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TxDOT Thrie-Beam Transition to Concrete Barrier MASH TL-3 Study
Pooled Fund-Engineering Support

LETTER REPORT

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Overview

Texas A&M Transportation Institute (TTI) has completed an assessment of the TxDOT Thrie-Beam Transition to Concrete Barrier for AASHTO MASH (ref. 1) Test Level 3 (TL-3) compliance. TTI reviewed previous crash tests conducted on thrie beam transition systems to assist with the evaluation. The results of the study are summarized below.

The TxDOT Thrie-Beam Transition to Concrete Barrier is an 18'-9" long system that transitions from a 31-inch tall MGS W-beam guardrail system to a concrete barrier. The TxDOT Thrie-Beam Transition to Concrete Barrier has a height of 31 inches. Two nested 12'-6" long thrie beam sections are attached to the concrete barrier using a 10-gauge thrie beam terminal connector. The thrie beam rail is twisted onto the face of the concrete barrier when attaching to a sloped parapet such as an F-shape or single slope barrier. A 6-inch tall concrete curb is located below the nested thrie beam section. To transition the nested thrie beam section to the W-beam guardrail system, a 6'-3" long, 10-gauge non-symmetrical (asymmetric) W-beam to thrie beam transition section is used. Appendix A provides additional details of the TxDOT Thrie-Beam Transition to Concrete Barrier.

Evaluation Results

According to MASH, two tests are recommended to evaluate approach guardrail to bridge rail transitions to test level 3 (TL-3).

- **MASH Test 3-20**: A 2425-lb vehicle impacting the critical impact point (CIP) of the transition at a nominal impact speed and angle of 62 mi/h and 25 degrees, respectively.

- **MASH Test 3-21**: A 5000-lb pickup truck vehicle impacting the CIP of the transition at a nominal impact speed and angle of 62 mi/h and 25 degrees, respectively.

An approach guardrail to bridge rail transition system has two distinct stiffness transition regions: one on the upstream end that transitions from the approach MGS guardrail to the transition section, and the other on the downstream end of the transition system where it attaches to the rigid concrete parapet or bridge rail. To determine MASH TL-3 compliance of the TxDOT Thrie-Beam Transition to Concrete Barrier, both the downstream and upstream transition were evaluated. The evaluation results for each required test is presented below.

MASH Test 3-21 at Downstream Transition

MASH Test 3-21 has been successfully performed on the TxDOT Thrie-Beam Transition to Concrete Barrier at the downstream transition (ref. 2). In this test, the thrie beam transition rails and terminal connector were twisted and attached directly to the face of the single slope barrier. The bottom of the single slope barrier was tapered at the end. This represents a more critical connection than a configuration in which the end terminal is directly attached to a vertical parapet or if a tapered steel spacer is used to vertically attach the thrie beam to a sloped parapet surface. Based on the results of this test, the impact performance of the TxDOT Thrie-Beam Transition to Concrete Barrier is considered acceptable under MASH Test 3-21 requirements at the downstream transition.

MASH Test 3-20 at Downstream Transition

MASH Test 3-20 has not been performed on the TxDOT Thrie-Beam Transition to Concrete Barrier at the downstream transition. However, MASH Test 3-20 has been successfully performed at the downstream transition on several thrie beam transition systems developed by TTI and Midwest Roadside Safety Facility (MwRSF) (ref. 3,4,5,6). Table 1 shows a comparison between the downstream transition for the TxDOT Thrie-Beam Transition to Concrete Barrier and the transition systems tested by TTI and MwRSF.

Table 1. Downstream Transition Comparison.

