U.S. Department of Transportation
Federal Highway Administration

May 13, 2020

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

In Reply Refer To:
HSST-1/B-335

Mr. Omar Fernandez
MTA Bridges and Tunnels – Triborough Bridge & Tunnel Authority
Bronx-Whitestone Facility Building
1 Hutchinson River Parkway
Bronx, NY 10465
USA

Dear Mr. Fernandez:

This letter is in response to your December 12, 2019 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number B-335 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

Decision

The following device is eligible within the length-of-need, with details provided in the form which is attached as an integral part of this letter:

- Bronx Whitestone Median Barrier Extension Bridge Rail

Scope of this Letter

To be found eligible for Federal-aid funding, new roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials'(AASHTO) Manual for Assessing Safety Hardware (MASH). However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

Eligibility for Reimbursement

Based solely on a review of crash test results and certifications submitted by the manufacturer, and the crash test laboratory, FHWA agrees that the device described herein meets the crash test and evaluation criteria of the AASHTO's MASH. Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions.

Name of system: Bronx Whitestone Median Barrier Extension Bridge Rail
Type of system: Longitudinal Barrier
Test Level: MASH Test Level 4 (TL4)
Testing conducted by: Texas A&M Transportation Institute
Date of request: December 12, 2019

FHWA concurs with the recommendation of the accredited crash testing laboratory on the attached form.

In accordance with FHWA's Memo "Federal-aid Reimbursement Eligibility Process for Safety Hardware Devices" dated November 12, 2015, FHWA will make note of any reported damage to a test vehicle's fuel tank. AASHTO's MASH states "Although not a specific factor in assessing test results, integrity of a test vehicle's fuel tank is a potential concern. It is preferable that the fuel tank remains intact and not be punctured. Damage or rupture of the fuel tank, oil pan, or other feature that might serve as a surrogate of the fuel tank should be reported". A test report included in this submittal documenting Test 4-12 (Report for test 611351-1) states that the fuel tank on the right side of the test vehicle was damaged.

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

This eligibility letter is issued for the subject device as tested. Modifications made to the device are not covered by this letter. Any modifications to this device should be submitted to the user (i.e., state DOT) as per their requirements.

You are expected to supply potential users with sufficient information on design, installation and maintenance 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 AASHTO's MASH.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.

Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number B-335 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 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.

- This FHWA eligibility letter is not an expression of any Agency view, position, or determination of validity, scope, or ownership of any intellectual property rights to a specific device or design. Further, this letter does not impute any distribution or licensing rights to the requester. This FHWA eligibility letter determination is made based solely on the crash-testing information submitted by the requester. The FHWA reserves the right to review and revoke an earlier eligibility determination after receipt of subsequent information related to crash testing.

Sincerely,

Michael S. Griffith

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:	12/12/2019	(•) New ( ) Resubmission
	Name:	Gavin Daly, P.E.	
	Company:	HNTB Corporation	
	Address:	Empire State Building, 350 Fifth Avenue, 57th Floor, New York, NY 10118	
	Country:	USA	
	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.

Device & Testing Criterion - Enter from right to left starting with Test Level ! - ! - ! ! - ! - !

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'B': Rigid/Semi-Rigid Barriers (Roadside, Median, Bridge Railings)	(•) Physical Crash Testing ( ) Engineering Analysis	Bronx Whitestone Median Barrier Extension Bridge Rail	AASHTO MASH	TL4

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 evaluation results meet the appropriate evaluation criteria in the MASH.

Individual or Organization responsible for the product:

Contact Name:	Omar Fernandez	Same as Submitter ☐
Company Name:	MTA Bridges & Tunnels - Triborough Bridge & Tunnel Authority	Same as Submitter ☐
Address:	Bronx-Whitestone Facility Building, 1 Hutchinson River Parkway	Same as Submitter ☐
Country:	Bronx, NY 10465, USA	Same as Submitter ☐

Enter below all disclosures of financial interests as required by the FHWA `Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.

HNTB: HNTB Corporation is a paid consultant for MTA-TBTA for this Bronx Whitestone Median Barrier Extension Bridge Rail project and eligibility request. HNTB has no further financial interest in the use of this barrier system.

TTI: Texas A&M Transportation Institute (TTI) was contracted by HNTB to perform full-scale crash testing of the Bronx Whitestone Median Barrier Extension Bridge Rail. There are no shared financial interests in the Bronx Whitestone Median Barrier Extension Bridge Rail design by TTI, or between HNTB and TTI, other than costs involved in the actual crash tests and reports for this submission to FHWA.

PRODUCT DESCRIPTION

Help

(•) New Hardware or Significant Modification ( ) Modification to Existing Hardware

The installation was 210 ft long, and was comprised of 14 barrier segments that were each 14 ft-9¾ inches long. Each segment was comprised of a lower steel median barrier and an upper barrier extension. Adjacent segments were connected through bolted splice connections.

The lower steel median barrier was comprised of posts fabricated from steel plates that were spaced 4 ft 11¼ inches apart. Steel tubes were attached to each side of these posts and an outer steel shell covered the tubes to provide a smooth barrier face on each side of the lower median barrier.

The upper barrier extension was comprised of vertical posts that were attached on top of the lower steel median barrier posts. Acrylic panels were installed between adjacent posts of the upper barrier extension. A rail comprised of a pair of HSS tubes was attached to each side of the upper barrier extension posts near the bottom of the upper barrier extension.

A 14 ft-7¾ inches gap in the upper barrier extension, with posts on each side, was built into the system near one end of the installation. No upper barrier extension posts or acrylic panels were present in this gap. Instead, a top rail comprised of two steel tubes spanned the gap and connected the adjacent upper barrier extension posts. Additionally, the outer HSS tubes of the typical rail extend across the gap.

