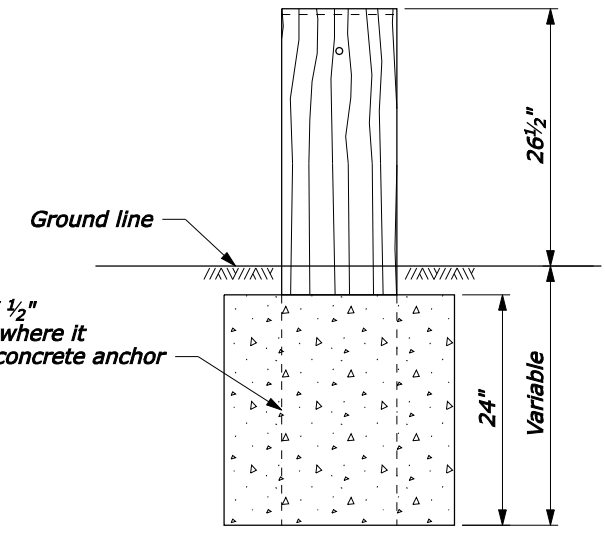
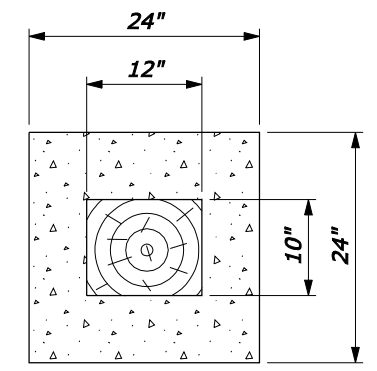
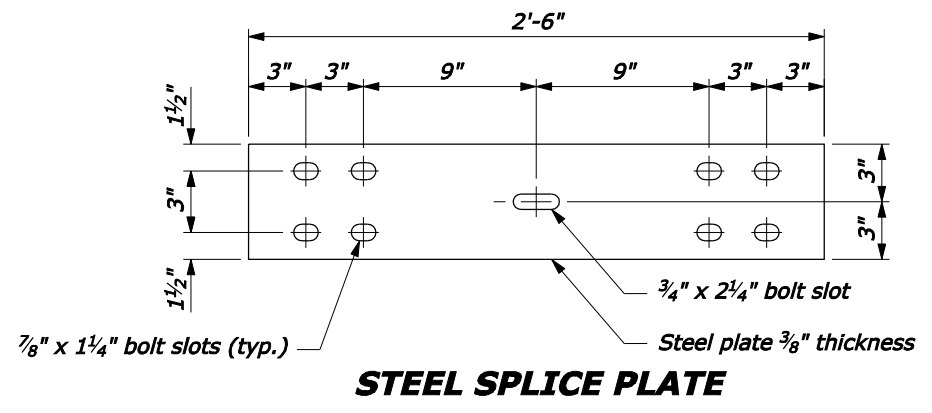
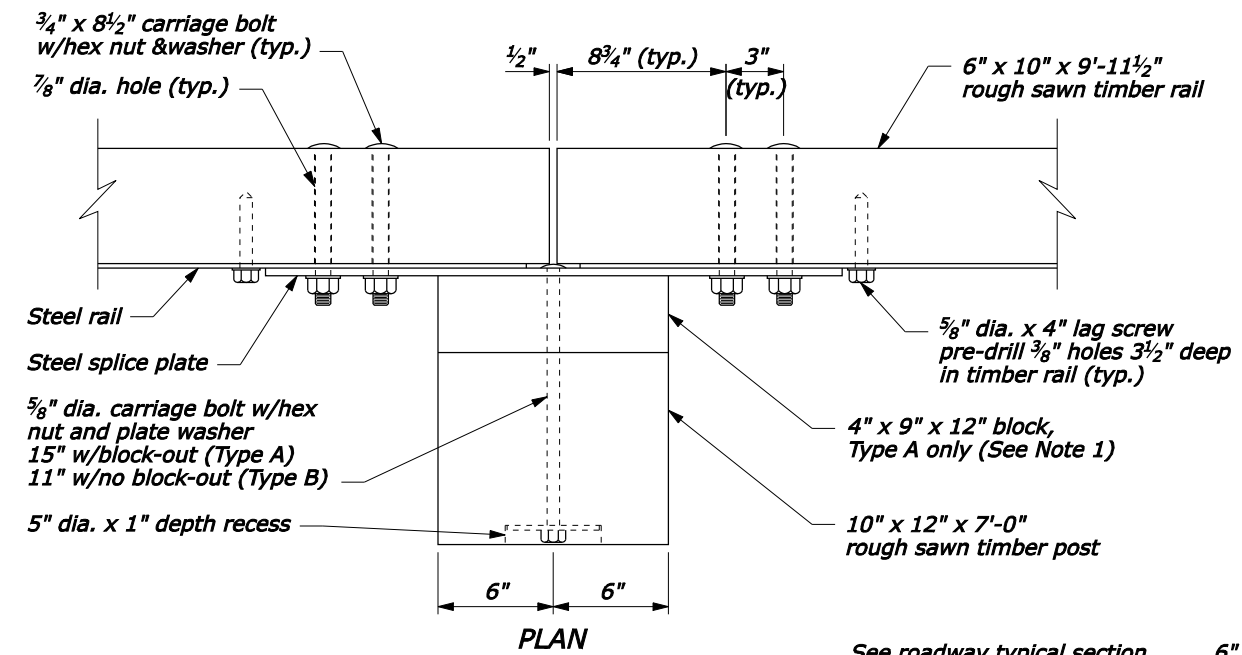
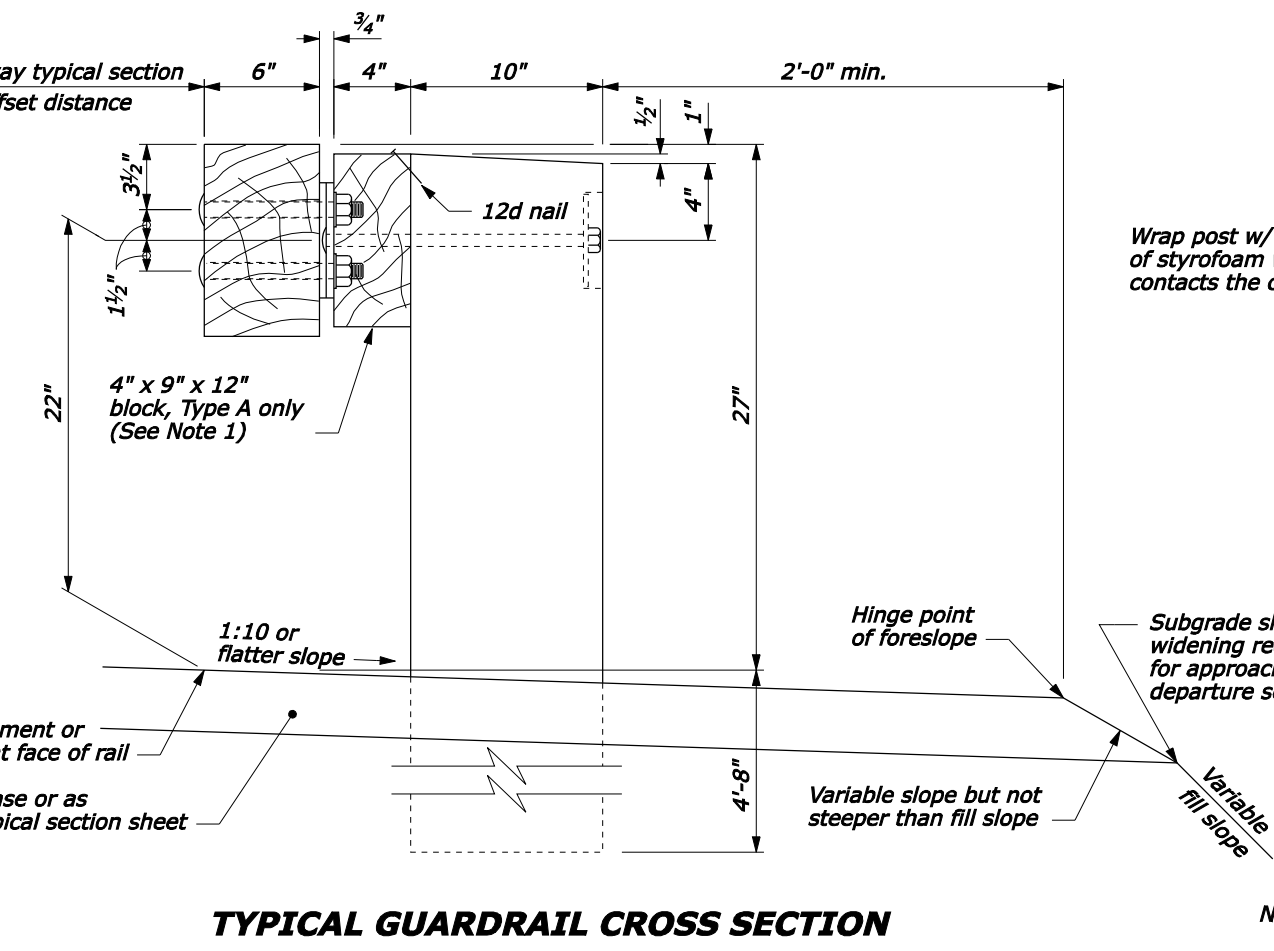
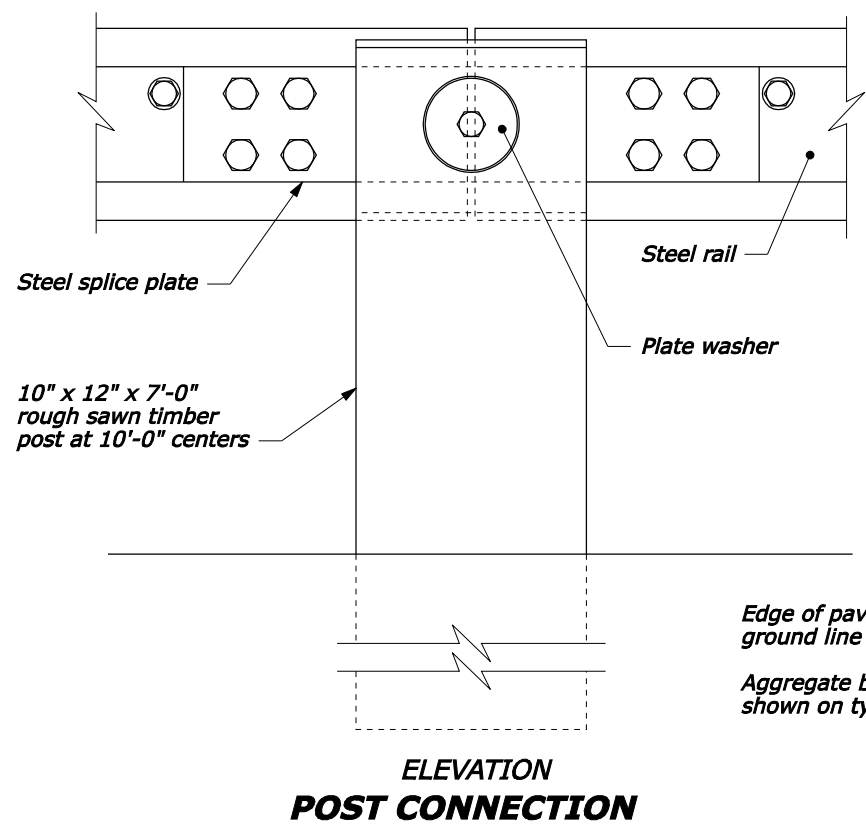


- NOTE:**
1. Use the Type A, blocked-out, system or the Type B, non-blocked-out, system as specified in the plans.
 2. Use weathering steel for all structural steel and fastener hardware as specified.
 3. Place a terminal section (See Standards 617-61 and 617-62) on both approach and trailing ends of barrier installations.



24" dia. round anchor is an acceptable alternative. Reduced size acceptable in solid rock.

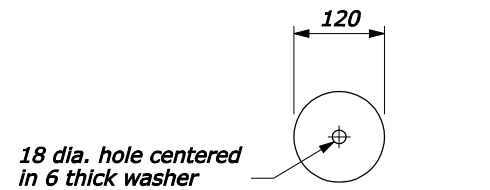
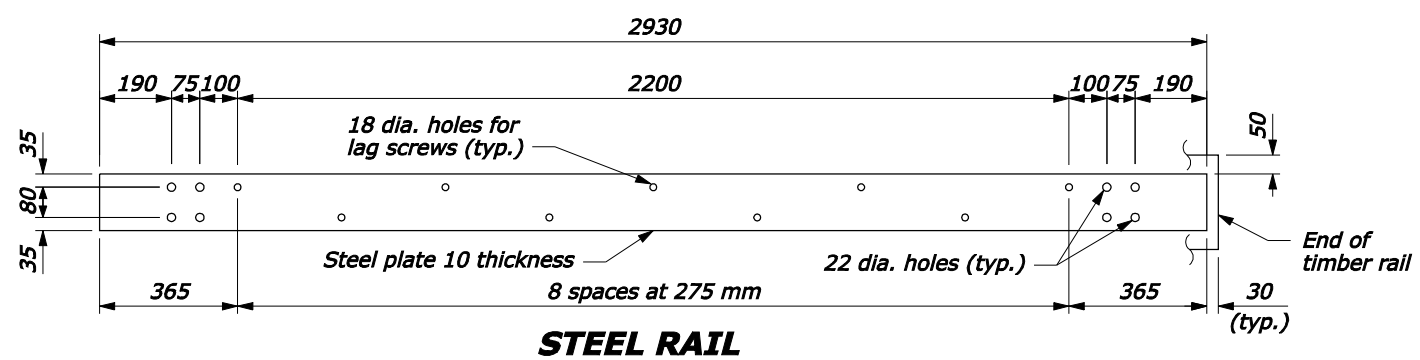
CONCRETE ANCHOR FOR SHORT GUARDRAIL POST



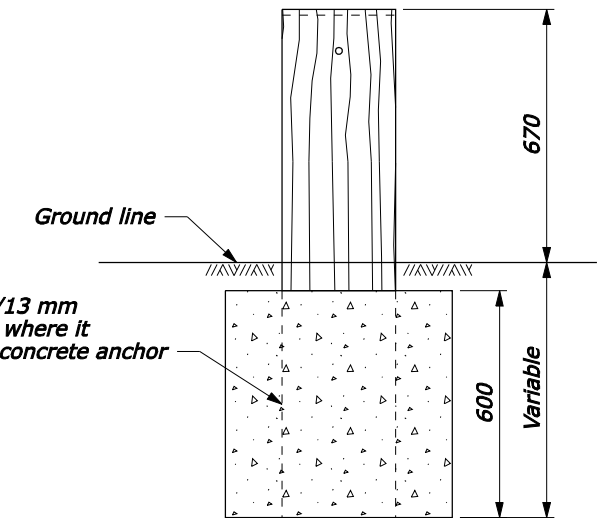
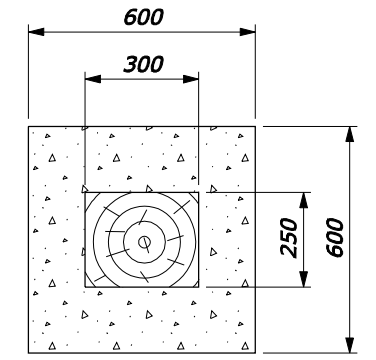
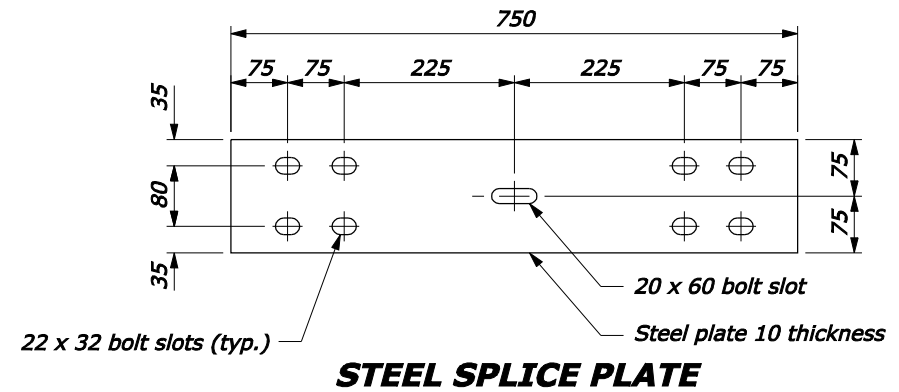
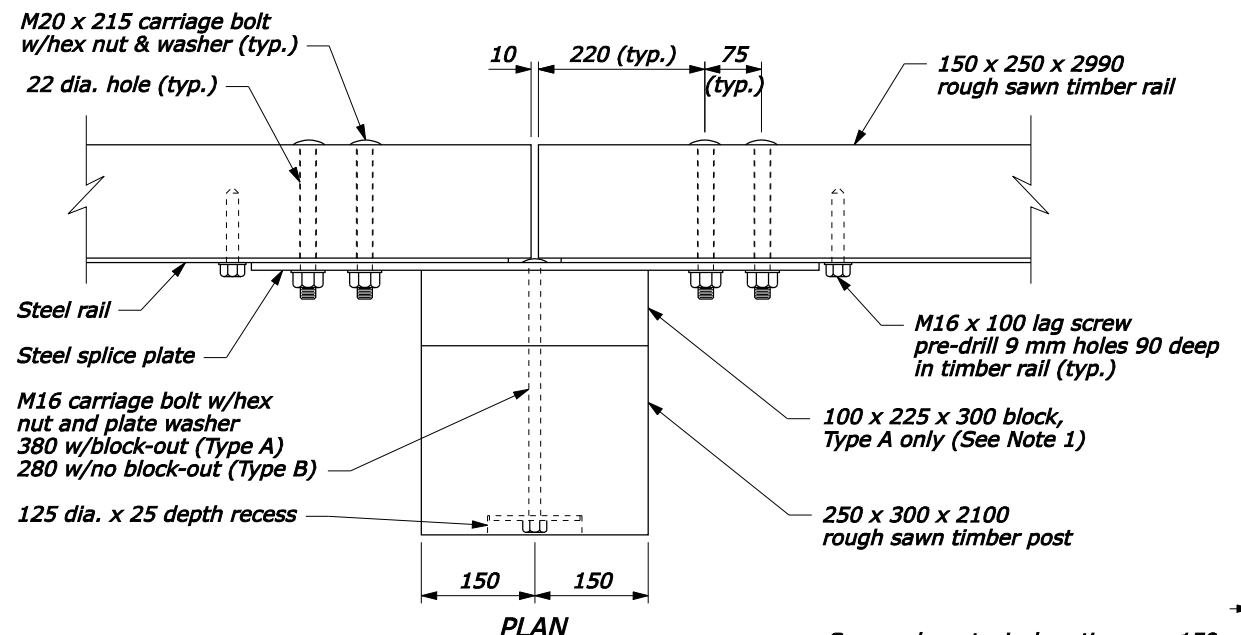
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD	
STEEL-BACKED TIMBER GUARDRAIL TYPE A & TYPE B	
STANDARD APPROVED FOR USE 3/1990 REVISED: 4/1994 6/2005	STANDARD 617-60

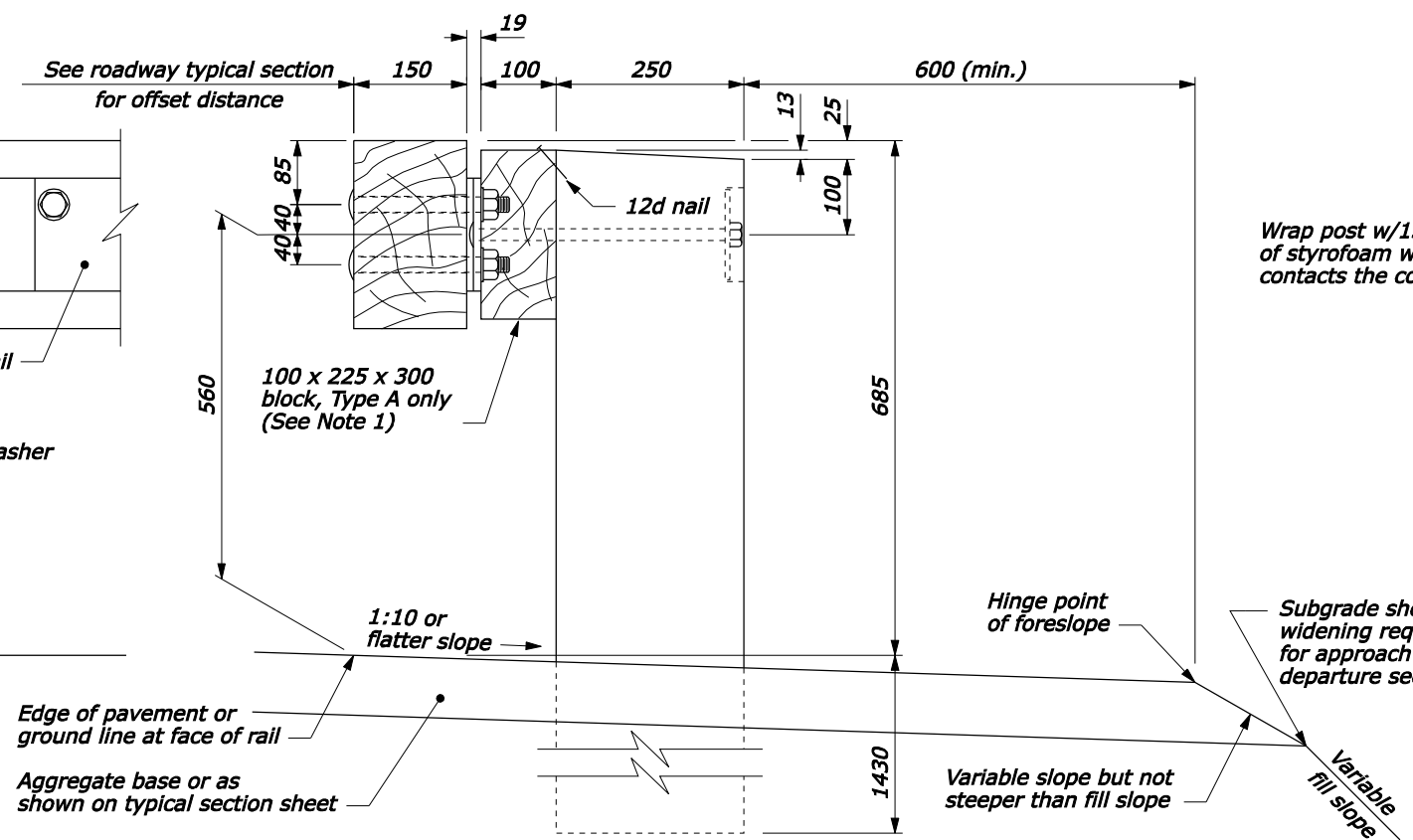
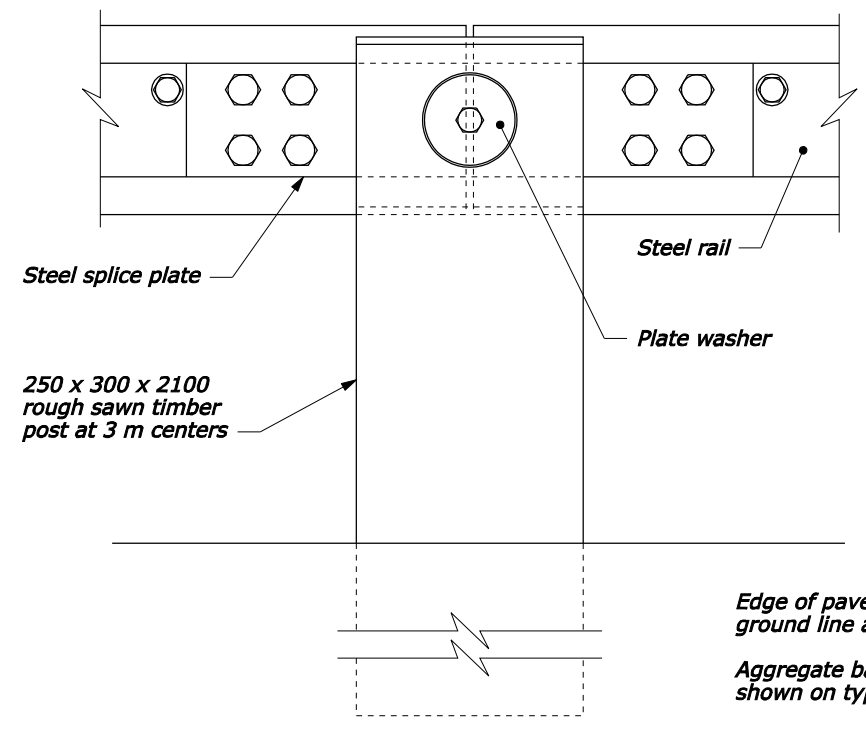
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- NOTE:**
1. Use the Type A, blocked-out, system or the Type B, non-blocked-out, system as specified in the plans.
 2. Use weathering steel for all structural steel and fastener hardware as specified.
 3. Place a terminal section (See Standards M617-61 and M617-62) on both approach and trailing ends of barrier installations.
 4. Furnish hardware in the metric sizes shown. Equivalent imperial sizes may be used when metric sizes are not available.
 5. Dimensions without units are millimeters.



600 dia. round anchor is an acceptable alternative. Reduced size acceptable in solid rock.



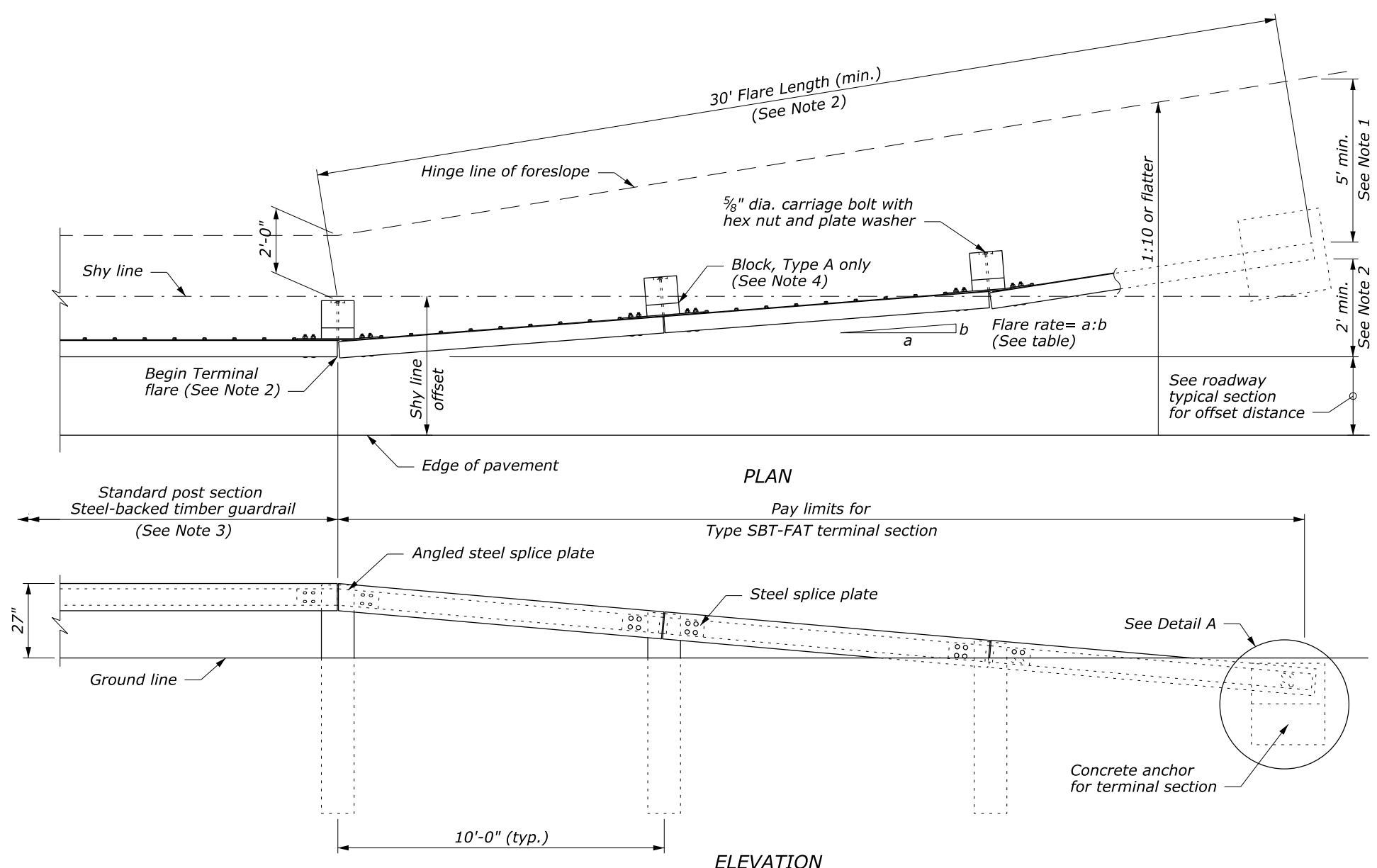
CONCRETE ANCHOR FOR SHORT GUARDRAIL POST

STEEL-BACKED TIMBER GUARDRAIL TYPE A & TYPE B

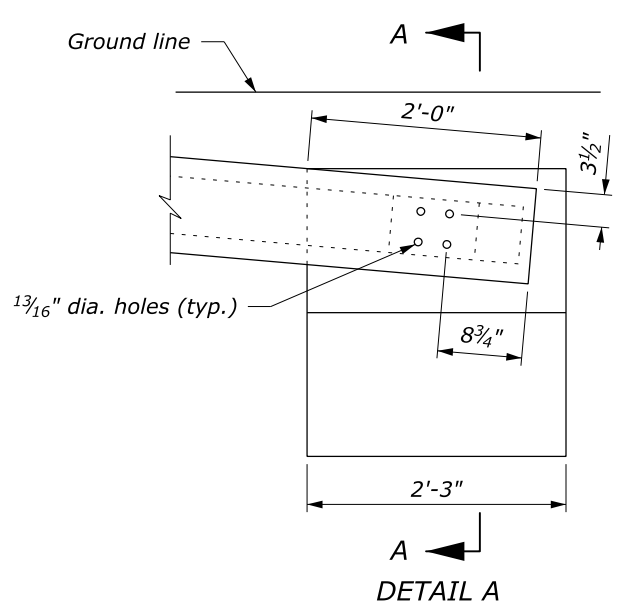
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
STEEL-BACKED TIMBER GUARDRAIL TYPE A & TYPE B	
STANDARD APPROVED FOR USE 3/1996	STANDARD
REVISED: 5/1997 6/2005	M617-60

NO SCALE

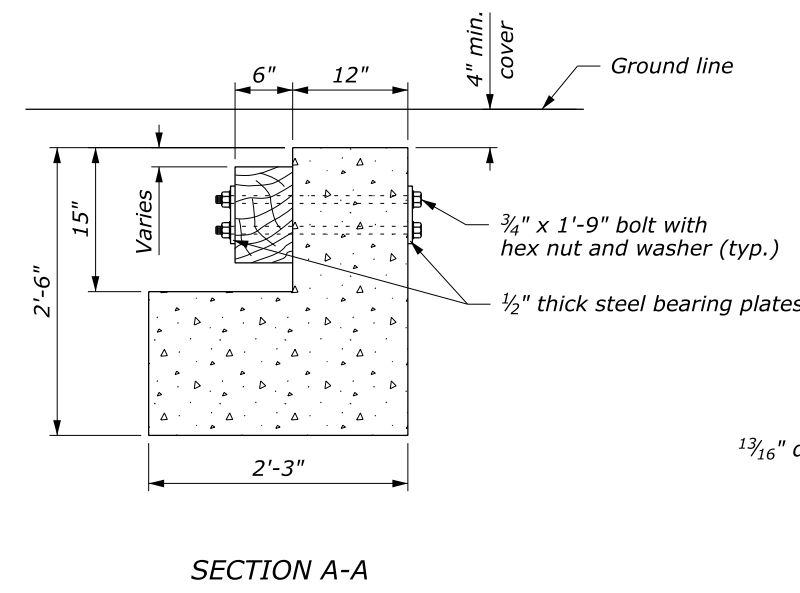
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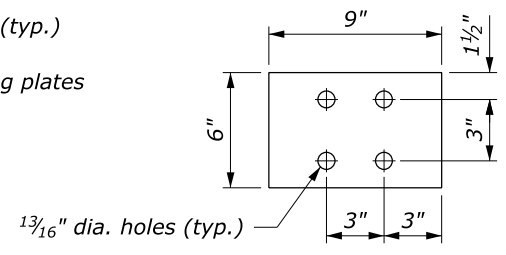
APPROACH & DEPARTURE FLARE WITH FLARED ANCHOR TERMINAL (FAT)



CONCRETE ANCHOR

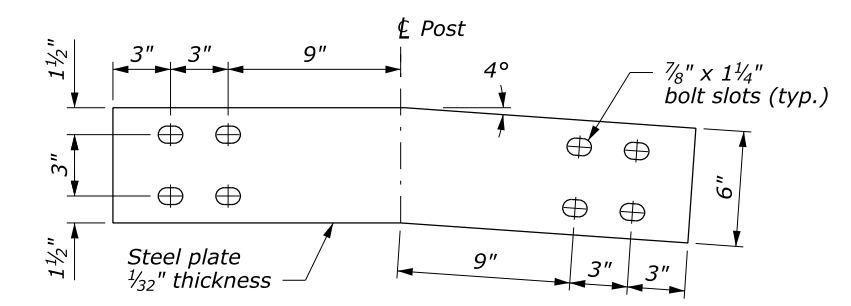


SECTION A-A



STEEL BEARING PLATE

Design Speed (mph)	Shy line offset (ft)	Flare rate inside shy line (a:b)	Flare rate outside shy line (a:b)
60	8.0	26:1	14:1
50	6.5	21:1	11:1
40	5.0	16:1	8:1
30 and less	3.5	13:1	7:1



ANGLED STEEL SPLICE PLATE

NOTE:

1. Extend the fill widening a minimum of 5 feet behind the guardrail, unless otherwise directed by the CO.
2. The guardrail flare shown in the plan view is the minimum length and rate required. As directed by the CO, flare the guardrail so that the terminal section is outside the clear zone. If the terminal section cannot be located outside the clear zone, it should be flared as far as practical from the road at the maximum rate indicated on the Guardrail Flare Rates table.
3. See Standard 617-60, Steel-Backed Timber Guardrail, Type SBT-A and SBT-B, for timber, structural steel, and hardware details.
4. On the Type A, blocked-out guardrail, include the blocks in terminal section, except on the concrete anchor. For the Type B, non-blocked-out guardrail, no blocks are included.

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

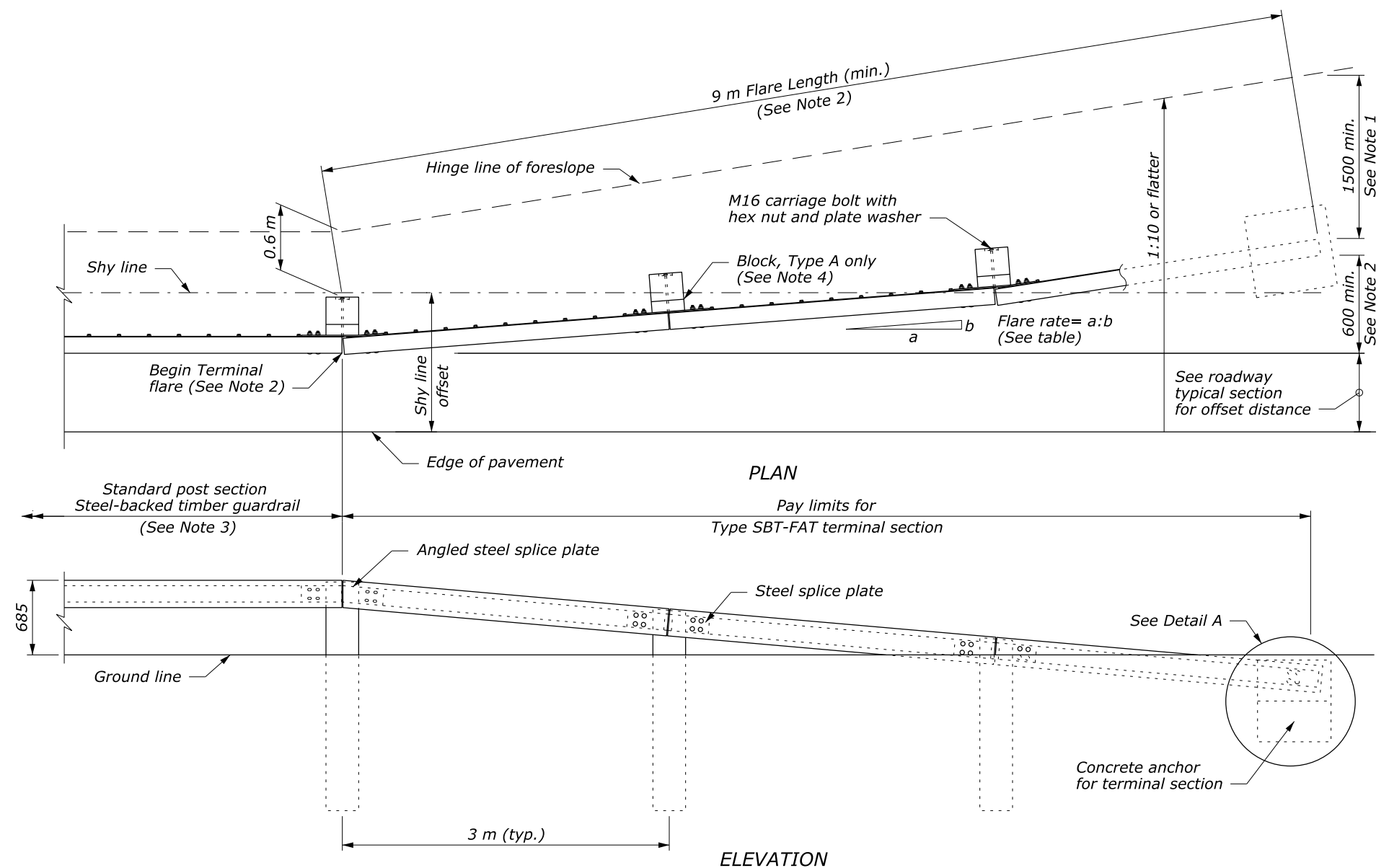
**STEEL-BACKED TIMBER GUARDRAIL
 TERMINAL SECTION
 TYPE SBT-FAT**

STANDARD APPROVED FOR USE 1/1990

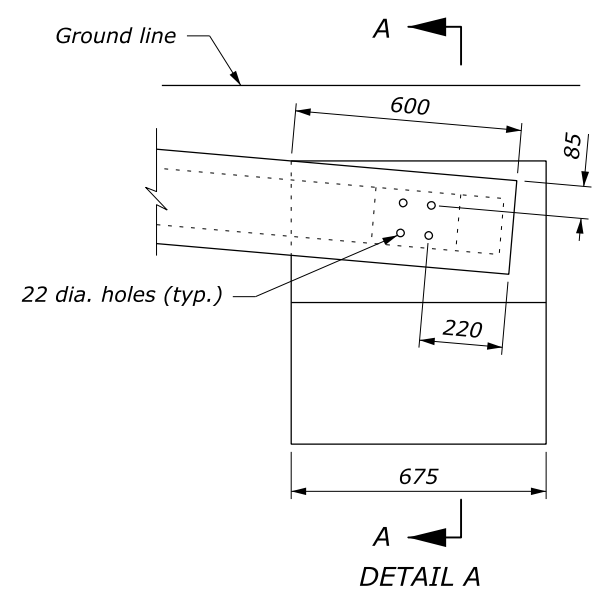
REVISSED: 4/1994 6/2005
 DRAFT: 12/2013

STANDARD
 617-61

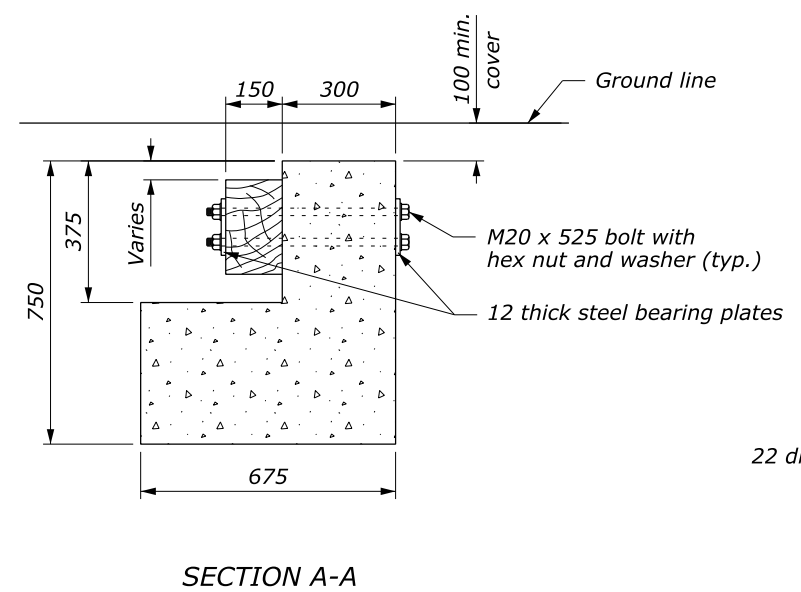
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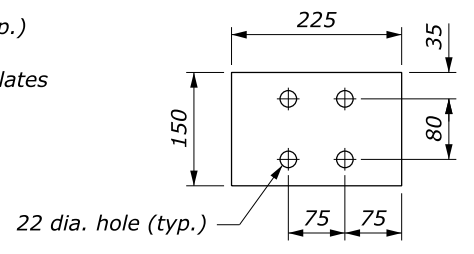
APPROACH & DEPARTURE FLARE WITH FLARED ANCHOR TERMINAL (FAT)



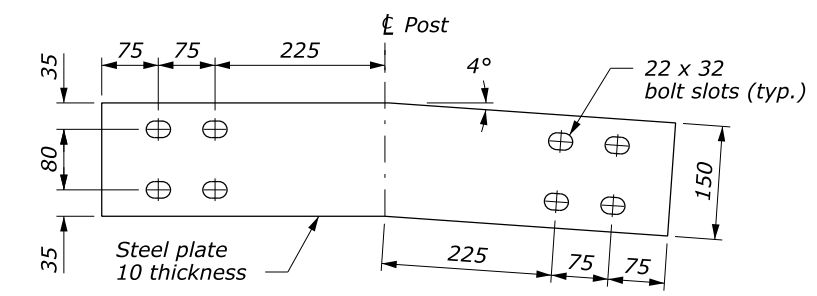
CONCRETE ANCHOR



SECTION A-A



STEEL BEARING PLATE



ANGLED STEEL SPLICE PLATE

NOTE:

1. Extend the fill widening a minimum of 1.5 m behind the guardrail, unless otherwise directed by the CO.
2. The guardrail flare shown in the plan view is the minimum length and rate required. As directed by the CO, flare the guardrail so that the terminal section is outside the clear zone. If the terminal section cannot be located outside the clear zone, it should be flared as far as practical from the road at the maximum rate indicated on the Guardrail Flare Rates table.
3. See Standard M617-60, Steel-Backed Timber Guardrail, Type SBTA and SBTB, for timber, structural steel, and hardware details.
4. On the Type A, blocked-out guardrail, include the blocks in terminal section, except on the concrete anchor. For the Type B, non-blocked-out guardrail, no blocks are included.
5. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are unavailable.
6. Dimensions without units are millimeters.

Design Speed (km/h)	Shy line offset (m)	Flare rate inside shy line (a:b)	Flare rate outside shy line (a:b)
100	2.5	26:1	14:1
80	2.0	21:1	11:1
60	1.5	16:1	8:1
50 or less	1.0	13:1	7:1

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

METRIC STANDARD

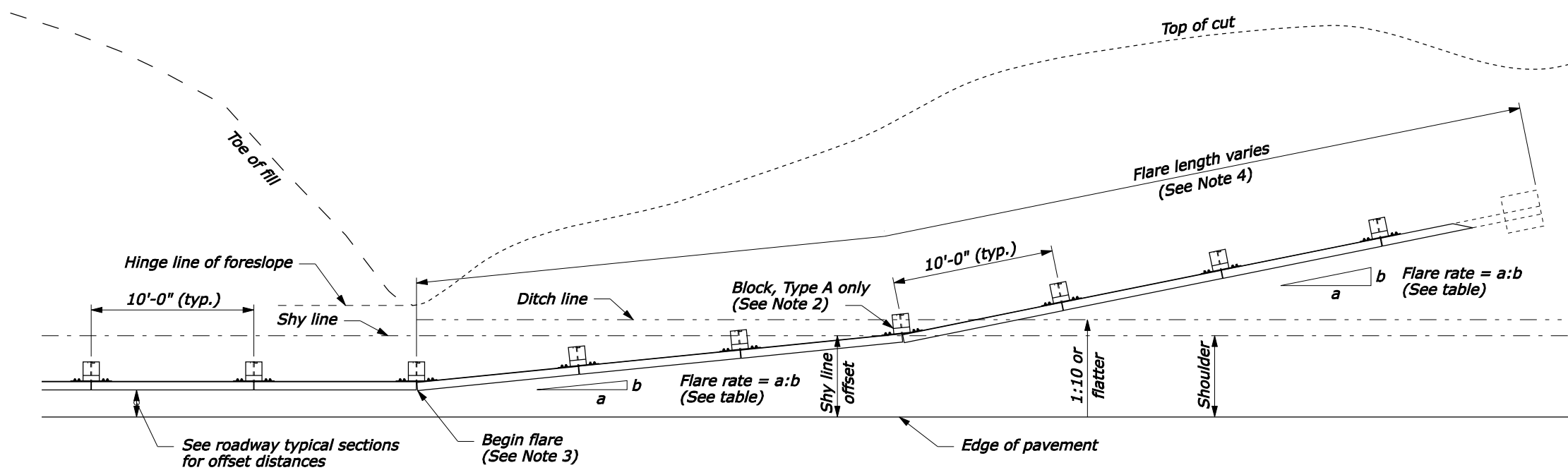
**STEEL-BACKED TIMBER GUARDRAIL
 TERMINAL SECTION
 TYPE SBT-FAT**

STANDARD APPROVED FOR USE 3/1996

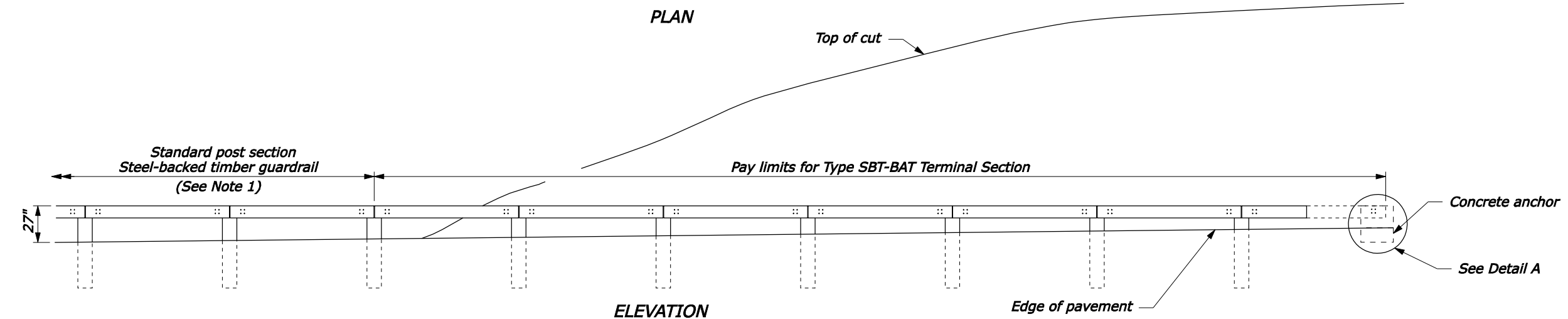
REVISOR: 6/2005
 DRAFT: 12/2013

STANDARD
M617-61

NO SCALE

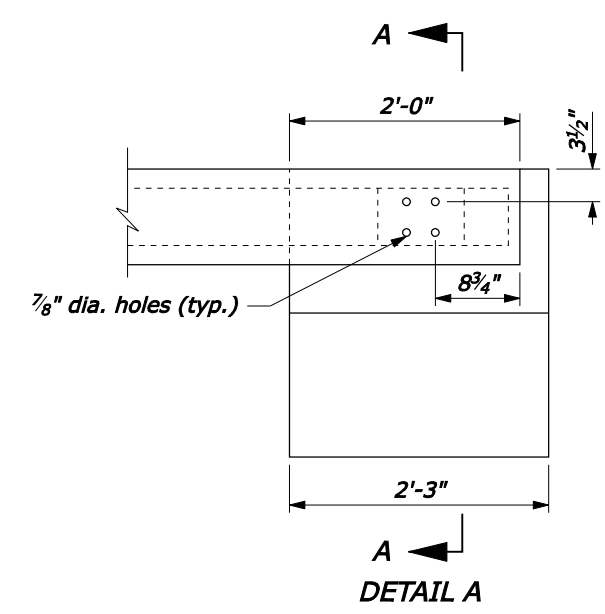


- NOTE:**
1. See Standard 617-60, SBTA and SBTB for timber, structural steel, and hardware details.
 2. On the Type A, blocked-out guardrail, include the blocks in the terminal section, except on the concrete anchor. For the Type B, non-blocked-out guardrail, no blocks are included.
 3. Begin the cut flares at the nearest post to a transition point between fill and cut as directed by the CO.
 4. Extend the flare into the cut until a minimum 1-foot cover is obtained over the guardrail end.