Transition System	Field/Back Edge of the Thrie Beam to the end of the Parapet Taper	Nested Thrie Beam?	Post Type	Post Spacing (in.)	Height of Transition (in.)	Curb in Transition?
TxDOT Thrie-Beam Transition to Concrete Barrier (ref. 2)	Aligned	Yes	W6x8.5	18.75	31	Yes
TxDOT T131RC Bridge Rail Transition (ref. 3)	9.5 inches towards the field side	Yes	W6x8.5	18.75	31	No
AGT Critical Configuration Transition to Standardized Buttress (ref. 4)	4.5 inches towards the field side	Yes	W6x8.5	18.75	31	No
2019 MASH 2-Tube Bridge Rail Thrie Beam Transition (ref. 5)	4.5 inches towards the field side	Yes	W6x8.5	18.75	34	No
34-in Tall Thrie Beam Transition to Concrete Buttress (ref. 6)	4.5 inches towards the field side	Yes	W6x15	37.5	34	No

As shown in Table 1, the downstream transition configurations of the crash tested systems are largely similar to the TxDOT Thrie-Beam Transition to Concrete Barrier. The primary difference between the transition systems is the taper position at the end of the barriers and the presence of a 6-inch tall curb in the TxDOT Thrie-Beam Transition to Concrete Barrier. A taper with greater offset distance from the thrie beam decreases the likelihood of vehicle interaction at the end of the barrier that can result in vehicle snagging. As shown in Table 1, the taper at the end of the parapet on the TxDOT Thrie-Beam Transition to Concrete Barrier is aligned with the field side of the nested thrie beam rail. While the other transitions have a greater depth of taper on the end of the parapet, the TxDOT Thrie-Beam Transition to Concrete Barrier incorporates a 6-inch tall curb beneath the nested thrie beam section, whereas the other transition systems were tested without a curb. In absence of a curb element, the parapet end must have additional depth of taper to mitigate vehicle snagging concerns. The curb in the TxDOT Thrie-Beam Transition to Concrete Barrier is considered a design element of the transition and not merely a drainage accommodation. The presence of a curb closes the clear opening beneath the thrie beam and is a physical deterrent that prevents a vehicle's tire from rotating beneath the rail and snagging on the end of the concrete parapet. Therefore, the taper on the end of the parapet in combination with the presence of a 6-inch tall curb eliminates concerns regarding snagging of the MASH 1100C vehicle on the parapet end. Other details of the TxDOT Thrie-Beam Transition to Concrete Barrier (e.g., rail element, post size, post spacing, etc.) are similar to those of the systems shown in Table 1 on which MASH Test 3-20 has been successfully performed.

Based on these considerations, the TxDOT Thrie-Beam Transition to Concrete Barrier is considered acceptable under MASH Test 3-20 requirements at the downstream transition end.

MASH Test 3-21 at Upstream Transition

MASH Test 3-21 has not been performed on the TxDOT Thrie-Beam Transition to Concrete Barrier at the upstream transition. However, MASH Test 3-21 has been successfully performed at the upstream transition on several thrie beam transition systems developed by TTI and Midwest Roadside Safety Facility (MwRSF) (ref. 5,7,8). Table 2 shows a comparison between the upstream configuration of the TxDOT Thrie-Beam Transition to Concrete Barrier and the upstream transitions that have been crash tested by TTI and MwRSF.

Table 2. Upstream Transition Comparison.

Transition	Transition from MGS W-Beam to Thrie Beam at Upstream Transition	Transition Height (in.)	Curb in Upstream Transition?
TxDOT Thrie-Beam Transition to Concrete Barrier	If continuous curb option is used: MGS to 25' long nested W-beam section. Nested W-beam section to nested thrie beam section using 10 gauge asymmetric W-beam to thrie beam transition piece.	31	Yes
	If continuous curb option is not used: MGS to nested thrie beam section using 10 gauge asymmetric W-beam to thrie beam transition piece.		No
MASH 2-Tube Bridge Rail Thrie Beam Transition (ref. 5)	MGS to nested thrie beam section using 10 gauge symmetric W-beam to thrie beam transition section.	34	No
MGS Stiffness Transition with Curb (ref. 7)	MGS to nested 12'-6" long W-beam section. Nested W-beam section to 6'-3" long 12 gauge thrie beam section using 10 gauge asymmetric W-beam to thrie beam transition piece.	31	Yes
MGS Approach Guardrail Transition using Standardized Steel Posts (ref. 8)	MGS to 6'-3" long 12 gauge thrie beam section using 10 gauge asymmetric W-beam to thrie beam transition piece.	31	No

