

**BOX BEAM STANDARD PLAN
INDEX OF SHEETS**

SHEET

TOPIC

LAYOUT DETAILS

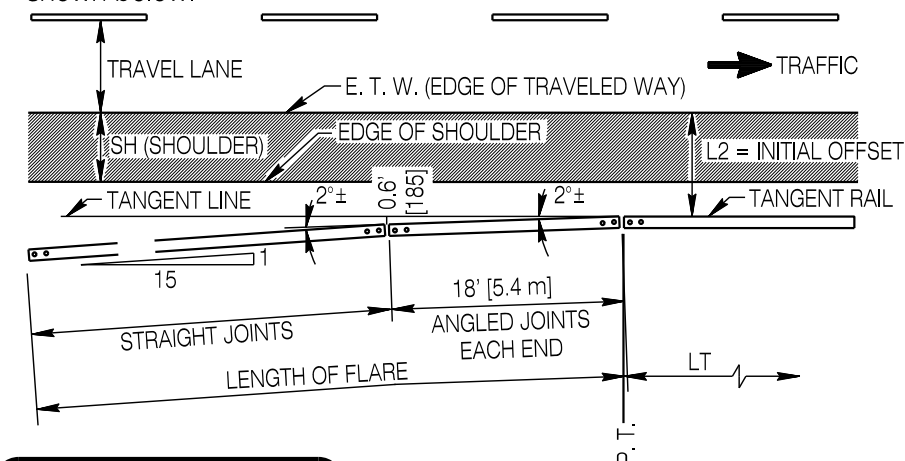
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- 03 Grading Requirements (Sheet 1 of 2)
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INSTALLATION DETAILS

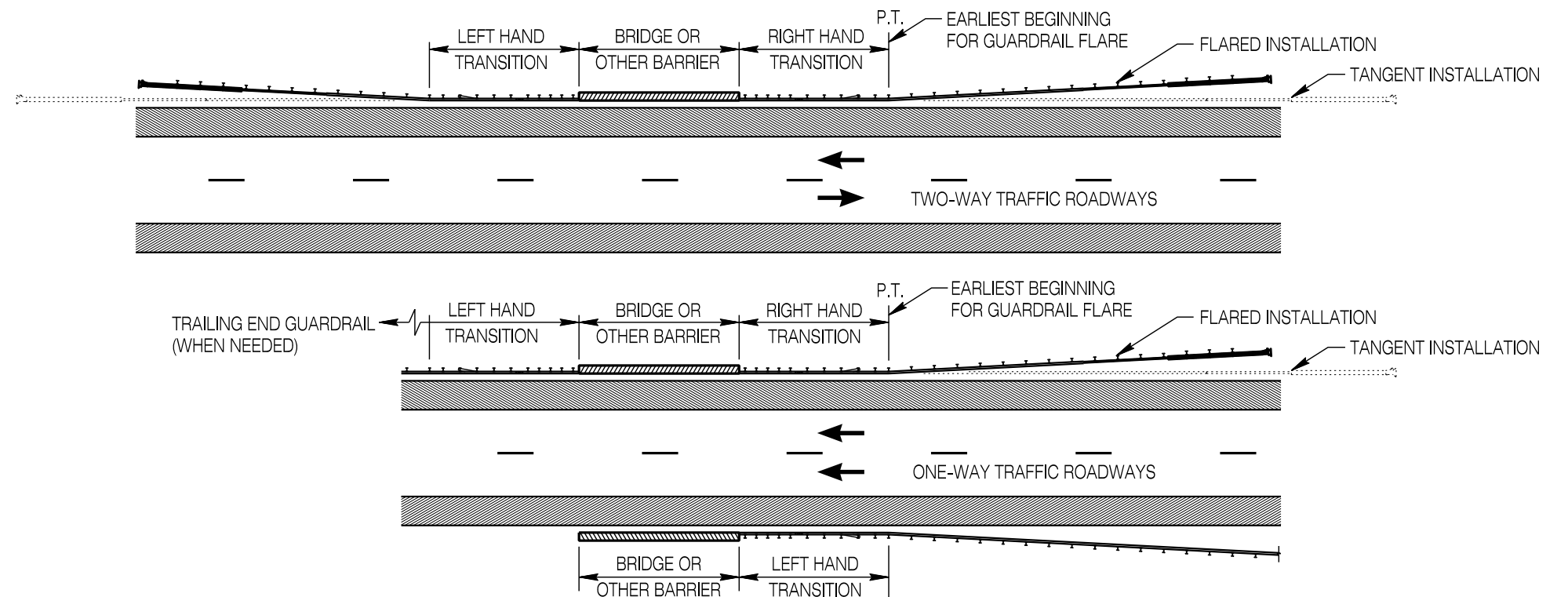
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- 07 Transitions C & D To Concrete Barrier
- 08 End Anchorage Type I, Type II, and Misc. Details
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Fabricate and furnish all box beam components in accordance with the latest WYDOT Standard Plan "Box Beam Guardrail Fabrication Standards". By reference that Standard plan is hereby included in the contract.

Initiating Guardrail Flares and Curved Guardrail Installations with radii of 715 ft. [218 m] and greater (i.e. 8 degrees and flatter) - Initiate by angling joints, not shop bending rail. A box beam joint will typically allow nearly 2 degrees of deflection per joint. To simulate a straight 1W:15L flare (typical for high speed roadways), angle the joints at each end of the first rail element on the flare as shown below.

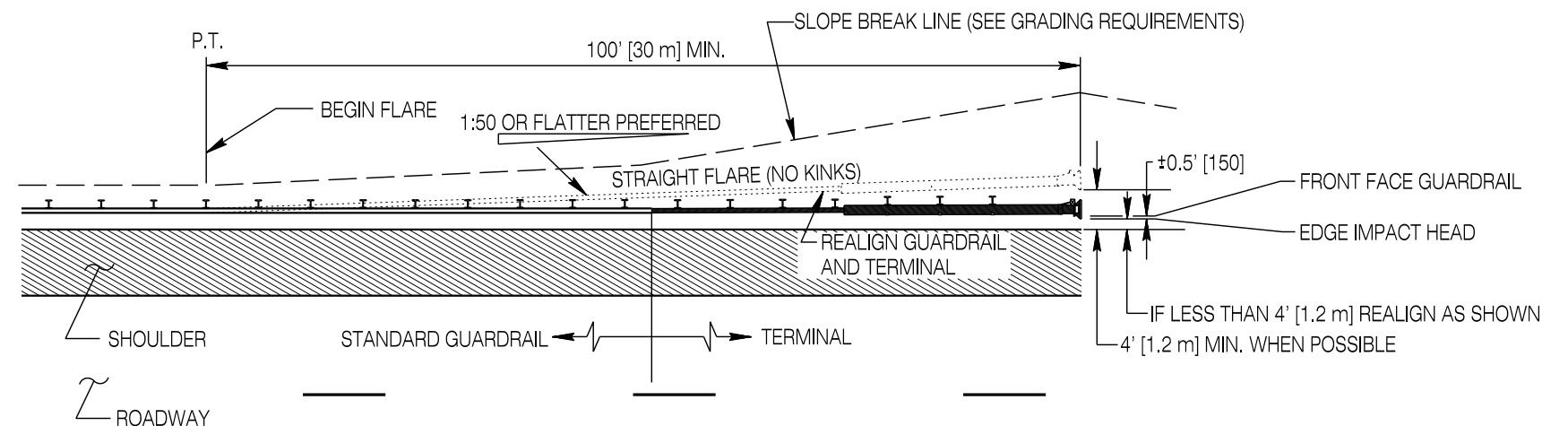


TYPICAL 1W:15L FLARE LAYOUT



CONNECTIONS TO BRIDGE RAILING AND OTHER TRAFFIC BARRIERS

Connect box beam guardrail and median barrier to bridge rails and/or concrete barriers with the appropriate guardrail transition section on each end receiving guardrail.



**INSTALL IMPACT HEAD OF TERMINAL A MINIMUM OF 4 FT. [1.2m]
FROM EDGE OF SHOULDER WHERE POSSIBLE**

For tangent (parallel) guardrail installations where the impact head of the terminal is within less than 4 ft. [1.2 m] from the edge of the shoulder, realign a minimum of the last 100 ft. [30.5 m] on a 1:50 (preferred) or flatter flare. In no case shall the flare be steeper than a 1:25. Provide grading around guardrail and terminal as shown in the "Grading Requirements" sheets.

Designed by: WVBW
Drawn by: JK
Checked by: WVBW
Previous Dwg. No.: 606-6

GENERAL REQUIREMENTS



WYOMING DEPARTMENT
OF
TRANSPORTATION



BOX BEAM GUARDRAIL

STANDARD PLAN

STANDARD PLAN NUMBER

606-6A

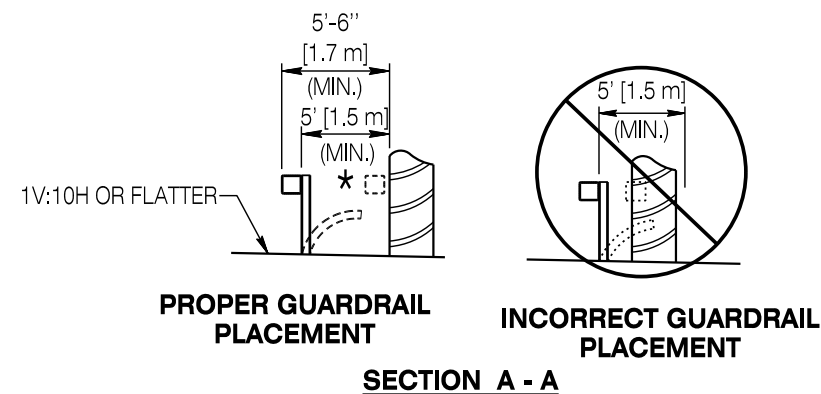
SHEET 1 of 13

Issued by: ENGINEERING SERVICES
Date Issued: JULY 2015

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.

NOTES FOR PLACEMENT OF GUARDRAIL NEAR FIXED OBJECTS

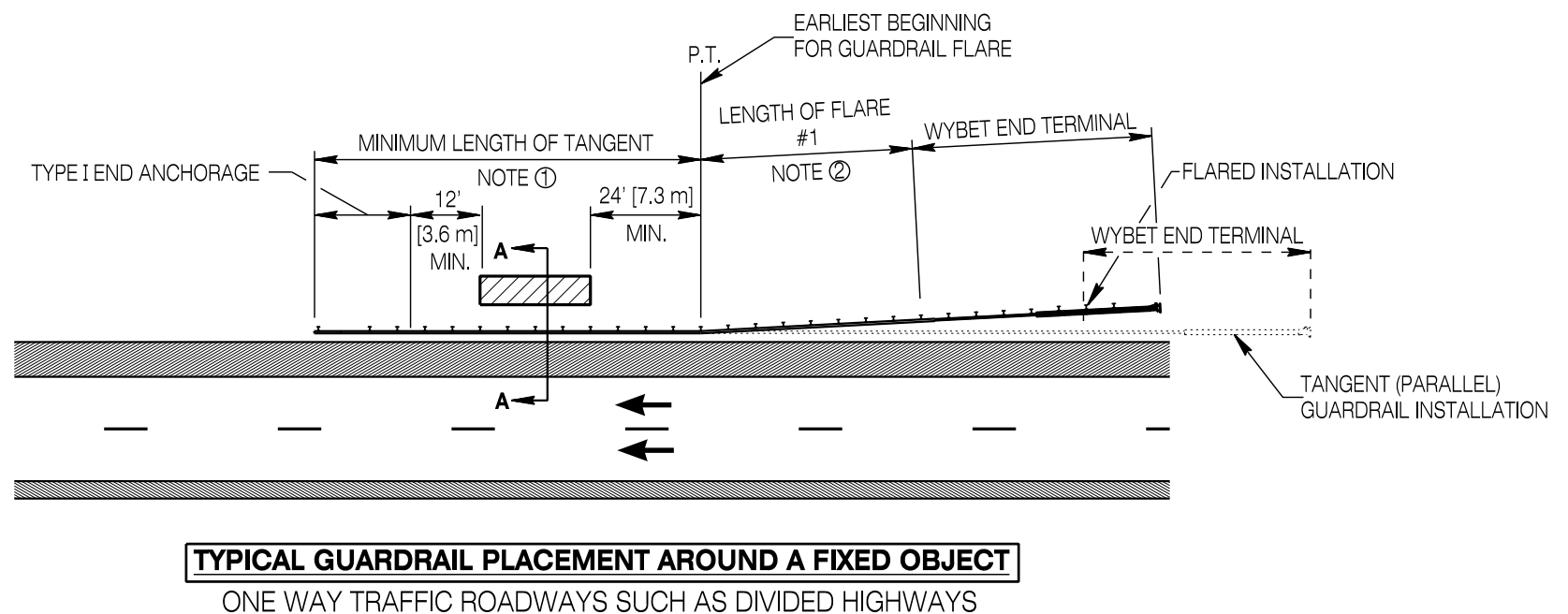
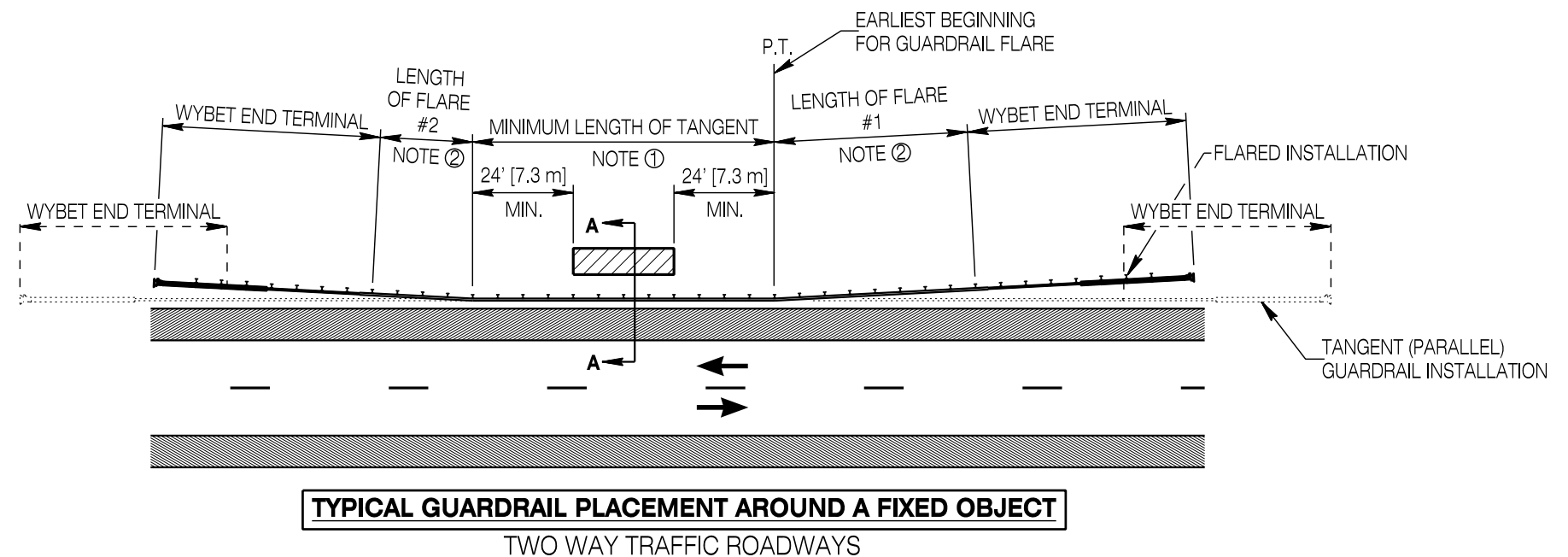
- Shielding Fixed Object Hazards** - Extend tangent run of guardrail a minimum of four standard post spaces (24 ft. [7.3 m]) on each side of the fixed object hazard. For standard post spacing, locate the back of the rail a minimum of 5 ft. [1.5 m] from the fixed object.