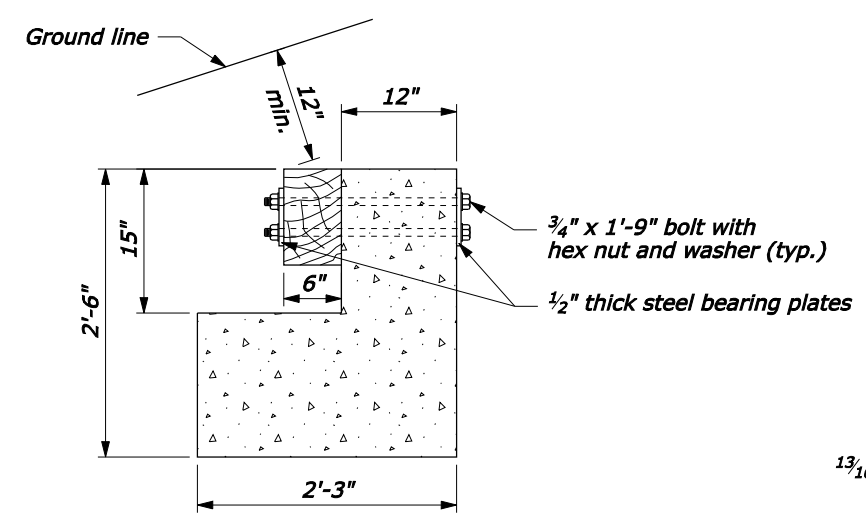


APPROACH & DEPARTURE FLARE WITH BACK SLOPE ANCHOR TERMINAL (BAT)

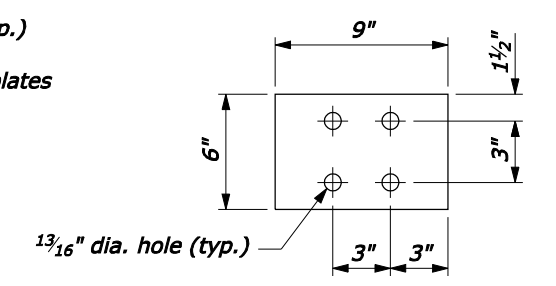
Design Speed (mph)	Shy line offset (ft)	Flare rate inside shy line (a:b)	Flare rate outside shy line (a:b)
60	8.0	26:1	14:1
50	6.5	21:1	11:1
40	5.0	16:1	8:1
30 and less	3.5	13:1	7:1



CONCRETE ANCHOR



SECTION A-A



STEEL BEARING PLATE

NO SCALE

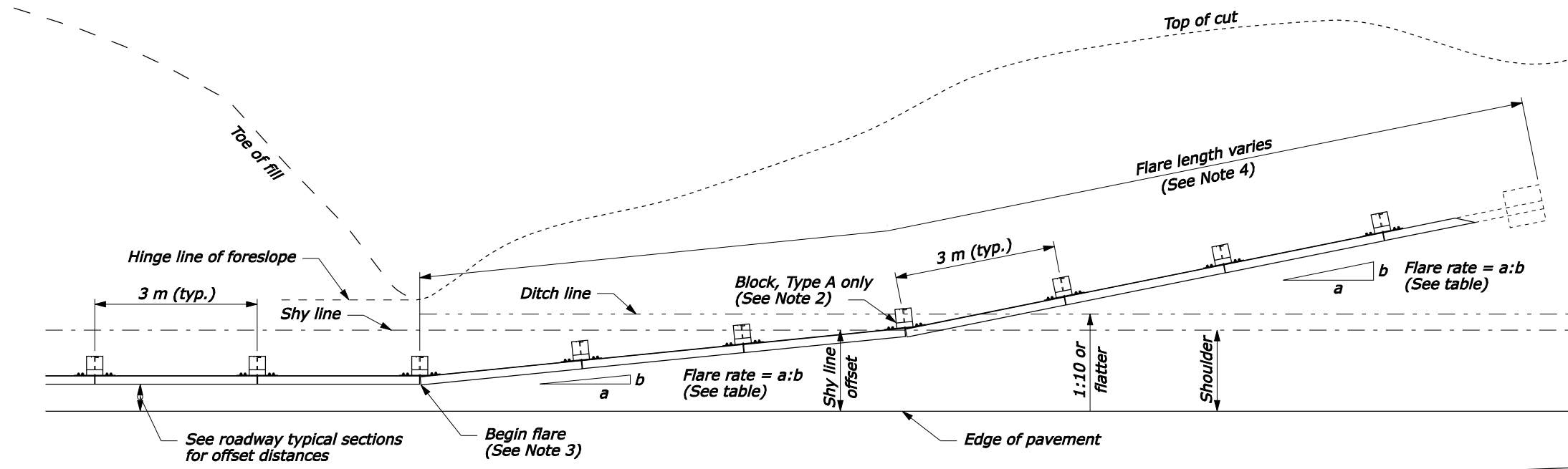
U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

**STEEL-BACKED TIMBER GUARDRAIL
 TERMINAL SECTION
 TYPE SBT-BAT**

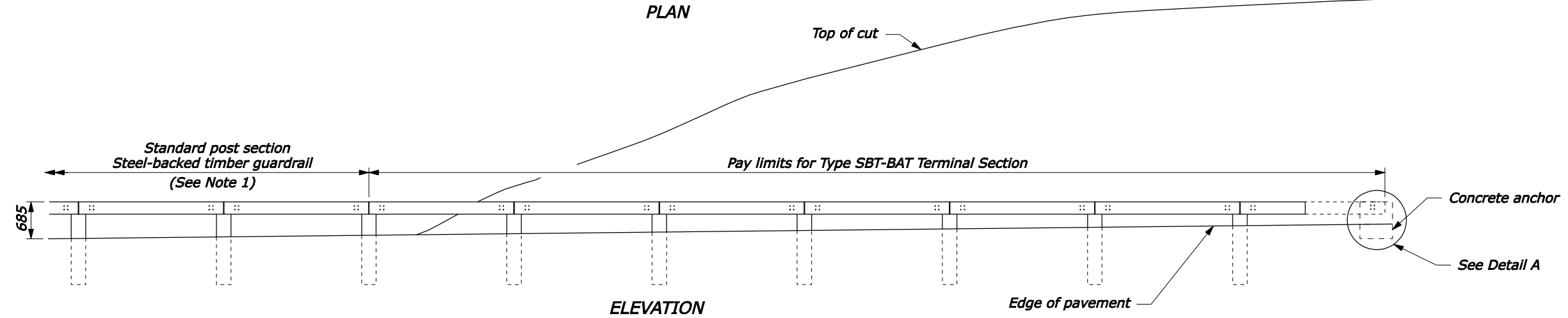
STANDARD APPROVED FOR USE 3/1990	STANDARD
REVISED: 4/1994 6/2005	617-62

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- NOTE:**
1. See Standard M617-60, SBTA and SBTB for timber, structural steel, and hardware details.
 2. On the Type A, blocked-out guardrail, include the blocks in the terminal section, except on the concrete anchor. For the Type B, non-blocked-out guardrail, no blocks are included.
 3. Begin the cut flares at the nearest post to a transition point between fill and cut as directed by the CO.
 4. Extend the flare into the cut until a minimum 300 mm cover is obtained over the guardrail end.
 5. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 6. Dimensions without units are millimeters.

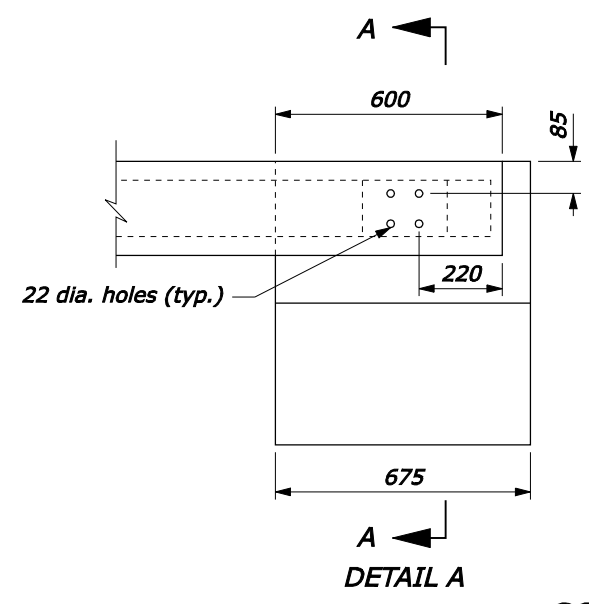
PLAN



ELEVATION

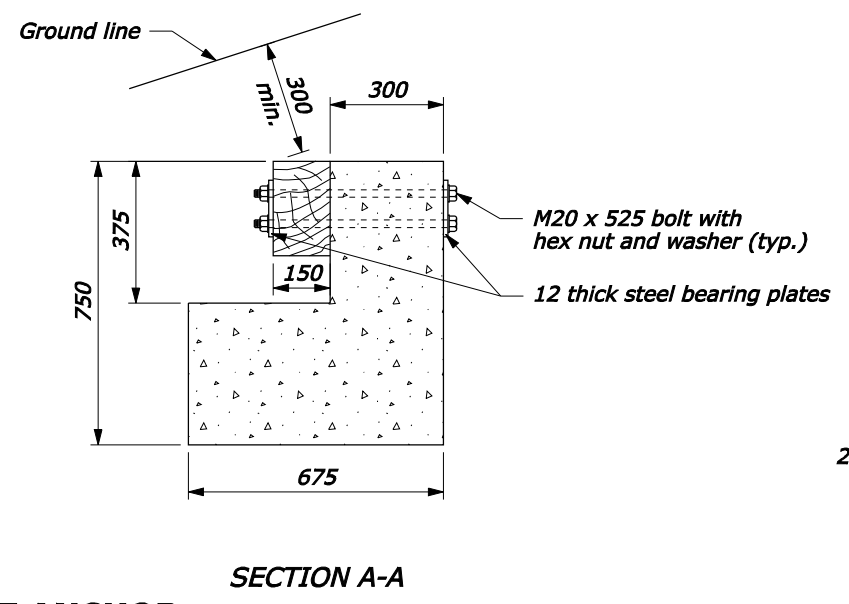
APPROACH & DEPARTURE FLARE WITH BACK SLOPE ANCHOR TERMINAL (BAT)

Design Speed (km/h)	Shy line offset (m)	Flare rate inside shy line (a:b)	Flare rate outside shy line (a:b)
100	2.5	26:1	14:1
80	2.0	21:1	11:1
60	1.5	16:1	8:1
50 or less	1.0	13:1	7:1

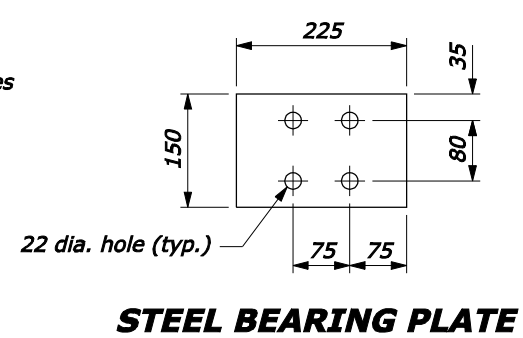


DETAIL A

CONCRETE ANCHOR



SECTION A-A

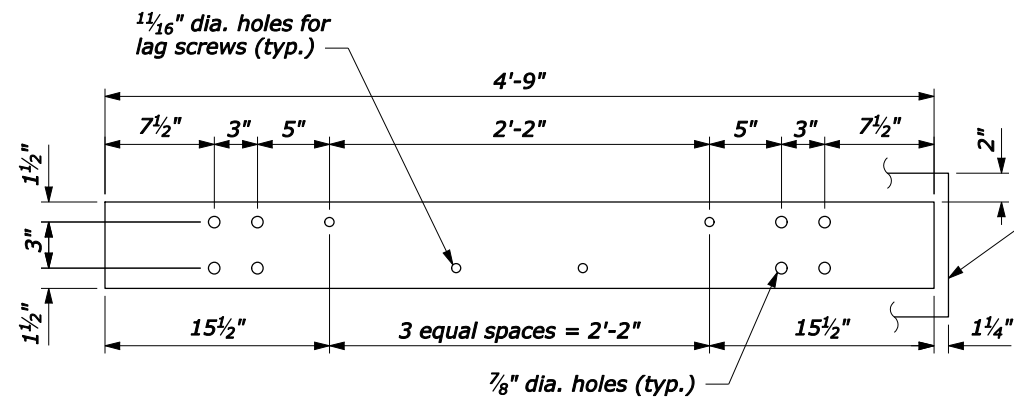


STEEL BEARING PLATE

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY
 METRIC STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
 TERMINAL SECTION
 TYPE SBT-BAT**
 STANDARD APPROVED FOR USE 3/1996
 REVISED: 6/2005
 STANDARD
M617-62

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STEEL RAIL
6" x 3/8" x 4'-9"

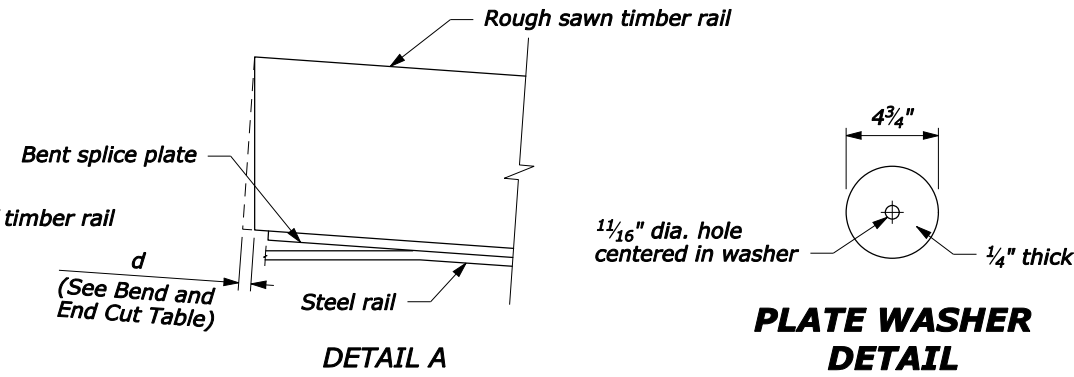
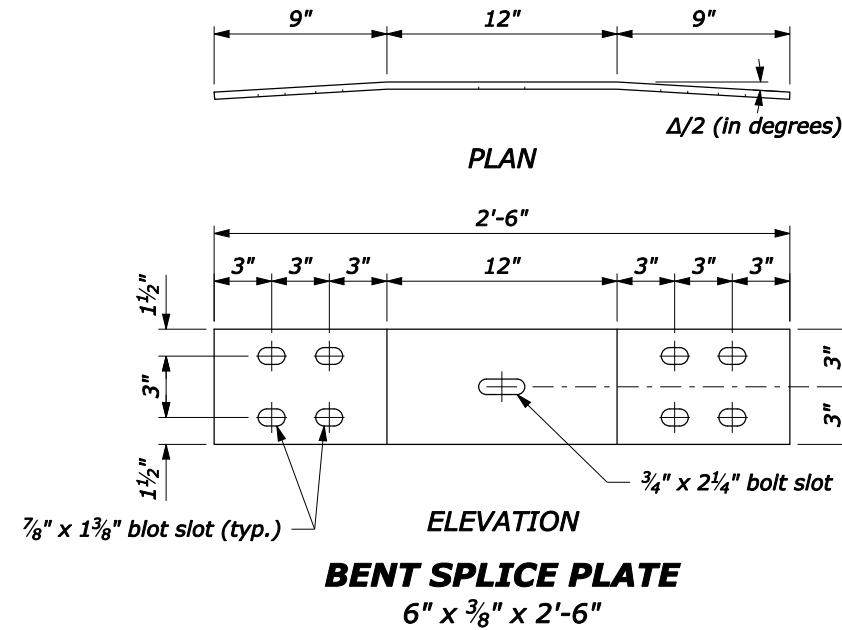
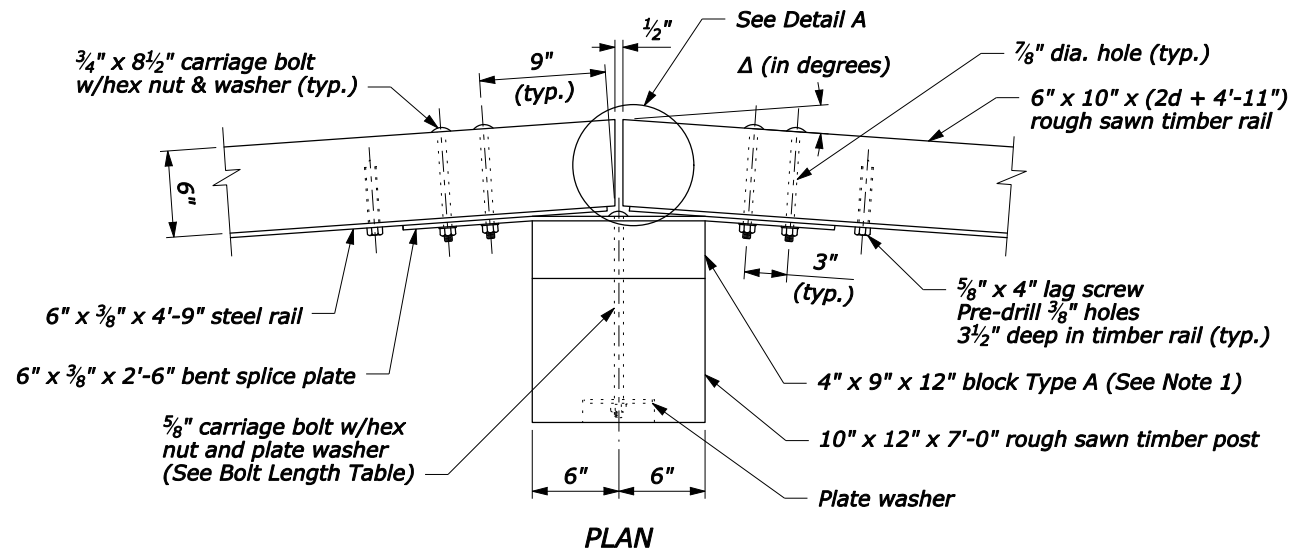


PLATE WASHER
DETAIL

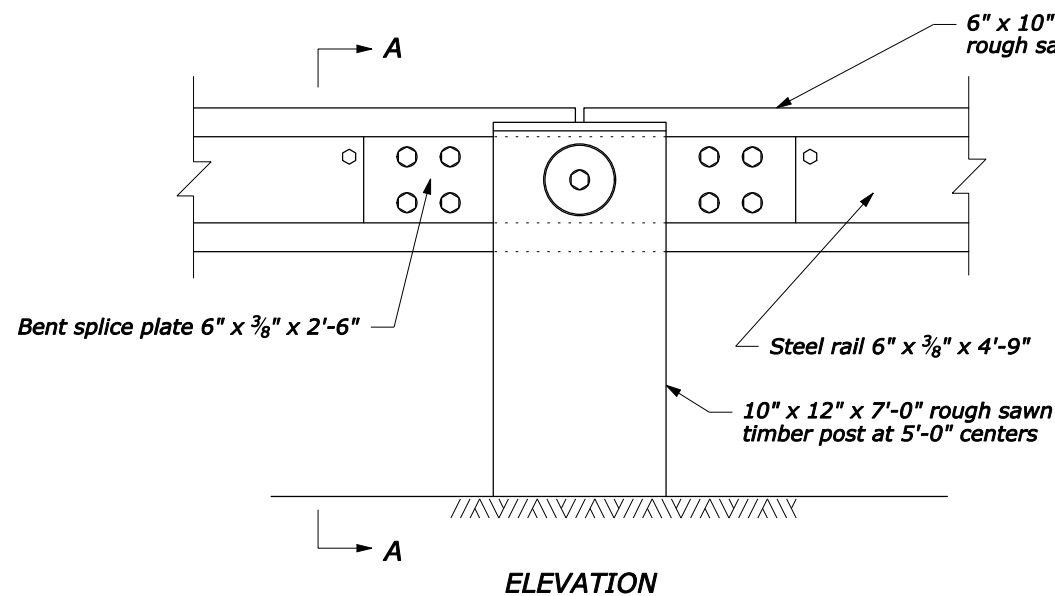
NOTE:

1. Use the Type A, blocked-out, system or the Type B, non-blocked-out, system as specified.
2. Use the weathering steel for all structural steel and fastener hardware.
3. Furnish shop bent splice plates. Use the minimum bend angle shown in the table below.
4. See Sheet 2 of 2 for Plan View Layout.

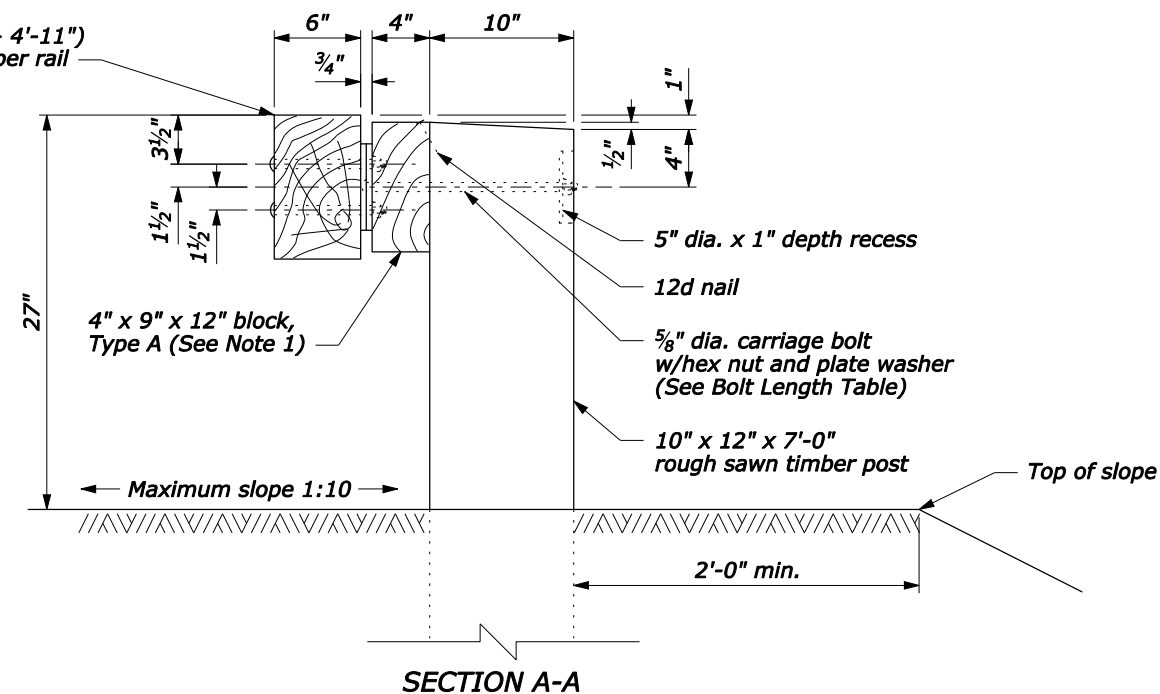


BENT SPLICE PLATE
6" x 3/8" x 2'-6"

BEND AND END CUT TABLE		
Radius R ft	$\Delta/2$ degrees	d in
20	7.18	3/4
25	5.74	5/8
30	4.78	1/2
35	4.10	7/16
40	3.58	3/8
45	3.18	1/3
50	2.87	5/16
55	2.61	1/4
60	2.39	1/4
65	2.20	1/4
70	2.05	1/4
over 70	flat	0



POST CONNECTION



BOLT LENGTH TABLE	
Type A (Block-out)	Type B (No Block-out)
15"	11"

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

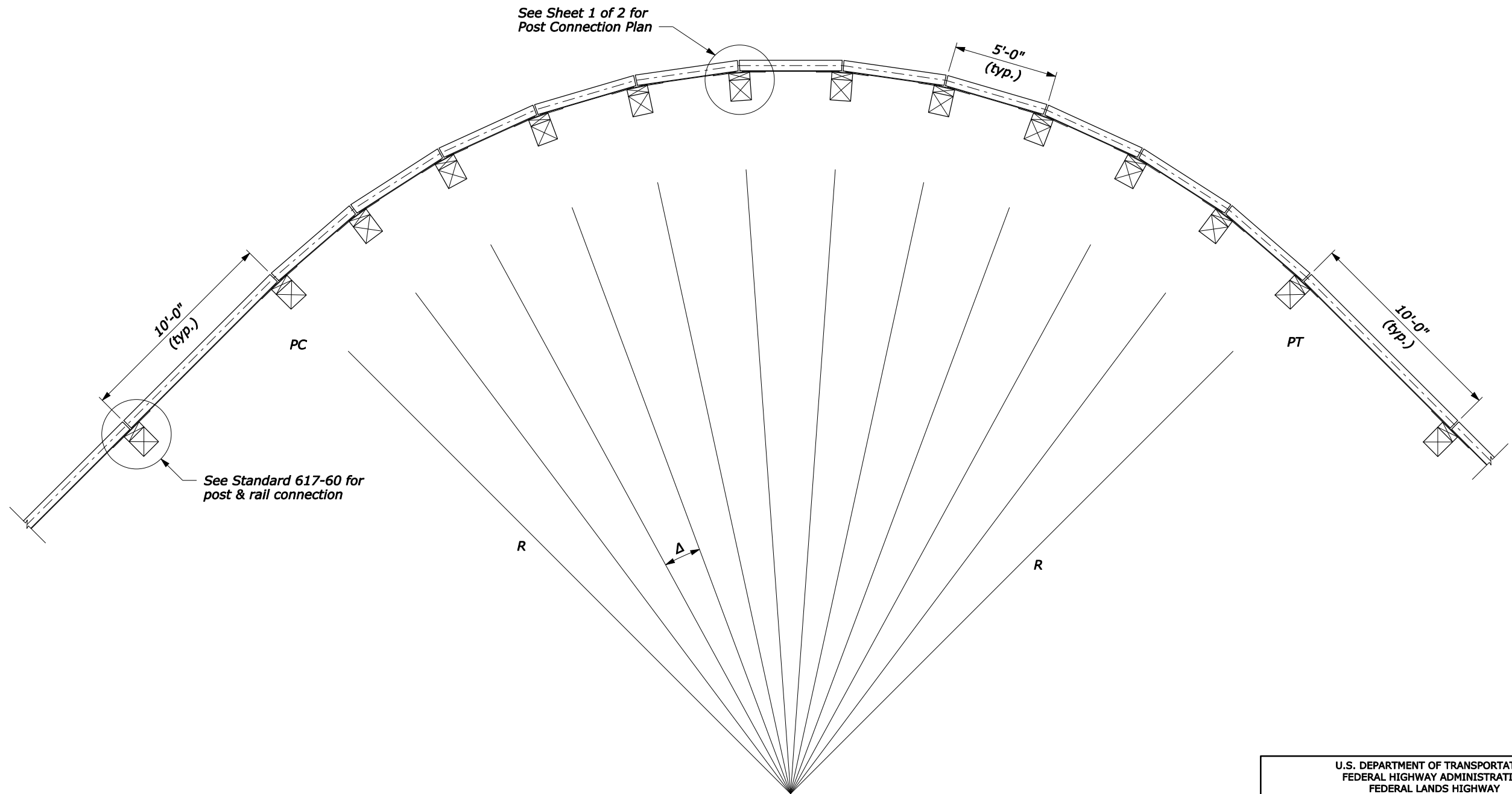
U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
AROUND CIRCULAR CURVES
70 FOOT RADIUS AND BELOW**
Sheet 1 of 2

STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED:	617-63

NO SCALE

NOTE:

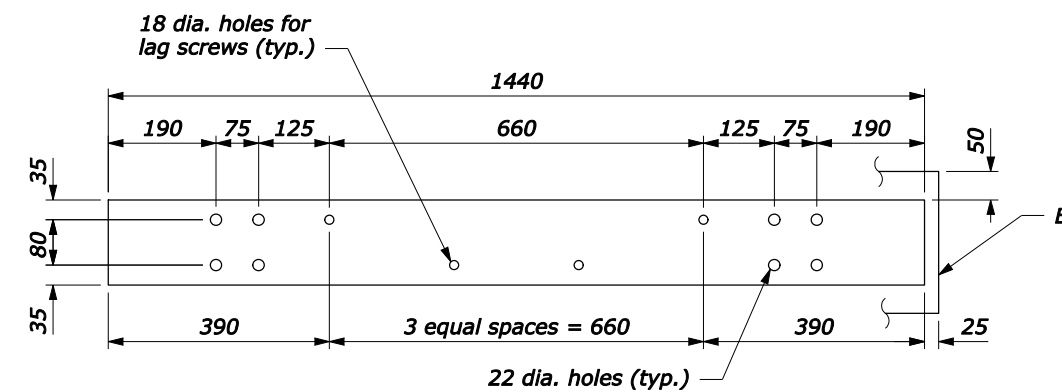
1. Δ is the central angle which subtends a 5'-0" chord.
2. R is measured from the center of the circle to the back surface of the rough sawn timber rail.



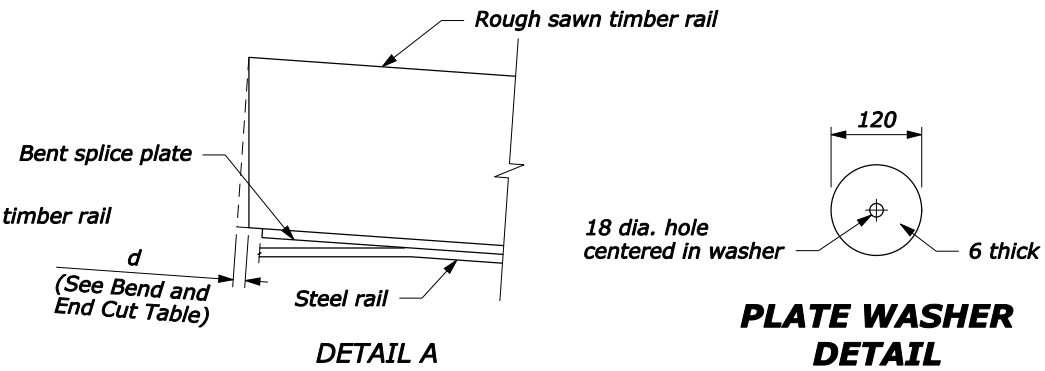
PLAN VIEW LAYOUT

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD STEEL-BACKED TIMBER GUARDRAIL AROUND CIRCULAR CURVES 70 FOOT RADIUS AND BELOW Sheet 2 of 2	
STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED:	617-63



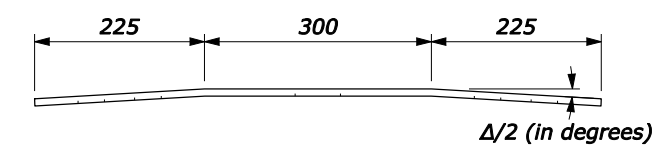
STEEL RAIL
150 x 10 x 1440



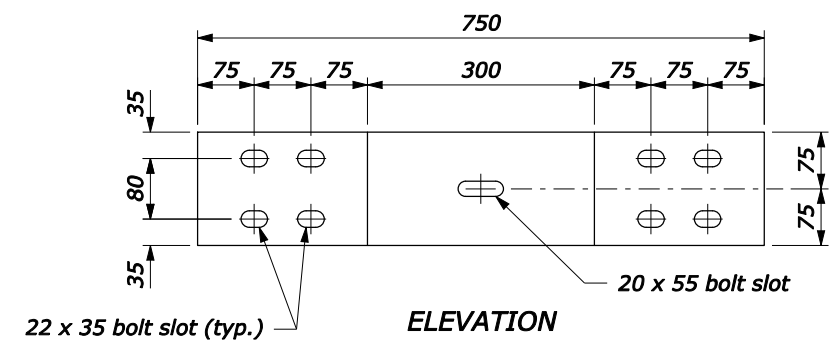
DETAIL A

PLATE WASHER
DETAIL

- NOTE:**
1. Use the Type A, blocked-out, system or the Type B, non-blocked-out, system as specified.
 2. Use the weathering steel for all structural steel and fastener hardware.
 3. Furnish shop bent splice plates. Use the minimum bend angle shown in the table below.
 4. See Sheet 2 of 2 for Plan View Layout.
 5. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 6. Dimensions without units are millimeters.

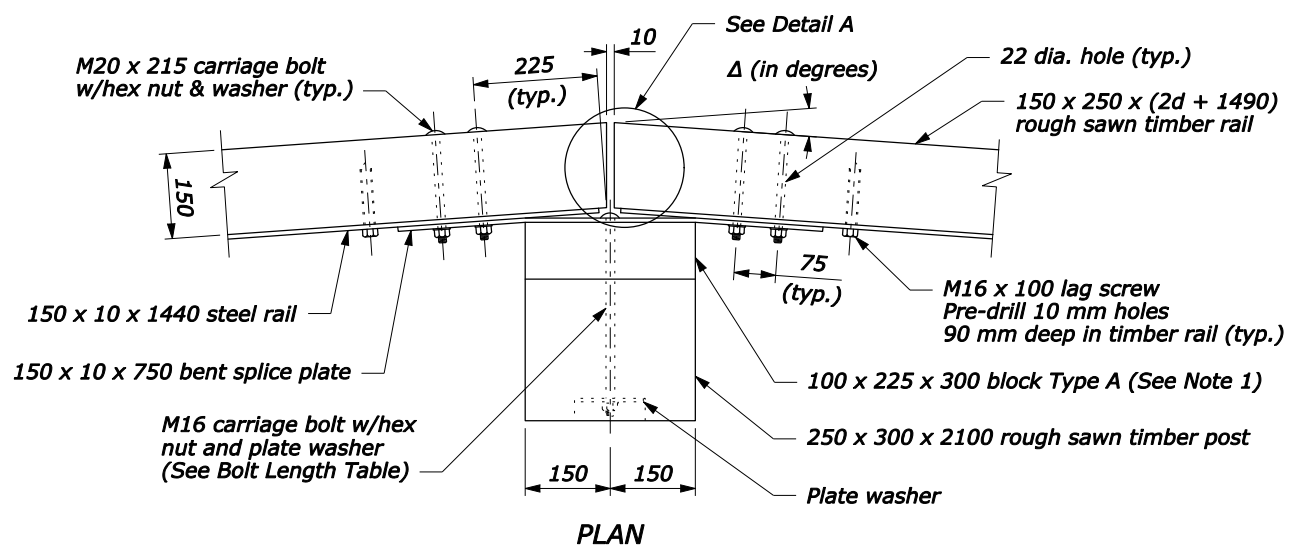


PLAN



ELEVATION

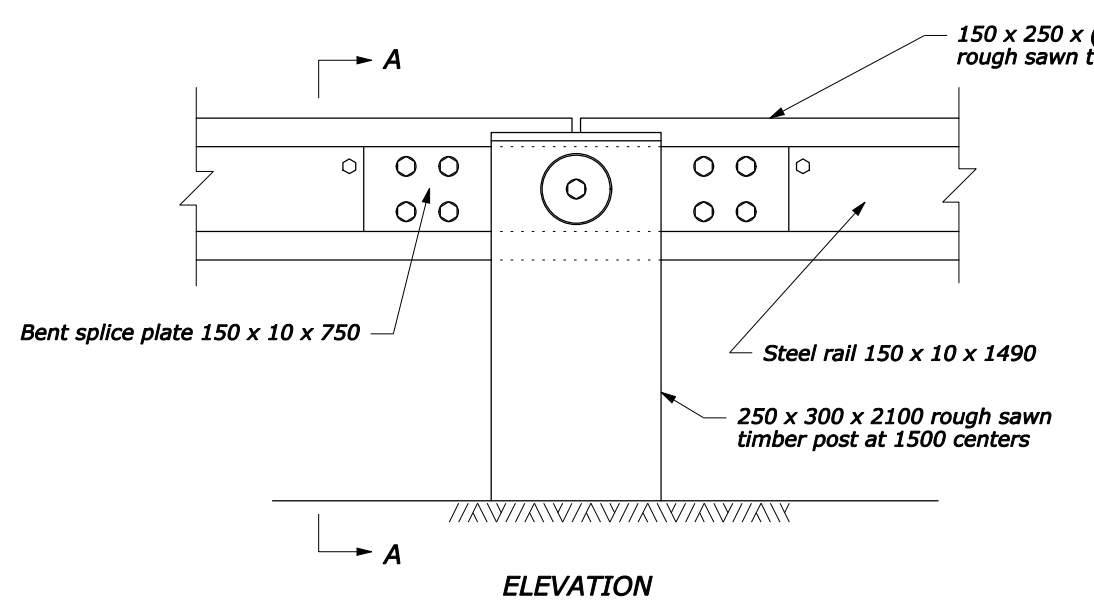
BENT SPLICE PLATE
150 x 10 x 750



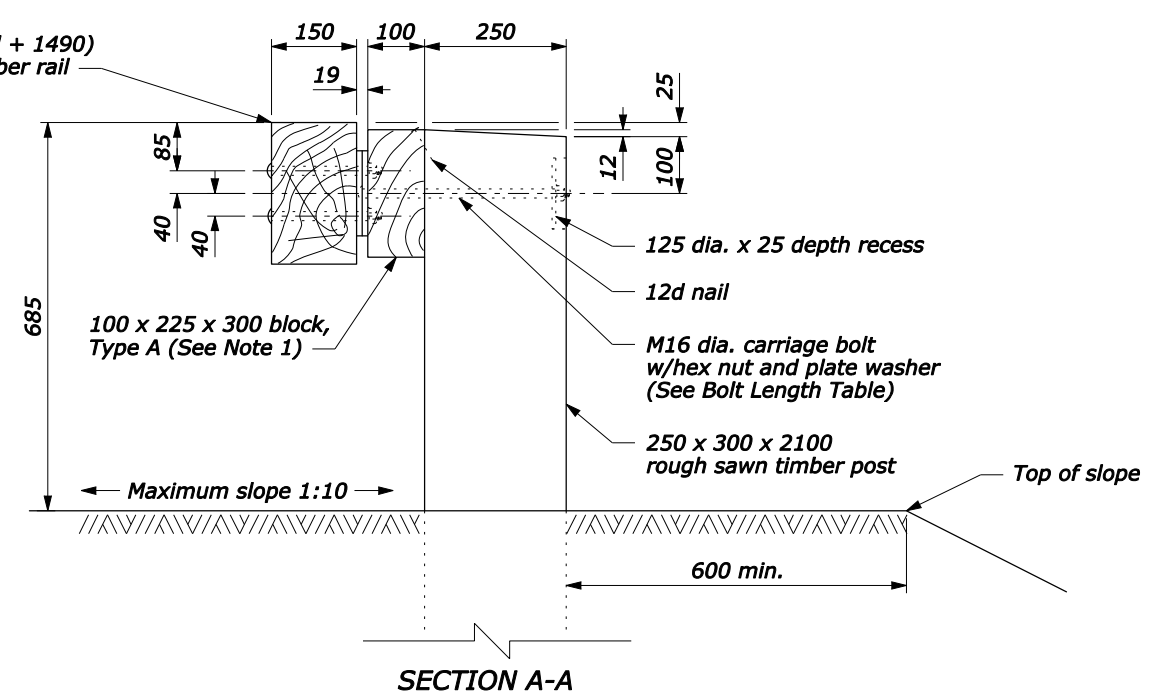
PLAN

Radius R meters	Δ/2 degrees	d mm
5	8.63	23
6	7.18	19
8	5.38	14
10	4.30	11
12	3.58	9
14	3.07	8
16	2.69	7
18	2.39	6
20	2.15	6
22	1.95	5
over 22	flat	0

Type A (Block-out)	Type B (No Block-out)
375	275



ELEVATION



SECTION A-A

POST CONNECTION

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

METRIC STANDARD
STEEL-BACKED TIMBER GUARDRAIL
AROUND CIRCULAR CURVES
22 m RADIUS AND BELOW
Sheet 1 of 2

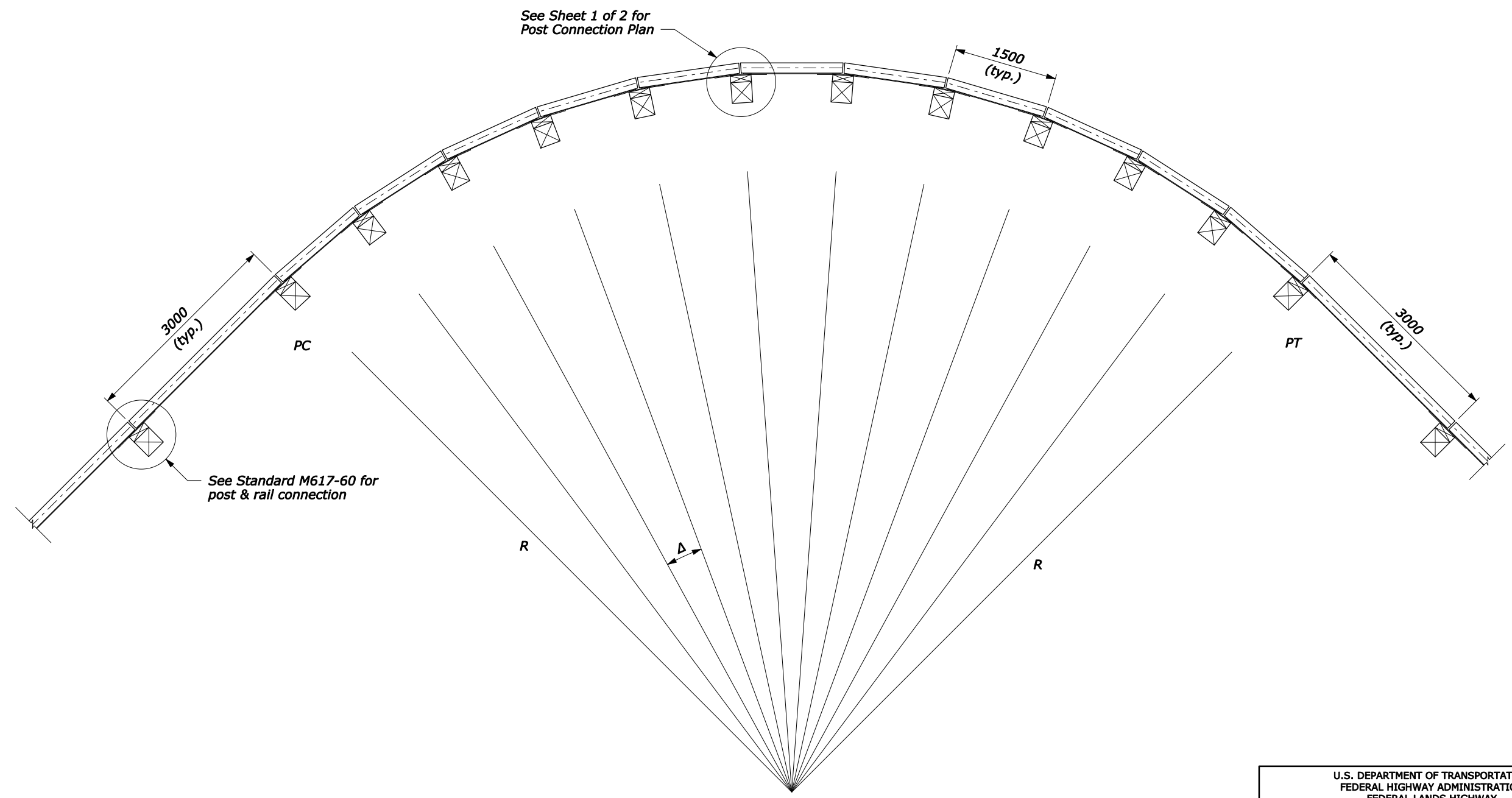
STANDARD APPROVED FOR USE 3/1996
REVISED: 6/2005

STANDARD
M617-63

NO SCALE

2 September 2009 1:46 PM H:\StanDraw\st61763.dgn [Metric]

- NOTE:**
1. Δ is the central angle which subtends a 1500 mm chord.
 2. R is measured from the center of the circle to the back surface of the rough sawn timber rail.
 3. Dimensions without units are millimeters.

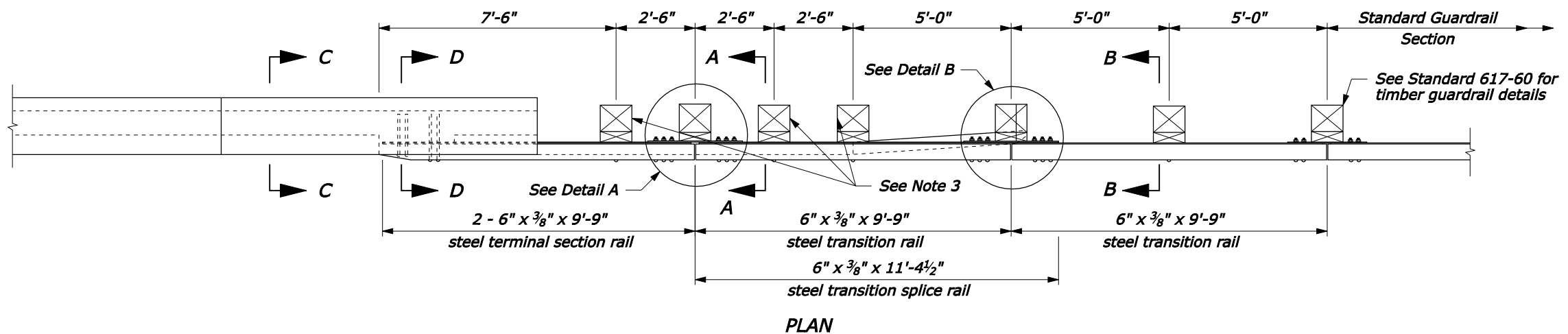


PLAN VIEW LAYOUT

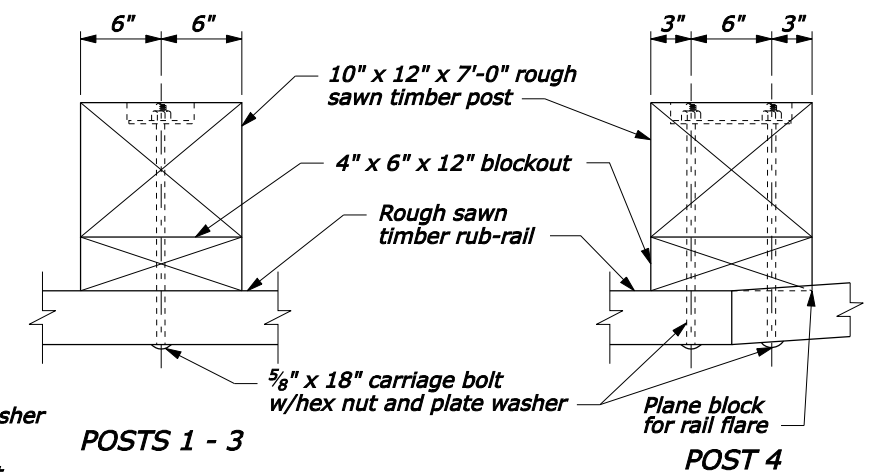
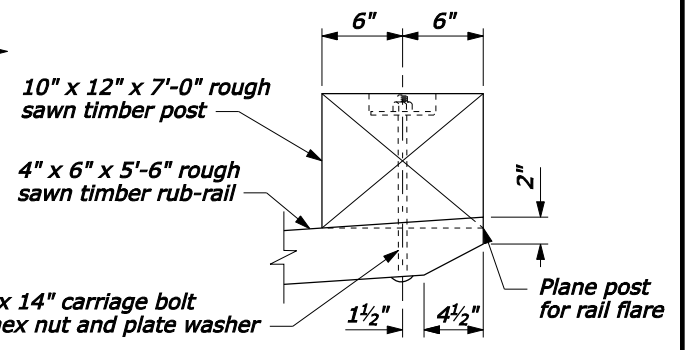
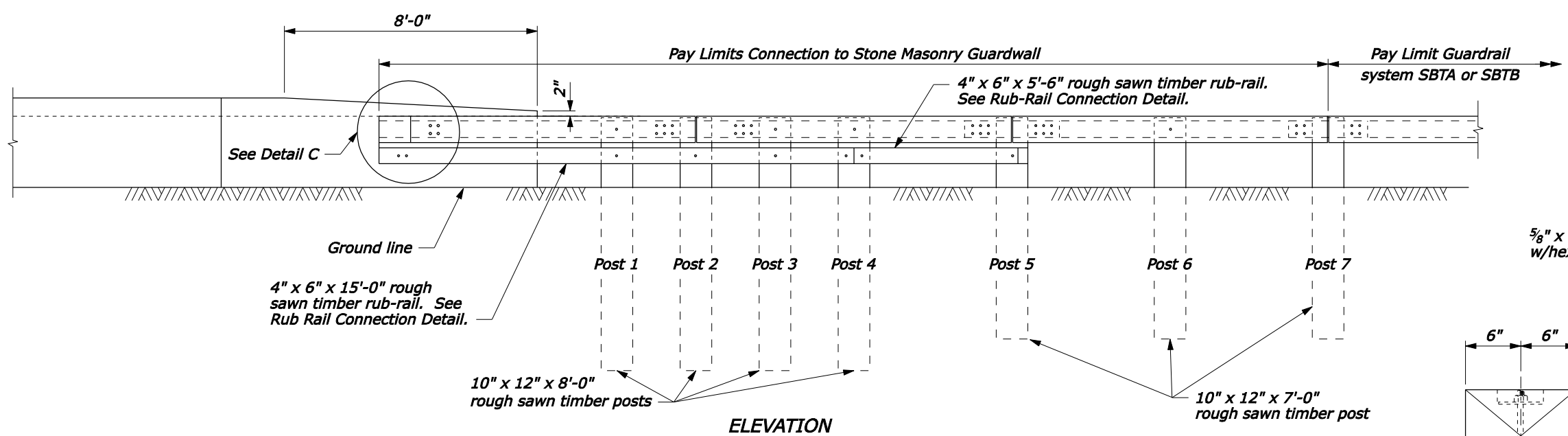
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD STEEL-BACKED TIMBER GUARDRAIL AROUND CIRCULAR CURVES 22 m RADIUS AND BELOW Sheet 2 of 2	
STANDARD APPROVED FOR USE 3/1996 REVISED: 6/2005	STANDARD M617-63

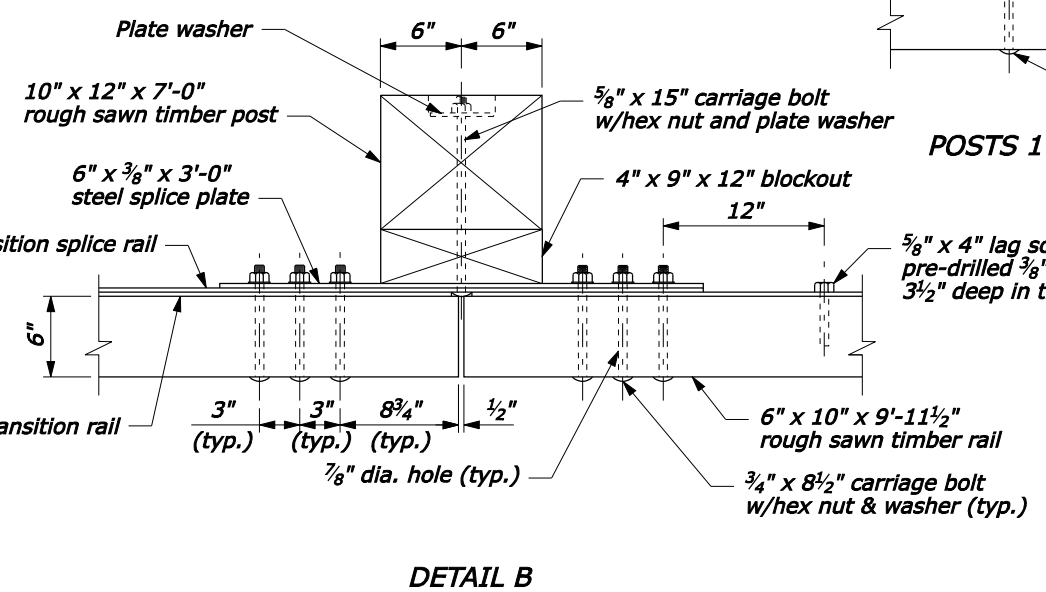
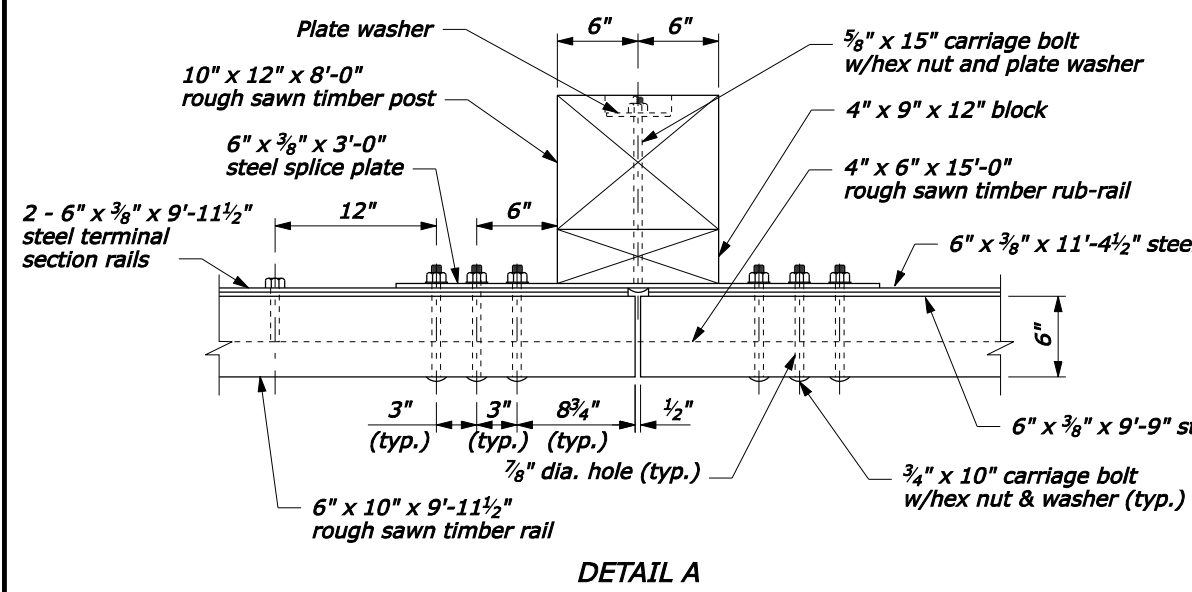
H:\StanDraw\st61763.dgn [Metric] 2 September 2009 1:46 PM



- NOTE:**
1. See the following sheets for Sections A-A through C-C, steel rail layouts, and other details.
 2. Use weathering steel for all structural steel and fastener hardware.
 3. For posts 1, 3, and 4, use an 8" x 9" x 12" block for the blockout, and a 5/8" x 2'-1 1/2" carriage bolt with hex nut and plate washer.