The top of the lower steel median barrier was 32⅜ inches above grade, the centerline of the bottom rail of the upper barrier extension was 41¾ inches above grade, and the top of the railing posts was 69 inches above grade.

CRASH TESTING

By signature below, the Engineer affiliated with the testing laboratory, agrees in support of this submission that all of the critical and relevant crash tests for this device listed above were conducted to meet the MASH test criteria. The Engineer has determined that no other crash tests are necessary to determine the device meets the MASH criteria.

Engineer Name:	Nauman M. Sheikh, P.E.	
Engineer Signature:	Nauman Sheikh Digitally signed by Nauman Sheikh Date: 2019.11.25 17:16:58 -06'00'	
Address:	TTI, TAMUS 3135, College Station, TX 77843-3135	Same as Submitter ☐
Country:	USA	Same as Submitter ☐

A brief description of each crash test and its result: Help

Required Test Number	Narrative Description	Evaluation Results
4-10 (1100C)	Test 4-10 involves an 1100C vehicle impacting the test article at a target impact speed of 62 mi/h and target angle of 25°. The target CIP for the right corner of the front bumper was 3.6 ft upstream of the joint between segments 6 & 7. The results of the test conducted on April 30, 2019, are found in TTI Test Report No. 611351-01. The 2008 Kia Rio test vehicle was traveling at an impact speed of 62.7 mi/h as it made contact with the Bronx Whitestone Median Barrier Extension Bridge Rail 3.7 ft upstream of the joint between segments 6 & 7 and at an impact angle of 25.1°. After loss of contact with the barrier, the vehicle came to rest 235 ft downstream of the impact point and 64 ft toward the traffic lanes. The Bronx Whitestone Median Barrier Extension Bridge Rail contained and redirected the 1100C vehicle. The vehicle did not penetrate, underride, or override the installation. No dynamic deflection or permanent deformation was observed. No detached elements, fragments, or other debris were present to penetrate or show potential for penetrating the occupant compartment, or to present hazard to others in the area. The 1100C vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 27° and 8°, respectively. Longitudinal OIV was 18.4 ft/s and lateral OIV was 33.8 ft/s. Maximum longitudinal occupant ridedown acceleration was 6.0 g, and maximum lateral occupant ridedown acceleration was 10.2 g. Occupant risk factors were within the maximum limits specified in MASH. Maximum exterior crush to the vehicle was 8.0 inches in the side plane at the right front corner at bumper height. Maximum occupant compartment deformation was 1.5 inches in the right front floor pan. The Bronx Whitestone Median Barrier Extension Bridge Rail performed acceptably for MASH test 4-10.	PASS

Required Test Number	Narrative Description	Evaluation Results
4-11 (2270P)	Test 4-11 involves a 2270P vehicle impacting the test article at a target impact speed of 62 mi/h and target angle of 25°. The target CIP for the right corner of the front bumper was 4.3 ft upstream of the joint between segments 8 & 9. The results of the test conducted on May 2, 2019, are found in TTI Test Report No. 611351-01. The 2014 RAM 1500 test vehicle was traveling at an impact speed of 62.9 mi/h as it made contact with the Bronx Whitestone Median Barrier Extension Bridge Rail 4.1 ft upstream of the joint between segments 8 & 9 and at an impact angle of 25.9°. After loss of contact with the barrier, the vehicle came to rest 215 ft downstream of the impact point and 2 ft toward the traffic lanes. The Bronx Whitestone Median Barrier Extension Bridge Rail contained and redirected the 2270P vehicle. The vehicle did not penetrate, underride, or override the installation. Maximum dynamic deflection was 0.7 inches, and no permanent deformation was observed. No detached elements, fragments, or other debris were present to penetrate or show potential for penetrating the occupant compartment, or to present hazard to others in the area. The 2270P vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 19° and 5°, respectively. Longitudinal OIV was 20.3 ft/s and lateral OIV was 29.5 ft/s. Maximum longitudinal occupant ridedown acceleration was 5.3 g, and maximum lateral occupant ridedown acceleration was 9.7 g. Occupant risk factors were within the preferred limits specified in MASH. Maximum exterior crush to the vehicle was 11.0 inches in the side plane at the right front corner at bumper height. Maximum occupant compartment deformation was 4.5 inches in the right front firewall area. The Bronx Whitestone Median Barrier Extension Bridge Rail performed acceptably for MASH test 4-11.	PASS

4-12 (10000S)	Test 4-12 involves a 10000S vehicle impacting the test article at a target impact speed of 56 mi/h and target angle of 15°. Two Test 4-12's were performed on the barrier. Test No. 611351-1 was performed in the main length-of-need of the barrier. Test 611351-2 was performed to evaluate the open section of the upper barrier extension. The Bronx Whitestone Median Barrier Extension Bridge Rail performed acceptably for both MASH test 4-12's, assummarized below: -- TEST 611351-1: The target CIP for the right corner of the front bumper was 5.0 ft upstream of the joint between segments 2 & 3. The results of the test conducted on May 6, 2019, are found in TTI Test Report No. 611351-01. The 2012 International 4300 SUT test vehicle was traveling at an impact speed of 57.2 mi/h as it made contact with the Bronx Whitestone Median Barrier Extension Bridge Rail 5.8 ft upstream of the joint between segments 2 & 3, and at an impact angle of 14.9°. After loss of contact with the barrier, the vehicle came to rest 352 ft downstream of the impact point and 30 ft toward the field side. The Bronx Whitestone Median Barrier Extension Bridge Rail contained and redirected the 10000S vehicle. The vehicle did not penetrate, underride, or override the installation. Any dynamic deflection was obscured in the camera views, but no permanent deformation was observed. No detached elements, fragments, or other debris were present to penetrate or show potential for penetrating the occupant compartment, or to present hazard to others in the area. The 10000S vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 25° and 4°, respectively. Longitudinal OIV was 7.5 ft/s, and lateral OIV was 16.1 ft/s. Maximum longitudinal occupant ridedown acceleration was 2.0 g, and maximum lateral occupant ridedown acceleration was 4.5 g. Maximum exterior crush to the vehicle was 10.0 inches at the right front corner at bumper height. Maximum occupant compartment deformation was 3.0 inches in the right floor pan area. See Additional Test 4-12 info next page----	PASS