- ★ The minimum provided deflection distance may be reduced by reducing the post spacing. Start the reduced post spacing 24 ft. [7.3 m] before the hazard and extend 24 ft. [7.3 m] beyond the hazard.

★ Deflection Distance	Post Spacing
5 ft. [1.5 m]	6 ft. [1830] (Standard)
4 ft. [1.2 m]	4 ft. [1220]

- Flared vs. Tangent (Parallel) Installation** - Drawing depicts flared guardrail runs with solid lines and tangent (parallel) installations in dashed lines. Tangent guardrail runs are longer than flared guardrails to shield the same hazard.



Designed by: WBBV
Drawn by: JK
Checked by: WBBV
Previous Dwg. No. 606-6

LAYOUT DETAILS GUARDRAIL PLACEMENT AROUND FIXED OBJECT HAZARDS

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



BOX BEAM GUARDRAIL

STANDARD PLAN

STANDARD PLAN NUMBER
606-6A
SHEET 2 of 13
Issued by: ENGINEERING SERVICES
Date Issued: JULY 2015

GRADING NOTES

If necessary, modify the earthwork shown in the plans and as staked to provide these minimum grading requirements at guardrail installations. The engineer will pay for this work using standard grading bid items as provided in the plans.

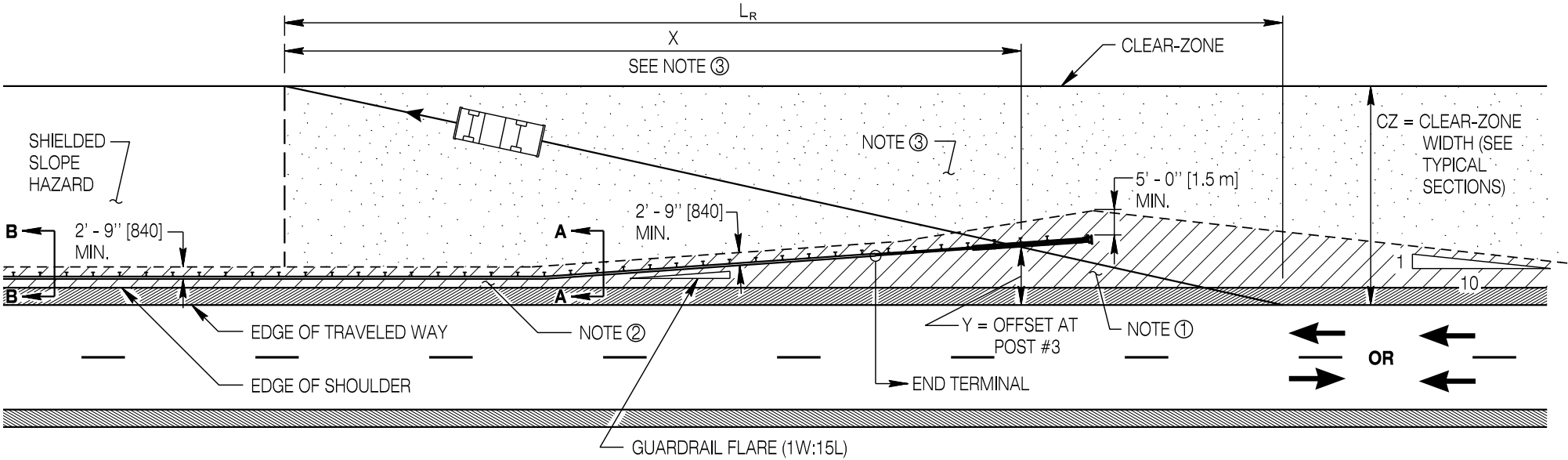
- ① Ensure the cross-slope of the earthwork in the area approaching a guardrail installation, the area around the terminal and the area of the guardrail flare is a 1V:10H surface or flatter. If Type I End Anchorages are used, extend this grading envelope through the clear-zone to the upstream beginning of the terminal.
- ② Ensure cross slope of grading from roadway to the barrier face is 1V:10H or flatter. Extend 1V:10H a minimum of 2 ft. [610] behind guardrail posts.
- ③ Ensure the area immediately behind and beyond the terminal is traversable and free from fixed object hazards or is at least similar in character to upstream, unshielded slopes located within the clear-zone. Ensure a slope of 1V:4H or flatter; if not practical, use a maximum slope of 1V:3H. Extend the traversable slope for a distance X beyond post 3 of the end terminal.

If not shown on the plans, calculate X from the formula below:

$$X = (CZ - Y) (L_R) / (CZ)$$

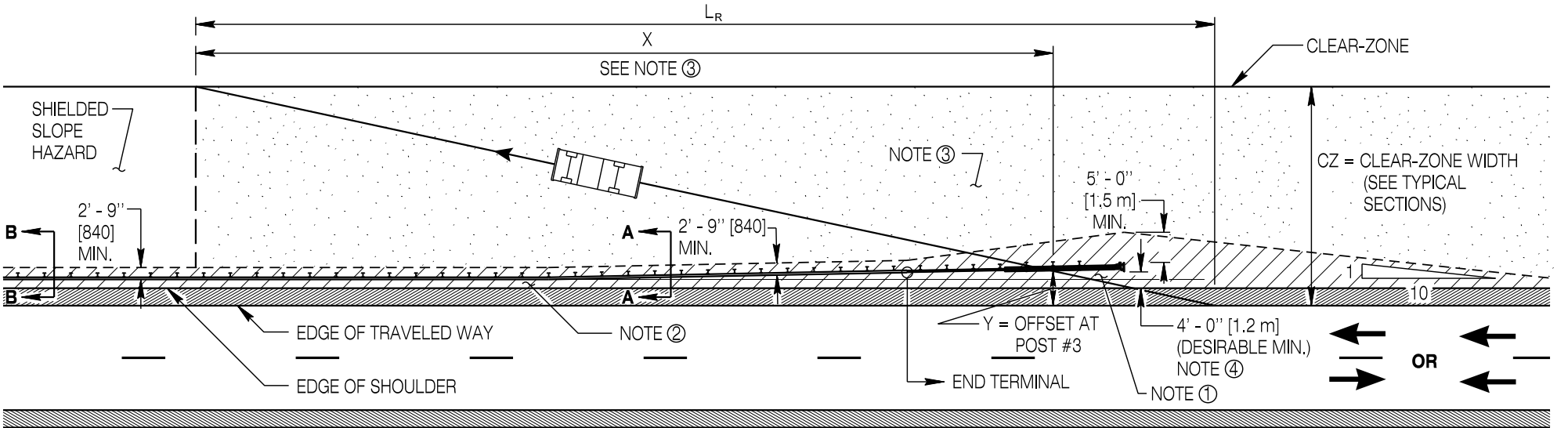
DESIGN SPEED		L _R Runout Length							
		ADT OVER 10,000		ADT 5,000 to 10,000		ADT 1,000 to 5,000		ADT Under 1000	
mph	[km/h]	ft	[m]	ft	[m]	ft	[m]	ft	[m]
80	130	470	143	430	131	380	116	330	101
70	110	360	110	330	101	290	88	250	76
60	100	300	91	250	76	210	64	200	61
50	80	230	70	190	58	160	49	150	46
40	60	160	49	130	40	110	34	100	30
30	50	110	34	90	27	80	24	70	21

- ③ "X" can be found graphically by moving up stream of the hazard the longitudinal distance L_R, shown in the table above, plotting the design trajectory from the edge of traveled way to the far extreme (width) of the hazard (or the clear zone width, whichever is less). The trajectory should intersect the guardrail at post 3 of the terminal (the point where the guardrail redirects). The distance back to the hazard from post 3 is "X".
- ④ For tangent guardrail installations where the face of the Guardrail at the impact head of the terminal is less than 4 ft. [1.2 m] from the shoulder break point, realign the guardrail and terminal as shown in detail on **SHEET 1** of this standard plan.



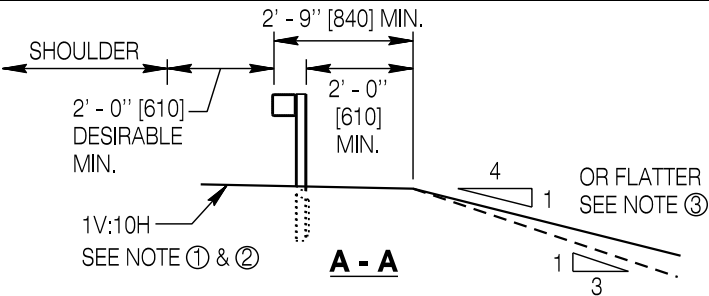
APPROACH END GRADING - FLARED GUARDRAIL INSTALLATION

(APPLIES TO TWO WAY TRAFFIC AND ONE WAY TRAFFIC ROADWAYS SUCH AS DIVIDED HIGHWAYS)

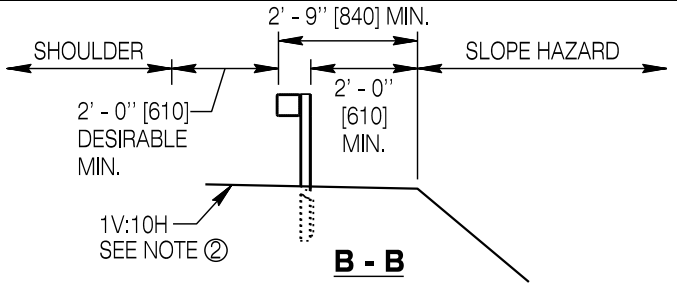


APPROACH END GRADING - TANGENT (PARALLEL) GUARDRAIL INSTALLATION

(APPLIES TO TWO WAY TRAFFIC AND ONE WAY TRAFFIC ROADWAYS SUCH AS DIVIDED HIGHWAYS)



RUNOUT GRADING BEHIND GUARDRAIL



FILL SLOPE HAZARD PROTECTION

Designed by: WBW
Drawn by: JK
Checked by: WBW
Previous Dwg. No. 606-6

GRADING REQUIREMENTS (SHEET 1 OF 2)

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



BOX BEAM GUARDRAIL

STANDARD PLAN

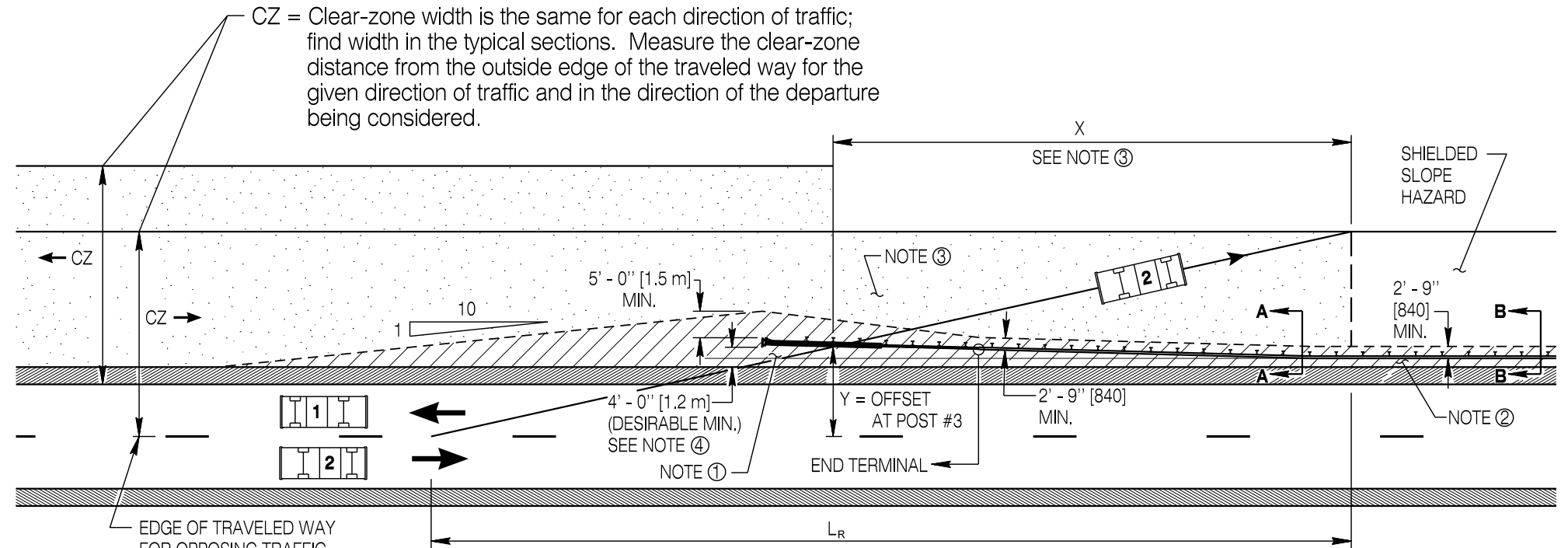
STANDARD PLAN NUMBER
606-6A
SHEET 3 of 13
Issued by: ENGINEERING SERVICES
Date Issued: JULY 2015

GRADING NOTES

If necessary, modify the earthwork shown in the plans and as staked to provide these minimum grading requirements at guardrail installations. The engineer will pay for this work using standard grading bid items as provided in the plans.

