U.S. Department of Transportation
Federal Highway Administration

1200 New Jersey Ave., SE
Washington, D.C. 20590

November 8, 2012

In Reply Refer To:
HSST/B-240

Ms. Aurora Meza
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483

Dear Ms. Meza:

This letter is in response to your request for the Federal Highway Administration (FHWA) to review a roadside safety system for eligibility for reimbursement under the Federal-aid highway program.

Name of system: 31-inch W-Beam Guardrail with 8-inch Offset Block
Type of system: Longitudinal Barrier
Test Level: AASHTO MASH TL3
Testing conducted by: Texas Transportation Institute
Task Force 13 Designator: SGR47
Date of request: October 5, 2012
Date initially acknowledged: October 5, 2012
Date of completed package: October 5, 2012

Decision:
The following device is eligible, with details provided in the form which is attached as an integral part of this letter:
31-inch W-Beam Guardrail with 8-inch Offset Block

Based on a review of crash test results you submitted certifying the device described herein meets the crash test and evaluation criteria of the American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH), the device is eligible for reimbursement under the Federal-aid highway program. Eligibility for reimbursement under the Federal-aid highway program does not establish approval or endorsement by the FHWA for any particular purpose or use.

The FHWA, the Department of Transportation, and the United States Government do not endorse products or services and the issuance of a reimbursement eligibility letter is not an endorsement of any product or service.

FHWA: HSST: WLongstreet: sf: x60087:10/26/12: NArtimovich: **Updated 11/1/12**
File: h://directory folder/HSST/ B240_31-inch W-Beam Guardrail 8-inch Offset Block.docx
cc: HSST Will Longstreet

Requirements
To be found eligible for Federal-aid funding, roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH).

Description
The device and supporting documentation are described in the attached form.

Summary and Standard Provisions
Therefore, the system described and detailed in the attached form is eligible for reimbursement and may be installed under the range of conditions tested. Please note the following standard provisions that apply to FHWA eligibility letters:

- This letter provides a AASHTO/ARTBA/AGC Task Force 13 designator that should be used for the purpose of the creation of a new and/or the update of existing Task Force 13 drawing for posting on the on-line 'Guide to Standardized Highway Barrier Hardware' currently referenced in AASHTO Roadside Design Guide.
- This finding of eligibility does not cover other structural features of the systems, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may influence system conformance with MASH will require a new reimbursement eligibility letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals safety problems, or that the system is significantly different from the version that was crash tested, we reserve the right to modify or revoke this letter.
- You are expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of the MASH.
- To prevent misunderstanding by others, this letter of eligibility is designated as number B-240 and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.

- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder. The FHWA does not become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

Sincerely yours,

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures

U.S. Department
of Transportation
**Federal Highway
Administration**

1200 New Jersey Ave., SE
Washington, D.C. 20590

Nov 8, 2012

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HSST/B-240

Ms. Aurora Meza
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483

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Sincerely yours,

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility Of Highway Safety Hardware

Submitter	Date of Request:	June 11, 2012	(•) New ( ) Resubmission
	Name:	Rory Meza (DES)	
	Company:	Texas Department of Transportation	
	Address:	125 East 11th Street, Austin, Texas 78701-2483	
	To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies	

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

System Type	Device Name / Variant	Testing Criterion	Test Level
'B': Barriers (Roadside, Median, Bridge	31-inch Guardrail with 8-inch Offset Block	AASHTO MASH	TL3

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the test / evaluation results meet the appropriate evaluation criteria in the MASH.

Identification of the individual or organization responsible for the product:

Contact Name:	Rory Meza
Company Name:	Texas Department of Transportation
Address 1:	125 East 11th Street
Address 2:	
City/State/Zip:	Austin/Texas/78701-2483
Country:	U.S.A.

PRODUCT DESCRIPTION

New Hardware
The guardrail incorporates a standard 12-gauge corrugated W-beam rail section mounted at a height of 31 inches on 6-ft long, W6x8.5 steel posts. The posts are spaced on 6 ft-3 inch centers and embedded 40 inches. The rail is offset from the posts using 6 inch wide x 8 inch deep x 14 inch long routed wood offset blocks or FHWA eligible alternative. The rail is attached to the blockout and post using a single 5/8-inch diameter x 10-inch long button head bolt. The rail splices are located midspan between posts. The W-beam guardrail conforms to AASHTO M180. The W6x8.5 steel guardrail posts are ASTM A36. The routed wood offset blocks are Grade 1 southern yellow pine. The guardrail post bolts and rail splice bolts comply with ASTM A307 and are galvanized in accordance with ASTM A153. The nuts comply with ASTM A563 and are galvanized in accordance with ASTM A153.