4-12 (10000S)	ADDITIONAL TEST 611351-2: The target CIP for the left corner of the front bumper was 16.5 ft upstream of the upstream edge of top of post #4. The results of the test conducted on May 8, 2019, are found in TTI Test Report No. 611351-01. The 2013 International 4300 SUT test vehicle was traveling at an impact speed of 57.1 mi/h as it made contact with the Bronx Whitestone Median Barrier Extension Bridge Rail 16.5 ft upstream of the upstream edge of top of post #4, and at an impact angle of 15.2°. After loss of contact with the barrier, the vehicle came to rest 315 ft downstream of the impact point and 18 ft toward the field side. The Bronx Whitestone Median Barrier Extension Bridge Rail contained and redirected the 10000S vehicle. The vehicle did not penetrate, underride, or override the installation. Maximum dynamic deflection was 1.5 inches, and no permanent deformation was observed. No detached elements, fragments, or other debris were present to penetrate or show potential for penetrating the occupant compartment, or to present hazard to others in the area. The 10000S vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 23° and 7°, respectively. Longitudinal OIV was 6.2 ft/s, and lateral OIV was 14.1 ft/s. Maximum longitudinal occupant ridedown acceleration was 3.5 g, and maximum lateral occupant ridedown acceleration was 16.7 g. Maximum exterior crush to the vehicle was 14.0 inches at the left front corner at bumper height. Maximum occupant compartment deformation was 5.0 inches in the left firewall area.	PASS
4-20 & 4-21	4-20 & 4-21: Device is not a transition	Non-Relevant Test, not conducted
4-22 (10000S)	4-22: Device is not a transition	Non-Relevant Test, not conducted

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 A&M Transportation Institute	
Laboratory Signature:	Digitally signed by Darrell L. Kuhn 'Date: 2019.11.25 13:51:30 -06'00	
Address:	TTI, TAMUS MS 3135, College Station, TX 77843-3135	Same as Submitter ☐
Country:	USA	Same as Submitter ☐
Accreditation Certificate Number and Dates of current Accreditation period :	ISO 17025-2017 Laboratory A2LA Certificate Number: 2821.01 Valid To: April 30, 2021	

Submitter Signature*: Gavin Daly Digitally signed by Gavin Daly Date: 2019.11.26 17:49:10 -05'00'

Submit Form

ATTACHMENTS

Attach to this form:

1) Additional disclosures of related financial interest as indicated above.
2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
3) 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 relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

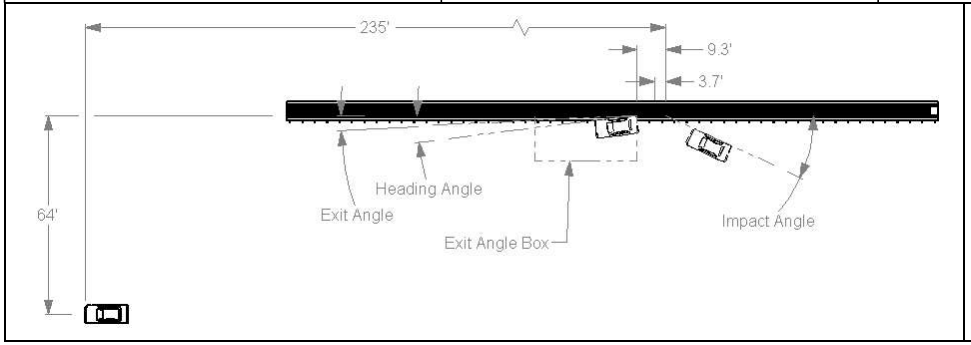
Eligibility Letter		
Number	Date	Key Words

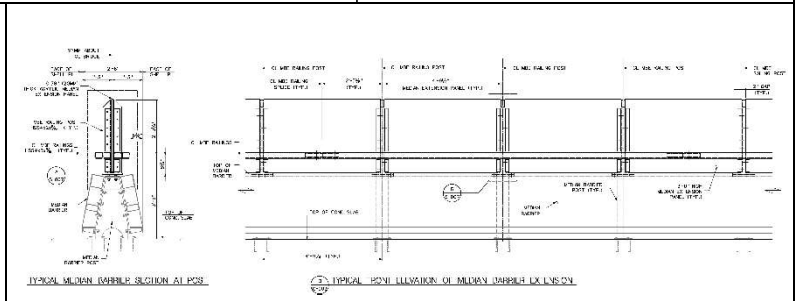
0.000 s

0.100 s

0.200 s

0.400 s





General Information
- Test Agency ..... Texas A&M Transportation Institute (TTI)
- Test Standard Test No. ..... MASH Test 4-10
- TTI Test No. 611351-3
- Test Date 2019-04-30

Test Article
- Type ..... Longitudinal Barrier – Bridge Rail
- Name ..... Bronx Whitestone Bridge Rail
- Installation Length ..... 210 ft
- Material or Key Elements .... Steel plate posts, steel parapet covering steel beams secured to posts, fabricated steel rail above the parapet, acrylic windscreen above parapet and rail supported by posts

Soil Type and Condition ..... Reinforced concrete foundation, damp

Test Vehicle
- Type/Designation 1100C
- Make and Model ..... 2008 Kia Rio
- Curb ..... 2430 lb
- Test Inertial ..... 2455 lb
- Dummy ..... 165 lb
- Gross Static ..... 2620 lb