- ① Ensure the cross-slope of the earthwork in the area approaching a guardrail installation, the area around the terminal and the area of the guardrail flare is a 1V:10H surface or flatter. If Type I End Anchorages are used, extend this grading envelope through the clear-zone to the upstream beginning of the terminal.
- ② Ensure cross slope of grading from roadway to the barrier face is 1V:10H or flatter. Extend 1V:10H a minimum of 2 ft. [610] behind guardrail posts.
- ③ Ensure the area immediately behind and beyond the terminal is traversable and free from fixed object hazards or is at least similar in character to upstream, unshielded slopes located within the clear-zone. Ensure a slope of 1V:4H or flatter; if not practical, use a maximum slope of 1V:3H. Extend the traversable slope for a distance X beyond post 3 of the end terminal.

If not shown on the plans, calculate X from the formula below:

$$X = (CZ - Y) (L_R) / (CZ)$$


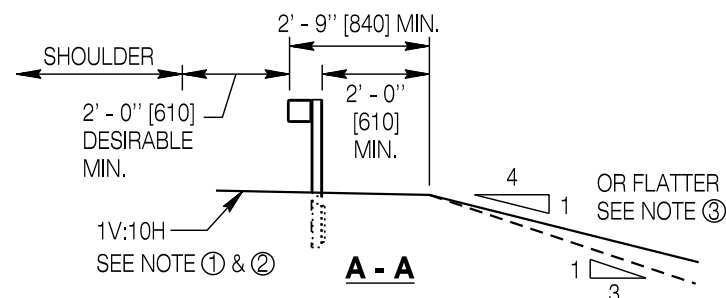
APPROACH END GRADING FOR OPPOSING TRAFFIC LANES

(APPLIES TO TWO WAY TRAFFIC ROADWAYS)

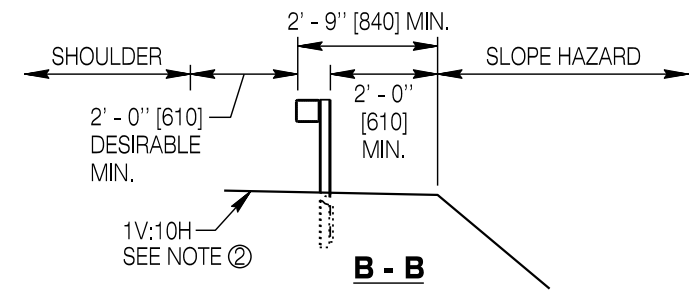
Note: Tangent installation shown, apply same concept for flared installations.

DESIGN SPEED		L _R Runout Length							
		ADT OVER 10,000		ADT 5,000 to 10,000		ADT 1,000 to 5,000		ADT Under 1000	
mph	[km/h]	ft	[m]	ft	[m]	ft	[m]	ft	[m]
80	130	470	143	430	131	380	116	330	101
70	110	360	110	330	101	290	88	250	76
60	100	300	91	250	76	210	64	200	61
50	80	230	70	190	58	160	49	150	46
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30	50	110	34	90	27	80	24	70	21

- ④ "X" can be found graphically by moving upstream of the hazard the longitudinal distance L_R, shown in the table above, plotting the design trajectory from the edge of traveled way to the far extreme (width) of the hazard (or the clear zone width, whichever is less). The trajectory should intersect the guardrail at post 3 of the terminal (the point where the guardrail redirects). The distance back to the hazard from post 3 is "X".
- ⑤ For tangent guardrail installations where the face of the Guardrail at the impact head of the terminal is less than 4 ft. [1.2 m] from the shoulder break point, realign the guardrail and terminal as shown in detail on **SHEET 1** of this standard plan.



RUNOUT GRADING BEHIND GUARDRAIL



FILL SLOPE HAZARD PROTECTION

Designed by: WBW
 Drawn by: JK
 Checked by: WBW
 Previous Dwg. No. 606-6

GRADING REQUIREMENTS (SHEET 2 OF 2)

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



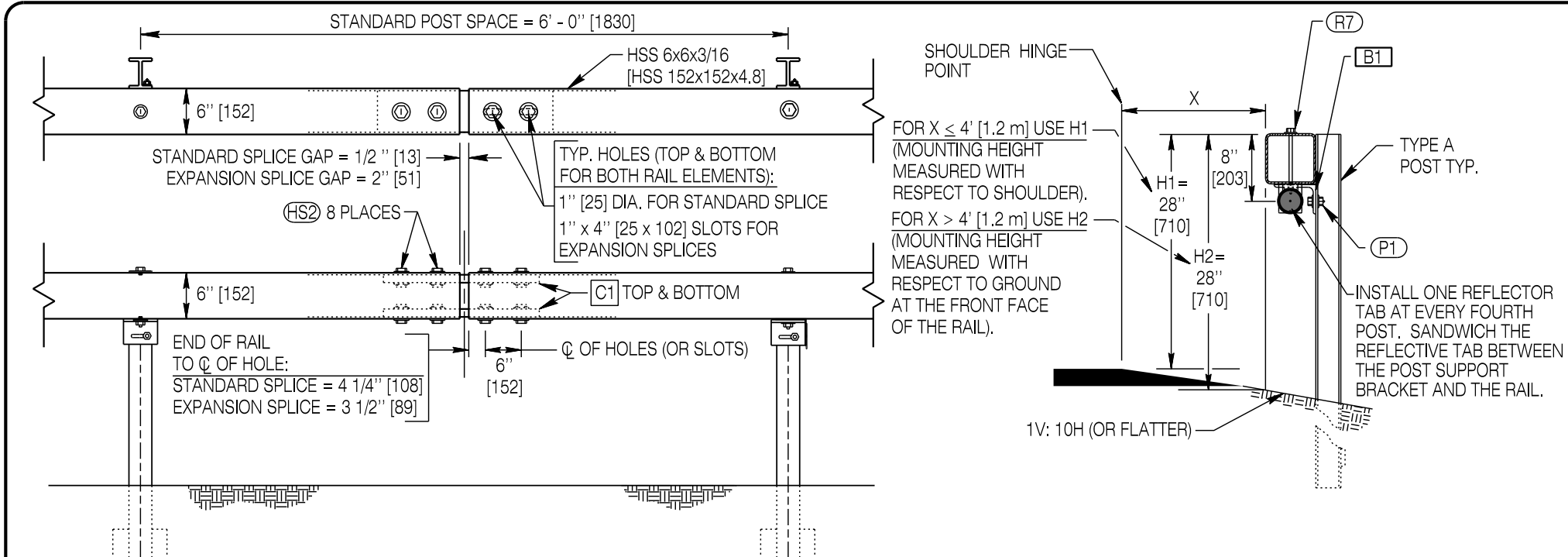
WYOMING DEPARTMENT
 OF
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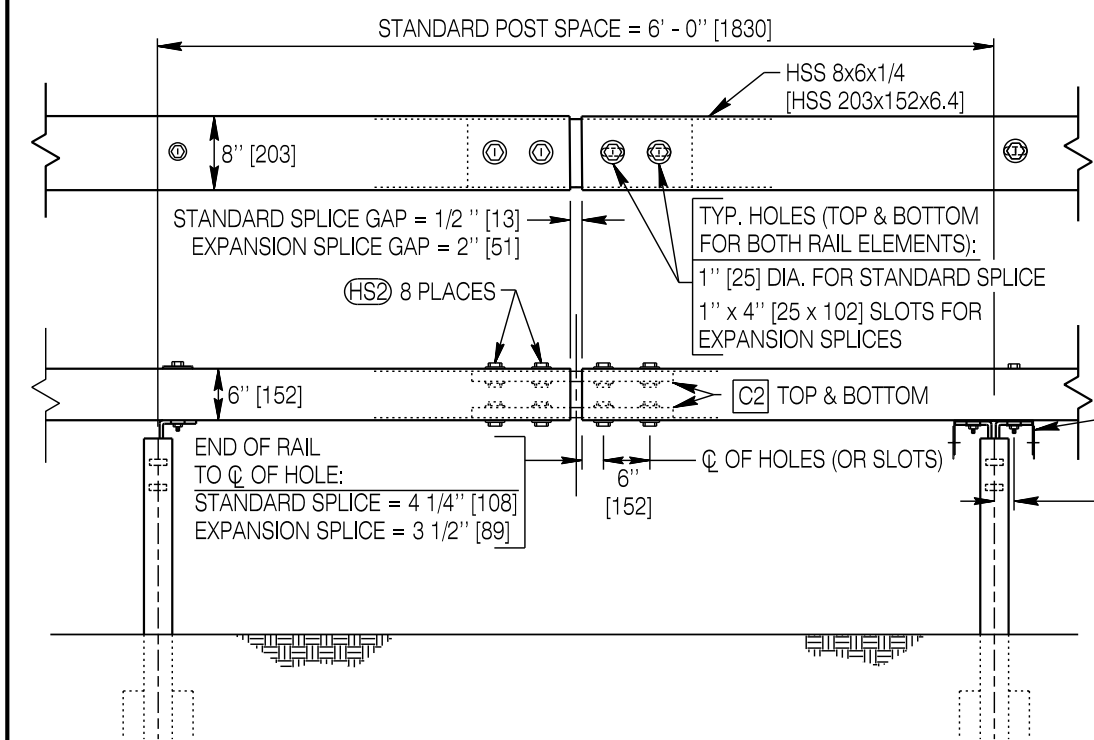
BOX BEAM GUARDRAIL

STANDARD PLAN

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 Issued by: ENGINEERING SERVICES
 Date Issued: JULY 2015



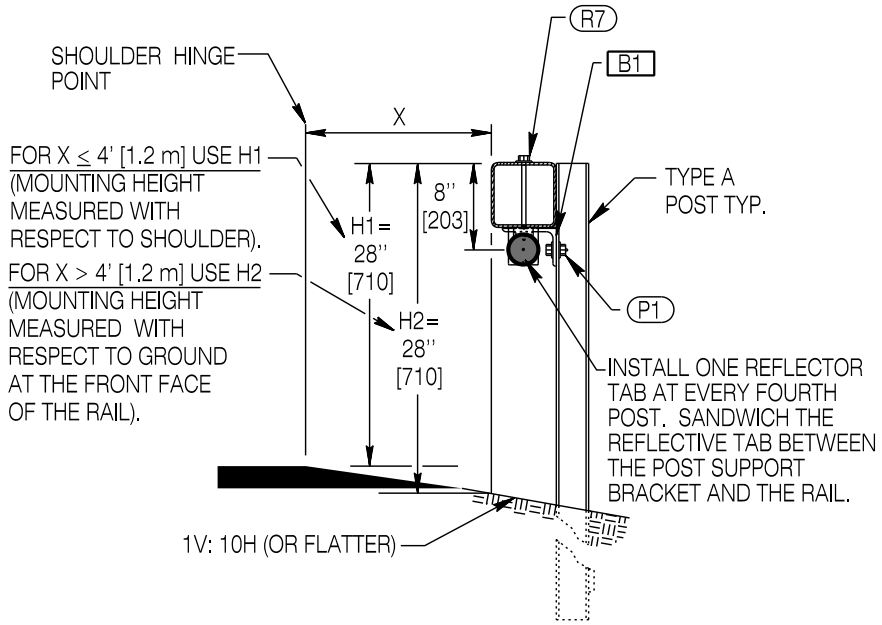
BOX BEAM GUARDRAIL DETAILS



(2) REFLECTIVE TABS EVERY 4TH POST

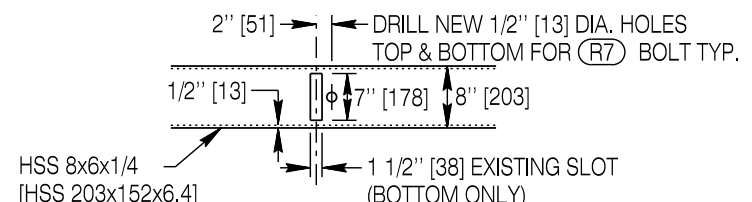
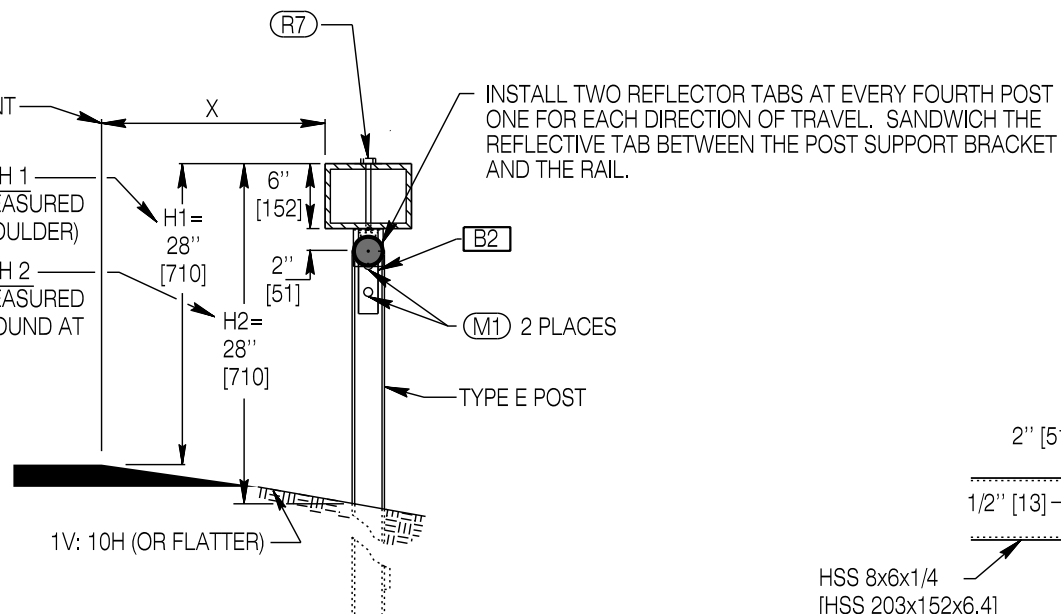
IMPORTANT!
OFFSET RAIL BOLT
2" [51] FROM POST ϕ .
ANGLE BRACKET
AWAY FROM ADJACENT
TRAFFIC AND WY-BET
TERMINALS

BOX BEAM MEDIAN BARRIER DETAILS

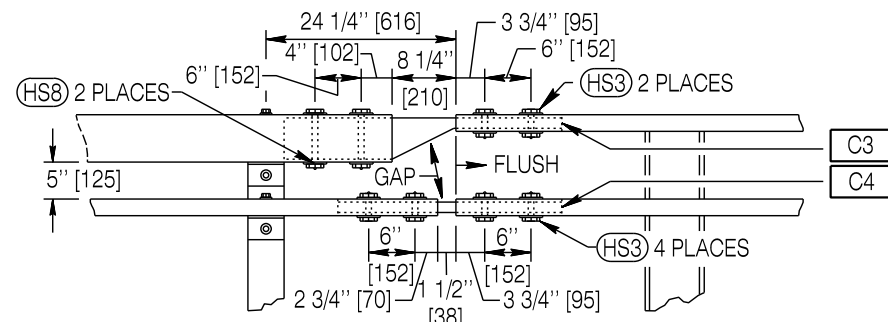


STANDARD MEDIAN BARRIER
POST (TYPICAL)
(POSITIVE CONNECTION)

