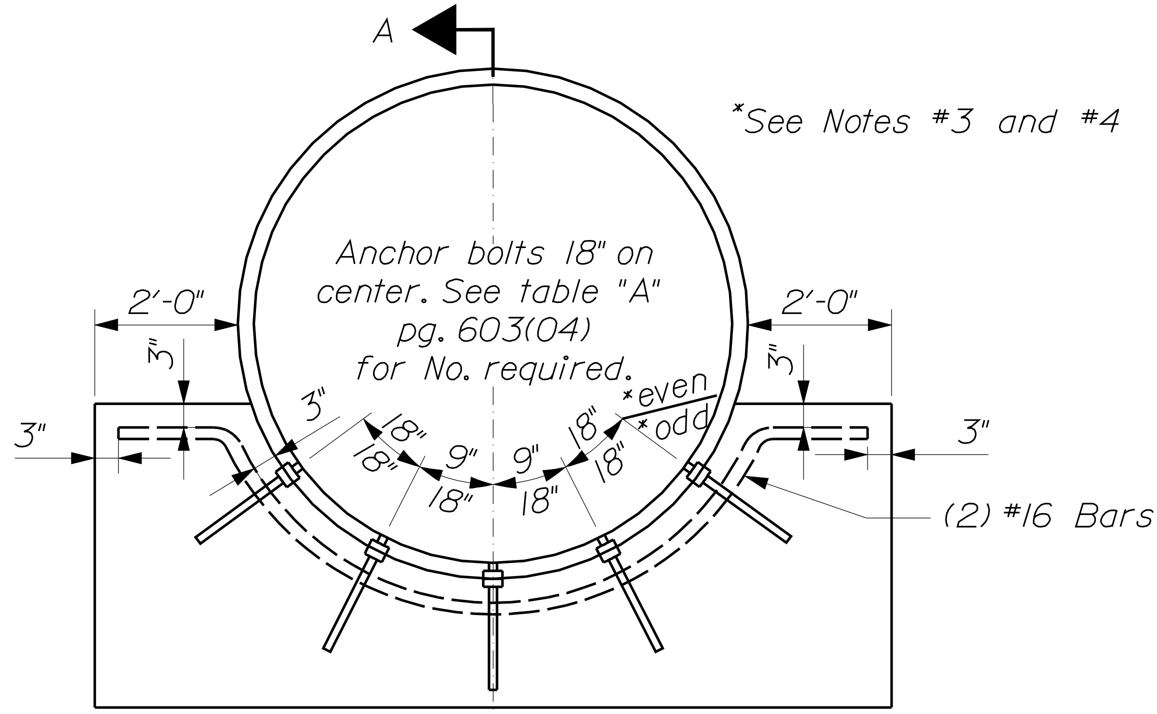
5. Pipe for inlet grate unit shall be the same type that is used to connect into the catch basin.

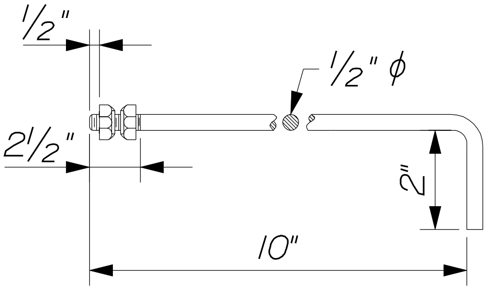
* 24" Inlet Grate Unit.

~ INLET UNITS IN FILL AREAS ~

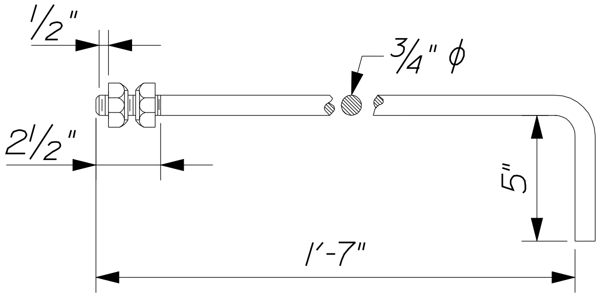
INLETS

603(02)

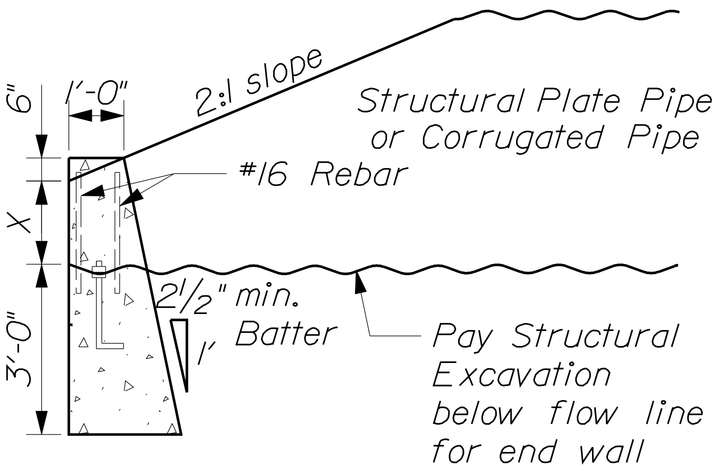




~ ANCHOR BOLT FOR CORRUGATED PIPES ~



~ ANCHOR BOLT FOR STRUCTURAL PLATE PIPES ~



~ SECTION A-A ~

NOTES:

1. For corrugated pipe, anchor bolt shall be placed in the second valley.
2. See Table "A" for "X" dimension.
3. For pipes with an even number of bolts no bolt shall be placed on CL, & x Dimension shall be split and measured from CL for initial bolt placement. The X dimension shall then be measured from the CL of the established bolt holes.
4. Pipes with an odd number of bolts shall have the first bolt placed on bottom @ CL & X dimension shall be measured from CL for all other bolt placements.

CONCRETE INLET ENDWALL

603(03)

TABLE A

CORRUGATED PIPES		
PIPE I.D.	NO. OF BOLTS REQUIRED	"X" DIMENSION
60"	4	1'-6"
66"	4	1'-6"
72"	4	1'-6"
78"	5	1'-6"
84"	5	1'-6"

STRUCTURAL PLATE PIPE		
PIPE I.D.	NO. OF BOLTS REQUIRED	"X" DIMENSION
72"	4	1'-6"
78"	5	1'-7½"
84"	5	1'-9"
90"	5	1'-10½
96"	6	2'-0"
102"	6	2'-1½"
108"	6	2'-3"
114"	7	2'-4½"
120"	7	2'-6"
126"	7	2'-7½"
132"	8	2'-9"
138"	8	2'-10½"
144"	9	3'-0"
150"	9	3-1½"
156"	9	3-3"
162"	10	3'-4½"
168"	10	3'-6"
174"	10	3'-7½"
180"	11	3'-9"

NOTES:

1. Culverts installed under 2:1 slopes shall have Riprap laid on 2:1 slope with no ditch transitions.

2. Excavation required to grade culvert inlets and outlets as shown will not be paid separately, but will be incidental to the culvert.

3. Anchor bolts will be incidental to the concrete items.

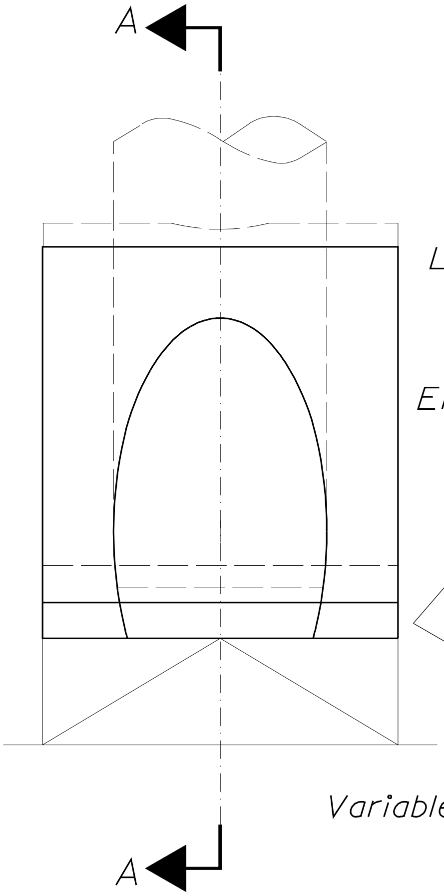
4. Concrete endwall shall be structural concrete class "A" and shall be paid for as Item 502.32 or Item 502.329, Structural Concrete Culvert Endwall. Reinforcing steel will not be paid for separately but will be considered incidental to Item 502.32 or Item 502.329.

5. Standard galvanized carriage or machine bolts ½" x 1' long or ¾" x 2' long with minimum 2½" thread may be furnished in place of anchor bolts. Washers shall be furnished at the head of each bolt.

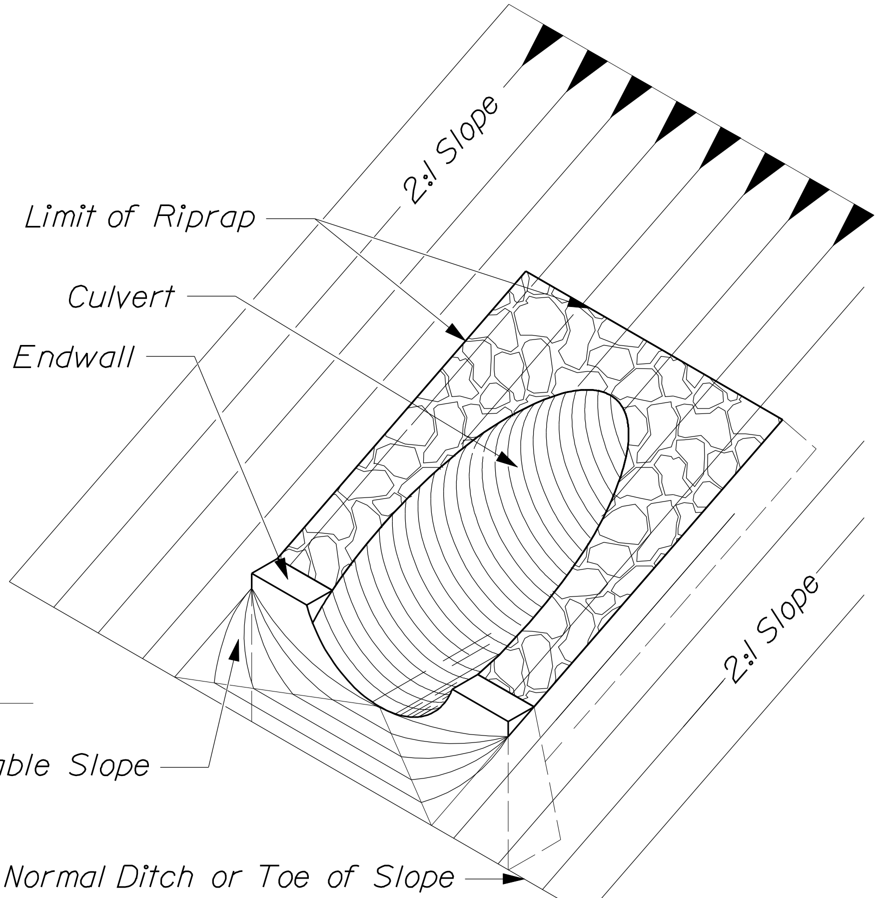
6. Bolt material shall conform to ASTM F568 Class 4.6. Nuts shall conform to ASTM A563M. Bolts, nuts, and washers shall be hot dip galvanized after fabrication to meet ASTM A153.

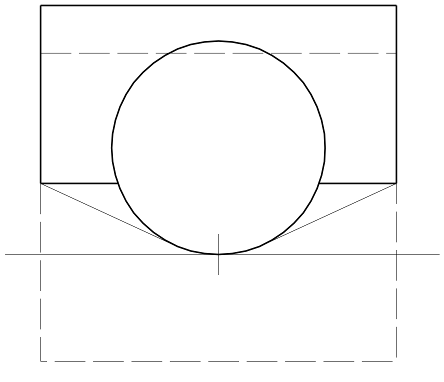
CONCRETE INLET ENDWALL

603(04)

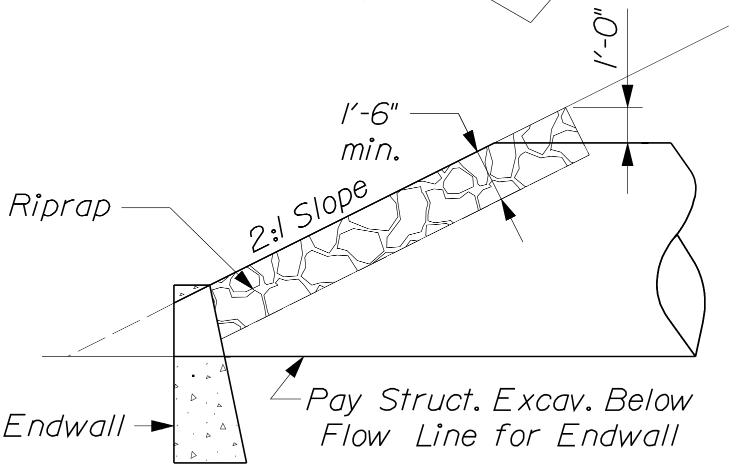


~ PLAN VIEW ~





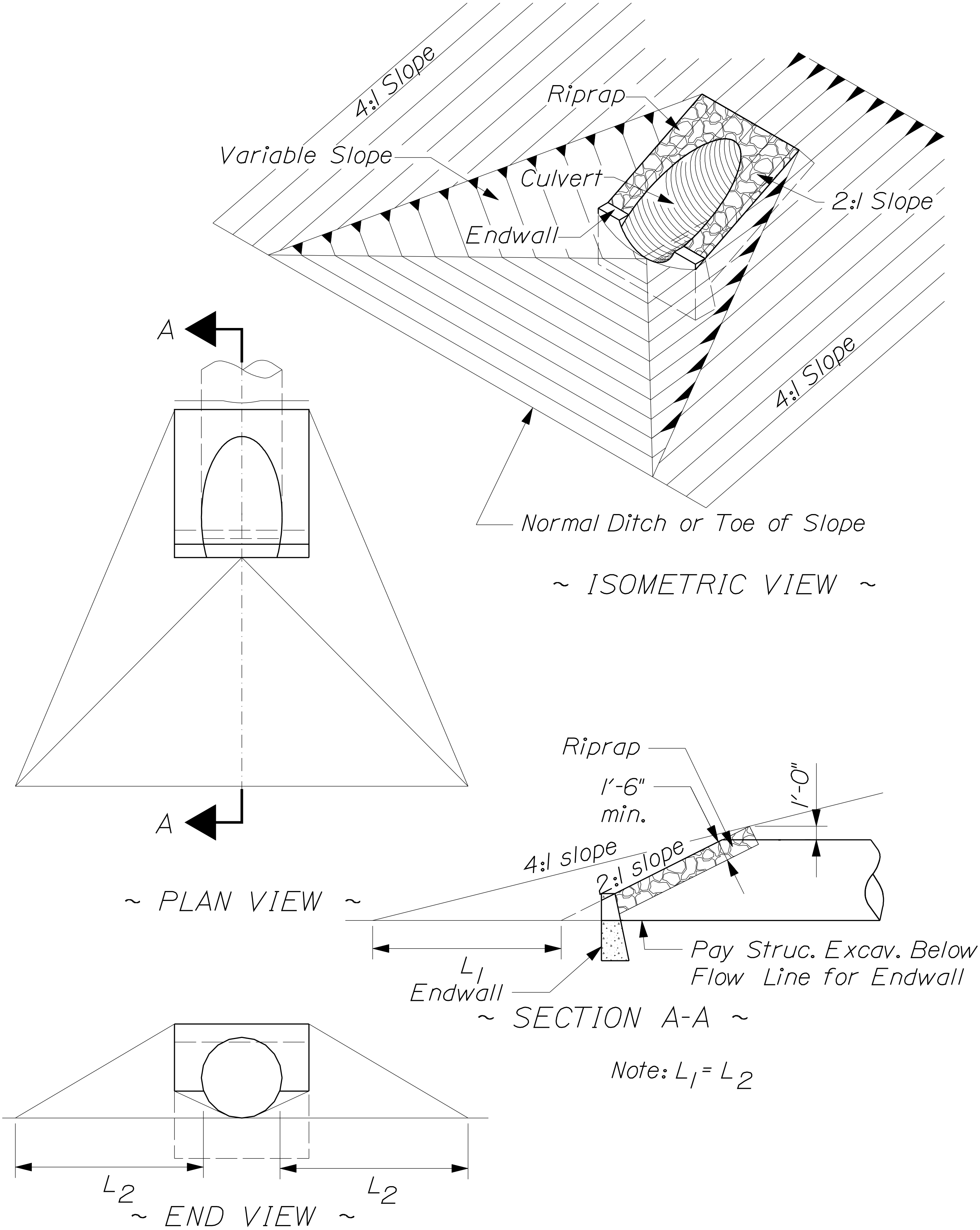
~ END VIEW ~



~ SECTION A-A ~

CONCRETE INLET ENDWALLS FOR RIVETED AND STRUCTURAL PLATE PIPES 60" TO 180" IN 2:1 SLOPES

603(05)



CONCRETE INLET ENDWALLS FOR RIVETED AND STRUCTURAL PLATE PIPES 60" TO 180" IN 4:1 SLOPES

603(06)

CIRCULAR CULVERT PIPE (NOMINAL WALL THICKNESS IN INCHES EXCEPT M294 PIPE)

DIAMETER	CORRUGATED METAL PIPE				SPIRAL RIB (TYPE IR)(B)		PLASTIC PIPE		REINFORCED CONCRETE PIPE		
	OPTION I		OPTION I/III		OPTION I	OPTION I/III	OPTION I / III	OPTION III	OPTION I/III		
	M218	M274 (A)	M246	M197	M274 (A)	M197	M294 DUAL-WALL PIPE STIFFNESS KPa @5% DEFL.	M278 PIPE STIFFNESS KPa	M170 CLASS III WALL A	M170 CLASS III WALL B	M170 CLASS III WALL C
12"	0.079	0.064	0.064	0.075			345	320	1¾	2	2¾
15"	0.079	0.064	0.064	0.075			290	320	1⅞	2¼	3
18"	0.109	0.079	0.079	0.075	0.079	0.106	275		2	2½	3¼
21"	0.109	0.079	0.079	0.075	0.079	0.106	260		2¼	2¾	3½
24"	0.109	0.079	0.079	0.075	0.079	0.106	235		2½	3	3¾
27"	0.109	0.079	0.079	0.105			205		2⅝	3¼	4
30"	0.109	0.079	0.079	0.105	0.110	0.134	195		2¾	3½	4¼
33"	0.109	0.079	0.079	0.105					2⅞	3¾	4½
36"	0.109	0.079	0.079		0.110	0.134	150		3	4	4¾
36" (I)			0.079	0.075							
42"	0.138	0.109	0.109		0.110		140		3½	4½	5¼
42" (I)			0.079	0.105							
48"	0.138	0.109	0.109		0.110		125		4	5	5¾
48" (I)			0.079	0.105							
54"	0.168	0.138	0.138		0.110		110		4½	5½	6¼
54" (I)			0.079	0.105							
60"	0.168	0.138	0.138		0.110		95		5	6	6¾
60"(I)			0.079	0.105							
66" (I)			0.079	0.135					5½	6½	7¼
72" (I)			0.109	0.135					6	7	7¾
78" (I)			0.109	0.164						7½	8¼
84" (I)			0.109	0.164						8	8¾

Metal Pipe values are for 2-2/3" x ½" Corrugations unless diameter is followed by (I) which requires 3" x 1" Corrugations for Aluminum Pipes and 3" x 1" or 5" x 1" Corrugations for Steel Pipes.
Option I Pipes shall only be used for entrances.
Fill heights over 15' may require larger metal gages.

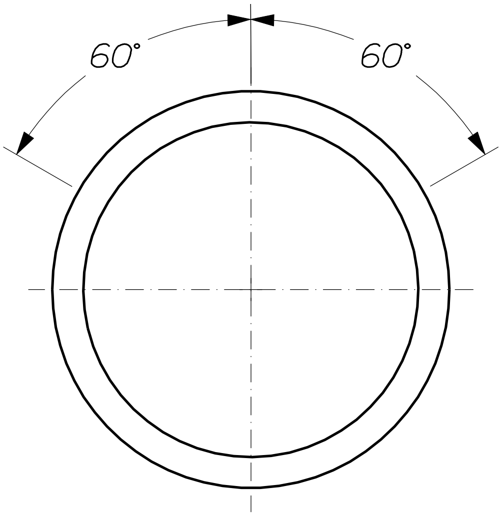
M218 = zinc coated (galvanized) corrugated steel pipe
M274 = aluminum coated (type 2) corrugated steel pipe
M246 = polymer pre-coated galvanized corrugated steel pipe

M197 = Corrugated Aluminum Alloy Pipe
M278 = Polyvinyl Chloride Pipe PVC
M170 = Reinforced Concrete Pipe
M294 = High Density Polyethylene Pipe

(A) Option I, M274 can be used for closed drainage Option III Pipe
(B) Spiral Rib Type IR can be used for Smoothlined Pipe

CULVERT PIPE

603(09)



~ PLACEMENT OF ANCHORS ~

Anchors shall be installed as shown on figure above at 60° down from Top Dead Center (TDC) to the nearest inch measured from the outside. For pipe diameters not listed below, divide the OD by 6.

Holes for anchors shall be drilled larger than the anchor bolt diameter specified in the table below to allow for anchoring materials.

ANCHOR PLACEMENT TABLE	
18" ϕ Pipes	60° from TDC = 12"
24" ϕ Pipes	60° from TDC = 15"
30" ϕ Pipes	60° from TDC = 19"
36" ϕ Pipes	60° from TDC = 22"

NOTES:

1. For new concrete pipe or pipe designated to be removed and reset, ties shall be used at all pipe inlets and outlets as specified in the construction notes.

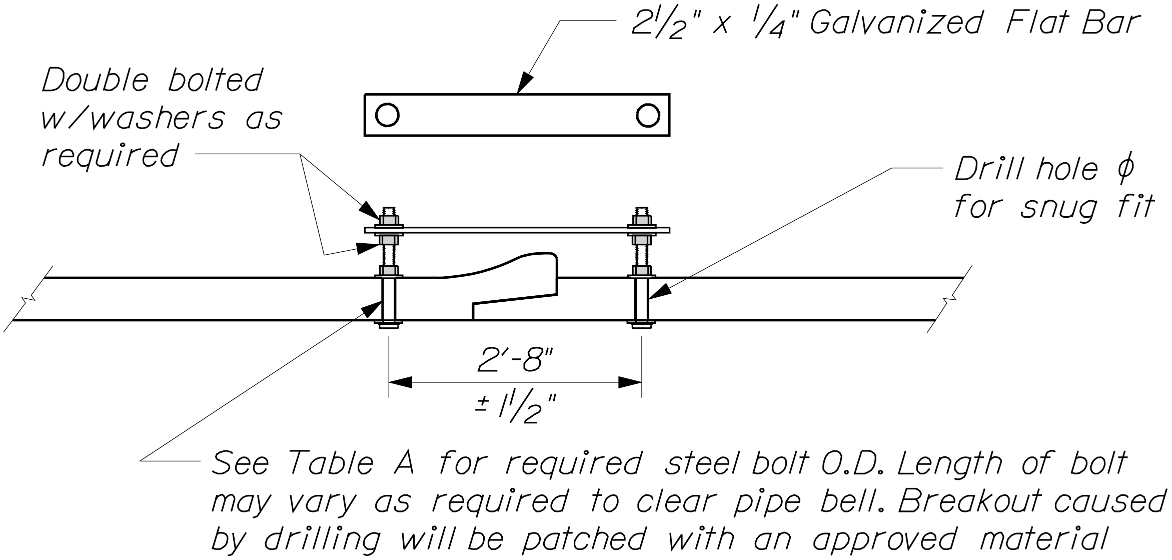
2. Ties shall be used only to hold pipe sections laterally together, not for pulling the pipe section together.

3. Tie rods and connections shall be placed on the outside of all pipe sections unless otherwise directed.

4. Tie rod shall be galvanized steel, including all hardware required. Any welded areas shall be treated with an approved galvanized paint. All welding shall meet current MaineDOT Specifications. Steel shall conform to ASTM A 307 or equivalent.

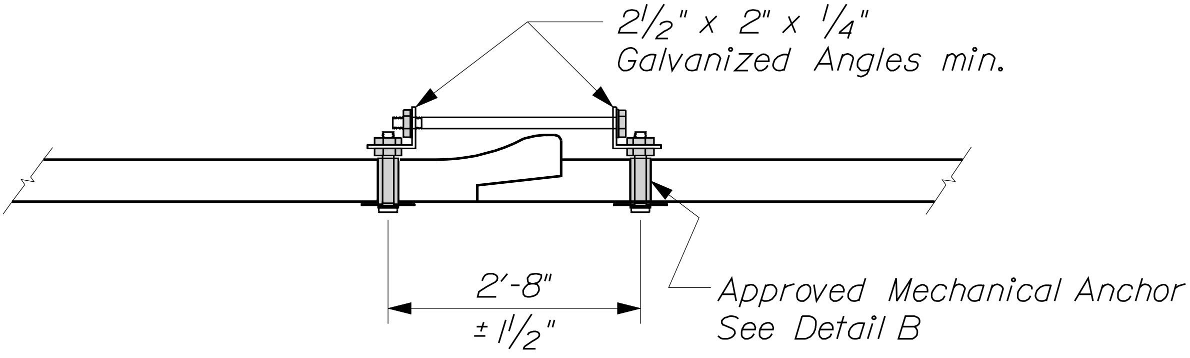
CONCRETE PIPE TIES

603(10)



See Table A for required steel bolt O.D. Length of bolt may vary as required to clear pipe bell. Breakout caused by drilling will be patched with an approved material

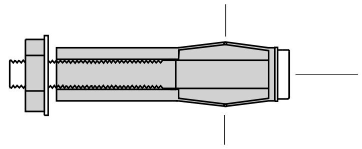
~ GALVANIZED BOLTED ANCHOR W/GALVANIZED FLATBAR CONNECTION ~



~ MECHANICAL ANCHOR W/ GALVANIZED PLATE CORE DRILL HOLES ~

TABLE A

PIPE SIZE (I.D.)	BOLT THREAD ϕ
12" - 26" I.D.	⅝"
27" - 66" I.D.	¾"
67" - 132" I.D.	1"

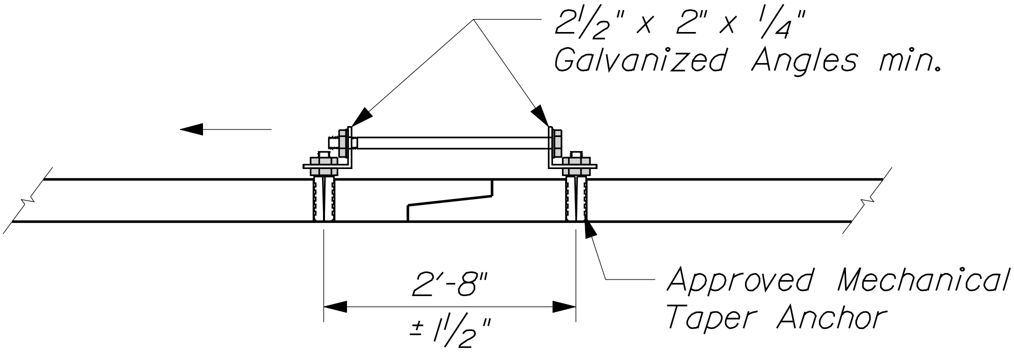


Compression/Expansion Type Mechanical Anchor

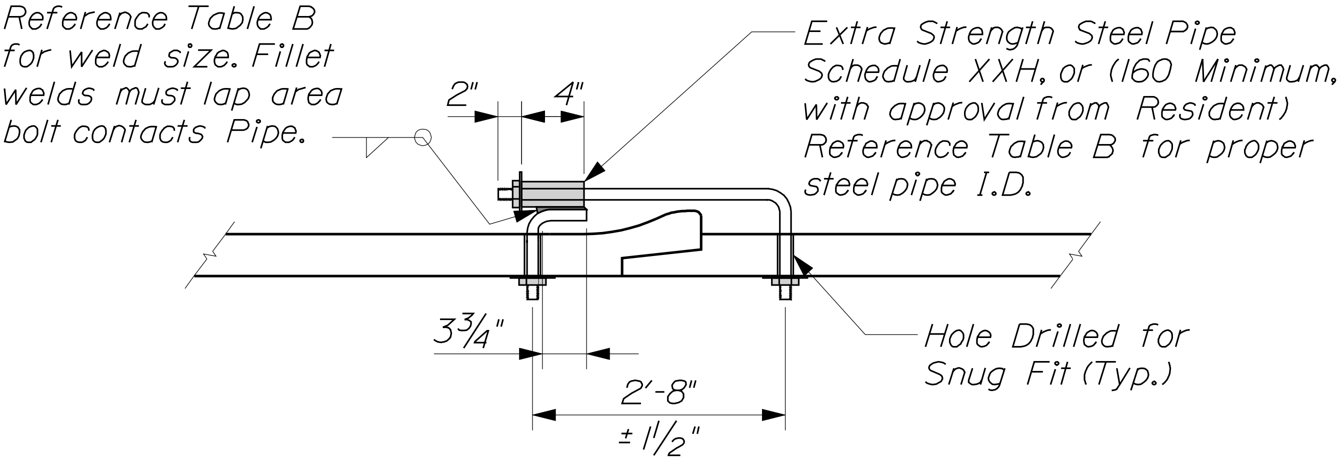
~ DETAIL B ~

CONCRETE PIPE TIES

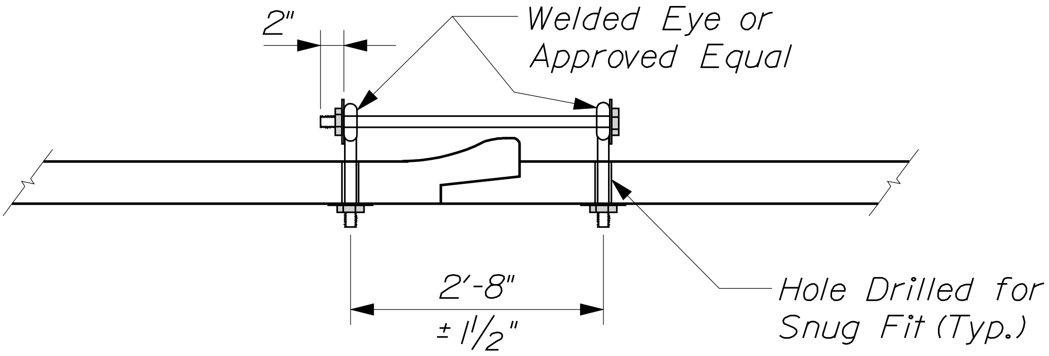
603(11)



~ MECHANICAL ANCHOR W/GALVANIZED ANGLE PLATE ~



~ WELDED PIPE TIE ~



~ EYE BOLT TIE ~

TABLE B			
BOLT O.D.	STEEL PIPE I.D.	WELD SIZE	CRP PIPE I.D.
5/8"	3/4"	5/16"	12" - 26"
3/4"	1"	3/8"	27" - 66"
1"	1 1/4"	1/2"	67" - 132"

CONCRETE PIPE TIES

603(12)

GENERAL NOTES

1. Catch basins in excess of 8′ in depth shall, if directed, be provided with steps similar to those detailed for manholes.

2. Drain holes in precast sumps shall be less than or equal to 3" in diameter and shall be plugged with mortar when constructed.

3. All precast sections of less than 8" wall thickness shall have tongue and groove joints.

4. Cone and ring sections shall have a wall thickness of 4" minimum to 8" maximum.

5. Minimum wall thickness at the sump shall be 4" as specified in AASHTO M199.

6. The wall around inlet and outlet pipes shall be a pre-cast opening 2" larger than the outside diameter of the pipe.

7. Lift holes or lift handles shall be provided for installation of Catch Basins and Manholes.

8. Lift holes shall not exceed 3" in diameter and shall be plugged with mortar when constructed. Lift handles shall not exceed 3" in diameter and shall be cut off as directed by the Resident Engineer prior to back filling the structure.

Structure	Top					Shape				Grate
Catch Basin	A	B	D	A(P)	B(P)	1	2	5	6	
Type A	■					■		■		C
Type B		■				■		■		C
Type A Portland				■		■		■		P
Type B Portland					■	■		■		P
Type F										C*
Manhole			■				■		■	MHC

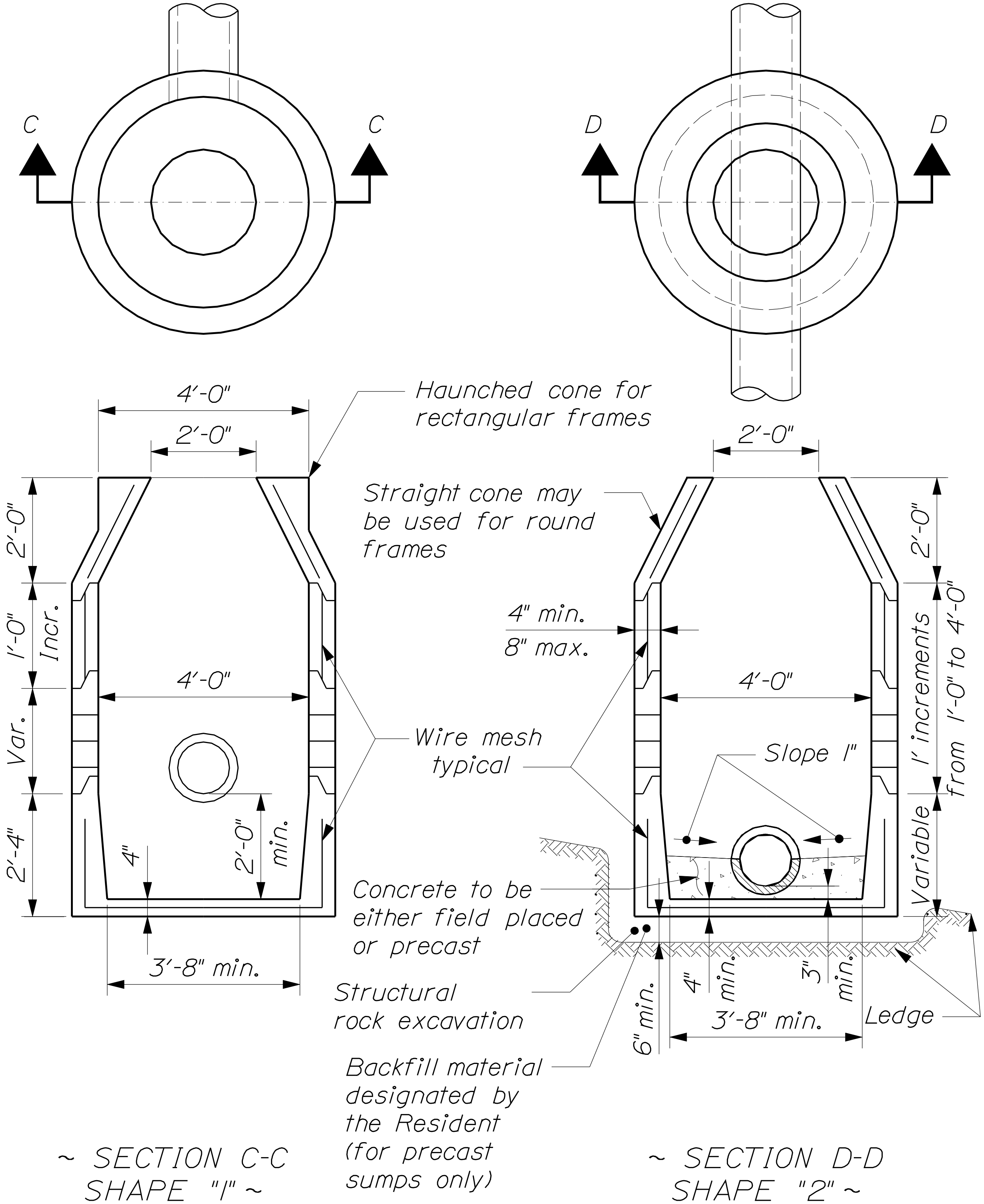
*Certain applications may allow for non-cascade grates.

~ TABLE OF CATCH BASIN TYPES ~

(combinations of tops and types)

CATCH BASINS

604(01)



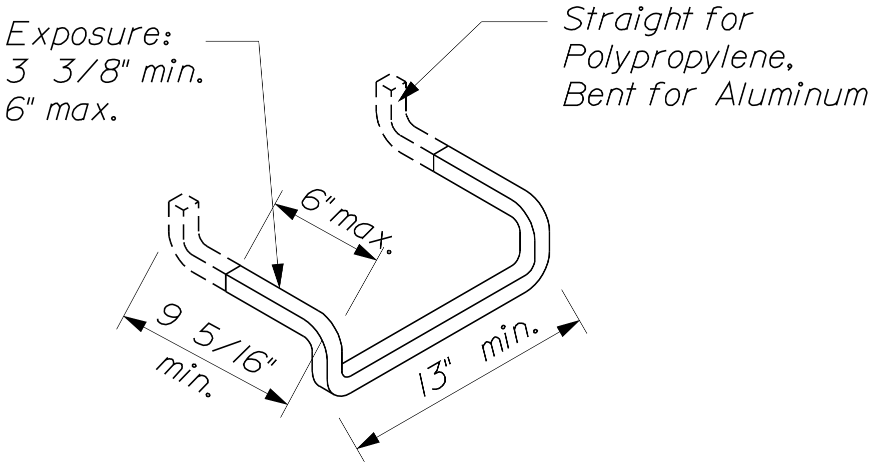
~ SECTION C-C SHAPE "1" ~

~ SECTION D-D SHAPE "2" ~

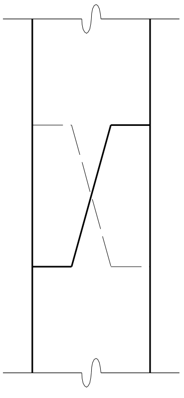
Dimensions are intended to be nominal

CATCH BASIN OR MANHOLE

604(02)

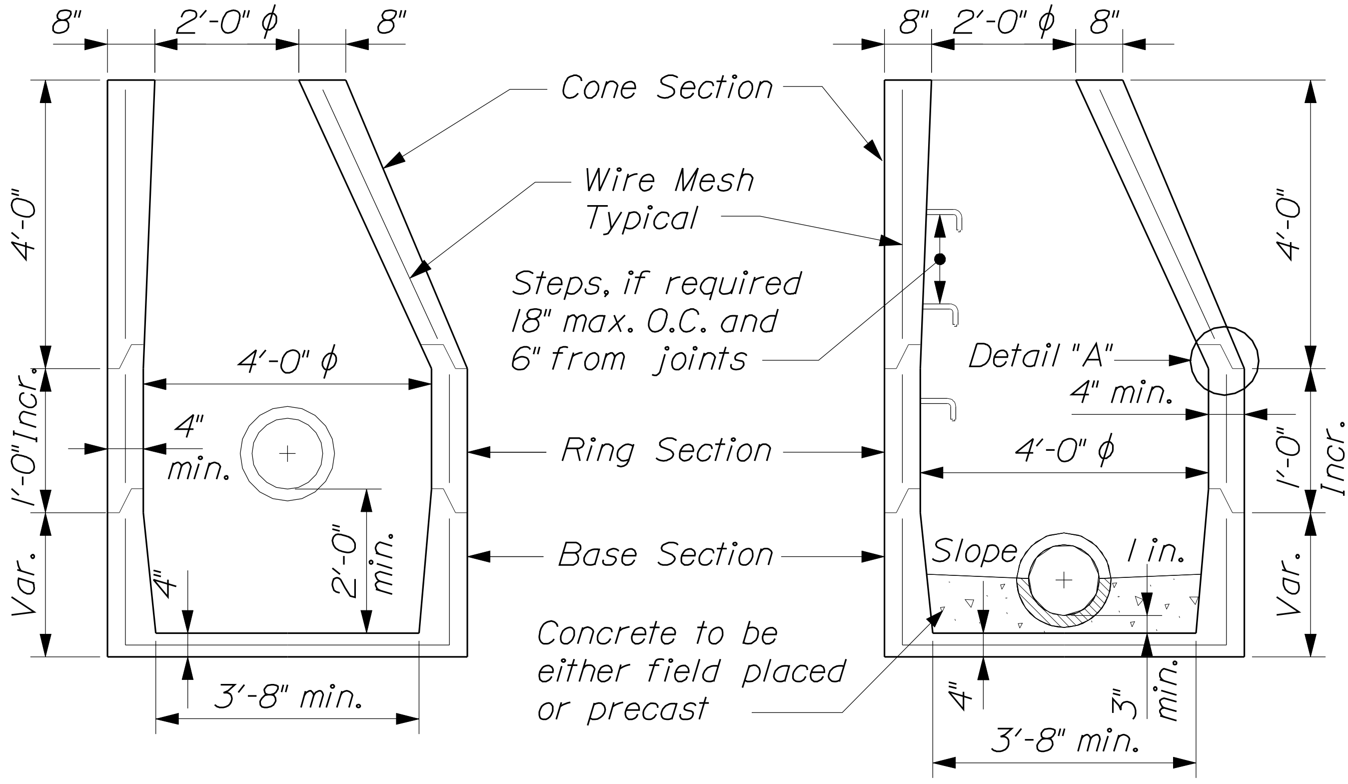


~ STEP ~



~ DETAIL "A" ~

Alternate Joint



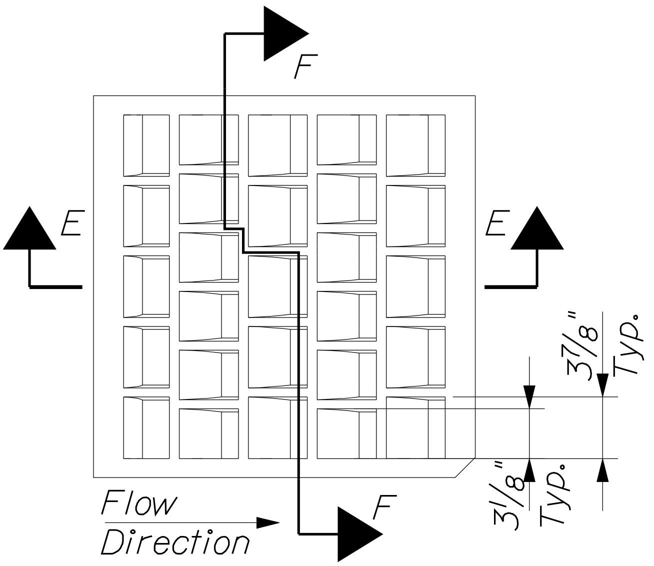
~ SHAPE "5" ~

~ SHAPE "6" ~

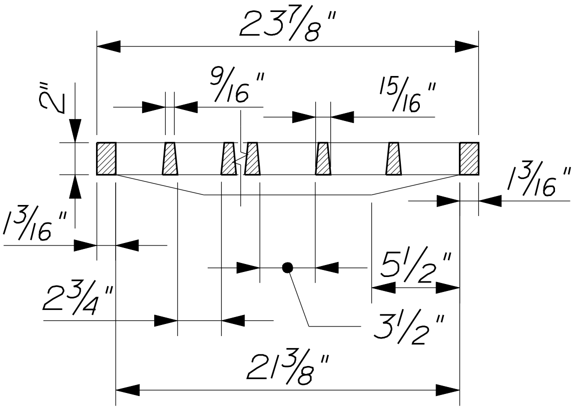
Dimensions are intended to be nominal.

CATCH BASIN OR MANHOLE

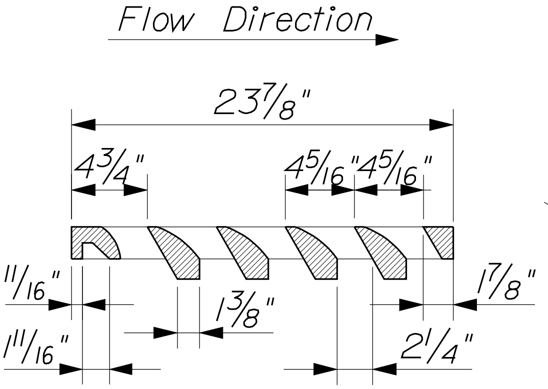
604(03)



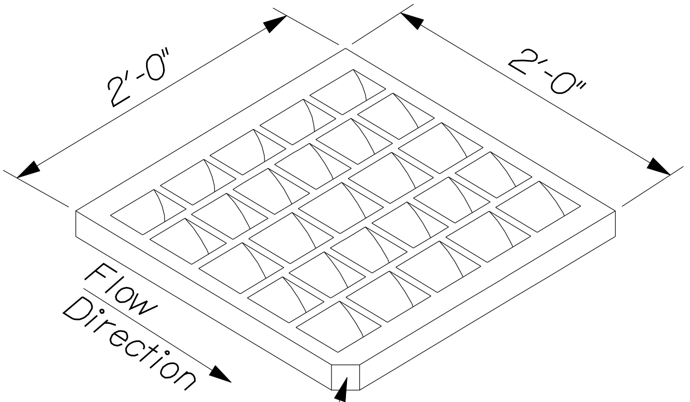
~ TOP VIEW ~



~ SECTION F-F ~



~ SECTION E-E ~



~ ISOMETRIC VIEW ~

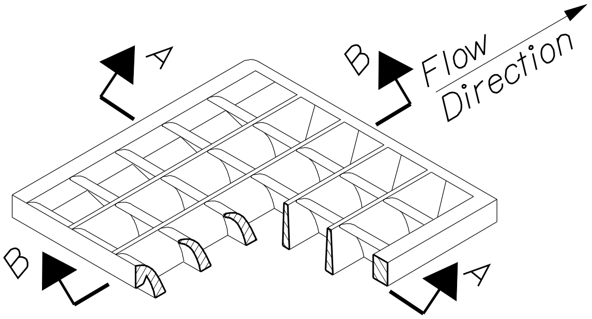
This corner left off
for "right" grate.
Diagonally opposite
corner for "left" grate
to fit in keyed frames.

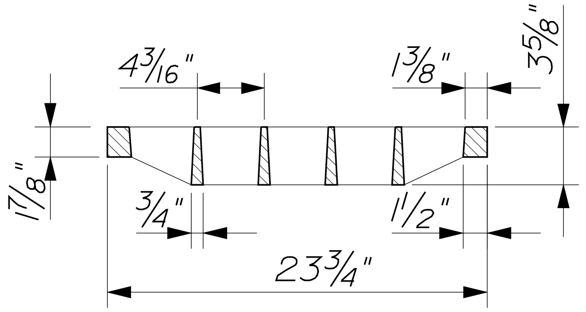
NOTES:

1. To be used where parallel bar grates would present a hazard to bicycle traffic.
2. For use on catch basin types: A1-C, A2-C, A5-C, B1-C, B2-C, B5-C, F3-C, F4-C, F5-C, F6-C.

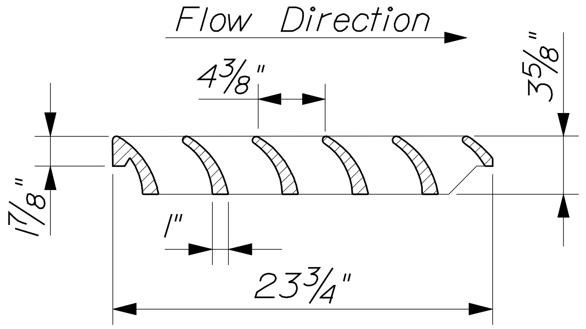
"CASCADE - TYPE" GRATES

604(04)A





~ SECTION A-A ~



~ SECTION B-B ~

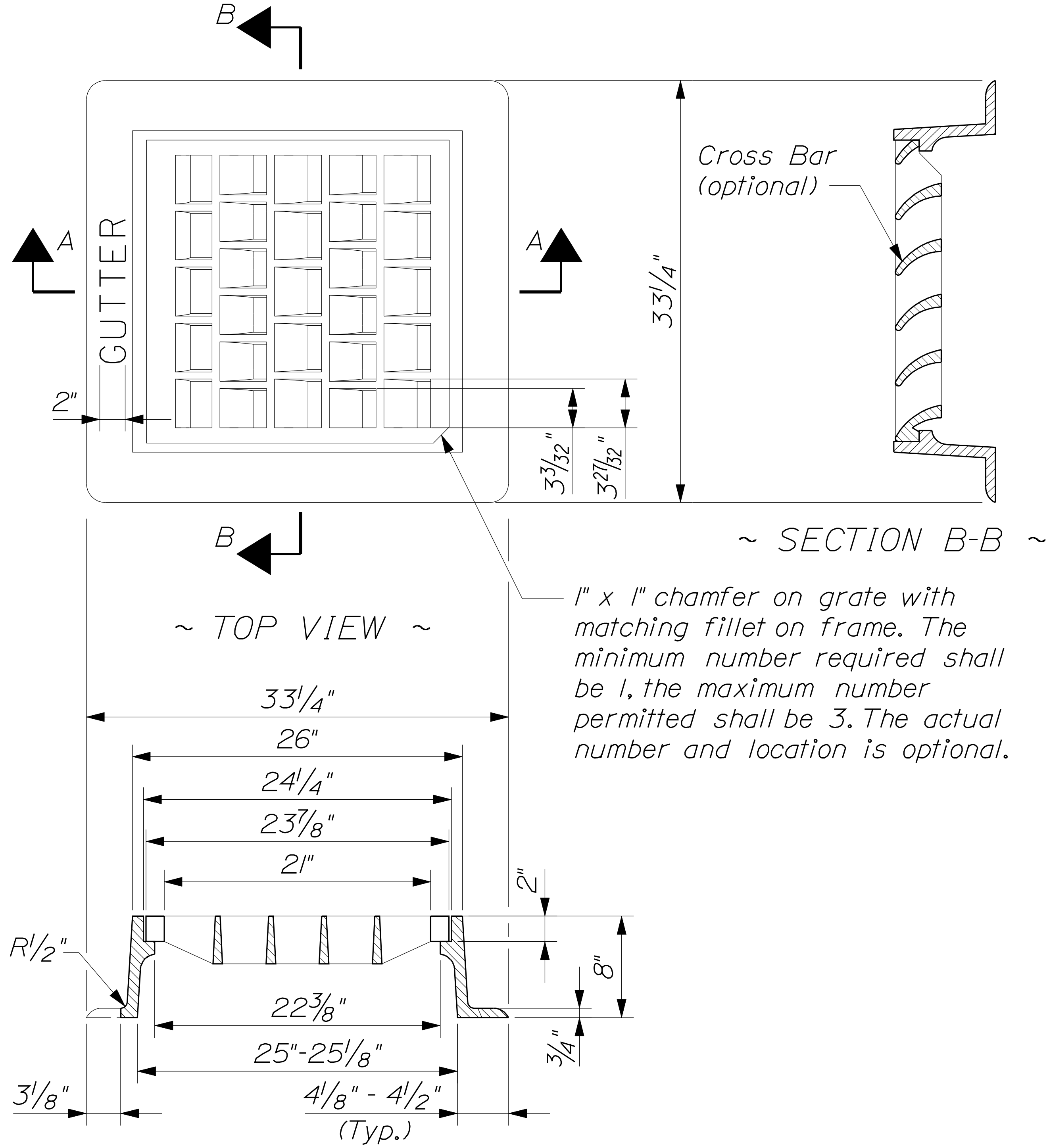
NOTES:

1. To be used where parallel bar grates would present a hazard to bicycle traffic.
2. For use on catch basin types: A1-C, A2-C, A5-C, B1-C, B2-C, B5-C, F3-C, F4-C, F5-C, F6-C.

"CASCADE - TYPE" GRATES

OR APPROVED EQUAL

604(04)B



~ TOP VIEW ~

~ SECTION B-B ~

1" x 1" chamfer on grate with matching fillet on frame. The minimum number required shall be 1, the maximum number permitted shall be 3. The actual number and location is optional.

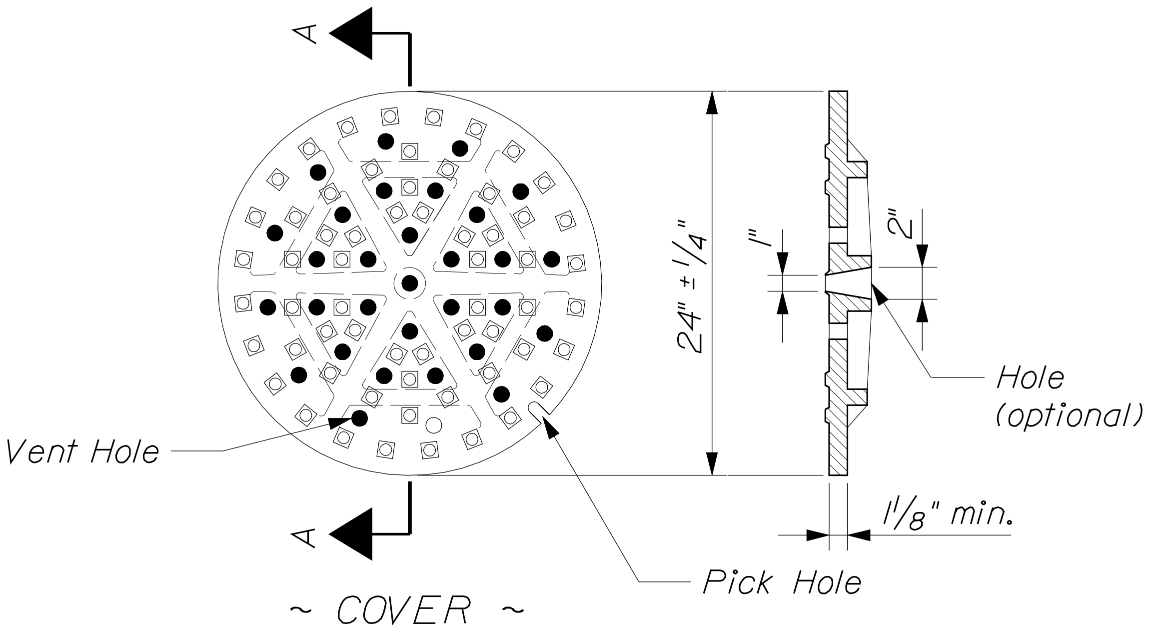
~ SECTION A-A ~

NOTES:

1. Type "A" frames are to have 3 flanges.
2. Type "B" frames are to have 4 flanges.
3. The word "gutter" is to be molded into the back flange - Type "B" only.
4. Frames and grates are to be of gray cast iron or ductile iron conforming to AASHTO M306.
5. Dimensions are nominal.

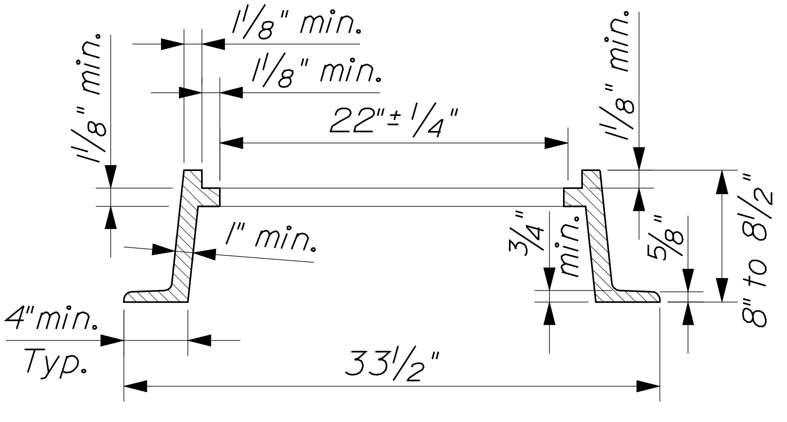
TYPE "A" & "B" CATCH BASIN TOPS

604(05)



~ COVER ~

~ SECTION A-A ~



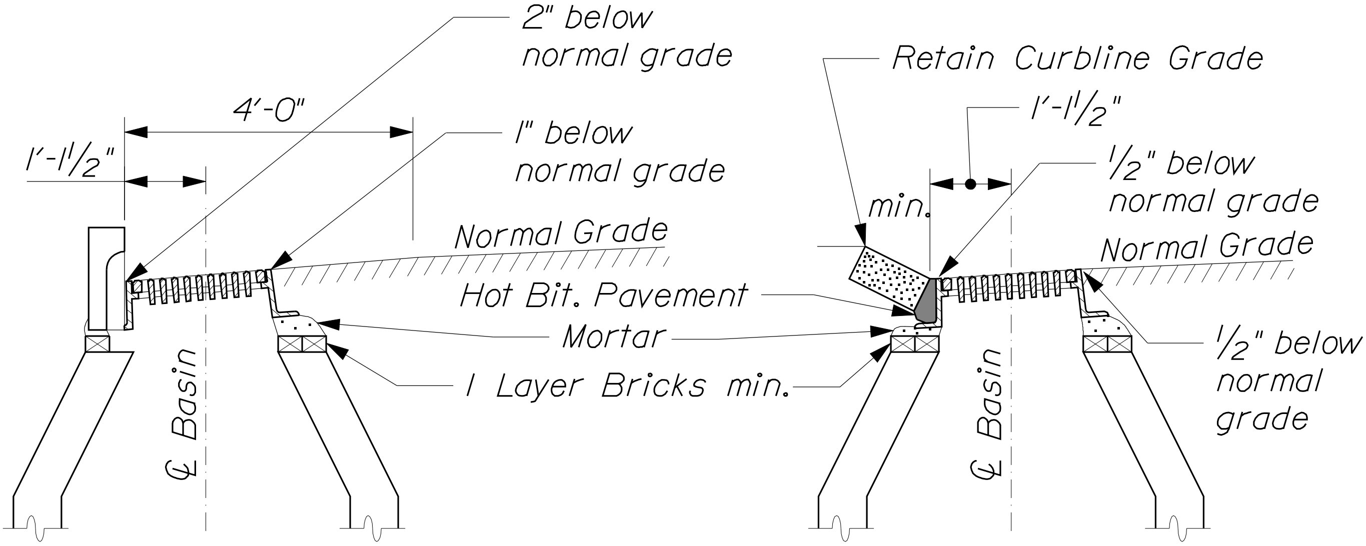
~ FRAME ~

NOTES:

1. Manhole frames and covers are to be machined to a smooth fit and shall be of gray cast iron or ductile iron conforming to AASHTO M306.
2. Diamond top surface is optional.

MANHOLE TOP "D"

604(07)



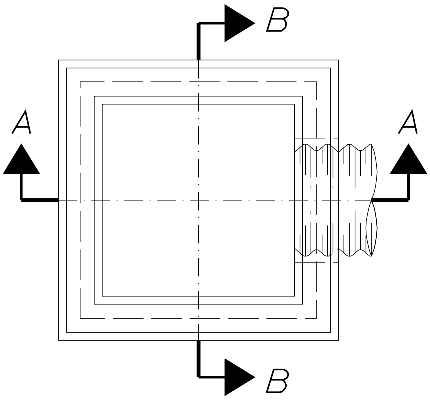
~ TYPE "A" ~
For use with
Curb Type 1 or 2

~ TYPE "B" ~
For use with
Curb Type 3 or 5

Dimensions are intended to be nominal.

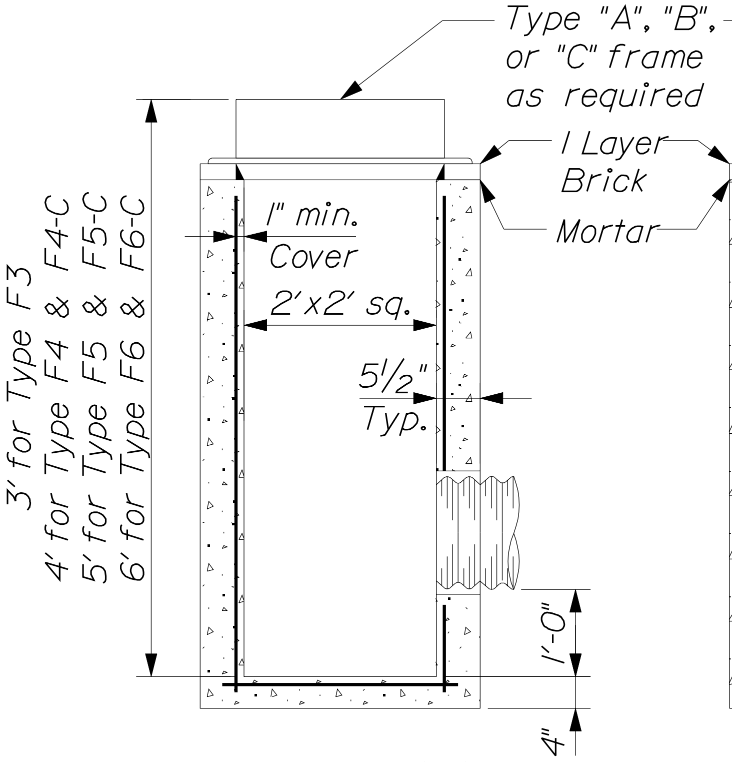
CATCH BASIN TOP INSTALLATION

604(08)

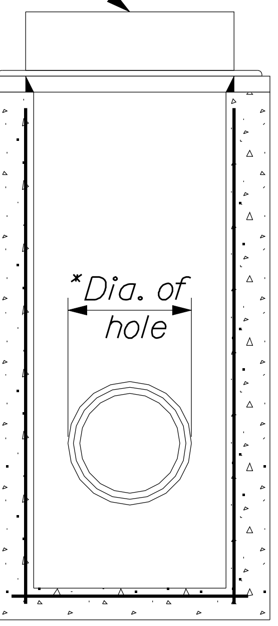


~ TOP VIEW ~

NOTE:
Entire Catch Basin with exception of leveling brick frame and grate to be precast as a single Portland Cement concrete unit, #4 rebar Minimum 8" O.C., or equivalent with Residents approval.



~ SECTION A-A ~

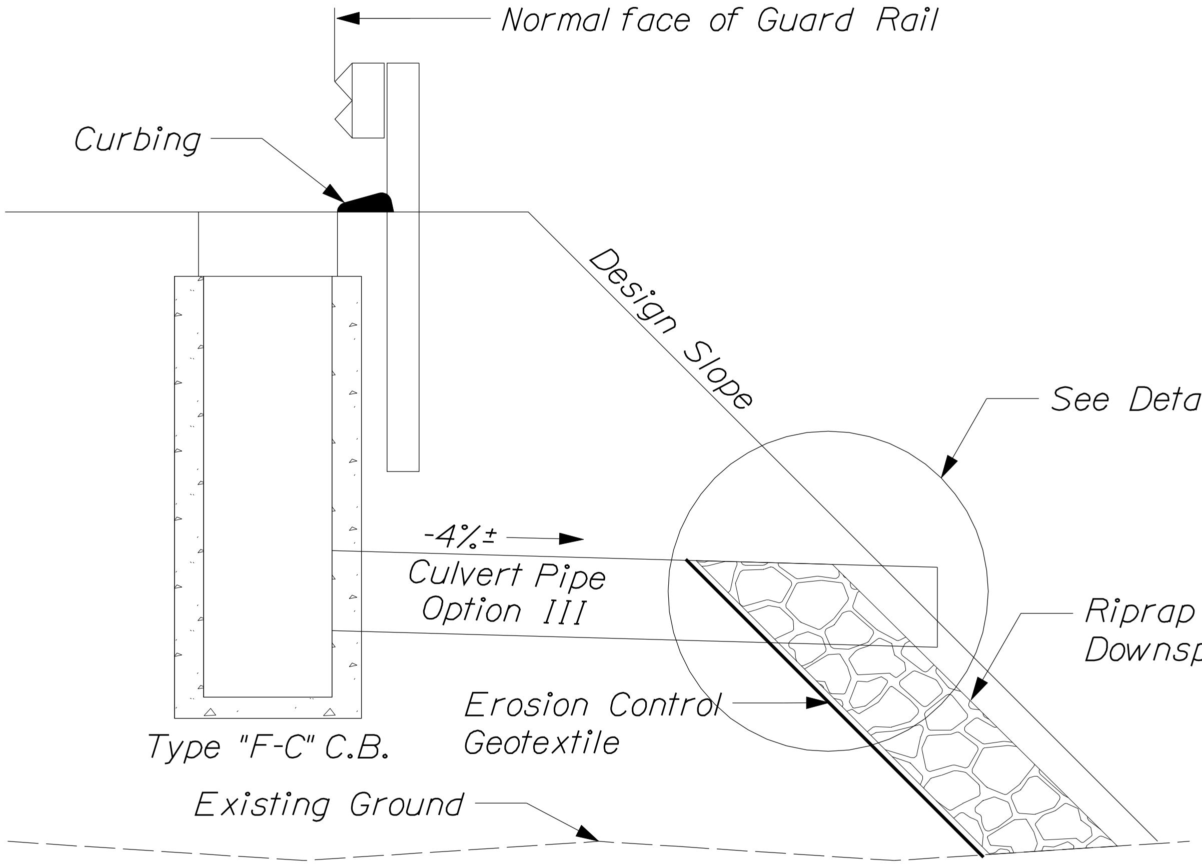


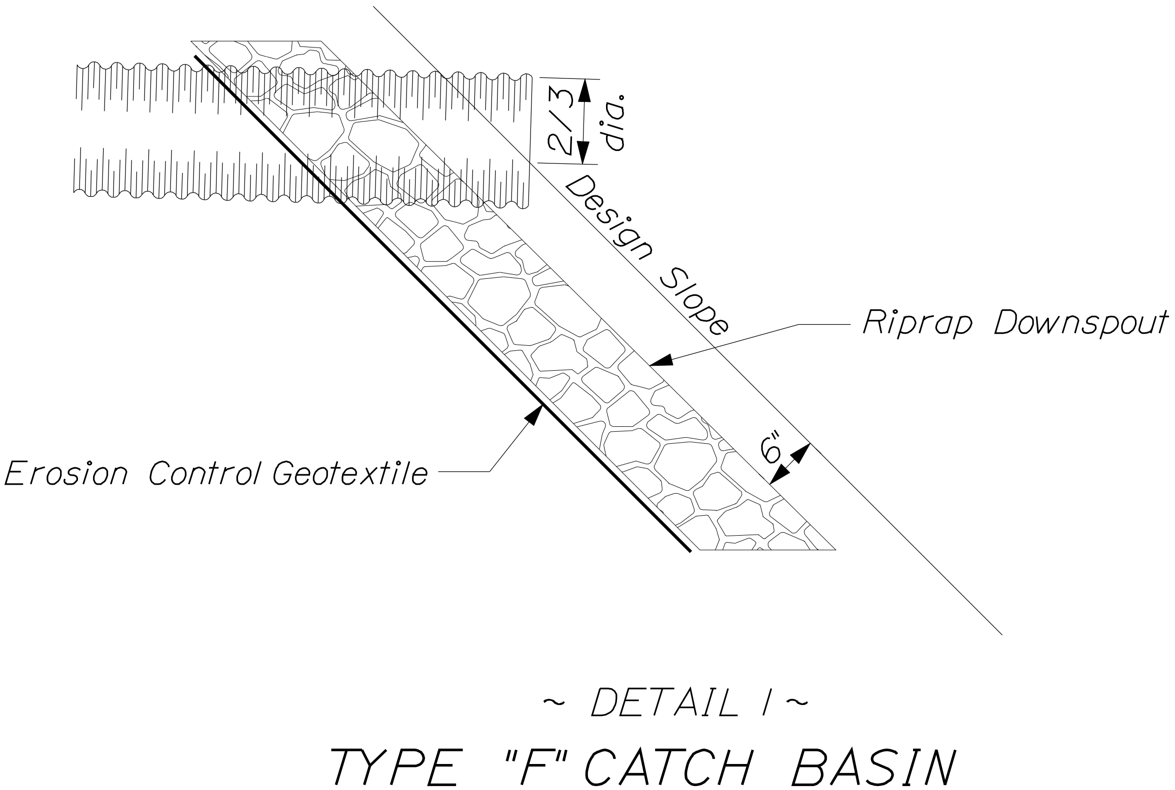
~ SECTION B-B ~

*Diameter of hole to be 3" larger than the inside diameter of flexible pipe or the outside diameter of rigid pipe.

CATCH BASIN TYPE "F"

604(10)





~ DETAIL I ~

TYPE "F" CATCH BASIN
WITH OUTLET PIPE AND RIPRAP

604(II)

GENERAL NOTES

1. Sewer bricks to conform to ASTM Standard Specification Design #C 32-63, Grade M.A. or S.A.

2. Casting shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage, distortion, or other defects. They shall be smooth and well cleaned, trimmed and inspected, and approved asphalt paint. Material to be designated in ASTM Standard Specifications. 48-Class 35.

3. All concrete shall be class "A" having a minimum ultimate compressive strength of 4,000 lb/in² at the end of 28 days unless otherwise noted.

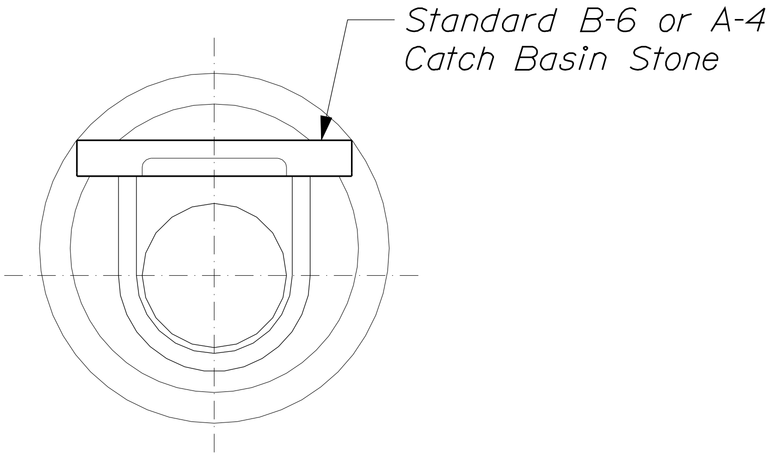
4. Plastic Manhole Steps 12" O.C. made of Co-Polymer Polypropylene with $3/8$ grade 60 steel rebar inside with 1st step 8" below top of cone.

5. Waterproofing - The outside surface of catch basins and manhole cones shall be given 2 coats of waterproofing material in accordance with the instructions of the Manufacturer. Time shall be allowed between coats to permit sufficient drying. This way the application of following coats has no effect on the previous coat(s).

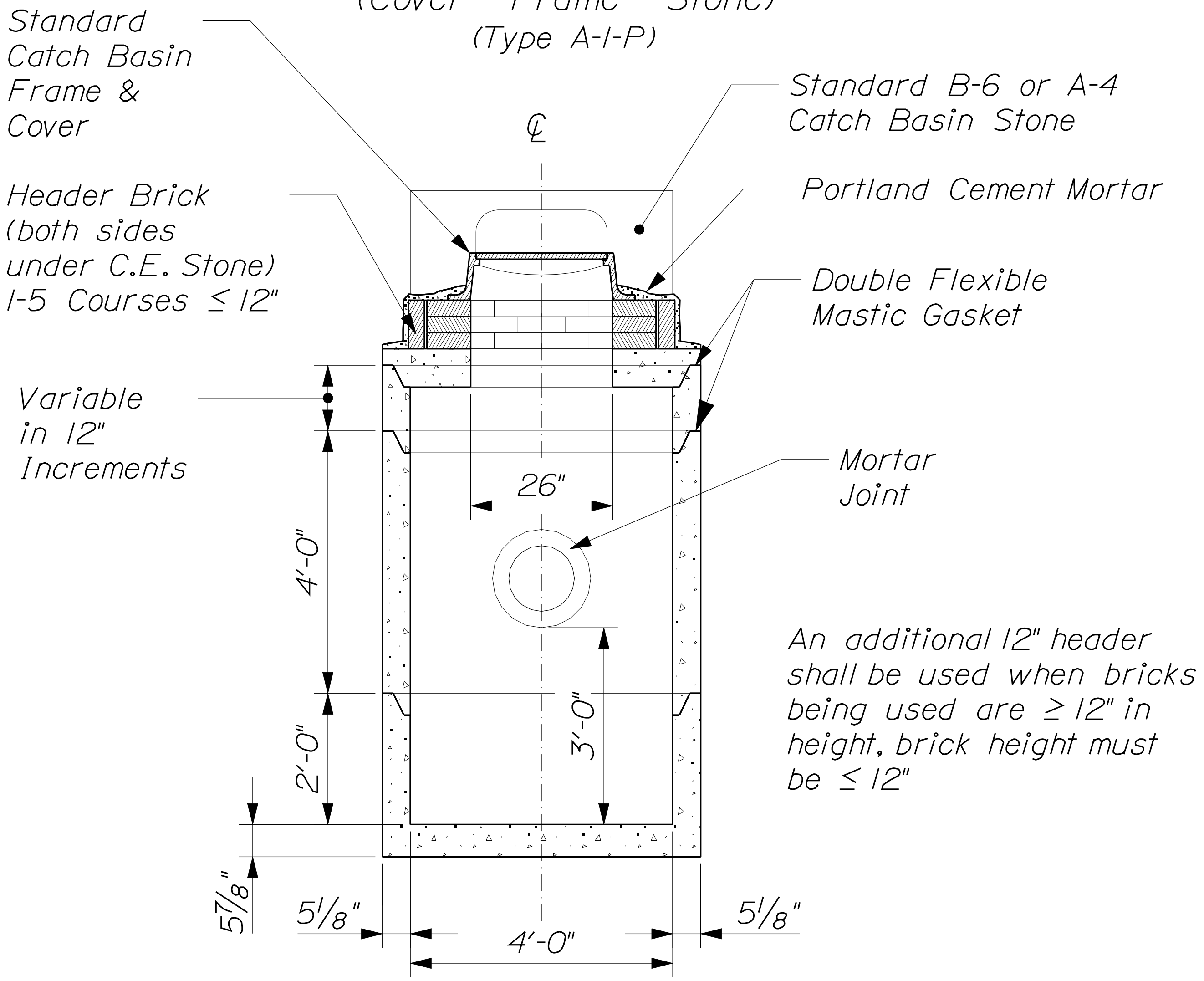
6. Catch basins not in a system that connects into existing City of Portland drainage system may be constructed without flexible plastic gaskets and will have a minimum 3 foot sump.

REINFORCED CONCRETE CATCH BASIN
TYPE A-I-P & TYPE B-I-P

604(12)



~ PLAN ~
(Cover - Frame - Stone)
(Type A-1-P)

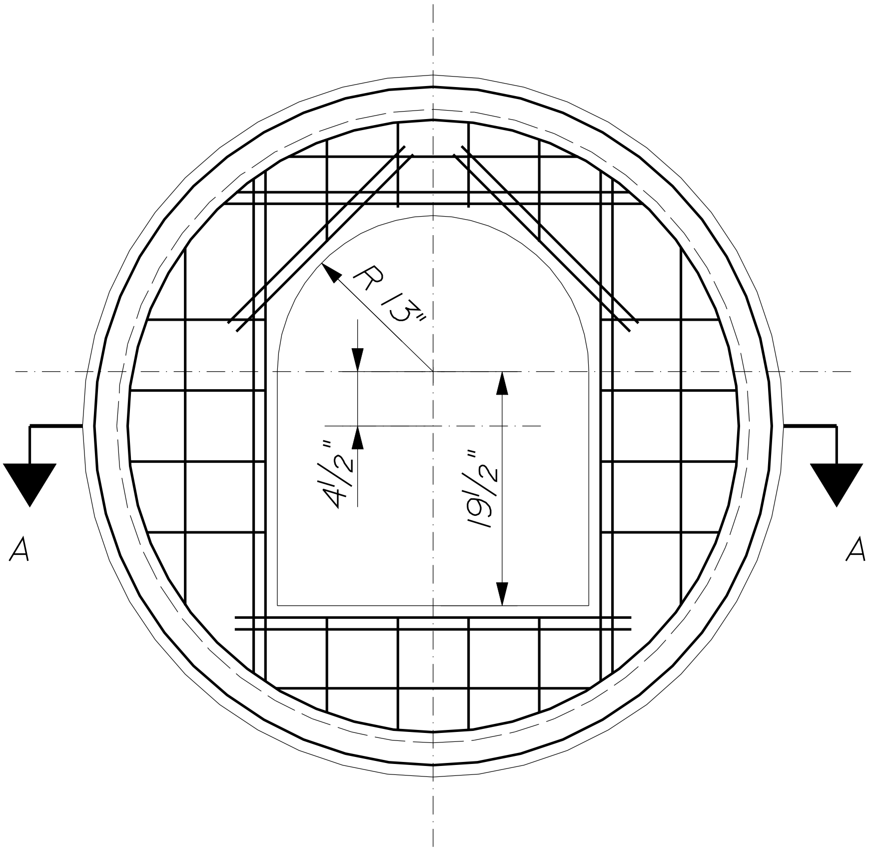


An additional 12" header shall be used when bricks being used are ≥ 12" in height, brick height must be ≤ 12"

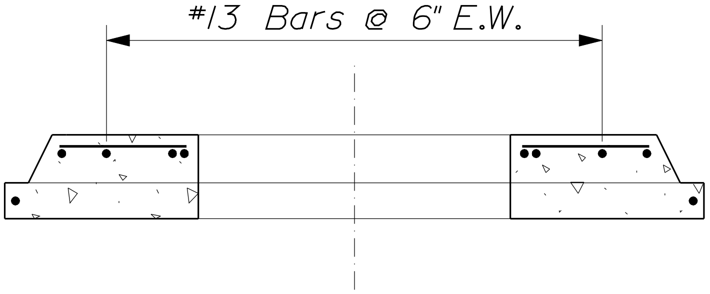
Construction Alternate "A"

REINFORCED CONCRETE CATCH BASIN
TYPE A-1-P

604(13)



~ PLAN ~

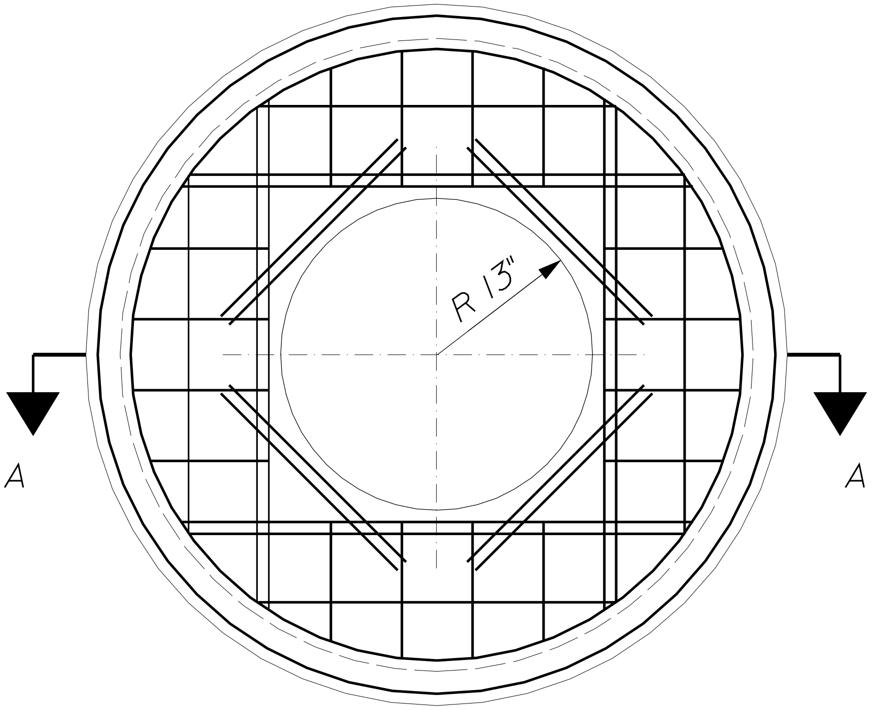


~ SECTION A-A ~

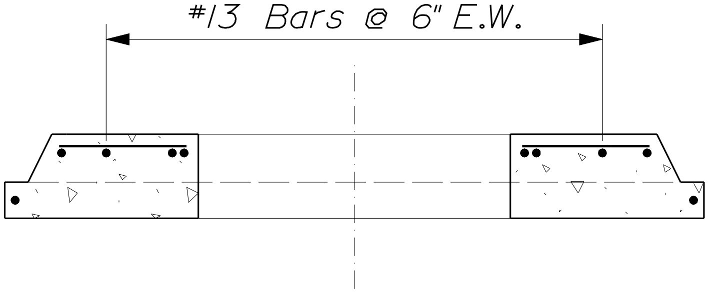
~ TOP SLAB DETAIL FOR TYPE A-I-P ~

REINFORCED CONCRETE CATCH BASIN
TYPE A-I-P TOP SLAB DETAIL

604(14)



~ PLAN ~

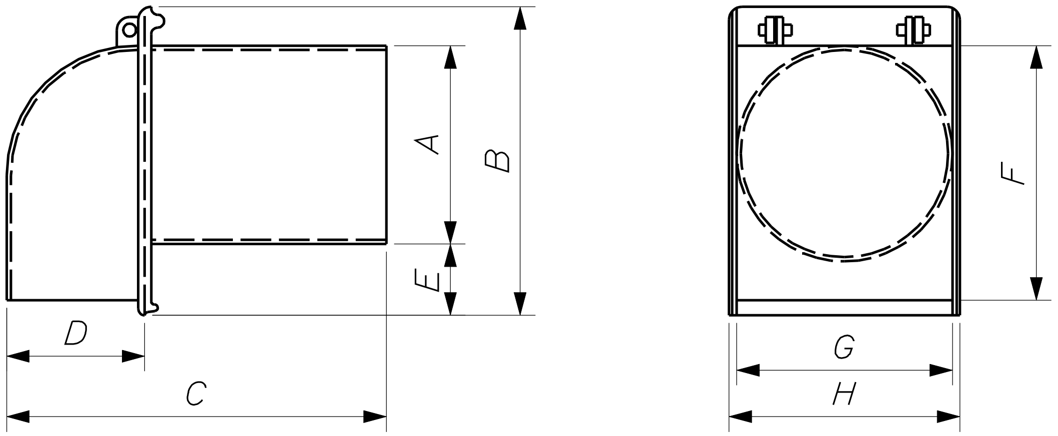


~ SECTION A-A ~

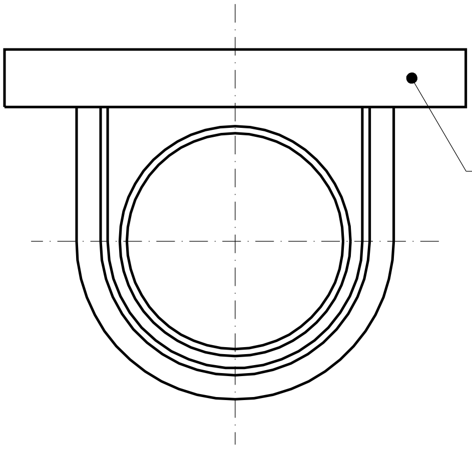
~ TOP SLAB DETAIL FOR TYPE B-I-P ~

REINFORCED CONCRETE CATCH BASIN TYPE B-I-P TOP SLAB DETAIL

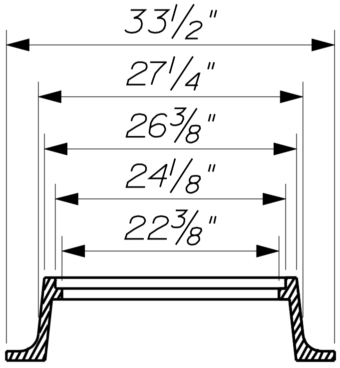
604(15)



~ TRAP DETAIL ~



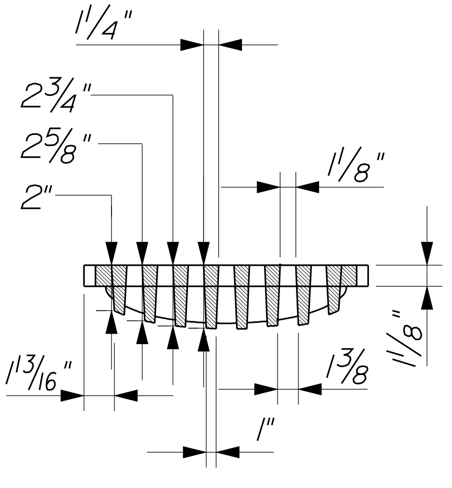
~ TYPE 'A' INLET ~



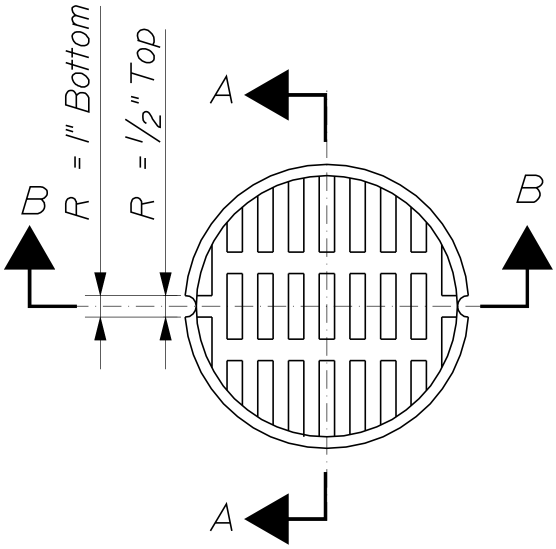
Size	6"	8"	10"	12"	15"
A	5½"	7½"	9½"	11½"	Similar to Designs at Left
B	13⅜"	15"	16"	17"	
C	13¾"	15⅜"	16¼"	22"	
D	5⅜"	5½"	6"	8"	
E	5⅞"	5⅜"	4½"	3¼"	
F	11⅝"	13¾"	14⅛"	15½"	
G	6½"	8¾"	11½"	12½"	
H	7¼"	9⅜"	12⅜"	13⅜"	

REINFORCED CONCRETE CATCH BASIN
TYPE A-I-P

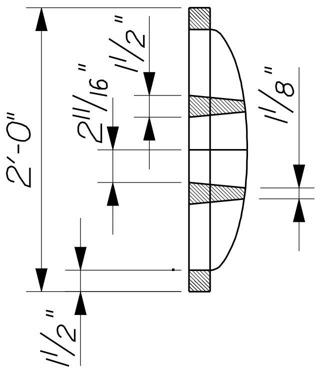
604(16)



SECTION B-B

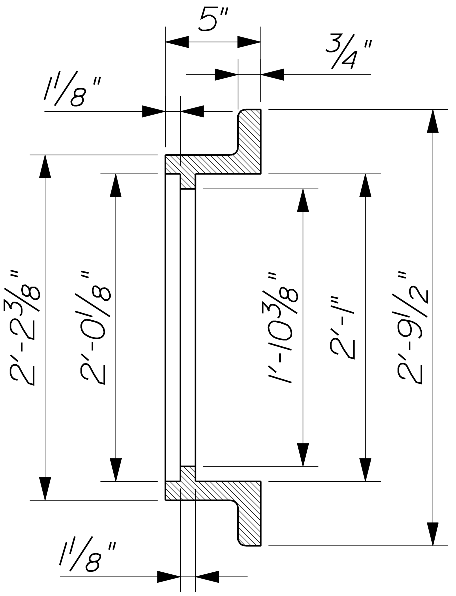


PLAN VIEW

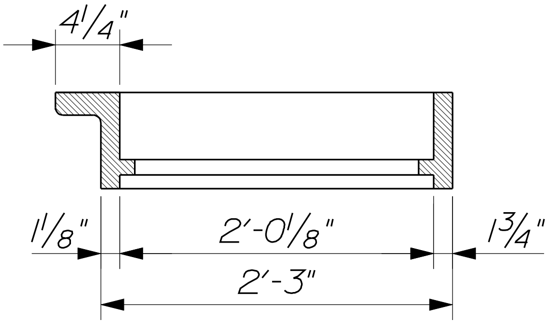


SECTION A-A

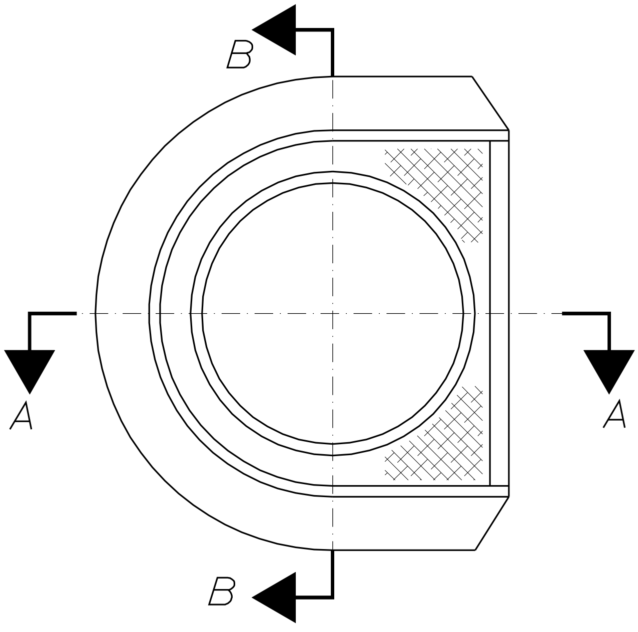
~ GRATE DETAIL ~



SECTION B-B



SECTION A-A



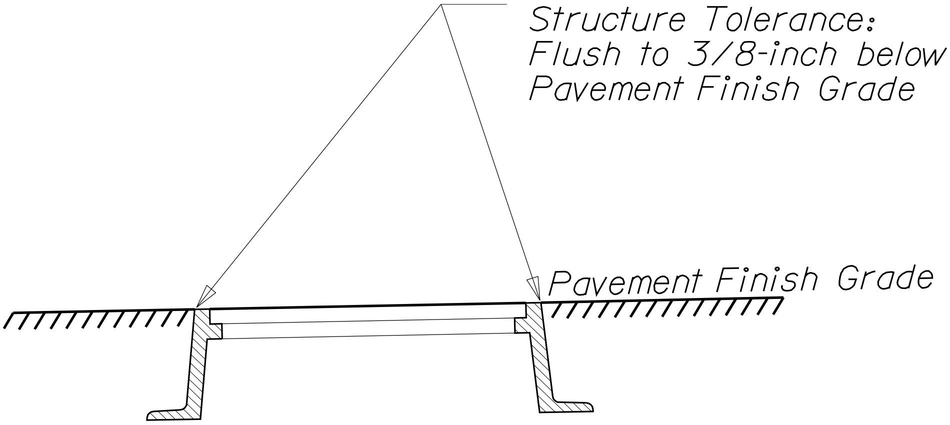
PLAN VIEW

~ FRAME DETAIL ~

REINFORCED CONCRETE CATCH BASIN
TYPE B-I-P DETAILS

604(17)

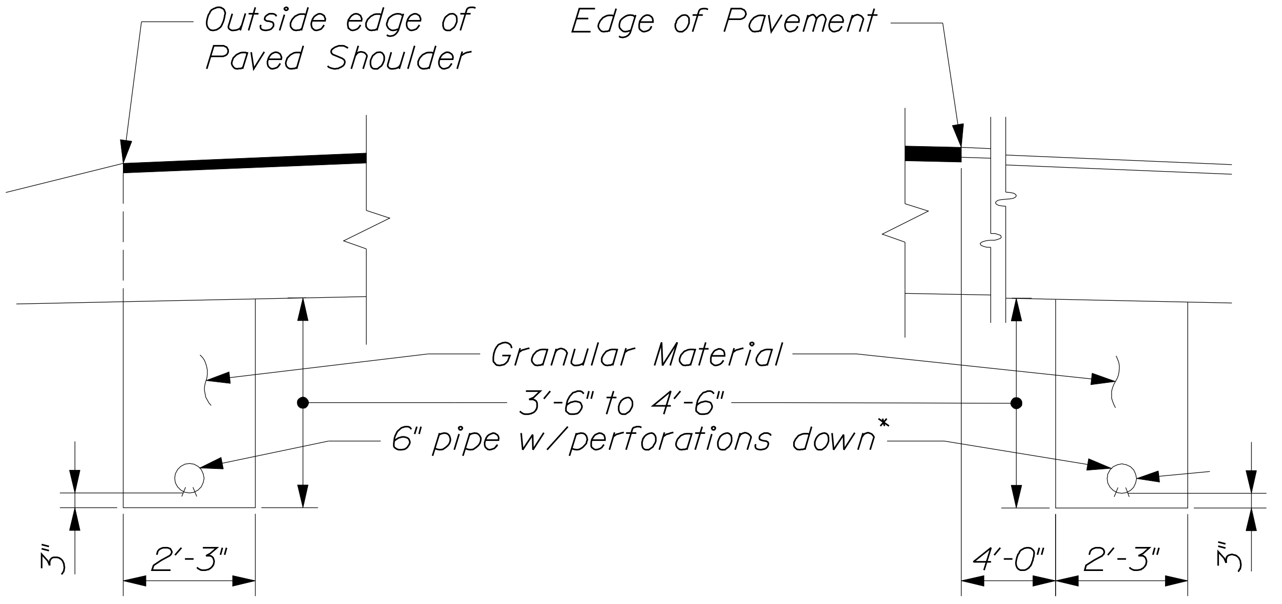
NOTES:
1) Manhole frames, valve boxes, and
covers shall meet ASTM A48



UTILITY STRUCTURE
(Manhole, Valve Box, Vault Cover)

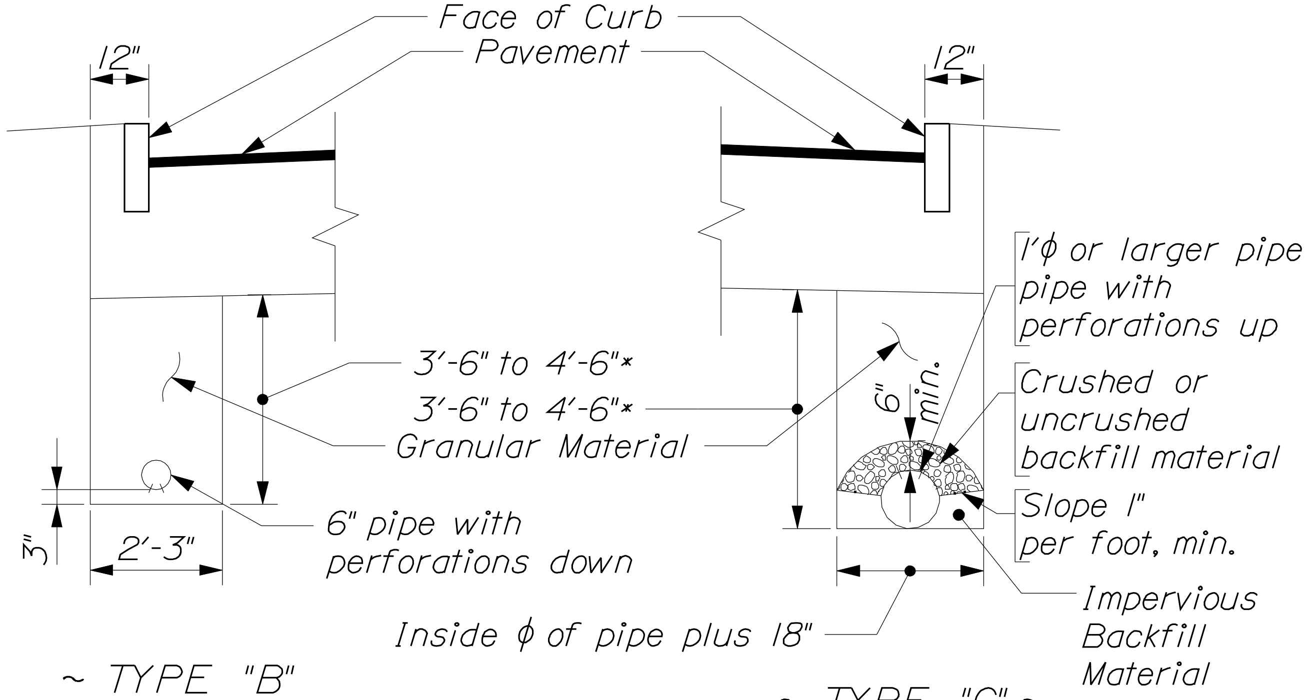
UTILITY STRUCTURES

604(18)



~ TYPE "B" PAVED SHOULDER ~

~ TYPE "B" GRAVEL SHOULDER ~



~ TYPE "B" CURBED SHOULDER ~

~ TYPE "C" ~

*Unless otherwise shown on the plans

UNDERDRAIN

605(01)

UNDERDRAIN NOTES

1. The maximum vertical measurement of depth for payment of Structural Rock Excavation will be to a horizontal plane located 12 inches below the bottom of the invert of the pipe for Underdrain Type "B" and Underdrain Type "C".

2. The material for Elbows, Tees, & Wyes for Underdrain Types "B" and "C" shall be at least as thick as the largest size pipe being connected.

3. The invert elevation of Underdrain Type "B" outlets shall be a minimum of 6 inches above the flow line of a ditch or the original ground.

4. Width of the trench for underdrain outlet will be the same as the underdrain trench.

5. No allowance for payment will be made for excavating or material excavated beyond the horizontal dimensions shown for Types "B" or "C" Underdrain.

6. In "Box Sections" the edge of the trench shall be in line with the edge of box section.

UNDERDRAIN NOTES

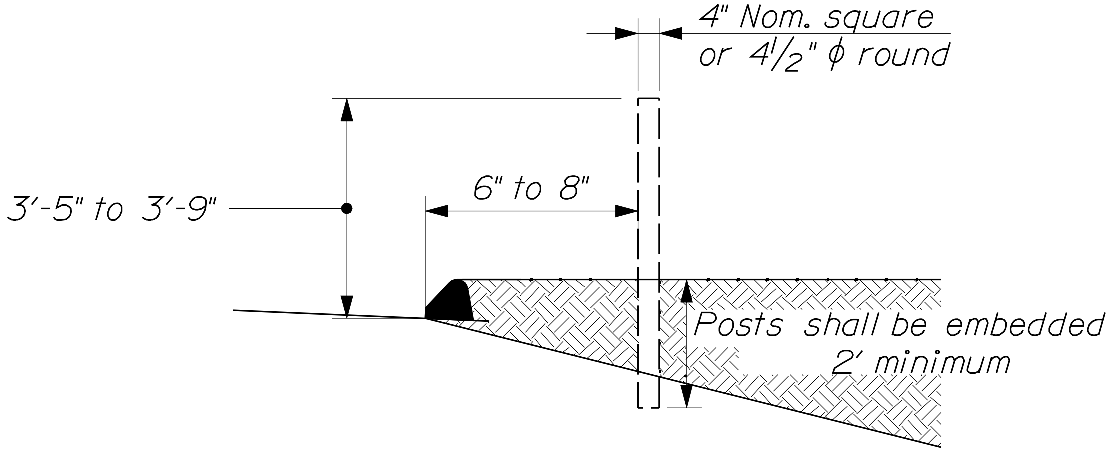
605(02)

Type "B" and Type "C" Underdrain Pipe									
Underdrain Pipe Nominal Wall Thickness in Inches						Underdrain Stiffness in KPa			
Corrugated				Metal Pipe		PVC Pipe		Polyethylene Pipe	
				Type IR $\frac{3}{4} \times \frac{3}{4} \times 7\frac{1}{2}$"					
Diameter	M 218	M 274 & M 246	M 197	M 274	M 197	M 278	ASTM F 949	M 294 SP	M 252 SP
Type "B" Underdrain Pipe									
6"	0.064	0.052	0.048			320	340		340
Type "C" Underdrain Pipe									
12"	0.079	0.064	0.075			320		345	
15"	0.079	0.064	0.075			320		290	
18"	0.079	0.064	0.075	0.079	0.106			275	
21"	0.079	0.064	0.075	0.079	0.106			260	
24"	0.079	0.064	0.075	0.079	0.106			235	
30"	0.109	0.064	0.105	0.079	0.106			195	
36"	0.109	0.064	0.105	0.079	0.106			150	

M 218 = Zinc Coated (Galvanized) Corrugated Steel Pipe
M 274 = Aluminum Coated (Type 2) Corrugated Steel Pipe
M 246 = Polymer Pre-coated Galvanized Corrugated Steel Pipe
M 197 = Corrugated Aluminum Alloy Pipe
M 278 = Smoothwall PVC pipe
ASTM F 949 = PVC Corrugated Sewer Pipe with smooth interior
M 294 SP = Corrugated Polyethylene Pipe with smooth inner liner
M 252 SP = Corrugated Polyethylene Drainage Tubing with smooth inner liner

UNDERDRAIN

605(03)



~ SINGLE WOOD POST ~

NOTES:

1. A post shall be provided for each mailbox.

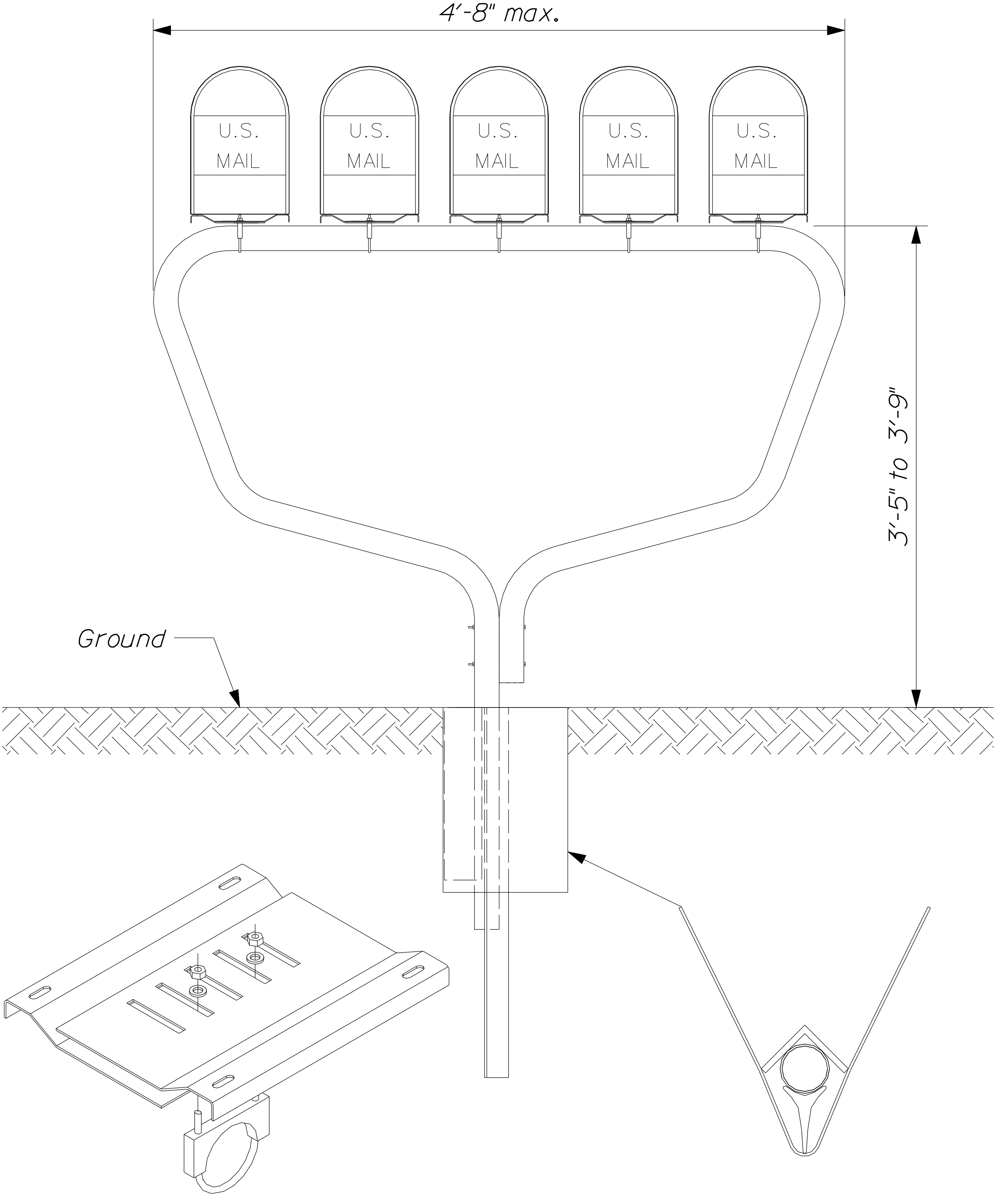
2. Posts shall not be spaced closer than 30".

3. Posts should not be placed closer than 200' from an intersecting road.

4. When single wood posts exceed $4\frac{1}{2}$" diameter or square dimension, two $\frac{3}{4}$" holes shall be drilled through the post at 90 degrees to each other, 4" above the finish grade.

MAILBOX POSTS

606(01)



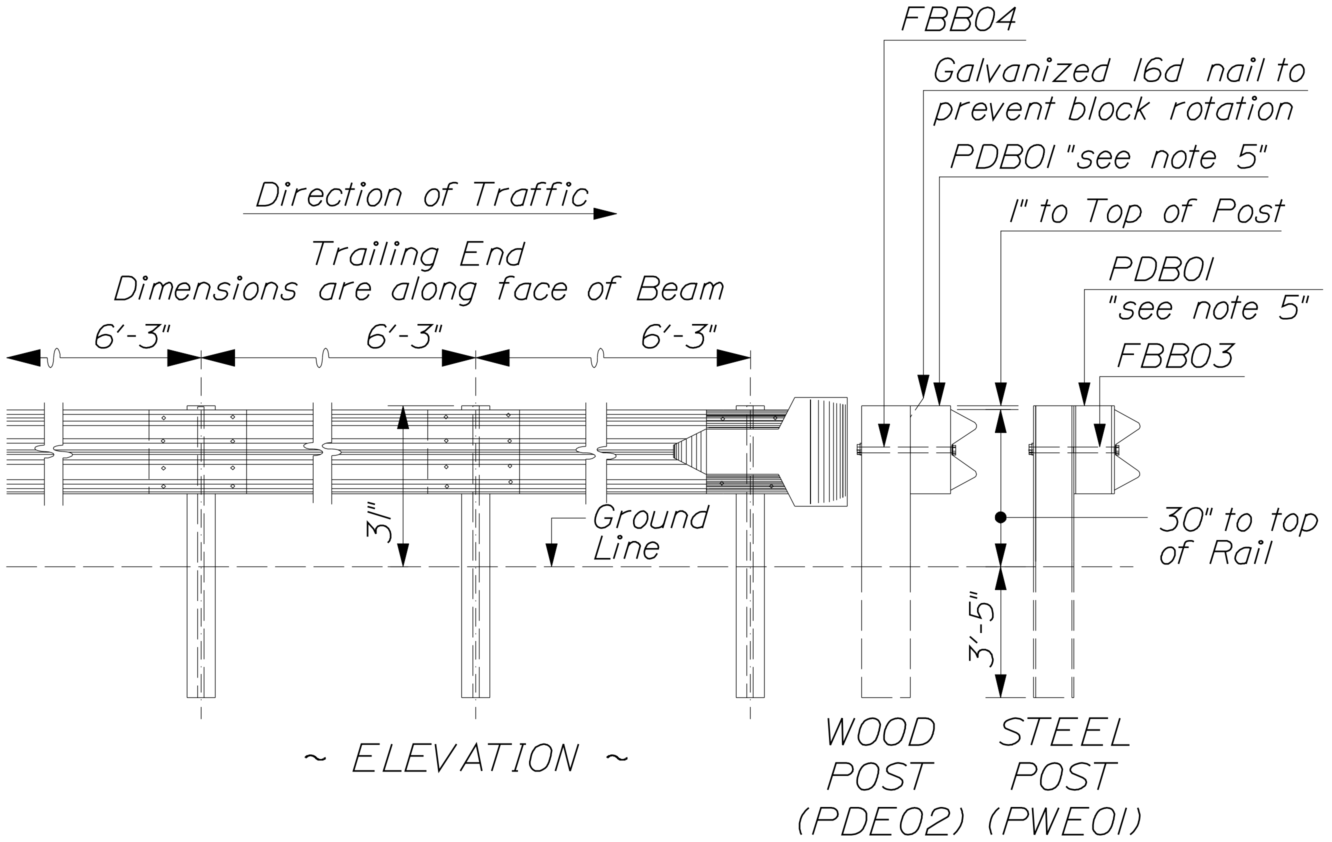
~ BRACKET DETAIL*~

~ ANCHOR* TOP VIEW ~

*Hardware may vary depending on particular approved system used.

MULTIPLE MAILBOX SUPPORT

606(02)

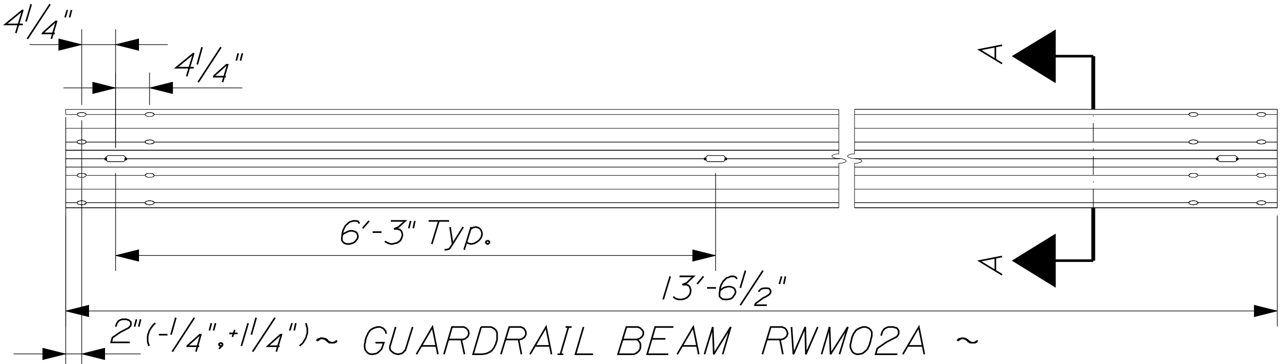


NOTES:

1. Intermediate post spacing shall be 6'-3" unless otherwise shown.
2. Wood posts for Guardrail shall be 6" nom. ($5\frac{1}{2}$" min.) x 8" nom. ($7\frac{1}{2}$" min.) and offset blocks shall be 6" x 8" nom. ($5\frac{1}{2}$" x $7\frac{1}{2}$" min.).
3. Steel posts for Guardrail shall be W6x9.0 or W6x8.5.
4. Steel posts punched with holes in addition to those specified to accommodate other types of Guardrail, will be accepted subject to the approval of the Resident.
5. Composite offset blocks may be used as an alternative to wood offset blocks provided that they meet NCHRP 350 requirements and are installed according to manufacturers specifications.
6. Beam type Guardrail set on a radius of 150' or less shall be circular Guardrail.
7. Offset blocks shall be installed on all posts.
8. Guardrail Terminal End (RWE03A) to be used only on trailing end of Guardrail on divided highways. Washers (FWR03) shall be installed on the last 9 posts.
9. Identification letters and numbers on drawings refer to the standard detail drawings shown in "A guide to Standardized Highway Barrier Hardware" by AASHTO-AGC-ARTBA Joint Committee. chantemaza@hotmail.com
10. Where guardrail with 30 inch height to top of rail will be installed with a connection to bridge transition type "I", a 25 foot transition shall be provided to match the height of the bridge transition as directed by the resident. Work shall be paid for under the appropriate (????????????)