Impact Conditions
- Speed ..... 62.7 mi/h
- Angle ..... 25.1°
- Location/Orientation ..... 3.7 ft upstream of joint 6-7

Impact Severity ..... 58 kip-ft

Exit Conditions
- Speed ..... 53.9 mi/h
- Trajectory/Heading Angle ... 3.9° / 8.1°

Occupant Risk Values
- Longitudinal OIV ..... 18.4 ft/s
- Lateral OIV ..... 33.8 ft/s
- Longitudinal Ridedown ..... 6.0 g
- Lateral Ridedown ..... 10.2 g
- THIV ..... 41.7 km/h
- PHD ..... 10.4 g
- ASI 2.61

Max. 0.050-s Average
- Longitudinal ..... -10.3 g
- Lateral ..... -20.2 g
- Vertical ..... -4.2 g

Post-Impact Trajectory
- Stopping Distance ..... 235 ft downstream 64 ft twd traffic lanes

Vehicle Stability
- Maximum Yaw Angle ..... 97°
- Maximum Pitch Angle ..... 8°
- Maximum Roll Angle ..... 27°
- Vehicle Snagging ..... No
- Vehicle Pocketing ..... No

Test Article Deflections
- Dynamic ..... None
- Permanent ..... None
- Working Width ..... 30.0 inches
- Height of Working Width ..... 6.0 inches

Vehicle Damage
- VDS 01RFQ5
- CDC 01FREW4
- Max. Exterior Deformation ..... 8.0 inches
- OCDI RF0102100
- Max. Occupant Compartment Deformation ..... 1.5 inches

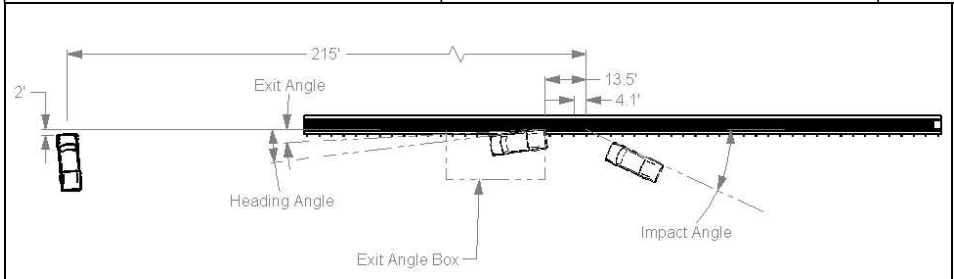
Figure 5.6. Summary of Results for *MASH* Test 4-10 on Bronx Whitestone Bridge Rail.

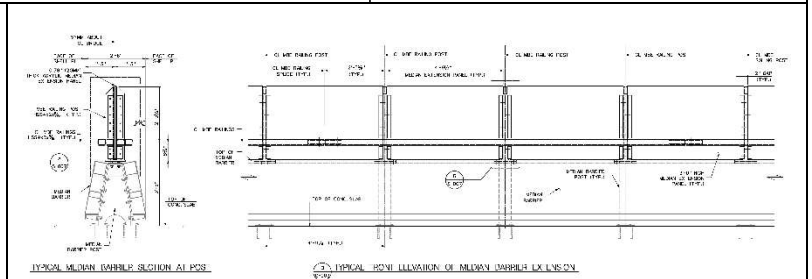
0.000 s

0.100 s

0.200 s

0.400 s





General Information
- Test Agency ..... Texas A&M Transportation Institute (TTI)
- Test Standard Test No. ..... MASH Test 4-11
- TTI Test No. 611351-4
- Test Date 2019-05-02

Test Article
- Type ..... Longitudinal Barrier – Bridge Rail
- Name ..... Bronx Whitestone Bridge Rail
- Installation Length ..... 210 ft
- Material or Key Elements ... Steel plate posts, steel parapet covering steel beams secured to posts, fabricated steel rail above the parapet, acrylic windscreen above parapet and rail supported by posts

Soil Type and Condition ..... Reinforced concrete foundation, damp

Test Vehicle
- Type/Designation 2270P
- Make and Model ..... 2014 RAM 1500 Pickup
- Curb ..... 4941 lb
- Test Inertial ..... 5010 lb
- Dummy ..... 165 lb
- Gross Static ..... 5175 lb

Impact Conditions
- Speed ..... 62.9 mi/h
- Angle ..... 25.9°
- Location/Orientation ..... 4.1 ft upstream of joint 8-9

Impact Severity ..... 126 kip-ft

Exit Conditions
- Speed ..... 49.5 mi/h
- Trajectory/Heading Angle ... 3.9° / 2.1°

Occupant Risk Values
- Longitudinal OIV ..... 20.3 ft/s
- Lateral OIV ..... 29.5 ft/s
- Longitudinal Ridedown ..... 5.3 g
- Lateral Ridedown ..... 9.7 g
- THIV ..... 39.2 km/h
- PHD ..... 10.1 g
- ASI 2.17

Max. 0.050-s Average
- Longitudinal ..... -9.5 g
- Lateral ..... -16.3 g
- Vertical ..... -4.2 g

Post-Impact Trajectory
- Stopping Distance ..... 215 ft downstream 2 ft twd traffic lanes

Vehicle Stability
- Maximum Yaw Angle ..... 43°
- Maximum Pitch Angle ..... 5°
- Maximum Roll Angle ..... 19°
- Vehicle Snagging ..... No
- Vehicle Pocketing ..... No

Test Article Deflections
- Dynamic ..... 0.7 inch
- Permanent ..... None
- Working Width ..... 30.7 inches
- Height of Working Width ..... 6.0 inches

Vehicle Damage
- VDS 01RFQ5
- CDC 01FREW4
- Max. Exterior Deformation ..... 11.0 inches
- OCDI RF0020000
- Max. Occupant Compartment Deformation ..... 4.5 inches

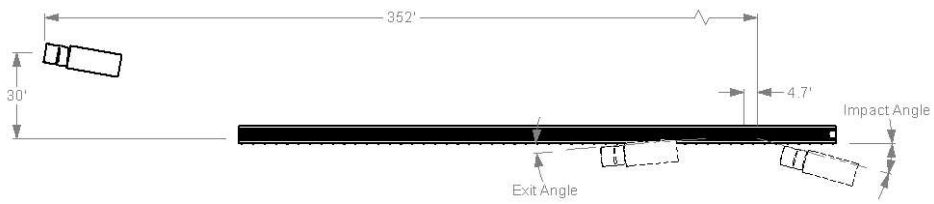
Figure 6.6. Summary of Results for *MASH* Test 4-11 on Bronx Whitestone Bridge Rail.