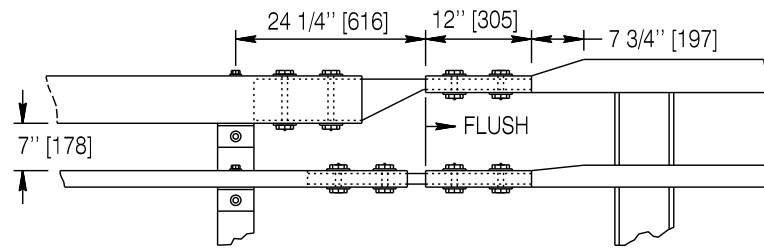
BOLT REQUIREMENTS	
3/4" A325 HIGH STRENGTH HEAVY HEX BOLTS (TYP. SPLICE BOLT)	
(HS2)	3/4" x 2" [19 x 50] (A325) STANDARD SPLICE BOLT + 1 HARDENED WASHER (F436)
3/4" A307 HEX BOLTS (TYP. MEDIAN POST BOLT)	
(M1)	3/4" x 1 1/2" [19 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
1/2" A307 HEX BOLTS (TYP. POST BOLT)	
(P1)	1/2" x 1 1/2" [13 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
3/8" A307 HEX BOLTS (TYP. RAIL BOLT)	
(R7)	3/8" x 7 1/2" [10 x 190] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
STANDARD HARDWARE AND POSTS (SEE BOX BEAM FABRICATION STANDARD PLAN)	
(B1)	STANDARD BOX BEAM SUPPORT ANGLE
(B2)	STANDARD BOX BEAM MEDIAN BARRIER SUPPORT ANGLE
(C1)	STANDARD BOX BEAM SPLICE PLATE
(C2)	STANDARD BOX BEAM MEDIAN BARRIER SPLICE PLATE
TYPE A POST - S3x5.7x5'-4" [S76x8.5x1625]	
TYPE E POST - S3x5.7x4'-10" [S76x8.5x1475]	



MODIFYING EXISTING PADDLE
MOUNTED MEDIAN BARRIER
TO STANDARD MEDIAN
BARRIER CONNECTION.



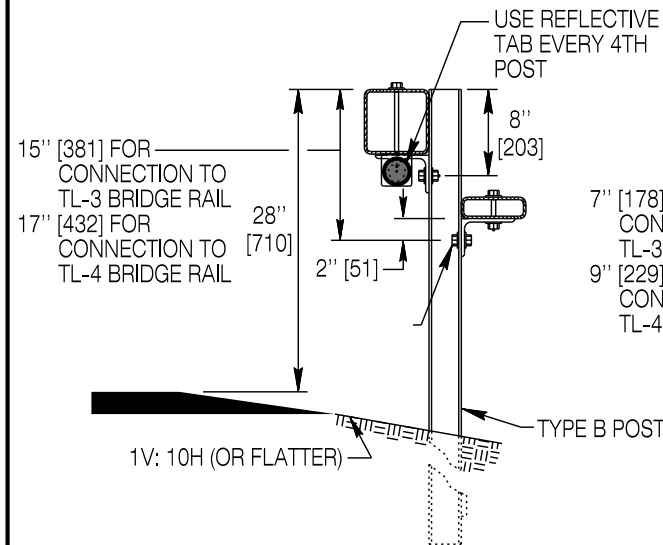
TRANSITION A - TL-3 BRIDGE RAIL CONNECTION



TRANSITION B - TL-4 BRIDGE RAIL CONNECTION

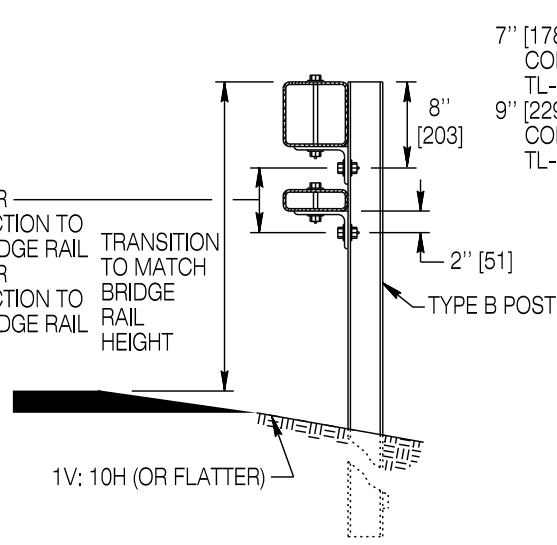
Use same hardware as TL-3 Connection

BRIDGE CONNECTION DETAILS



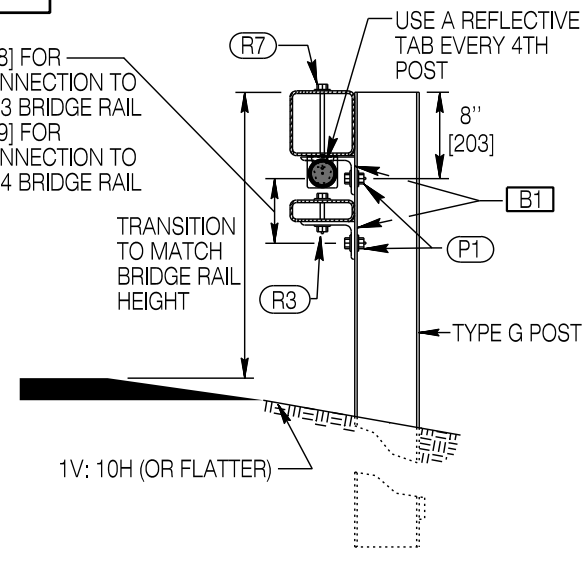
POST T9

Use same connection hardware as T1-T6



POST T7 - T8

Use same connection hardware as T1-T6



POST T1 - T6

BOLT REQUIREMENTS

3/4\" A325 HIGH STRENGTH HEAVY HEX BOLTS (TYP. SPLICE BOLT)

- (HS2) 3/4\" x 2\" [19 x 50] (A325) + 1 HARDENED WASHER (F436)
- (HS3) 3/4\" x 3 1/2\" [19 x 90] (A325) + 2 HARDENED WASHERS (F436) + 1 NUT (A194-2HM)
- (HS8) 3/4\" x 8\" [19 x 205] (A325) + 2 HARDENED WASHERS (F436) + 1 NUT (A194-2HM)

1/2\" A307 HEX BOLTS (TYP. POST BOLT)

- (P1) 1/2\" x 1 1/2\" [13 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)

3/8\" A307 HEX BOLTS (TYP. RAIL BOLT)

- (R3) 3/8\" x 3 1/2\" [10 x 90] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
- (R7) 3/8\" x 7 1/2\" [10 x 190] (A307) + 2 WASHERS (F844) + 1 NUT (A563)

STANDARD HARDWARE AND POSTS

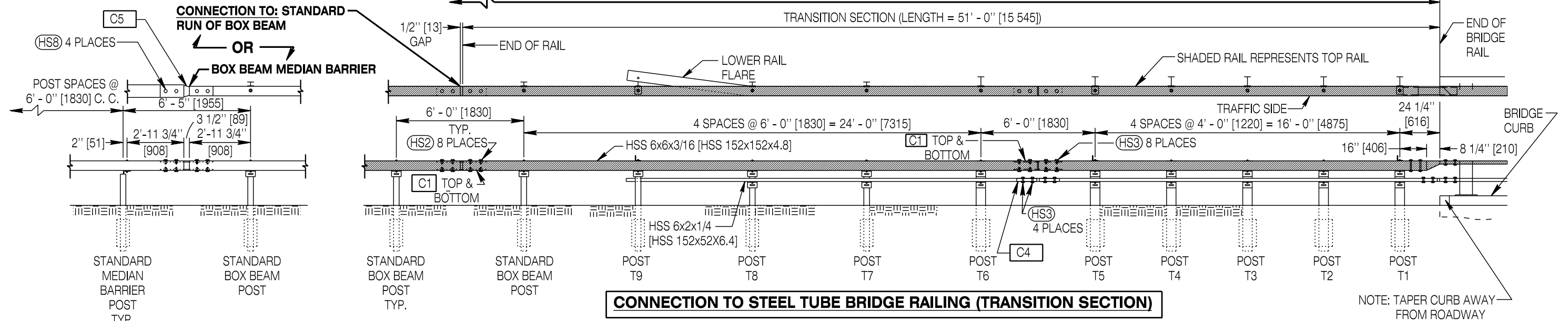
(SEE BOX BEAM FABRICATION STANDARD PLAN)

- [B1] STANDARD BOX BEAM SUPPORT ANGLE
- [C1] STANDARD BOX BEAM SPLICE PLATE
- [C3] UPPER BRIDGE RAIL CONNECTION SLEEVE
- [C4] LOWER BRIDGE RAIL CONNECTION SLEEVE
- [C5] MEDIAN BARRIER CONNECTION SLEEVE

- TYPE A POST - S3x5.7x5'-4\" [S 76x8.5x1625]
- TYPE B POST - S3x5.7x5'-4\" [S 76x8.5x1625]
- TYPE G POST - W6x9x5'-4\" [W 152x13.4x1625]
OR W6x8.5x5'-4\" [W152x12.7x1625]

BOX BEAM GUARDRAIL OR BOX BEAM MEDIAN BARRIER PAY LIMITS

TRANSITION SECTION (LENGTH = 51' - 0\" [15 545])



CONNECTION TO STEEL TUBE BRIDGE RAILING (TRANSITION SECTION)

Use for all connections of box beam to steel tube bridge rail.

Left Hand approach installation shown - mirror details for Right Hand approach installation.