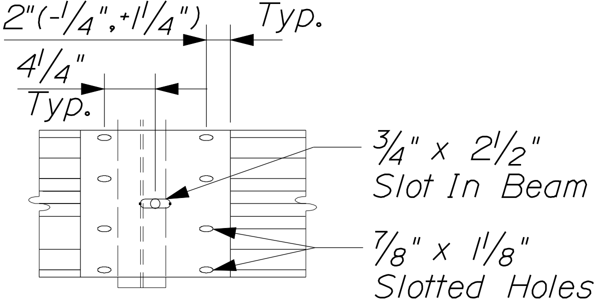
GUARDRAIL

606(03)

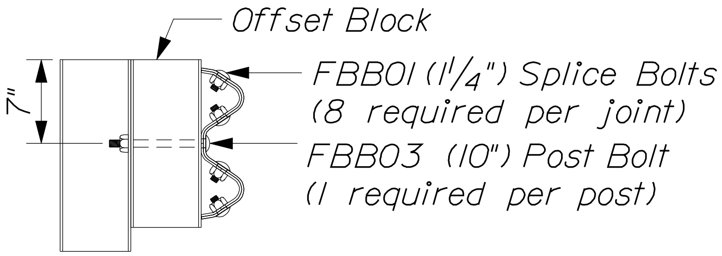


~ GUARDRAIL BEAM RWM02A ~
(Minimum thickness 0.105")

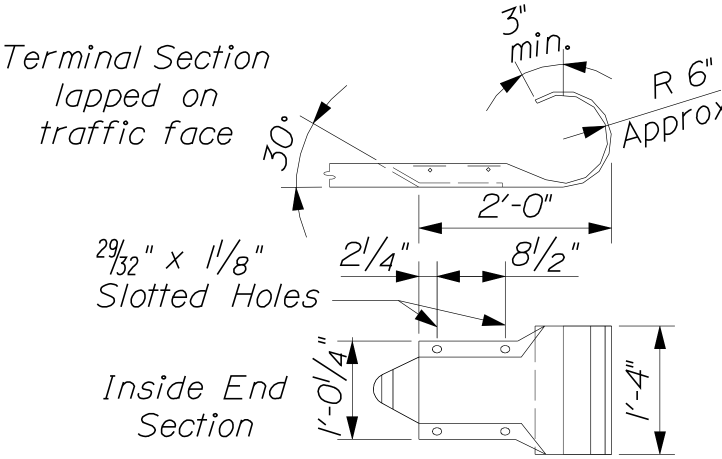
NOTE:
All dimensions subject to manufacturing tolerances



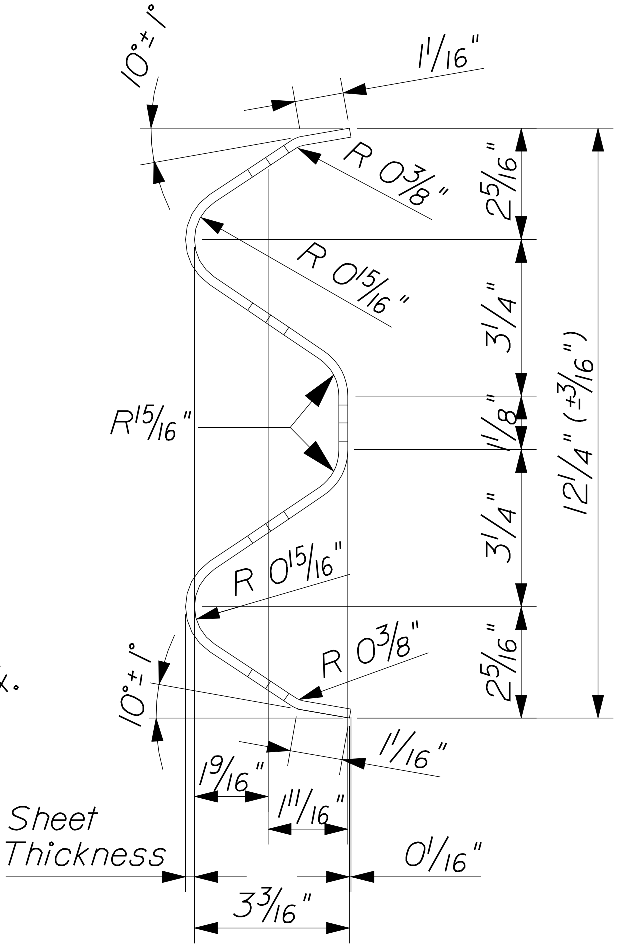
~ GUARDRAIL SPLICE AT POST ~



~ CROSS SECTION THROUGH GUARDRAIL SPLICE ~



~ GUARDRAIL TERMINAL END - RWE03A ~
(See 606(03) Note #8)

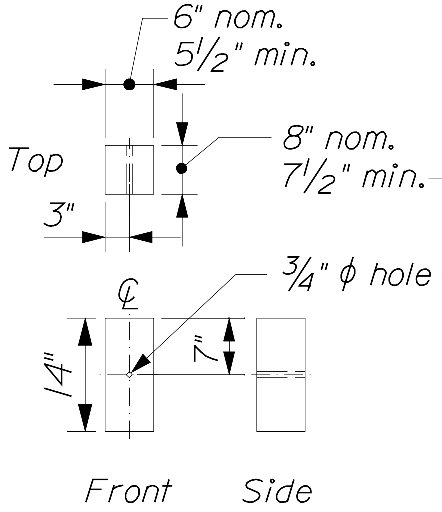


~ SECTION A - A ~

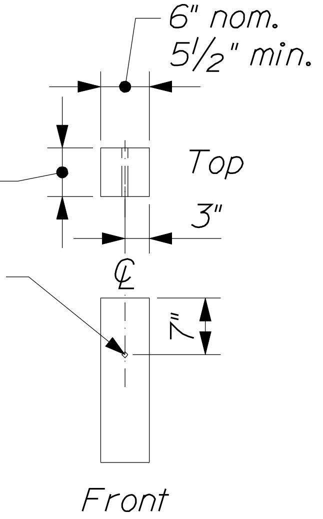
~ GUARDRAIL BEAM DETAIL RWM02A ~

GUARDRAIL

606(04)



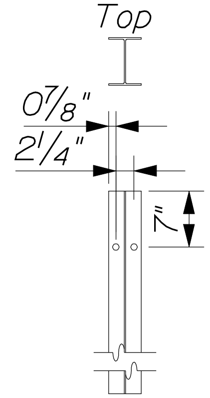
~ WOOD OFFSET BLOCK ~
(PDB01)



~ WOOD POST ~
(PDE02)

Wood Post, Offset Block, and G.R. Beam shall be bolted with one Bolt FBB04 and Washer FWC16A under nut.

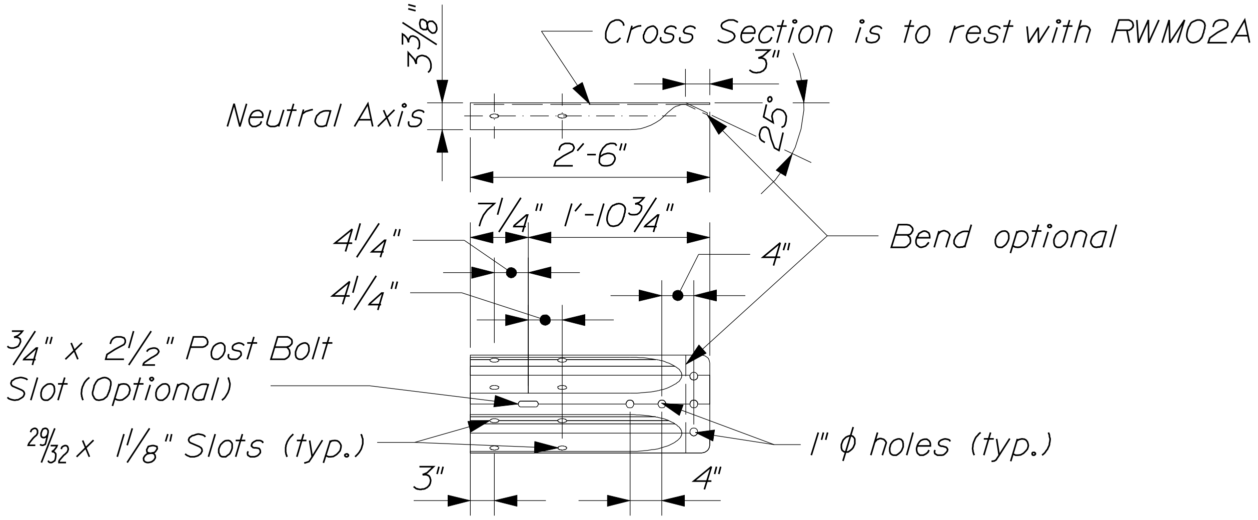
Location of hole for attaching Offset Block to Wood Post



Offset Block and Post shall be bolted with one FBB03 Post Bolt. Holes to be ¾" φ.

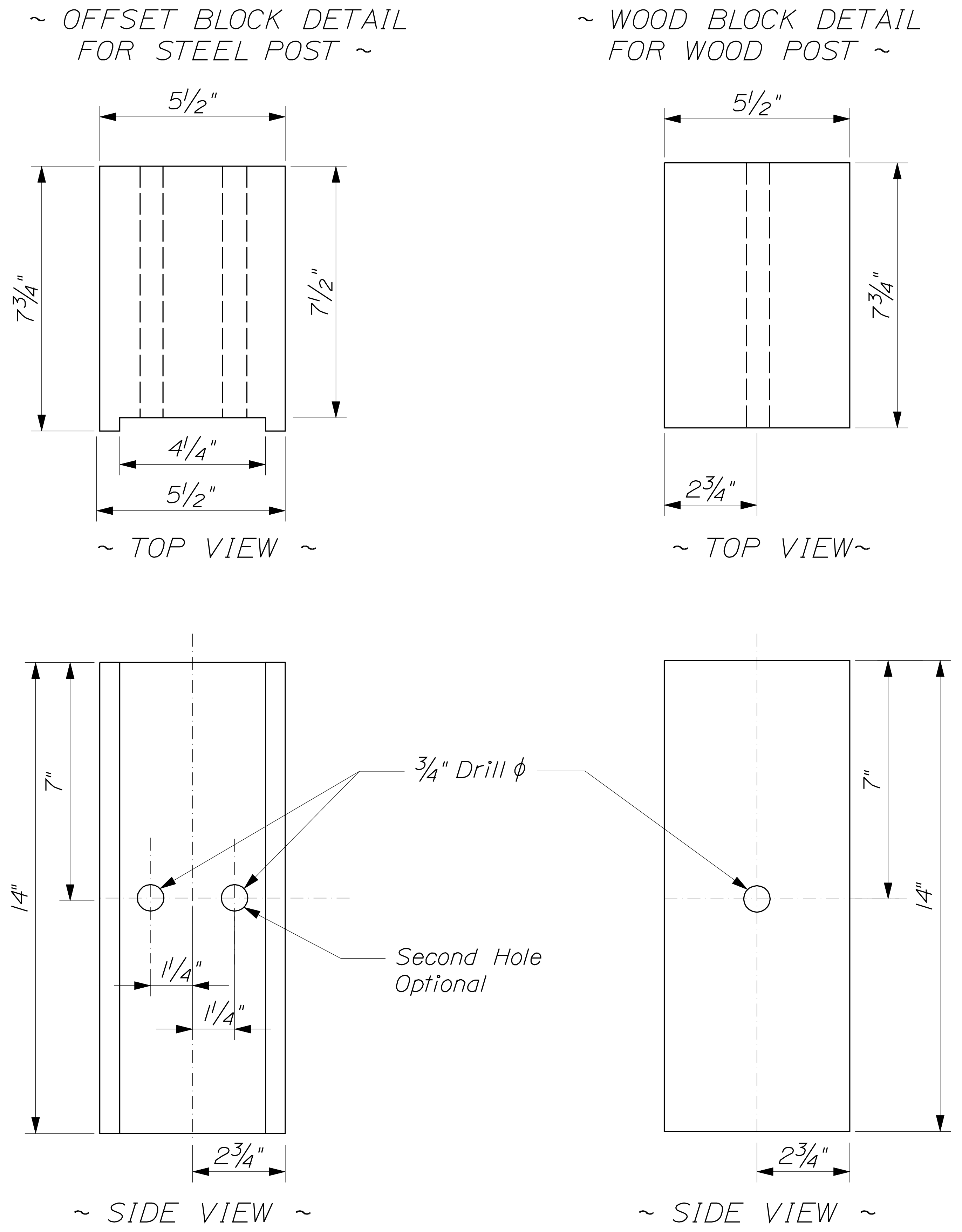
Location of holes for attaching Offset Block to Steel Post (second Hole is Optional)

~ STEEL POST ~
(PWE01)



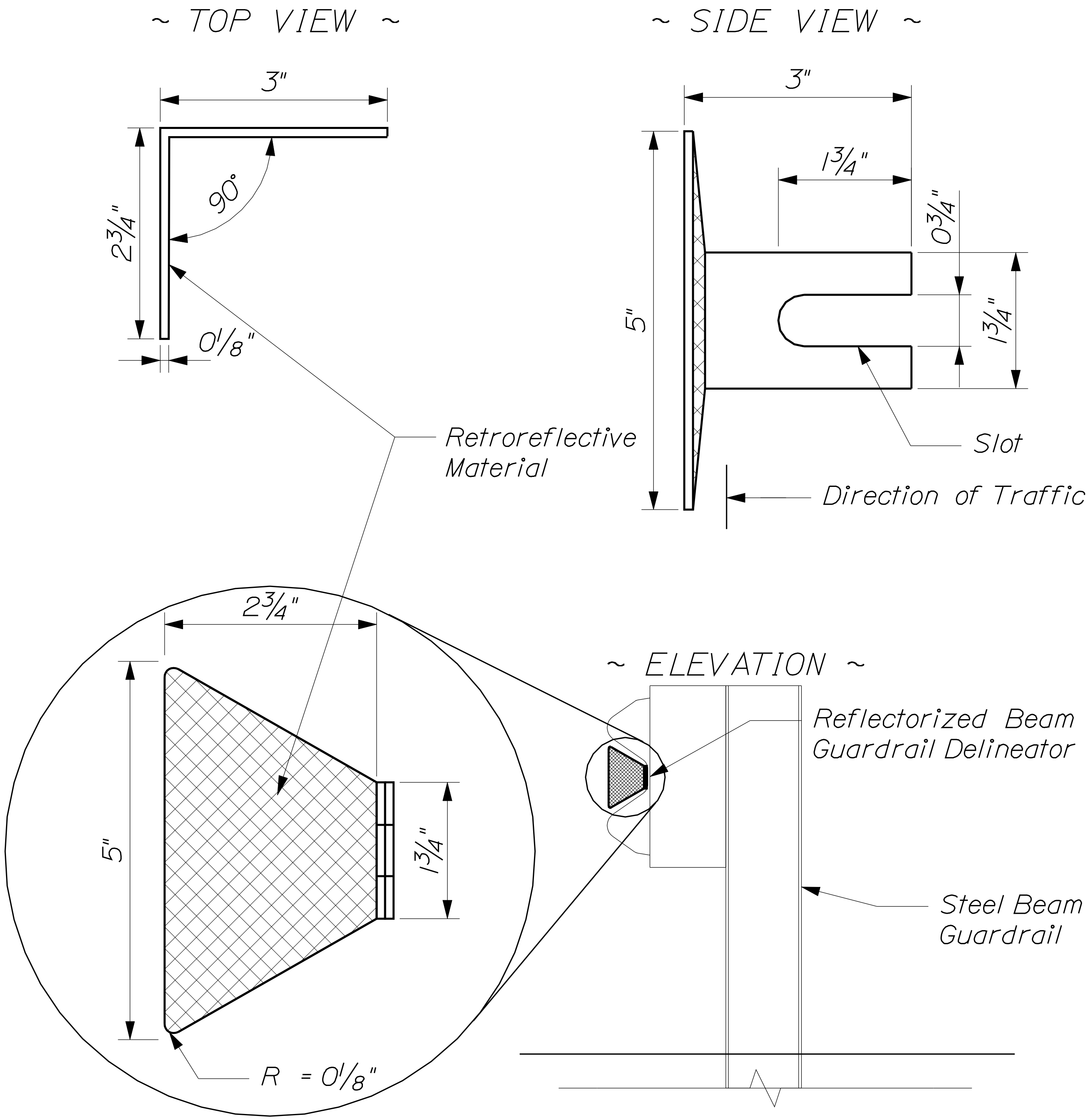
~ W-BEAM TERMINAL CONNECTOR RWE02A ~

GUARDRAIL



OFFSET BLOCK DETAIL FOR STEEL OR WOOD POST

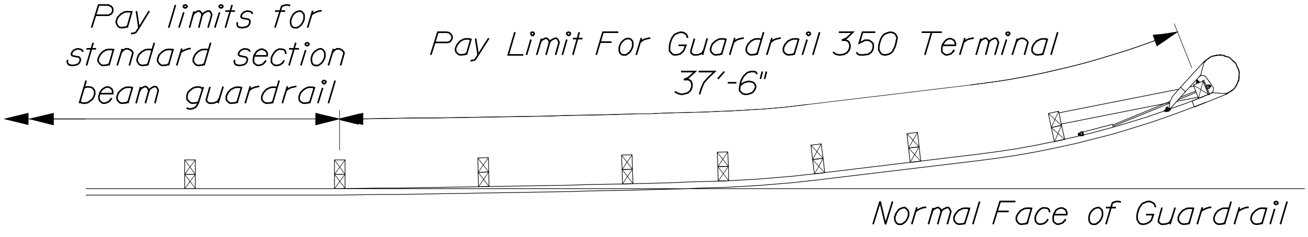
606(06)



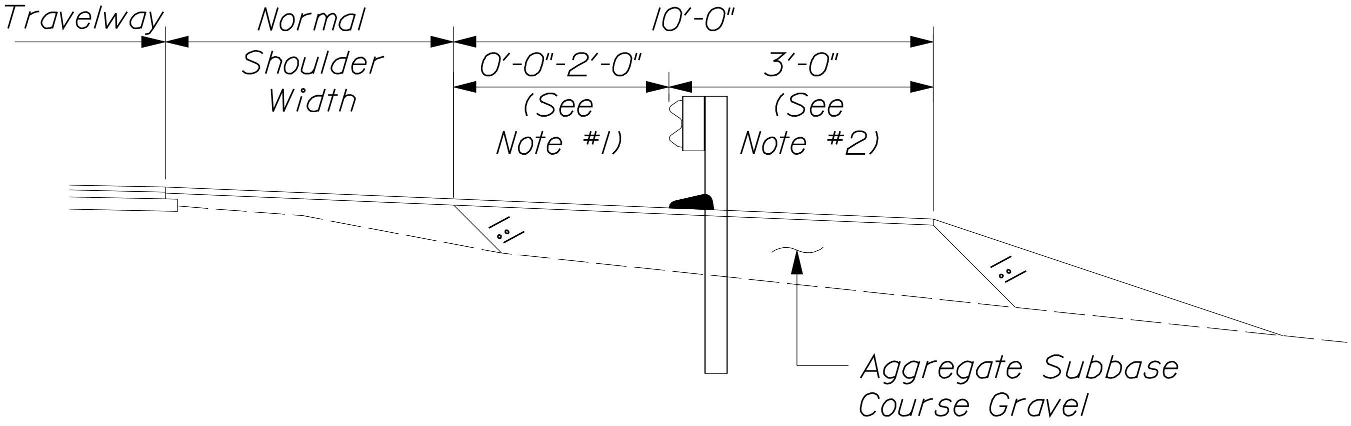
All dimensions are in inches and subject to manufacturing tolerances.

REFLECTORIZED BEAM GUARDRAIL DELINEATOR DETAILS

606(07)



~ PLAN VIEW ~



~ SECTION ~

~ NOTES ~

1. Typical barrier location shall be two feet beyond the normal shoulder edge. Restricted locations allow for the barrier to be placed at the normal shoulder edge, subject to Project Manager approval.

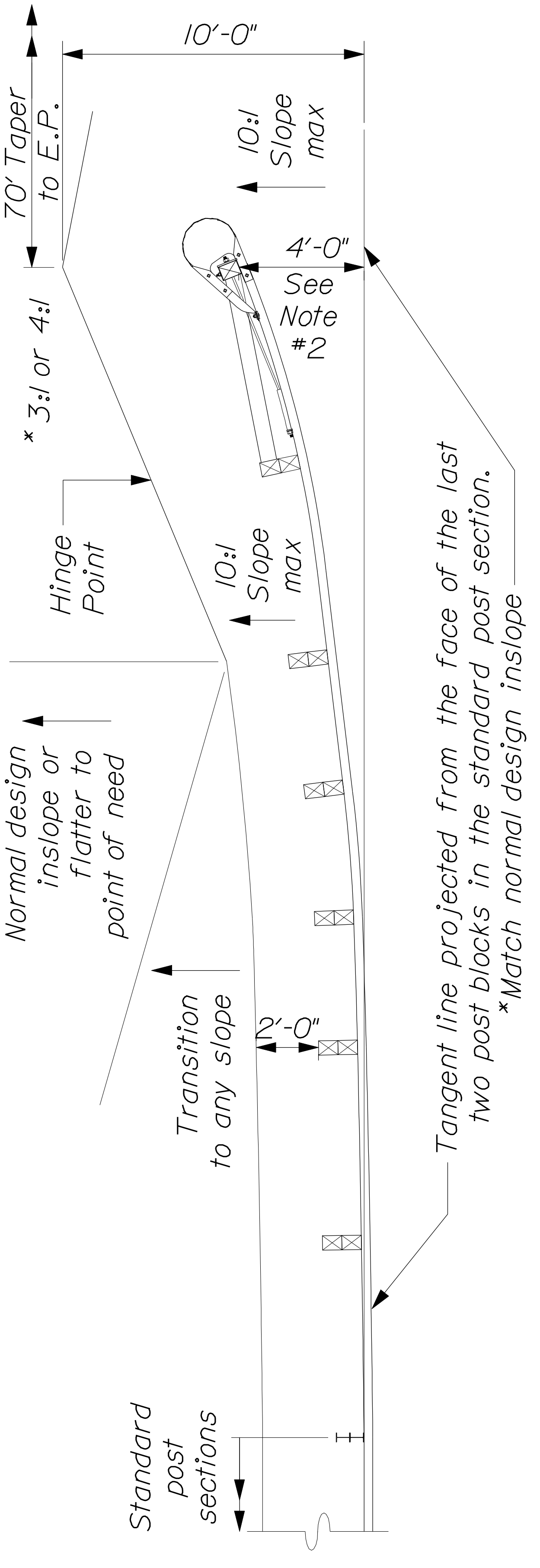
2. A minimum of three feet shall be provided between the face of the barrier and the break in a fill embankment. When minimal impacts are an issue, a two foot space may be used, but seven foot guardrail posts are required.

GUARDRAIL AND CURB PLACEMENT

606(08)

GUARDRAIL 350 FLARED TERMINAL GRADING

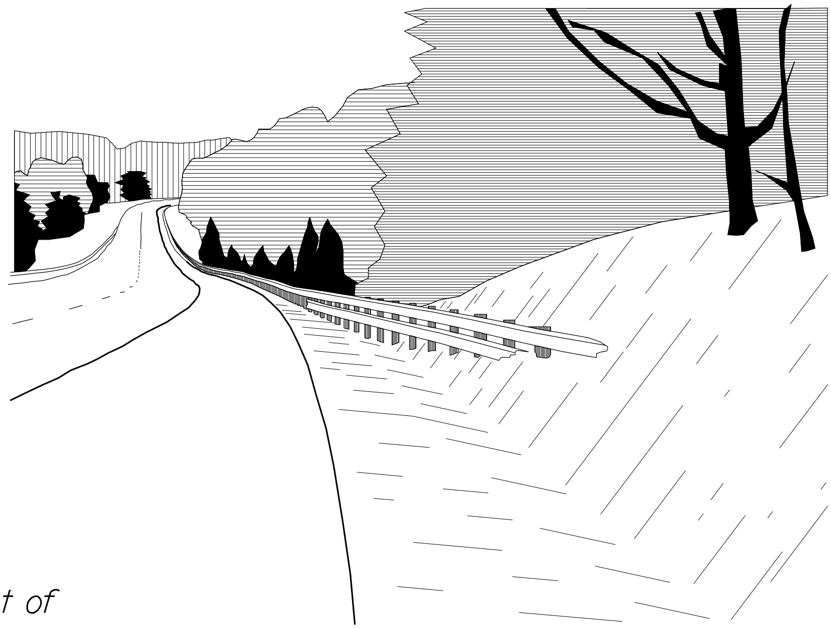
606(09)



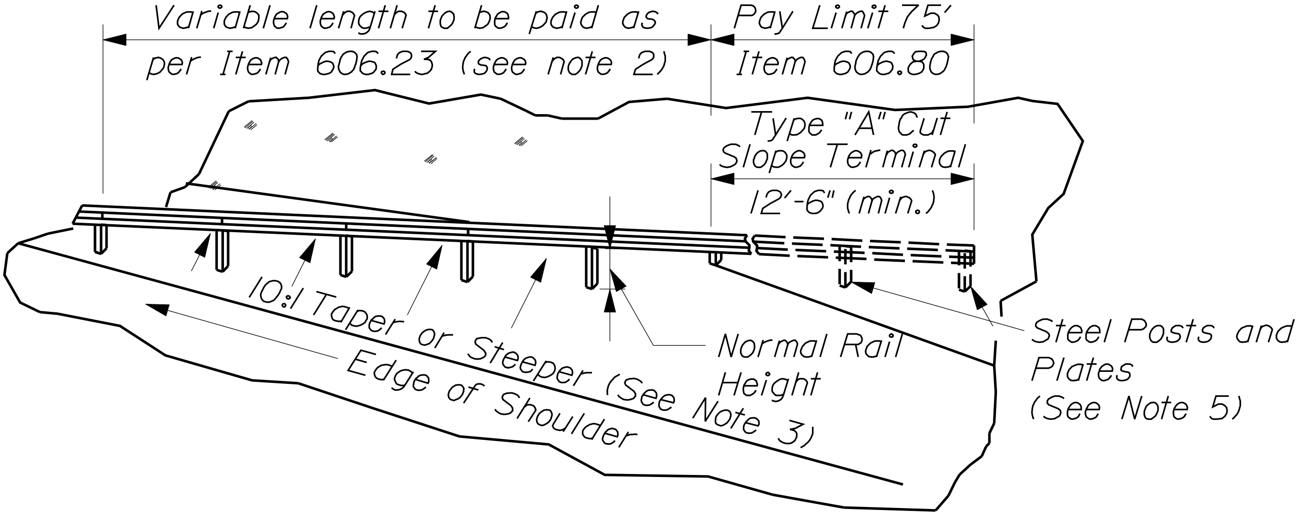
NOTES:

1. Post layout and Spacing will vary based on the terminal system that's selected. Refer to MFG Specifications for detailed layout and grading requirements.

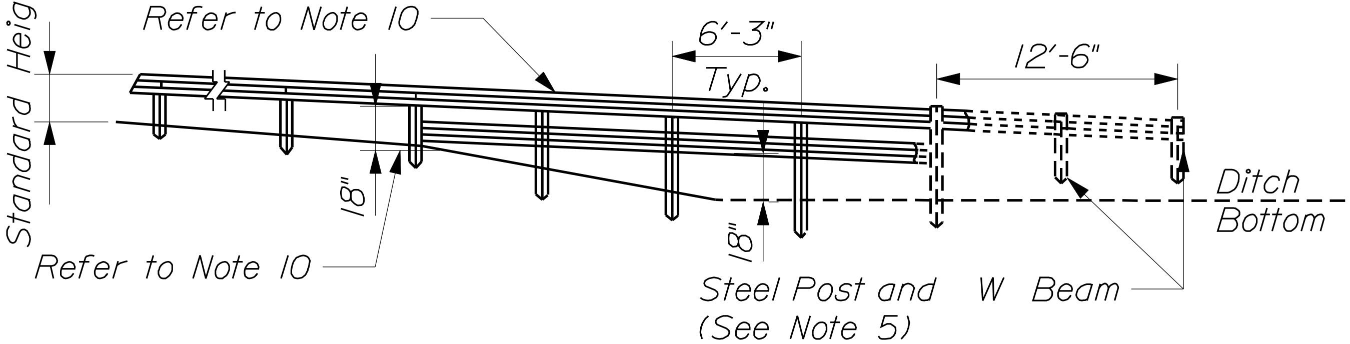
2. Only a 4'-0" Offset may be used at post #1, unless approved by a project manager.



~ PERSPECTIVE ~



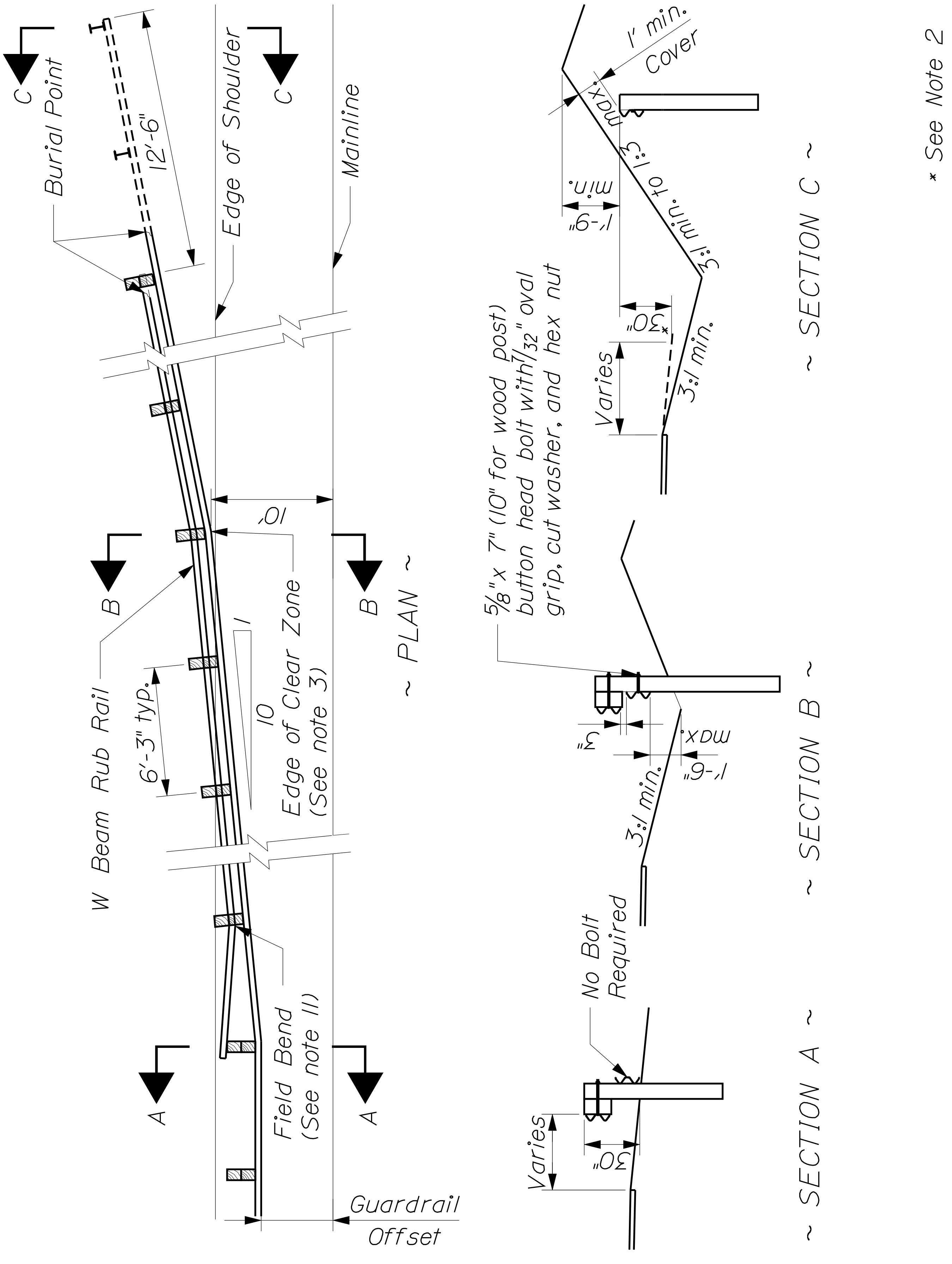
~ TYPE A (SOFT SHALE OR SOIL) TERMINAL ~



~ ELEVATION ~

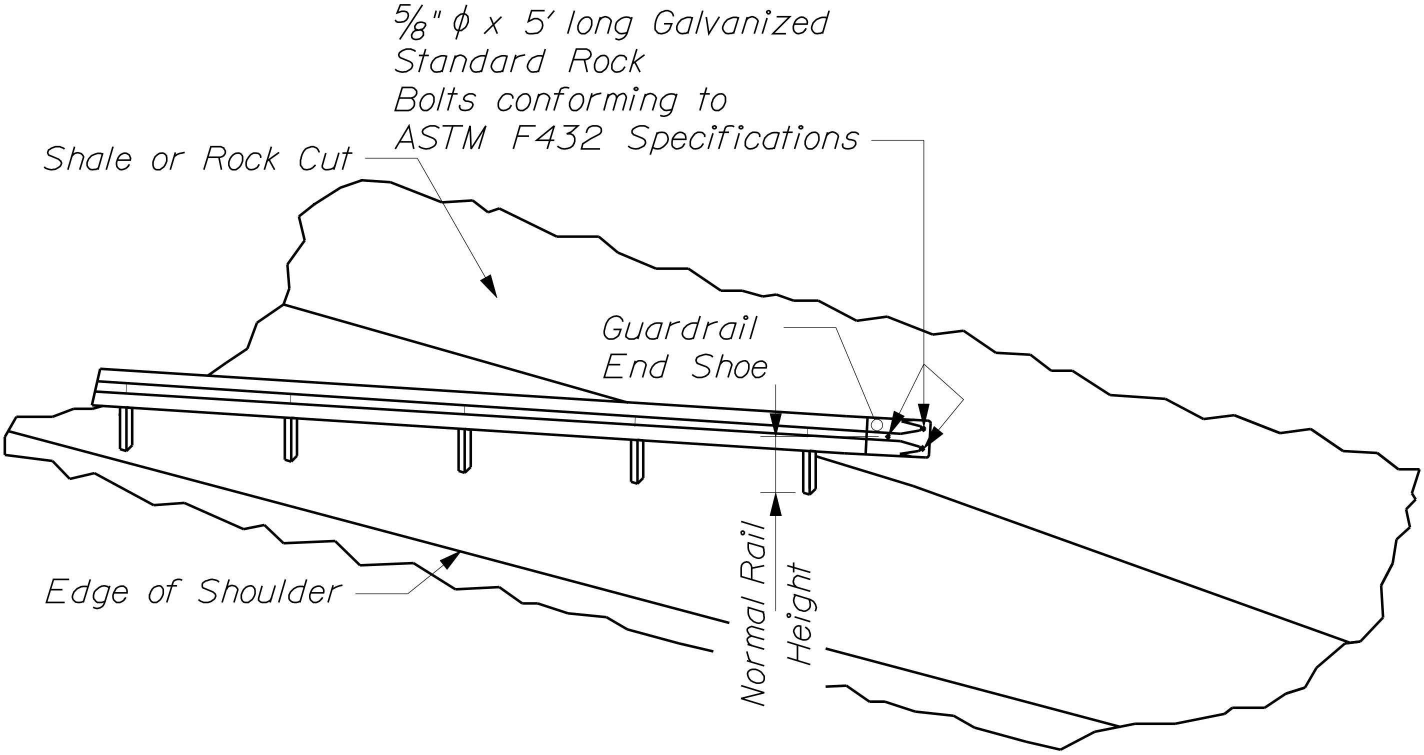
BURIED BACKSLOPE GUARDRAIL TERMINAL

606(10)

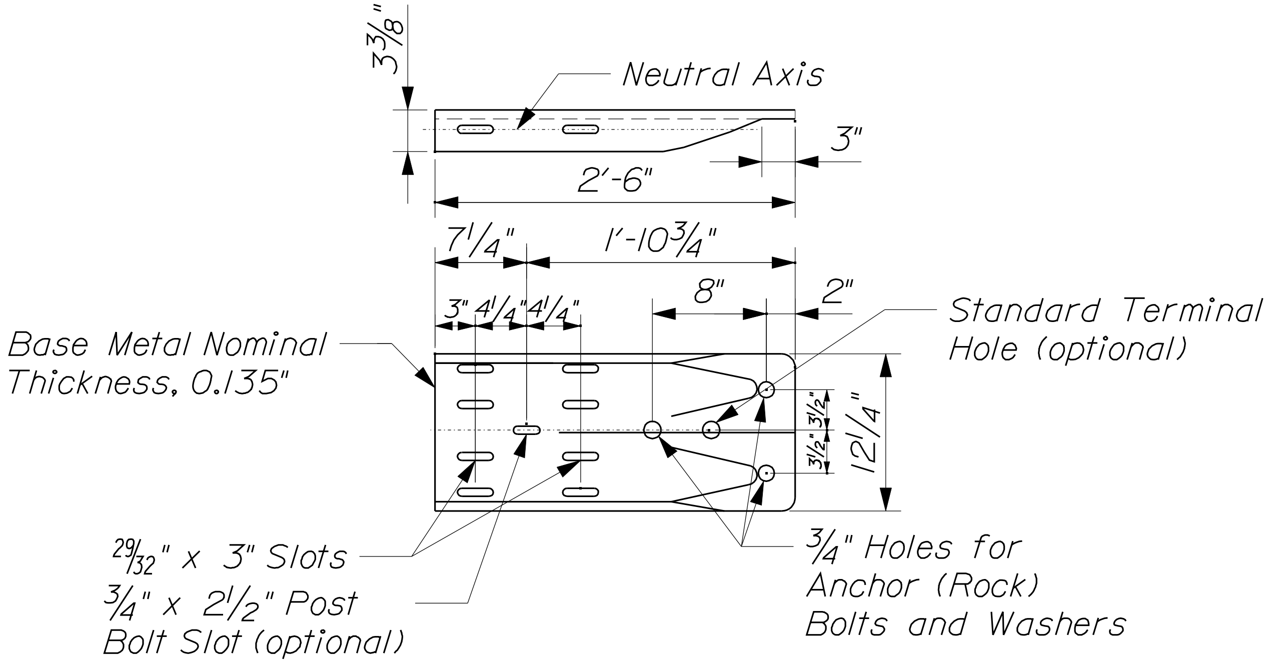


BURIED IN BACKSLOPE GUARDRAIL TERMINAL

606(11)



~ TYPE B (SHALE OR ROCK) TERMINAL INSTALLATION ~



~ GUARDRAIL END SHOE DETAIL ~

GUARDRAIL TERMINAL ATTACHMENT TO LEDGE

606(12)

NOTES

1. Prior to placing guardrail, a final check of existing conditions will be made by the project resident and any adjustment necessary to ensure the proper functioning of the guardrail for the purpose for which it is intended will be made accordingly.

2. Extra length posts and W beam rub rail required within the pay limit of Item #606.80 shall be considered incidental.

3. Extra W Beam Rub Rail required outside of the pay limit of Item #606.80 will be paid with guardrail Item (606.178 Guardrail Beam).

4. Extra length posts, if needed, outside the pay limit of Item 606.80 shall be incidental to Item 606.23.

5. The flare taper rate of the guardrail may be steepened after crossing the clear zone point to shorten the length of the terminal.

6. Type (A) (soil) cut slopes terminal guardrail shall be that guardrail which
    - is to extend a minimum of two 6′-3" spans into the cut slope, from the first post beyond the toe of the cut slope, as detailed herein
    - is to terminate a minimum of 1′-0" below the ground elevation of the back slope.

7. In the buried portion of the terminal, posts shall be galvanized steel. Wood posts and blocks may be used for the remainder of the terminal.

8. The Contractor shall so arrange his work sequence to provide that each Type (A) and (B) Terminal End shall be installed concurrently with the placement of each section of beam rail including backfilling and shaping of the disturbed slope.

9. Type (B) (shale or rock) Terminal installation shall consist of anchoring the guardrail against the face of the exposed rock using guardrail end shoes as detailed herein.

10. The final decision as to the type of cut slope terminal installation Type (A) or (B) at each location will be based on the actual materials encountered during construction.

11. Buried end terminals, both Type (A) and (B), will be paid as Item #606.80 complete in place.

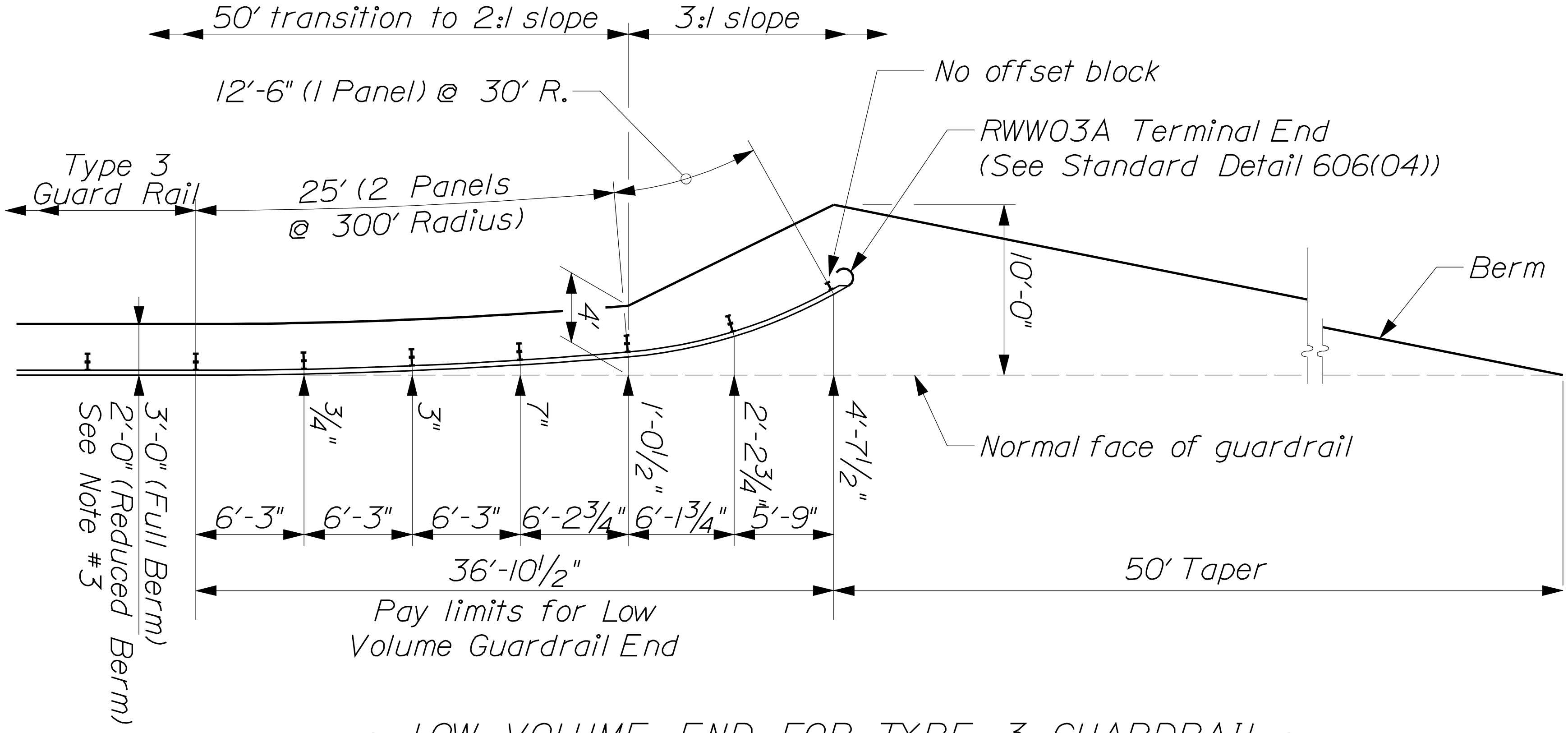
12. All labor, equipment, and materials necessary for the terminal end installation including but not limited to excavation, backfilling, and slope shaping will be considered incidental to Item #606.80.

13. Hold the top guardrail element constant with the typical barrier installation:
    - When the bottom of the top of guardrail element exceedes 18" in height, at any point of the slope, go up stream 1 post and add a bottom rail element under the standard guardrail element.
    - When the top of the installation exceeds 45" from the ground, at any point in the installation, then both elements will be sloped down to maintain a maximum height of 45" in front of the toe of slope.

14. Bend the downstream end of the bottom rail to the backside of the post and bolt to posts. Use 96" long posts, wood (see note 7) or steel, width dimensions as per standard details at location requiring bottom rail element:
    - When bolt holes are field drilled, zinc rich paint (cold galvanization) shall be applied to all disturbed surfaces prior to bolt installation.

BURIED IN BACKSLOPE/ATTACHMENT TO LEDGE GUARDRAIL TERMINALS

606(13)



~ LOW VOLUME END FOR TYPE 3 GUARDRAIL ~

NOTES:

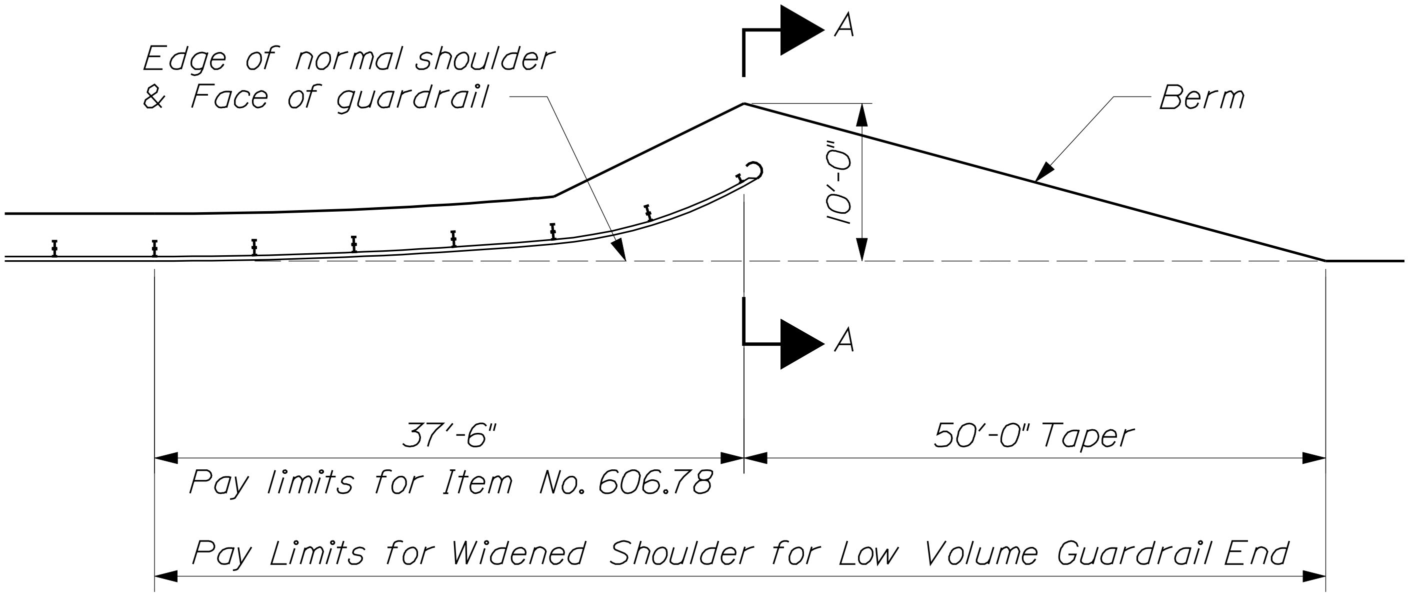
1. Layout dimensions are measured to the face of the guardrail beam.

2. Provide plate washers FWR03 for the beam - to - post connections at the last seven (7) posts.

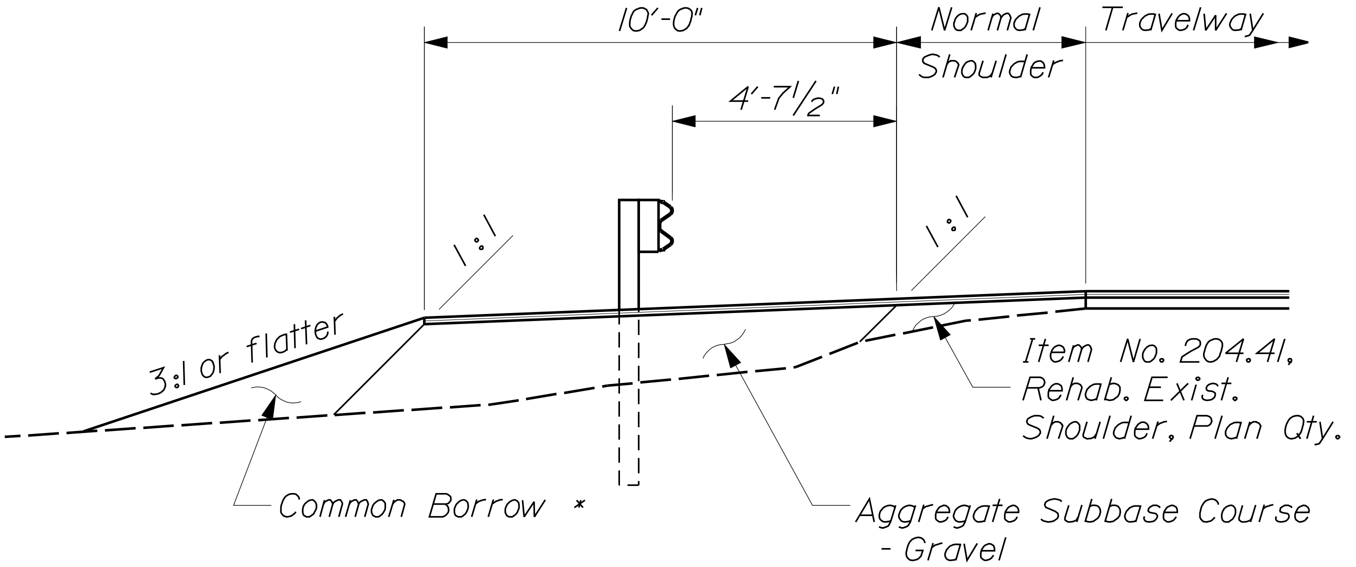
3. A minimum of three feet shall be provided between the face of the barrier and the break in a fill embankment. When minimal impacts are an issue, a two foot space may be used, but seven foot guardrail posts are required.

LOW VOLUME GUARDRAIL END

606(14)



~ PLAN ~



~ SECTION A-A ~

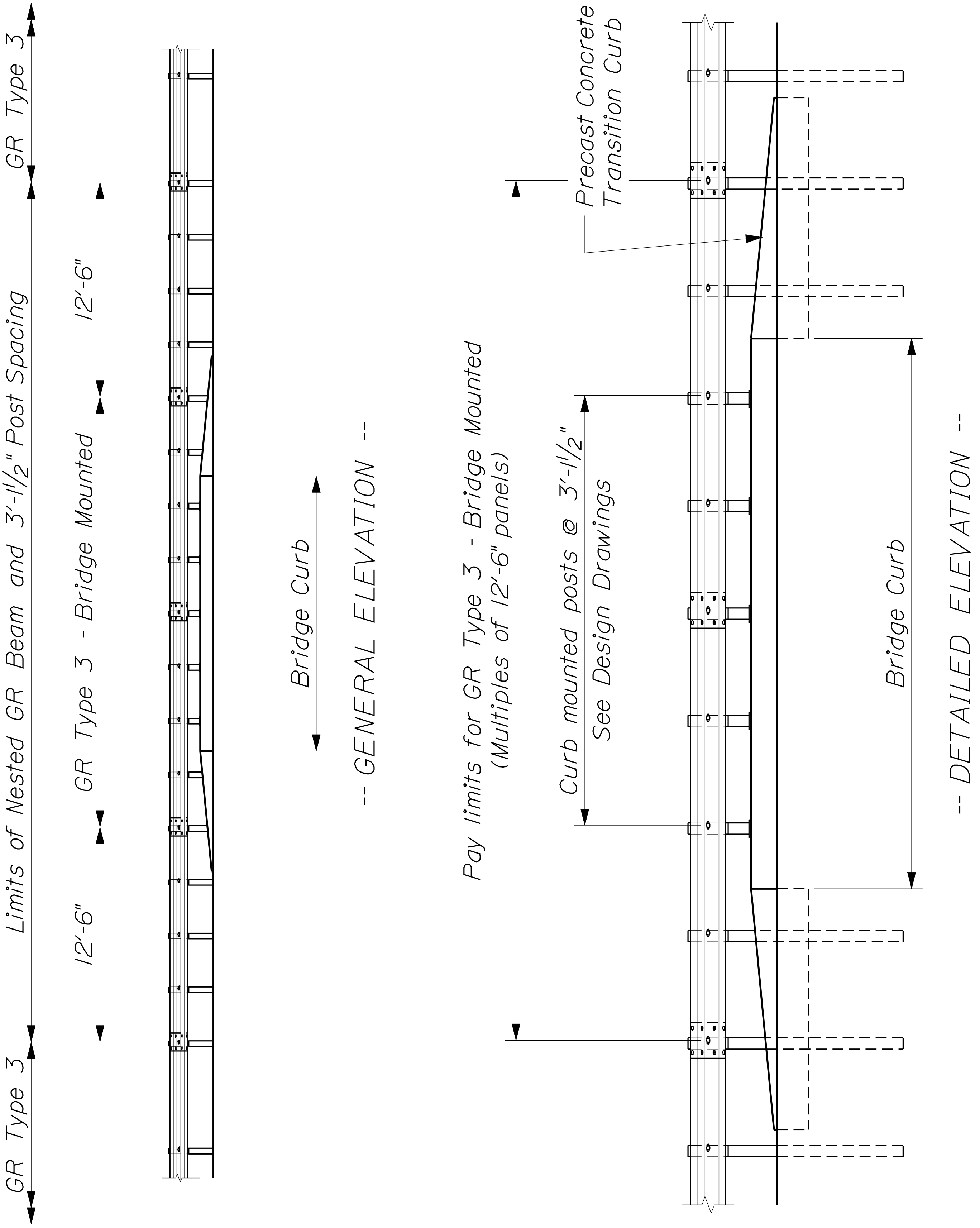
* Use adjacent or available excavation in place of Common Borrow unless otherwise directed by the Resident.

NOTE:

Widened Shoulder for Low Volume Guardrail End, when required, will be paid for under Item No. 606.753, complete in place, which price shall be full payment for furnishing, placing, grading and compacting of aggregate subbase. Common borrow, seed, mulch, loam and hot bituminous pavement will be paid for under the applicable pay items.

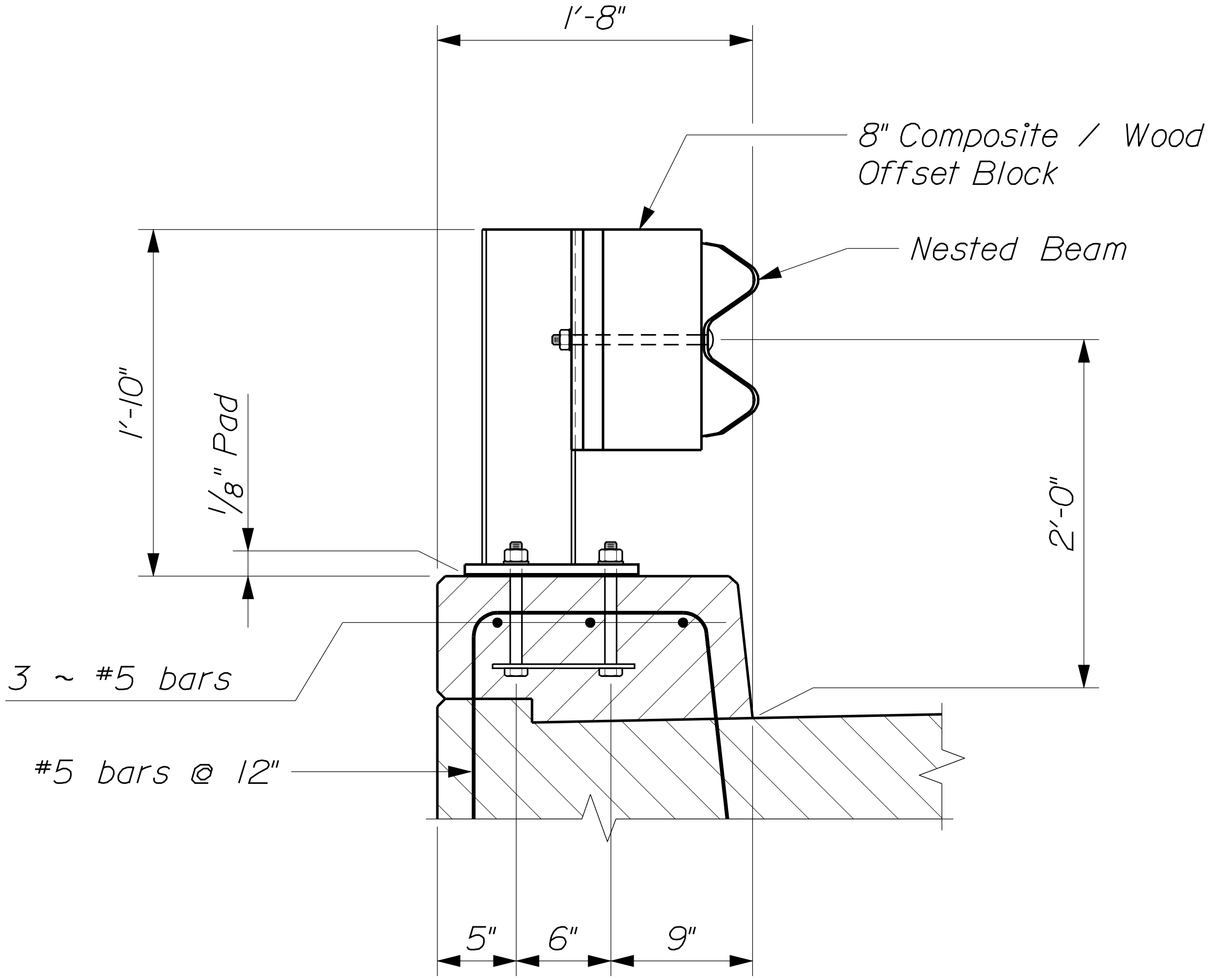
SHOULDER WIDENING FOR LOW VOLUME GUARDRAIL END

606(15)

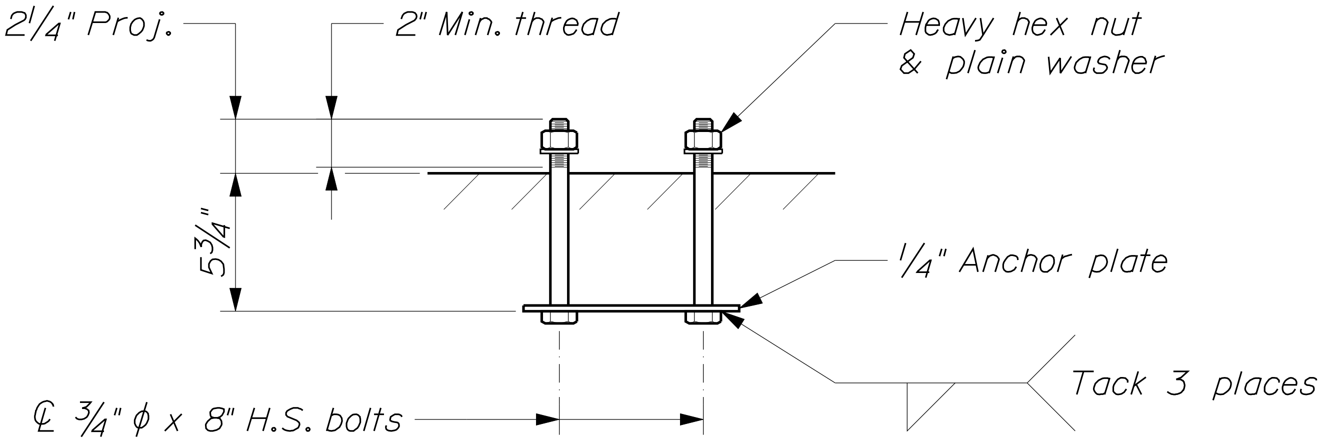


GUARDRAIL TYPE 3 - SINGLE RAIL
BRIDGE MOUNTED

606(16)



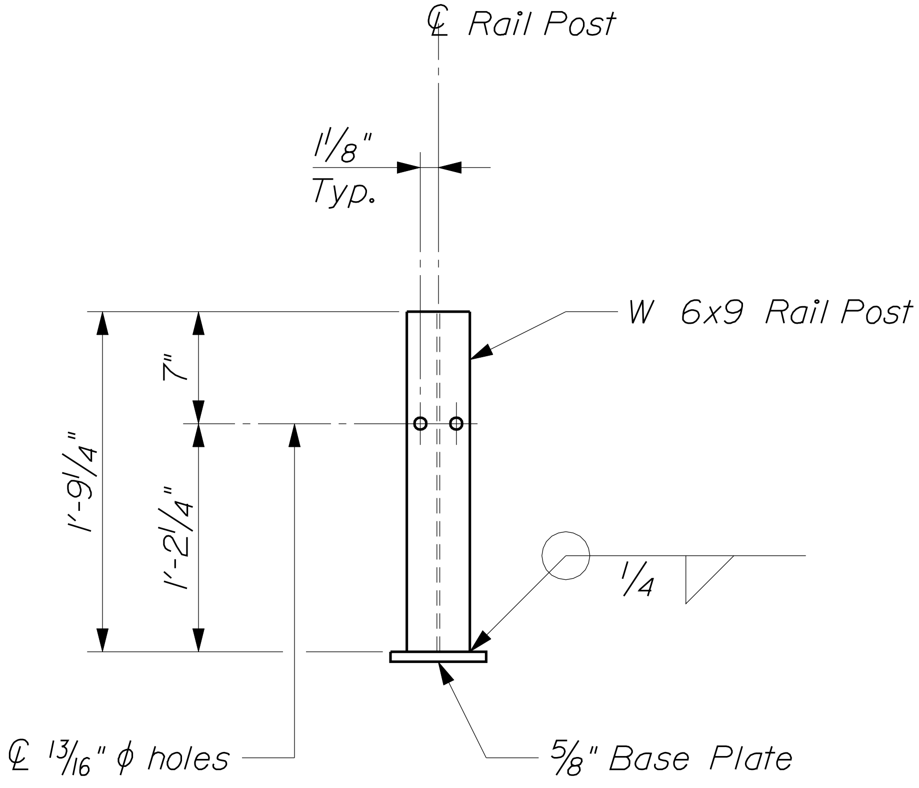
-- TYPICAL RAIL SECTION --



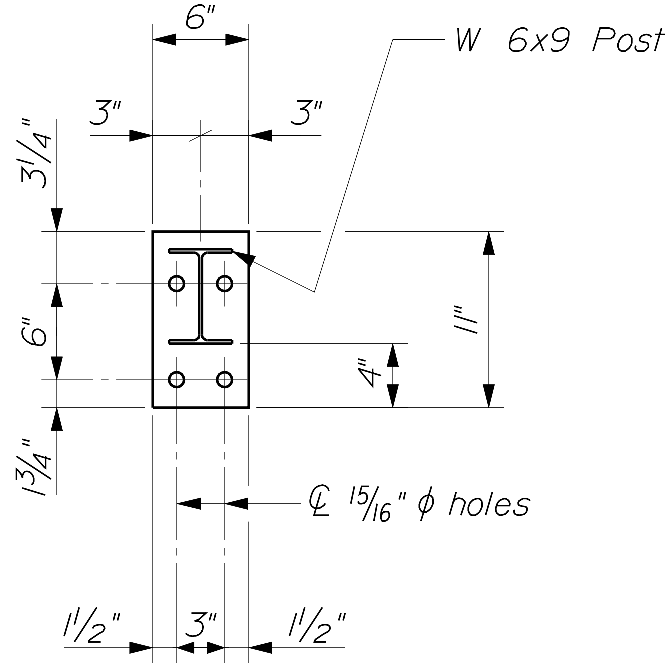
-- ANCHOR BOLT DETAIL

GUARDRAIL TYPE 3 - SINGLE RAIL
BRIDGE MOUNTED

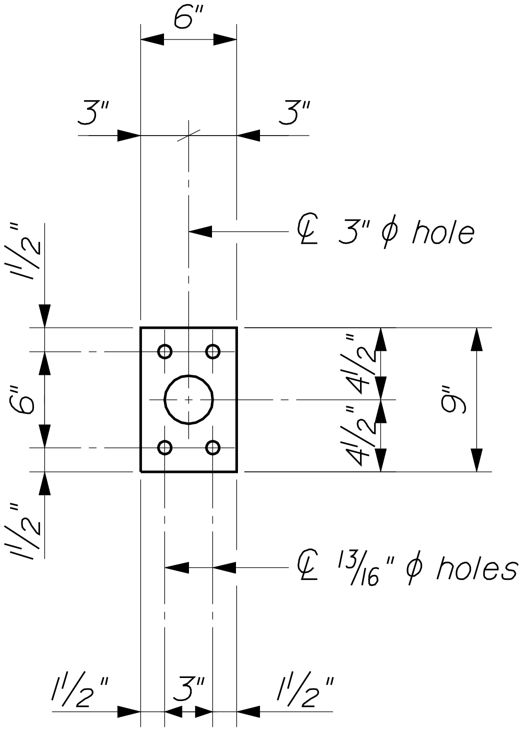
606(17)



-- RAIL POST ELEVATION --



-- BASE PLATE PLAN --



-- ANCHOR PLATE PLAN --

GUARDRAIL TYPE 3 - SINGLE RAIL
BRIDGE MOUNTED

606(18)

NOTES:

1. All work and materials shall conform to the provisions of Section 507 - Railings and Section 606 - Guardrail of the Standard Specifications, as applicable.

2. All exposed cut or sheared edges shall be broken and free of burrs.

3. Curb mounted posts shall be set normal to grade unless otherwise shown.

4. Composite / wood offset blocks shall match those of the associated highway guardrail system.

5. Twenty - five percent of the post - to - base welds in a production lot shall be tested by the Magnetic Particle Method. If rejectable discontinuities are found, another twenty - five percent of that production lot shall be tested. If rejectable discontinuities are found in the second twenty - five percent, all post - to - base welds in that lot shall be tested. Acceptance criteria shall be in accordance with the latest editon of the AWS D1.5 Bridge Welding Code.

6. All non - stock parts shall be galvanized after fabrication in accordance with ASTM A 123, except that hardware shall meet the requirements of either ASTM A 153 or ASTM B 695, Class 50, Type I. Parts except hardware shall be blast - cleaned prior to galvanizing in accordance with SSPC - SP6.

7. Anchor bolts shall be set with a template. Nuts securing the post base shall be tightened to a snug fit and given an additional $^{1}/_{8}$ turn.

8. Nested guardrail beam and extra posts beyond the pay limits of the Bridge - Mounted Guardrail will be paid for as twice the required length of Guardrail Type 3 - Single Rail.

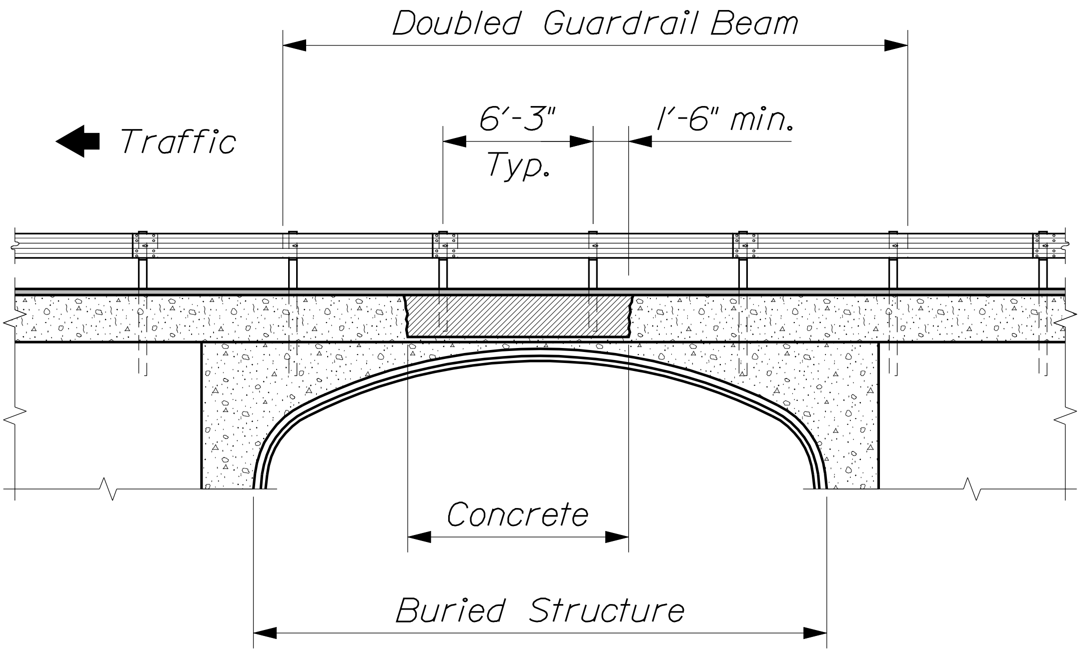
9. For details of the Concrete Transition Curb, refer to Standard Details Section 609, Curb. Payment for Concrete Transition Curb will be made under Item No. 609.247, Terminal Curb Type 2 - 7 ft.

MATERIALS:

Guardrail Beam, Composite / Wood
Offset Blocks & Posts ________________ See Standard Specifications Section 710
Base Plate & Anchor Plate ________ AASHTO M 270M/M 270, Grade 250 (36)
ASTM A 709/A 709M, Grade 36 (250)
Anchor bolts ___________________________ ASTM A 449 or ASTM A 1554, Grade 55
Anchor bolt washers / nuts ____________________ ASTM F 436 / ASTM A 563

GUARDRAIL TYPE 3 - SINGLE RAIL
BRIDGE MOUNTED

606(19)



~ ELEVATION ~

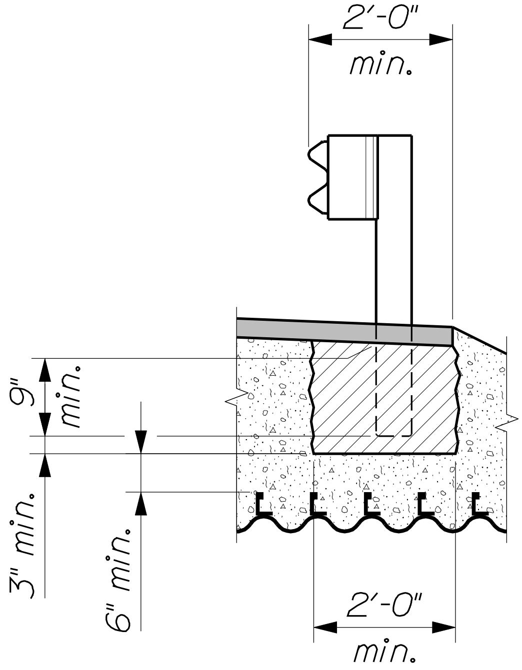
NOTES:

1. Guardrail posts interfering with a buried structure shall be cut to length in the field and cast into a concrete base as shown. The concrete may be placed directly into a trench excavated in the subbase material. The concrete mix shall be Class "A". Payment will be considered incidental to the guardrail pay items.

2. Only galvanized steel posts are to be used for this application.

3. The guardrail beam shall be doubled at least one space beyond the limits of the cut posts. Any extra beam length shall be installed toward the leading end of the guardrail. Payment will be considered incidental to the guardrail pay items.

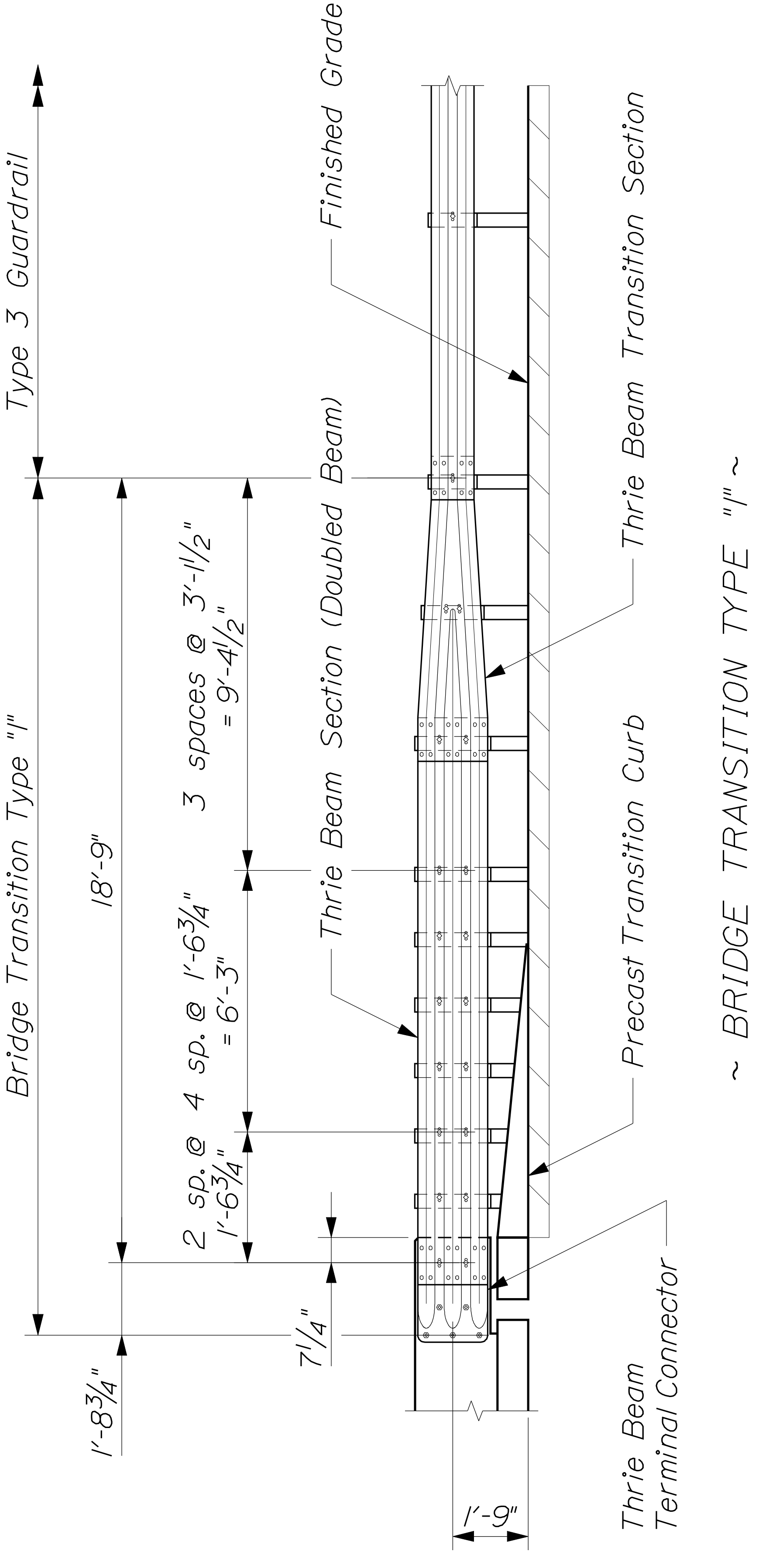
4. Payment for any hand work required to place pavement in this area will be considered incidental to the paving items.



~ GUARDRAIL SECTION ~

GUARDRAIL TREATMENT OVER BURIED STRUCTURES

606(20)



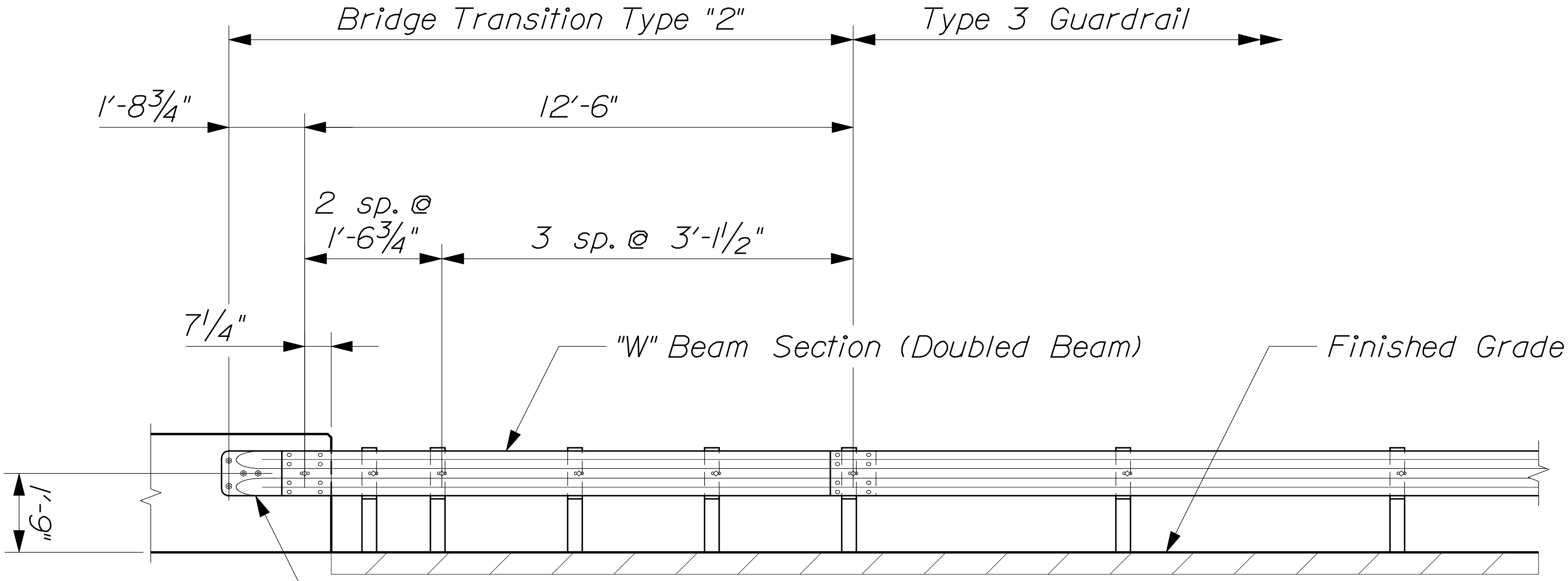
~ BRIDGE TRANSITION TYPE "I" ~

NOTE: Part designations are shown in "A Guide to Standardized Highway Barrier Hardware" as prepared and approved by the AASHTO - AGC - ARTBA Joint Committee, Task Force 13 Report.

STANDARD BRIDGE TRANSITION - TYPE "I"

606(21)

# NON - STANDARD
# BRIDGE TRANSITION - TYPE "2"
606(22)



~ BRIDGE TRANSITION TYPE "2" ~

NOTES:

1. Part designations are shown in "A Guide to Standardized Highway Barrier Hardware" as prepared and approved by the AASHTO - AGC - ARTBA Joint Committee, Task Force 13 Report.

2. This design does not meet NCHRP 350 crash testing criteria.

TERMINAL CONNECTOR NOTES

1. Nuts, washers, 7/8" ϕ bolts, and Bearing Plate shall be incidental to Item 606.25. Nuts shall conform to A.S.T.M. A563, Grade DH, galvanized in accordance with A.S.T.M. A153. Bolts shall be heavy hex structural bolt A.S.T.M. A325, Type 1 or 3, and galvanized in accordance with A.S.T.M. 153 - Nuts shall also be heavy hex.

2. Terminal Connector anchorage shall be installed on the trailing end.

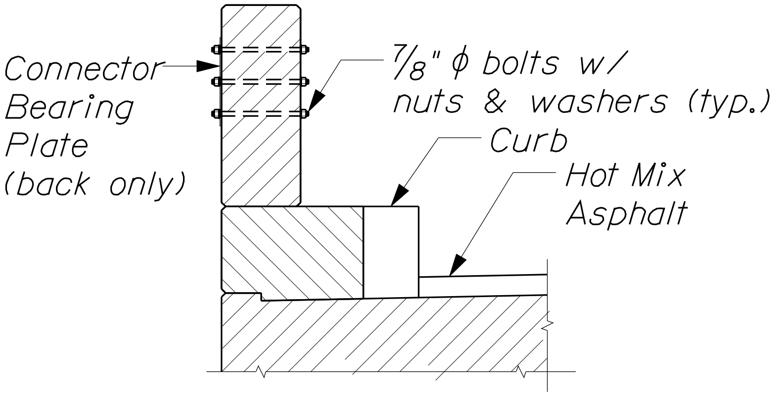
3. After installation of Guardrail is complete, upset threads on anchor bolts in three places around each bolt at the junction of the nut and the exposed thread with a center punch or similar tool.

4. Terminal Connector anchorage shall be paid under Item 606.25.

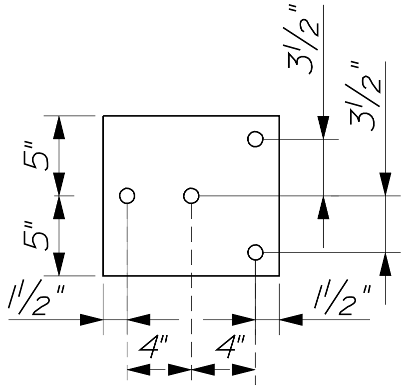
5. All accessories (posts, bolts. nuts, etc.) shall be as detailed for standard Type 3 Guardrail, except as otherwise detailed.

6. Field drilling for Terminal Connector, blockouts, and all hardware shall be considered incidental to Item 606.25, Terminal Connector.

~ CROSS SECTION OF END POST ~



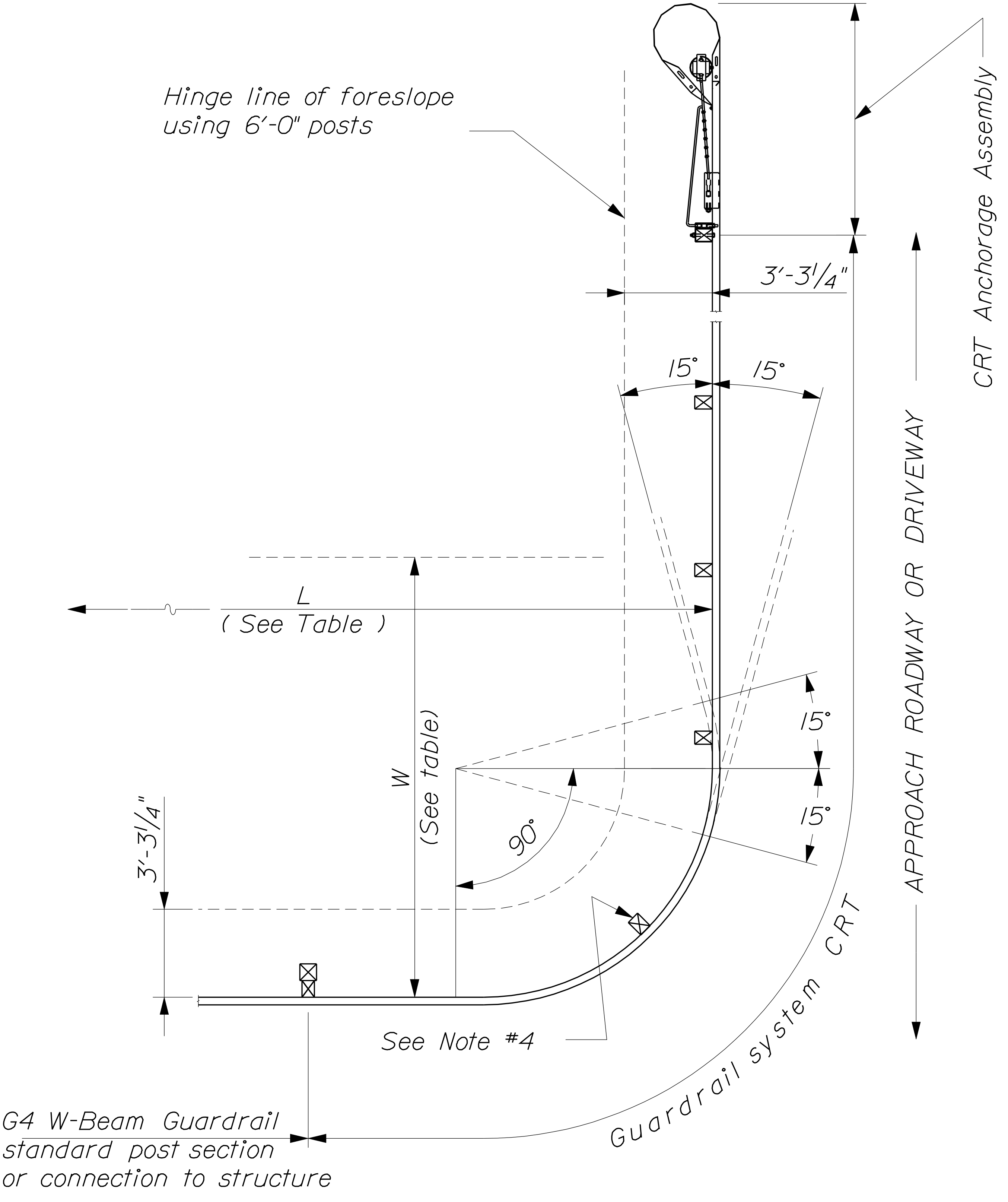
~ TERMINAL CONNECTOR BEARING PLATE ~



HOLES 15/16" ϕ (Typ.)

TERMINAL CONNECTOR PLATE & NOTES

606(23)

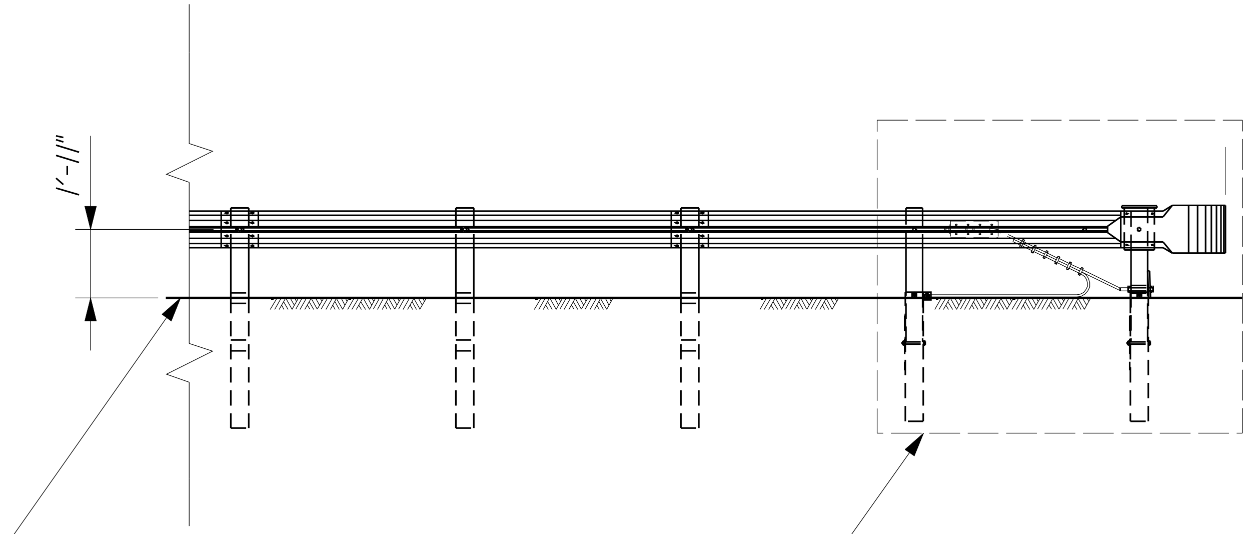


~ PLAN ~

CABLE RELEASING TERMINAL
CURVED W BEAM GUARDRAIL SYSTEM

606(24)

RADIUS FEET	ANGLE	NUMBER OF CRT POSTS	AREA FREE OF FIXED OBJECTS FEET	
			L	W
8'-0"	75°-105°	5	25'-0"	16'-0"
16'-0"	75°-90°	6	30'-0"	16'-0"
	90°-105°	7		
25'-0"	75°	7	40'-0"	20'-0"
	90°	8		
	105°	9		
30'-0"	75°	9	50'-0"	20'-0"
	90°	11		
	105°	12		



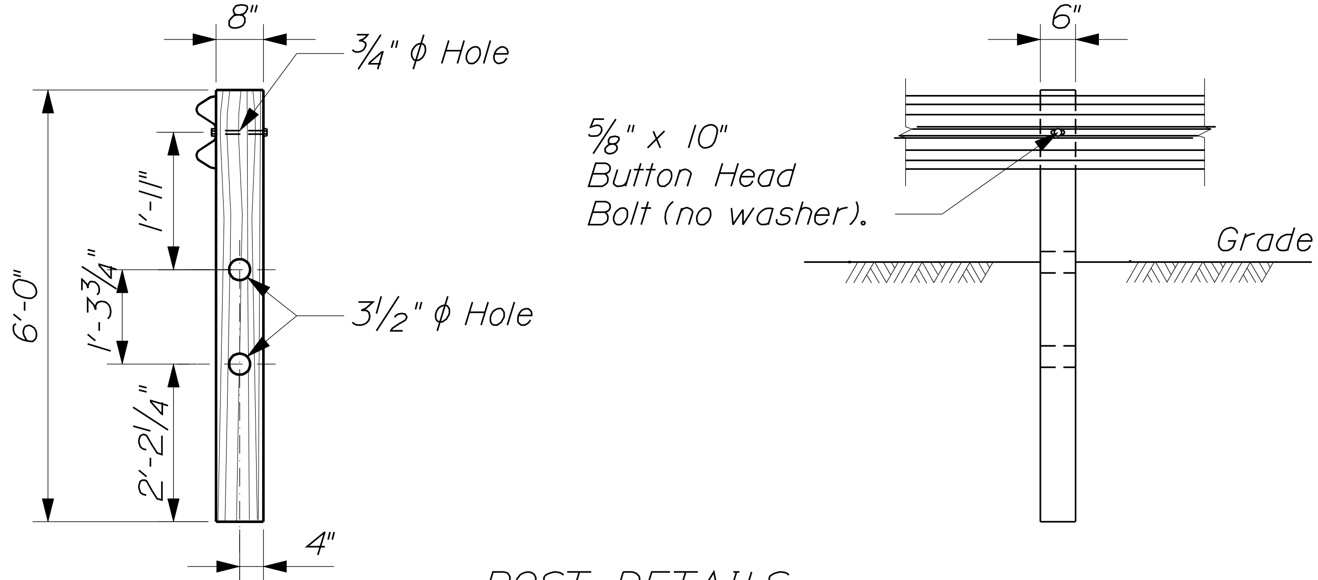
Edge of pavement or ground line at face of rail as applicable.

See CRT Anchorage Assembly Detail

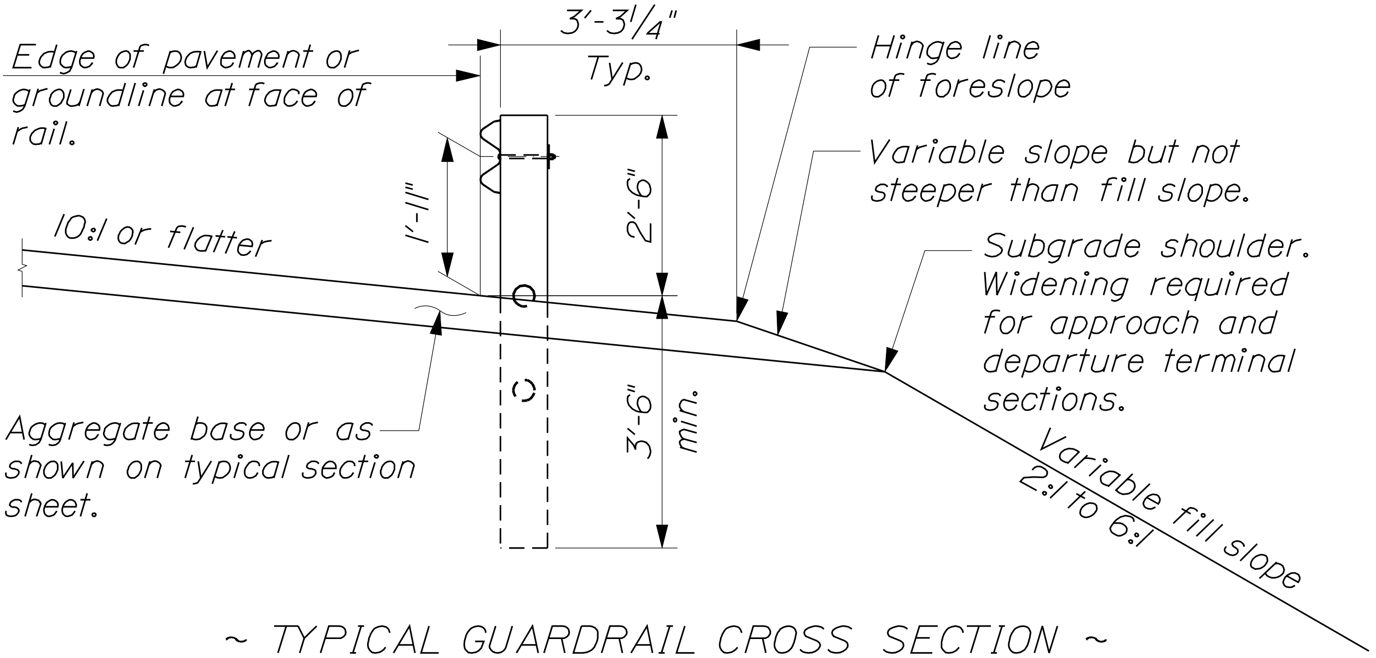
~ ELEVATION ~

CABLE RELEASING TERMINAL CURVED W BEAM GUARDRAIL SYSTEM

606(25)



~ POST DETAILS ~



~ TYPICAL GUARDRAIL CROSS SECTION ~

NOTES:

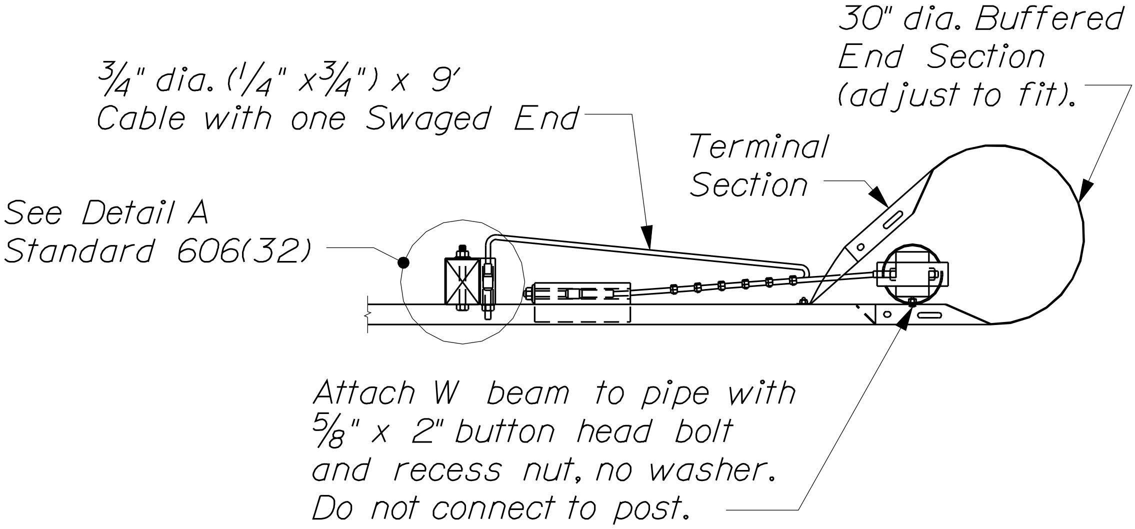
1. Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.

2. The use of terminal section, Type CRT, is limited to driveways, road approaches and low speed minor road connections. Do not use on mainline roadways.

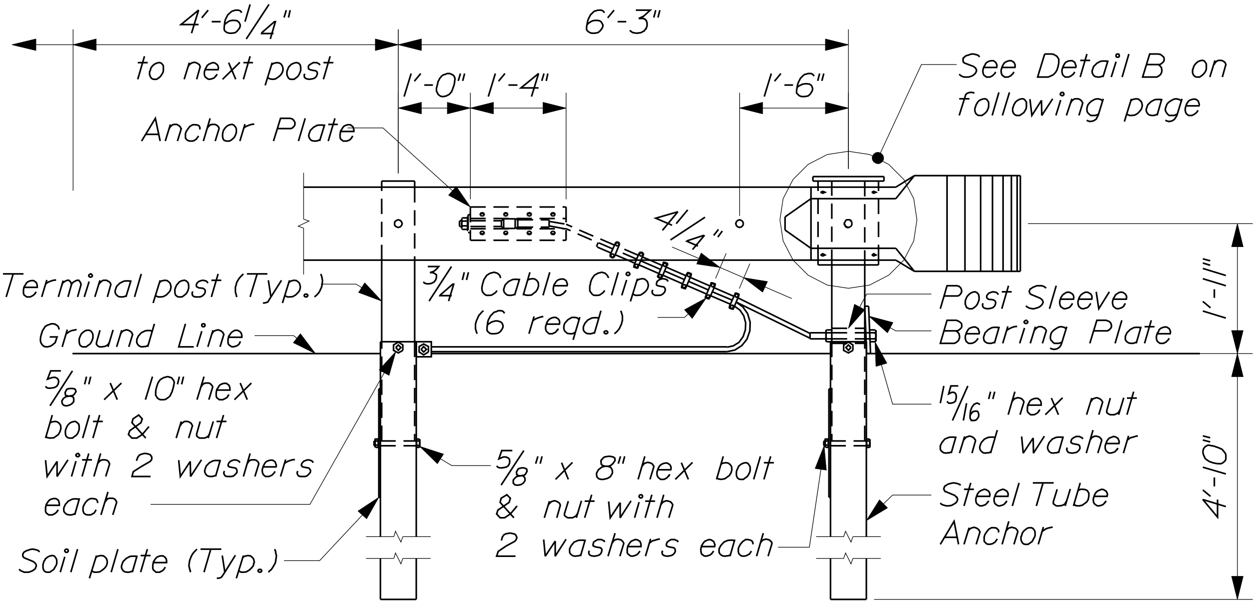
3. Do not bolt post to W beam for 8'-0" radius only.

CABLE RELEASING TERMINAL
CURVED W BEAM GUARDRAIL SYSTEM

606(26)



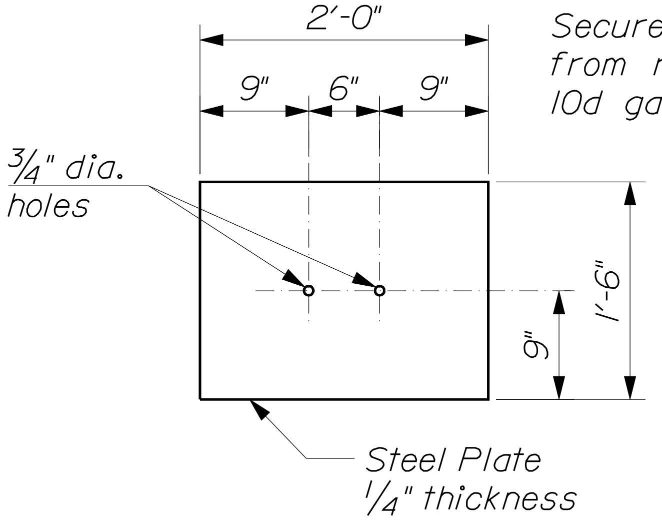
~ PLAN ~



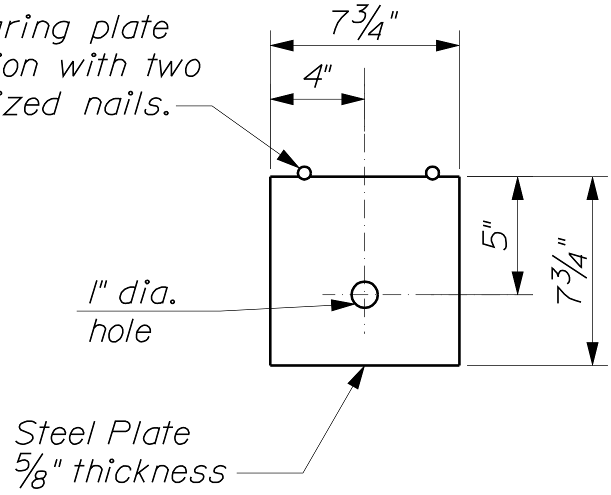
~ ELEVATION ~

CABLE RELEASING TERMINAL ANCHORAGE ASSEMBLY

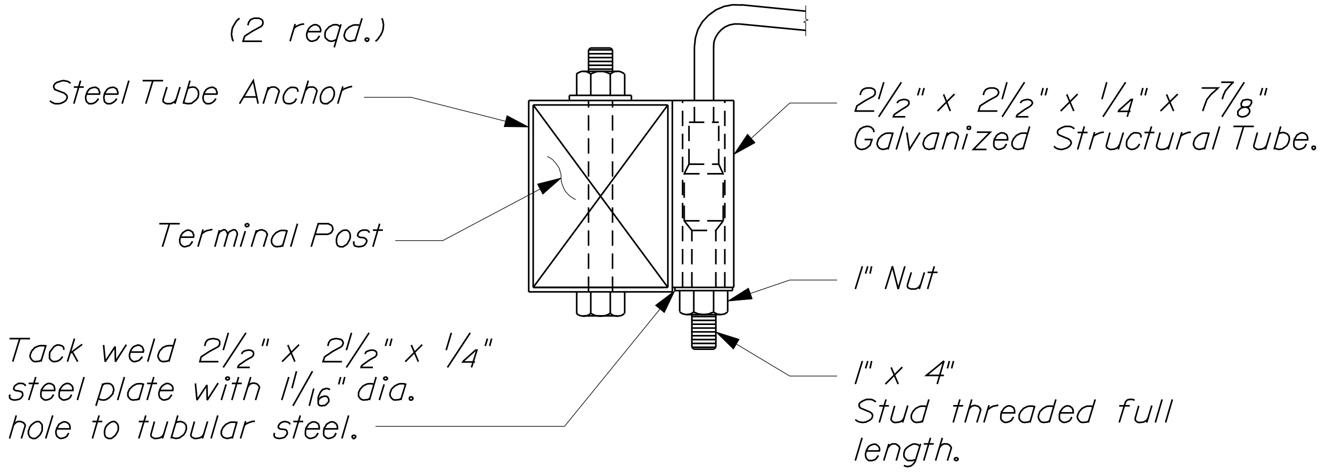
606(27)



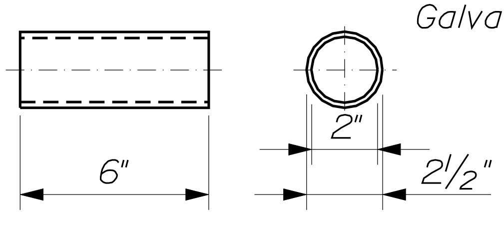
~ SOIL PLATE ~
(2 reqd.)



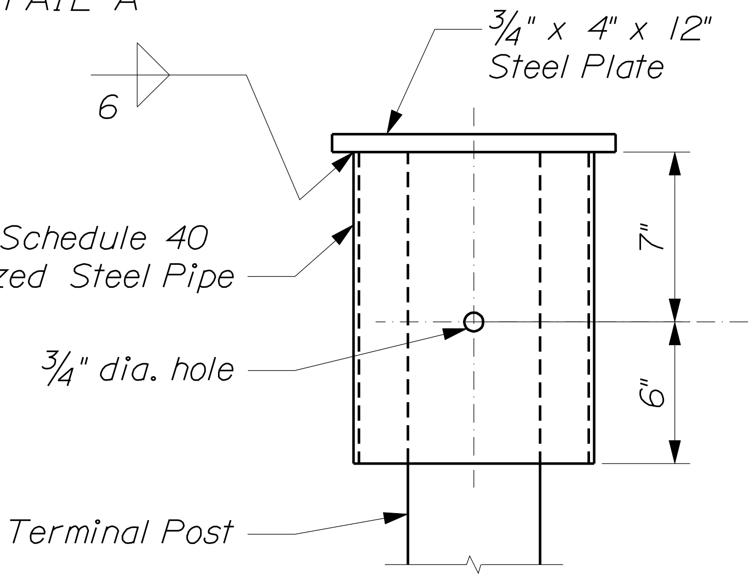
~ BEARING PLATE ~



~ DETAIL A ~



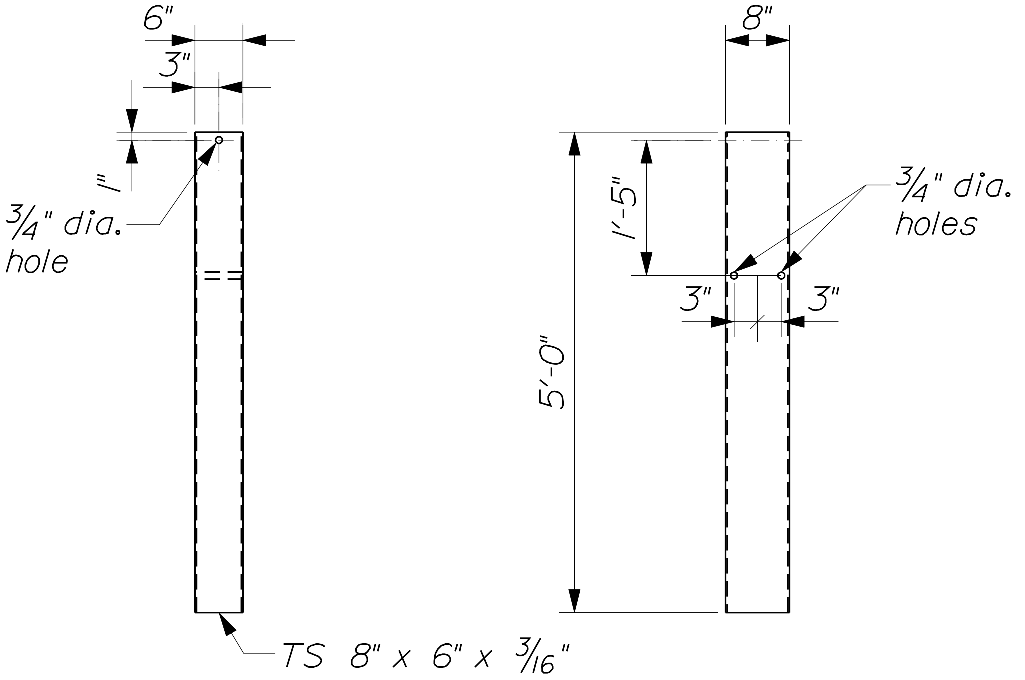
~ GALVANIZED STANDARD PIPE POST SLEEVE ~



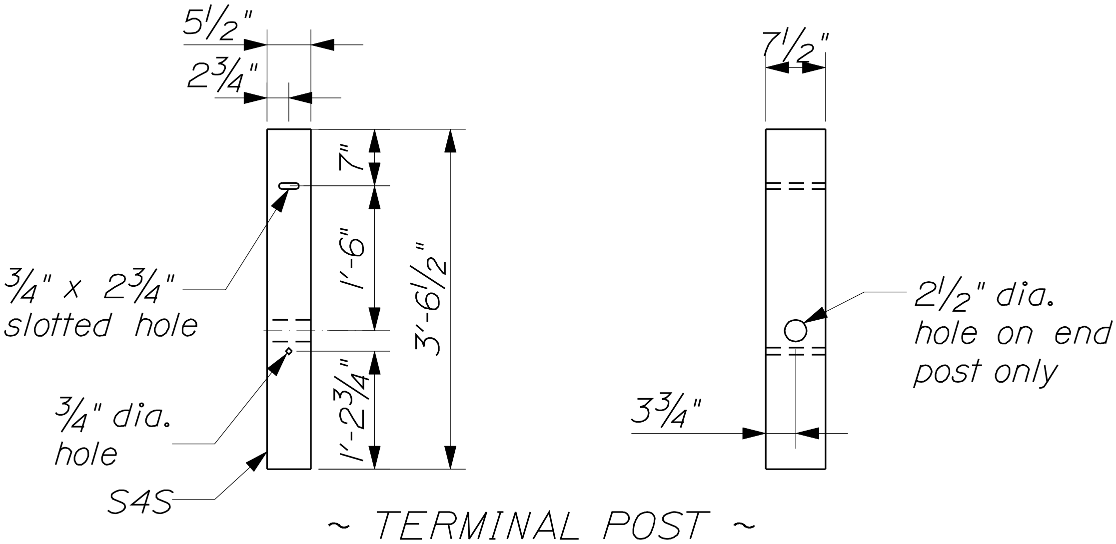
~ DETAIL B ~

CABLE RELEASING TERMINAL HARDWARE

606(28)



~ STEEL TUBE ANCHOR ~



~ TERMINAL POST ~

NOTE:
Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance, and accepted manufacturing practices.