CRASH TESTING

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-10 (1100C)	The 31-inch W-beam guardrail with standard offset blocks contained and redirected the 1100C vehicle in a stable manner. The vehicle did not penetrate, underride, or override the guardrail. The 1100C vehicle remained upright both during and after the collision event. Maximum roll and pitch angles were -16 degrees and -1 degrees, respectively. The 1100C vehicle exited within the prescribed exit box. The W-beam rail element detached from posts13 through 17. Maximum dynamic deflection of the W-beam rail element during the test was 2.38 ft. There were not detached rail elements that penetrated or showed potential for penetrating the occupant compartment, nor presented a hazard to others in the area. The vehicle contacted several guardrail support posts, but there was no occupant compartment deformation. The occupant risk measures (OIV and Ridedown Acceleration) were below the preferred values recommended in MASH.	PASS
3-11 (2270P)	The modified G4(1S) guardrail system with 8-inch offset blocks, splices at posts, and a mounting height of 27 5/8 inches met all required evaluation criteria for MASH Test 3-11. The MGS with 12-inch offset blocks, splices midspan between posts, and 31-inch mounting height was also successfully tested under MASH Test 3-11 impact conditions. Therefore, in consultation with FHWA, it was decided that this test was not critical for evaluation of the new guardrail system.	WAIVER REQUES
3-20 (1100C)	This is not a transition system	WAIVER REQUES
3-21 (2270P)	This is not a transition system	WAIVER REQUES

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

Laboratory Name:	Texas Transportation Institute
Laboratory Contact:	Roger Bligh
Address:	3135 TAMU, College Station, Texas 77843-3135
Country:	USA
Accreditation Certificate Number and Date:	A2LA Certificate Number 2821.01 April 30, 2013

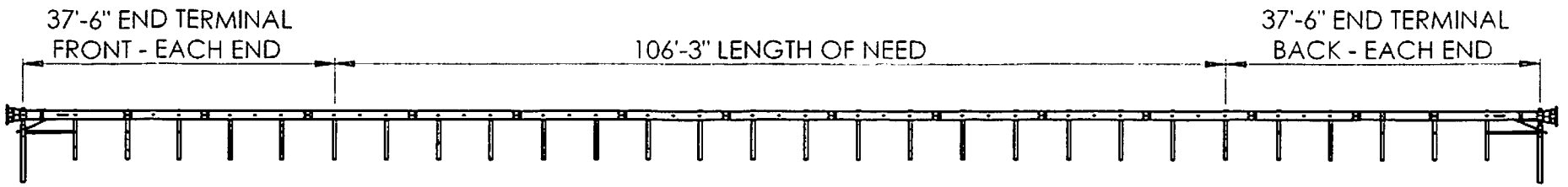
ATTACHMENTS

Attach to this form:

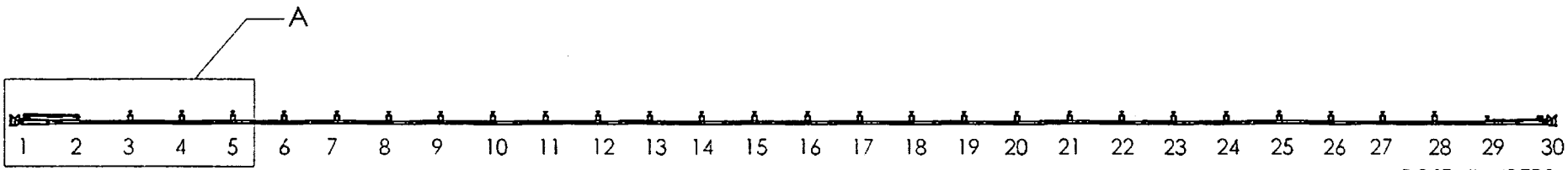
1) A copy of the Test Data Summary Sheet for each test conducted in support of this request.
2) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [Hardware Guide Drawing Standards]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are key to understanding the performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

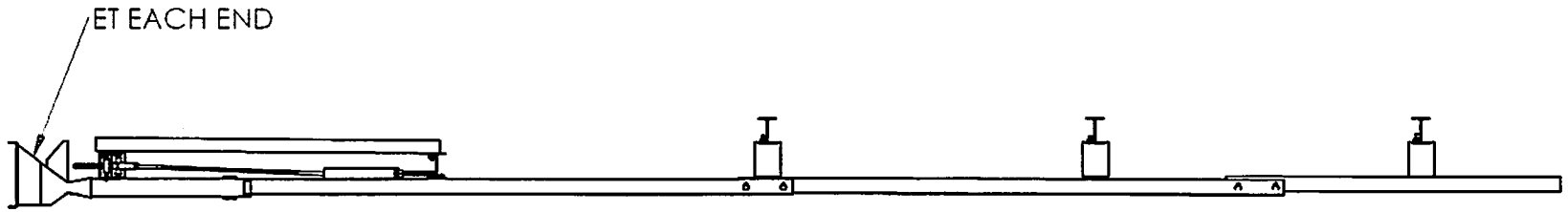
Eligibility Letter		AASHTO TF13	
Number	Date	Designator	Key Words
B240	October 24, 2012	SGR47	W-Beam Guardrail, Longitudinal Barriers, MASH, standard offset blocks, 31 inches, W6x8.5 steel posts, 5/8-inch diameter x 10-inch long button head bolt, Grade 1 southern yellow pine, ASTM A307, ASTM A36, ASTM A153, ASTM A563