As shown in Table 2, the upstream transition configurations of the crash tested systems are largely similar to the TxDOT Thrie-Beam Transition to Concrete Barrier. The exception is that the MGS Stiffness Transition with Curb (ref. 7) and MGS Approach Guardrail Transition using Standardized Steel Posts (ref. 8) have an additional 6'-3" long, 12 gauge thrie beam section in the upstream transition compared to the MASH 2-Tube Bridge Rail Thrie Beam Transition (ref. 5) and the TxDOT Thrie-Beam Transition to Concrete Barrier. The MASH 2-Tube Bridge Rail Thrie Beam Transition (ref. 5) has a higher rail height (34 inches) than the MGS Approach Guardrail Transition using Standardized Steel Posts. Since this upstream transition was successfully tested at a more critical rail height without the additional 6'-3" long 12-gauge thrie beam section, TTI researchers believe that the TxDOT Thrie-Beam Transition to Concrete Barrier can be expected to perform acceptably at the upstream transition without the additional 6'-3" long 12-gauge thrie beam section after the non-symmetric W-beam-to-thrie beam transition section. Therefore, since other details are similar to successfully crash tested upstream

transitions, it is concluded that the TxDOT Thrie-Beam Transition to Concrete Barrier will satisfy MASH Test 3-21 criteria at the upstream transition.

MASH Test 3-20 at Upstream Transition

MASH Test 3-20 has not been performed on the TxDOT Thrie-Beam Transition to Concrete Barrier at the upstream transition. However, MASH Test 3-20 has been successfully performed at the upstream transition on the MGS Stiffness Transition with and without curb (ref. 7, 8). As shown in Table 2, the TxDOT Thrie-Beam Transition to Concrete Barrier is comparable to the MGS Stiffness Transition with and without curb. The difference between the two transitions is that the MGS Stiffness Transition has an additional 6'-3" long 12-gauge thrie beam section in the upstream transition. As previously stated, TTI researchers believe that this difference is not significant based on successful testing of the MASH 2-Tube Bridge Rail Thrie Beam Transition under more critical load during MASH Test 3-21. Therefore, since the MGS Stiffness Transition with and without curb has been found to meet MASH Test 3-20 criteria at the upstream transition, the TxDOT Thrie-Beam Transition to Concrete Barrier is considered acceptable under MASH Test 3-20 requirements at the upstream transition.

Conclusion

TTI has reviewed the TxDOT Thrie-Beam Transition to Concrete Barrier, and their opinion is that this transition system complies with MASH TL-3 safety evaluation criteria.

References

1. American Association of State Highway and Transportation Officials, *Manual for Assessing Safety Hardware*, AASHTO Subcommittee on Bridges and Structures, Washington, D.C., 2016.

2. R. P. Bligh, W. L. Menges, B. L. Griffith, G. E. Schroeder, and D. L. Kuhn. *MASH Evaluation of TxDOT Roadside Safety Features – Phase III*. TTI Report No. 0-6946-R3. Texas A&M Transportation Institute, College Station, TX, February 2020.

3. W. F. Williams, R. P. Bligh, and W. L. Menges. *MASH TL-3 Testing and Evaluation of the TxDOT T131RC Bridge Rail Transition*. TTI Test Report No. 9-1002-12-4. Texas A&M Transportation Institute, College Station, TX, March 2013.

4. S. K. Rosenbaugh, J. D. Schmidt, and R. K. Faller. *Development of a Standardized Buttress for Approach Guardrail Transitions*. TRB Paper No. 18-05386. Midwest Roadside Safety Facility, Lincoln, NE, November 6, 2017.