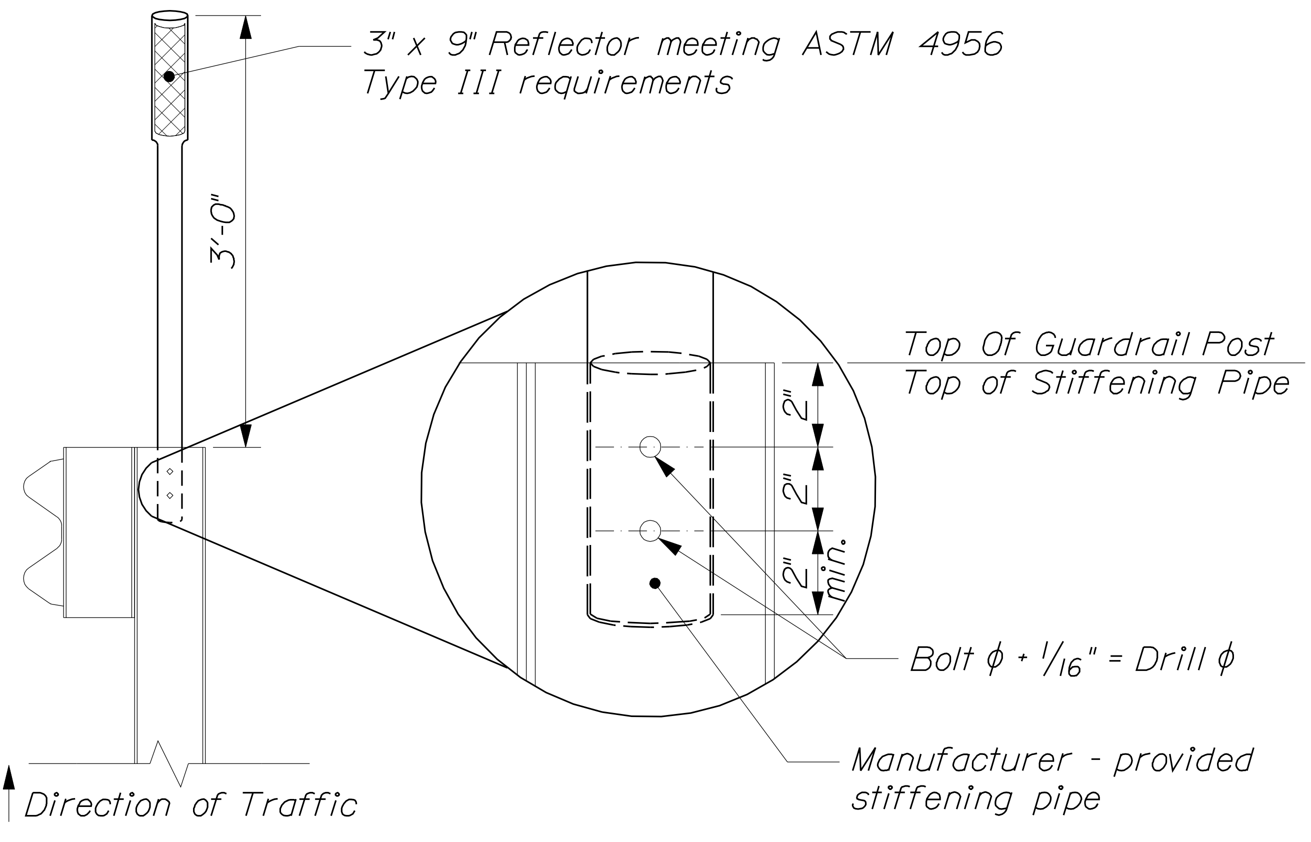
CABLE RELEASING TERMINAL HARDWARE

606(29)

NOTES:

1. Reflectorized Flexible Guardrail Markers shall be from Maine DOT's Approved Product List of Guardrail Material.

2. Installation:
   a. Each bolt-hole diameter shall be the bolt diameter + 1/16".
   b. Wood post attachment - attach marker with 2, 5/16" diameter galvanized lag bolts, having 3" of embedment into the wood post. Use 5/16" flat galvanized steel washers.
   c. Steel post attachment - attach marker with 2, 5/16" diameter galvanized hex head bolt, washer and nut assemblies, having 1/2" of bolt extension behind steel post. Washers shall be 5/16" flat galvanized steel.
   d. When provided by the marker manufacturer, a stiffening pipe shall be inserted into the base of the marker prior to drilling bolt holes and shall remain in-place.



REFLECTORIZED FLEXIBLE GUARDRAIL MARKER DETAILS

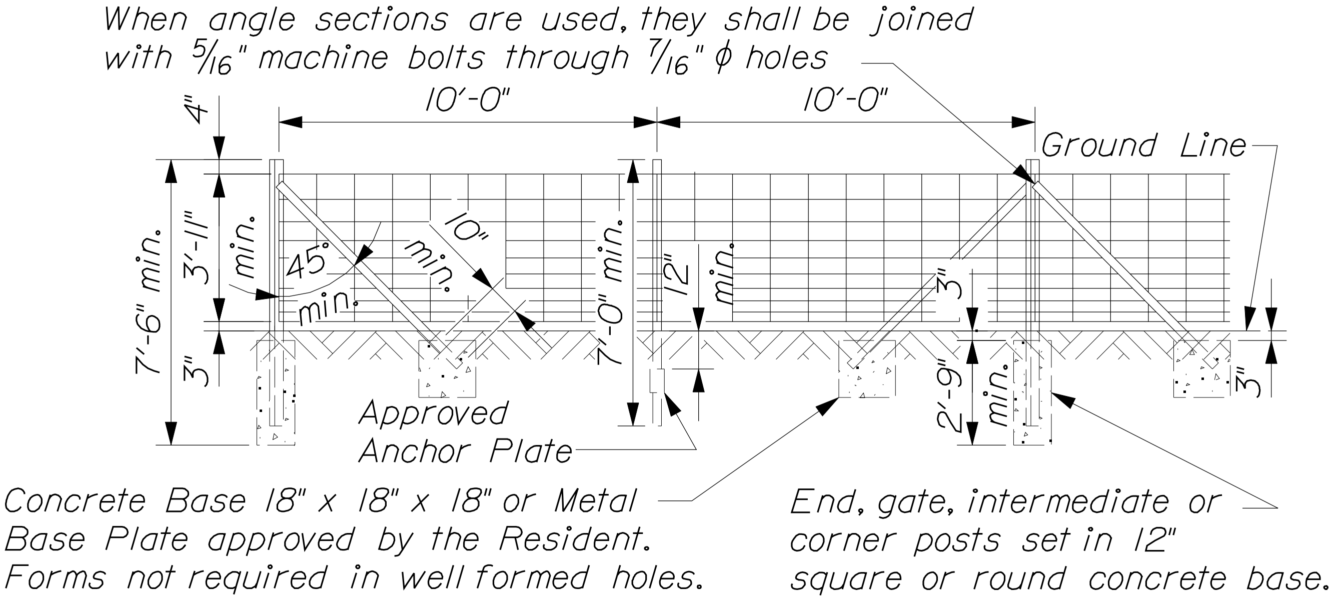
606(30)

WOVEN WIRE FENCE	NOMINAL SIZE (inches)	SHAPE	WEIGHT (lbs./ft.)	COMMENTS
End, Intermediate, & Corner Posts	2½" x 2½" x ¼"	∡	9.04	
	2"	ϕ	8.05	Grade 1* w/Top Cap
	2"	ϕ	6.87	Grade 2* w/Top Cap
Gate Posts		∡	15.85	
	3½" x 3½" x 5/16"	ϕ	12.76	Grade 1* w/Top Cap
		ϕ	10.23	Grade 2* w/Top Cap
Line Posts	----	T	2.93	Studded
	1¼"	ϕ	5.00	Grade 1* w/Top Cap
	1¼"	ϕ	4.05	Grade 2* w/Top Cap
Braces	1¾" x 1¾" x ¼"	∡	6.11	
	1¼"	ϕ	5.00	
	1¼"	ϕ	4.05	
CHAIN LINK FENCE	NOMINAL SIZE (inches)	SHAPE	WEIGHT (lbs./ft.)	COMMENTS
End & Corner Posts	2" I.D.	ϕ	8.05	Grade 1*
	2" I.D.	ϕ	6.87	Grade 2*
	2½" x 2"	H	9.04	
	3½" x 3½"	∡	11.33	Integral Loops
Line Posts	1½" I.D.	ϕ	6.00	Grade 1*
	1½" I.D.	ϕ	5.03	Grade 2*
	1⅞" x 1⅝"	H	5.95	
	1⅞" x 1⅝"	C	5.03	
Top & Brace Rails	1¼" I.D.	ϕ	5.00	Grade 1*
	1¼" I.D.	ϕ	4.06	Grade 2*
	1⅝ x 1¼"	⊔		

* AASHTO M 181 Par. 29.1

FENCE POST, RAIL, AND BRACE OPTIONS

607(01)

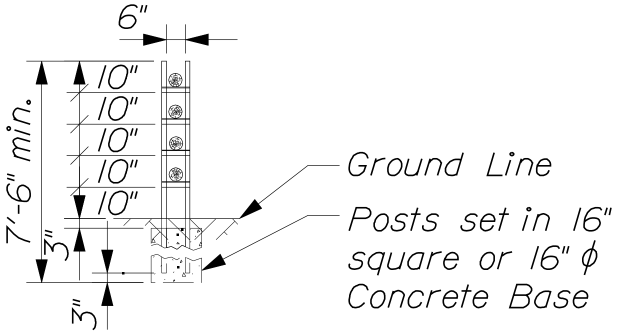


~ END OR GATE POST ~

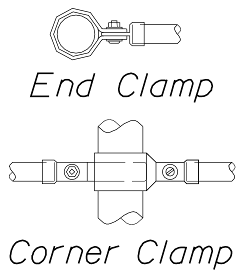
~ LINE POST ~

~ INTERMEDIATE OR CORNER POST ~

~ WOVEN WIRE FENCING - METAL POSTS ~



~ BARWAY ~



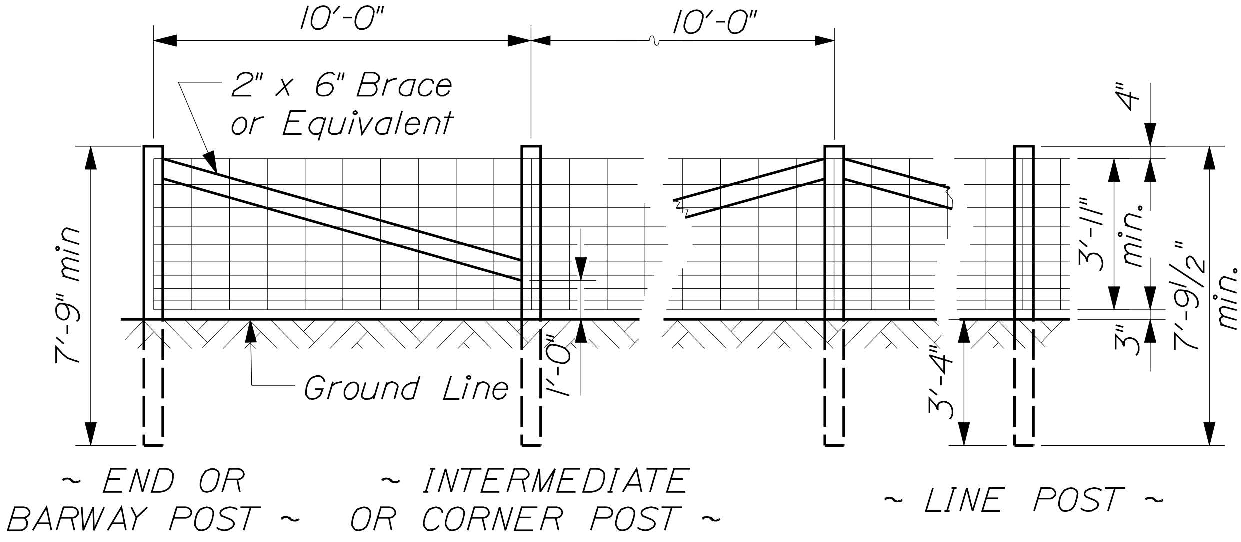
~ BRACE CLAMPS - PIPE POSTS ~

NOTE:
Metal posts shall be installed for a 16'-0" opening. Barway posts and braces shall conform to the requirements of "Gate Posts" and "Braces" under "Woven Wire Fencing - Metal Posts". Cross bar supports for barways shall be 1 3/4" x 1 3/4" x 1/4" rolled angle section. When round gate posts are used, the length of the cross bar supports shall equal the center-to-center of the posts plus 2 inches and they shall be attached to the barway post with 5/16" x 4 1/4" machine bolts. When angle section gate posts are used, the length of the cross bar supports shall be equal to the out-to-out dimensions of the angle sections and shall be attached with 5/16" x 1" machine bolts. All bracing shall conform to the requirements of "Woven Wire Fencing - Metal Posts". Cross bars shall be as required for "Barways - Wood Posts".

~ BARWAYS - METAL POSTS ~

FENCING

607(02)

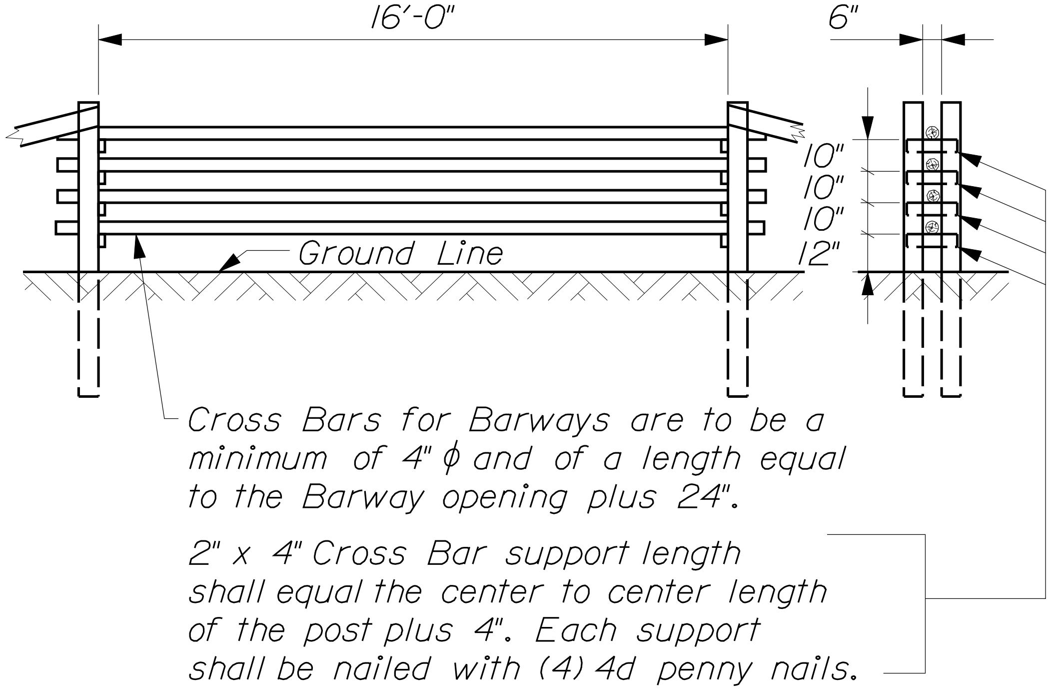


NOTES:

1. Staples for wood posts are to be 9 Ga. 1½" and placed according to the Standard Specifications.

2. All end, corner, barway, and intermediate posts shall be braced as shown.

~ WOVEN WIRE FENCING - WOOD POSTS ~



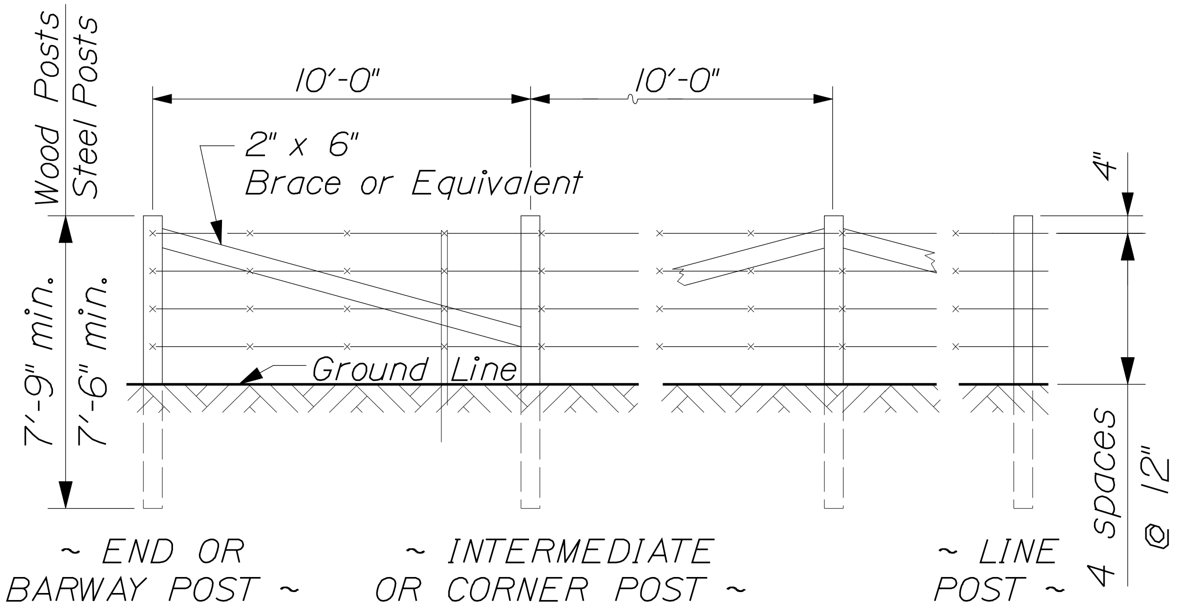
Cross Bars for Barways are to be a minimum of 4" ϕ and of a length equal to the Barway opening plus 24".

2" x 4" Cross Bar support length shall equal the center to center length of the post plus 4". Each support shall be nailed with (4) 4d penny nails.

~ BARWAYS - WOOD POSTS ~

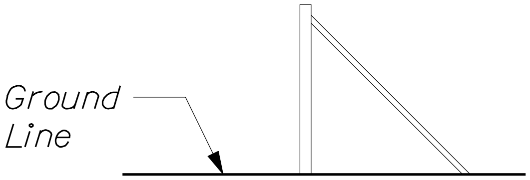
FENCING

607(03)

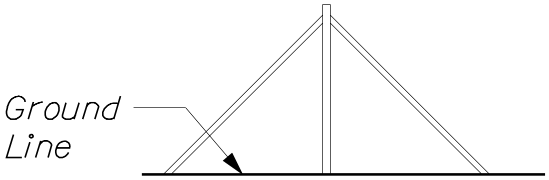


NOTE:
"Barbed Wire - Metal Posts" shall be constructed with the post and wire spacing shown above. Metal posts and braces shall conform to all of the requirements noted and shown for "Woven Wire Fencing - Metal Posts", including concrete bases.

BARBED WIRE FENCING - WOOD POSTS AND
BARBED WIRE FENCING - METAL POSTS



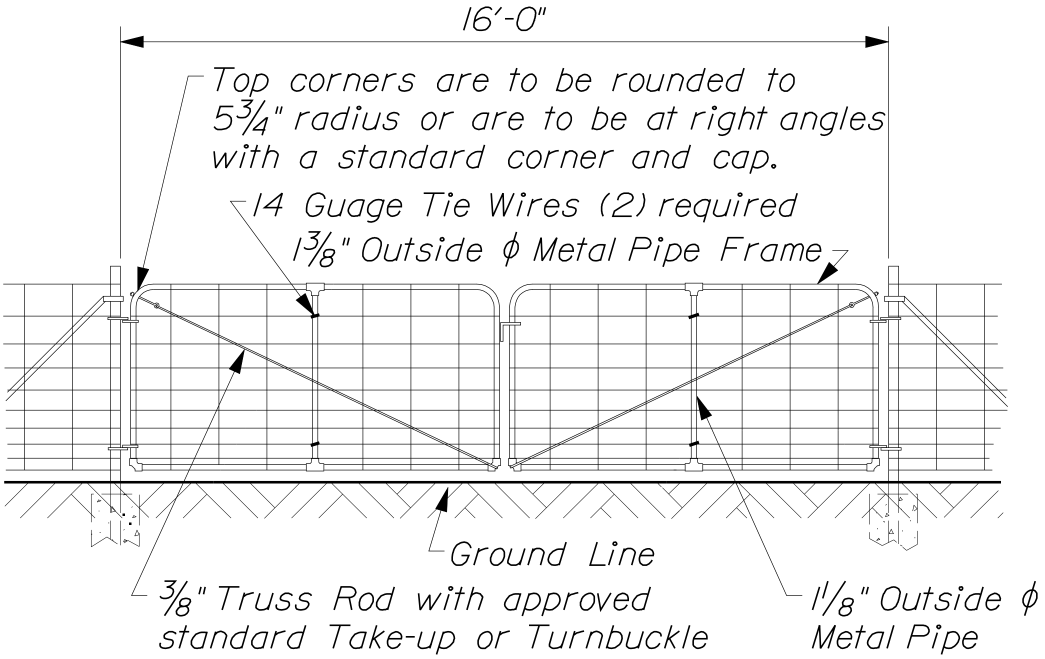
~ BRACING - TYPE I ~
used at gates, barways,
and terminals



~ BRACING - TYPE II ~
used at corners, intermediate points,
and changes in vertical alignment

BRACING ASSEMBLIES FOR WOVEN WIRE AND BARBED WIRE FENCING

607(04)



NOTES:

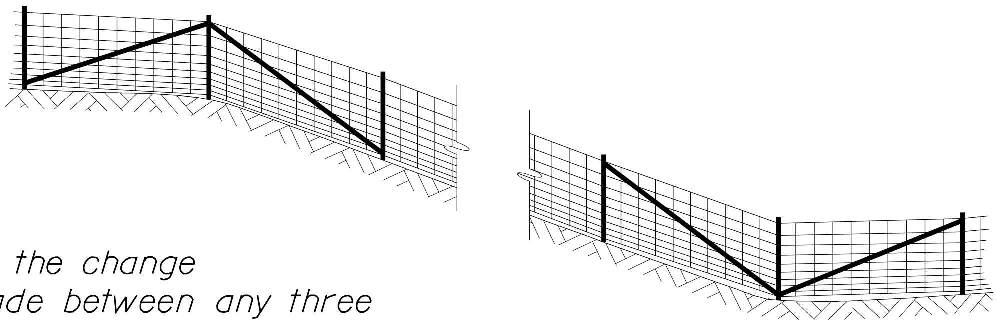
1. Gate posts, braces and anchorages to be as specified under "Woven Wire Fencing - Metal Posts".

2. All gates shall be installed with the top hinge point pointing down.

3. Wire for gates shall conform to A.S.T.M. A116, Class 1, Design No. 1047-12-11.

4. The required fittings for fence and gates shall be steel or malleable iron of an approved standard type.

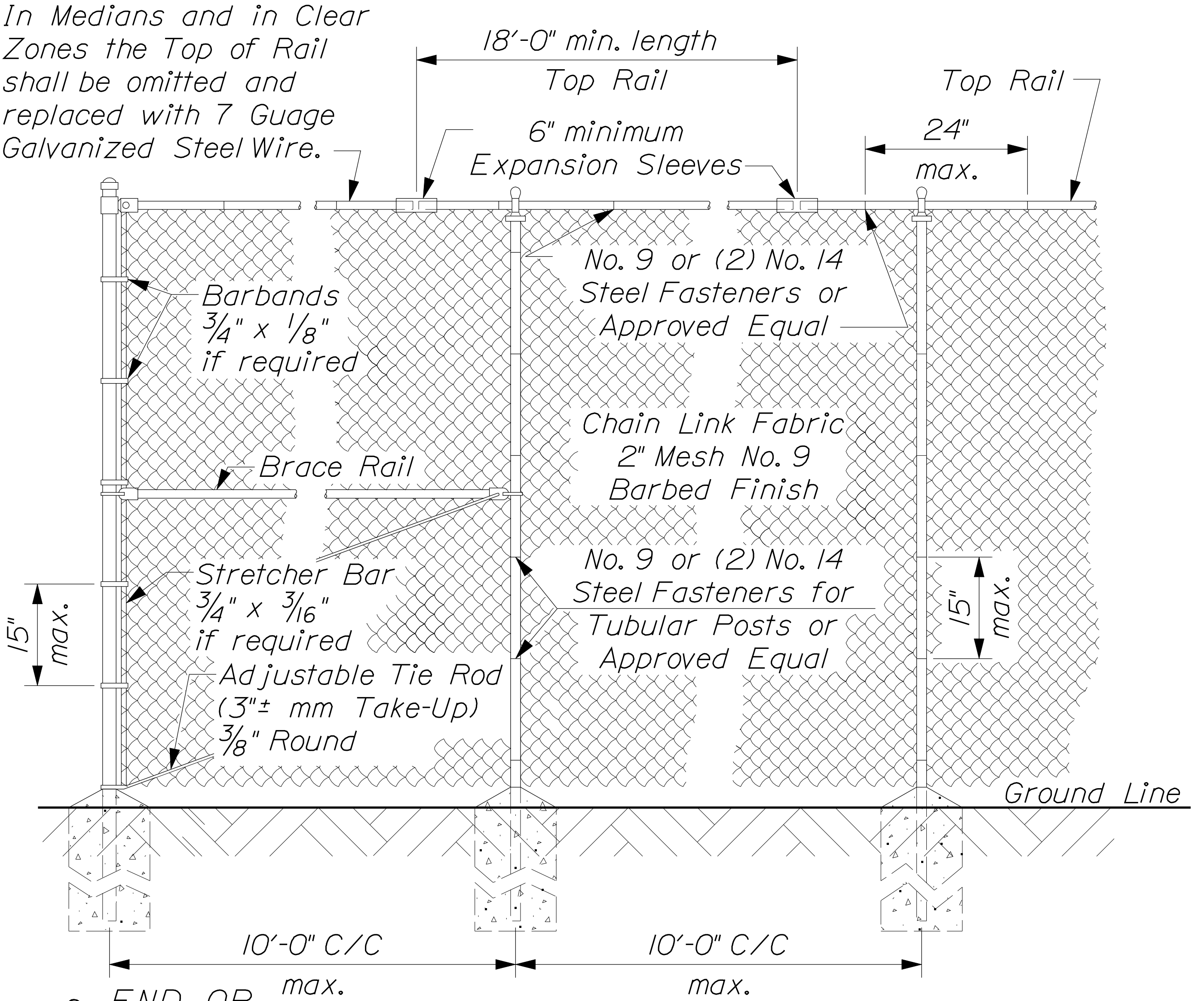
5. Gates shall be furnished with a standard fork latch and one piece of $\frac{3}{16}$" straight link alloy steel chain, 24" long. One end shall be attached to the gate frame and attached to the other end shall be a snap lock or other approved fastening device.



Where the change in grade between any three fence posts exceeds 15%, additional intermediate bracing shall be provided.

DRIVE GATEWAYS (16 FEET) & INTERMEDIATE BRACING

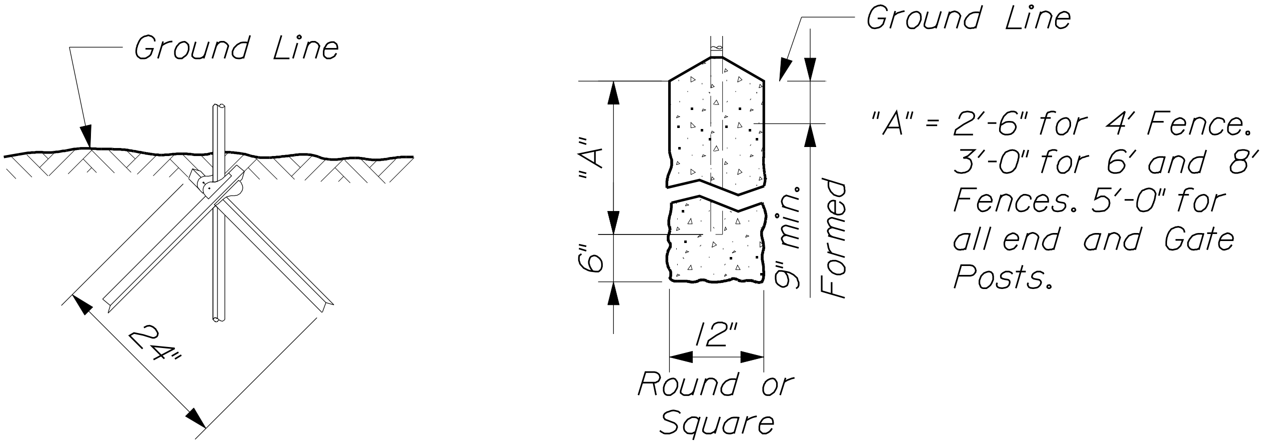
607(05)


In Medians and in Clear Zones the Top of Rail shall be omitted and replaced with 7 Guage Galvanized Steel Wire.

~ END OR CORNER POST ~

~ LINE POST ~

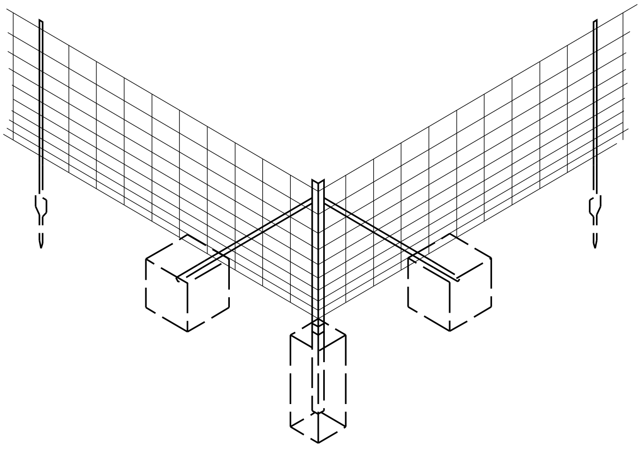
~ LINE POST ~


"A" = 2′-6″ for 4′ Fence. 3′-0″ for 6′ and 8′ Fences. 5′-0″ for all end and Gate Posts.

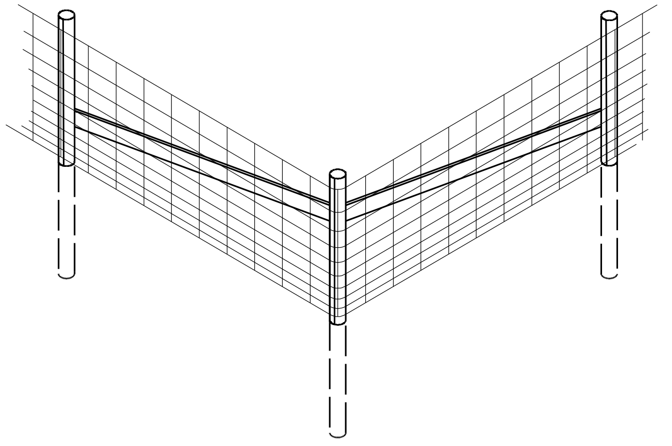
~ DRIVE ANCHOR ~
(90° to Fence Line)

~ LINE, CORNER, AND END POST BASE ~

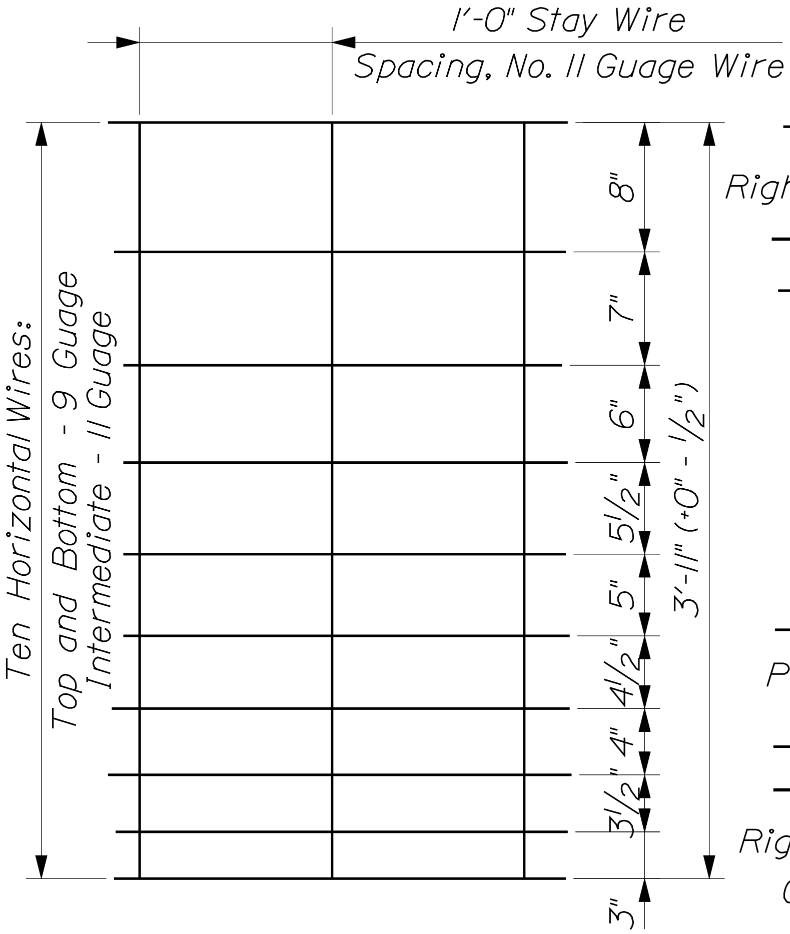
CHAIN LINK FENCE
607(06)



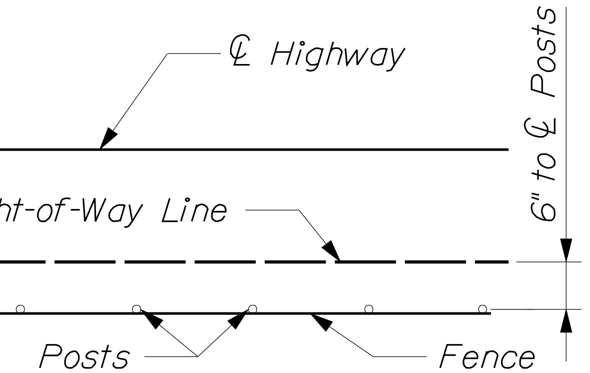
~ BRACING ASSEMBLY FOR METAL POSTS ~



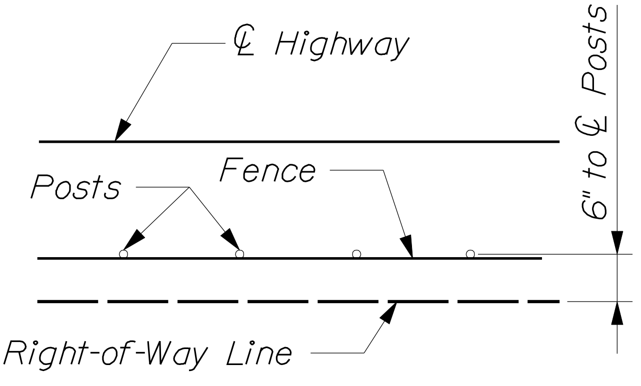
~ BRACING ASSEMBLY FOR WOOD POSTS ~



~ WOVEN WIRE FENCE ~



NON-CONTROLLED ACCESS FENCE



CONTROLLED ACCESS FENCE

~ FENCE LOCATION WITH RESPECT TO RIGHT OF WAY LINE~

FENCING

607(07)

GENERAL NOTES

1. When ledge is encountered, steel posts shall be set and grouted 12 inches deep unless the posts penetrate the ground to the depth indicated on the drawings.

2. When wood posts are used, braces shall be attached to the posts with a minimum of (4) 40 penny nails per attachment.

3. When the word "Standard" is used, it shall be interpreted as if it were followed by the expression "To The Fence Industry".

4. Woven wire and barbed wire fencing shall be attached to wood posts with 9 guage $1^1/_2$" galvanized staples.

5. Concrete for post foundations shall be Class B.

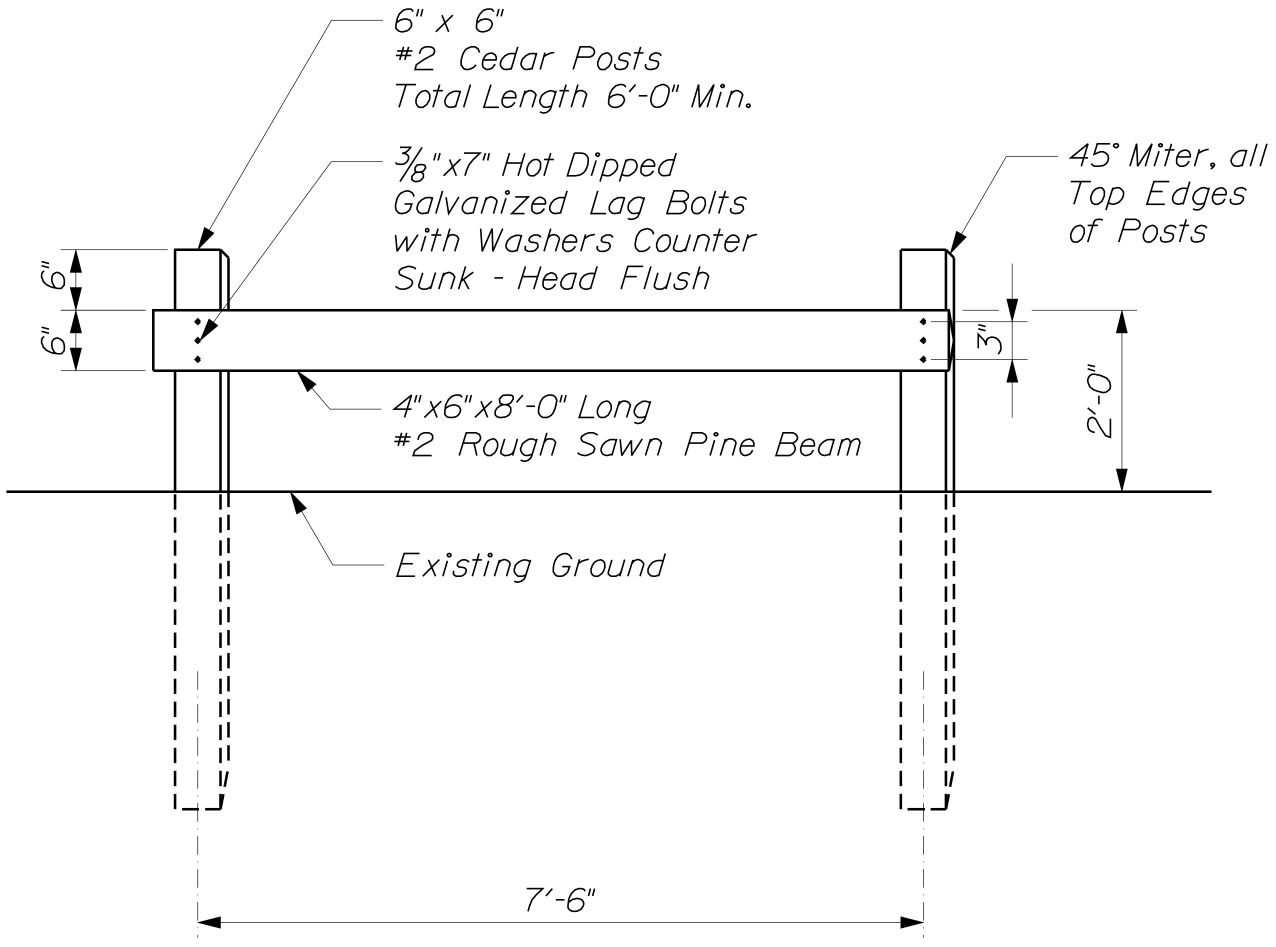
6. In well formed holes with vertical walls, forms will be required only at the top 9 inches. Holes which cannot be well formed shall have forms for the full depth of the base.

~ SPACING OF FENCE POSTS ON CURVES ~

RADIUS OF CURVE AT FENCE LOCATION	NORMAL POST SPACING
Over 500 feet	10 feet
Over 200 feet to 500 feet	8 feet
Over 100 feet to 200 feet	6 feet
100 feet and Less	5 feet

FENCING

607(08)

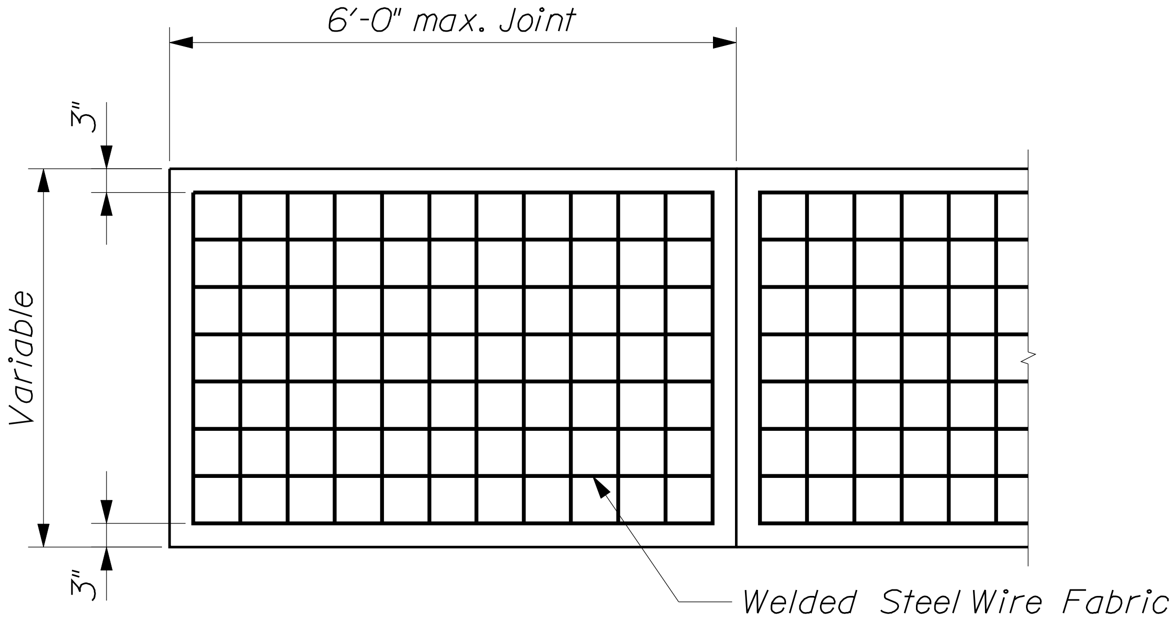


NOTES:

1. Pre-drill 1/4" diameter holes for Lag Bolts.
2. Pre-drill 1 1/4" diameter holes 1/2" deep to counter sink Lag Bolts.

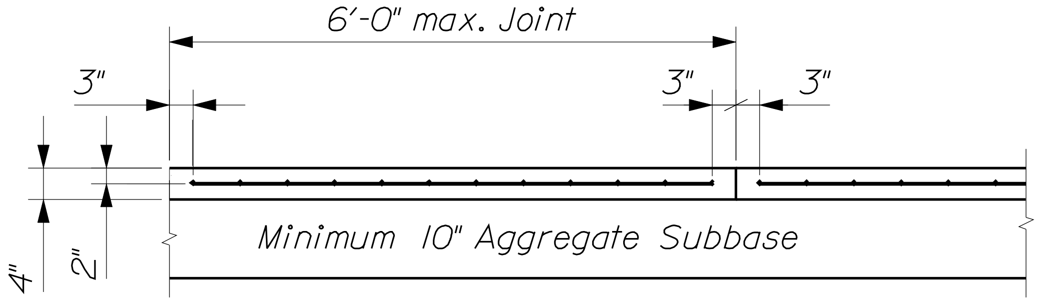
TIMBER FENCE

607(09)



~ PLAN ~

NOTE:
Sidewalk shall conform to Standard Specifications Section 608.



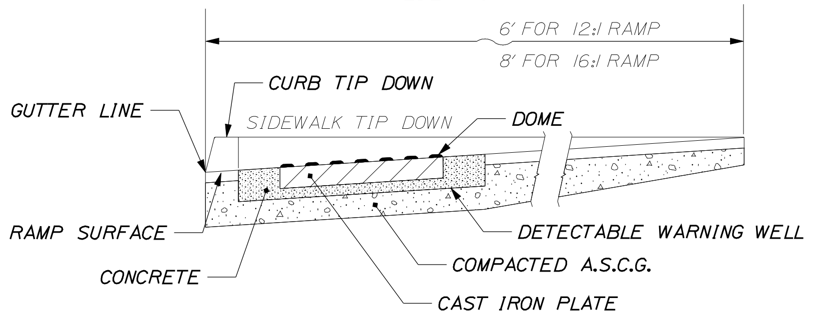
~ ELEVATION ~

REINFORCED PORTLAND CEMENT CONCRETE SIDEWALK

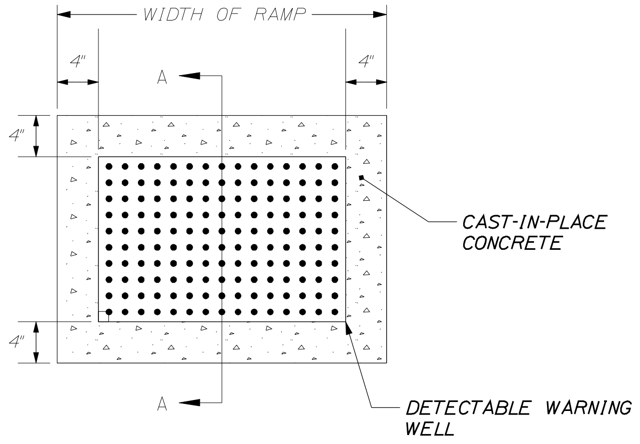
608(01)

VIEWS AND DETAILS OF THE DETECTABLE WARNING

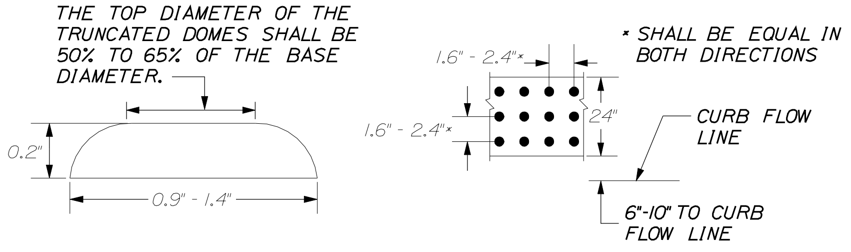
(NOT TO SCALE)



SIDE SECTION VIEW OF
DETECTABLE WARNING, WELL, CURB AND GUTTER



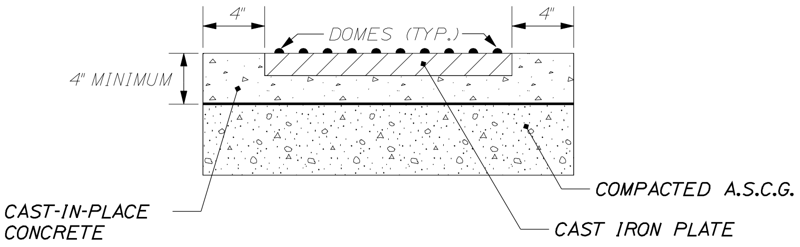
PLAN VIEW OF
DETECTABLE WARNING AND WELL



ELEVATION VIEW

PLAN VIEW

DOME AND DETECTABLE WARNING DETAILS



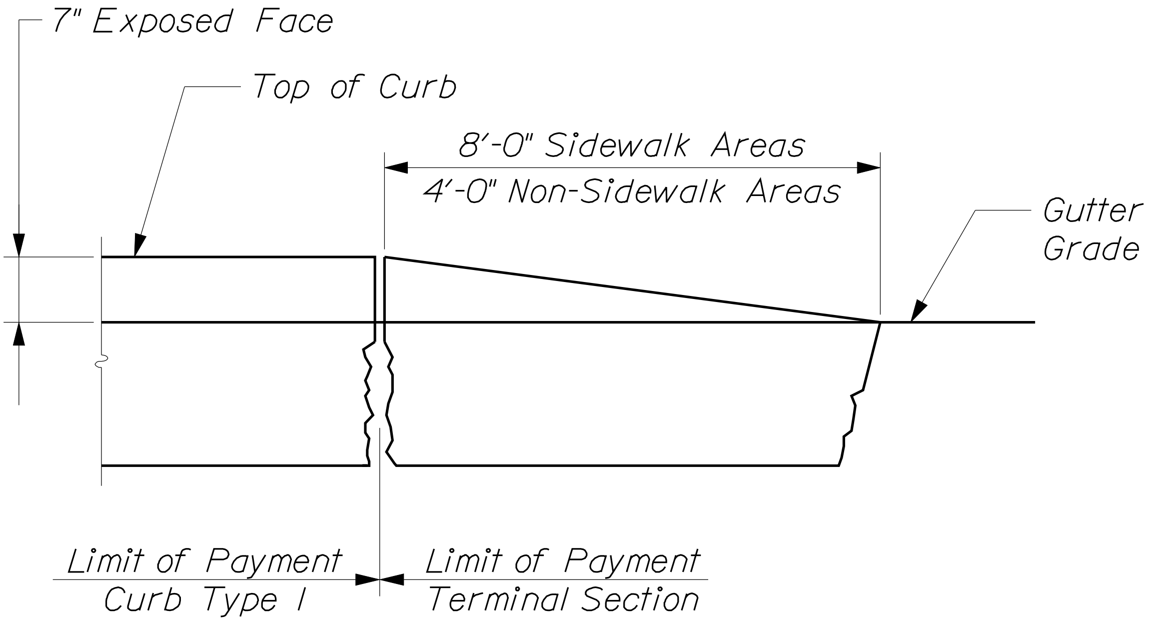
SECTION A-A

NOTE: ALL DETECTABLE WARNING AREAS SHALL START 6-10" FROM THE FLOW LINE OF THE CURB, BE 24" IN DEPTH, AND COVER THE COMPLETE WIDTH OF THE RAMP AREA ONLY.

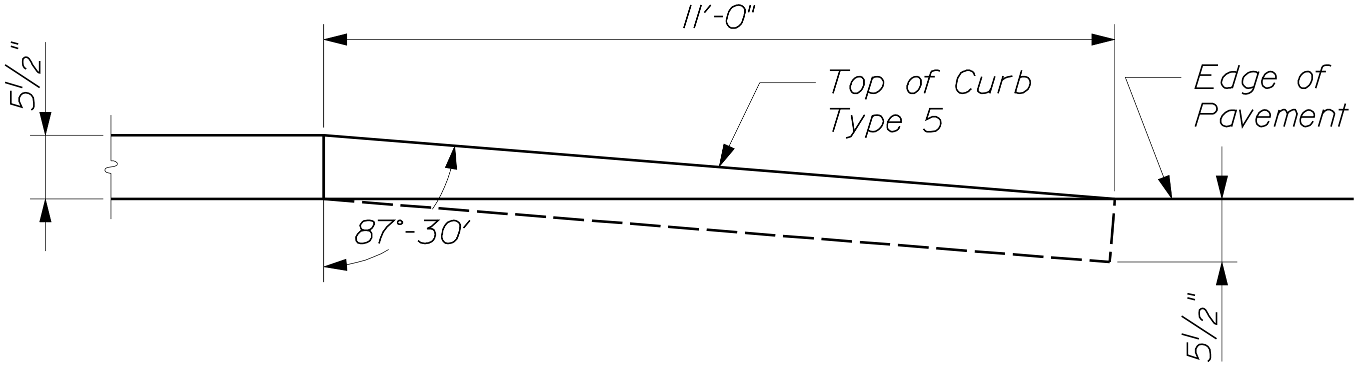
DETECTABLE WARNINGS

608(02)

CURB TYPES 1, 2 & 5 ON CURVES				
TYPE	RADIUS OF CURVE	LENGTH	PAID FOR AS	STONE IS CUT OR CAST
1 & 2	0 to 60′ incl.	4′ min.	Circular	Arc to Fit Curve
	Over 60′ to 160′	4′ to 6′	Straight	Straight Pieces
5	0 to 8′ incl.	2′ min.	Circular	To Fit Curve
	Over 8′ to 30′ incl.	12" min. Chord	Circular	Str. Pieces, Radial Ends
	Over 30′ & Under 160′	2′ to 3′	Straight	Straight Pieces
	160′ and Over	3′ to 6′	Straight	Straight Pieces



~ TERMINAL SECTION TYPE "1" ~

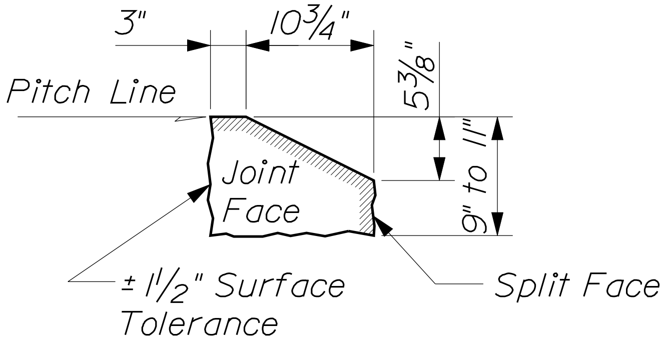


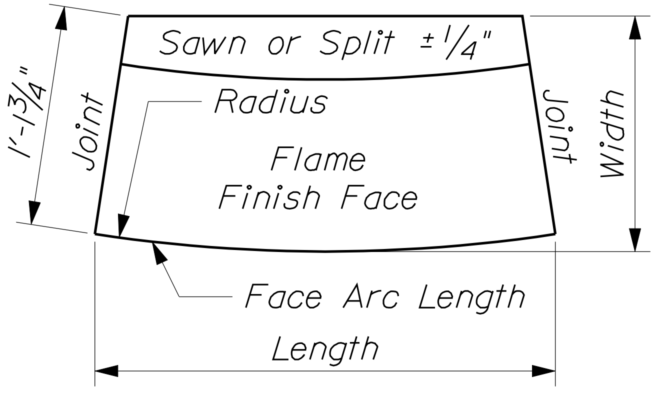
~ TERMINAL SECTION TYPE "5" ~

(use when shown on plans only)

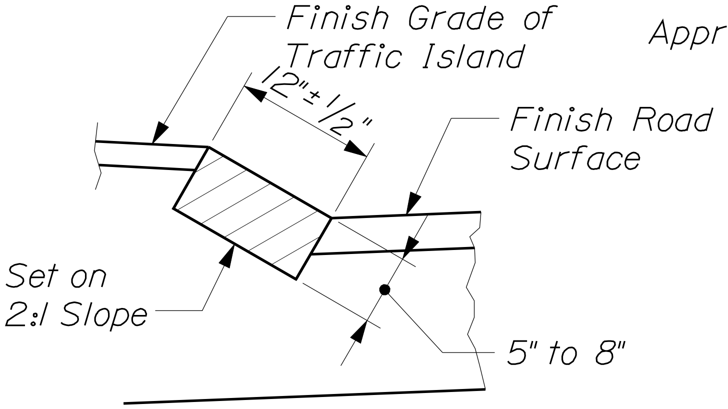
TERMINAL CURB SECTION

609(01)



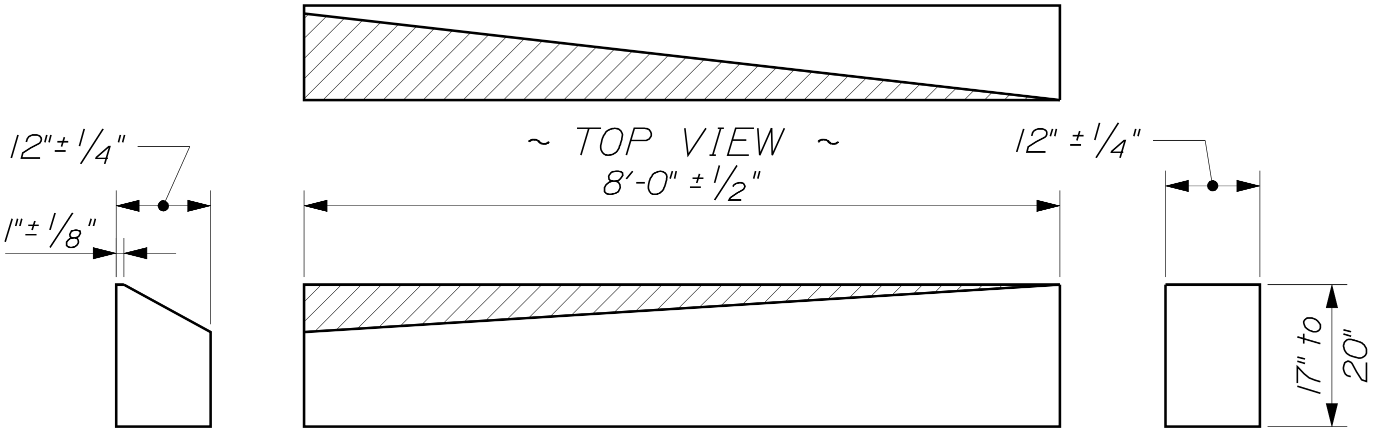


Approved Alternate Circular Curb Type 5
2'-0" to 8'-0" Radius



3' min. Length

~ CURB TYPE 5 ~



~ TOP VIEW ~

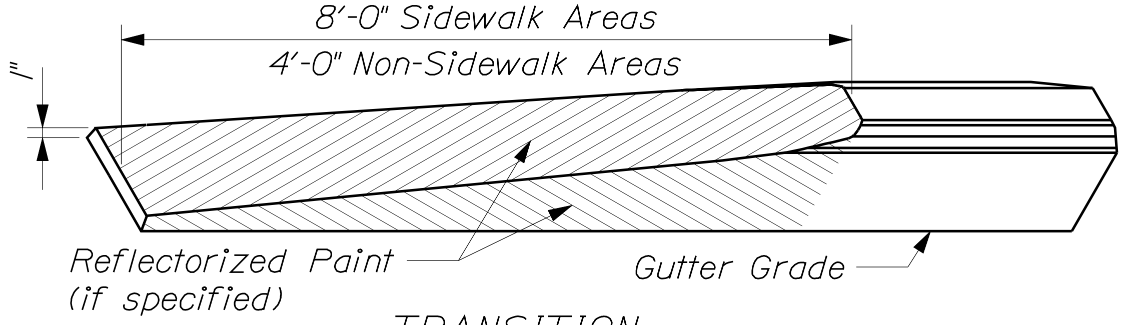
~ END VIEW ~ ~ ELEVATION ~ ~ END VIEW ~

Transition Section "B"
Curb Type "5" to Vertical Curb Type "1" & Type "2"

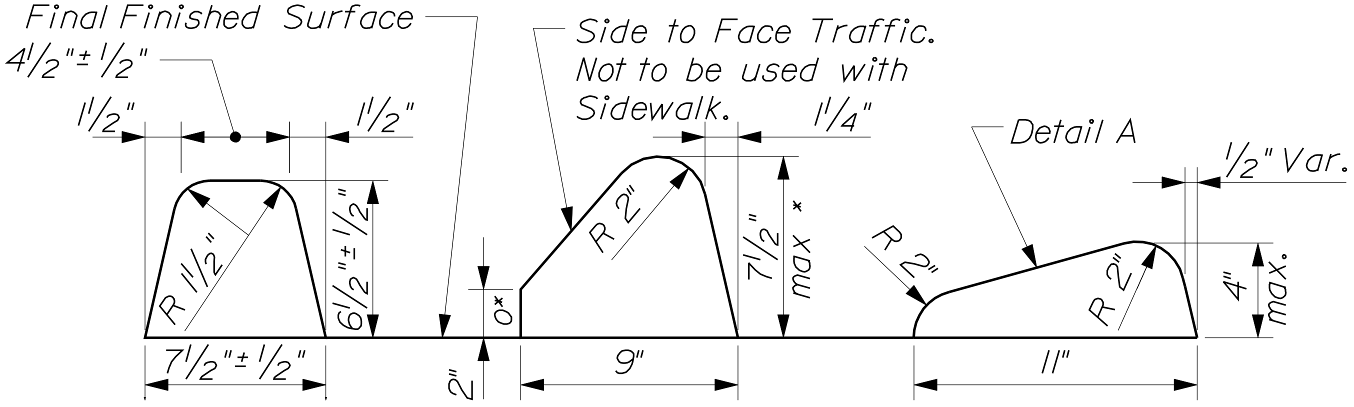
~ CURB TRANSITION ~

CURB

609(02)



~ TRANSITION ~



~ MOLD 1 ~

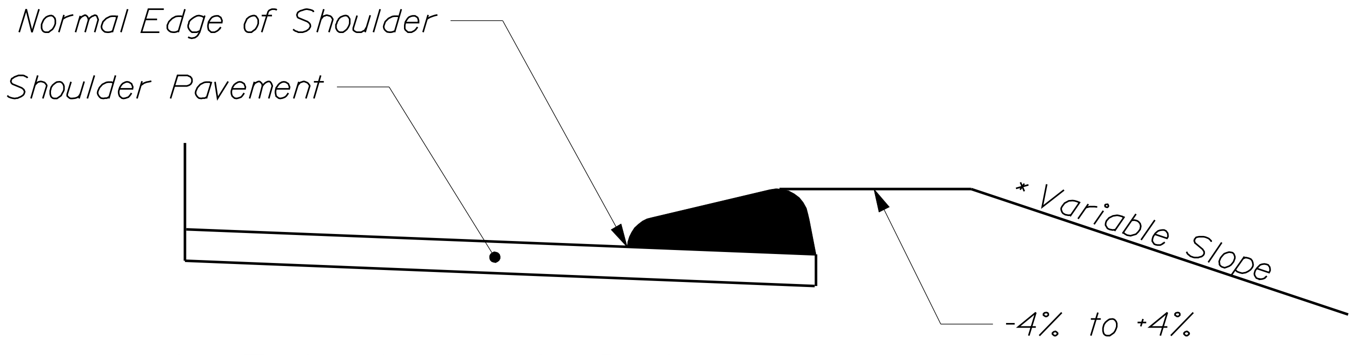
~ MOLD 2 ~
*Under Guardrail

~ MOLD 3 ~
*Under Guardrail

~ CURB TYPE 3 ~

Curb Mold 2 or 3 shall be used in all situations except for where the curb forms the edge of the sidewalk. Mold 1 shall be used in conjunction with sidewalks or where there is a potential for sidewalks. Mold 3 shall be used in situations where the design speed exceeds 45 mph. Maximum height of Curb under Guardrail shall not exceed 4".

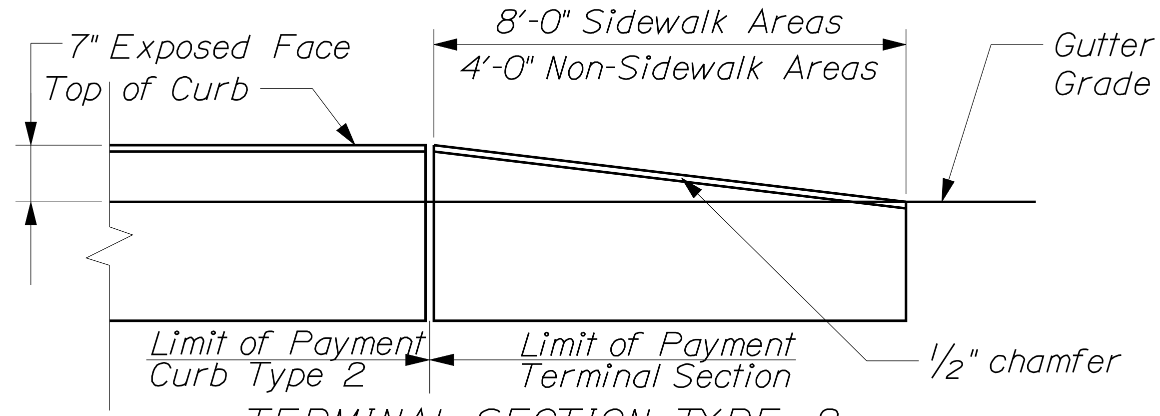
~ DETAIL A ~



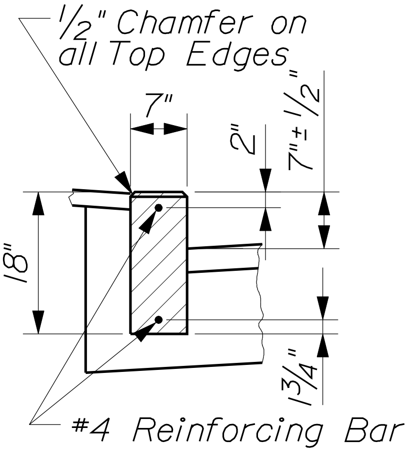
* See Typical Sections for Project

CURB TYPE 3

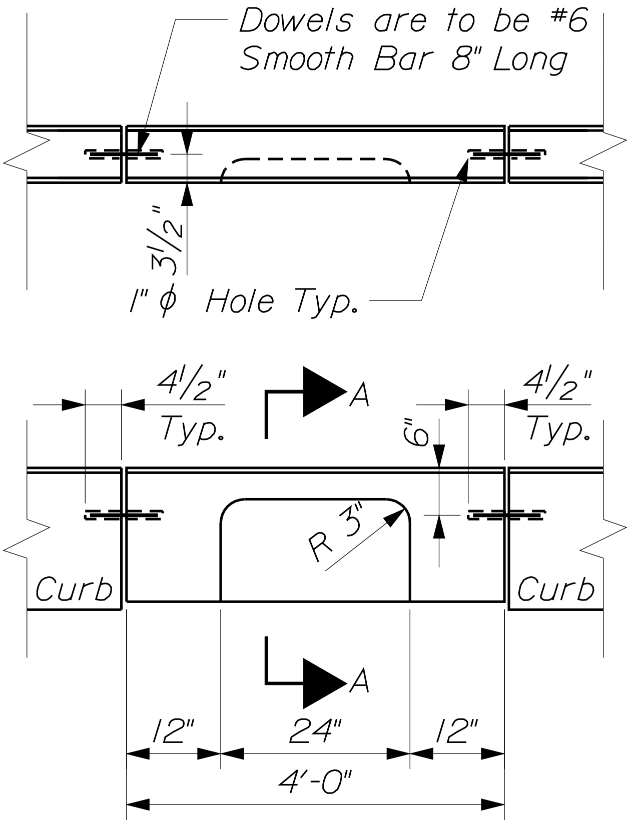
609(03)



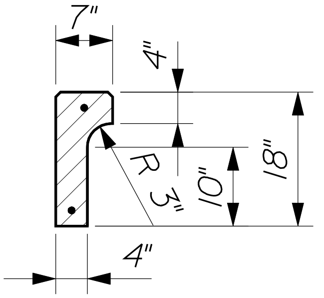
~ TERMINAL SECTION TYPE 2 ~



~ VERTICAL CURB TYPE 2 ~



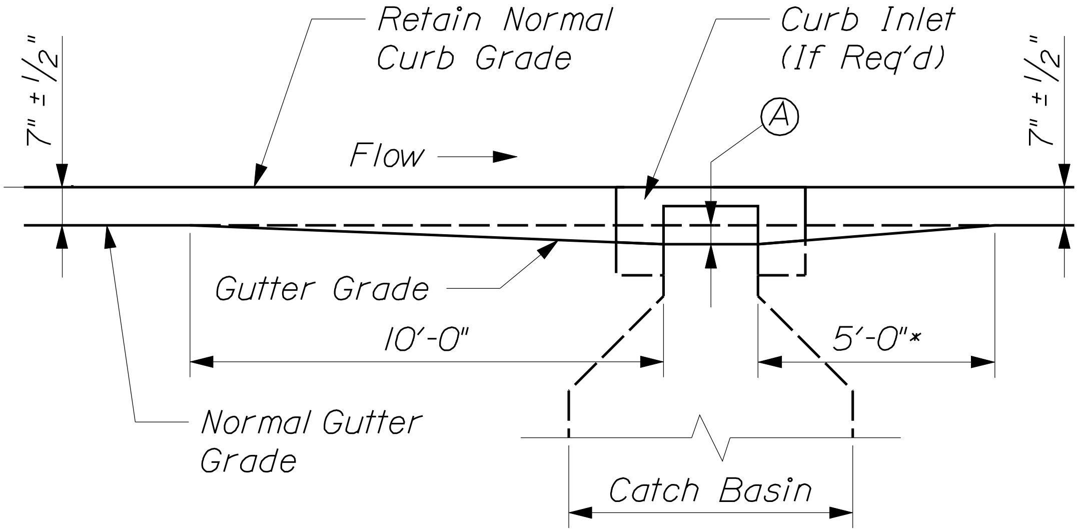
~ CURB INLET TYPE 2 ~



~ SECTION A - A ~

VERTICAL CURB TYPE 2

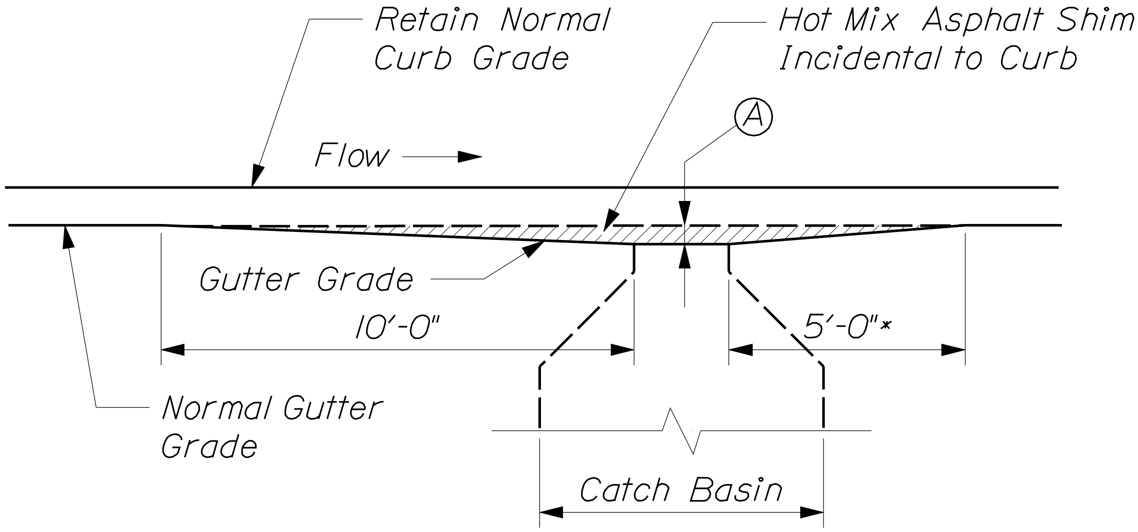
609(04)



~ AT CURB INLETS ~

Ⓐ For Parking Lane = 2"
Adjacent to Travel Lane = 0"

* Dimension to be 10'-0"
if at bottom of a sag.

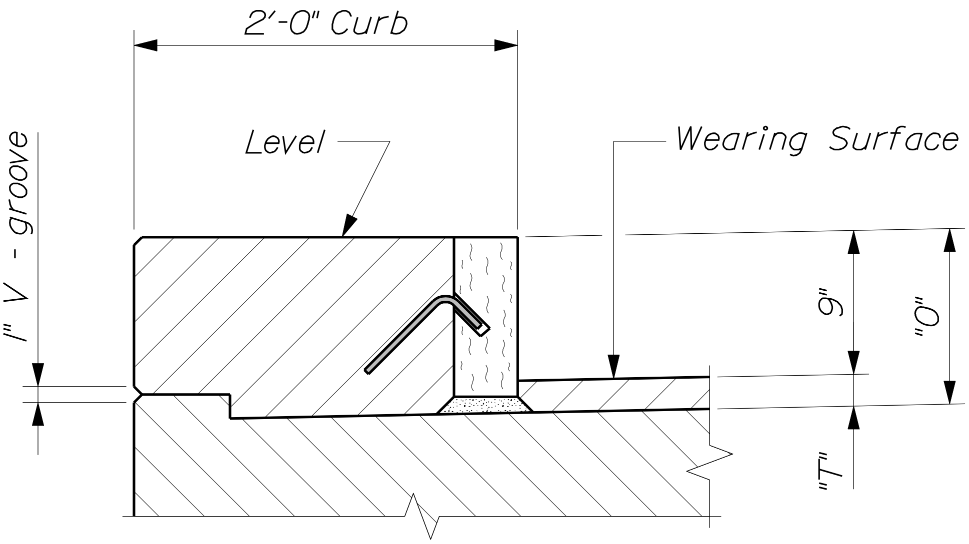


~ AT CURB WITHOUT INLET STONES ~

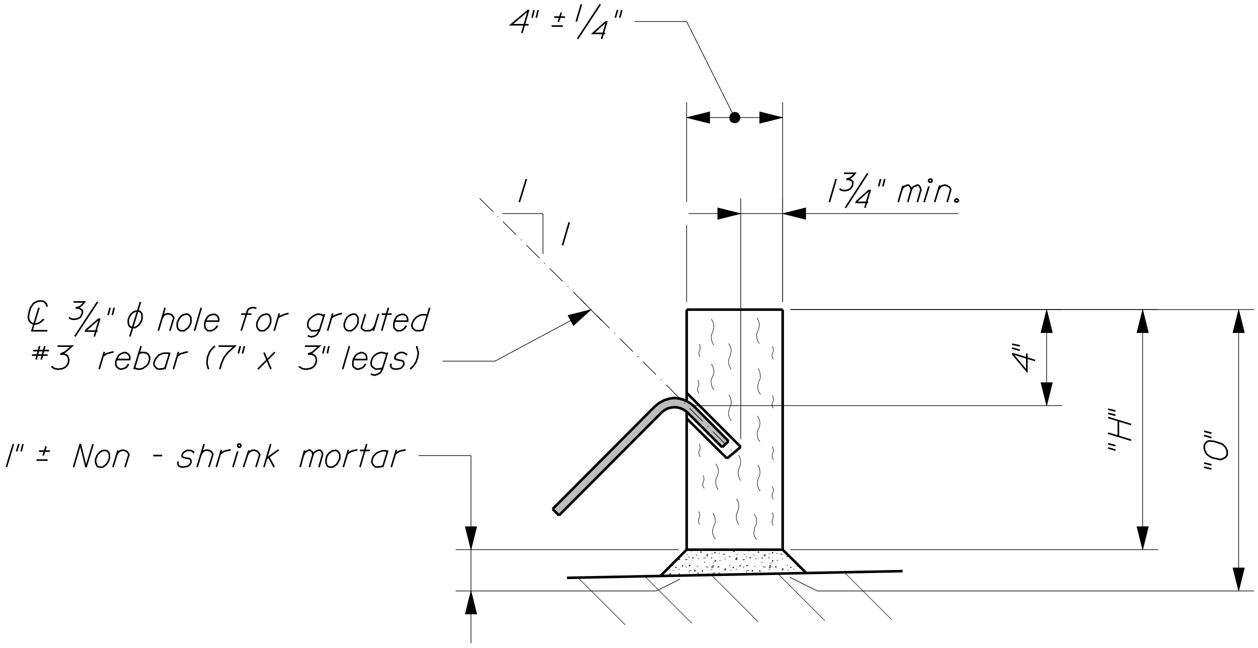
NOTE:
Grates shall be installed on gradient of the gutter and be depressed 2" below the normal gutter grade unless this depression interferes with traffic.

GUTTER GRADE TRANSITION AT CATCH BASIN

609(05)



~ CONCRETE CURB WITH VERTICAL BRIDGE CURB ~
For Wearing Surface ("T") details, refer to Section 502 ~ Concrete Curb

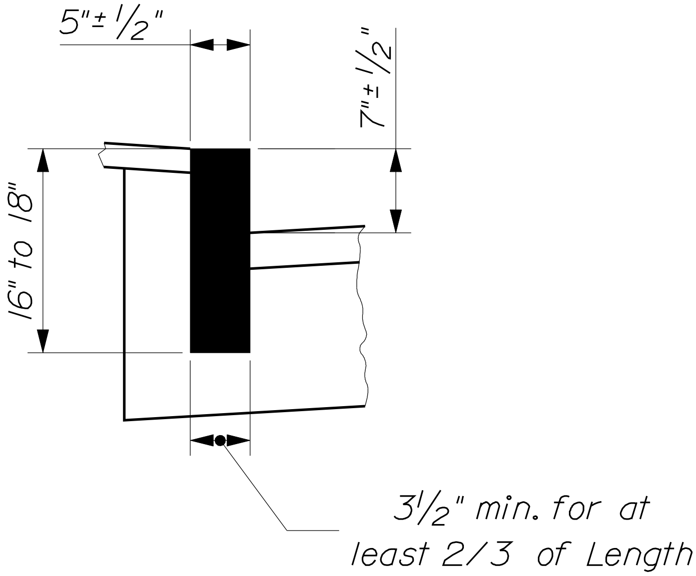


~ VERTICAL BRIDGE CURB DETAIL ~

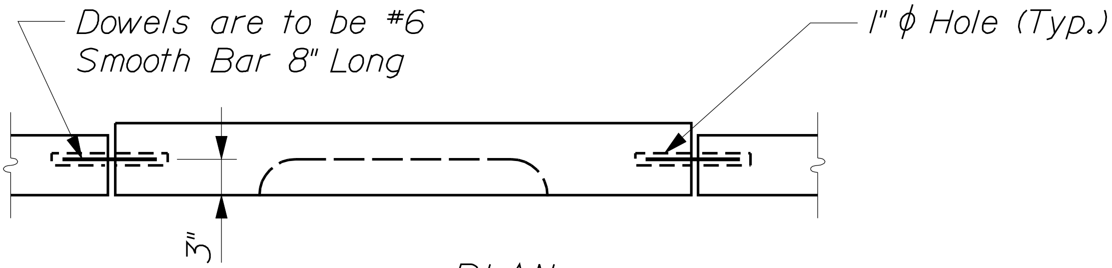
TABLE OF DIMENSIONS				
Type	Wearing Surface Type	"T"	"H"	"O"
1A	Unreinforced Concrete	2"	10" ± 1/4"	11"
1B	Bituminous	3 1/4"	11 1/4" ± 1/4"	1'-0 1/4"

VERTICAL BRIDGE CURB

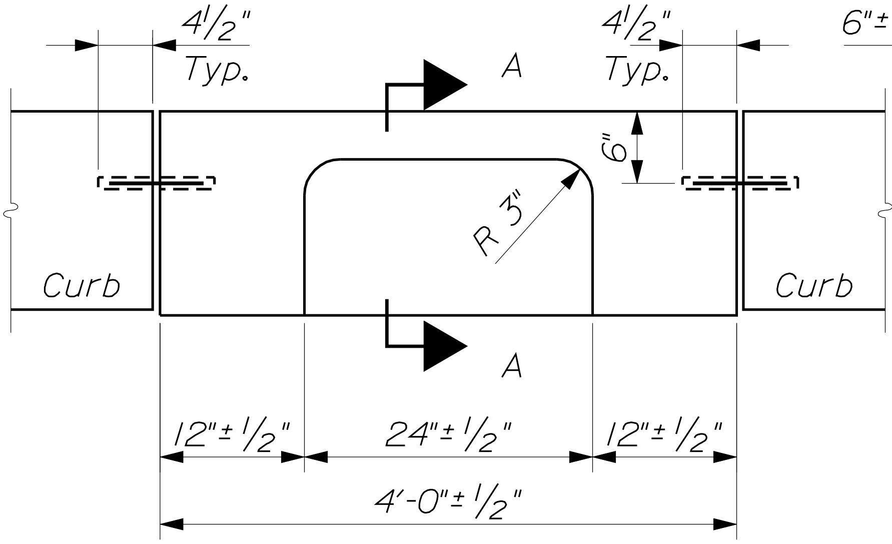
609(06)

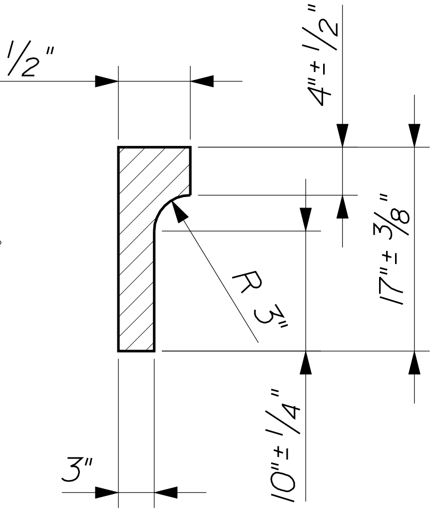


~ VERTICAL CURB ~
TYPE I



~ PLAN ~



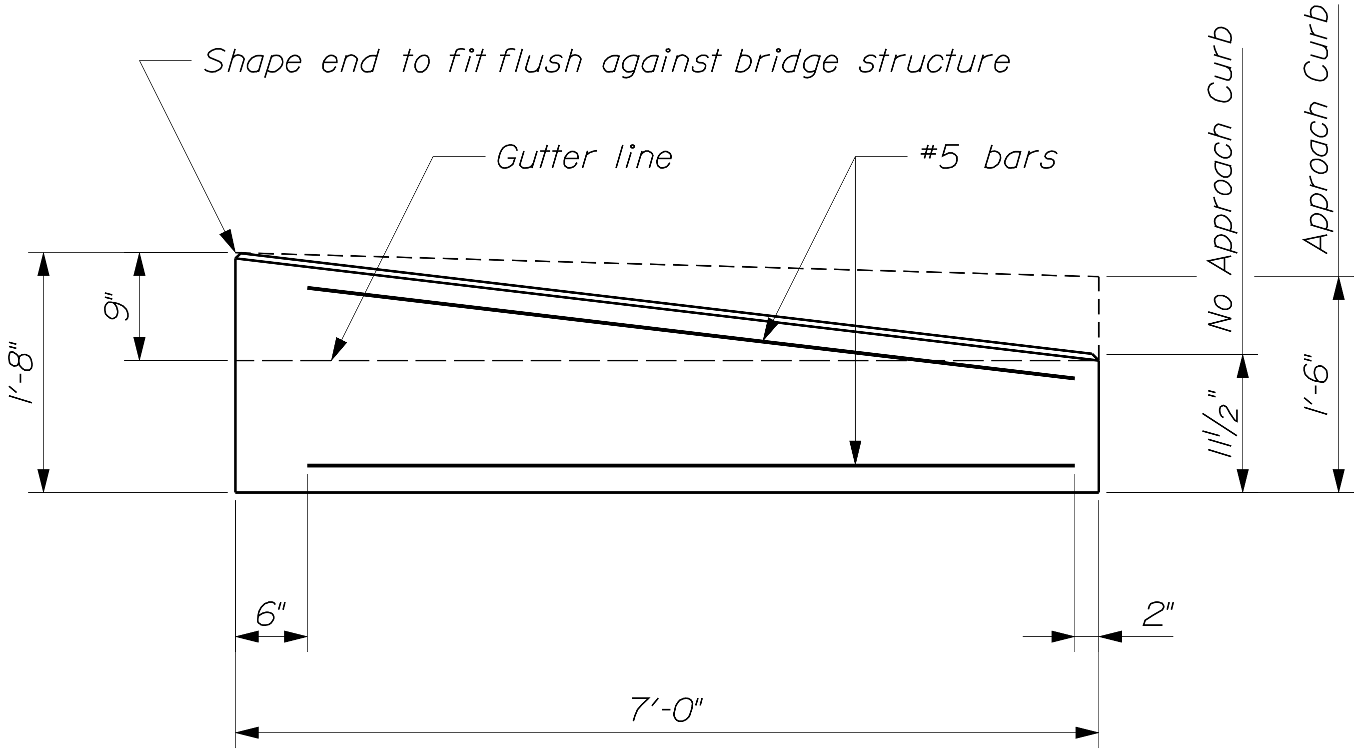


~ CURB INLET TYPE I ~

~ SECTION A-A ~

CURB TYPE I

609(07)



~ ELEVATION ~

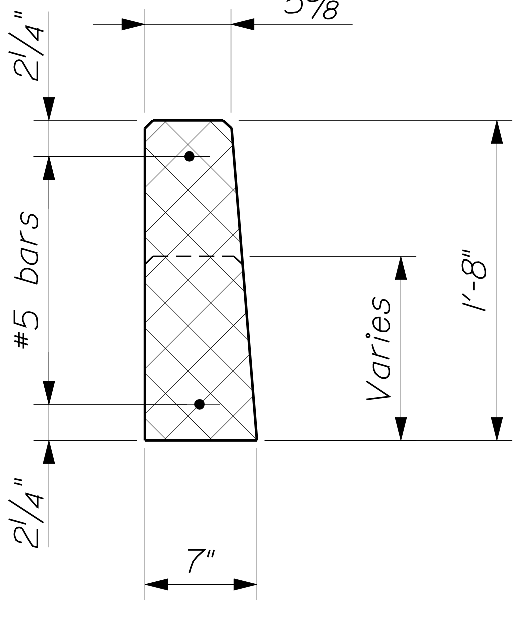
NOTES:

1. Precast Concrete Transition Curb shall meet the requirements of Standard Specifications Section 609 - Curb.

2. Dimensions shown are designed to accommodate a 9" reveal bridge curb with a battered face. Dimensions shall be adjusted to fit other situations as required.

3. Alternate transition curb sections may be used as approved by the Resident.

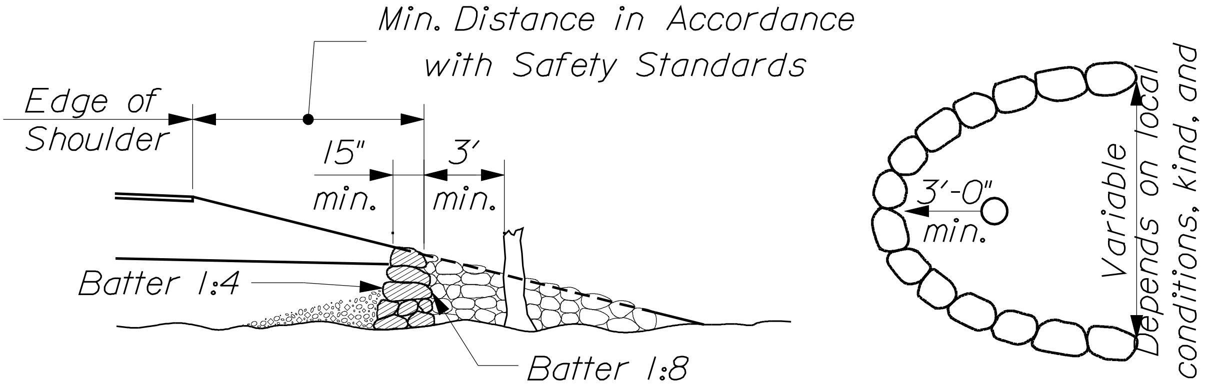
4. Unless otherwise indicated, payment will be made under Item No. 609.247, Terminal Curb Type 2 - 7 ft.



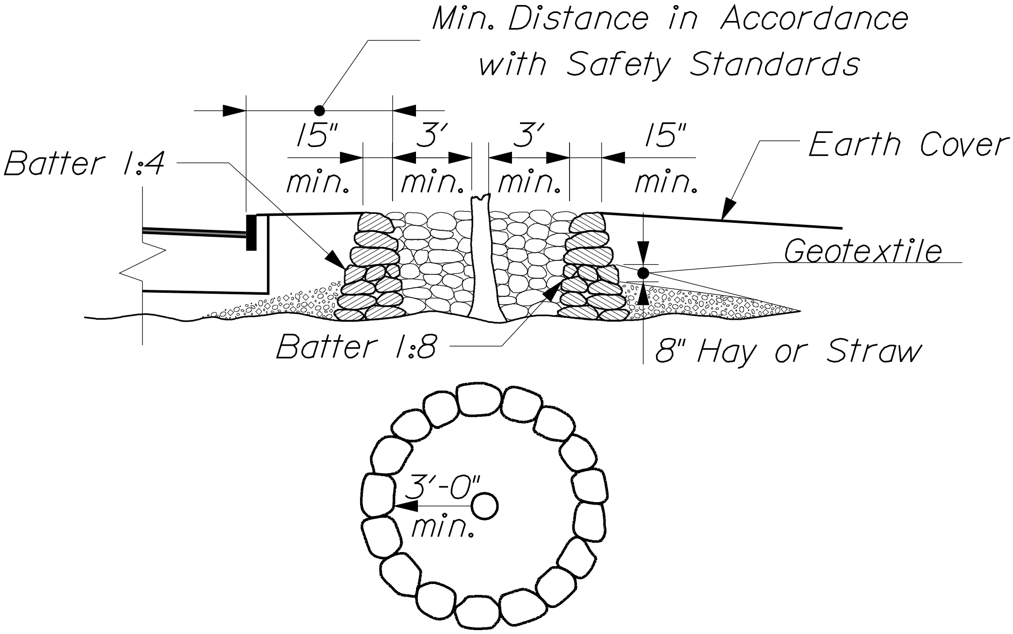
~ SECTION ~

PRECAST CONCRETE TRANSITION CURB

609(08)



~ OPEN WELL ~



~ CLOSED WELL ~

NOTES:

1. Selected ledge excavation, crushed stone or other porous material shall be used to fill around the old ground area of the tree from the tree well to the perimeter of the branches.

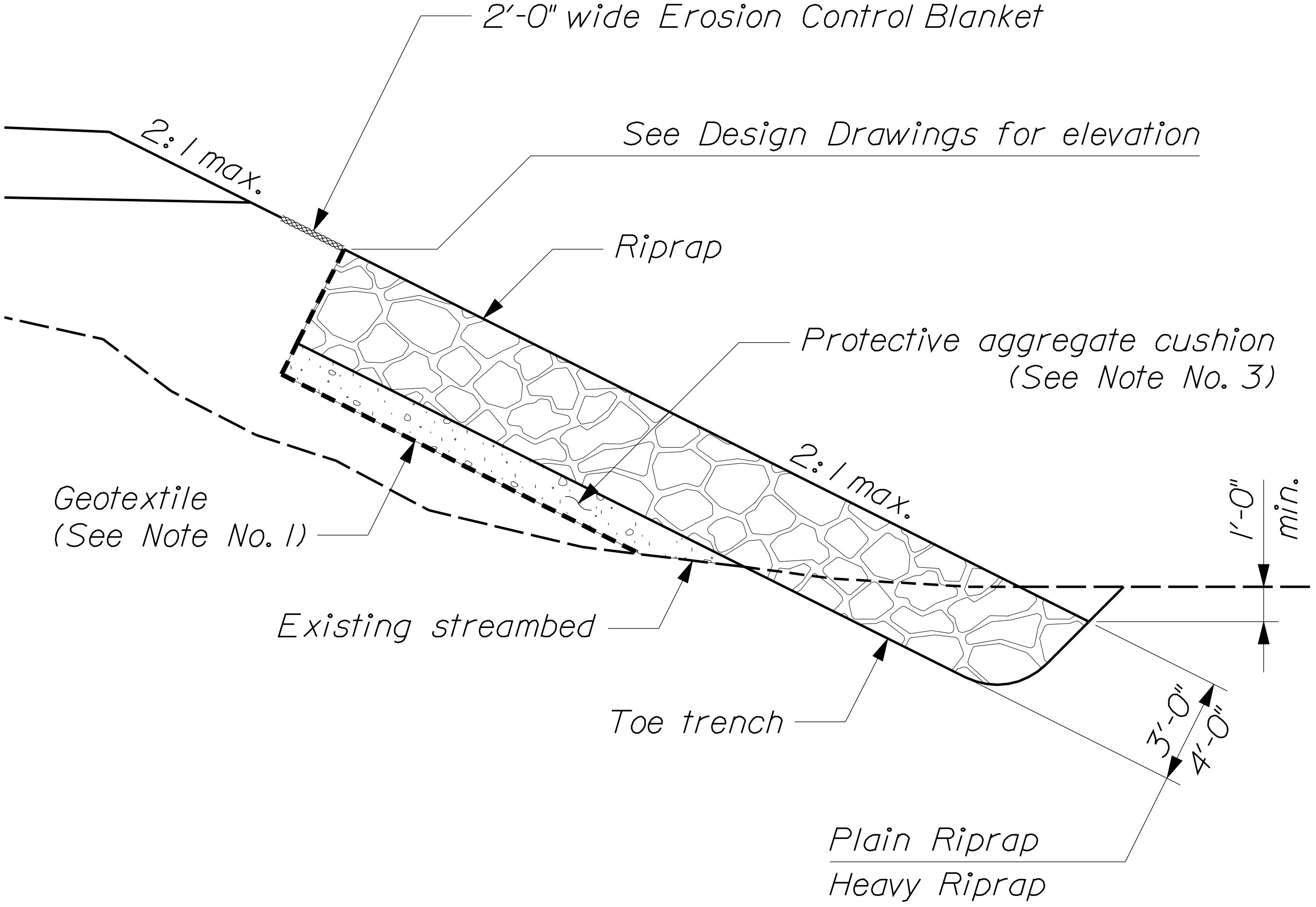
2. A Geotextile to prevent infiltration of fines shall be placed over the rock fill.

3. If drainage away from the tree well is necessary, Underdrain Outlet Pipe shall be used, and will be paid for under Item 605.10 6" Underdrain Outlet.

4. The Tree Wells shall be paid for under Item 610.09 Hand Laid Riprap.

TREE WELLS

610(01)



~ PLAIN OR HEAVY RIPRAP SIDE SLOPE ~

NOTES:

1. Geotextile shall be Class 1, Non - woven, Erosion Control Geotextile (loosely placed) meeting the requirements of Standard Specification 722.03.

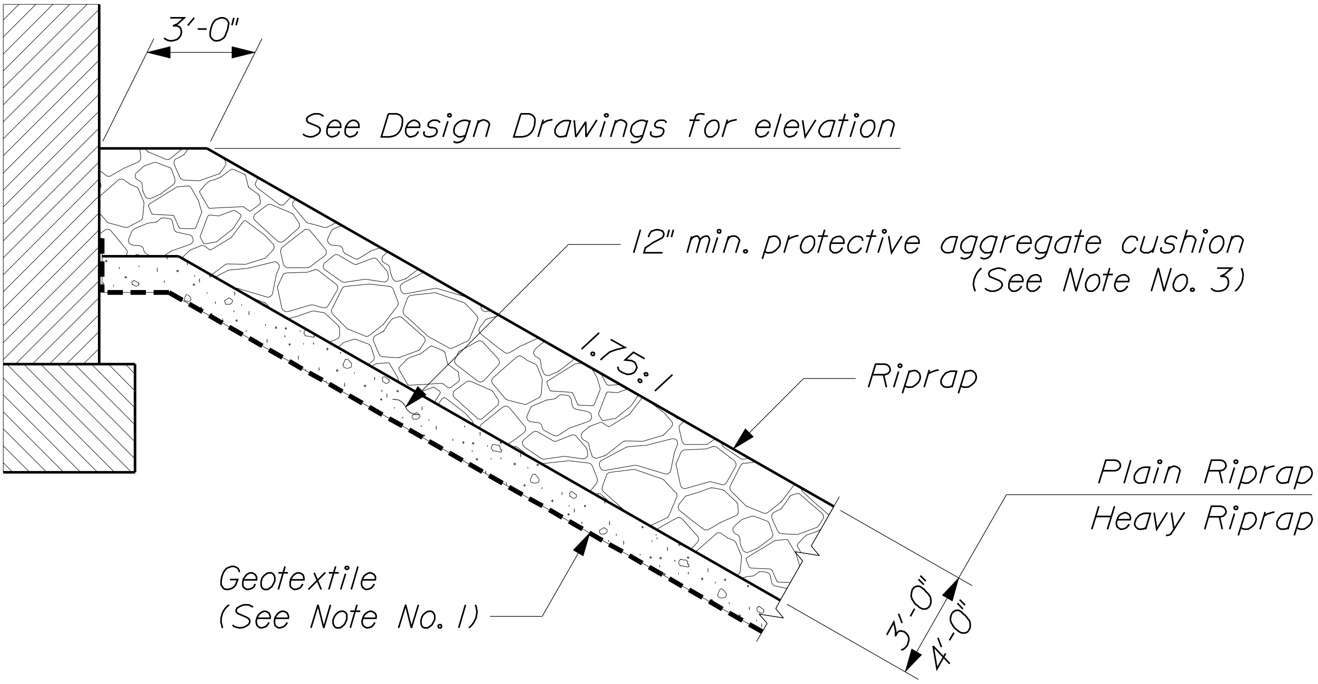
2. Refer to Standard Detail 620(05) for specific details on geotextile placement.

3. Protective aggregate cushion shall be a minimum of 12 inches thick and shall meet the requirements of 703.19, Granular Borrow - Material for Underwater Backfill

4. Use of Plain or Heavy Riprap shall be as shown on the Design Drawings.

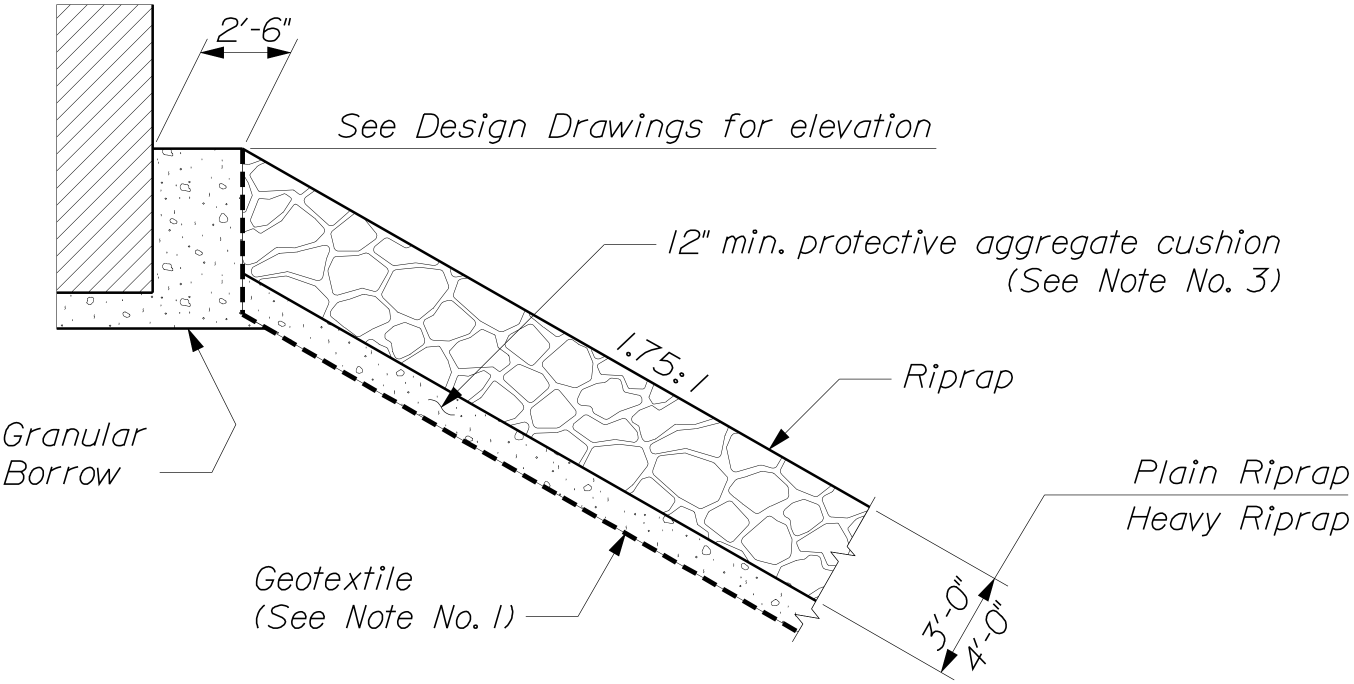
STONE SCOUR PROTECTION

610(02)



~ RIPRAP SLOPE AT TRADITIONAL ABUTMENT ~

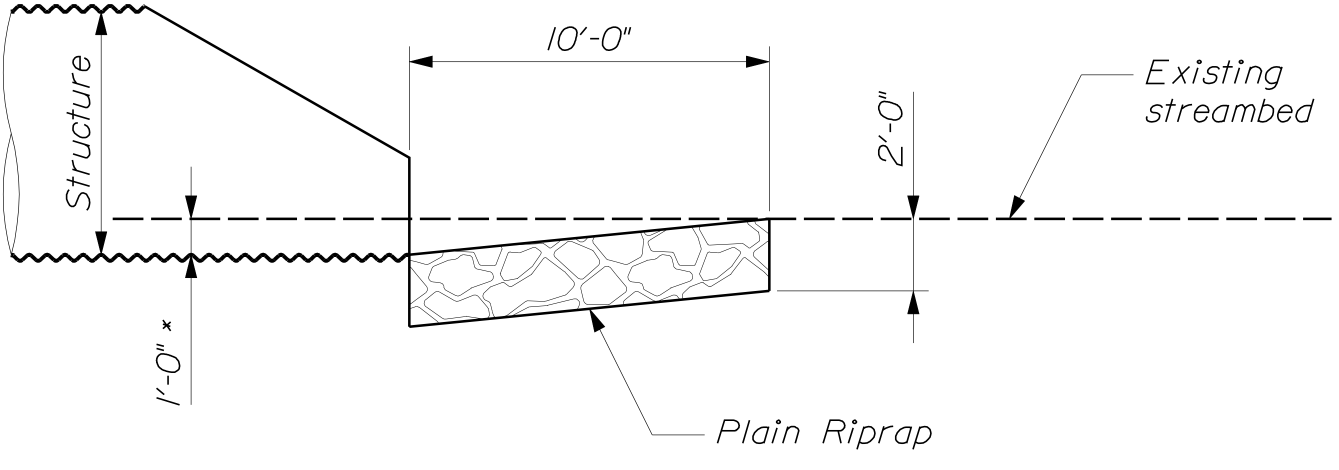
Note: Work these details with Standard Detail 610(02)



~ RIPRAP SLOPE AT INTEGRAL ABUTMENT ~

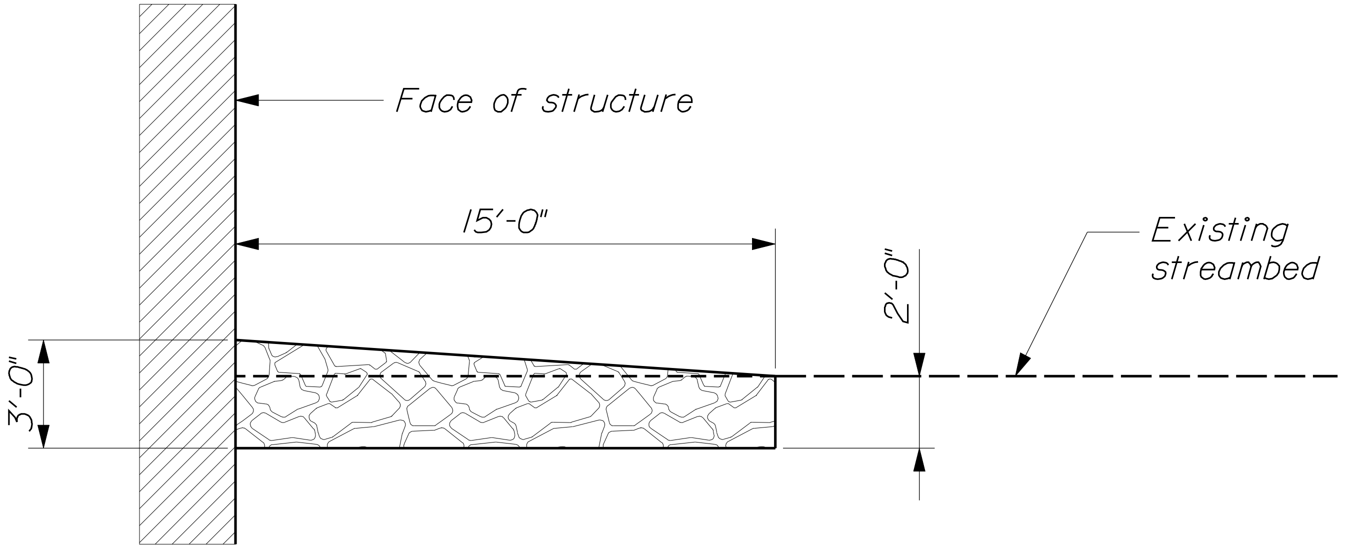
STONE SCOUR PROTECTION

610(03)



~ PLAIN RIPRAP APRON ~

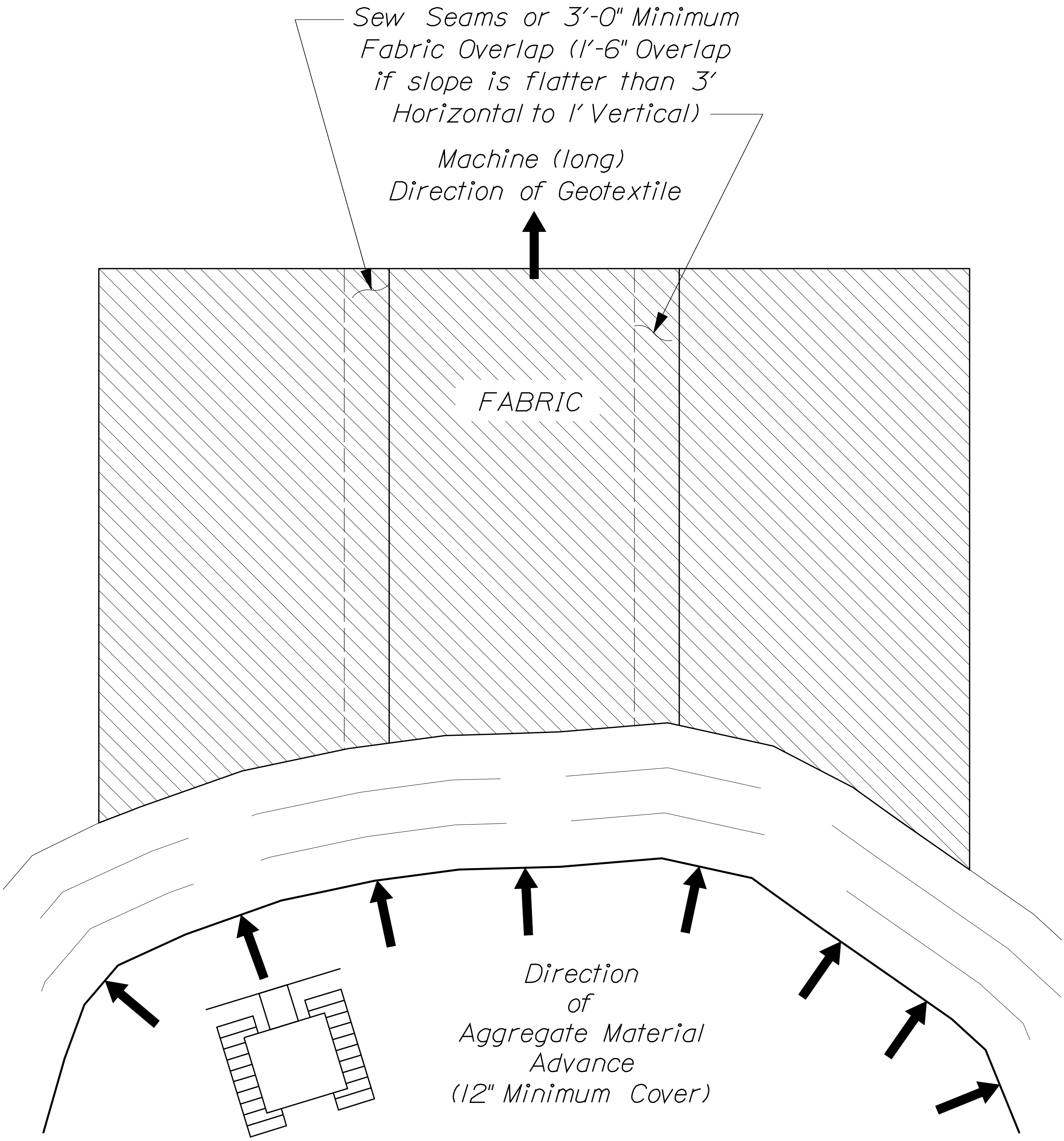
* Or as specified on the Design Drawings



~ STONE BLANKET ~

STONE SCOUR PROTECTION

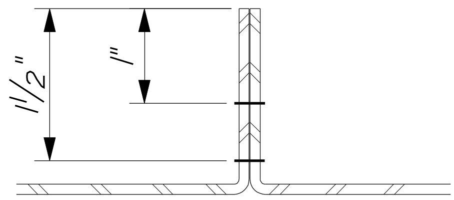
610(04)



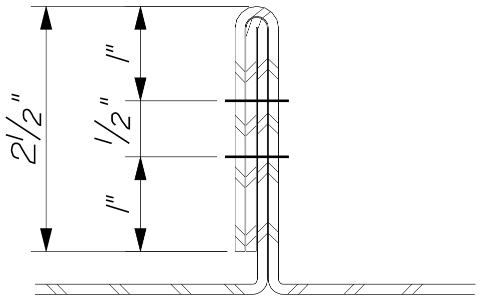
PLACEMENT OF FIRST LIFT OF COVER MATERIAL TO
~ TENSION GEOTEXTILE ON MODERATE GROUND CONDITIONS ~
(NO MUD WAVE).