Designed by: WBW
Drawn by: JK
Checked by: WBW
Previous Dwg. No. 606-6

TRANSITIONS A & B TO TL-3 AND TL-4 STEEL BRIDGE RAILS

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



**WYOMING DEPARTMENT
OF
TRANSPORTATION**



BOX BEAM GUARDRAIL

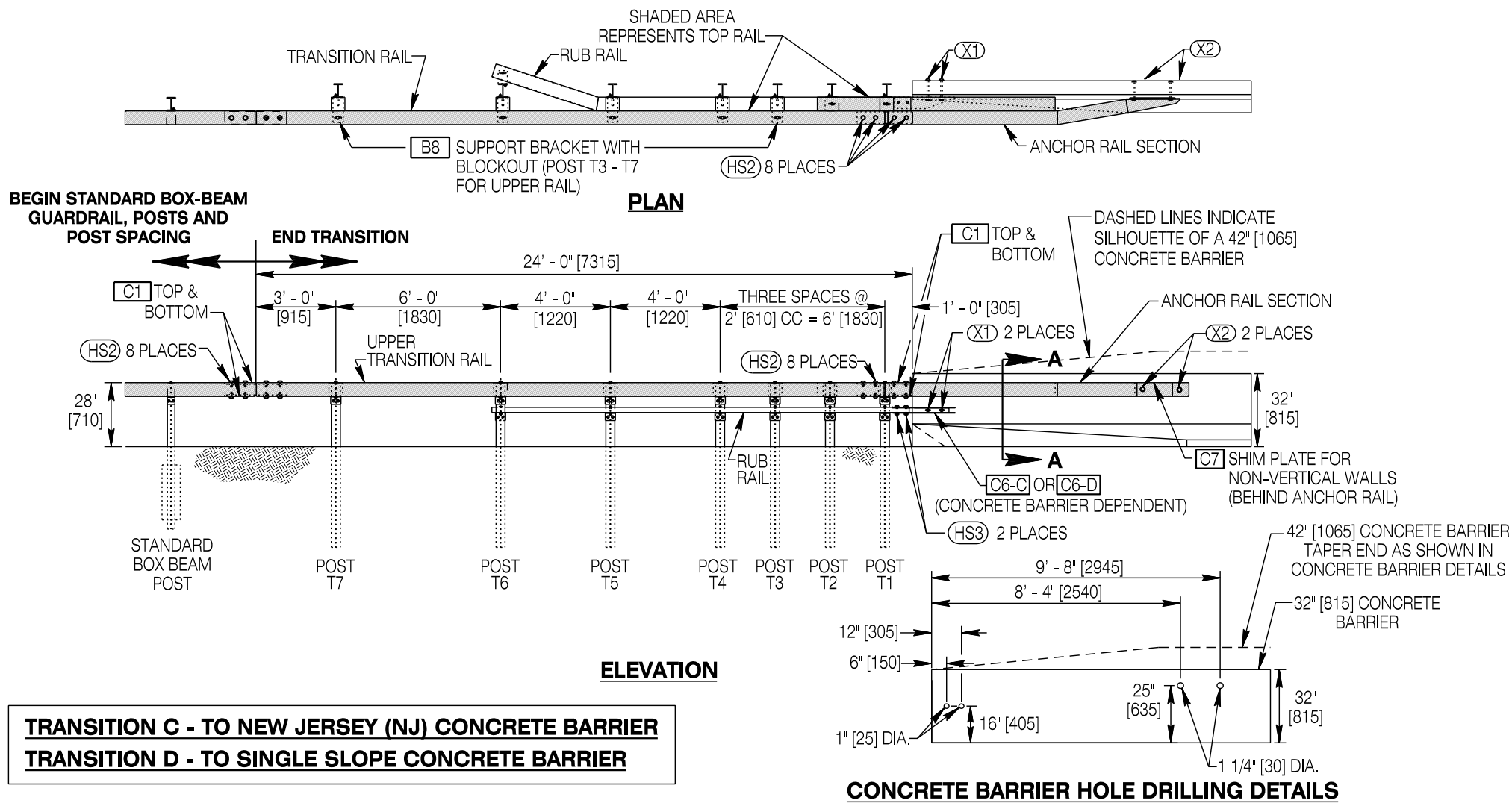
STANDARD PLAN

STANDARD PLAN NUMBER

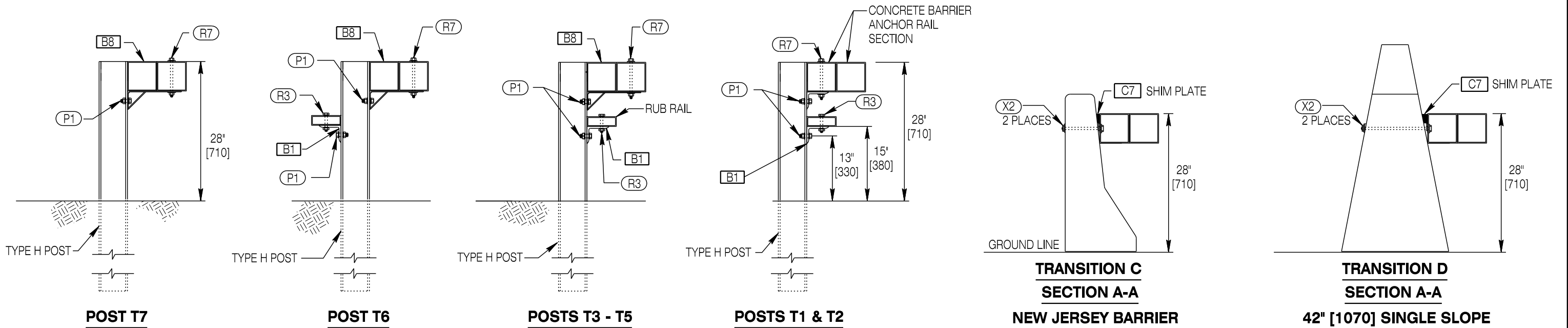
606-6A

SHEET 6 of 13

Issued by: ENGINEERING SERVICES
Date Issued: JULY 2015



BOLT REQUIREMENTS	
3/4" A325 HIGH STRENGTH HEAVY HEX BOLTS (TYP. SPLICE BOLT)	
(HS2)	3/4" x 2" [19 x 50] (A325) + 1 HARDENED WASHER (F436)
(HS3)	3/4" x 3 1/2" [19 x 90] (A325) + 2 HARDENED WASHERS (F436) + 1 NUT (A194-2HM)
1/2" A307 HEX BOLTS (TYP. POST BOLT)	
(P1)	1/2" x 1 1/2" [13 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
3/8" A307 HEX BOLTS (TYP. RAIL BOLT)	
(R3)	3/8" x 3 1/2" [10 x 90] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
(R7)	3/8" x 7 1/2" [10 x 190] (A307) + 2 WASHERS (F844) + 1 NUT (563)
SPECIAL APPLICATION BOLTS	
(X1)	3/4" [19] SAE GRADE 5 HEX BOLT (LENGTH DEPENDENT ON CONCRETE) ** + (2) 3/4" [19] WASHERS + (1) 3/4" [19] SAE GRADE 5 HEX NUT ** 3/4" x 4" [19 x 102] POWERS WEDGE BOLT OR EQUIVALENT ANCHORS ARE ACCEPTABLE ALTERNATIVE
(X2)	1" [25] SAE GRADE 5 HEX BOLT (LENGTH DEPENDENT ON CONCRETE) + (2) 1" [25] PLATE WASHERS + (1) 1" [25] SAE GRADE 5 HEX NUT
STANDARD HARDWARE AND POSTS (SEE BOX BEAM FABRICATION STANDARD PLAN)	
(B1)	STANDARD BOX BEAM SUPPORT ANGLE
(B8)	TRANSITION C & D RAIL SUPPORT BRACKET
(C1)	STANDARD BOX BEAM SPLICE PLATE
(C6-C)	RUB RAIL CONNECTOR BRACKET (FOR NJ CONCRETE BARRIER)
(C6-D)	RUB RAIL CONNECTOR BRACKET (FOR SINGLE SLOPE CONCRETE BARRIER)
(C7)	SHIM PLATE
TYPE H POST - W 6x9x6'-0" [W 152x13.4x1830] OR W 6x8.5x6'-0" [W 152x12.7x1830]	



Designed by: WBW
Drawn by: JK
Checked by: WBW
Previous Dwg. No. 606-6

TRANSITIONS C & D TO CONCRETE BARRIER

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



WYOMING DEPARTMENT
OF
TRANSPORTATION



BOX BEAM GUARDRAIL

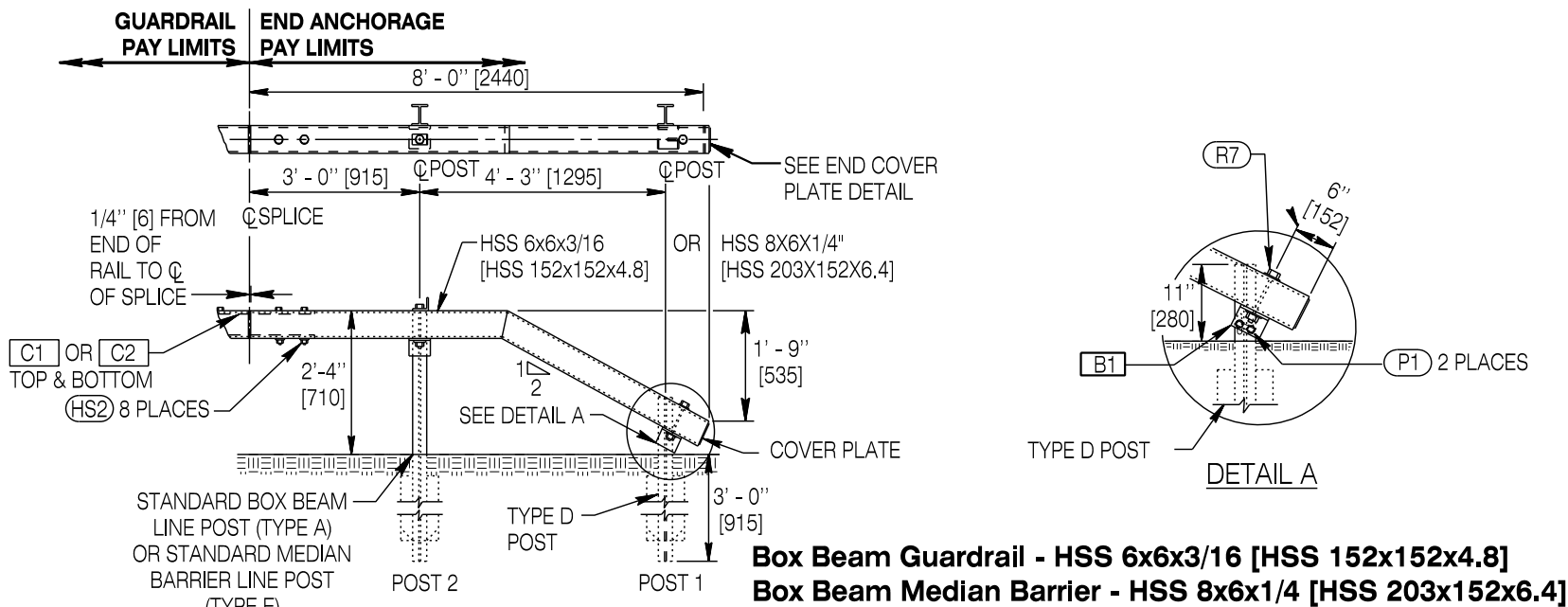
STANDARD PLAN

STANDARD PLAN NUMBER

606-6A

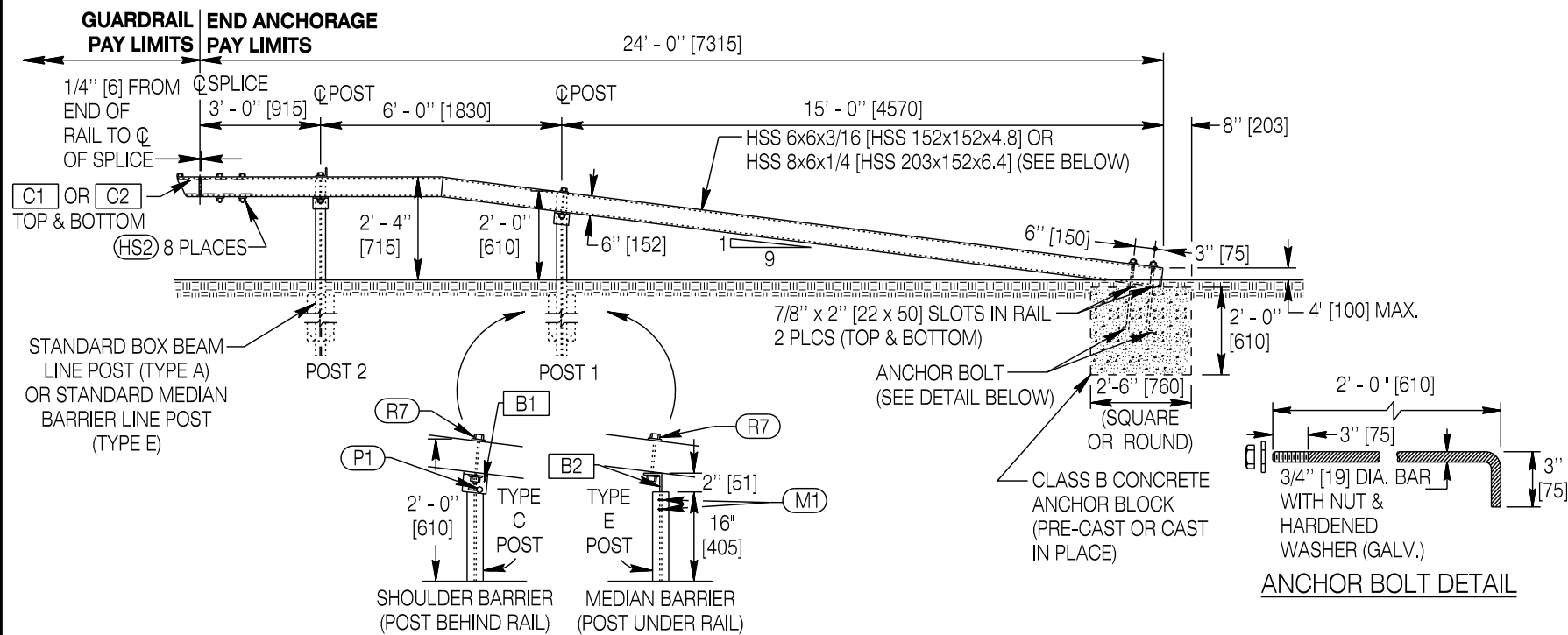
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Issued by: ENGINEERING SERVICES
Date Issued: JULY 2015



END ANCHORAGE TYPE II

Note: Only use Type II End Anchorages for the downstream terminal of a guardrail run on one-way traffic roadways (such as divided highways). Place Type II anchorages at least 48 ft. [15.0 m] downstream of the hazard.



END ANCHORAGE TYPE I

Box Beam Guardrail - HSS 6x6x3/16 [HSS 152x152x4.8]
Box Beam Median Barrier - HSS 8x6x1/4 [HSS 203x152x6.4]

Note: Flare Type I End Anchorages outside the clear-zone.

BOLT REQUIREMENTS

3/4" A325 HIGH STRENGTH HEAVY HEX BOLTS (TYP. SPLICE BOLT)

- (HS2) 3/4" x 2" [19 x 50] (A325) STANDARD SPLICE BOLT + 1 HARDENED WASHER (F436)
- (HS8) 3/4" x 8" [19 x 203] (A325) + 2 HARDENED WASHERS (F436) + 1 NUT (A194-2HM)

3/4" A307 HEX BOLTS (TYP. MEDIAN POST)

- (M1) 3/4" x 1 1/2" [19 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)

1/2" A307 HEX BOLTS (TYP. POST BOLT)

- (P1) 1/2" x 1 1/2" [13 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)

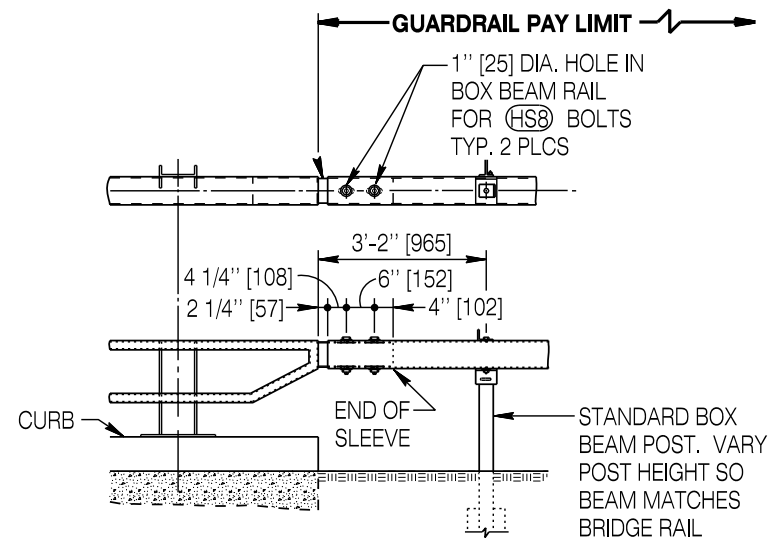
3/8" A307 HEX BOLTS (TYP. RAIL BOLT)

- (R7) 3/8" x 7 1/2" [10 x 190] (A307) + 2 WASHERS (F844) + 1 NUT (A563)

STANDARD HARDWARE AND POSTS

(SEE BOX BEAM FABRICATION STANDARD PLAN)

- (B1) STANDARD BOX BEAM SUPPORT ANGLE
- (B2) STANDARD BOX BEAM MEDIAN BARRIER SUPPORT ANGLE
- (C1) STANDARD BOX BEAM SPLICE PLATE
- (C2) STANDARD BOX BEAM MEDIAN BARRIER SPLICE PLATE
- TYPE A POST - S3x5.7x5'-4" [S76x8.5x1625]
- TYPE C POST - S3x5.7x5'-0" [S76x8.5x1525]
- TYPE D POST - S3x5.7x3'-11" [S76x8.5x1195]
- TYPE E POST - S3x5.7x4'-10" [S76x8.5x1475]



EXIT END CONNECTION TO STEEL BRIDGE RAILING

(Only for exit ends of one-way traffic bridges which are not required to be upgraded to receive transition sections.)