RUB-RAIL CONNECTION



POST CONNECTION

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

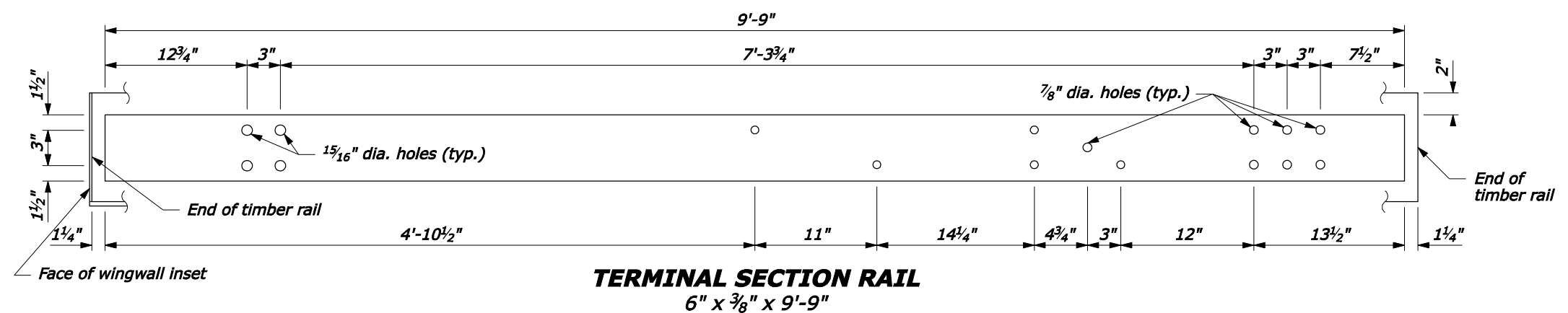
U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 CONNECTION TO
STONE MASONRY GUARDWALL**
Sheet 1 of 3

STANDARD APPROVED FOR USE --/----

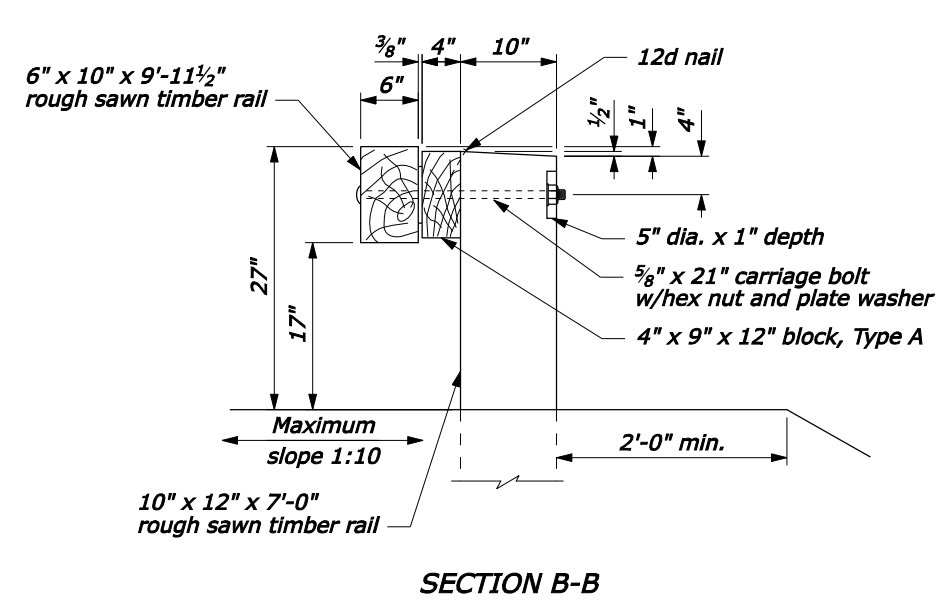
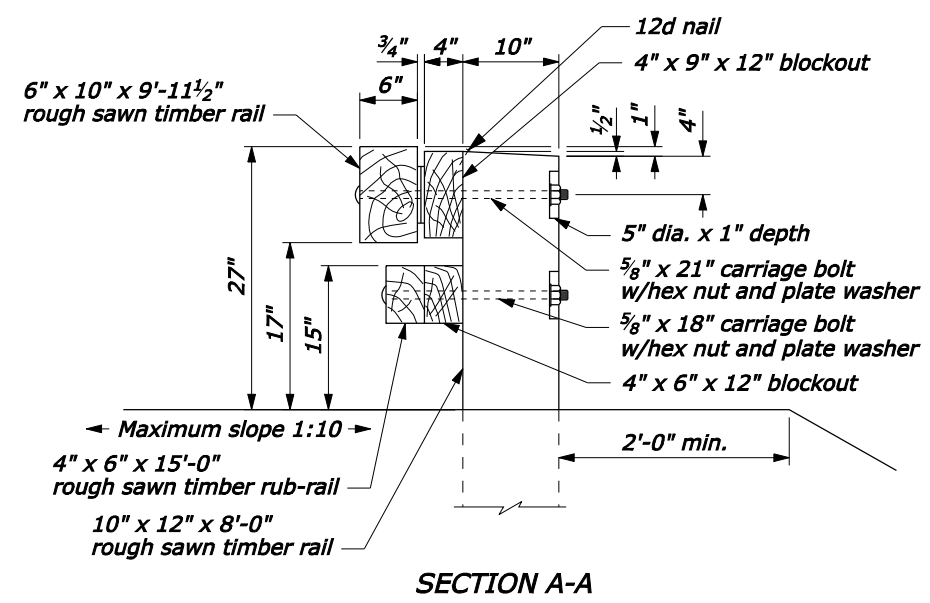
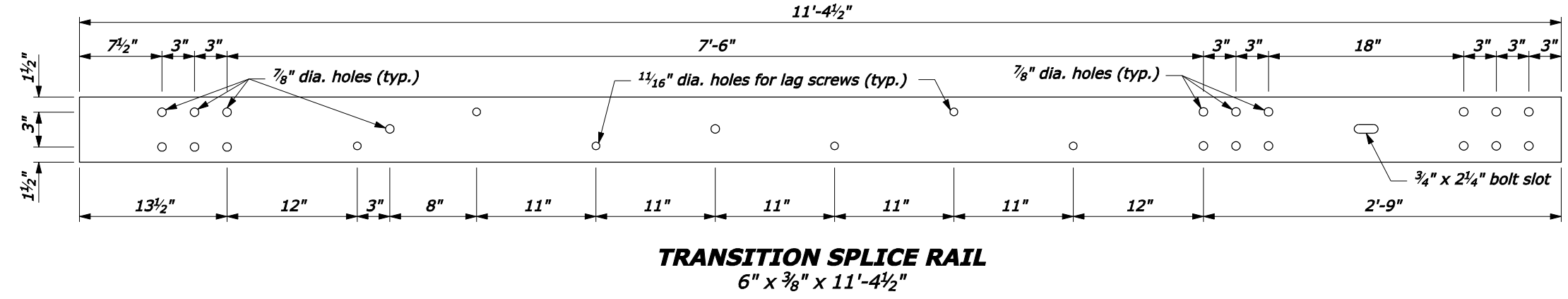
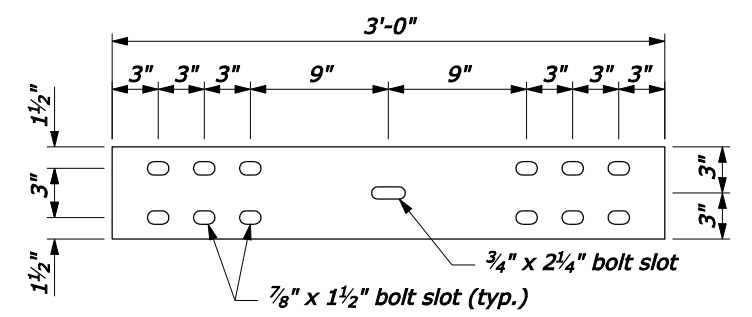
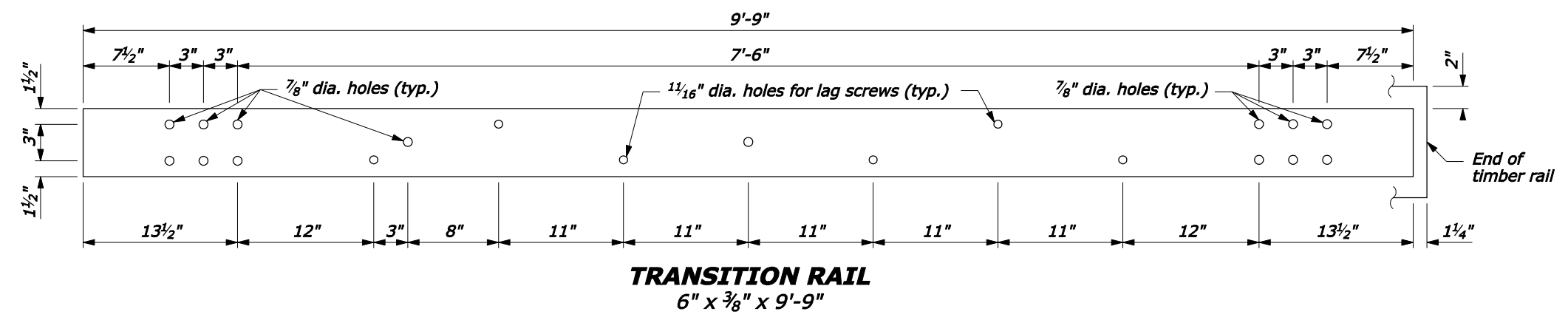
REVISD:
DRAFT: 1/2008

STANDARD
617-64

14-Jan-2008 04:06 PM P:\198.145.186.2\std.pln\std61764.dgn [US Customary]



NOTE:
1. Pre-drill 3/4" holes in blocks outs and posts.



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

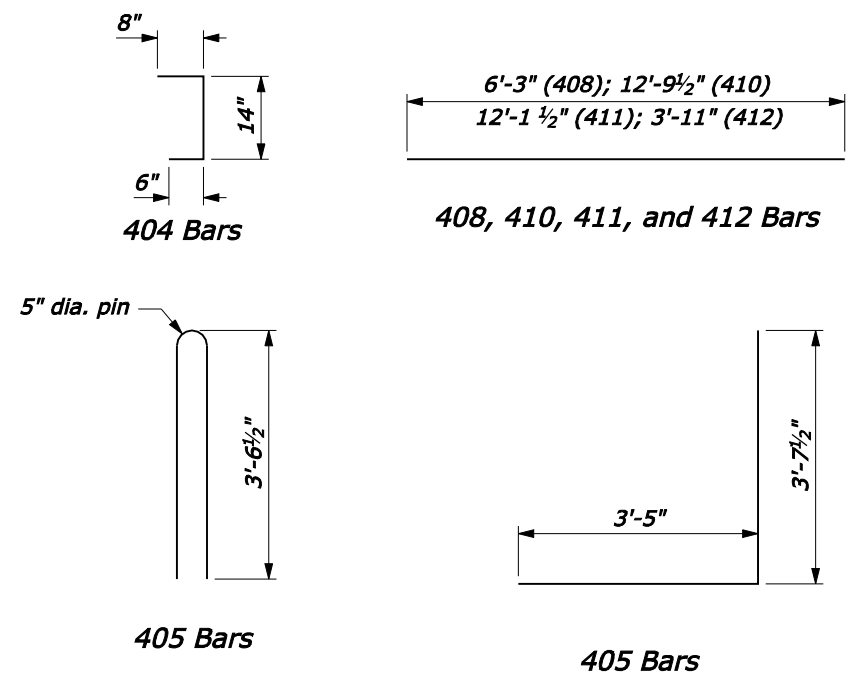
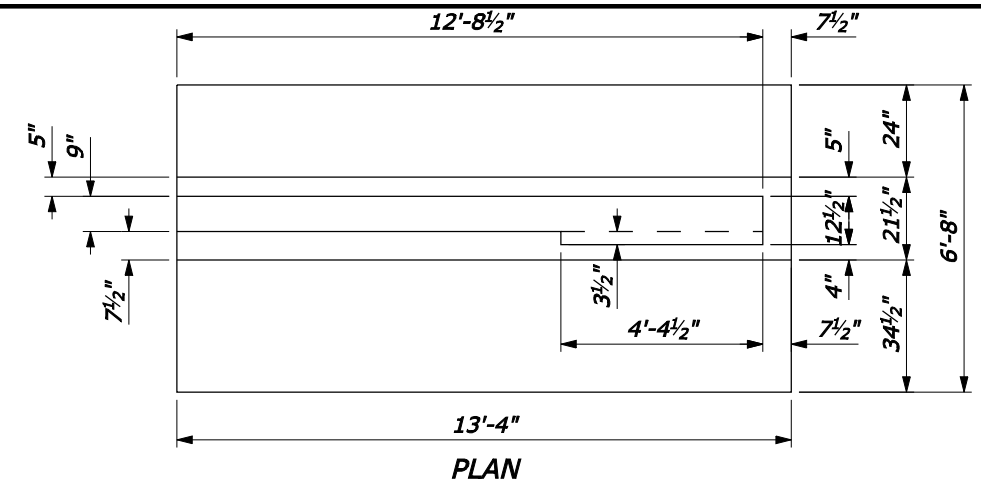
U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 CONNECTION TO
STONE MASONRY GUARDWALL**
Sheet 2 of 3

STANDARD APPROVED FOR USE --/----

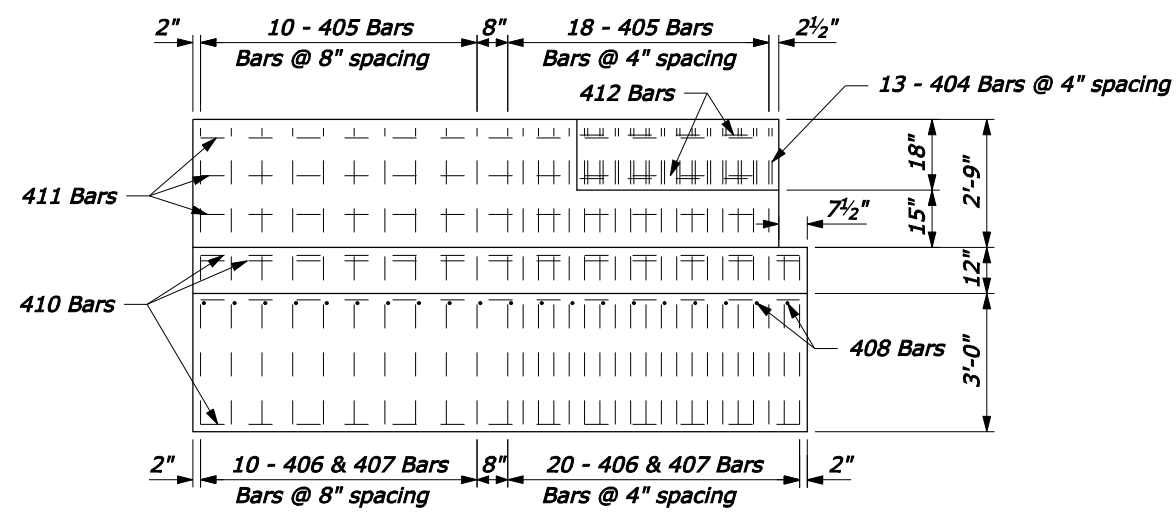
REVISID: DRAFT: 1/2008

STANDARD
617-64

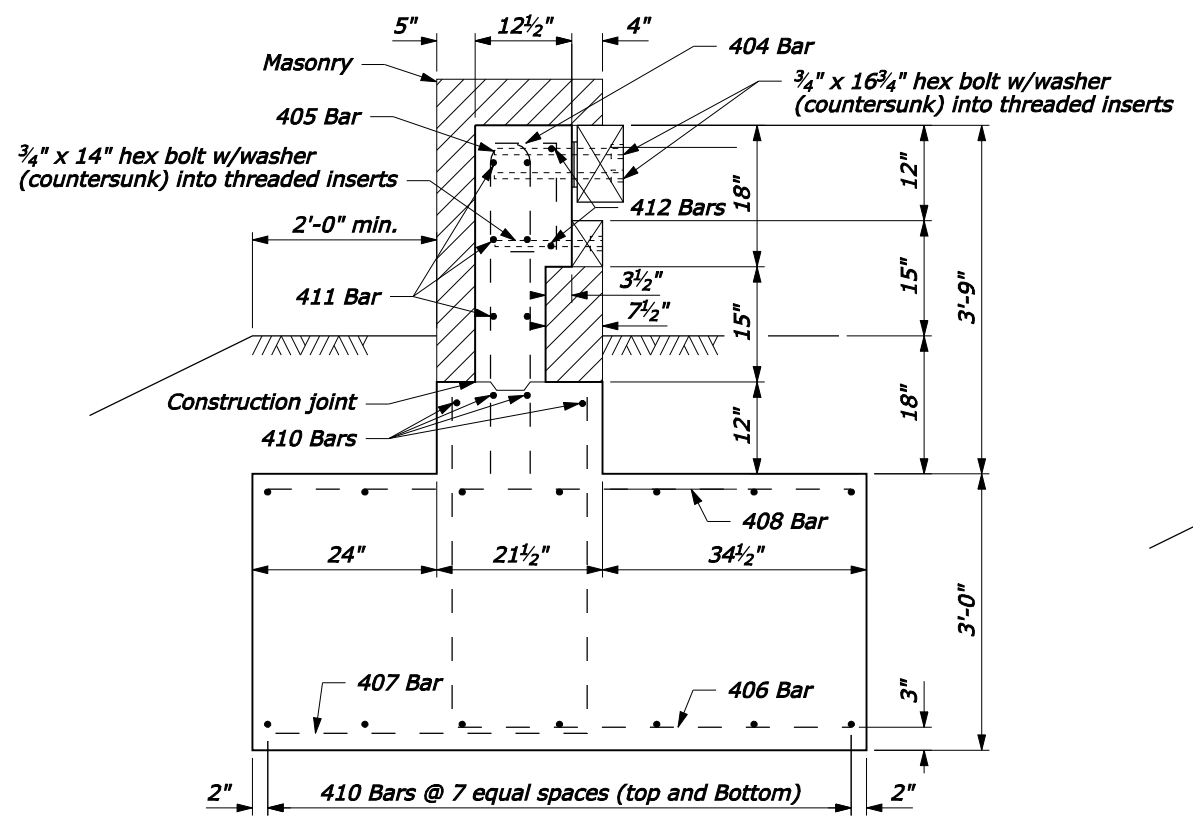
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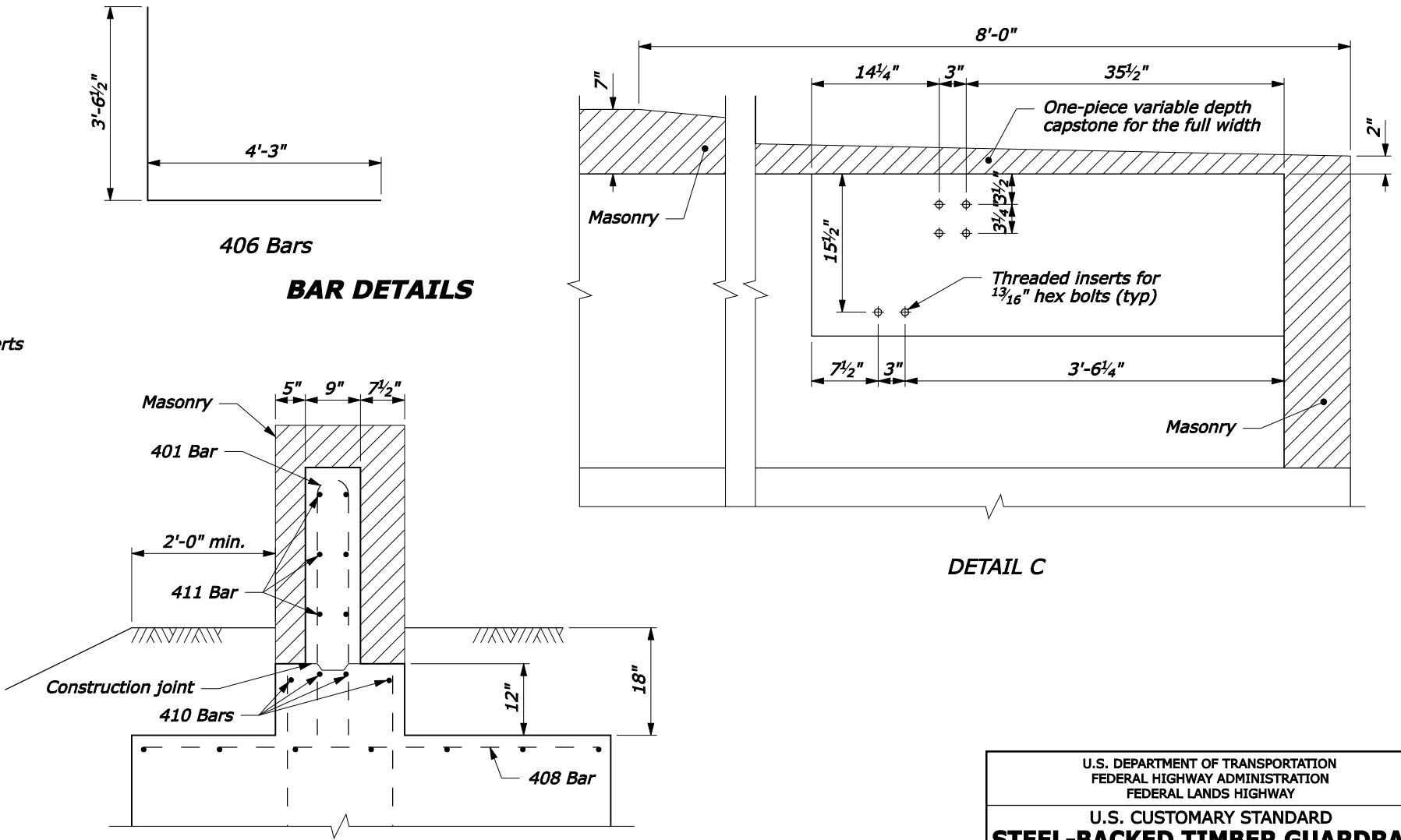
- NOTE:**
1. **CONCRETE:** Structural concrete Class A(AE), with a specified minimum 28-day compressive strength $F'_c=4350$ psi. Vibrate all concrete. Chamfer exposed edges $3/4"$ unless otherwise shown. Do not use calcium chloride additives in the concrete.
 2. **REINFORCING STEEL:** Reinforcing steel Grade 420 (ASTM A615M-96a, Grade 420) deformed billet steel bars conforming to AASHTO M31M. The minimum concrete covering to the face of any bar is 2" unless otherwise shown. All bars are US Customary size #5.
 3. Construct footing against undisturbed material or backfill with well compacted granular material.



ELEVATION



SECTION D-D
PARAPET END BLOCK



DETAIL C

SECTION C-C

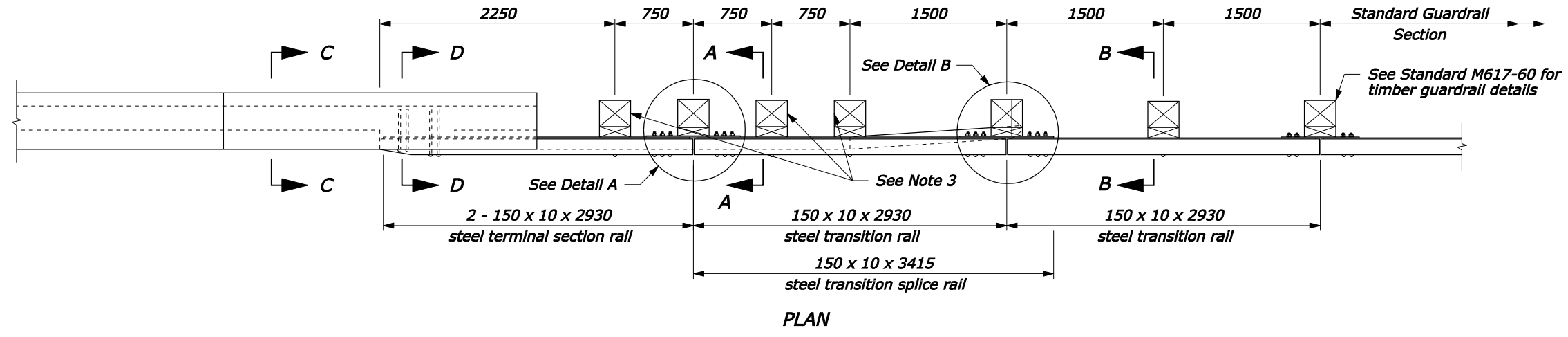
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

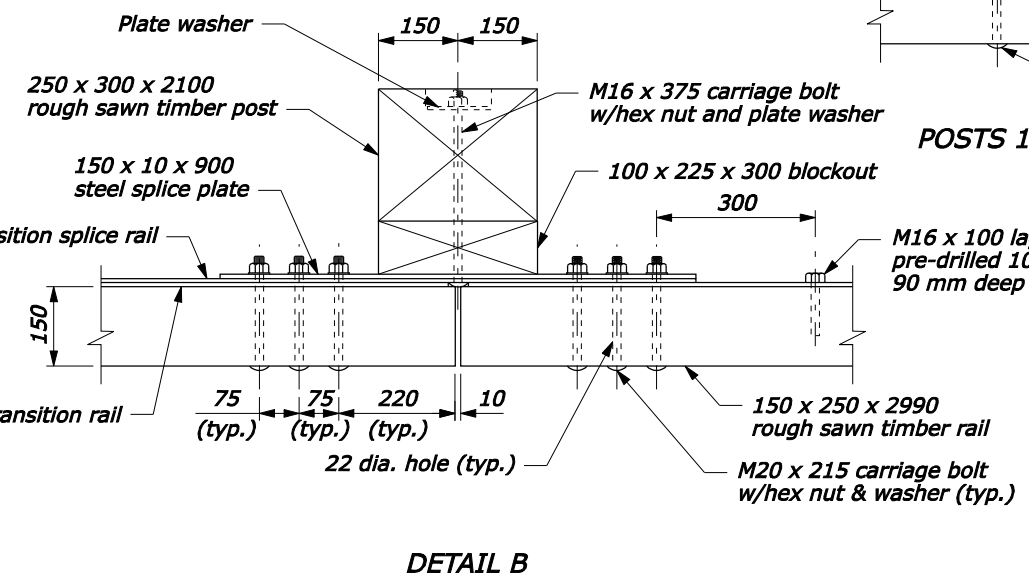
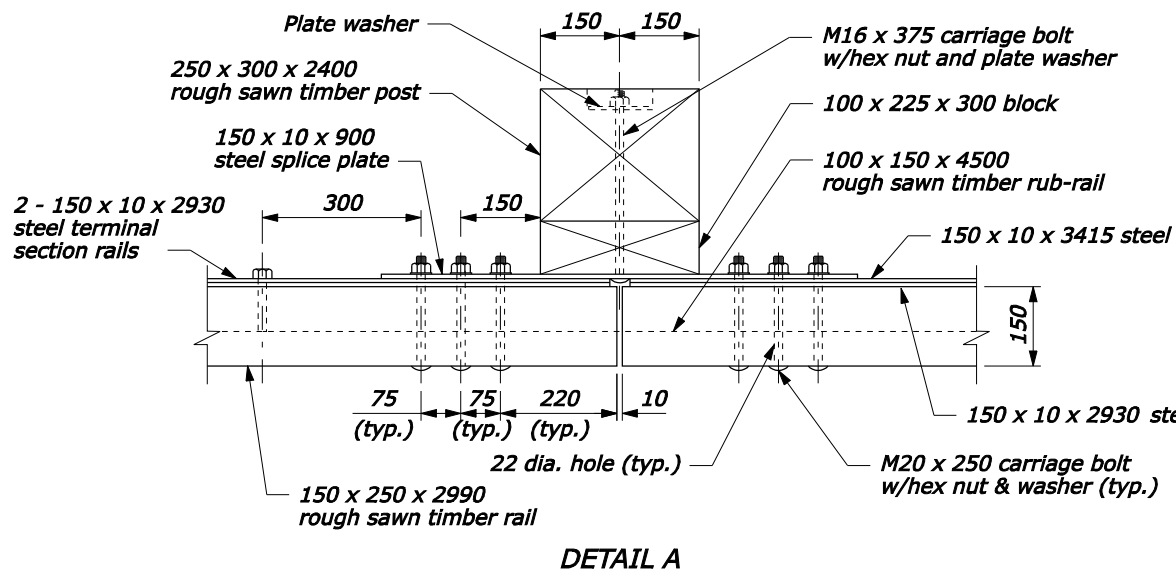
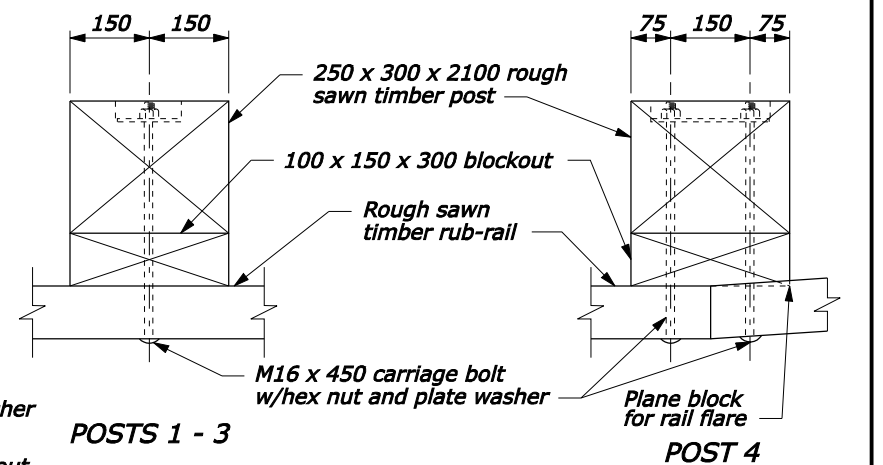
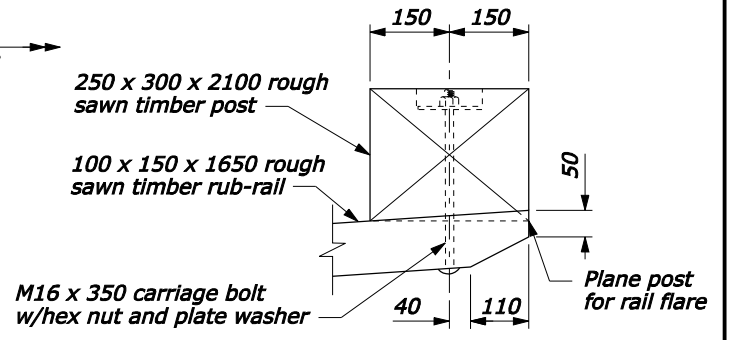
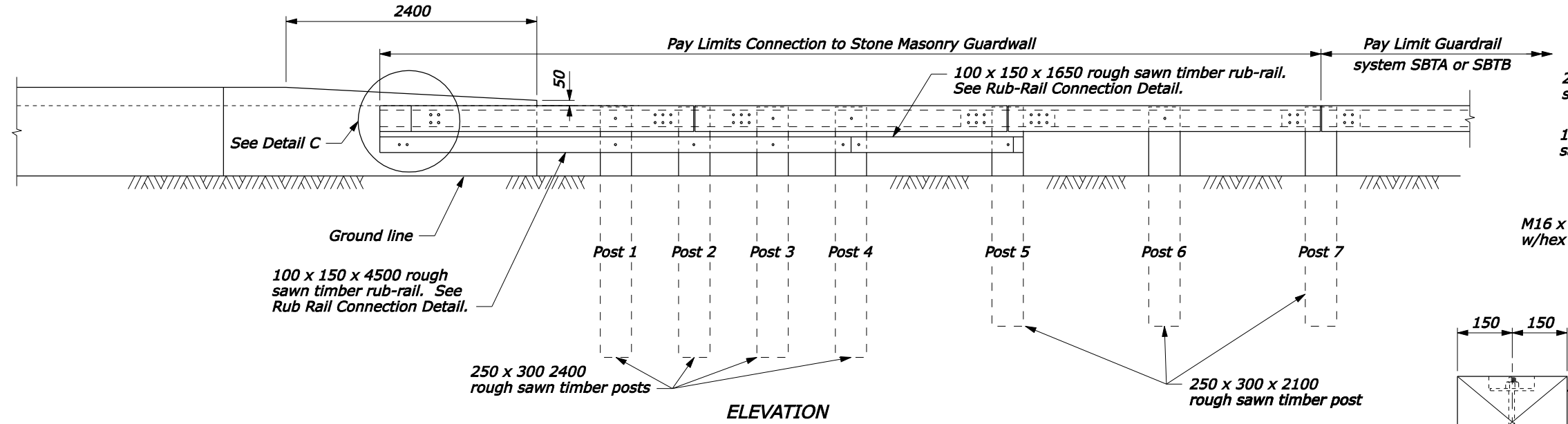
U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 CONNECTION TO
STONE MASONRY GUARDWALL**
Sheet 3 of 3

STANDARD APPROVED FOR USE --/----	STANDARD
REVISED:	617-64
DRAFT: 1/2008	

23-Jan-2008 11:37 AM
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- NOTE:**
1. See the following sheets for Sections A-A through C-C, steel rail layouts, and other details.
 2. Use weathering steel for all structural steel land fastener hardware.
 3. For posts 1, 3, and 4, use a 200 x 225 x 300 mm block for the blockout, and an M16 x 650 mm carriage bolt with hex nut and plate washer.
 4. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 5. Dimensions without units are millimeters.



POST CONNECTION

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

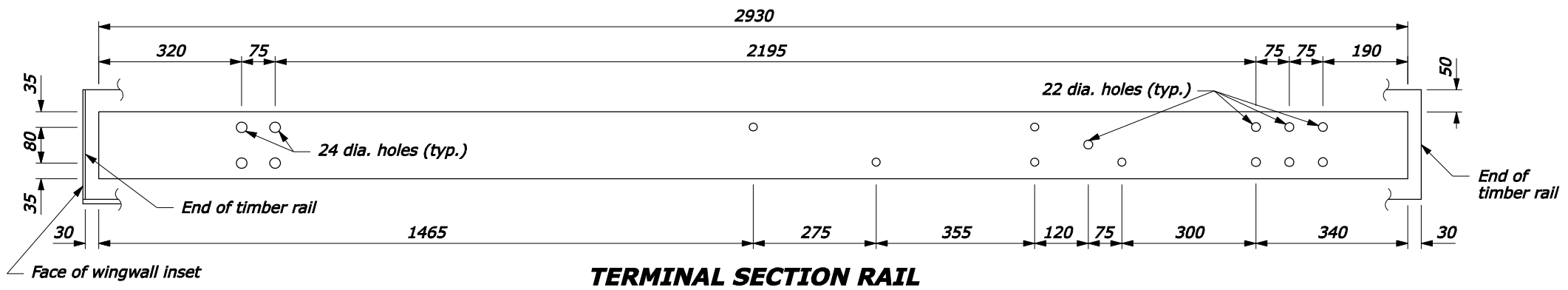
METRIC STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
 TL-2 CONNECTION TO
 STONE MASONRY GUARDWALL**
 Sheet 1 of 3

STANDARD APPROVED FOR USE --/----

REVISED: 1/2008
 DRAFT: 1/2008

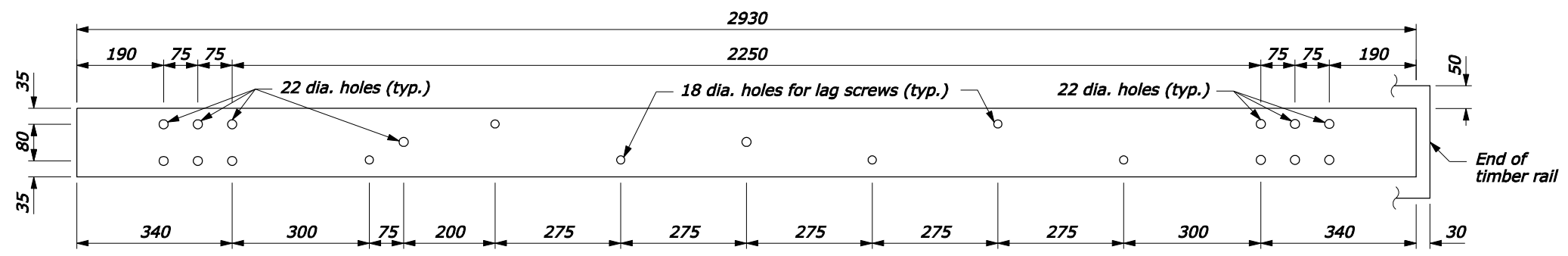
STANDARD
M617-64

14-Jan-2008 03:43 PM
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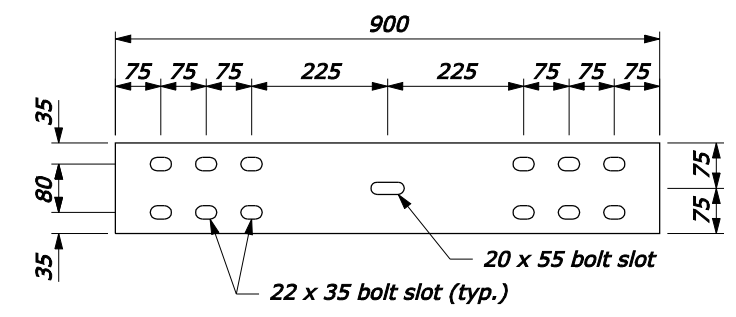


TERMINAL SECTION RAIL
150 x 10 x 2930

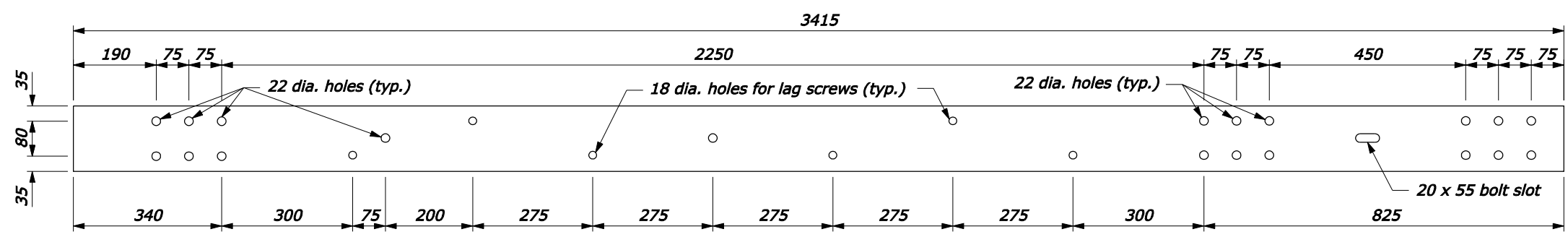
- NOTE:**
1. Pre-drill 18 mm holes in blocks outs and posts.
 2. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 3. Dimensions without units are millimeters.



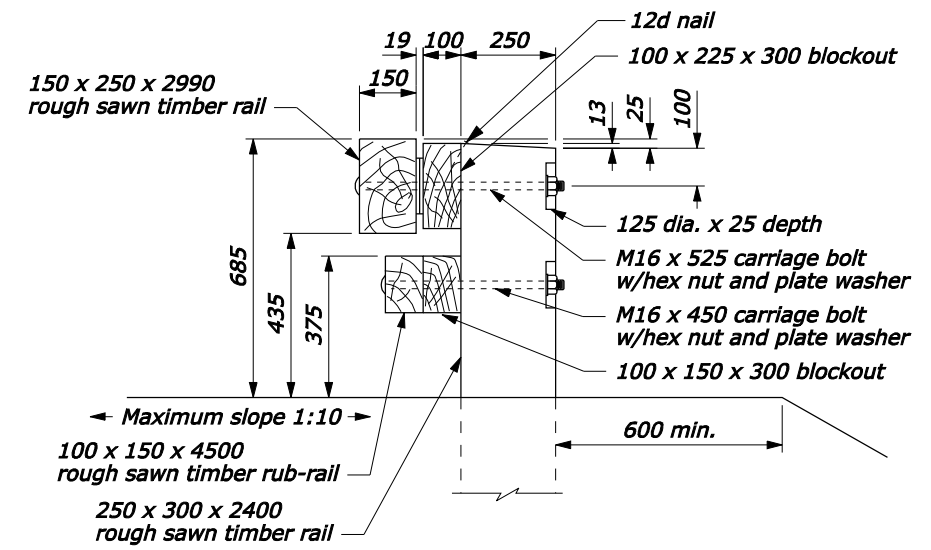
TRANSITION RAIL
150 x 10 x 2930



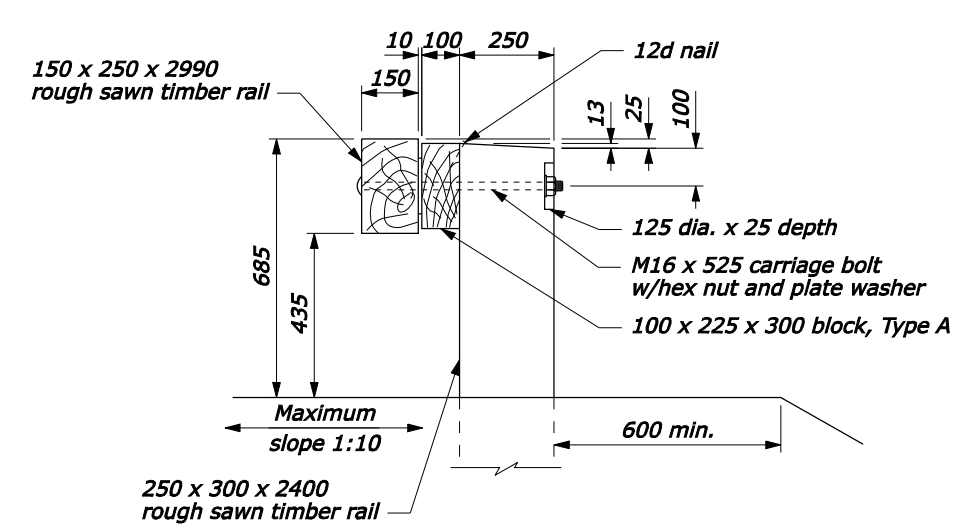
SPLICE PLATE
150 x 10 x 900



TRANSITION SPLICE RAIL
150 x 10 x 3415



SECTION A-A



SECTION B-B

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

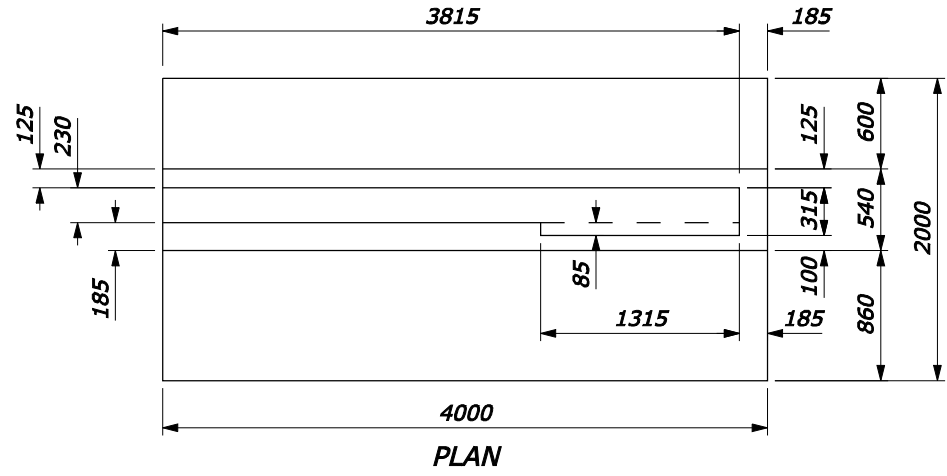
METRIC STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 CONNECTION TO
STONE MASONRY GUARDWALL**
Sheet 2 of 3

STANDARD APPROVED FOR USE --/----

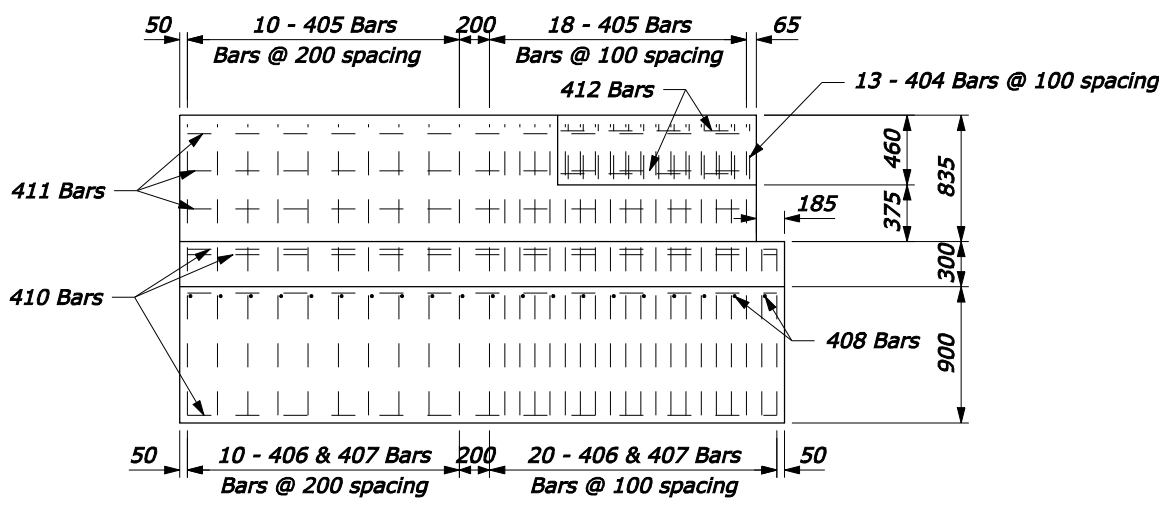
REVISID: 1/2008
DRAFT: 1/2008

STANDARD
M617-64

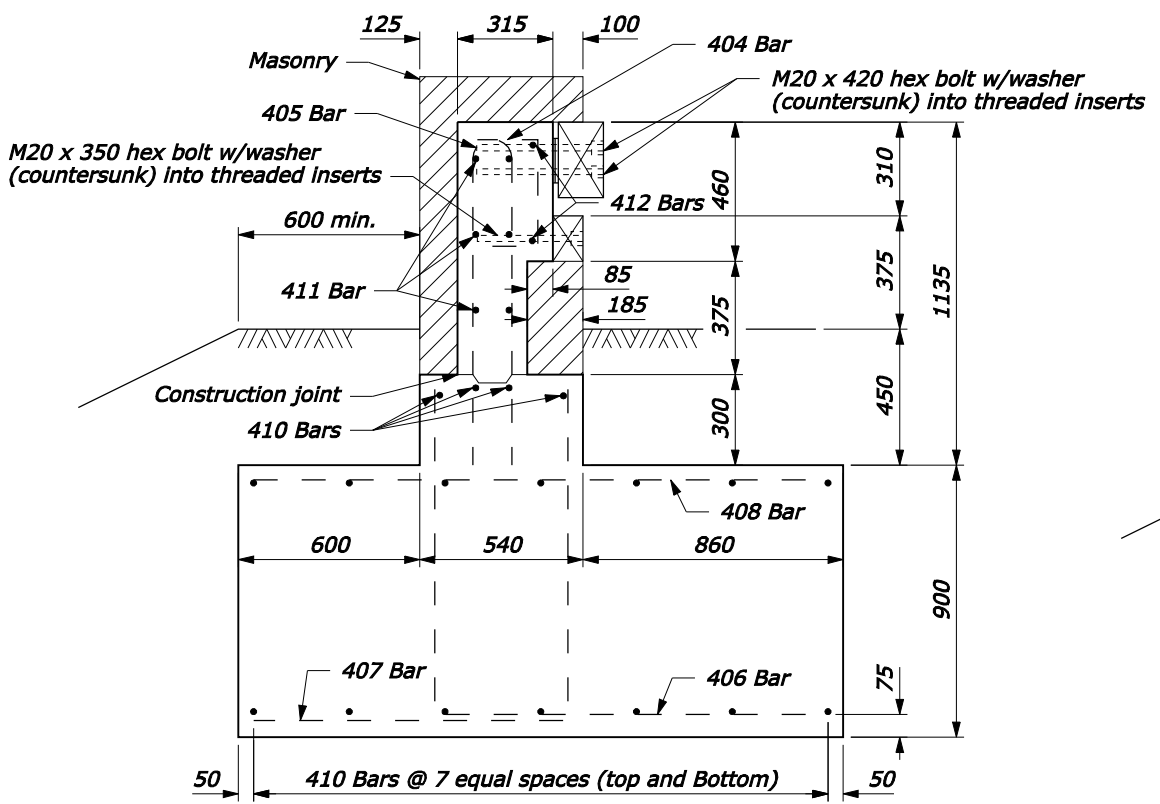
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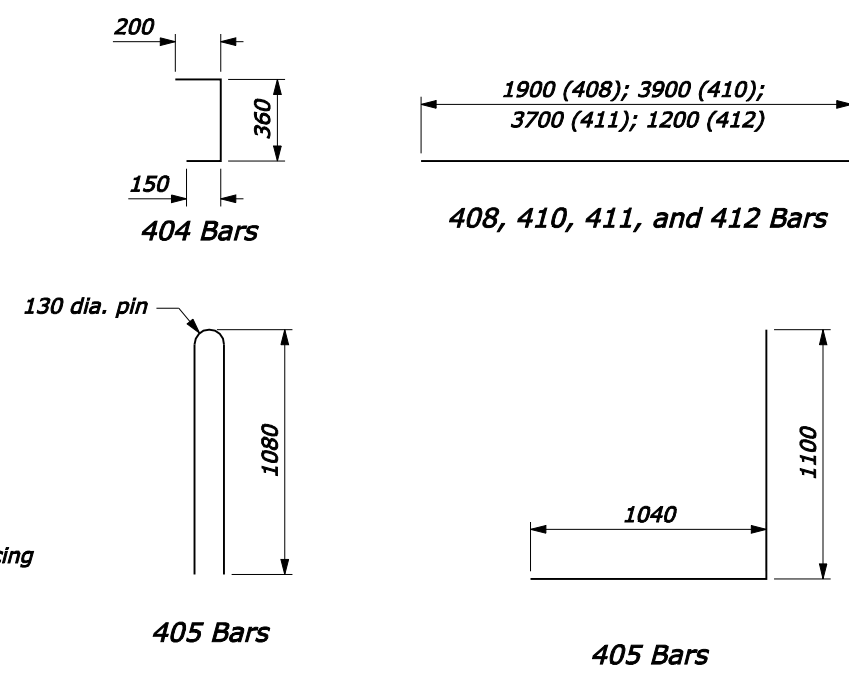
PLAN



