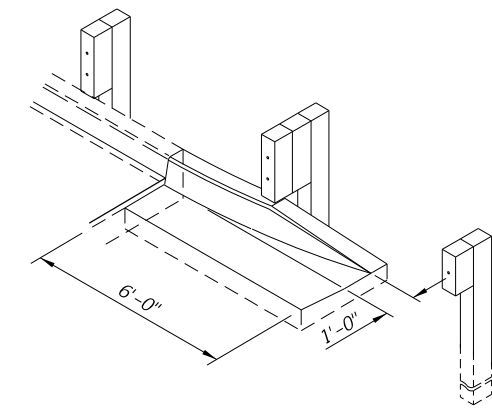
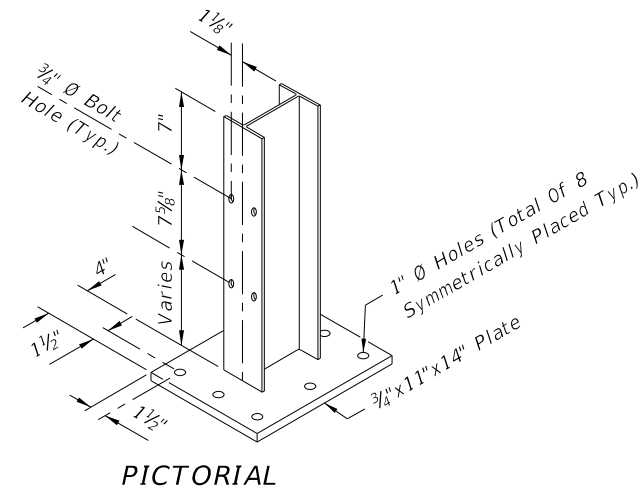
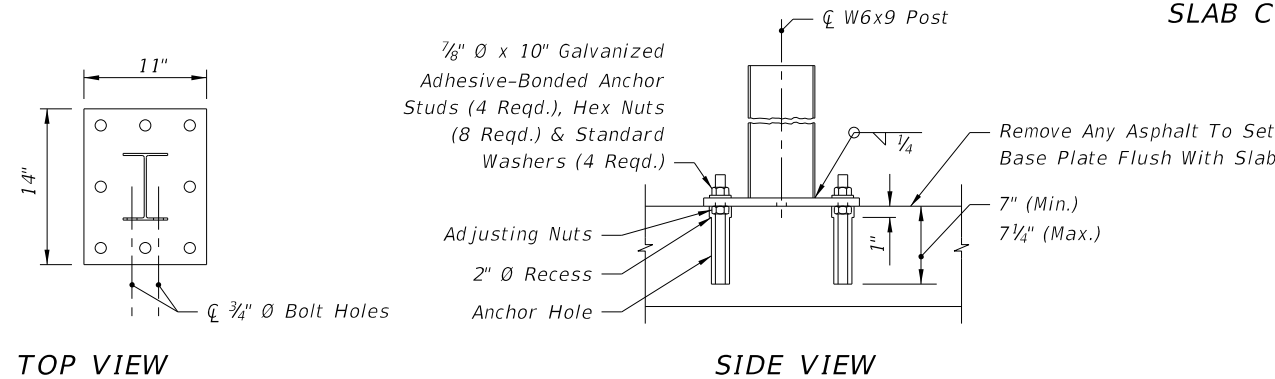


GENERAL NOTES

1. This index provides guardrail transition and connection details for approach end guardrail on existing bridges, and anchorage details for trailing end traffic railing retrofits and safety shapes on existing bridges. Sheets 1 through 23 apply to bridges with retrofitted traffic railings, (Sheet 23 shows the trailing end guardrail connections). Sheet 24 applies to bridges with safety shaped traffic railing. Construct the guardrail transitions and connections where shown in the plans.
2. The schemes identified by Arabic numerals in this index are complementary to the bridge traffic railing barrier retrofit schemes with like numeral identification in Index Nos. 470, 471 through 476, 480 through 483. The schemes in this index identified by Roman numerals are complementary to bridge safety shaped traffic railing barrier where determined to be in accordance with applications of criteria specified in the Instructions for Design Standards (IDS-470 & IDS-480).
3. For trailing end guardrail connections for existing bridges with either Vertical Face Retrofits or Safety Shape Traffic Railing, see the Trailing End Transition Connection to Rigid Barrier detail shown in Index No. 400. Likewise, for miscellaneous guardrail construction details that are not provided in this Index, refer to Index No. 400.



CURB TYPE F FLARE WHEN END OF EXISTING APPROACH SLAB CURB EXPOSED



TOP VIEW

SIDE VIEW

SPECIAL STEEL POST FOR ROADWAY THRIE-BEAM TRANSITIONS TO BRIDGE TRAFFIC RAILING RETROFITS

NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROFITS ON EXISTING BRIDGES

1. The transition detail shown on this sheet shows (a) the standard post spacings within the typical thrie-beam approach transitions connecting to existing bridges with retrofit traffic railings, and (b) depict the typical alignments of the approach transitions.
2. The curb and gutter flare shown on this sheet is typical of flares that are to be constructed when approach slab curbs extend to the beginning of the slab, and where other treatment to curb blunt ends are not in place.
3. The special steel post for roadway thrie-beam transitions detailed on this sheet is specific to all transition applications on this index that require one or more steel posts.

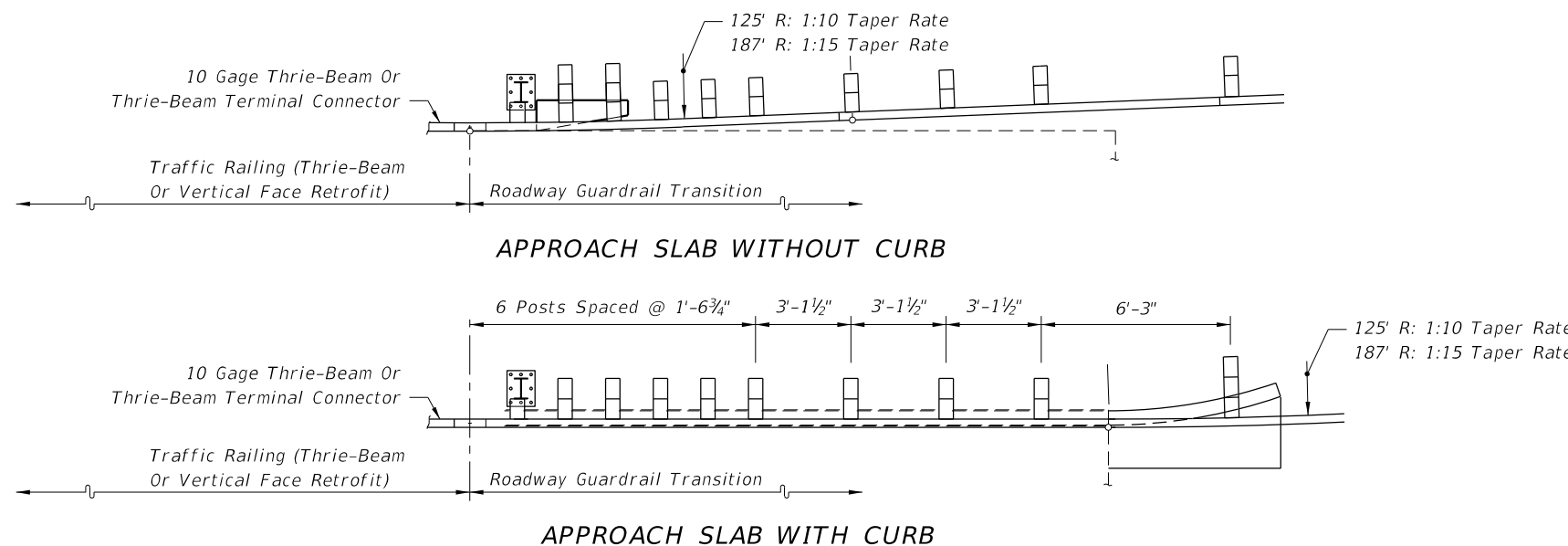
The special steel post and base plate assembly shall be fabricated in accordance with Specification Section 967.

Anchor studs shall be fully threaded rods in accordance with ASTM F1554 Grade 36 or ASTM A193 Grade B7. All nuts shall be heavy hex in accordance with ASTM A563 or ASTM A19

4. Anchor studs and nuts shall be hot-dip zinc coated in accordance with the Specifications. After the nuts have been snug tightened, the anchor stud threads shall be single punch distorted immediately above the top nuts to prevent loosening of the nuts. Distorted threads shall be coated with a galvanizing compound in accordance with the Specifications.

Adhesive bonding material systems for anchors shall comply with Specification Section 937 and be installed in accordance with Specification Section 416.4. Nested beam extensions and points for terminal connector attachments will vary for traffic railing barrier vertical face retrofits. The plan views for the vertical face retrofit barriers show the primary configurations for each particular scheme. The associated pictorial views show the variations.

5. For installing thrie-beam terminal connector to traffic railing vertical face retrofits, see notations on Sheets 12 through 15 and the flag notation on Sheet 23.
6. Payment for connections to traffic railing vertical face retrofits are to be made under the contract unit price for Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate and bolts, nuts and washers.



Longitudinal Location Of Transition Blocks And Curb End Flares Will Vary With Scheme Type

PARTIAL PLAN VIEWS

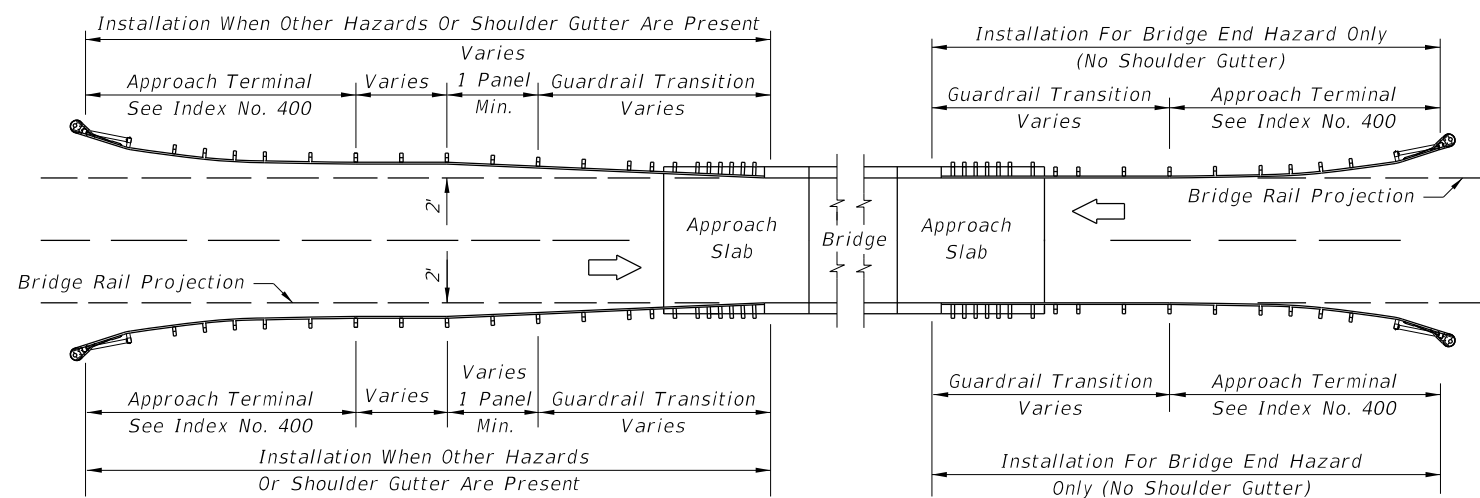
DESIGN NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROFITS ON EXISTING BRIDGES

1. For selection of an appropriate transition scheme, see the Instructions for Design Standards (IDS-470 & IDS-480) for instructions to the Structures and Roadway engineers.

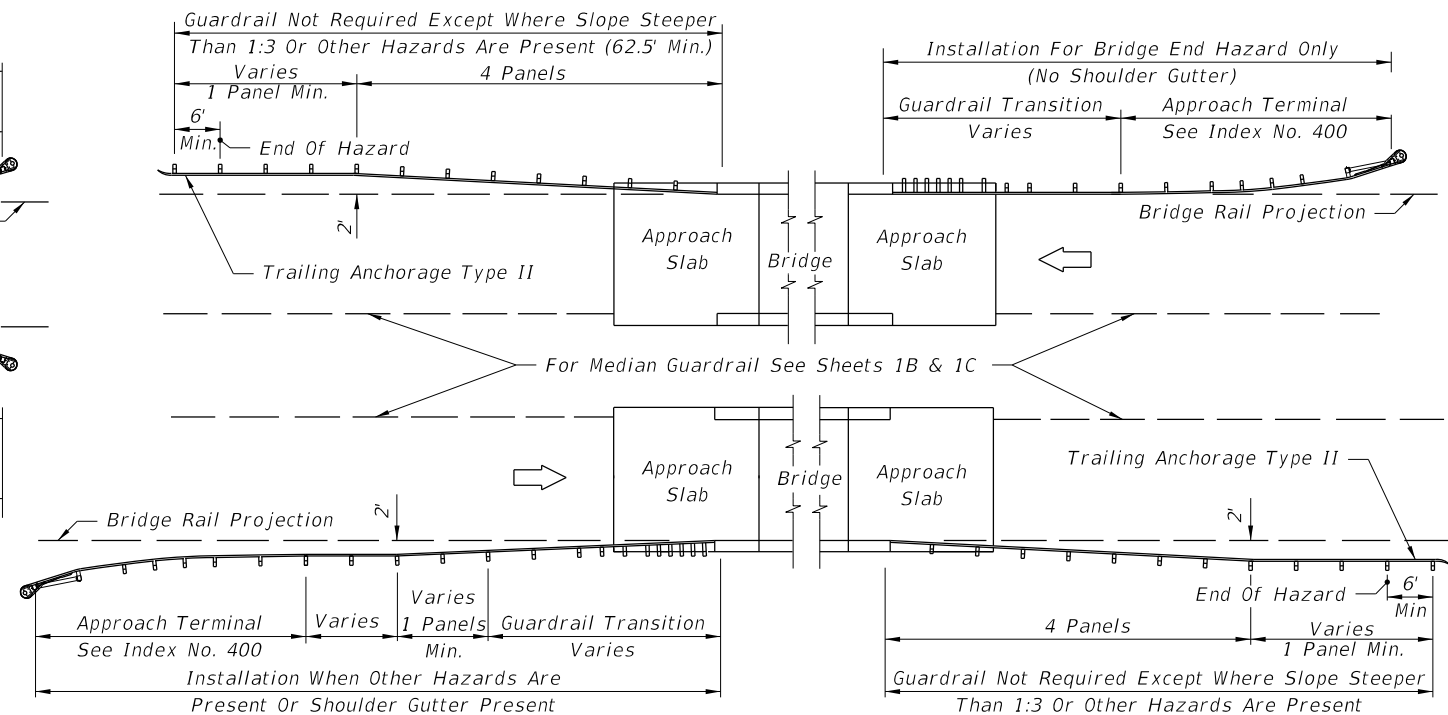
GUARDRAIL TRANSITION ALIGNMENTS FOR BRIDGE THRIE-BEAM AND VERTICAL FACE TRAFFIC RAILING RETROFIT

10/26/2016 6:37:08 AM

LAST REVISION 11/01/16	REVISION	DESCRIPTION:	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 1 of 24
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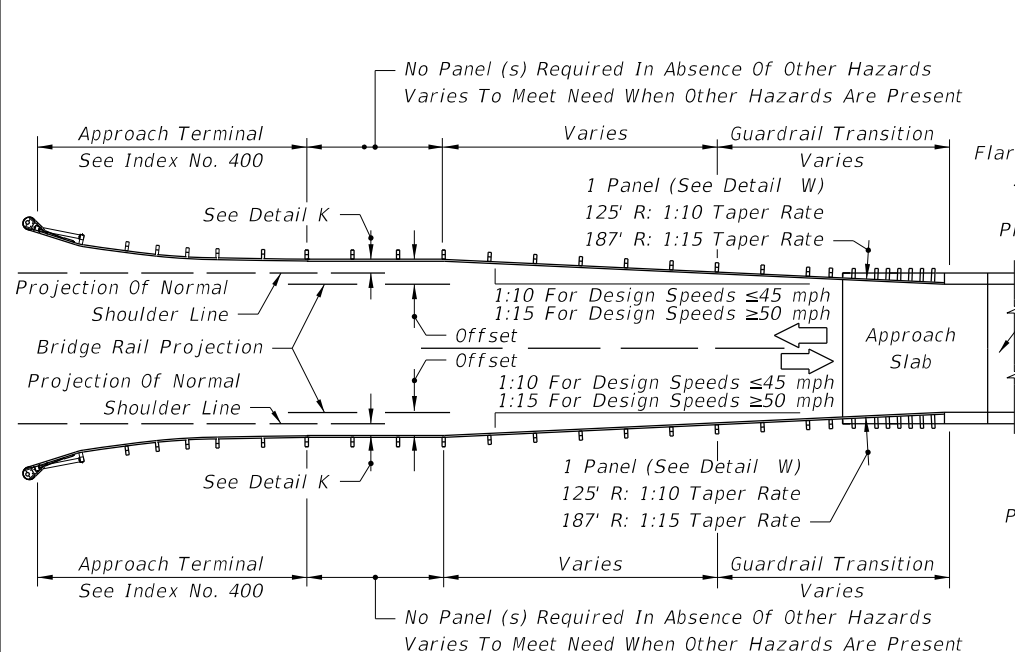


UNDIVIDED ROADWAY - DETAIL H

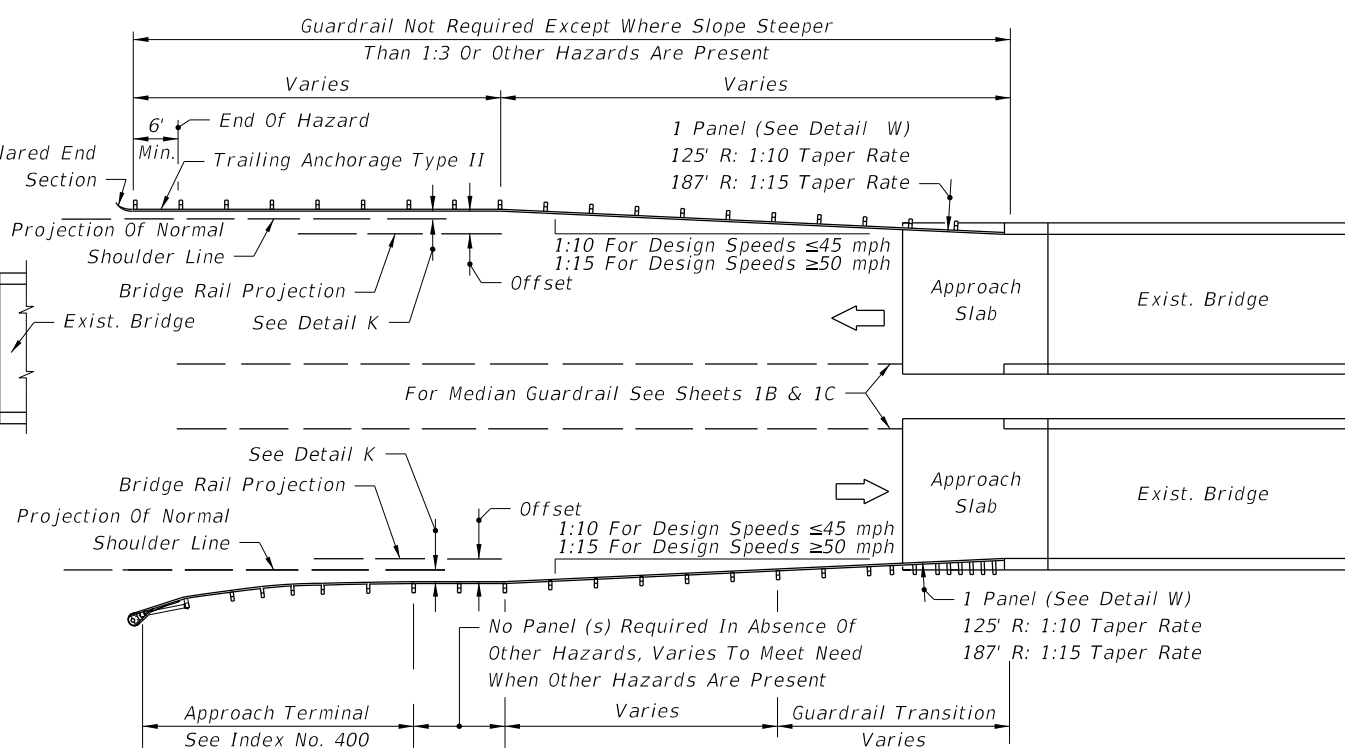


DIVIDED ROADWAY - DETAIL I

GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

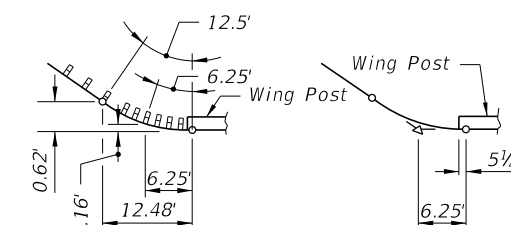


UNDIVIDED ROADWAY - DETAIL S

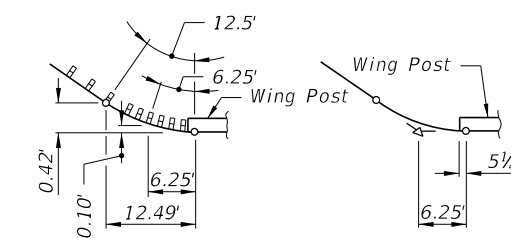


DIVIDED ROADWAY - DETAIL T

GUARDRAIL APPLICATIONS FOR BRIDGES WITH LESS THAN FULL WIDTH SHOULDERS AND CONCRETE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH