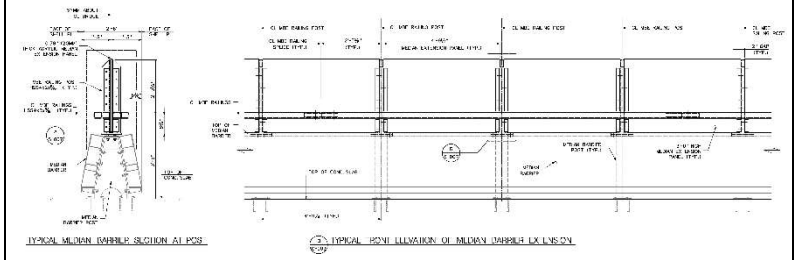
0.000 s

0.200 s

0.400 s

0.700 s





General Information
- Test Agency ..... Texas A&M Transportation Institute (TTI)
- Test Standard Test No. ..... MASH Test 4-12
- TTI Test No. 611351-1
- Test Date 2019-05-06

Test Article
- Type ..... Longitudinal Barrier – Bridge Rail
- Name ..... Bronx Whitestone Bridge Rail
- Installation Length ..... 210 ft
- Material or Key Elements ... Steel plate posts, steel parapet covering steel beams secured to posts, fabricated steel rail above the parapet, acrylic windscreen above parapet and rail supported by posts

Soil Type and Condition ..... Reinforced concrete foundation, damp

Test Vehicle
- Type/Designation 10000S
- Make and Model ..... 2012 International 4300 Single-Unit Truck
- Curb ..... 14,070 lb
- Test Inertial ..... 22,110 lb
- Dummy ..... No dummy
- Gross Static ..... 22,110 lb

Impact Conditions
- Speed ..... 57.2 mi/h
- Angle ..... 14.9°
- Location/Orientation ..... 5.8 ft upstream of joint 2-3

Impact Severity ..... 160 kip-ft

Exit Conditions
- Speed ..... 50.4 mi/h
- Trajectory/Heading Angle ... 0.6° / 0°

Occupant Risk Values
- Longitudinal OIV ..... 7.5 ft/s
- Lateral OIV ..... 16.1 ft/s
- Longitudinal Ridedown ..... 2.0 g
- Lateral Ridedown ..... 4.5 g
- THIV ..... 19.9 km/h
- PHD ..... 4.6 g
- ASI 0.84

Max. 0.050-s Average
- Longitudinal ..... -1.9 g
- Lateral ..... -7.0 g
- Vertical ..... -3.3 g

Post-Impact Trajectory
- Stopping Distance ..... 352 ft downstream 30 ft twd field side

Vehicle Stability
- Maximum Yaw Angle ..... 22°
- Maximum Pitch Angle ..... 4°
- Maximum Roll Angle ..... 25°
- Vehicle Snagging ..... No
- Vehicle Pocketing ..... No

Test Article Deflections
- Dynamic ..... Not Obtainable
- Permanent ..... 0 inches
- Working Width ..... 73.3 inches
- Height of Working Width ..... 123.8 inches

Vehicle Damage
- VDS ..... NA
- CDC 01FREW3
- Max. Exterior Deformation ..... 10.0 inches
- OCDI ..... NA
- Max. Occupant Compartment Deformation ..... 3.0 inches

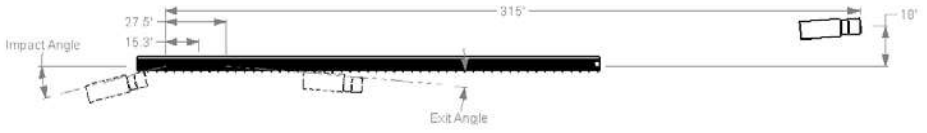
Figure 7.6. Summary of Results for *MASH* Test 4-12 on Bronx Whitestone Bridge Rail.

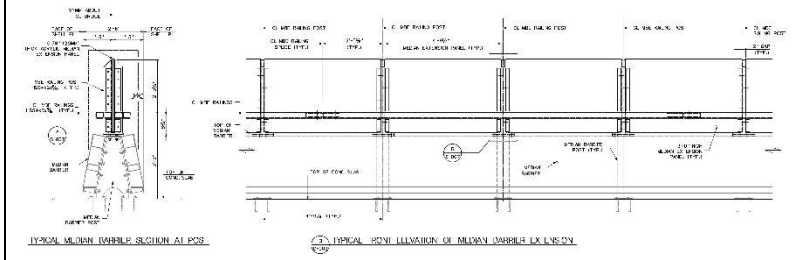
0.000 s

0.200 s

0.400 s

0.700 s





General Information
- Test Agency: Texas A&M Transportation Institute (TTI)
- Test Standard Test No.: MASH Test 4-12
- TTI Test No.: 611351-2
- Test Date: 2019-05-08

Test Article
- Type: Longitudinal Barrier – Bridge Rail
- Name: Bronx Whitestone Bridge Rail
- Installation Length: 210 ft
- Material or Key Elements: Steel plate posts, steel parapet covering steel beams secured to posts, fabricated steel rail above the parapet, acrylic windscreen above parapet and rail supported by posts