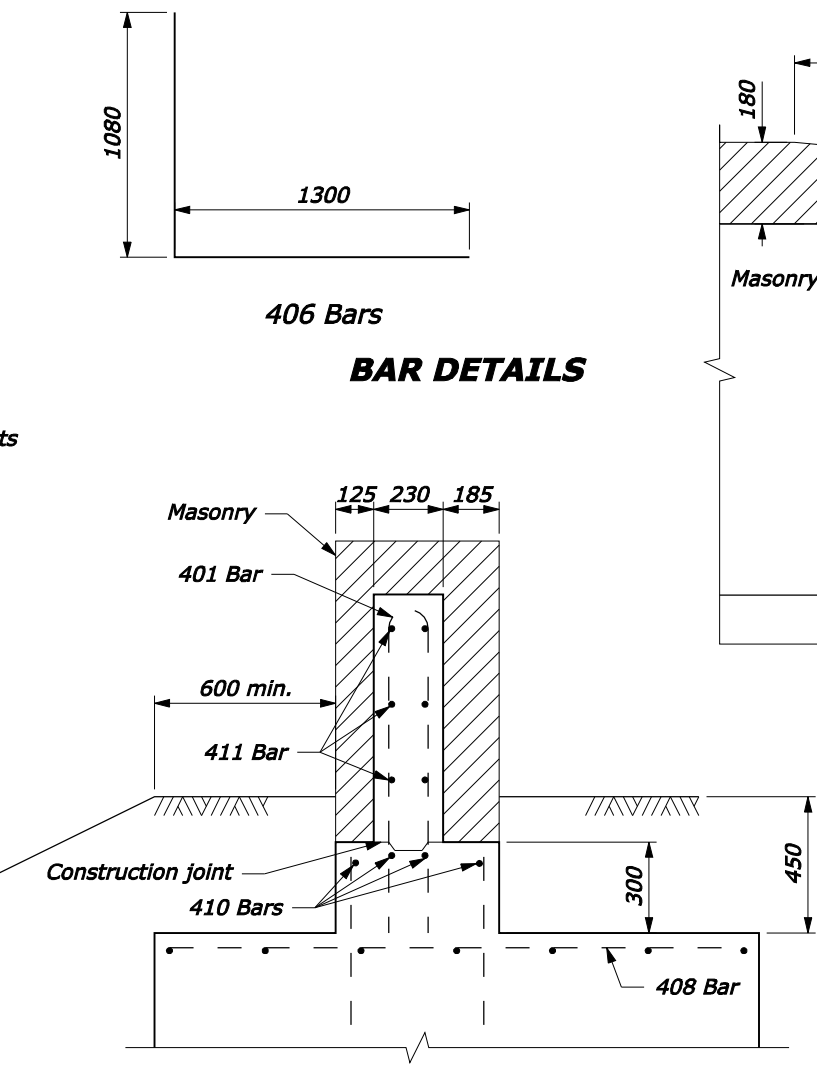
ELEVATION



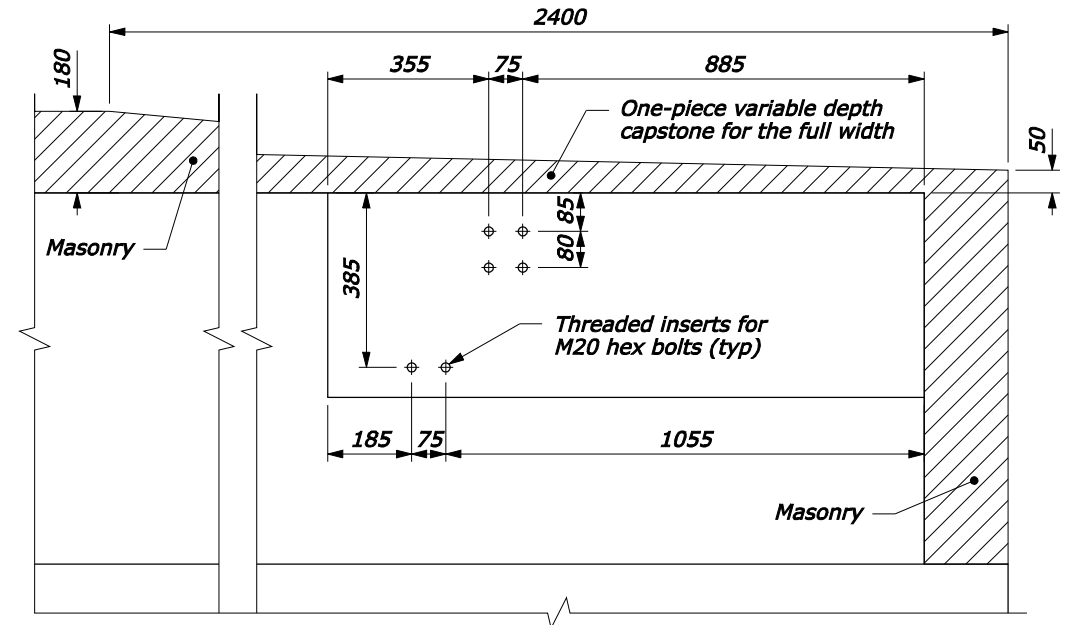
SECTION D-D
PARAPET END BLOCK



BAR DETAILS



SECTION C-C



DETAIL C

NOTE:

1. **CONCRETE:** Structural concrete Class A(AE), with a specified minimum 28-day compressive strength $F'c=30$ MPa. Vibrate all concrete. Chamfer exposed edges 20 mm unless otherwise shown. Do not use calcium chloride additives in the concrete.
2. **REINFORCING STEEL:** Reinforcing steel Grade 420 (ASTM A615M-96a, Grade 420) deformed billet steel bars conforming to AASHTO M31M. The minimum concrete covering to the face of any bar is 50 mm unless otherwise shown. All bars are Metric size #16.
3. Construct footing against undisturbed material or backfill with well compacted granular material.
4. Dimensions without units are millimeters.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

METRIC STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 CONNECTION TO
STONE MASONRY GUARDWALL**
Sheet 3 of 3

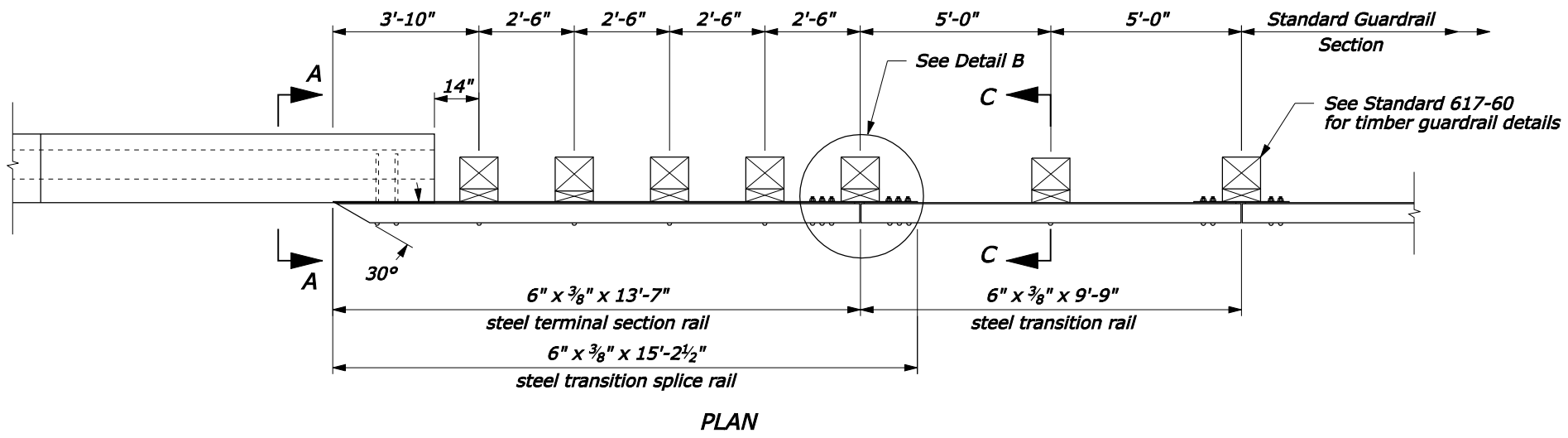
STANDARD APPROVED FOR USE --/----

REVISID: 1/2008
DRAFT: 1/2008

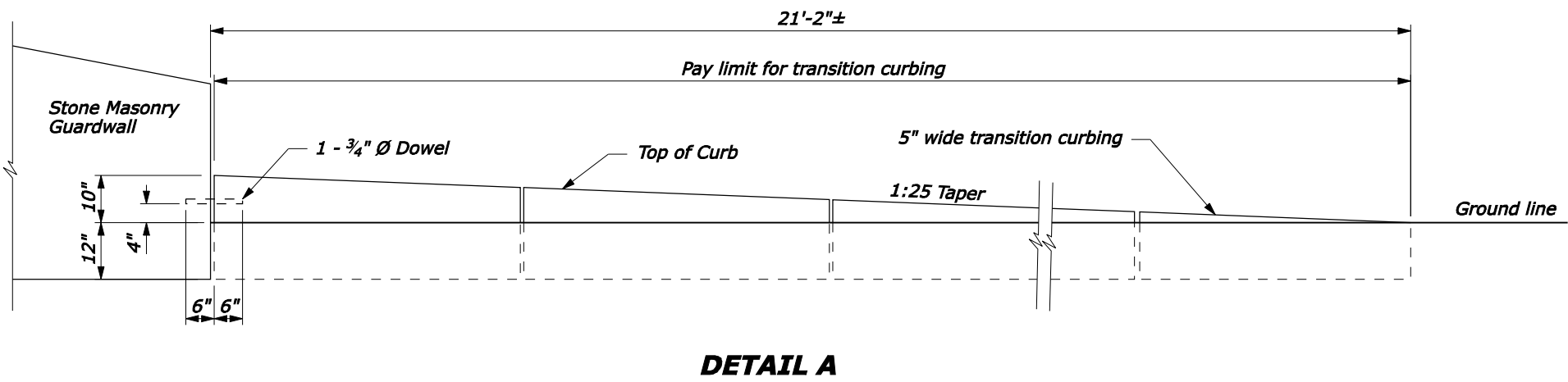
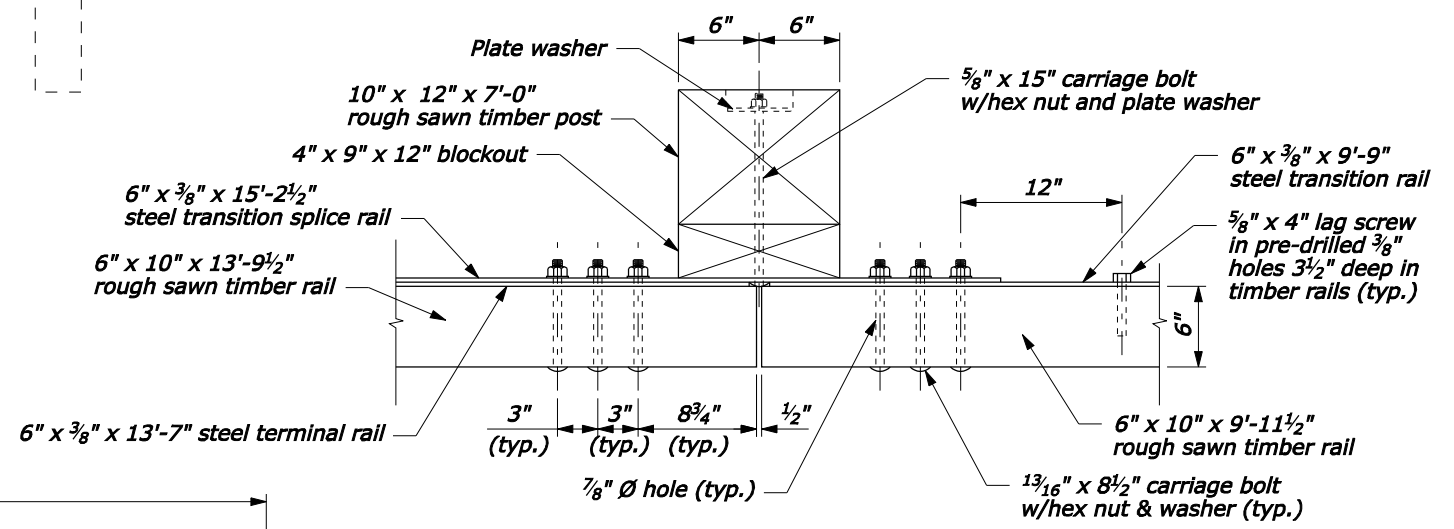
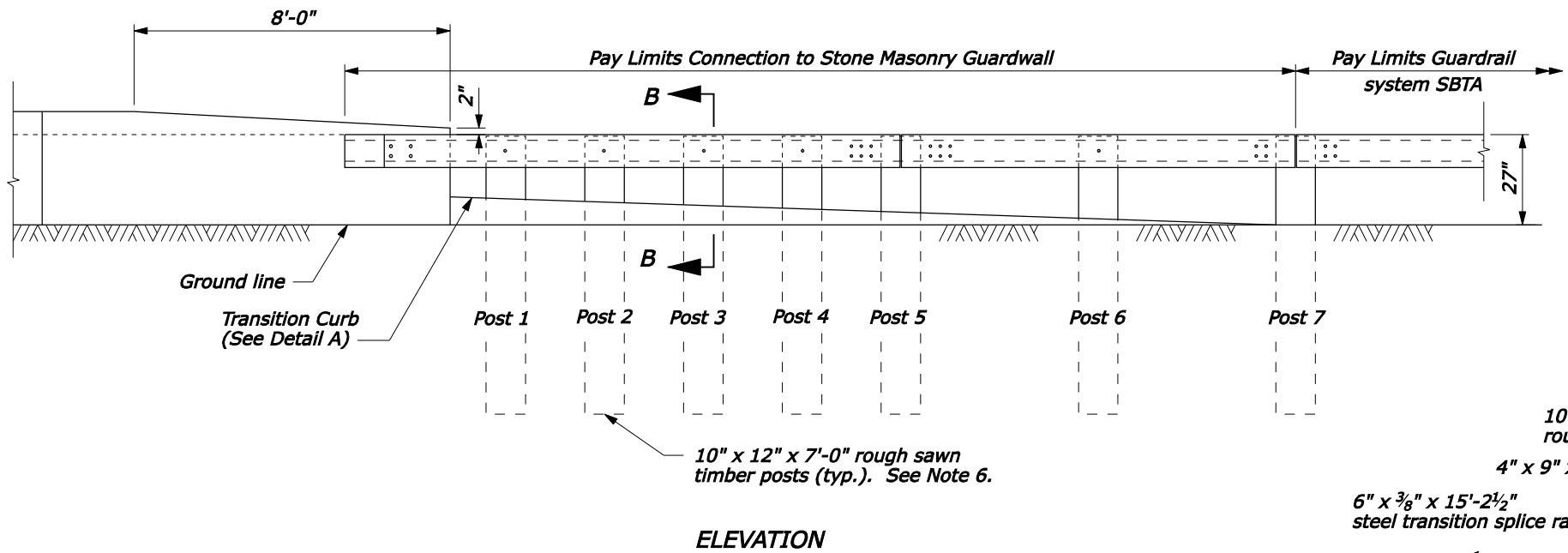
STANDARD
M617-64

NO SCALE

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- NOTE:**
1. See Sheet 2 of 2 for Sections A-A through C-C, steel rail layouts, and other details.
 2. Use weathering steel for all structural steel and fastener hardware.
 3. Transition curbing (including dowel) will be paid for at the contract unit price for transition curbing.
 4. Install transition curbing of material type specified in plans.
 5. Curb may be continuous or slabs at least 4'-11" in length. Install faces of slabs evenly and with maximum 1/8" separation.
 6. If contract requires steel post, substitute wood post with 6" x 9" x 6'-6" long steel post.



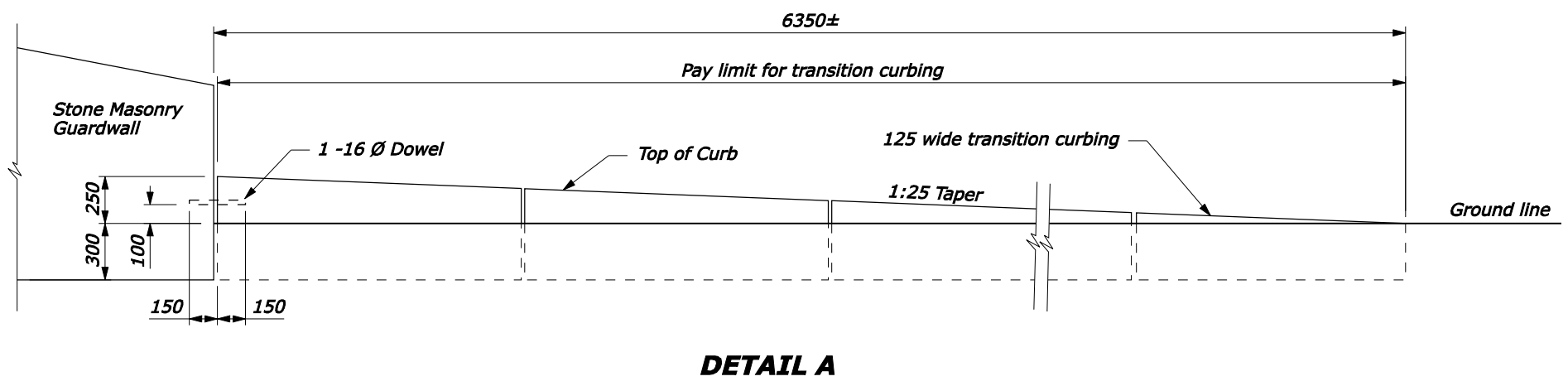
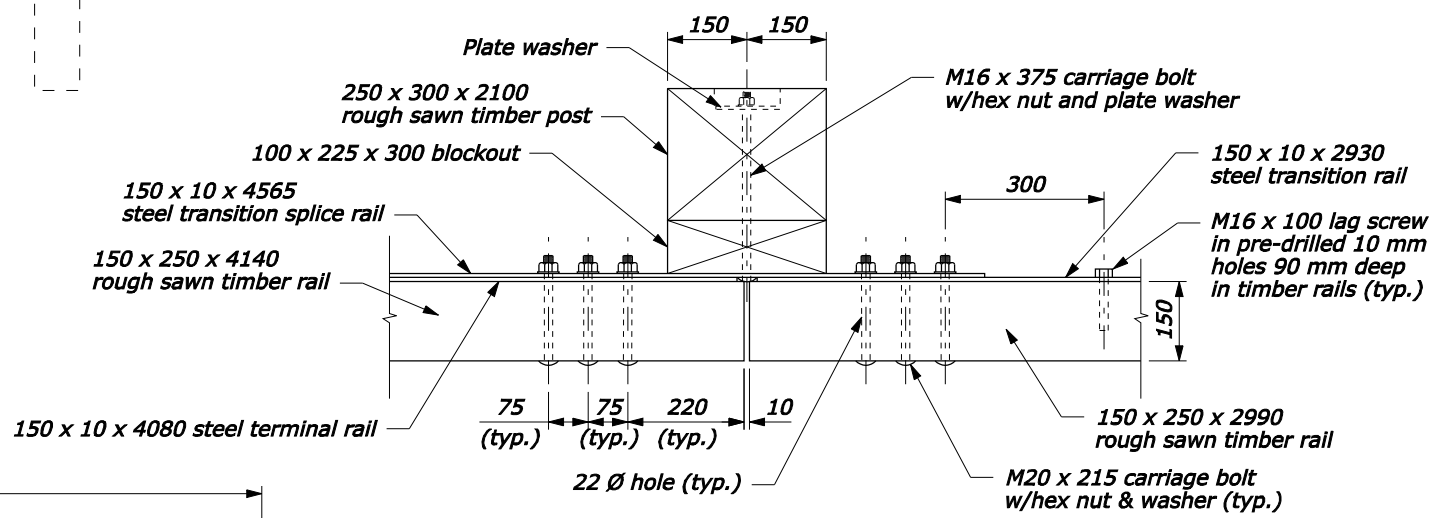
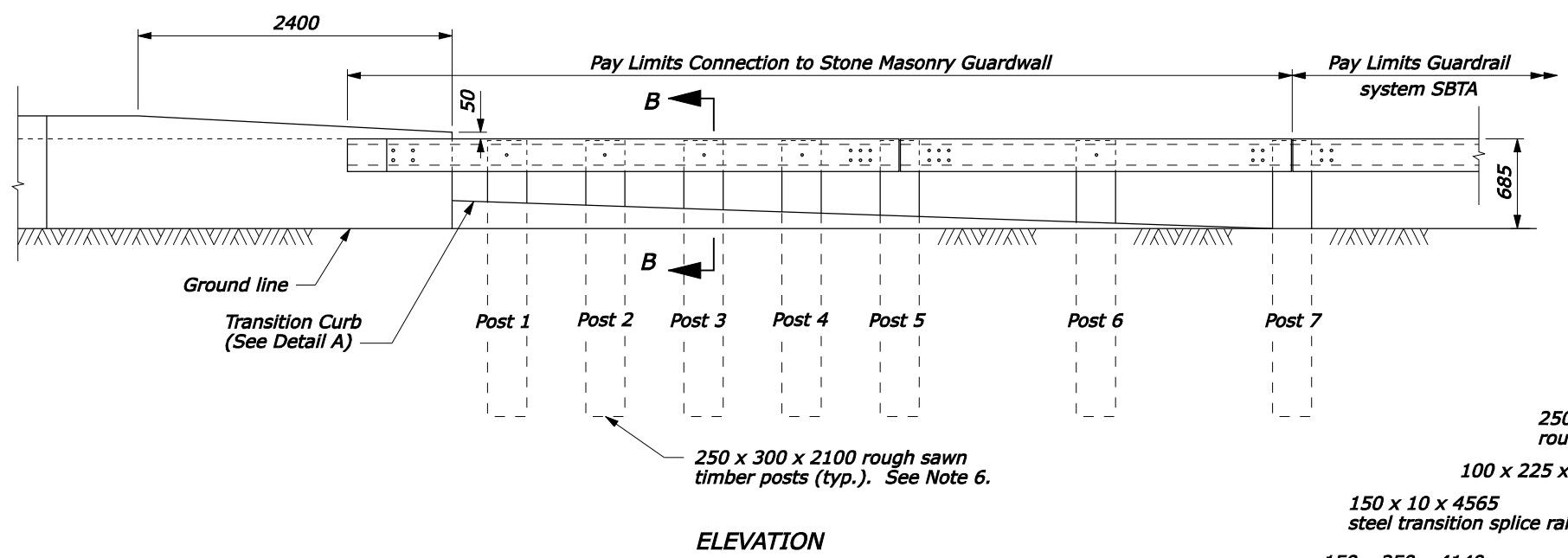
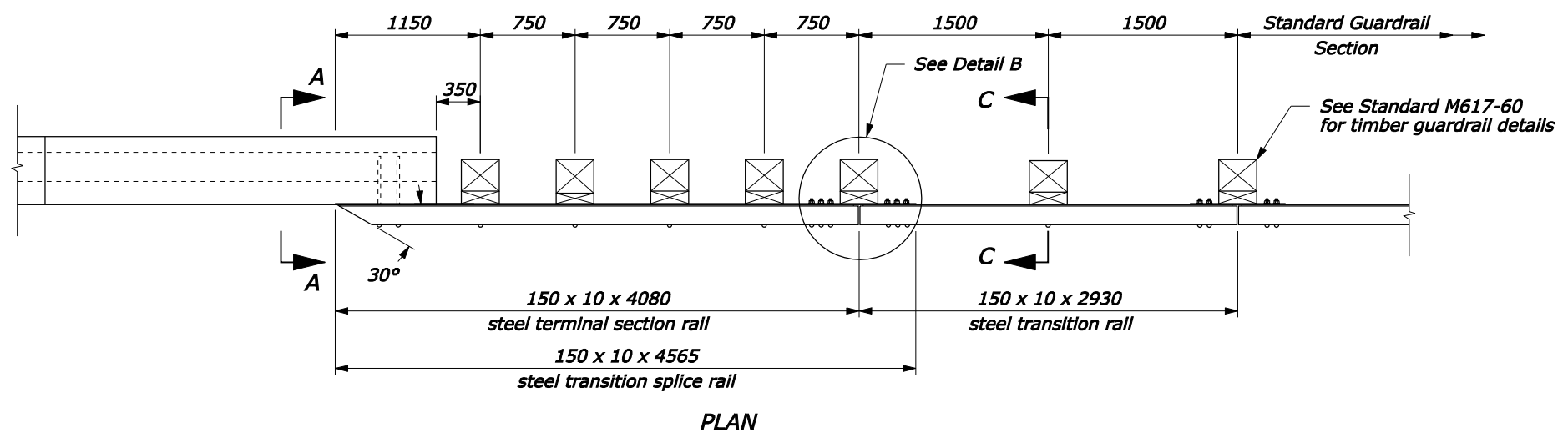
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-3 CONNECTION TO
STONE MASONRY GUARDWALL**
Sheet 1 of 2

STANDARD APPROVED FOR USE --/----	STANDARD
REVISED: DRAFT: 1/2008	617-65

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NOTE:

1. See Sheet 2 of 2 for Sections A-A through C-C, steel rail layouts, and other details.
2. Use weathering steel for all structural steel and fastener hardware.
3. Transition curbing (including dowel) will be paid for at the contract unit price for transition curbing.
4. Install transition curbing of material type specified in plans.
5. Curb may be continuous or slabs at least 1.5 m in length. Install faces of slabs evenly and with maximum 2.5 mm separation.
6. If contract requires steel post, substitute wood post with $W150 \times 225 \times 2.0$ m long.
7. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
8. Dimensions without units are millimeters.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

METRIC STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-3 CONNECTION TO
STONE MASONRY GUARDWALL**
Sheet 1 of 2

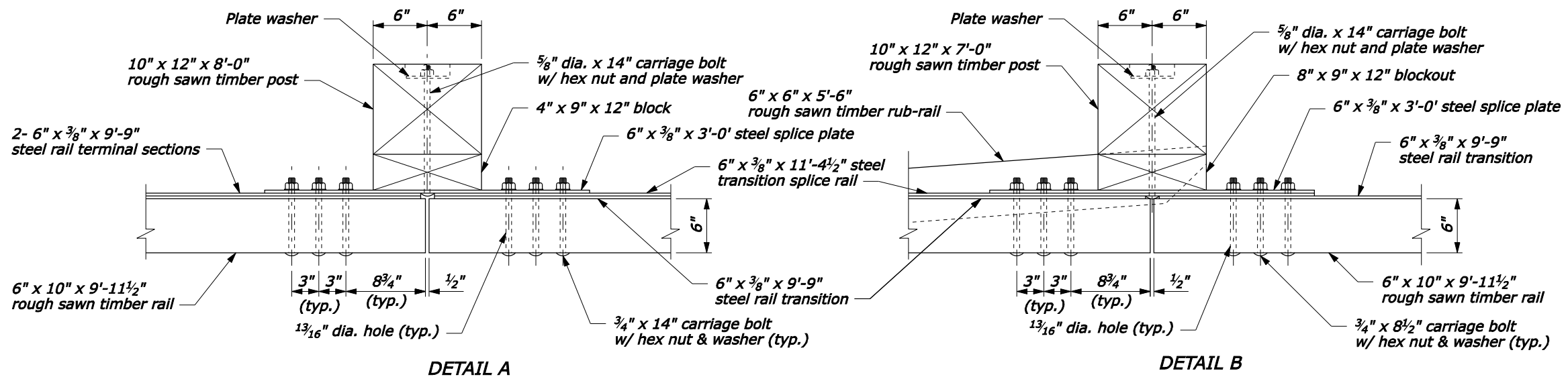
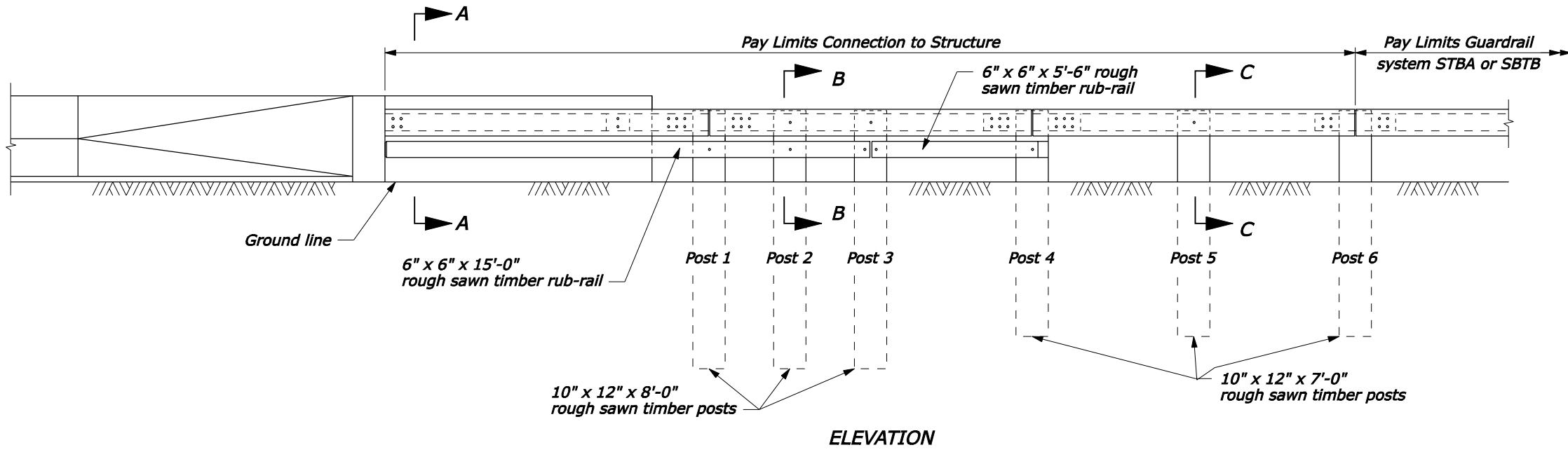
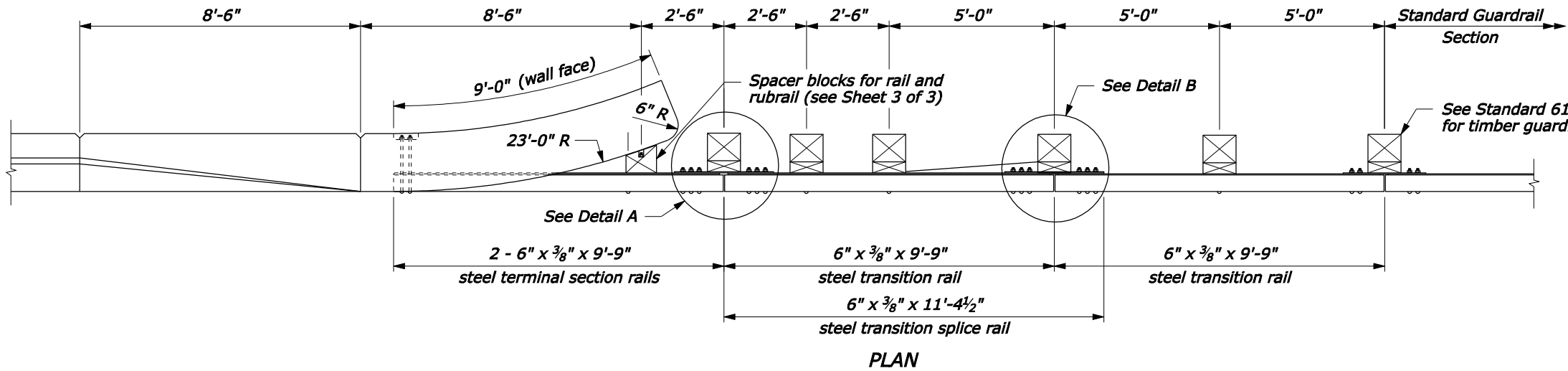
STANDARD APPROVED FOR USE --/----

REVISID: DRAFT: 1/2008

STANDARD
M617-65

NO SCALE

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POST CONNECTION

NO SCALE

NOTE:

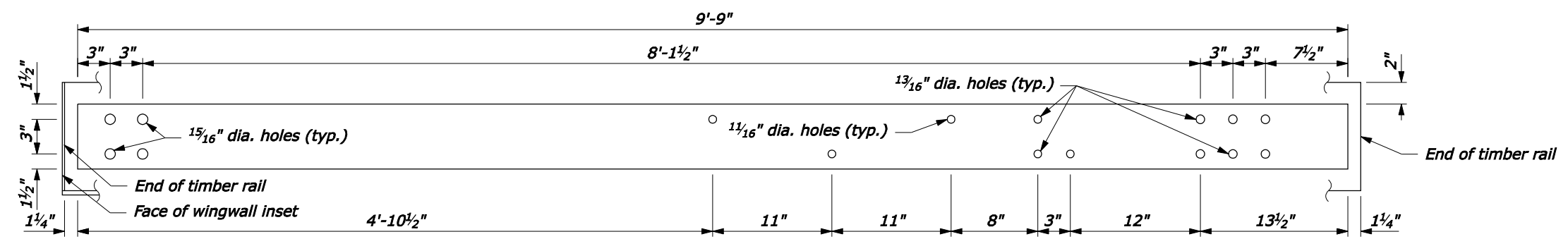
1. See the following sheets for Sections A-A through C-C, steel rail layouts, and other details.
2. Use weathering steel for all structural steel and fastener hardware.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

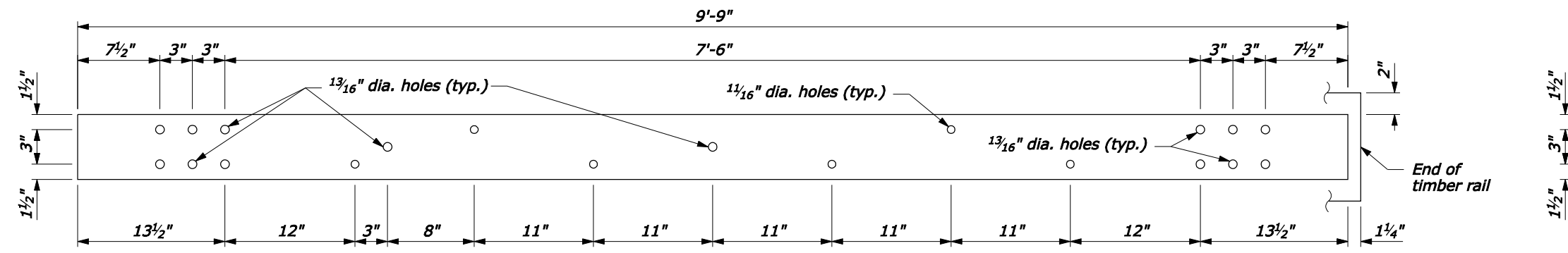
U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
CONNECTION TO
CURVED BACK STRUCTURE**
Sheet 1 of 3

STANDARD APPROVED FOR USE 1/1994	STANDARD
REVISED: 4/1994	617-66
DRAFT: 1/2008	

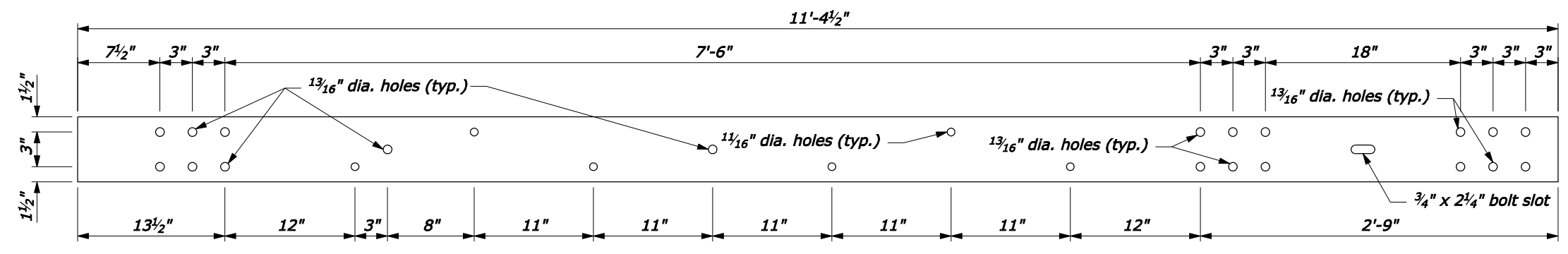
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TERMINAL SECTION RAIL
6" x 3/8" x 9'-9"

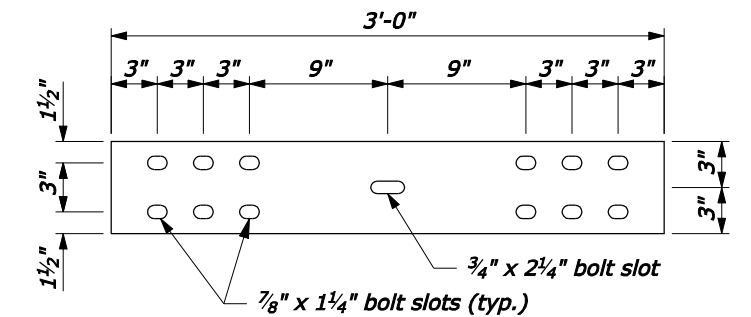


TRANSITION RAIL
6" x 3/8" x 9'-9"

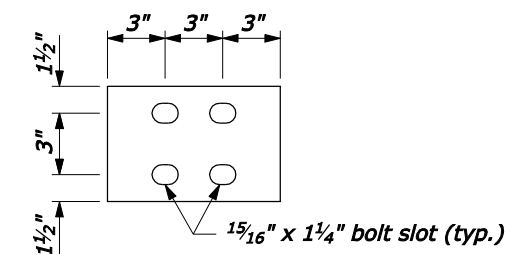


TRANSITION SPLICE RAIL
6" x 3/8" x 11'-4 1/2"

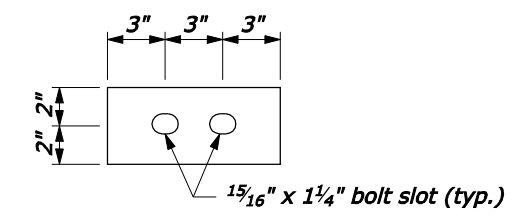
NOTE:
1. Pre-drill 5/8-inch holes in timber rail and 3/8-inch holes in the wood spacer block for the 5/8-inch lag screws.



SPLICE PLATE
6" x 3/8" x 3'-0"

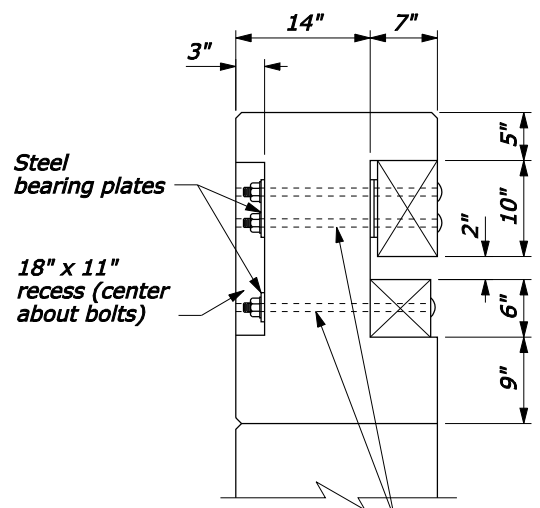


6" x 3/8" x 9"

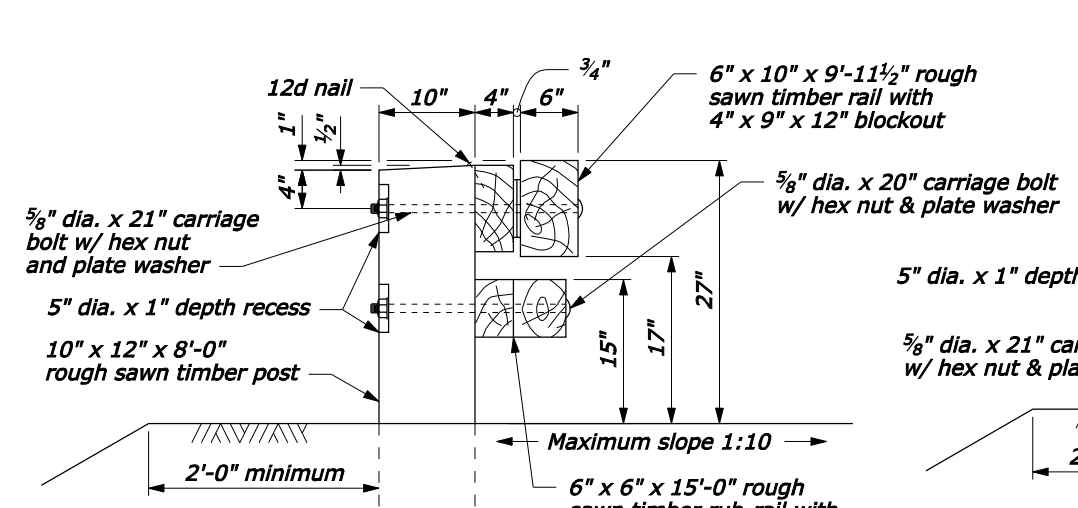


4" x 3/8" x 9"

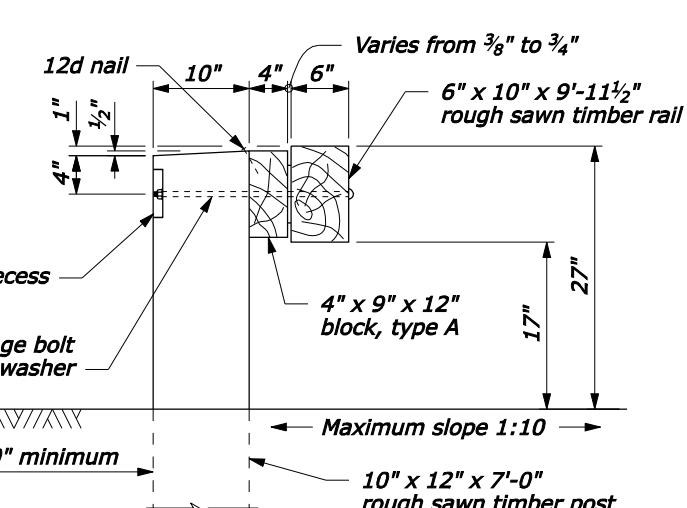
BEARING PLATE DETAILS



SECTION A-A



SECTION B-B



SECTION C-C

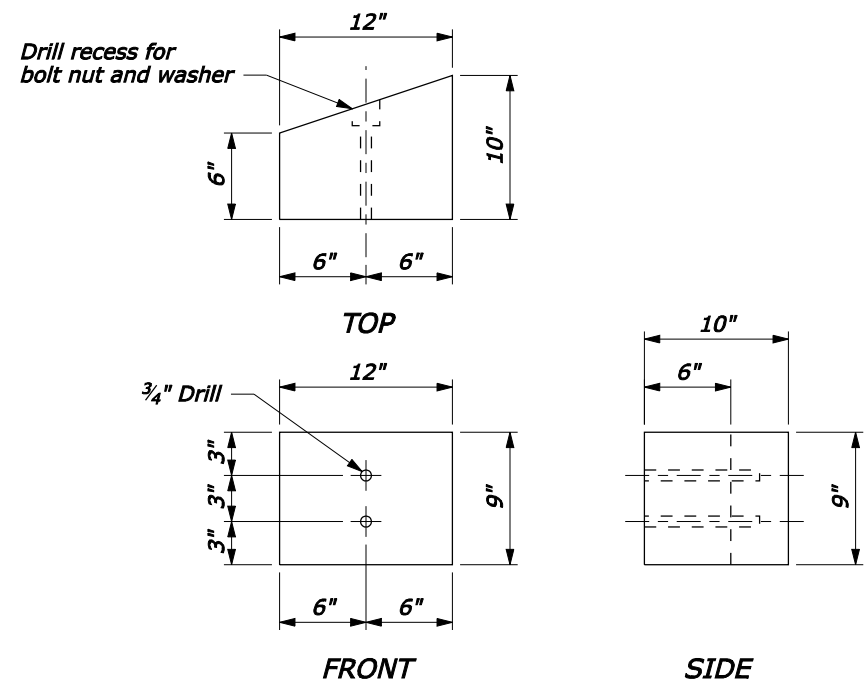
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

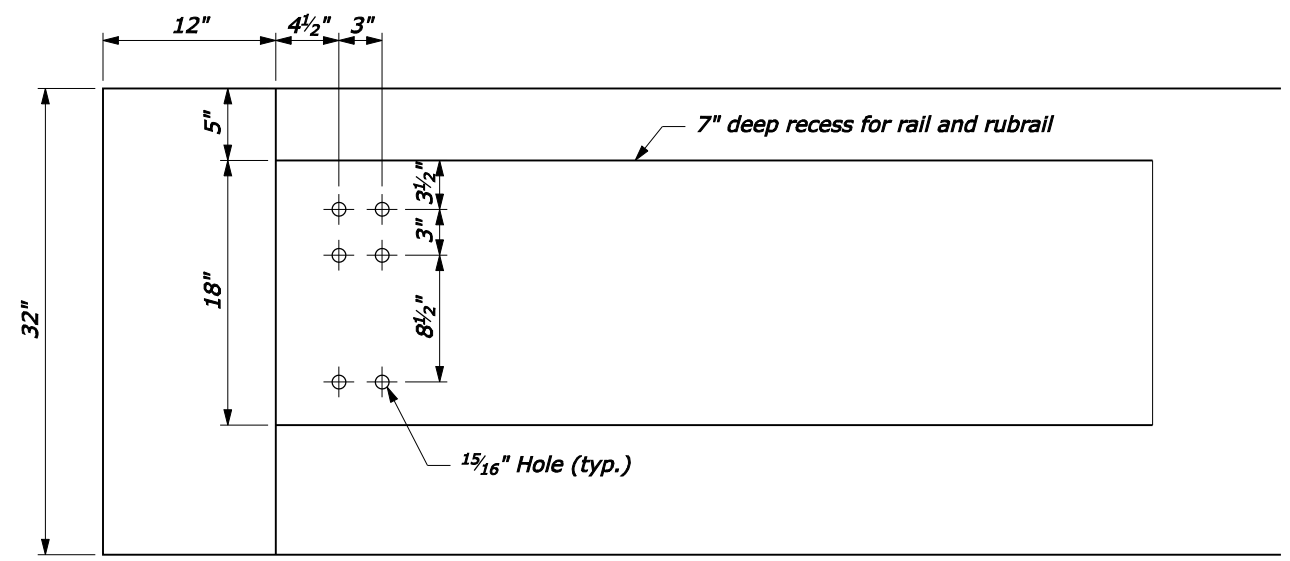
U.S. CUSTOMARY STANDARD
STEEL-BACKED TIMBER GUARDRAIL CONNECTION TO CURVED BACK STRUCTURE
Sheet 2 of 3