125' R LAYOUT



187' R LAYOUT

STANDARD PANELS SET TO RADIALS ADJOINING BRIDGES
DETAIL W

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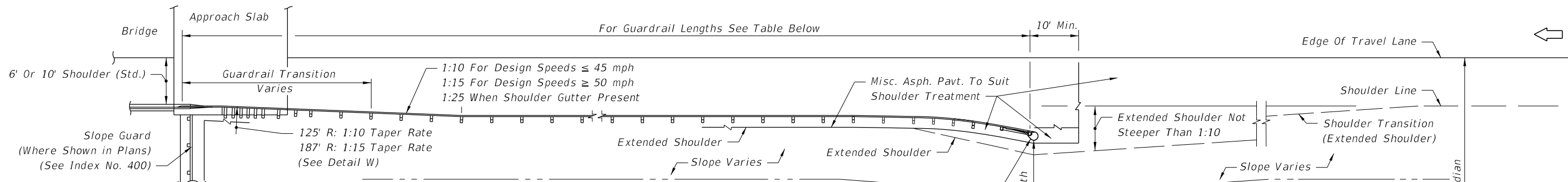
LAST REVISION	DESCRIPTION:
11/01/16	



FY 2017-18
DESIGN STANDARDS

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

INDEX NO.	SHEET NO.
402	1A of 24

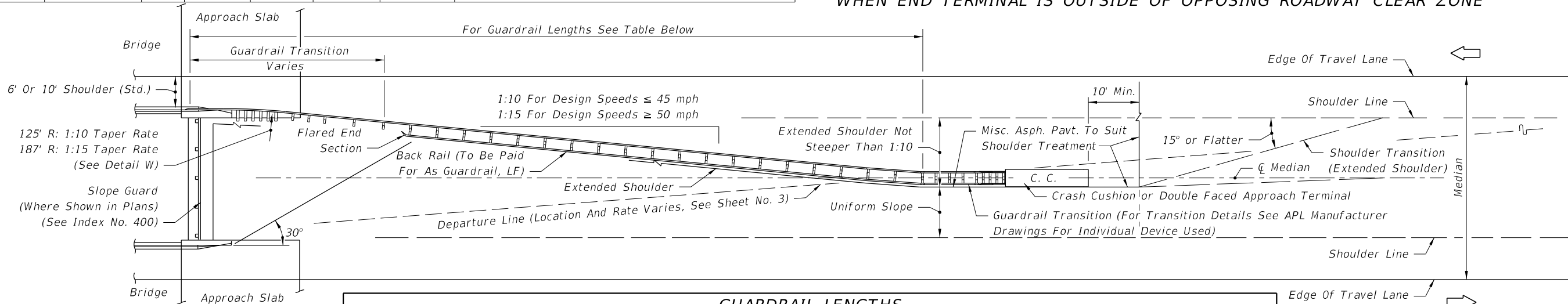


GUARDRAIL LENGTH (Ft.)						
Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Rdwy. Shldr.		10' & 12' Rdwy. Shldr.	
			Min. Median Width	Guardrail Length	Min. Median Width	Guardrail Length
60-70	≥ 1500	36	50	362.5	54	312.5
60-70	< 1500	30	44	287.5	48	237.5
55	≥ 1500	30	44	287.5	48	237.5
55	< 1500	24	38	212.5	42	162.5
45-50	≥ 1500	24	38	212.5	42	162.5
45-50	< 1500	20	34	162.5	38	112.5
45-50	Urban w/o Curb	24	38	212.5	42	162.5
35-40	Urban w/o Curb	18	32	162.5	36	100.0

Notes:
 Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for flared end anchorage assemblies to shield normal transverse underslope and bridge end hazards. Lengths may need to be adjusted for connection location on wing post or bridge traffic railing barrier, auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present.

Note: For approach end anchorage assemblies see sheets elsewhere in this Index and the plans.

WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE



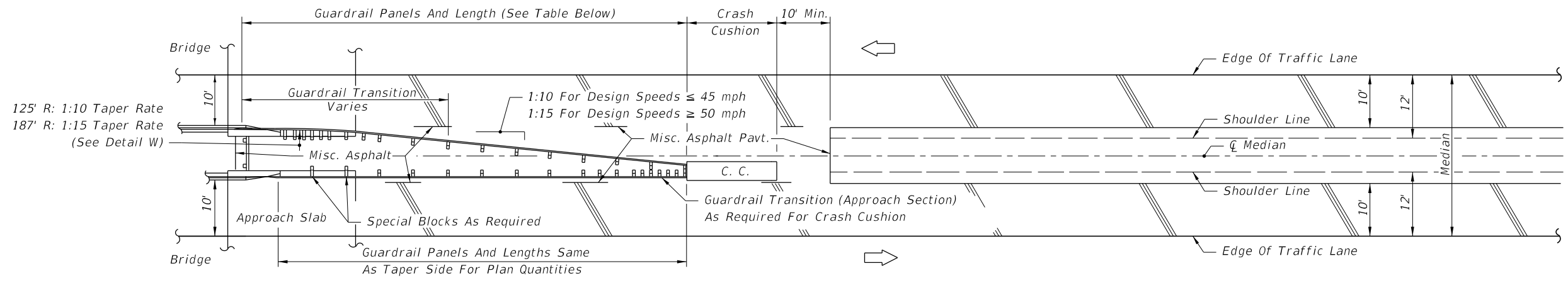
Median Width (ft.)	1:10 TAPER RATE								1:15 TAPER RATE							
	6' Bridge Shoulder				10' Bridge Shoulder				6' Bridge Shoulder				10' Bridge Shoulder			
	Front	Back	Total	Length (Ft.)	Front	Back	Total	Length (Ft.)	Front	Back	Total	Length (Ft.)	Front	Back	Total	Length (Ft.)
32	7.5	6	13.5	168.75	4.5	3	7.5	93.75	11.5	9	20.5	256.25	7.5	6	13.5	168.75
34	8.5	6	14.5	181.25	5.5	4	9.5	118.75	12.5	10	22.5	281.25	7.5	6	13.5	168.75
36	9.5	7	16.5	206.25	6.5	5	11.5	143.75	13.5	11	24.5	306.25	8.5	7	15.5	193.75
38	10.5	8	18.5	231.25	7.5	6	13.5	168.75	14.5	12	26.5	331.25	10.5	9	19.5	243.75
40	10.5	8	18.5	231.25	7.5	6	13.5	168.75	16.5	13	29.5	368.75	11.5	9	20.5	256.25
42	11.5	8	19.5	243.75	8.5	6	14.5	181.25	17.5	14	31.5	393.75	12.5	10	22.5	281.25
44	12.5	9	21.5	268.75	9.5	7	16.5	206.25	18.5	15	33.5	418.75	13.5	11	24.5	306.25
46	12.5	9	21.5	268.75	10.5	8	18.5	231.25	19.5	16	35.5	443.75	14.5	12	26.5	331.25
48	14.5	11	25.5	318.75	11.5	9	20.5	256.25	20.5	16	36.5	456.25	16.5	13	29.5	368.75

The lengths shown on this table are typical for roadways with standard width shoulders and a relocated connection to the existing wing post. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and for end anchorage or end shielding use.

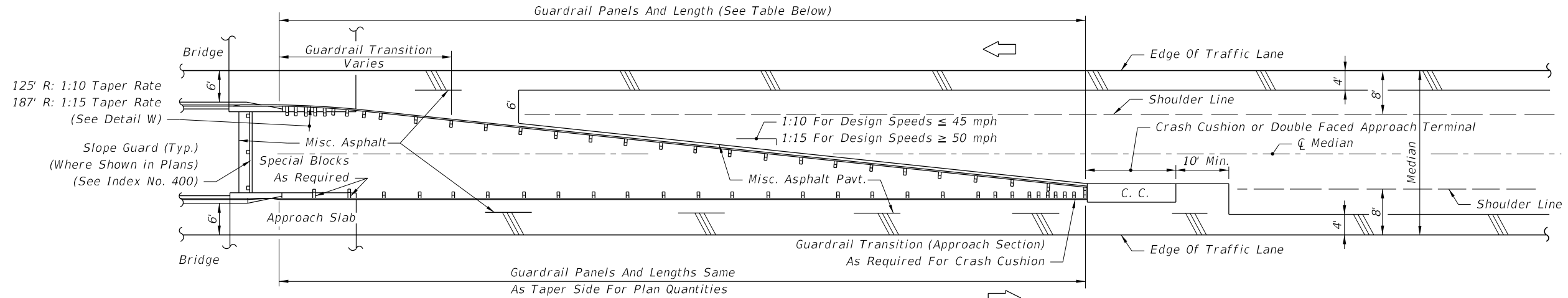
WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE

APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH CONCRETE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS

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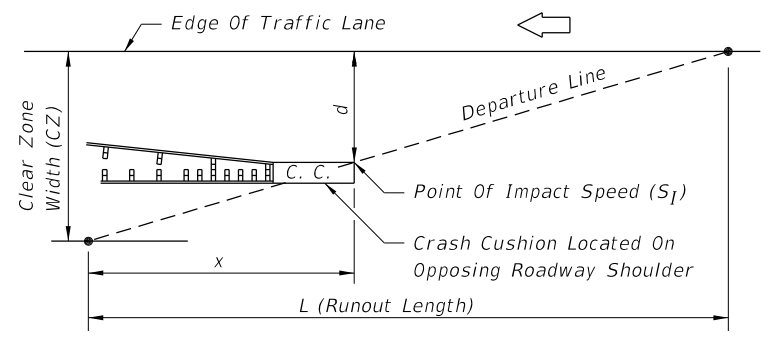


MEDIANS WITH 10' BRIDGE SHOULDERS



MEDIANS WITH 6' BRIDGE SHOULDERS

Note: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians.



Speed (S_1) For Determining Crash Cushion Size:

$$S_1 = \frac{x}{L} (\text{Design Speed}) = \left[\frac{(CZ - d)}{CZ} \right] \text{Design Speed}$$

SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

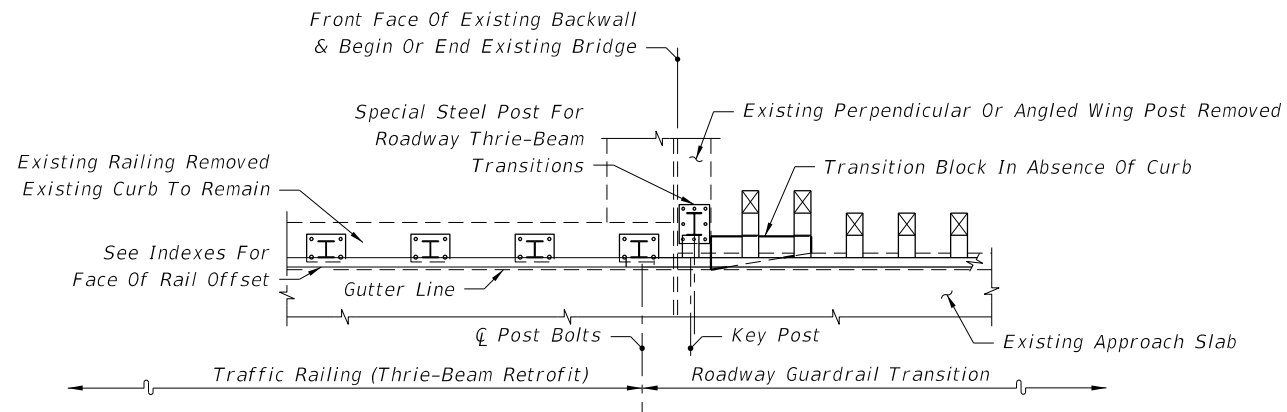
MEDIAN WIDTH (Ft.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1:10 TAPER RATE		1:15 TAPER RATE		1:10 TAPER RATE		1:15 TAPER RATE	
	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)
30	12.5	156.25	18.5	231.25	6.5	81.25	9.5	118.75
28	11.5	143.75	16.5	206.25	5.5	68.75	7.5	93.75
26	9.5	118.75	14.5	181.25	5.5*	68.75	5.5*	68.75
24	8.5	106.25	11.5	143.75	5.5*	68.75	5.5*	68.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds (S_1 's) along the runouts from the approach roadways; however, when calculated speeds (S_1 's) are less than 30 mph crash cushions shall be no less in size than for 30 mph; see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width; see * below.

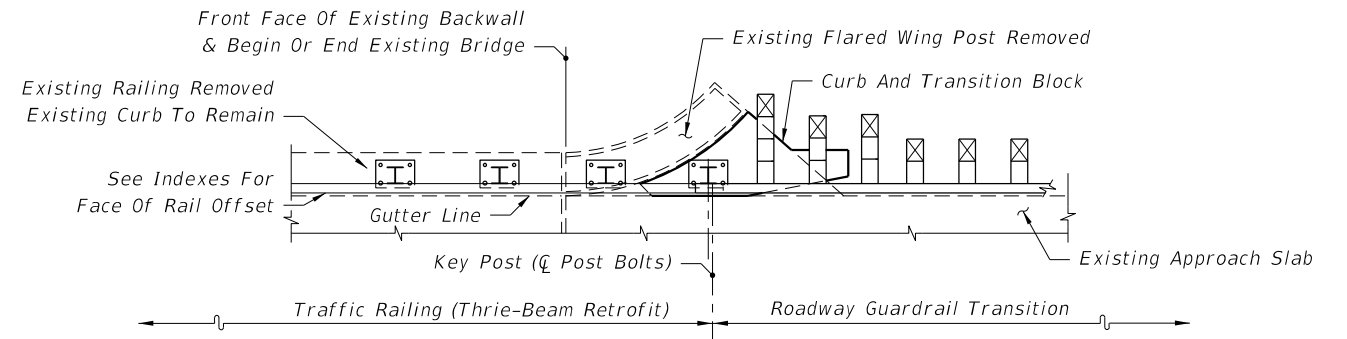
*Number shown is the minimum number of panels plus a W-Thrie beam transition panel; single faced guardrail must have a length of five (5) or more panels.

**APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH CONCRETE TRAFFIC RAILING
EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS**

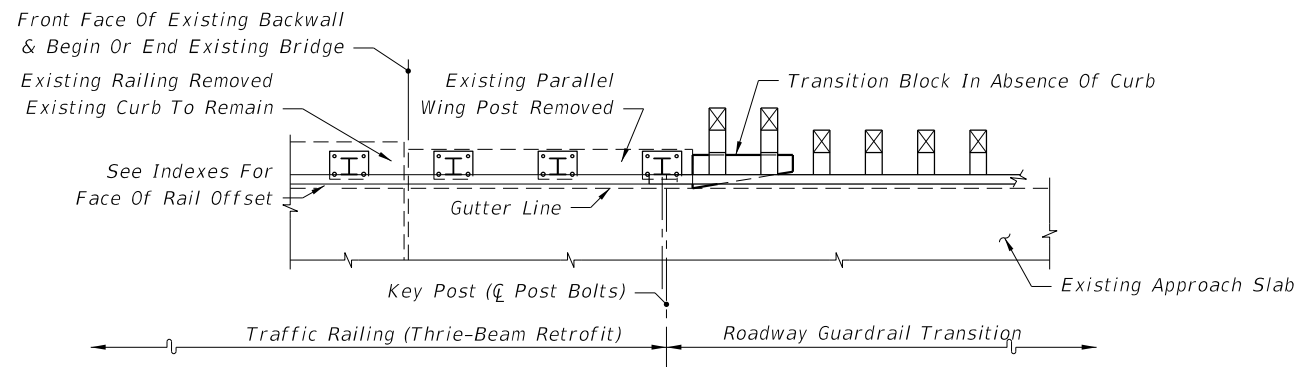
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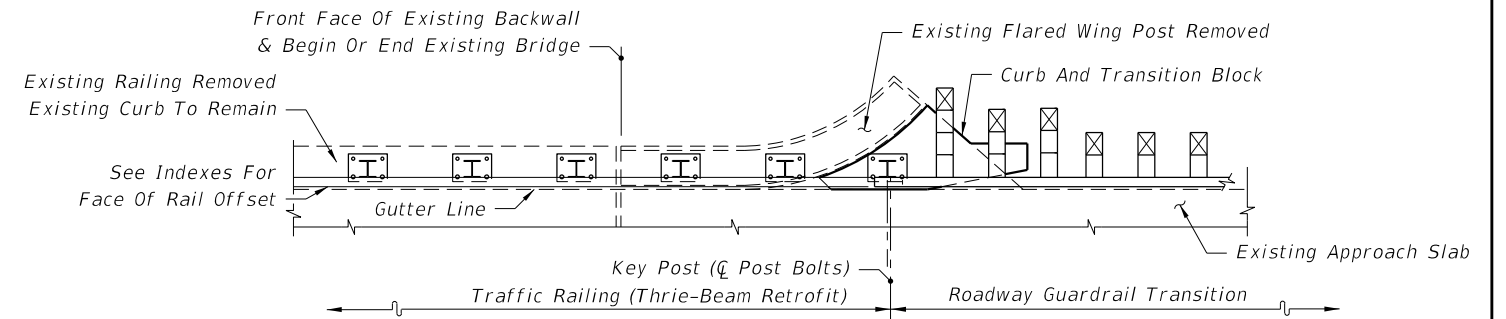
SEE INDEX NO. 471 - SCHEME 1