ELEVATION VIEW



PLAN VIEW



DETAIL A
SCALE 1 : 40

*ALL POST SPACES - 75"

The Texas A&M University System

Texas Transportation Institute
College Station, Texas 77843

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Project No.
420020

Full Rail

Guardrail TxDOT

Approved:
Akram Abu-Odeh:

Date:
2010-07-30

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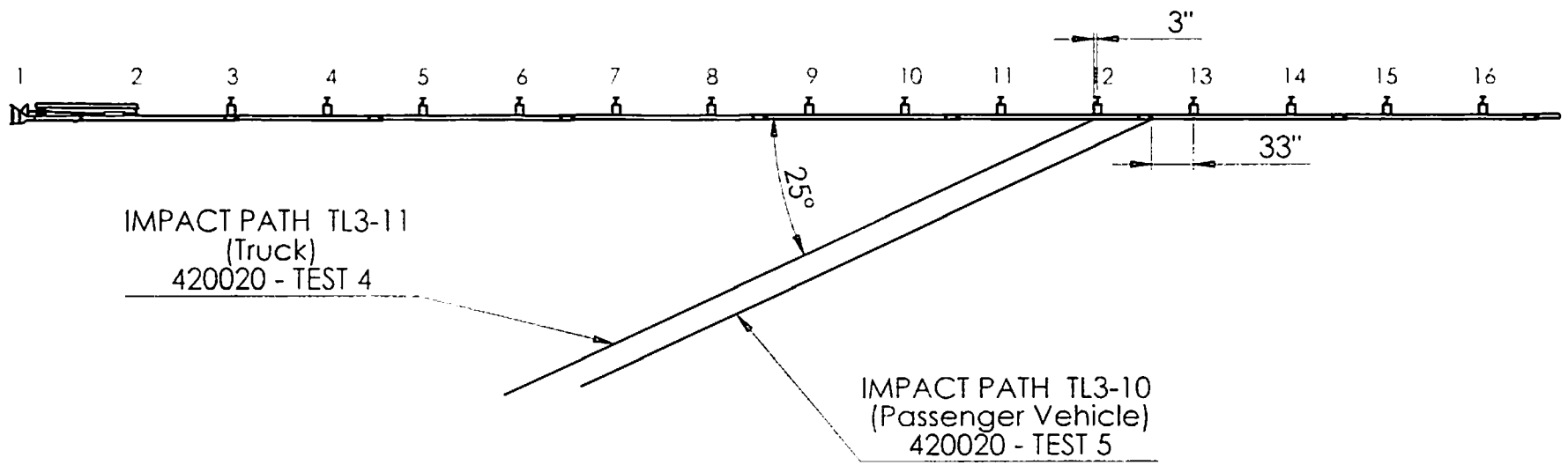

The Texas A&M University System

Texas Transportation Institute
College Station, Texas 77843

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Project No. 420020

Impact Points

Guardrail TxDOT

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#	PART NAME	QTY.
1	Nut, Recessed Guardrail	134
2	Bolt, Button-head 1 1/2"	114
3	Post, 31in. W-6x8.5 SYTP	10
4	Blockout, Wood W-beam Routered	26
5	W-Beam, 4- space 12 gauge	11
6	Bolt, Button-head 10 inch	26
7	Post, W6 x 8.5 SLP	18
8	W-Beam, 9'-4.5" - 12 gauge	2
9	5/16" nut	4
10	5/16" flat washer	8
11	Bolt, 5/16" -18 x 1-1/2" hex	4
12	ET plus head	2
13	Washer, 1" flat	4
14	Nut, 1" -8 hex	4
15	Anchor Bracket, ET Cable	2
16	W-beam, ET	2
17	3/4" Anchor Cable	2

#	PART NAME	QTY.
18	Post, CRP Bottom	2
19	CRP top, 31"	2
20	5/16" flat washer	8
21	Bolt, 5/16"-18x2 Hex	4
22	CRP bent plate washer	2
23	Strut, CRP	2
24	Washer, 5/8" flat	6
25	Bolt, 5/8"-11x2" Hex	6

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The Texas A&M University System

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Texas Transportation Institute
College Station, Texas 77843

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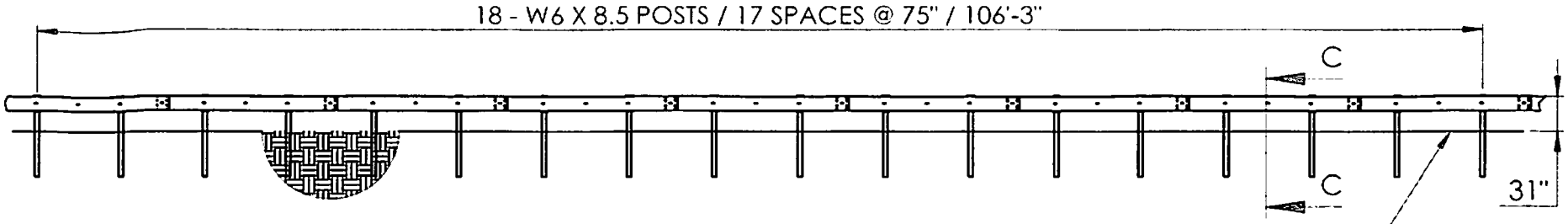
Project No. 420020