GEOTEXTILE PLACEMENT

620(01)

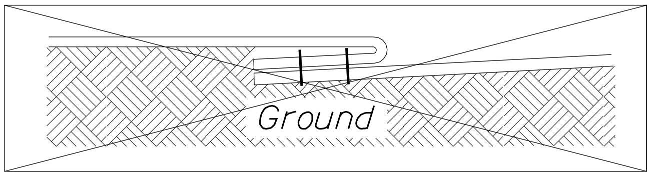


FLAT or PRAYER Seam
Type SSA-2

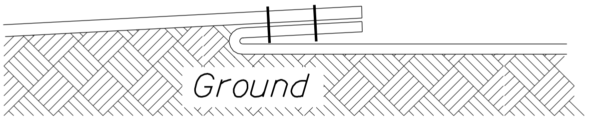


J Seam
Type SSN-1

~ TYPES OF SEAMS ~

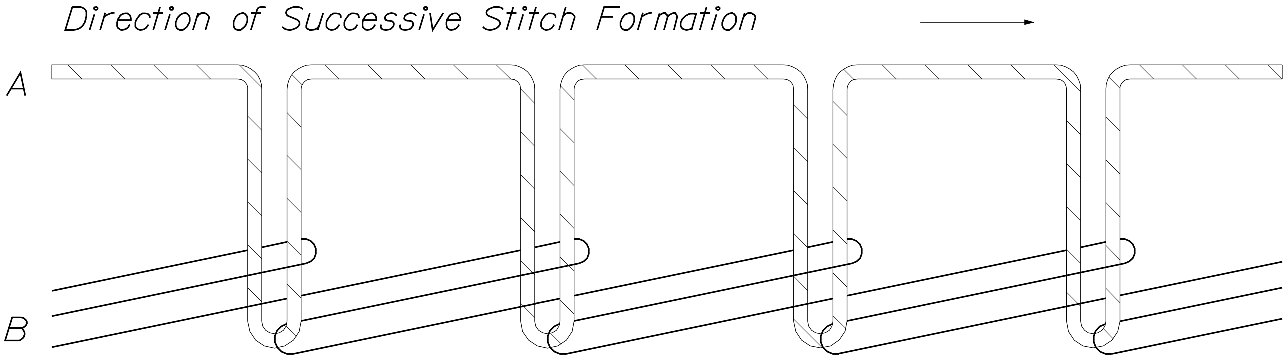


Improper Placement
(cannot inspect or repair)



Proper Placement
(seam up)

~ SEAM PLACEMENT ~



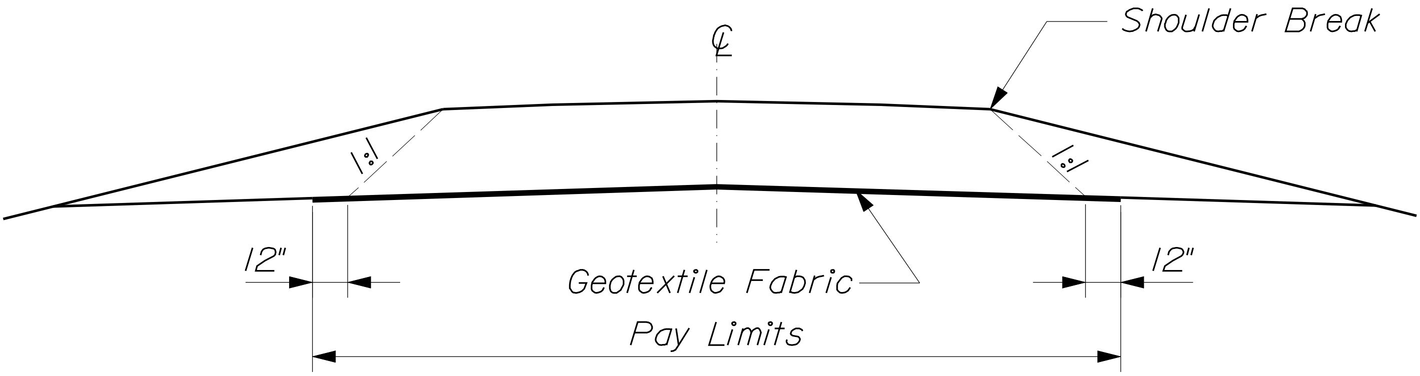
~ CLASS 401 TYPE STITCH ~

NOTE:

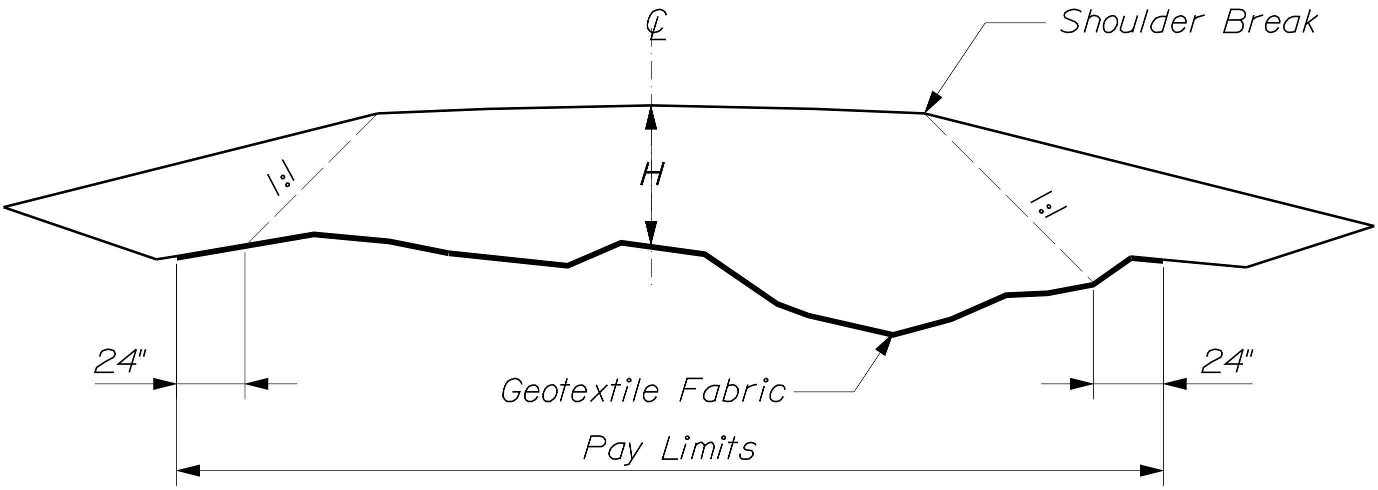
This type of stitch shall be formed with two threads: one needle thread "A", and one looper thread, "B". loops of thread "A" shall be passed through the material and interlaced and interlooped with loops of thread "B". The interloopings shall be drawn against the underside of the bottom ply of material.

GEOTEXTILE SEAMING

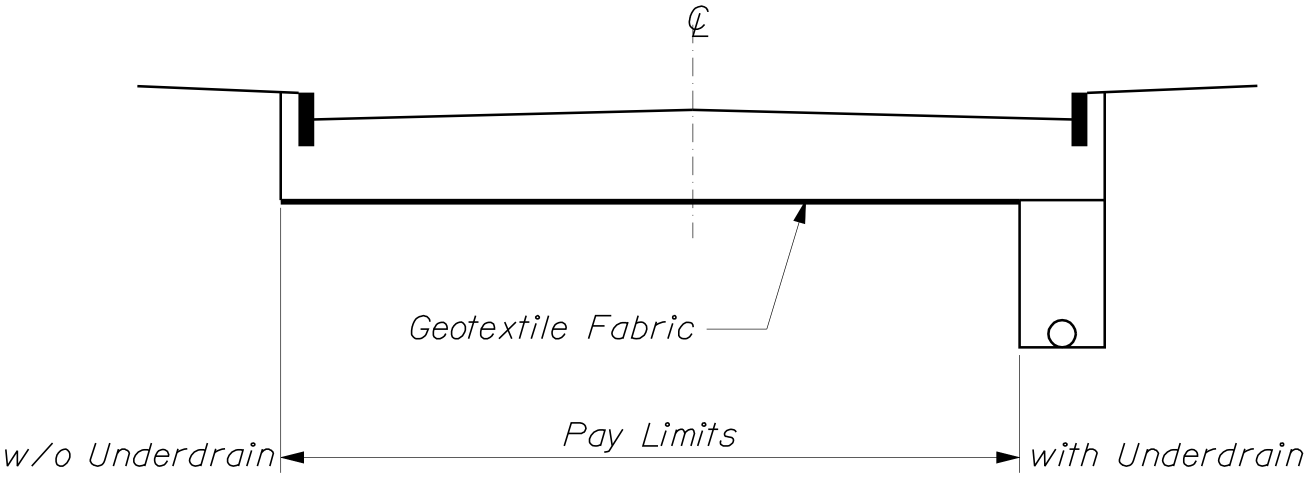
620(02)



~ GEOTEXTILE AT SUBGRADE ~



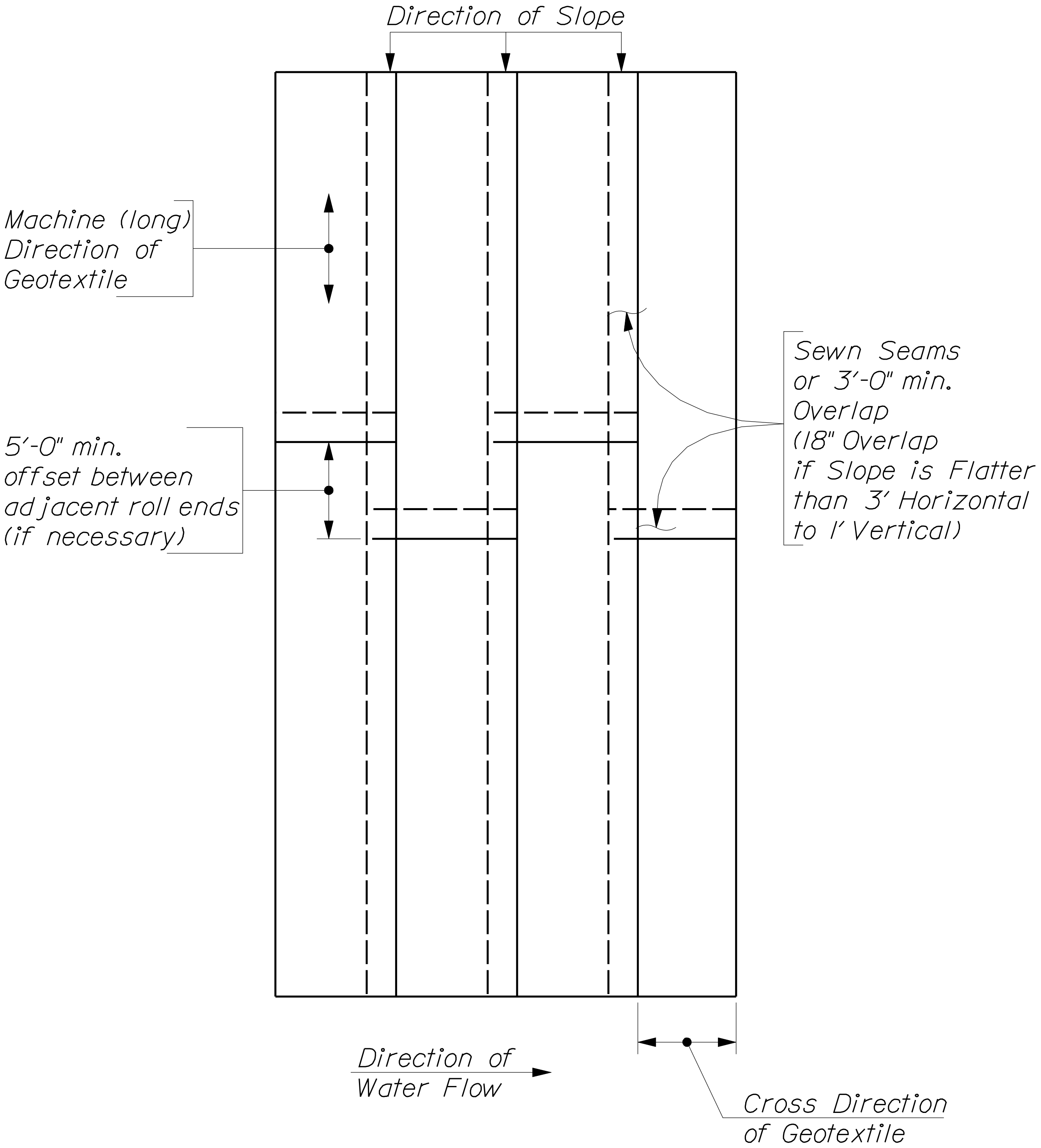
~ GEOTEXTILE ON OLD GROUND ~



~ BOX SECTION ~

LATERAL LIMITS IN A ROADWAY

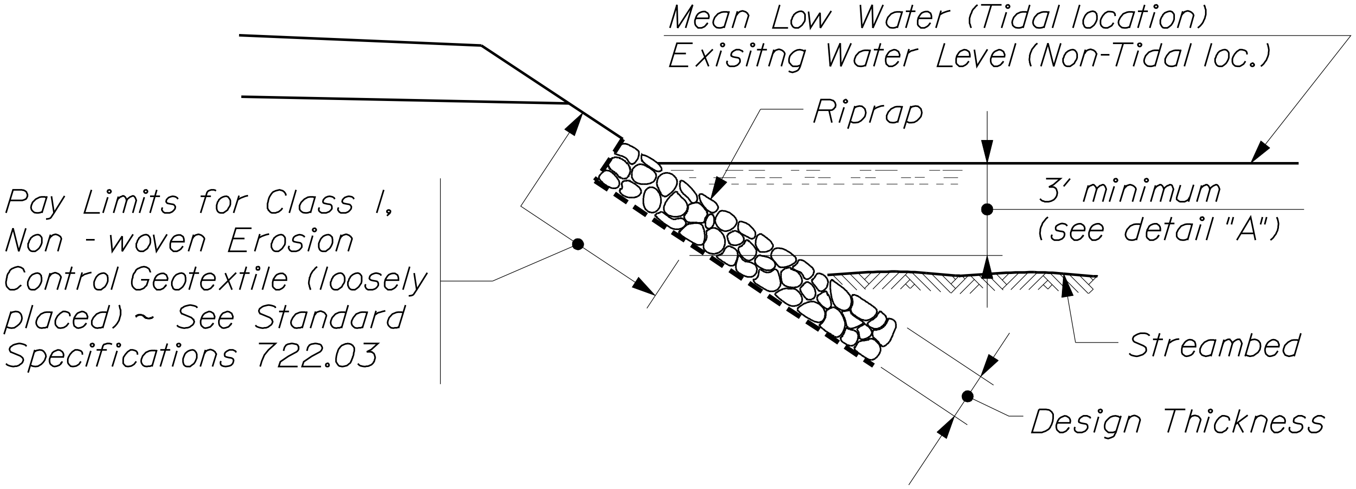
620(03)



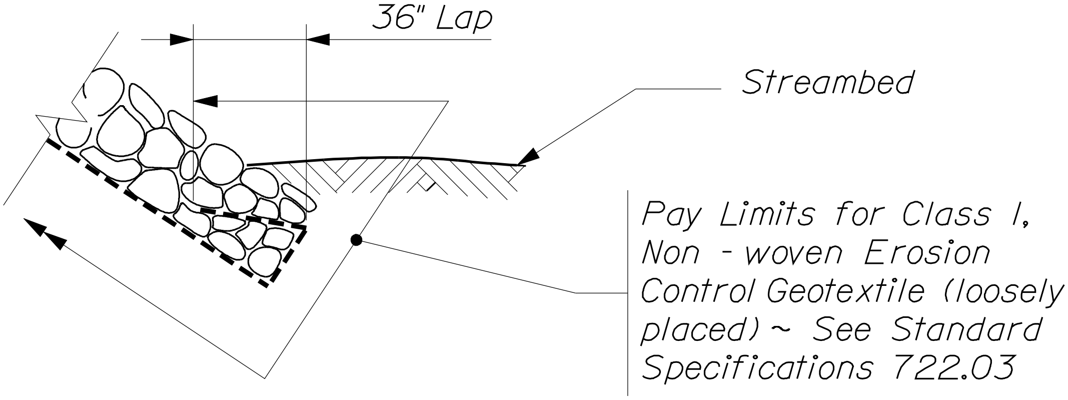
~ PLAN VIEW ~

GEOTEXTILE PLACEMENT FOR PROTECTION OF SLOPES ADJACENT TO STREAMS & TIDAL AREAS

620(04)

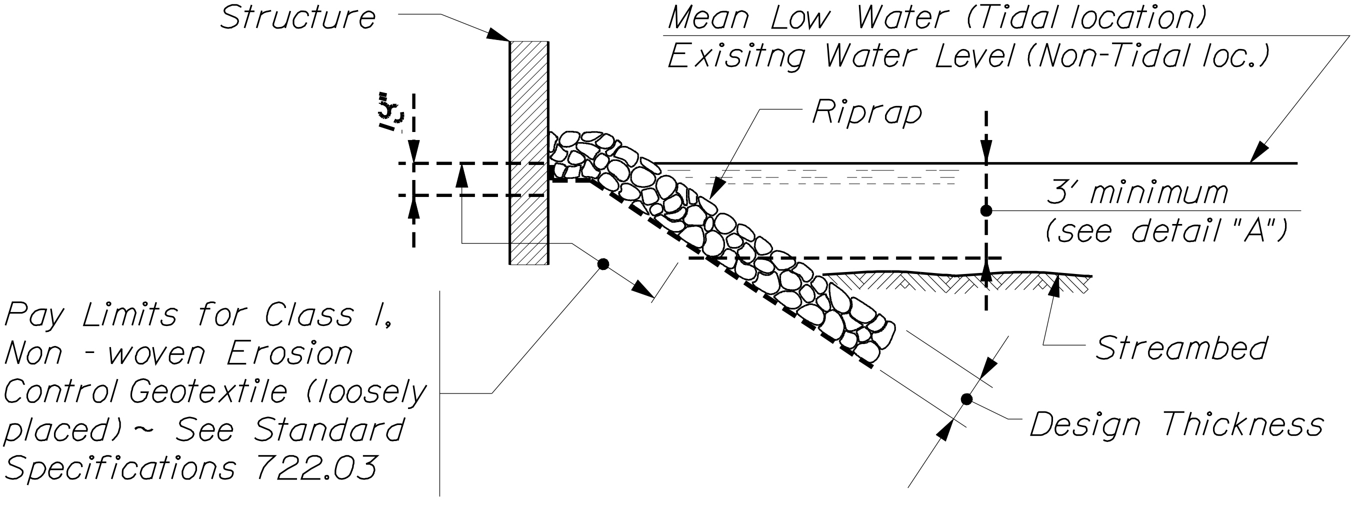


~ AT ROADWAY SLOPES ~



~ DETAIL "A" ~

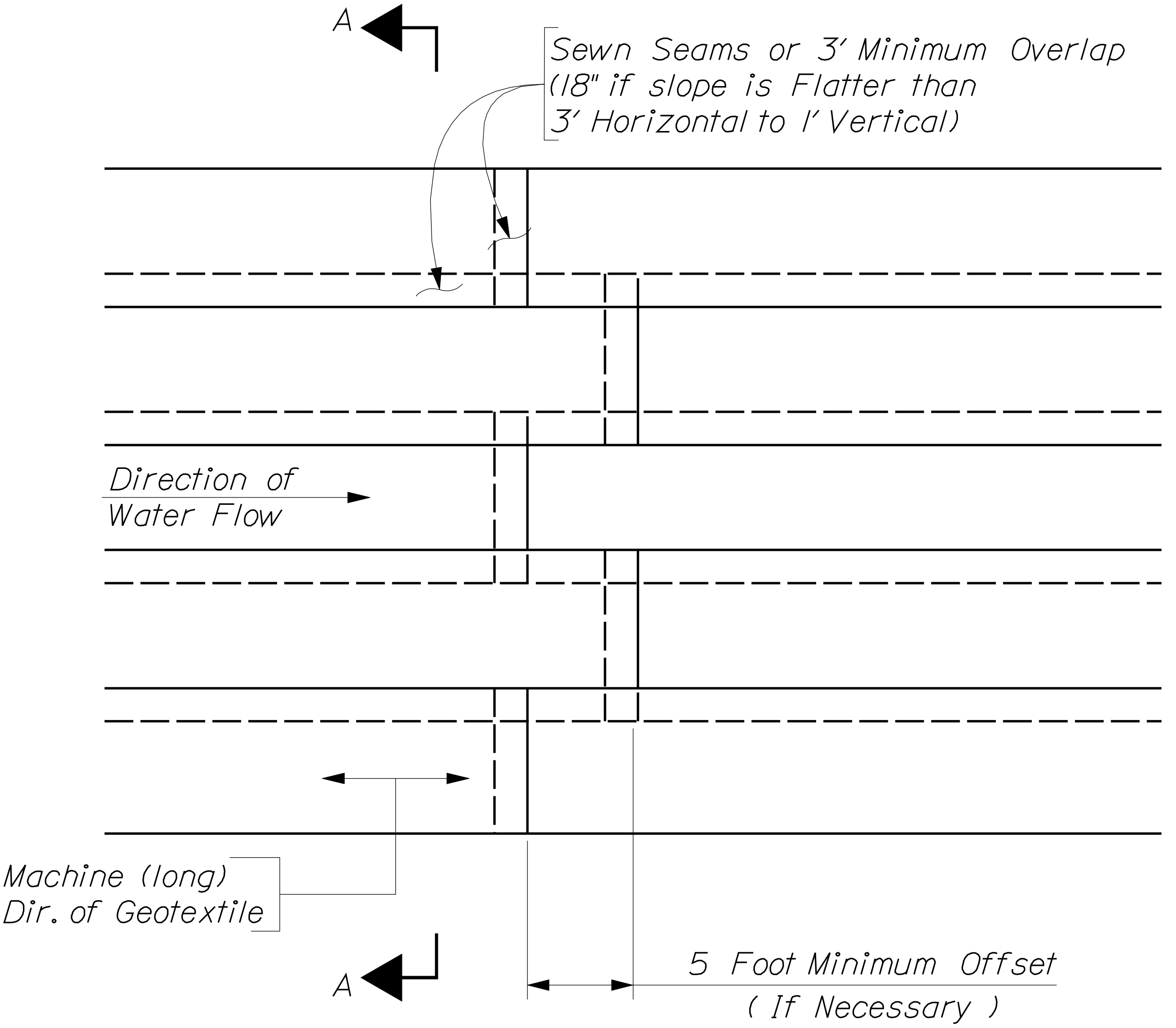
(For use where water depth is less than 3′)

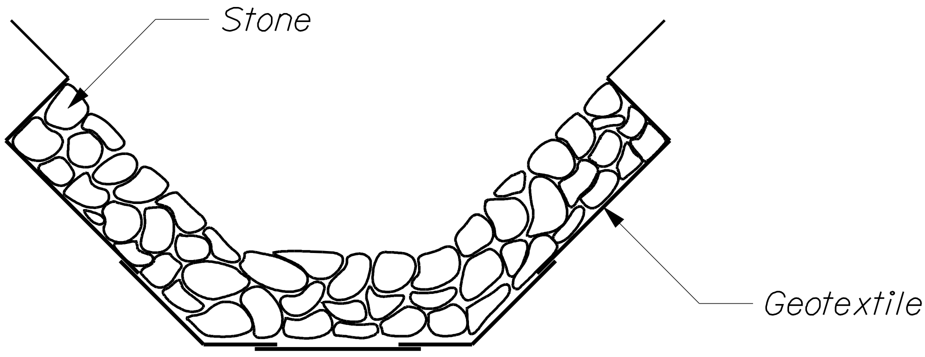


~ AT STRUCTURE ~

GEOTEXTILE PLACEMENT FOR PROTECTION OF SLOPES ADJACENT TO STREAMS & TIDAL AREAS

620(05)





~ SECTION A-A ~

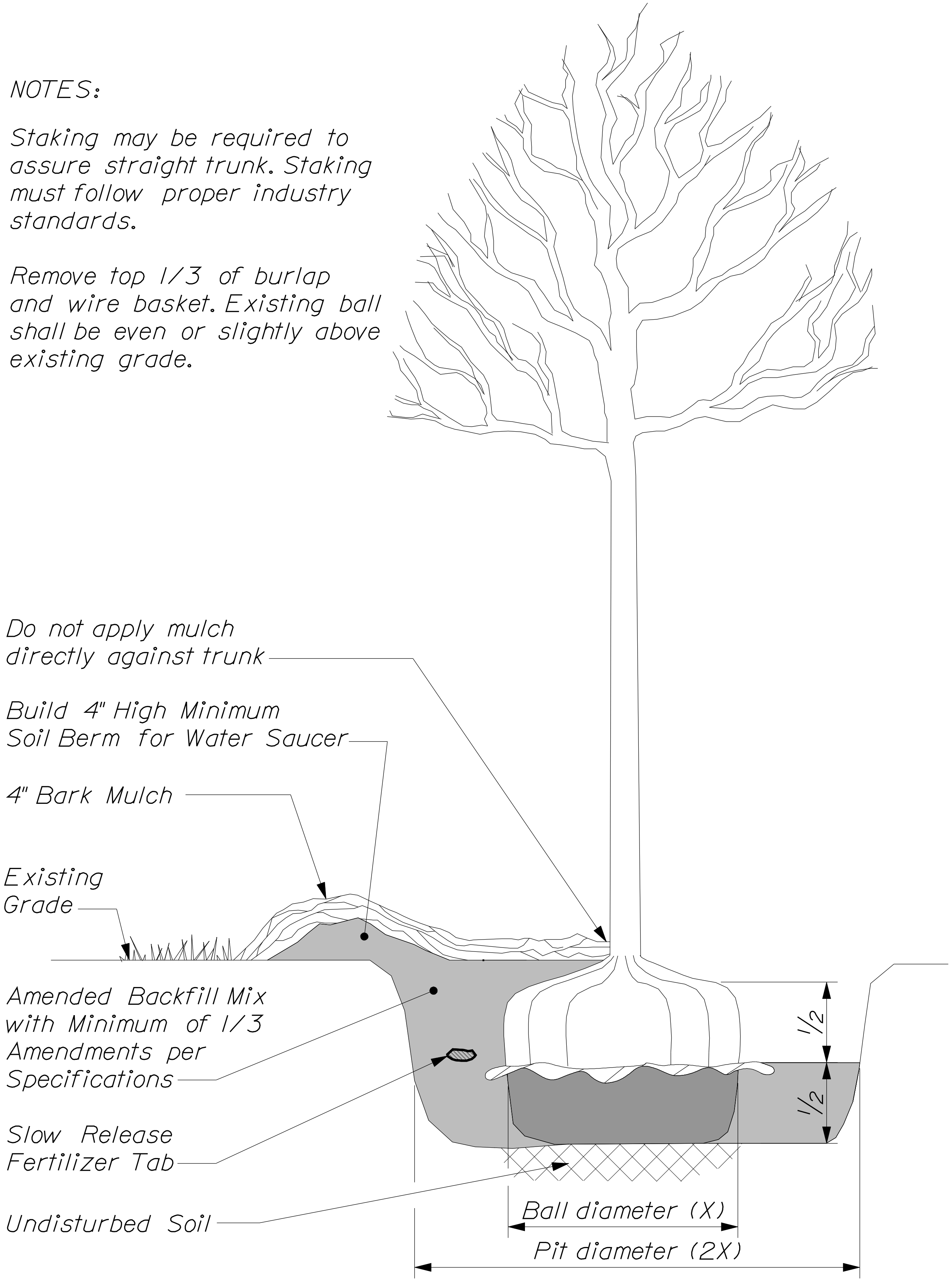
GEOTEXTILE PLACEMENT SCHEME FOR PROTECTION OF DITCHES, SHALLOW CHANNELS, ETC.

620(06)

NOTES:

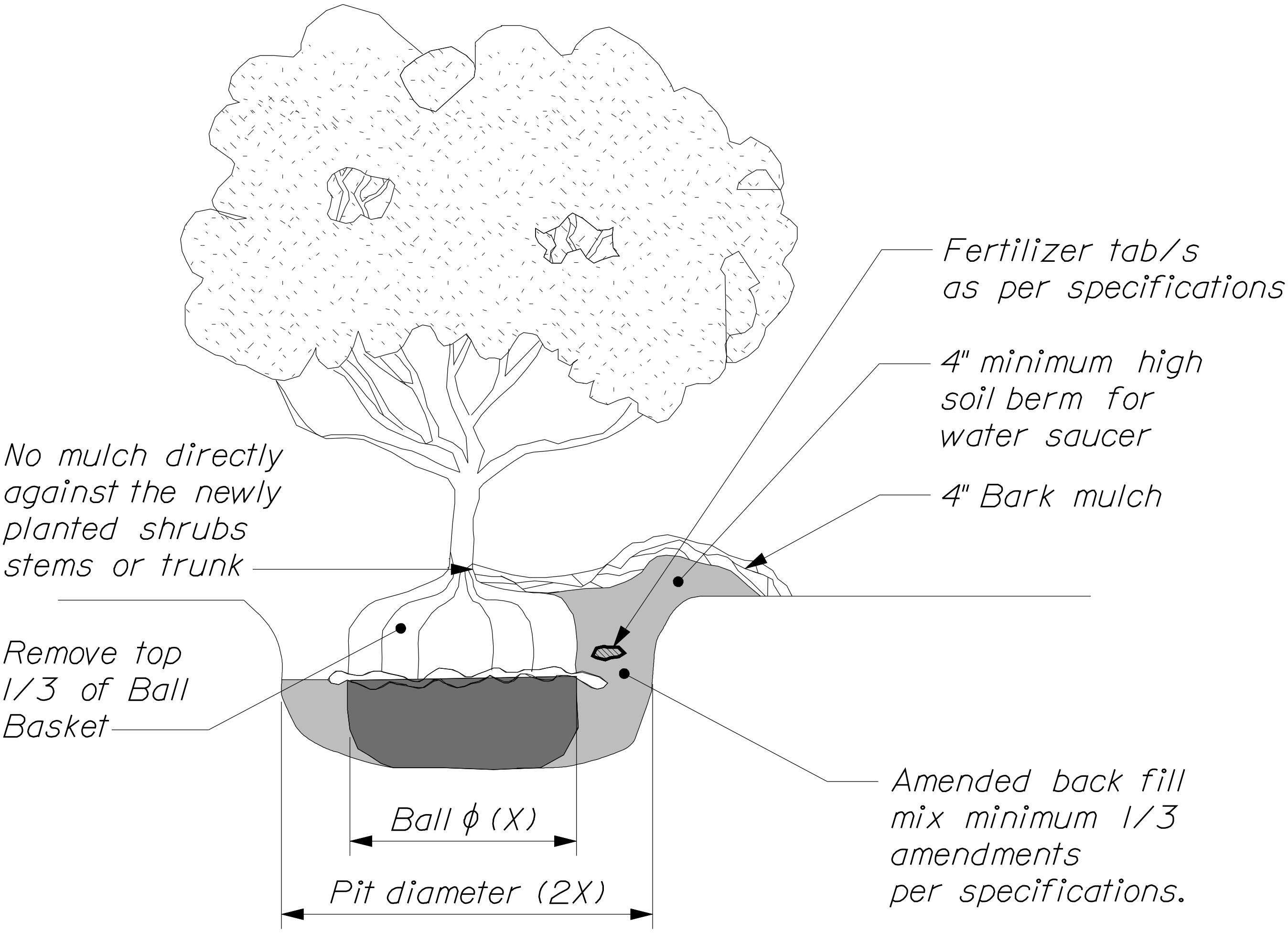
1. Staking may be required to assure straight trunk. Staking must follow proper industry standards.

2. Remove top 1/3 of burlap and wire basket. Existing ball shall be even or slightly above existing grade.



B & B TREE PLANTING DETAIL

621(01)



B & B SHRUB PLANTING DETAIL

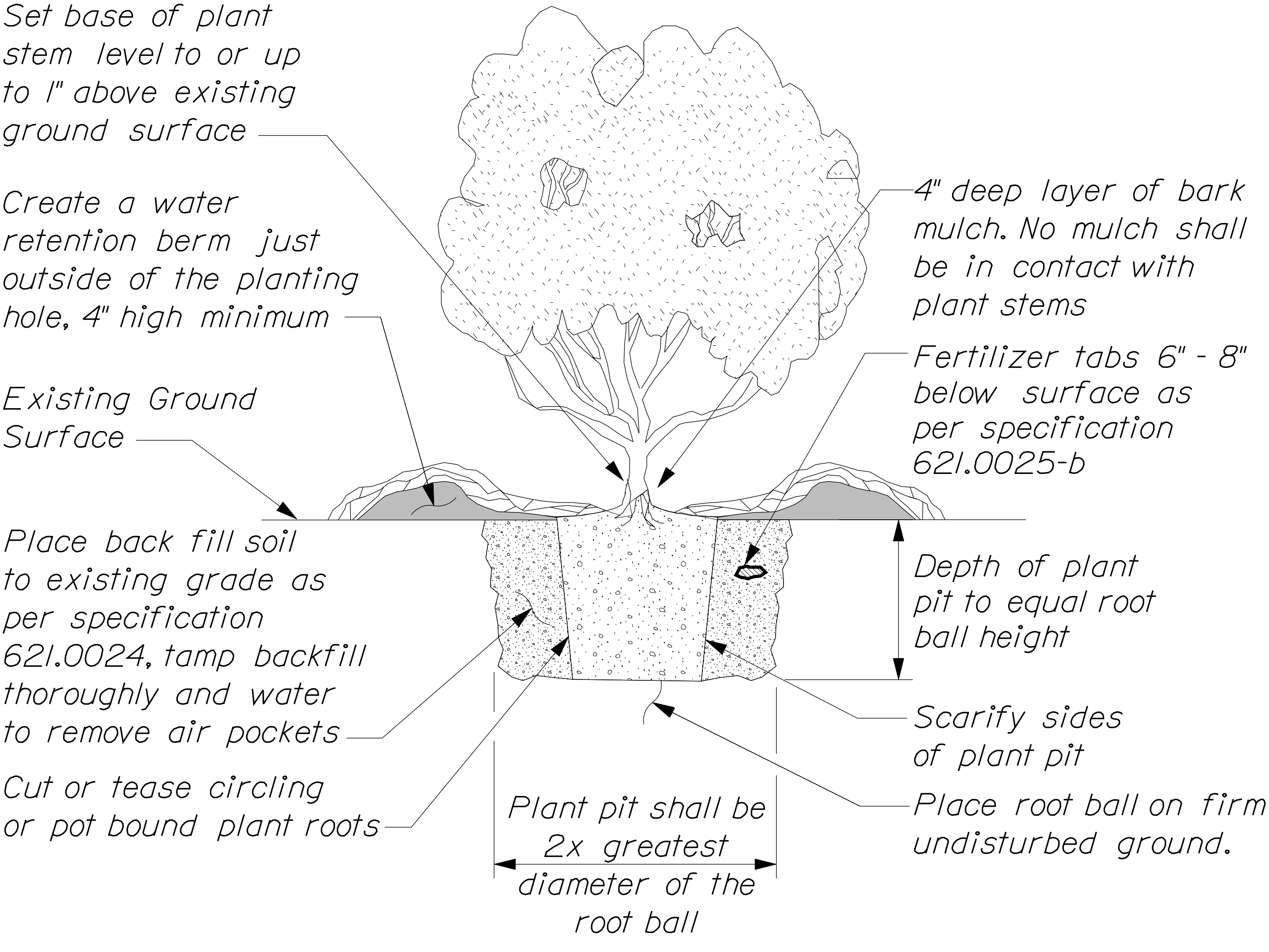
621(02)

NOTES:

1. All plantings shall comply with current Maine Department of Transportation Standard Specifications.

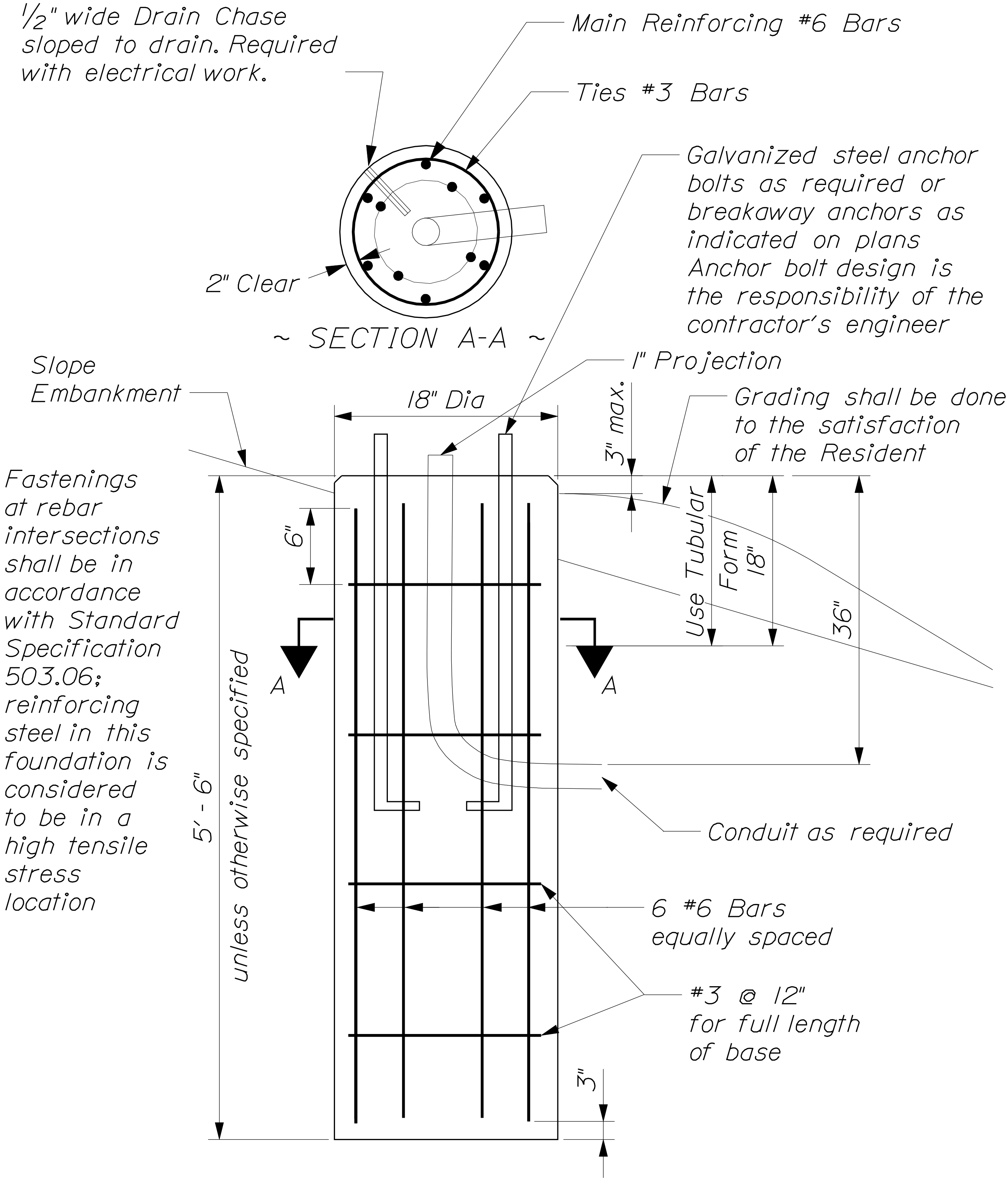
2. Remove and properly dispose of containers, tags, labels, and flagging tape, unless otherwise directed by an Authorized MaineDOT employee.

3. Prune broken and dead branches at time of planting.



CONTAINER TREE/SHRUB PLANTING DETAIL

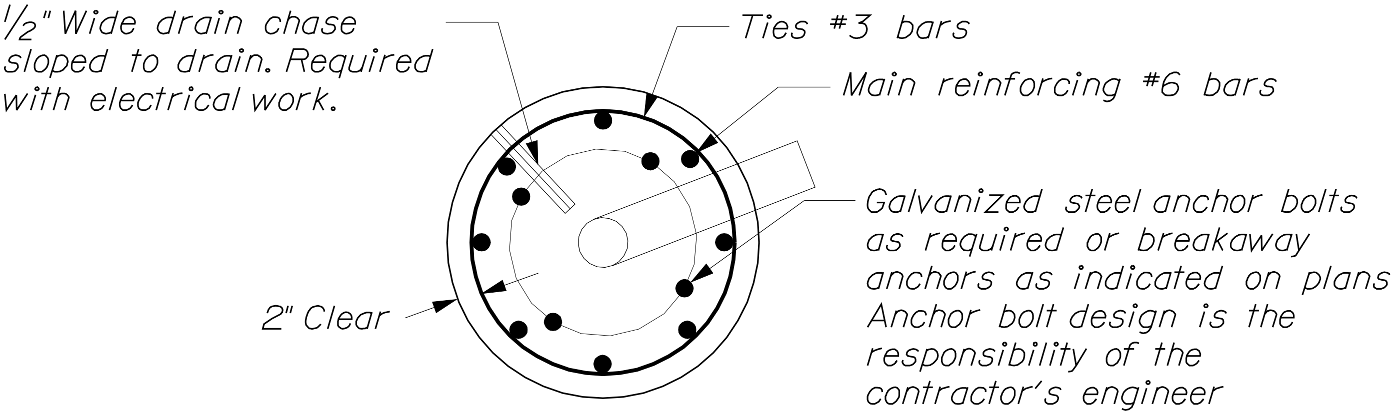
621(03)



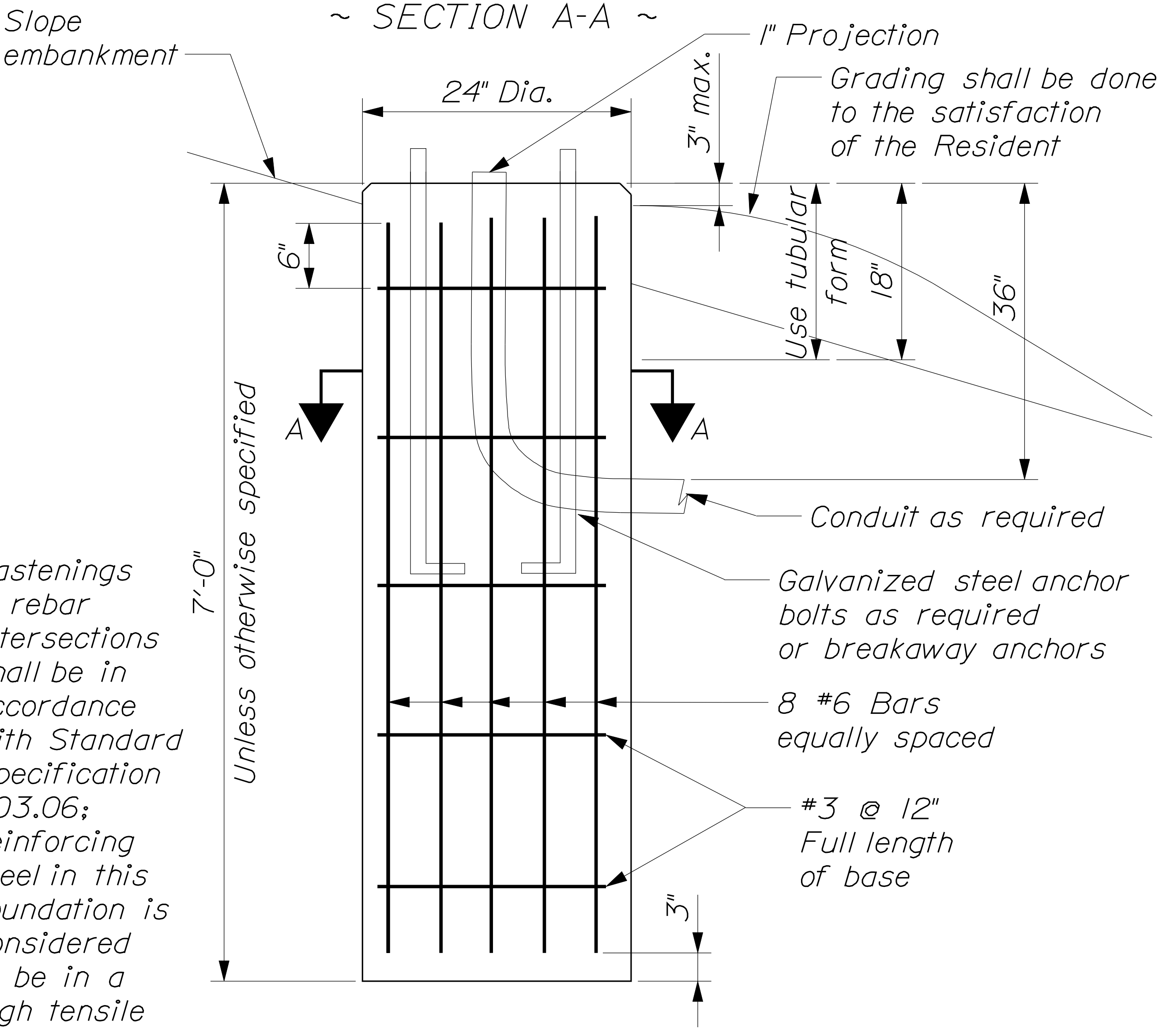
~ 18 INCH FOUNDATION ~
ITEM NO. 626.31

FOUNDATIONS FOR TRAFFIC SIGNALS, HIGHWAY SIGNING AND LIGHTING

626(01)



~ SECTION A-A ~

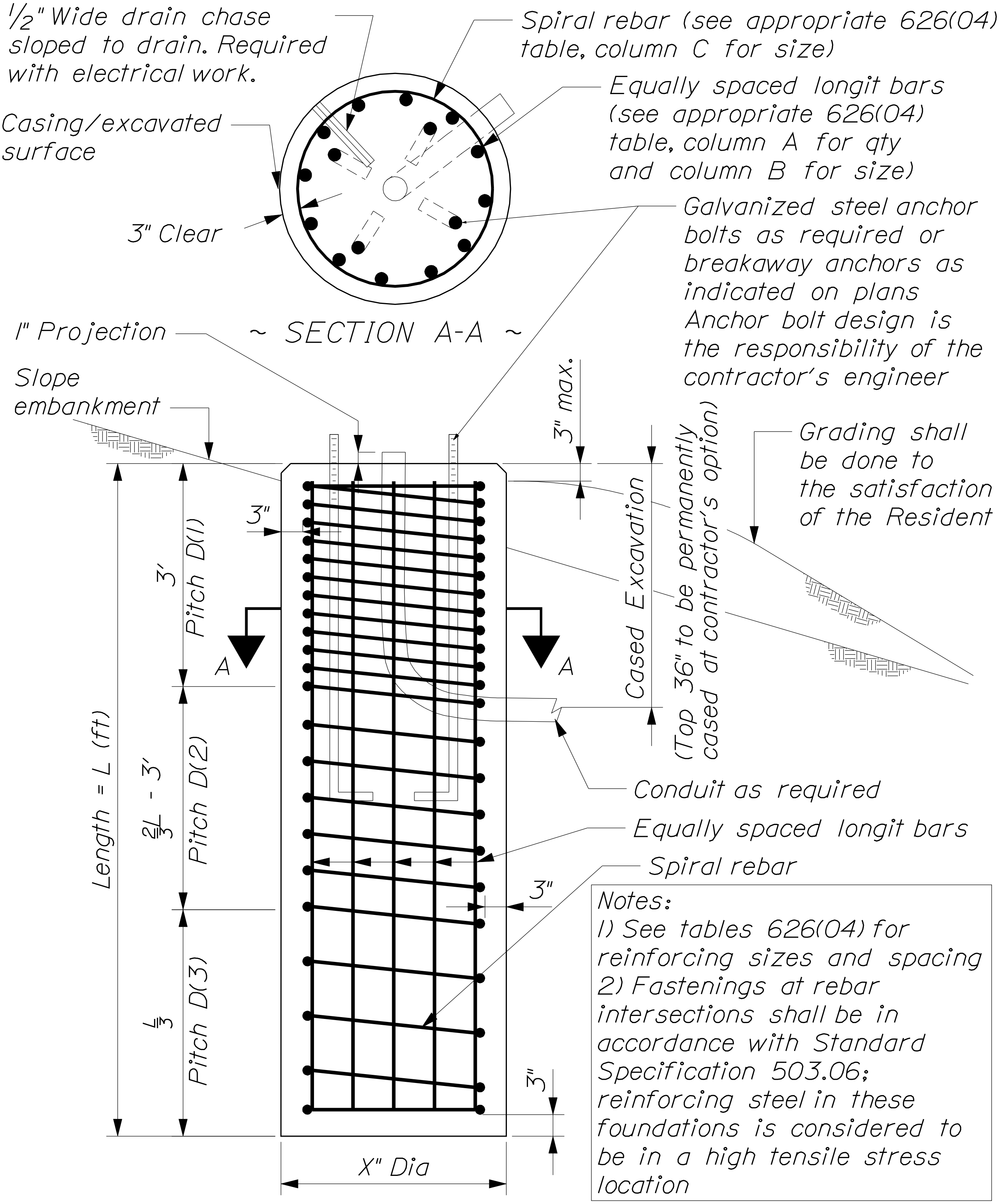


Fastenings at rebar intersections shall be in accordance with Standard Specification 503.06; reinforcing steel in this foundation is considered to be in a high tensile stress location

~ 24 INCH FOUNDATION ~
ITEM NO. 626.32

FOUNDATIONS FOR TRAFFIC SIGNALS, HIGHWAY SIGNING AND LIGHTING

626(02)



Notes:
1) See tables 626(04) for reinforcing sizes and spacing
2) Fastenings at rebar intersections shall be in accordance with Standard Specification 503.06; reinforcing steel in these foundations is considered to be in a high tensile stress location

~ 30" to 60" DIA. FOUNDATION ~
ITEM NO. 626.331 and 626.332

FOUNDATIONS FOR TRAFFIC SIGNALS, HIGHWAY SIGNING AND LIGHTING

626(03)

Chart P28-1 - Foundation Length L (ft.) Based on Bending Moment (φ=28 deg)

BENDING MOMENT (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10	10					
20	10					
30	10					
40	10	10				
50	11	10	10			
60	11	11	10	10		
70	12	11	11	10	10	
80	12	12	11	11	10	10
90	12	12	11	11	11	10
100	13	12	12	11	11	11
110	13	13	12	12	11	11
120	14	13	12	12	12	11
130	14	13	13	12	12	11
140	14	13	13	12	12	12
150	15	14	13	13	12	12
160	15	14	13	13	12	12
170	15	14	14	13	13	12
180	15	15	14	13	13	12
190	16	15	14	14	13	13
200	16	15	14	14	13	13

Chart P28-2 - Foundation Length L (ft.) Based on Torsion (φ=28 deg)

TORSION (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10	10	10				
20	11	10	10			
30	13	11	10	10		
40	16	13	11	10	10	
50	18	15	12	11	10	10
60	20	16	14	12	11	10
70		17	15	13	11	10
80		19	16	14	12	11
90		20	17	15	13	12
100			18	15	14	12
110			19	16	14	13
120			20	17	15	13
130				18	16	14
140				19	16	15
150				19	17	15
160				20	18	16
170					19	16
180					19	17
190					20	17
200					20	18

Chart P28-3 - Summary of Reinforcing Steel (φ=28 deg) (for Charts P28-1 and P28-2)

Foundation Diameter X (ft)	Moment (kip-feet)	Torsion (kip-feet)	QTY Longit Bars A	Longit Bar Size B	Spiral Bar Size C	Spiral Spacing (0 to 3 ft) D1(in)	Spiral Spacing (3 ft to 2L/3 ft) D2 (in)	Spiral Spacing (2L/3 ft to tip) D3 (in)
2.5	0 ≤ M ≤ 200	0 ≤ T ≤ 60	12	#8	#5	4	12	12
3.0	0 ≤ M ≤ 200	0 ≤ T ≤ 90	15	#8	#5	4	12	12
3.5	0 ≤ M ≤ 200	0 ≤ T ≤ 120	18	#9	#5	4	12	12
4.0	0 ≤ M ≤ 200	0 ≤ T ≤ 160	21	#9	#5	4	12	12
4.5	0 ≤ M ≤ 200	0 ≤ T ≤ 200	24	#10	#5	4	12	12
5.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	27	#10	#5	4	12	12

Notes: Minimum clear cover to the reinforcing shall be 3 inches.
Spiral spacing shall be measured from the top of the foundation.

ITEM NOS. 626.331 AND 626.332 for SOILS WITH φ=28 deg.

Chart P30-1 - Foundation Length L (ft.) Based on Bending Moment (φ=30 deg)

BENDING MOMENT (kip-ft.)	**FOUNDATION DIAMETER (inches) X**					
	30	36	42	48	54	60
10						
20						
30						
40						
50	10					
60	11	10				
70	11	11	10			
80	12	11	11	10		
90	12	12	11	11	10	
100	13	12	11	11	11	10
110	13	12	12	11	11	11
120	13	13	12	12	11	11
130	14	13	12	12	12	11
140	14	13	13	12	12	11
150	14	13	13	12	12	12
160	14	14	13	13	12	12
170	15	14	13	13	12	12
180	15	14	14	13	13	12
190	15	14	14	13	13	12
200	16	15	14	13	13	13

Chart P30-2 - Foundation Length L (ft.) Based on Torsion (φ=30 deg)

TORSION (kip-ft.)	**FOUNDATION DIAMETER (inches) X**					
	30	36	42	48	54	60
10						
20	10					
30	11	10				
40	13	11				
50	14	12	10			
60	15	13	11			
70	17	14	12	10		
80	18	15	13	11	10	
90	20	16	13	12	11	
100		17	14	12	11	10
110		18	15	13	12	11
120		19	16	14	12	11
130		20	16	14	13	11
140			17	15	13	12
150			18	15	13	12
160			18	16	14	13
170			19	16	14	13
180			20	17	15	13
190			20	17	15	14
200				18	16	14

ITEM NOS. 626.331 AND 626.332 for SOILS WITH φ=30 deg.

Chart P30-3 - Summary of Reinforcing Steel (φ=30 deg) (for Charts P30-1 and P30-2)

Foundation Diameter X (feet)	Moment (kip-feet)	Torsion (kip-feet)	QTY Longit Bars A	Longit Bar Size B	Spiral Bar Size C	Spiral Spacing (0 to 3 ft) D1 (in)	Spiral Spacing (3 ft to 2L/3 ft) D2 (in)	Spiral Spacing (2L/3 ft to tip) D3 (in)
2.5	0 ≤ M ≤ 200	0 ≤ T ≤ 60	12	#8	#5	4	12	12
		60 < T ≤ 80	12	#8	#5	4	8	12
		80 < T ≤ 90	12	#8	#5	4	8	8
3.0	0 ≤ M ≤ 200	0 ≤ T ≤ 100	15	#8	#5	4	12	12
		100 < T ≤ 130	15	#8	#5	4	8	12
3.5	0 ≤ M ≤ 200	0 ≤ T ≤ 150	18	#9	#5	4	12	12
		150 < T ≤ 190	18	#9	#5	4	8	12
4.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	21	#9	#5	4	12	12
4.5	0 ≤ M ≤ 200	0 ≤ T ≤ 200	24	#10	#5	4	12	12
5.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	27	#10	#5	4	12	12

Notes: Minimum clear cover to the reinforcing shall be 3 inches.
Spiral spacing shall be measured from the top of the foundation.

ITEM NOS. 626.331 AND 626.332 for SOILS WITH φ=30 deg.

Chart P32-1 - Foundation Length L (ft.) Based on Bending Moment (φ=32 deg)

BENDING MOMENT (kip-ft.)	**FOUNDATION DIAMETER (inches) X**					
	30	36	42	48	54	60
10						
20						
30						
40						
50	10					
60	11	10				
70	11	11				
80	11	11	10			
90	12	11	11	10		
100	12	12	11	11	10	
110	12	12	11	11	11	10
120	13	12	12	11	11	11
130	13	12	12	11	11	11
140	13	13	12	12	11	11
150	14	13	12	12	12	11
160	14	13	13	12	12	11
170	14	13	13	12	12	12
180	14	14	13	13	12	12
190	15	14	13	13	12	12
200	15	14	13	13	12	12

Chart P32-2 - Foundation Length L (ft.) Based on Torsion (φ=32 deg)

TORSION (kip-ft.)	**FOUNDATION DIAMETER (inches) X**					
	30	36	42	48	54	60
10						
20						
30	10					
40	11					
50	12	10				
60	13	11				
70	14	12	10			
80	15	13	11			
90	16	13	12	10		
100	17	14	12	11		
110	19	15	13	11		
120	20	16	13	12	10	
130	20	16	14	12	11	
140		17	14	13	11	10
150		18	15	13	12	11
160		19	16	13	12	11
170		19	16	14	12	11
180		20	17	14	13	11
190			17	15	13	12
200			18	15	13	12

ITEM NOS. 626.331 AND 626.332 for SOILS WITH φ=32 deg.

Chart P32-3 - Summary of Reinforcing Steel (φ=32 deg) (for Charts P32-1 and P32-2)

Foundation Diameter X (feet)	Moment (kip-feet)	Torsion (kip-feet)	QTY Longit Bars A	Longit Bar Size B	Spiral Bar Size C	Spiral Spacing (0 to 3 ft) D1 (in)	Spiral Spacing (3 ft to 2L/3 ft) D2 (in)	Spiral Spacing (2L/3 ft to tip) D3 (in)
2.5	0 ≤ M ≤ 200	0 ≤ T ≤ 60	12	#8	#5	4	12	12
		60 < T ≤ 70	12	#8	#5	4	8	12
		70 < T ≤ 90	12	#8	#5	4	8	8
		90 < T ≤ 120	12	#8	#5	4	4	8
		120 < T ≤ 130	12	#8	#5	4	4	4
3.0	0 ≤ M ≤ 200	0 ≤ T ≤ 100	15	#8	#5	4	12	12
		100 < T ≤ 110	15	#8	#5	4	8	12
		110 < T ≤ 150	15	#8	#5	4	8	8
		150 < T ≤ 180	15	#8	#5	4	4	8
3.5	0 ≤ M ≤ 200	0 ≤ T ≤ 150	18	#9	#5	4	12	12
		150 < T ≤ 160	18	#9	#5	4	8	12
		160 < T ≤ 200	18	#9	#5	4	8	8
4.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	21	#9	#5	4	12	12
4.5	0 ≤ M ≤ 200	0 ≤ T ≤ 200	24	#10	#5	4	12	12
5.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	27	#10	#5	4	12	12

Notes: Minimum clear cover to the reinforcing shall be 3 inches.
Spiral spacing shall be measured from the top of the foundation.

ITEM NOS. 626.331 AND 626.332 for SOILS WITH φ=32 deg.

Chart P34-1 - Foundation Length L (ft.) Based on Bending Moment (φ=34 deg)

BENDING MOMENT (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10						
20						
30						
40						
50						
60	10					
70	11	10				
80	11	11	10			
90	12	11	11	10		
100	12	11	11	11		
110	12	12	11	11	10	
120	12	12	11	11	11	10
130	13	12	12	11	11	11
140	13	12	12	11	11	11
150	13	13	12	12	11	11
160	14	13	12	12	11	11
170	14	13	13	12	12	11
180	14	13	13	12	12	12
190	14	14	13	12	12	12
200	15	14	13	13	12	12

Chart P34-2 - Foundation Length L (ft.) Based on Torsion (φ=34 deg)

TORSION (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10						
20						
30						
40	10					
50	11					
60	12	10				
70	13	11				
80	13	11				
90	14	12	10			
100	15	13	11			
110	16	13	11			
120	17	14	12	10		
130	18	14	12	11		
140	18	15	13	11		
150	19	16	13	12	10	
160	20	16	14	12	11	
170		17	14	12	11	
180		17	15	13	11	
190		18	15	13	12	10
200		18	15	13	12	11

ITEM NOS. 626.331 AND 626.332 for SOILS WITH φ=34 deg.

Chart P34-3 - Summary of Reinforcing Steel (φ=34 deg) (for Charts P34-1 and P34-2)

Foundation Diameter X (feet)	Moment (kip-feet)	Torsion (kip-feet)	QTY Longit Bars A	Longit Bar Size B	Spiral Bar Size C	Spiral Spacing (0 to 3 ft) D1 (in)	Spiral Spacing (3 ft to 2L/3 ft) D2 (in)	Spiral Spacing (2L/3 ft to tip) D3 (in)
2.5	0 ≤ M ≤ 200	0 ≤ T ≤ 60	12	#8	#5	4	12	12
		60 < T ≤ 70	12	#8	#5	4	8	12
		70 < T ≤ 100	12	#8	#5	4	8	8
		100 < T ≤ 110	12	#8	#5	4	4	8
		110 < T ≤ 160	12	#8	#5	4	4	4
3.0	0 ≤ M ≤ 200	0 ≤ T ≤ 100	15	#8	#5	4	12	12
		100 < T ≤ 110	15	#8	#5	4	8	12
		110 < T ≤ 150	15	#8	#5	4	8	8
		150 < T ≤ 180	15	#8	#5	4	4	8
		180 < T ≤ 200	15	#8	#5	4	4	4
3.5	0 ≤ M ≤ 200	0 ≤ T ≤ 150	18	#9	#5	4	12	12
		150 < T ≤ 160	18	#9	#5	4	8	12
		160 < T ≤ 200	18	#9	#5	4	8	8
4.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	21	#9	#5	4	12	12
4.5	0 ≤ M ≤ 200	0 ≤ T ≤ 200	24	#10	#5	4	12	12
5.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	27	#10	#5	4	12	12

Notes: Minimum clear cover to the reinforcing shall be 3 inches.
Spiral spacing shall be measured from the top of the foundation.

Chart S400-1 - Foundation Length L (ft.) Based on Bending Moment (Su=400 psf)

BENDING MOMENT (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10	10	10				
20	11	11	10	10	10	
30	12	12	11	11	11	10
40	13	12	12	12	11	11
50	14	14	13	13	12	12
60	15	14	14	13	13	13
70	16	15	15	14	14	13
80	17	16	15	15	14	14
90	18	17	16	15	15	14
100	19	18	17	16	15	15
110	20	18	17	16	16	15
120		19	18	17	16	16
130		20	18	17	17	16
140			19	18	17	17
150			20	18	18	17
160				19	18	18
170				20	19	18
180					19	19
190					20	19
200					20	19

Chart S400-2 - Foundation Length L (ft.) Based on Torsion (Su=400 psf)

TORSION (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10	11	10	10			
20	16	13	11	10		
30		16	13	11	10	10
40		20	16	13	12	11
50			18	15	13	12
60				17	15	13
70				19	17	14
80					18	16
90					20	17
100						18
110						20
120						
130						
140						
150						
160						
170						
180						
190						
200						

Chart S400-3 - Summary of Reinforcing Steel (Su=400 psf) (for Charts S400-1 and S400-2)

Foundation Diameter X (feet)	Moment (kip-feet)	Torsion (kip-feet)	QTY Longit Bars A	Longit Bar Size B	Spiral Bar Size C	Spiral Spacing (0 to 3 ft) D1 (in)	Spiral Spacing (3 ft to 2L/3 ft) D2 (in)	Spiral Spacing (2L/3 ft to tip) D3 (in)
2.5	0 ≤ M ≤ 110	0 ≤ T ≤ 20	12	#8	#5	4	12	12
3.0	0 ≤ M ≤ 130	0 ≤ T ≤ 40	15	#8	#5	4	12	12
3.5	0 ≤ M ≤ 150	0 ≤ T ≤ 50	18	#9	#5	4	12	12
4.0	0 ≤ M ≤ 170	0 ≤ T ≤ 70	21	#9	#5	4	12	12
4.5	0 ≤ M ≤ 200	0 ≤ T ≤ 90	24	#10	#5	4	12	12
5.0	0 ≤ M ≤ 200	0 ≤ T ≤ 110	27	#10	#5	4	12	12

Notes: Minimum clear cover to the reinforcing shall be 3 inches.
Spiral spacing shall be measured from the top of the foundation.

ITEM NOS. 626.331 AND 626.332 for SOILS WITH Su=400 psf

Chart S600-1 - Foundation Length L (ft.) Based on Bending Moment (Su=600 psf)

BENDING MOMENT (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10	10					
20	10					
30	11	10	10	10		
40	12	11	11	11	10	10
50	12	12	12	11	11	11
60	13	13	12	12	11	11
70	14	13	13	12	12	12
80	15	14	13	13	13	12
90	15	14	14	13	13	13
100	16	15	14	14	13	13
110	17	15	15	14	14	14
120	17	16	15	15	14	14
130	18	17	16	15	14	14
140	19	17	16	16	15	15
150	19	18	17	16	15	15
160	20	18	17	16	16	15
170	20	19	17	17	16	16
180		19	18	17	16	16
190		20	18	17	17	16
200		20	19	18	17	17

Chart S600-2 - Foundation Length L (ft.) Based on Torsion (Su=600 psf)

TORSION (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10	10					
20	12	10	10			
30	16	13	11	10		
40	19	15	12	11	10	
50		17	14	12	11	10
60		20	16	13	12	11
70			18	15	13	11
80			19	16	14	12
90				17	15	13
100				19	16	14
110				20	17	15
120					18	16
130					19	17
140					20	17
150						18
160						19
170						20
180						
190						
200						

Chart S600-3 - Summary of Reinforcing Steel (Su=600 psf) (for Charts S600-1 and S600-2)

Foundation Diameter X (feet)	Moment (kip-feet)	Torsion (kip-feet)	QTY Longit Bars A	Longit Bar Size B	Spiral Bar Size C	Spiral Spacing (0 to 3 ft) D1 (in)	Spiral Spacing (3 ft to 2L/3 ft) D2 (in)	Spiral Spacing (2L/3 ft to tip) D3 (in)
2.5	0 ≤ M ≤ 170	0 ≤ T ≤ 40	12	#8	#5	4	12	12
3.0	0 ≤ M ≤ 200	0 ≤ T ≤ 60	15	#8	#5	4	12	12
3.5	0 ≤ M ≤ 200	0 ≤ T ≤ 80	18	#9	#5	4	12	12
4.0	0 ≤ M ≤ 200	0 ≤ T ≤ 110	21	#9	#5	4	12	12
4.5	0 ≤ M ≤ 200	0 ≤ T ≤ 140	24	#10	#5	4	12	12
5.0	0 ≤ M ≤ 200	0 ≤ T ≤ 170	27	#10	#5	4	12	12

Notes: Minimum clear cover to the reinforcing shall be 3 inches.
Spiral spacing shall be measured from the top of the foundation.

ITEM NOS. 626.331 AND 626.332 for SOILS WITH Su=600 psf

Chart S800-1 - Foundation Length L (ft.) Based on Bending Moment (Su=800 psf)

BENDING MOMENT (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10						
20						
30	10					
40	11	10	10			
50	12	11	11	10	10	
60	12	12	11	11	11	10
70	13	12	12	11	11	11
80	13	13	12	12	12	11
90	14	13	13	12	12	12
100	14	14	13	13	12	12
110	15	14	13	13	13	12
120	15	14	14	13	13	13
130	16	15	14	14	13	13
140	16	15	15	14	14	13
150	17	16	15	14	14	14
160	17	16	15	15	14	14
170	18	16	16	15	15	14
180	18	17	16	15	15	14
190	19	17	16	16	15	15
200	20	18	17	16	15	15

Chart S800-2 - Foundation Length L (ft.) Based on Torsion (Su=800 psf)

TORSION (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10	10					
20	11	10				
30	13	12	10			
40	16	13	11			
50	18	15	12	10		
60		16	13	11	10	
70		18	15	12	11	10
80		20	16	13	12	11
90			17	14	13	11
100			18	15	13	12
110			20	16	14	13
120				17	15	13
130				18	16	14
140				19	17	14
150				20	17	15
160					18	16
170					19	16
180					20	17
190					20	18
200						18

Chart S800-3 - Summary of Reinforcing Steel (Su=800 psf) (for Charts S800-1 and S800-2)

Foundation Diameter X (feet)	Moment (kip-feet)	Torsion (kip-feet)	QTY Longit Bars A	Longit Bar Size B	Spiral Bar Size C	Spiral Spacing (0 to 3 ft) D1 (in)	Spiral Spacing (3 ft to 2L/3 ft) D2 (in)	Spiral Spacing (2L/3 ft to tip) D3 (in)
2.5	0 ≤ M ≤ 200	0 ≤ T ≤ 50	12	#8	#5	4	12	12
3.0	0 ≤ M ≤ 200	0 ≤ T ≤ 80	15	#8	#5	4	12	12
3.5	0 ≤ M ≤ 200	0 ≤ T ≤ 110	18	#9	#5	4	12	12
4.0	0 ≤ M ≤ 200	0 ≤ T ≤ 150	21	#9	#5	4	12	12
4.5	0 ≤ M ≤ 200	0 ≤ T ≤ 190	24	#10	#5	4	12	12
5.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	27	#10	#5	4	12	12

Notes: Minimum clear cover to the reinforcing shall be 3 inches.
Spiral spacing shall be measured from the top of the foundation.

ITEM NOS. 626.331 AND 626.332 for SOILS WITH Su=800 psf

Chart S1200-1 - Foundation Length L (ft.) Based on Bending Moment (Su=1,200 psf)

BENDING MOMENT (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10						
20						
30						
40						
50	10					
60	11	10	10			
70	11	11	11	10	10	
80	12	11	11	11	11	
90	12	12	11	11	11	10
100	13	12	12	11	11	11
110	13	12	12	12	11	11
120	13	13	12	12	12	11
130	14	13	13	12	12	12
140	14	13	13	12	12	12
150	14	14	13	13	12	12
160	15	14	13	13	13	13
170	15	14	14	13	13	13
180	15	14	14	13	13	13
190	16	15	14	14	13	13
200	16	15	14	14	13	13

Chart S1200-2 - Foundation Length L (ft.) Based on Torsion (Su=1,200 psf)

TORSION (kip-ft.)	FOUNDATION DIAMETER (inches) X					
	30	36	42	48	54	60
10						
20	10					
30	11					
40	12	10				
50	14	11	10			
60	16	13	11			
70	17	14	12	10		
80	19	15	12	11		
90		16	13	11	10	
100		17	14	12	11	
110		18	15	13	11	10
120		20	16	13	12	11
130			17	14	12	11
140			18	15	13	11
150			18	15	13	12
160			19	16	14	12
170			20	17	14	13
180				17	15	13
190				18	15	14
200				19	16	14

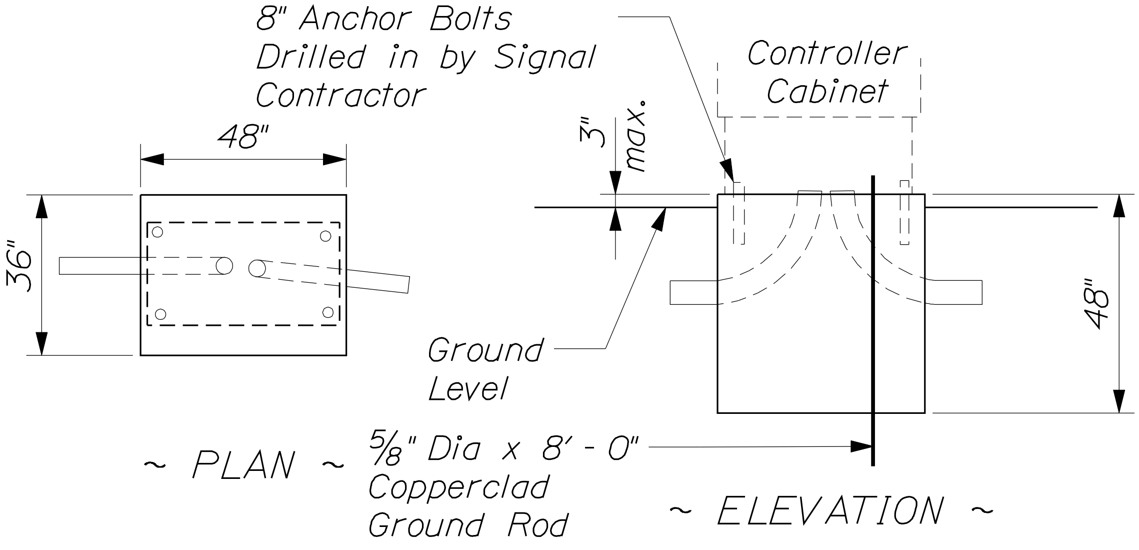
ITEM NOS. 626.331 AND 626.332 for SOILS WITH Su=1200 psf

Chart S1200-3 - Summary of Reinforcing Steel (Su=1,200 psf) (for Charts S1200-1 and S1200-2)

Foundation Diameter X (feet)	Moment (kip-feet)	Torsion (kip-feet)	QTY Longit Bars A	Longit Bar Size B	Spiral Bar Size C	Spiral Spacing (0 to 3 ft) D1 (in)	Spiral Spacing (3 ft to 2L/3 ft) D2 (in)	Spiral Spacing (2L/3 ft to tip) D3 (in)
2.5	0 ≤ M ≤ 200	0 ≤ T ≤ 60	12	#8	#5	4	12	12
		60 < T ≤ 80	12	#8	#5	4	8	12
3.0	0 ≤ M ≤ 200	0 ≤ T ≤ 100	15	#8	#5	4	12	12
		100 < T ≤ 120	15	#8	#5	4	8	12
3.5	0 ≤ M ≤ 200	0 ≤ T ≤ 140	18	#9	#5	4	12	12
		140 < T ≤ 170	18	#9	#5	4	8	12
4.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	21	#9	#5	4	12	12
4.5	0 ≤ M ≤ 200	0 ≤ T ≤ 200	24	#10	#5	4	12	12
5.0	0 ≤ M ≤ 200	0 ≤ T ≤ 200	27	#10	#5	4	12	12

Notes: Minimum clear cover to the reinforcing shall be 3 inches.
Spiral spacing shall be measured from the top of the foundation.

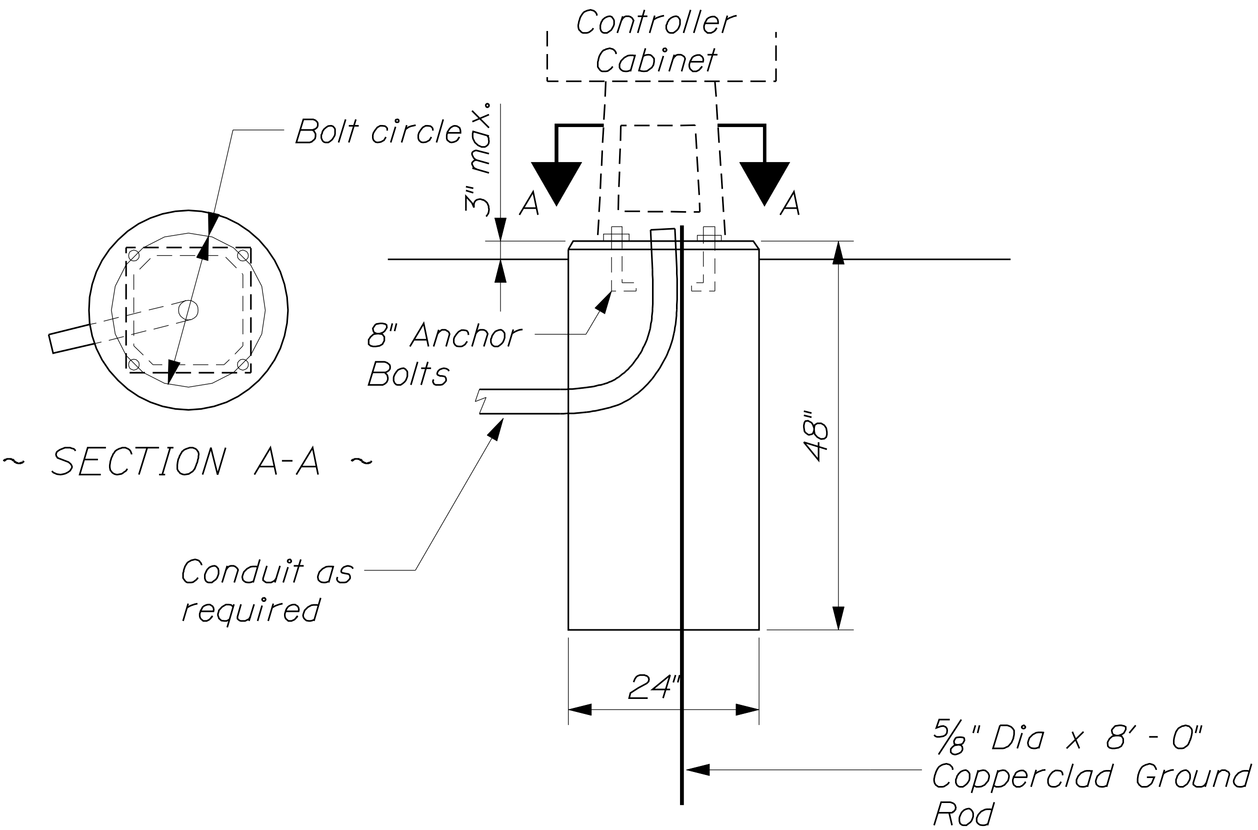
ITEM NOS. 626.331 AND 626.332 for SOILS WITH Su=1200 psf



~ PLAN ~

~ ELEVATION ~

~ GROUND MOUNTED CONTROLLER CABINET FOUNDATION ~

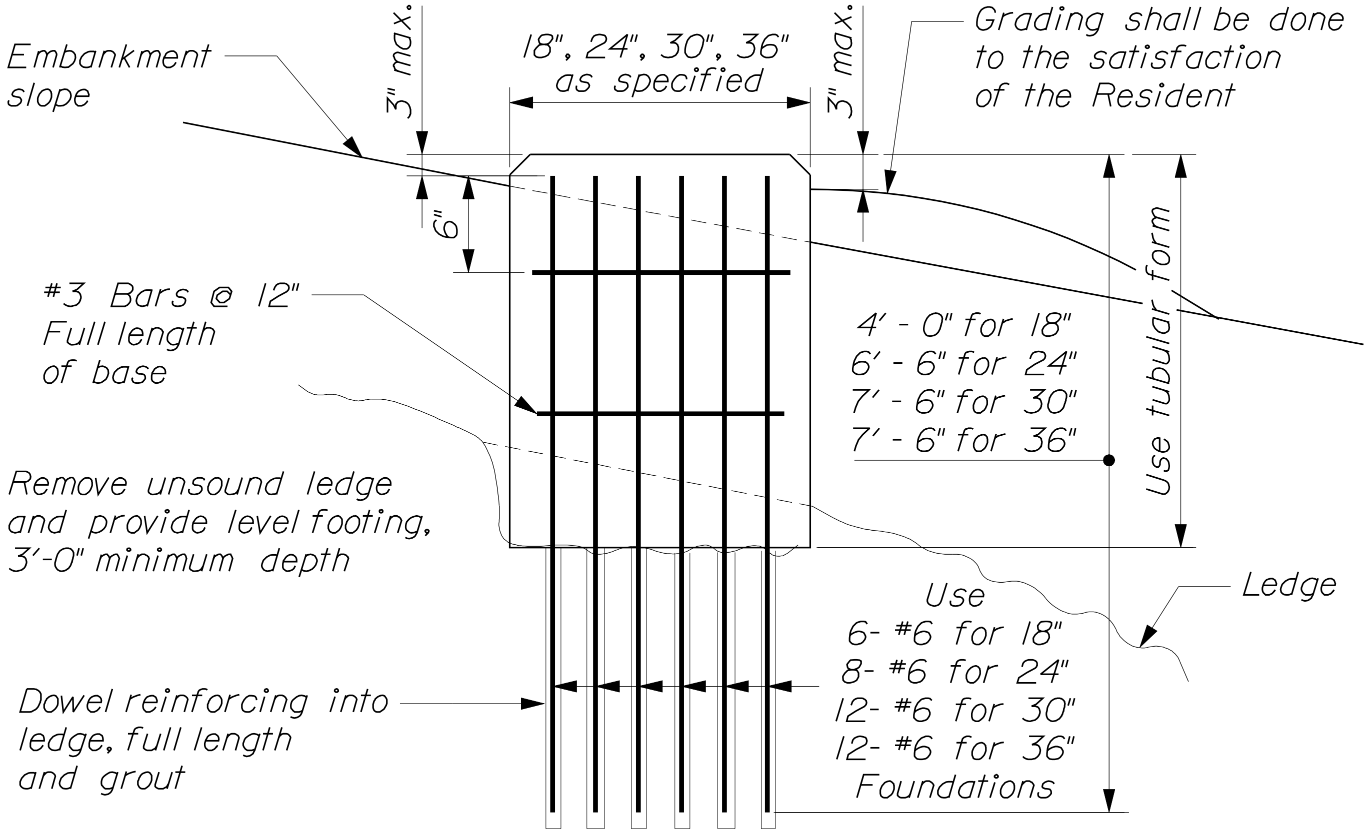


~ SECTION A-A ~

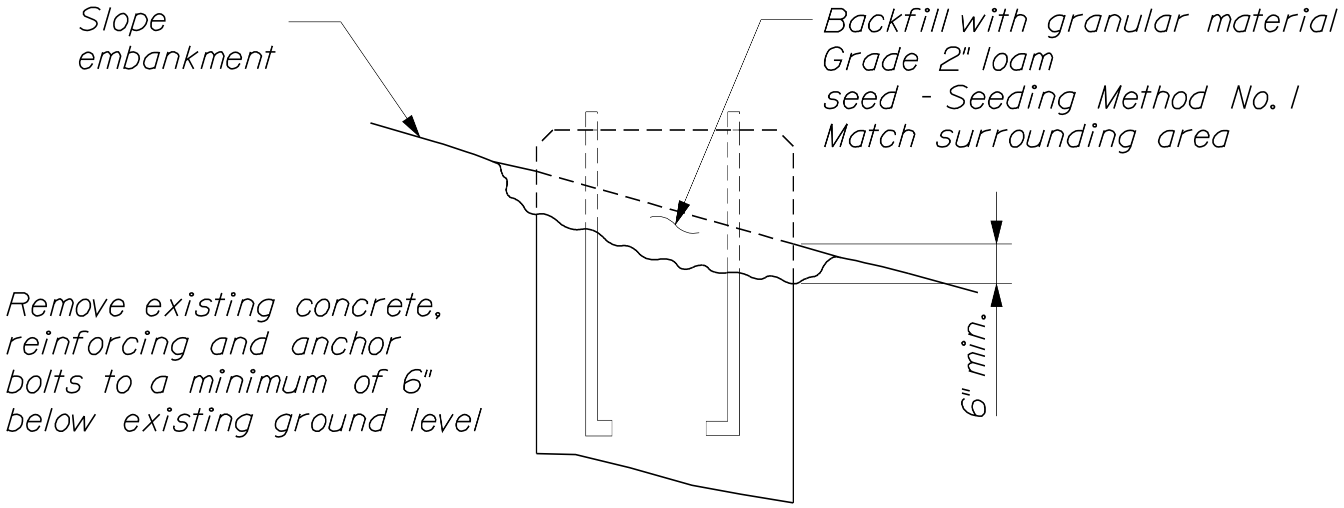
~ CONTROLLER CABINET FOUNDATION ~
ITEM NO. 626.35

FOUNDATIONS FOR TRAFFIC SIGNALS, HIGHWAY SIGNING AND LIGHTING

626(05)



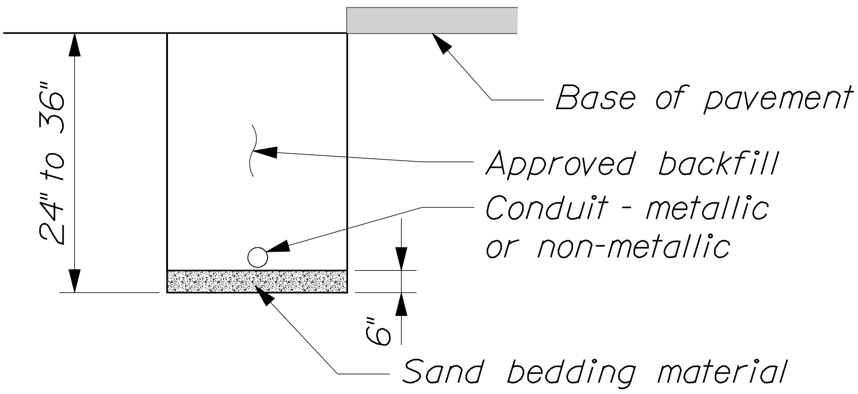
~ 18, 24, 30,36 INCH FOUNDATIONS
WHERE SOLID ROCK IS ENCOUNTERED AT LESS THAN
THE REQUIRED DISTANCE BELOW GROUND LEVEL ~



~ REMOVAL OF CONCRETE FOUNDATIONS ~
ITEM NO. 626.36

FOUNDATIONS FOR TRAFFIC SIGNALS, HIGHWAY SIGNING AND LIGHTING

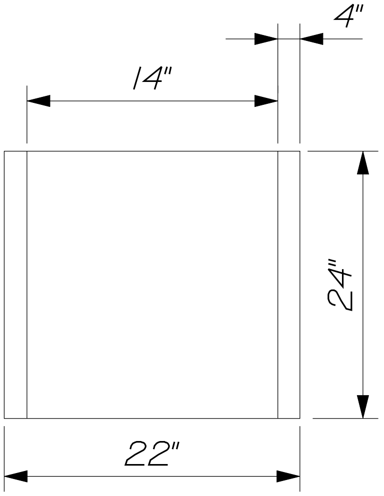
626(06)



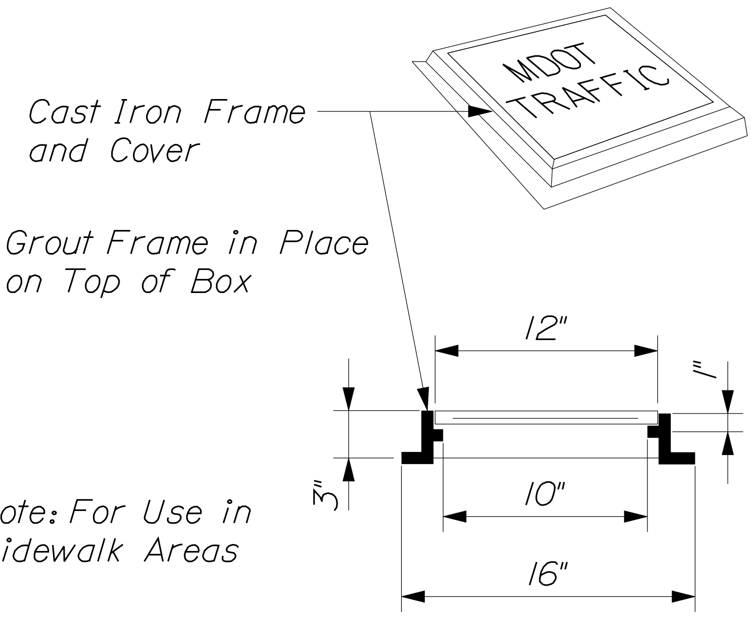
~ CONDUIT TRENCH ~

FOUNDATIONS FOR TRAFFIC SIGNALS, HIGHWAY SIGNING AND LIGHTING

626(07)

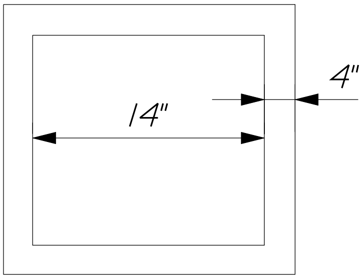


~ ELEVATION ~

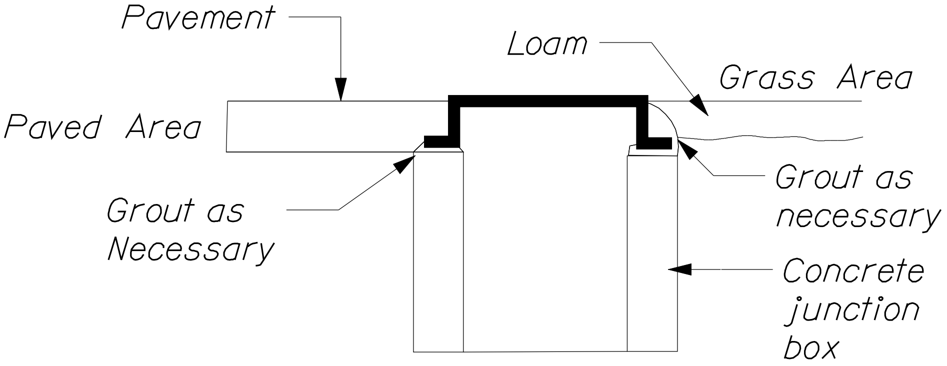


Note: For Use in
Sidewalk Areas

~ JUNCTION BOX COVER AND FRAME ~



~ TOP ~

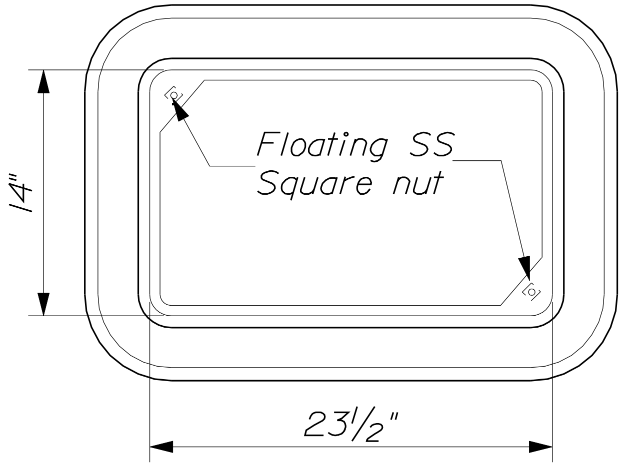


Install junction box on grade.
Grout as necessary as shown.

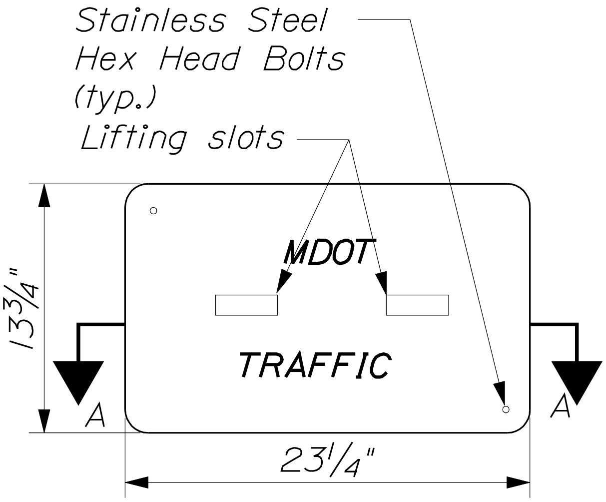
~ PRECAST CONCRETE JUNCTION BOX ~
ITEM NO. 626.111

ELECTRICAL JUNCTION BOX FOR TRAFFIC SIGNALS, AND LIGHTING

626(08)

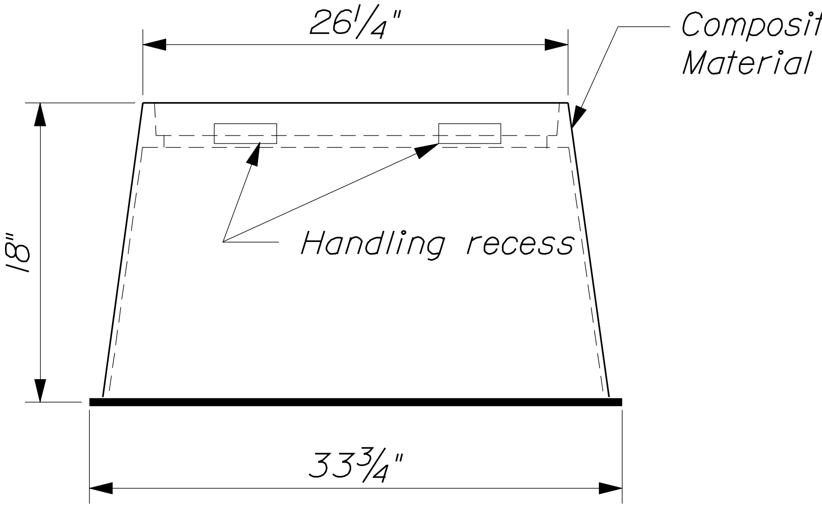


~ PLAN ~

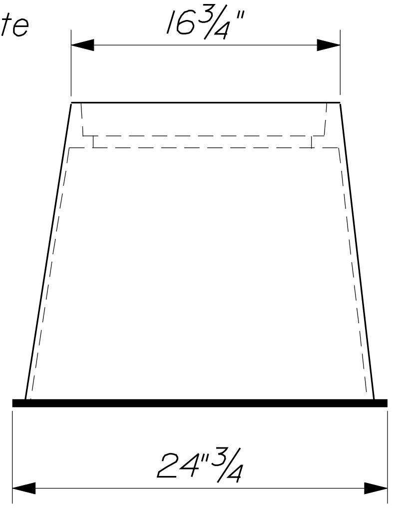


~ COVER ~

~ SECTION A-A ~



~ ELEVATION ~



~ END ~

13" x 24" Flared Wall
JUNCTION BOX
ITEM NO. 626.11

NOTE:
The Junction Box shall be capable of supporting incidental traffic loads of 22,000 pounds without distortion or failure.
Junction Boxes shall be as listed on MaineDOT's Qualified Products List of Traffic Signal and Lighting Materials.
Dimensions show are representative and may have slightly different dimensions.

ELECTRICAL JUNCTION BOX FOR TRAFFIC SIGNALS, AND LIGHTING

626(09)

~ GENERAL NOTES ~

All pavement markings shall be in accordance with the most recent (Manual on Uniform Traffic Control Devices for Streets and Highways), U.S. DOT, FHWA.

Temporary Pavement Markings over Winter Shutdown shall include Yellow Center Line, And White edge lines.

~ SYMBOLS AND ARROWS ~

Stroke width and line width variance shall be no more than ±1/4" from dimensions shown.

Square foot dimensions shown are pay dimensions, paid by Item No. 627.75.

Grid is marked in 4" intervals except as noted. Symbols and letters shall be proportioned according to grid as shown.

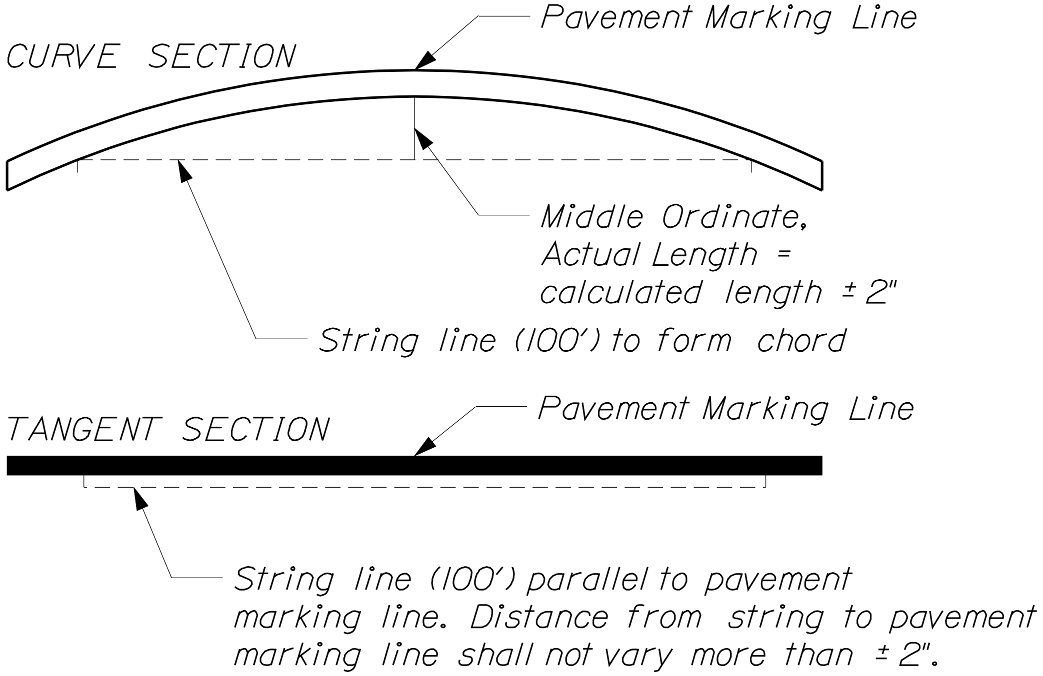
Spacing between characters shall be one unit, but visual spacing may be used.

Spacing between symbol and stop line shall be a minimum of 20'. Spacing between symbol and symbol shall be a minimum of 50' or as directed by the Resident.

Pavement marking lines on interstates shall be 6" in width.

6" crosswalk lines shall be paid for by Item No. 627.75.

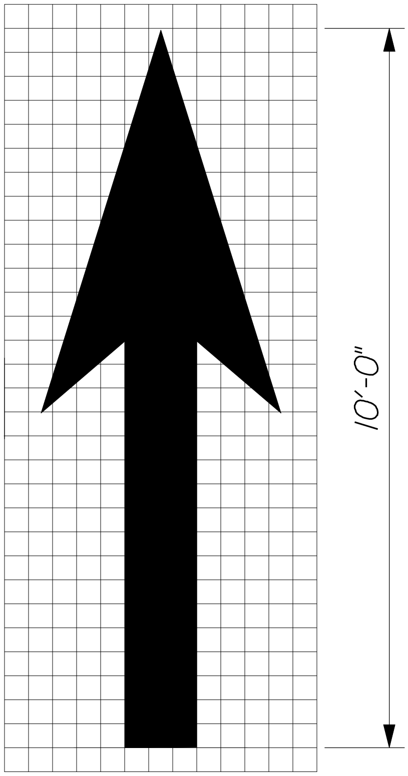
4" lines for parking spaces shall be paid for by Item No. 627.75.



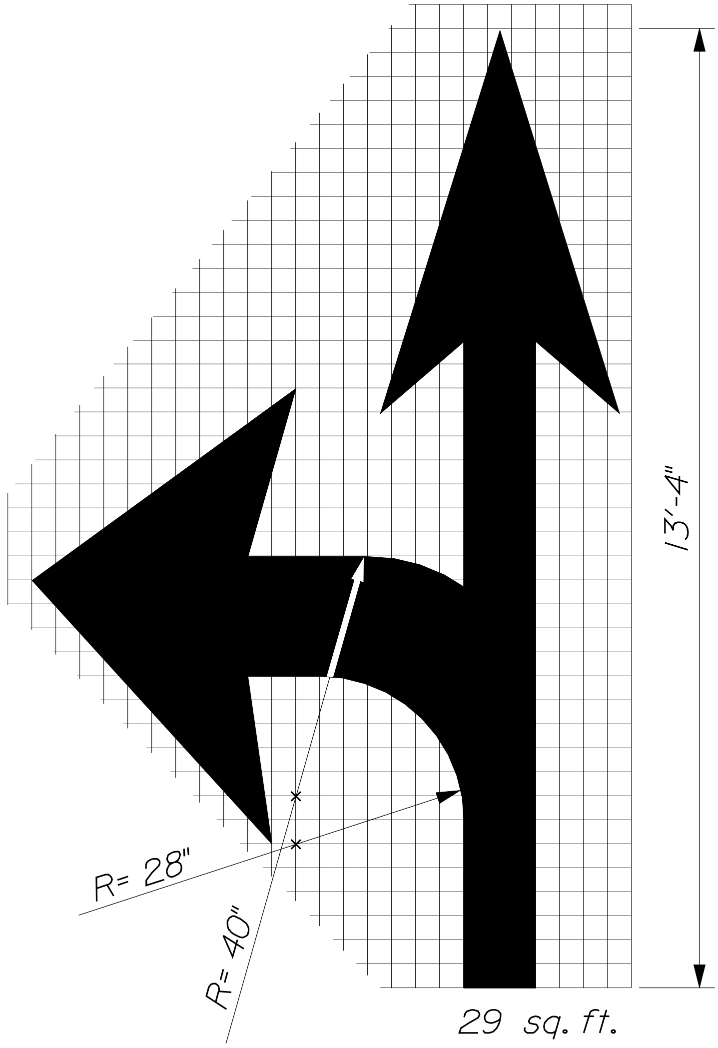
~ TOLERANCE FOR PAVEMENT MARKING LINES ~

PAVEMENT MARKING

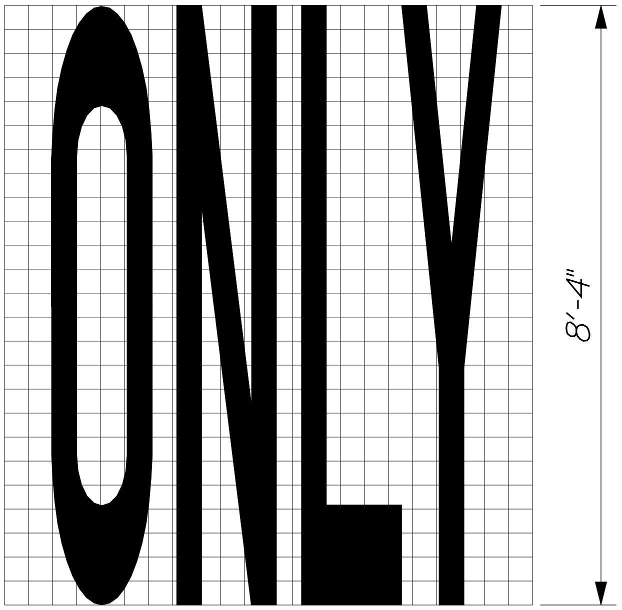
627(01)



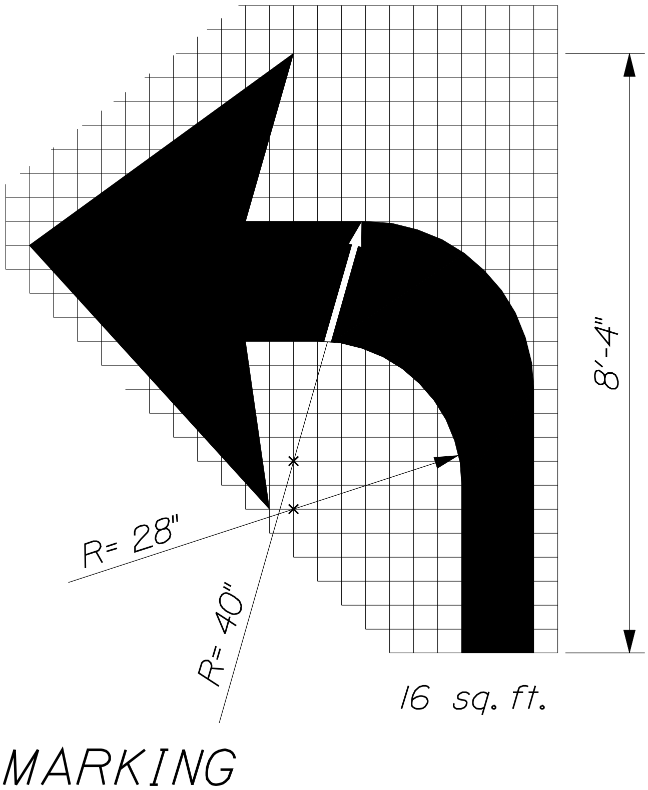
13 sq. ft.



29 sq. ft.



22 sq. ft.



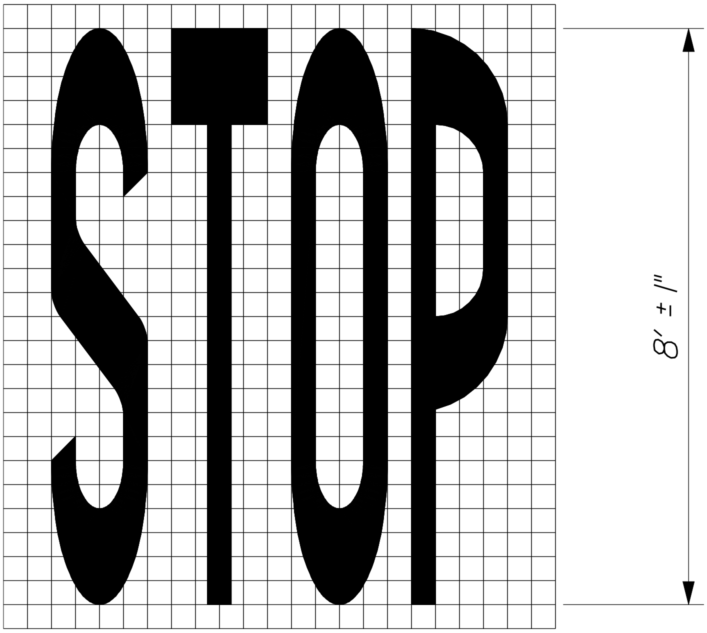
16 sq. ft.

NOTE: See page 627(01) for general notes on pavement markings.

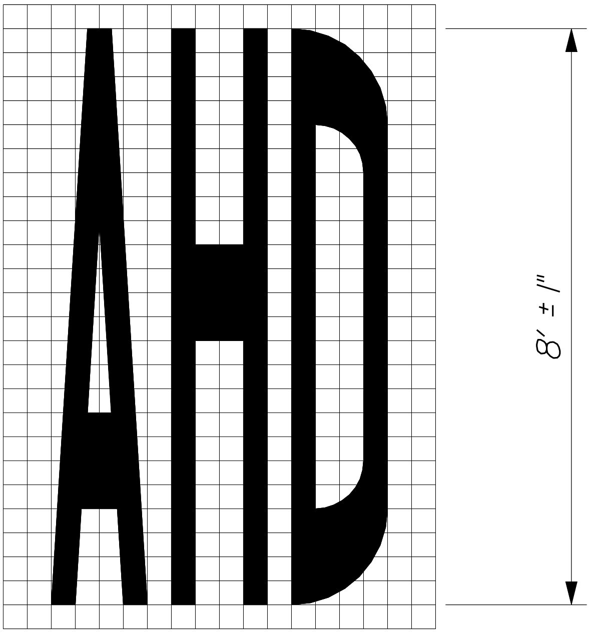
PAVEMENT MARKING

Straight Arrow, Straight/Left Arrow, Left Arrow, & ONLY

627(02)A



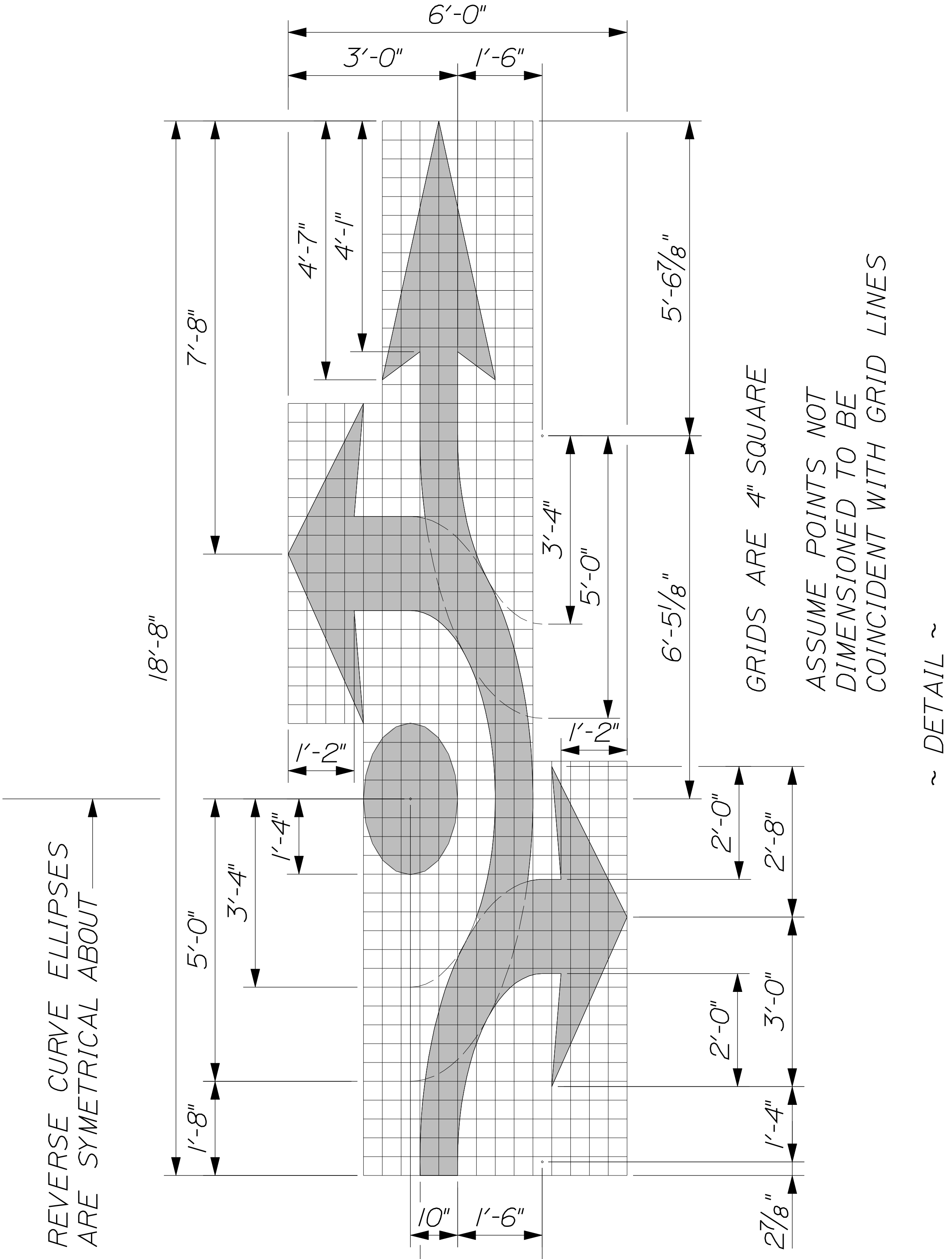
22 sq. ft.



16 sq. ft.

NOTE: See page 627(01) for general notes on pavement markings.

PAVEMENT MARKING
STOP & AHEAD
627(02)B

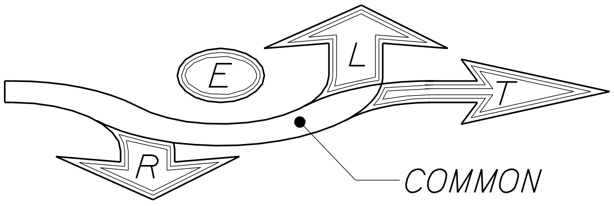


NOTE: See page 627(01) for general notes on pavement markings.

PAVEMENT MARKING

Roundabout Arrows

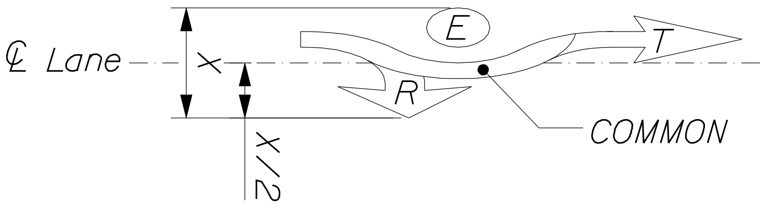
627(02)C



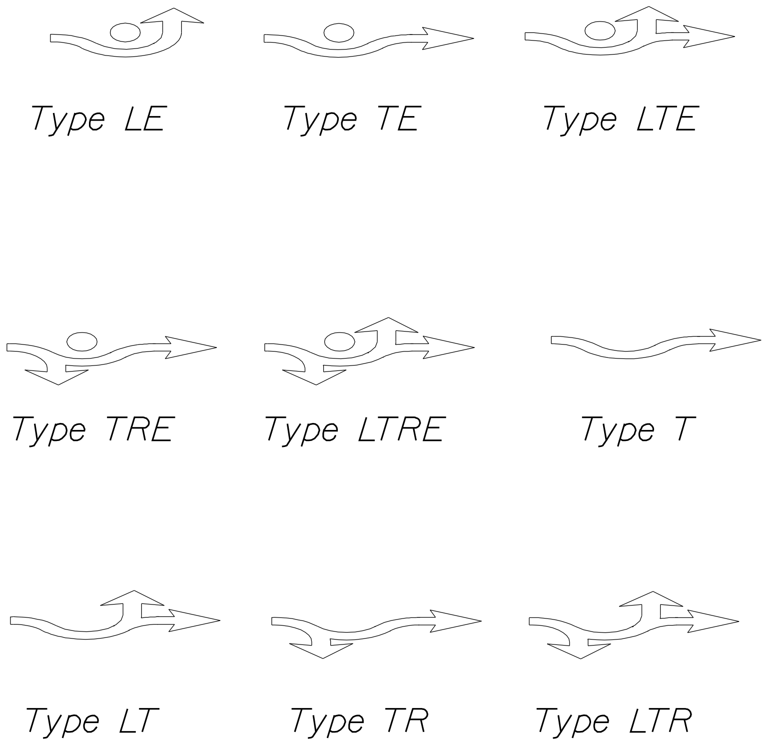
~ COMPONENT KEY ~

The labelled areas above correspond to the portions needed for each type of roundabout traffic arrows.