SEE INDEX NO. 471 - SCHEME 3




SEE INDEX NO. 471 - SCHEME 2

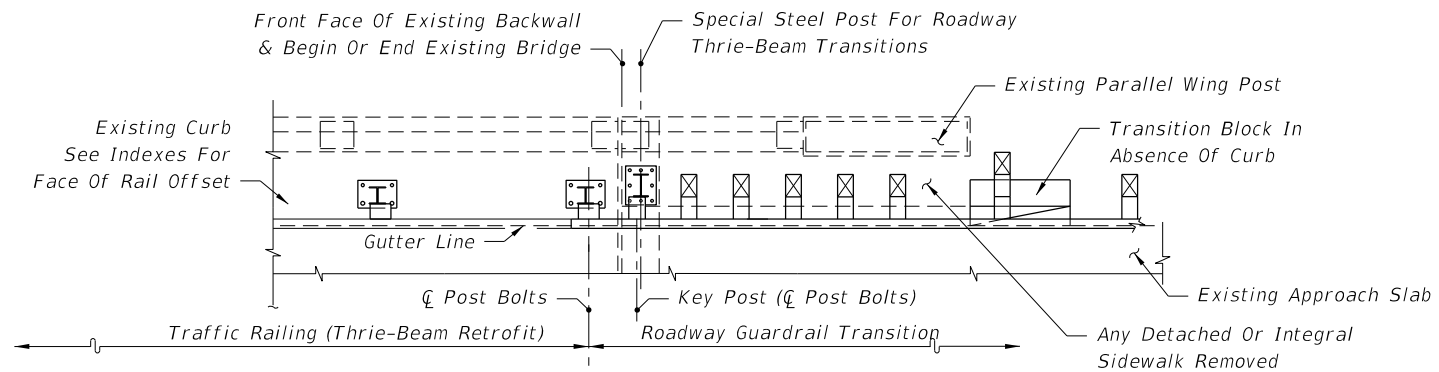


SEE INDEX NO. 471 - SCHEME 3

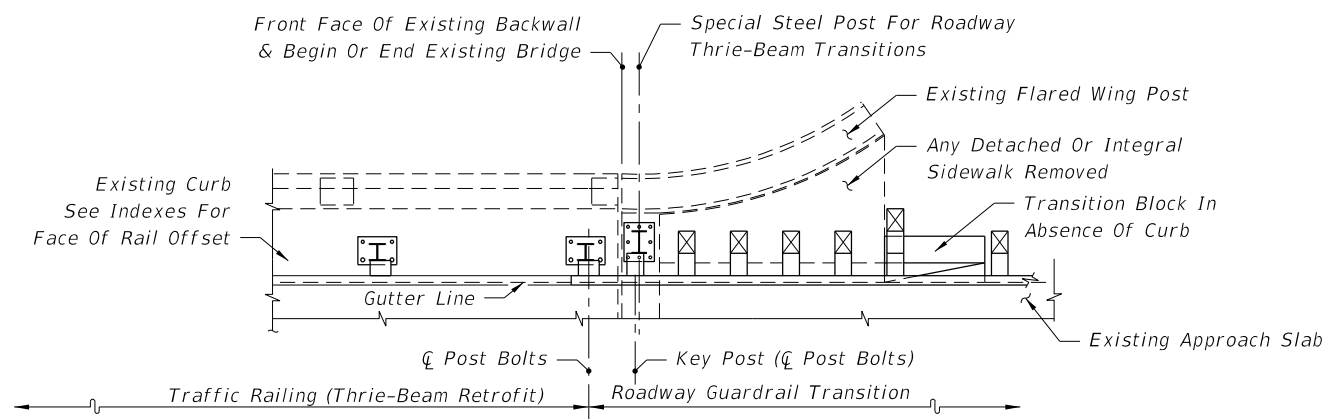
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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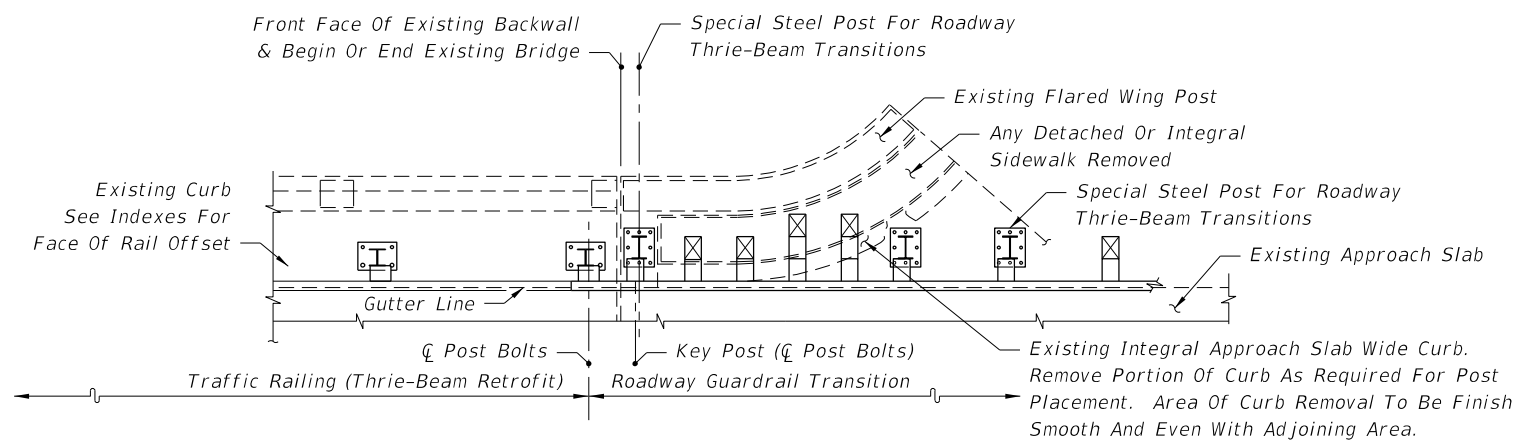
LAST REVISION 07/01/07	REVISION DESCRIPTION:	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 2 of 24
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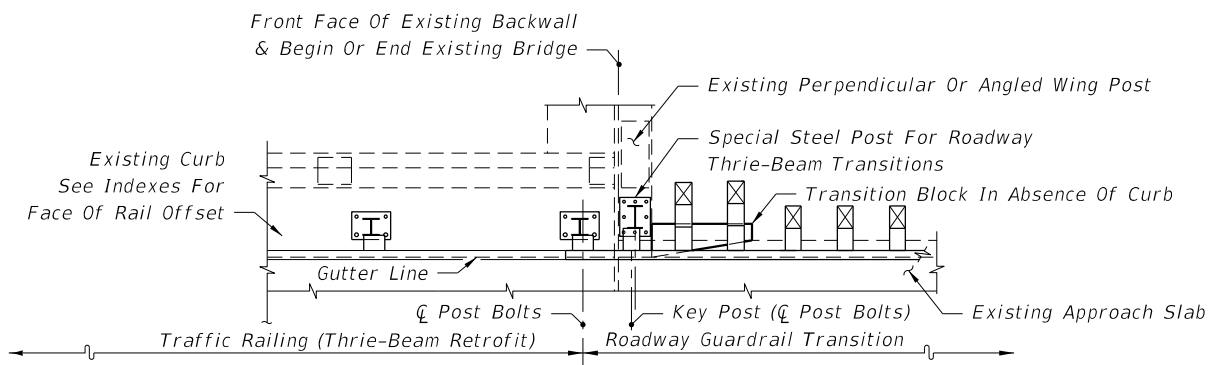
SEE INDEX NOS. 472 & 475 - SCHEME 2



SEE INDEX NOS. 472 & 475 - SCHEME 2




SEE INDEX NOS. 472 & 475 - SCHEME 2

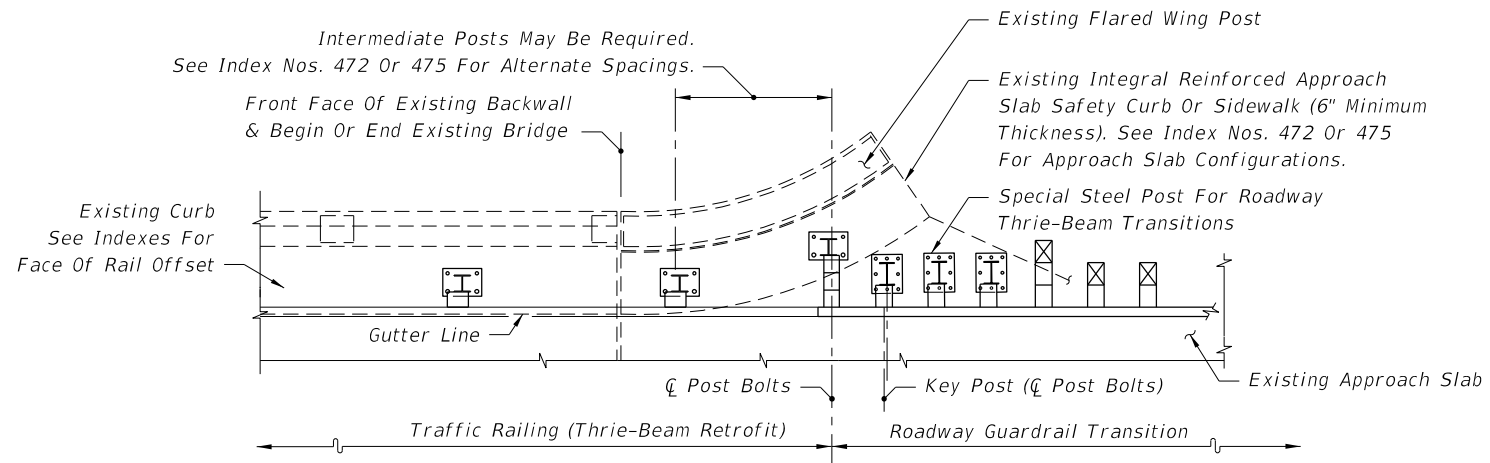


SEE INDEX NOS. 472 & 475 - SCHEME 1

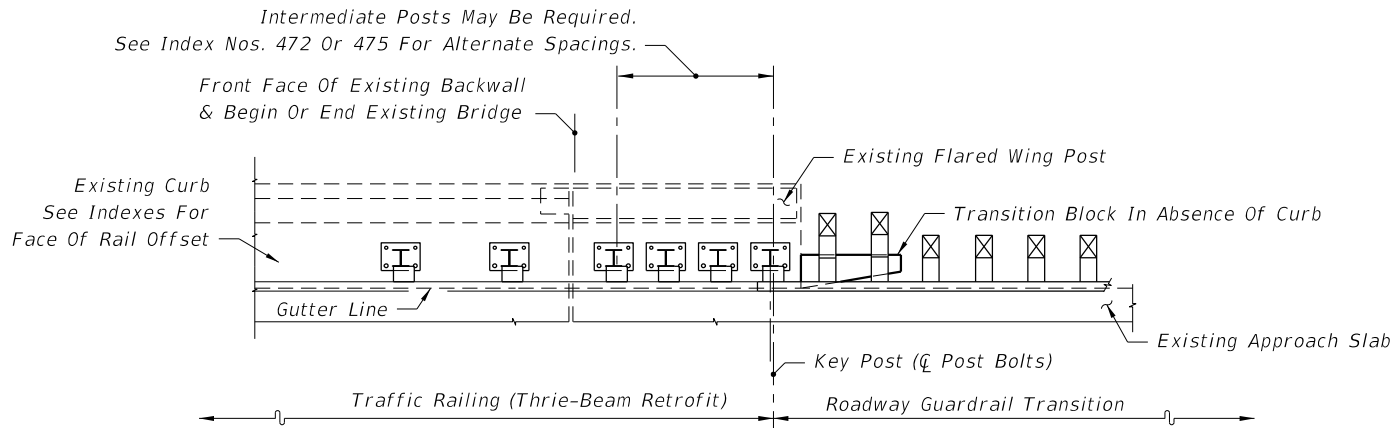
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS
FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

10/26/2016 6:37:22 AM

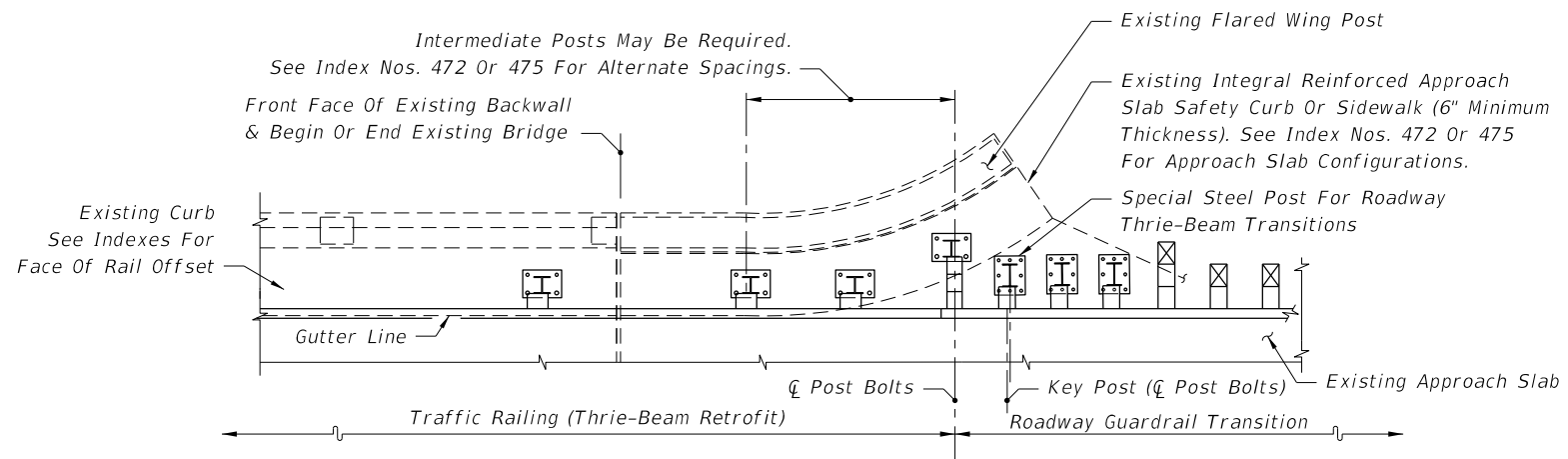
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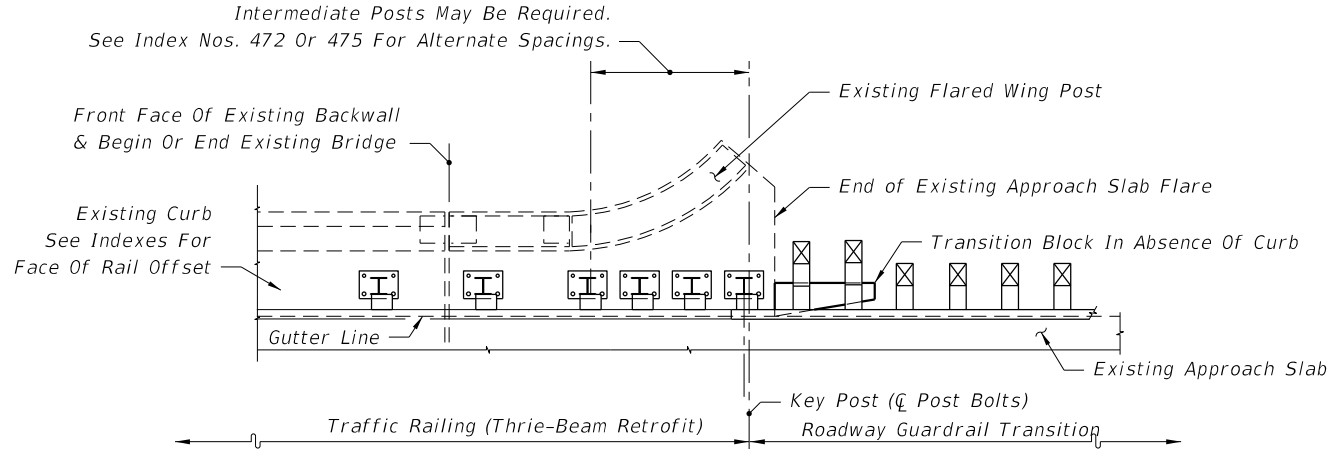
SEE INDEX NOS. 472 & 475 - SCHEMES 3 & 4



SEE INDEX NOS. 472 & 475 - SCHEMES 5 & 6



SEE INDEX NOS. 472 & 475 - SCHEMES 3 & 4

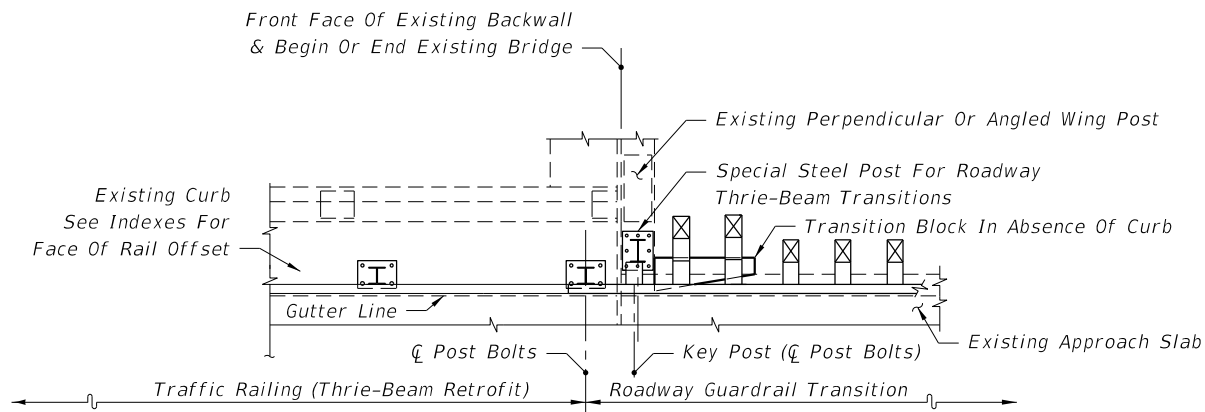


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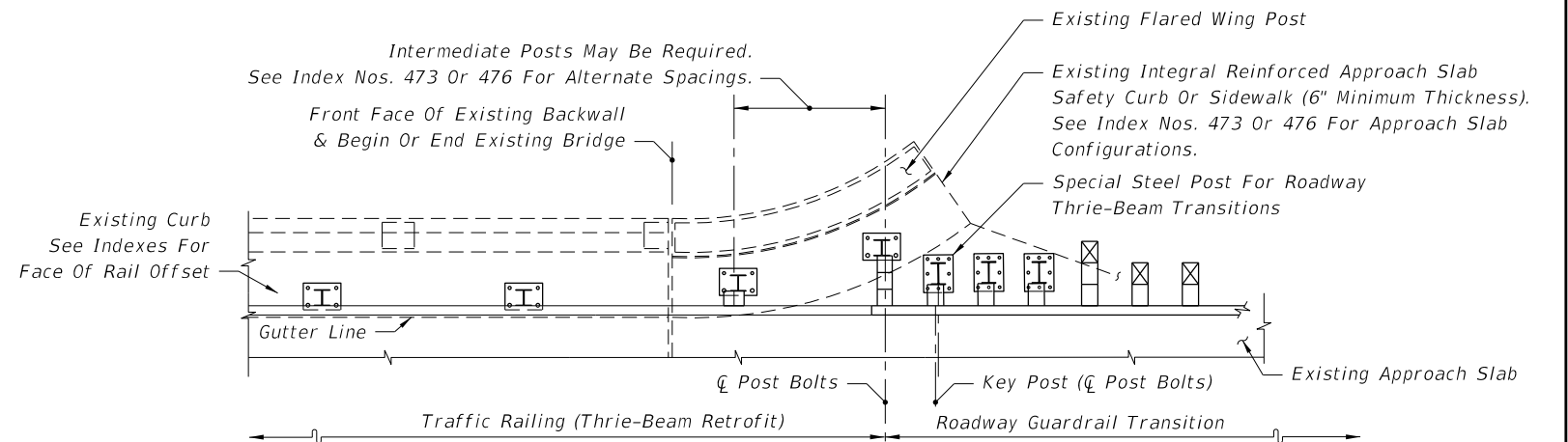
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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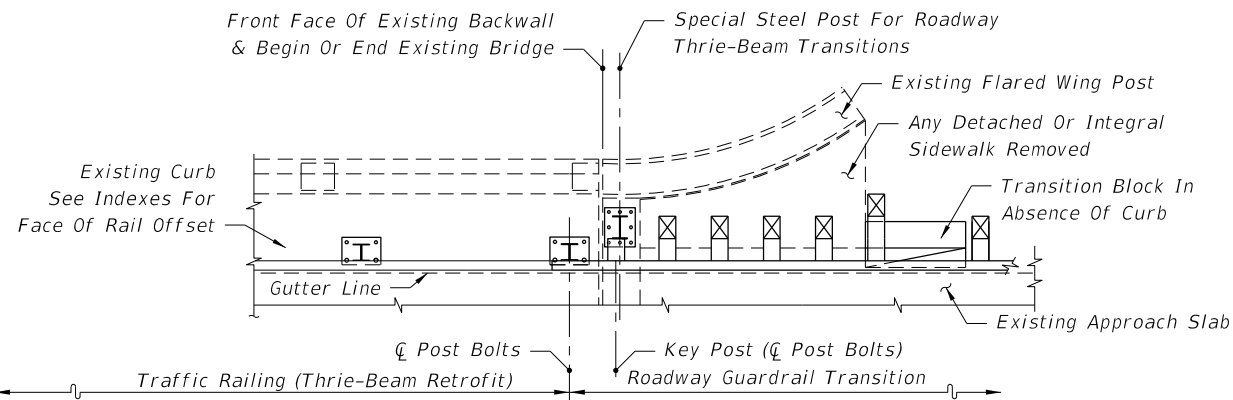
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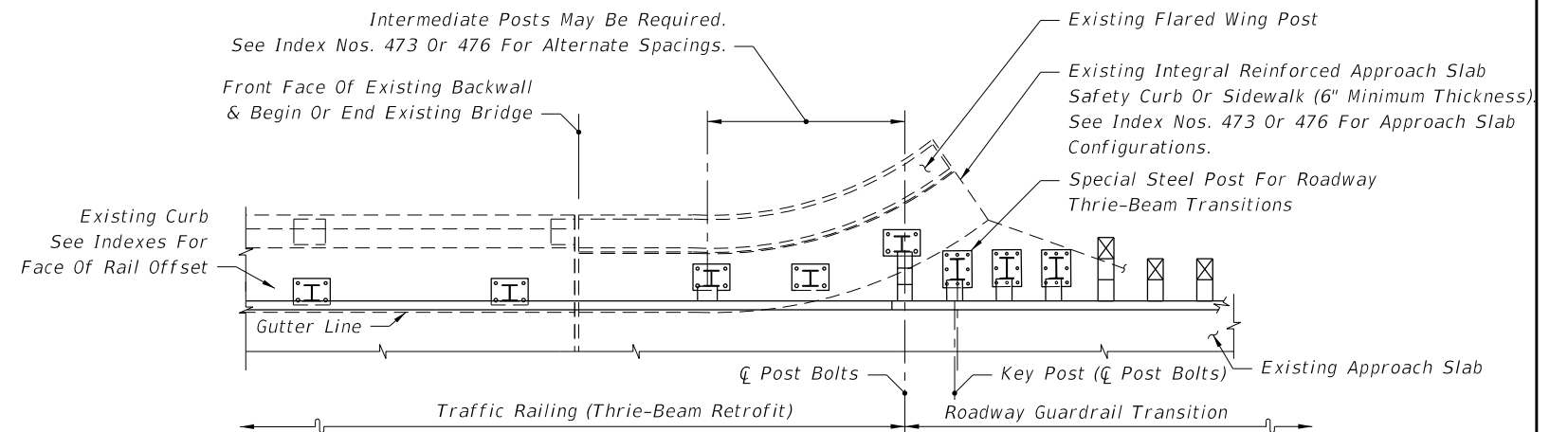
SEE INDEX NOS. 473 & 476 - SCHEME 1