Designed by: WBW
 Drawn by: JK
 Checked by: WBW
 Previous Dwg. No. 606-6

END ANCHORAGE TYPE I, TYPE II AND MISC. DETAILS

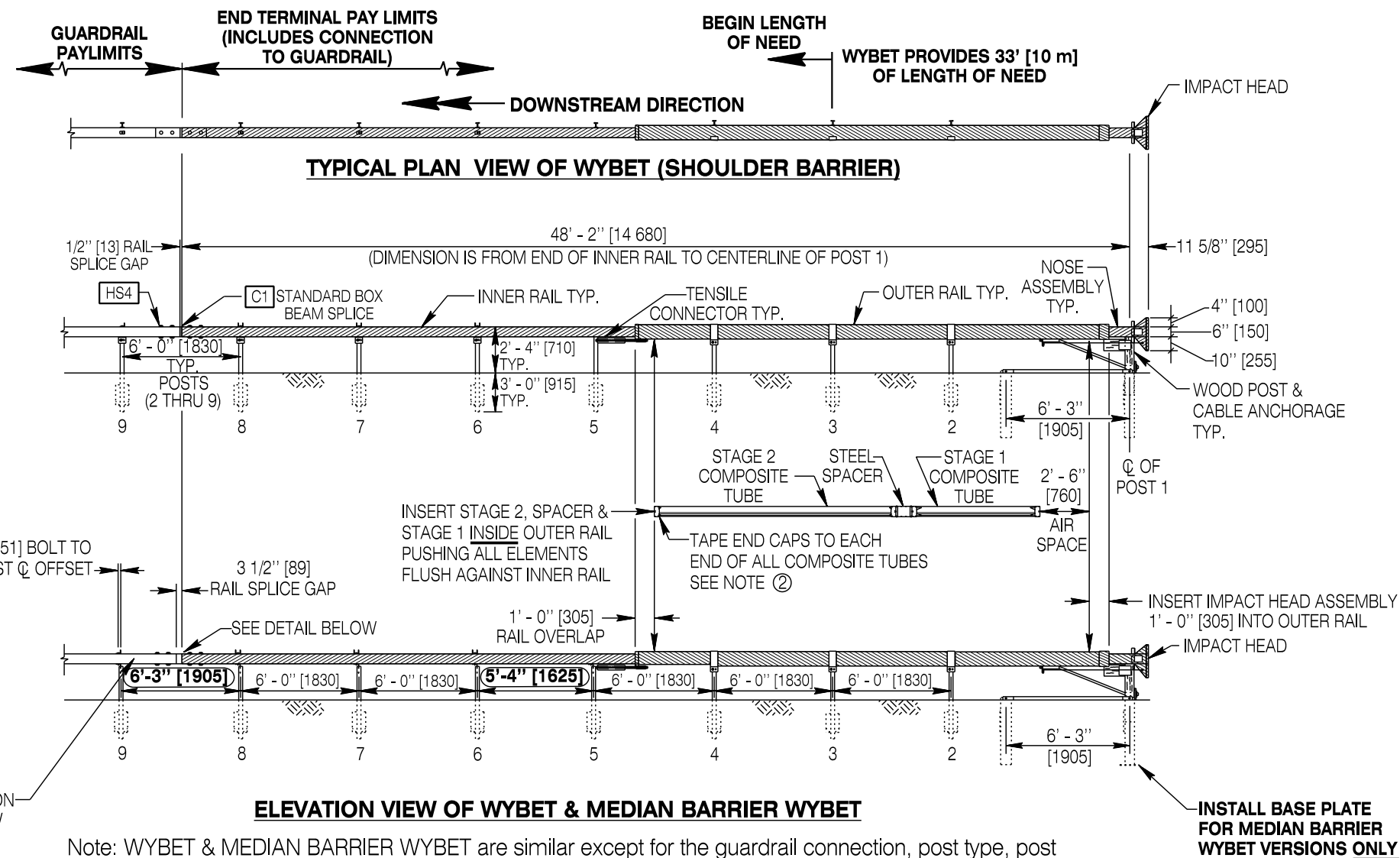
Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



BOX BEAM GUARDRAIL

STANDARD PLAN

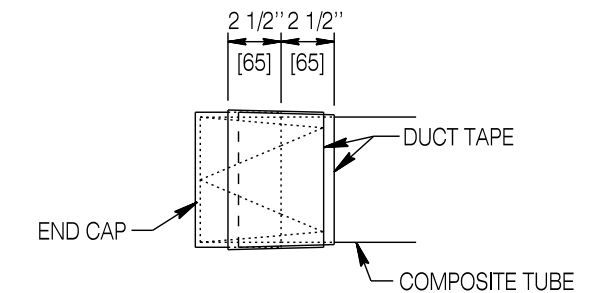
STANDARD PLAN NUMBER
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 SHEET 8 of 13
 Issued by: ENGINEERING SERVICES
 Date Issued: JULY 2015



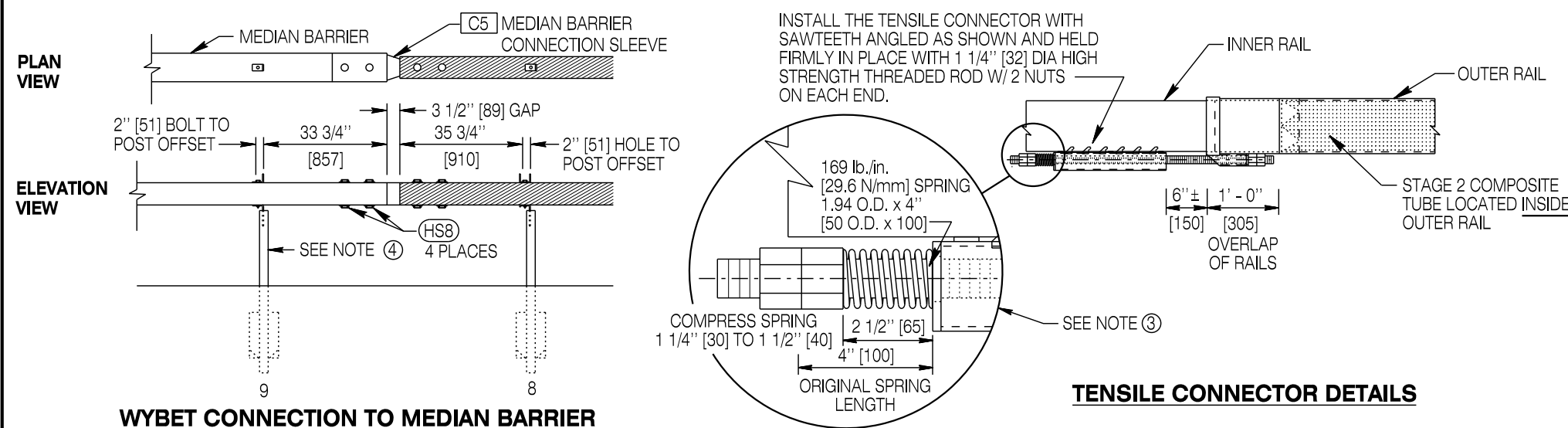
WYBET & MEDIAN BARRIER WYBET GENERAL NOTES

Where "End Terminal (WYBET)" is specified, provide either the WYBET or BEAT option as shown herein. Where "Median Barrier End Terminal (WYBET)" is specified, provide either the Median Barrier WYBET or Median Barrier BEAT option as shown herein.

- For tangent guardrail installations where the face of the guardrail at the impact head of the terminal is less than 4 ft. [1.2 m] from the shoulder break point, realign the guardrail and terminal as shown in detail on **SHEET 1** of this standard plan.
- COMPOSITE TUBES:** Tape end caps by double wrapping with 4" [100] wide duct tape or a 4X wrap of 2" [50] wide duct tape. Ensure a minimum of 2 1/2" [65] of tape on the end cap and 2 1/2" [65] of tape on the composite tubes. Place composite tubes and spacer inside outer rail element as shown.



- TENSIONING THE WYBET:** Tighten the cable anchor and the tensile connector without the spring installed. After the cable anchor is taut and the correct overlap attained at each end of the outer rail, remove the nut on the threaded rod to install the spring. Reinstall the nut and compress the spring 1 1/4" [30] to 1 1/2" [40]. Do not fully compress the spring! Place the second nut on each end of the tensile connector to ensure first nut does not back off.
- MEDIAN BARRIER WYBET INSTALLATIONS:** For connection of WYBET's to older paddle mounted median barrier, remove paddles and use bolted connection for minimum of 10 posts beyond the WYBET. (See **SHEET 5**)
- USE ONLY COMPONENTS** furnished by the manufacturer for the terminal. Do not substitute standard guardrail components.



Designed by: WBW
Drawn by: JK
Checked by: WBW
Previous Dwg. No. 606-6

END TERMINAL (WYBET), OPTION 1 - WYBET (SHEET 1 OF 2)

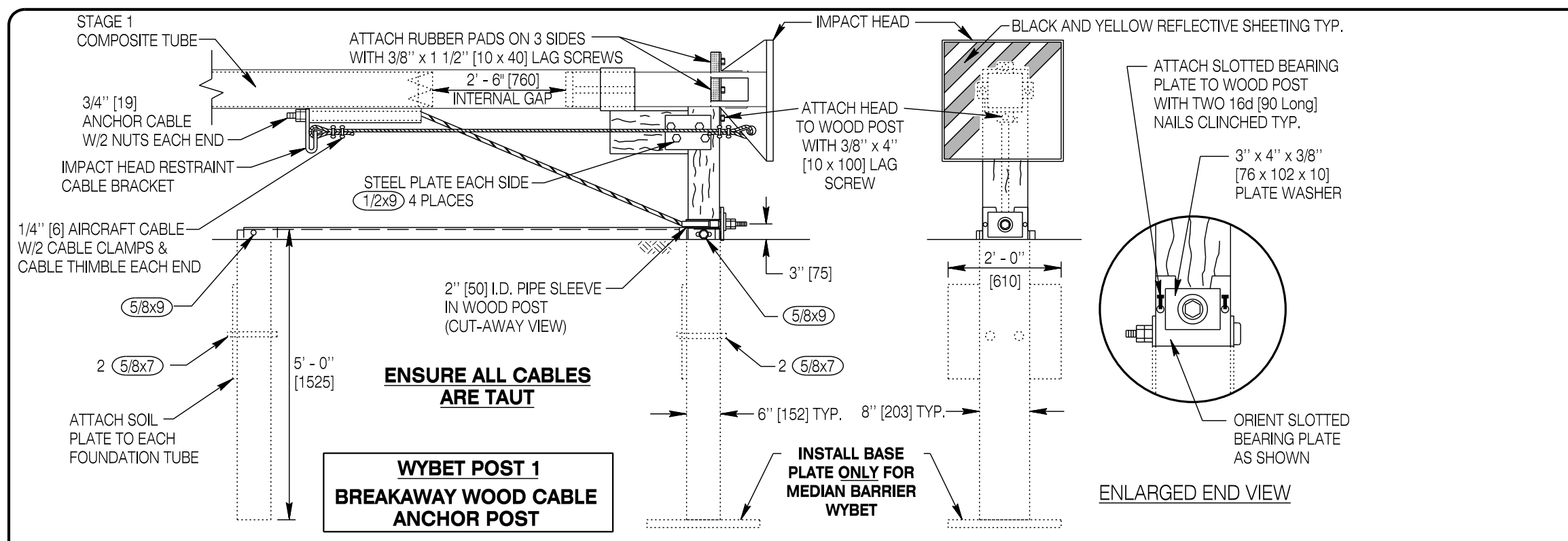
Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



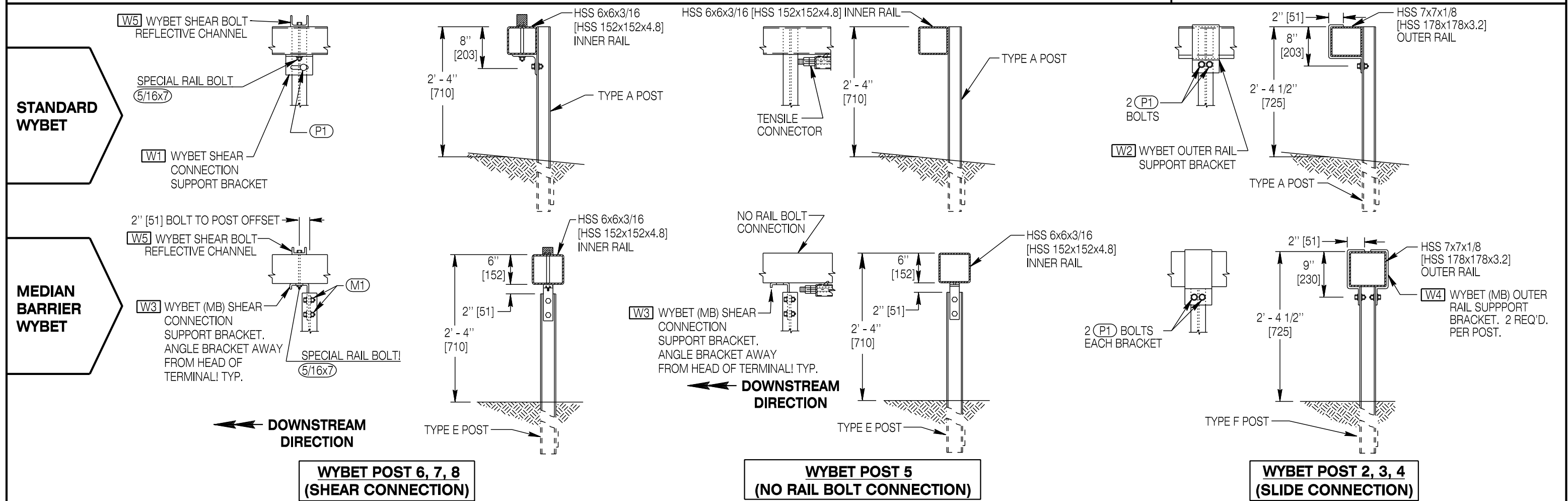
BOX BEAM GUARDRAIL

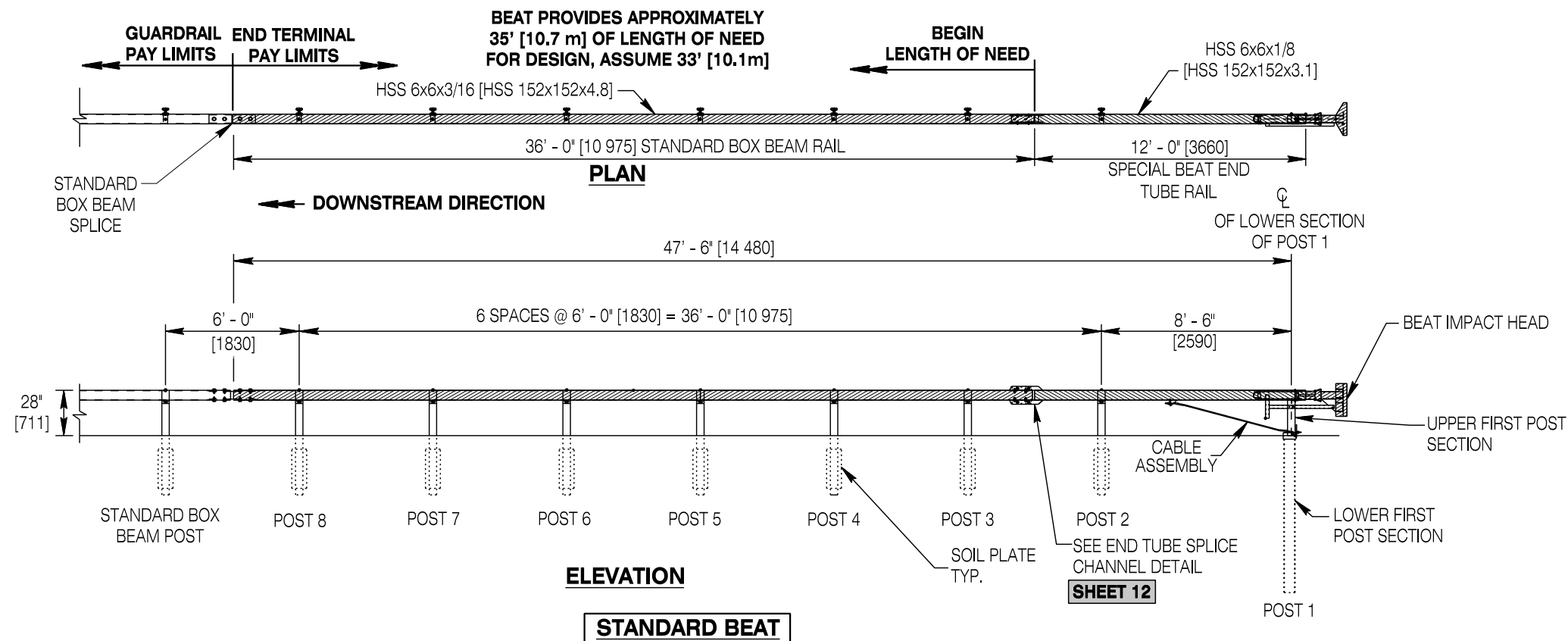
STANDARD PLAN

STANDARD PLAN NUMBER
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Issued by: ENGINEERING SERVICES
Date Issued: JULY 2015