For example: the roundabout traffic arrow type tre requires the "common", "T", "R", and "E" areas.



Center the arrow on the lane centerline between the lateral extremities of that arrow type.



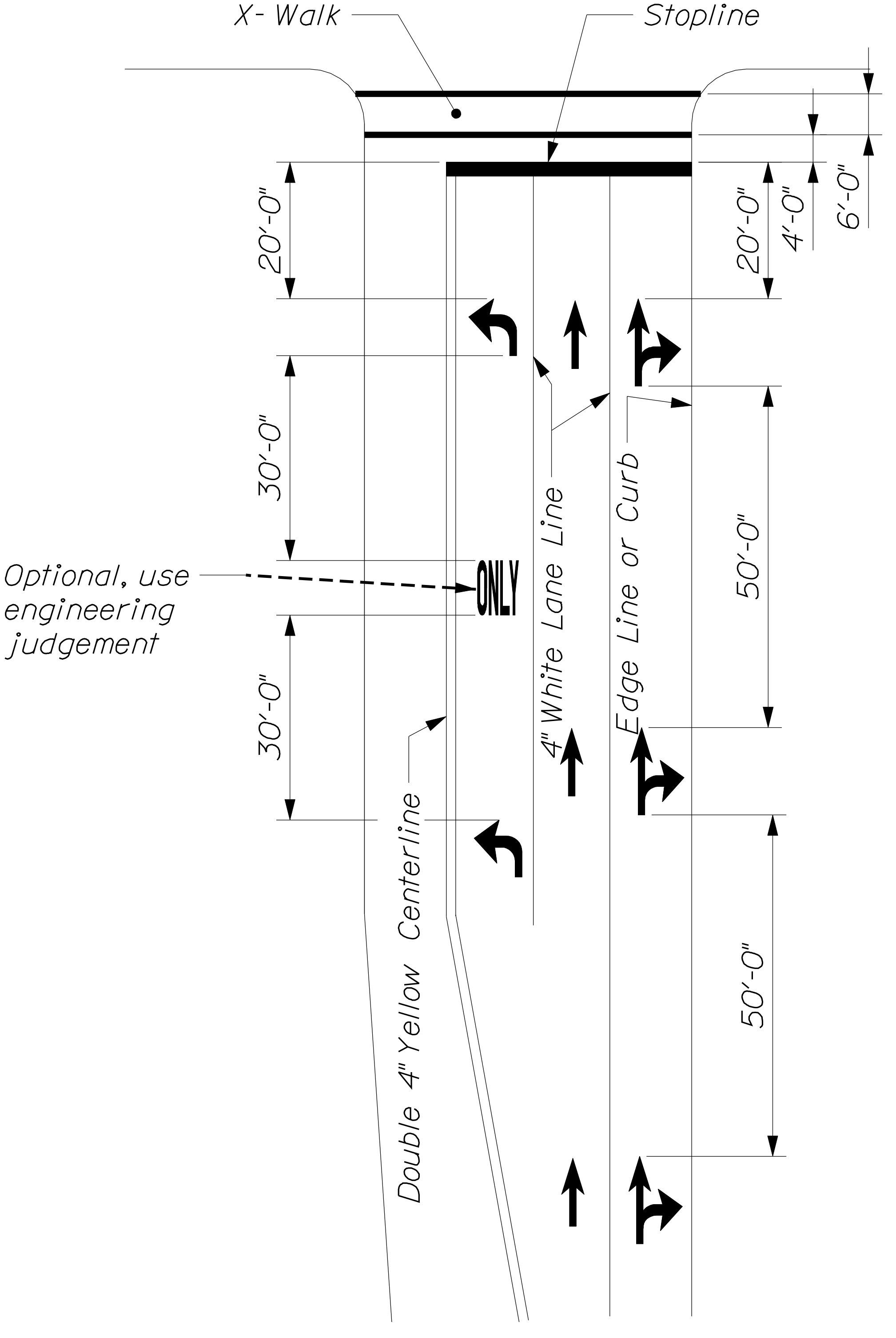
~ ROUNDABOUT PAVEMENT MARKING ARROWS ~

NOTE: See page 627(01) for general notes on pavement markings.

PAVEMENT MARKING

Roundabout Arrows

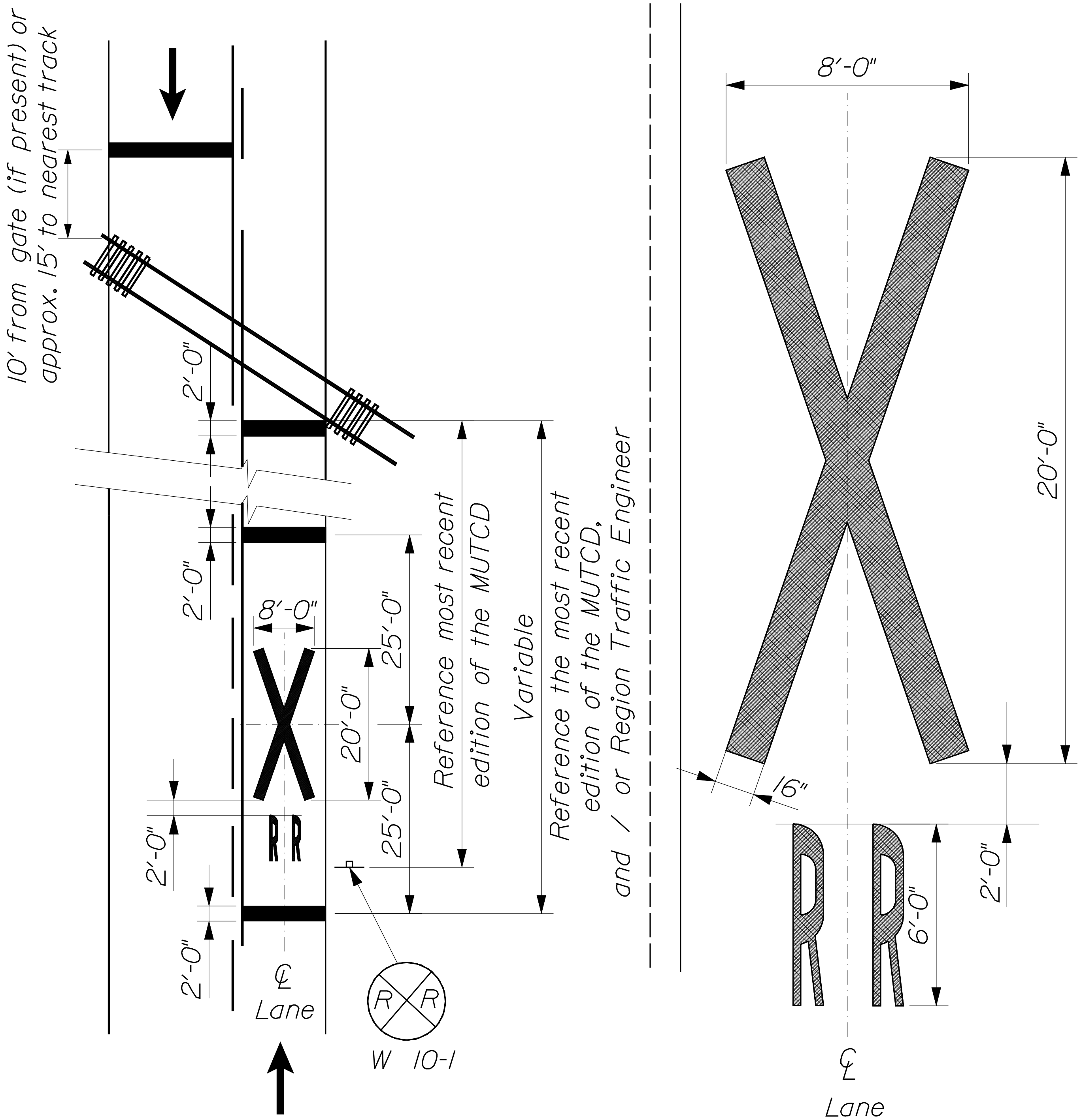
627(02)D



~ TYPICAL PLACEMENT OF PAVEMENT MARKING SYMBOLS AT SIGNALIZED INTERSECTIONS ~

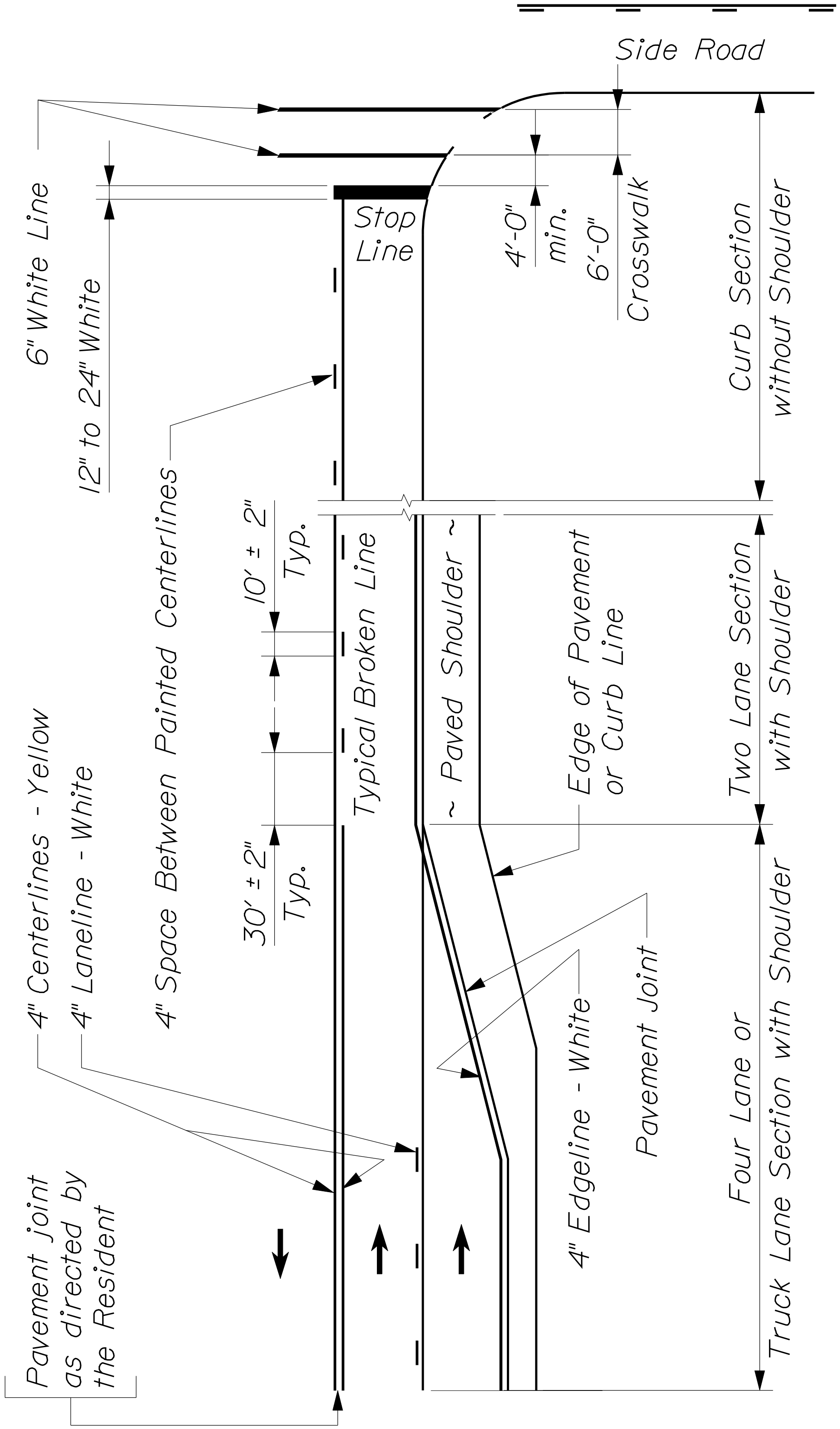
PAVEMENT MARKING

627(03)



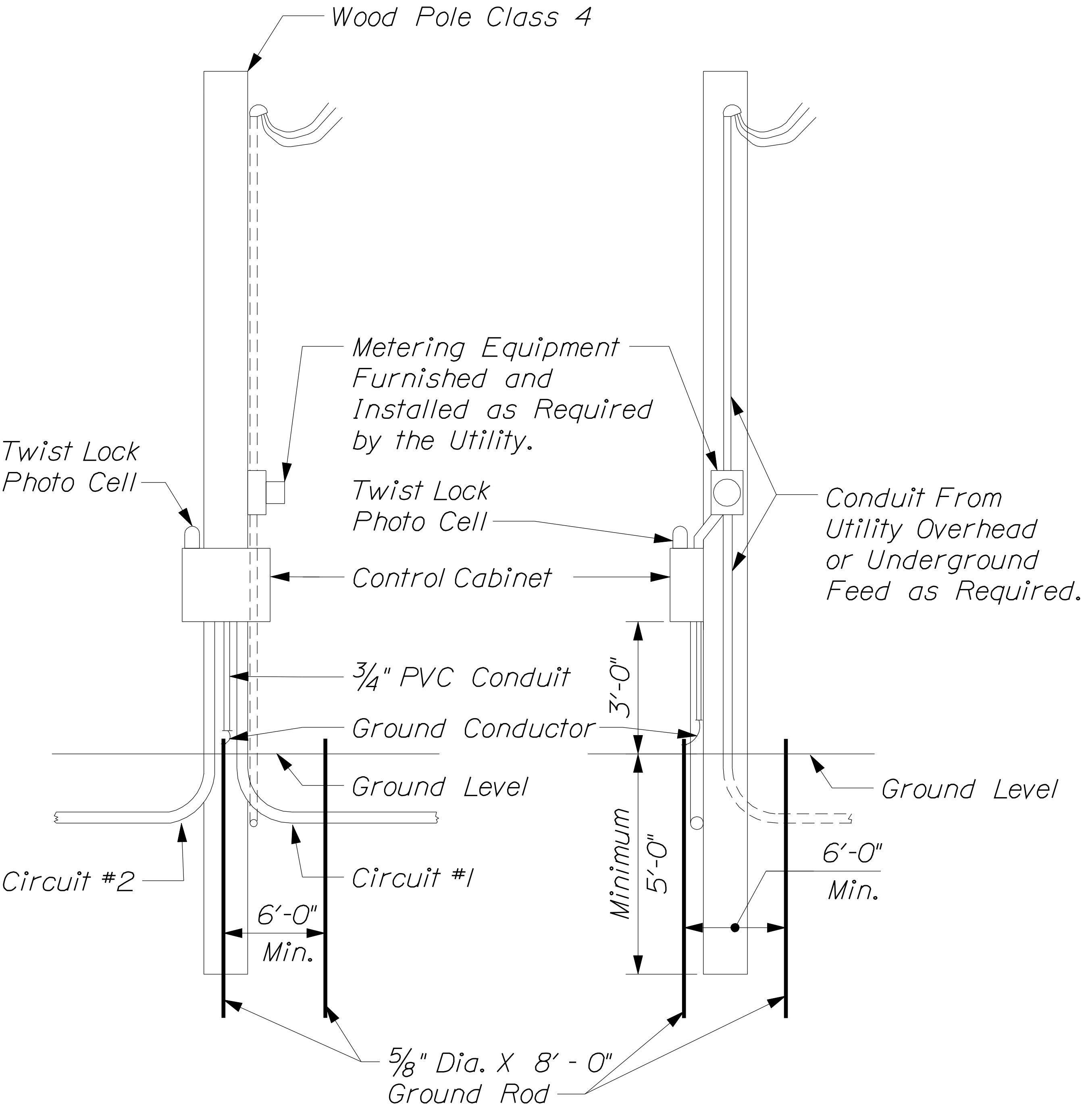
PAVEMENT MARKINGS AT RAILROAD GRADE CROSSINGS

627(04)



PAVEMENT MARKING
TYPICAL TWO - WAY ROADWAY

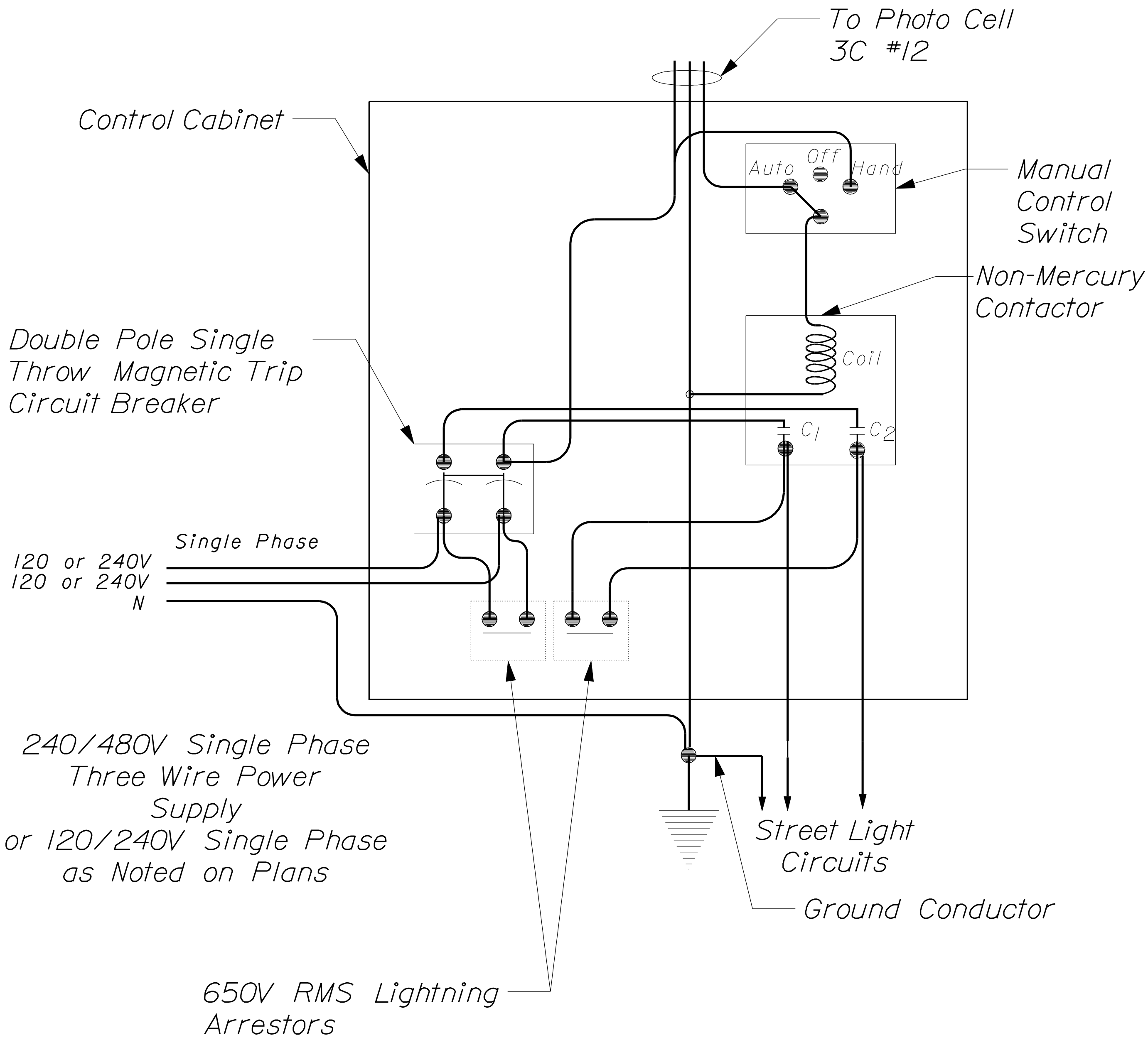
627(05)



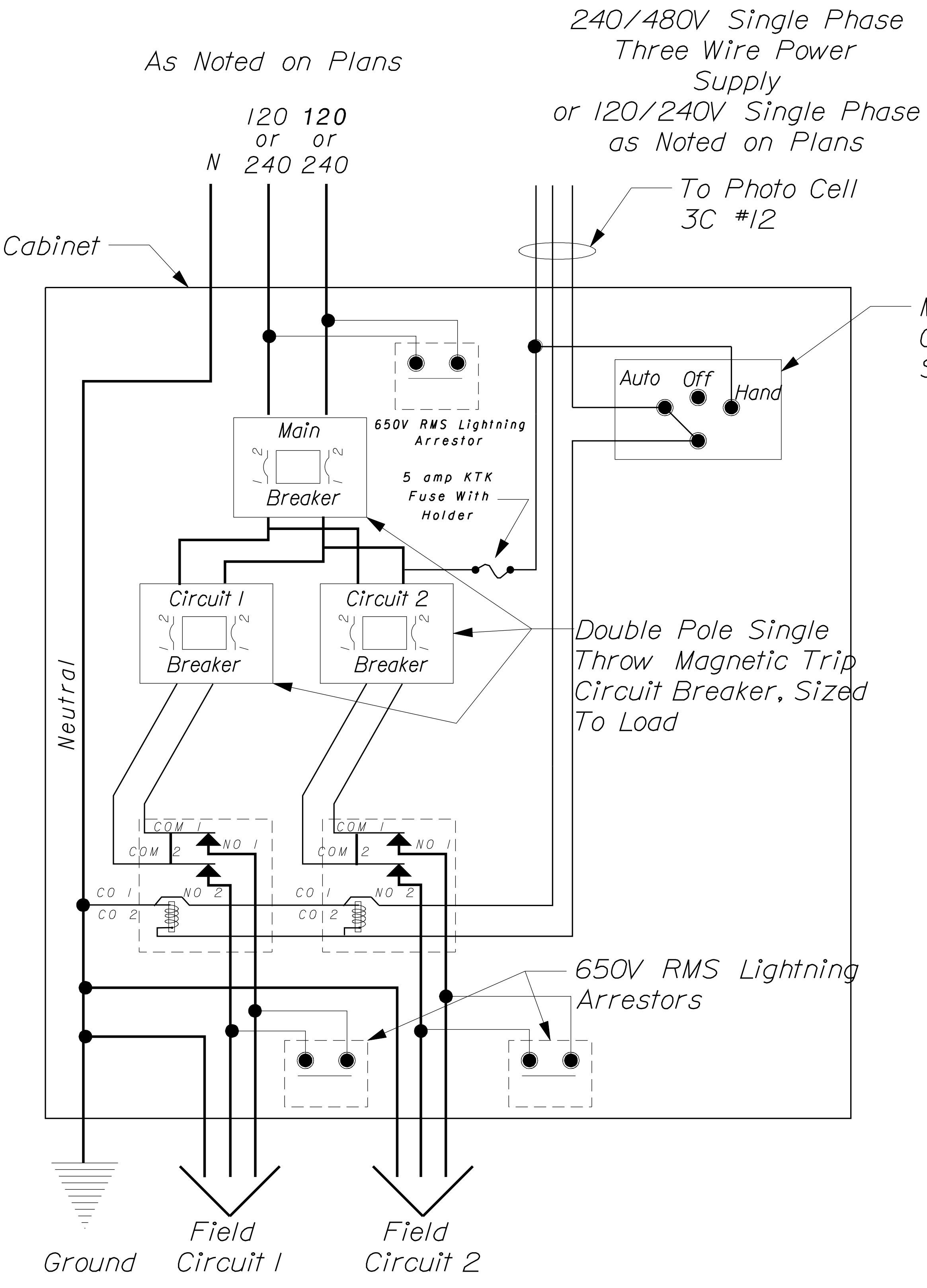
~ SERVICE POLE ~

HIGHWAY LIGHTING

634(01)



~ SCHEMATIC FOR STREET LIGHTING CONTROL CABINET - ONE CIRCUIT ~



~ SCHEMATIC FOR STREET LIGHTING CONTROL CABINET - MULTI CIRCUIT ~

HIGHWAY LIGHTING

634(03)

6" RISE / 12" TREAD (2:1 SLOPE)

REINFORCING STEEL

MARK	SIZE	NUMBER	LENGTH (EACH)
R	#4 0.668 lbs./ft.	(2) each parapet (1) each ft. of width	11" for "A" +13.4" for each "B" +12" for "C"
S	#4 0.668 lbs./ft.	(2) for "A" (2) for each "B" (2) for "C"	4" each parapet +12" per ft. of width

CONCRETE CLASS "A"

SECTION	STEPS PER FT. OF WIDTH	PARAPET EACH WALL
"A" header	0.026 cu. yds.	0.013 cu. yds.
"B" each inter. Step	0.031 cu. yds.	0.021 cu. yds.
"C" footer	0.033 cu. yds.	0.022 cu. yds.

8" RISE / 12" TREAD (1½ : 1 SLOPE)

REINFORCING STEEL

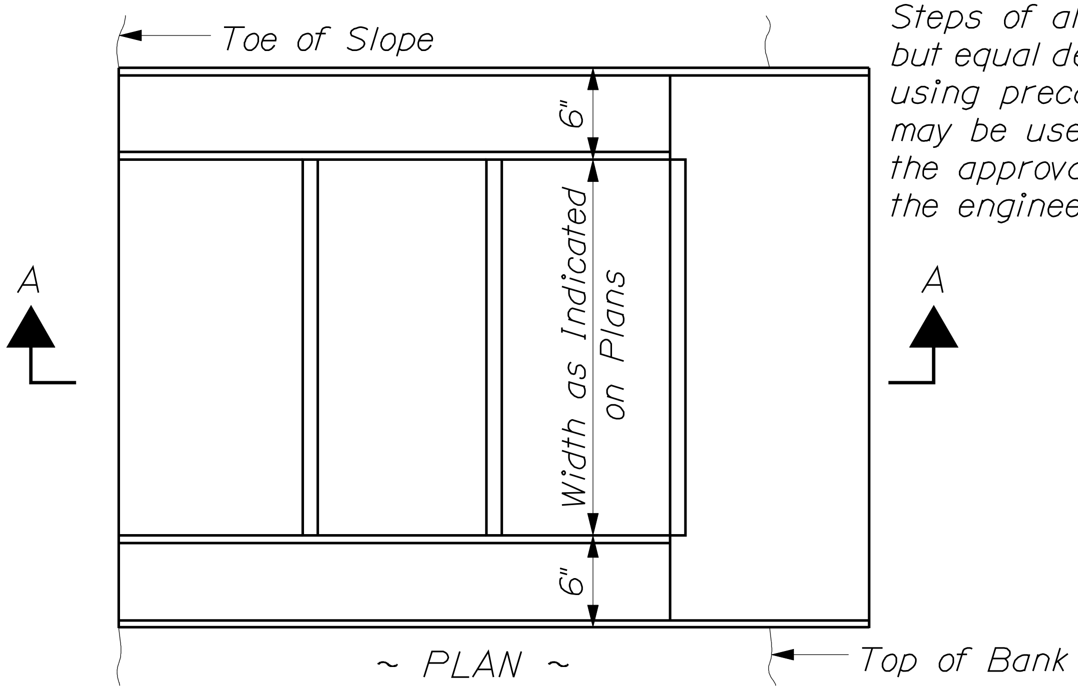
MARK	SIZE	NUMBER	LENGTH (EACH)
R	#4 0.668 lbs./ft.	(2) each parapet (1) each ft. of width	11" for "A" +14.5" for each "B" +12" for "C"
S	#4 0.668 lbs./ft.	(2) for "A" (2) for each "B" (2) for "C"	4" each parapet +12" per ft. of width

CONCRETE CLASS "A"

SECTION	STEPS PER FT. OF WIDTH	PARAPET EACH WALL
"A" header	0.033 cu. yds.	0.016 cu. yds.
"B" each inter. Step	0.036 cu. yds.	0.025 cu. yds.
"C" footer	0.037 cu. yds.	0.026 cu. yds.

QUANTITIES FOR CONCRETE STEPS

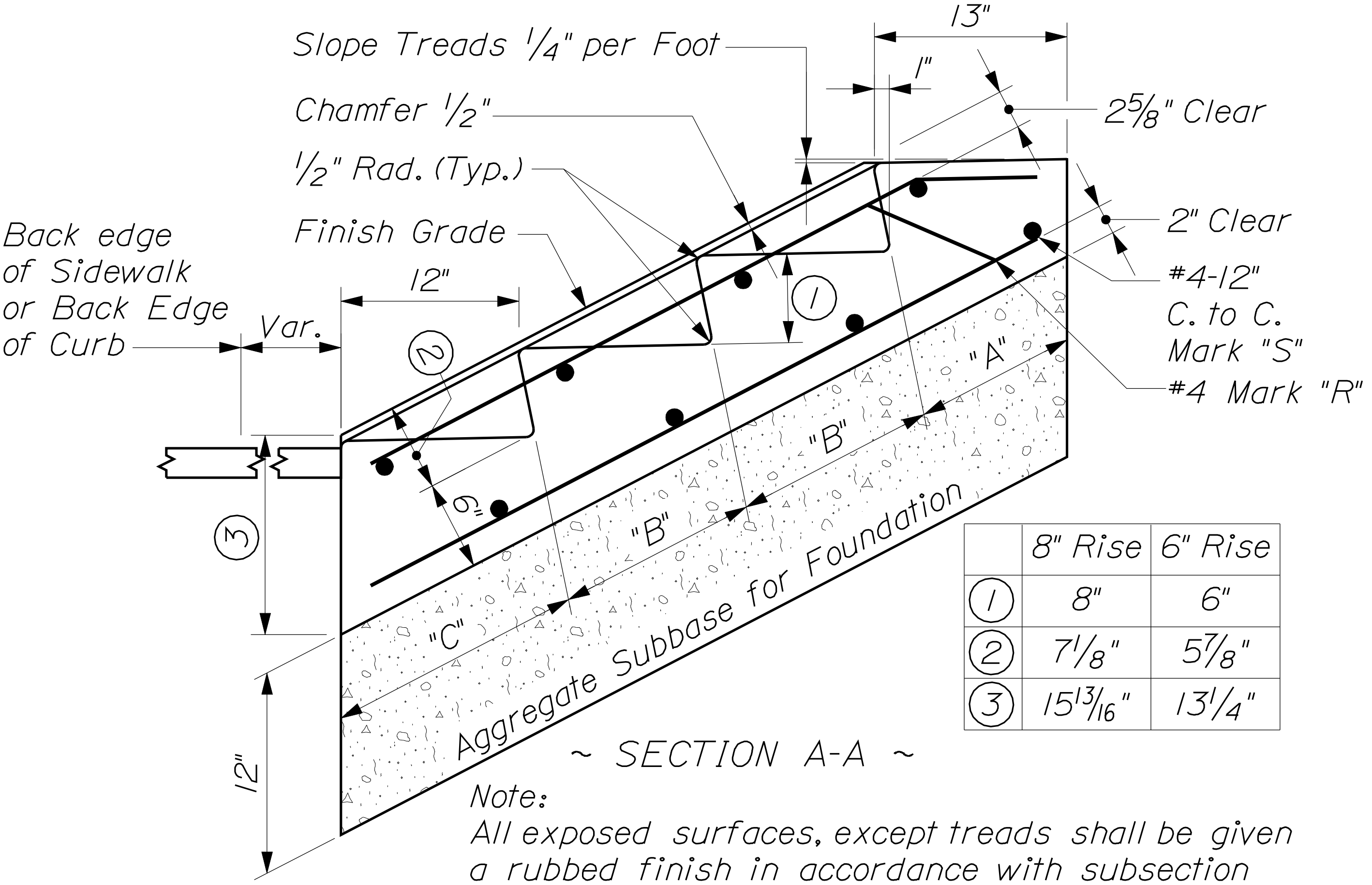
642(01)



~ PLAN ~

Steps of alternate
but equal design,
using precast parts
may be used upon
the approval of
the engineer.

Cost of furnishing and placing reinforcing steel shall be considered included in the price per cubic yard of cast-in-place concrete steps.



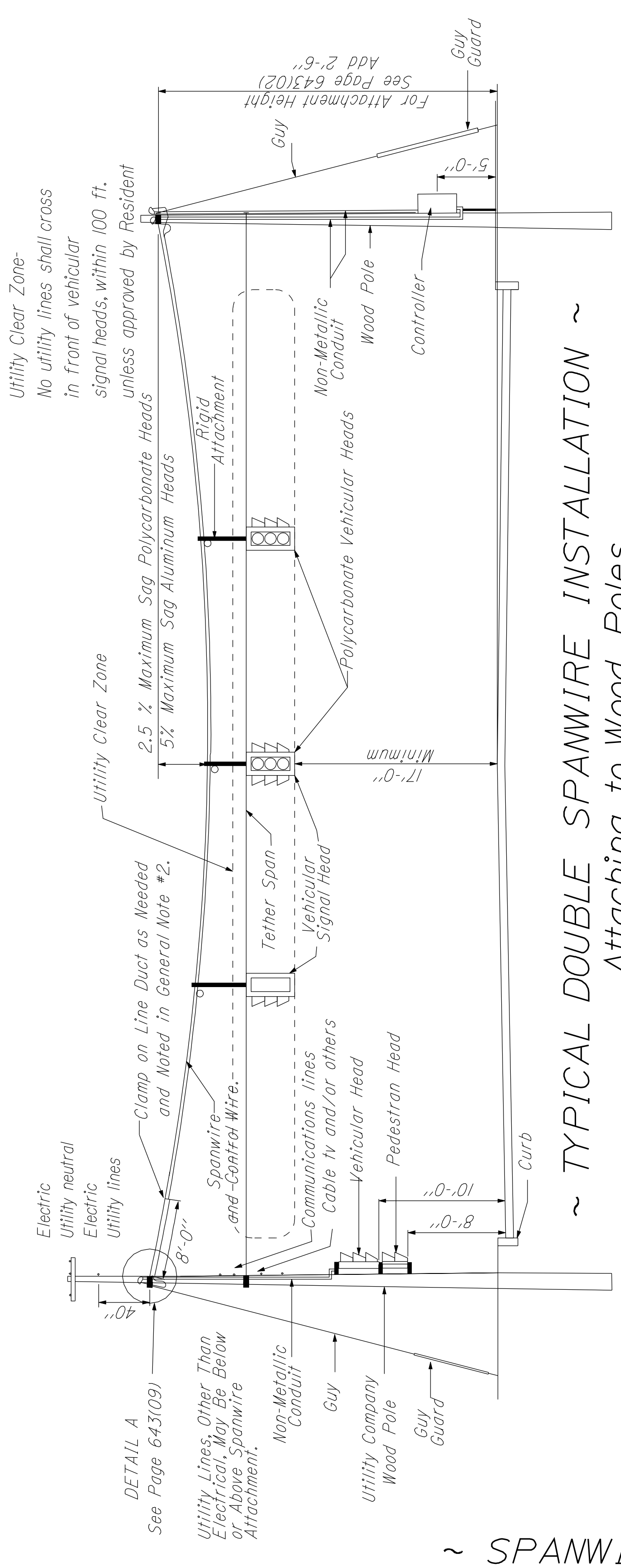
	8" Rise	6" Rise
①	8"	6"
②	7 1/8"	5 7/8"
③	15 13/16"	13 1/4"

~ SECTION A-A ~

Note:
All exposed surfaces, except treads shall be given a rubbed finish in accordance with subsection 502.14(d)2. Treads shall be given a broomed finish.

CAST IN PLACE REINFORCED CONCRETE STEPS

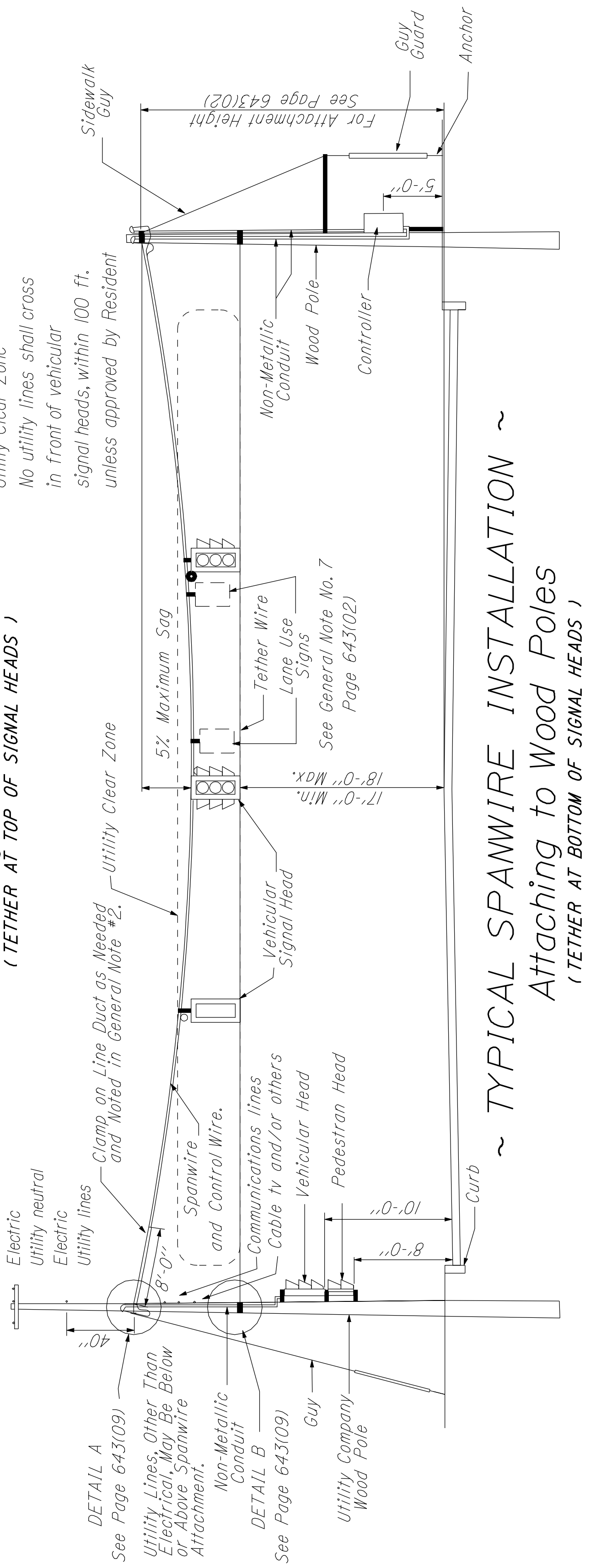
642(02)



~ TYPICAL DOUBLE SPANWIRE INSTALLATION ~

Attaching to Wood Poles

(TETHER AT TOP OF SIGNAL HEADS)



~ TYPICAL SPANWIRE INSTALLATION ~

Attaching to Wood Poles

(TETHER AT BOTTOM OF SIGNAL HEADS)

~ SPANWIRE ~

TRAFFIC SIGNALS

643(01)

~ HEIGHT OF SPANWIRE ATTACHMENT ~

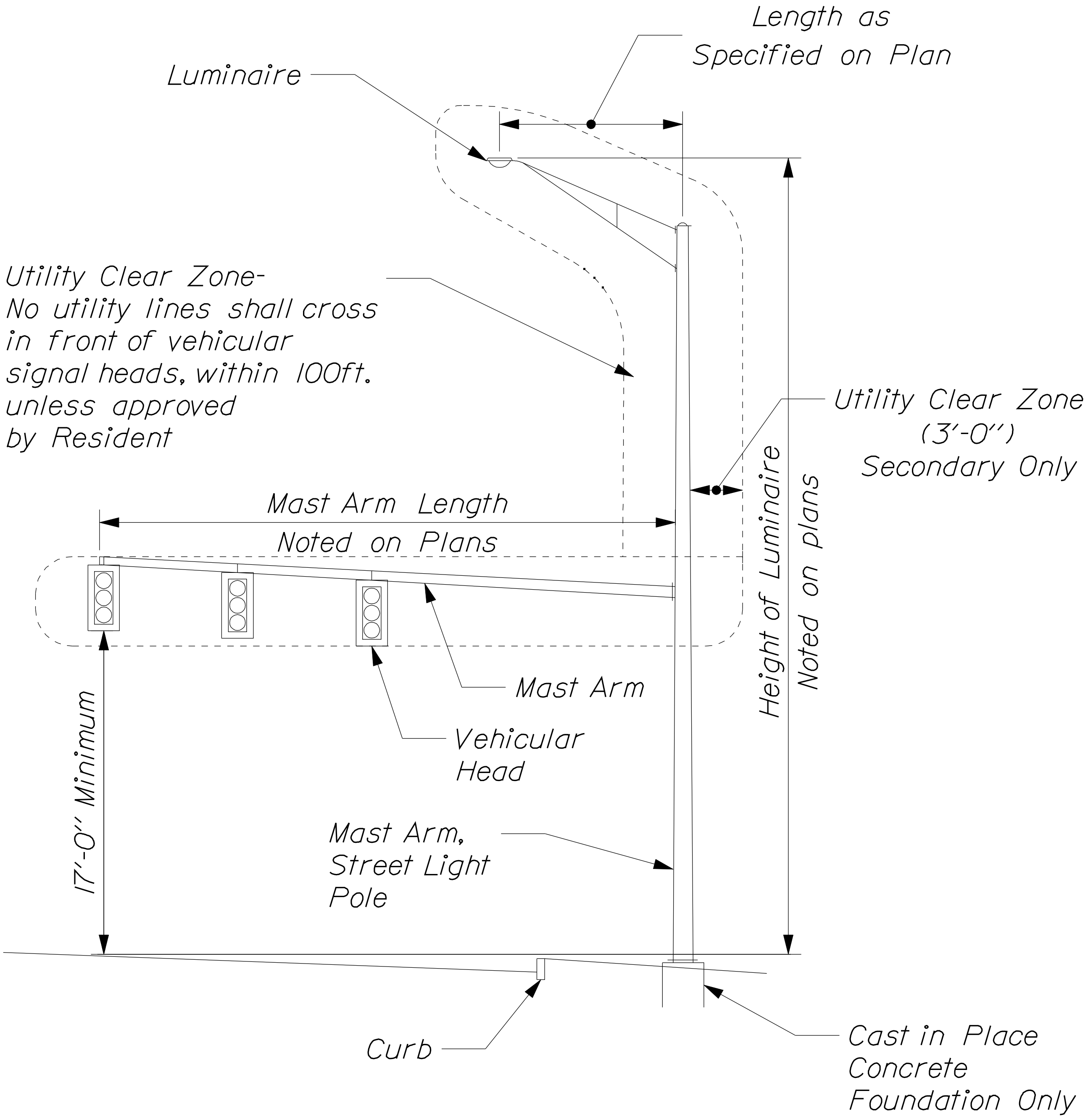
HORIZONTAL SPAN WIDTH	HEIGHT OF SPANWIRE ATTACHMENT- 5% Sag Aluminum Heads	HEIGHT OF TOP ATTACHMENT- 2.5% Sag DOUBLE SPANWIRE Polycarbonate Heads
Up to 38′	23′-0″	24′-4″
40′	23′-6″	24′-6″
45′	23′-9″	
50′	24′-0″	24′-9″
55′	24′-3″	
60′	24′-6″	25′-0″
65′	24′-9″	
70′	25′-0″	25′-3″
75′	25′-3″	
80′	25′-6″	25′-6″
85′	25′-9″	
90′	26′-0″	25′-9″
95′	26′-3″	
100′	26′-6″	26′-0″
105′	26′-9″	
110′	27′-0″	26′-3″
115′	27′-3″	
120′	27′-6″	26′-6″
125′	27′-9″	
130′	28′-0″	26′-9″
135′	28′-3″	
140′	28′-6″	27′-0″
145′	28′-9″	
150′	29′-0″	27′-3″
155′	29′-3″	
160′	29′-6″	27′-6″
165′	29′-9″	

~ GENERAL NOTES for TRAFFIC SIGNAL SPANWIRE ~

1. Height of Spanwire attachment is shown on chart above. When attaching to utility company owned poles, the Contractor shall check with respective utility companies to determine if all adjustments have been made.
2. When utility pole clearances cannot be met, the signal Spanwire shall be protected by schedule 40 line duct.
3. The utility companies shall be responsible for avoiding the Traffic Signal Clear Zone as shown below. At the Pre-construction Utility Meeting, conflicts, if any, will be resolved.
4. Conduits installed on utility company owned poles will be installed by the respective utility. The conduit will be provided by the signal Contractor.
5. Utilities will be no lower than 19 feet at mid span.
6. The location of all signal equipment and related items shall be in conformity with 'Americans with Disabilities Act' (ADA) accessibility standards. Use of sidewalks and pedestrian ramps shall not be obstructed.
7. Lane use shall be hung using "Pelco" assembly part no. SE-5111 or equal. Vehicular heads shall be hung using 'Pelco' assembly part no. SE-5024 or SE-5073, or equal.

SPANWIRE
TRAFFIC SIGNALS

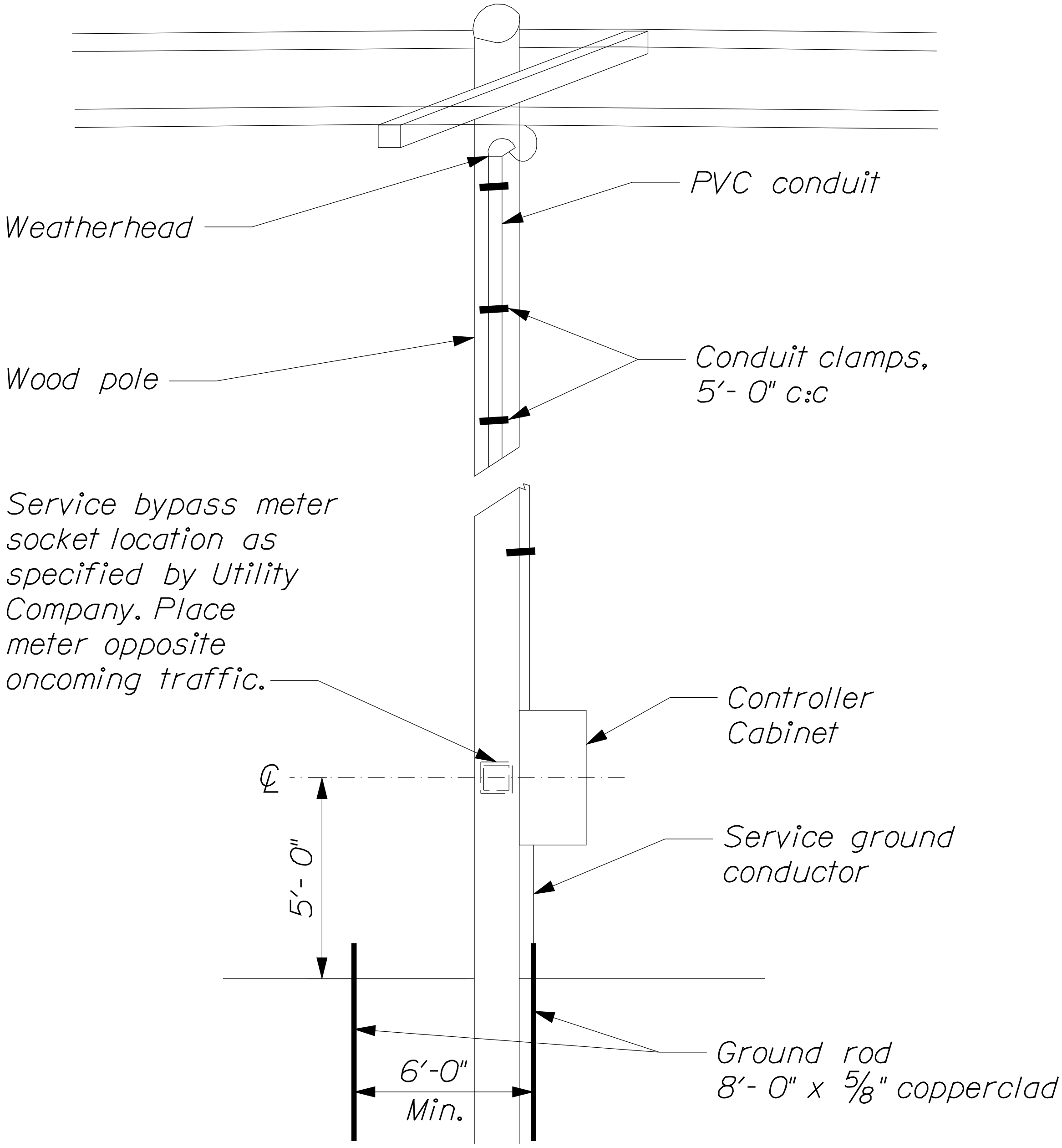
643(02)



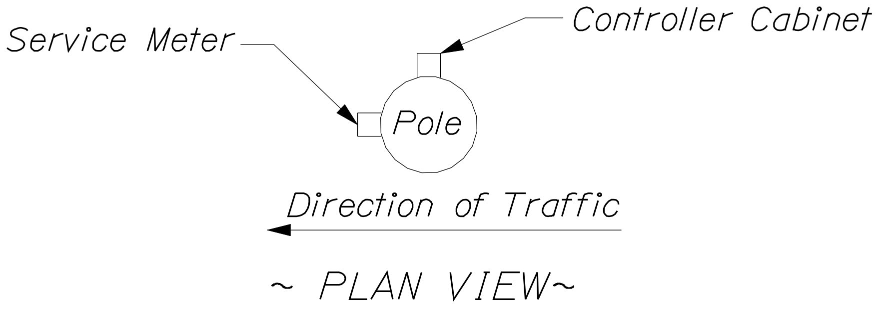
~ TYPICAL MAST ARM, STREET LIGHT INSTALLATION ~

TRAFFIC SIGNALS

643(03)



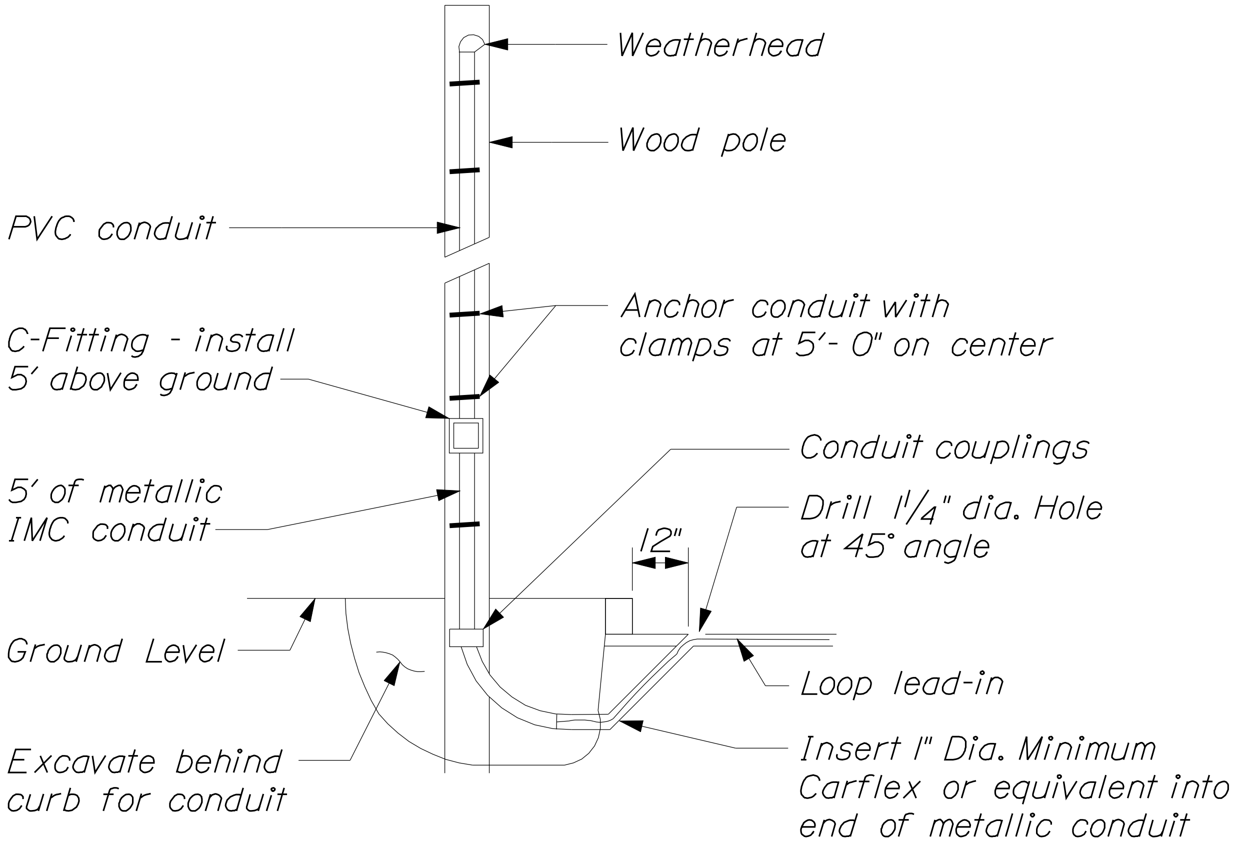
~ SERVICE CONNECTION ~



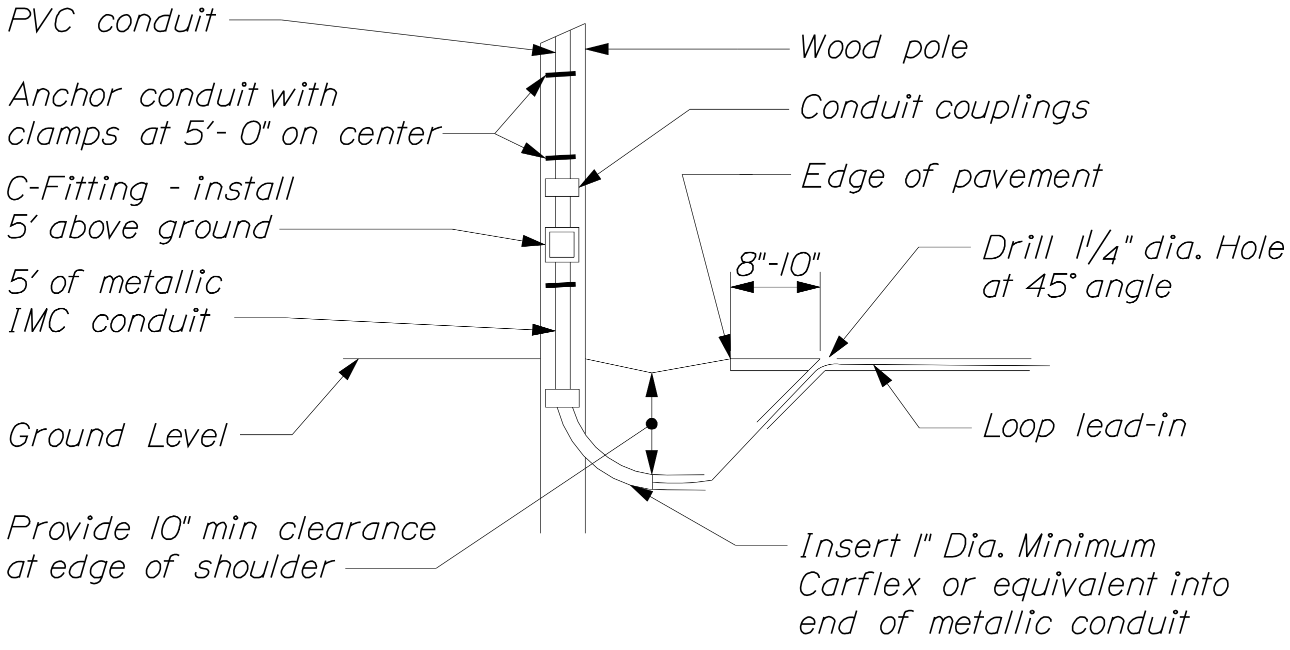
~ PLAN VIEW~

TRAFFIC SIGNALS

643(04)



~ CURB SECTION ~



~ SHOULDER SECTION ~

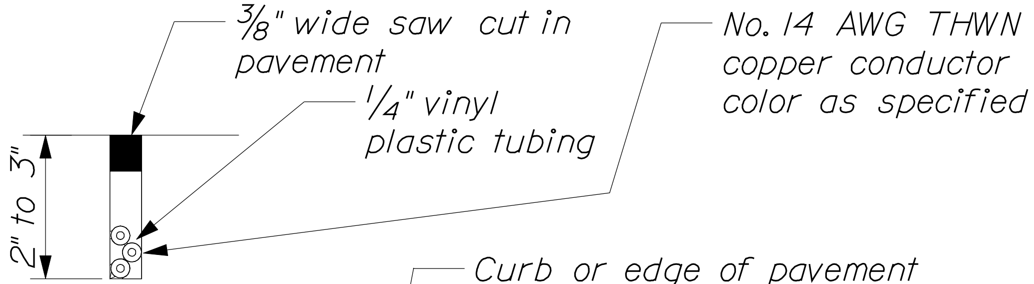
~ DETECTOR LEAD-IN INSTALLATION ~

TRAFFIC SIGNALS

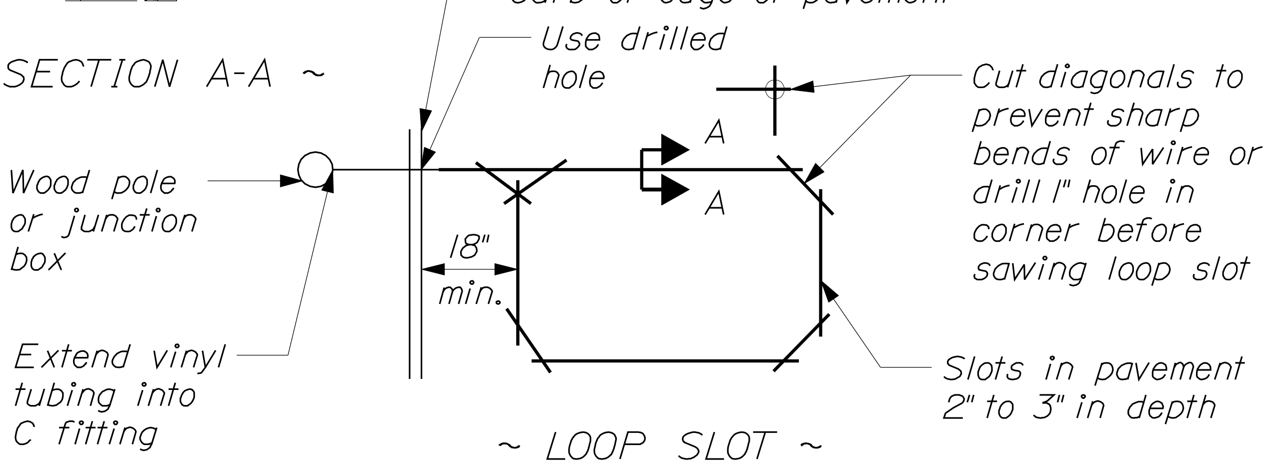
643(05)

NOTES:

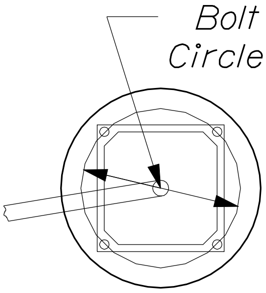
Location and configuration of loops are subject to approval of the Resident in the field. Number of turns of wire in loops and number of loops per amplifier shall be in accordance with the manufacturer's recommendations. Loop slots shall be filled with an approved two-component epoxy embedding sealer.



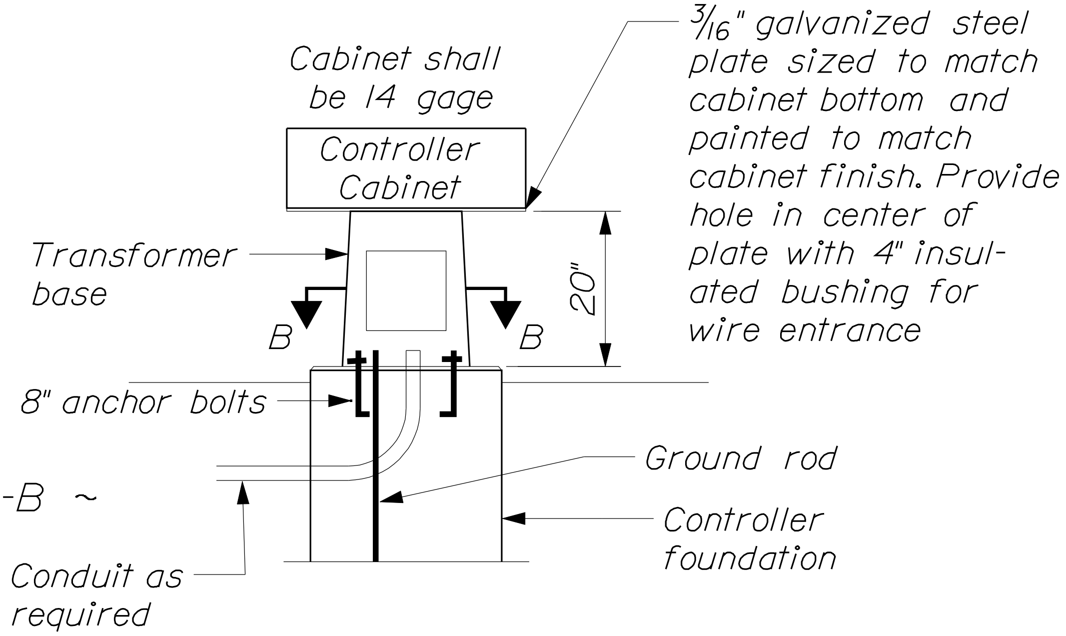
~ SECTION A-A ~



~ LOOP SLOT ~



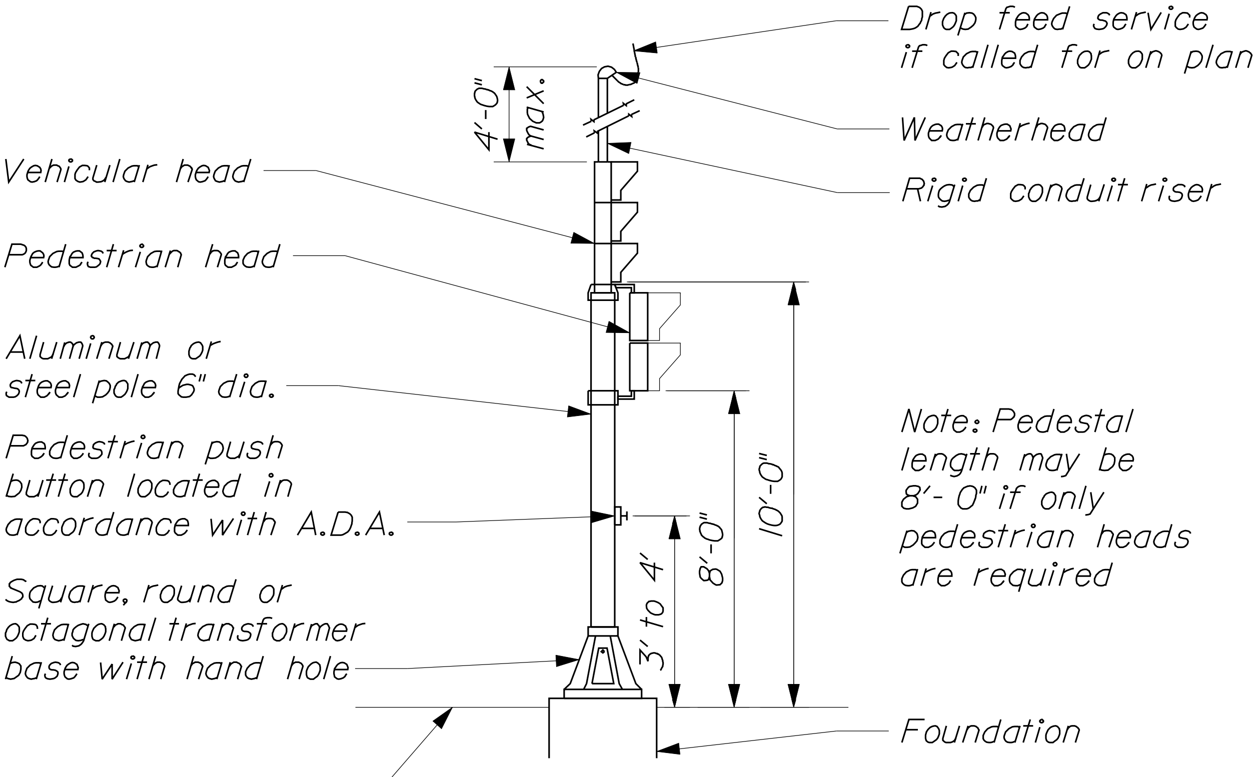
~ SECTION B-B ~



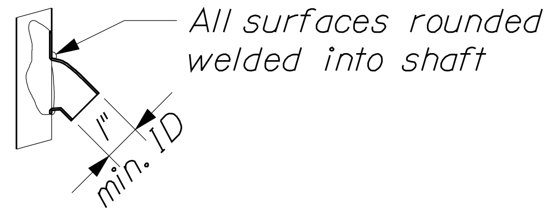
~ GROUND MOUNTED CONTROLLER ~

TRAFFIC SIGNALS

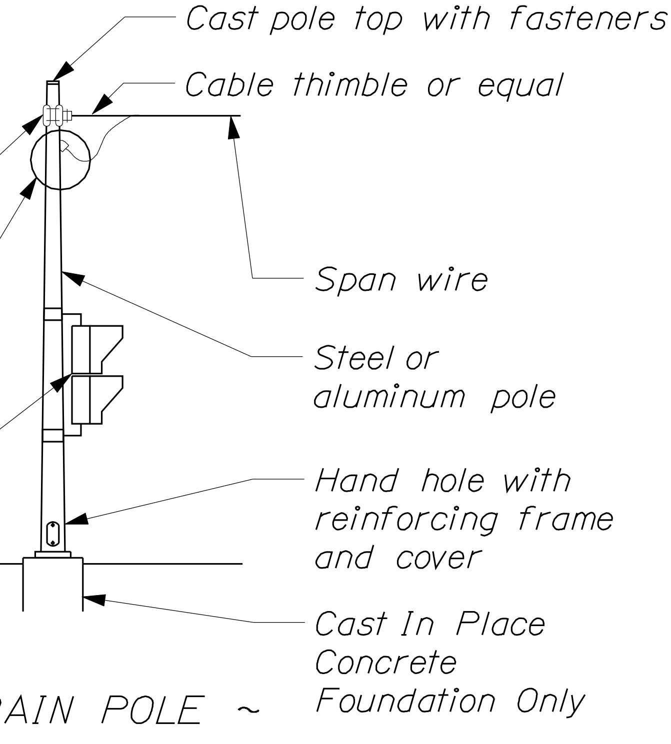
643(06)



~ PEDESTAL POLE ~



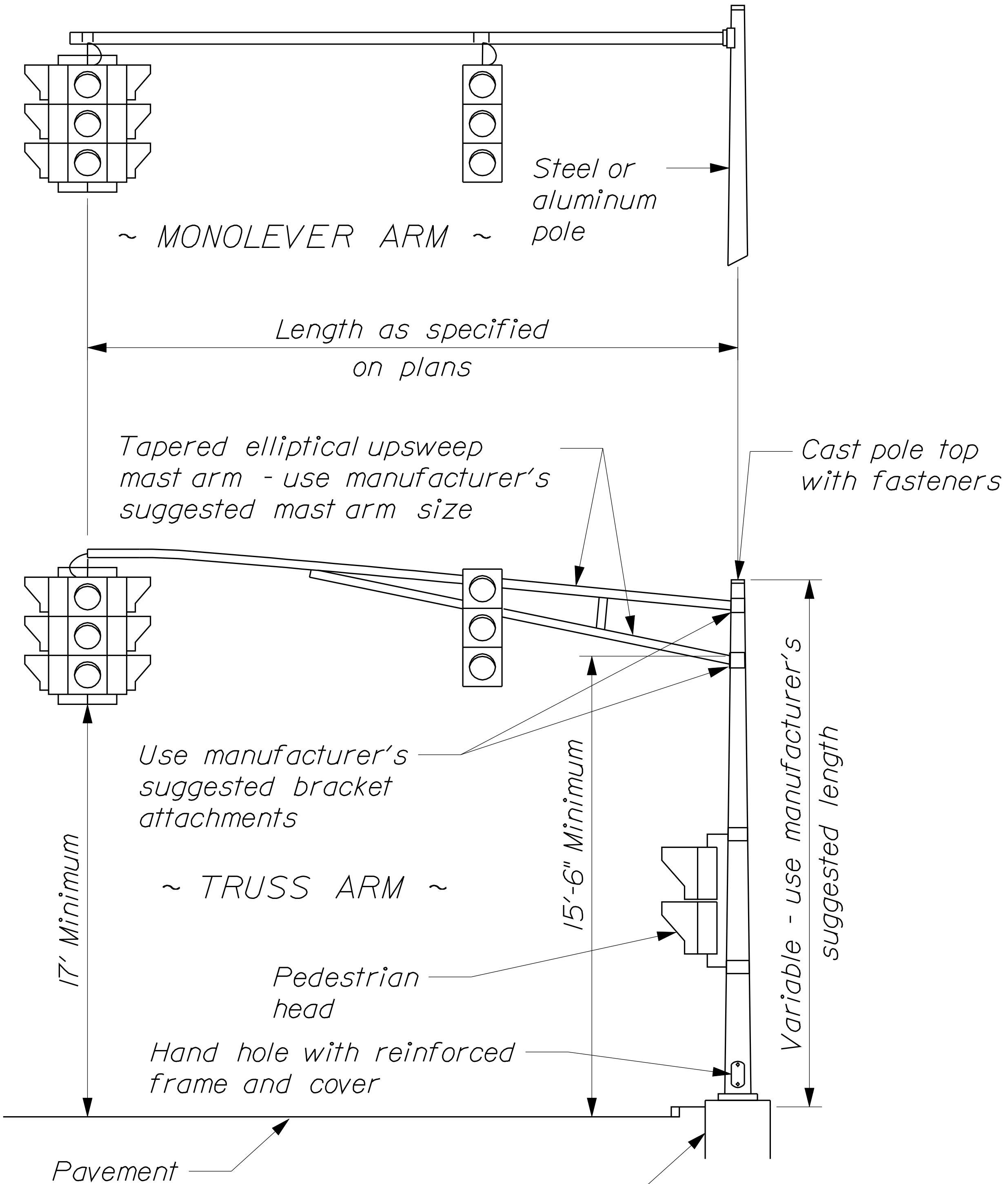
DETAIL "A"



~ STRAIN POLE ~

TRAFFIC SIGNALS

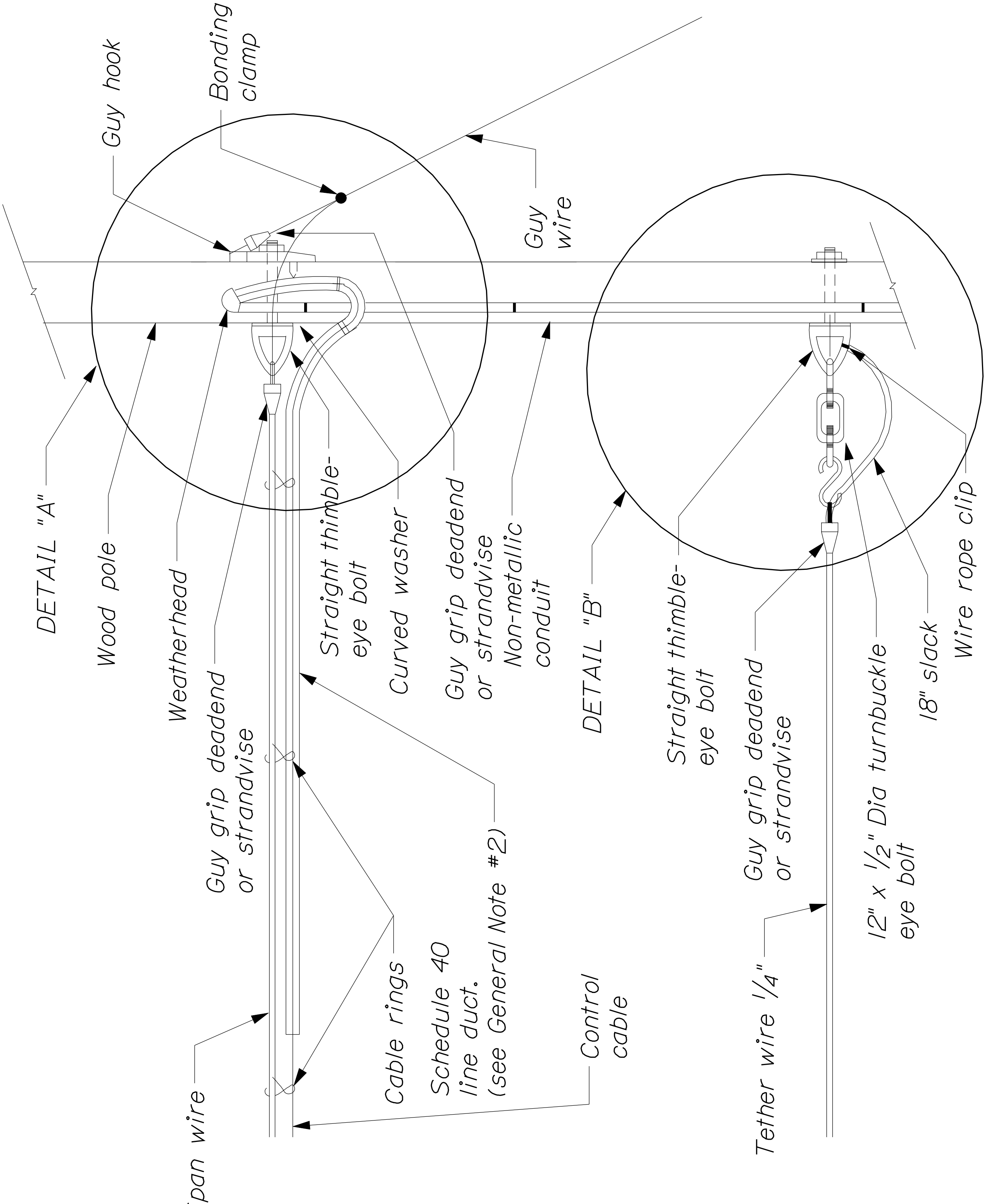
643(07)



~ MAST ARM POLES ~

TRAFFIC SIGNALS

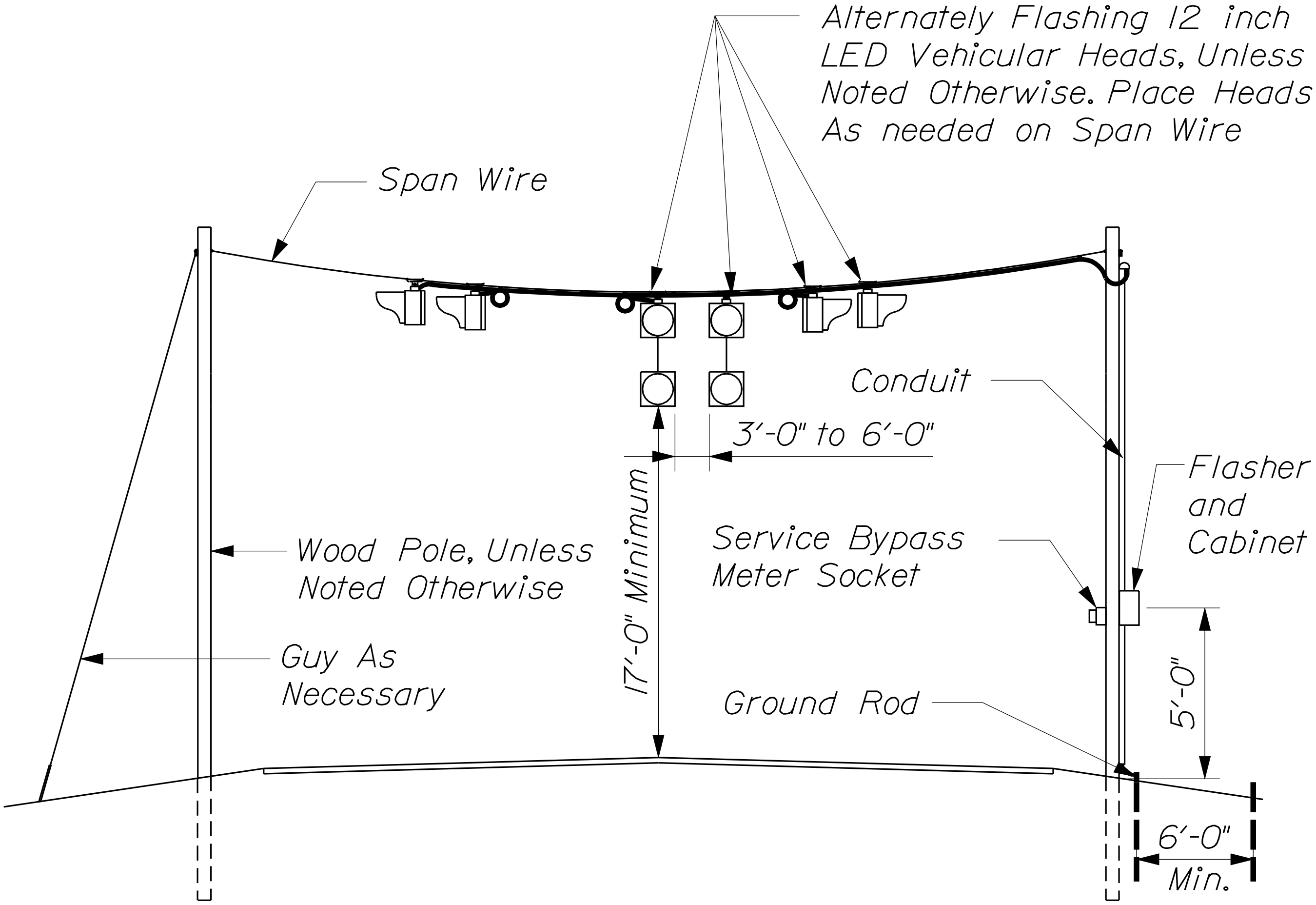
643(08)



~ TYPICAL SPANWIRE INSTALLATION ~
Attaching to Wood Poles

TRAFFIC SIGNALS

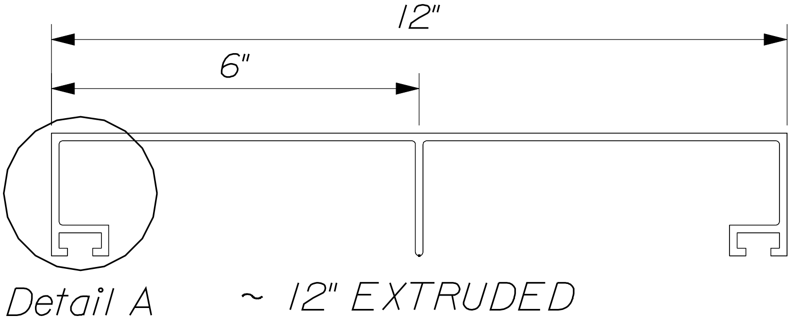
643(09)



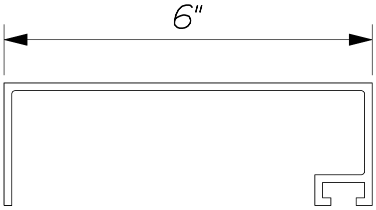
NOTE:
All work shall conform to applicable portions of The Standard Specifications and The Standard Details.

~ TYPICAL FLASHING BEACON INSTALLATION ~
ITEM NO. 643.60

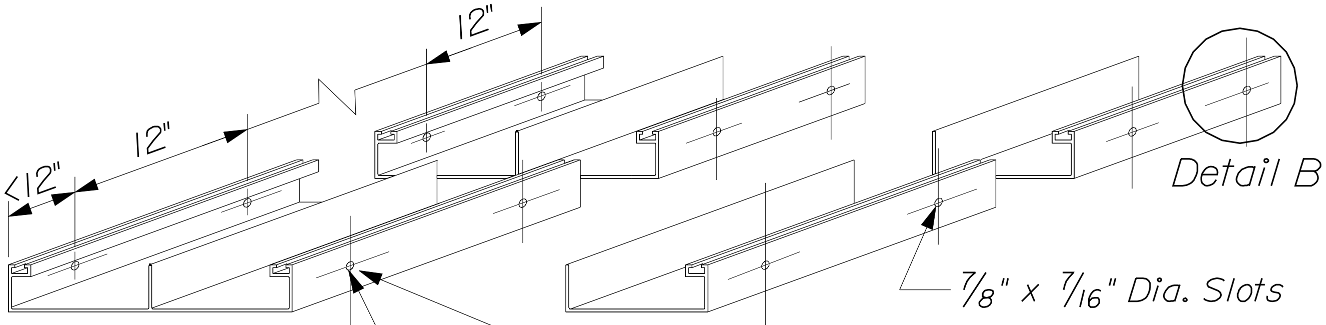
# TRAFFIC SIGNALS
643(10)



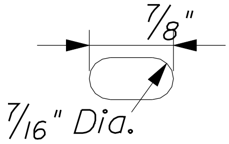
~ 12" EXTRUDED ALUMINUM PLANK ~



~ 6" EXTRUDED ALUMINUM PLANK ~

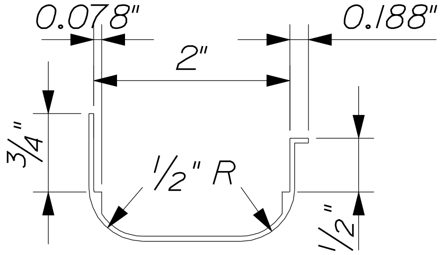


Attach Planks Together With 3/8" x 3/4" Bolts, Nuts, and Washers, 12" C:C

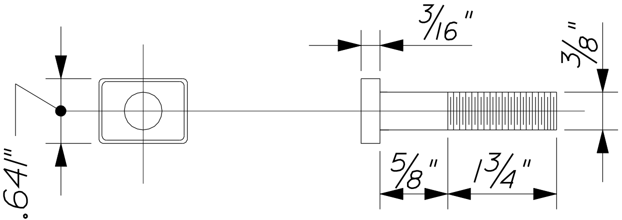


~ DETAIL - B ~

~ BOLT HOLE PUNCHING PLAN FOR EXTRUDED ALUMINUM PLANKS ~

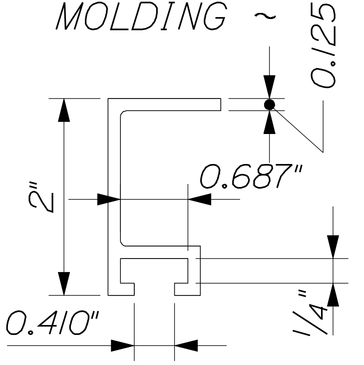


~ SIDE TRIM MOLDING ~

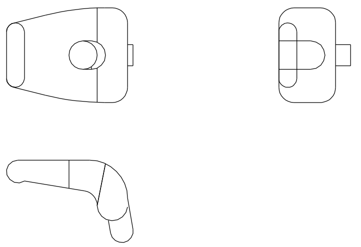


Post clip bolts shall be stainless steel on all overhead signs

~ POST CLIP BOLT ~



~ DETAIL - A ~

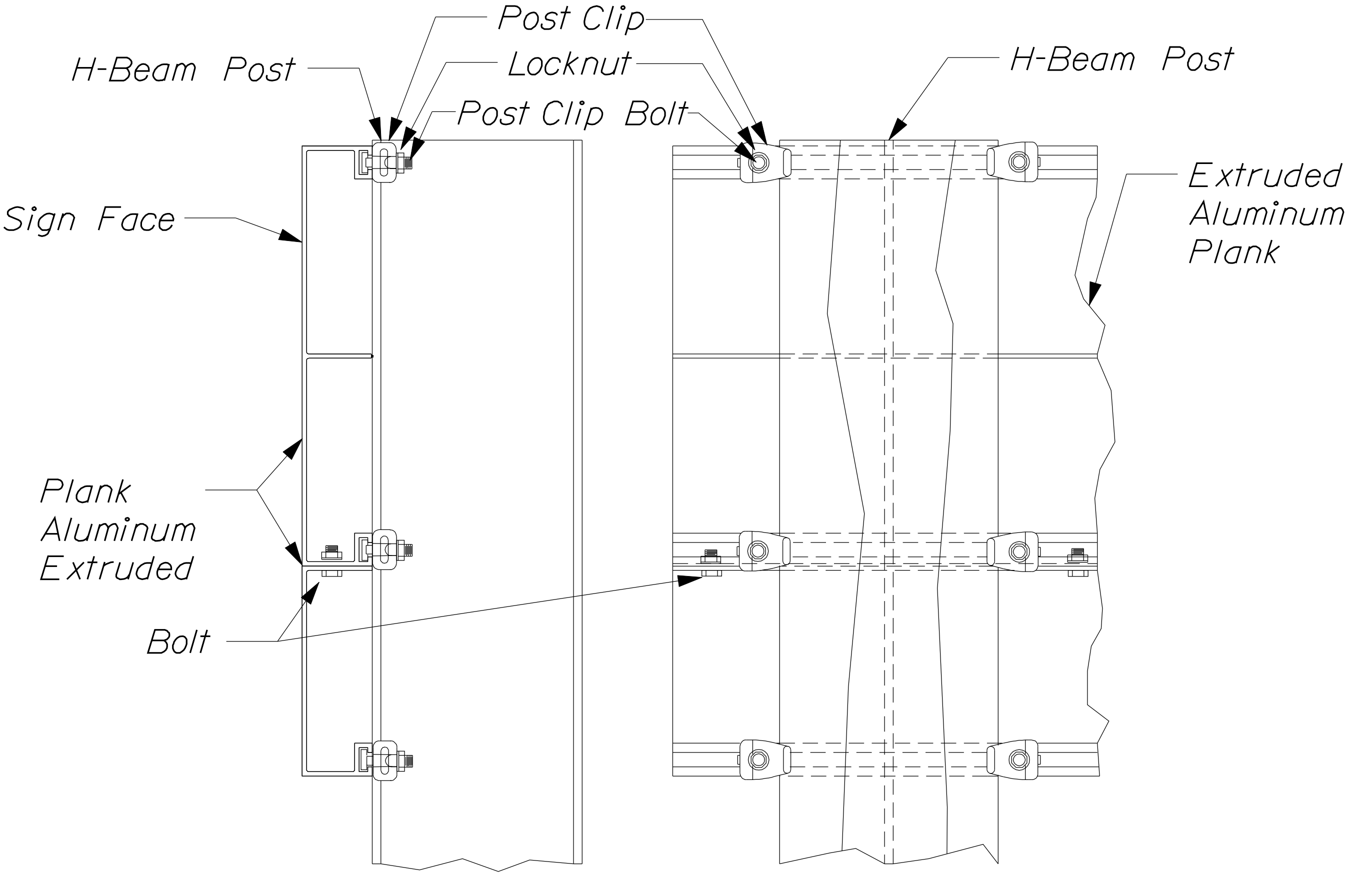


~ POST CLIP ~

ITEM NO. 645.251

TYPE I SIGNS
HIGHWAY SIGNING

645(01)

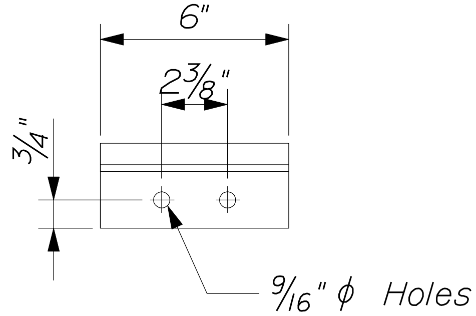


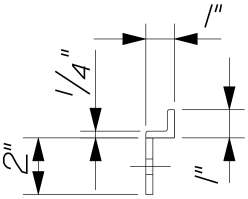
~ ATTACHMENT OF EXTRUDED ALUMINUM PLANKS TO H-BEAM POSTS ~

ITEM NO. 645.251

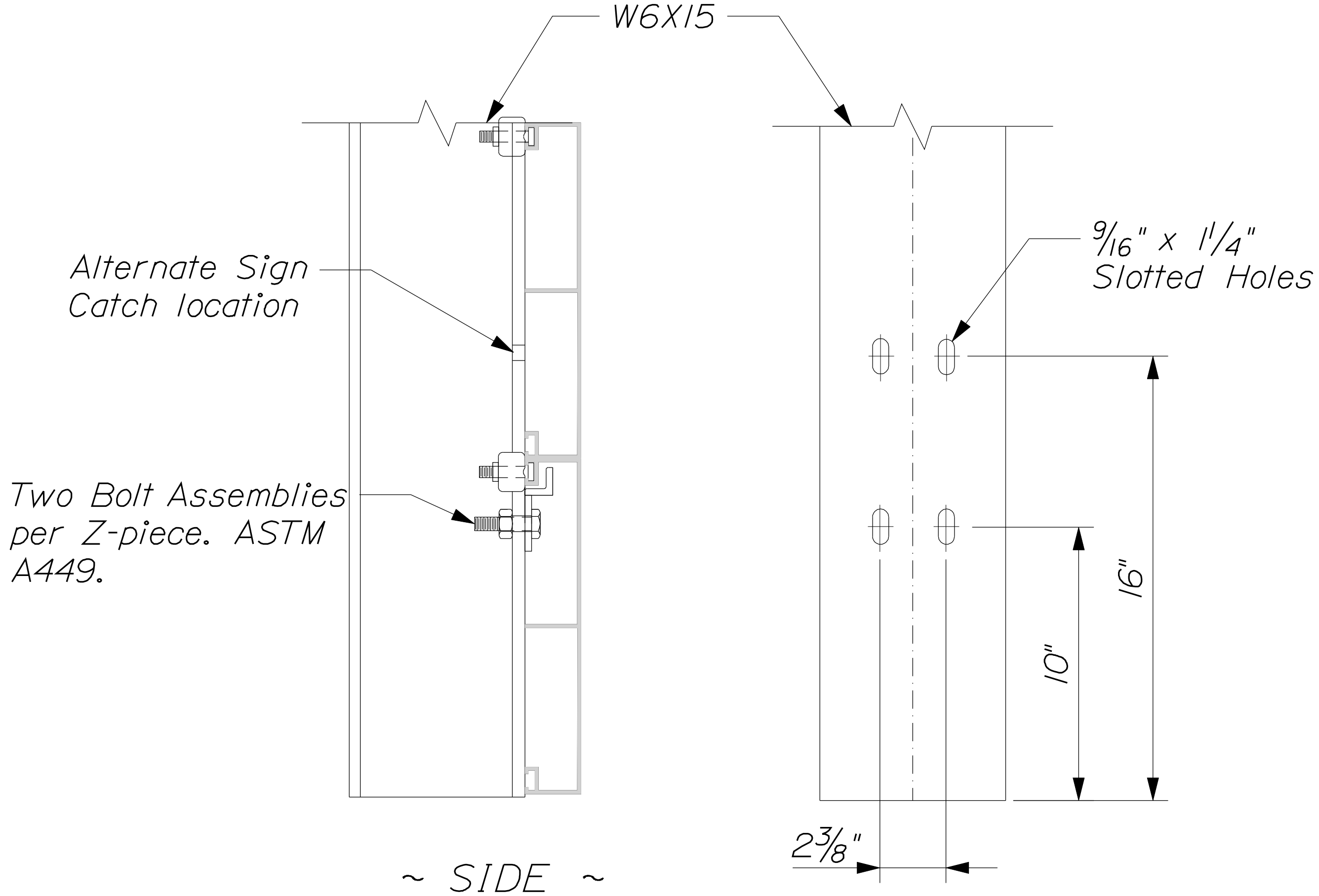
TYPE I SIGNS
HIGHWAY SIGNING

645(02)





Shipped location
of Z-piece, one per
W-shape



~ SIDE ~

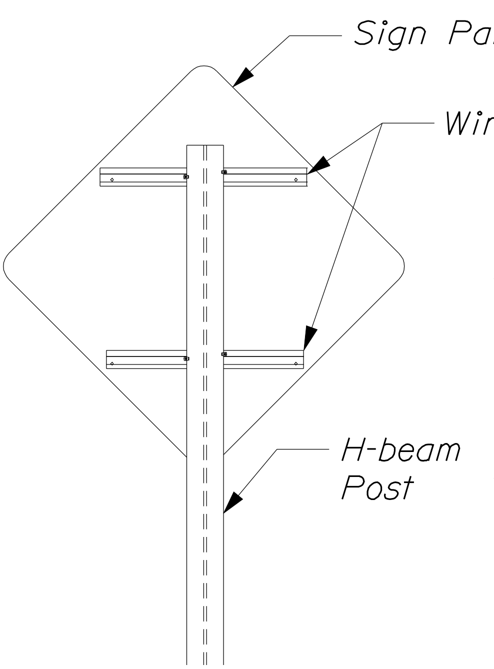
Z-Piece may be fabricated.

~ FRONT ~

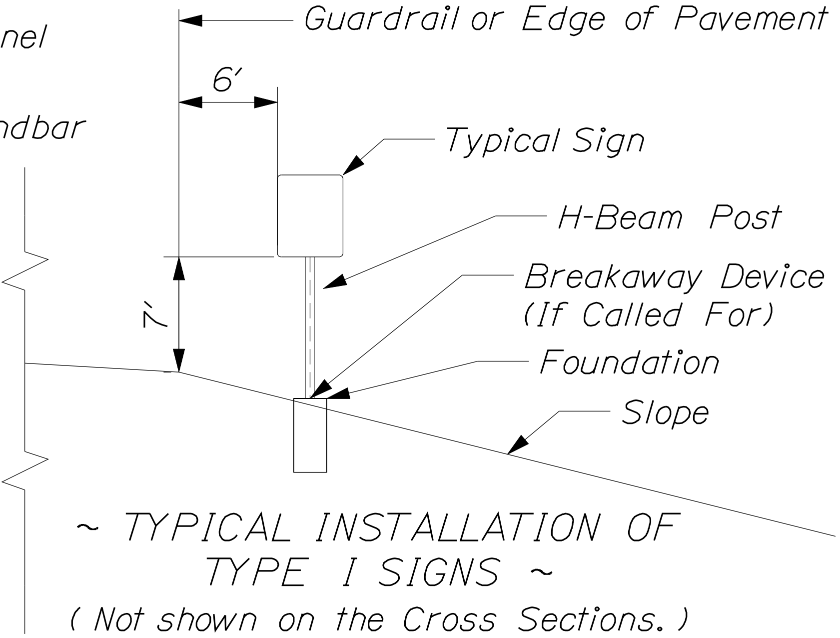
~ SIGN CHECK ~
INSTALL ON ALL OVERHEAD SIGNS

ATTACHMENT OF EXTRUDED ALUMINUM PLANKS TO
OVERHEAD, CANTILEVER AND OVERPASS SIGN SUPPORT STRUCTURES

# A Portion ITEM NUMBERS. 645.12, 645.13, 645.15
# HIGHWAY SIGNING
645(03)

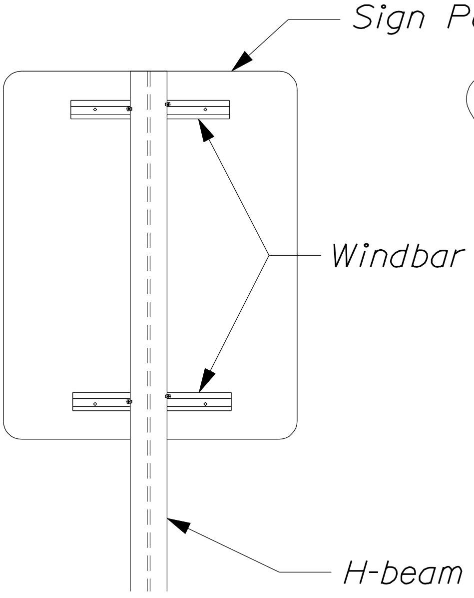


~ BACK ~

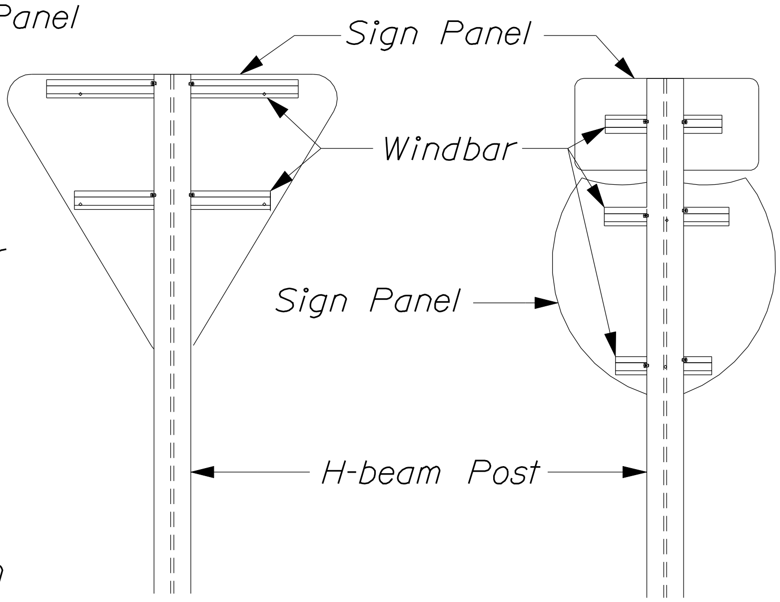


~ TYPICAL INSTALLATION OF TYPE I SIGNS ~

(Not shown on the Cross Sections.)



~ BACK ~



~ BACK ~ ~ BACK ~

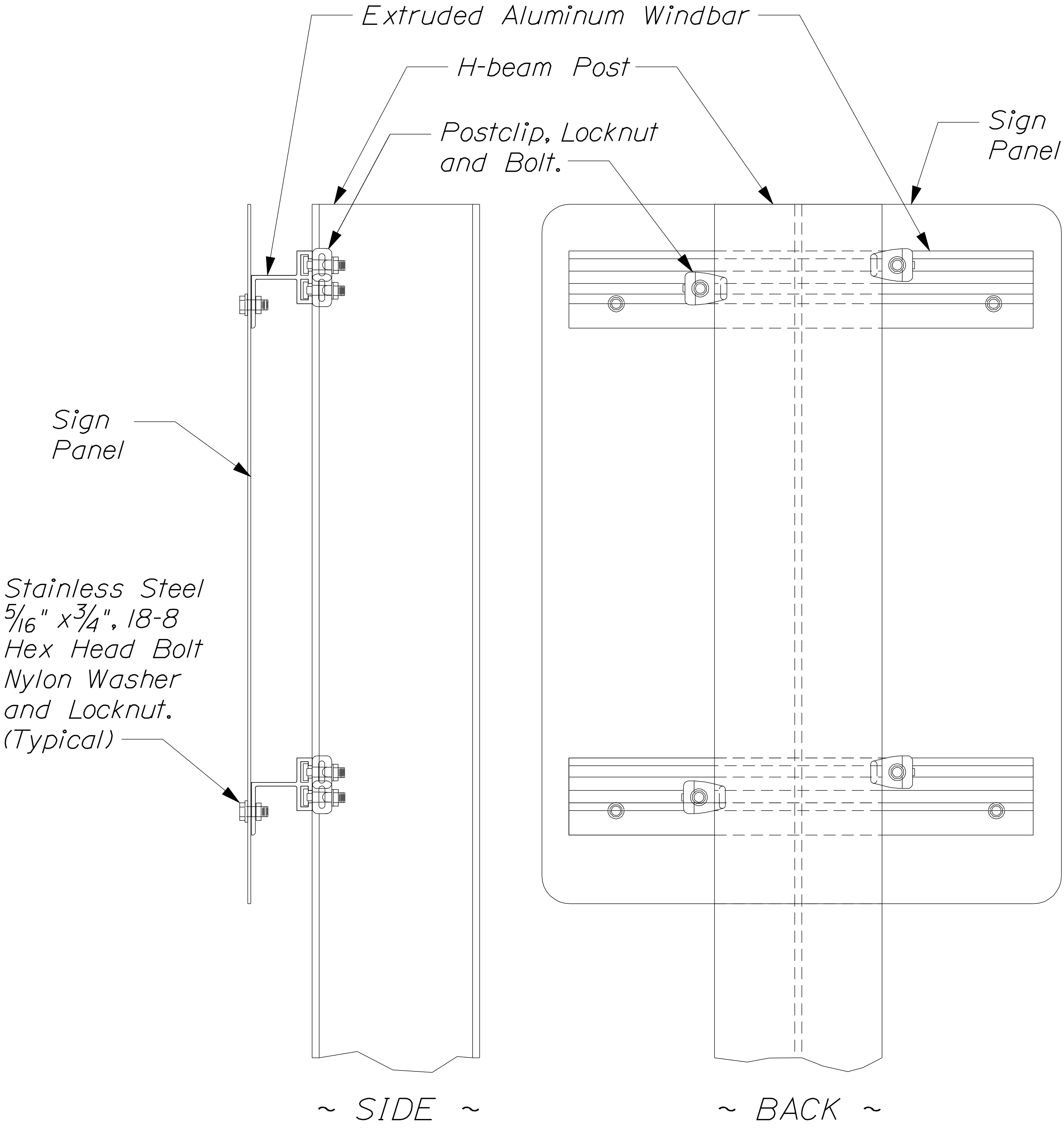
NOTE:
Bolt holes in sign panels shall be located as shown in "Standard Highway Signs".

ATTACHMENT OF SIGNS, REGULATORY, WARNING, AND ROUTE MARKER ASSEMBLY SIGNS, TYPE I TO H-BEAM POSTS

ITEM NO. 645.271

HIGHWAY SIGNING

645(04)



ATTACHMENT OF SIGNS, REGULATORY, WARNING, AND ROUTE MARKER ASSEMBLY SIGNS, TYPE I TO H-BEAM POSTS

ITEM NO. 645.271

HIGHWAY SIGNING

645(05)

STANDARD H-BEAM POSTS for TYPE I SIGNS

SINGLE SUPPORT SIGNS

Foundation Size	Sign Area (A)	Sign Width (W)	Post Size	Base Plate Size (2), (3)	Material	Anchor Bolts (1)	Bolt Circle	Maximum Mounting Height
N/A	0 - 10 ft^2	Use Wood Posts	See Note #8	N/A	A36	N/A	N/A	12 Ft to Center of Sign
1'-6"	10 < A ≤ 16 ft^2	W = 4'- 0" Max. But includes 5'- 0" Yield Sign	W6x9	12"x12"x1" 41 LB		1" DIA x 3' - 0"	12"	
1'-6"	16 < A ≤ 25 ft^2	W = 5'- 0" Max.	W6x15	12"x12"x1" 41 LB		1" DIA x 3' - 0"	12"	
2'-0"	25 < A ≤ 42 ft^2	W = 7'- 0" Max.	W8x24	14'x14"x1" 55 LB		1 1/4"DIA x 3' - 6"	14"	

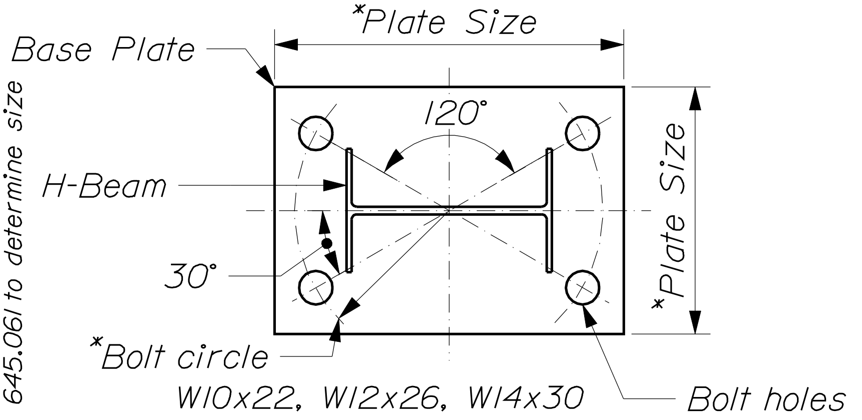
MULTIPLE SUPPORT SIGNS

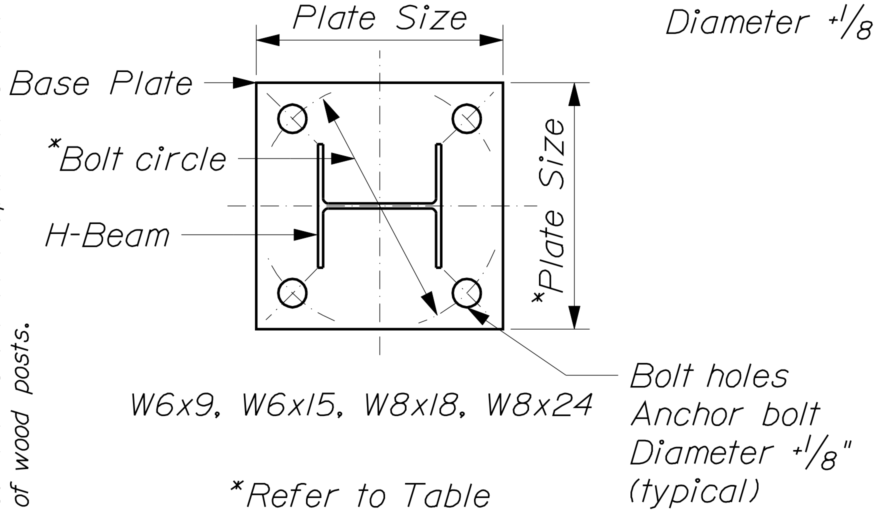
Foundation Size	Sign Area (A)	Sign Width (W)	Post Size	Base Plate Size (2), (3)	Material	Anchor Bolts (1)	Bolt Circle	Maximum Mounting Height
2'-0"	To 60 ft^2/Post	Varible	W8x18	14'x14"x1" 55 LB	A36	1 1/4"DIA x 3' - 6"	14"	20 Ft to Center of Sign
2'-0"	60 - 85 ft^2/Post		W10x22	12"x17"x1 1/4" 72LB		1 1/4"DIA x 3' - 6"	15"	
2'-6"	85 - 110 ft^2/Post		W12x26	13'"x19"x1 1/4" 87 LB		1 1/2" DIA x 4'- 0"	15"	
2'-6"	110 - 135 ft^2/Post		W14x30	14"x21"x1 1/4" 104 LB		1 1/2" DIA x 4'- 0"	19"	

NOTES:

1. Bolts to be 50,000 PSI minimum yield strength.
2. Post to base plate weld shall be 5/16" fillet weld.
3. Base plates and H-Beams shall be hot dipped galvanized after fabrication in accordance with section 720.06.
4. Payment for the weight of base plate shall be incidental to Item No. 645.289.
5. Posts to be equipped with breakaway devices shall have holes drilled or punched before galvanizing. Posts equipped with breakaway devices shall have the post size die stamped, before galvanizing, near the bottom end of beam.
6. W - Shapes utilized with Breakaway Devices shall be in strict conformance with ASTM A6, Table 16, A, Depth.
7. Anchors for use with breakaway devices shall be set for the deepest potential W-Shape, depth +1/8". Gaps between the post (W-Shape) and the breakaway device shall be filled with galvanized shims that have the same area and hole pattern as the breakaway device. The maximum difference between the breakaway device opening and beam depth, including shims, is 1/16". Shims will be incidental to the breakaway device.
8. Refer to Standard Specification section 645.061 to determine size of wood posts.

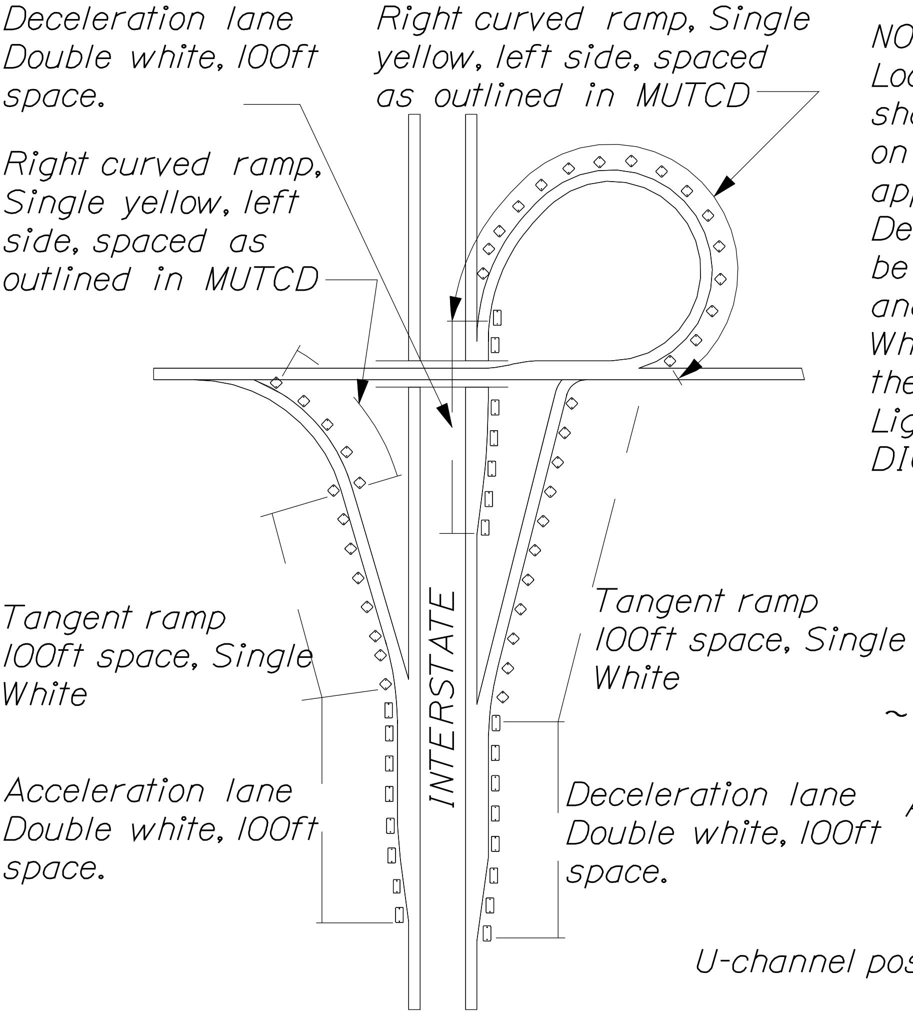
~ ANCHOR BOLT LAYOUT ~





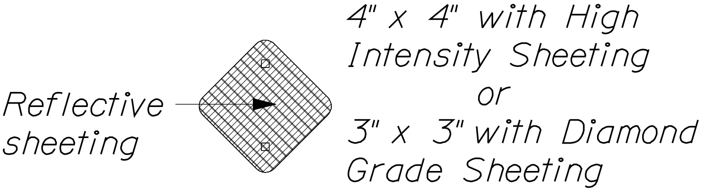
*Refer to Table

# H-BEAM POSTS
# HIGHWAY SIGNING
645(06)

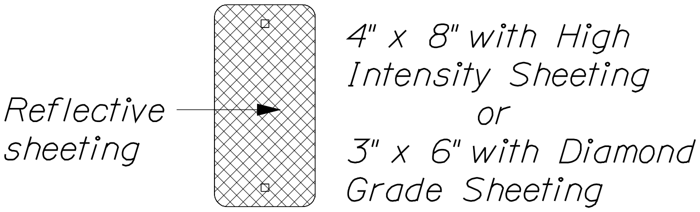


NOTE:
Locations of Delineators shall be 528 ft, 10/mile on mainline, subject to approval of the Resident. Delineators on ramps shall be placed as shown here and in the MUTCD.
When placing delineators in the area of any Highway Lighting, follow normal DIGSAFE procedures.