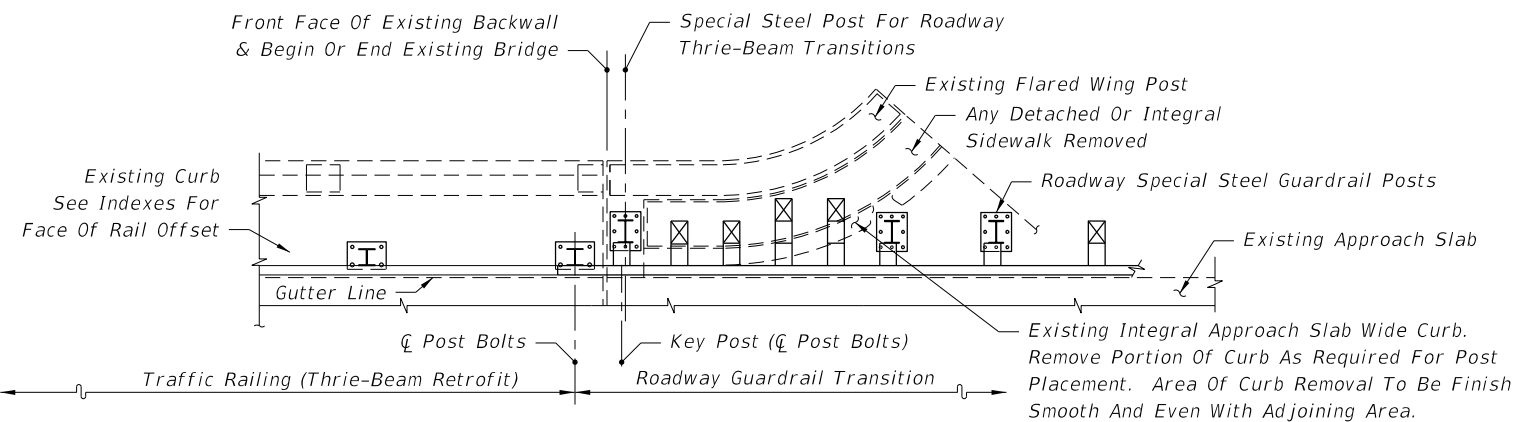
SEE INDEX NOS. 473 & 476 - SCHEMES 3 & 4



SEE INDEX NOS. 473 & 476 - SCHEME 2



SEE INDEX NOS. 473 & 476 - SCHEMES 3 & 4

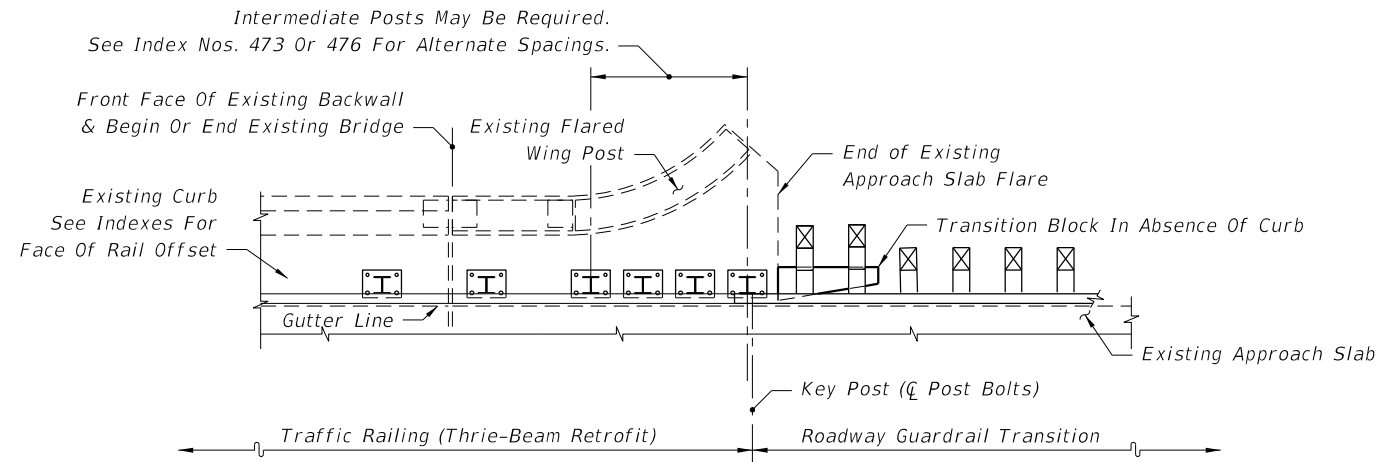


SEE INDEX NOS. 473 & 476 - SCHEME 2

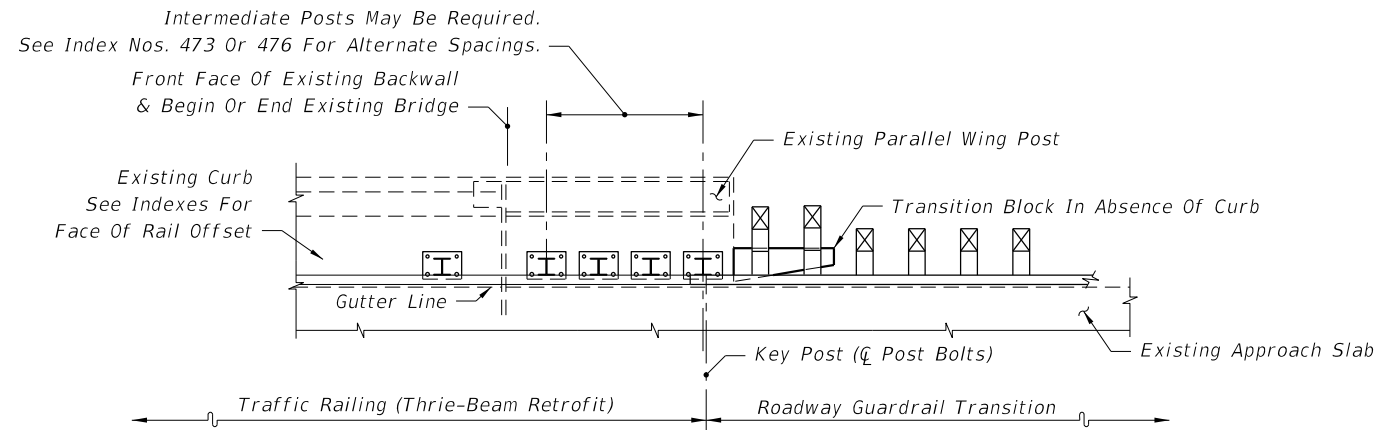
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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LAST REVISION 07/01/07	DESCRIPTION:
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SEE INDEX NOS. 473 & 476 - SCHEMES 5 & 6

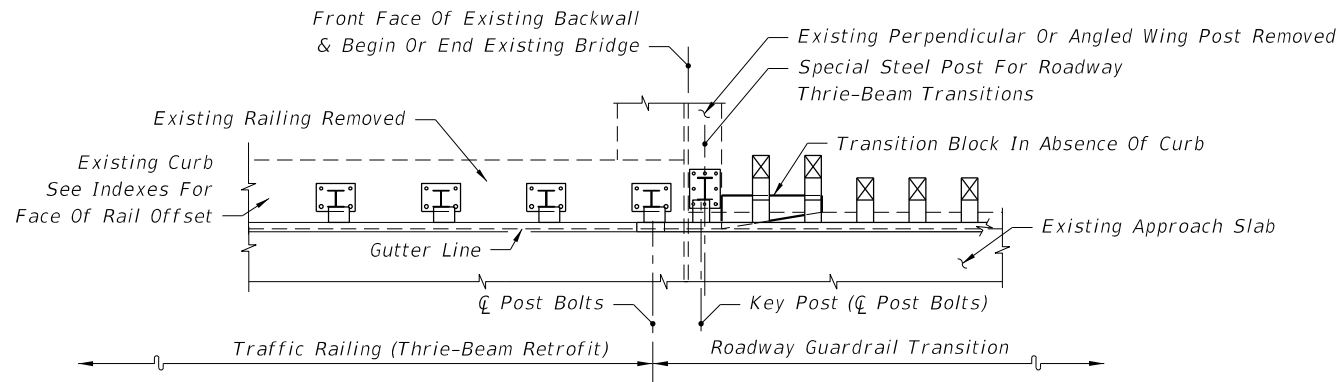


SEE INDEX NOS. 473 & 476 - SCHEMES 5 & 6

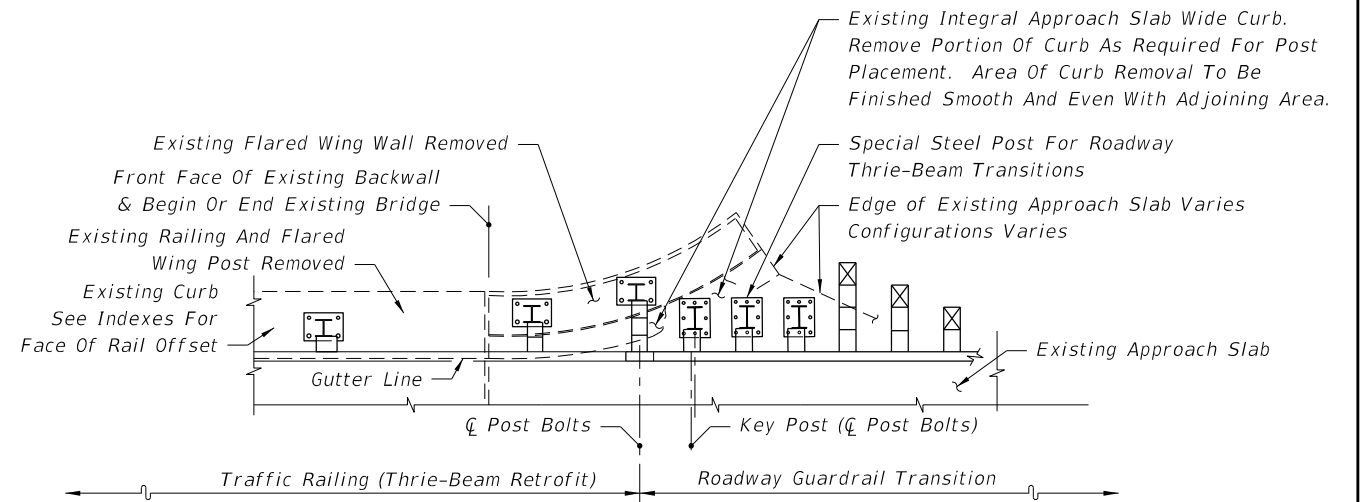
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS
FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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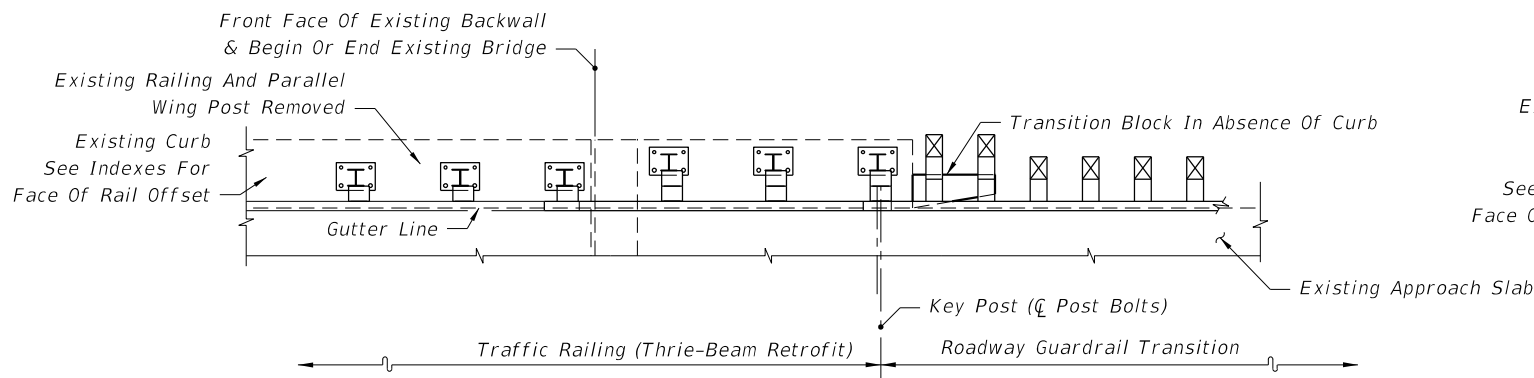
LAST REVISION 07/01/07	DESCRIPTION:	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 6 of 24
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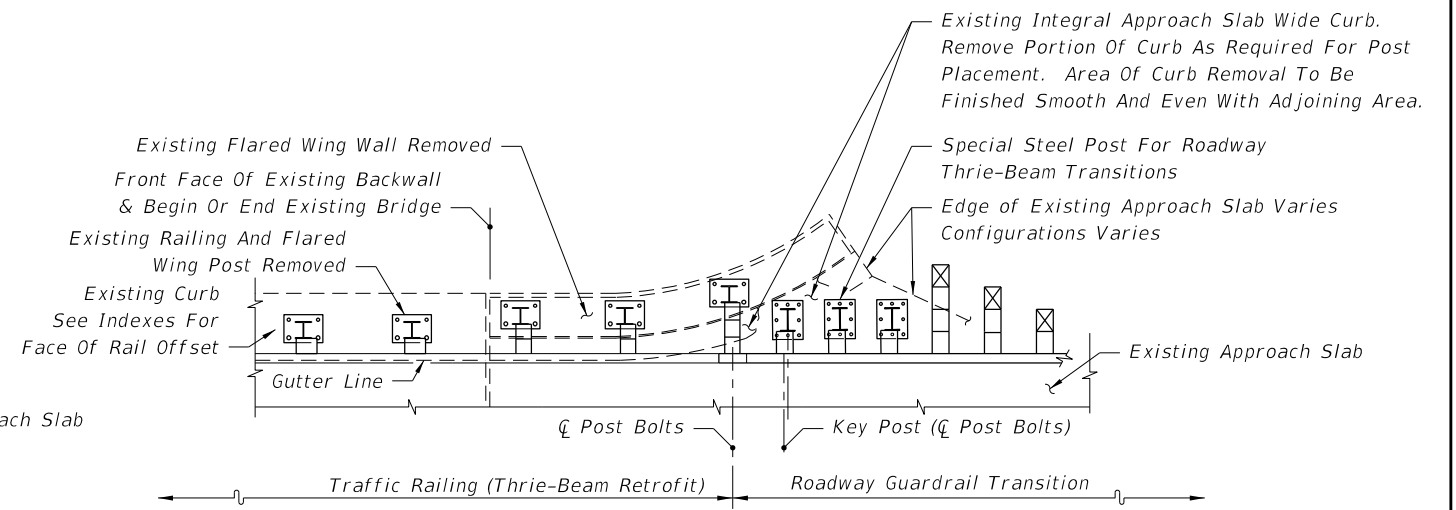
SEE INDEX NO. 474 - SCHEME 1



SEE INDEX NO. 474 - SCHEME 3




SEE INDEX NO. 474 - SCHEME 2

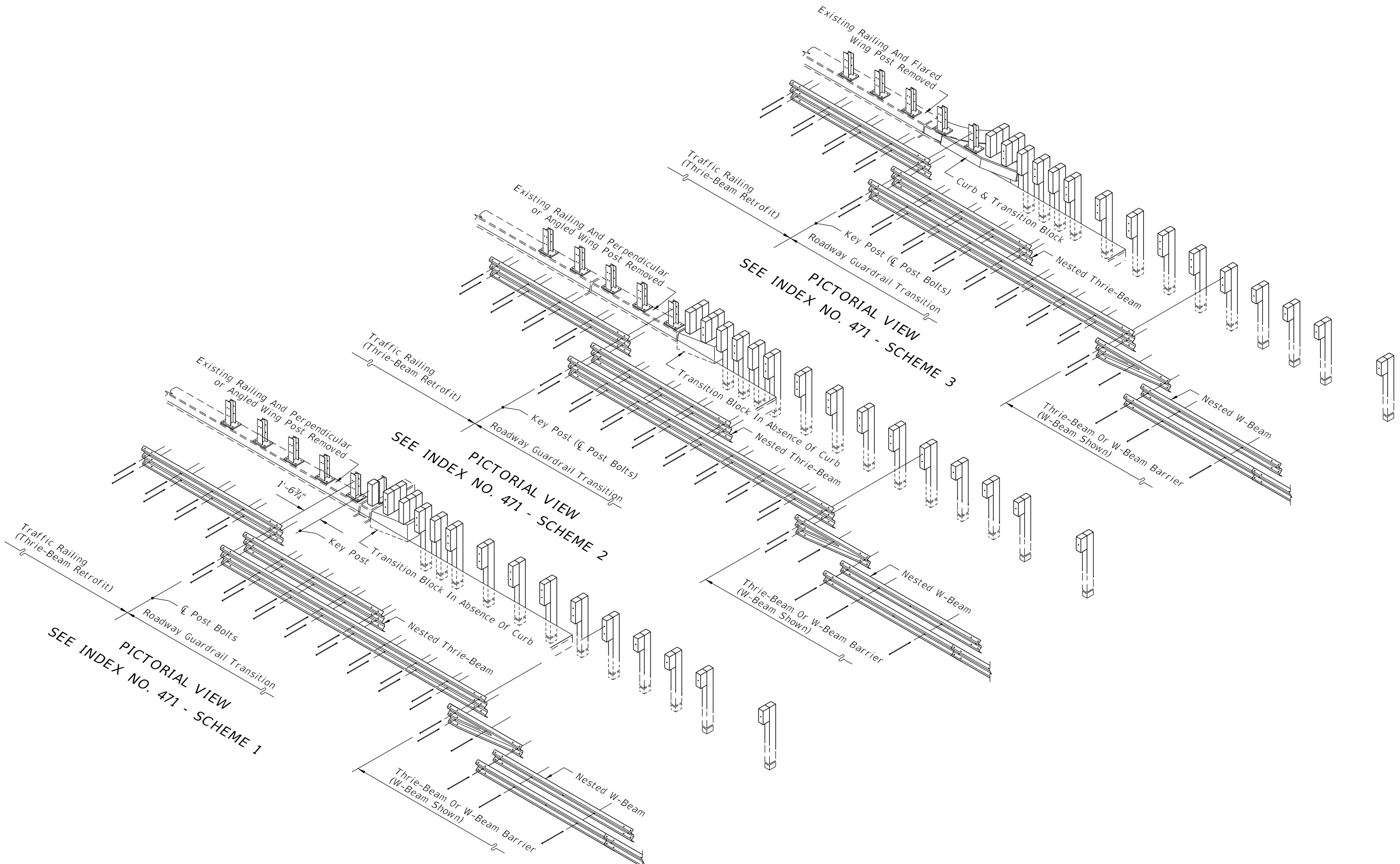


SEE INDEX NO. 474 - SCHEME 3

PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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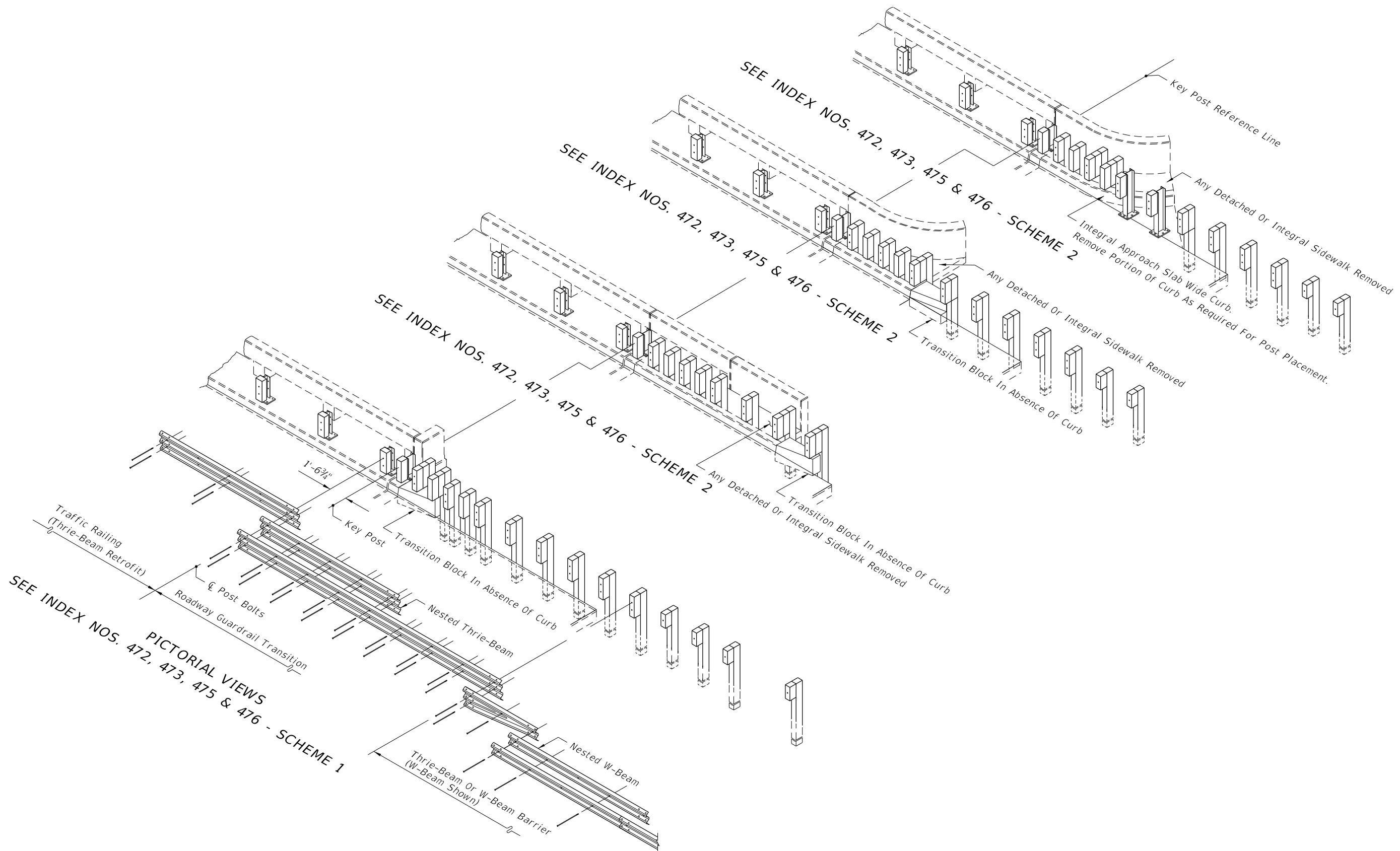
LAST REVISION 07/01/07	REVISION DESCRIPTION:	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 7 of 24
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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