Parts List

Guardrail TxDOT



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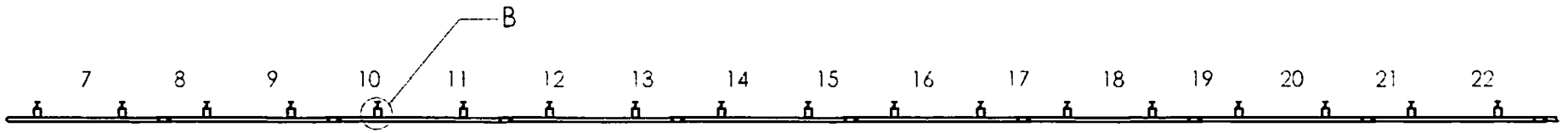
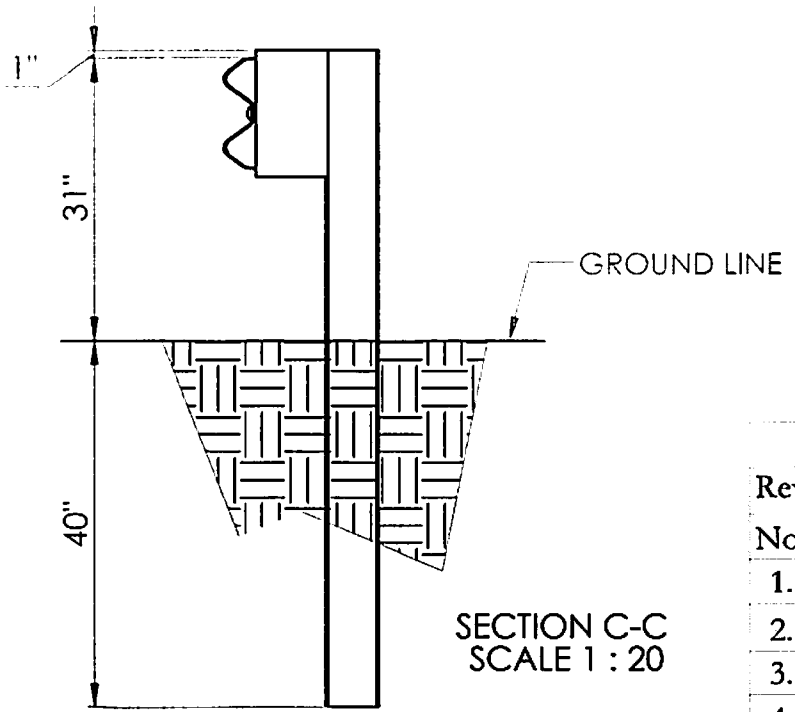


PLAN VIEW



SECTION C-C
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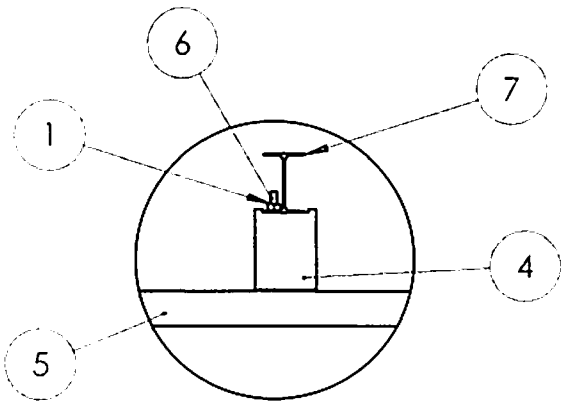

DETAIL B
SCALE 1 : 18

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The Texas A&M University System

Texas Transportation Institute
College Station, Texas 77843

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Project No.
420020
Guardrail TxDOT

Length of Need

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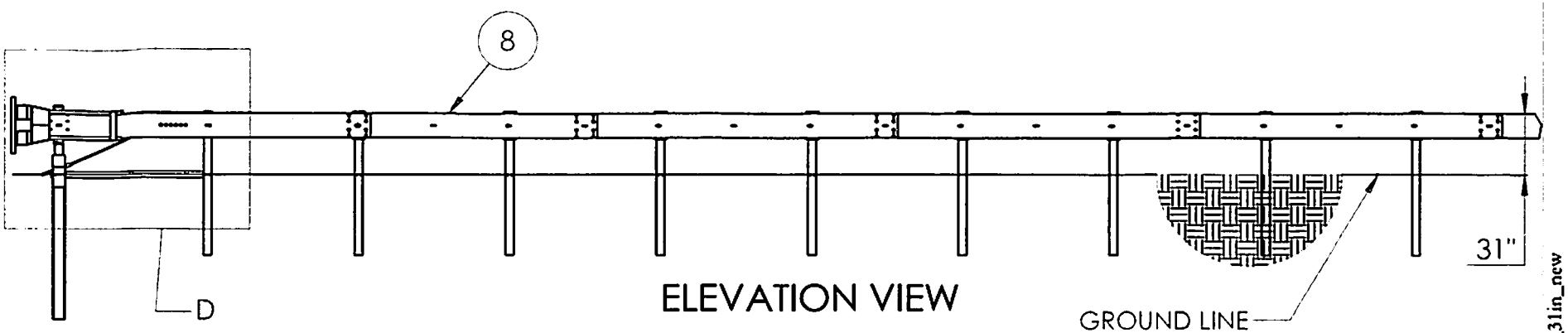