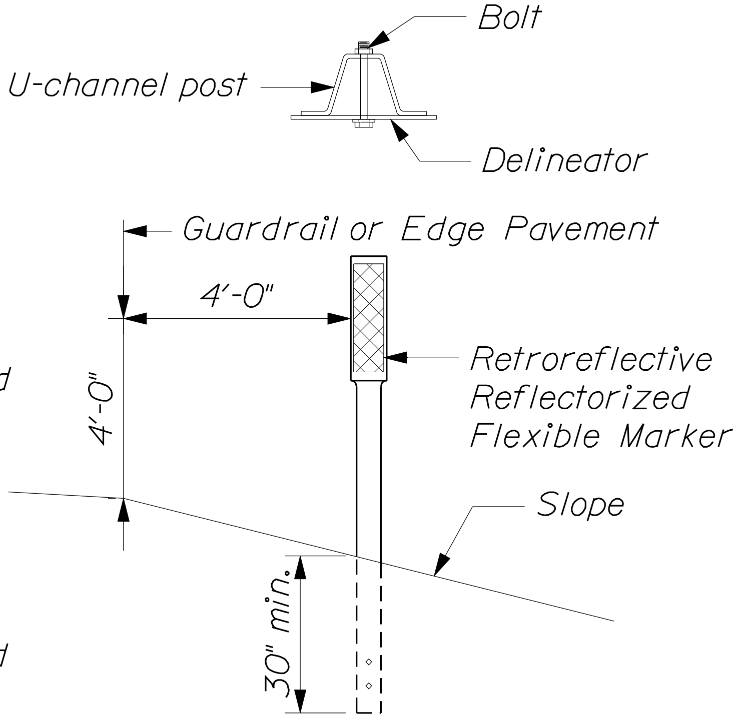
~ TYPICAL PLACEMENT OF DELINEATORS AT INTERCHANGES ~



~ SINGLE DELINEATOR ~



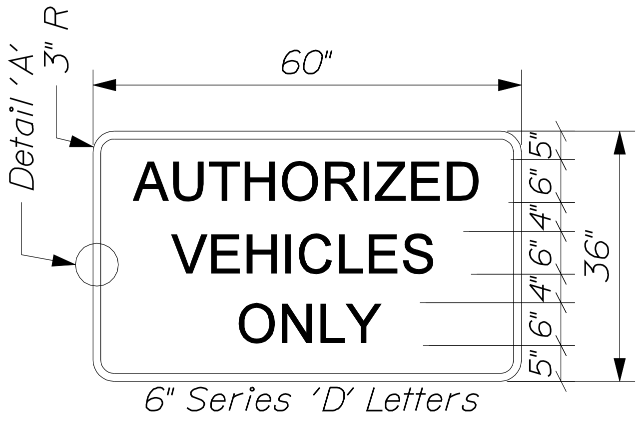
~ DOUBLE DELINEATOR ~



~ DELINEATORS ~

DELINEATORS
HIGHWAY SIGNING

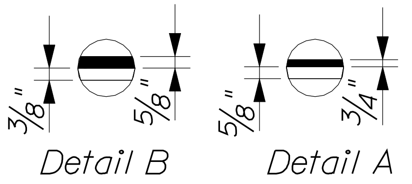
645(07)



White Background
Black Letters and
Legend

AVO

Borders



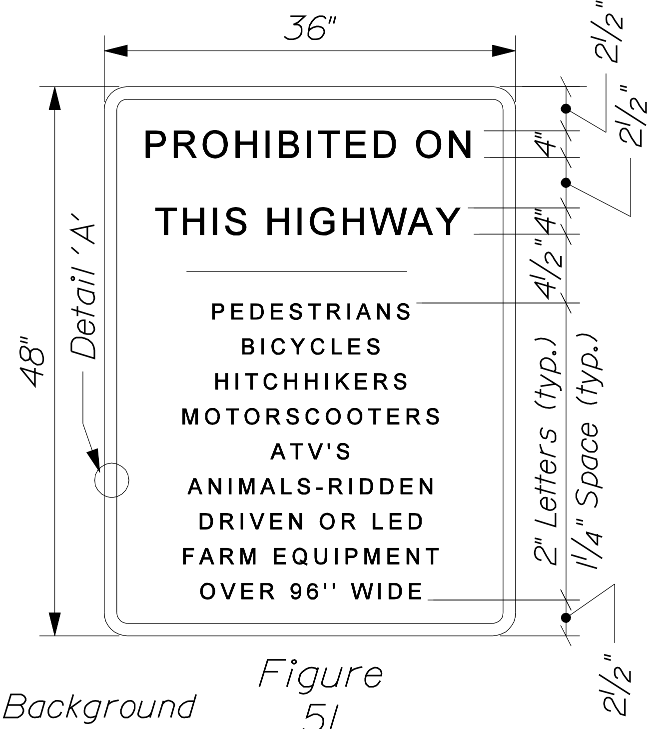
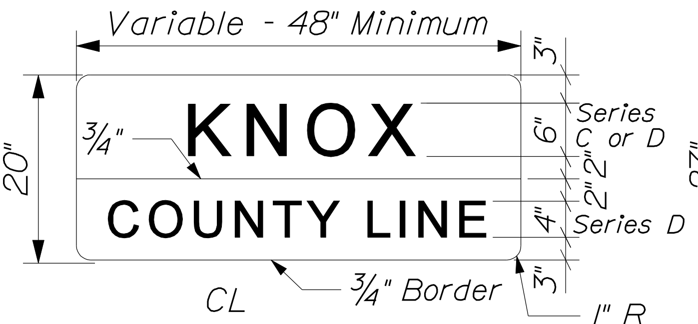
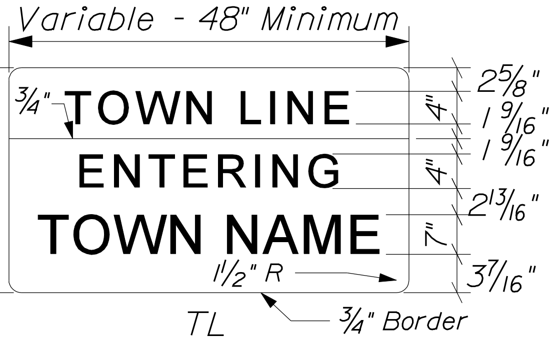


Figure
51

White Background
Black Letters and
Legend

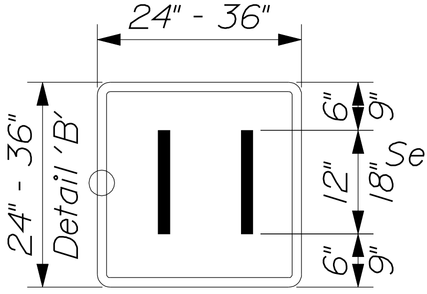


CL
COUNTY LINE SIGN



TL
TOWNLINE SIGN

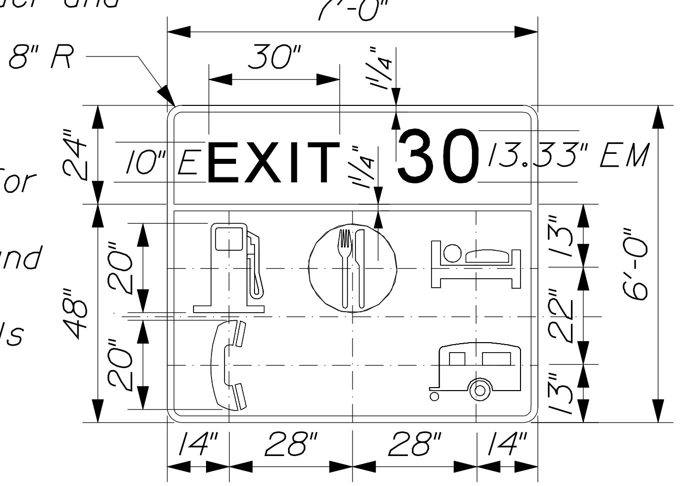
Green Background
White Border and
Legend



MI-5

Use Symbols for
24" Shields
Blue Background
White Legend,
Border, Symbols

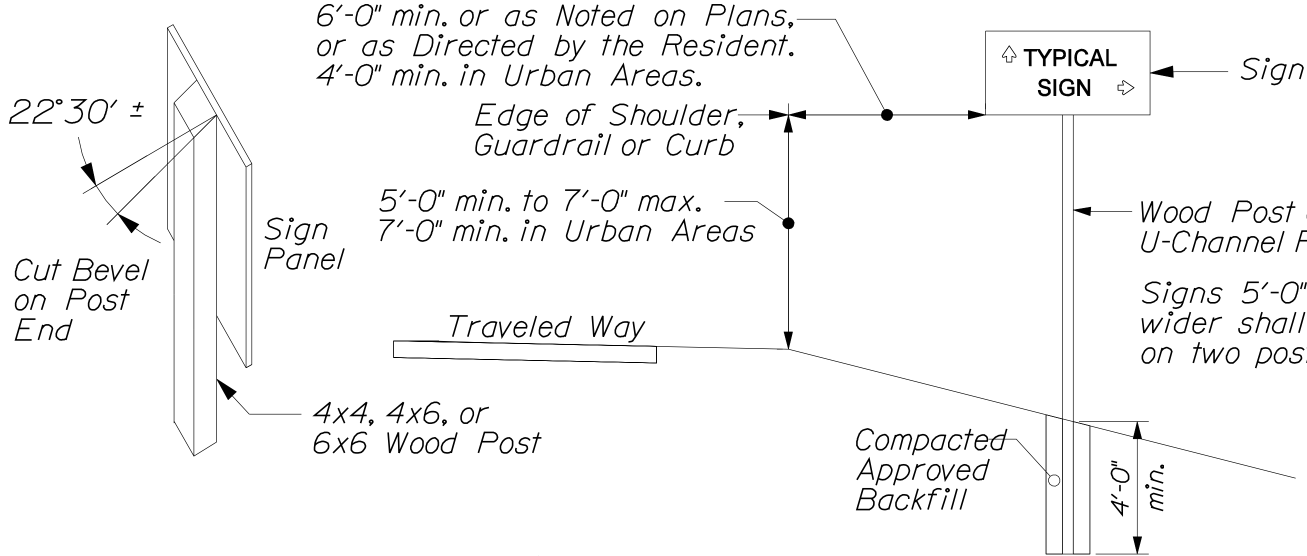
24" X 30" For 3 Digit Rte Number
36" X 45" For 3 Digit Rte Number
When Using MI-5 on Guide Signs
Omit the Border. White Background,
Black Legend and Border.



Services Sign
For Interstate

STATE OF MAINE SIGNS
HIGHWAY SIGNING

645(08)



~ TYPICAL TYPE II SIGNS ~

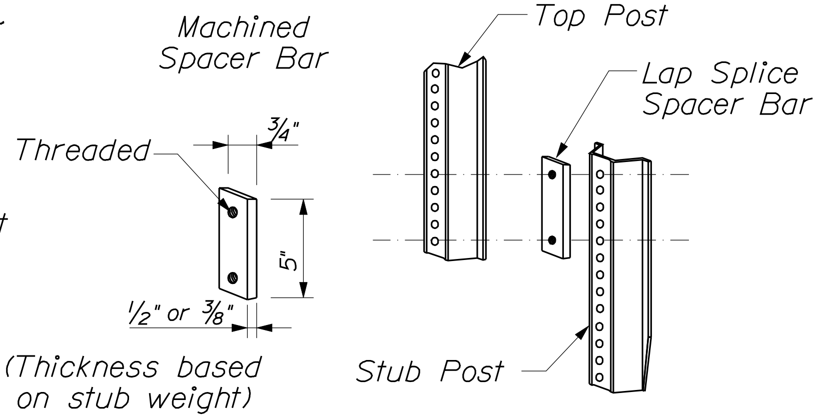
~ LAP SPLICE NOTES ~

1. Gold spacers (1/2 " thick) are coupled with 3, 4 or 5 lb/ft stub posts.

2. Silver spacers (3/8 " thick) are coupled with 2, 2½, or 2¾ lb/ft stub posts.

3. Secure grade 9 bolts with 20 foot pounds of torque.

4. Same weight posts and stubs leave a small gap between the spacer bar and post (this is acceptable according to the manufacturer).



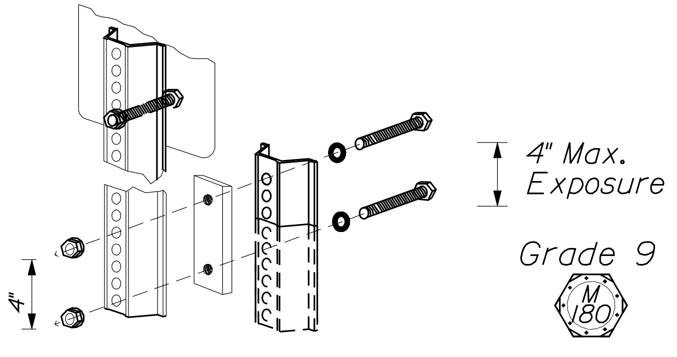
2 flat washers and self-locking hex nuts per post. A ¾" x 5" plated spacer bar shall be used per post. This spacer is to stiffen the connection.

~ INSTALLATION NOTES ~

1. Required- matching shaped u- channels. (weight per foot does not need to match)

2. Mount permanent signs that are wider than 30" (larger than 6.25 ft²) on wood posts.

3. Mount signs 5 feet (min.) Above pavement or curb (when present) in rural areas, 7 feet (min.) where parking is permitted within 200 feet of the sign (urban areas).

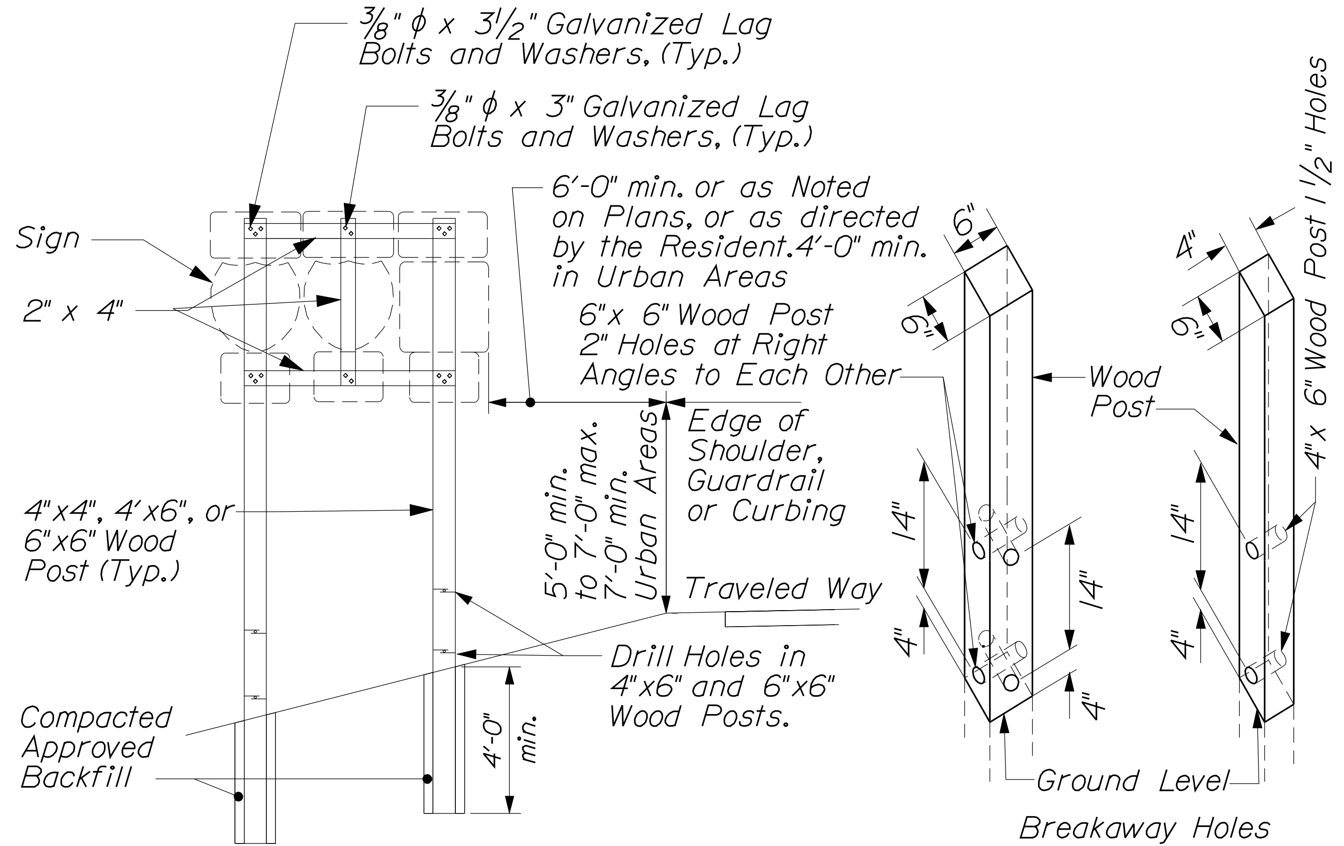


~ U-CHANNEL - LAP SPLICE ~
(Crash Worthy) Breakaway System

~ U-CHANNEL BREAK AWAYS ~

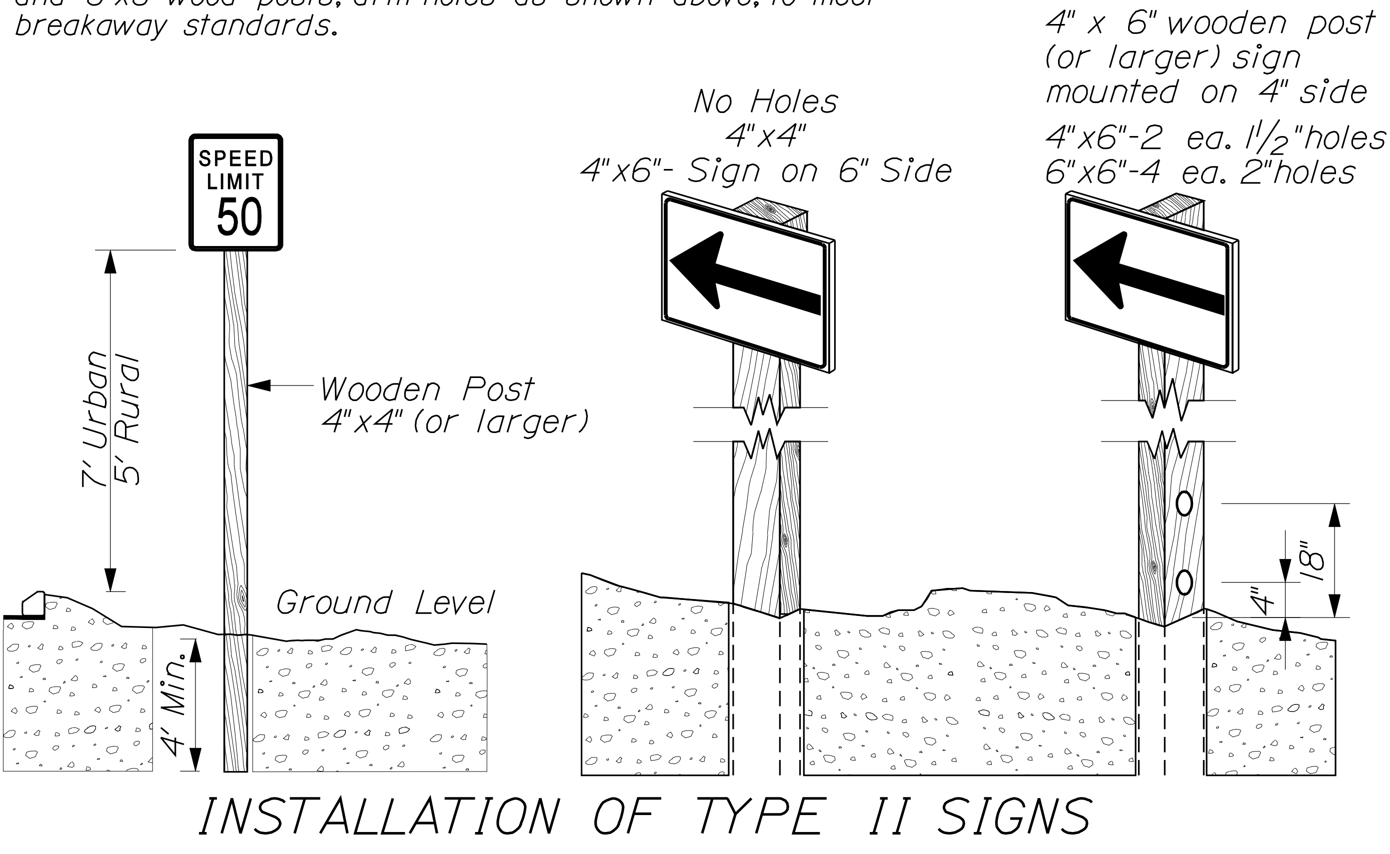
INSTALLATION OF TYPE II SIGNS
HIGHWAY SIGNING & BREAK AWAY POSTS

645(09)A



Breakaway Holes in Wood Posts

NOTES:
Refer to Section 645.061 of the Standard Specifications to determine the size of wood posts. All wood posts and brackets shall be pressure treated to CCA 40. On 4"x6" and 6"x6" wood posts, drill holes as shown above, to meet breakaway standards.

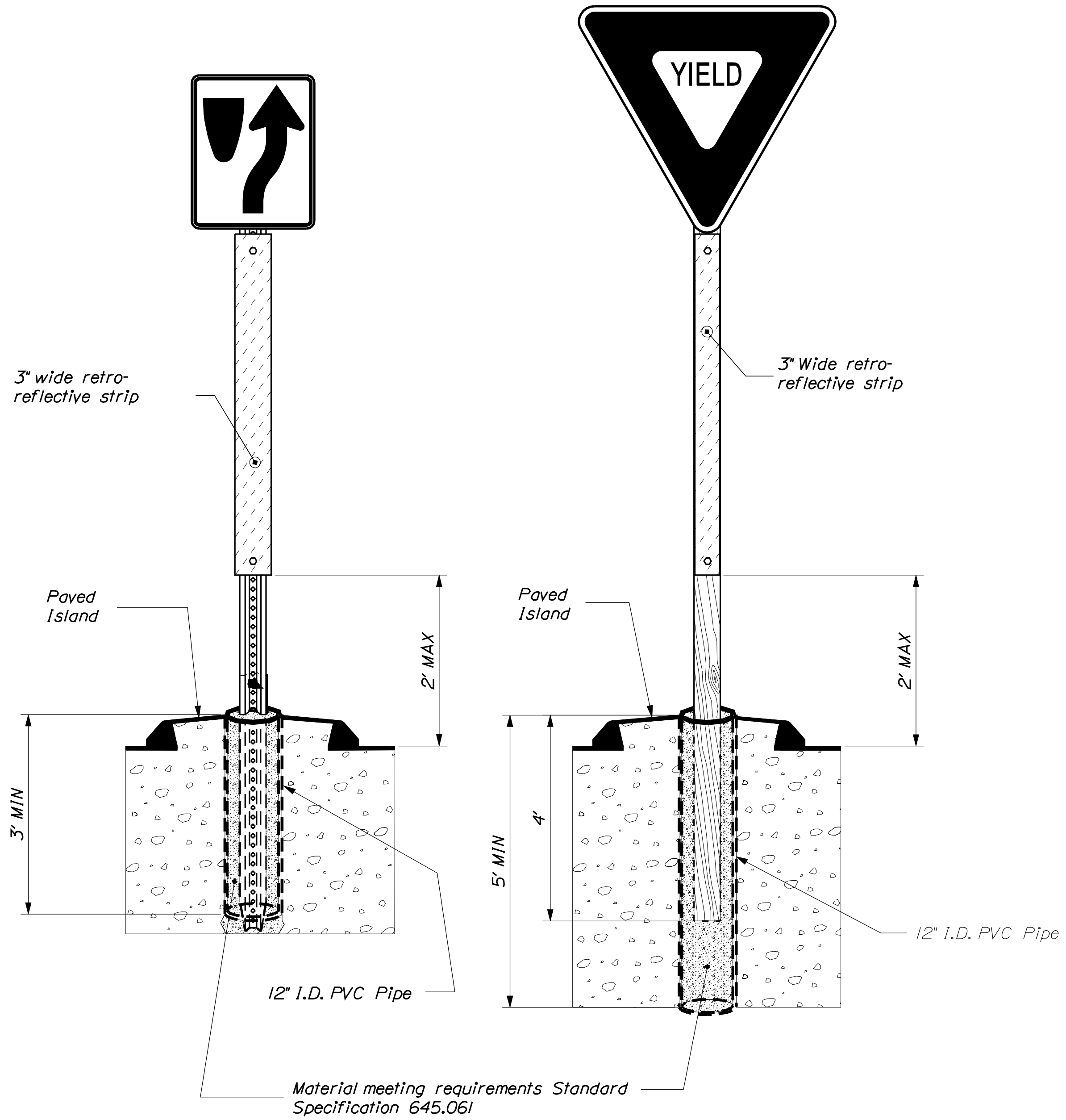


INSTALLATION OF TYPE II SIGNS
HIGHWAY SIGNING & BREAK AWAY POSTS

645(09)B

STEEL U-CHANNEL POST INSTALLATION

PRESSURE TREATED WOOD POST INSTALLATION



NOTES:

1) Posts to be plumbed & set in compacted/tamped material

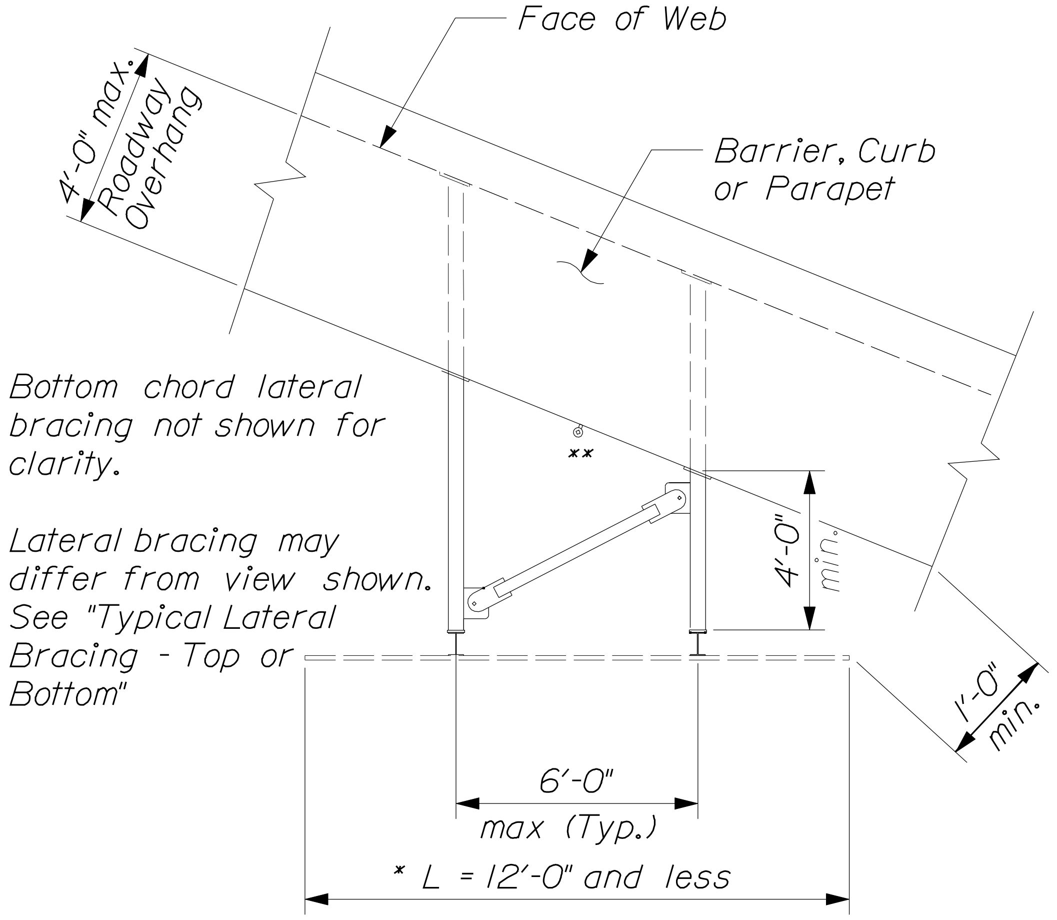
2) Top of PVC pipe shall have no more than 1 inch reveal from finished surface pavement

3) Installation shall meet all requirements found in Standard Specification 645.06I

~ ISLAND SIGN POST SLEEVE ~

INSTALLATION OF TYPE II SIGNS
HIGHWAY SIGNING & BREAK AWAY POSTS

645(09)C



~ PLAN - SMALL SIGN PANEL SUPPORT LAYOUT ~

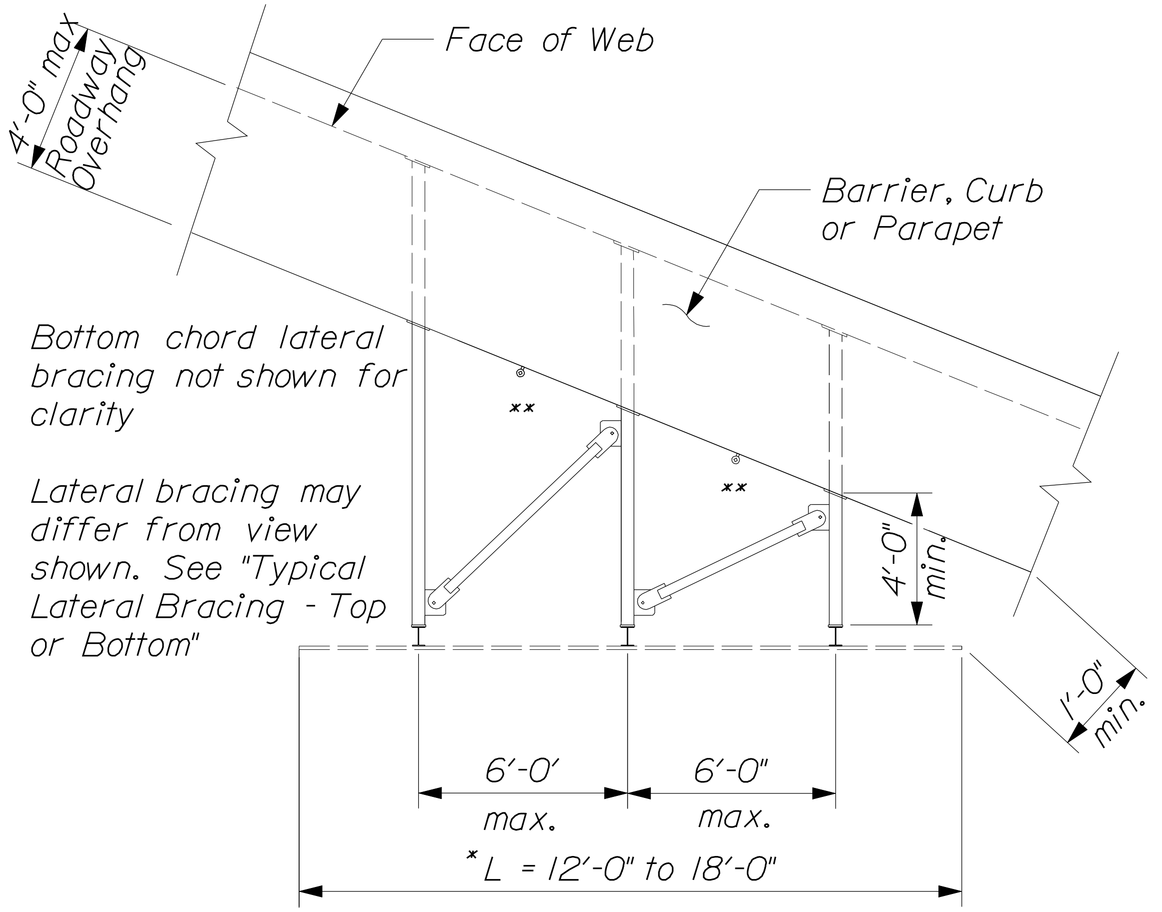
Max. skew permitted: 50 degrees
Max. height of sign permitted, 14'-0"

* Note: L = Width of sign

** Anchoring eyelet for barriers only
(See Anchorage Eyelet Detail)

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING



~ PLAN - MEDIUM SIGN PANEL SUPPORT LAYOUT ~

Max. skew permitted: 30 degrees
Max. height of sign permitted, 14'-0"

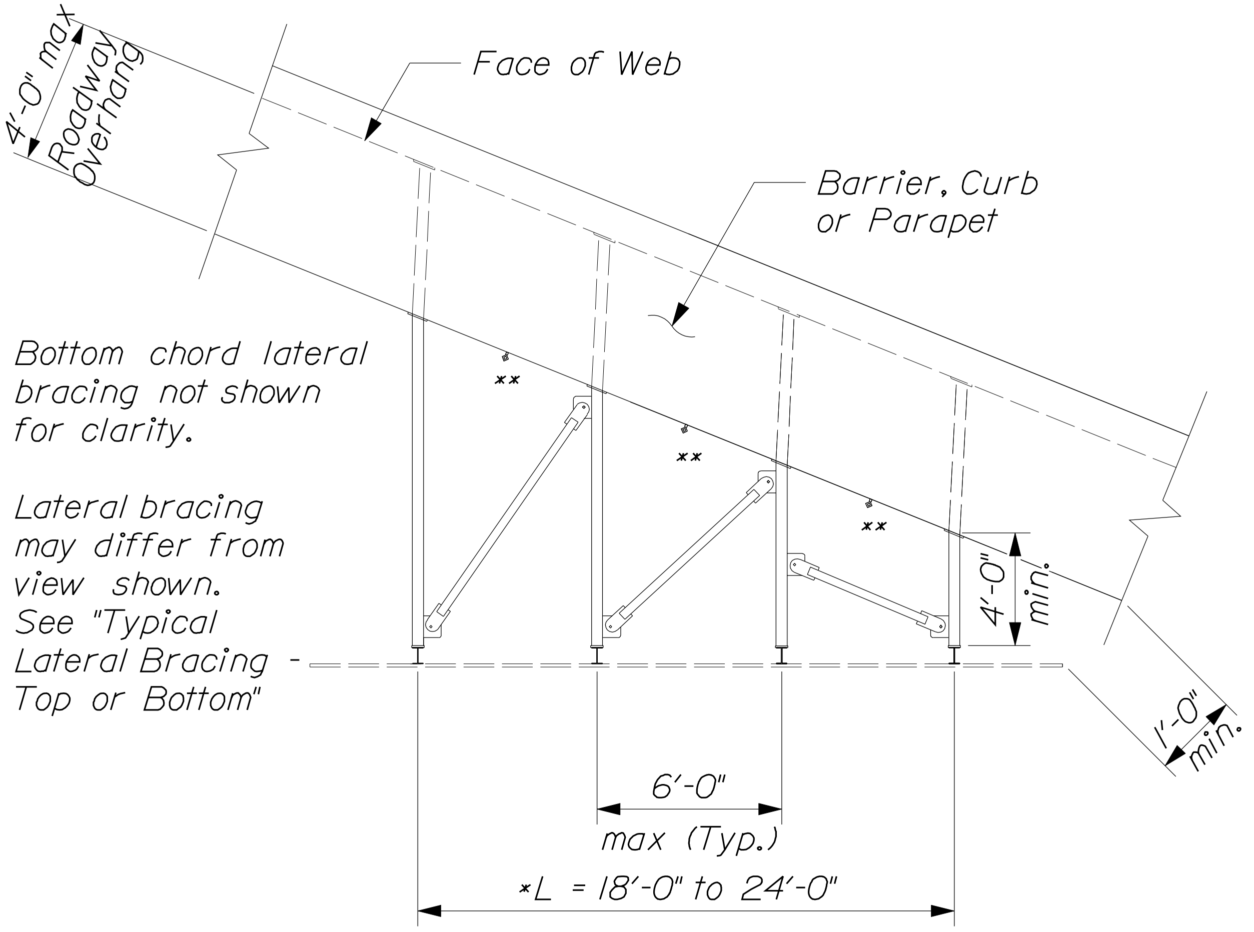
* Note: L = width of sign

** Anchoring eyelet for barriers only.
(See Anchorage Eyelet Detail)

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

645(11)



Bottom chord lateral bracing not shown for clarity.

Lateral bracing may differ from view shown. See "Typical Lateral Bracing - Top or Bottom"

~ PLAN - LARGE SIGN PANEL SUPPORT LAYOUT ~

Max. skew permitted: 30 degrees
Max. height of sign permitted, 14'-0"

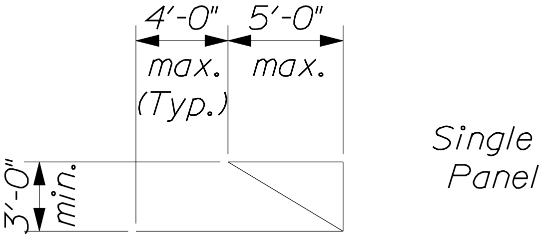
* Note: L = Width of sign

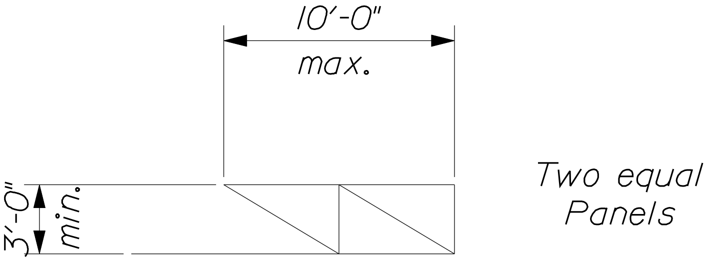
** Anchoring eyelet for barriers only.
(See Anchorage Eyelet Detail)

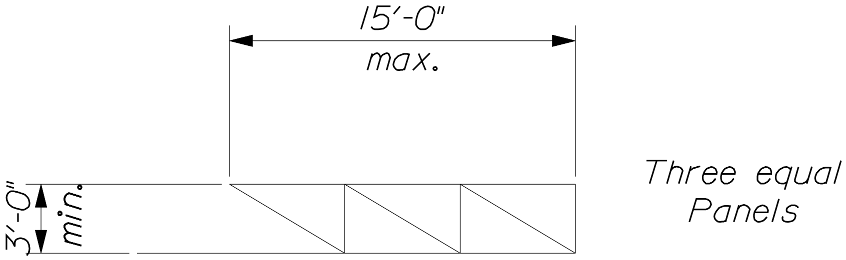
ITEM NO. 645.13

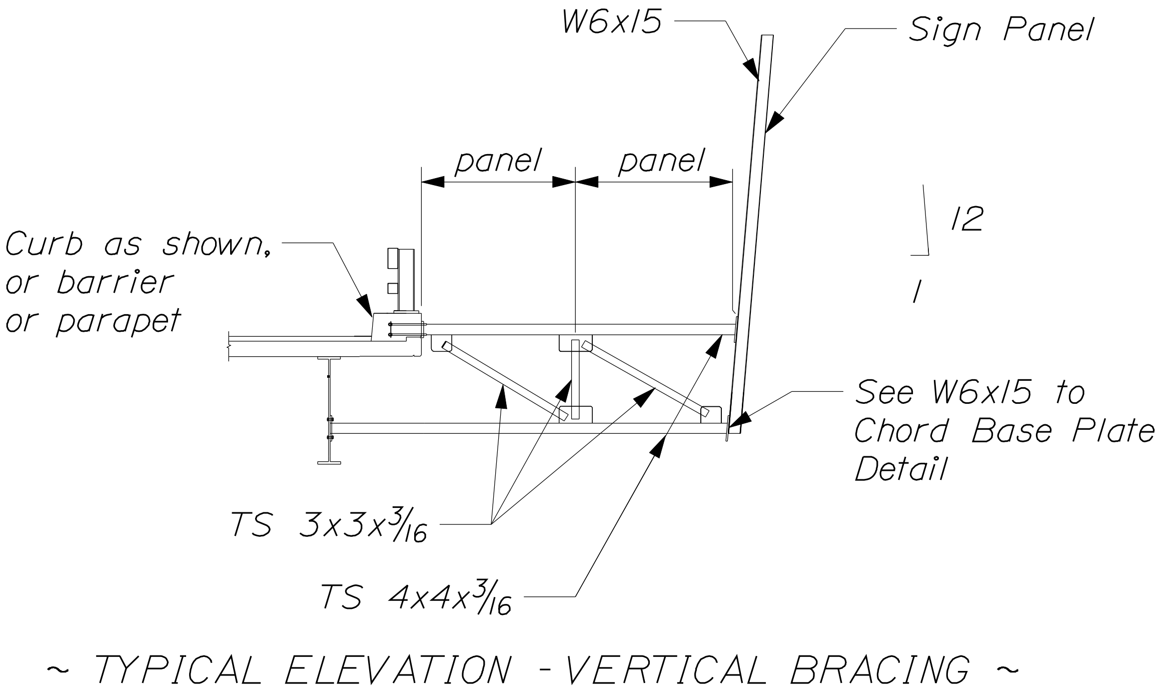
OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

645(12)







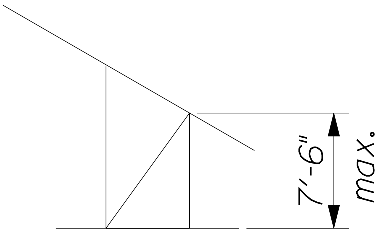


~ TYPICAL ELEVATION - VERTICAL BRACING ~

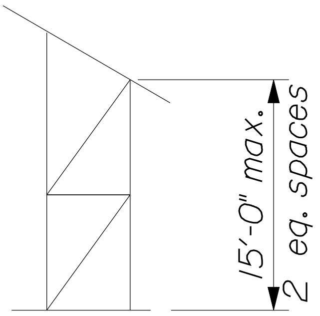
ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

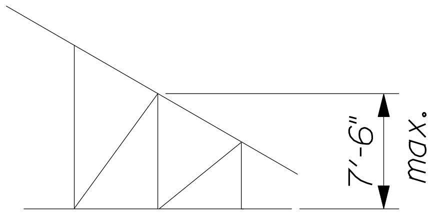
645(13)



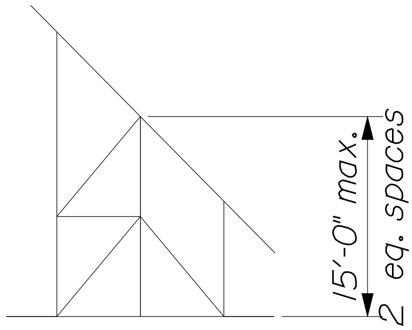
~ PLAN VIEW
2 - BRACKET ~



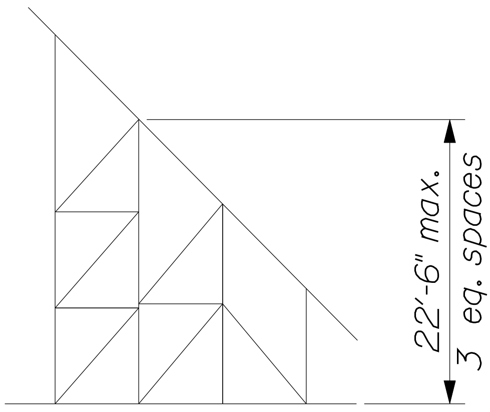
~ PLAN VIEW
2 - BRACKET ~



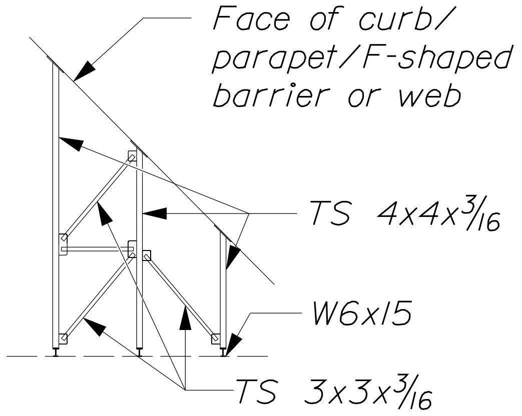
~ PLAN VIEW
3 - BRACKET ~



~ PLAN VIEW
3 - BRACKET ~



~ PLAN VIEW
4 - BRACKET ~



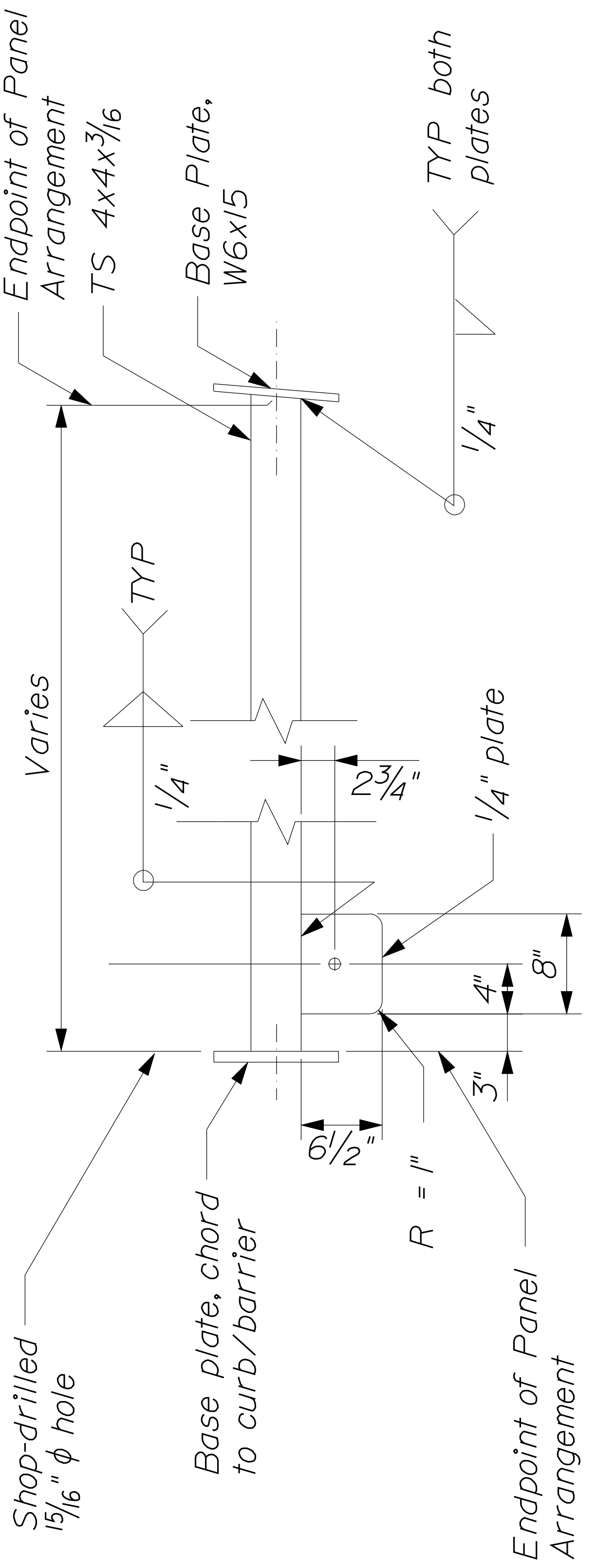
~ TYPICAL LATERAL
BRACING ~

~ TYPICAL LATERAL BRACING TOP OR BOTTOM ~

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

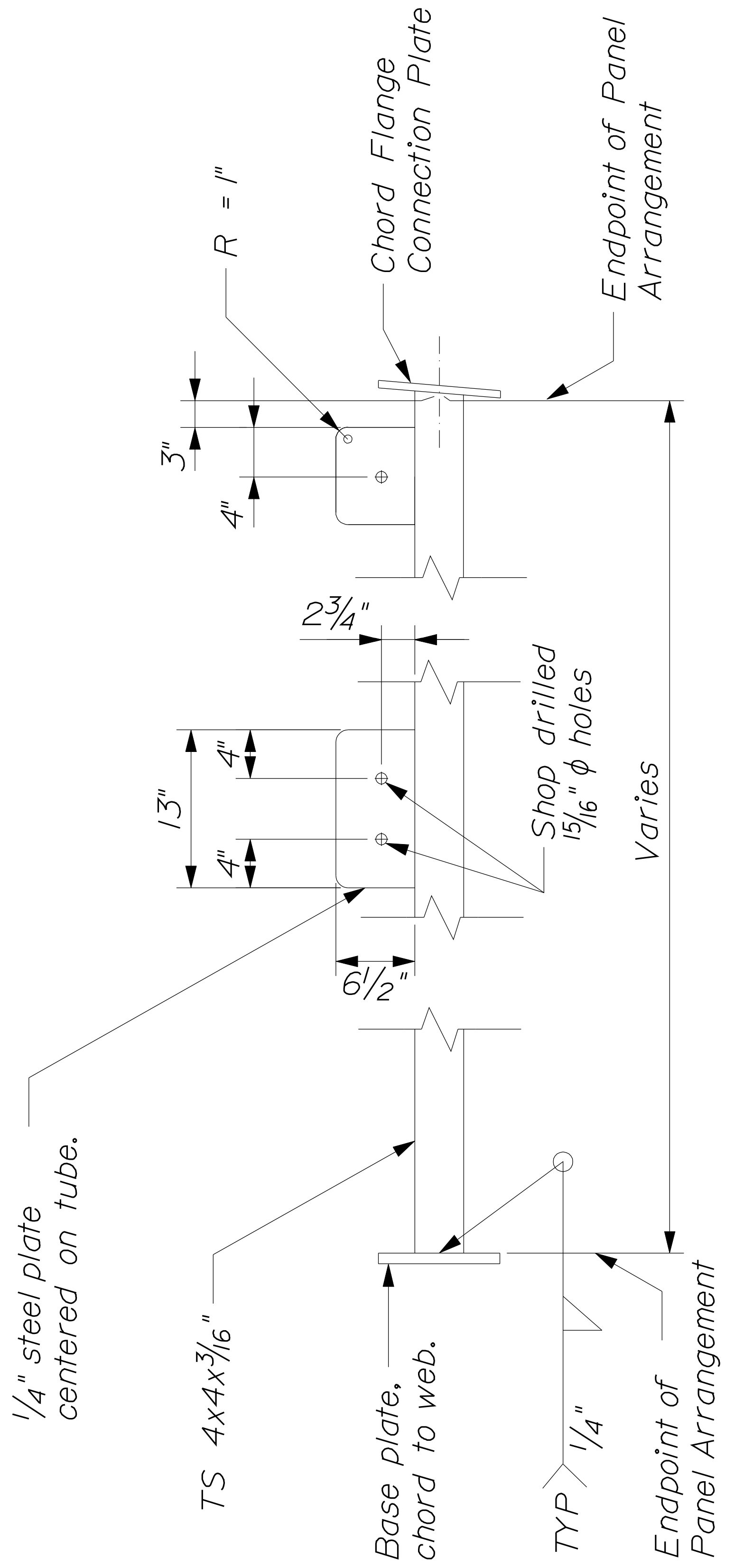
645(14)



~ TYPICAL TOP CHORD ~

ITEM NO. 645.13

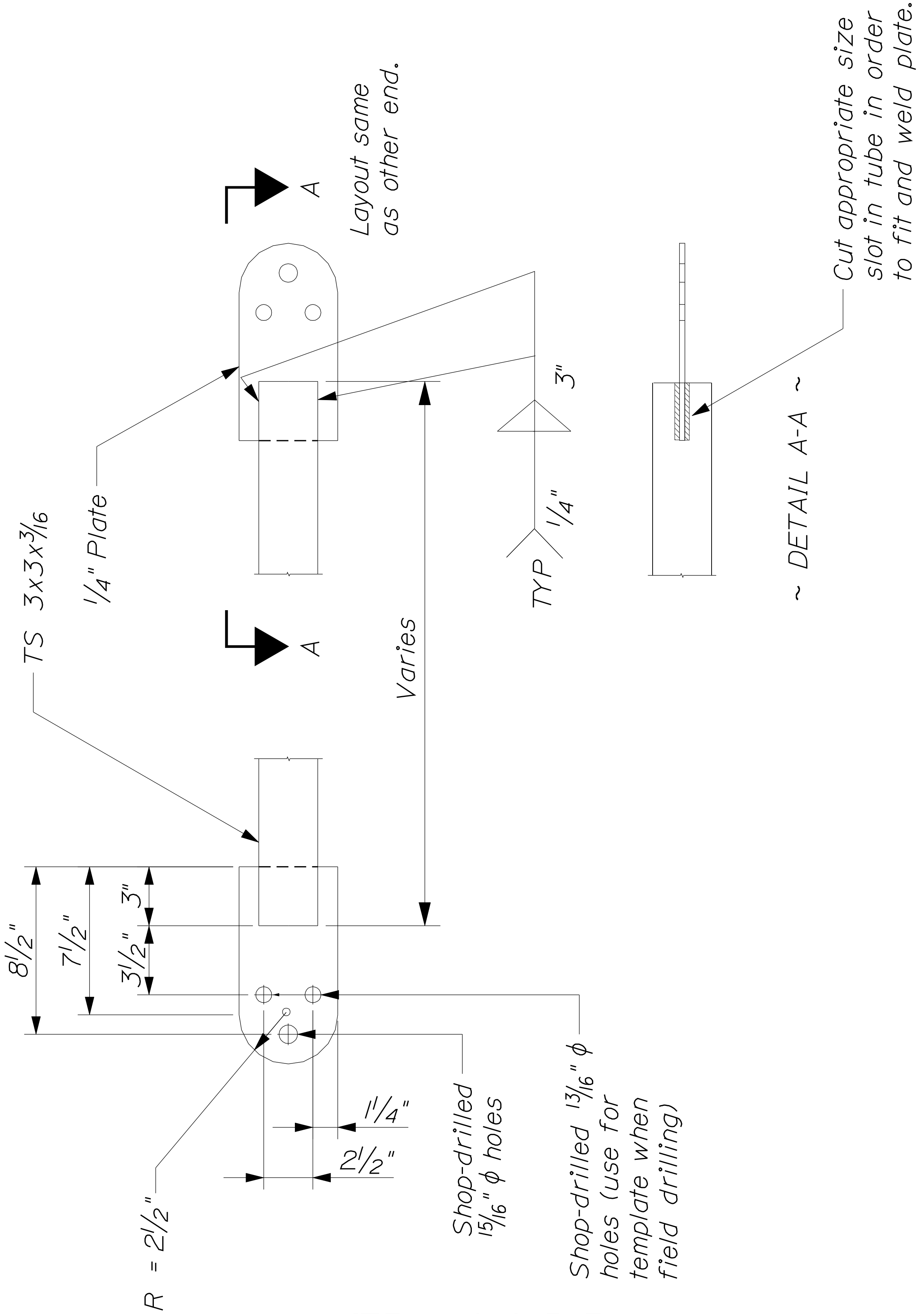
OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING



~ TYPICAL BOTTOM CHORD ~

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

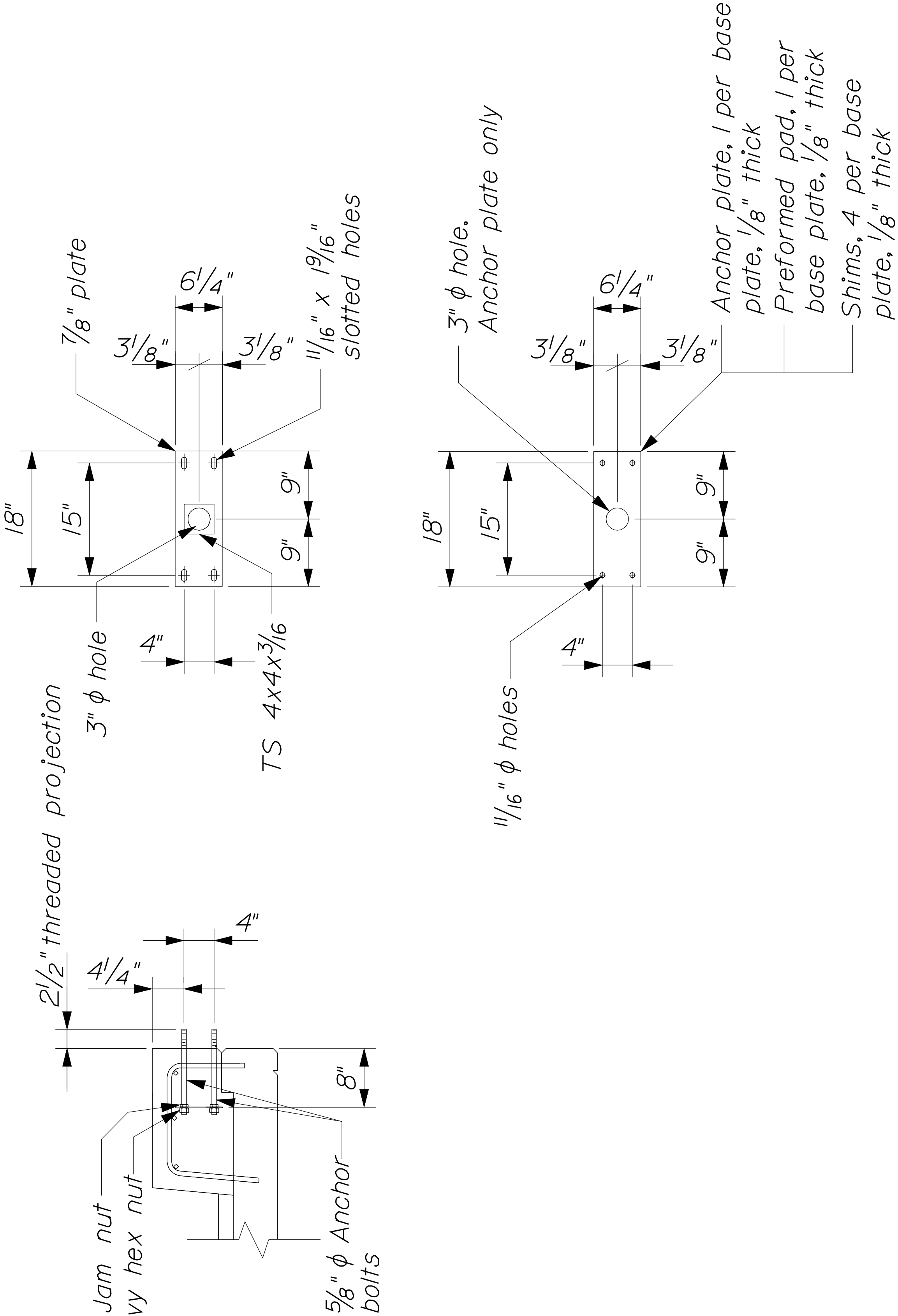


~ TYPICAL LATERAL AND VERTICAL BRACE ~

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

645(17)

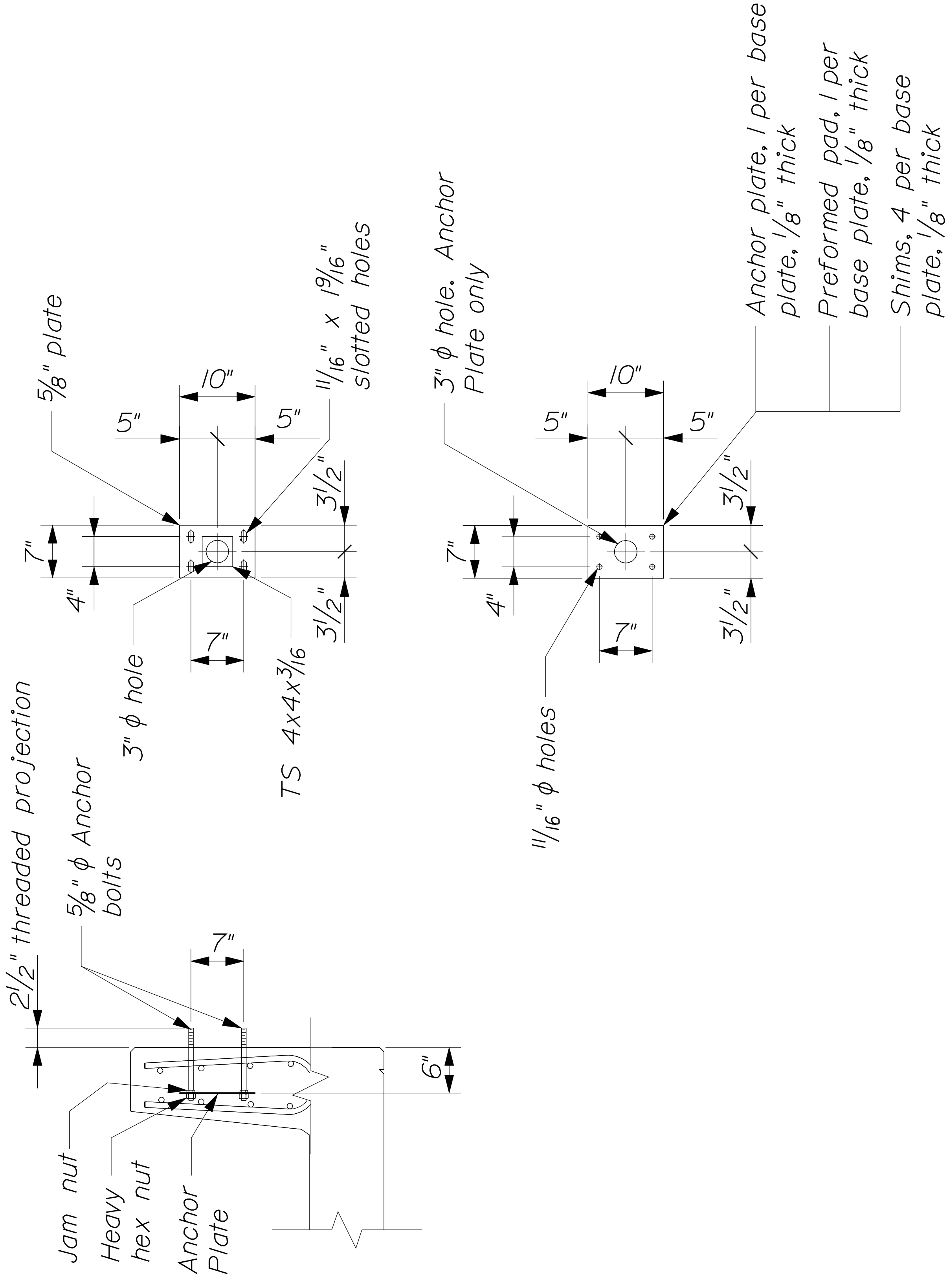


~ CURB TO CHORD BASE PLATE AND ANCHOR BOLT SYSTEM ~

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

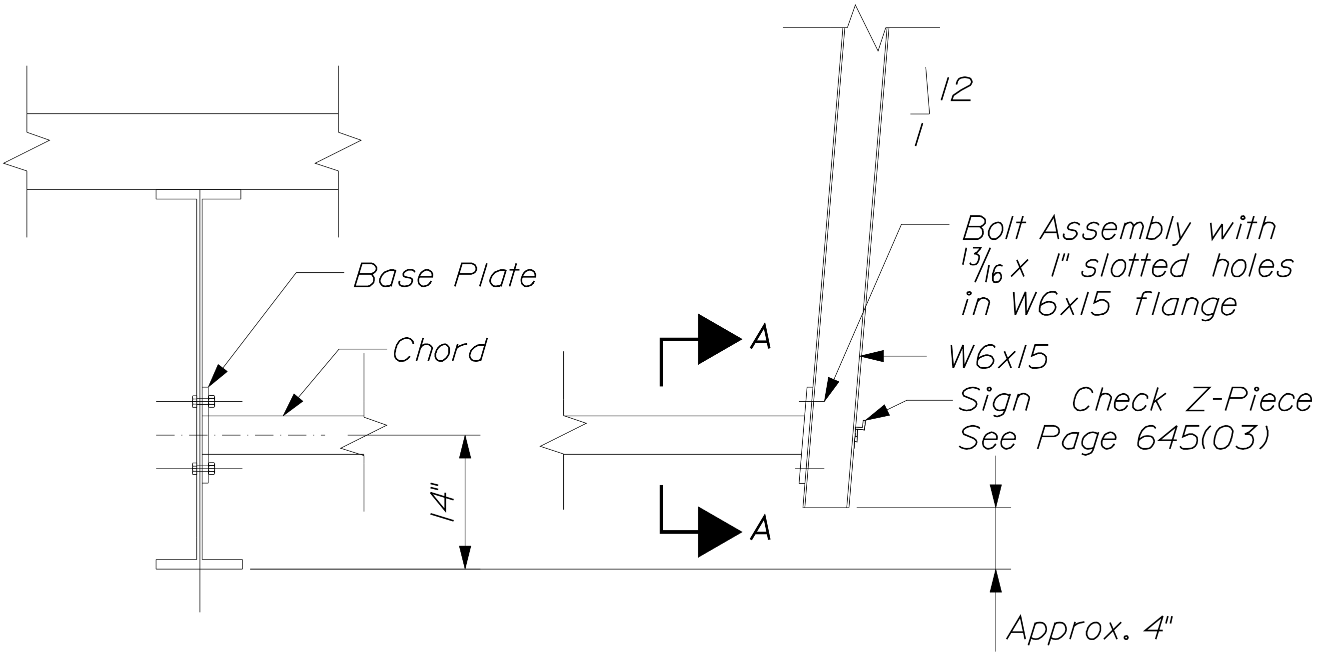
645(18)

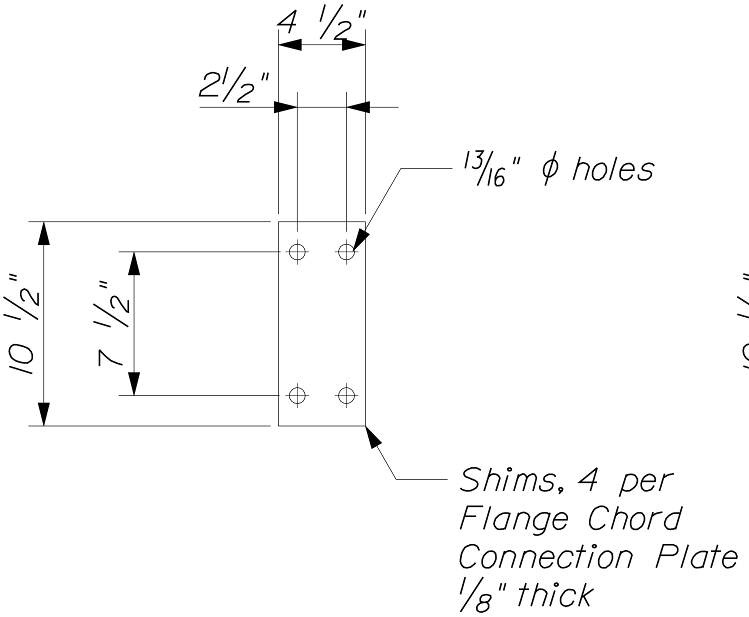


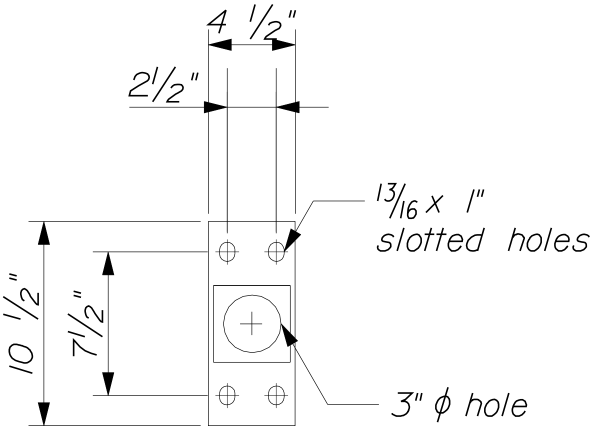
~ BARRIER/STEEL BEAM TO CHORD BASE PLATE AND ANCHOR BOLT SYSTEM ~

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING







~ DETAIL A-A ~

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

645(20)

* Anchorage Eyelet shall be attached so that it is capable of supporting a dead weight load of 5400 lbs (2400 kN)

Anchorage Eyelet shall be galvanized to the requirments of ASTM A153 or shall be Stainless Steel.

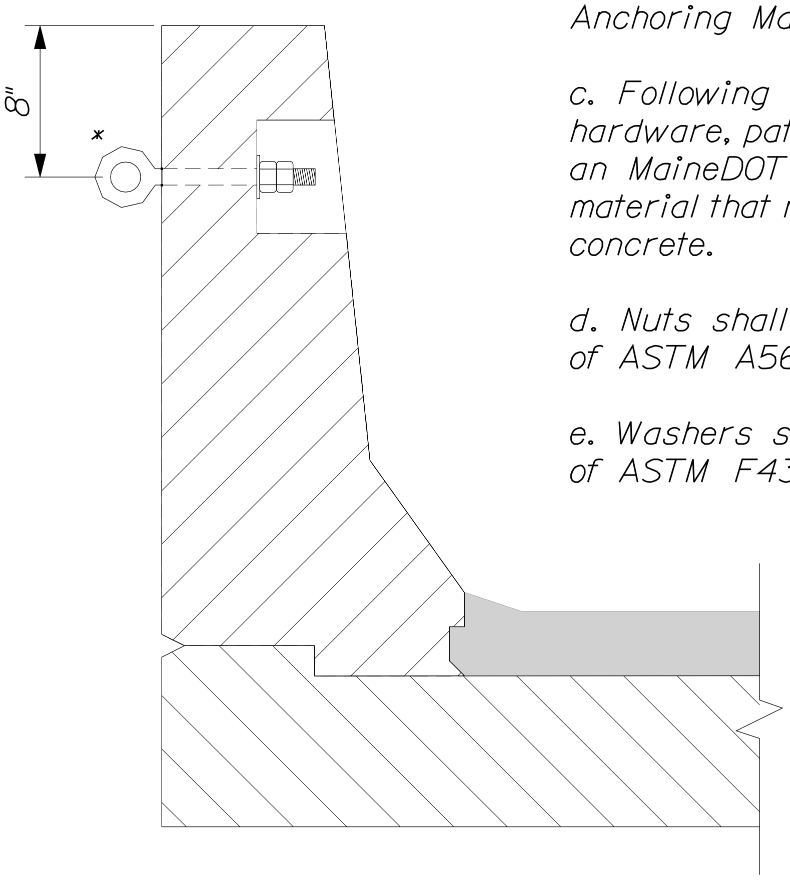
a. Block-out opening is 6" high by 6" wide.

b. Drill hole for eyelet shank 1/4" larger than shank diameter and fill void with grout selected from MaineDOT Prequalified List of Anchoring Material

c. Following installation of eyelet hardware, patch block-out with an MaineDOT approved patching material that matches the barrier concrete.

d. Nuts shall meet the requirements of ASTM A563.

e. Washers shall meet the requirements of ASTM F436.



~ ANCHORAGE EYELET DETAIL ~

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

645(21)

NOTES:

1. The support frame dimensions shall be determined by the Contractor. These shall be based on the sign size, bridge skew angle, and cross-sectional geometry. Field verification of these parameters is the responsibility of the Contractor. The Contractor shall consider the possibility of interferences such as splice plates, drains, stiffeners, etc. in developing the shop drawings.

2. The Contractor shall select an appropriate layout using the views in these Standards as a guide in order to determine the number of brackets, the configuration of the vertical bracing and the configuration of the lateral bracing.

3. The support frame is designed such that the Contractor may fasten chords, vertical and horizontal bracing using a single bolt per connection in an oversized hole for erection purposes. When the frame is in final desired position, adjustments may be accomplished and remaining bolt holes may be drilled in the field using the connected components as a template.

4. The Contractor shall select an appropriate chord base plate for attaching to a concrete barrier, curb or parapet, using the views in these Standards as a guide. An accommodating anchor bolt system shall be selected from this Standard.

5. All work and materials shall conform to the applicable provisions of Section 504, Structural Steel, of the Standard Specification Highways and Bridges.

6. All Steel components shall be galvanized after fabrication in accordance with ASTM A123, except that hardware used in the connections of the structural frame shall meet the requirements of either ASTM A153 or ASTM B695, Class 50, Type I. Parts except hardware shall be blast-cleaned prior to galvanizing in accordance with SSPC-SP6.

7. Materials:

   Hollow steel sections shall meet the requirements of ASTM A500, Grade B.

   Steel plate shall meet the requirements of ASTM A572, Grade 50. Steel shapes shall meet the requirements of ASTM A992.

   Steel shim plates shall meet the requirements of ASTM A36.

ITEM NO. 645.13

OVERPASS MOUNTED SIGN SUPPORT
HIGHWAY SIGNING

Bolting assemblies used in the connections of the structural frame shall be Heavy Hex Head 3/4" and meet the requirements of ASTM A325. The Contractor shall select appropriate bolt lengths.

Anchor bolt assemlies used to fasten the structural frame to a concrete curb, barrier or parapet shall meet the requirements of ASTM A449, Type I with a minimum yield strength of 55KSI.

Remaining materials used shall be as specified elsewhere in these Standards or in the Contract Documents.

8. *Fastener nuts in anchor and bolt assemblies shall be tightened to a snug fit and given an extra $1/8$ turn. Fastener assemblies in oversized holes shall have washers under bolt heads and nuts.*

9. *Holes that are field drilled shall be coated with an approved zinc-rich primer prior to final erection.*

10. *A random 25% of all base plate to chord welds and chord to Flange Connection Plate welds shall be MT inspected. Only a one-time repair is allowed on these welds without written permission of the Engineer. All other welds shall be subject to VT inspection.*

11. *Anchor bolts shall be installed with misalignments of less than 1:40 from theoretical location.*

12. *An anchorage eyelet shall be installed approximately midpoint between each bracket when a concrete barrier is utilized as the top chord attachment.*

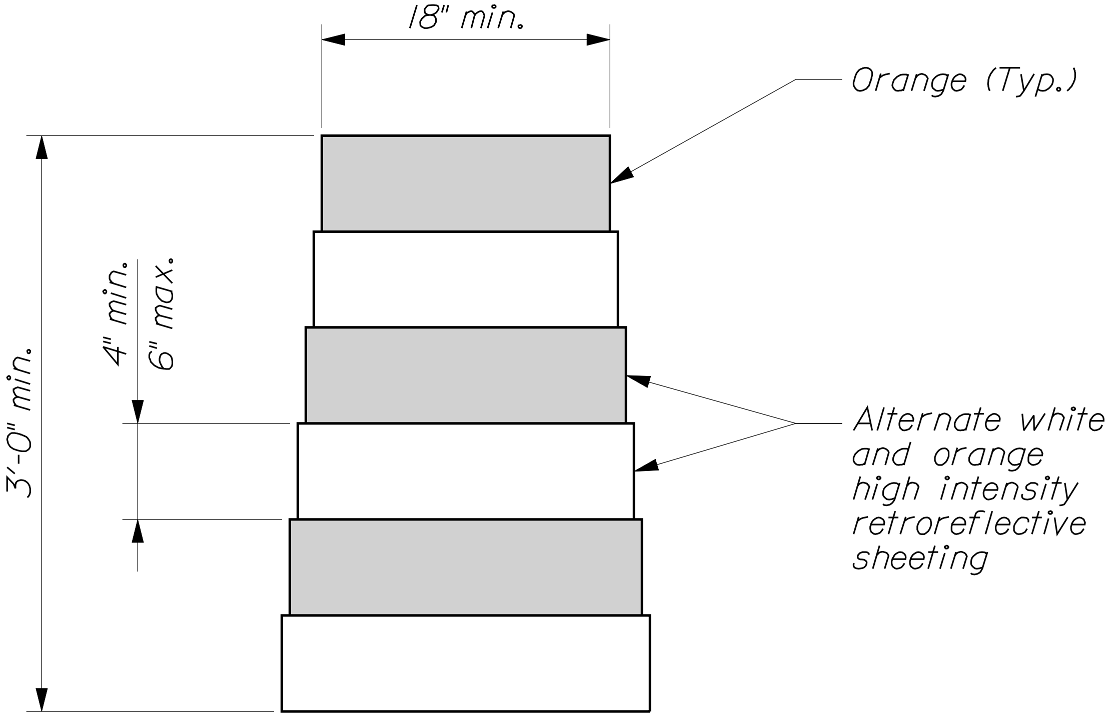
13. *Preformed pads, specified in Section 713, Structural Steel and Related Material, of the Standard Specifications Highways and Bridges, shall be placed between each chord base plate and concrete surface.*

14. *The Contractor may use shim plates, as provided by this Standard, beneath all base plates and Flange Connection Plates as necessary, up to an adjustment of 1/2".*

ITEM NO. 645.13

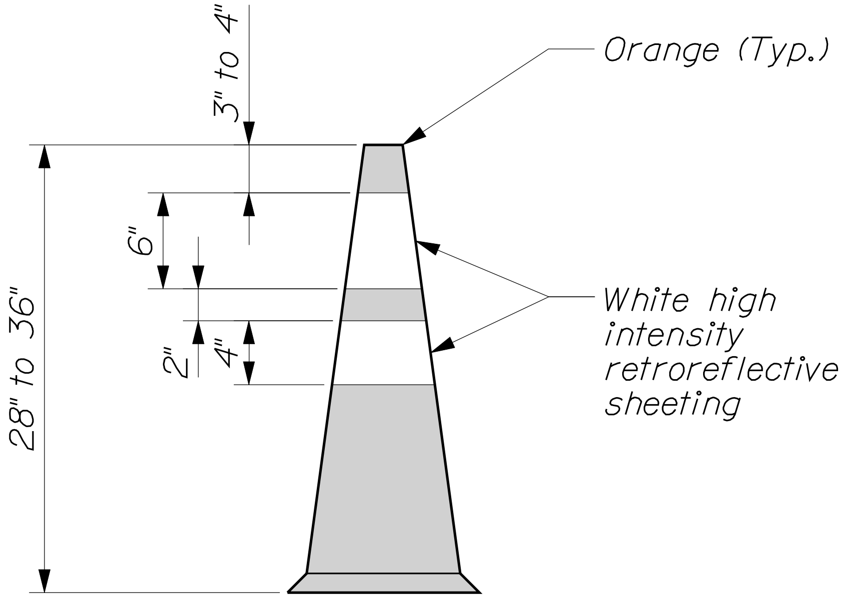
OVERPASS MOUNTED SIGN SUPPORT

HIGHWAY SIGNING



~ DRUM ~

(Non - metal)

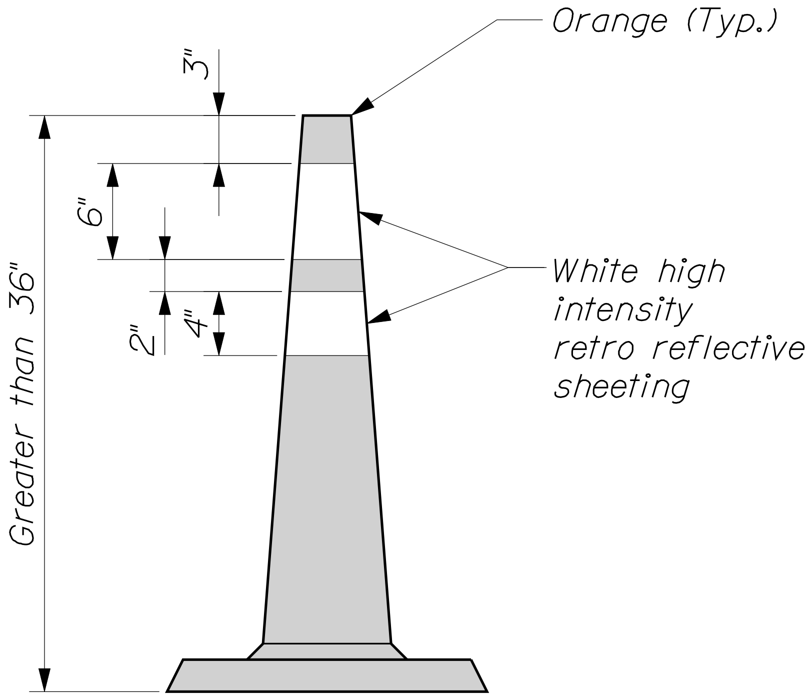


~ CONE ~

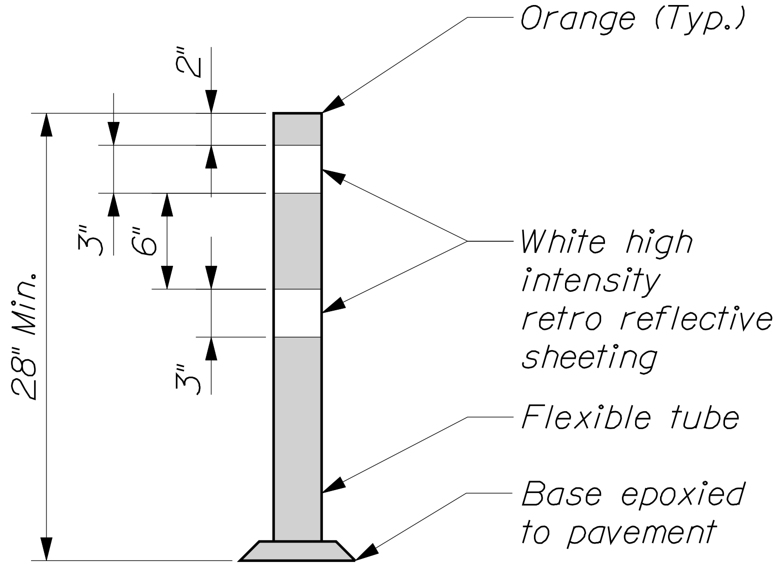
(Standard)

CHANNELIZING DEVICES

652(01)



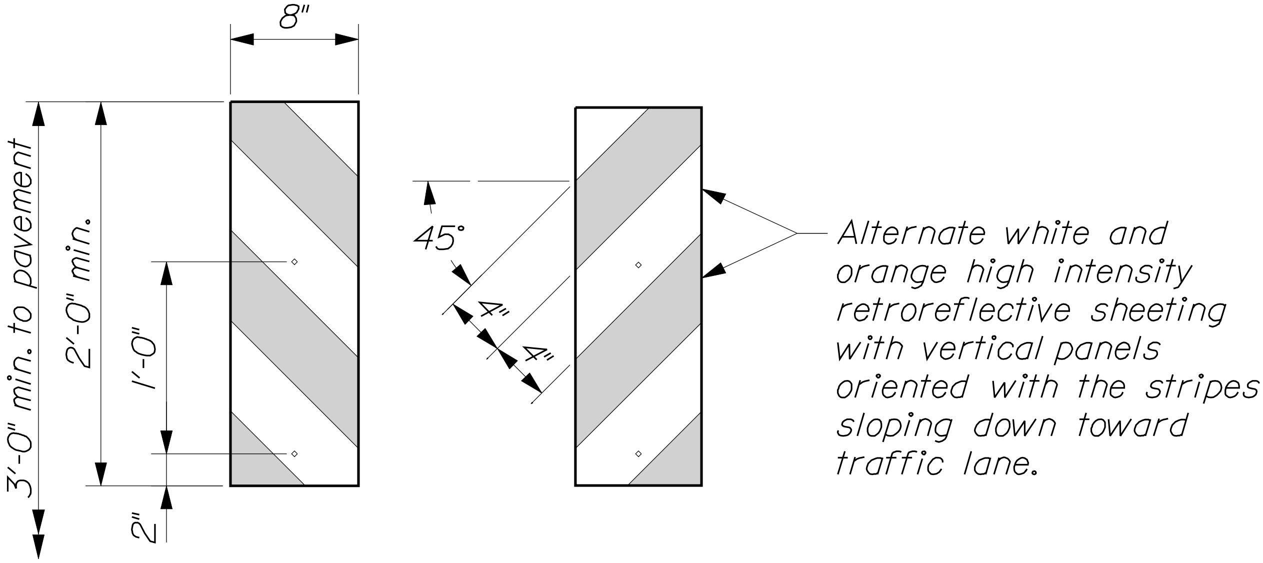
~ CONE ~
(High Ballasted)



~ TUBULAR MARKERS ~
(Flexible)

CHANNELIZING DEVICES

652(02)



Alternate white and orange high intensity retroreflective sheeting with vertical panels oriented with the stripes sloping down toward traffic lane.

Where the height of the vertical panel itself is 36" or greater a panel stripe width of 6" shall be used.

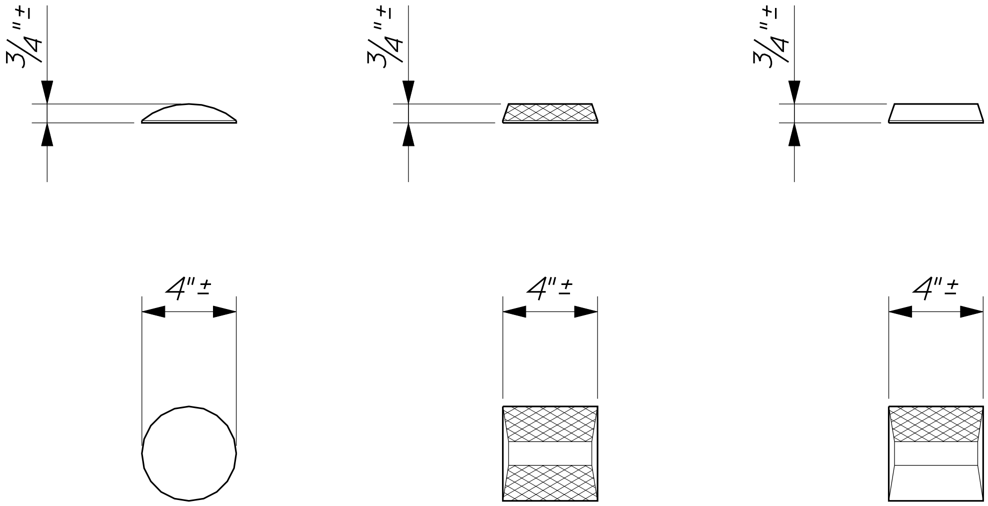
~ VERTICAL PANELS ~

CHANNELIZING DEVICES

652(03)

NOTES:

1. Vertical panels shall have alternate orange and white high intensity retroreflective stripes as shown.
2. Drums may be weighted with up to 22 Lbs of dry sand.
3. Ballast shall not be placed on top of a drum.
4. Temporary raised pavement marker color shall correspond with pavement striping color as follows: clear markers for white striping and amber markers for yellow striping.

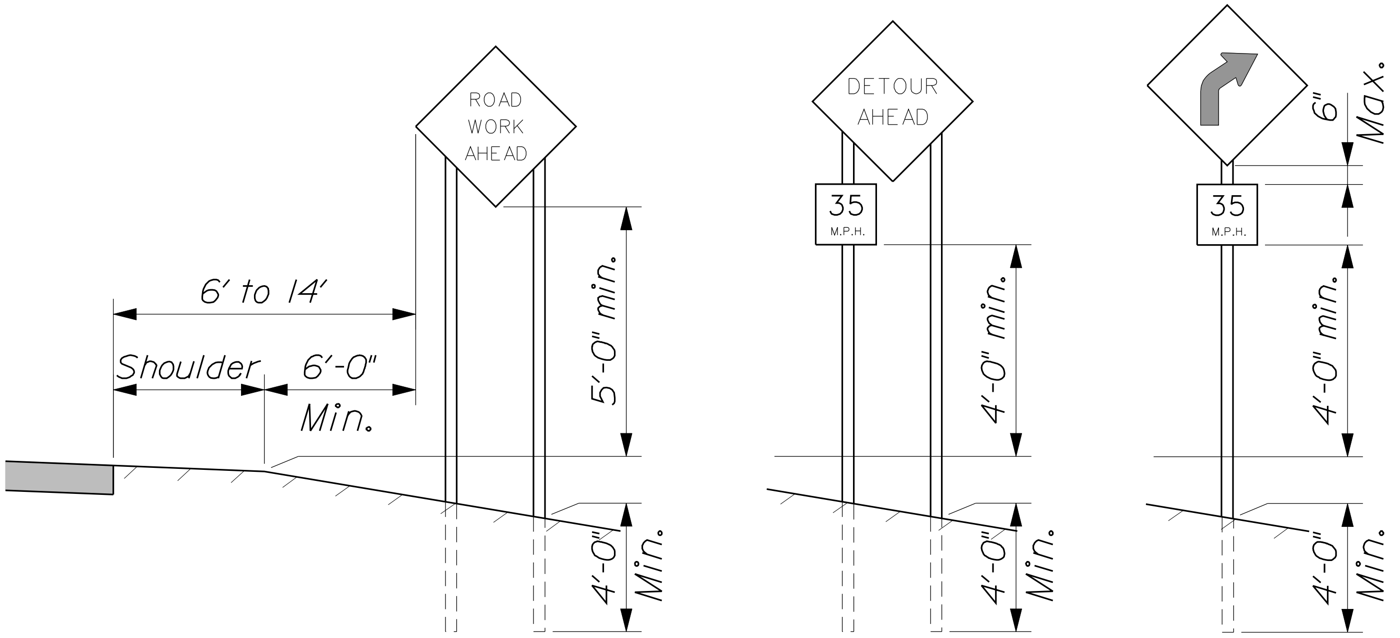


Type "A" Type "B" Type "C"

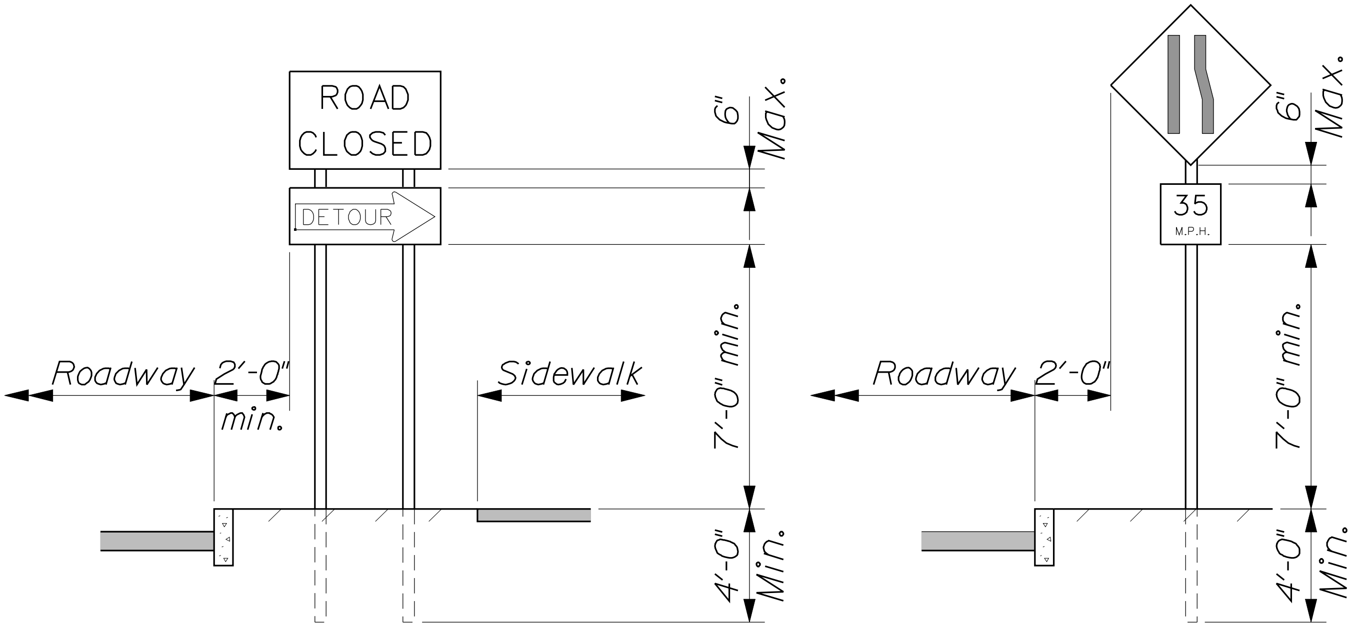
~ RAISED PAVEMENT MARKERS ~

CHANNELIZING DEVICES

652(04)



~ RURAL AREA ~
(Fixed signs)



~ URBAN AREA ~
(Fixed signs)

CONSTRUCTION SIGNS

652(05)

NOTES;

1. All signs shall conform to the applicable provisions of the current edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways", FHWA; and to "Standard Highway Signs", FHWA. Refer to current edition of MUTCD.

2. Steel U-channels are required as sign posts.

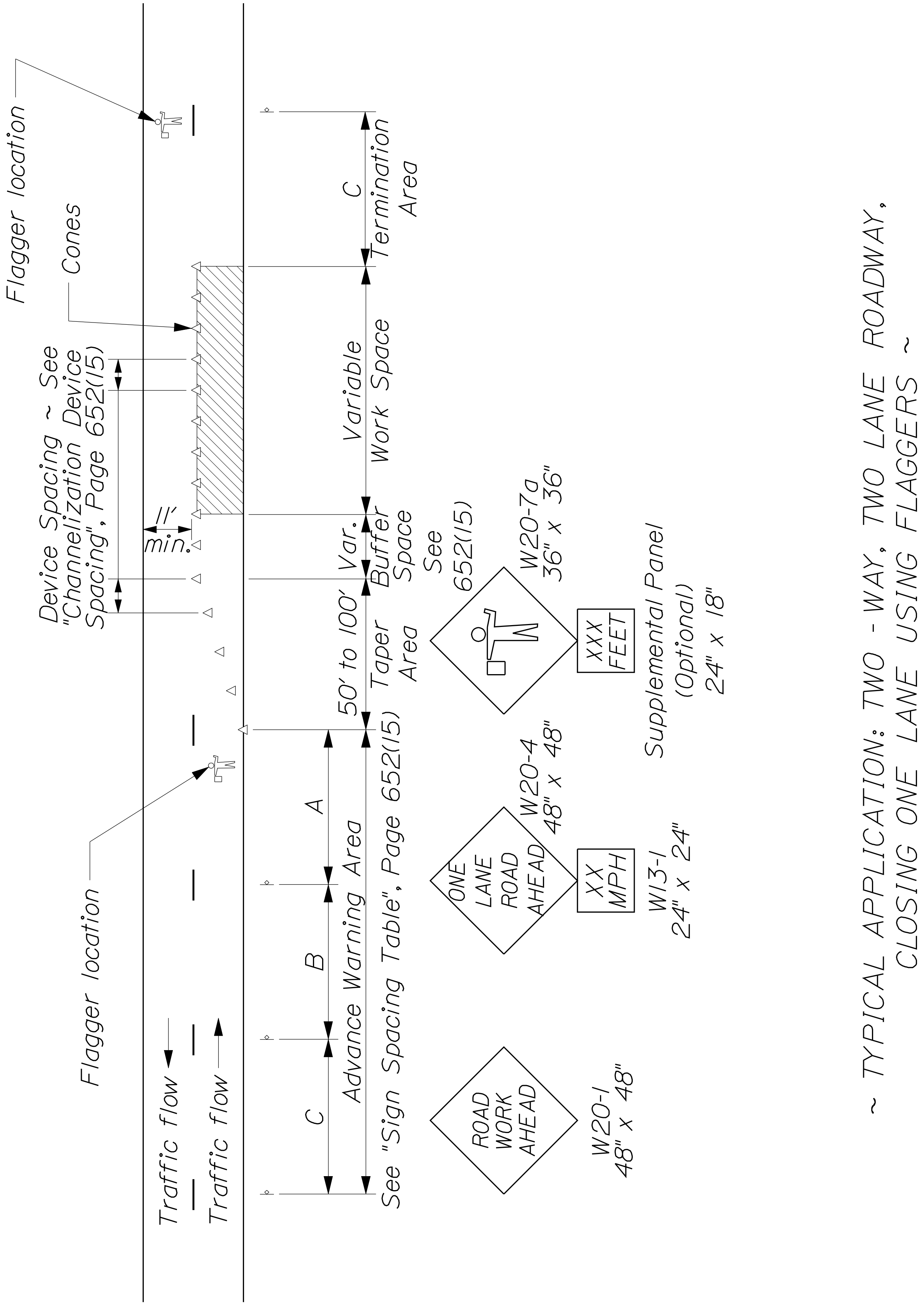
3. Mount signs that are wider than 3 feet or larger than one square yard in area on two or more posts.

4. When parking is permitted within 200 feet of the sign, mount the sign a minimum of 7 feet above the pavement surface.

5. When using lap splice see detail 645(24) for installation requirements.

CONSTRUCTION SIGNS

652(06)



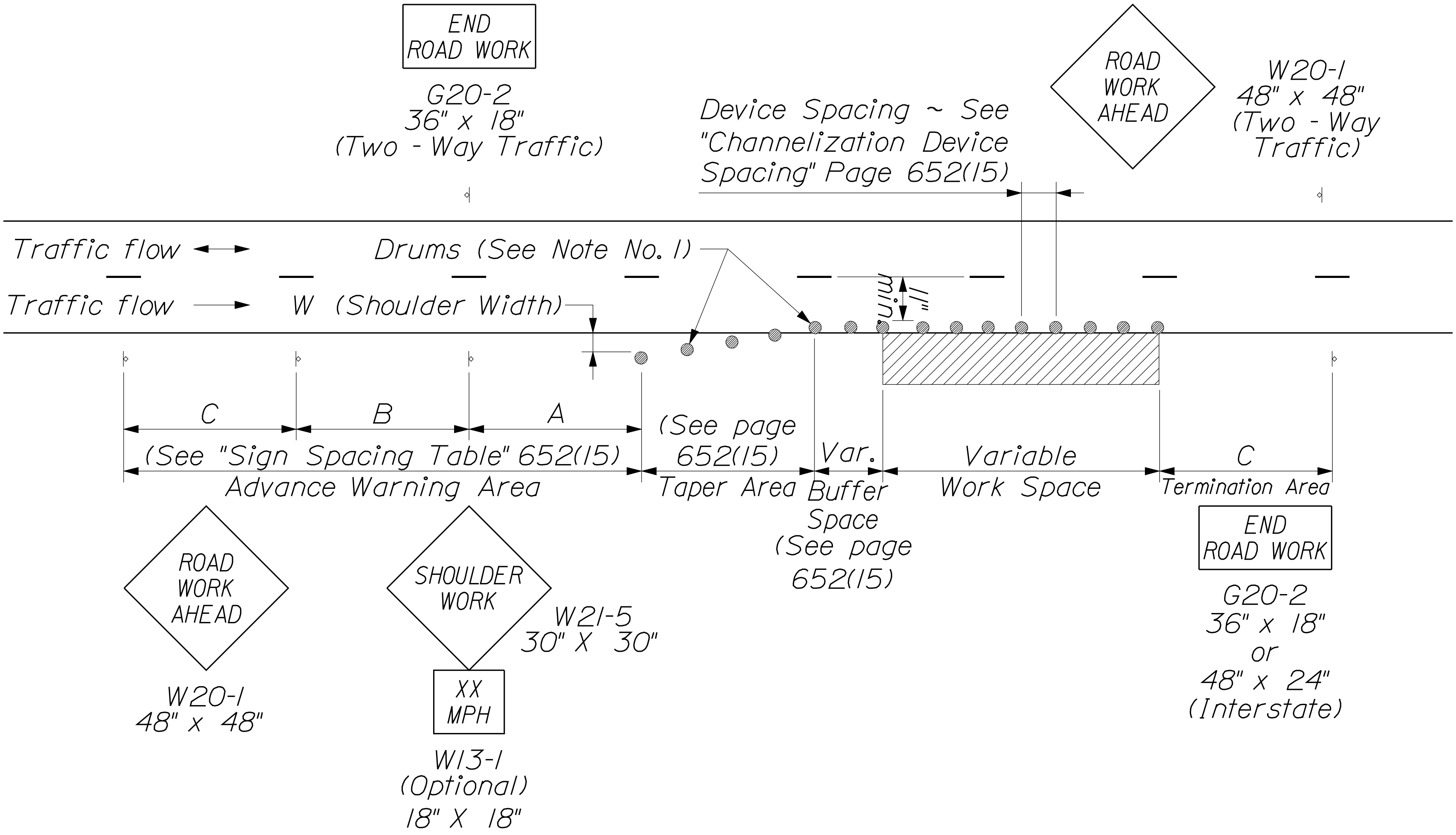
~ TYPICAL APPLICATION: TWO - WAY, TWO LANE ROADWAY, CLOSING ONE LANE USING FLAGGERS ~

CONSTRUCTION TRAFFIC CONTROL

652(07)

NOTES:

1. For operations that require a shoulder closure for a day or less, drums may be replaced with Type "A" Cones.



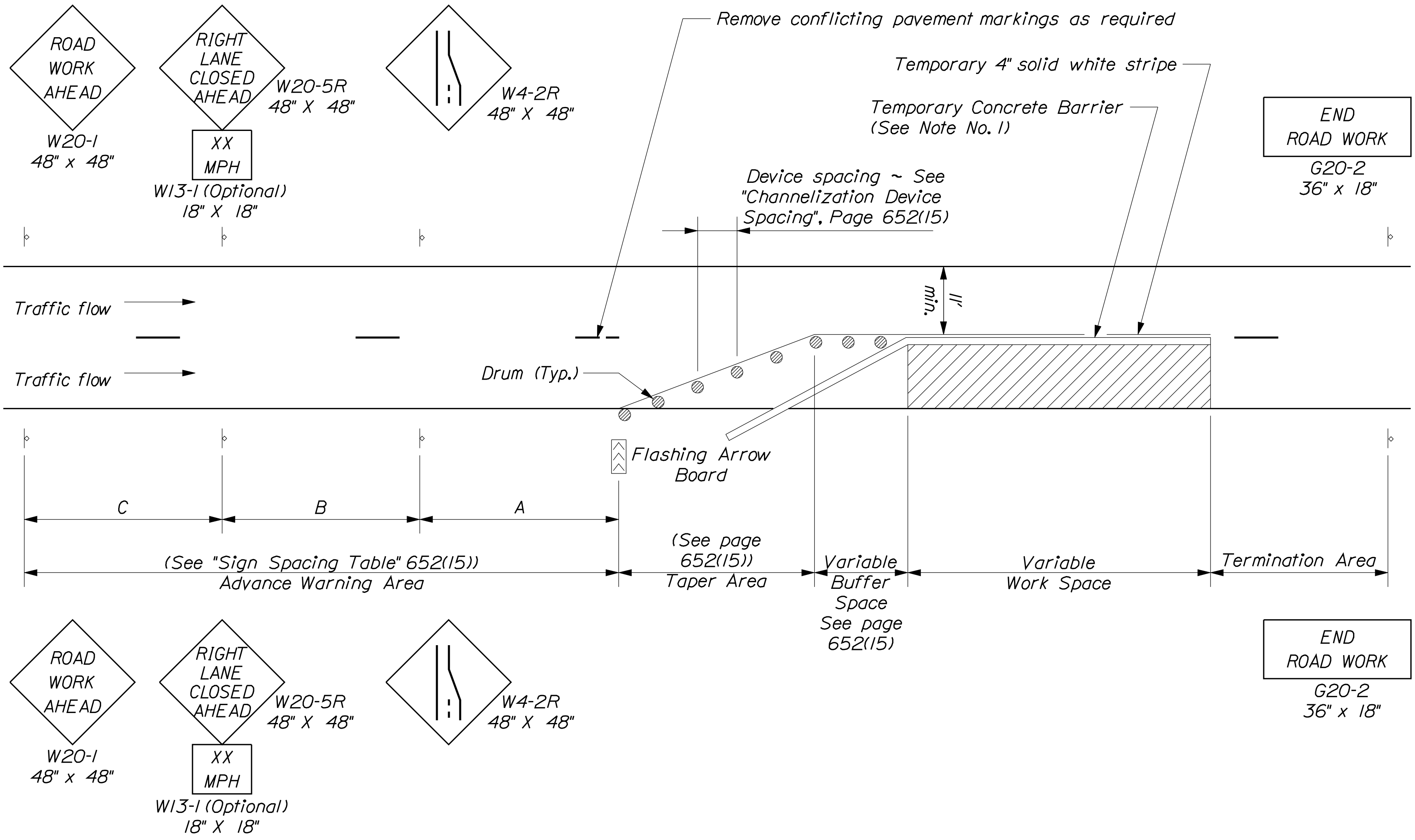
~ TYPICAL APPLICATION: ONE - WAY OR TWO - WAY, TWO LANE ROADWAY, CLOSING SHOULDER ~

CONSTRUCTION TRAFFIC CONTROL

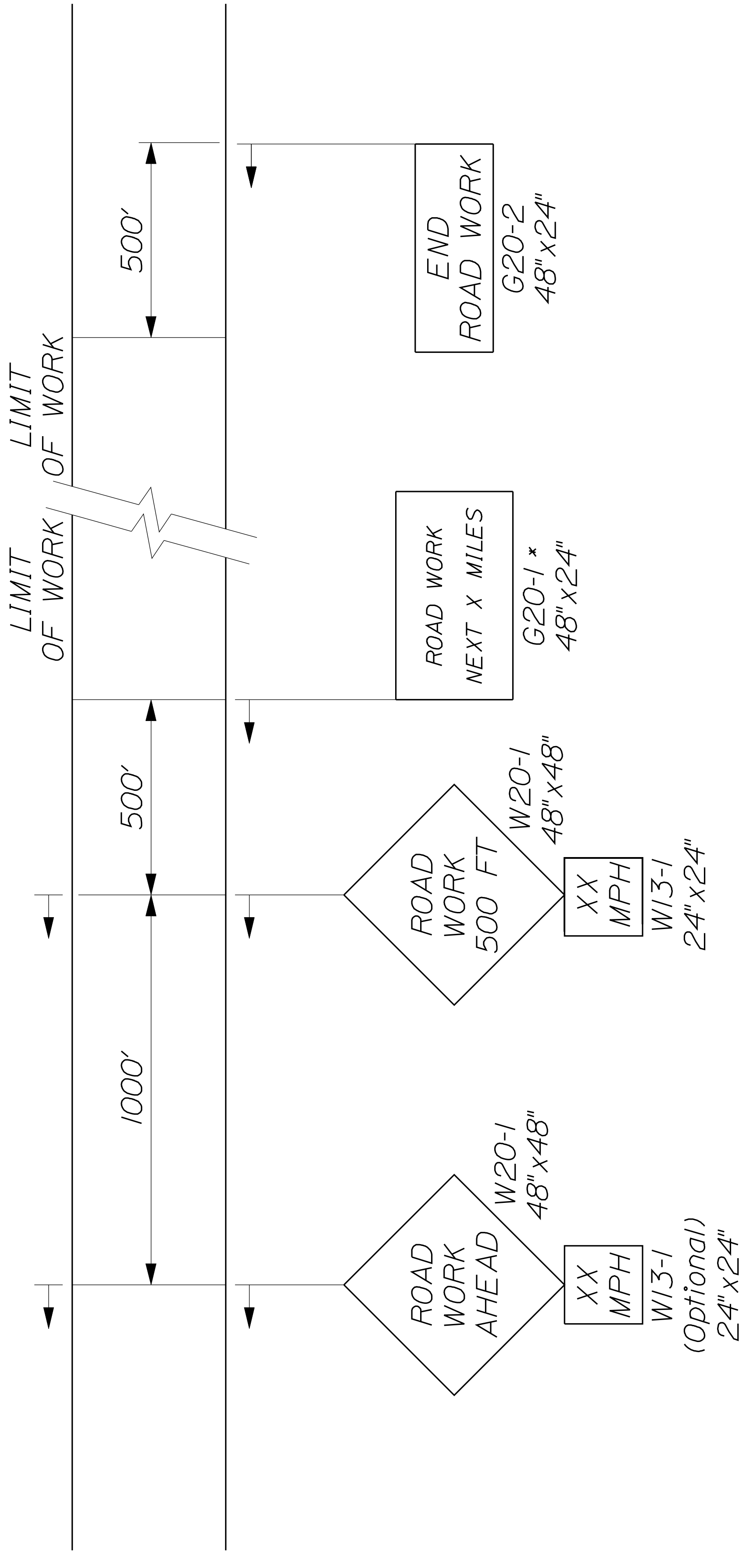
652(09)

NOTES:

1. Barrier placement is in accordance with the most current edition of the AASHTO Roadside Design Guide.
2. Terminate barrier ends outside the clear zone or protect the ends with an impact attenuator.
3. Right lane closure is shown. For left lane closure, substitute signing with W20-5L & W4-2L.