10/26/2016 6:37:33 AM

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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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LAST REVISION 07/01/14	DESCRIPTION:
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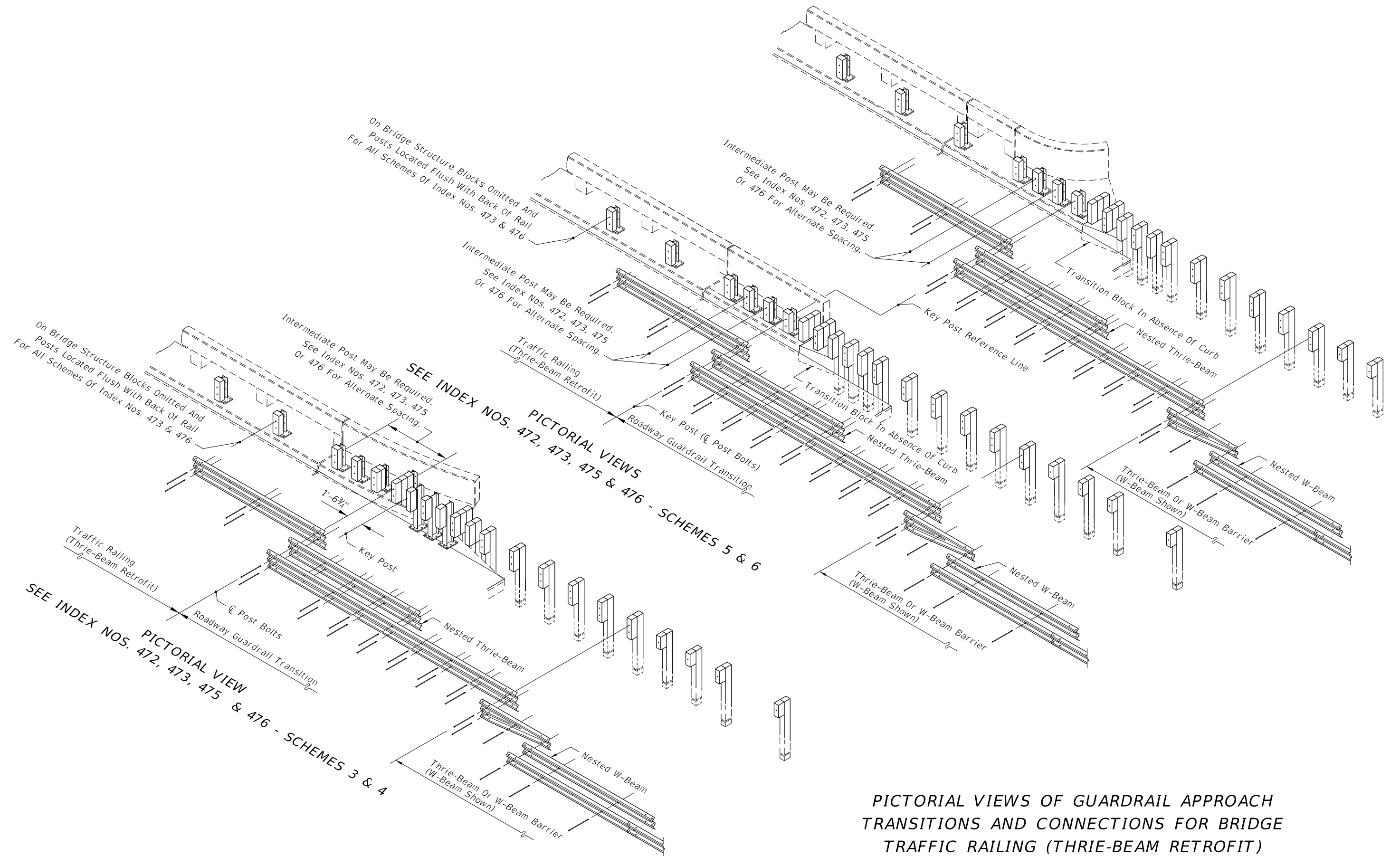


GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

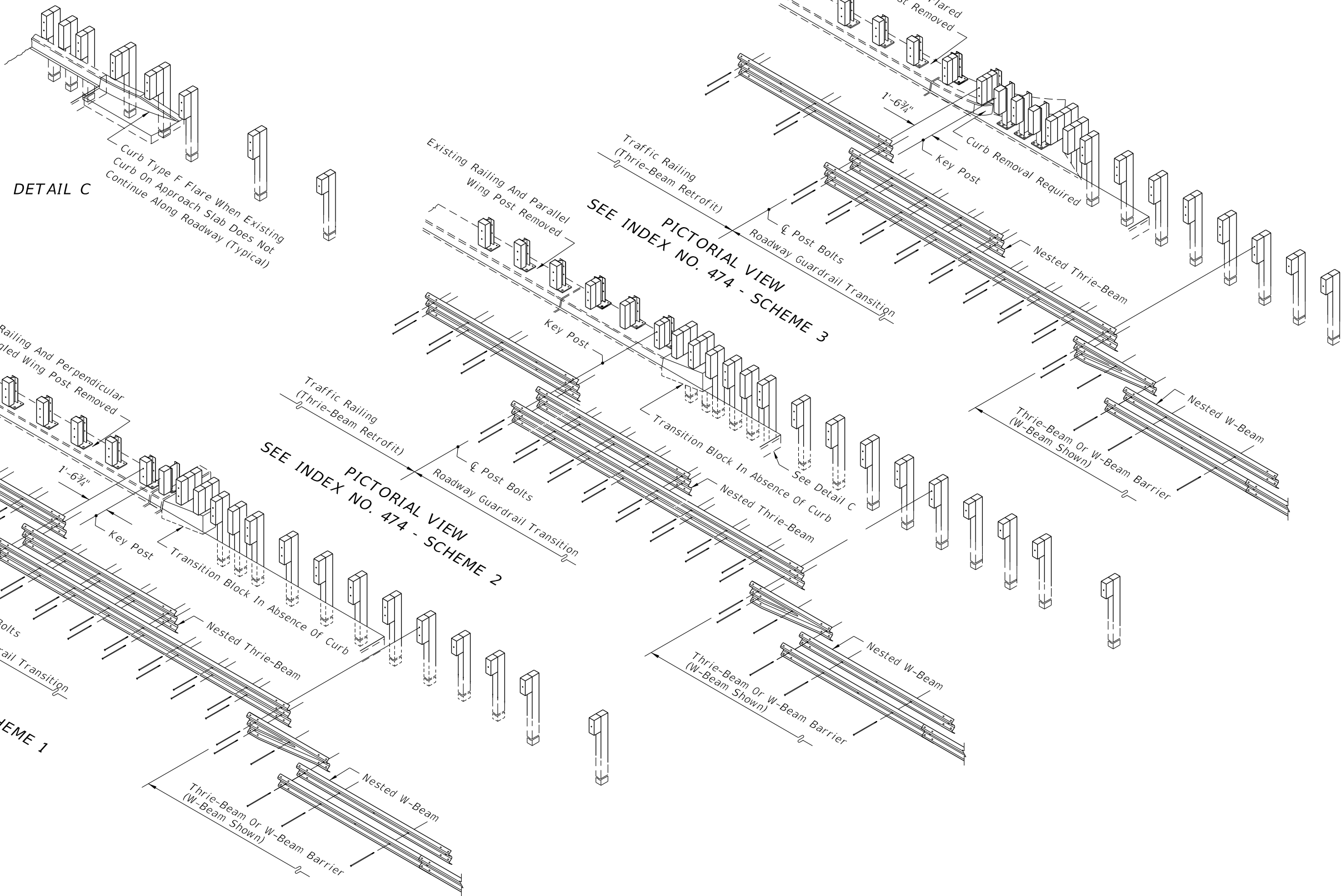
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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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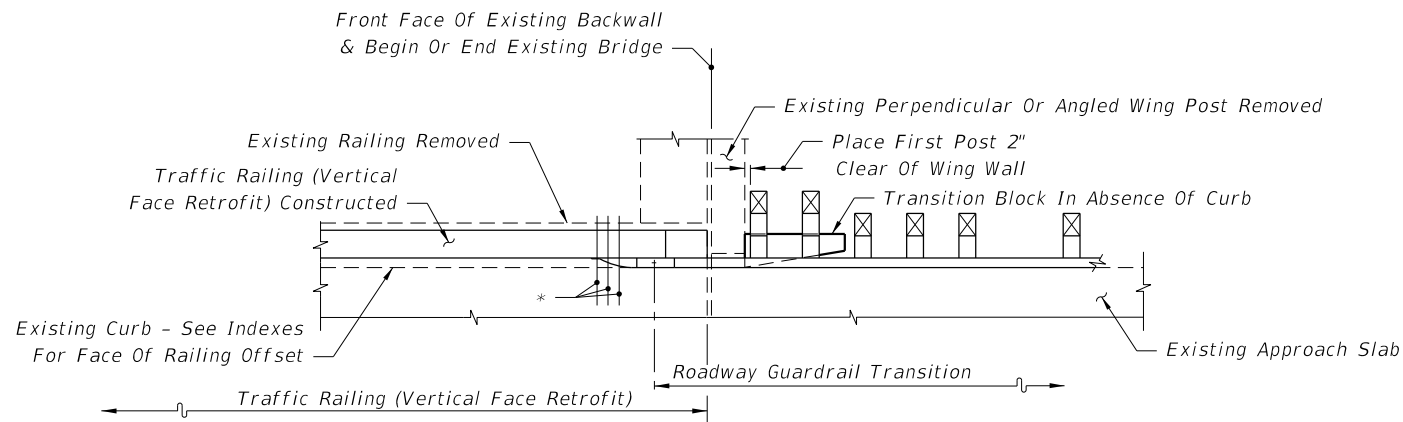
SHEET NO.
10 of 24



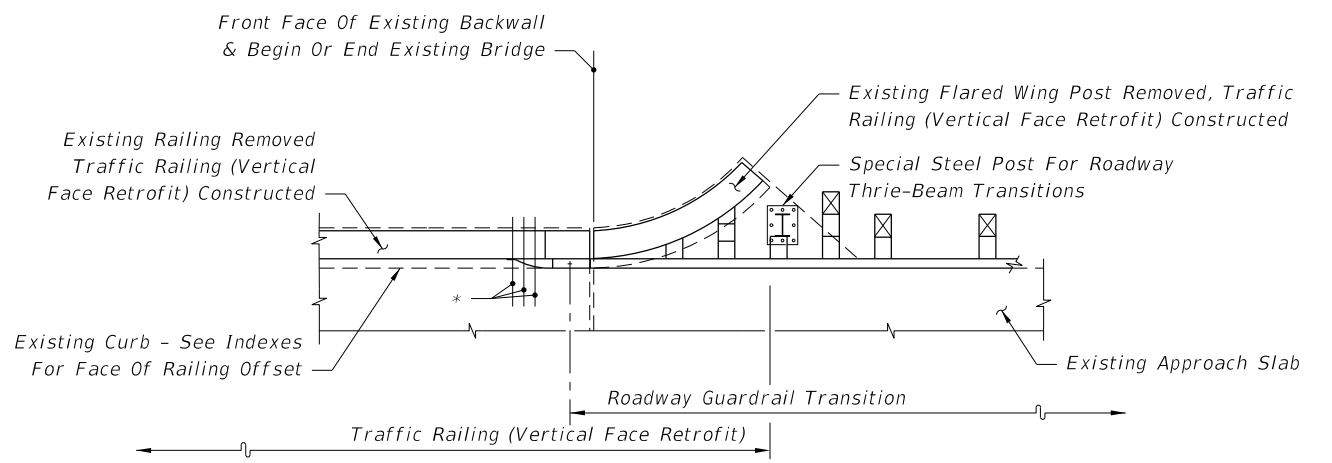
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

10/26/2016 6:37:39 AM

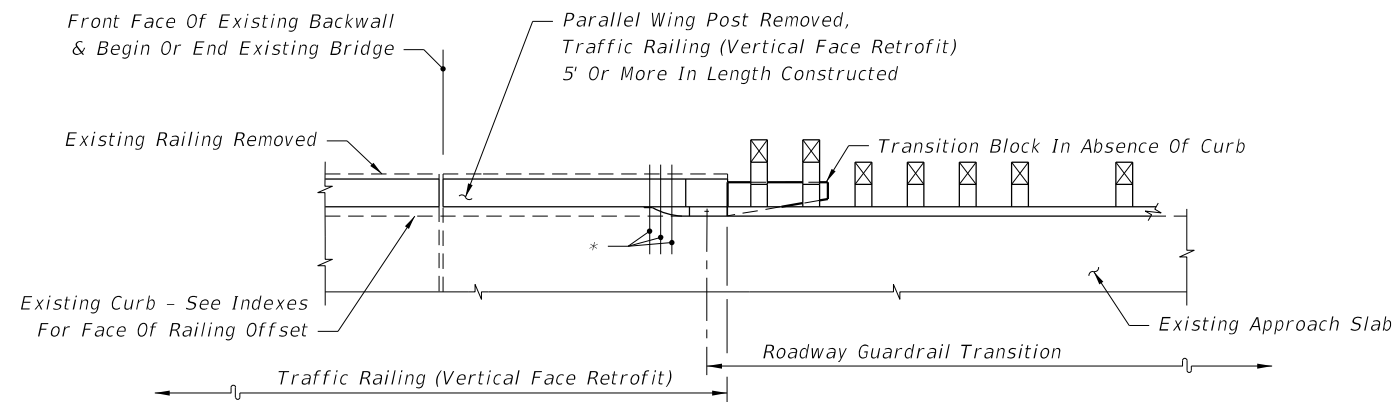
LAST REVISION 07/01/14	DESCRIPTION:	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 11 of 24
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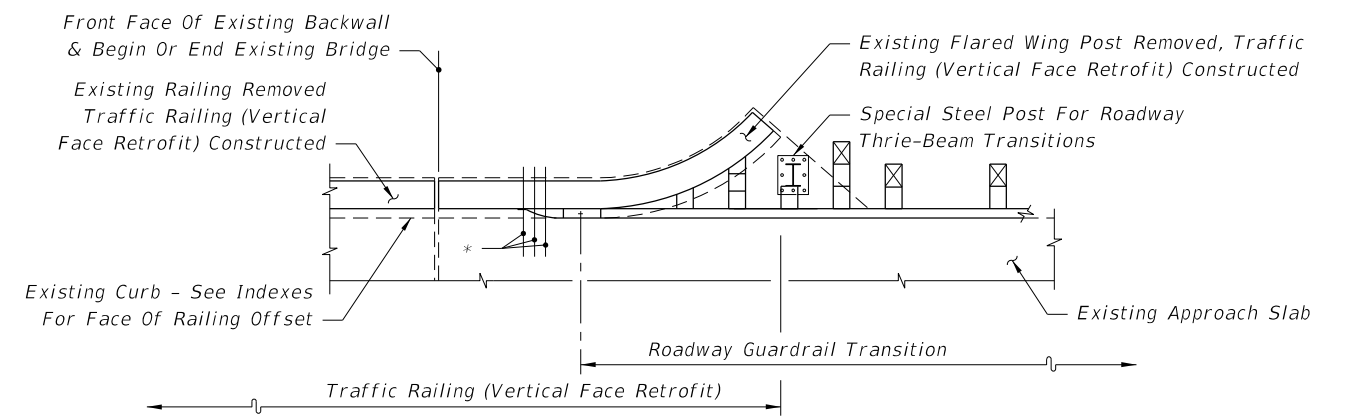
SEE INDEX NO. 481 - SCHEME 1



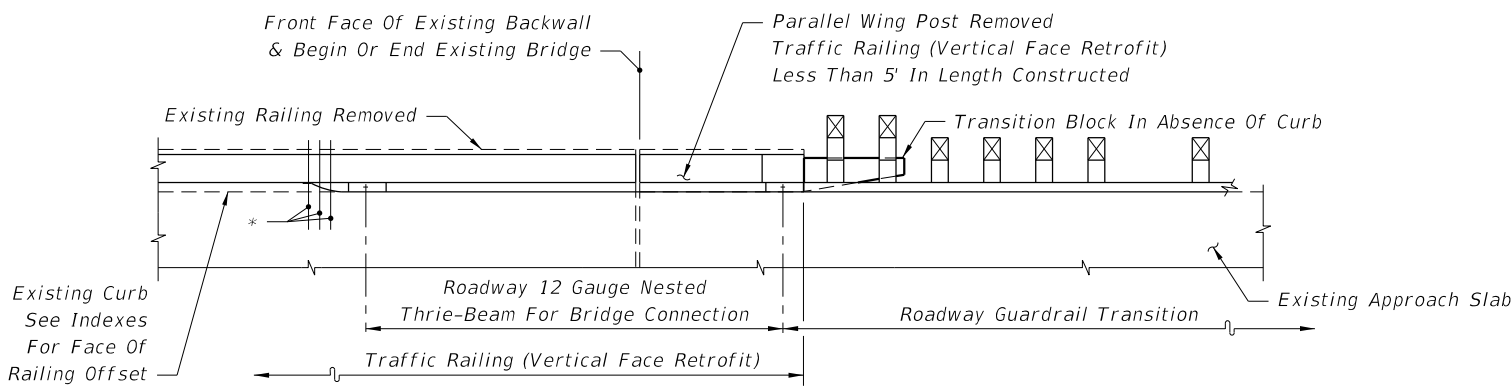
SEE INDEX NO. 481 - SCHEME 3



SEE INDEX NO. 481 - SCHEME 2



SEE INDEX NO. 481 - SCHEME 3



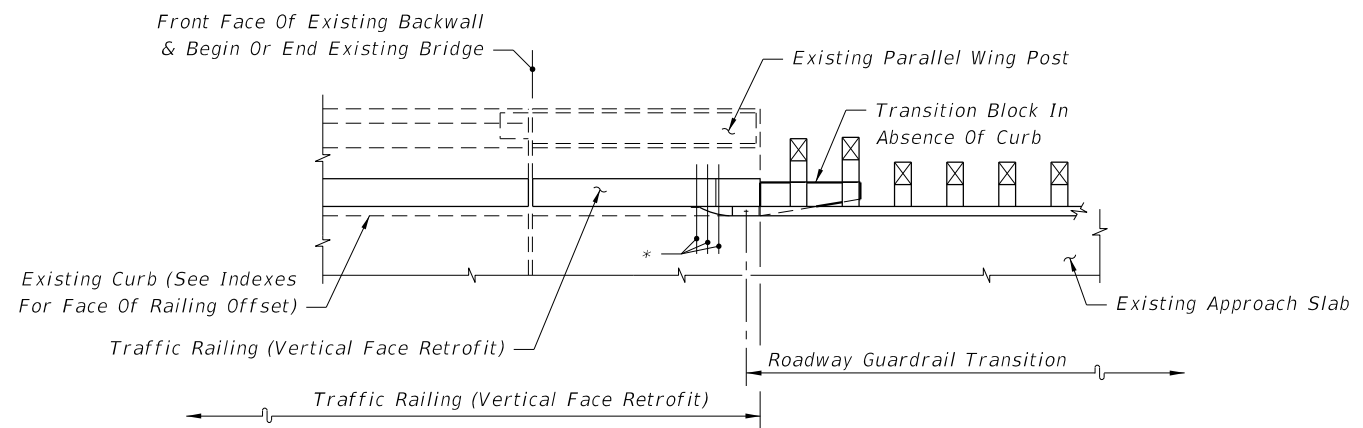
SEE INDEX NO. 481 - SCHEME 2

Note:
 * 21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø x 12" Long HS
 Hex Bolts And Nuts (5 Reqd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

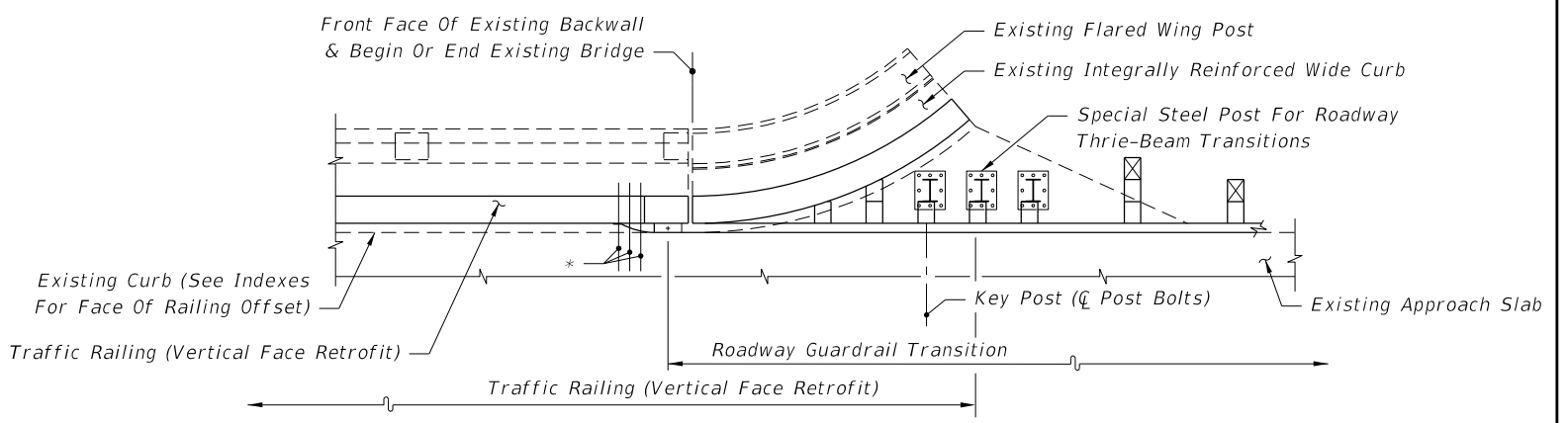
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)