BOLT REQUIREMENTS	
3/4" A325 HIGH STRENGTH HEAVY HEX BOLTS (TYP. SPLICE BOLT)	
(HS2)	3/4" x 2" [19 x 50] (A325) + 1 HARDENED WASHER (F436)
(HS8)	3/4" x 8" [19 x 205] (A325) + 2 HARDENED WASHERS (F436)
3/4" A307 HEX BOLTS (TYP. MEDIAN POST BOLT)	
(M1)	3/4" x 1 1/2" [19 x 40] (A307) + 2 WASHER (F844) + 1 NUT (A563)
1/2" A307 HEX BOLTS (TYP. POST)	
(P1)	1/2" x 1 1/2" [13 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
SPECIAL APPLICATION BOLTS	
(5/16X7)	5/16" x 7 1/2" [8 x 190] (A307) + 1 WASHER (F844) + 1 NUT (A563)
(1/2 x 9)	1/2" x 9" [13 x 230] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
(5/8x7)	5/8" x 7 1/2" [16 x 190] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
(5/8x9)	5/8" x 9 1/2" [16 x 240] (A307) + 2 WASHERS (F844) + 1 NUT (A563)
STANDARD HARDWARE AND POSTS (SEE BOX BEAM FABRICATION STANDARD PLAN)	
(C1)	STANDARD BOX BEAM SPLICE PLATE
(C5)	MEDIAN BARRIER CONNECTION SLEEVE
TYPE A POST - S 3x5.7x5'-4" [S 76x8.5x1625]	
TYPE E POST - S 3x5.7x4'-10" [S 76x8.5x1475]	
TYPE F POST - S 3x5.7x4'-10" [S 76x8.5x1475]	





NOTES

Where "End Terminal (WYBET)" is specified, provide either the WYBET or BEAT option as shown herein. Where "Median Barrier End Terminal (WYBET)" is specified, provide either the Median Barrier WYBET or Median Barrier BEAT option as shown herein.

- ① For tangent guardrail installations where the face of the guardrail at the impact head of the terminal is less than 4 ft [1.2 m] from the shoulder break point, realign the guardrail and terminal as shown in detail on **SHEET 1** of this standard plan.
- ② The BEAT End Terminal shown herein is proprietary and can only be manufactured and sold by Road Systems, Inc. or its duly authorized representative.

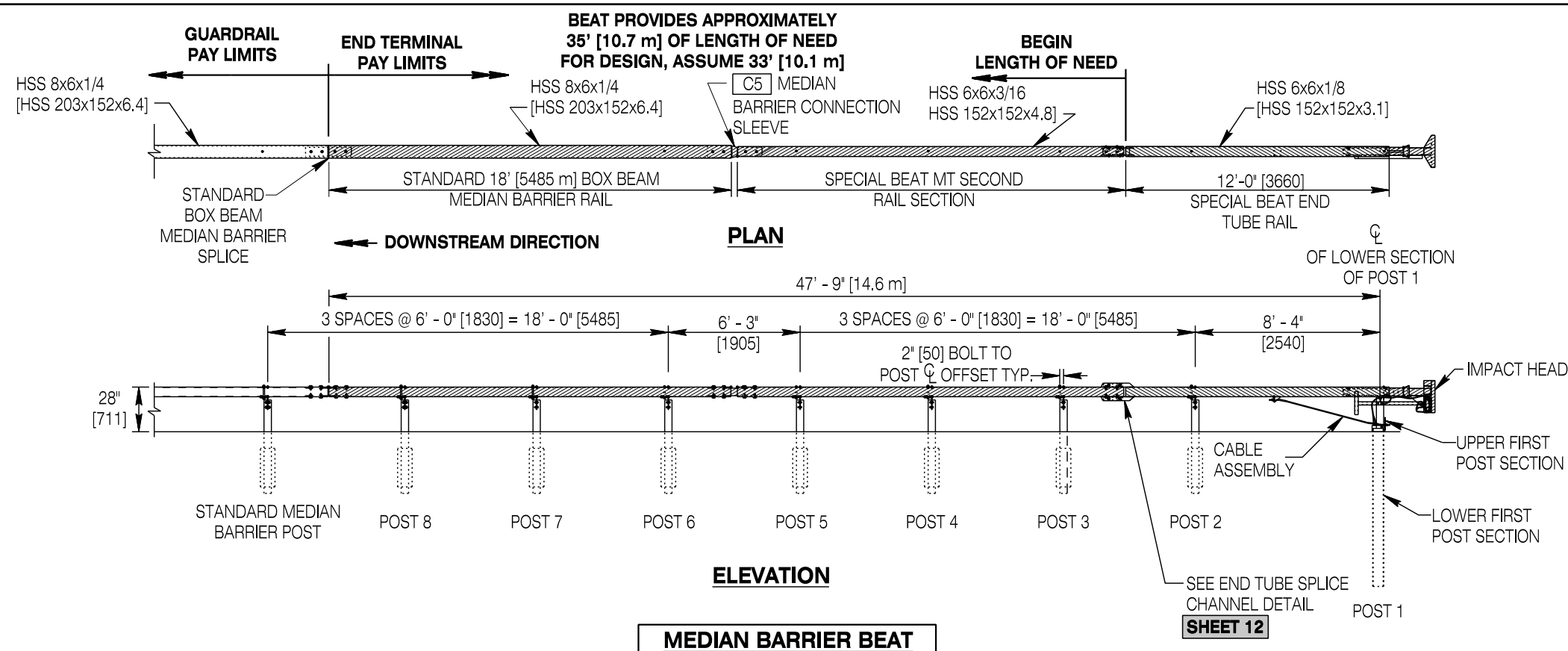
Details shown herein are approximate. Refer to the manufactures drawings and installation manual for more precise details and requirements.

Any items shown as an "additional requirement" are over and above the manufacturer's standard product requirements.

Summary of additional requirements for the BEAT:

- A. Double nut each end of the cable anchor to prevent from loosening.

- ③ Rail element beyond end tube section tie plate has to be a minimum of 18 ft [5485] before splice.



Designed by: WBW
Drawn by: JK
Checked by: WBW
Previous Dwg. No. 606-6

END TERMINAL (WYBET), OPTION 2 - BEAT (SHEET 1 OF 2)

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



BOX BEAM GUARDRAIL

STANDARD PLAN

STANDARD PLAN NUMBER

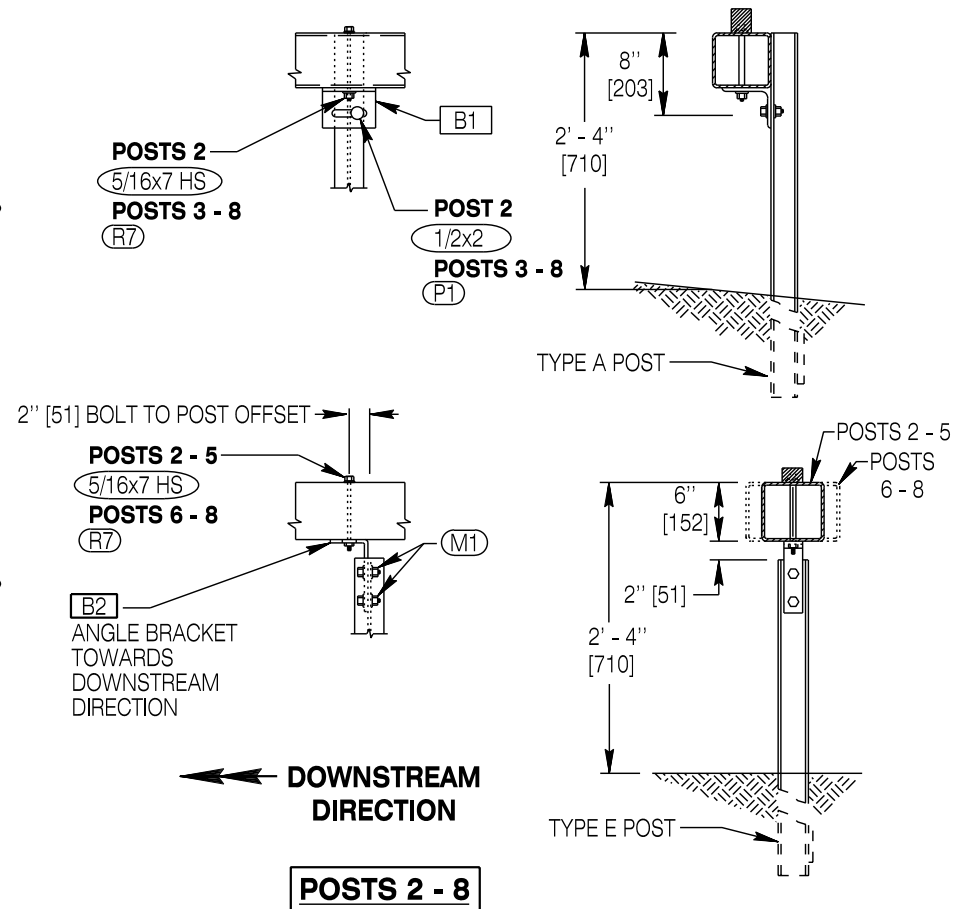
606-6A

SHEET 11 of 13

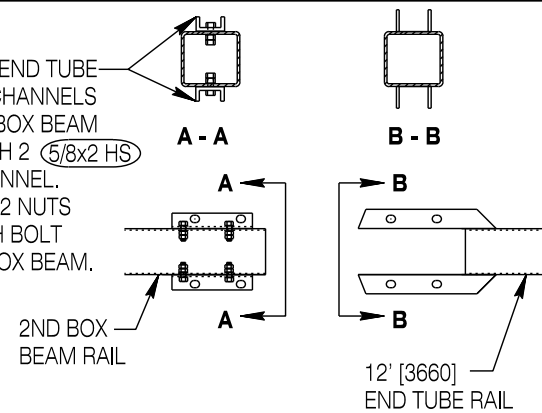
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Date Issued: JULY 2015

STANDARD BEAT

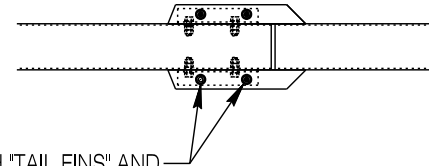
MEDIAN BARRIER BEAT



STEP 1
ATTACH END TUBE SPLICE CHANNELS TO 2ND BOX BEAM RAIL WITH 2 (5/8x2 HS) PER CHANNEL. ENSURE 2 NUTS ON EACH BOLT INSIDE BOX BEAM.

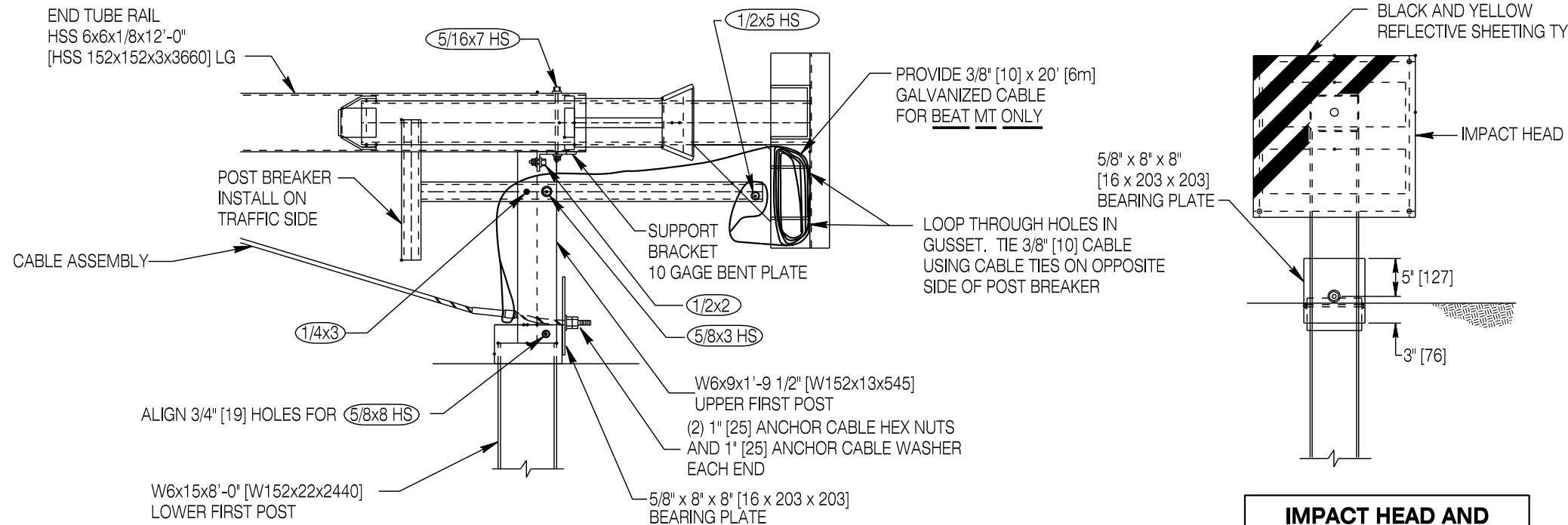


STEP 2
SLIDE 12' [3660] LONG END TUBE RAIL TO BUTT UP AGAINST 2ND BOX BEAM RAIL WITH "TAIL FINS" ON OUTSIDE OF THE END SPLICE CHANNELS UNTIL HOLES ALIGN