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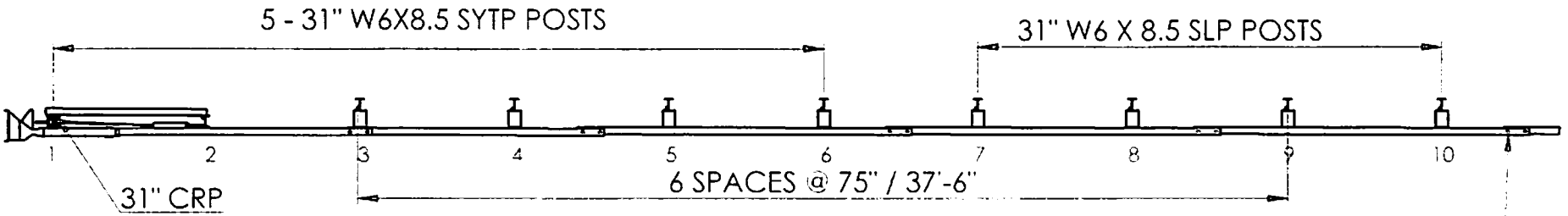

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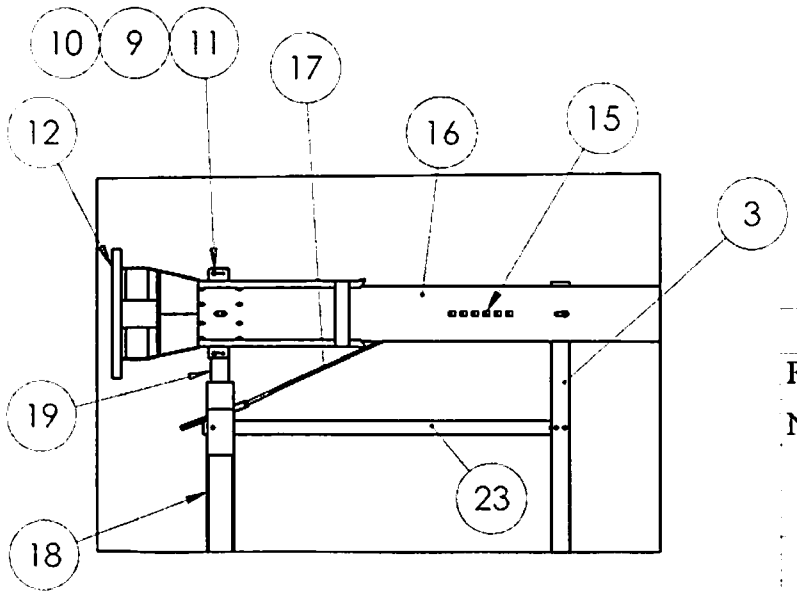

DETAIL D
SCALE 1 : 40

The Texas A&M University System

Texas Transportation Institute
College Station, Texas 77843

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Project No. 420020

End Terminal - Left Side

Guardrail TxDOT

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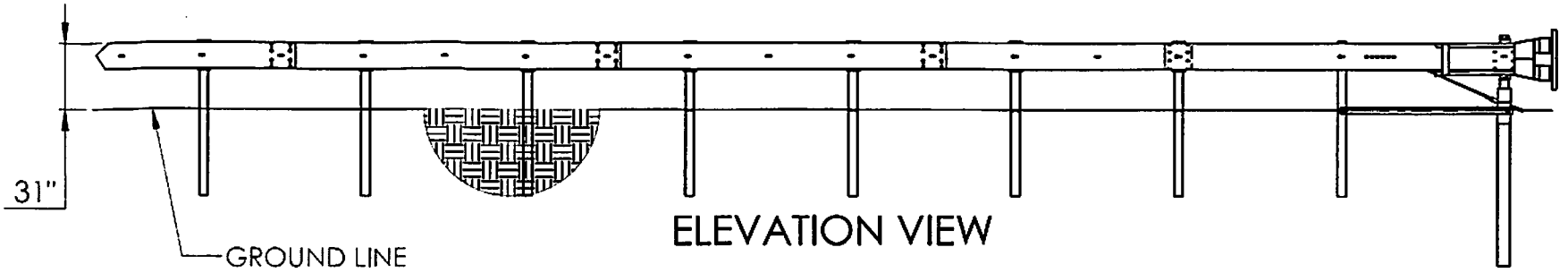
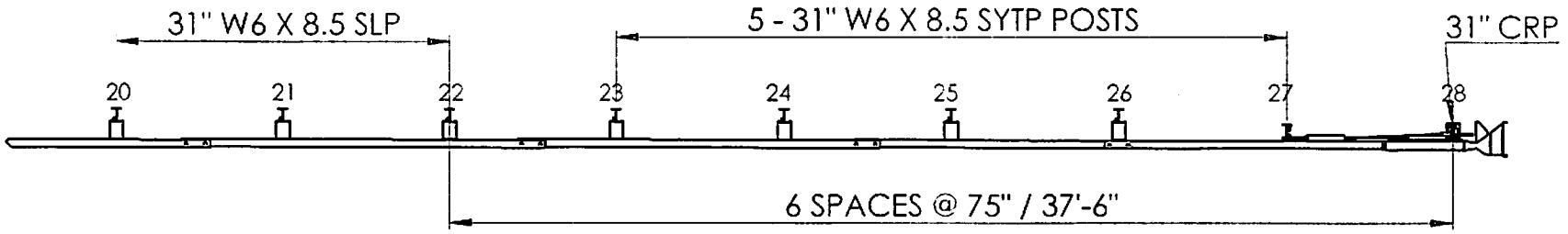