10/26/2016 6:37:41 AM

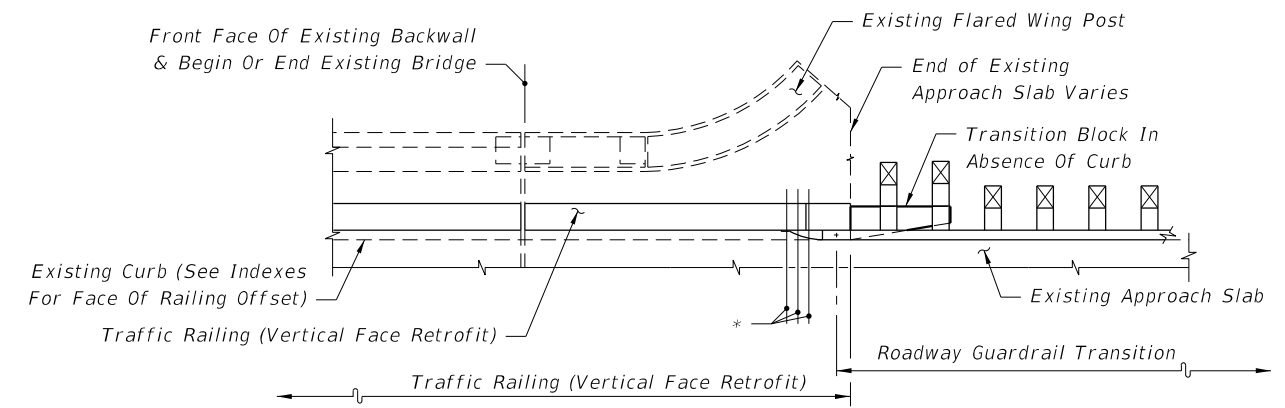
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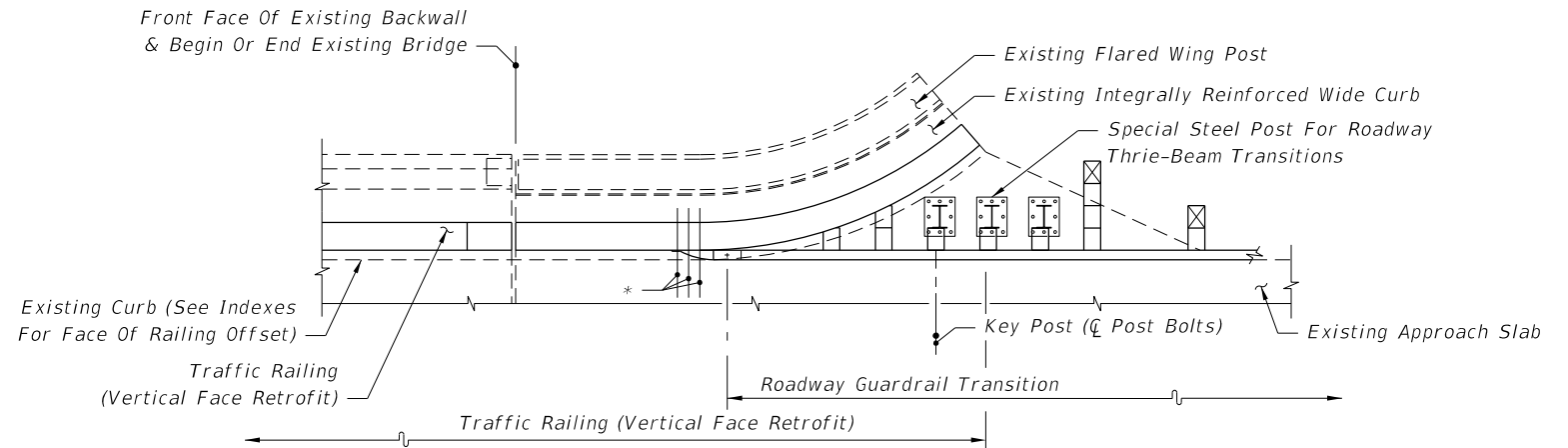
SEE INDEX NOS. 405 OR 482 - SCHEME 2



SEE INDEX NOS. 405 OR 482 - SCHEME 3



SEE INDEX NOS. 405 OR 482 - SCHEME 2



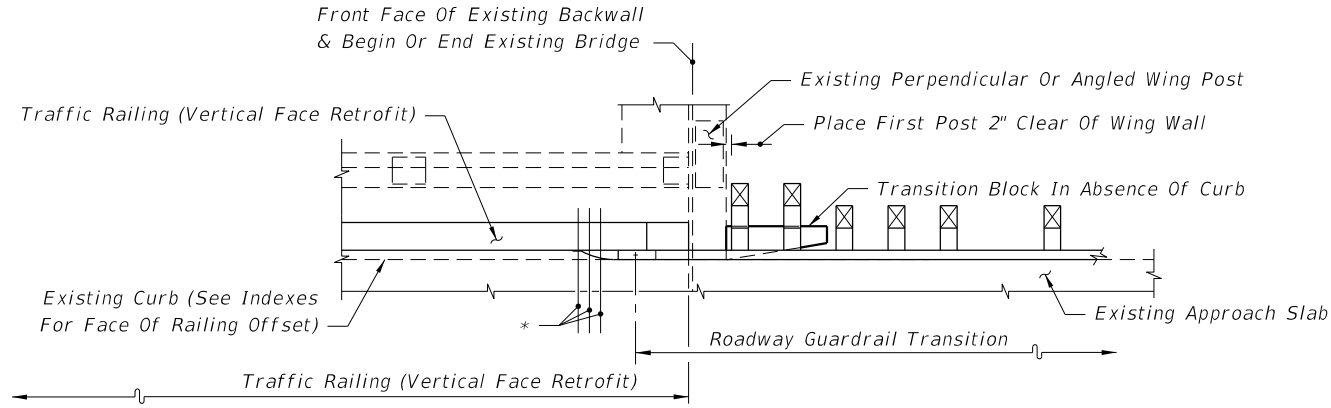
SEE INDEX NOS. 405 OR 482 - SCHEME 3

Note:
 *21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø x 12" Long
 HS Hex Bolts And Nuts (5 Reqd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

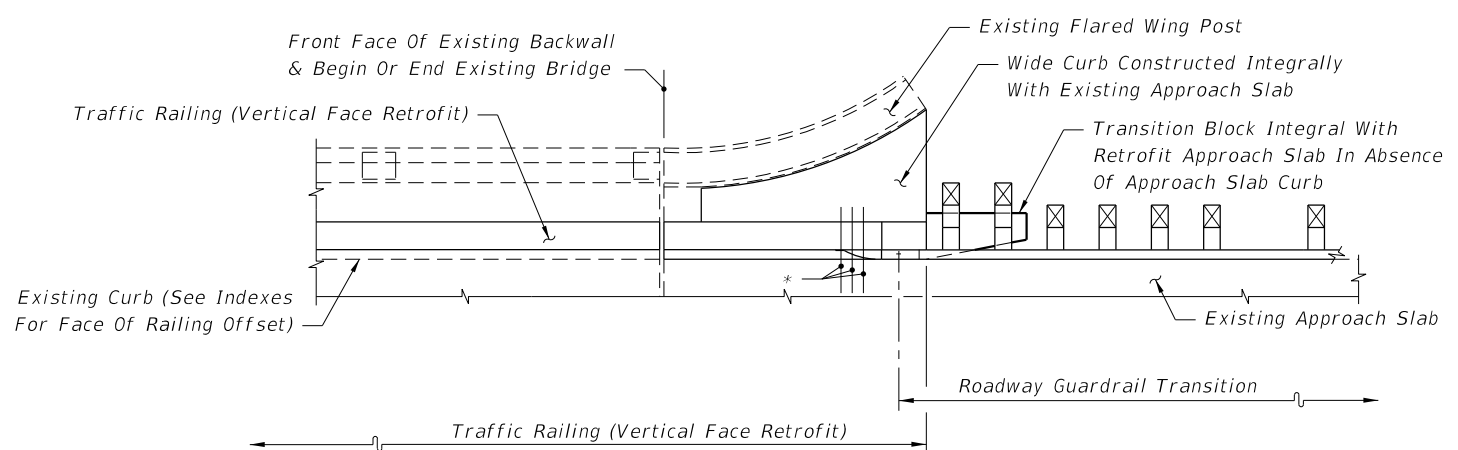
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)
 (INDEX 482 SHOWN, INDEX 405 SIMILAR)

10/26/2016 6:37:43 AM

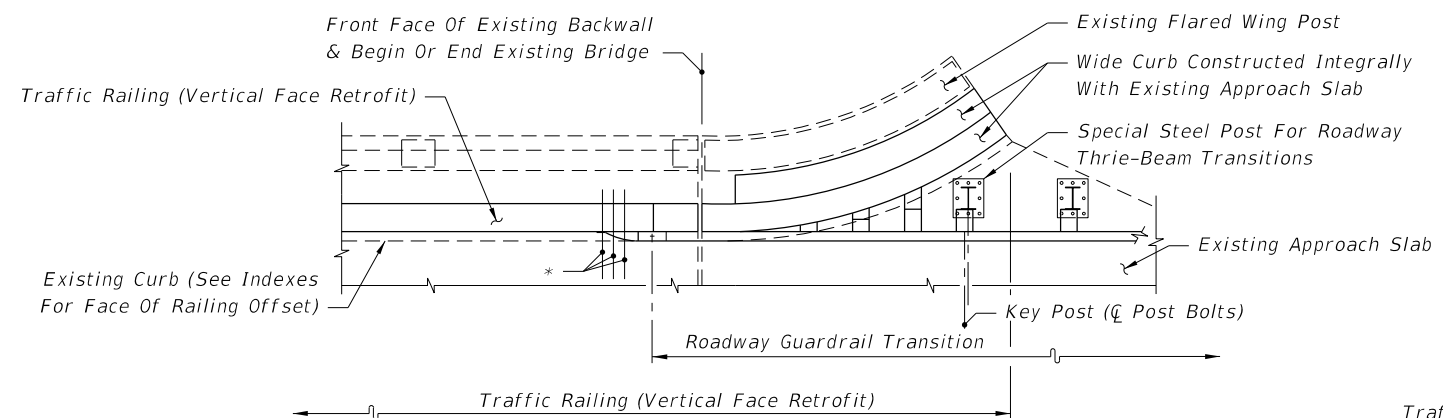
LAST REVISION 07/01/13	DESCRIPTION:	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 13 of 24
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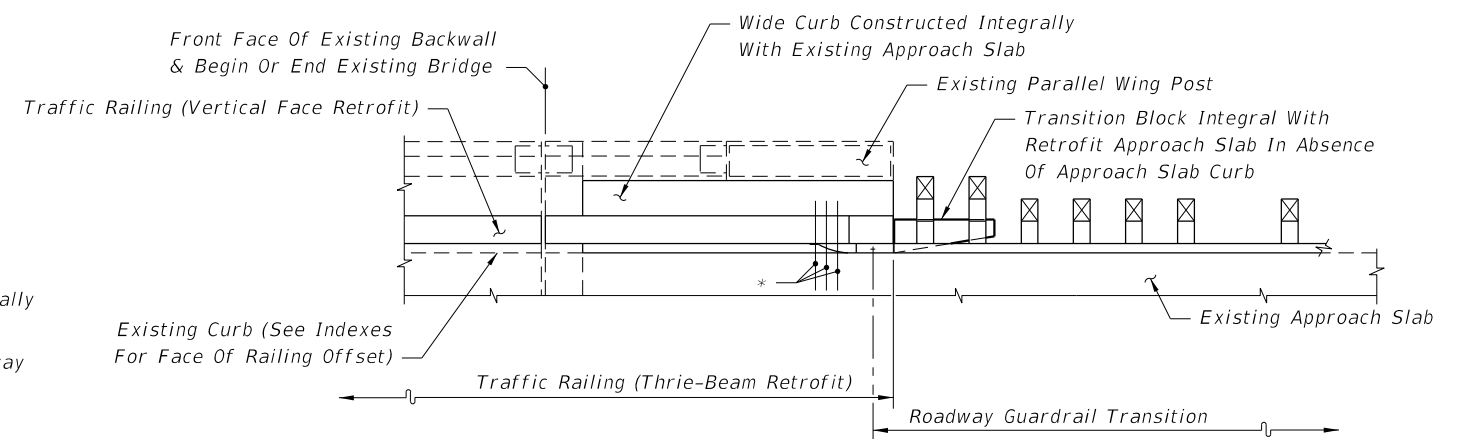
SEE INDEX NOS. 405 OR 482 - SCHEME 1



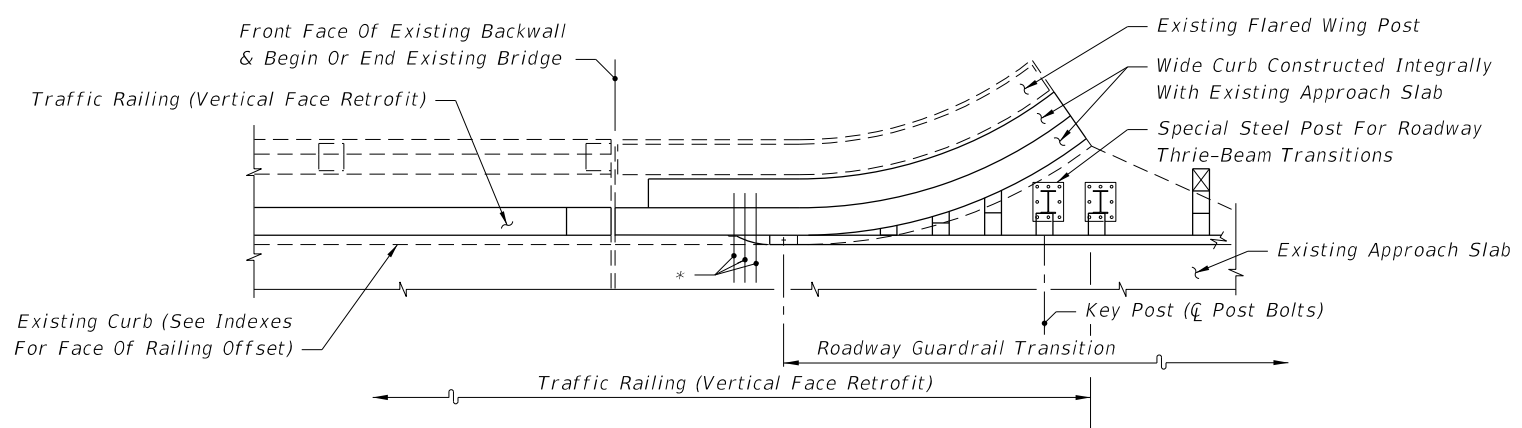
SEE INDEX NOS. 405 OR 482 - SCHEME 5



SEE INDEX NOS. 405 OR 482 - SCHEME 4



SEE INDEX NOS. 405 OR 482 - SCHEME 5



SEE INDEX NOS. 405 OR 482 - SCHEME 4

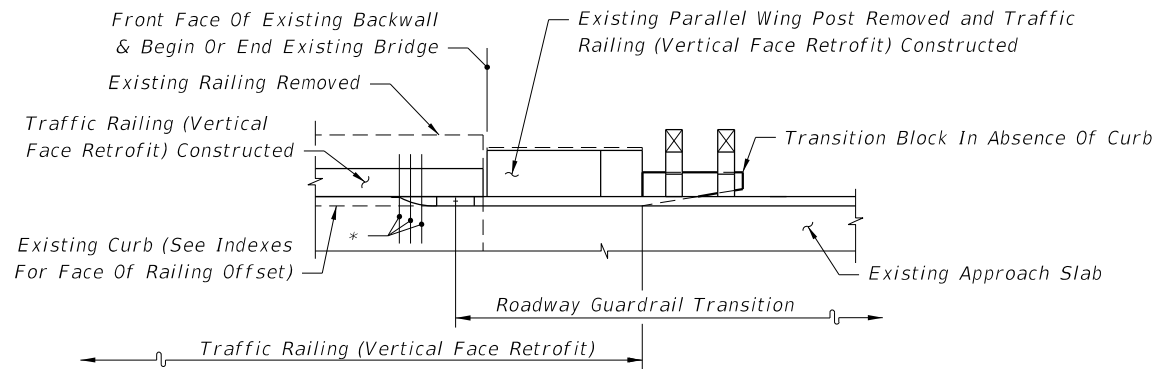
Note:
 * 21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø x 12" Long HS Hex Bolts And Nuts (5 Req'd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)
 (INDEX 482 SHOWN, INDEX 405 SIMILAR)

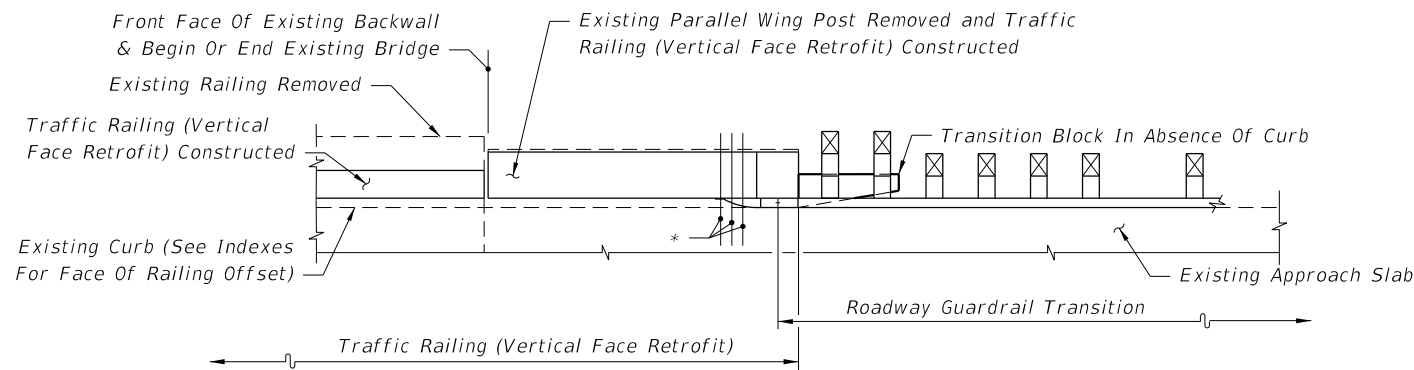
10/26/2016 6:37:47 AM

LAST REVISION 07/01/13	REVISION	DESCRIPTION:	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 14 of 24
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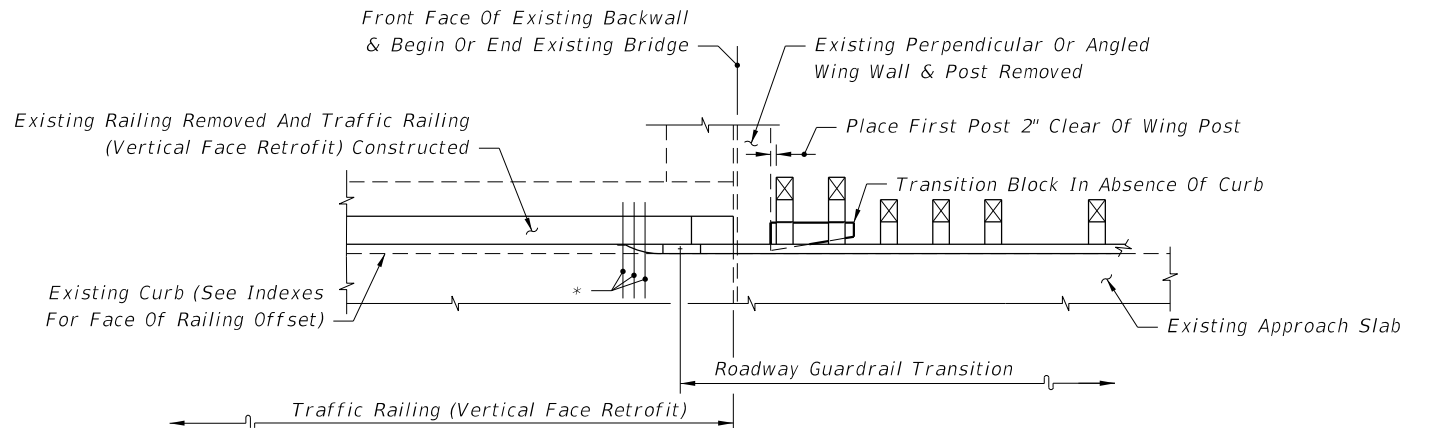
10/26/2016 6:37:49 AM