5. W. F. Williams, W. L. Menges, G. E. Schroefer, and D L. Kuhn. *MASH TL-3 Evaluation of 2019 MASH 2-Tube Bridge Rail Thrie Beam Transition.* TTI Test Report No. 608331-01-4-6. Texas A&M Transportation Institute, College Station, TX. [Pending Review]

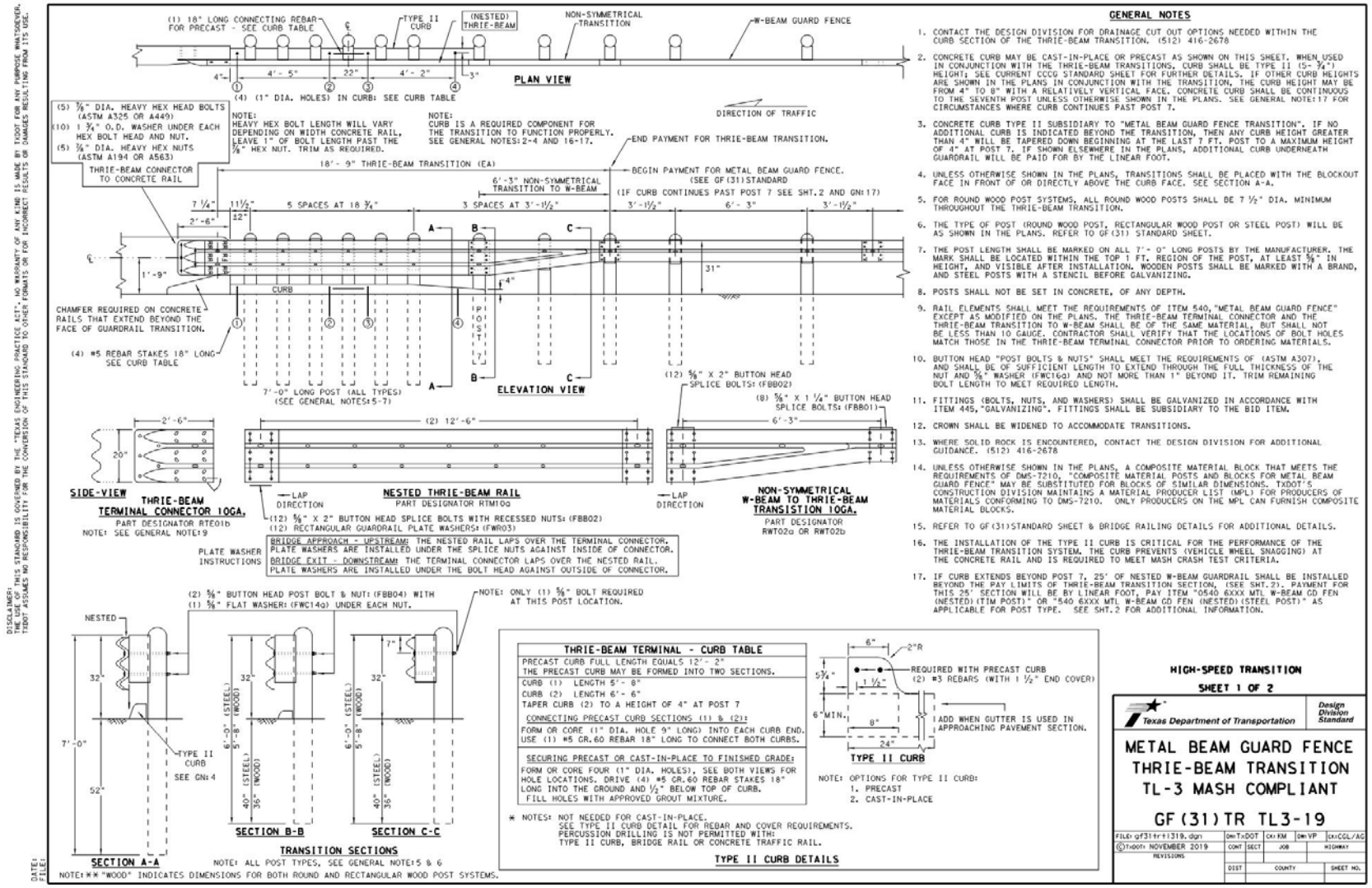
6. S. K. Rosenbaugh, R. K. Faller, W. G. Fallet, R. W. Bielenberg, and J. D. Schmidt. *34-in. Tall Thrie Beam Transition to Concrete Buttress*. MwRSF Research Report No. TRP-03-367-19. Midwest Roadside Safety Facility, Lincoln, NE, March 27, 2019.