ELEVATION VIEW



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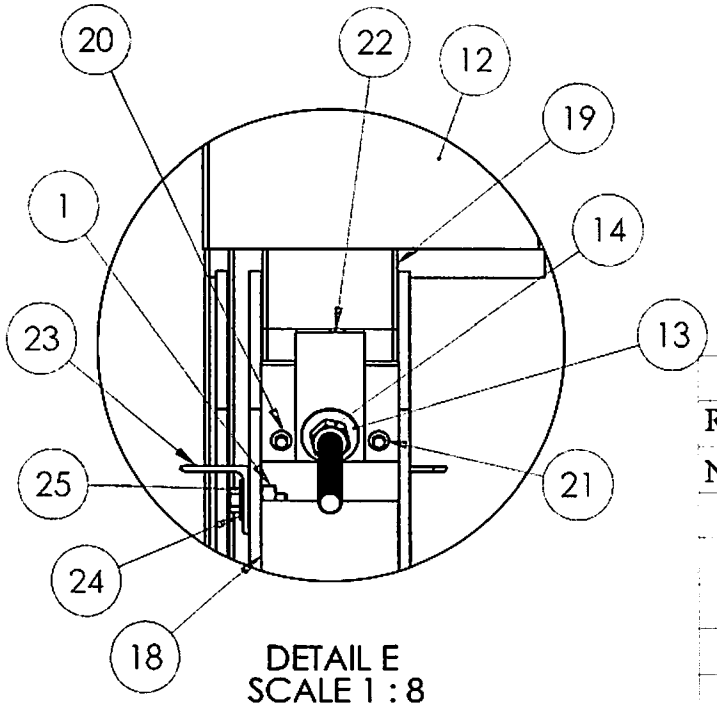

DETAIL E
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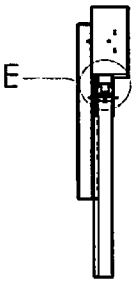

END VIEW

The Texas A&M University System

Texas Transportation Institute
College Station, Texas 77843

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1.				Project No.	End Terminal - Right Side		
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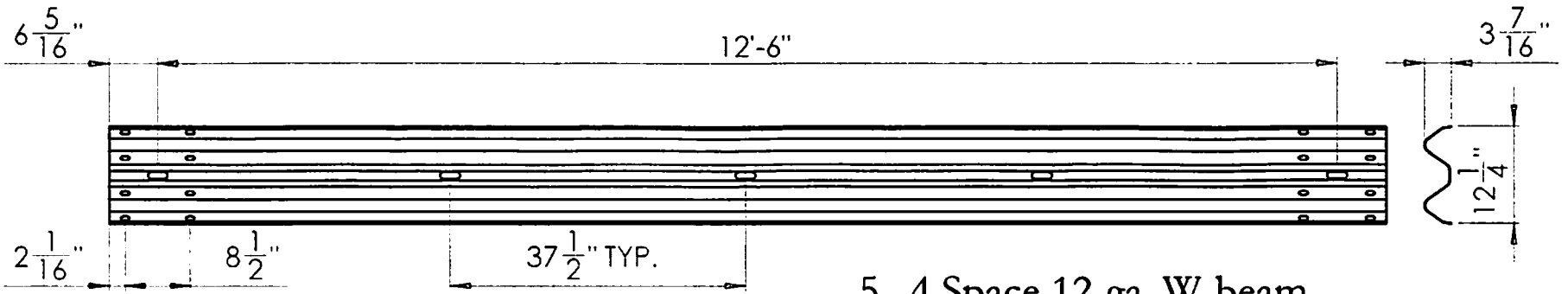