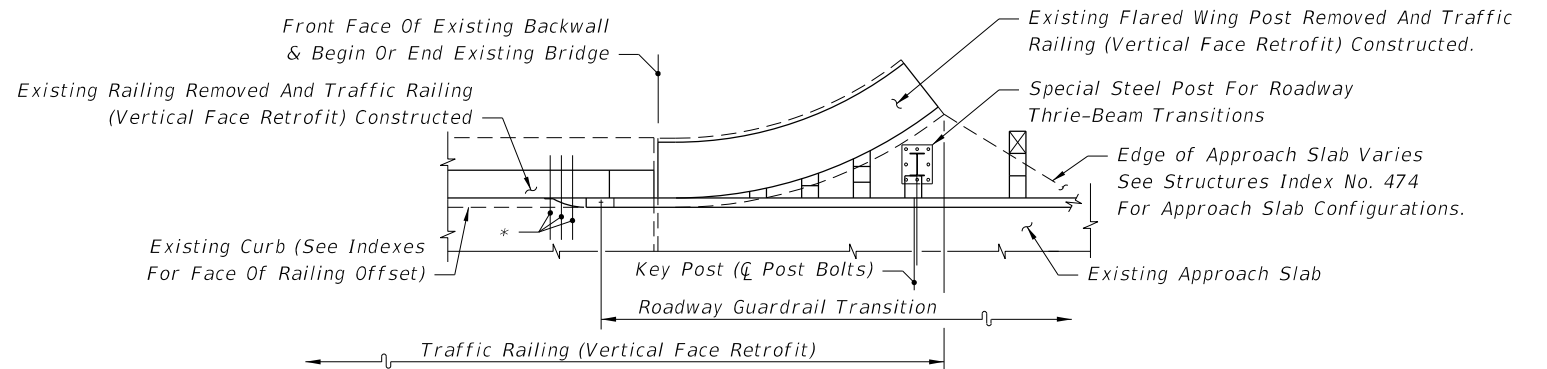
SEE INDEX NO. 483 - SCHEME 2



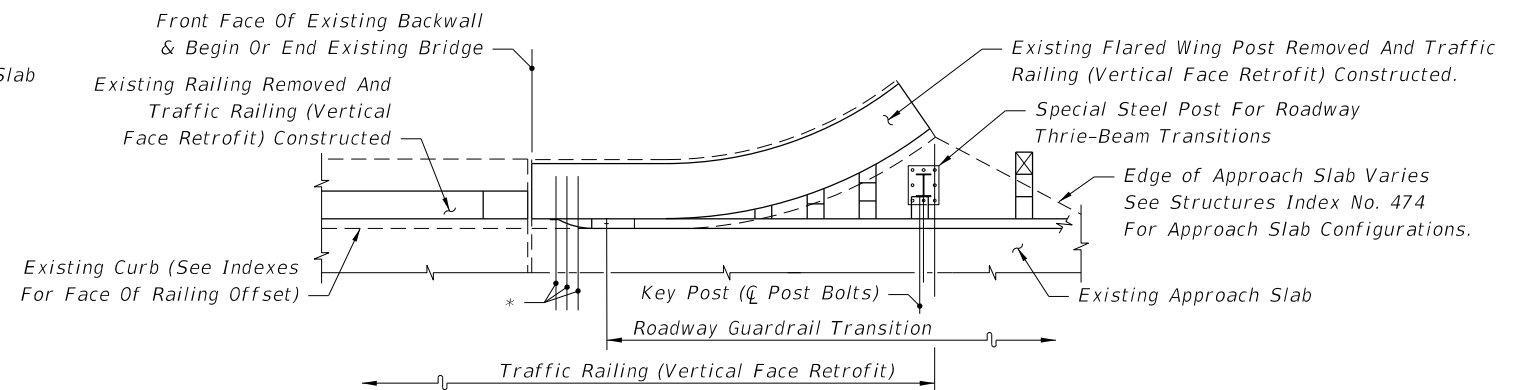
SEE INDEX NO. 483 - SCHEME 2



SEE INDEX NO. 483 - SCHEME 1



SEE INDEX NO. 483 - SCHEME 3



SEE INDEX NO. 483 - SCHEME 3

Note:

* 21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø HS Hex Bolts And Nuts (12" Long For Scheme 1 And Length To Fit For Schemes 2 And 3) (5 Req'd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

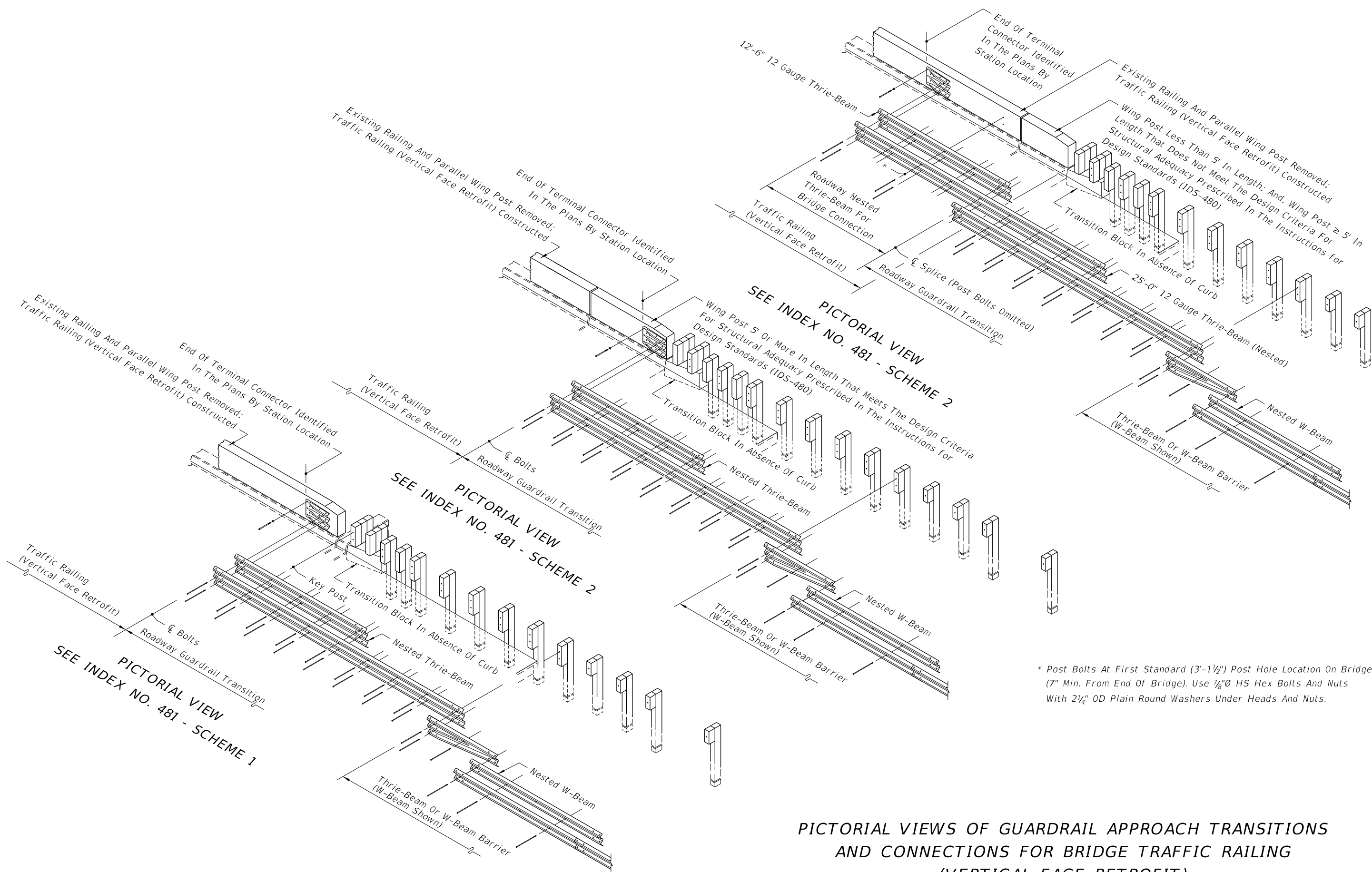
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)

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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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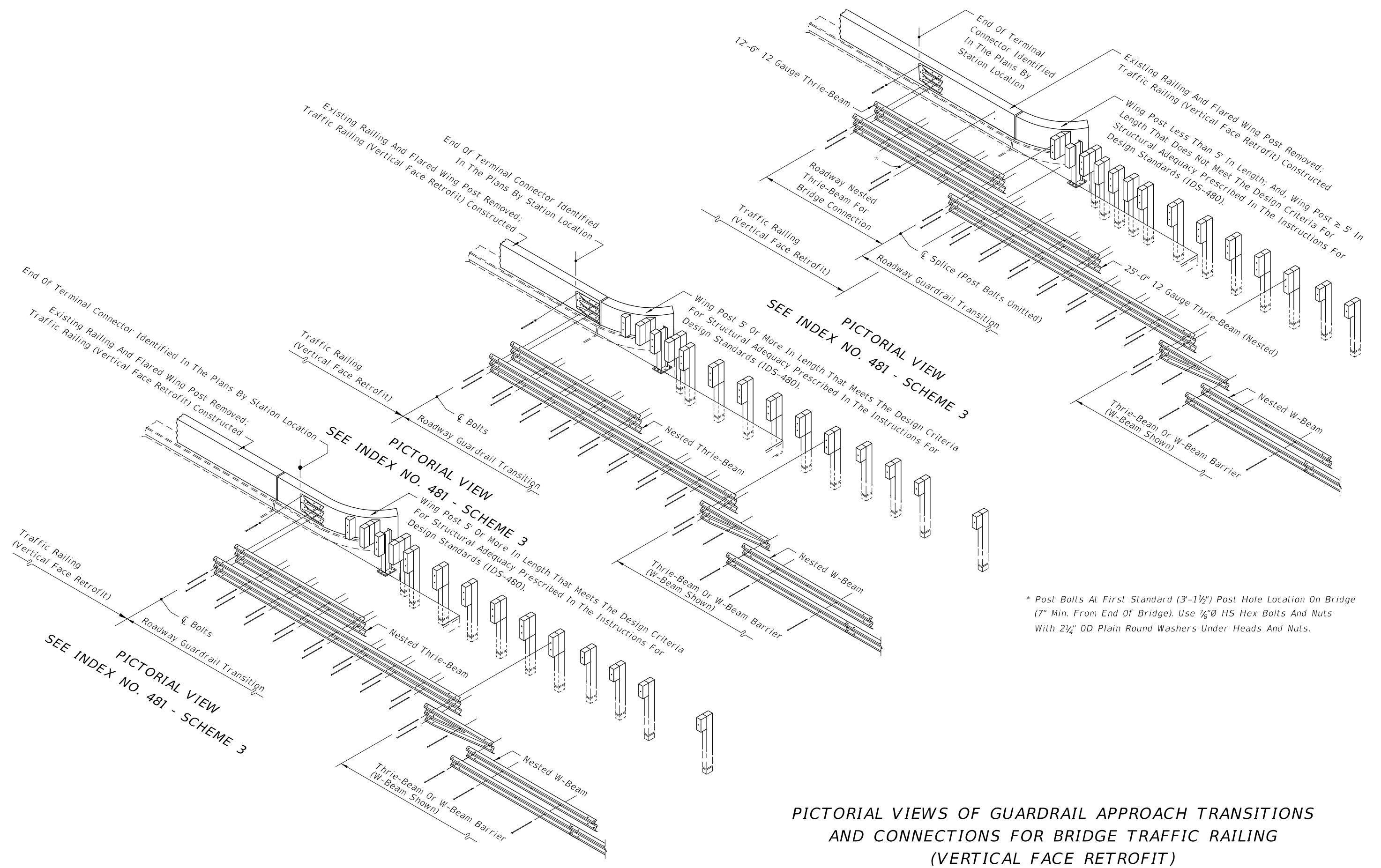


* Post Bolts At First Standard (3'-1 1/2") Post Hole Location On Bridge (7" Min. From End Of Bridge). Use 7/8" ϕ HS Hex Bolts And Nuts With 2 1/4" OD Plain Round Washers Under Heads And Nuts.

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

10/26/2016 6:37:51 AM

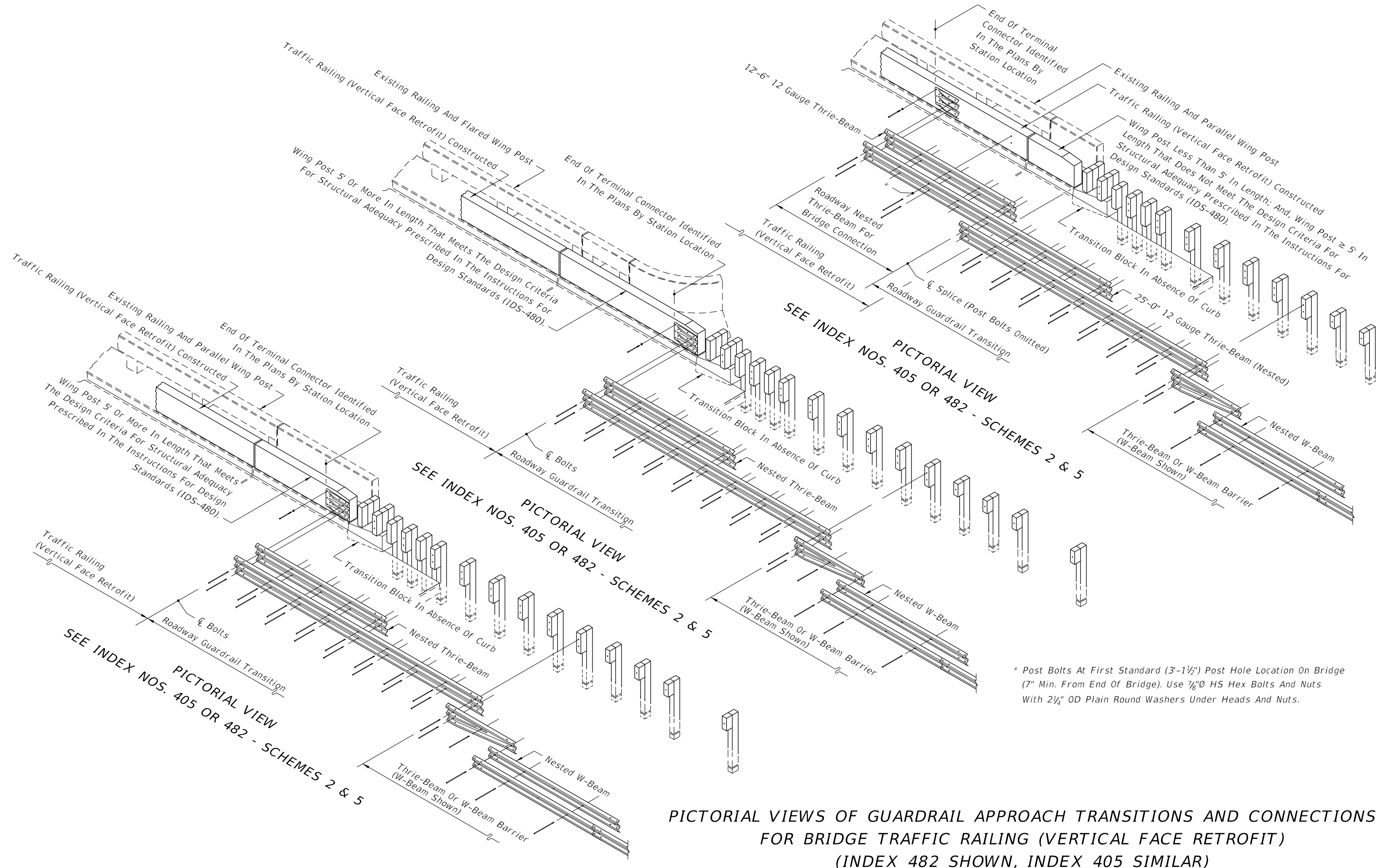
LAST REVISION 07/01/14	DESCRIPTION:	FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 16 of 24
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**PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS
AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING
(VERTICAL FACE RETROFIT)**

10/26/2016 6:37:55 AM

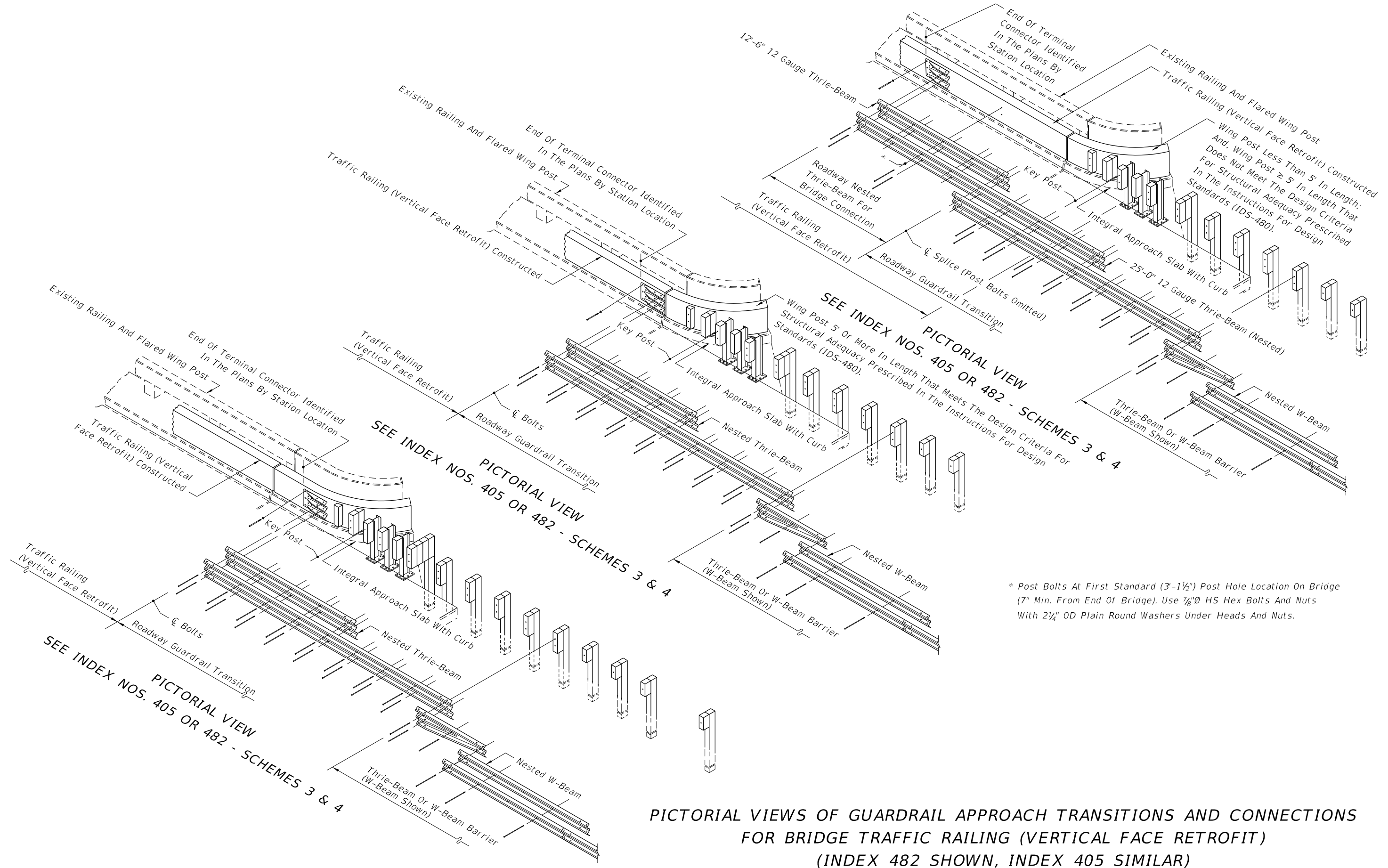
LAST REVISION 07/01/14	REVISION	DESCRIPTION:	FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 17 of 24
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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT) (INDEX 482 SHOWN, INDEX 405 SIMILAR)