7. B. J. Winkelbauer, S. K. Rosenbaugh, R. W. Bielenberg, J. G. Putjenter, K. A. Lechtenberg, R. K. Faller, and J. D. Reid. *Dynamic Evaluation of MGS Stiffness Transition with Curb*. MwRSF Research Report No. TRP-03-291-14. Midwest Roadside Safety Facility, Lincoln, NE, June 30, 2014.

8. S. K. Rosenbaugh, R. K. Faller, R. W. Bielenberg, K. A. Lechtenberg, D. L. Sicking, and J. D. Reid. *Development of the MGS Approach Guardrail Transition using Standardized Steel Posts*. MwRSF Research Report NO. TRP-03-210-10, Midwest Roadside Safety Facility, Lincoln, NE, December 21, 2010.

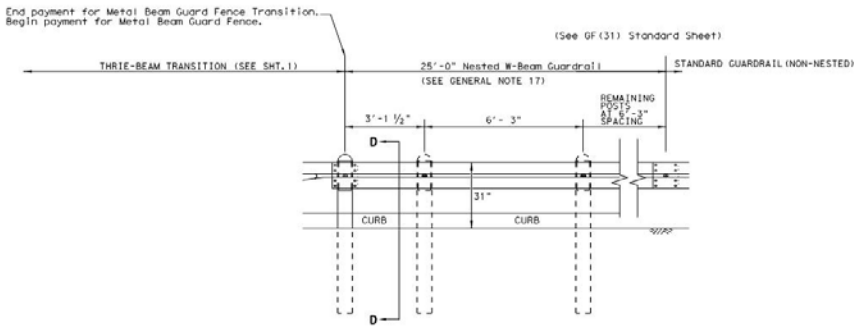
APPENDIX A

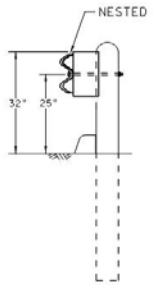
Details for the TxDOT Thrie-Beam Transition to Concrete Barrier