~ TYPICAL APPLICATION: NON-INTERSTATE, ONE-WAY, TWO LANE ROADWAY, CLOSING ONE LANE, USING TEMPORARY CONCRETE BARRIER (55 MPH OR LESS) ~



* Round to nearest mile & do NOT use if project length is less than ¾ of a mile

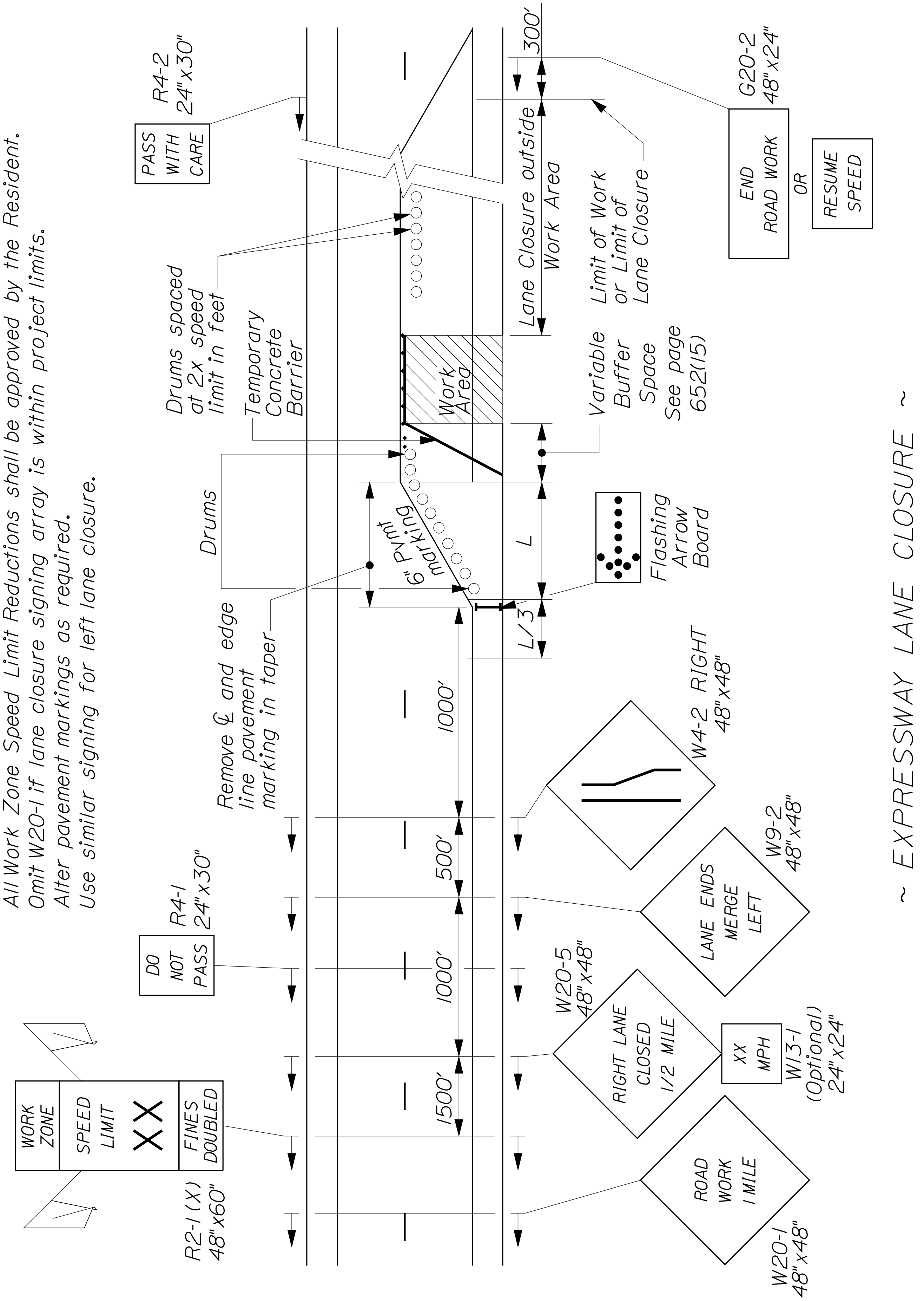
~ PROJECT APPROACH SIGNING ~
EXPRESSWAY

CONSTRUCTION TRAFFIC CONTROL

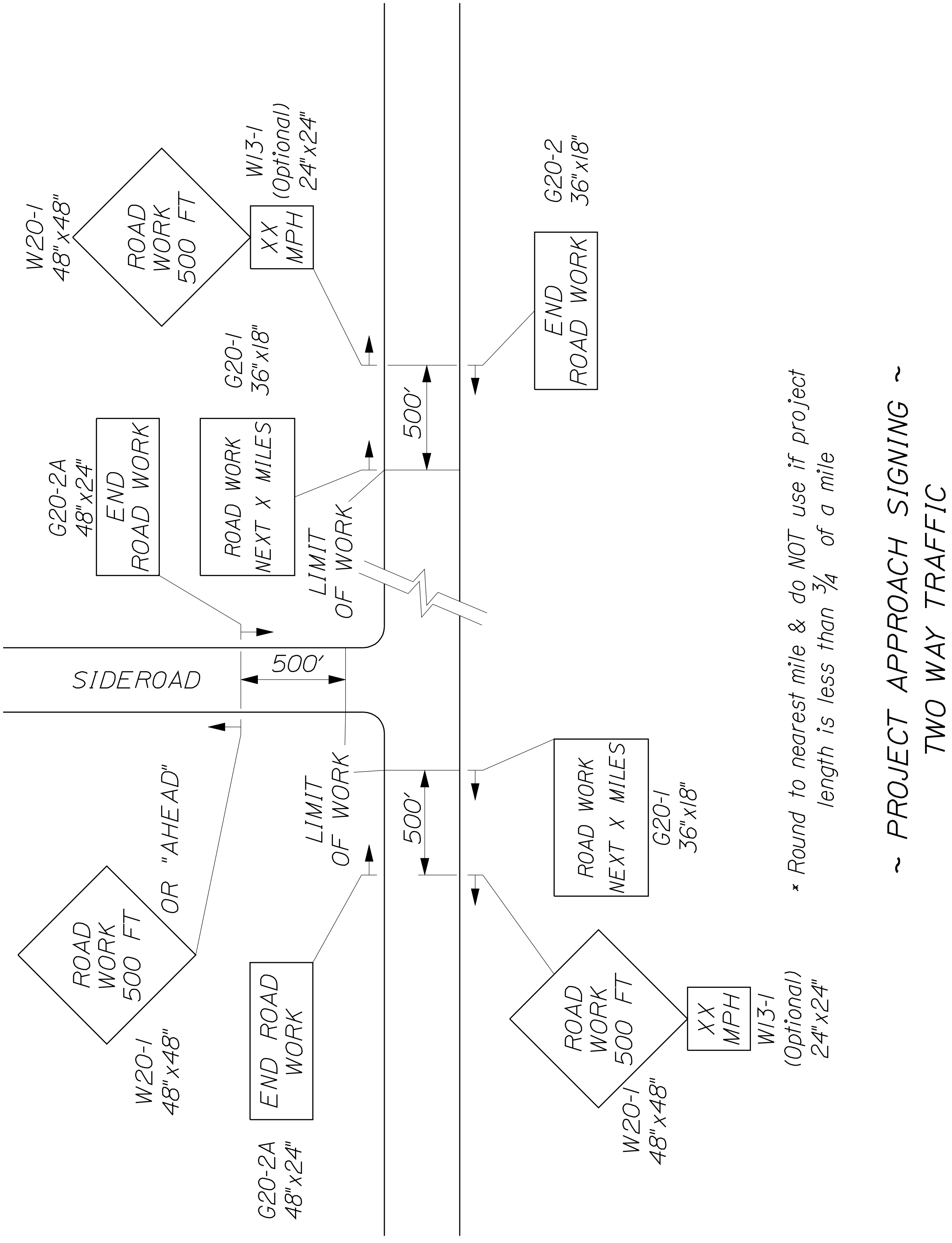
652(10)

~ EXPRESSWAY LANE CLOSURE ~

NOTES:
All Work Zone Speed Limit Reductions shall be approved by the Resident.
Omit W20-1 if lane closure signing array is within project limits.
Alter pavement markings as required.
Use similar signing for left lane closure.



CONSTRUCTION TRAFFIC CONTROL

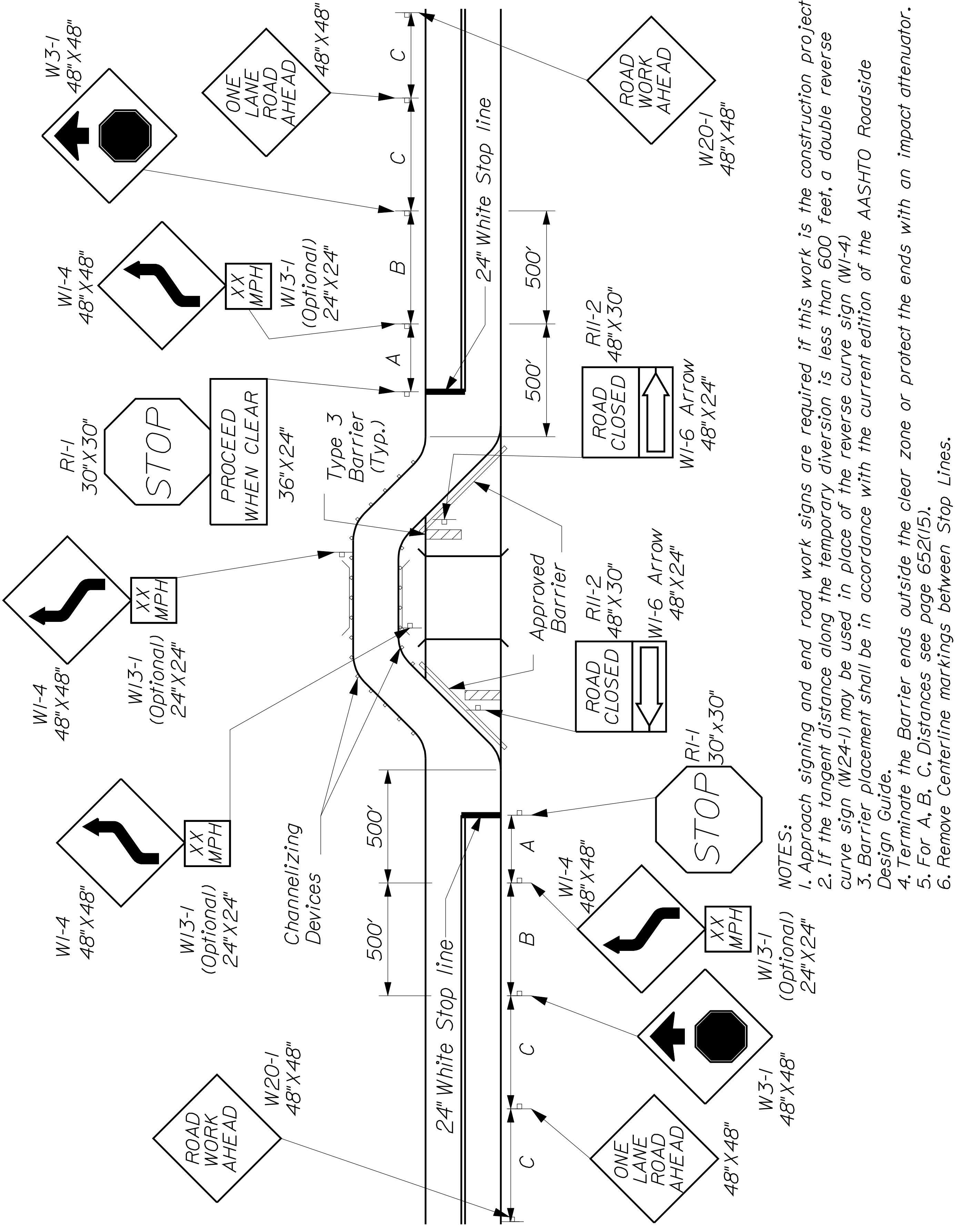


* Round to nearest mile & do NOT use if project length is less than 3/4 of a mile

~ PROJECT APPROACH SIGNING ~
TWO WAY TRAFFIC

CONSTRUCTION TRAFFIC CONTROL

652(12)

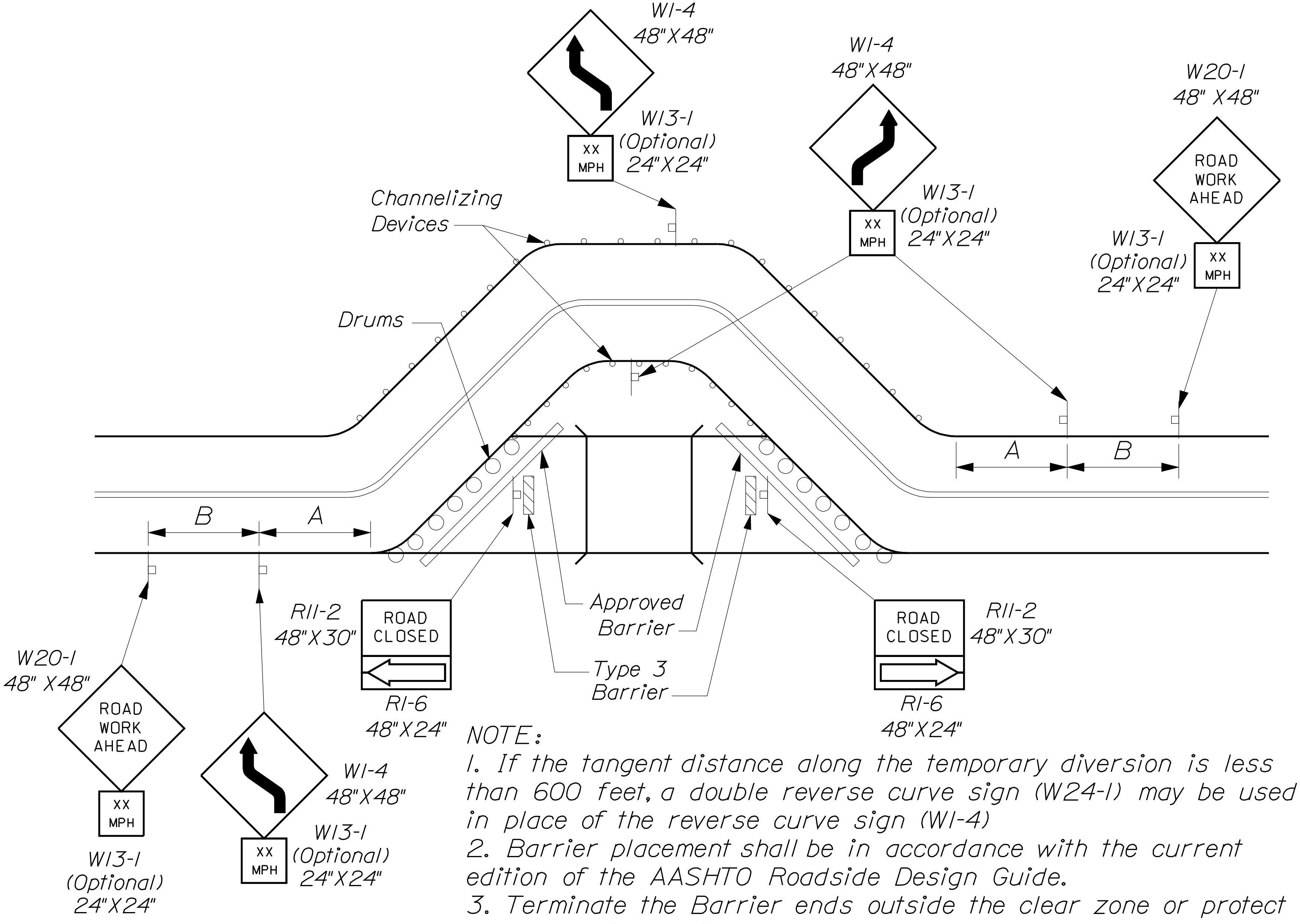


NOTES:
1. Approach signing and end road work signs are required if this work is the construction project.
2. If the tangent distance along the temporary diversion is less than 600 feet, a double reverse curve sign (W24-1) may be used in place of the reverse curve sign (W1-4)
3. Barrier placement shall be in accordance with the current edition of the AASHTO Roadside Design Guide.
4. Terminate the Barrier ends outside the clear zone or protect the ends with an impact attenuator.
5. For A, B, C, Distances see page 652(15).
6. Remove Centerline markings between Stop Lines.

ROAD CLOSURE WITH ONE LANE DIVERSION
LOW VOLUME ROAD WITH ADEQUATE SIGHT DISTANCE

ROAD CLOSURE WITH TWO WAY LANE DIVERSION

652(14)



NOTE:

1. If the tangent distance along the temporary diversion is less than 600 feet, a double reverse curve sign (W24-1) may be used in place of the reverse curve sign (W1-4)

2. Barrier placement shall be in accordance with the current edition of the AASHTO Roadside Design Guide.

3. Terminate the Barrier ends outside the clear zone or protect the ends with an impact attenuator.

4. For A, B, C, Distances see page 652(15).

~ TWO WAY TWO LANE DETOUR ~

CONSTRUCTION TRAFFIC CONTROL

652(15)

TYPE OF TAPER	TAPER LENGTH (L)*
Merging Taper	at least L
Shifting Taper	at least 0.5 L
Shoulder Taper	at least 0.33 L
One-Lane, Two-Way Traffic Taper	100 ft maximum
Downstream Taper	100 ft per lane

* Formulas for L are as follows:

For speed limits of 40 mph or less:

$$L = \frac{WS^2}{60}$$

For speed limits of 45 mph or greater:

$$L = WS$$

* Formulas for L are as follows:

A minimum of 5 channelization devices shall be used in the taper.

CHANNELIZATION DEVICE SPACING

The spacing of channelization devices shall not exceed a distance in feet equal to 1.0 times the speed limit in mph when used for taper channelization, and a distance in feet of 2.0 times the speed limit in mph when used for tangent channelization.

SIGN SPACING TABLE

Road Type	Distance Between Signs**		
	A	B	C
Urban 30 mph or less	100	100	100
Urban 35 mph and greater	350	350	350
Rural	500	500	500
Expressway / Urban Parkway	1000	1500	2640

**Distances are shown in feet.

SUGGESTED BUFFER ZONE LENGTHS

Speed (mph)	Length (feet)	Speed (mph)	Length (feet)
20	115	40	325
25	155	45	360
30	200	50	425
35	250	55	495

GENERAL NOTES;

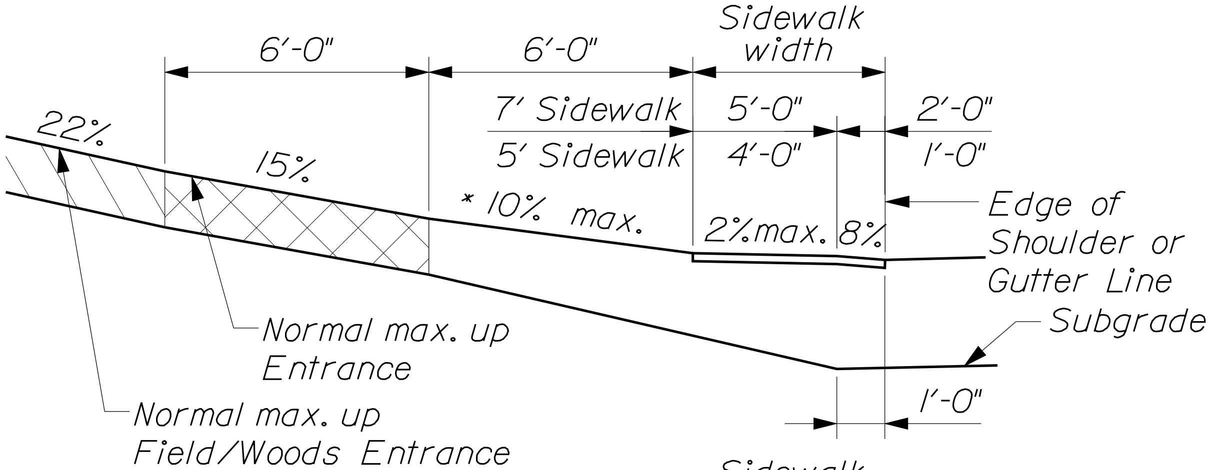
1. Final placement of signs and devices may be changed to fit field conditions as approved by the Resident.

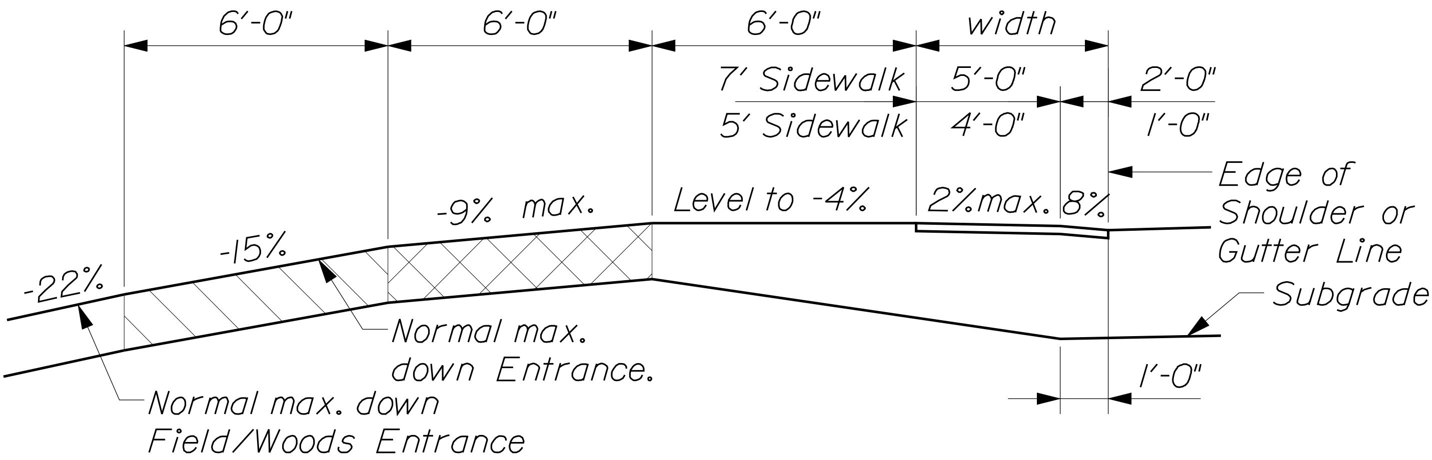
2. Maintain same number of lanes for a shifting taper.

3. Shoulder taper allowed when a minimum of 10 feet can be open from centerline for lane.

DIVISION 800

MISCELLANEOUS DETAILS





GENERAL NOTES:

1. The sidewalk width shall be paved in all cases.

2. All residential or commercial entrances 10% and over shall be paved.

NOTES ON MAXIMUM ENTRANCE PROFILES:

1. These profiles are a guide for the majority of cases, but should be field checked when the main line grade is steep (4% to 6% or greater) or the angle of approach to the entrance is unusual.

2. Generally the majority of entrances on a project will be built with flatter profiles than these maximum cases.

3. When grading entrances which are flatter than the maximum profiles the following rule of thumb should be used. Do not exceed a grade % change of more than 9% in a 6 foot increment of entrance length. This applies to both up and down profiles.

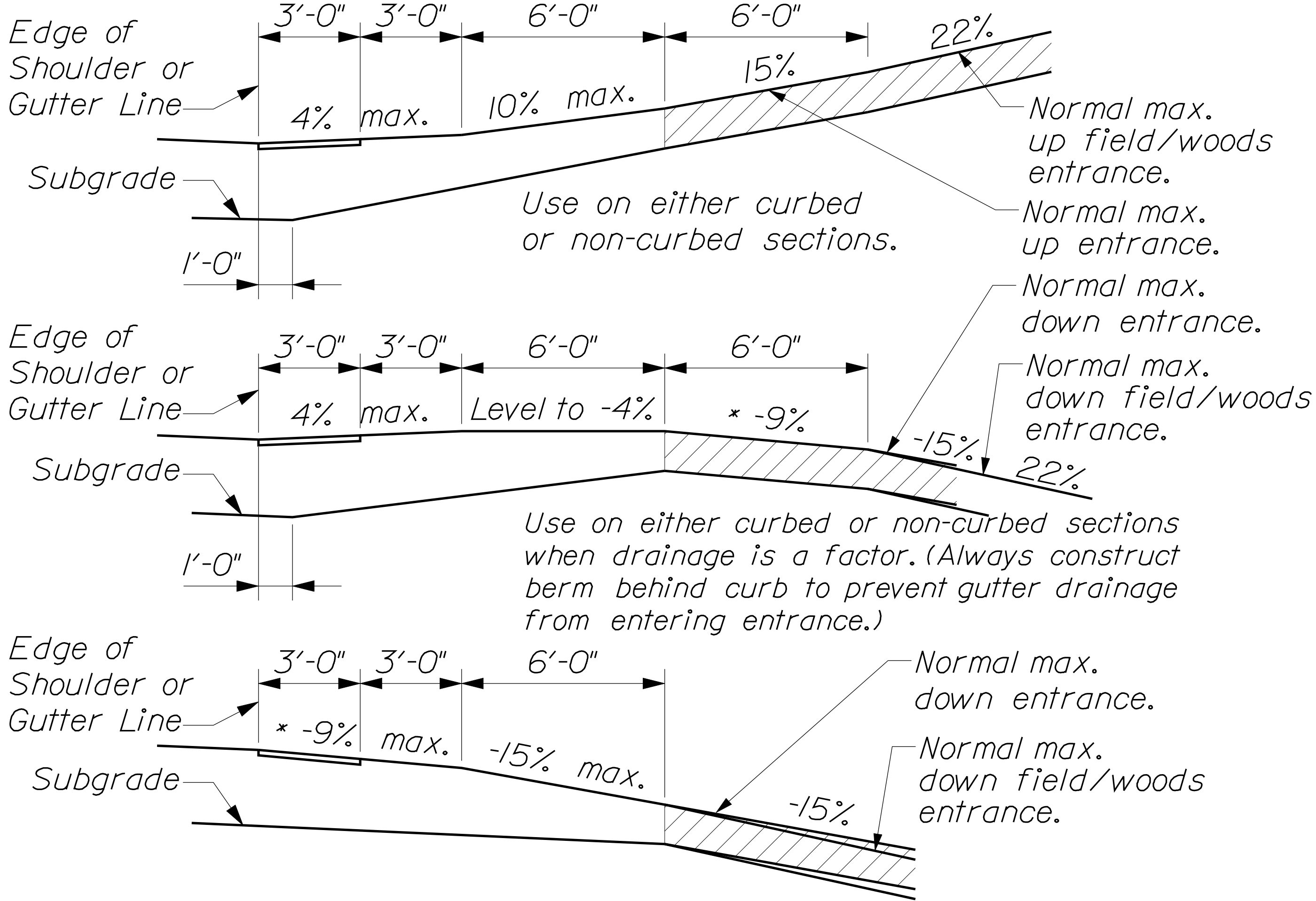
4. Entrances with grades exceeding 15% must have a design[1] exception. Field entrances with grades exceeding 22% must have a [1]design exception.

5. Any design change to an existing entrance that is steeper than (+ or -) 6% that adversely changes the grade (+ or -) by more than 3% will require a [1]design exception.

[1] Design exception to be approved by Program Manager (or designee).

ENTRANCES ON SIDEWALK SECTIONS

801(01)



Use on either curbed or non-curbed sections.

Use on either curbed or non-curbed sections when drainage is a factor. (Always construct berm behind curb to prevent gutter drainage from entering entrance.)

Use only on non-curbed sections on seasonal or limited use entrances or when drainage is not a factor.

GENERAL NOTES:

1. The first 3 feet shown as pavement shall be paved only when abutting a paved area.

2. All residential or commercial entrances 10% and over shall be paved.

NOTES ON MAXIMUM ENTRANCE PROFILES:

1. These profiles are a guide for the majority of cases, but should be field checked when the main line grade is steep (4% to 6% or greater) or the angle of approach to the entrance is unusual.

2. Generally the majority of entrances on a project should be built with flatter profiles than these maximum cases.

3. When grading entrances which are flatter than the maximum profiles the following rule of thumb should be used. Do not exceed a grade % change of more than 9% in a 6 foot increment of entrance length. This applies to both up and down profiles.

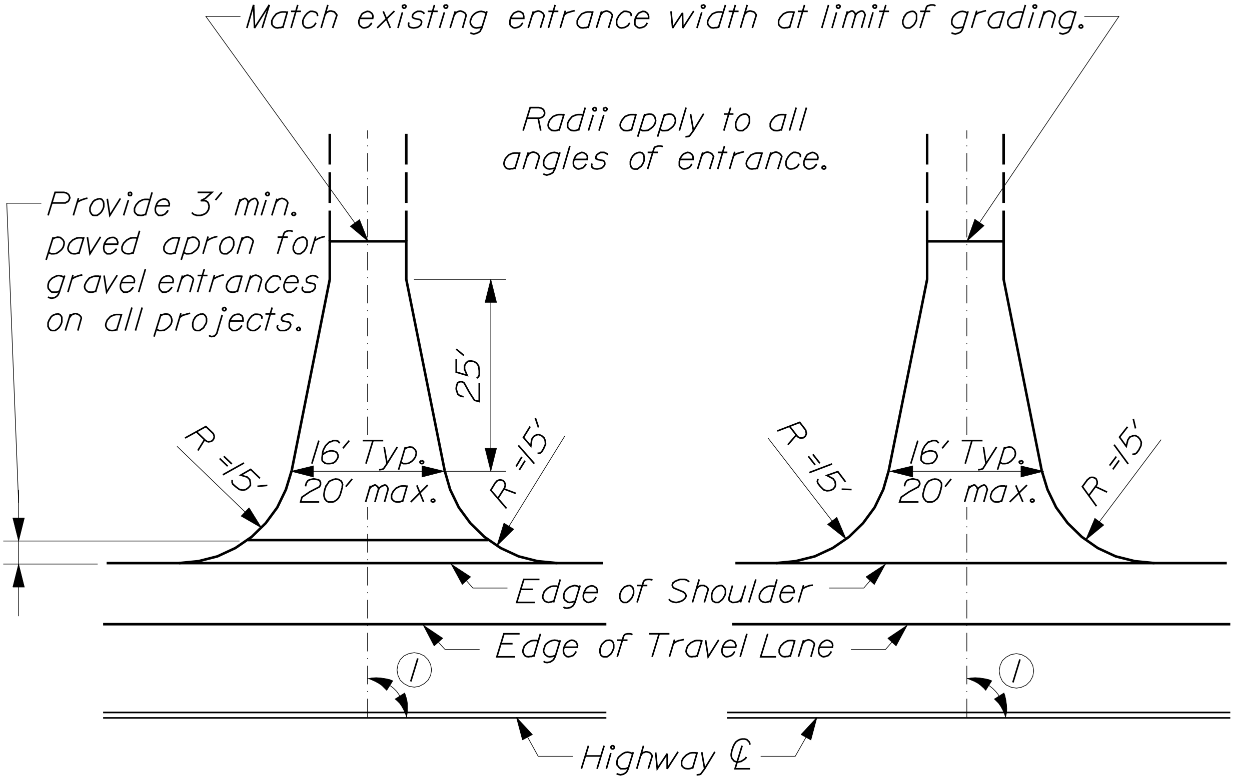
4. Entrances with grades exceeding 15% must have a [1]design exception. Field entrances with grades exceeding 22% must have a [1]design exception.

5. Any design change to an existing entrance that is steeper than (+ or -) 6% that adversely changes the grade (+ or -) by more than 3% will require a [1]design exception.

[1] Design exception to be approved by Program Manager (or designee).

ENTRANCES ON NON-SIDEWALK SECTIONS

801(02)



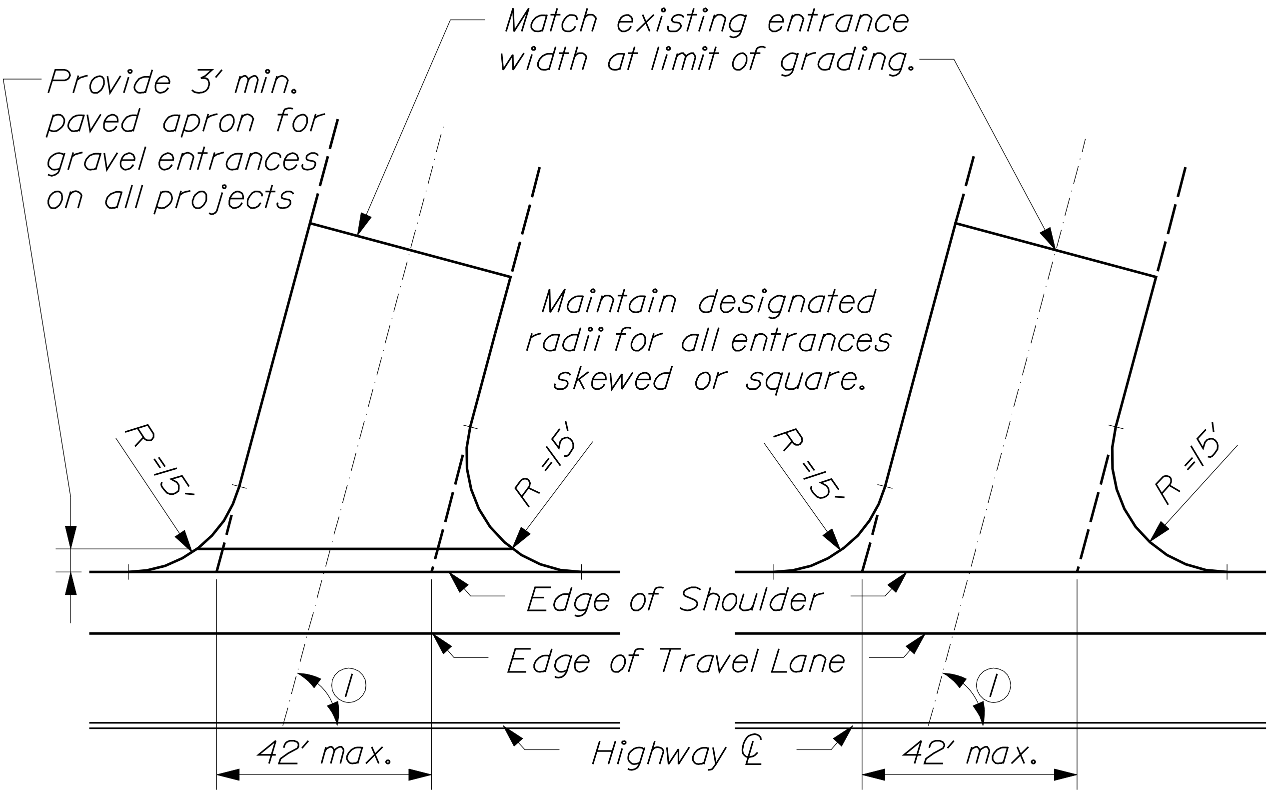
~ GRAVEL ENTRANCE ~ ~ PAVED ENTRANCE~

① Entrance angle should not be less than 45°.

RESIDENTIAL ENTRANCE ONTO UNCURBED HIGHWAY - PAVED SHOULDERS

801(03)

Entrances with a high number of truck movements may be designed on an individual basis.



Match existing entrance width at limit of grading.

Provide 3′ min. paved apron for gravel entrances on all projects

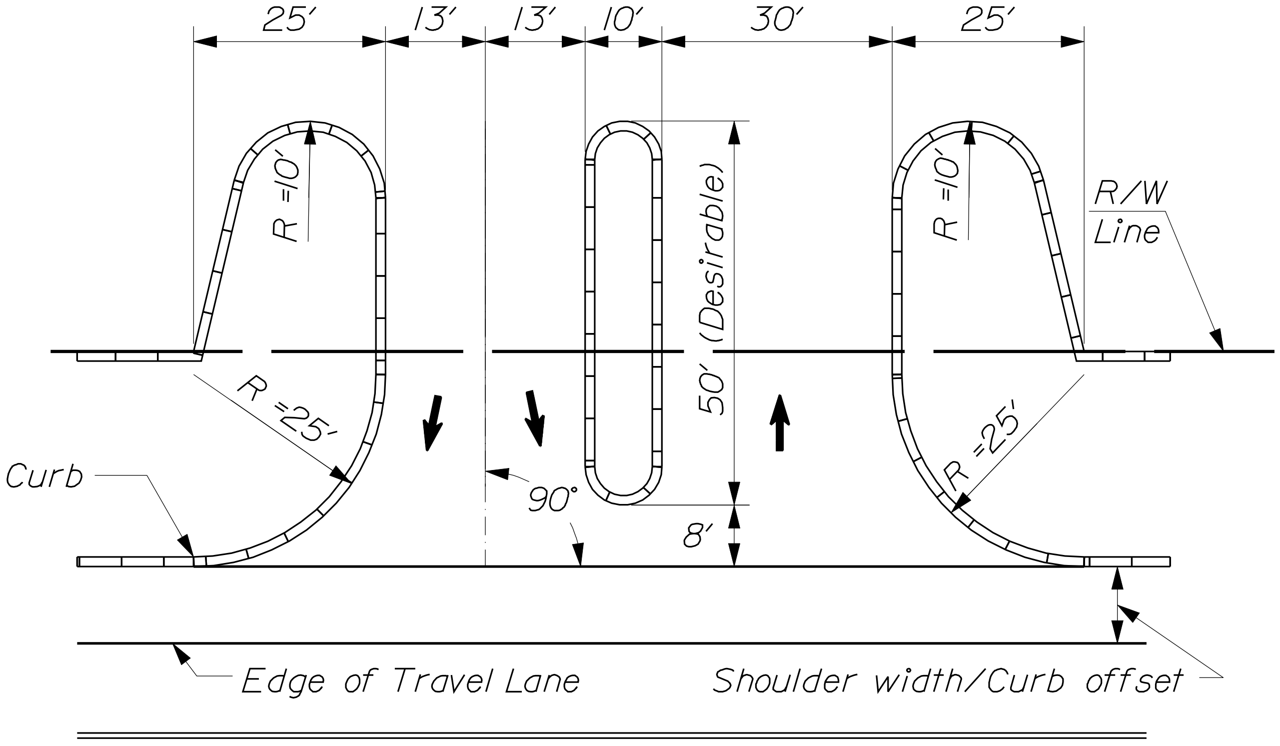
Maintain designated radii for all entrances skewed or square.

~ GRAVEL ENTRANCE ~ ~ PAVED ENTRANCE ~

① Entrance angle should not be less than 45°.

COMMERCIAL/INDUSTRIAL ENTRANCE ONTO ONTO UNCURBED HIGHWAY - PAVED SHOULDERS

801(04)



~ PAVED ENTRANCE ~

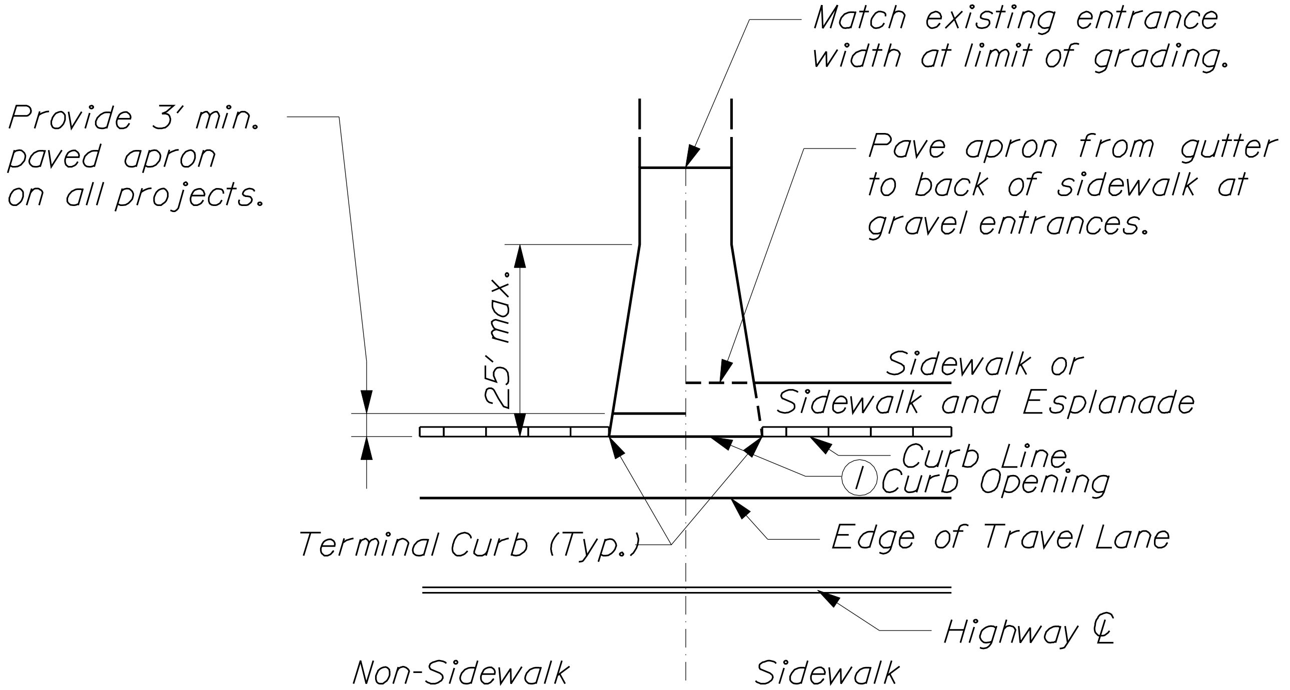
NOTES:

1. This type of entrance is suitable for other high traffic volume, public-type installations.

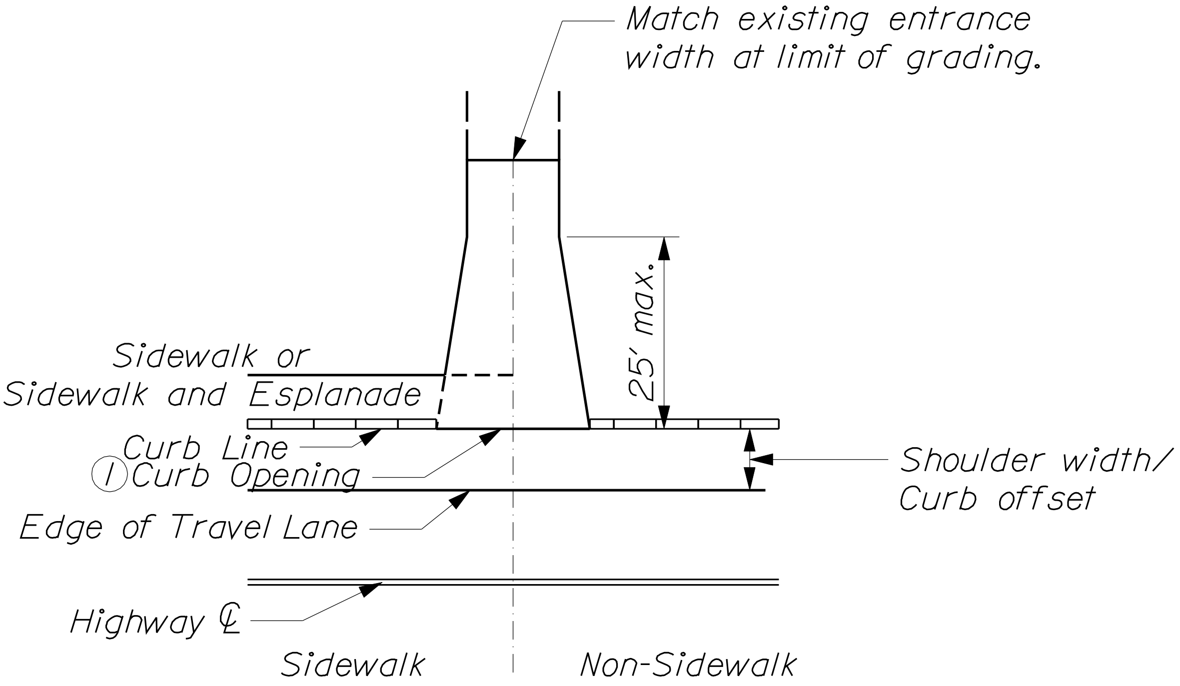
2. All island borders shall be curbed.

SHOPPING CENTER ENTRANCE ONTO HIGHWAY - PAVED SHOULDERS

801(05)



~ GRAVEL ENTRANCE ~



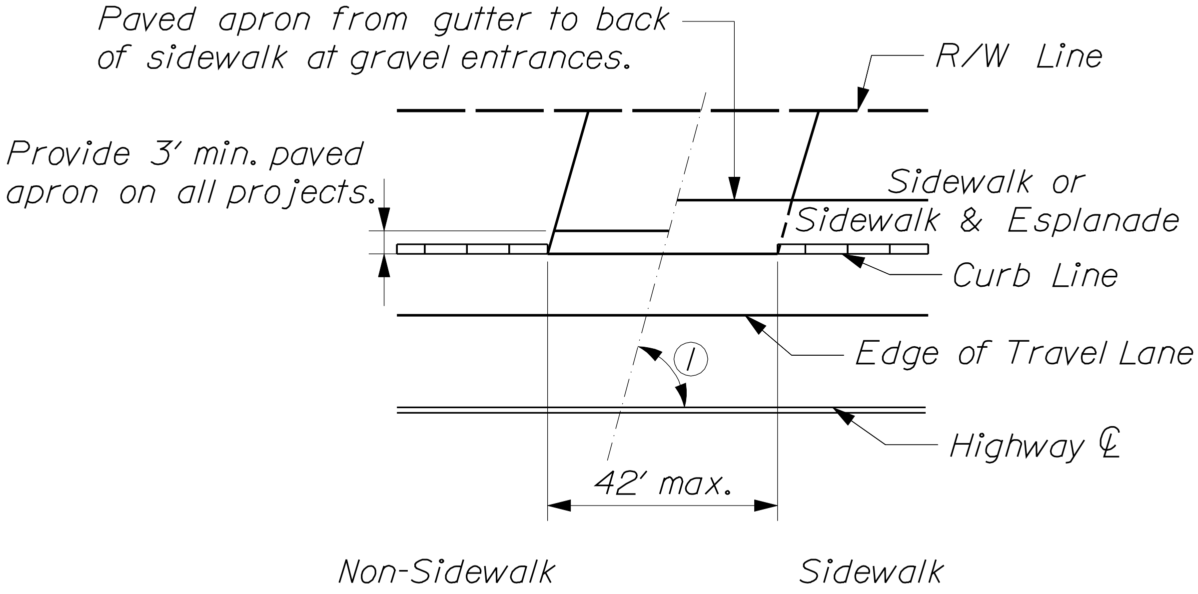
~ PAVED ENTRANCE ~

NOTES:

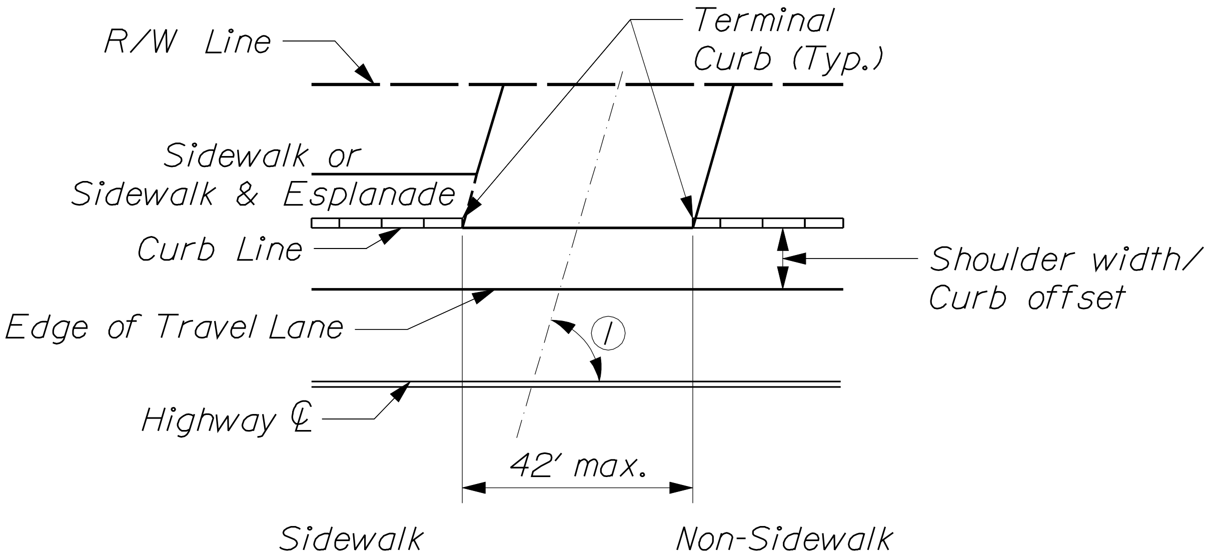
① Minimum curb opening is 20′ where the shoulder width is ≥ 6′ and 26′ where the shoulder width is < 6′.

RESIDENTIAL ENTRANCE ONTO CURBED HIGHWAY (WITH/WITHOUT SIDEWALKS)

801(06)



~ GRAVEL ENTRANCE ~



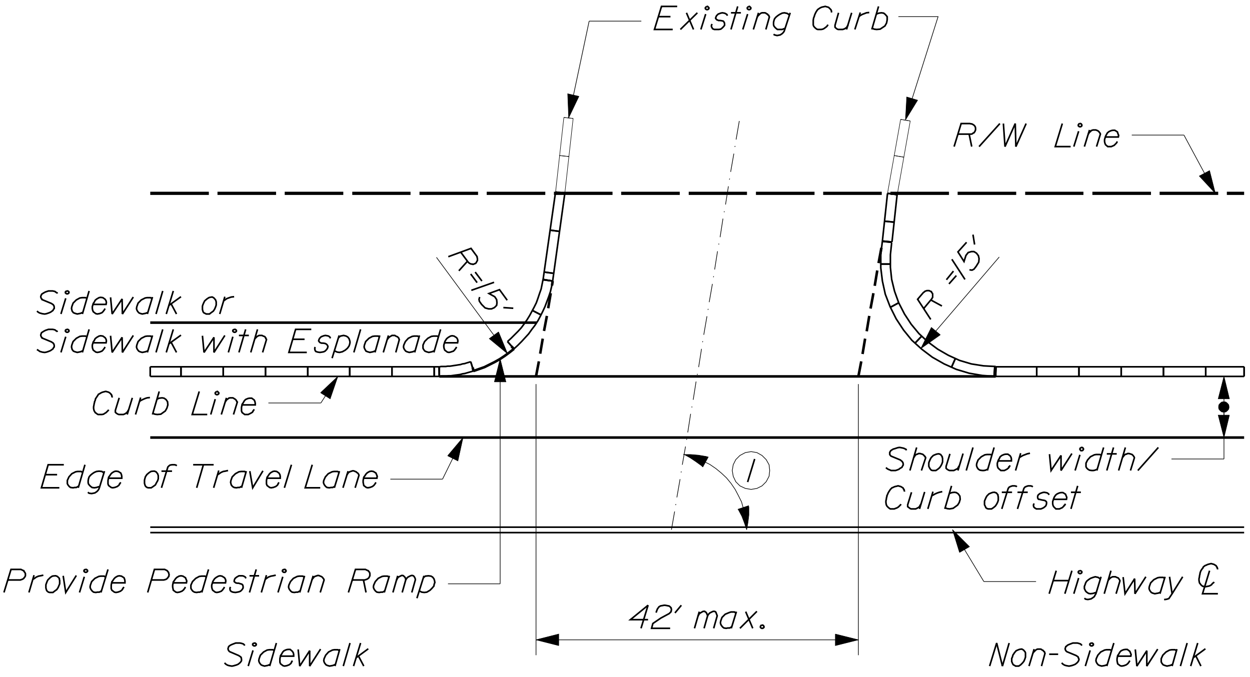
~ PAVED ENTRANCES ~

① Minimum entrance angle is 45° where the shoulder width ≥ 6′ and 60° where the shoulder width < 6′.

② If there are high truck turning volumes, the designer should consider providing turning radii of 15′ - 25′ and/or a wider opening and/or limiting the angle of turn to accomodate trucks.

UNCURBED COMMERCIAL/INDUSTRIAL ENTRANCE ONTO CURBED HIGHWAY (WITH/WITHOUT SIDEWALK)

801(07)

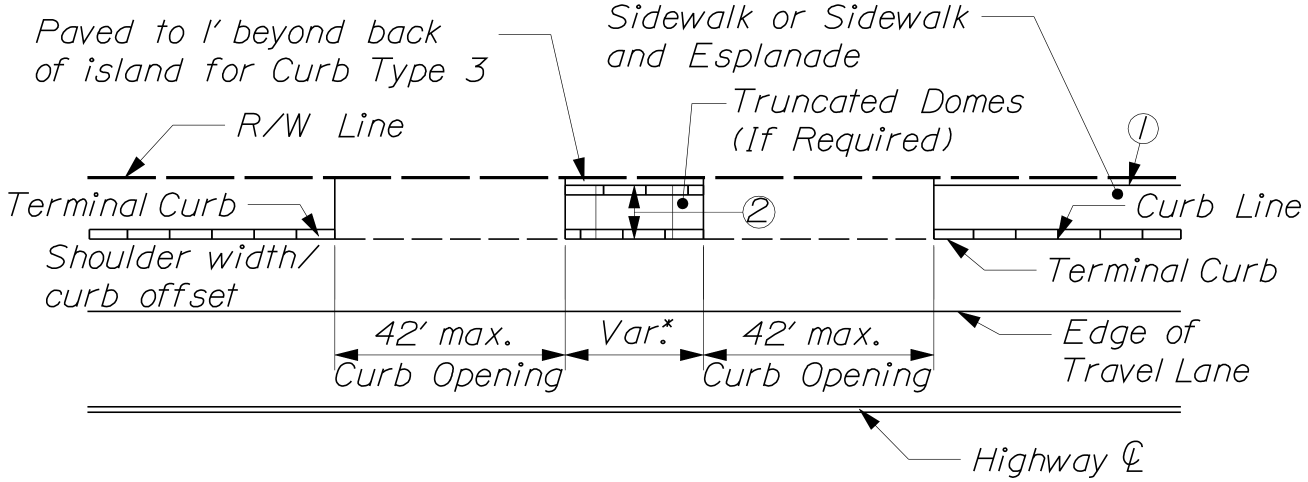


~ PAVED ENTRANCE ~

① Minimum entrance angle is 45° where the shoulder width ≥ 6' and 60° where the shoulder width < 6'.

CURBED COMMERCIAL/INDUSTRIAL ENTRANCE ONTO CURBED HIGHWAY WITH/WITHOUT SIDEWALK

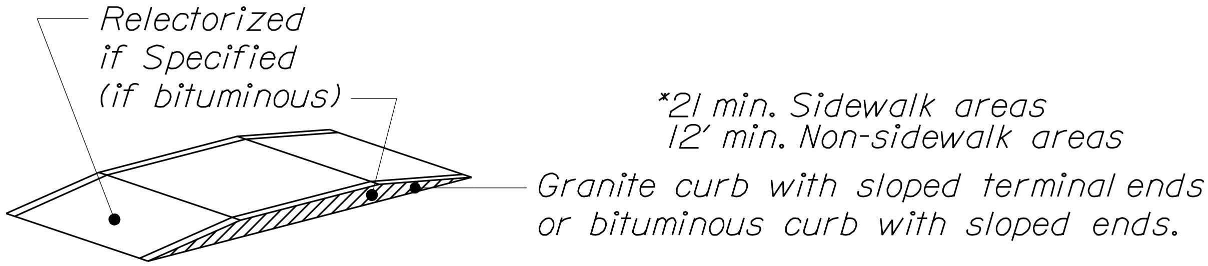
801(08)



~ NON-SIDEWALK ~

~ SIDEWALK ~

*21 min. Sidewalk areas
12' min. Non-sidewalk areas



~ CENTRAL ISLAND ~

① Where parking of Service Area abuts sidewalk, a curb, guardrail or fence should be provided.

② Island width will extend within 1' of Right-of-Way line, if practical. When island width exceeds 10', use design in figure 8-41 in Highway Design Guide.

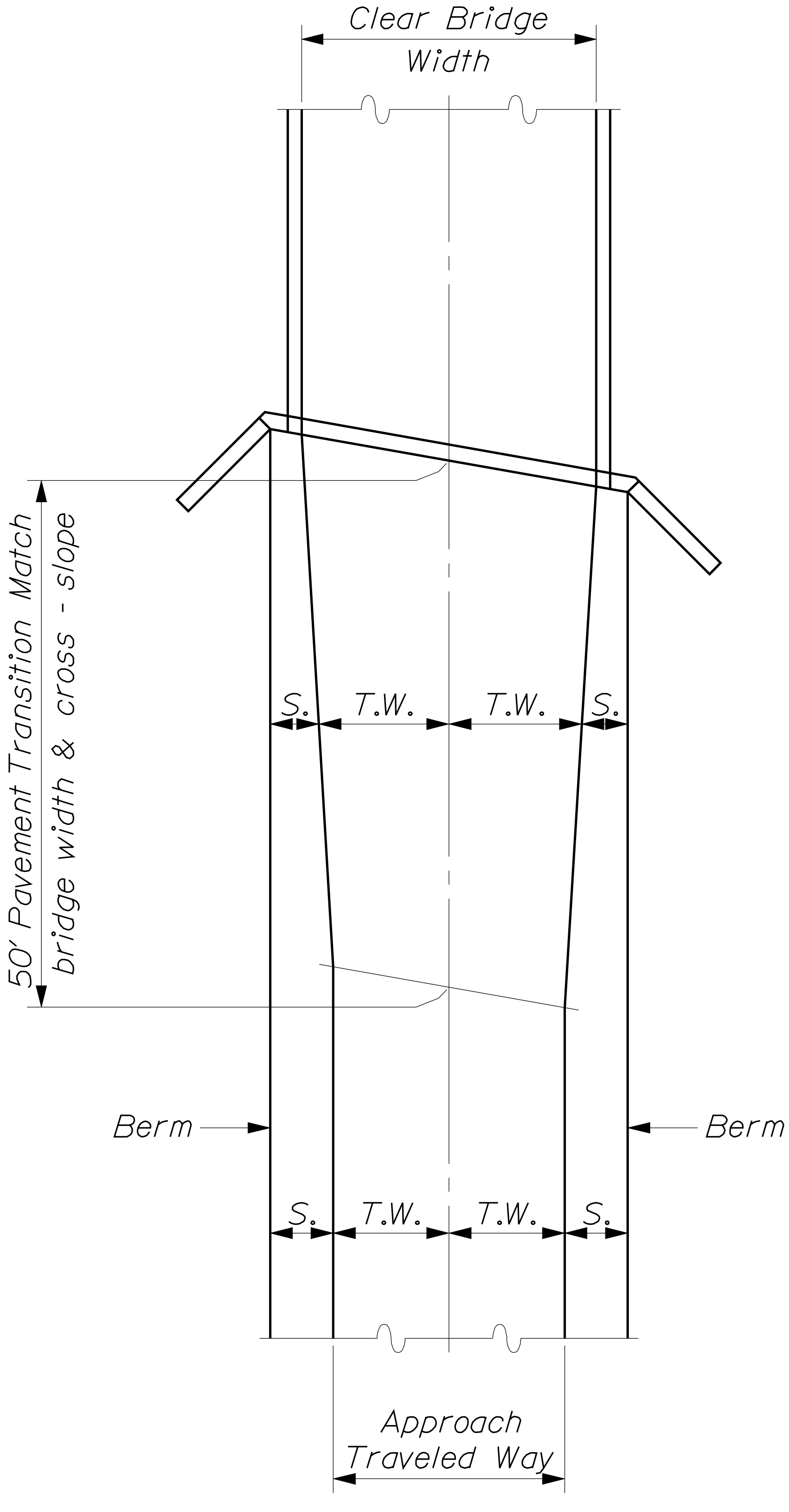
③ If there are high truck turning volumes, the designer should consider providing turning radii of 15' - 25' and/or wider opening and/or limiting the angle of turn to accomodate trucks.

④ If project requires a traffic movement permit then truncated domes will be required.

COMMERCIAL/INDUSTRIAL DOUBLE ENTRANCES ONTO CURBED HIGHWAY (NARROW RIGHT-OF-WAY)

801(09)

T.W. = Traveled Way Pavement & Cross - slope
S. = Shoulder Pavement & Cross - slope



PAVEMENT TRANSITION AT BRIDGE

801(10)

GENERAL NOTES

1. When the sidewalk is less than 5'-0" in width, a minimum pad 5'-0" x 5'-0" sloping no more than 2% shall be provided whenever a change in direction must be made.

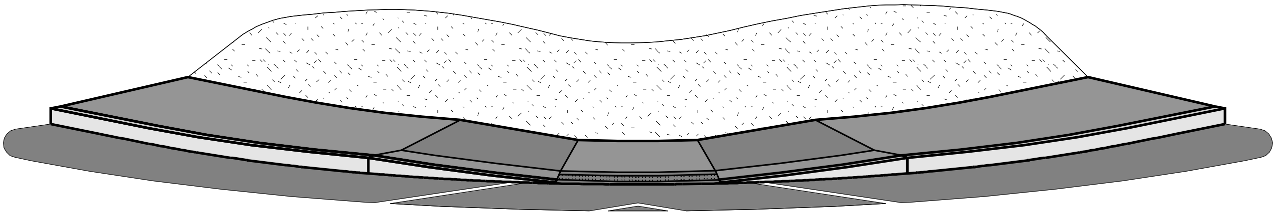
2. There shall be a minimum of 12" Aggregate Subbase Course-Gravel under the 2" pavement on pedestrian ramps.

3. Curb openings for pedestrian ramps shall be 6'-0" minimum.

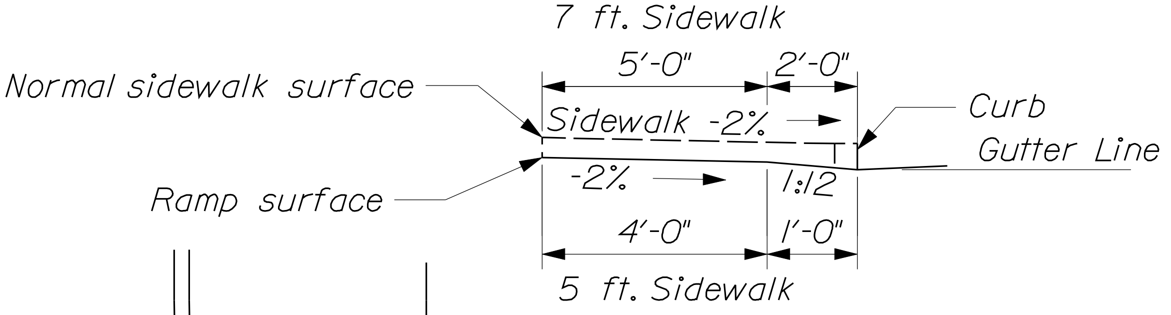
4. Detectable Warning Fields shall be installed at each pedestrian ramp in accordance with The Americans With Disabilities Act (ADA) specifications and guidelines.

PEDESTRIAN RAMP NOTES

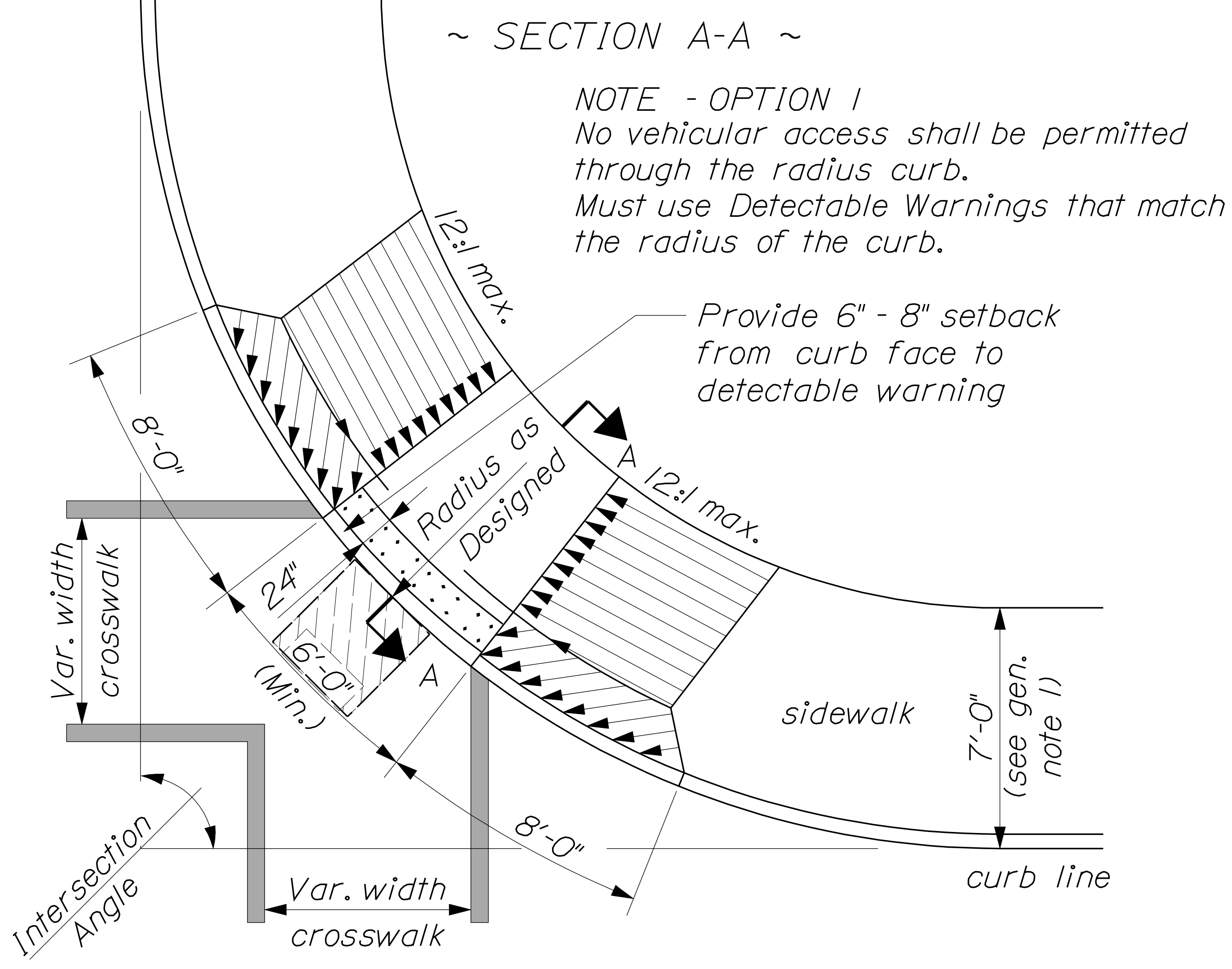
801(11)



~ PERSPECTIVE VIEW ~
(not to scale)



~ SECTION A-A ~



NOTE - OPTION 1
No vehicular access shall be permitted through the radius curb.
Must use Detectable Warnings that match the radius of the curb.

Provide 6" - 8" setback from curb face to detectable warning

Note:
This less desireable design should not be used unless design constraints require it. Does not provide directional cues. Use Option 2 when possible.

PEDESTRAIN RAMP - OPTION 1

801(12)

PEDESTRIAN RAMPS - OPTION 2

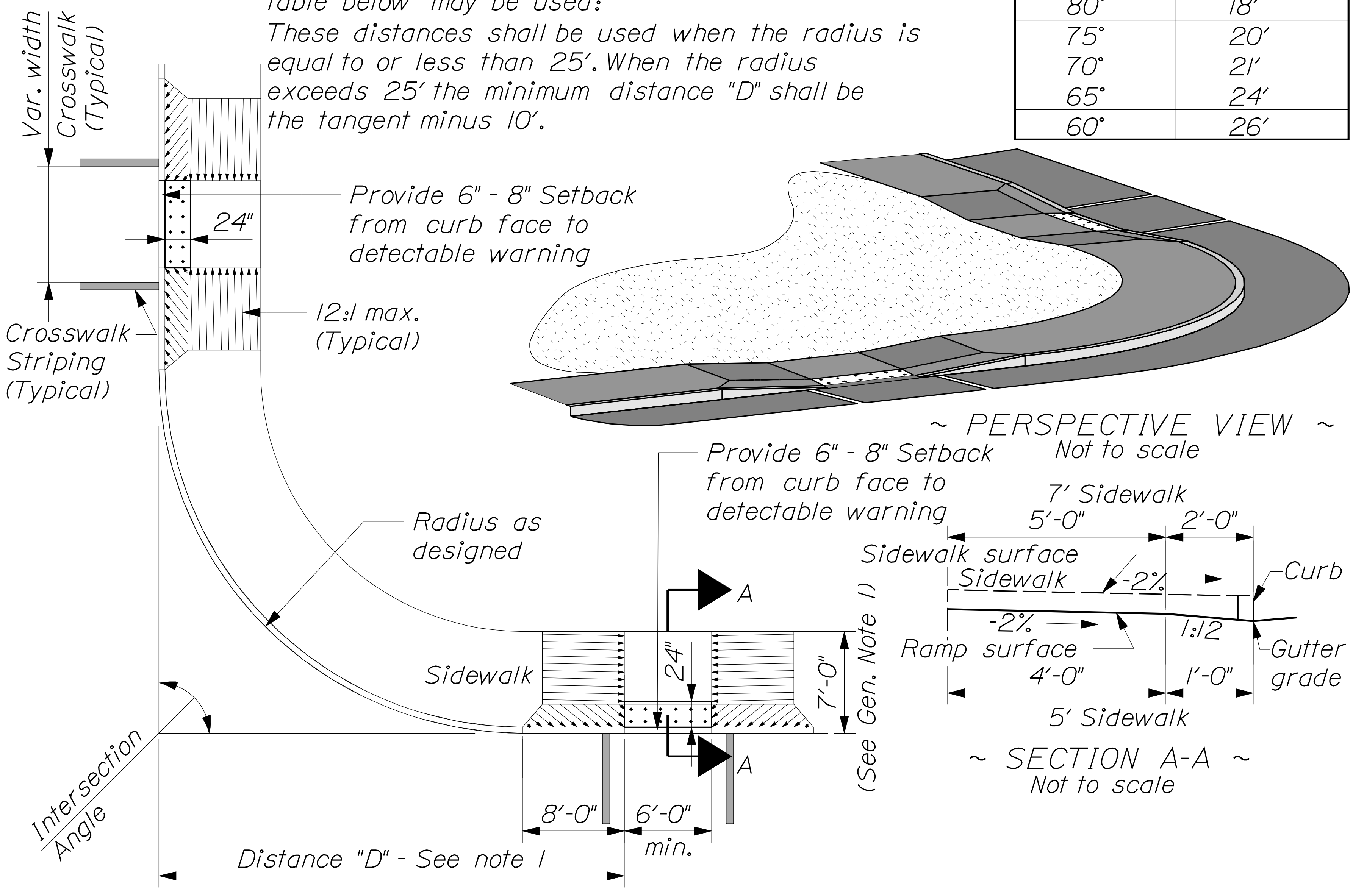
801(13)

NOTES - OPTION 2

The desirable distance "D" is the tangent distance of the curb radius plus 7′. When local conditions do not permit the use of this distance the distances shown in the table below may be used:

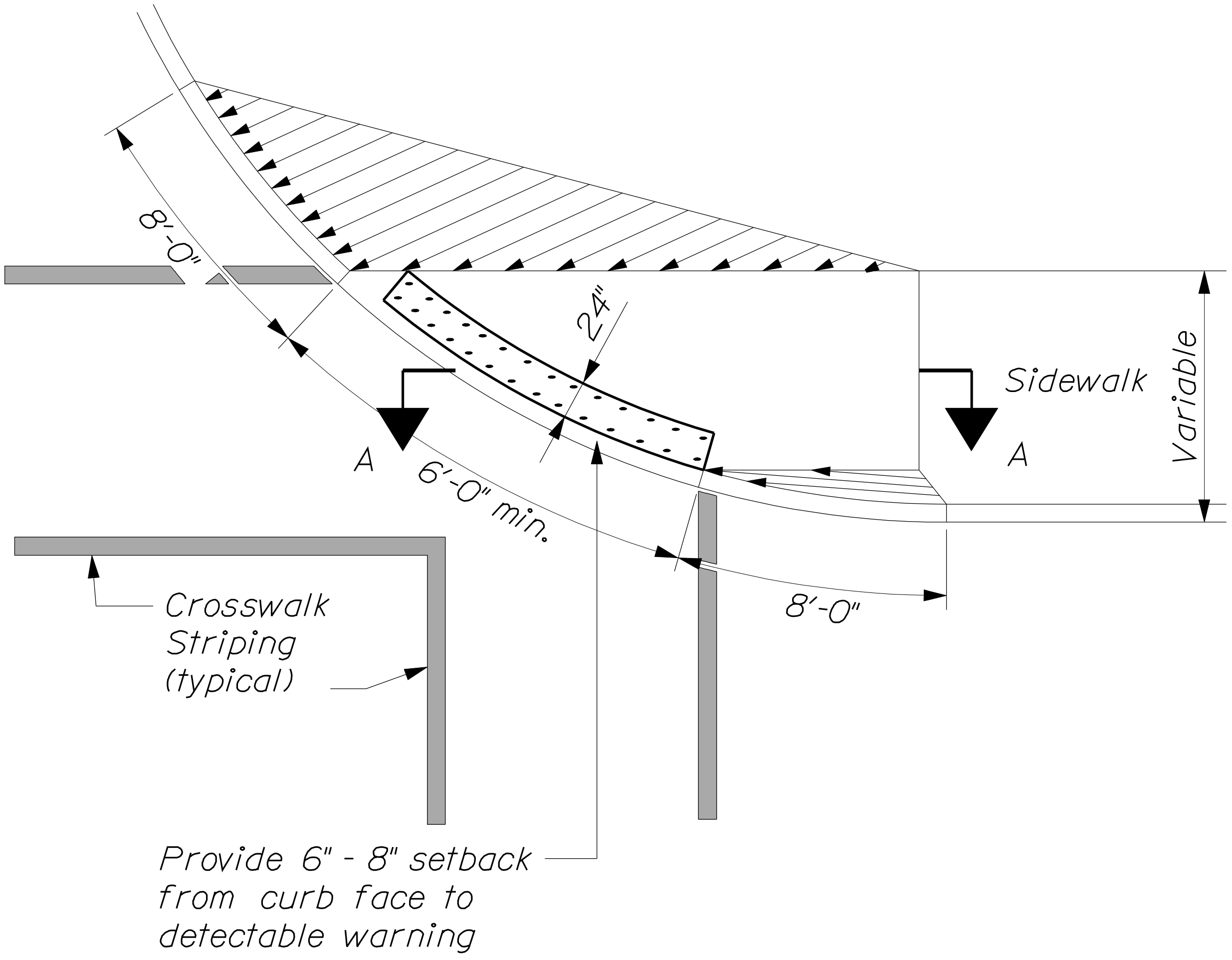
These distances shall be used when the radius is equal to or less than 25′. When the radius exceeds 25′ the minimum distance "D" shall be the tangent minus 10′.

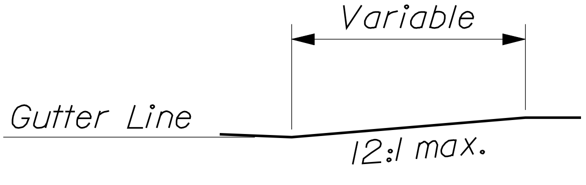
Intersection Angle	Absolute Minimum "D"
90°	15′
85°	16′
80°	18′
75°	20′
70°	21′
65°	24′
60°	26′



~ PERSPECTIVE VIEW ~
Not to scale

~ SECTION A-A ~
Not to scale





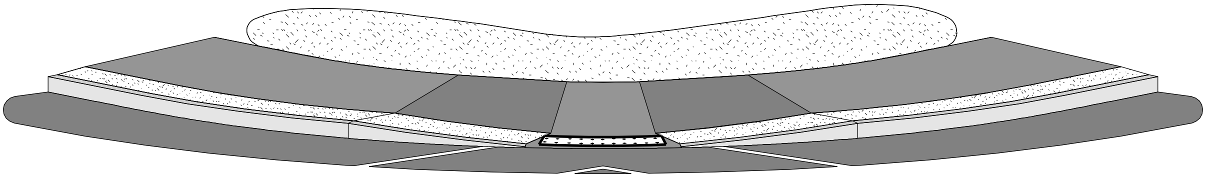
~ SECTION A-A ~

Note:
This less desireable design should not be used unless design constraints require it. Does not provide directional cues. Use Option 2 when possible.

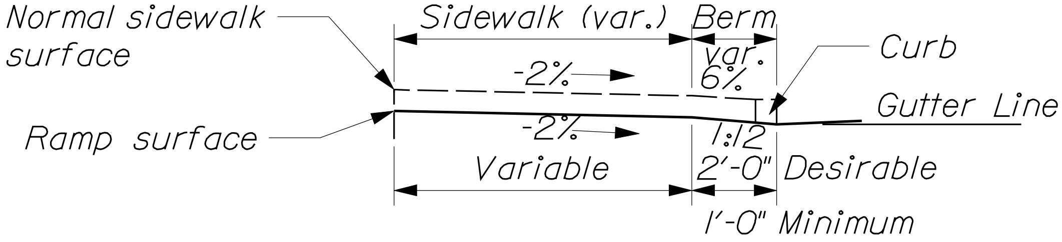
Must use Detectable Warnings that match the radius of the curb.

PEDESTRIAN RAMPS - OPTION 3

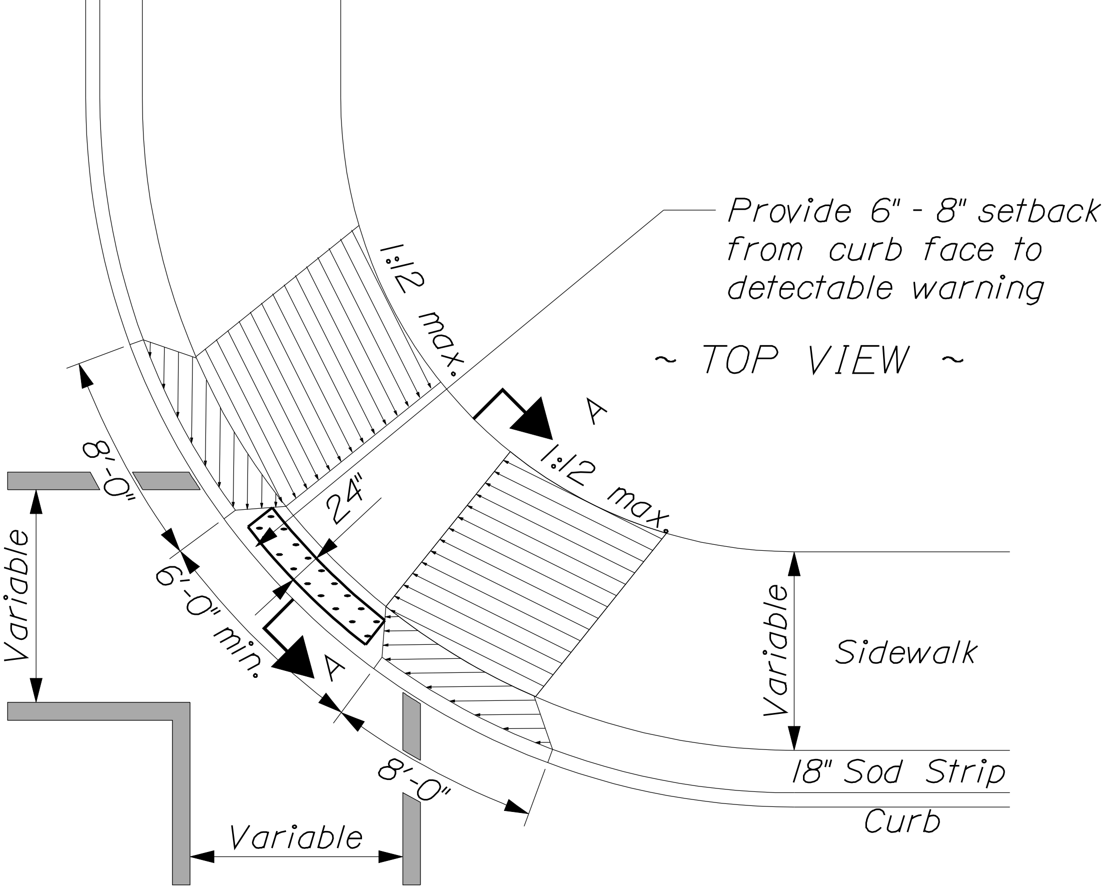
801(14)



~ PERSPECTIVE VIEW ~



~ SECTION A-A ~



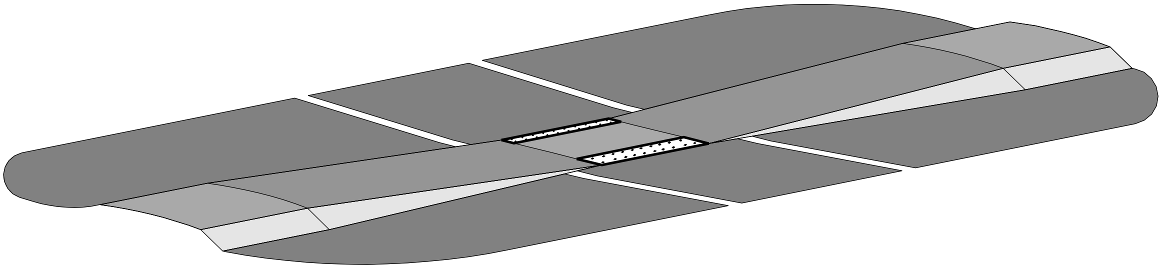
~ TOP VIEW ~

Note:
This less desireable design should not be used unless design constraints require it. Does not provide directional cues. Use Option 2 when possible.

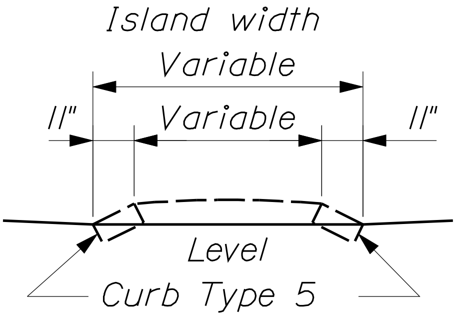
Must use Detectable Warnings that match the radius of the curb.

PEDESTRIAN RAMP WITH BERM

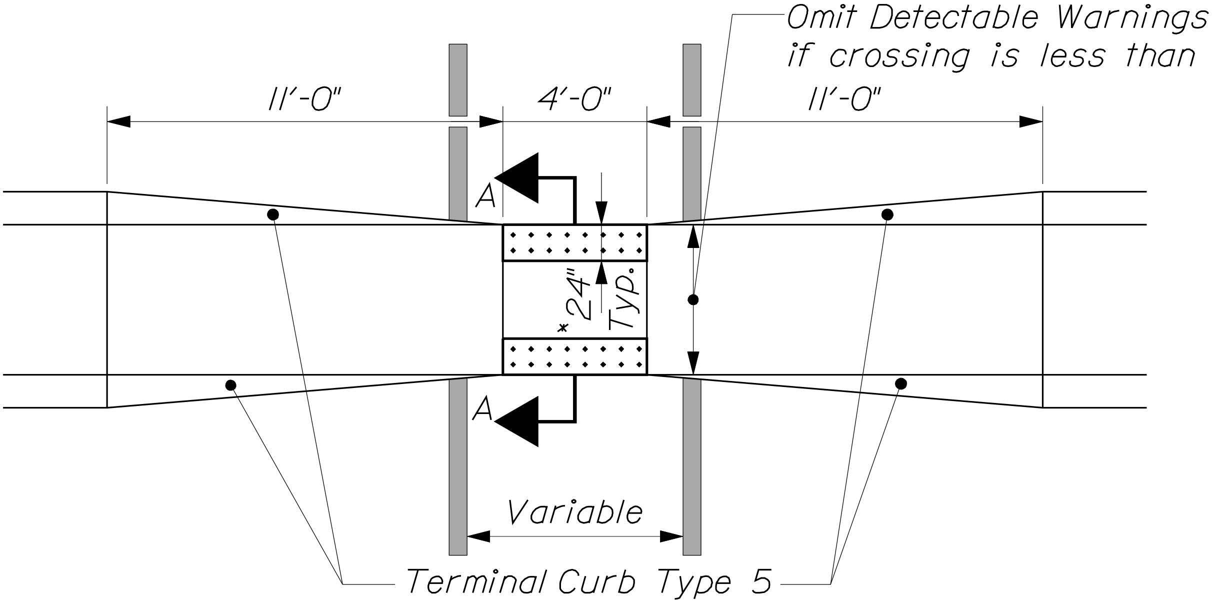
801(15)



~ PERSPECTIVE VIEW ~



~ SECTION A-A ~

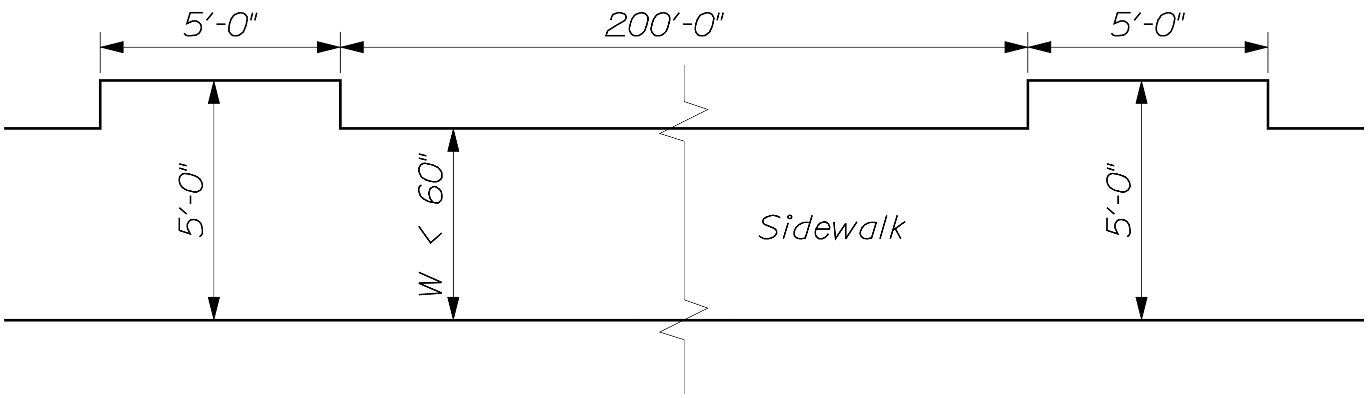


~ TOP VIEW ~

*24" Except where island or medians are less than 4' wide. The detectable warning should extend across the full length of the cut through the island or median.

PEDESTRIAN RAMP
ISLAND - CURB TYPE 5

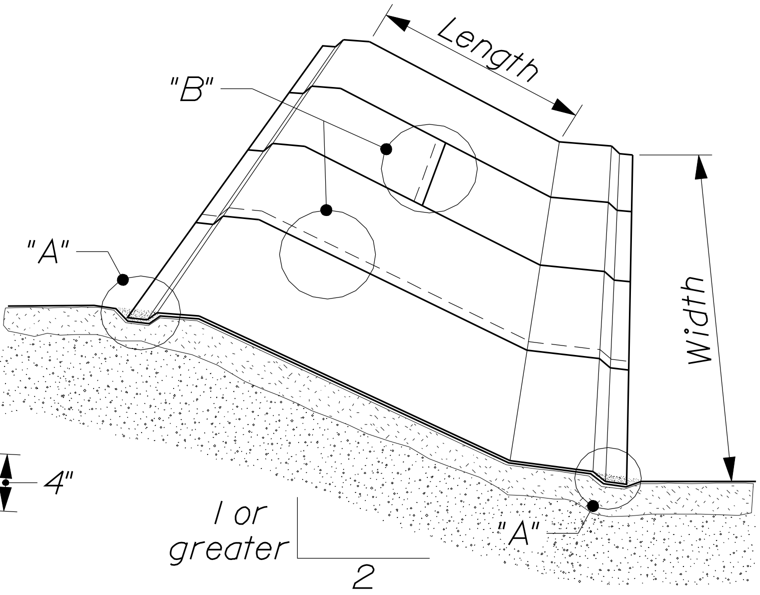
801(16)



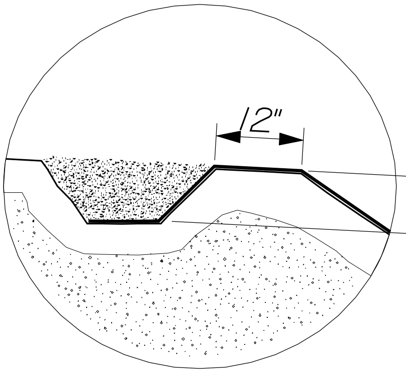
Sidewalks less than 60″ in width require a
5′-0″ x 5′-0″ passing area every 200′.

PEDESTRIAN PASSING AREAS

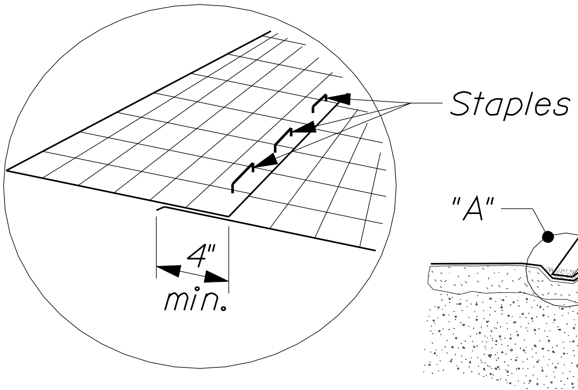
801(17)



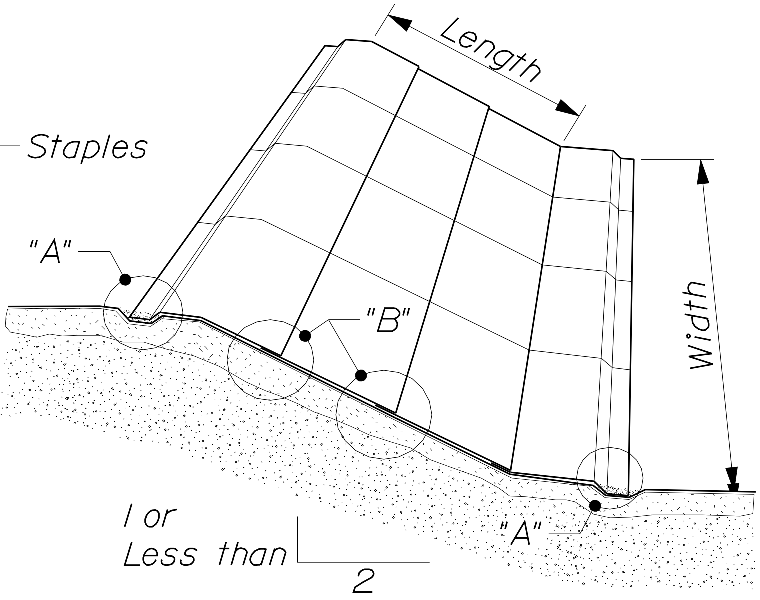
~ STEEP SLOPES ~



~ DETAIL "A" ~
Anchor Trench



~ DETAIL "B" ~
Lap Joint



~ MODERATE SLOPES ~

NOTES:

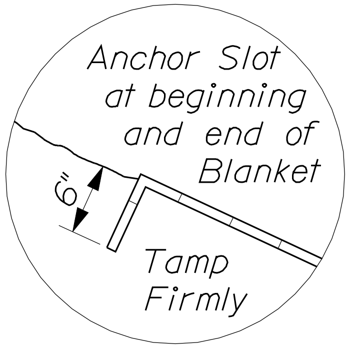
1. Width may vary depending on type of material chosen.
2. Follow Manufacturer's recommendations for anchoring blanket ends, overlaps, and staple spacing. Dimensions for these activities are to be used as a minimum.
3. Staples may be as provided or biodegradable staples according to the Qualified Products List*.
4. See section 717.061 of the MaineDOT Standard Specification or MaineDOT Qualified Products List*.

*http://www.maine.gov/mdot/transportation-research/qpl.php

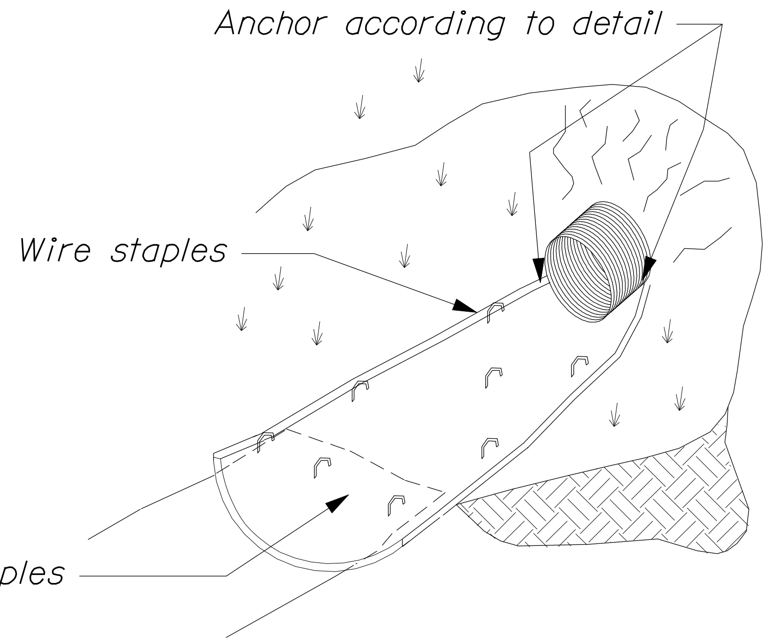
5. Reference the most recent version of the MaineDOT Best Management Practices for Erosion and Sedimentation Control Manual.

EROSION CONTROL BLANKET SLOPE APPLICATION

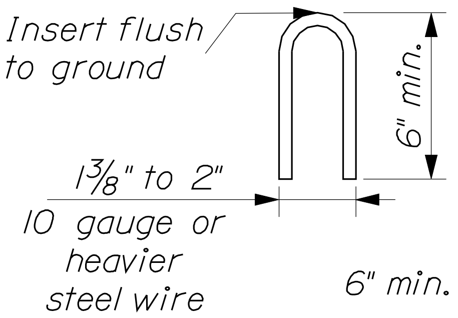
802(01)



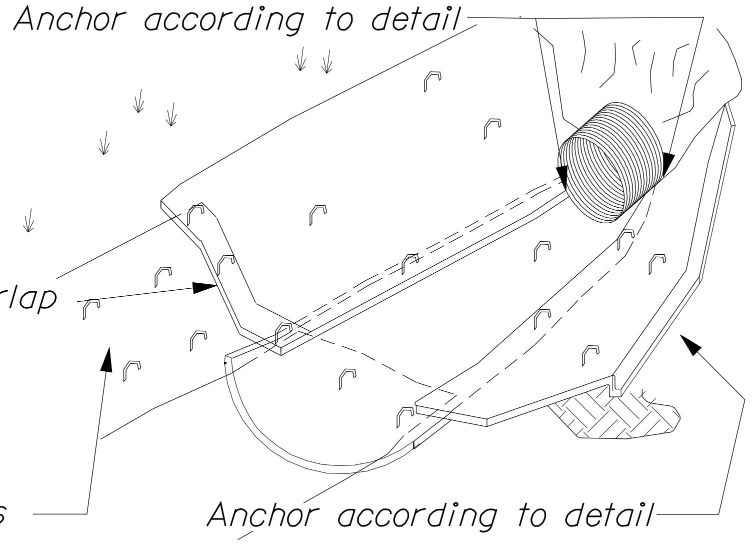
~ ANCHOR DETAIL ~



~ UNCOVERED CHANNEL SIDE SLOPES ~



~ WIRE STAPLE ~



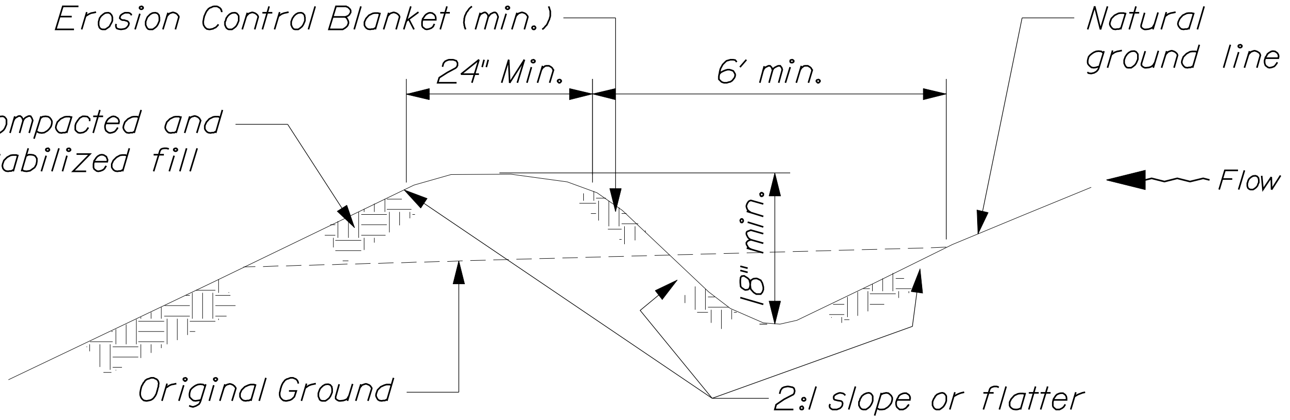
~ COVERED CHANNEL SIDE SLOPES ~

NOTES:

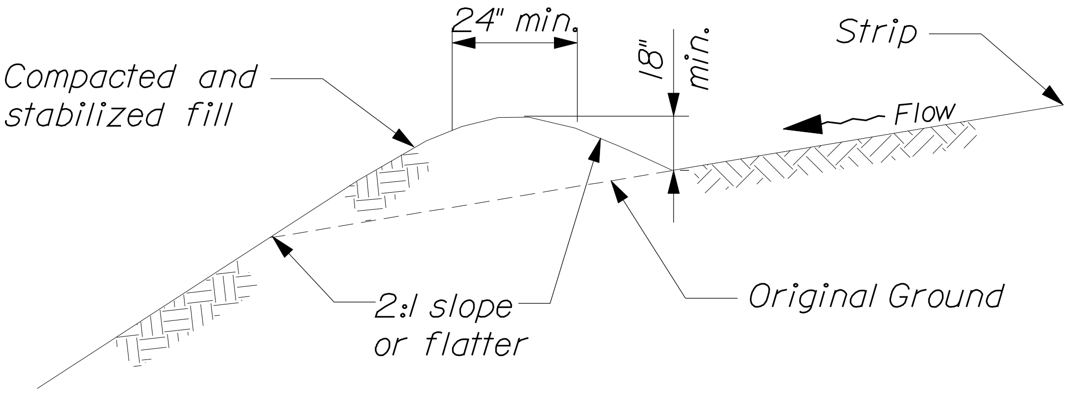
1. Width may vary depending on design flows, channel side slopes, and type of material chosen.
2. Follow Manufacturer's recommendations for anchoring blanket ends, overlaps, and staple spacing. Dimensions shown for these activities are to be used as a minimum.
3. Staples may be as provided or biodegradable staples according to the Qualified Products List*.
4. See Section 717.061 of the MaineDOT Standard Specifications or MaineDOT Qualified Products List*.
*http://www.maine.gov/mdot/transportation-research/qpl.php
5. Reference the most recent version of the MaineDOT Best Management Practices for Erosion and Sedimentation Control Manual.

EROSION CONTROL BLANKET DITCH APPLICATIONS

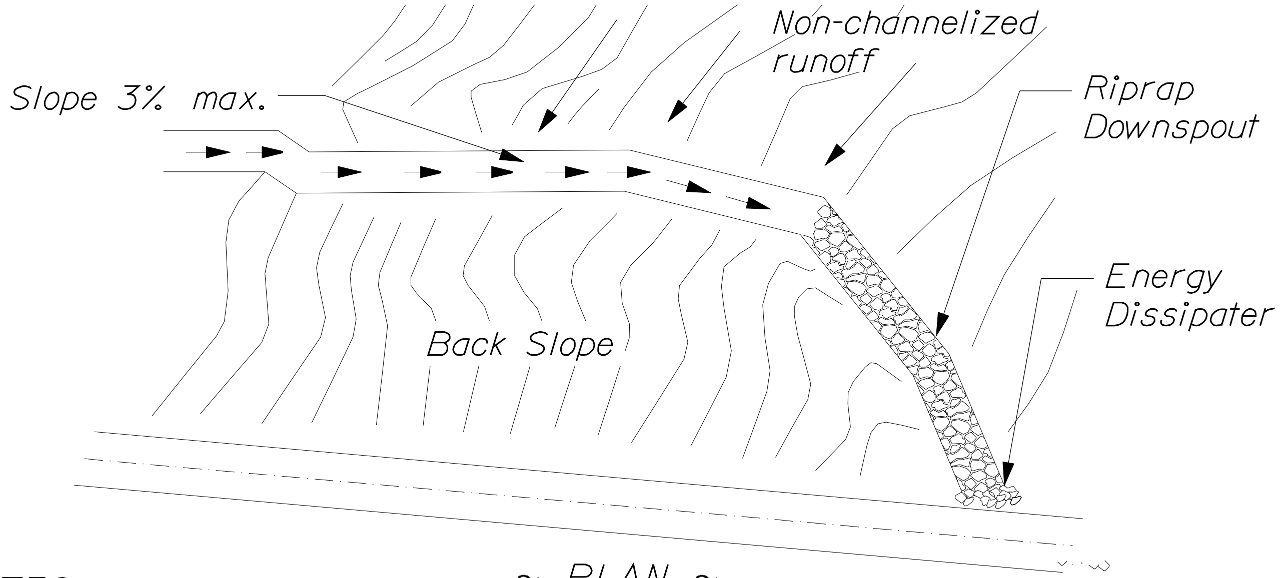
802(02)



~ EXCAVATED DIVERSION ~



~ FILL PLACED DIVERSION ~



~ PLAN ~

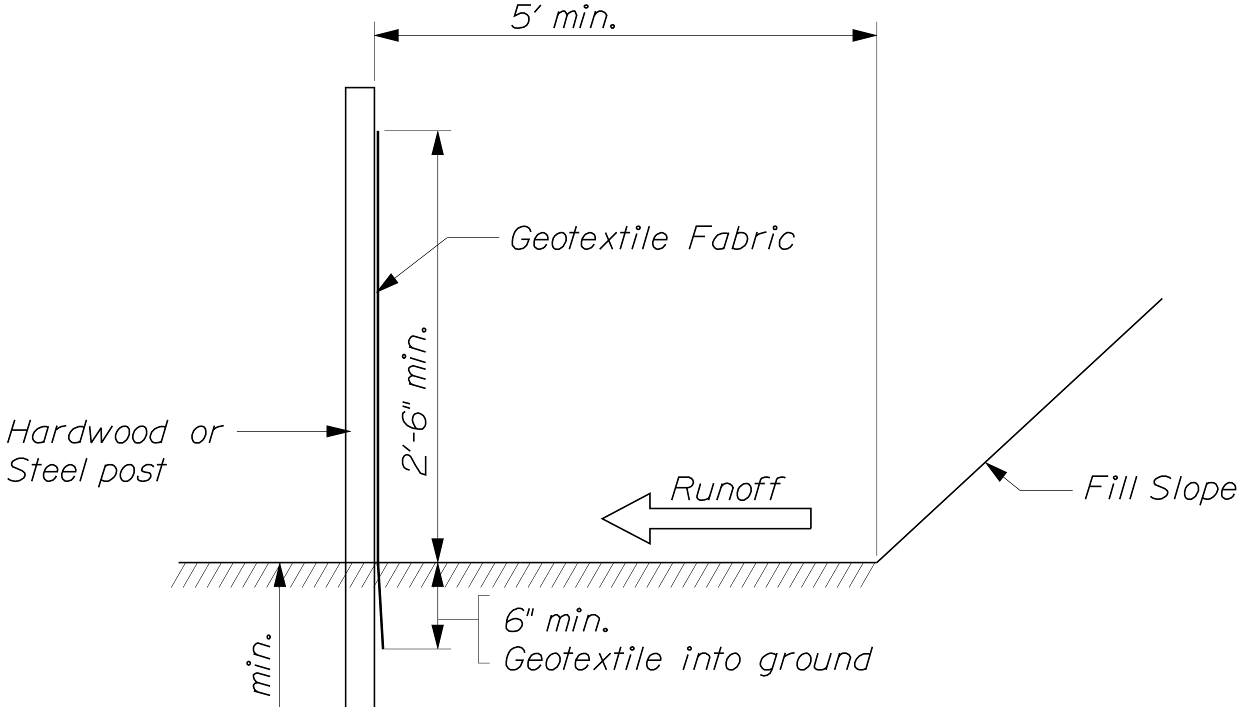
NOTES:

1. Dimensions shown are for a temporary hillside diversion; if used as a permanent practice, it must be designed by a professional engineer.

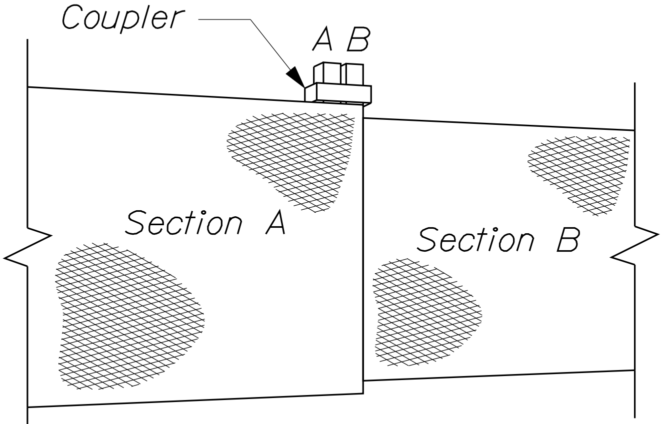
2. Reference the most recent version of the MaineDOT Best Management Practices for Erosion and Sedimentation Control Manual.

HILLSIDE DIVERSIONS

802(03)



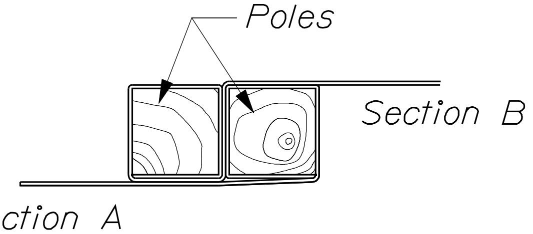
~ SIDE VIEW ~



Posts may be wired together
when joining sections

~ JOINING SECTIONS ~

The coupler can be any acceptable
device used to tie the poles together

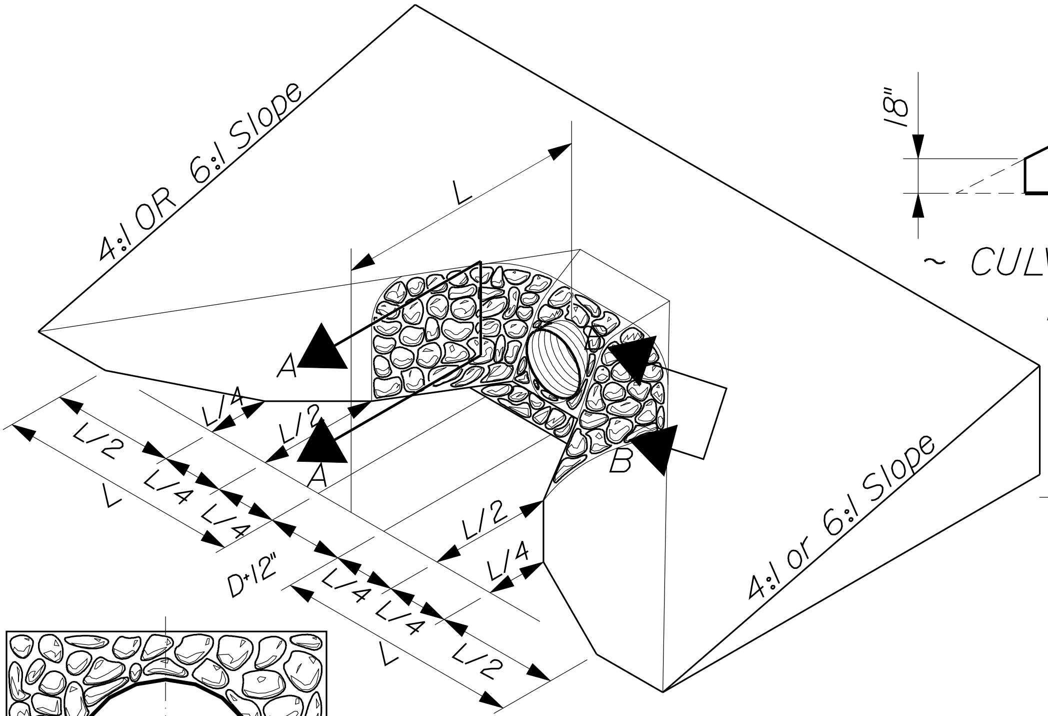


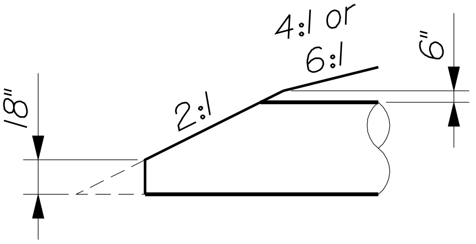
~ TOP VIEW ~

REF:
Best Management Practices for Erosion and Sedimentation Control -
Level Spreader

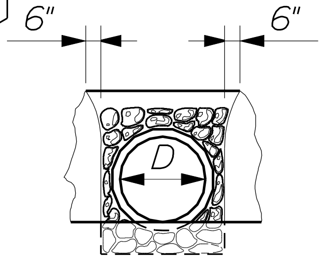
SILT FENCE
SEDIMENT BARRIER

802(04)

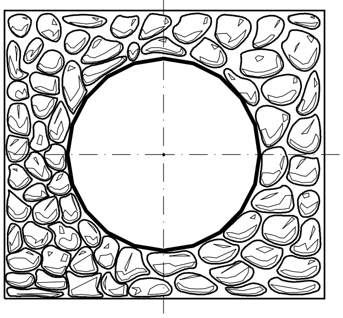




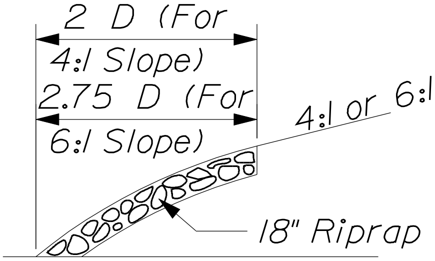
~ CULVERTS CUT ON 2:1 SLOPE ~



~ FRONT VIEW ~

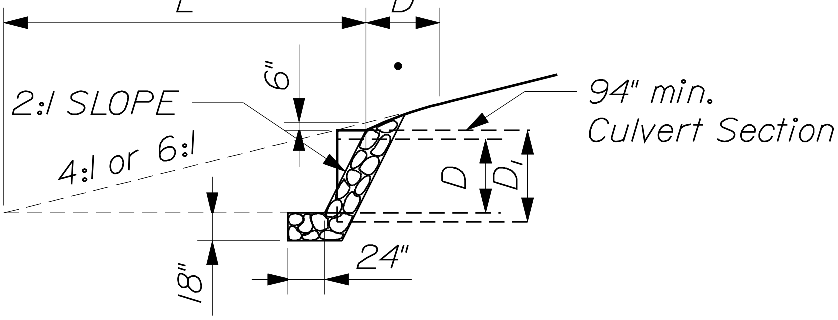


Install riprap 24" around diameter of pipe on 2:1 guardrail slopes



~ SECTION A-A ~
90° to Roadway ℄

TABLE B		
Culvert Diameter	"L" 4:1 Slope	"L" 6:1 Slope
1'-6"	8'-10"	12'-10"
1'-9"	9'-10"	14'-9"
1'-12"	10'-10"	16'-5"
2'-6"	12'-10"	19'-8"
2'-11"	15'-1"	22'-8"
3'-5"	17'-1"	25'-7"
3'-11"	19'-1"	28'-10"
4'-5"	22'	32'-2"
4'-11"	24'	35'-5"
5'-5"	26'	38'-9"
5'-11"	28'-7"	42'
6'-11"	32'-6"	48'-3"



~ SECTION B-B ~

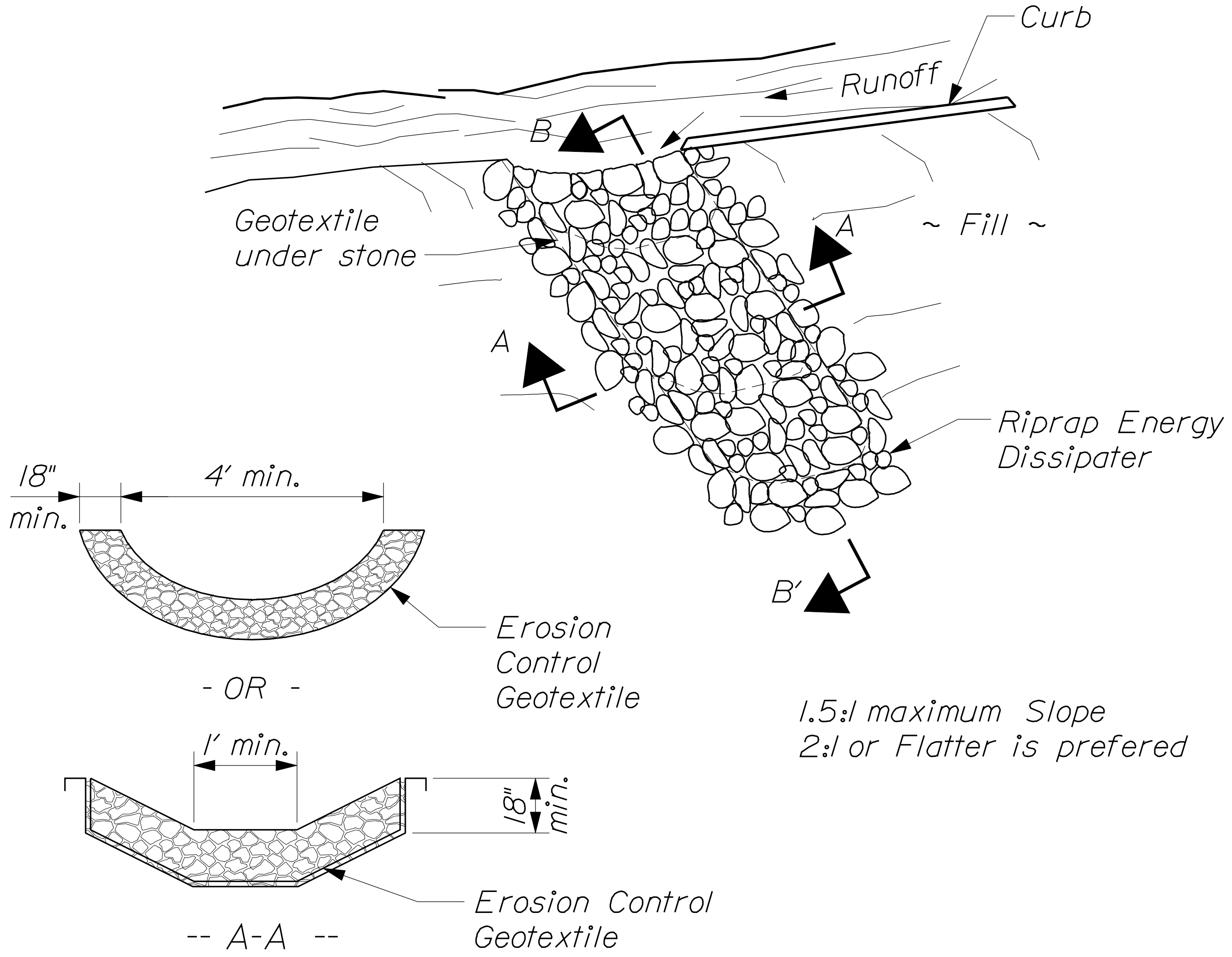
NOTES:

1. The dimensions shown are approximate and may be modified in the field by the Resident.
2. Riprap will be required on portions of the culvert end treatment of 2:1. The remaining portion shall be loamed, seeded and hay mulched as directed.
3. Culverts installed on 2:1 slopes shall have riprap laid on a 2:1 slope around the inlet and outlet.