Soil Type and Condition: Reinforced concrete foundation, damp

Test Vehicle
- Type/Designation: 10000S
- Make and Model: 2013 International 4300 Single-Unit Truck
- Curb: 14,190 lb
- Test Inertial: 22,270 lb
- Dummy: No dummy
- Gross Static: 22,270 lb

Impact Conditions
- Speed: 57.1 mi/h
- Angle: 15.2°
- Location/Orientation: 16.5 ft upstream of upstream edge of post 4

Impact Severity: 167 kip-ft

Exit Conditions
- Speed: 53.0 mi/h
- Trajectory/Heading Angle: 2.1° / 0°

Occupant Risk Values
- Longitudinal OIV: 6.2 ft/s
- Lateral OIV: 14.1 ft/s
- Longitudinal Ridedown: 3.5 g
- Lateral Ridedown: 16.7 g
- THIV: 17.0 km/h
- PHD: 16.7 g
- ASI: 0.67

Max. 0.050-s Average
- Longitudinal: -2.2 g
- Lateral: 6.2 g
- Vertical: 2.8 g

Post-Impact Trajectory
- Stopping Distance: 315 ft downstream 18 ft twd field side

Vehicle Stability
- Maximum Yaw Angle: 17°
- Maximum Pitch Angle: 7°
- Maximum Roll Angle: 23°
- Vehicle Snagging: No
- Vehicle Pocketing: No

Test Article Deflections
- Dynamic: 1.5 inches
- Permanent: 0 inches
- Working Width: 43.8 inches
- Height of Working Width: 135.6 inches

Vehicle Damage
- VDS: NA
- CDC: 11FREW3
- Max. Exterior Deformation: 14.0 inches
- OCDI: NA
- Max. Occupant Compartment Deformation: 5.0 inches

Figure 8.6. Summary of Results for *MASH* Test 4-12 on Bronx Whitestone Bridge Rail.

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY

CONTRACT NO. PSC-16-2991
MEDIAN BARRIER EXTENSION CRASH TEST AND FABRICATION FOR THE BRONX WHITESTONE BRIDGE
AS-BUILT DRAWINGS

PREPARED BY:

HNTB CORPORATION
EMPIRE STATE BUILDING
350 5TH AVE, 57TH FL.
NEW YORK, NY 10118

DATE: 06/05/2019

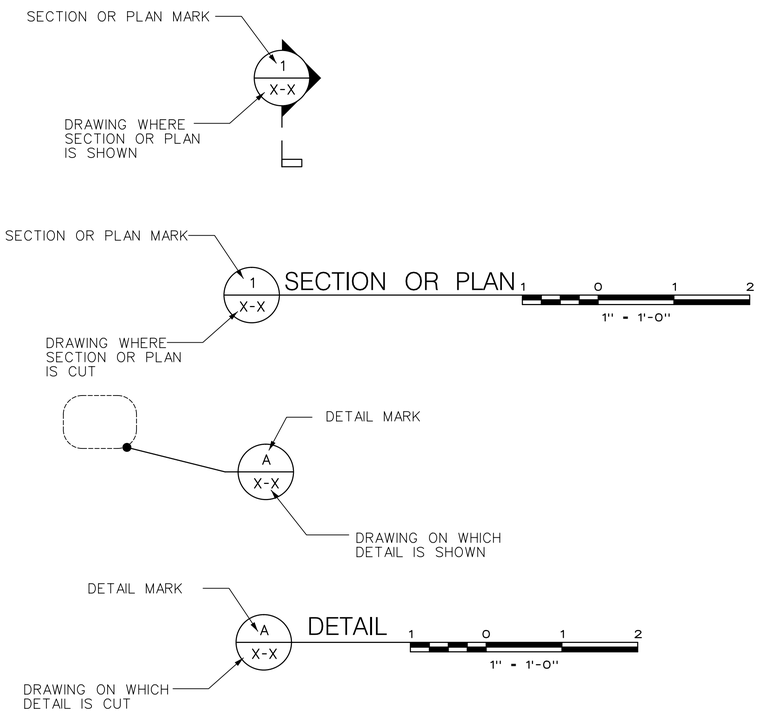
INDEX OF DRAWINGS

SHEET NO.	DWG. NO.	DRAWING TITLE	REV. NO.	DWG. DATE
GENERAL				
001	-	TITLE SHEET	1	06/05/2019
002	G-001	INDEX OF DRAWINGS, ABBREVIATIONS AND LEGENDS	1	06/05/2019
003	G-002	GENERAL NOTES	1	06/05/2019
004	G-003	GENERAL ELEVATION SHEET 1 OF 2	1	06/05/2019
005	G-004	GENERAL ELEVATION SHEET 2 OF 2	1	06/05/2019
STRUCTURAL				
006	S-001	MEDIAN BARRIER TYPICAL ELEVATION	1	06/05/2019
007	S-002	MEDIAN BARRIER TYPICAL SECTIONS	1	06/05/2019
008	S-003	MEDIAN BARRIER POST DETAILS	1	06/05/2019
008A	S-003A	MOCK DECK PLATE DETAILS	1	06/05/2019
009	S-004	MEDIAN BARRIER SPLICE DETAILS	1	06/05/2019
010	S-005	MEDIAN BARRIER RAILING DETAILS	1	06/05/2019
011	S-006	TYPICAL ELEVATION AND CROSS SECTION OF MEDIAN BARRIER EXTENSION	1	06/05/2019
012	S-007	MEDIAN BARRIER EXTENSION TYPICAL DETAILS - 1	1	06/05/2019
013	S-008	MEDIAN BARRIER EXTENSION TYPICAL DETAILS - 2	1	06/05/2019
014	S-009	MEDIAN BARRIER EXTENSION OPENING FOR STANDPIPE VALVE	1	06/05/2019
015	S-010	MEDIAN BARRIER EXTENSION DETAILS FOR STANDPIPE VALVE OPENING - 1	1	06/05/2019
016	S-011	MEDIAN BARRIER EXTENSION DETAILS FOR STANDPIPE VALVE OPENING - 2	1	06/05/2019
017	S-012	MEDIAN BARRIER EXTENSION TYPICAL SPLICE DETAILS	1	06/05/2019