STANDARD APPROVED FOR USE 1/1994	STANDARD
REVISED: 4/1994	617-66
DRAFT: 1/2008	

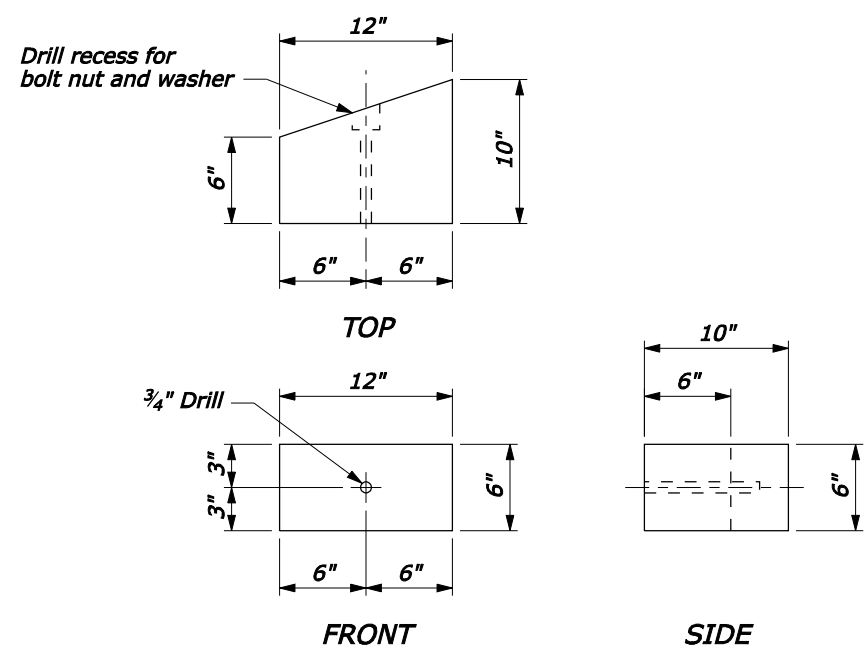
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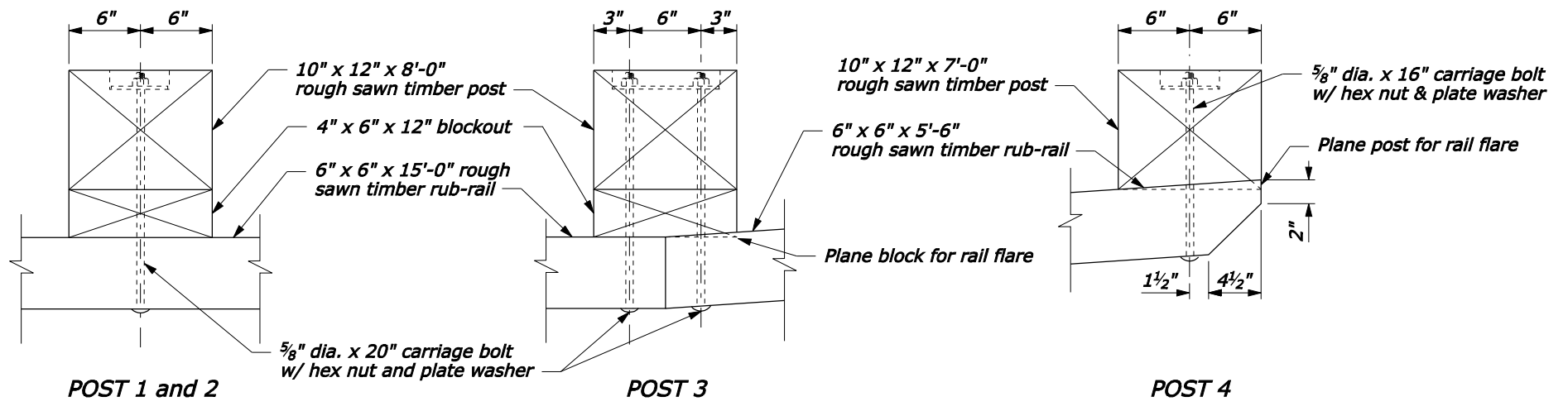
SPACER BLOCK FOR RAIL



PARAPET ATTACHMENT DETAIL



SPACER BLOCK FOR RUB-RAIL

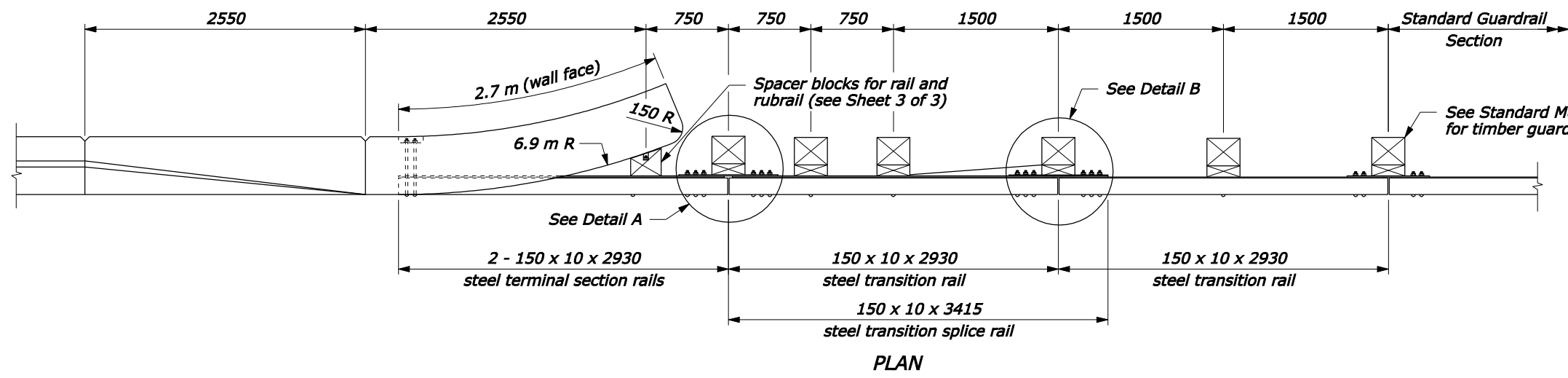


RUB-RAIL CONNECTIONS

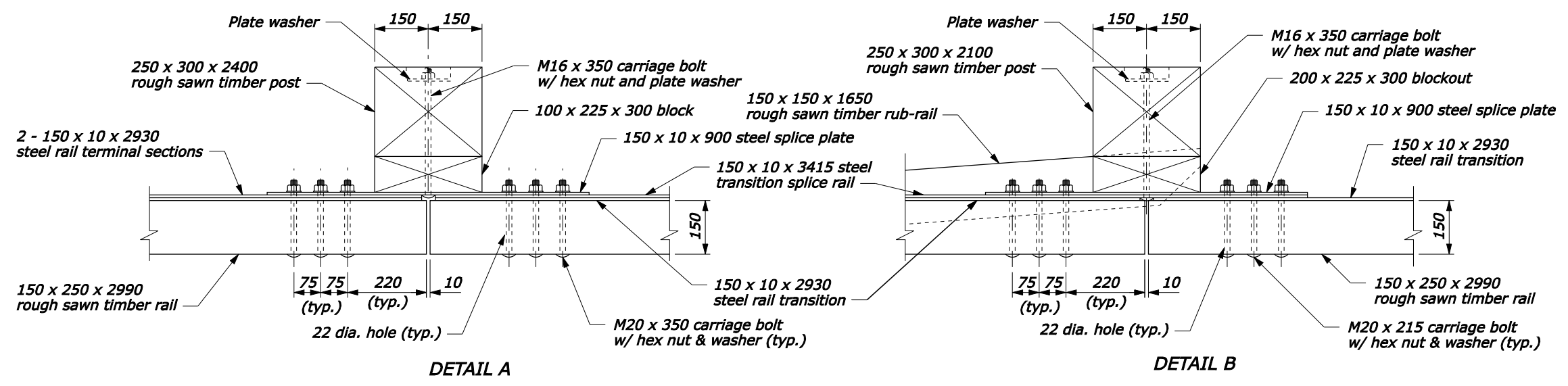
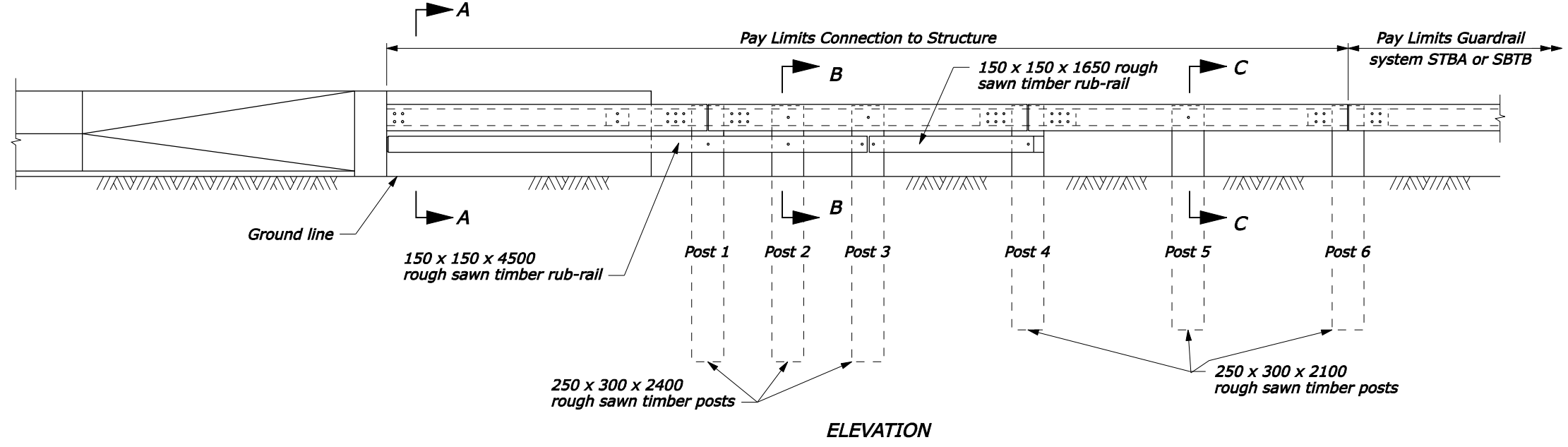
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD STEEL-BACKED TIMBER GUARDRAIL CONNECTION TO CURVED BACK STRUCTURE Sheet 3 of 3	
STANDARD APPROVED FOR USE 1/1994	STANDARD
REVISED: 4/1994 DRAFT: 1/2008	617-66

P:\198.145.186.2\std_plan\std61766.dgn [US Customary] 23-Jan-2008 04:09 PM



- NOTE:**
1. See the following sheets for Sections A-A through C-C, steel rail layouts, and other details.
 2. Use weathering steel for all structural steel and fastener hardware.
 3. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 4. Dimensions without units are millimeters.



POST CONNECTION

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

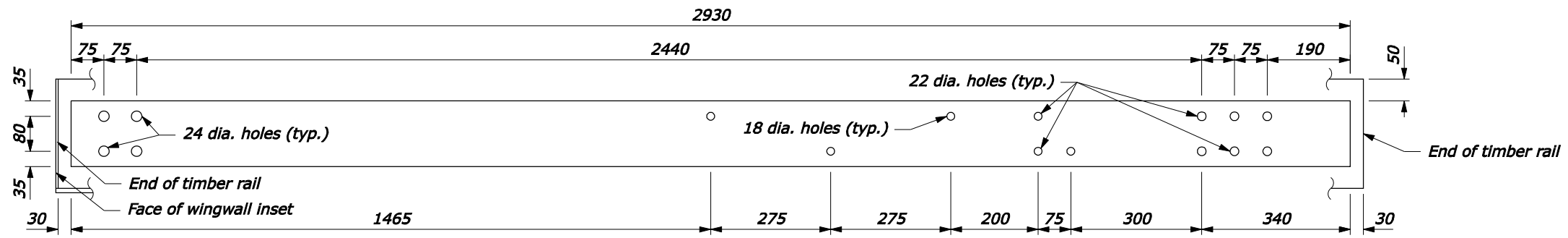
METRIC STANDARD
STEEL-BACKED TIMBER GUARDRAIL CONNECTION TO CURVED BACK STRUCTURE
 Sheet 1 of 3

STANDARD APPROVED FOR USE 3/1996

REVISOR: 1/2008
 DRAFT: 1/2008

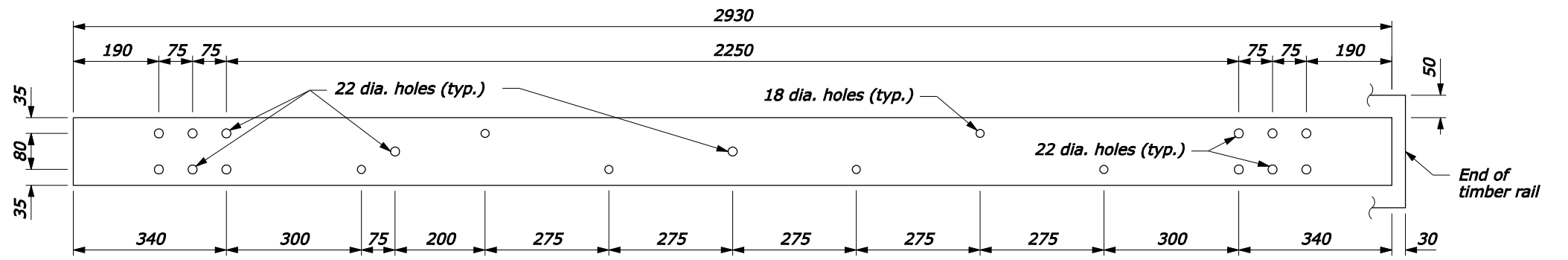
STANDARD M617-66

23-Jan-2008 04:10 PM
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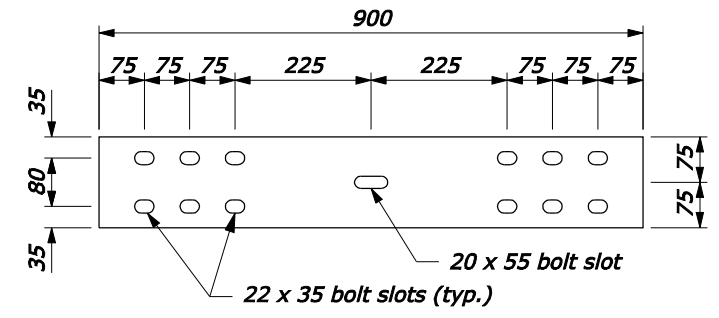


TERMINAL SECTION RAIL
150 x 10 x 2930

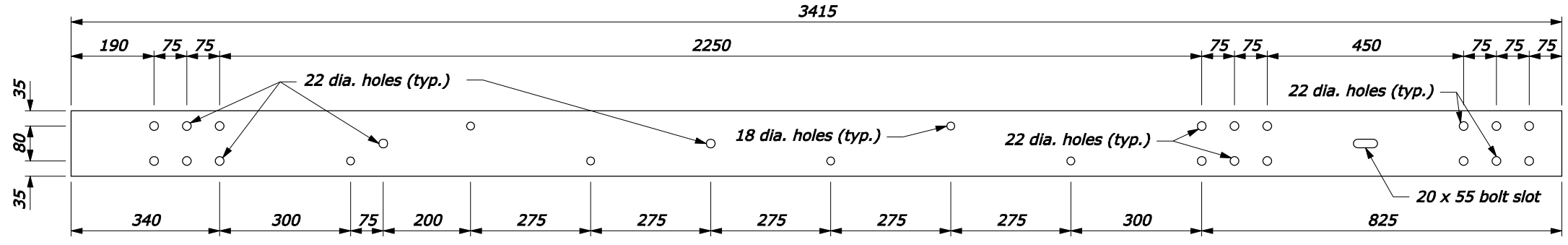
- NOTE:**
1. Pre-drill 16 mm holes in timber rail and 10 mm holes in the wood spacer block for the 16 mm lag screws.
 2. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 3. Dimensions without units are millimeters.



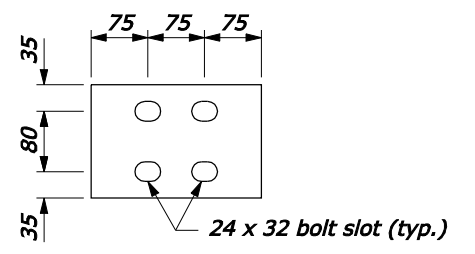
TRANSITION RAIL
150 x 10 x 2930



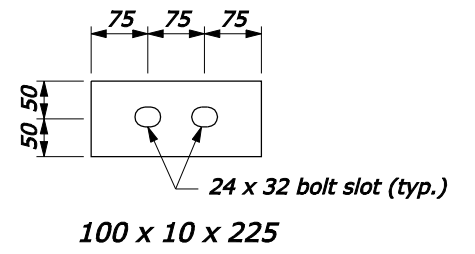
SPLICE PLATE
150 x 10 x 900



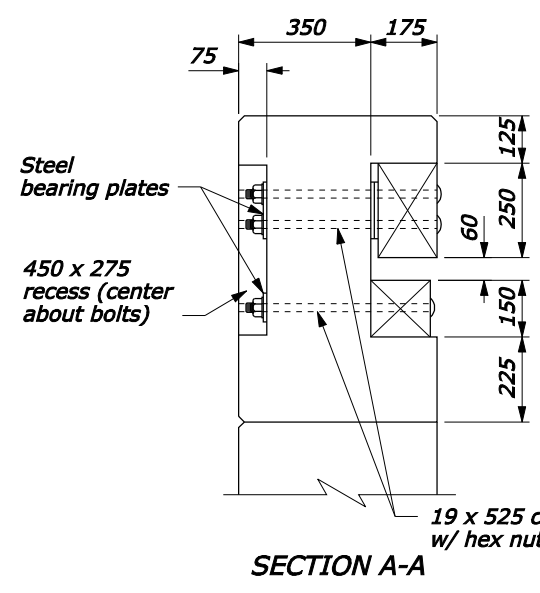
TRANSITION SPLICE RAIL
150 x 10 x 3415



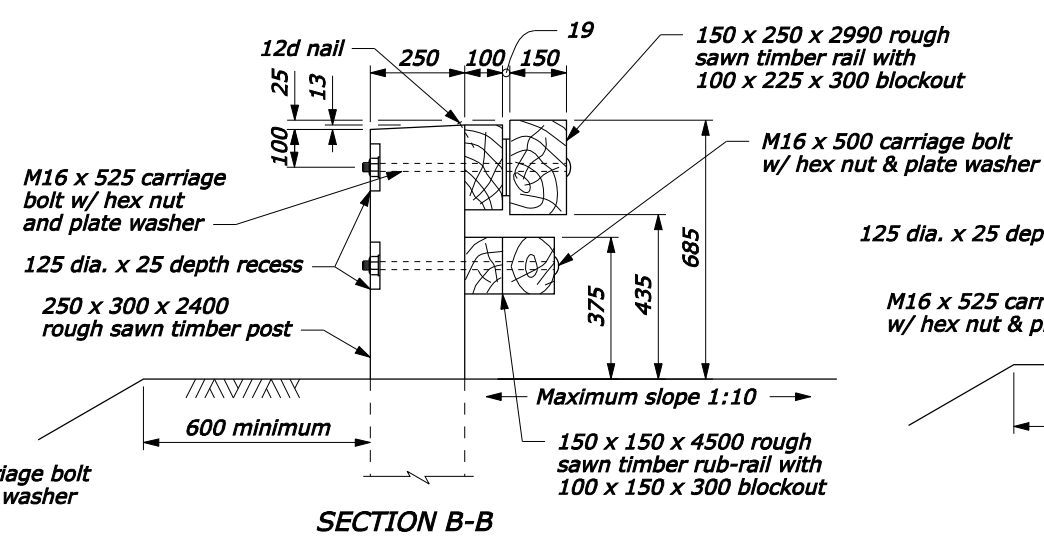
BEARING PLATE DETAILS



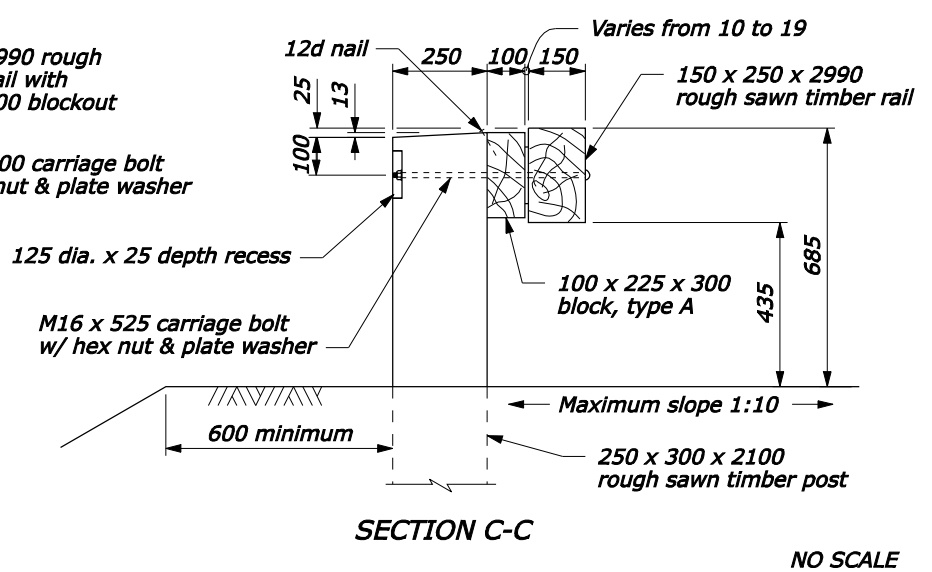
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SECTION A-A



SECTION B-B



SECTION C-C

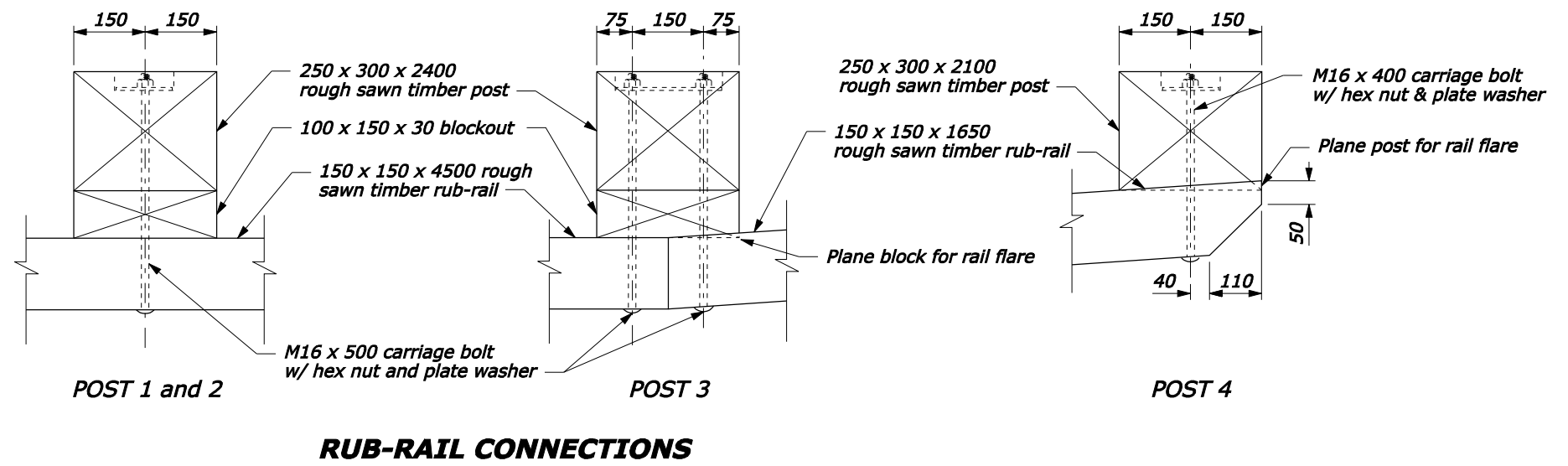
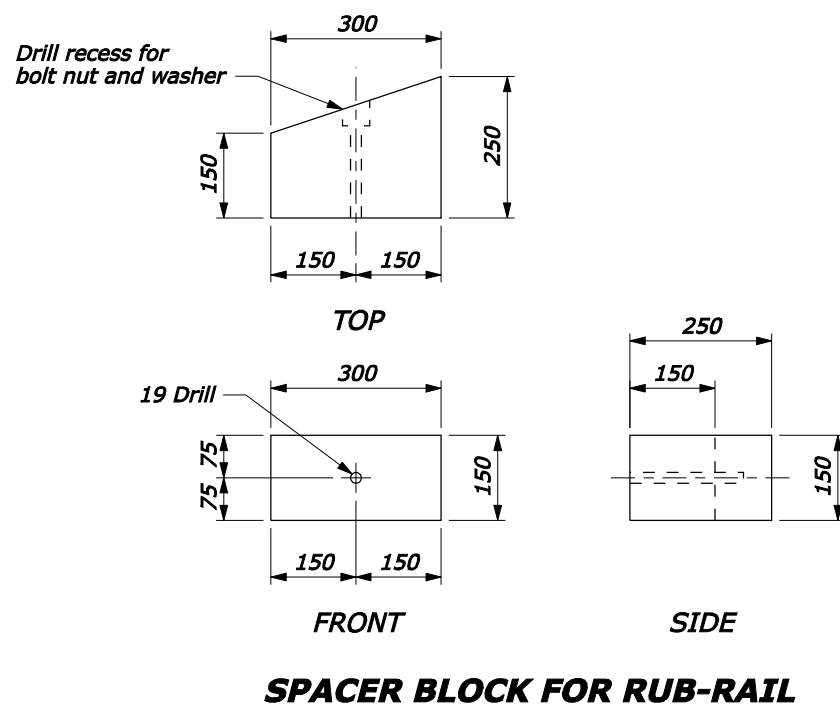
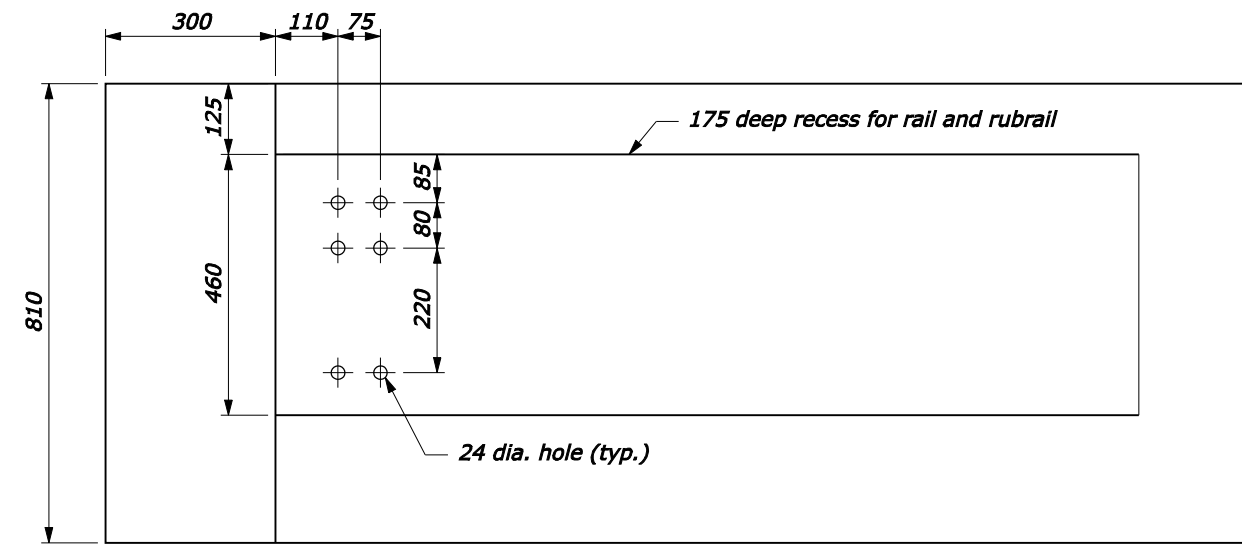
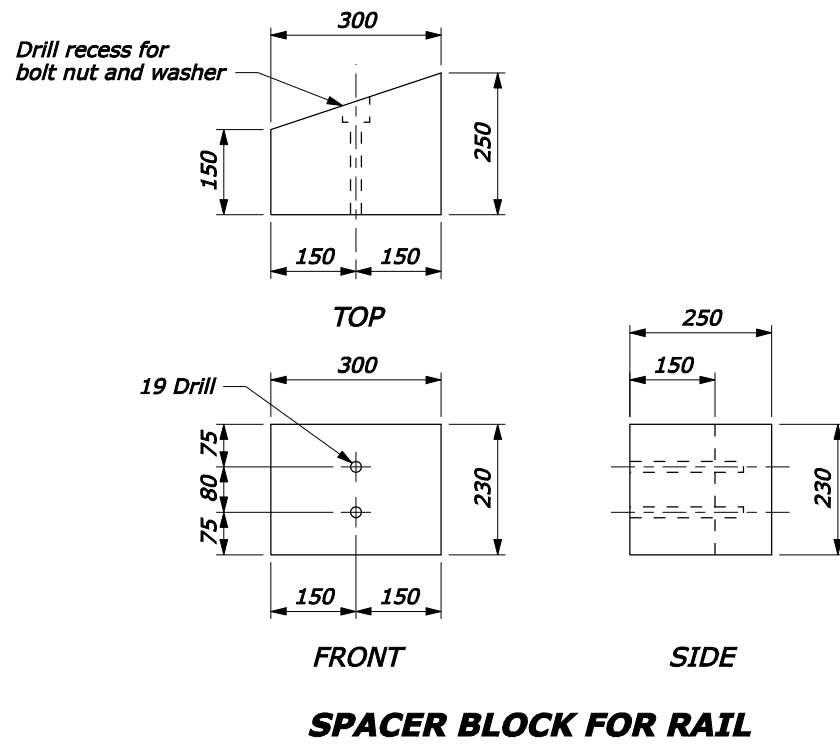
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

METRIC STANDARD
STEEL-BACKED TIMBER GUARDRAIL CONNECTION TO CURVED BACK STRUCTURE
Sheet 2 of 3

STANDARD APPROVED FOR USE 3/1996
REVISOR: 1/2008
DRAFT: 1/2008

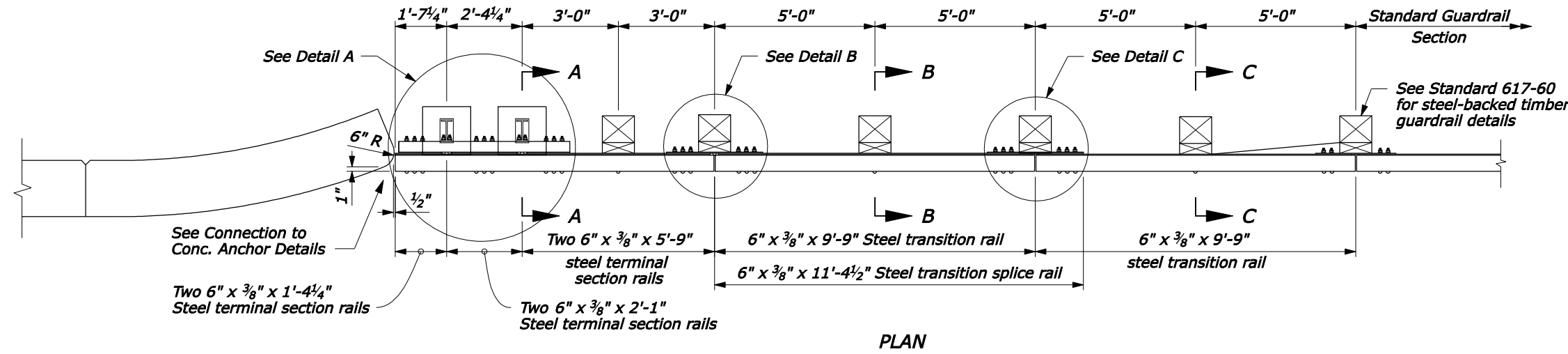
STANDARD
M617-66



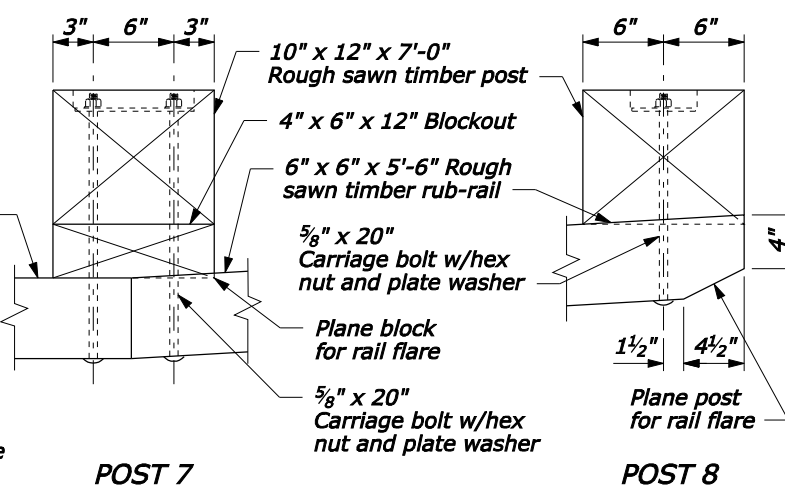
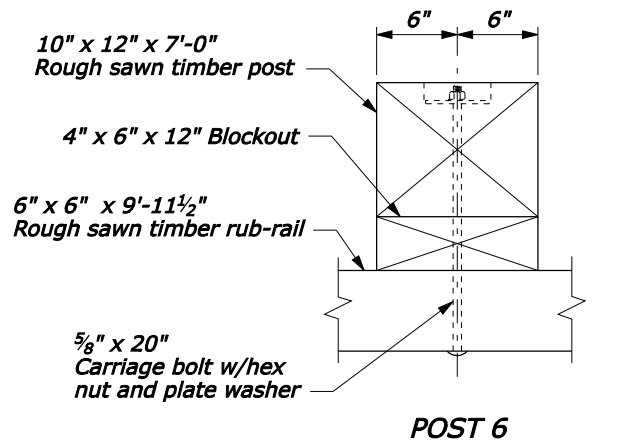
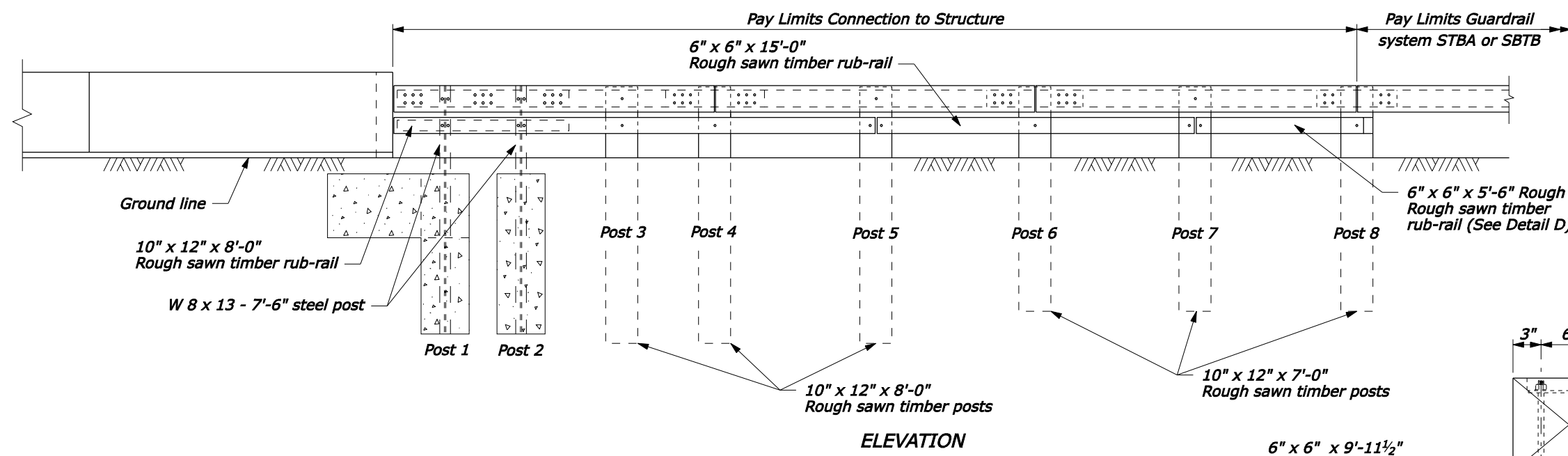
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD STEEL-BACKED TIMBER GUARDRAIL CONNECTION TO CURVED BACK STRUCTURE Sheet 3 of 3	
STANDARD APPROVED FOR USE 3/1996	STANDARD M617-66
REVISED: DRAFT: 1/2008	

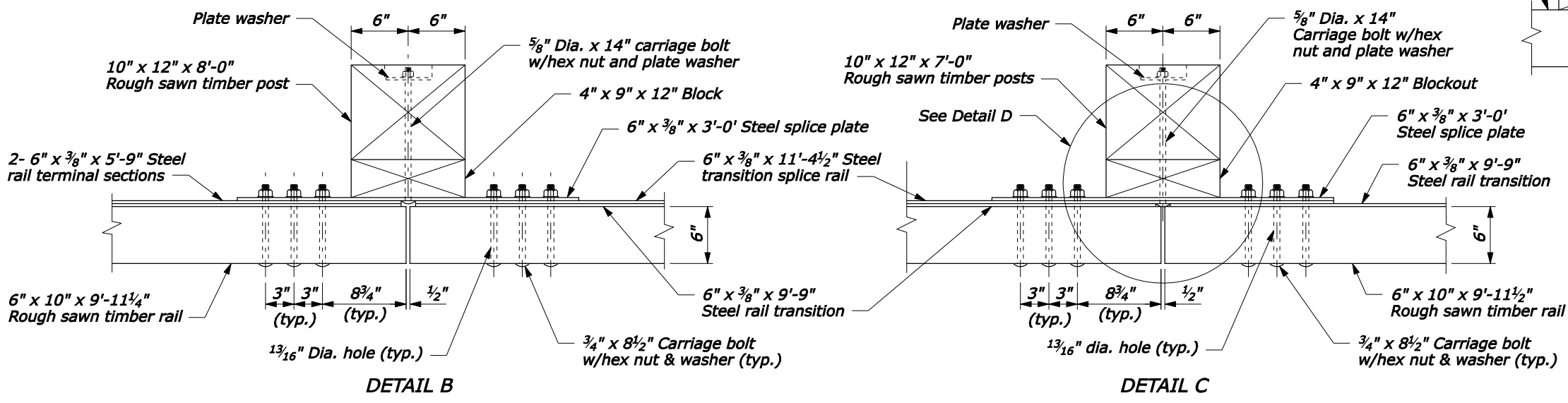
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 ftp://196.145.188.2/scd_plan/st61766.dgn [Metric]



- NOTE:**
1. See the following sheets for Sections A-A through C-C, steel rail layouts, and other details.
 2. Use weathering steel for all structural steel and fastener hardware.
 3. Transition shown for curved end structure. For transition to a straight parapet end, install the timber rail so that the face of the timber rail is offset 1 inch towards the roadway.



RUBRAIL CONNECTION PLAN



DETAIL B

DETAIL C

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
 TL-2 TRANSITION TO STRAIGHT
 OR CURVED-END STRUCTURE**
 Sheet 1 of 3

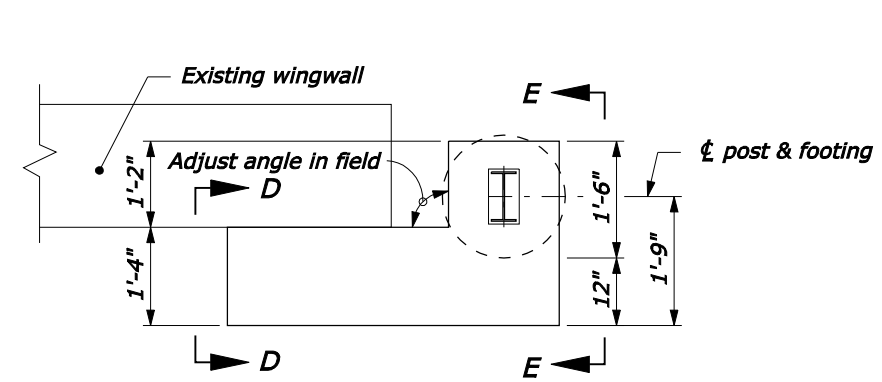
STANDARD APPROVED FOR USE --/----

REVISED: 3/2008

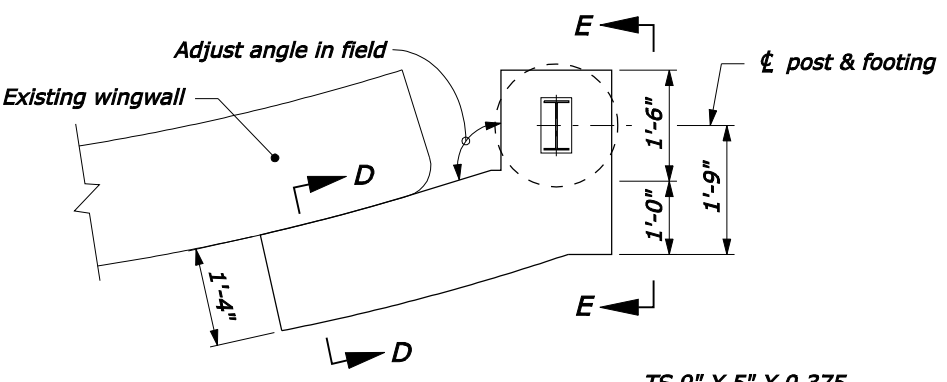
DRAFT: 3/2008

STANDARD
617-67

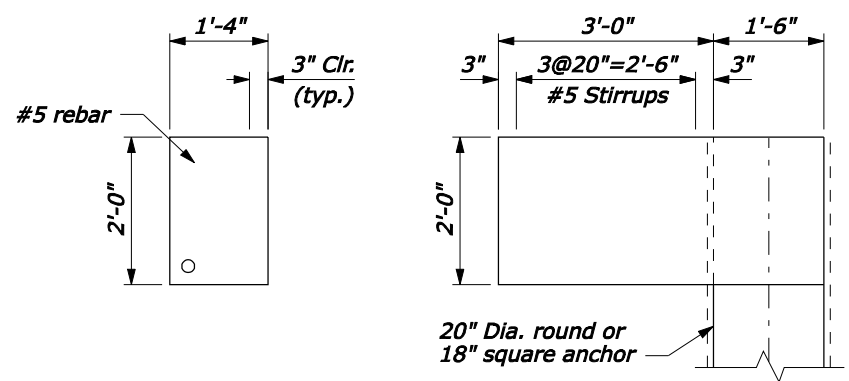
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NON-FLARED WINGWALL

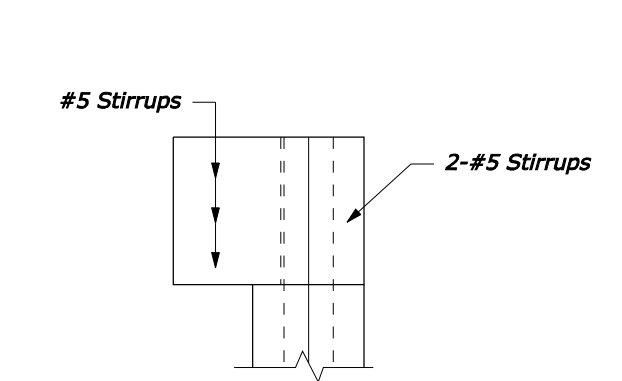


FLARED WINGWALL



SECTION D-D

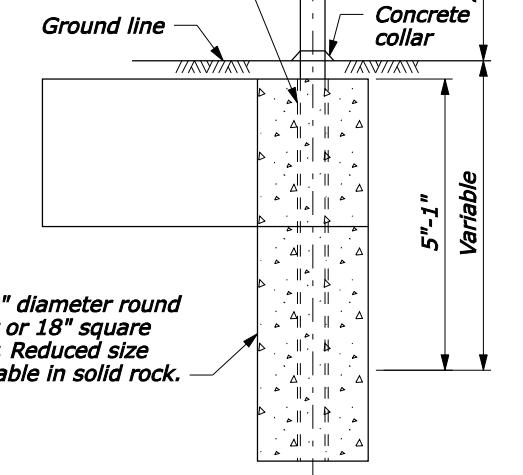
ELEVATION



SECTION E-E

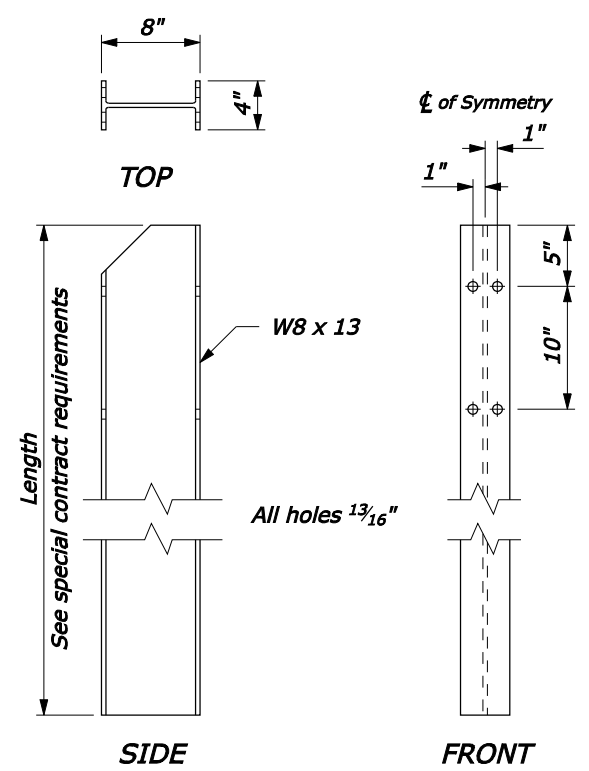
CONNECTION TO CONCRETE ANCHOR

TS 9" X 5" X 0.375
ASTM A500 Grade B or A501



Use 20" diameter round anchor or 18" square anchor. Reduced size acceptable in solid rock.