10/26/2016 6:37:57 AM

LAST REVISION 07/01/14	REVISION	DESCRIPTION:	FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 18 of 24
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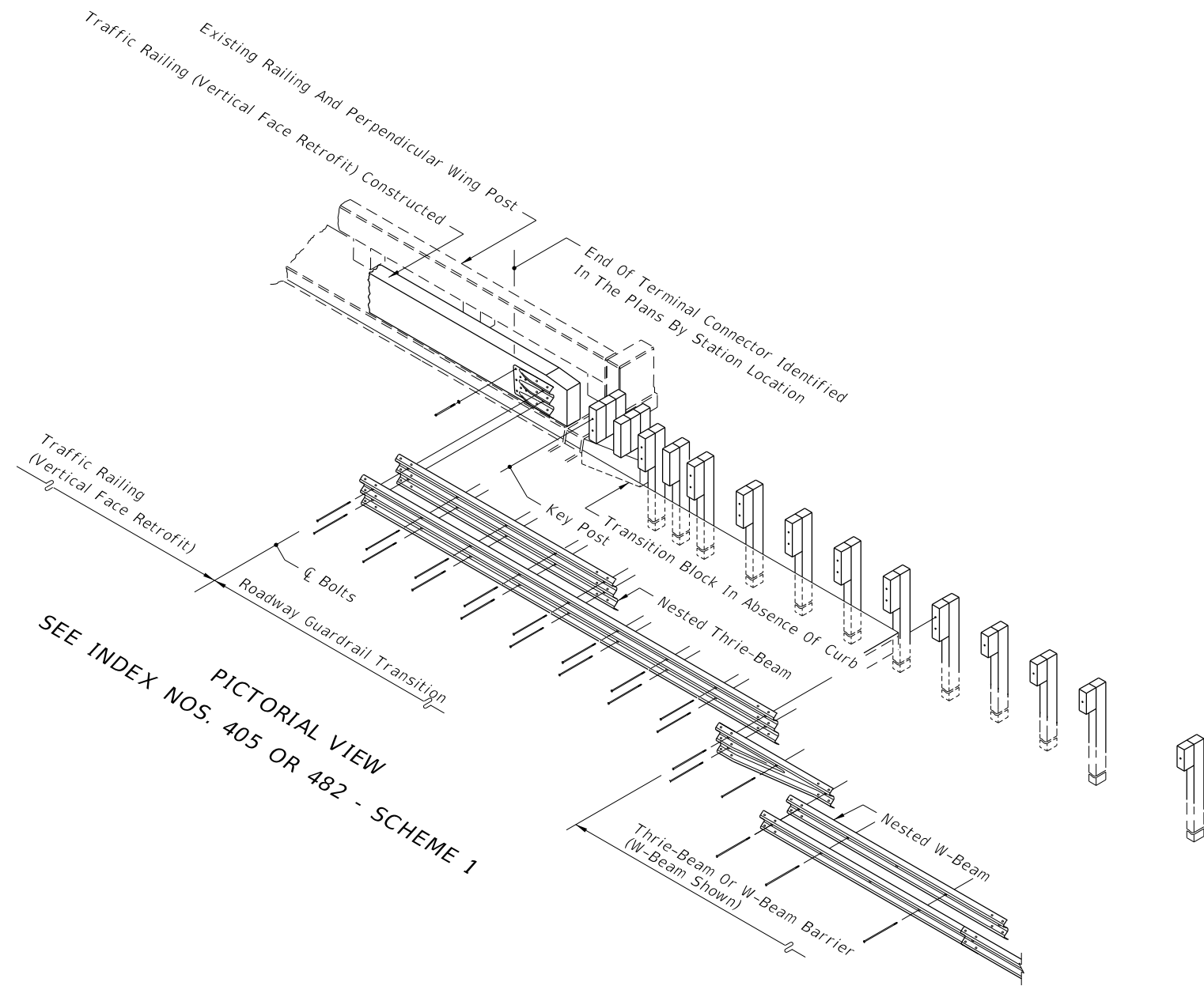


PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT) (INDEX 482 SHOWN, INDEX 405 SIMILAR)

10/26/2016 6:38:00 AM

LAST REVISION 07/01/14	REVISION	DESCRIPTION:	FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 19 of 24
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PICTORIAL VIEW
 SEE INDEX NOS. 405 OR 482 - SCHEME 1

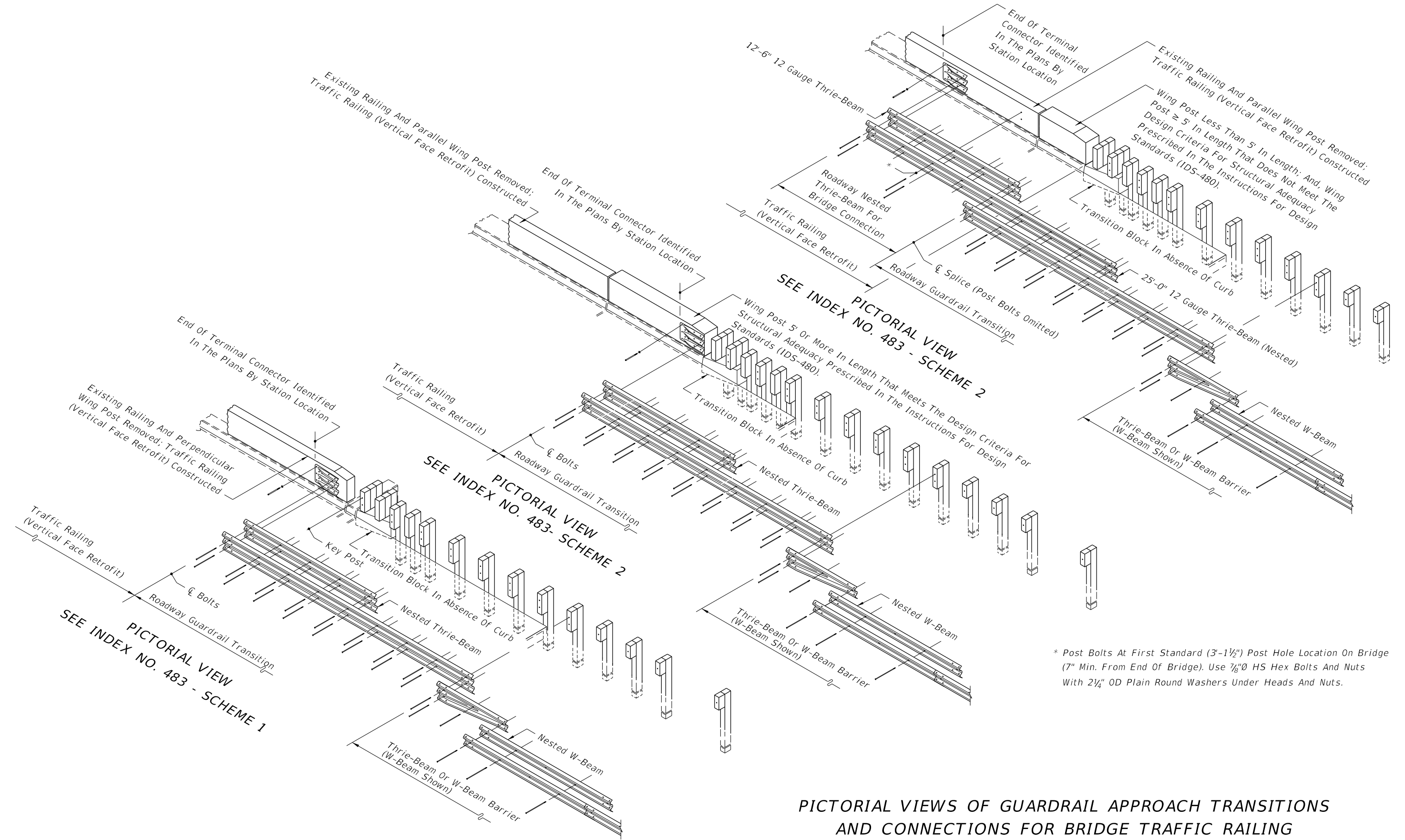
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT) (INDEX 482 SHOWN, INDEX 405 SIMILAR)

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FY 2017-18
DESIGN STANDARDS

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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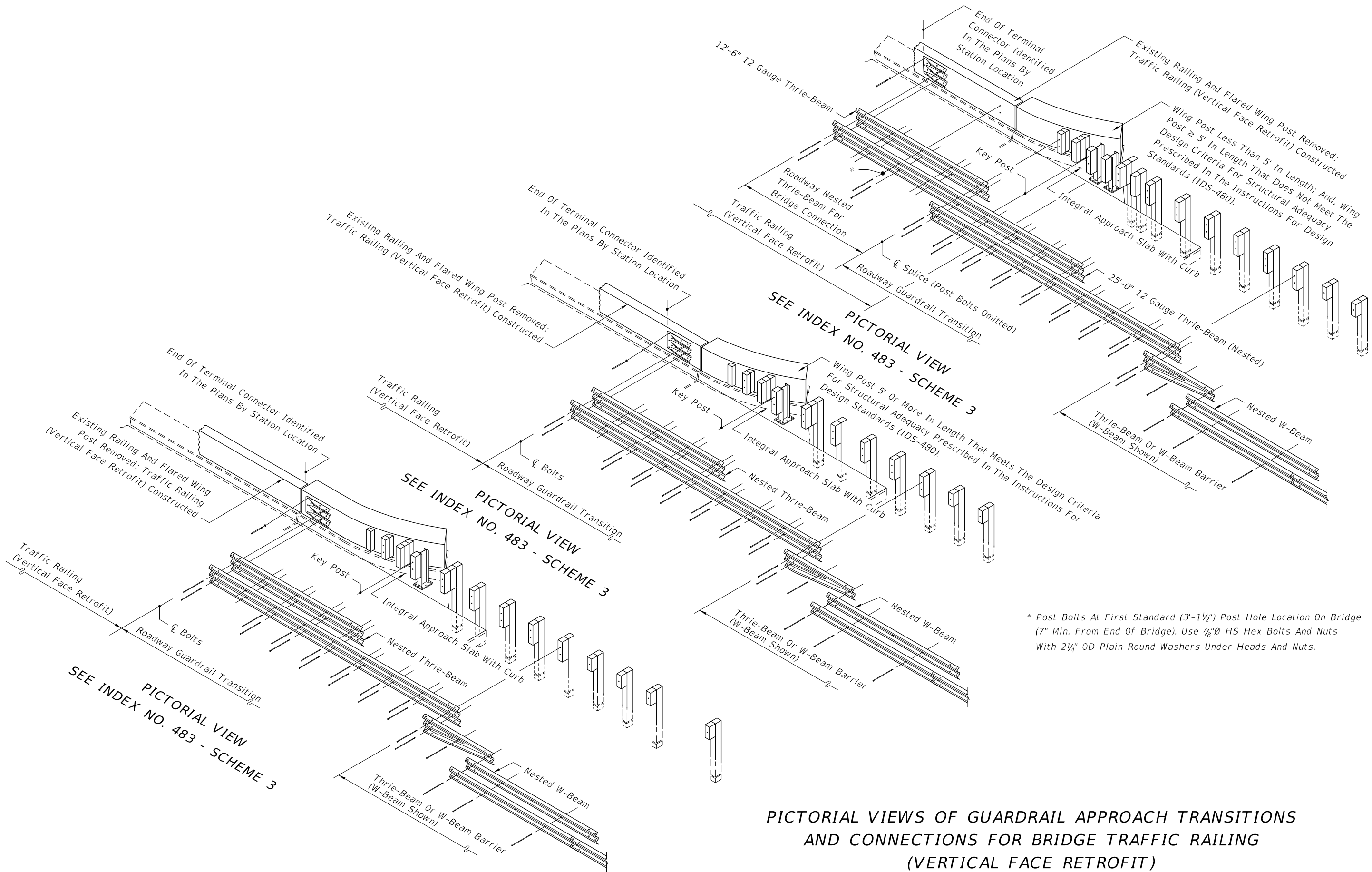


* Post Bolts At First Standard (3'-1 1/2") Post Hole Location On Bridge (7" Min. From End Of Bridge). Use 7/8" ϕ HS Hex Bolts And Nuts With 2 1/4" OD Plain Round Washers Under Heads And Nuts.

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

10/26/2016 6:38:04 AM

LAST REVISION 07/01/14	DESCRIPTION:	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 21 of 24
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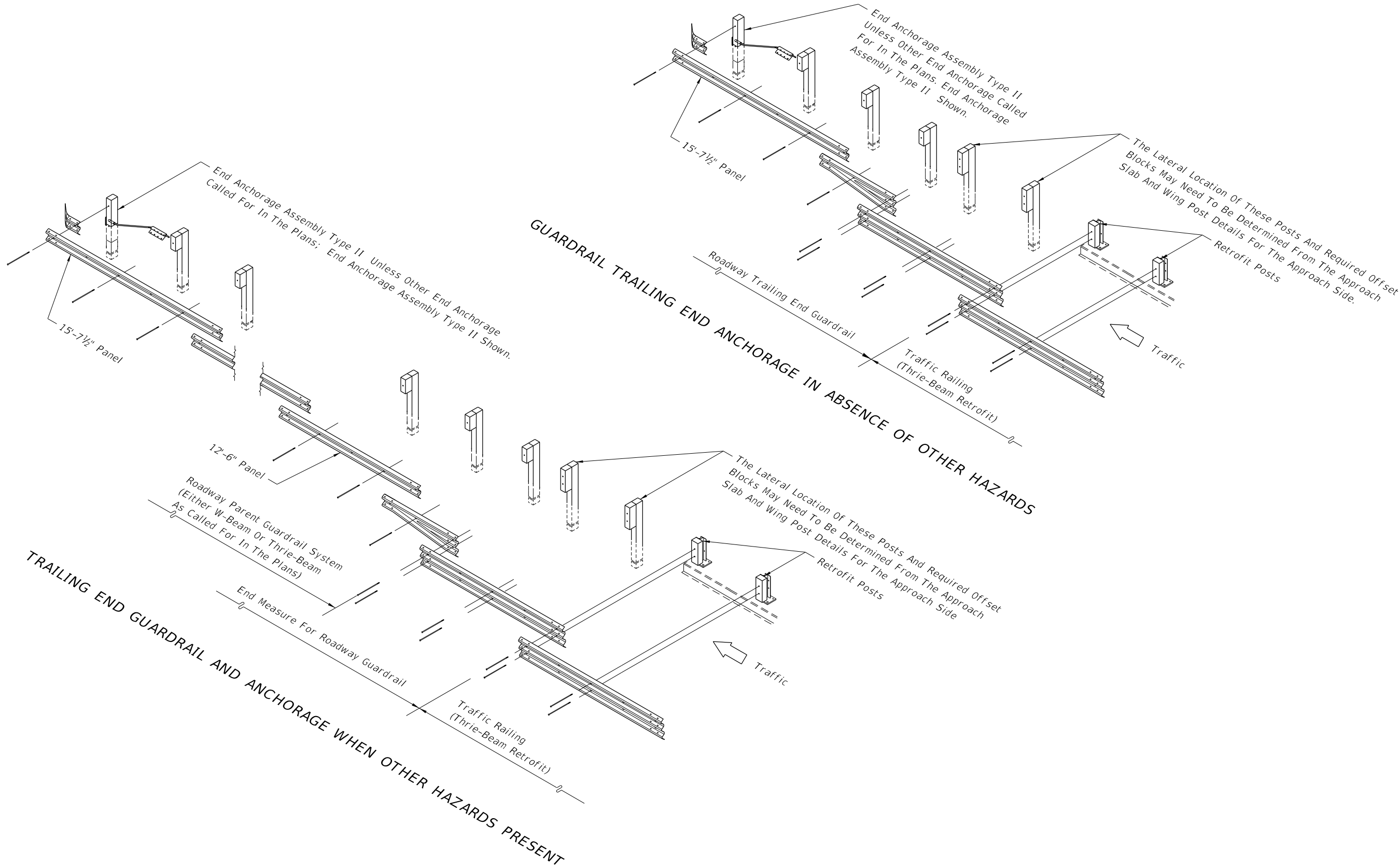


* Post Bolts At First Standard (3'-1 1/2") Post Hole Location On Bridge (7" Min. From End Of Bridge). Use 7/8"Ø HS Hex Bolts And Nuts With 2 1/4" OD Plain Round Washers Under Heads And Nuts.

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

10/26/2016 6:38:06 AM

LAST REVISION 07/01/14	DESCRIPTION: 	 FY 2017-18 DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 22 of 24
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TRAILING END GUARDRAIL AND ANCHORAGE FOR BRIDGE TRAFFIC RAILING (THRIE BEAM RETROFITS)

10/26/2016 6:38:09 AM

LAST REVISION 11/01/16	REVISION	DESCRIPTION:
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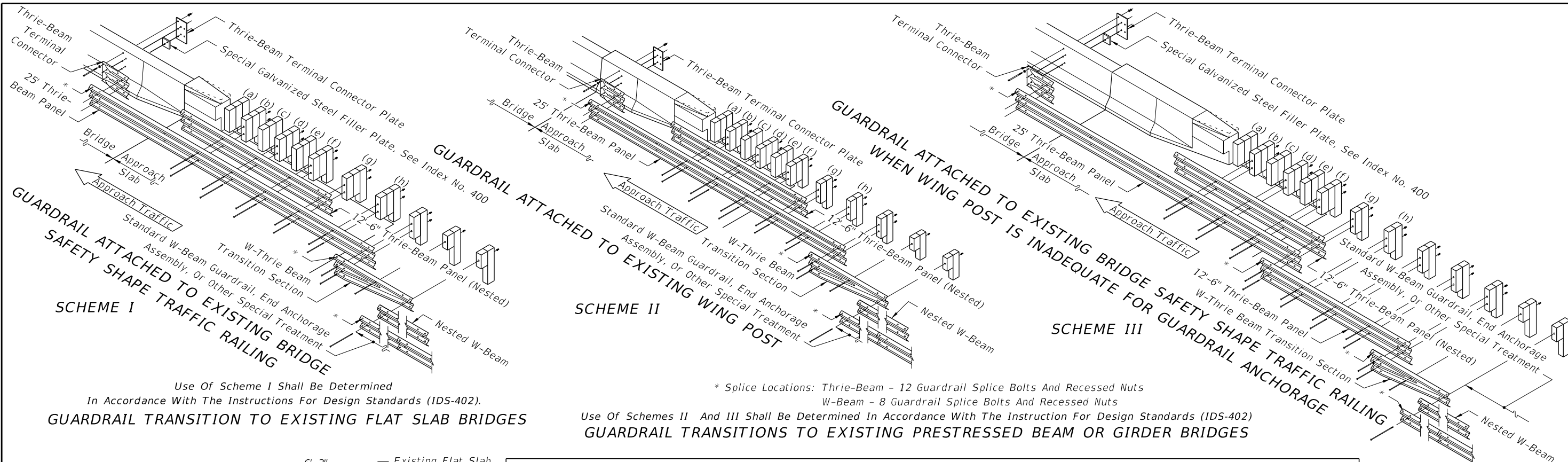
FY 2017-18

 DESIGN STANDARDS

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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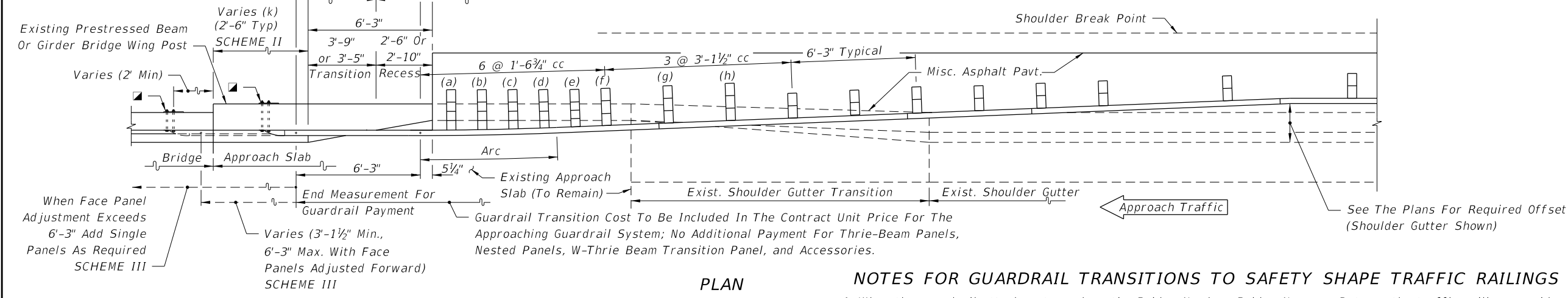


SCHEME I
GUARDRAIL ATTACHED TO EXISTING BRIDGE SAFETY SHAPE TRAFFIC RAILING
 Use Of Scheme I Shall Be Determined In Accordance With The Instructions For Design Standards (IDS-402).
GUARDRAIL TRANSITION TO EXISTING FLAT SLAB BRIDGES

SCHEME II
GUARDRAIL ATTACHED TO EXISTING WING POST
SCHEME III
GUARDRAIL ATTACHED TO EXISTING BRIDGE SAFETY SHAPE TRAFFIC RAILING WHEN WING POST IS INADEQUATE FOR GUARDRAIL ANCHORAGE
 * Splice Locations: Thrie-Beam - 12 Guardrail Splice Bolts And Recessed Nuts
 W-Beam - 8 Guardrail Splice Bolts And Recessed Nuts
 Use Of Schemes II And III Shall Be Determined In Accordance With The Instruction For Design Standards (IDS-402).
GUARDRAIL TRANSITIONS TO EXISTING PRESTRESSED BEAM OR GIRDER BRIDGES

APPROACH POSTS AND SPECIAL OFFSET BLOCKS

Block assemblies for special offsets can be made up of one special block plus one standard size block or of three standard size blocks field dressed to approximately equal size, with the pieces secured for relative position by 16d galvanized nails, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION' - Index 400. The nested rails shall not be bolted to the blocks and posts at posts (a), (c) and (e). The details shown are for approach slabs with internal edge dike extending beyond parapet type traffic railing termini.



PLAN

NOTES FOR GUARDRAIL TRANSITIONS TO SAFETY SHAPE TRAFFIC RAILINGS ON EXISTING BRIDGES

1. When the guardrail attachment overlays the Bridge Number, Bridge Name or Date on the traffic railing, provide an aluminum sign panel with the obscured information. Attach the sign panel to the face of the traffic railing adjacent to the Thrie-Beam Terminal Connector with 1/4"Ø x 1" long concrete screws or expansion anchors at each corner, as approved by the Engineer. The sign panel shall be a minimum 1/16" thick and meet the requirements of Specification Section 700 with a white background and 3" tall black letters and sized appropriately to contain the information required. The cost of the sign panel shall be included in the cost of the Guardrail Bridge Anchorage Assembly.
2. When retrofitting thrie-beam guardrail to existing wing posts or existing bridge safety shape traffic railing, attachment construction to be paid for under the contract unit price for Guardrail Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate(s) and bolts, nuts and washers.

GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR EXISTING FLAT SLAB, PRESTRESSED BEAM AND GIRDER BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

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10/26/2016 6:38:12 AM