STEP 3
BOLT THROUGH "TAIL FINS" AND END SPLICE CHANNEL 4 PLACES WITH (5/8x6 HS)

END TUBE SPLICE CHANNEL DETAIL



IMPACT HEAD AND BEARING PLATE DETAIL

BOLT REQUIREMENTS

3/4" A325 HIGH STRENGTH HEAVY HEX BOLTS (TYP. SPLICE BOLT)

(HS2) 3/4" x 2" [19 x 50] (A325) + 1 HARDENED WASHER (F436)

3/4" A307 HEX BOLTS (TYP. MEDIAN POST BOLT)

(M1) 3/4" x 1 1/2" [19 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)

1/2" A307 HEX BOLTS (TYP. POST)

(P1) 1/2" x 1 1/2" [13 x 40] (A307) + 2 WASHERS (F844) + 1 NUT (A563)

3/8" A307 HEX BOLTS (TYP. RAIL BOLT)

(R7) 3/8" x 7 1/2" [10 x 190] (A307) + 2 WASHERS (F844) + 1 NUT (A563)

SPECIAL APPLICATION BOLTS

(1/4x3)	1/4" x 3" [6 x 75] SAE GRADE 2 BOLT + 1 WASHER (F844) + 1 SAE GRADE 2 HEX NUT
(5/16x7 HS)	5/16" x 7 1/2" [8 x 190] SAE GRADE 5 BOLT + 2 WASHERS (F436) + 1 SAE GRADE 5 HEX NUT
(1/2x2)	1/2" x 2" [13 x 50] SAE GRADE 2 BOLT + 2 WASHER (F436) + 1 SAE GRADE 2 HEX NUT
(1/2x5 HS)	1/2" x 5" [13 x 125] SAE GRADE 5 BOLT + 1 SAE GRADE 2 HEX NUT
(5/8x2 HS)	5/8" x 2" [16 x 50] SAE GRADE 5 BOLT + 2 WASHER (F436) + 2 SAE GRADE 5 HEX NUT
(5/8x3 HS)	5/8" x 3" [16 x 75] SAE GRADE 5 BOLT + 1 WASHER (F436) + 1 SAE GRADE 5 HEX NUT
(5/8x6 HS)	5/8" x 6" [16 x 150] SAE GRADE 5 BOLT + 2 WASHERS (F436) + 1 SAE GRADE 5 HEX NUT
(5/8x7 HS)	5/8" x 7" [16 x 180] SAE GRADE 5 BOLT + 2 WASHERS (F436) + 1 SAE GRADE 5 HEX NUT
(5/8x8 HS)	5/8" x 8" [16 x 205] SAE GRADE 5 BOLT + 1 WASHER (F436) + 1 SAE GRADE 5 HEX NUT

STANDARD HARDWARE AND POSTS (SEE BOX BEAM FABRICATION STANDARD PLAN)

B1	STANDARD BOX BEAM SUPPORT ANGLE
B2	STANDARD BOX BEAM MEDIAN BARRIER SUPPORT ANGLE
C1	STANDARD BOX BEAM SPLICE PLATE
C2	STANDARD BOX BEAM MEDIAN BARRIER SPLICE PLATE
C5	MEDIAN BARRIER CONNECTION SLEEVE

TYPE A POST - S 3x5.7x5'-4" [S 76x8.5x1625]

TYPE E POST - S 3x5.7x4'-10" [S 76x8.5x1475]

Designed by: WBW
Drawn by: JK
Checked by: WBW
Previous Dwg. No. 606-6

END TERMINAL (WYBET), OPTION 2 - BEAT (SHEET 2 OF 2)

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



WYOMING DEPARTMENT
OF
TRANSPORTATION



BOX BEAM GUARDRAIL

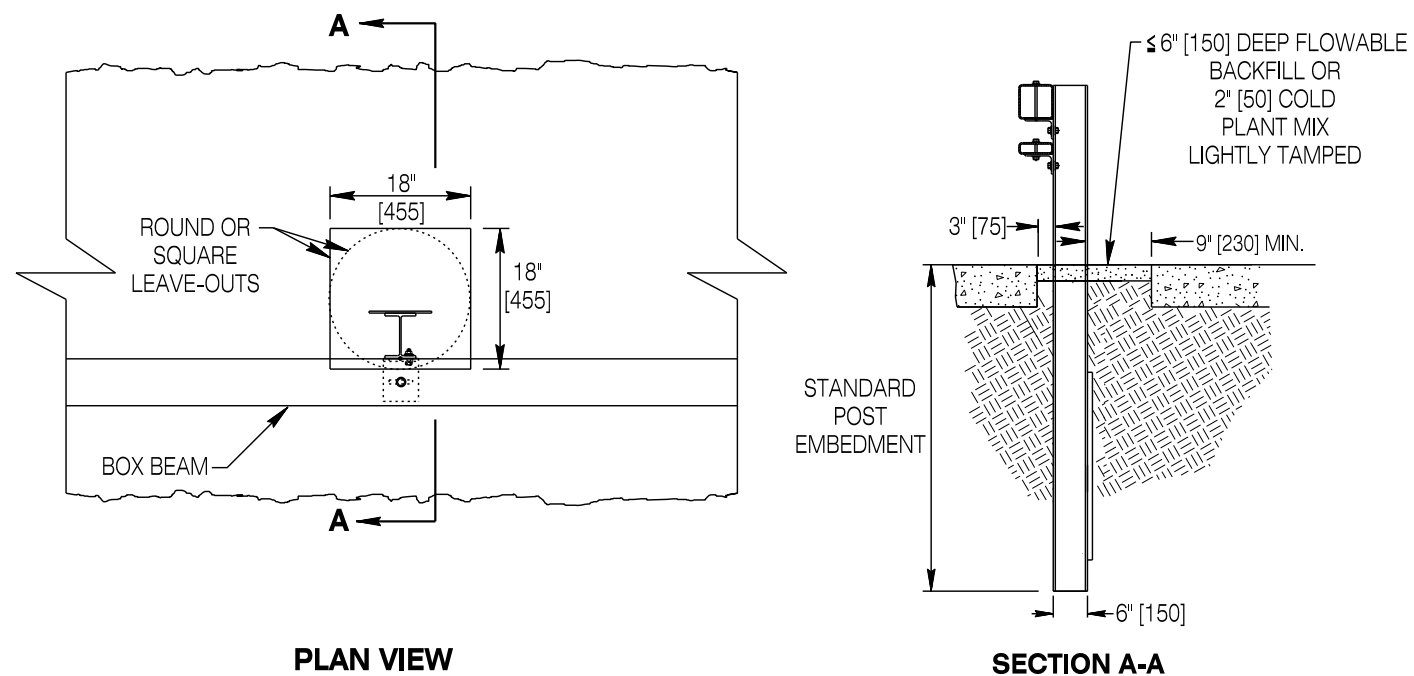
STANDARD PLAN

STANDARD PLAN NUMBER

606-6A

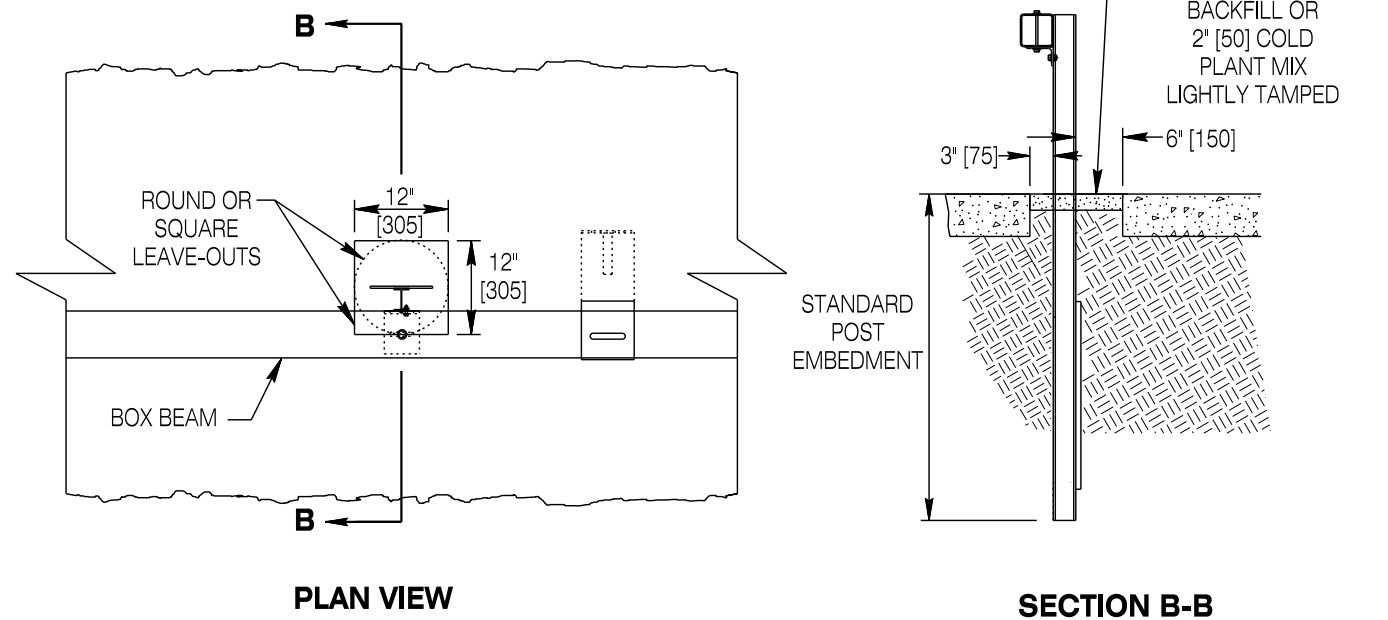
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Date Issued: JULY 2015



STRONG TRANSITION POSTS

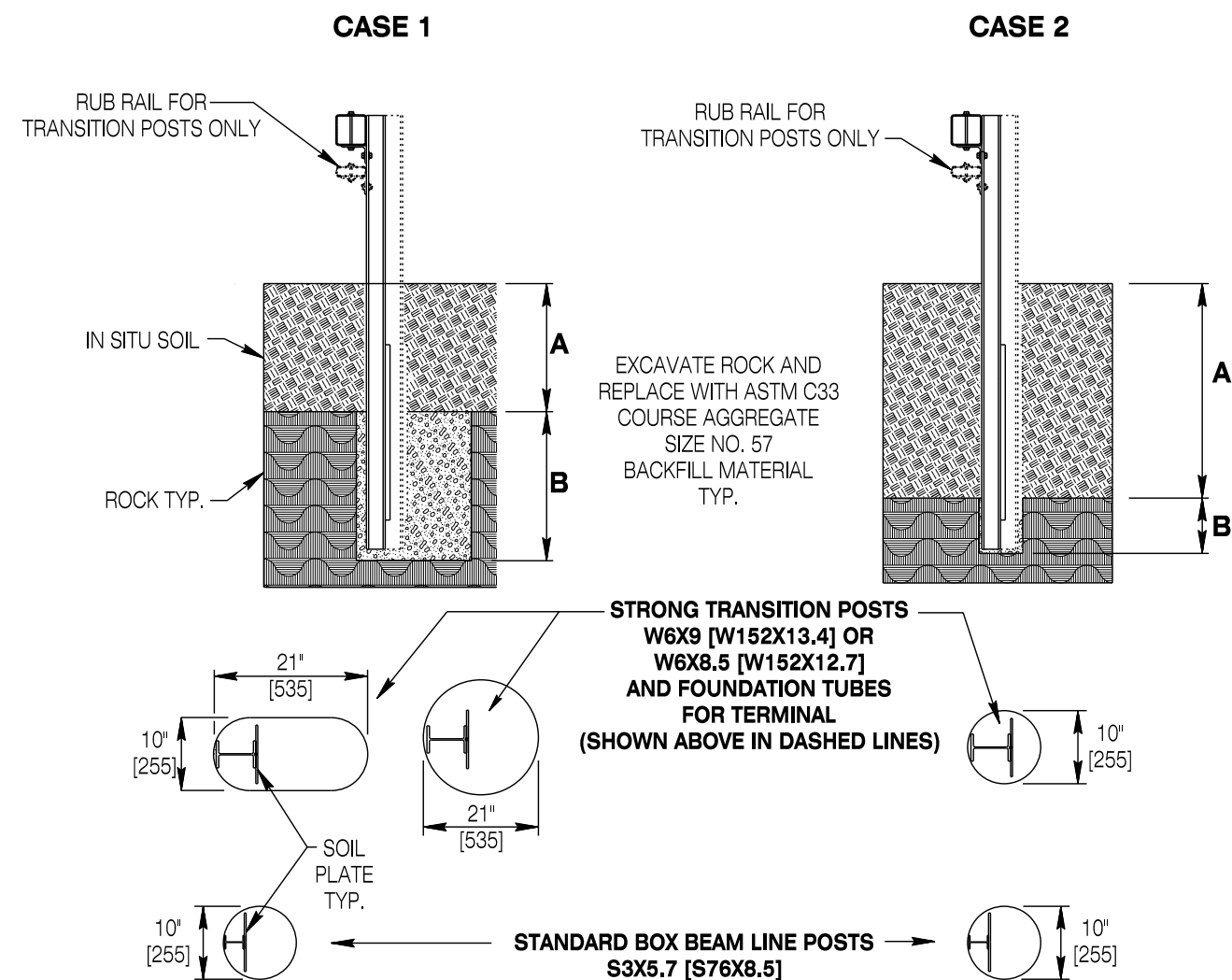
W6X9 [W152X13.4] OR W6X8.5 [W152X12.7]
AND FOUNDATION TUBES FOR TERMINAL



STANDARD BOX BEAM LINE POSTS

S3X5.7 [S76X8.5]

POST PLACEMENT IN ASPHALT OR CONCRETE PAVEMENTS



CASE 1 - A ≤ 18" [455]

For overlying soil depths (A) ranging from 0 to 18" [0 to 455], the depth of required drilling (B) is equal to 24" [610] or the desired embedment depth minus the depth of the soil, which ever is less.

CASE 2 - A > 18" [455]

For overlying soil depths (A) ranging from > 18" [455], to the embedment depth of the post, depth of required drilling (B) is equal to either 12" [305] or the desired embedment depth minus the depth of soil, which ever is less.

POSTS IN ROCK

Designed by: VVBW
Drawn by: JK
Checked by: VVBW
Previous Dwg. No. 606-6

POST PLACEMENT IN PAVEMENTS AND ROCK

Note: Units shown in brackets [] are metric and are in millimeters (mm) unless other units are shown.



WYOMING DEPARTMENT
OF
TRANSPORTATION



BOX BEAM GUARDRAIL

STANDARD PLAN

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