CONCRETE ANCHOR FOR GUARDRAIL POST



TOP

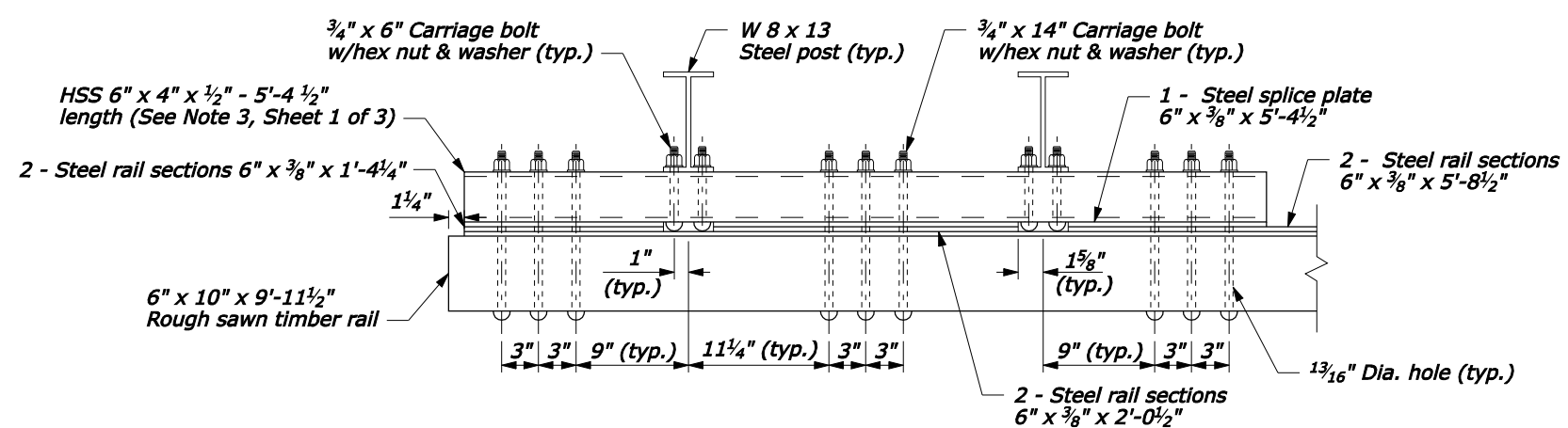
Length
See special contract requirements

SIDE

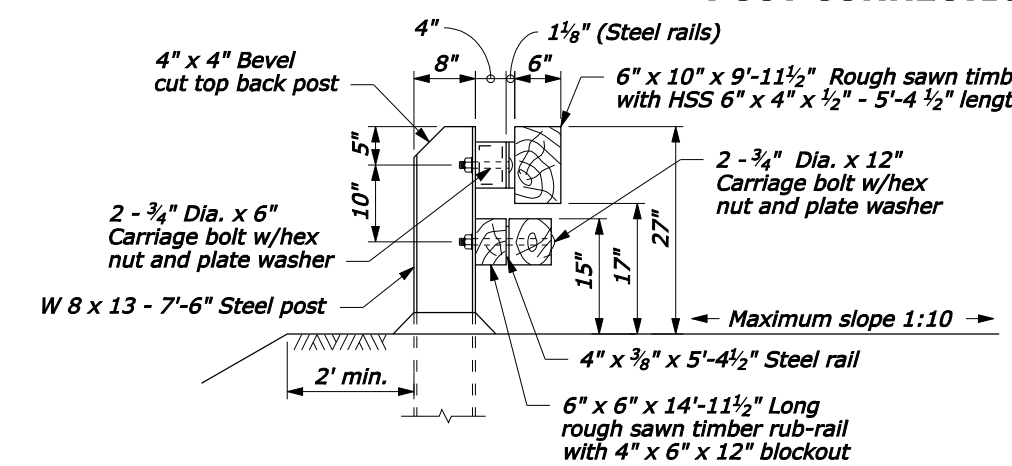
Line of Symmetry

FRONT

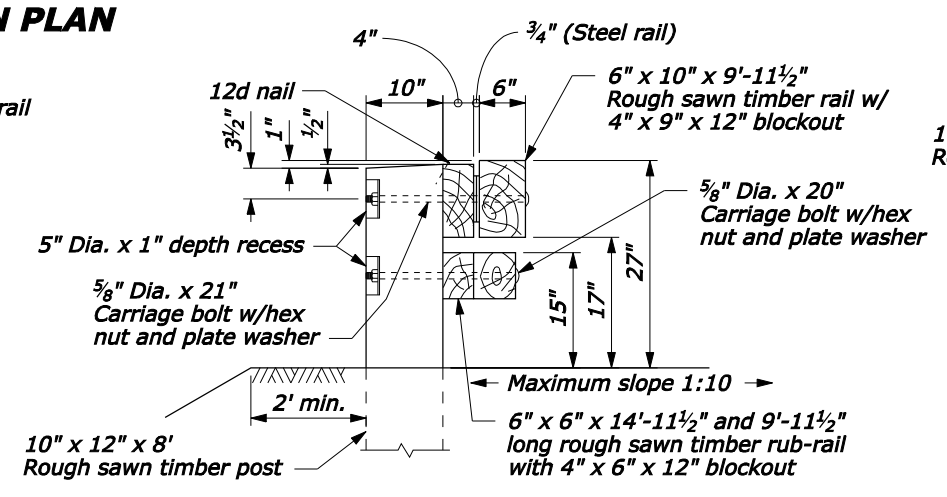
STEEL POST



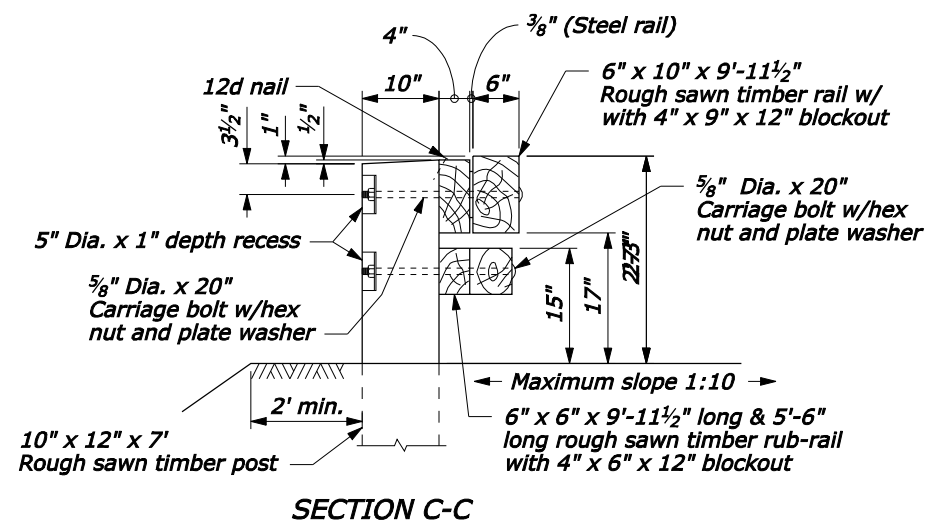
**DETAIL A
POST CONNECTION PLAN**



SECTION A-A



SECTION B-B



SECTION C-C

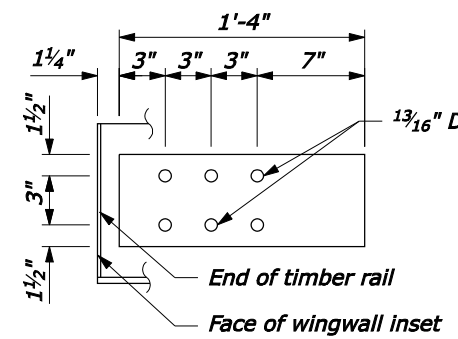
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

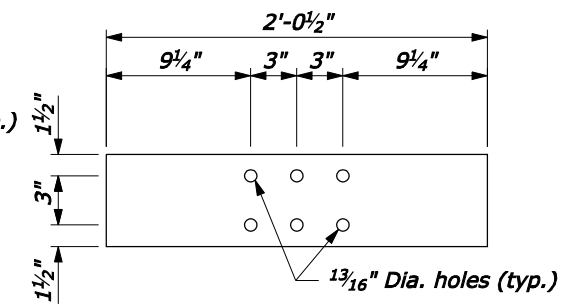
U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 TRANSITION TO STRAIGHT
OR CURVED-END STRUCTURE**
Sheet 2 of 3

STANDARD APPROVED FOR USE --/---	STANDARD 617-67
REVISED: DRAFT: 3/2008	

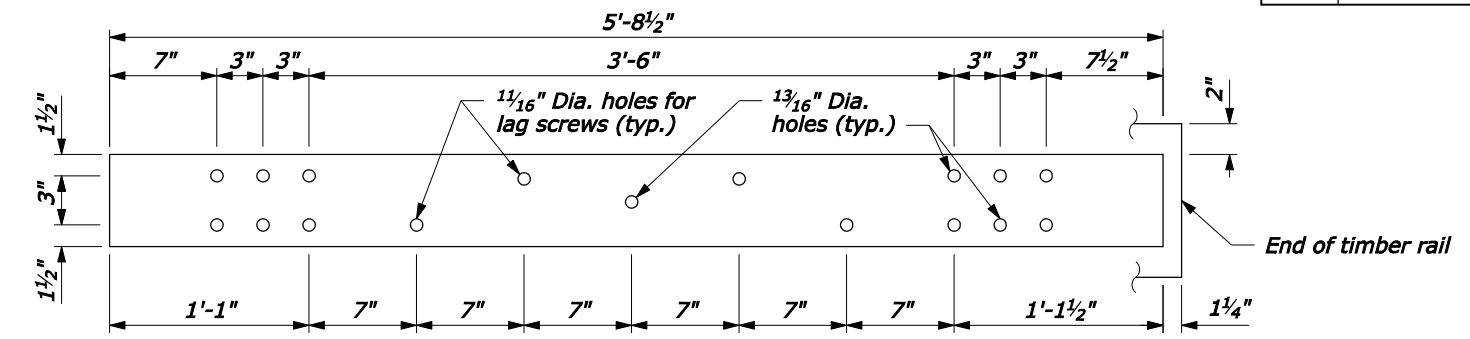
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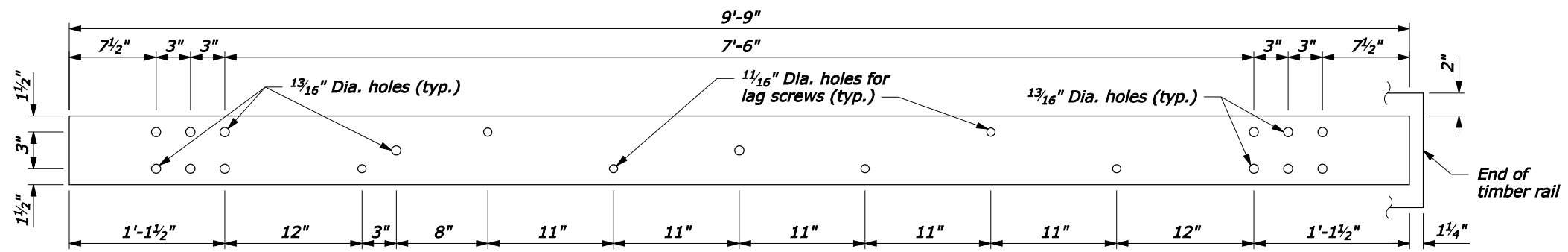
TERMINAL SECTION
6" x 3/8" x 1'-4"



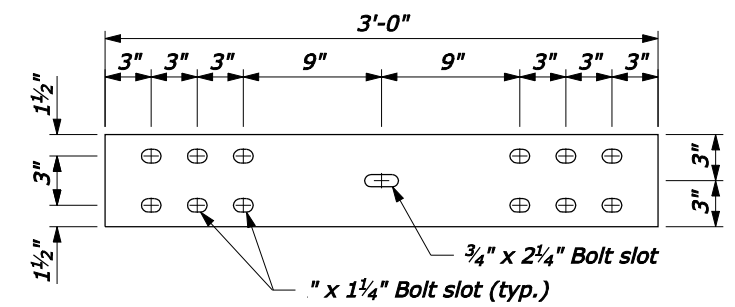
TERMINAL SECTION
6" x 3/8" x 2'-0 1/2"



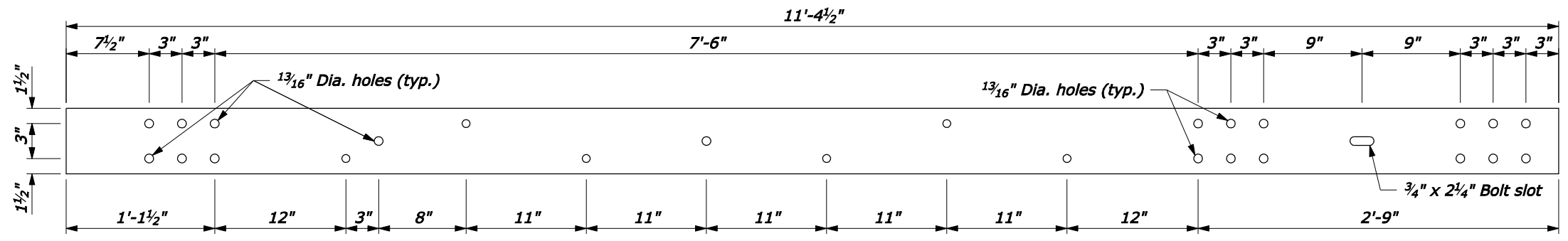
TERMINAL SECTION
6" x 3/8" x 5'-8 1/2"



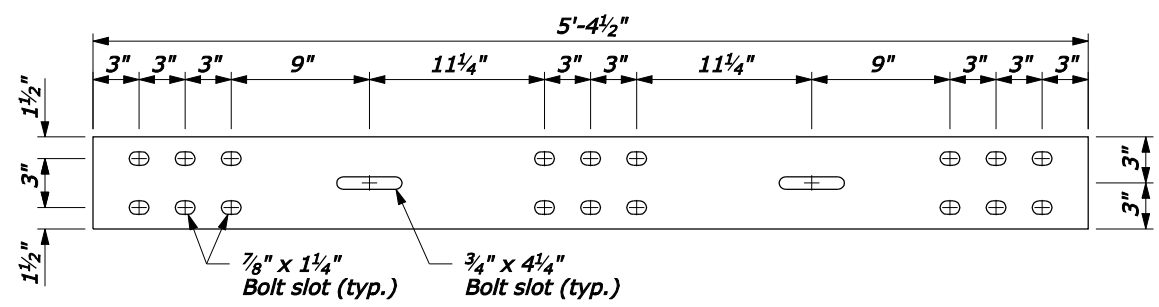
TRANSITION SECTION
6" x 3/8" x 9'-9"



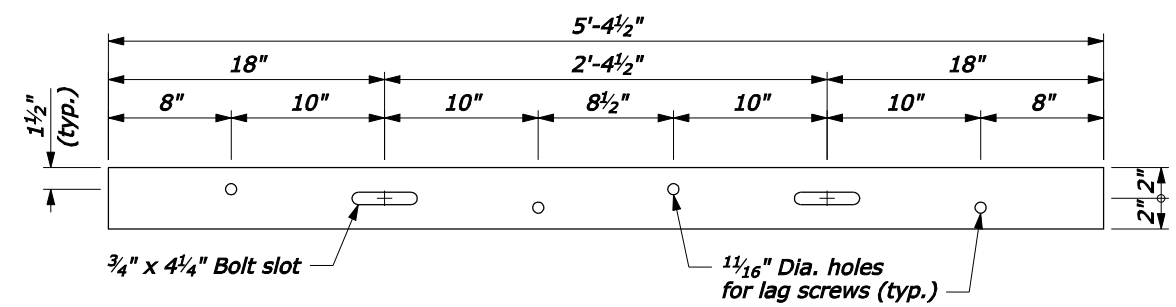
STEEL SPLICE PLATE
6" x 3/8" x 3'-0"



TRANSITION SECTION
6" x 3/8" x 11'-4 1/2"



STEEL SPLICE PLATE
6" x 3/8" x 5'-4 1/2"



RUB-RAIL TRANSITION SECTION
4" x 3/8" x 5'-4 1/2"

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

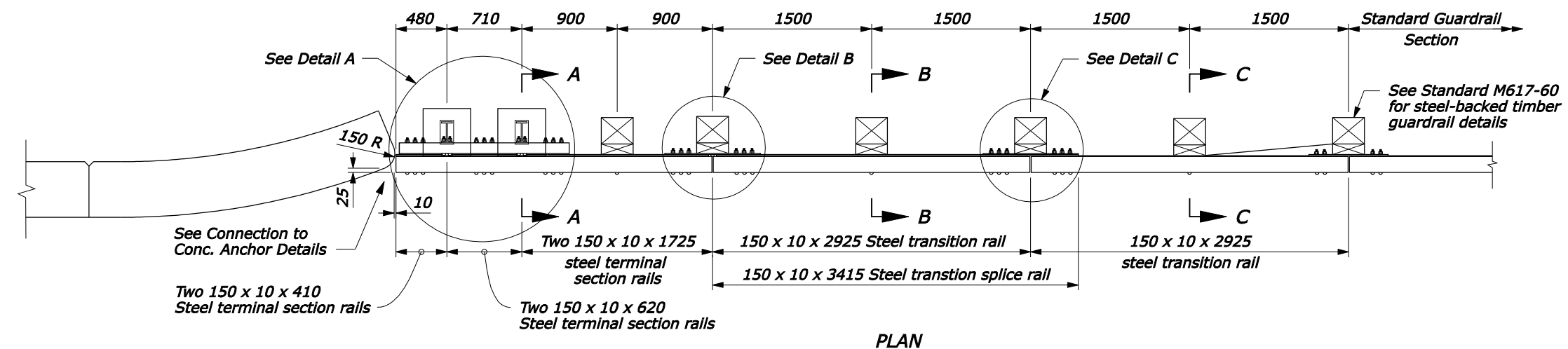
U.S. CUSTOMARY STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 TRANSITION TO STRAIGHT
OR CURVED-END STRUCTURE**
Sheet 3 of 3

STANDARD APPROVED FOR USE --/----

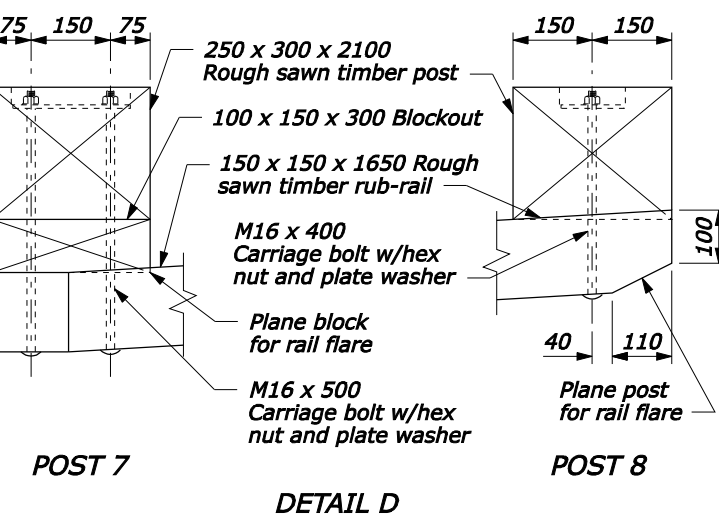
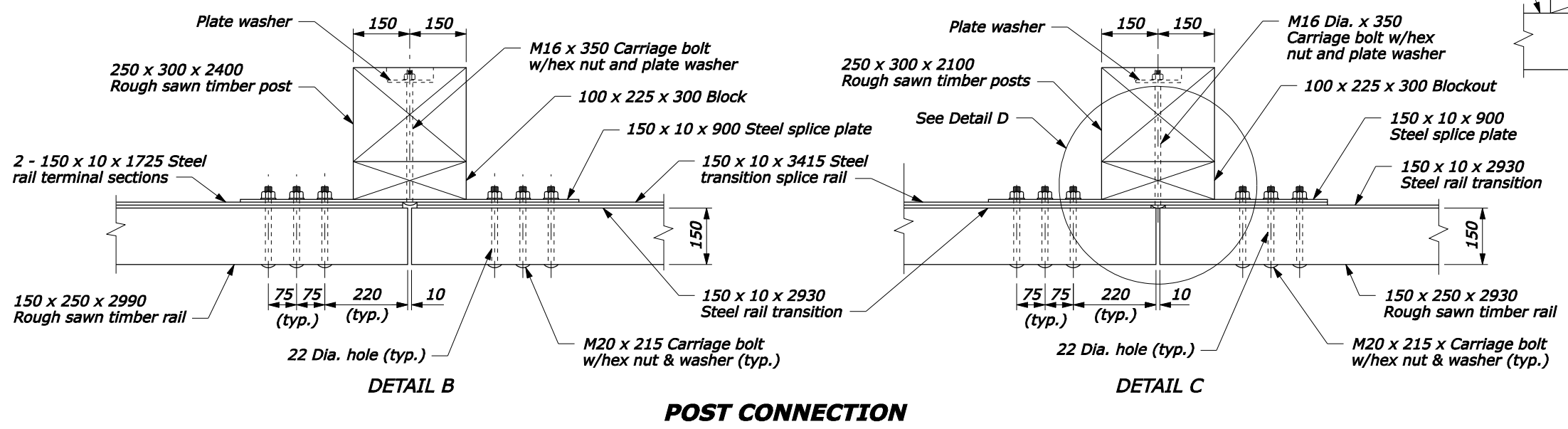
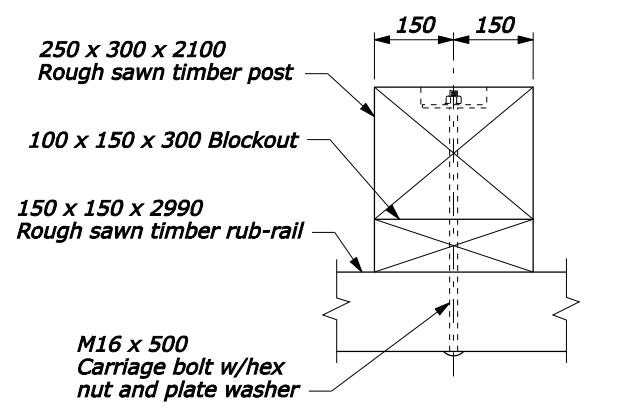
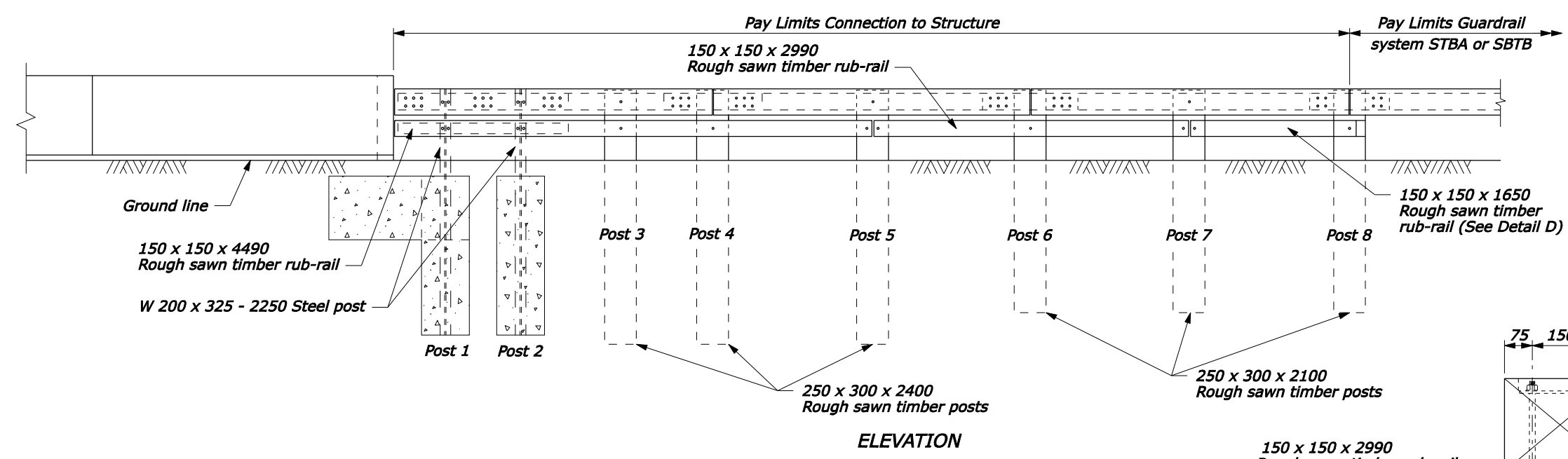
REVISED:
DRAFT: 3/2008

STANDARD
617-67

05-May-2008 04:08 PM P:\198.145.186.2\std. plan\std.1767.dgn [US Customary]



- NOTE:**
1. See the following sheets for Sections A-A through C-C, steel rail layouts, and other details.
 2. Use weathering steel for all structural steel and fastener hardware.
 3. Transition shown for curved end structure. For transition to a straight parapet end, install the timber rail so that the face of the timber rail is offset 25 mm towards the roadway.
 4. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 5. Dimensions without units are millimeters.



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

METRIC STANDARD

**STEEL-BACKED TIMBER GUARDRAIL
TL-2 TRANSITION TO STRAIGHT
OR CURVED-END STRUCTURE**

Sheet 1 of 3

STANDARD APPROVED FOR USE --/----

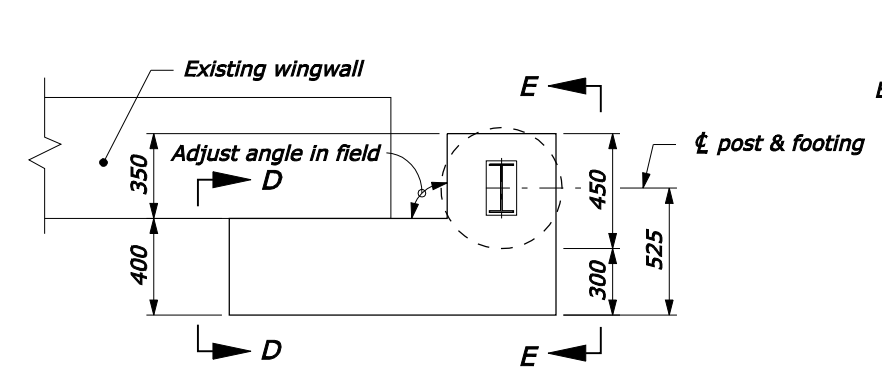
REVIS: 5/2008

DRAFT: 5/2008

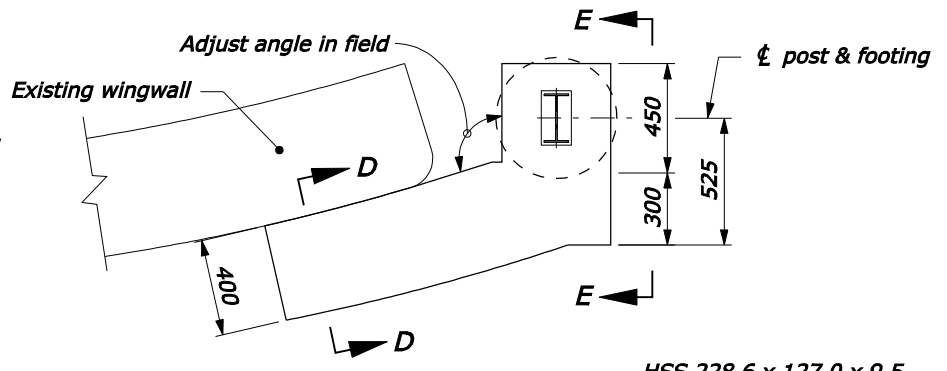
STANDARD M617-67

NO SCALE

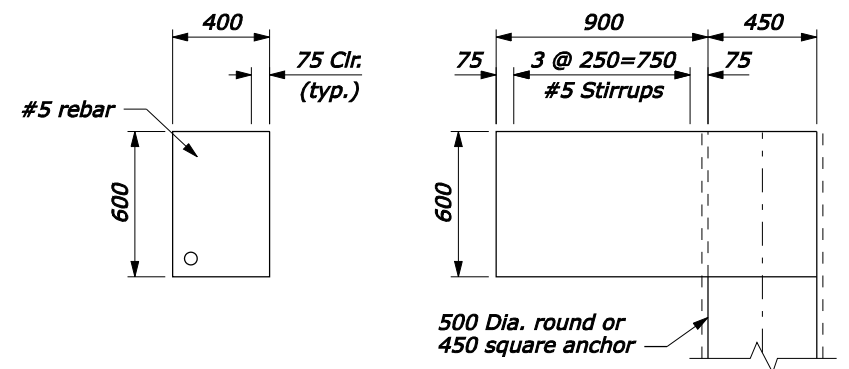
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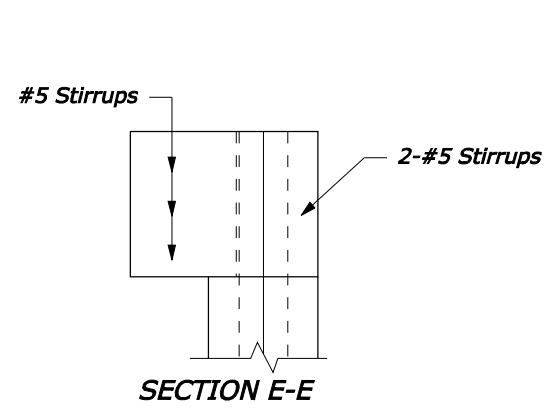
NON-FLARED WINGWALL



FLARED WINGWALL

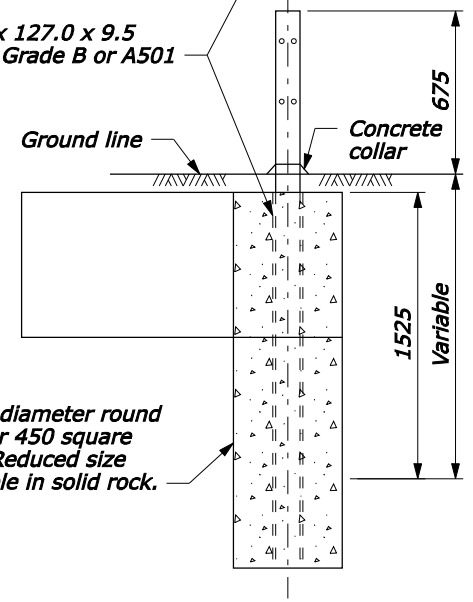


SECTION D-D
ELEVATION
CONNECTION TO CONCRETE ANCHOR



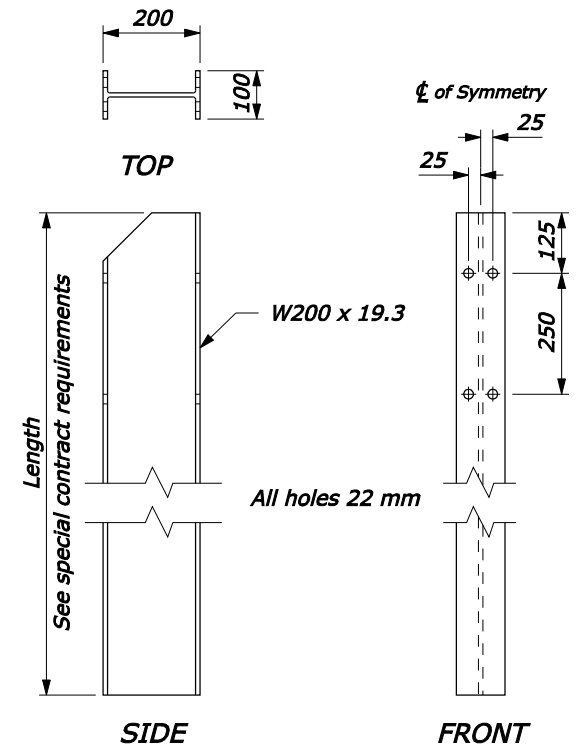
SECTION E-E

HSS 228.6 x 127.0 x 9.5
ASTM A500 Grade B or A501

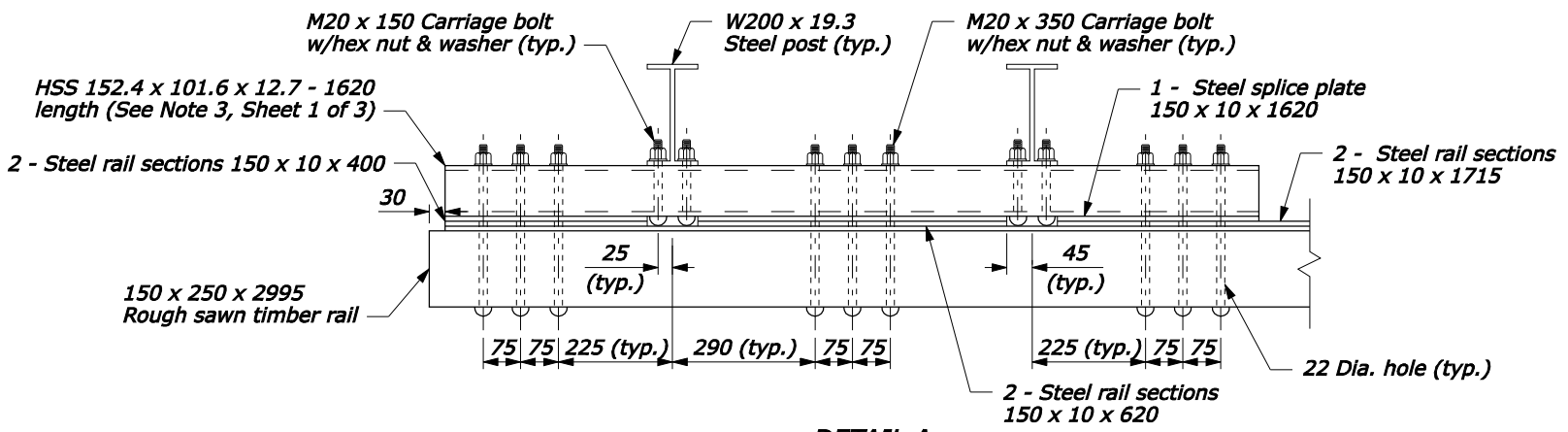


Use 500 diameter round anchor or 450 square anchor. Reduced size acceptable in solid rock.

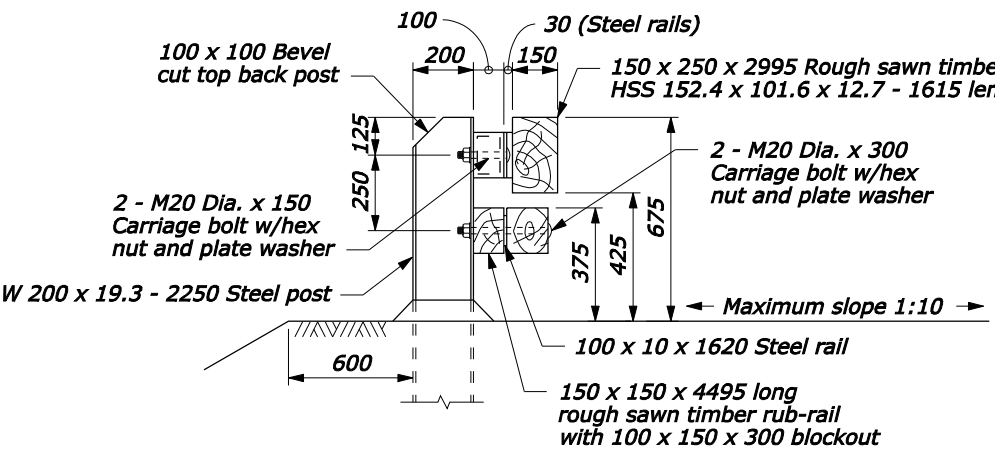
CONCRETE ANCHOR FOR GUARDRAIL POST



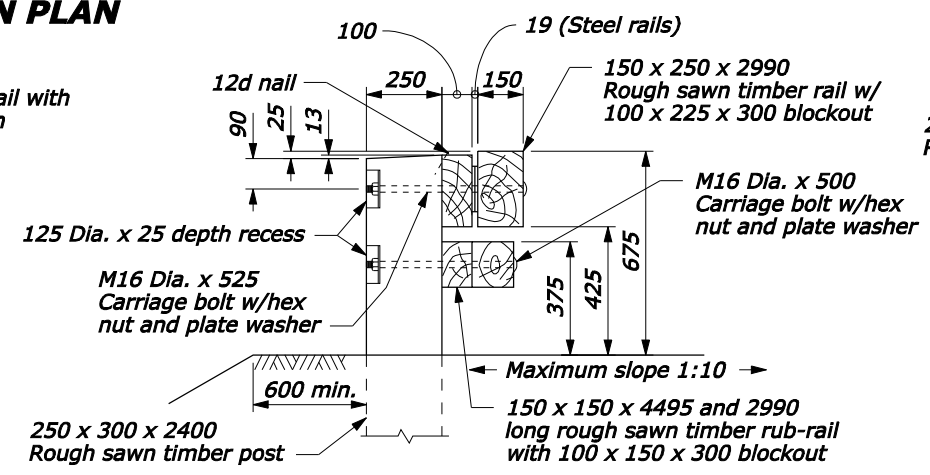
STEEL POST



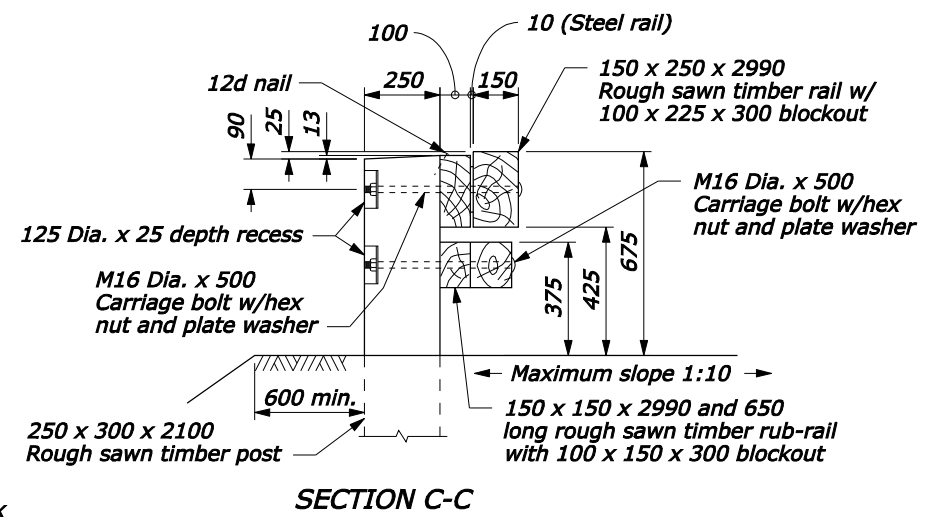
DETAIL A
POST CONNECTION PLAN



SECTION A-A



SECTION B-B



SECTION C-C

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

METRIC STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 TRANSITION TO STRAIGHT
OR CURVED-END STRUCTURE**
Sheet 2 of 3

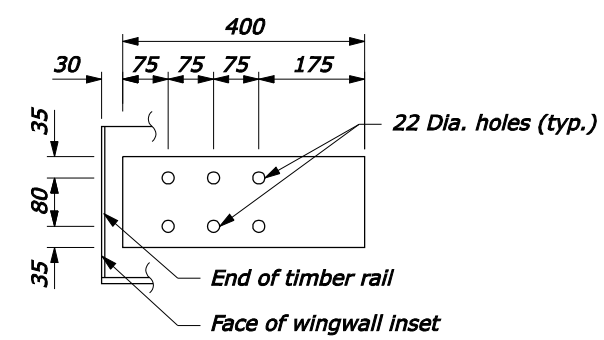
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REVISID:
DRAFT: 3/2008

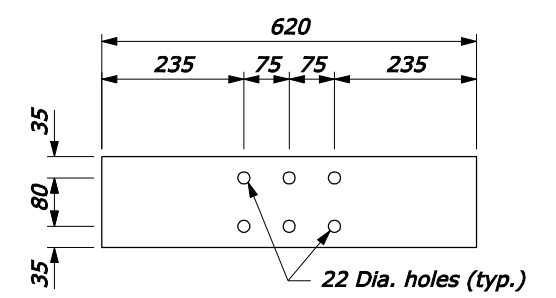
STANDARD
M617-67

NO SCALE

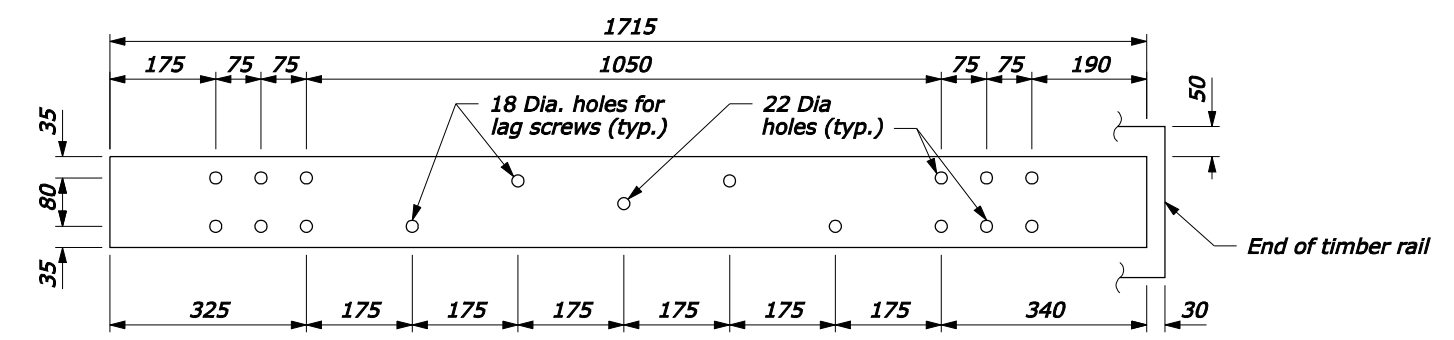
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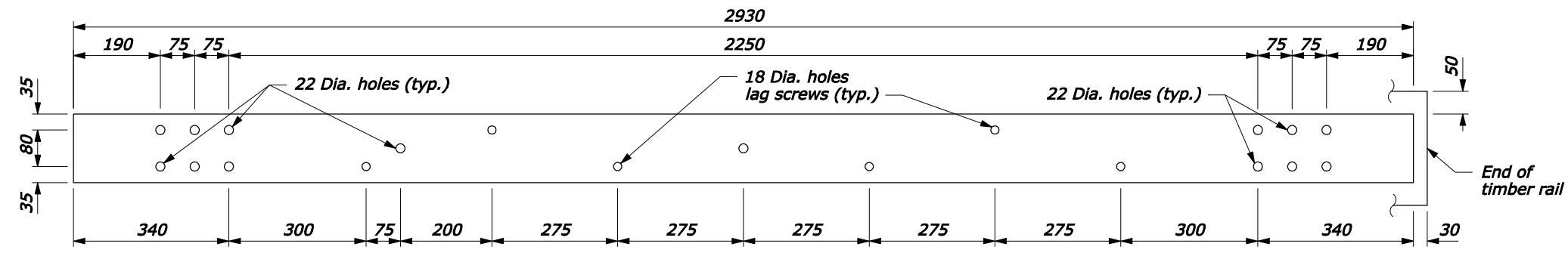
TERMINAL SECTION
150 x 10 x 400



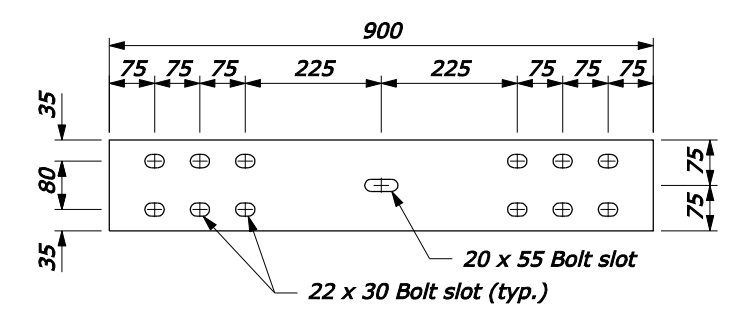
TERMINAL SECTION
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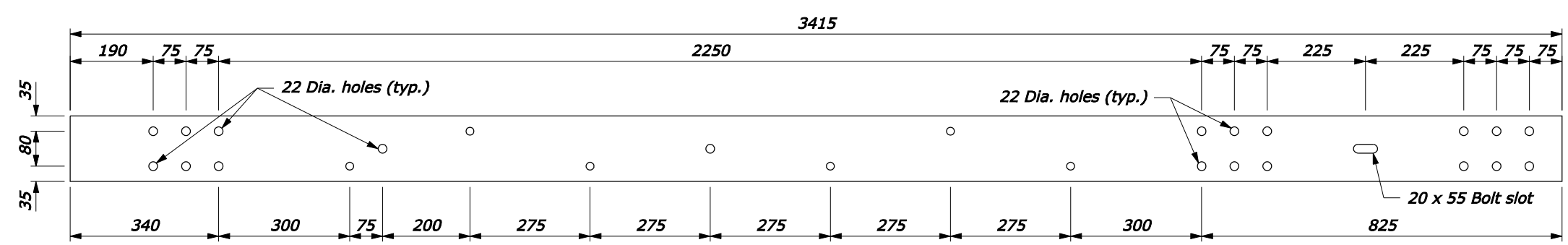
TERMINAL SECTION
150 x 10 x 1715



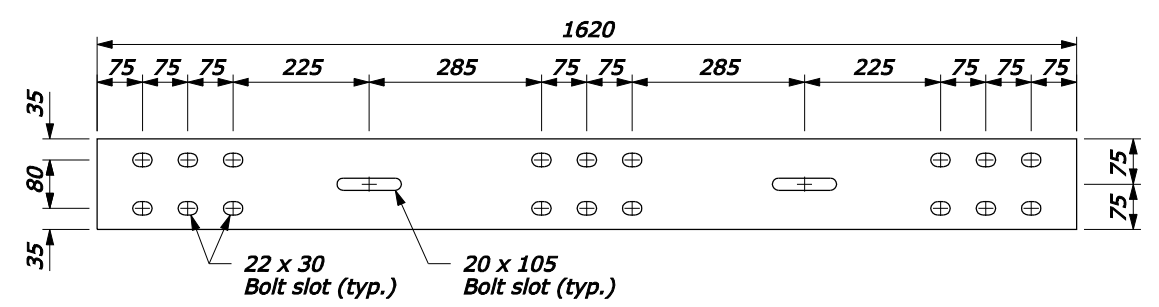
TRANSITION SECTION
150 x 10 x 2930



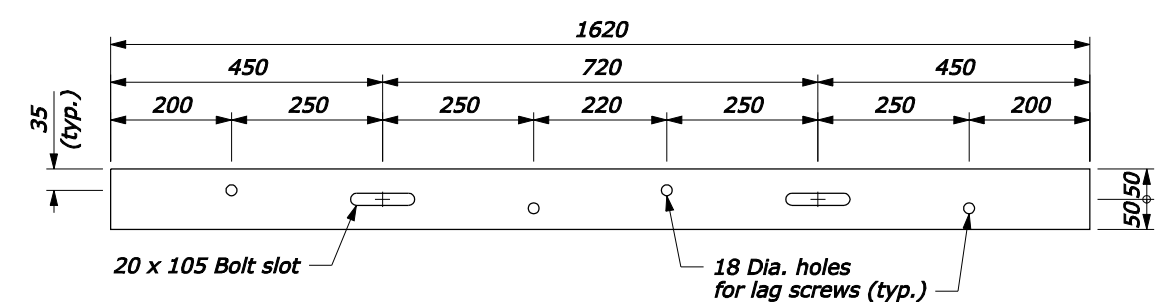
STEEL SPLICE PLATE
150 x 10 x 900



TRANSITION SECTION
150 x 10 x 3415



STEEL SPLICE PLATE
150 x 10 x 1620



RUB-RAIL TRANSITION SECTION
100 x 10 x 1620

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
FEDERAL LANDS HIGHWAY

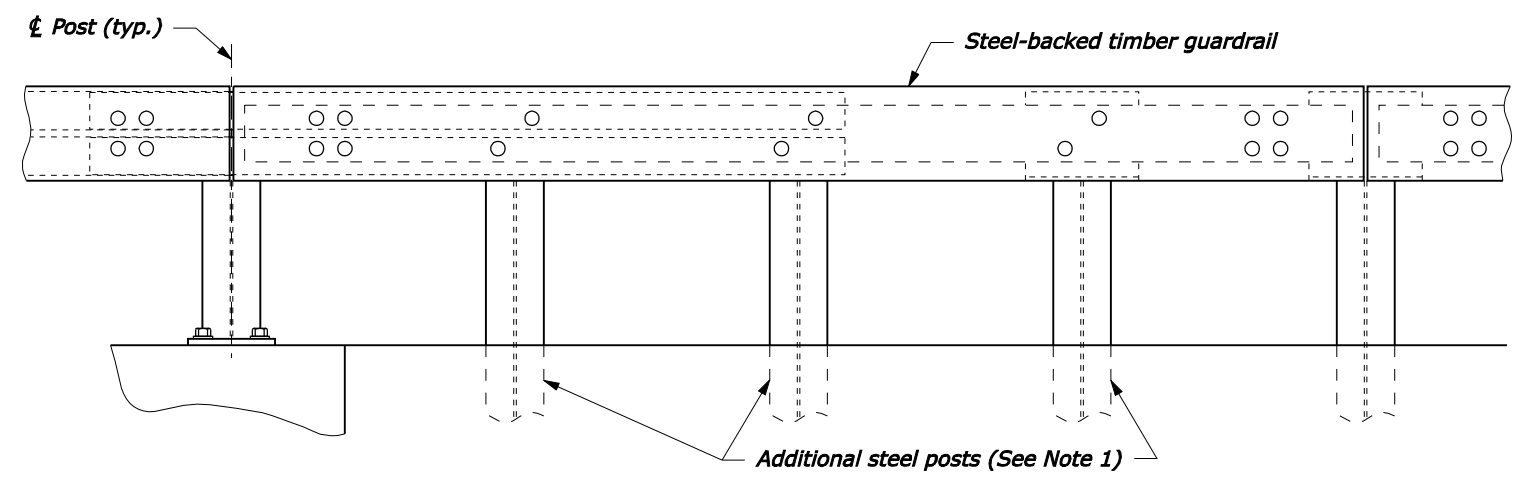
METRIC STANDARD
**STEEL-BACKED TIMBER GUARDRAIL
TL-2 TRANSITION TO STRAIGHT
OR CURVED-END STRUCTURE**
Sheet 3 of 3

STANDARD APPROVED FOR USE --/----

REVISI
DRAFT: 3/2008

STANDARD
M617-67

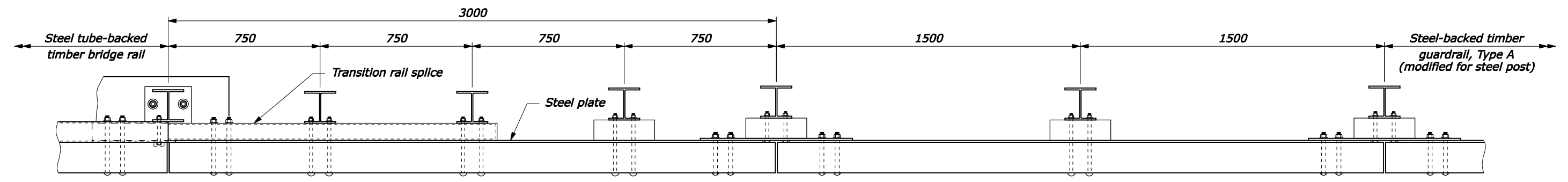
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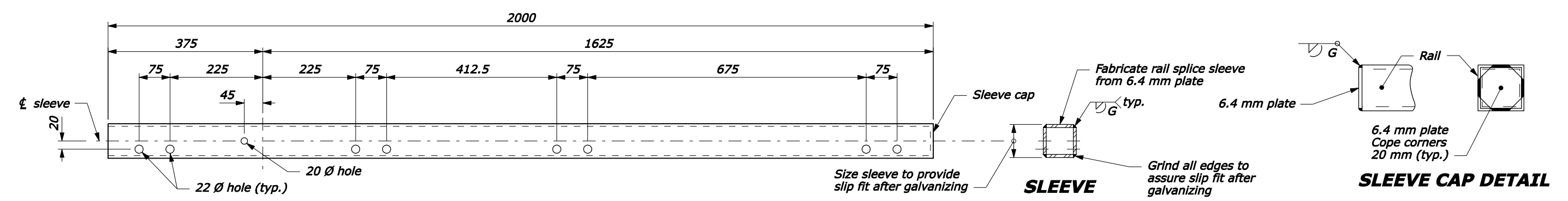
RAIL TRANSITION ELEVATION

NOTE:

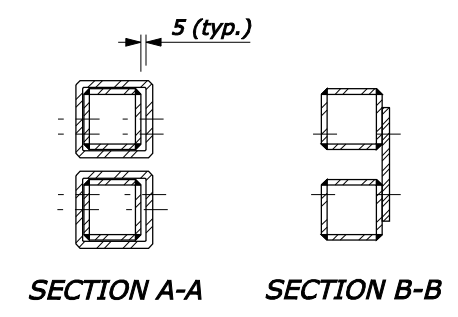
1. At each additional post provide 2-M16 round head square neck bolts with plate washer and hex nut, a 20 x 60 slot in steel plate, and 18 mm Ø holes in timber rail, steel post, and timber block. See Standard M617-60, Steel-backed timber guardrail, Type A (modified for steel post).
2. Dimensions without units are millimeters.