REF: Best Mngmt. Practices for Erosion and Sediment Control - Culvert Inlet / Outlet Protection.

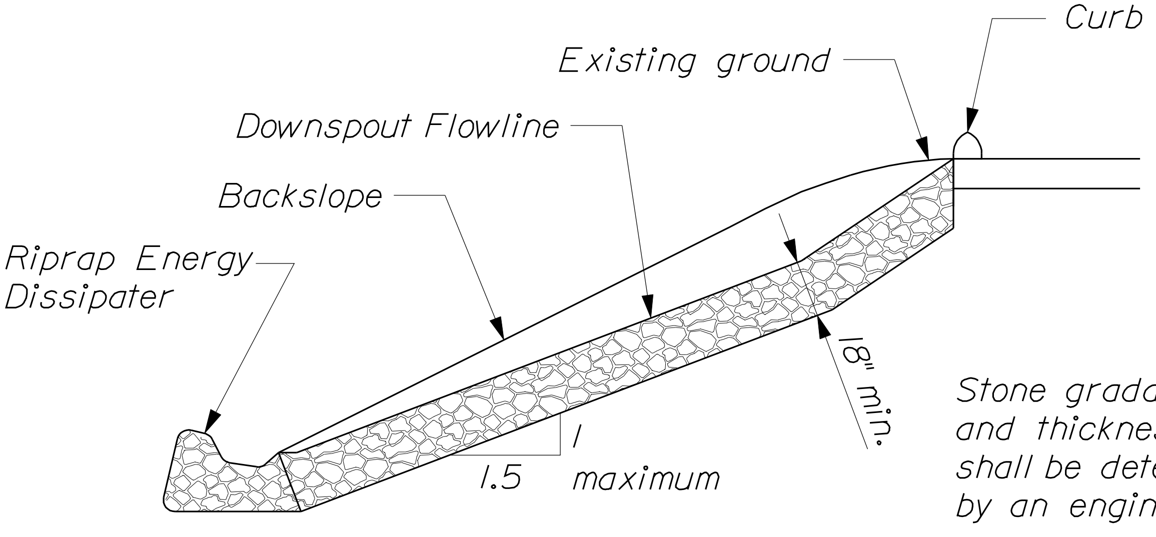
ROADWAY CULVERT END SLOPE TREATMENT

802(05)



-- A-A --

1.5:1 maximum Slope
2:1 or Flatter is prefered



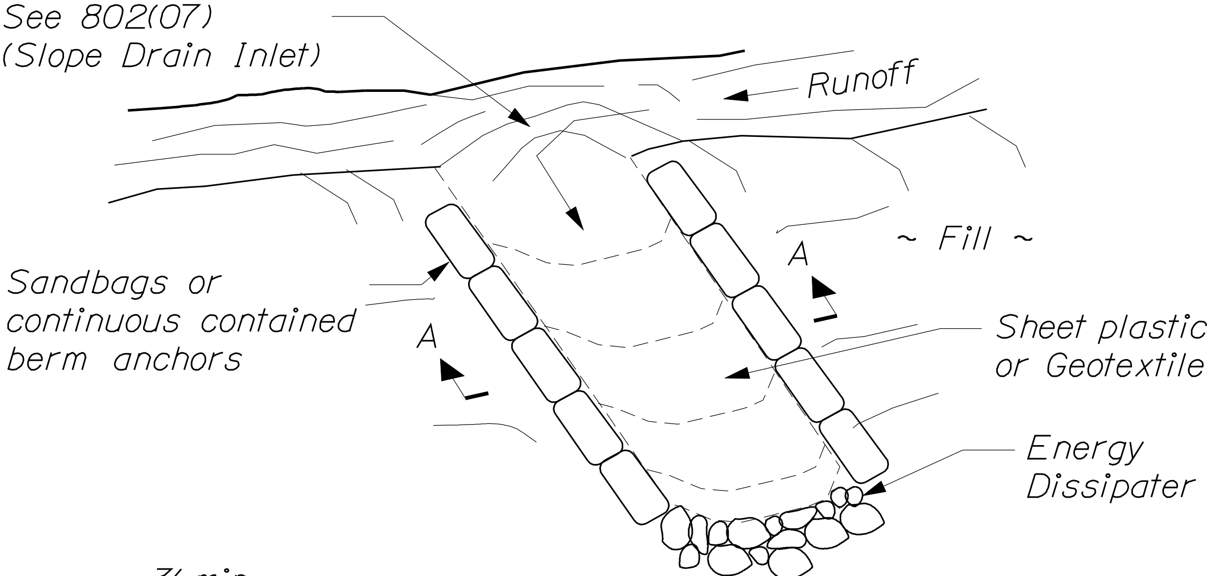
Stone gradation and thickness shall be determined by an engineer.

-- B-B' --

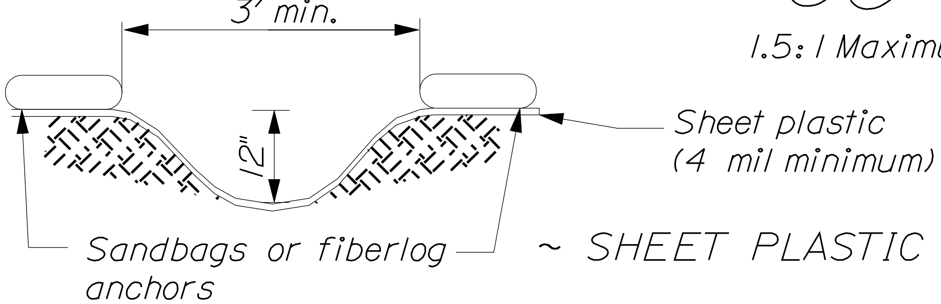
REF: Best Management Practices for Erosion and Sediment Control - Temporary Slope Drains

RIPRAP DOWNSPOUT

802(06)

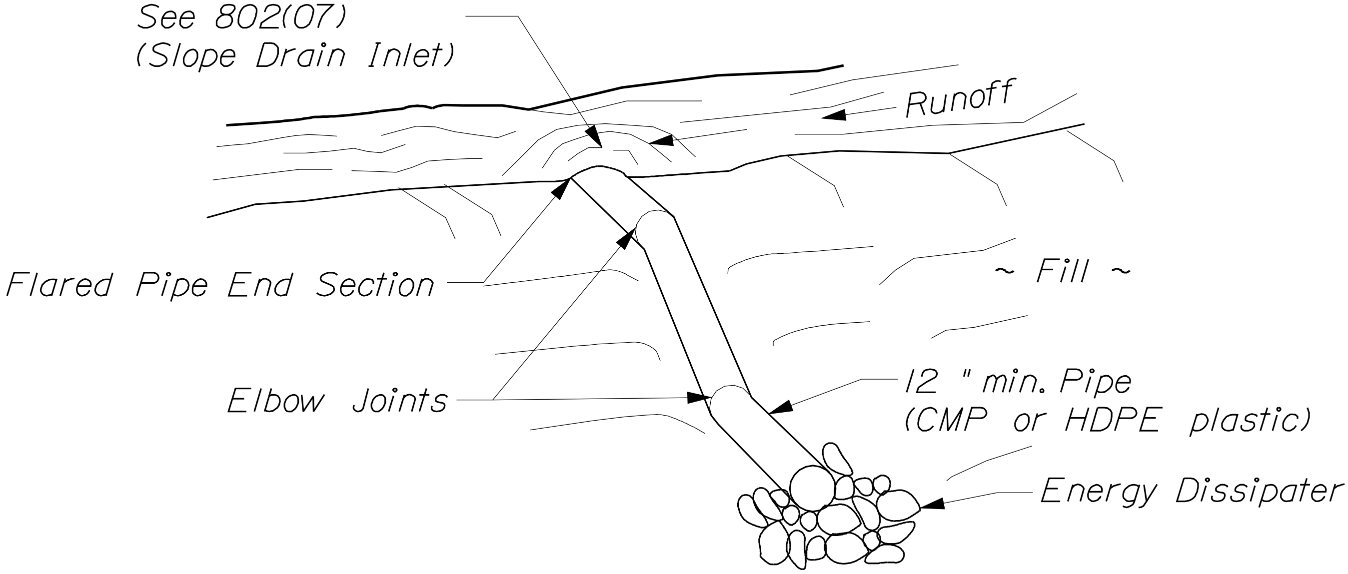


1.5: 1 Maximum Slope



~ SHEET PLASTIC SLOPE DRAIN ~

~ SECTION A-A ~

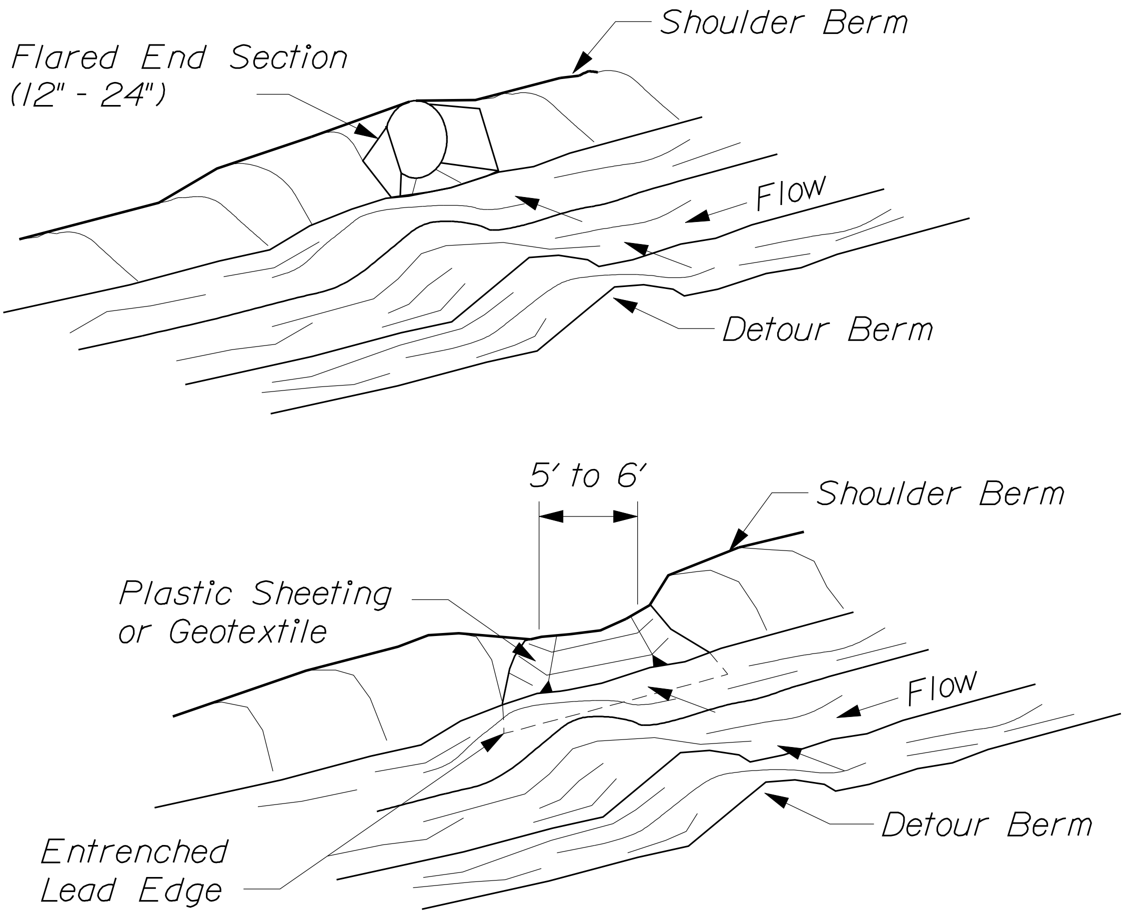


~ PIPE SLOPE DRAIN ~

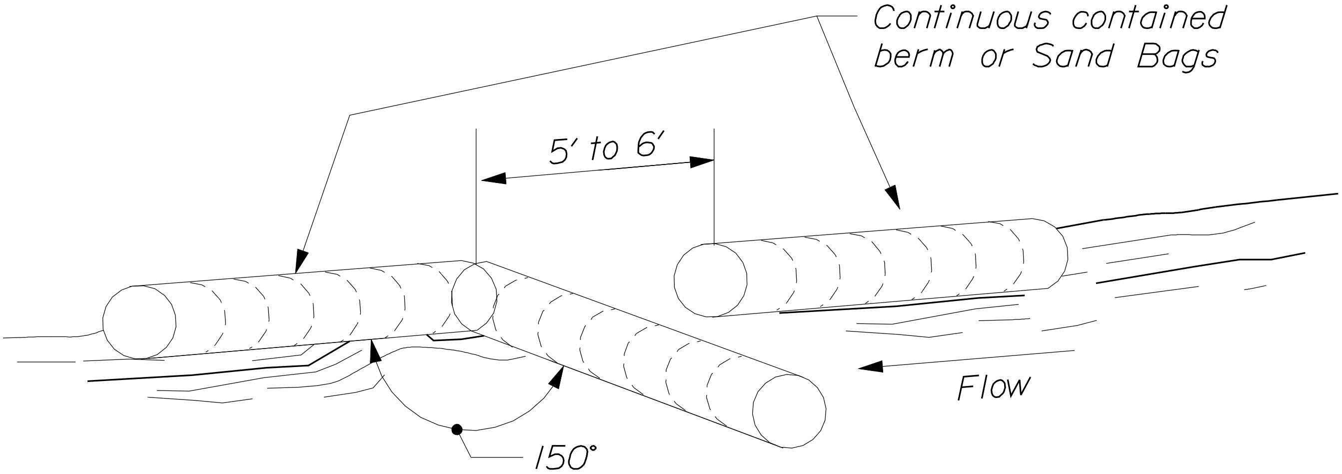
REF: Best Mngmt. Practices for Erosion and Sedimentation Control - Temporary Slope Drains

TEMPORARY SLOPE DRAINS

802(07)



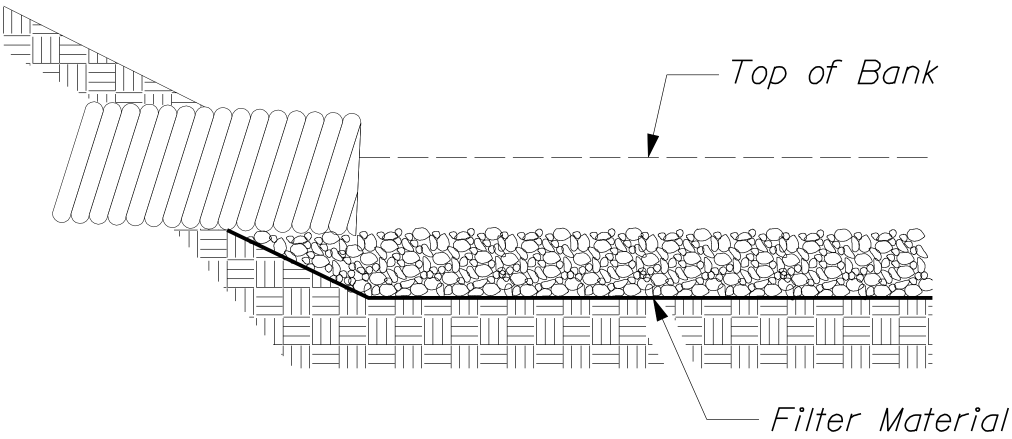
~ SLOPE DRAIN INLETS ~



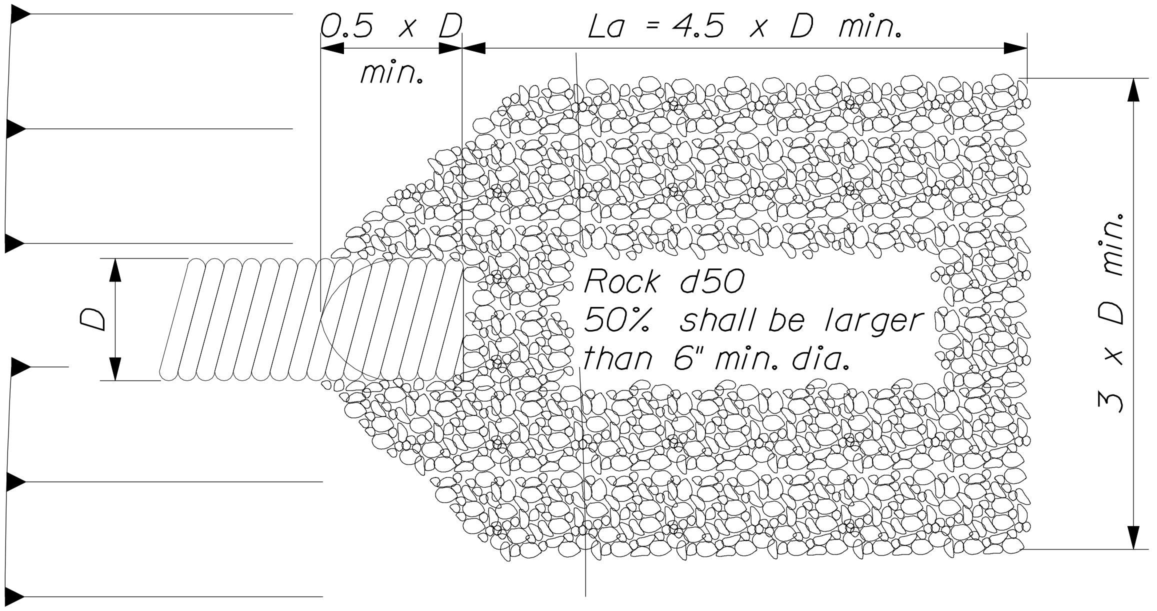
REF: Best Mngmt. Practices for Erosion and Sedimentation Control - Temporary Slope Drains

TEMPORARY SLOPE DRAIN INLETS

802(08)



~ SECTION ~



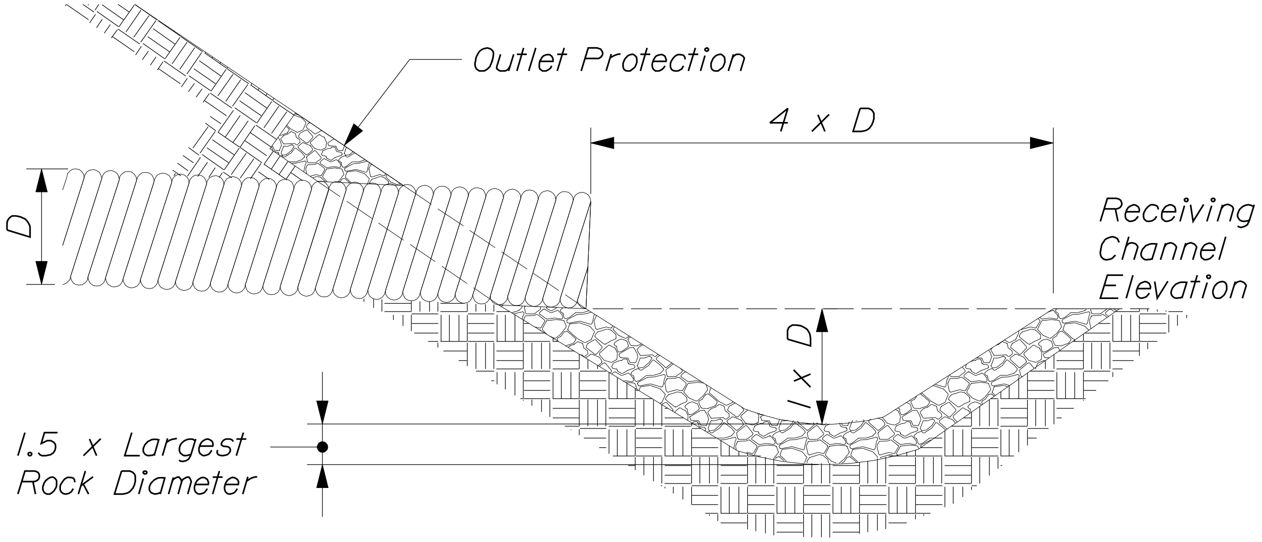
~ PLAN ~

NOTES:

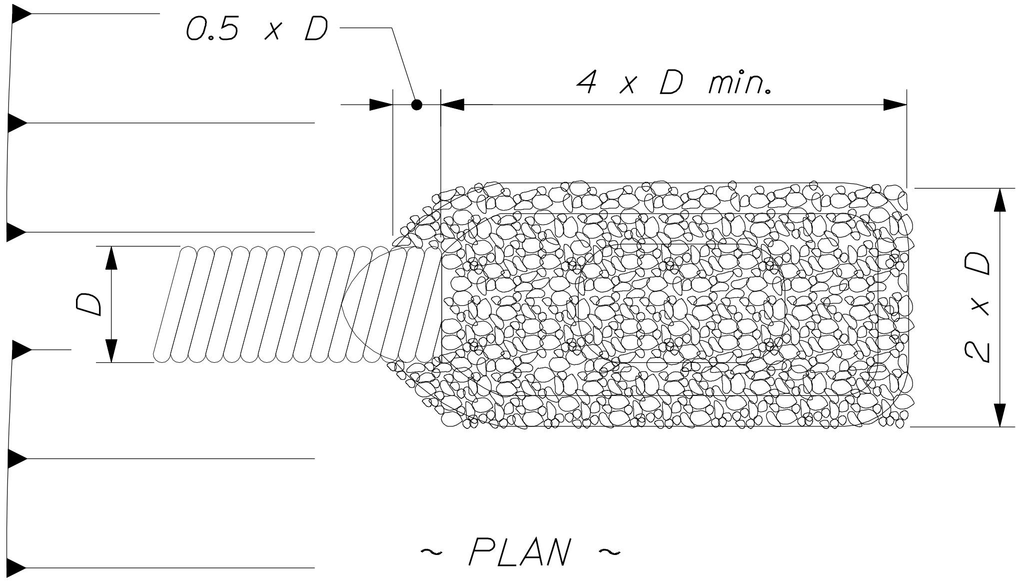
1. 'La' = Length of Apron. Distance 'La' shall be of sufficient length to dissipate energy
2. Apron shall be set to a zero grade and aligned parallel to water flow.
3. Filter material shall be filter fabric or 6" thick minimum graded gravel layer.
4. Reference: Best Management Practices for Erosion and Sediment Control - Energy Dissipater Riprap Apron
5. This detail shall apply to pipe diameters of 36" or less.
6. Larger diameter pipes shall be designed by a professional engineer.
7. Reference: Riprap spec. 703.29

ENERGY DISSIPATER - RIPRAP APRON

802(09)



~ SECTION ~



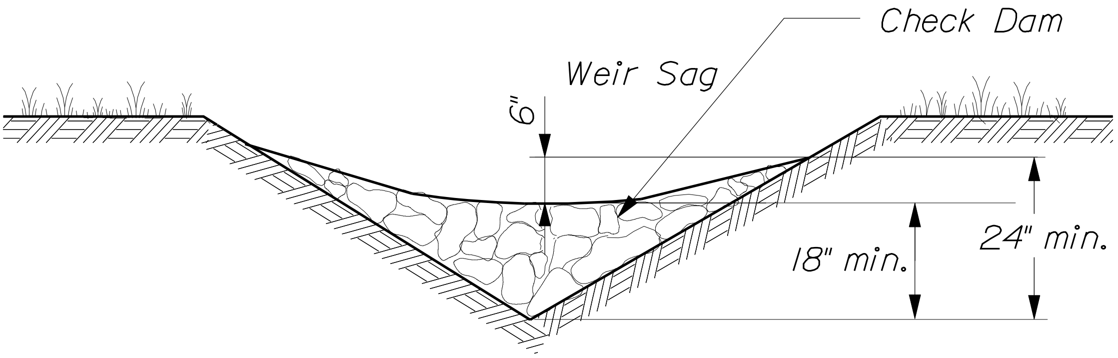
~ PLAN ~

NOTES:

1. Riprap shall be underlain by gravel bedding or non-woven geotextile.
2. REF: Best Management Practices for Erosion and Sediment Control - Energy Dissipater.
3. This detail shall apply to pipe diameters of 36" or less. Plunge pools for large diameter pipes shall be designed by a professional engineer.

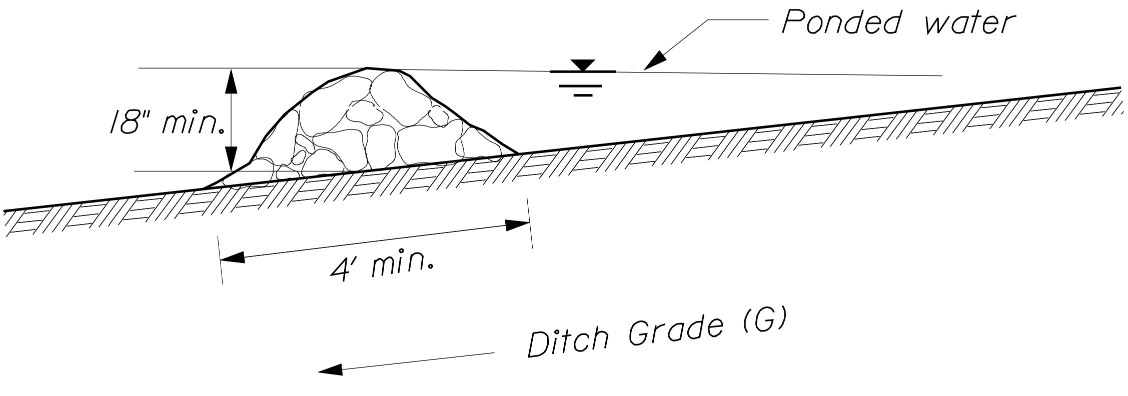
ENERGY DISSIPATER - PLUNGE POOL

802(10)



~ CROSS SECTION ~

NOTE:
Unless specified, stone shall meet requirements of material specification 703.29 stone ditch protection.

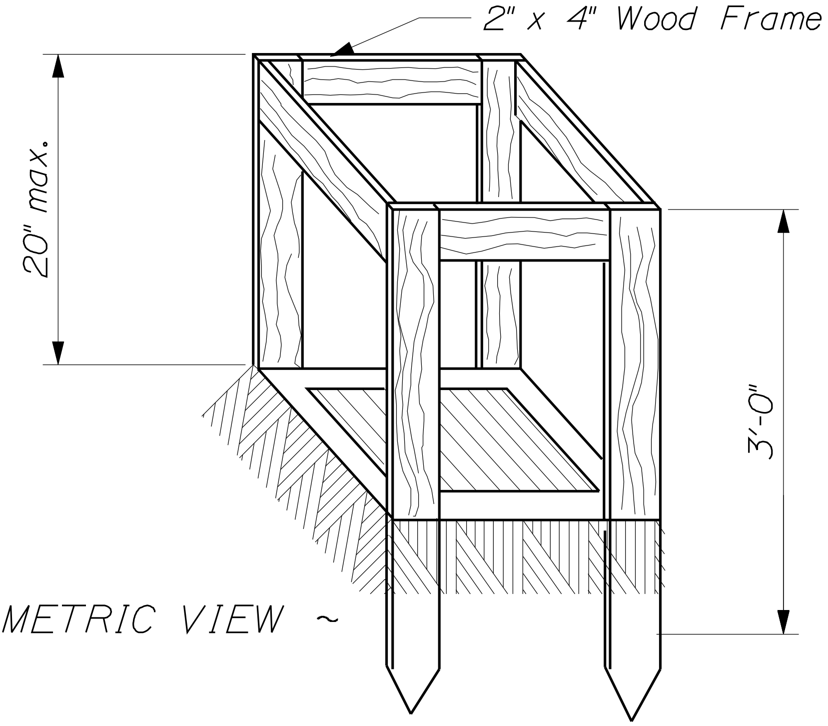


~ PROFILE @ DITCH ~

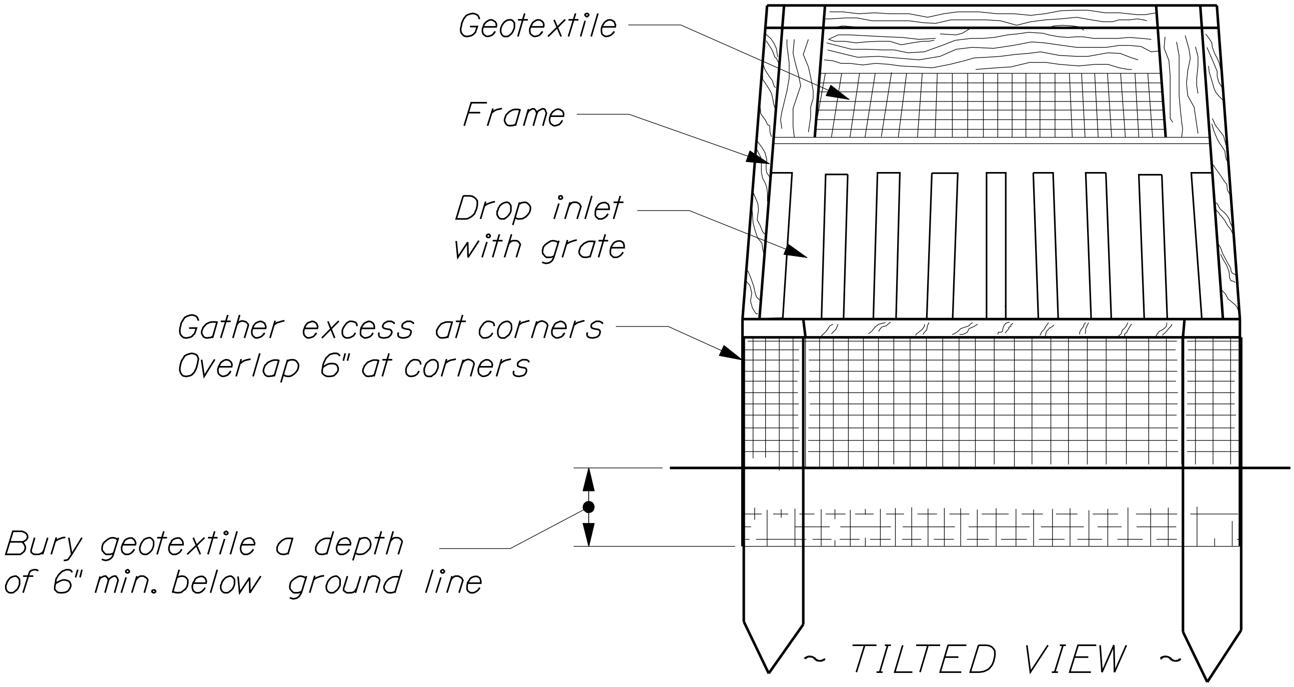
REF: Best Management Practices for Erosion and Sedimentation Control - Check Dam

STONE CHECK DAM

802(II)



~ ISOMETRIC VIEW ~



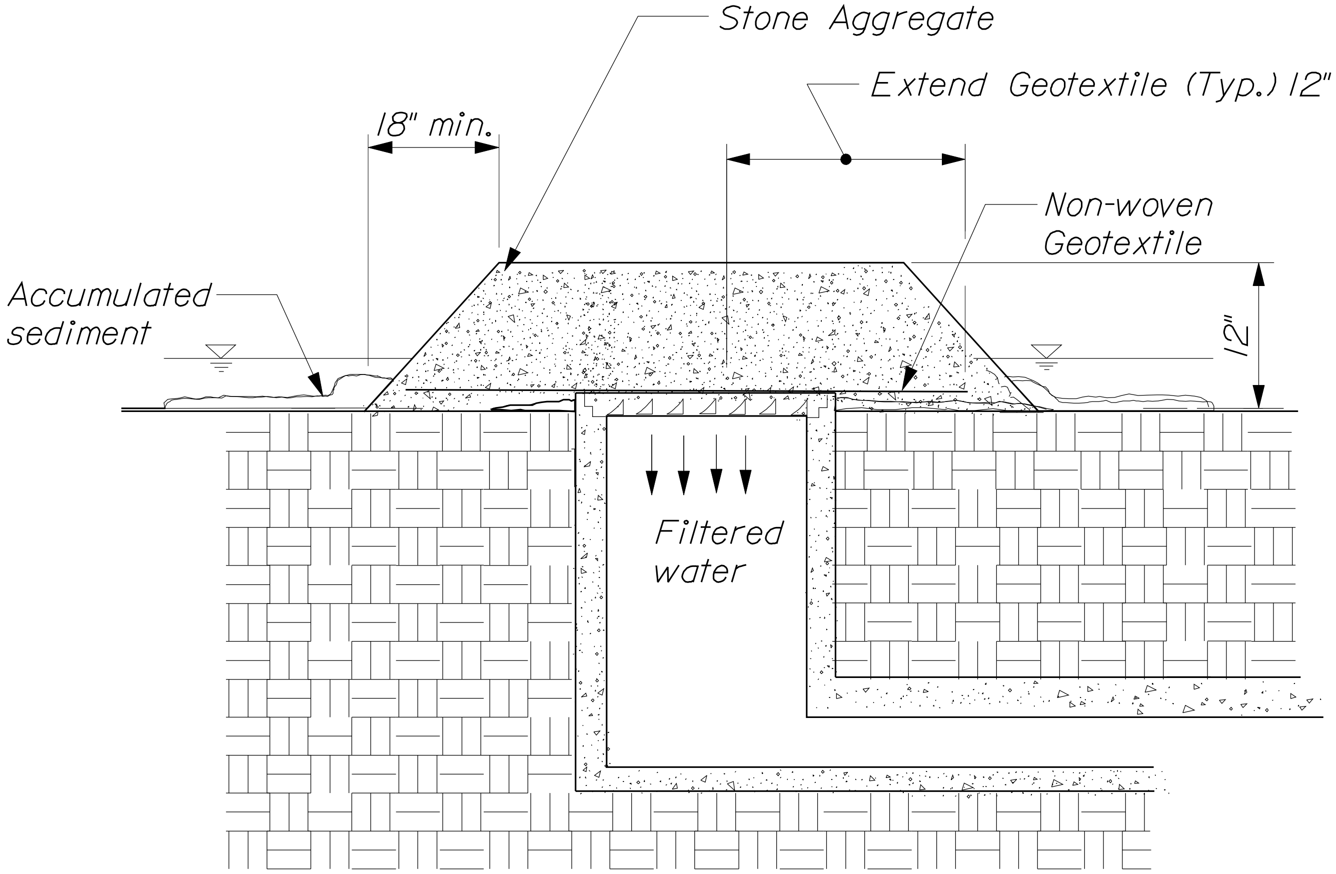
~ TILTED VIEW ~

NOTE: Use Silt Fence inlet protection in sump locations only. Sheet flow less than 1 acre Drainage Area not in paved areas or with concentrated flows.

REF: Best Management Practices for Erosion and Sedimentation Control - Storm Drain Inlet Protection

SILT FENCE CB/ INLET GRATE UNIT PROTECTION

802(12)



~ SECTION ~

NOTES:

1. Use Stone aggregate and non-woven geotextile inlet protection only in sump locations where heavy concentrated flows are expected.

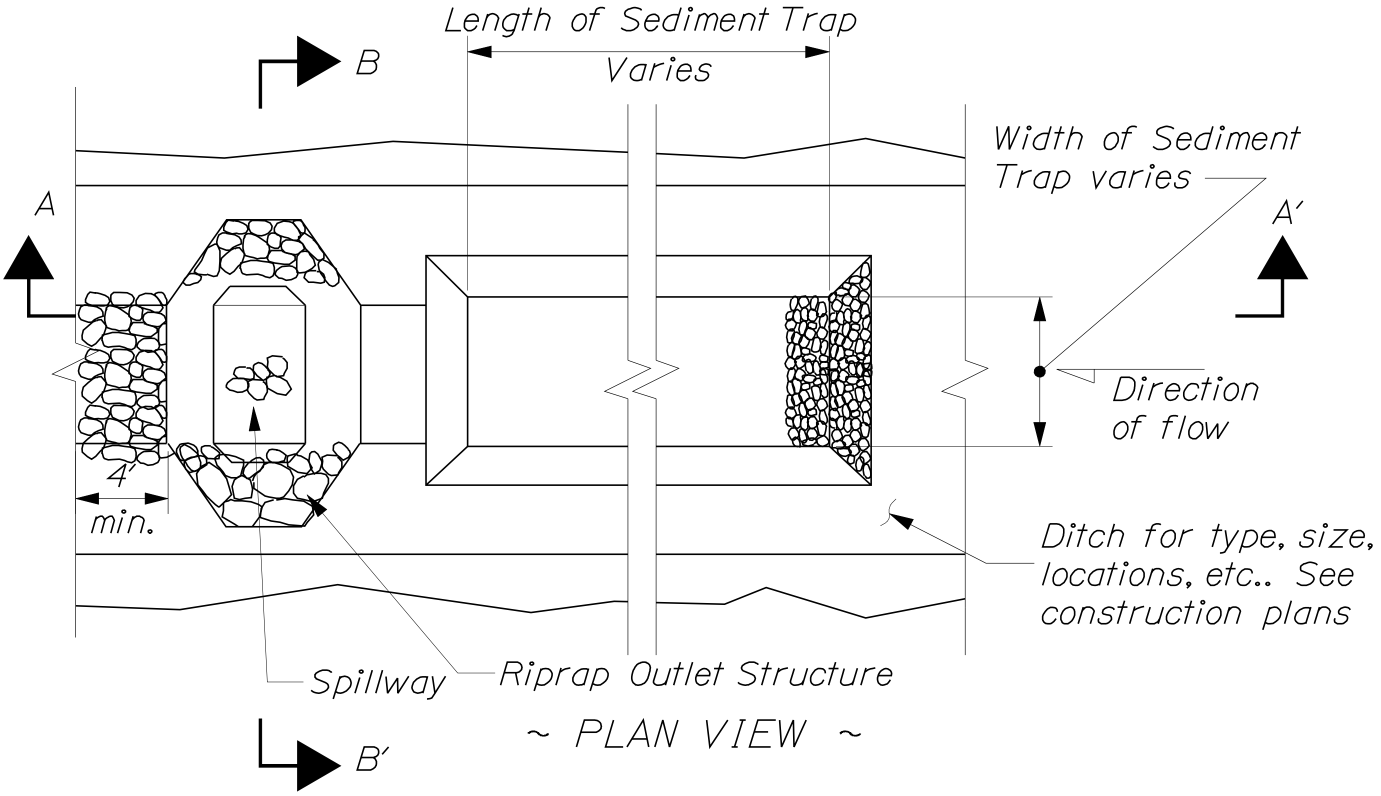
2. Do not use where ponding around the structure might cause inconvenience or damage.

3. Stone aggregate shall be Stone For French Drain 703.24 or approved by the Resident.

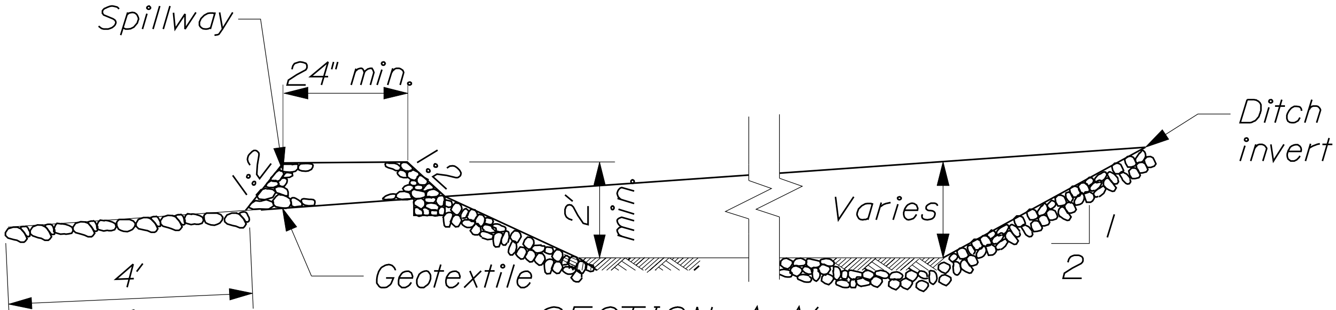
4. Ref: Best management Practices for erosion and sedimentation control - Storm Drain Inlet Protection.

STONE AGGREGATE & GEOTEXTILE CB/ INLET GRATE UNIT PROTECTION

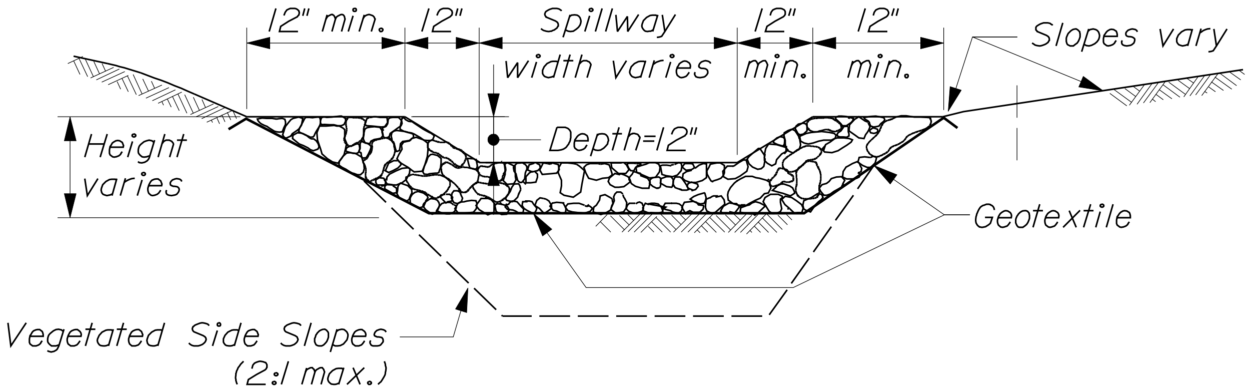
802(13)



~ PLAN VIEW ~



~ SECTION A-A′ ~

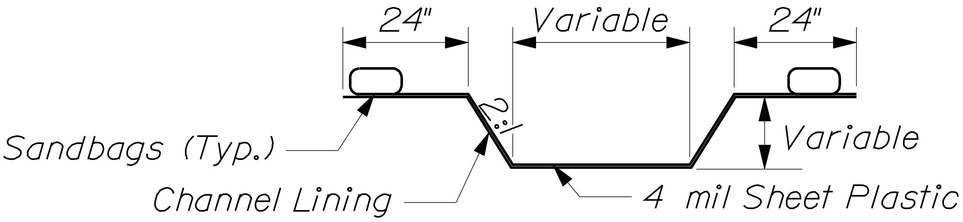


~ SECTION B-B′ ~

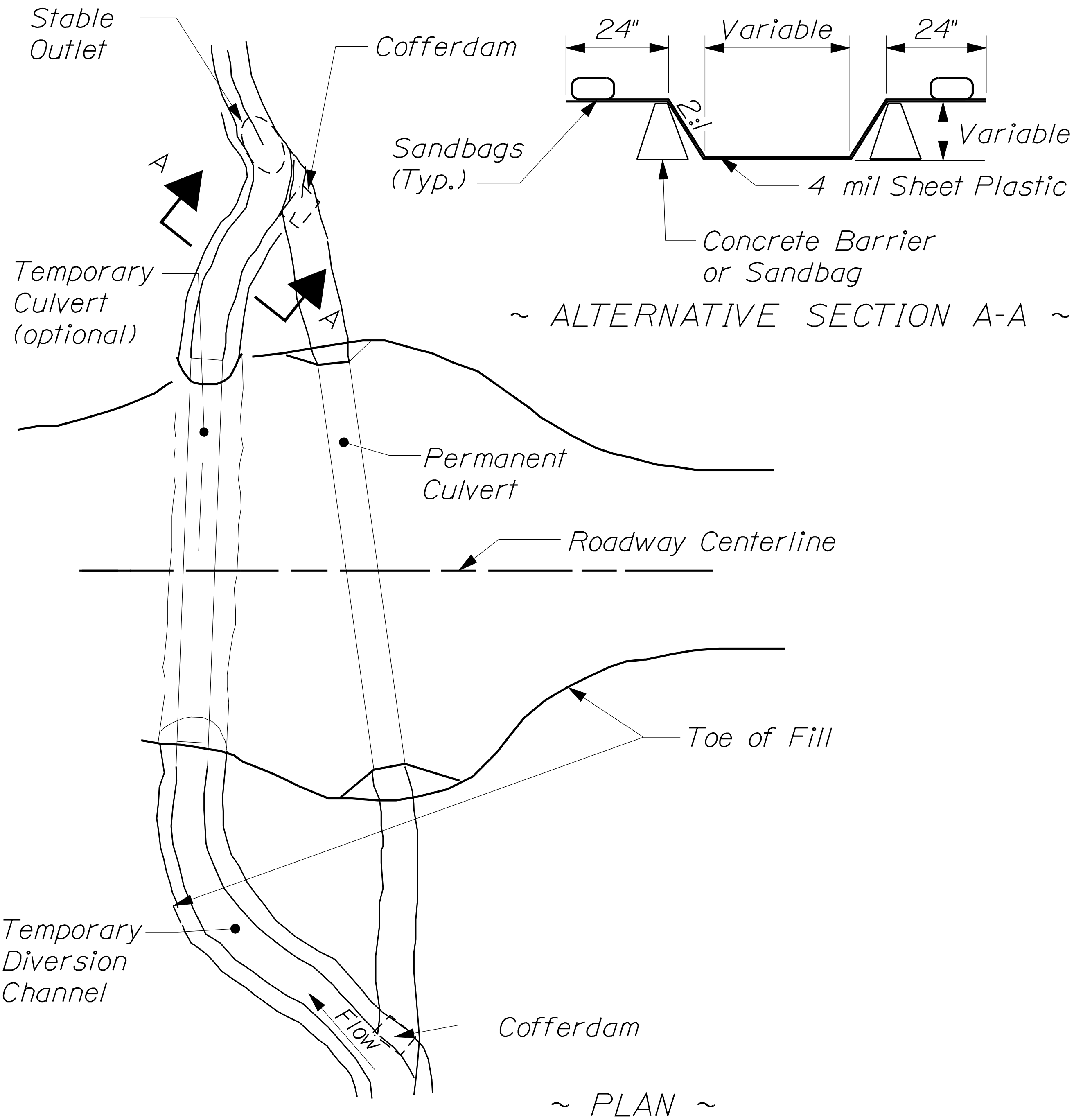
REF:
Best Management Practices for Erosion and Sedimentation Control - Sediment Traps

SEDIMENT TRAP

802(14)



~ SECTION A-A ~



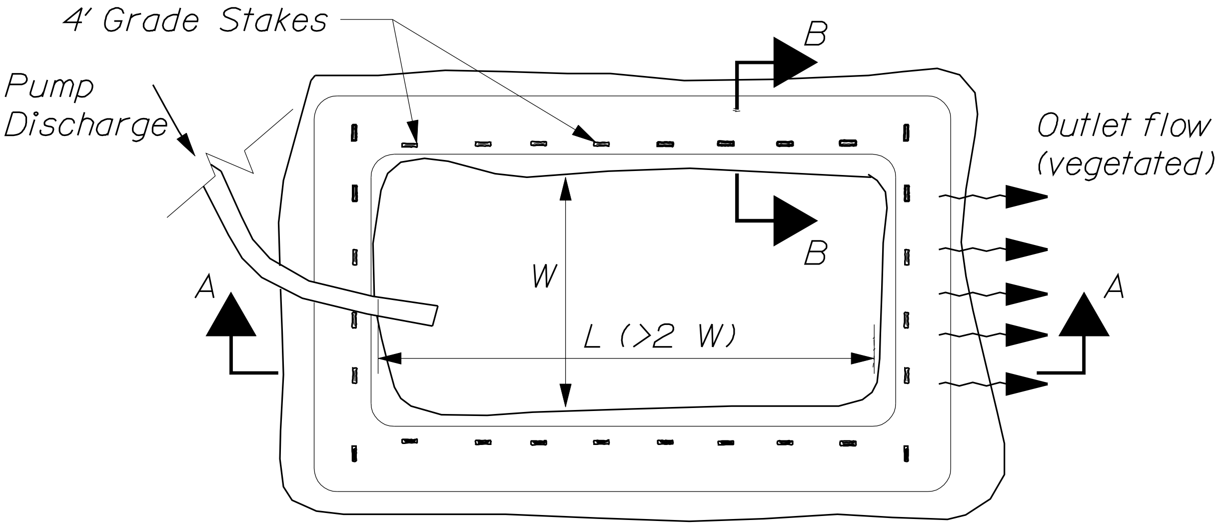
~ ALTERNATIVE SECTION A-A ~

~ PLAN ~

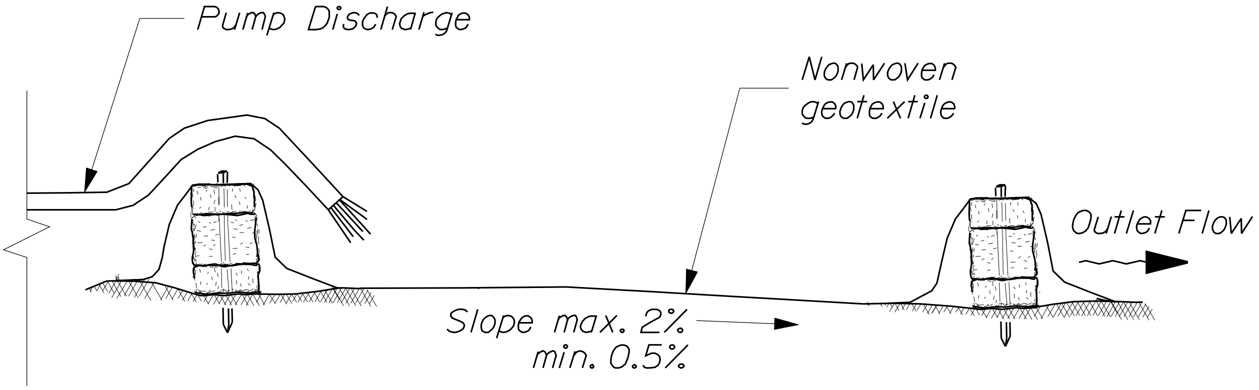
REF: Best Management Practices for Erosion and Sedimentation Control - Temporary Stream Diversion

TEMPORARY STREAM DIVERSION

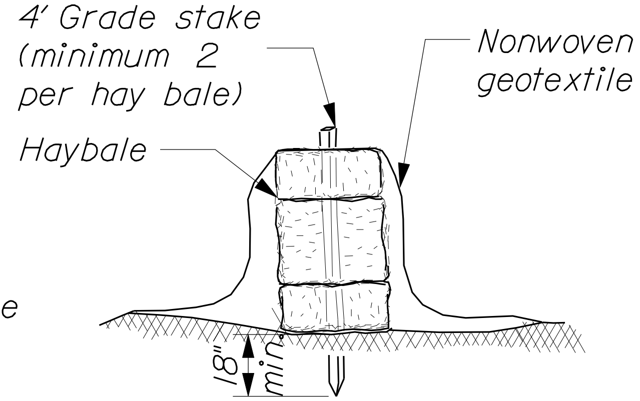
802(15)



~ PLAN ~



~ SECTION A-A ~



~ SECTION B-B ~

NOTES:

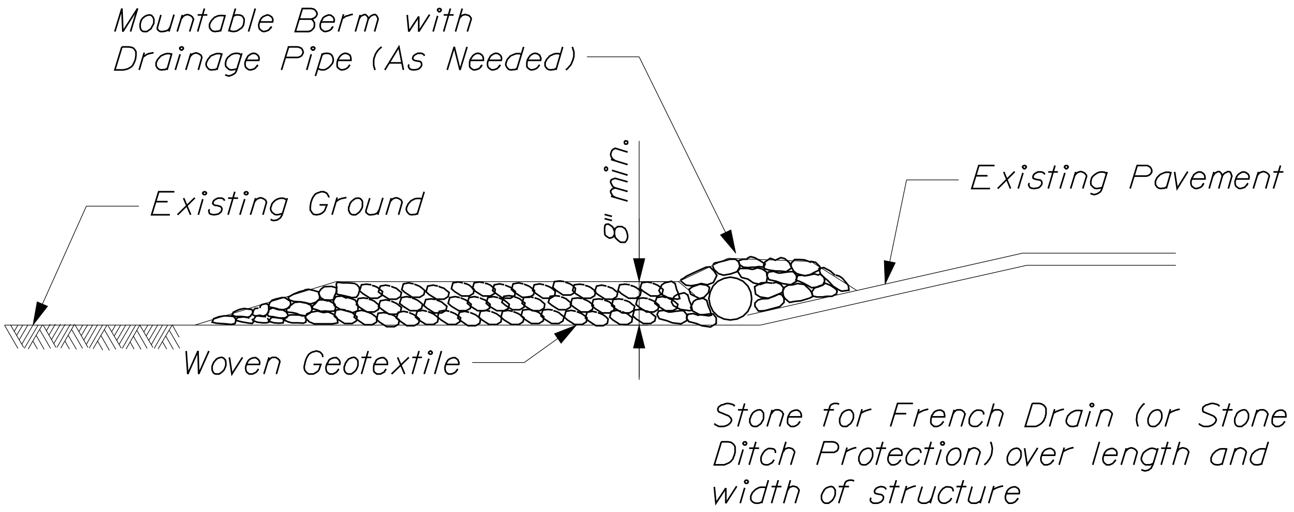
1. Most non-woven geotextile is available in 12.5' & 15' widths.

2. Overlap all temporary sediment basin geo-textile joints by 1' minimum.

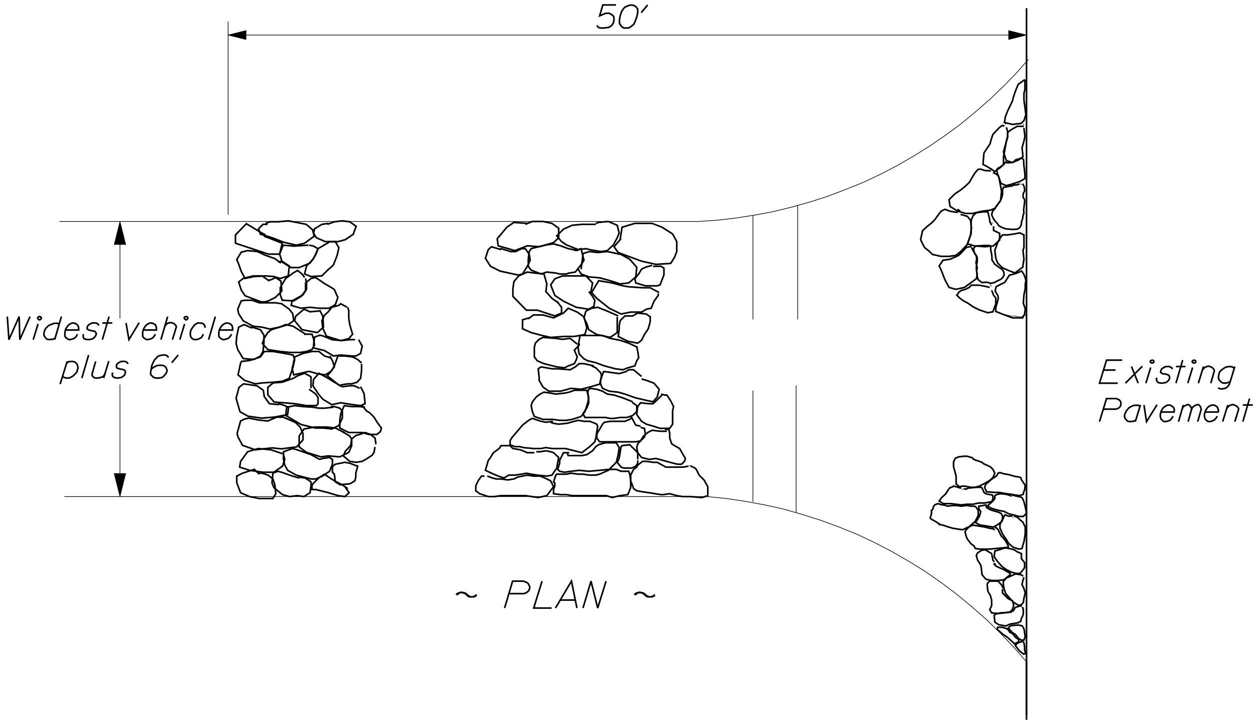
3. Design basin according to Best Management Practices for Erosion and Sedimentation Control - Temporary Sediment Basin.

TEMPORARY SEDIMENT BASIN

802(16)



~ PROFILE ~



~ PLAN ~

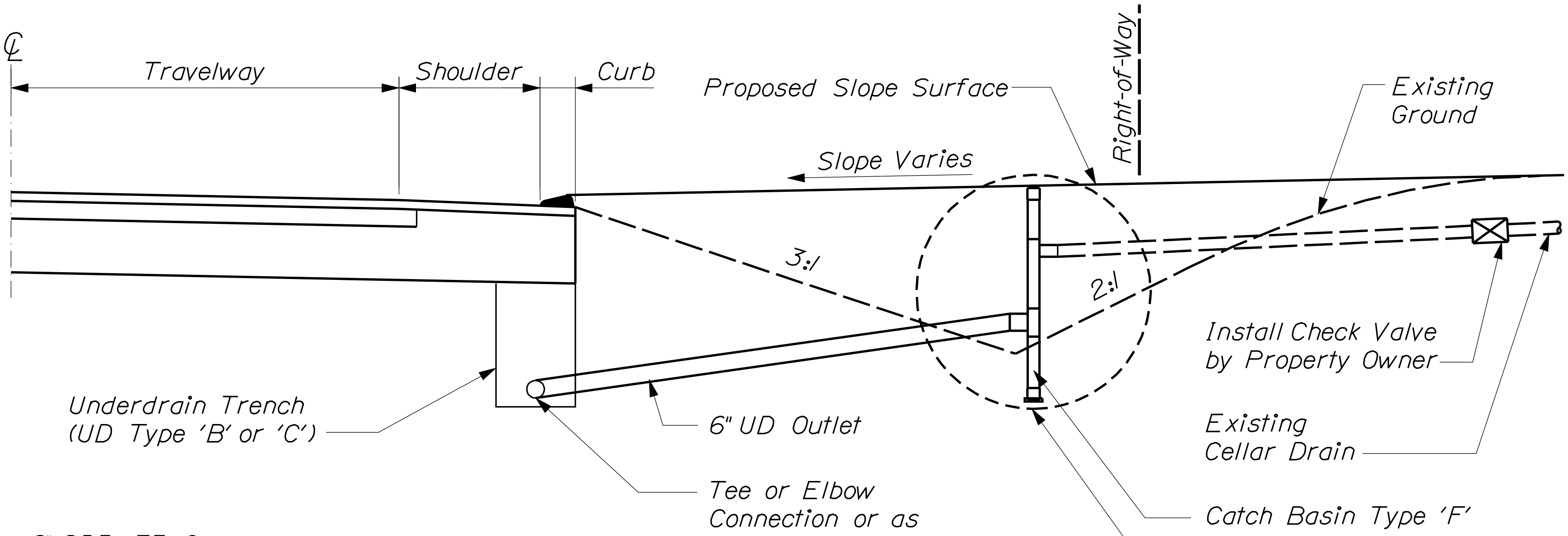
REF: Best Management Practices for Erosion and Sedimentation Control - Stabilized Construction Entrance/Exit

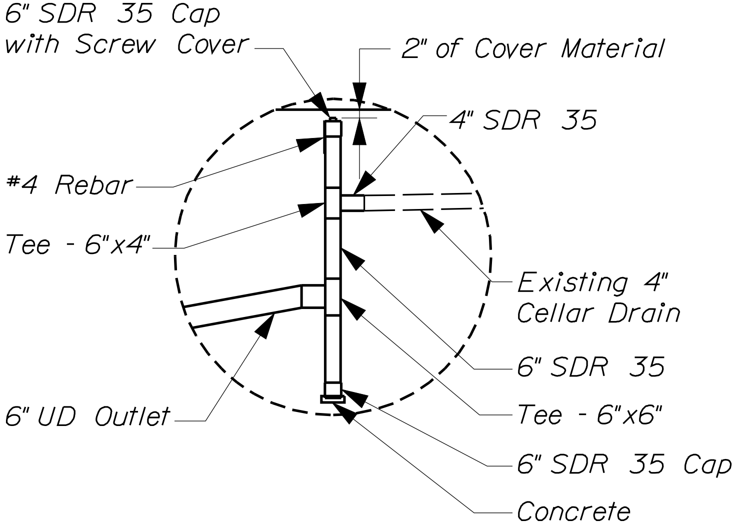
CONSTRUCTION ENTRANCE/EXIT

802(17)

CELLAR DRAIN CONNECTION

802(18)





~ DETAIL "A" INSPECTION STANDPIPE ~

~ NOTES ~

1. Payment for connection from the inspection standpipe to the proposed underdrain system shall be a 6 inch underdrain outlet, item no. 605.10, or as directed by the resident.

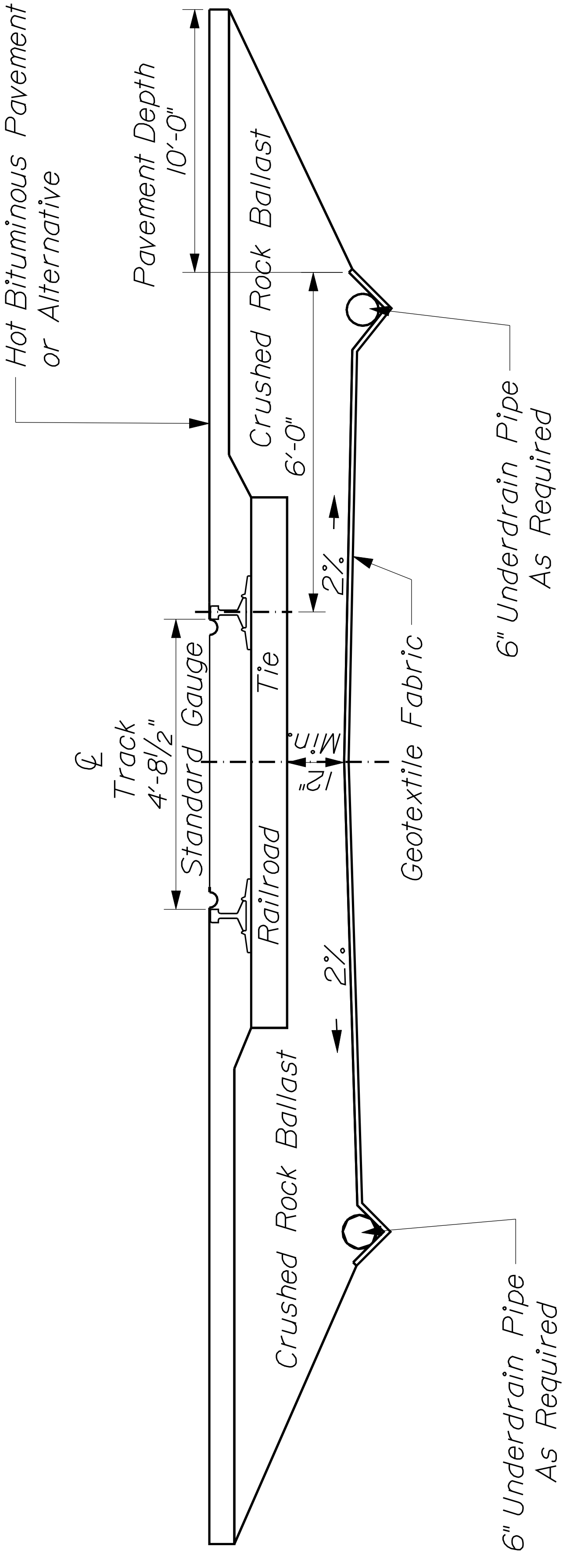
2. Inspection standpipe shall have a solid cover and be installed within the state's right of way.

3. A check valve to prevent back flow to property may be installed. Check valve should be installed at the upstream side of the inspection standpipe and outside of the state's right of way. Installation of check valve shall be the responsibility of the property owner.

4. Payment for connection of the existing cellar drain to the inspection standpipe shall be incidental to the item no. 801.141 or 801.16.

5. The station locations may be changed to fit field conditions, as directed by the resident.

6. A 3 foot length of #4 rebar shall be placed adjacent to standpipe and flush with cap, Installation of the rebar and the concrete footing shall be incidental to item no. 801.141 or 801.16.

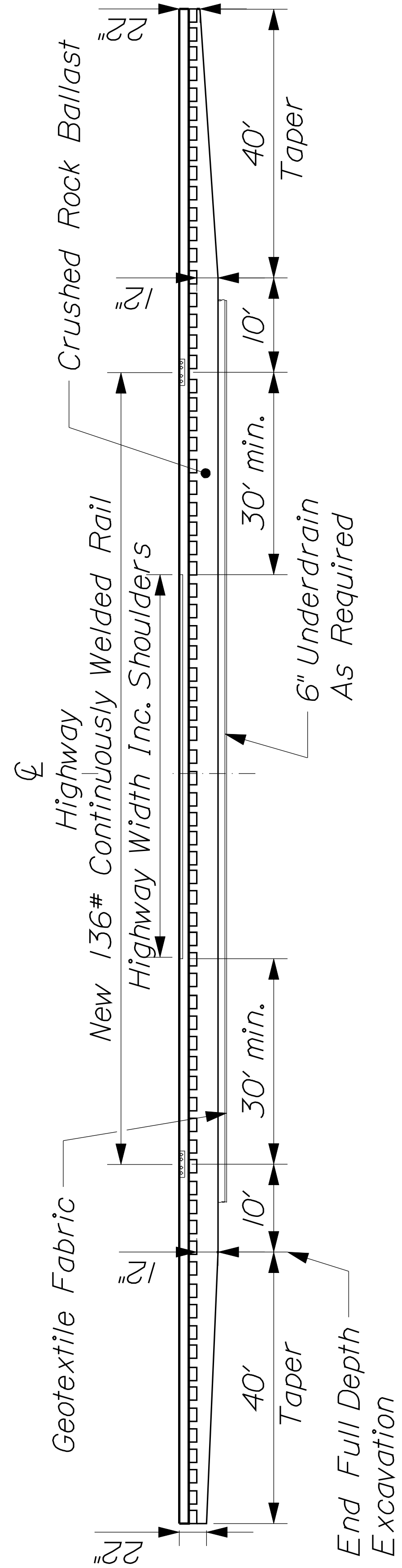


~ RAILROAD SECTION ~

Not to Scale

STANDARD RAILROAD GRADE CROSSING DETAIL

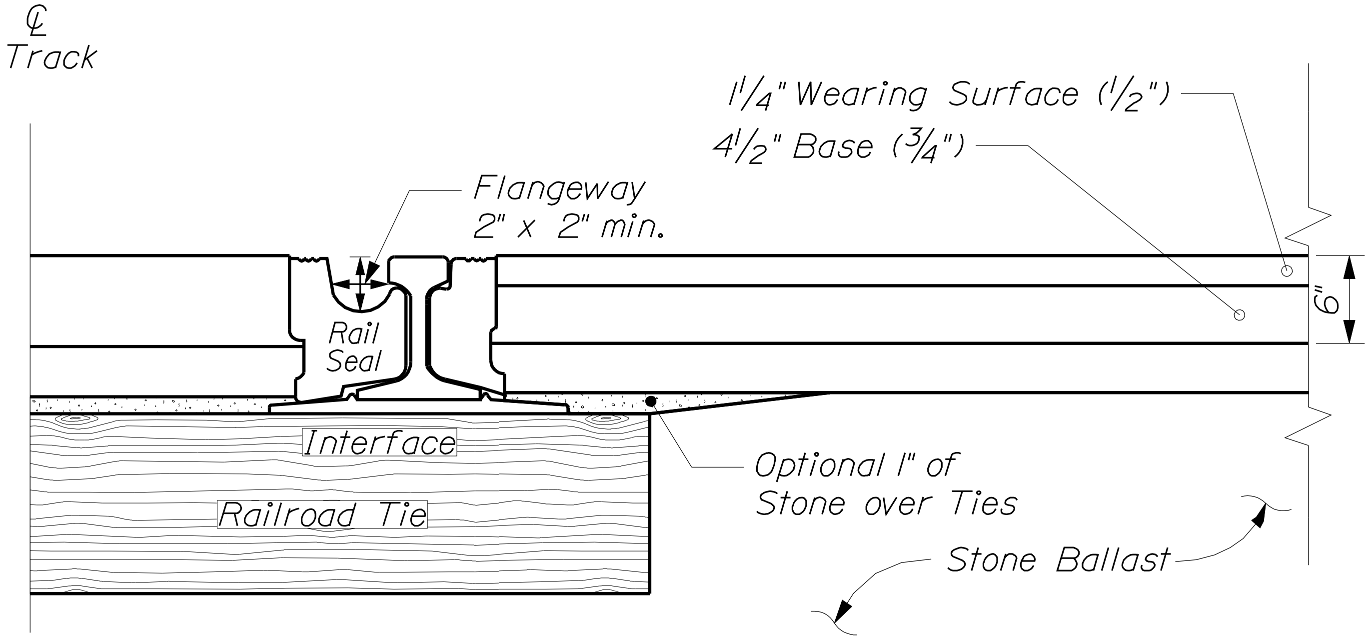
803(02)



HIGHWAY SECTION
RAILROAD GRADE CROSSING

803(03)

PAVING DETAIL



ADDITIONAL PAVING NOTES

The Department will pay for the work specified in Subsection 401.11 for the HMA used, except that cleaning objectionable material from the pavement and furnishing and applying Item 409.15 bituminous material to joints and contract surfaces is incidental.

A tack coat of emulsified asphalt, RS-1 or HFMS-1, Item 409.15 shall be applied to any existing pavement at a rate of approximately 0.025 gal/sq.yd, and on milled pavement approximately 0.05 gal/sq.yd, prior to placing a new course. All joints between existing and new pavement will be tacked.

Crossings shall be paved within 20 days following the completion of the crossing reconstruction.

Paved shoulders within the gage of the rail to point 24" outside of the field side of each rail shall be a standard 6" depth of pavement. Paved shoulders outside of this area shall be paved with 2" surface mix only.

- The bituminous binder material for the mixture shall be viscosity grade AC-10 or 20 asphalt cement.
- The density requirements are waived.

PAVING DETAIL
PAVING NOTES

803(04)

RAILROAD CROSSING GENERAL NOTES

1. The highway section over railroad crossings shall be designed with a minimum of 2-11 ft travelways and 6' shoulders. 4' shoulders may be designed if field conditions warrant.

2. Signals shall be located as per standard detail and shall comply with the latest edition of the Manual of Uniform Traffic Control Devices.

3. The standard crossing surface shall consist of a rubber railseal interface as manufactured by Polycorp or Performance Polymers, Inc, or approved equivalent. Alternative crossing surfaces may be installed with approval of MaineDOT.

4. New 136 # prime welded rail shall be provided for crossing reconstruction. The minimum length of welded rail shall be 117' or extend 30' beyond each edge of pavement whichever is longer. The full depth excavation area shall extend 10' beyond the welded rail and excavated to a minimum depth of 12" below bottom of tie elevation.

5. 7" x 9" ties (8'6" or 9' long) shall be installed under the welded rail and shall be fully box anchored. Anchors may be omitted beneath the crossing surface in order to accommodate the installation of rubber railseal.

6. Geotextiles provided for rail crossings shall be the following minimum weights: 8 oz./s.y. for non-woven fabrics and 6 oz./s.y. for woven fabrics. The minimum width through the crossing area shall be 17'. Geotextile fabrics shall be placed throughout the entire full depth construction area.

7. Construction signs and traffic control devices shall be erected and maintained during the construction of the project.

8. Field work performed between December 15 and March 15 shall be approved in advance by the MaineDOT Resident.

9. Erosion Control shall be installed and maintained as per approved Erosion Control Plan until all permanent measures are in place.

RAILROAD CROSSING GENERAL NOTES

803(04)A

~ SPECIAL PROVISION ~

Section 403 - Bituminous Pavement

Descrip. of Course	Grad. Design	Item No.	Bit. Cont. % of Mix	Total Thick.	No. of Layers	Complementary Notes
Railroad Planning (6" Pavement Depth)						
Wearing	1/2"	403.208	N/A	1 1/2"	1	4,9,17
Binder	3/4"	403.207	N/A	4 1/2"	2	4,9,17

~ NOTES ~

1. The design traffic level for the mix placed shall be 0.3 to <3million ESALS

2. Section 106.6 Acceptance, (2) Method C-For hot mix asphalt designated as Method C in Special Provision Section 403 - Hot Mix Asphalt, one sample will be taken from the paver hopper or the truck body per 250 ton per pay item. The mix will be tested for gradation and PGAB content. Disputes will not be allowed. If the mix is within tolerances listed in Table 9, Method C the Department will pay the contract unit price.

~ TABLE 9 ~

Property	USL and LSL - Method C
Percent passing 3/16" [No. 4] and larger sieves	Target +/- 7
Percent passing 3/32" [No. 8] to 1.18mm [No.16] sieves	Target +/- 5
Percent passing 1/32" [no. 30] sieve	Target +/- 4
Percent passing 1/64" [No. 50] to 0.003" [No.200] sieve	Target +/- 3
PGAB Content	Target +/- 0.5

If the test results for each 250 ton increment are outside these limits the following deductions (Table 9b) shall apply to the HMA quantity represented by the test. A second consecutive failing test shall result in cessation of production.

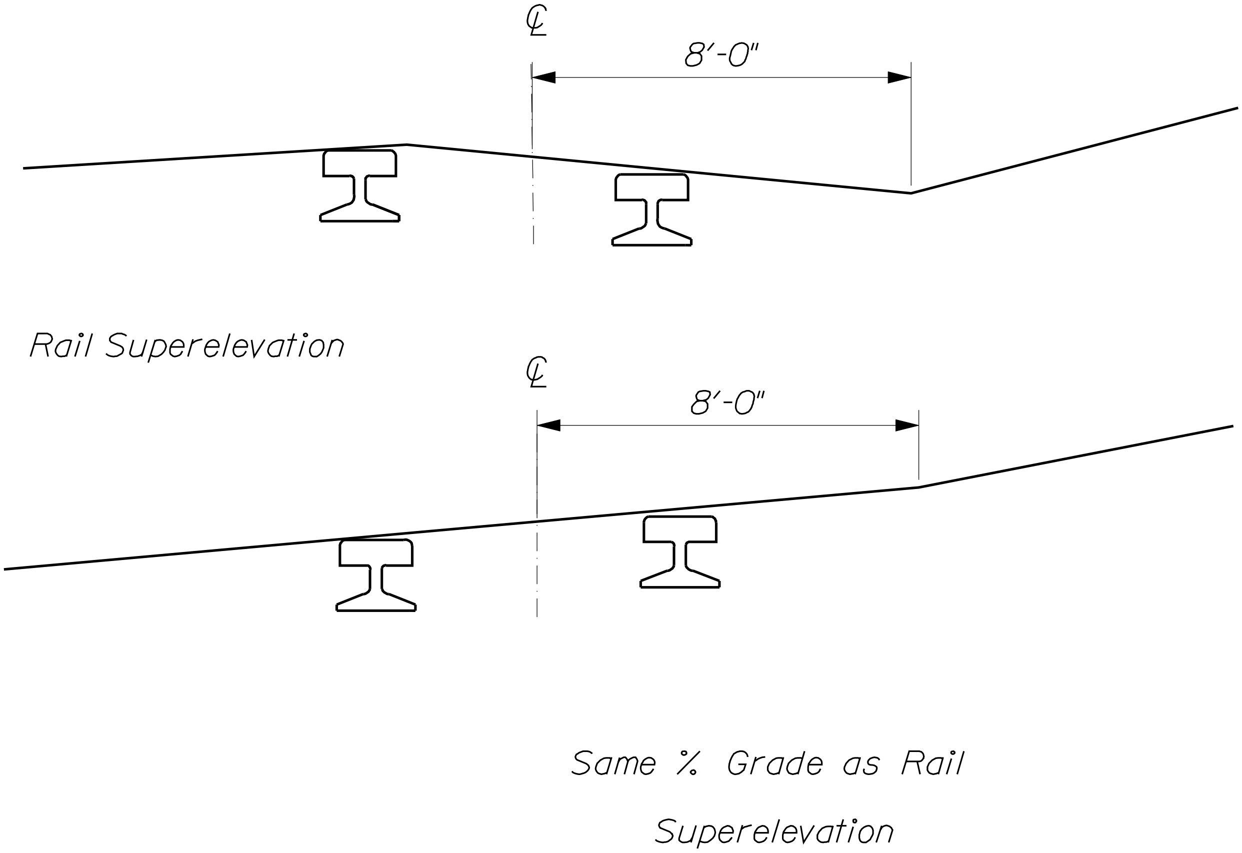
~ TABLE 9B ~

PGAB Content	- 5%
No. 8 - 3/32" sieve	- 2%
No. 50 - 1/64" sieve	- 1%
No. 200 - 0.003" sieve	- 2%

3. Compaction of the new Hot Mix Asphalt Pavement will be obtained using a minimal roller train consisting of a 3-5 ton vibratory roller. An approved release agent is required to ensure the mixture does not adhere to hand tools, rollers, pavers, and truck bodies. The use of petroleum based fuel oils will not be permitted.

RAILROAD CROSSING PAVING NOTES

803(04)B



~ RAIL ROAD CROSSING GRADING ~

NOTE:
The slope of the 8′ shown, in no case, shall be above the plane of the rails either side of C/L per P.U.C. General Order # 2.

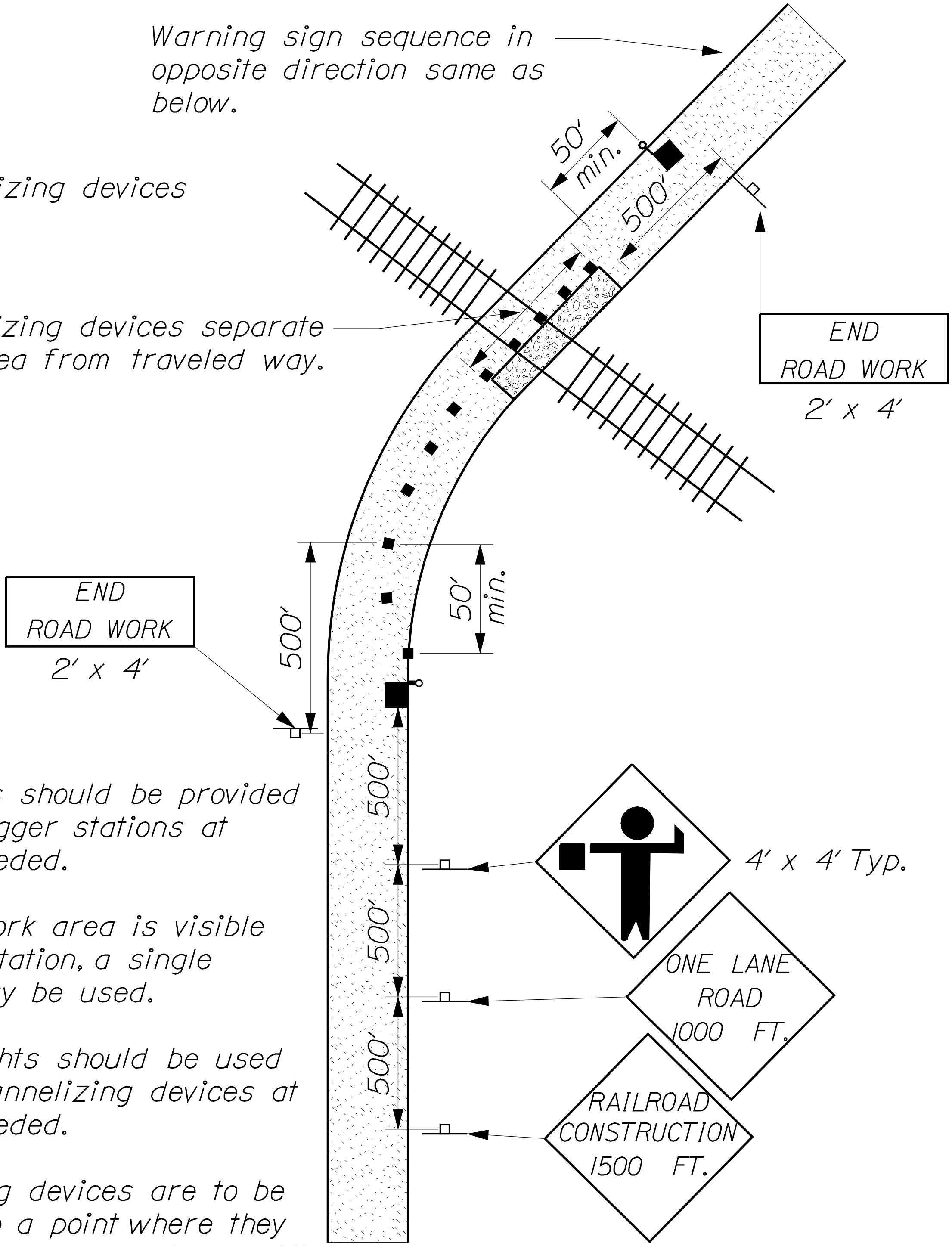
RAIL ROAD CROSSING GRADING

803(05)

Key:

■ Flagger

■■ Channelizing devices



Warning sign sequence in opposite direction same as below.

Channelizing devices separate work area from traveled way.

NOTE:

1. Flood lights should be provided to mark flagger stations at night as needed.

2. If entire work area is visible from one station, a single flagger may be used.

3. Warning lights should be used to mark channelizing devices at night as needed.

4. Channelizing devices are to be extended to a point where they are visible to approaching traffic.

TYPICAL APPLICATIONS OF TRAFFIC CONTROL DEVICES ON 2-LANE HIGHWAY. ONE LANE IS CLOSED AND FLAGGING IS PROVIDED.

803(06)

Use Highest Posted Speed	Minimum Distance (Feet)
20 mph	225′
25 mph	325′
30 mph	450′
35 mph	550′
40 mph	650′
45 mph	750′
50 mph	850′
55 mph	950′
60 mph	1100′

~ SUGGESTED MIN. PAVEMENT MARKING PLACEMENT DISTANCE ~

NOTES:

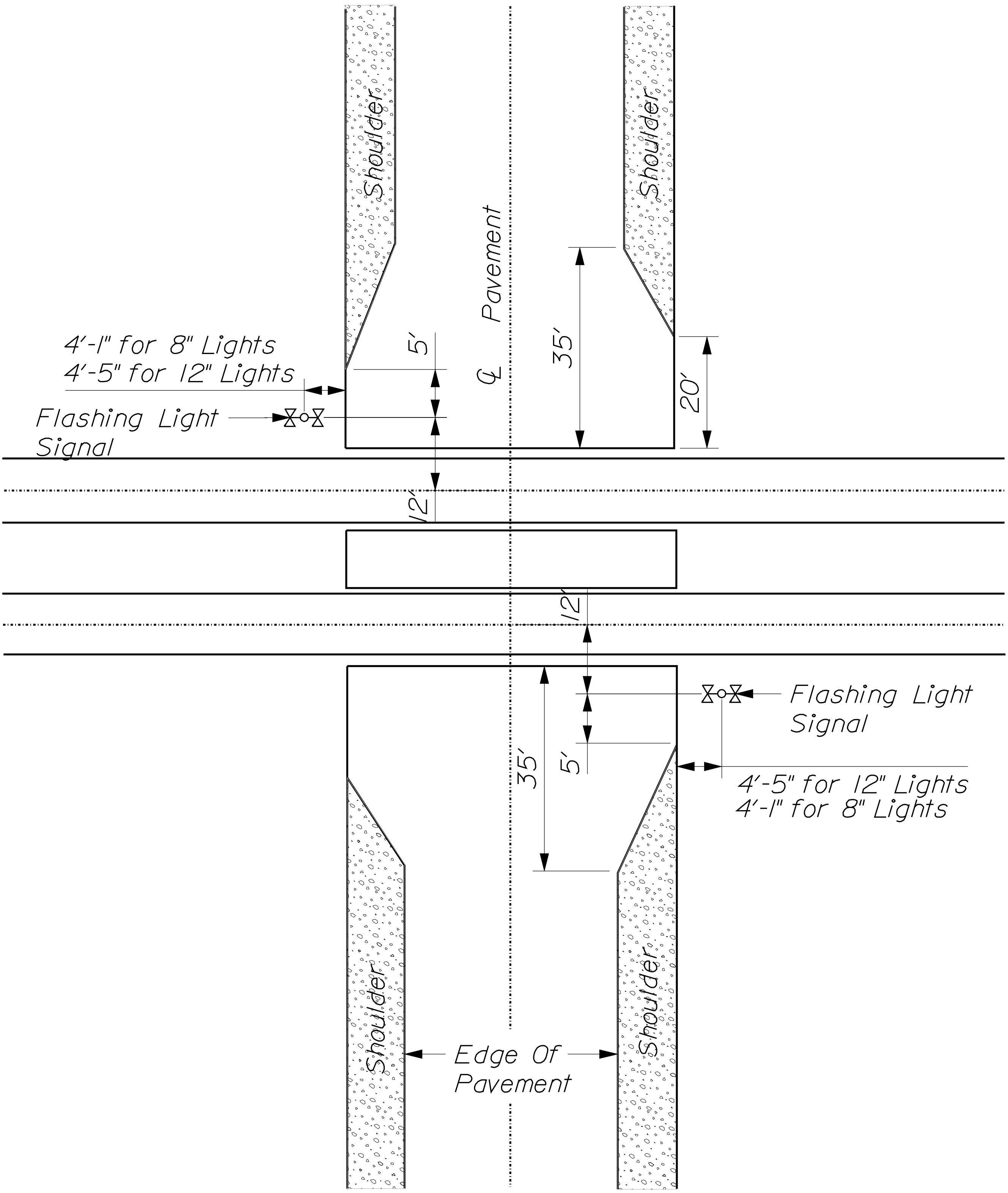
1. When used, a portion of the pavement marking symbol shall be directly opposite the Advance Warning Sign (W 10-1). If needed, supplemental pavement marking symbol(s) may be placed between the Advance Warning Sign and the crossing, but should be at least 50′ from the Stop Line.

2. A three lane roadway should be marked with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads the transverse bands should extend across all approach lanes, and individual RXR symbols should be used in each approach lane.

3. Refer to Standard Alphabet for Highway and Markings for RXR symbols details.

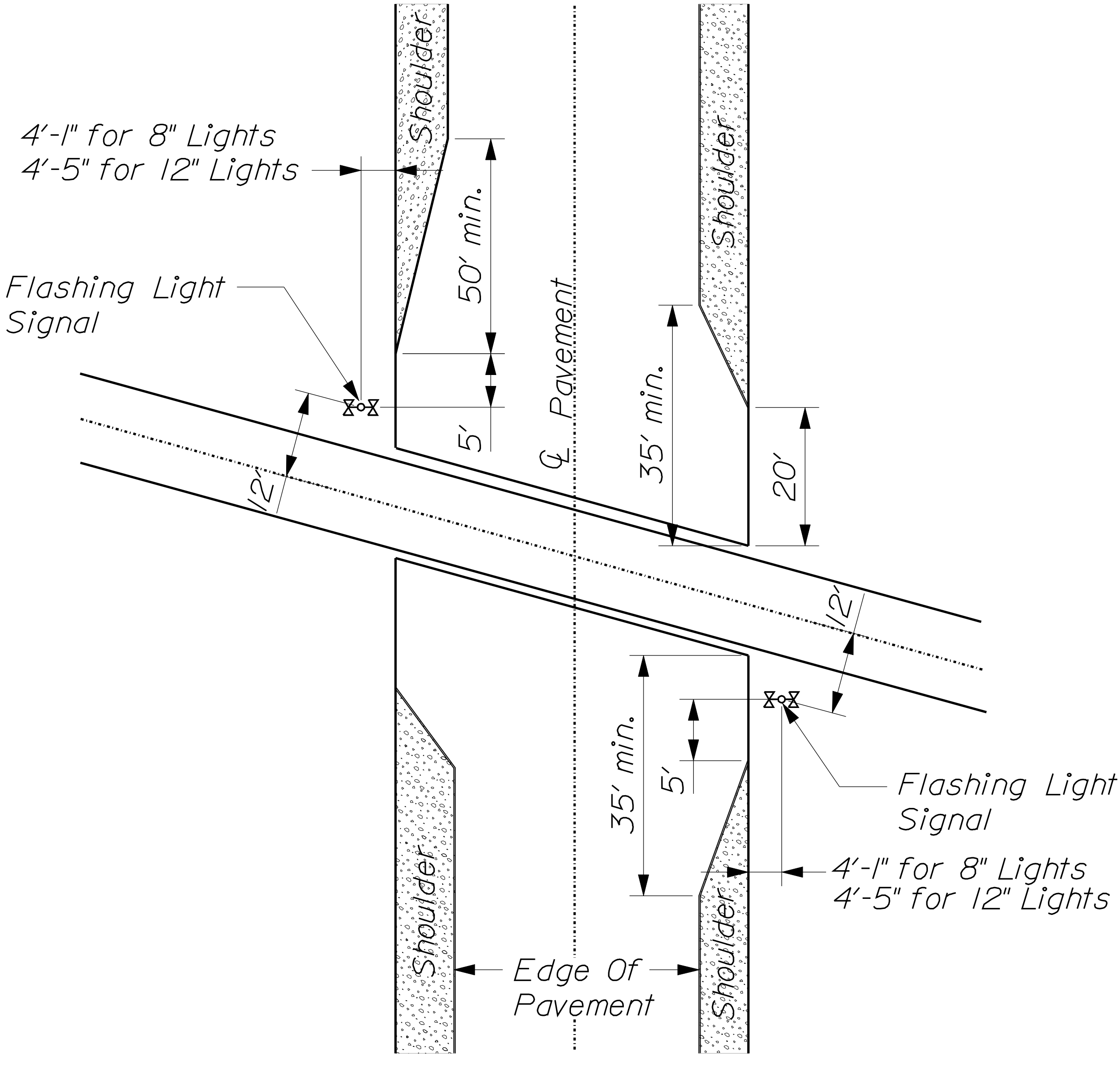
PAVEMENT MARKING NOTES

803(07)



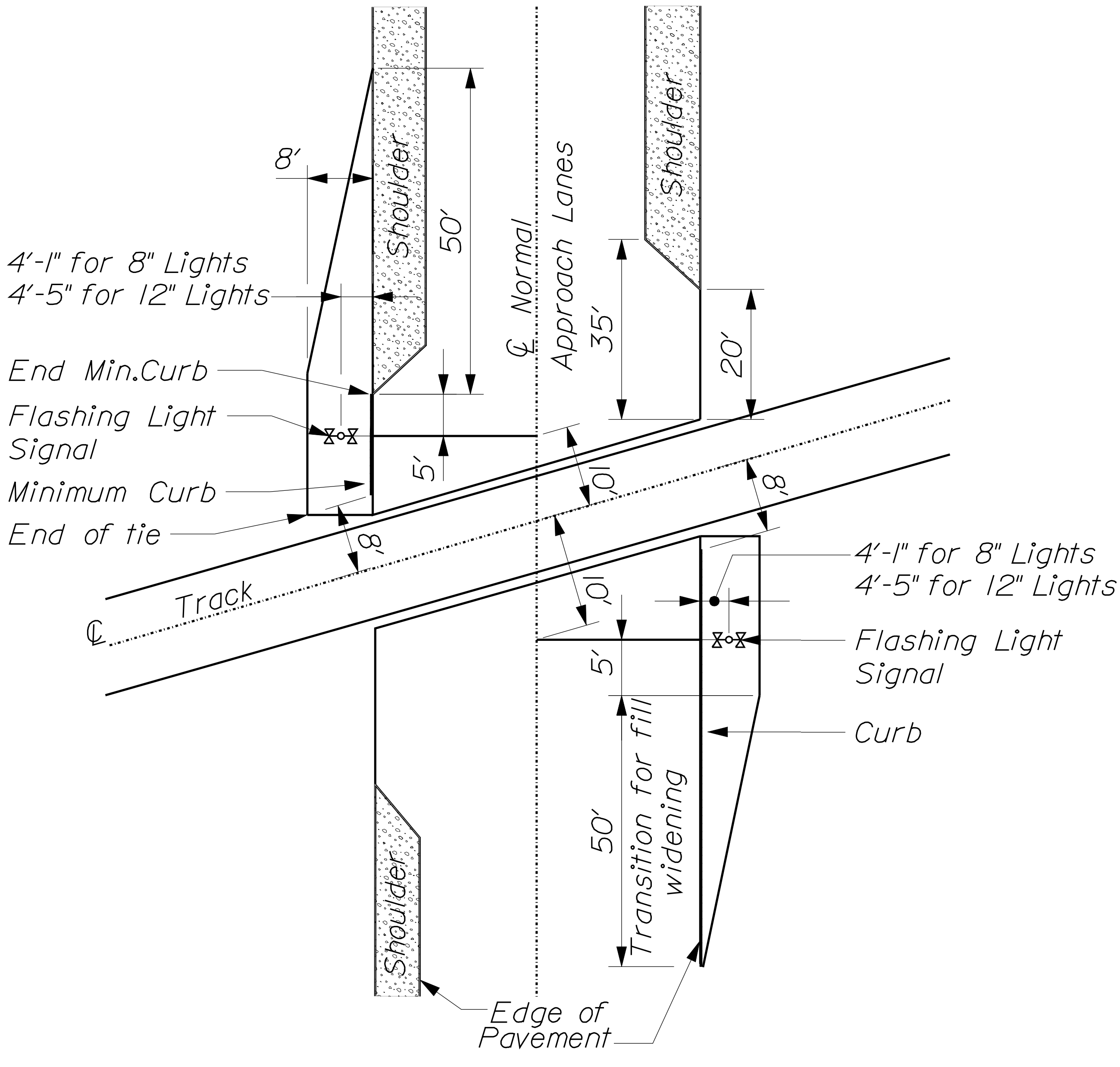
TYPICAL SIGNAL LOCATION AND PAVING PLAN FOR SQUARE CROSSING

803(08)



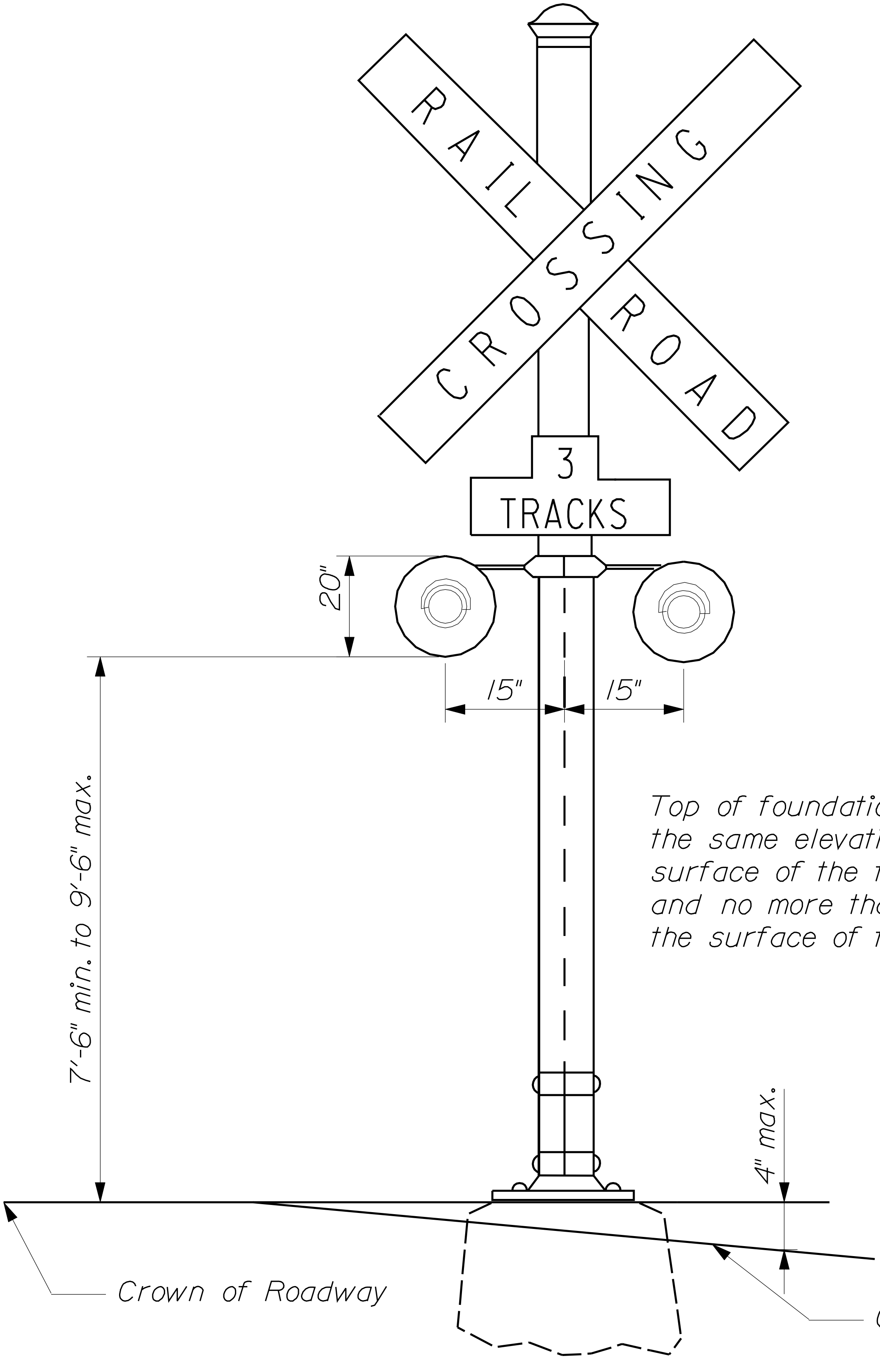
TYPICAL SIGNAL AND GUARD RAIL LOCATIONS FOR ACUTE ANGLE CROSSING

803(09)



TYPICAL SIGNAL AND CURB LOCATIONS FOR OBTUSE ANGLE CROSSING

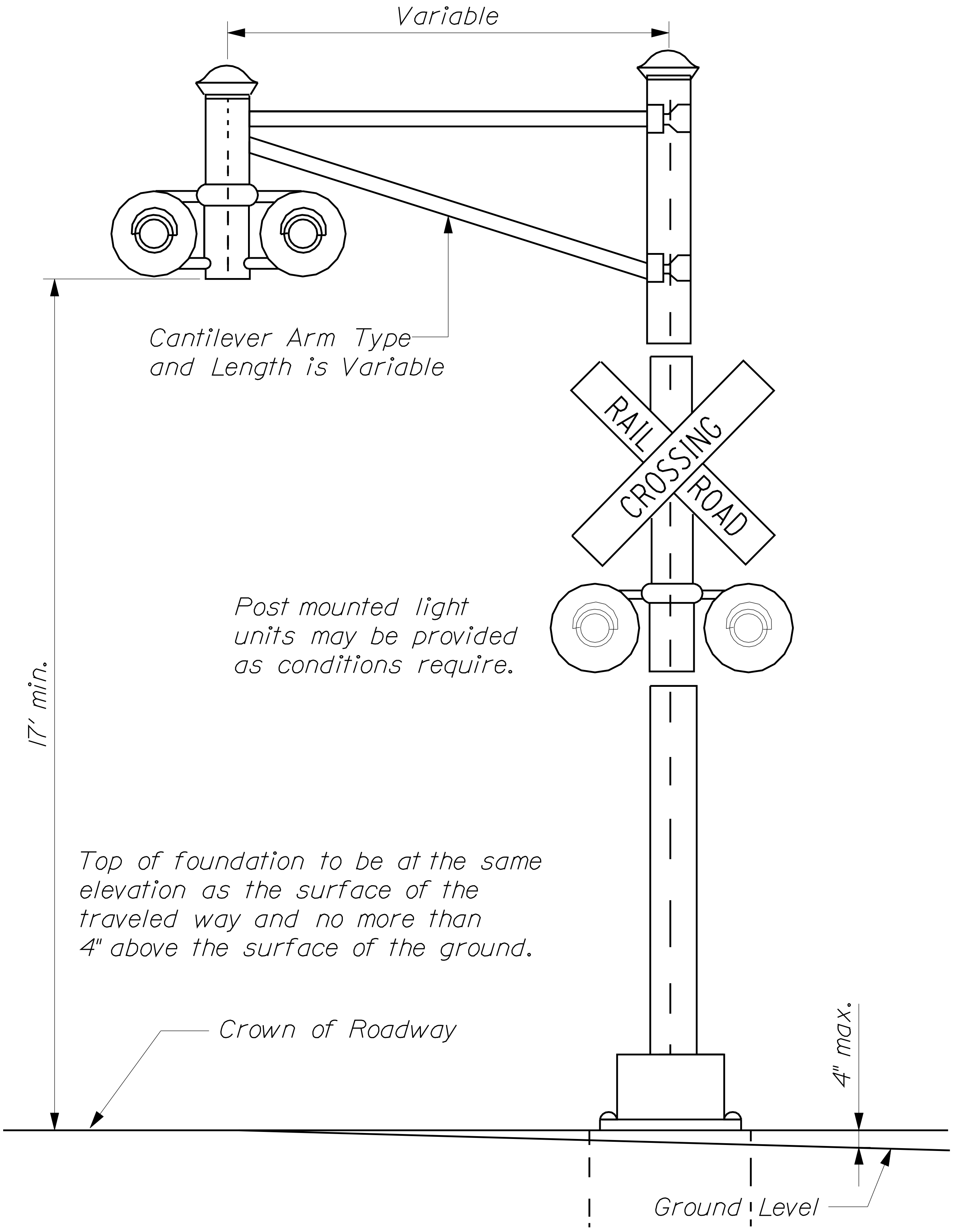
803(10)



Top of foundation to be at the same elevation as the surface of the traveled way and no more than 4" above the surface of the ground.

TYPICAL FLASHING LIGHT SIGNAL - POST MOUNTED.
TYPICAL SHOULDER WITHOUT CURB

803(II)



Cantilever Arm Type and Length is Variable

Post mounted light units may be provided as conditions require.

Top of foundation to be at the same elevation as the surface of the traveled way and no more than 4" above the surface of the ground.

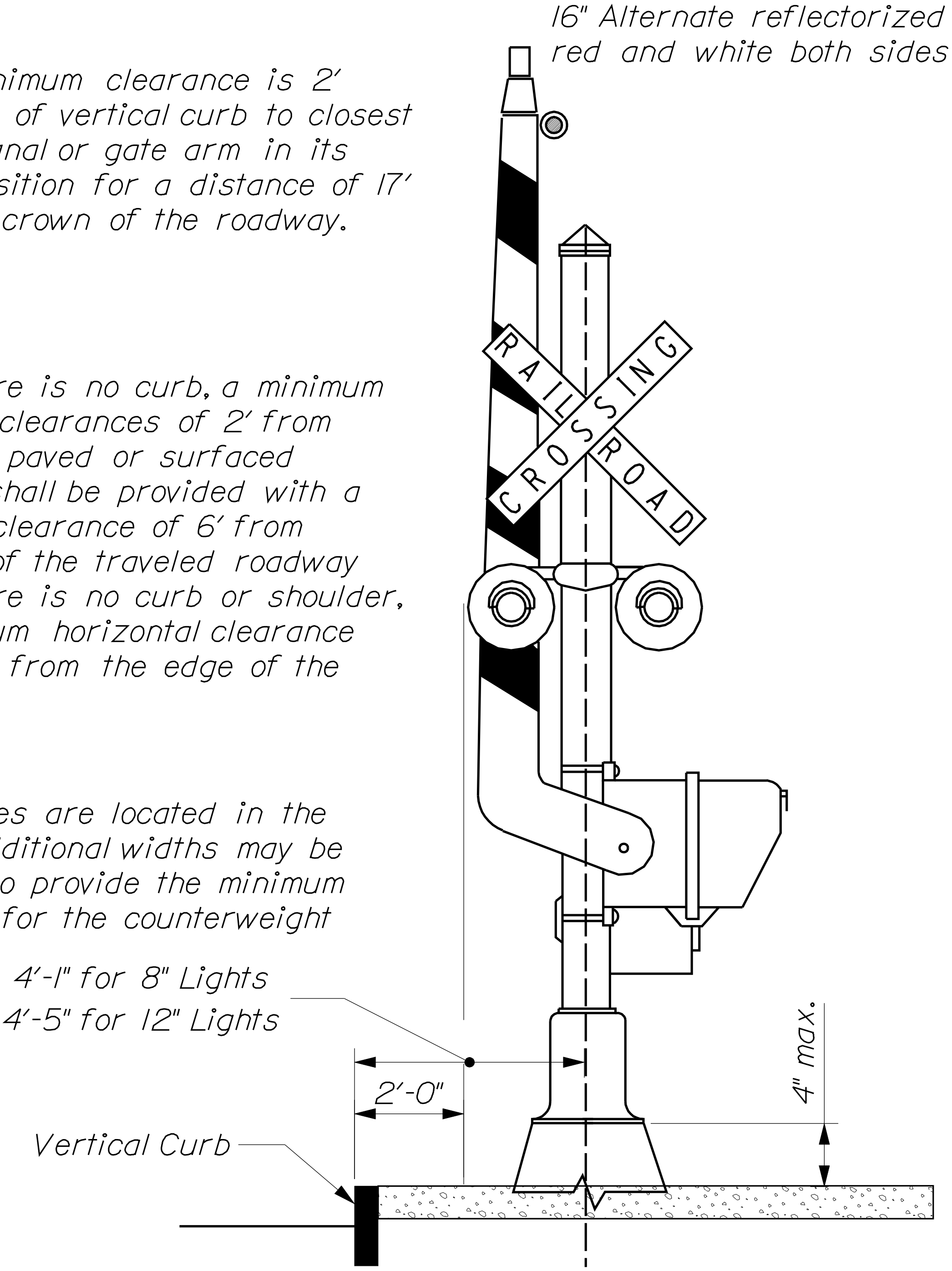
TYPICAL FLASHING LIGHT SIGNAL - CANTILEVER SUPPORTED

803(12)

Typical minimum clearance is 2′ from face of vertical curb to closest part of signal or gate arm in its upright position for a distance of 17′ above the crown of the roadway.

Where there is no curb, a minimum horizontal clearances of 2′ from edge of a paved or surfaced shoulder shall be provided with a minimum clearance of 6′ from the edge of the traveled roadway where there is no curb or shoulder, the minimum horizontal clearance shall be 6′ from the edge of the roadway.

Where gates are located in the median, additional widths may be required to provide the minimum clearance for the counterweight supports.



TYPICAL CLEARANCES FOR FLASHING LIGHT SIGNALS AND AUTOMATIC GATES TYPICAL CURB LOCATION

803(13)