ABBREVIATIONS

AASHTO	=	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRAFFIC OFFICIALS
ASTM	=	AMERICAN SOCIETY OF TESTING AND MATERIALS
BOT.	=	BOTTOM
CL	=	CENTER LINE
CLR.	=	CLEAR
CONC.	=	CONCRETE
CONN.	=	CONNECTION
CPGW	=	COMPLETE PENETRATION GROOVE WELD
CTSK	=	COUNTERSUNK
CVN	=	CHARPY V-NOTCH TEST
DET.	=	DETAIL
DIA./DIAM.	=	DIAMETER
DWG.	=	DRAWING
EF	=	EACH FACE
ELEV./EL.	=	ELEVATION
EQ.	=	EQUAL
FLG	=	FLANGE
F.S.	=	FAR SIDE
GALV.	=	GALVANIZED
H.S.	=	HIGH STRENGTH
K	=	KIPS
LONG.	=	LONGITUDINAL
MAX.	=	MAXIMUM
MBE	=	MEDIAN BARRIER EXTENSION
MIN.	=	MINIMUM
NA	=	NOT APPLICABLE
NO.	=	NUMBER
N.S.	=	NEAR SIDE
NT	=	NON-TYPICAL
N.T.S.	=	NOT TO SCALE
NYSSCM	=	NEW YORK STATE STEEL CONSTRUCTION MANUAL
OC	=	ON CENTER
OPP	=	OPPOSITE
O TO O	=	OUT TO OUT
P.E.	=	PROFESSIONAL ENGINEER
PL	=	PLATE
PLS.	=	PLATES
PPGW	=	PARTIAL PENETRATION GROOVE WELD
QTY.	=	QUANTITY
R / RAD	=	RADIUS
REQD	=	REQUIRED
REV.	=	REVISION
SPA.	=	SPACE/SPACING
SPL	=	SPLICE
STD.	=	STANDARD
STIFF.	=	STIFFENER
STL	=	STEEL
SYMM.	=	SYMMETRICAL
TRANS.	=	TRANSVERSE
TYP.	=	TYPICAL
UON	=	UNLESS OTHERWISE NOTED
UT	=	ULTRASONIC TESTING
VERT	=	VERTICAL
WP	=	WORKING POINT

SECTION AND DETAIL LEGEND



LEGEND:

STEEL IN SECTION

CONCRETE IN SECTION

EPDM RUBBER GASKET IN SECTION

W0015001.dgn
$$prf$$
$$refO1$$
$$refO2$$
$$refO3$$

tbio-68648.tbl
1:09:31 AM
gdaly

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY. UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER SIGNATURE AND DATE OF ALTERATION."

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: NONE

HNTB

Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE
INDEX OF DRAWINGS, ABBREVIATIONS AND LEGENDS

PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. G-001
SHEET 002 OF 018
DATE JUNE 5, 2019
REVISION NO. 1

GENERAL NOTES:

SCOPE OF WORK

1. FABRICATION OF THE MEDIAN BARRIER AND MEDIAN BARRIER EXTENSION FOR THE LIMITS SHOWN ON THE CONTRACT DRAWINGS AND SHIPMENT TO THE TESTING FACILITY.

DESIGN SPECIFICATIONS

1. DESIGN, DETAILING, FABRICATION AND EXECUTION OF ALL CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT EDITIONS OF THE FOLLOWING PUBLICATIONS:

   A. AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, CUSTOMARY U.S. UNITS

   B. NEW YORK STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS CONSTRUCTION AND MATERIALS AND ANY PROJECT SPECIAL SPECIFICATIONS

   C. AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS

   D. NEW YORK STATE STEEL CONSTRUCTION MANUAL (NYSSCM)

   E. AASHTO/AWS BRIDGE WELDING CODE D1.5

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL FOR THE MEDIAN BARRIER SHALL CONFORM TO THE FOLLOWING:

PLATES	ASTM A709, GR 50
HSS RAILING AND SPLICE TUBES	ASTM A500, GR B
H.S. BOLTS	ASTM F3125, GR A325, TYPE 1
NUTS	ASTM A563
WASHERS	ASTM F436
SPLICE BOLTS	ASTM A449
FLAT HEAD COUNTER SUNK SCREWS	ASTM F835

2. ALL STRUCTURAL STEEL FOR THE MEDIAN BARRIER EXTENSION SHALL CONFORM TO THE FOLLOWING:

PLATES AND ANGLES	ASTM A709, GR 50
HSS POSTS, RAILING AND SPLICE TUBES	ASTM A500, GR C
H.S. BOLTS	ASTM F3125, GR A325, TYPE 1
NUTS	ASTM A563
WASHERS	ASTM F436

3. ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH SECTION 719 OF THE NYS STANDARD SPECIFICATIONS, UNLESS OTHERWISE NOTED.

4. ALL FASTENERS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH SECTION 719 OF THE NYS STANDARD SPECIFICATIONS, UNLESS OTHERWISE NOTED.

5. REPAIRS TO DAMAGED GALVANIZING SHALL BE MADE IN ACCORDANCE WITH ASTM A780.

6. ALL HIGH STRENGTH BOLTED CONNECTIONS SHALL BE INSTALLED IN STANDARD SIZE HOLES, EXCEPT WHERE SLOTTED HOLES OR OVERSIZED HOLES ARE SHOWN ON THE CONTRACT DRAWINGS. THREADS SHALL BE EXCLUDED FROM THE SHEAR PLANE. HIGH STRENGTH BOLTS SHALL BE TIGHTENED USING THE TURN-OF-NUT METHOD IN ACCORDANCE WITH THE NYSSCM, UNLESS OTHERWISE NOTED. HARDENED WASHERS SHALL BE PLACED UNDER BOTH THE HEAD AND THE NUT.