RAIL TRANSITION PLAN



TRANSITION RAIL SPLICE DETAIL



U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

METRIC STANDARD
**STEEL-BACKED TIMBER
 GUARDRAIL CONNECTION TO
 TUBULAR STEEL-BACKED
 TIMBER BRIDGE RAIL**

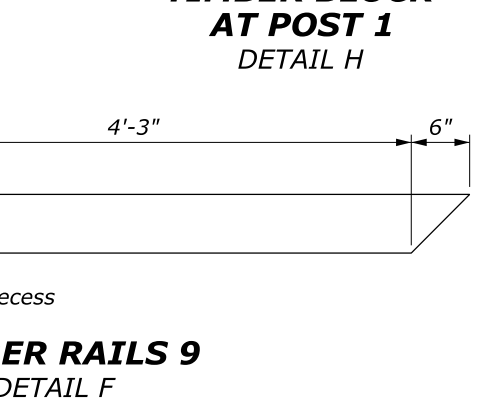
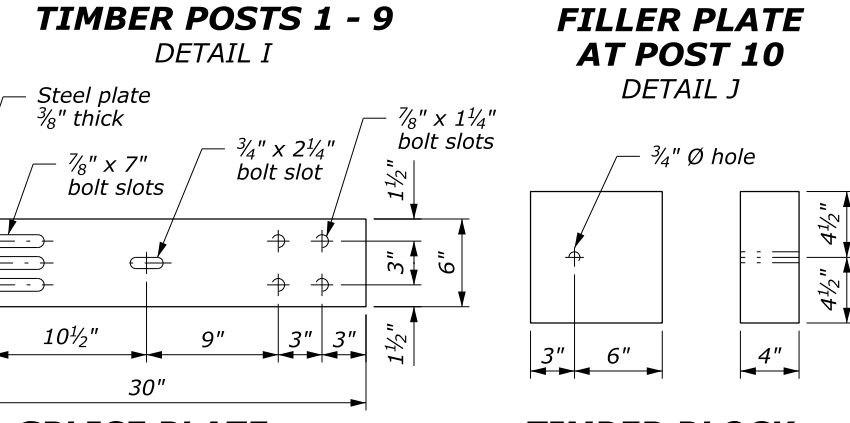
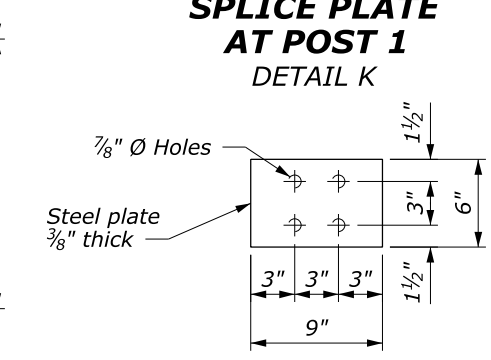
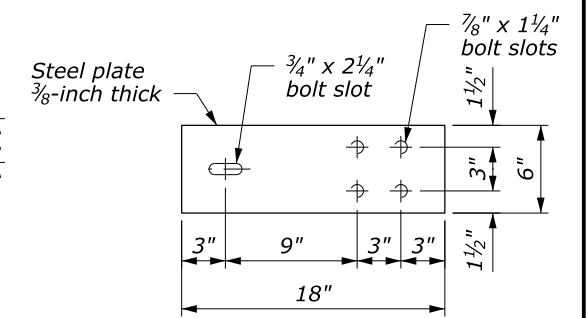
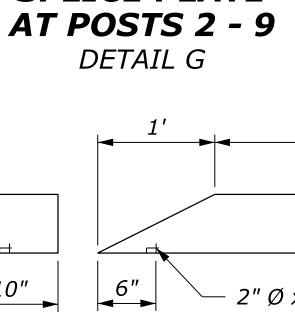
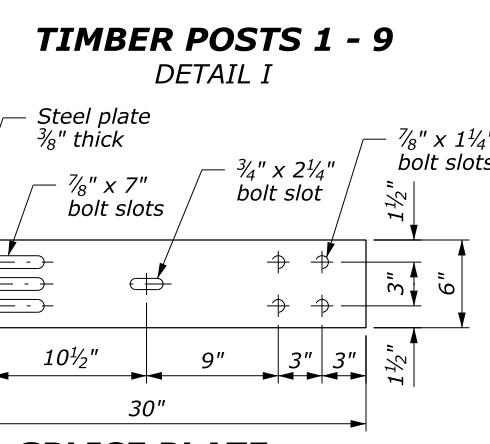
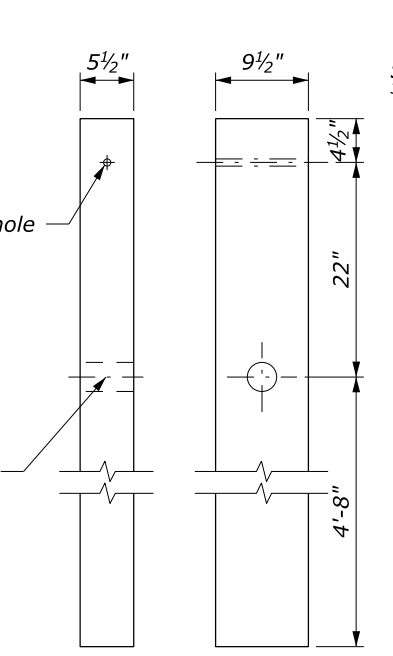
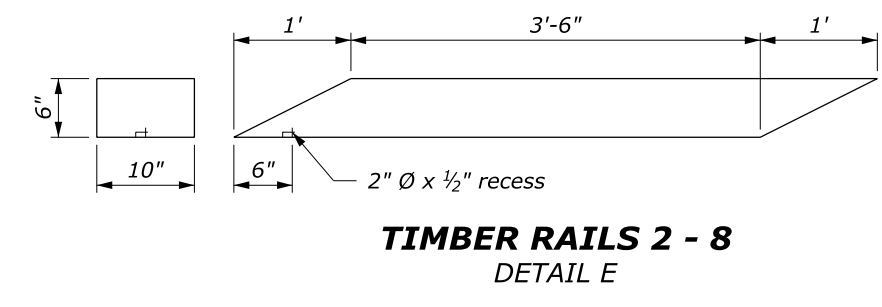
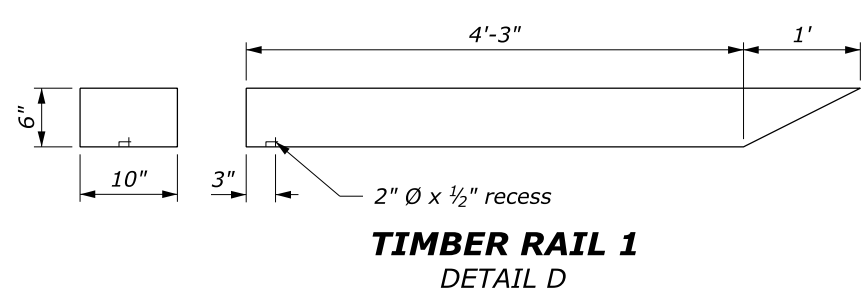
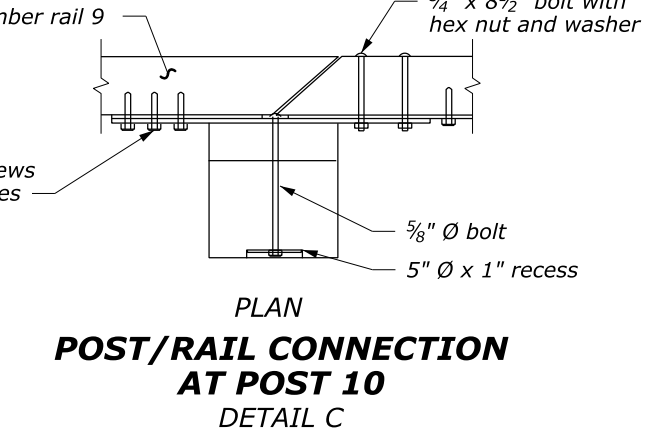
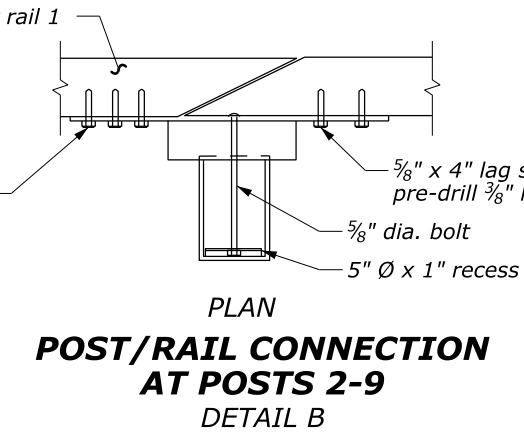
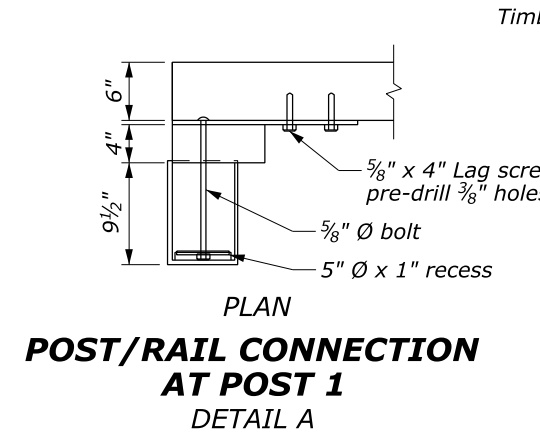
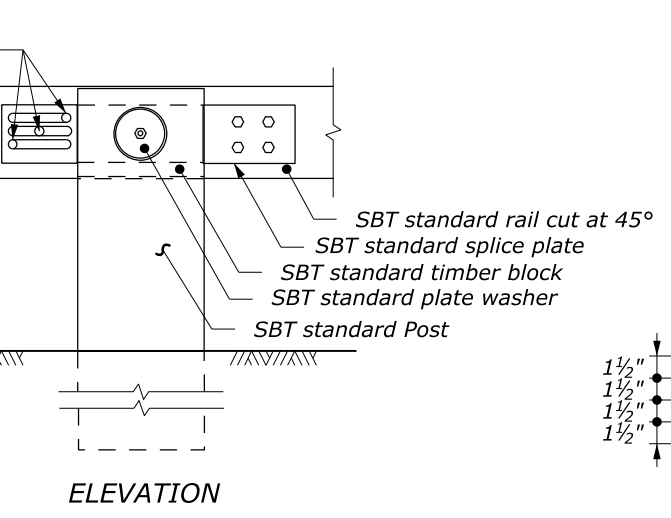
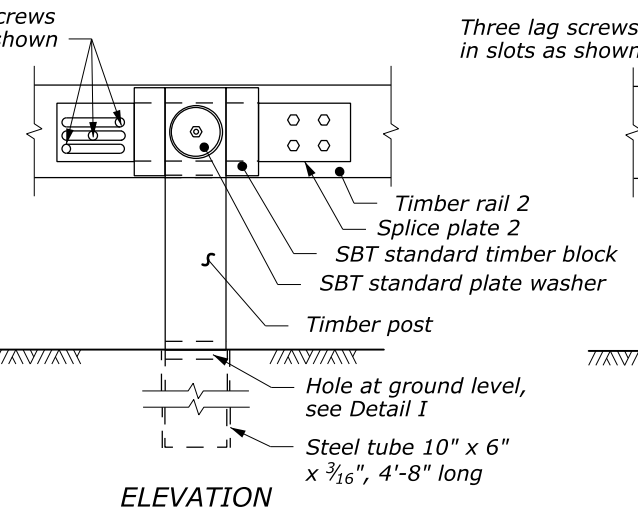
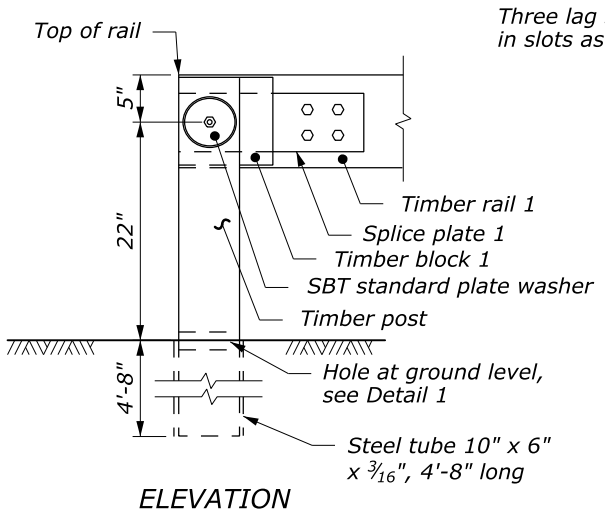
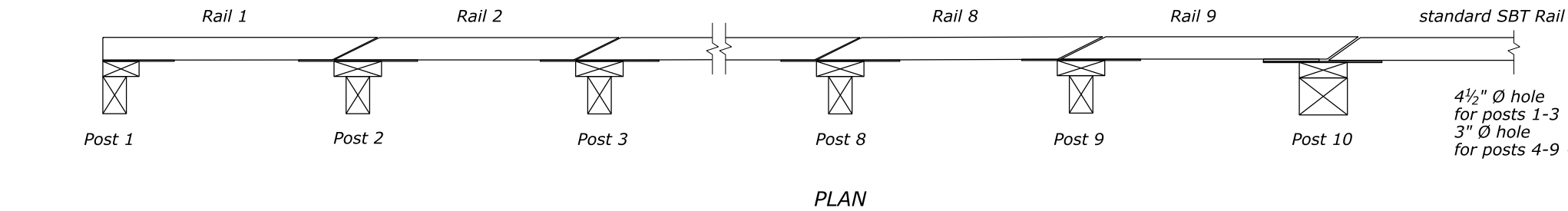
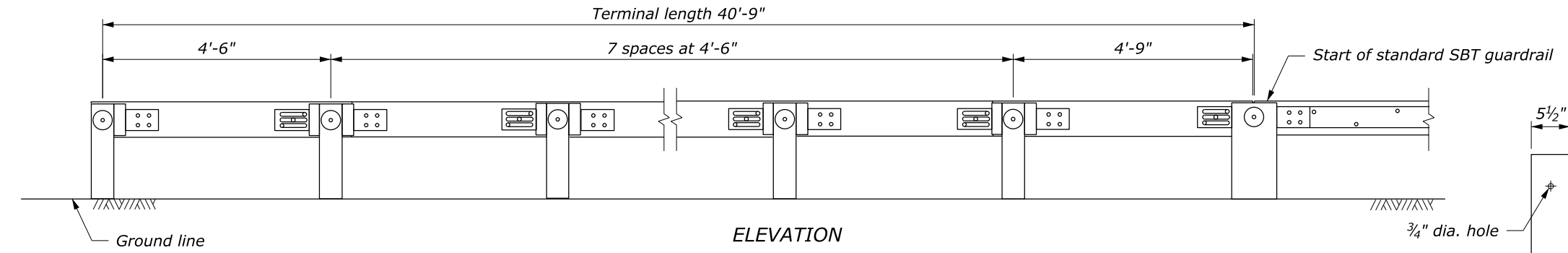
STANDARD APPROVED FOR USE --/----

REVISOR: 12/2007
 DRAFT: 12/2007

STANDARD
M617-68

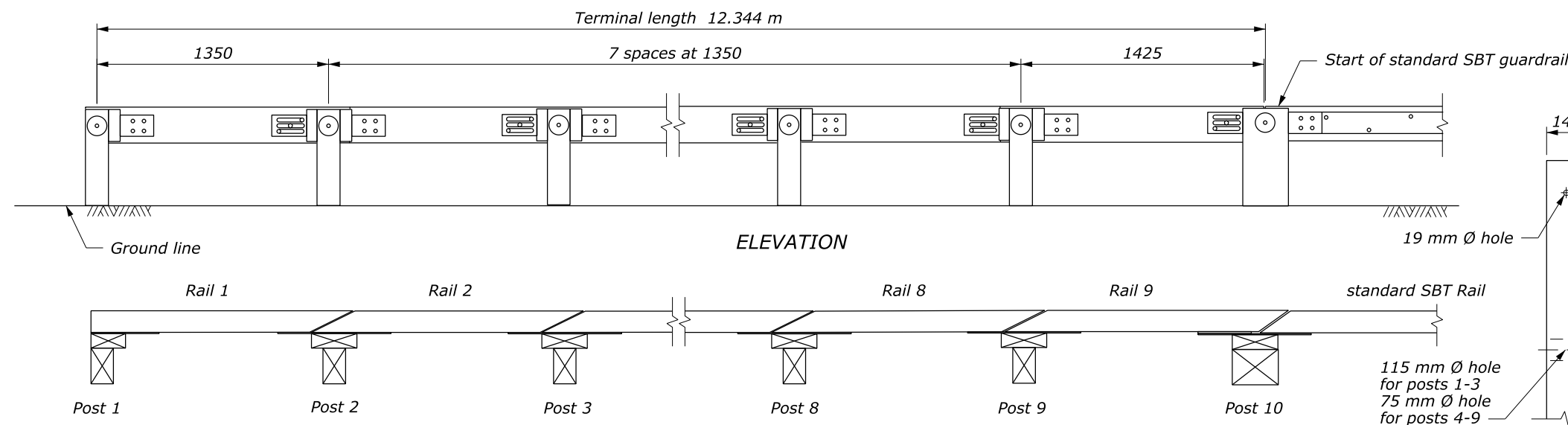
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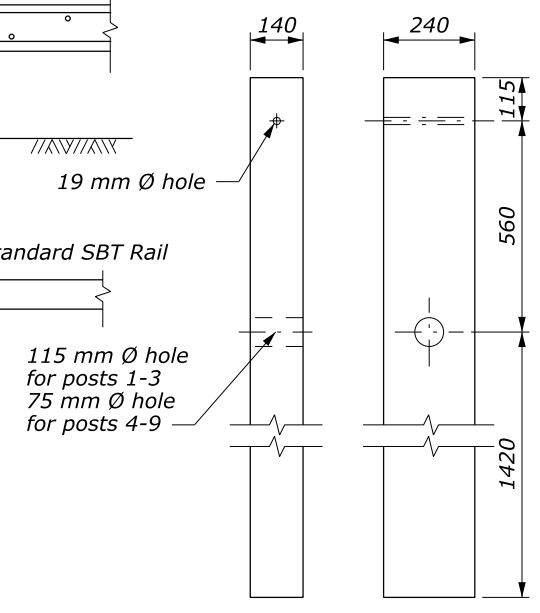


U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD TL-2 END TERMINAL FOR STEEL-BACKED TIMBER GUARDRAIL	
STANDARD APPROVED FOR USE --/--	STANDARD
REVISED: DRAFT: 9/2011	617-69

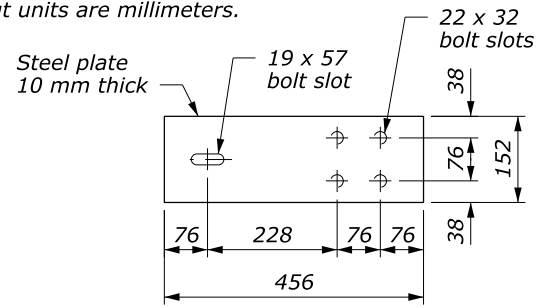
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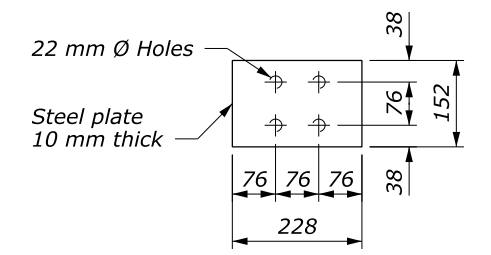
NOTE:
 1. Dimensions without units are millimeters.



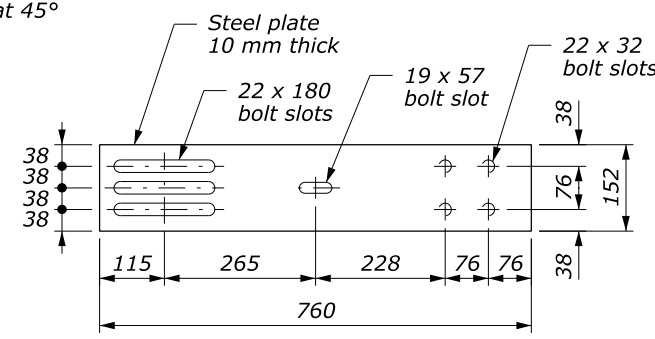
TIMBER POSTS 1 - 9
 DETAIL I



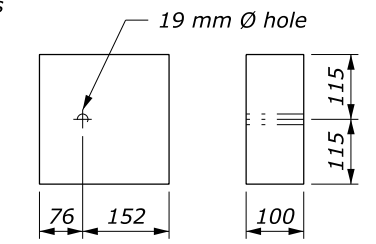
SPLICE PLATE AT POST 1
 DETAIL K



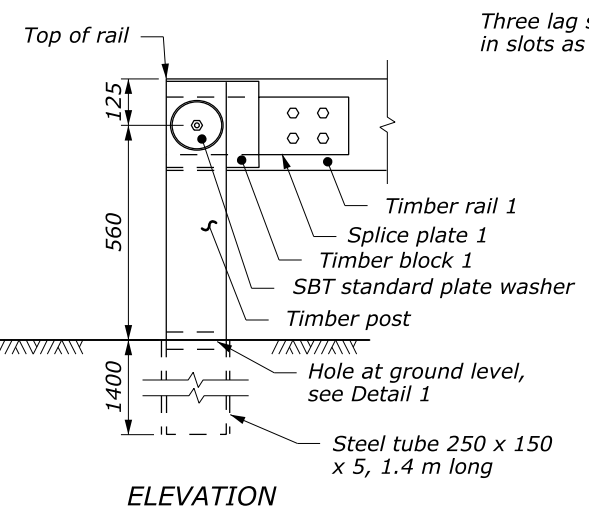
FILLER PLATE AT POST 10
 DETAIL J



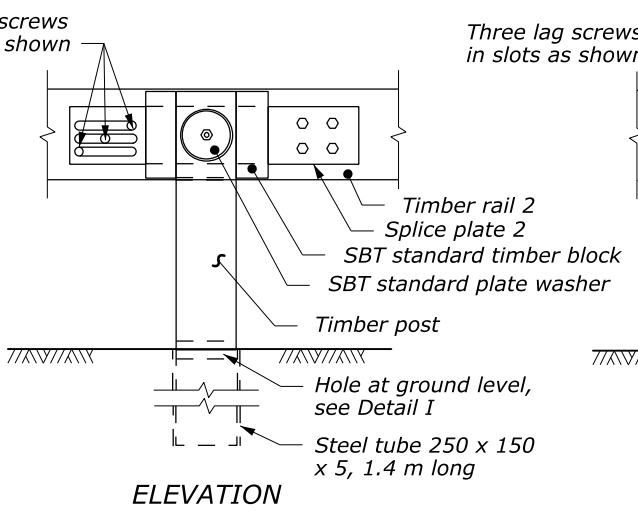
SPLICE PLATE AT POSTS 2 - 9
 DETAIL G



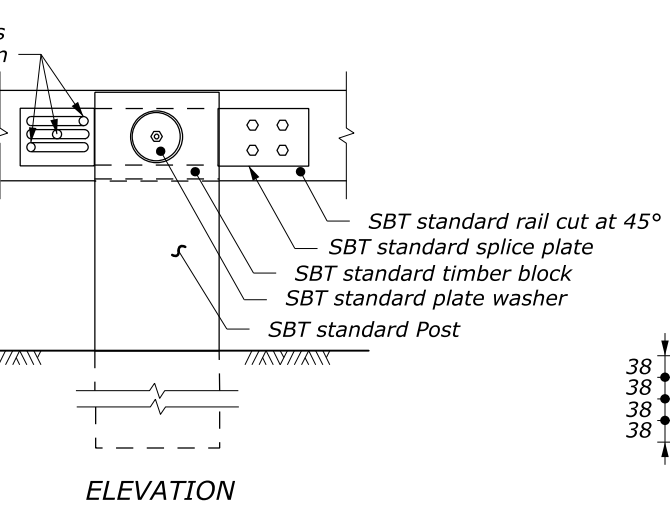
TIMBER BLOCK AT POST 1
 DETAIL H



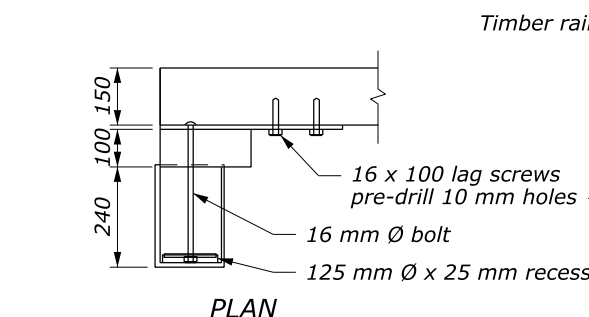
ELEVATION



ELEVATION

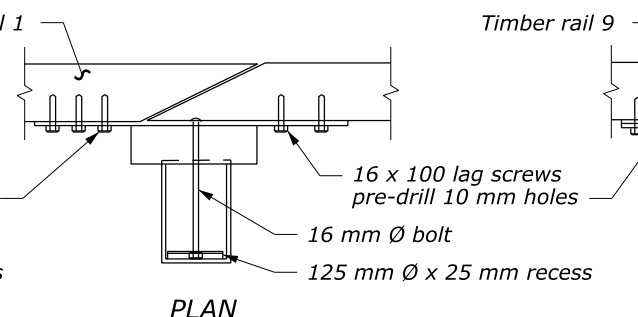


ELEVATION



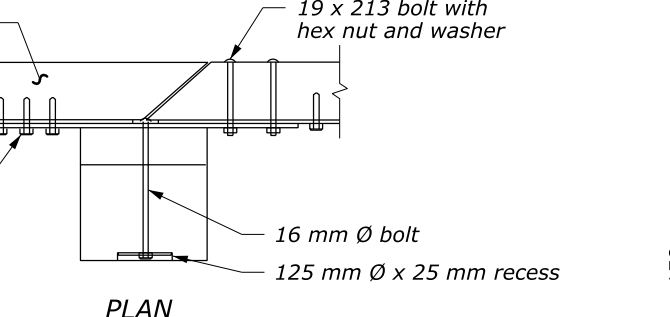
PLAN

POST/RAIL CONNECTION AT POST 1
 DETAIL A



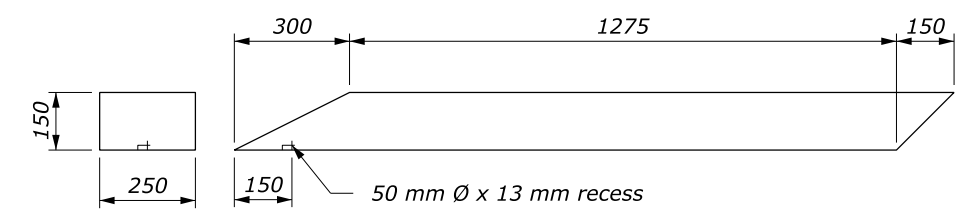
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POST/RAIL CONNECTION AT POSTS 2-9
 DETAIL B

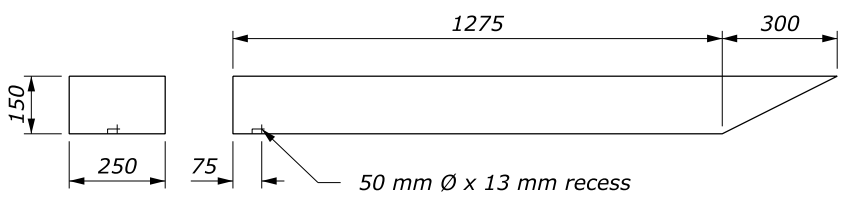


PLAN

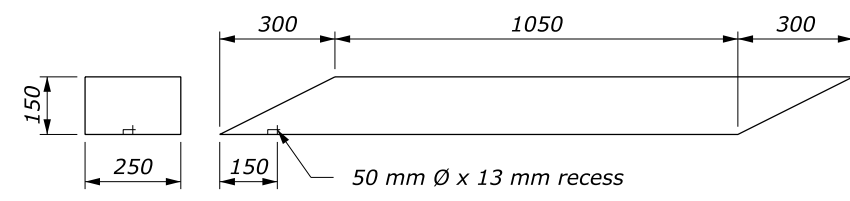
POST/RAIL CONNECTION AT POST 10
 DETAIL C



TIMBER RAILS 9
 DETAIL F



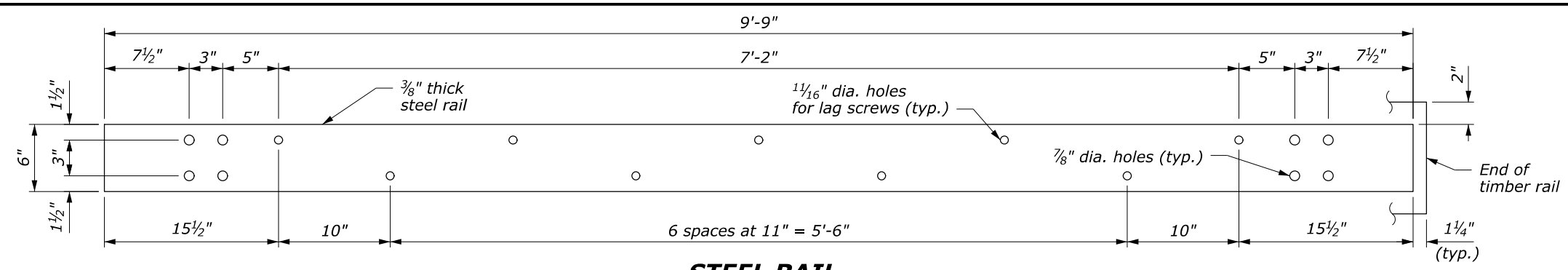
TIMBER RAIL 1
 DETAIL D



TIMBER RAILS 2 - 8
 DETAIL E

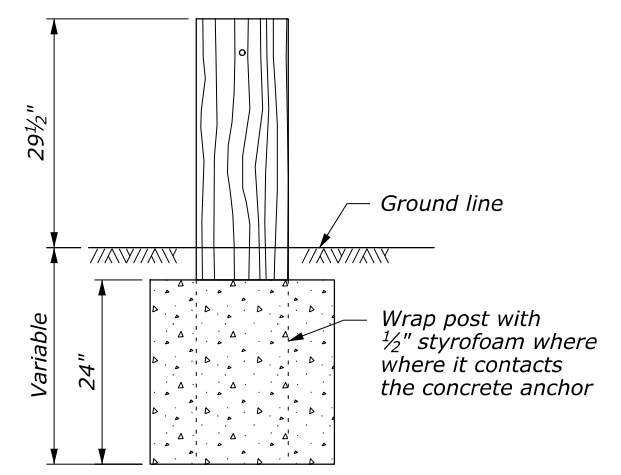
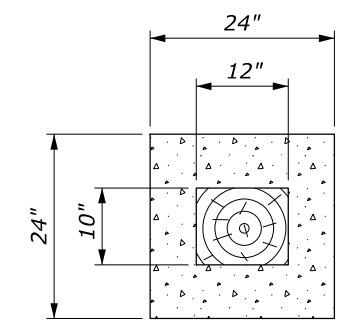
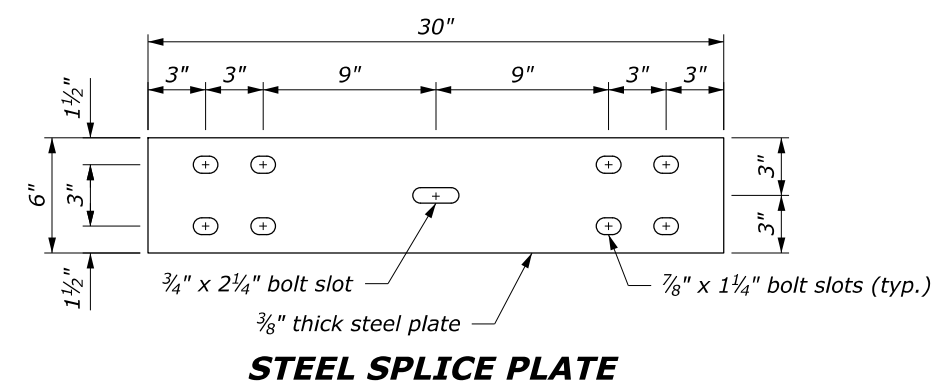
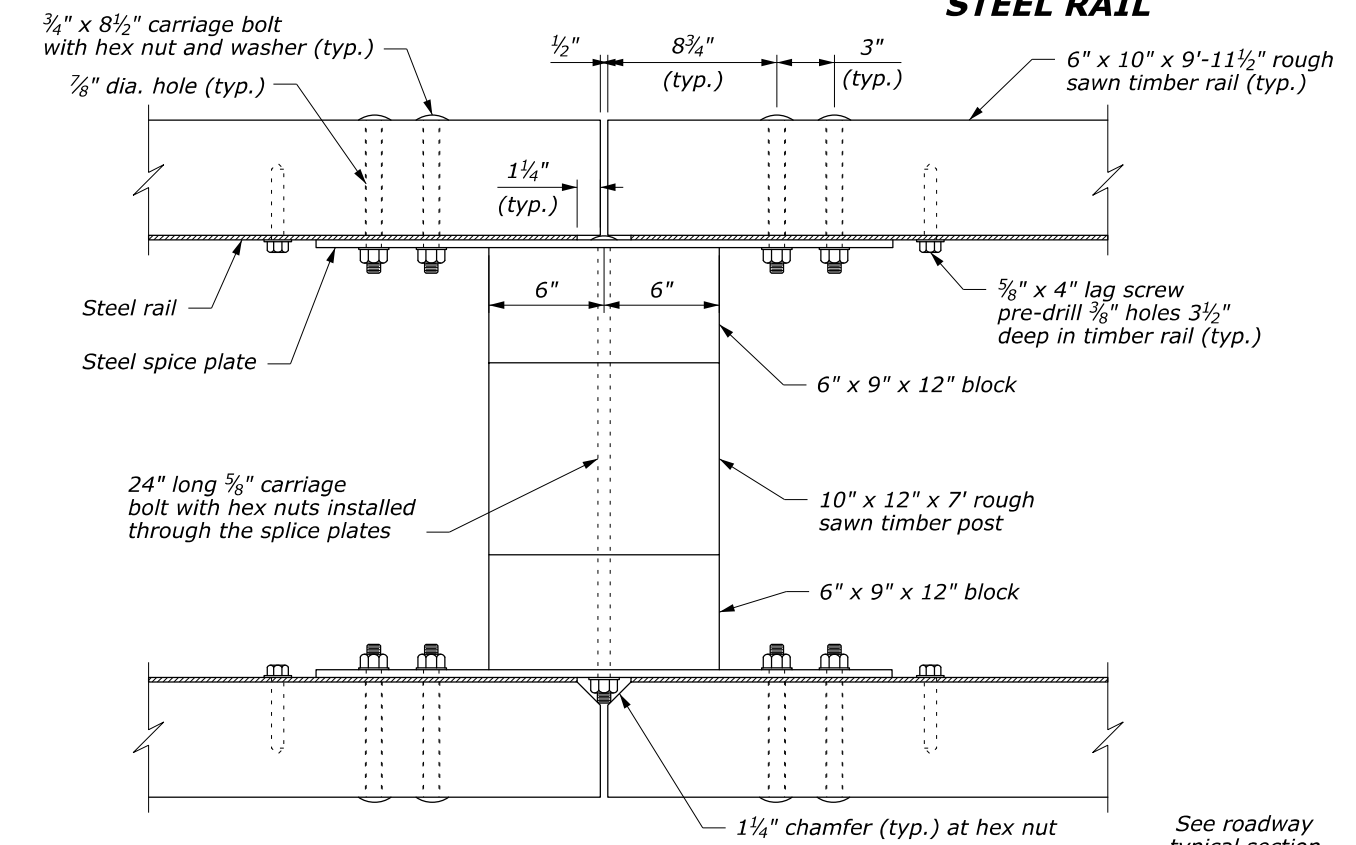
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U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
TL-2 END TERMINAL FOR STEEL-BACKED TIMBER GUARDRAIL	
STANDARD APPROVED FOR USE --/---	STANDARD M617-69
REVISED: 9/2011	DRAFT: 9/2011

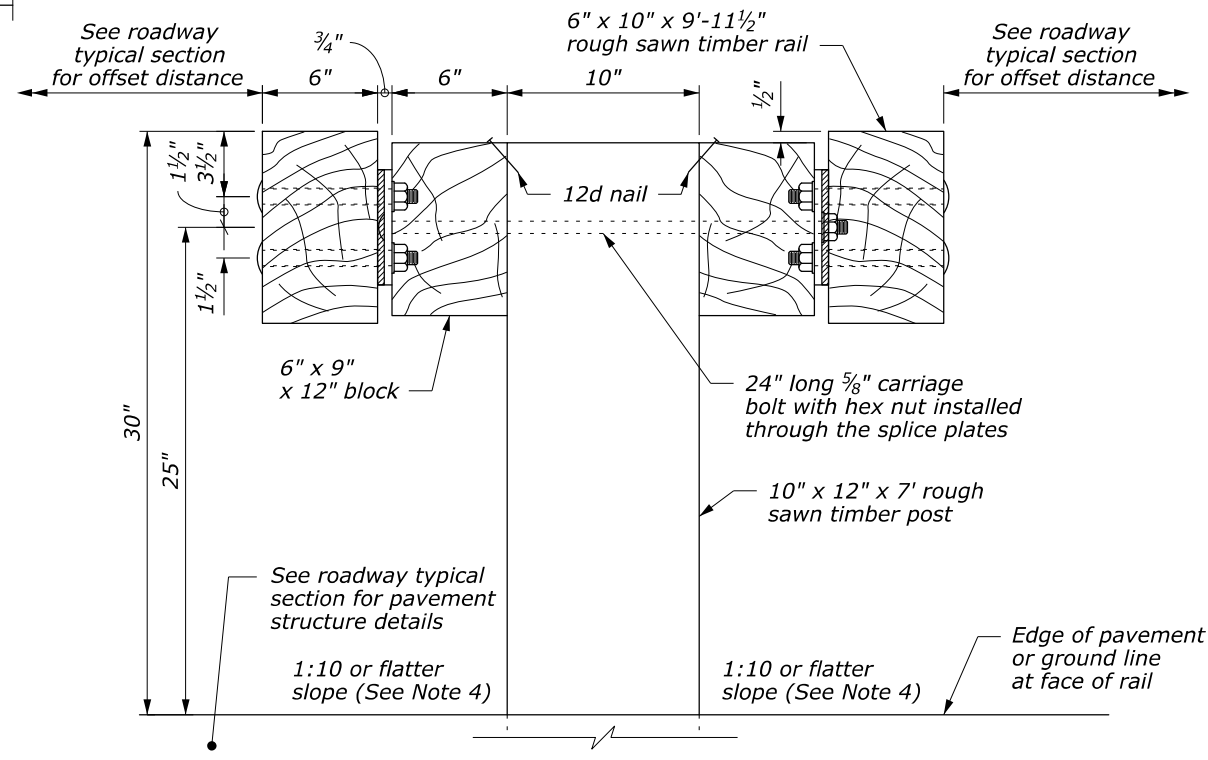
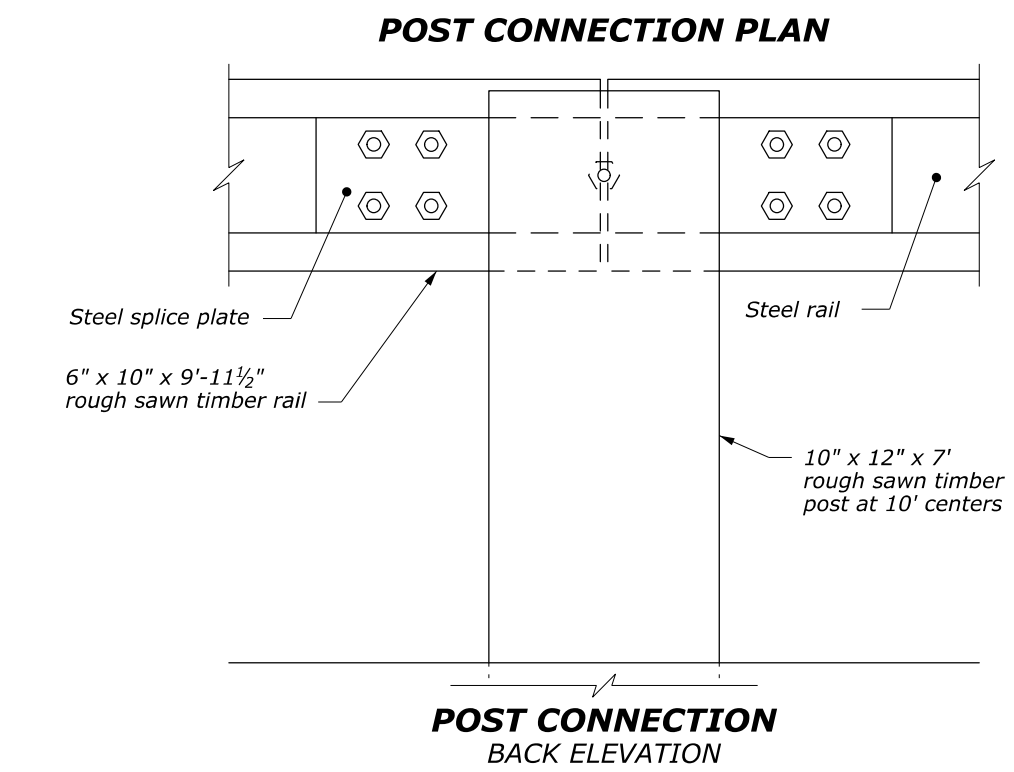


NOTE:

1. Use weathering steel for all structural steel and fastener hardware as specified.
2. Place terminal section on both approach and trailing ends of barrier installations. See Standards 617-61 and 617-62.
3. Use no more than 3 short guardrail posts in a row. A 25" diameter round anchor may be used instead of the square anchor shown. A reduced size is acceptable in solid rock.
4. In areas where the rail face is offset a minimum of 20 feet from the edge of travel lane, a maximum approach shoulder slope of 1V:6H may be used.



CONCRETE ANCHOR FOR SHORT GUARDRAIL POST
See Note 3

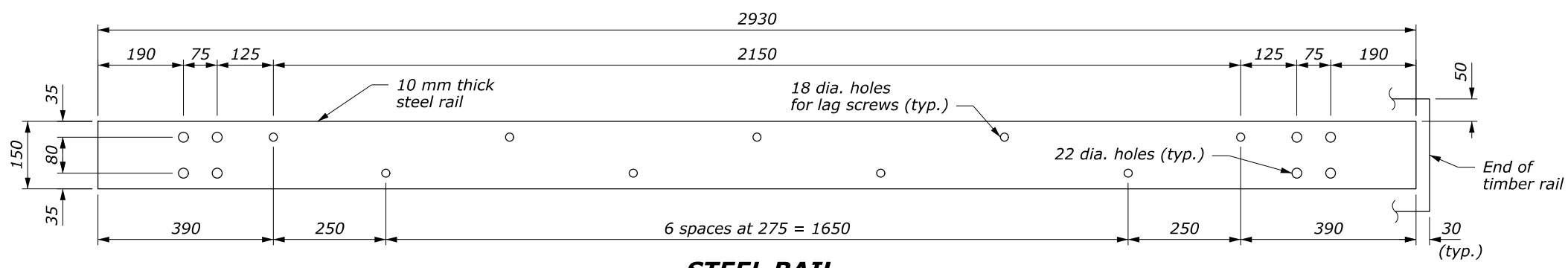


TYPICAL GUARDRAIL CROSS SECTION

NO SCALE

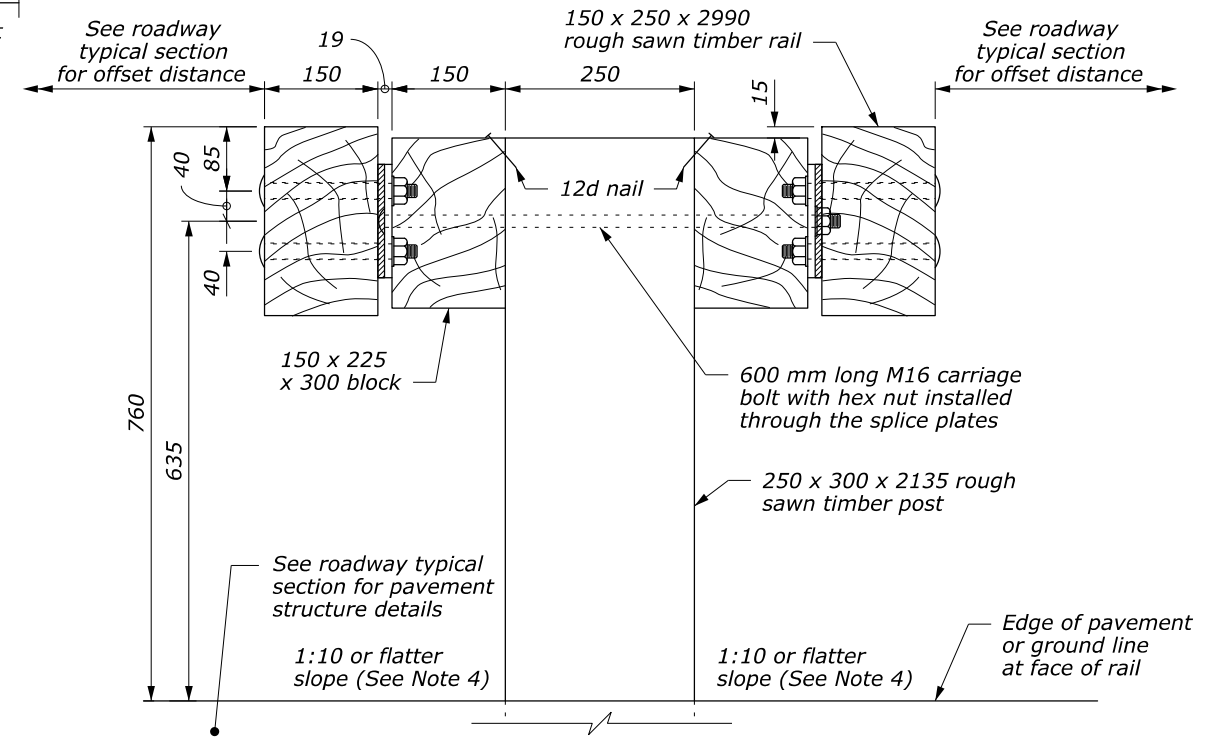
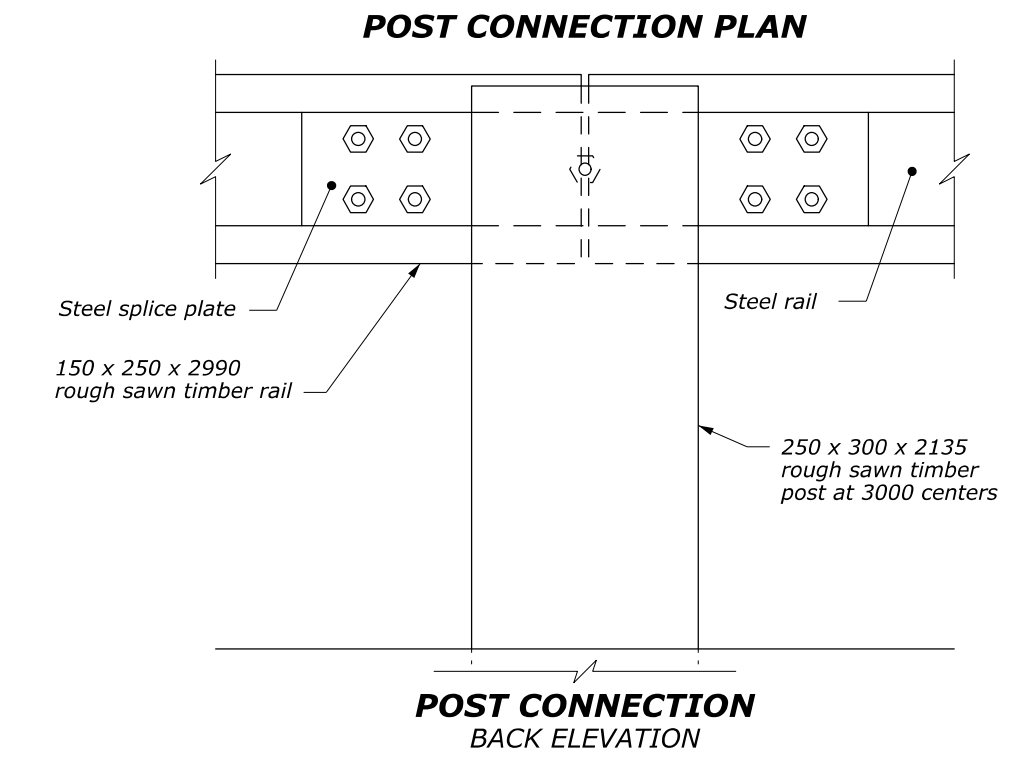
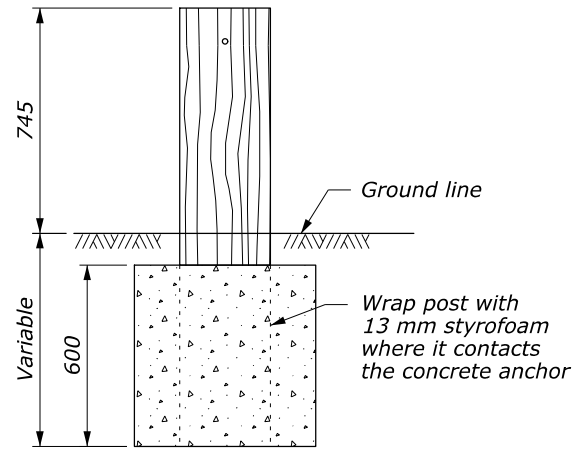
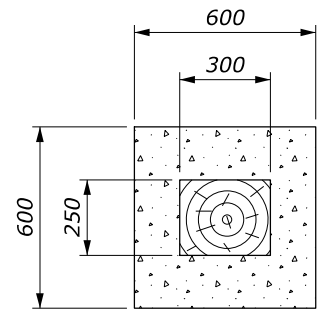
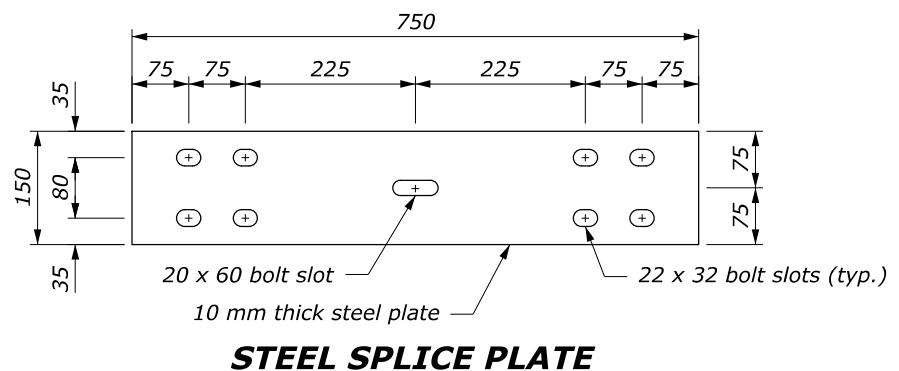
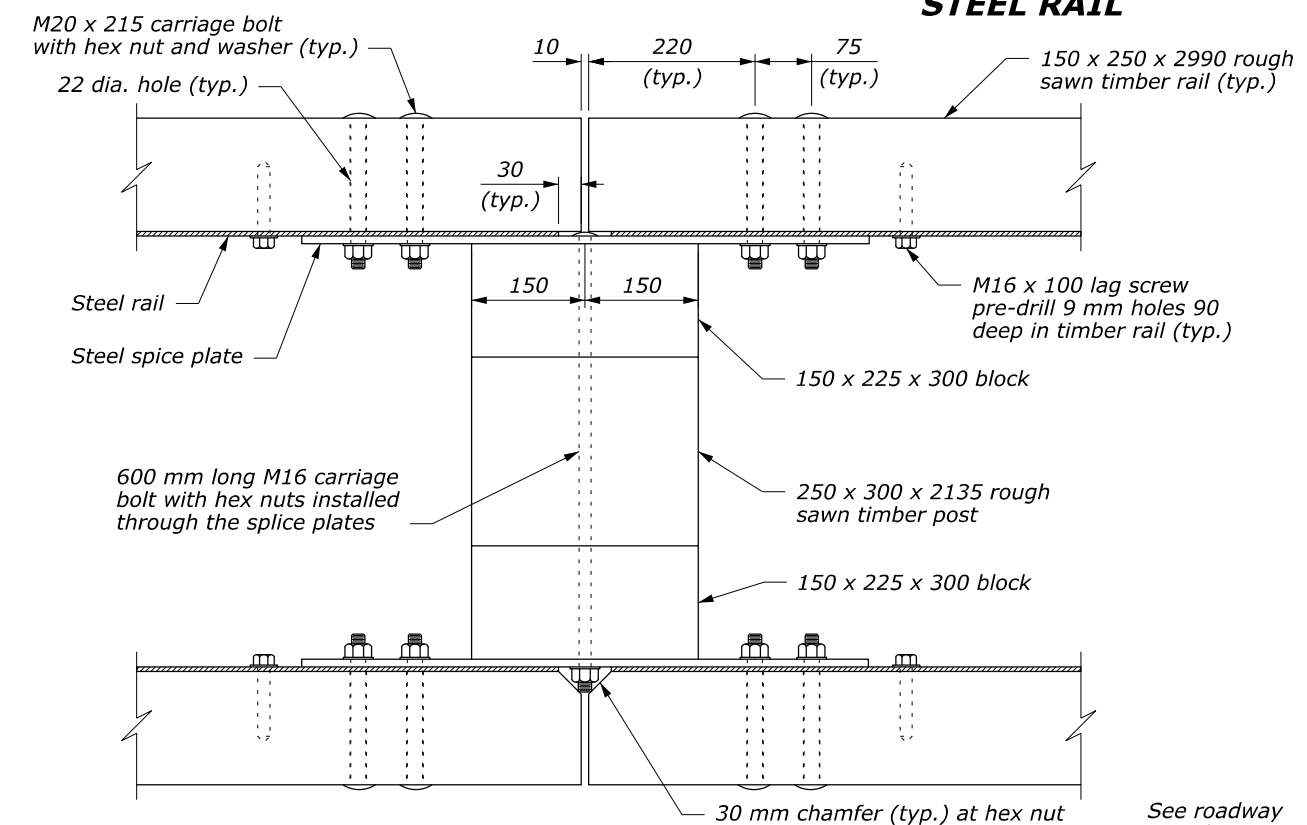
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U.S. CUSTOMARY STANDARD STEEL-BACKED TIMBER GUARDRAIL MEDIAN, TYPE A	
STANDARD APPROVED FOR USE --/----	STANDARD
REVISED: DRAFT: 3/2010	617-70

11 March 2010 11:17 AM
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NOTE:

1. Use weathering steel for all structural steel and fastener hardware as specified.
2. Place terminal section on both approach and trailing ends of barrier installations. See Standards M617-61 and M617-62.
3. Use no more than 3 short guardrail posts in a row. A 625 mm diameter round anchor may be used instead of the square anchor shown. A reduced size is acceptable in solid rock.
4. In areas where the rail face is offset a minimum of 6 m from the edge of travel lane, a maximum approach shoulder slope of 1V:6H may be used.
5. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are unavailable.
6. Dimensions without units are millimeters.