5. 4 Space 12-ga. W-beam
RWM02

The Texas A&M University System

Texas Transportation Institute
College Station, Texas, 77843

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Project No. 420020

Guardrail

Guardrail TxDOT

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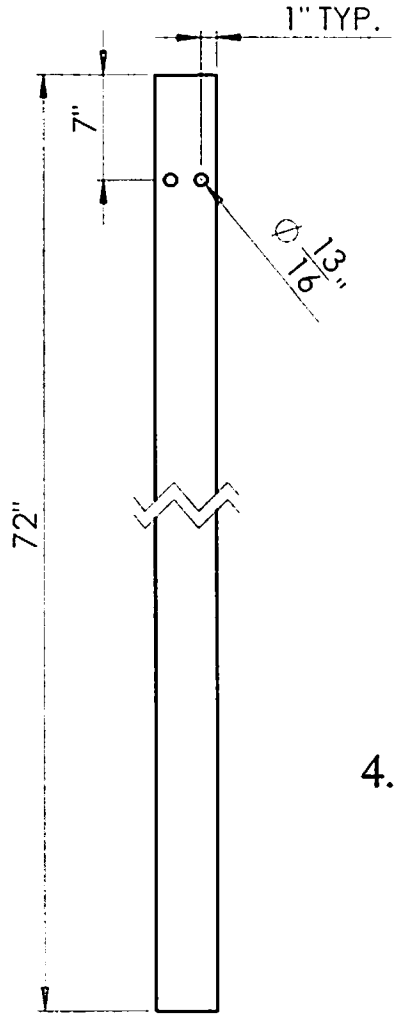
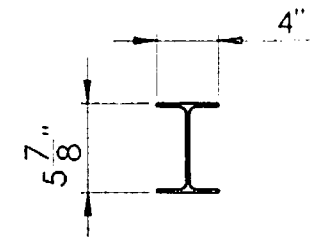
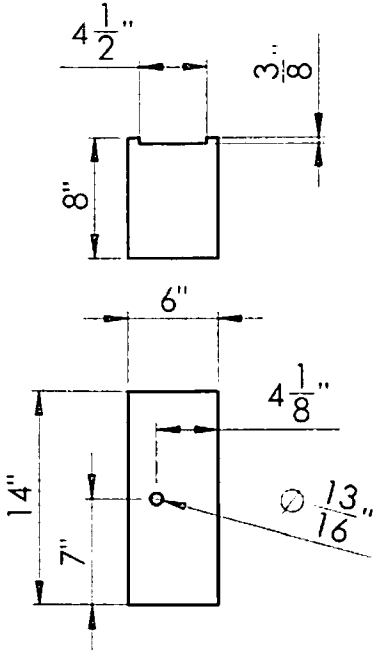
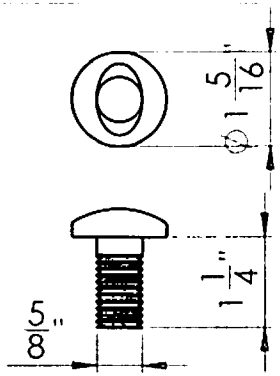




7. Standard Post
W6 x 8.5
ARTBA # PWE01

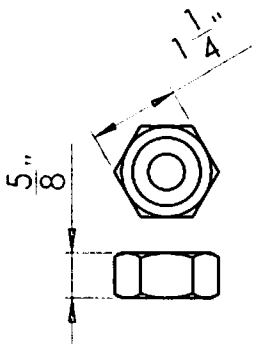


4. 8" Wood Blockout
ARTBA # PDB01b

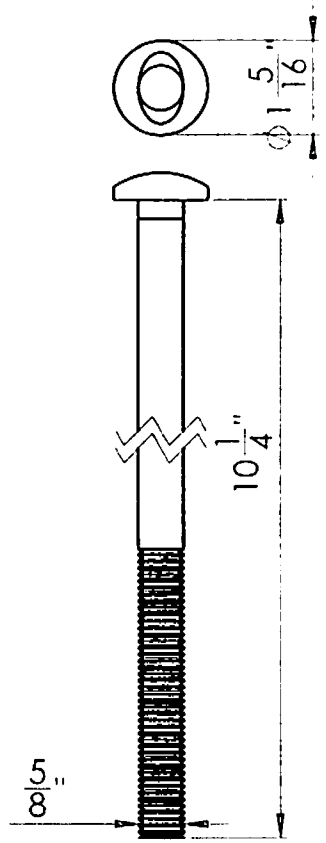


2. Button-head
Splice Bolt
ARTBA # FBB03

Bolts and Nut
Scale 1:2.5



1. Recessed
Guardrail Nut
ARTBA # FBB01



6. 10" Guardrail
Bolt
ARTBA # FBB03

The Texas A&M University System

Revisions:

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Texas Transportation Institute
College Station, Texas, 77843