(1) 18" LONG CONNECTING REBAR FOR PRECAST - SEE CURB TABLE
TYPE II CURB
(NESTED) THRIE-BEAM
NON-SYMMETRICAL TRANSITION
W-BEAM GUARD FENCE
PLAN VIEW
(4) (1" DIA. HOLES) IN CURB: SEE CURB TABLE
DIRECTION OF TRAFFIC
(5) ⅞" DIA. HEAVY HEX HEAD BOLTS (ASTM A325 OR A449)
(10) 1 ¾" O.D. WASHER UNDER EACH HEX BOLT HEAD AND NUT.
(5) ⅞" DIA. HEAVY HEX NUTS (ASTM A194 OR A563)
THRIE-BEAM CONNECTOR TO CONCRETE RAIL
NOTE: HEAVY HEX BOLT LENGTH WILL VARY DEPENDING ON WIDTH CONCRETE RAIL, LEAVE 1" OF BOLT LENGTH PAST THE ⅞" HEX NUT. TRIM AS REQUIRED.
NOTE: CURB IS A REQUIRED COMPONENT FOR THE TRANSITION TO FUNCTION PROPERLY. SEE GENERAL NOTES: 2-4 AND 16-17.
END PAYMENT FOR THRIE-BEAM TRANSITION.
18'-9" THRIE-BEAM TRANSITION (EA)
BEGIN PAYMENT FOR METAL BEAM GUARD FENCE. (SEE GF(31)STANDARD (IF CURB CONTINUES PAST POST 7 SEE SHT.2 AND GN:17)
6'-3" NON-SYMMETRICAL TRANSITION TO W-BEAM
5 SPACES AT 18 ¾"
3 SPACES AT 3'-1½"
CHAMFER REQUIRED ON CONCRETE RAILS THAT EXTEND BEYOND THE FACE OF GUARDRAIL TRANSITION.
(4) #5 REBAR STAKES 18" LONG SEE CURB TABLE
7'-0" LONG POST (ALL TYPES) (SEE GENERAL NOTES: 5-7)
ELEVATION VIEW
(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS: (FBB02)
(8) ⅝" X 1 ¼" BUTTON HEAD SPLICE BOLTS: (FBB01)
SIDE-VIEW
THRIE-BEAM TERMINAL CONNECTOR 10GA.
PART DESIGNATOR RTE01b
NOTE: SEE GENERAL NOTE: 9
NESTED THRIE-BEAM RAIL
PART DESIGNATOR RTM10q
LAP DIRECTION
NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSITION 10GA.
PART DESIGNATOR RWT02a OR RWT02b
(12) ⅝" X 2" BUTTON HEAD SPLICE BOLTS WITH RECESSED NUTS: (FBB02)
(12) RECTANGULAR GUARDRAIL PLATE WASHERS: (FWR03)
PLATE WASHER INSTRUCTIONS
BRIDGE APPROACH - UPSTREAM: THE NESTED RAIL LAPS OVER THE TERMINAL CONNECTOR. PLATE WASHERS ARE INSTALLED UNDER THE SPLICE NUTS AGAINST INSIDE OF CONNECTOR.
BRIDGE EXIT - DOWNSTREAM: THE TERMINAL CONNECTOR LAPS OVER THE NESTED RAIL. PLATE WASHERS ARE INSTALLED UNDER THE BOLT HEAD AGAINST OUTSIDE OF CONNECTOR.
(2) ⅝" BUTTON HEAD POST BOLT & NUT: (FBB04) WITH (1) ⅝" FLAT WASHER: (FWC14q) UNDER EACH NUT.
NOTE: ONLY (1) ⅝" BOLT REQUIRED AT THIS POST LOCATION.
NESTED
TYPE II CURB SEE GN: 4
SECTION A-A
SECTION B-B
SECTION C-C
TRANSITION SECTIONS
NOTE: ALL POST TYPES, SEE GENERAL NOTE: 5 & 6
NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.
THRIE-BEAM TERMINAL - CURB TABLE
PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.
CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7
CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE (1" DIA. HOLE 9" LONG) INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.
SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE:
FORM OR CORE FOUR (1" DIA. HOLES), SEE BOTH VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB. FILL HOLES WITH APPROVED GROUT MIXTURE.
REQUIRED WITH PRECAST CURB (2) #3 REBARS (WITH 1 ½" END COVER)
ADD WHEN GUTTER IS USED IN APPROACHING PAVEMENT SECTION.
TYPE II CURB
NOTE: OPTIONS FOR TYPE II CURB: 1. PRECAST 2. CAST-IN-PLACE
* NOTES: NOT NEEDED FOR CAST-IN-PLACE. SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS. PERCUSSION DRILLING IS NOT PERMITTED WITH: TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.
TYPE II CURB DETAILS
GENERAL NOTES
1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ⅜") HEIGHT; SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16q) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S CONSTRUCTION DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31)STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.
HIGH-SPEED TRANSITION
SHEET 1 OF 2
Texas Department of Transportation
Design Division Standard
METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT
GF(31)TR TL3-19
FILE: gf31tr1319.dgn
DN: TxDOT CK: KM DW: VP CK: CGL/AG
©TxDOT: NOVEMBER 2019
CONT SECT JOB HIGHWAY
REVISIONS
DIST COUNTY SHEET NO.
DISCLAIMER: THE USE OF THIS STANDARD IS GOVERNED BY THE "TEXAS ENGINEERING PRACTICE ACT". NO WARRANTY OF ANY KIND IS MADE BY TXDOT FOR ANY PURPOSE WHATSOEVER. TXDOT ASSUMES NO RESPONSIBILITY FOR THE CONVERSION OF THIS STANDARD TO OTHER FORMATS OR FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.
DATE:
FILE:

DATE:
FILE:

REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)





SECTION D-D

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-19

FILE: gf31tr-tl319.dgn	DW: TxDOT	CK: KM	DW: KM	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.