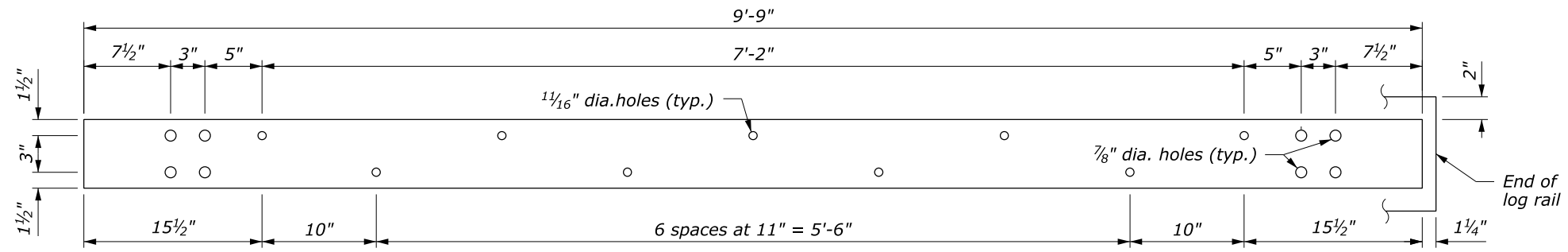


CONCRETE ANCHOR FOR SHORT GUARDRAIL POST
See Note 3

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
STEEL-BACKED TIMBER GUARDRAIL MEDIAN, TYPE A	
STANDARD APPROVED FOR USE --/----	STANDARD
REVISED: DRAFT: 3/2010	M617-70

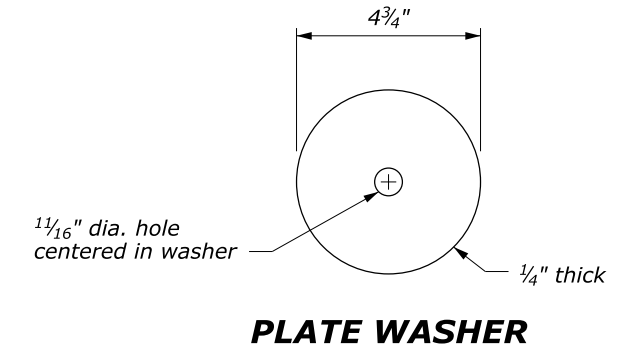
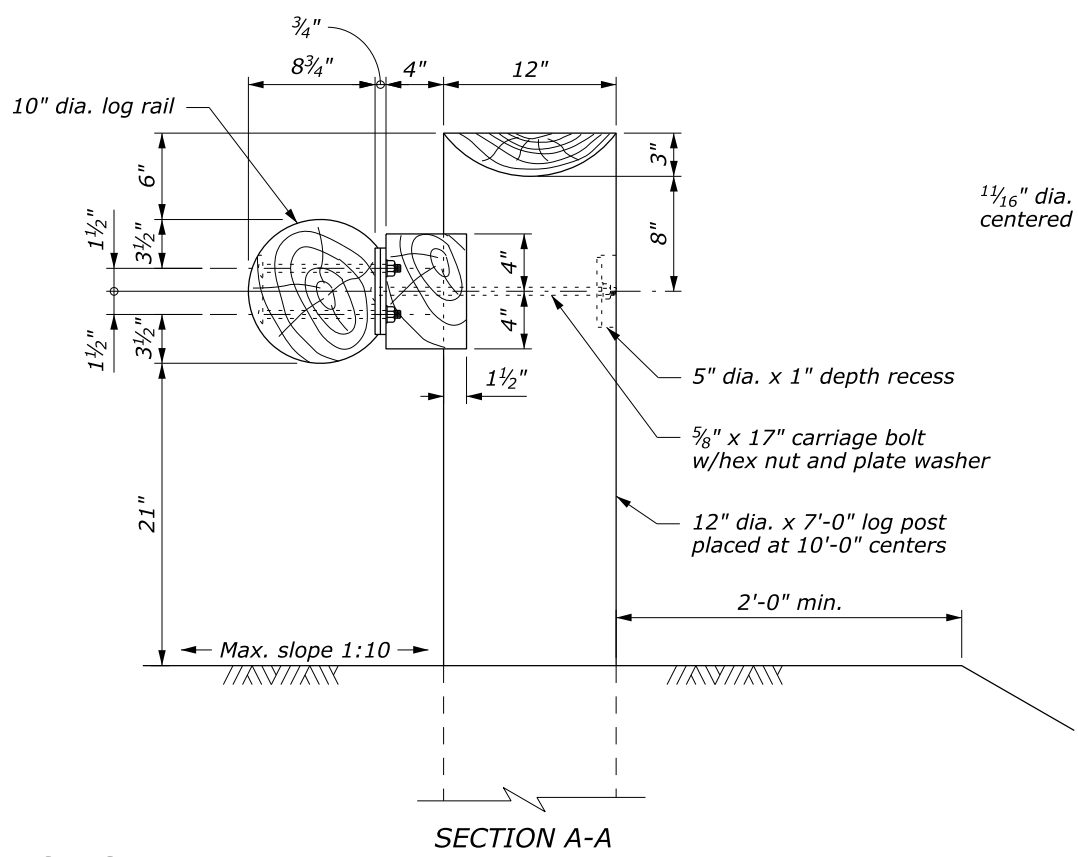
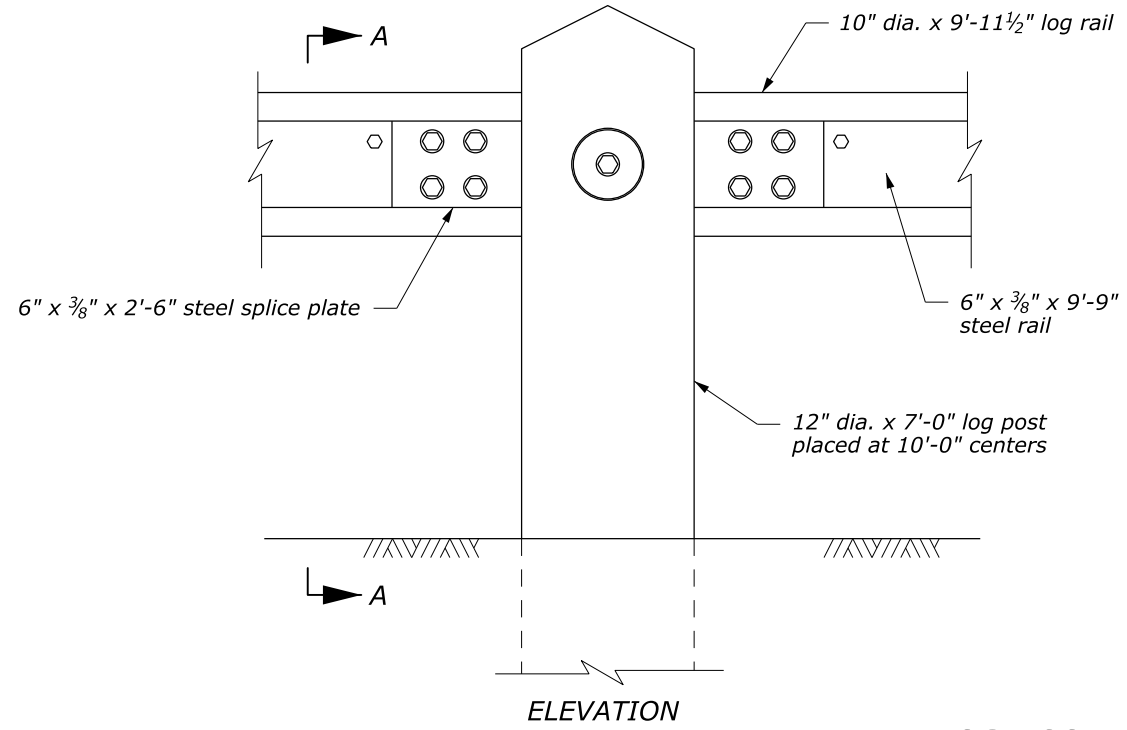
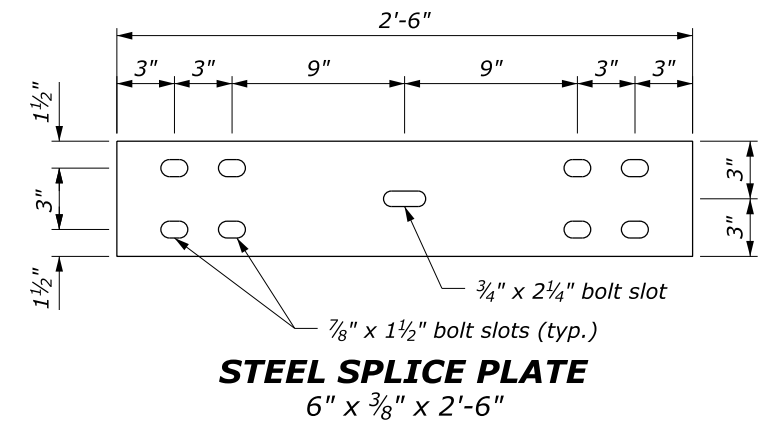
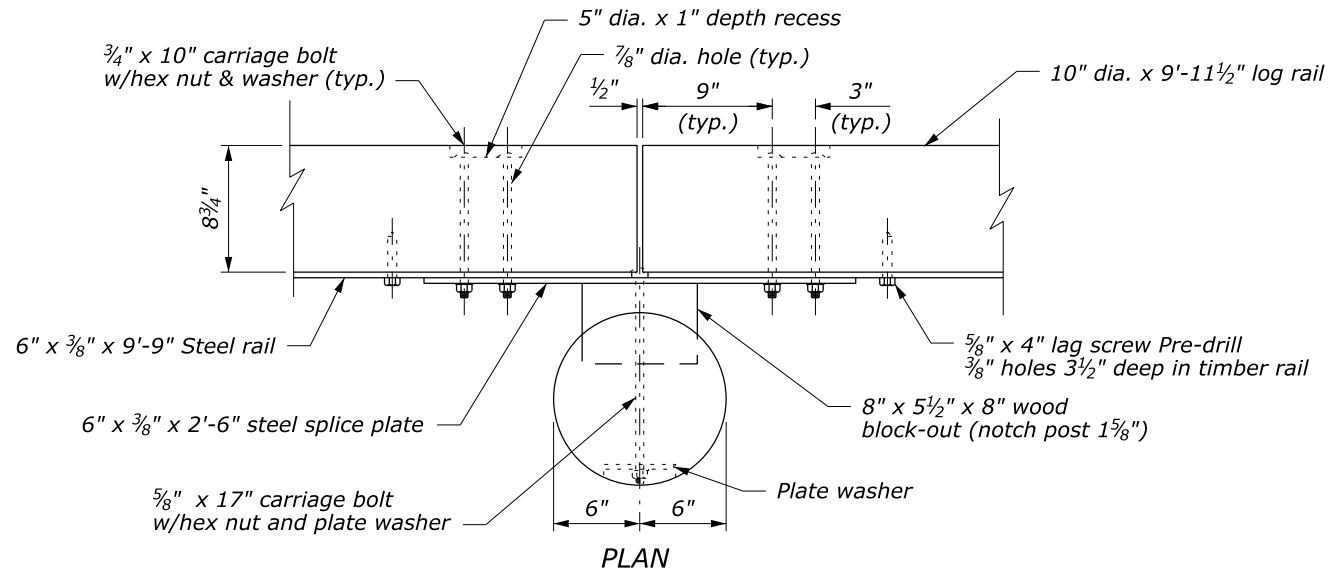
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STEEL RAIL
6" x 3/8" x 9'-9"

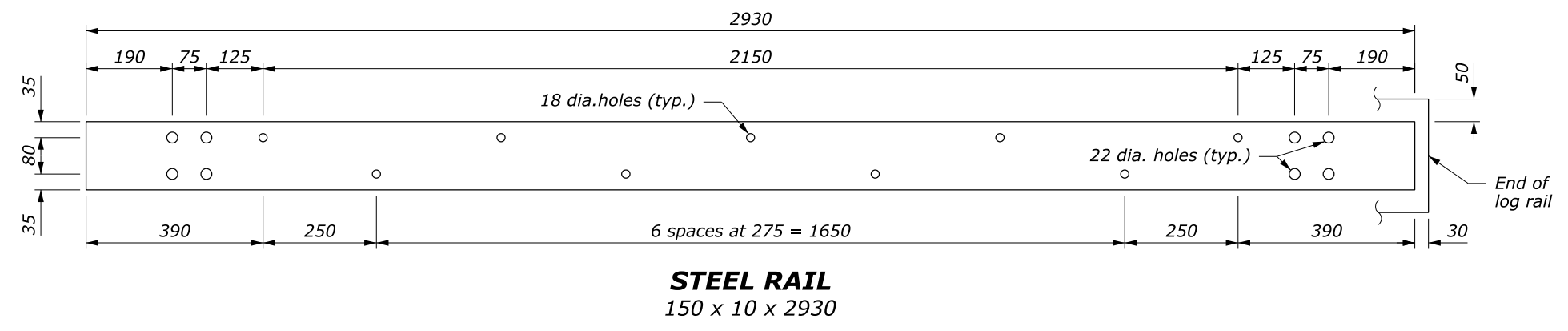
NOTE:
1. For details of the wood block-out, post notch, and general notes for Steel-Backed Log Guardrail. See Standard 617-81.



U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD	
STEEL-BACKED LOG RAIL	
STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED: DRAFT: 11/2013	617-80

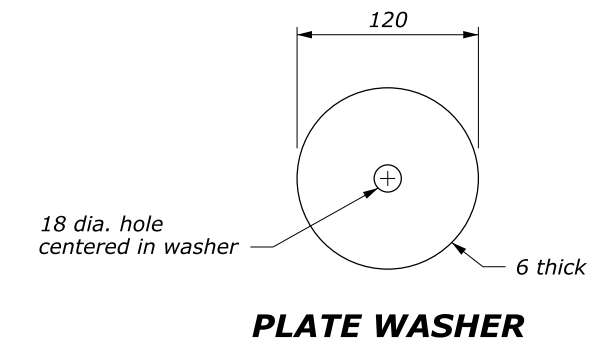
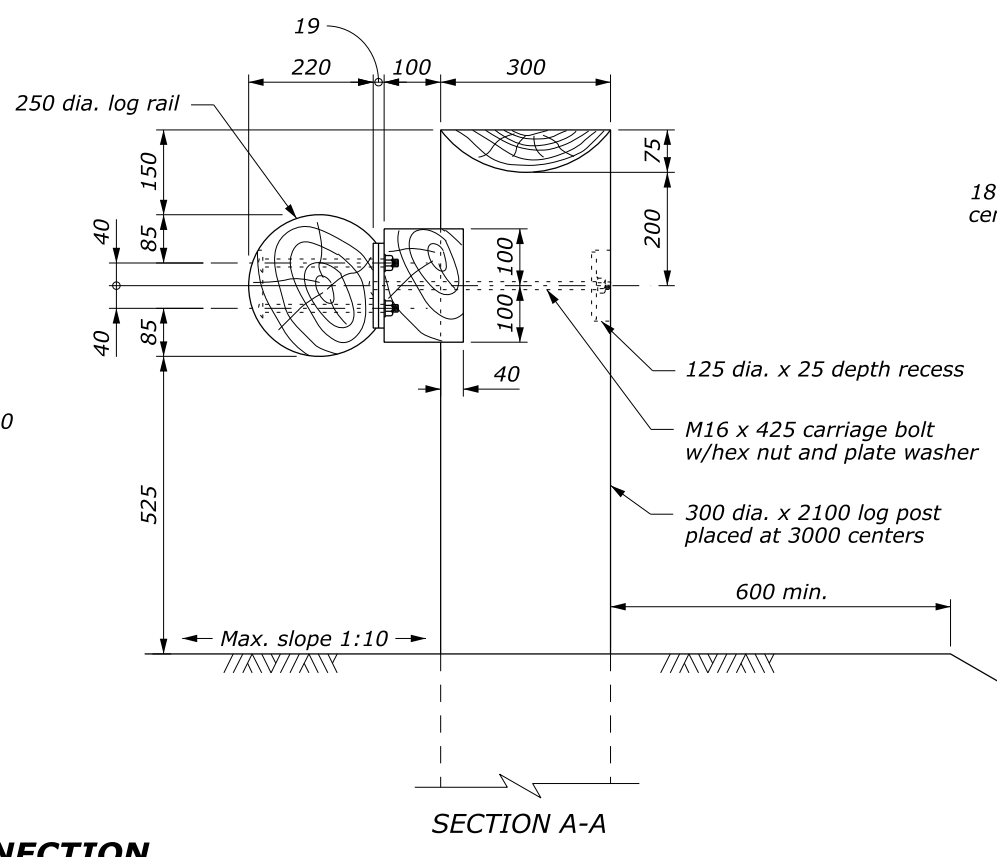
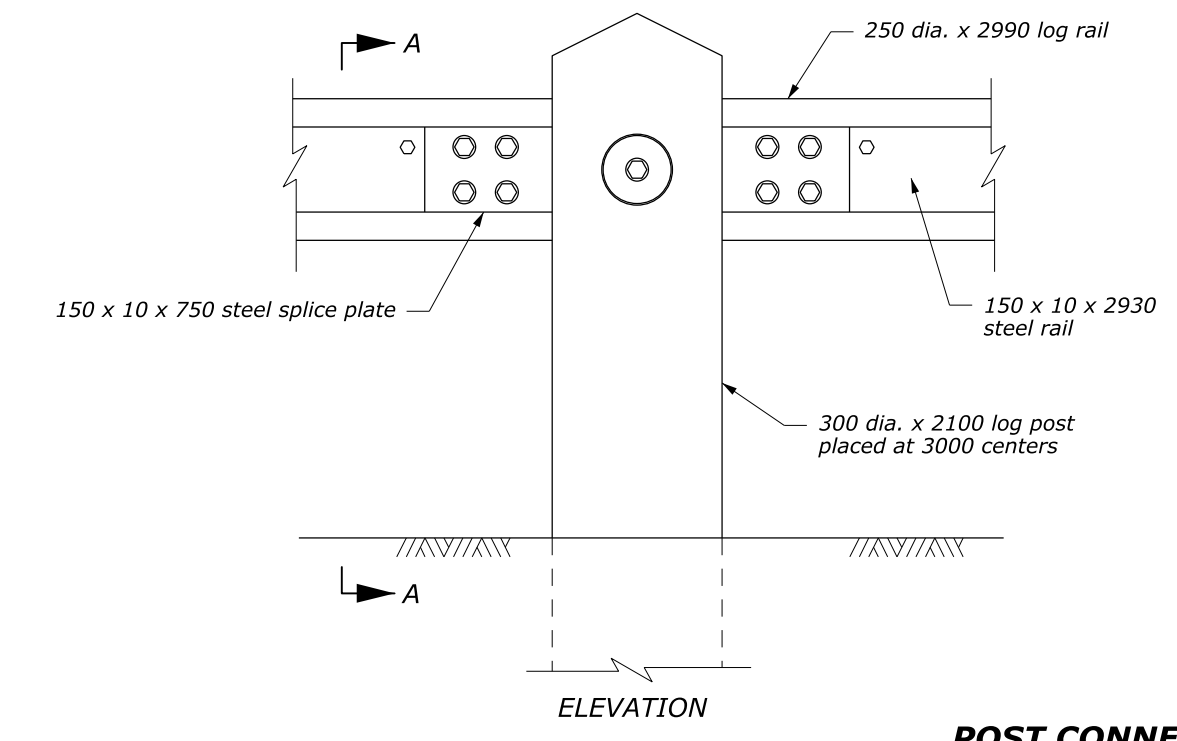
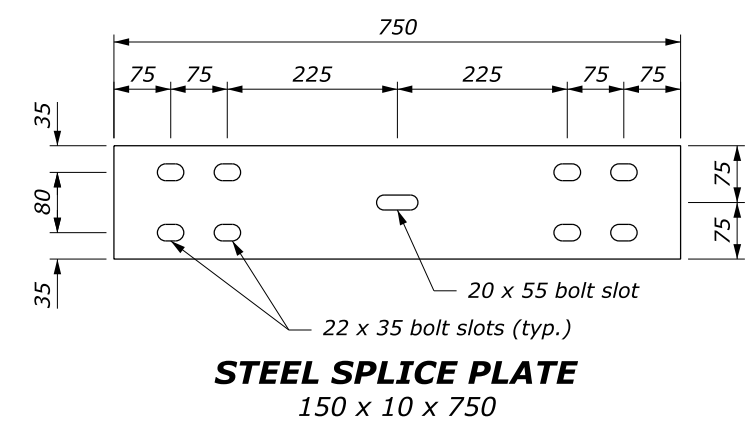
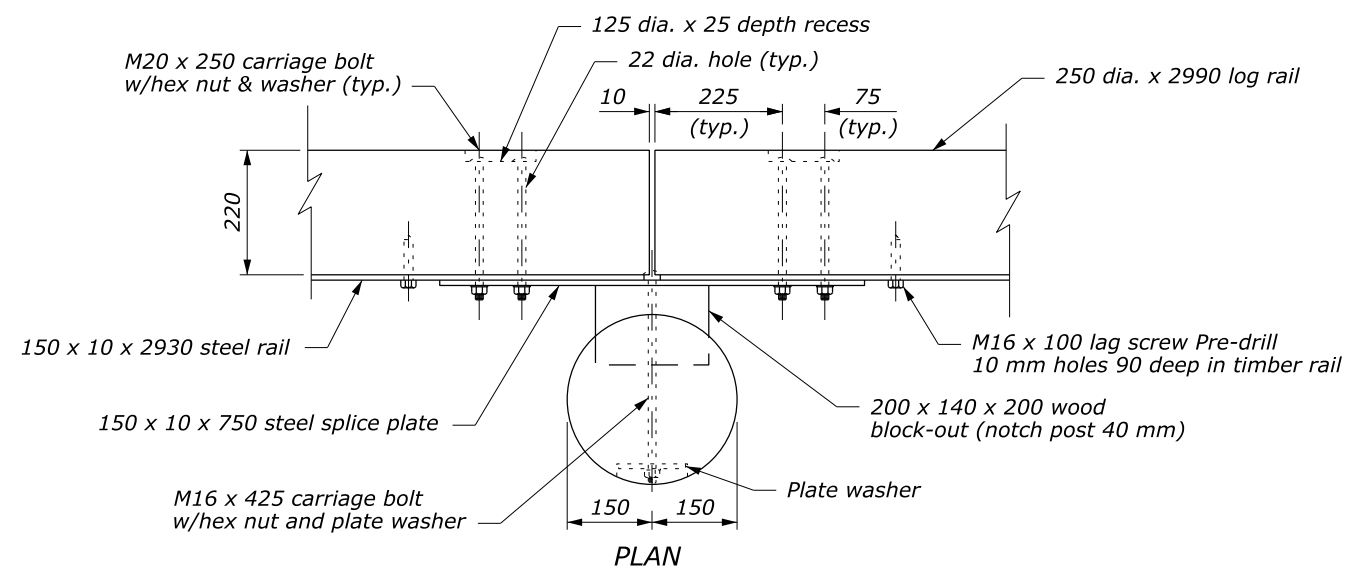
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NOTE:

1. For details of the wood block-out, post notch, and general notes for Steel-Backed Log Guardrail. See Standard M617-81.
2. Furnish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
3. Dimensions without units are millimeters.



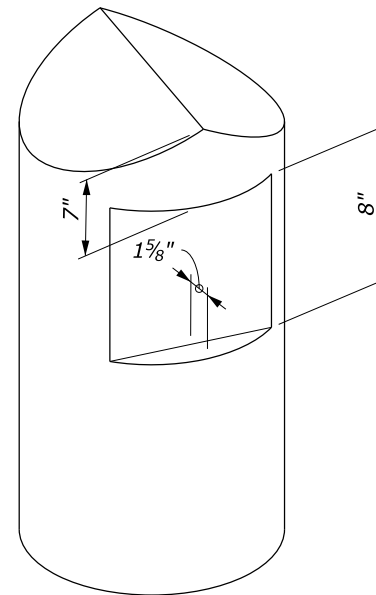
POST CONNECTION

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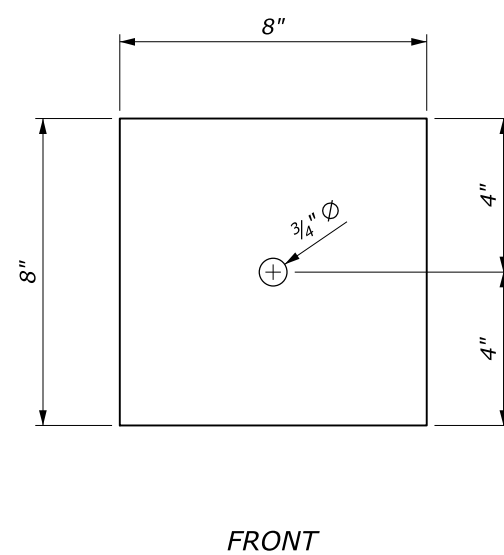
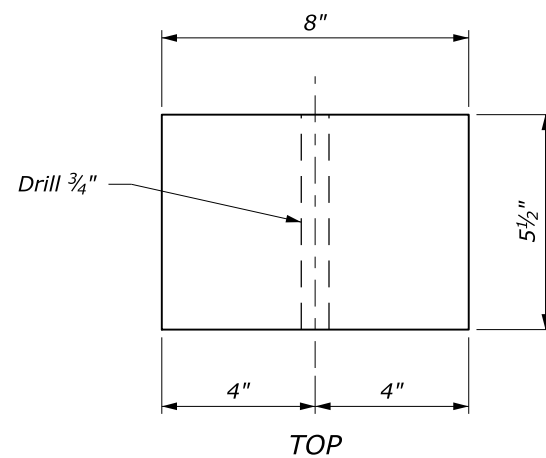
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
STEEL-BACKED LOG RAIL	
STANDARD APPROVED FOR USE 3/1996	STANDARD
REVISED: 6/2005 DRAFT: 11/2013	M617-80

NOTE:

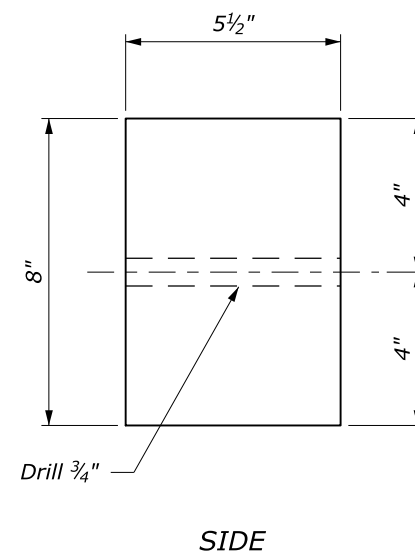
1. Install logs for rails butt to butt and tip to tip. A 2" maximum taper between the butt and tip ends of individual logs is permitted.
2. 20 foot logs are acceptable for rails provided the 2" maximum taper requirement is met and roadway curvature permits.
3. Make splices in rail elements at posts only.
4. Field cut log ends and dress as necessary to obtain tight fitting butt joints in full contact with each other at the log ends. Trim traffic exposed faces of log ends at the joints and elsewhere and dress as necessary to obtain a smooth surface with no protrusions.
5. Dress back face of log rail members to provide a flat surface wide enough to accommodate a 6" steel rail.
6. Apply an approved tinted brown color stain to all exposed surfaces of logs. Apply stain either as a part of or subsequent to preservative treatment.
7. Treat all field cuts and drill holes with two applications of the same preservative and stain as the rails and posts.
8. The nominal bolt length is 16". Bolt lengths will vary according to log size. Extra long threaded bolts may be used, provided they are field cut so that none of the shank protrudes beyond the back of the post.



POST NOTCH FOR WOOD BLOCK-OUT



WOOD BLOCK-OUT
8" x 5 1/2" x 8"

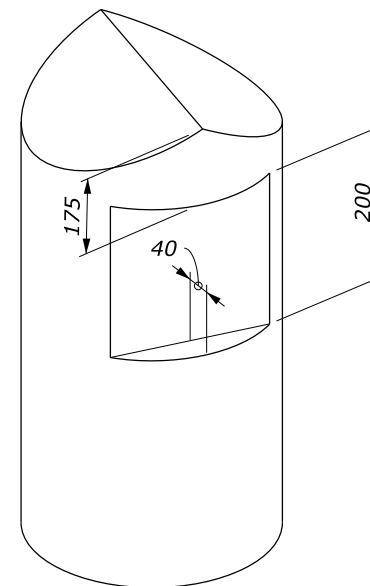


U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD	
STEEL-BACKED LOG RAIL BLOCKOUT	
STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED: DRAFT: 11/2013	617-81

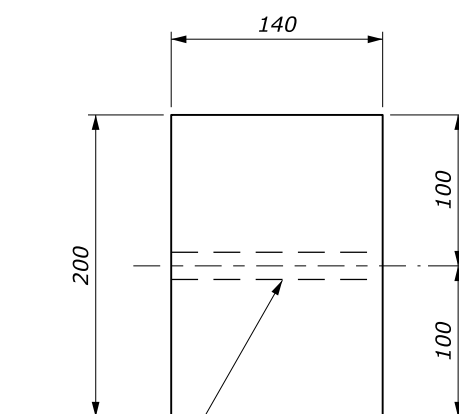
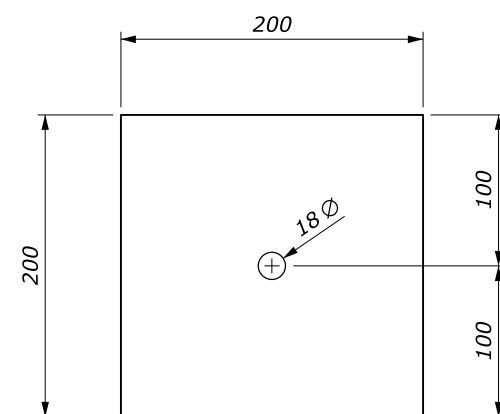
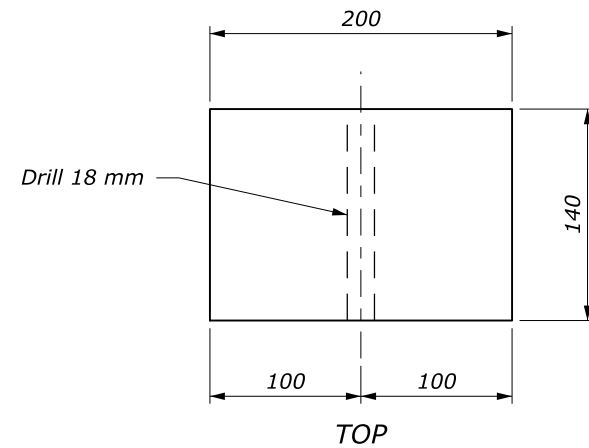
NO SCALE

NOTE:

1. Install logs for rails butt to butt and tip to tip. A 50 mm maximum taper between the butt and tip ends of individual logs is permitted.
2. 6 meter logs are acceptable for rails provided the 50 mm maximum taper requirement is met and roadway curvature permits.
3. Make splices in rail elements at posts only.
4. Field cut log ends and dress as necessary to obtain tight fitting butt joints in full contact with each other at the log ends. Trim traffic exposed faces of log ends at the joints and elsewhere and dress as necessary to obtain a smooth surface with no protrusions.
5. Dress back face of log rail members to provide a flat surface wide enough to accommodate a 150 mm steel rail.
6. Apply an approved tinted brown color stain to all exposed surfaces of logs. Apply stain either as a part of or subsequent to preservative treatment.
7. Treat all field cuts and drill holes with two applications of the same preservative and stain as the rails and posts.
8. The nominal bolt length is 400 mm. Bolt lengths will vary according to log size. Extra long threaded bolts may be used, provided they are field cut so that none of the shank protrudes beyond the back of the post.
9. Dimensions without units are millimeters.



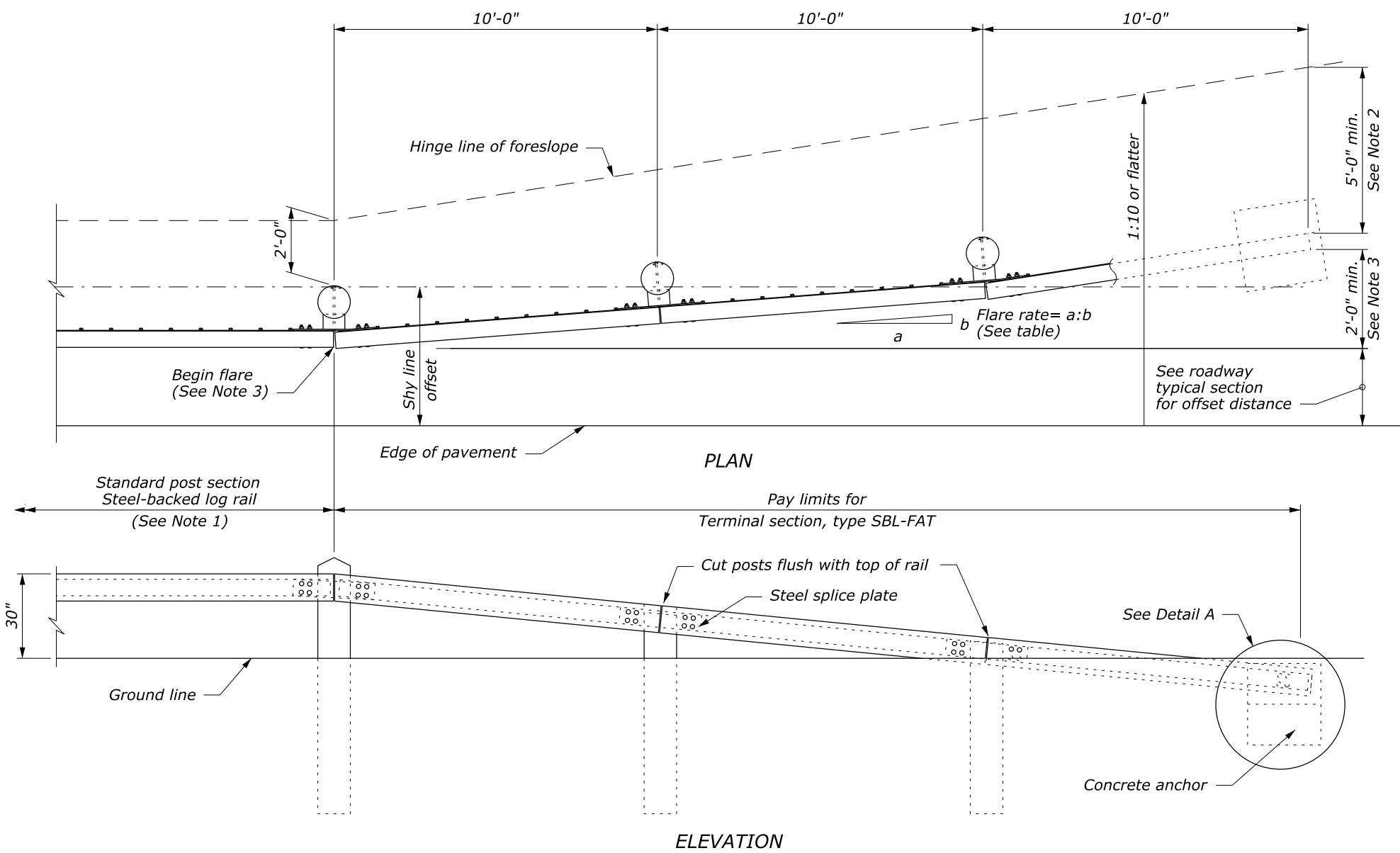
POST NOTCH FOR WOOD BLOCK-OUT



WOOD BLOCK-OUT
200 x 140 x 200

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
METRIC STANDARD	
STEEL-BACKED LOG RAIL BLOCKOUT	
STANDARD APPROVED FOR USE 3/1996	STANDARD
REVISED: 6/2005 DRAFT: 11/2013	M617-81

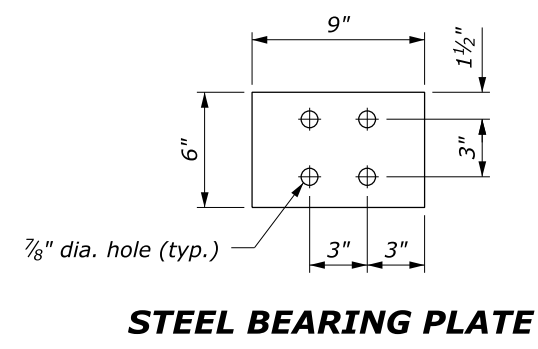
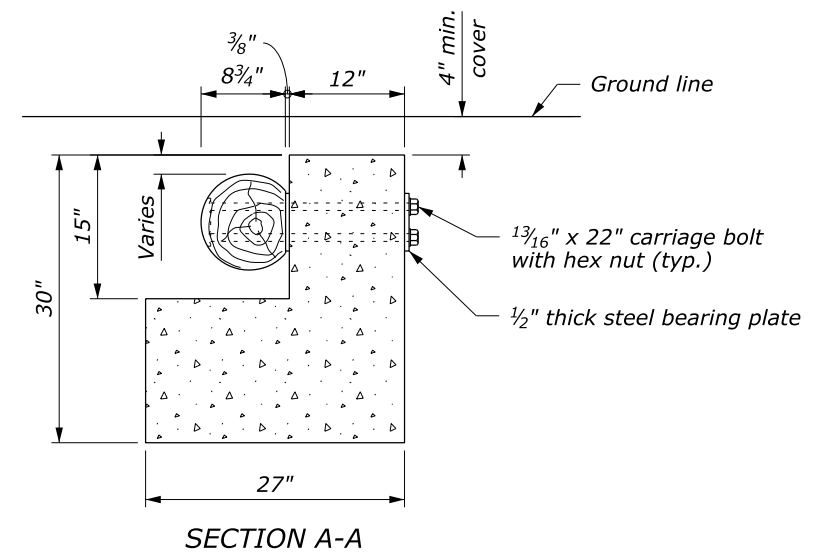
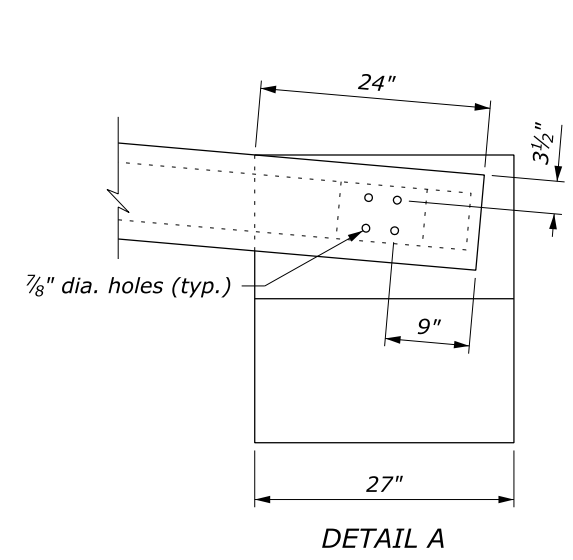


APPROACH & DEPARTURE FLARE WITH FLARED ANCHOR TERMINAL (FAT)

NOTE:

1. See Standard 617-80 and 617-81, Steel-Backed Log Rail, for timber, structural steel, and hardware details.
2. Extend the fill widening a minimum of 5 feet behind the guardrail, unless otherwise directed by the CO.
3. The guardrail flare shown in the plan view is the minimum length and rate required. As directed by the CO, flare the guardrail so that the terminal section is outside the clear zone. If the terminal section cannot be located outside the clear zone, it should be flared as far as practical from the road at the maximum rate indicated on the Guardrail Flare Rates table.

Design Speed (mph)	Shy Line Offset (ft)	Flare Rate (a:b)	
		Inside Shy Line	Outside Shy Line
60	8.0	26:1	14:1
50	6.5	21:1	11:1
40	5.0	16:1	8:1
40 or less	3.5	13:1	7:1



CONCRETE ANCHOR

STEEL BEARING PLATE

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

U.S. CUSTOMARY STANDARD

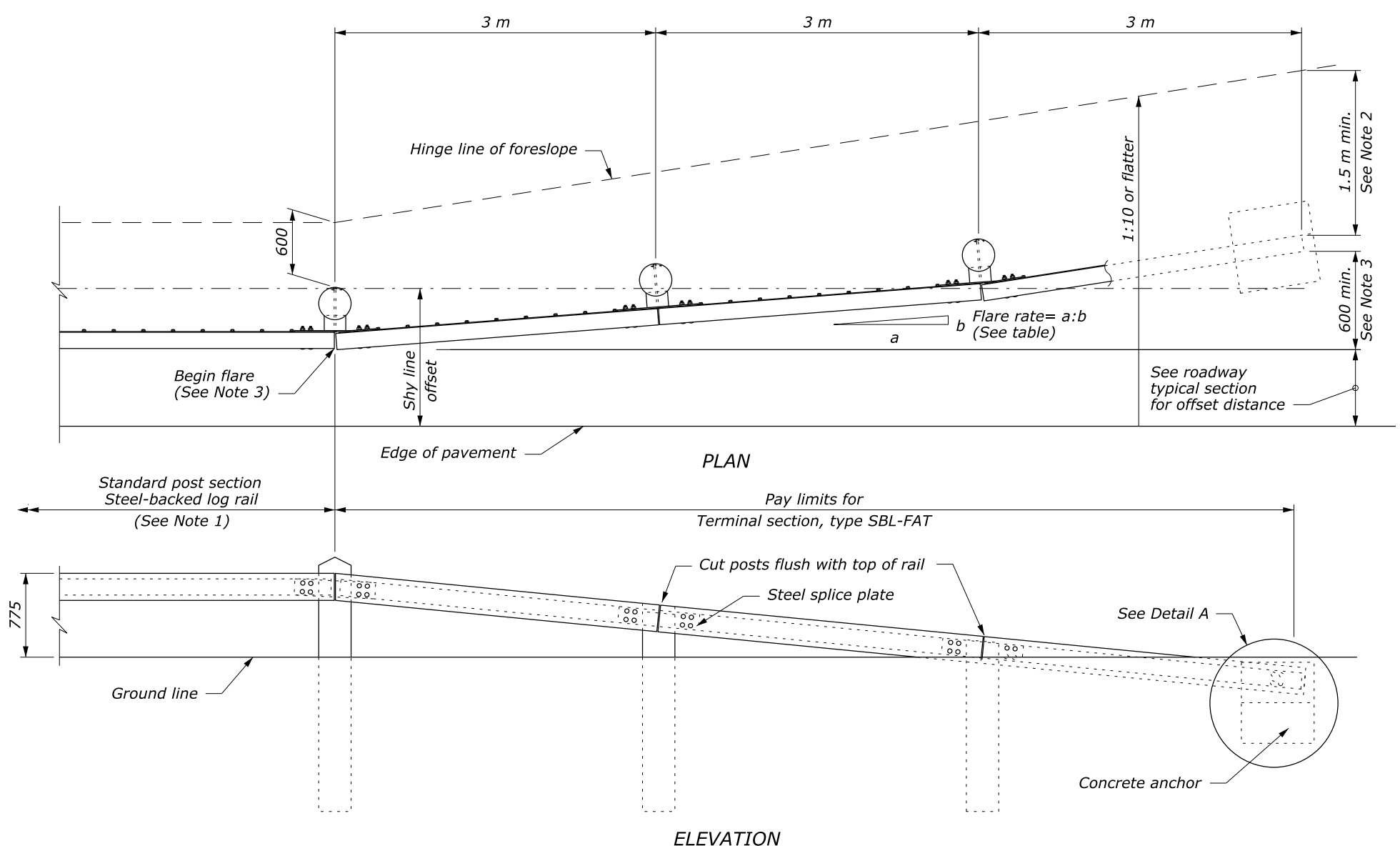
**STEEL-BACKED LOG RAIL
 TERMINAL SECTION,
 TYPE SBL-FAT**

STANDARD APPROVED FOR USE 6/2005

REVISOR: 11/2013

STANDARD 617-82

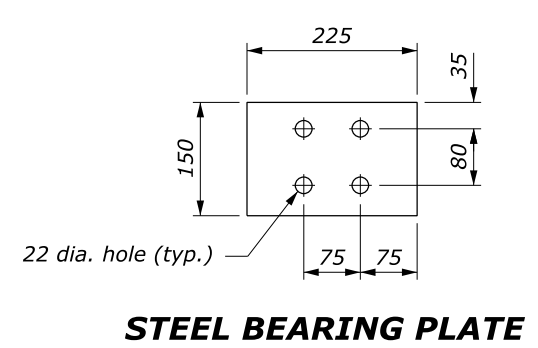
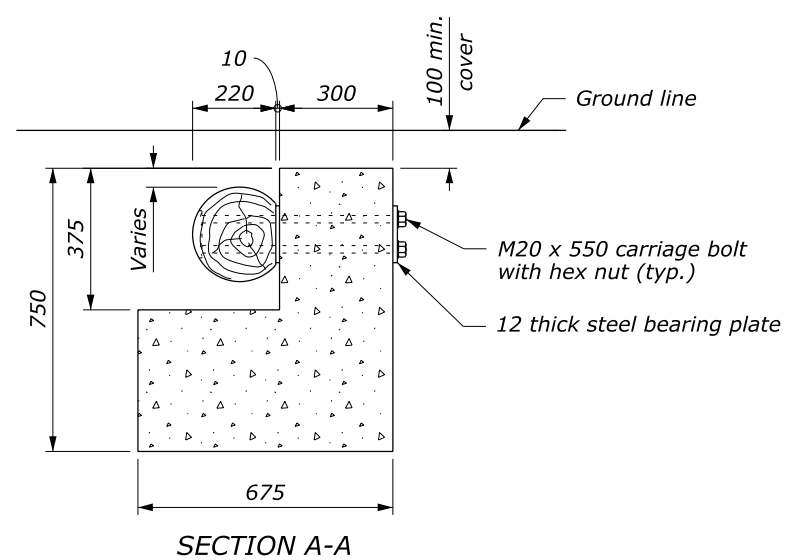
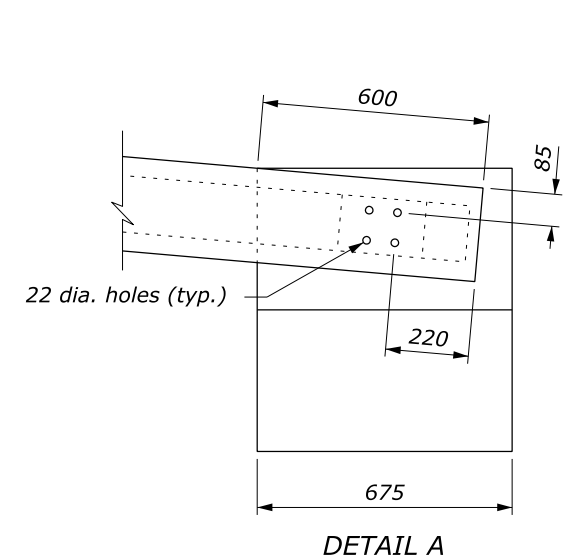
NO SCALE



APPROACH & DEPARTURE FLARE WITH FLARED ANCHOR TERMINAL (FAT)

- NOTE:**
1. See Standard M617-80 and M617-81, Steel-Backed Log Rail, for timber, structural steel, and hardware details.
 2. Extend the fill widening a minimum of 1.5 m behind the guardrail, unless otherwise directed by the CO.
 3. The guardrail flare shown in the plan view is the minimum length and rate required. As directed by the CO, flare the guardrail so that the terminal section is outside the clear zone. If the terminal section cannot be located outside the clear zone, it should be flared as far as practical from the road at the maximum rate indicated on the Guardrail Flare Rates table.
 4. Finish hardware in the metric sizes shown. Equivalent US Customary sizes may be used when metric sizes are not available.
 5. Dimensions without units are millimeters.

Design Speed (km/h)	Shy Line Offset (m)	Flare Rate (a:b)	
		Inside Shy Line	Outside Shy Line
100	2.5	26:1	14:1
80	2.0	21:1	11:1
60	1.5	16:1	8:1
50 or less	1.0	13:1	7:1



CONCRETE ANCHOR

STEEL BEARING PLATE

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 FEDERAL LANDS HIGHWAY

METRIC STANDARD

**STEEL-BACKED LOG RAIL
 TERMINAL SECTION,
 TYPE SBL-FAT**

STANDARD APPROVED FOR USE 6/2005

REVISOR: 11/2013

STANDARD M617-82

NO SCALE