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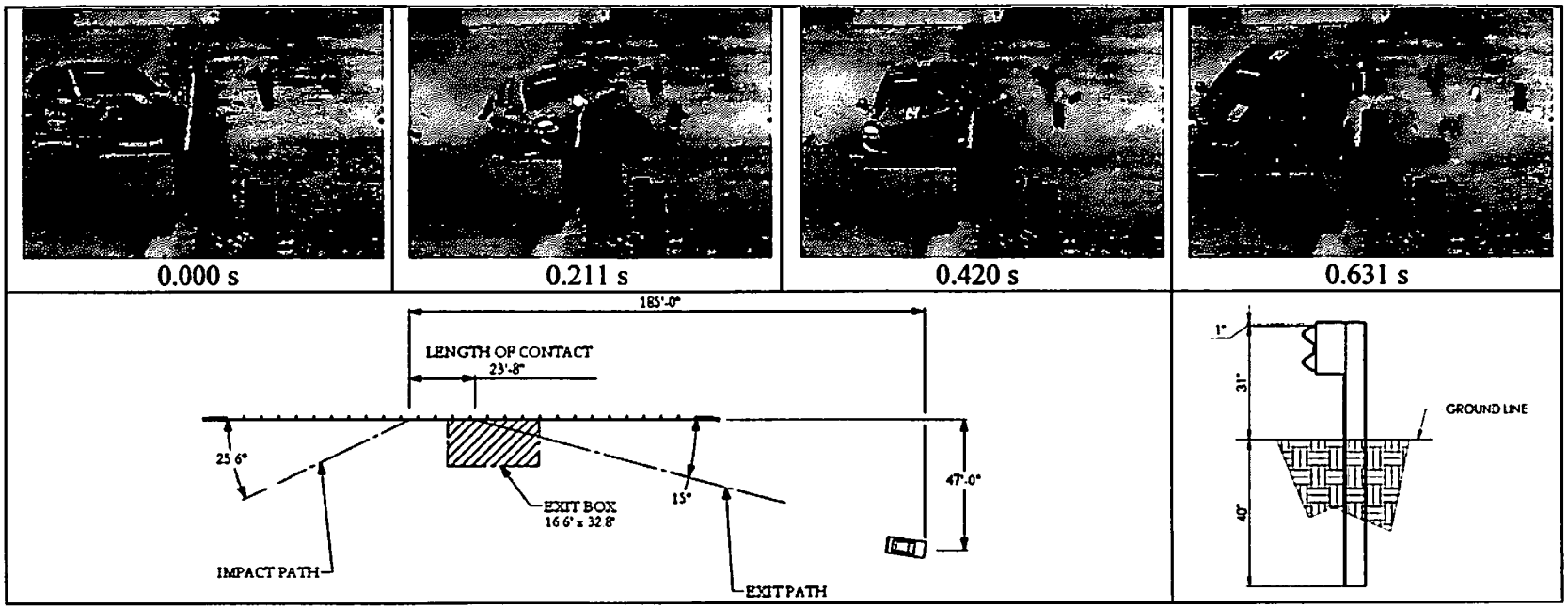
2010-07-07	IL	1:12	8 of 8

Project No. 420020

Posts, etc.

Guardrail TxDOT



General Information
- Test Agency ..... Texas Transportation Institute (TTI)
- Test Standard Test No. ..... MASH Test 3-10
- TTI Test No. 420020-5
- Date 2010-08-26

Test Article
- Type ..... Guardrail
- Name ..... 31-inch W-Beam Guardrail with standard offset blocks
- Installation Length ..... 181.25 ft
- Material or Key Elements .... 12-ga. W-beam rail, 8-inch deep routed wood blockouts

Soil Type and Condition ..... Crushed Limestone, Dry

Test Vehicle
- Type/Designation 1100C
- Make and Model ..... 2003 Kia Rio
- Curb ..... 2387 lb
- Test Inertial ..... 2435 lb
- Dummy ..... 174 lb
- Gross Static ..... 2609 lb

Impact Conditions
- Speed ..... 60.4 mi/h
- Angle ..... 25.6 degrees
- Location/Orientation ..... 38 inches upstrm Post 13

Exit Conditions
- Speed ..... 29.2 mi/h
- Angle ..... 15.0 degrees

Occupant Risk Values
- Impact Velocity
  - Longitudinal ..... 21.0 ft/s
  - Lateral ..... 17.4 ft/s
- Ridedown Accelerations
  - Longitudinal ..... 8.8 G
  - Lateral ..... 6.8 G
- THIV ..... 29.2 km/h
- PHD ..... 10.1 G
- ASI 0.82
- Max. 0.050-s Average
  - Longitudinal ..... -6.8 G
  - Lateral ..... 5.6 G
  - Vertical ..... -1.8 G

Post-Impact Trajectory
- Stopping Distance ..... 185 ft dwnstrm 47 ft twd traffic

Vehicle Stability
- Maximum Yaw Angle ..... 49 degrees
- Maximum Pitch Angle ..... -11 degrees
- Maximum Roll Angle ..... -16 degrees
- Vehicle Snagging ..... No
- Vehicle Pocketing ..... No

Test Article Deflections
- Dynamic ..... 2.38 ft
- Permanent ..... 1.58 ft
- Working Width ..... 2.38 ft

Vehicle Damage
- VDS 11LFQ4
- CDC 11LDEW3
- Max. Exterior Deformation ..... 12.5 inches
- OCDI LF0000000
- Max. Occupant Compartment Deformation 0

Impact Severity ..... 1778 kip-ft (-0.4%)

Figure 5.7. Summary of Results for *MASH* Test 3-10 on the TxDOT 31-inch W-Beam Guardrail.