7. HD BLIND BOLTS WHERE INDICATED TO BE COATED WITH DACRALON ZINC FINISH.

8. WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AASHTO/AWS D1.5 AND THE NYSSCM, THE STRICTER PROVISIONS SHALL APPLY. ALL WELDING SHALL BE PERFORMED WITH MATCHING FILLER METAL BY AN AASHTO/AWS OR NYSDOT QUALIFIED WELDER.

9. NON-DESTRUCTIVE TESTING SHALL BE PERFORMED IN ACCORDANCE WITH AASHTO/AWS D1.5, NYSSCM AND THE SPECIFICATIONS.

10. TRANSPARENT COLORLESS ACRYLIC PANELS SHALL BE "ACRYLITE SOUNDSTOP GS CC", 0.78" (20 MM) THICK EMBEDDED WITH COLORLESS POLYAMIDE FILAMENTS.

11. RUBBER GASKETS SHALL BE 70 DUROMETER EPDM OR APPROVED EQUAL.

SUGGESTED INSTALLATION SEQUENCE:

REQUIREMENTS IN THIS CONTRACT

1. FABRICATE MEDIAN BARRIER FOR THE EXTENTS SHOWN ON THE CONTRACT DRAWINGS.
2. FABRICATE MEDIAN BARRIER EXTENSION FOR THE EXTENTS SHOWN ON THE CONTRACT DRAWINGS.
3. SHOP ASSEMBLE MEDIAN BARRIER AND MEDIAN BARRIER EXTENSION AND VERIFY GEOMETRY AND FIELD SPLICES.
4. DISASSEMBLE AND SHIP MEDIAN BARRIER AND MEDIAN BARRIER EXTENSION TO THE CRASH TESTING FACILITY.

REQUIREMENTS BY OTHERS:

5. INSTALL CONCRETE SLAB.
6. PLACE MEDIAN BARRIER POSTS AT SPACING INDICATED IN S-001.
7. POST-INSTALL $\frac{7}{8}$" DIA. ADHESIVE ANCHOR BOLTS INTO THE CONCRETE SLAB.
8. INSTALL MEDIAN BARRIER SHELL / TUBE ASSEMBLY ON EACH SIDE OF THE POSTS.
9. INSTALL BOTH SIDES OF THE MEDIAN BARRIER EXTENSION WITH CONNECTION ANGLES LOOSE ON TOP OF THE MEDIAN BARRIER POSTS.
10. INSTALL MEDIAN EXTENSION PANELS, TIGHTEN BLIND BOLTS ON CONNECTION ANGLES.

SPARE PARTS FOR CRASH TESTING:

THE FOLLOWING SPARE PARTS FOR REPLACEMENT DURING CRASH TESTING SHALL BE FABRICATED AND SHIPPED ALONG WITH THE TEST BARRIER LENGTH:

1. SIX (6) MEDIAN BARRIER EXTENSION PANELS (LENGTH 4'-9$\frac{1}{4}$") WITH GASKETS.
2. TWO (2) TYPICAL MEDIAN BARRIER EXTENSION STEEL FRAMES (LENGTH 14'-9$\frac{1}{4}$")
3. TWO (2) TYPICAL MEDIAN BARRIER UNITS (LENGTH 14'-9$\frac{1}{4}$")
4. ANY ASSOCIATED CONNECTION HARDWARE

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: NONE

HNTB

Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

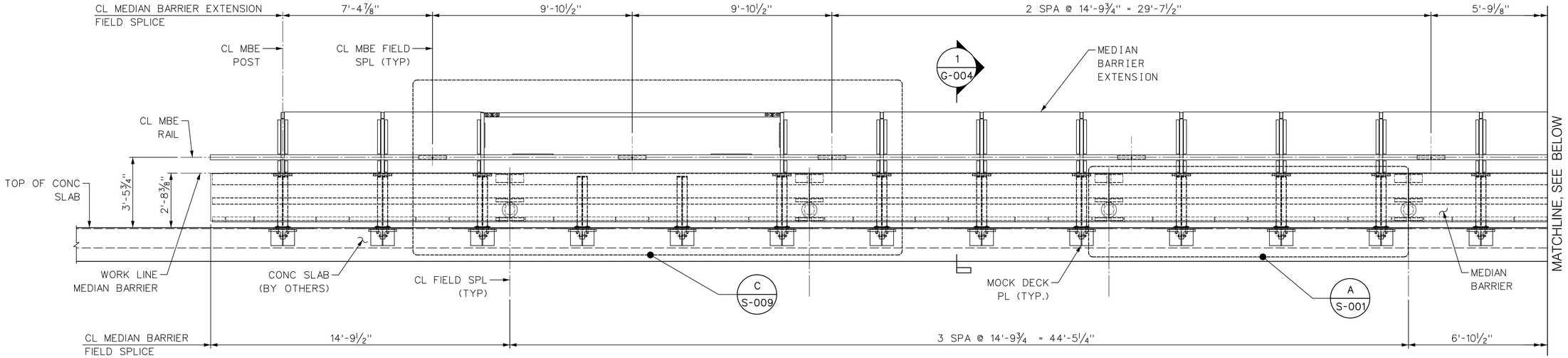
DRAWING TITLE: GENERAL NOTES

PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. G-002
SHEET 003 OF 018
DATE JUNE 5, 2019
REVISION NO. 1

W0010002.dgn
$$prf$$
$$refO1$$
$$refO2$$
$$refO3$$

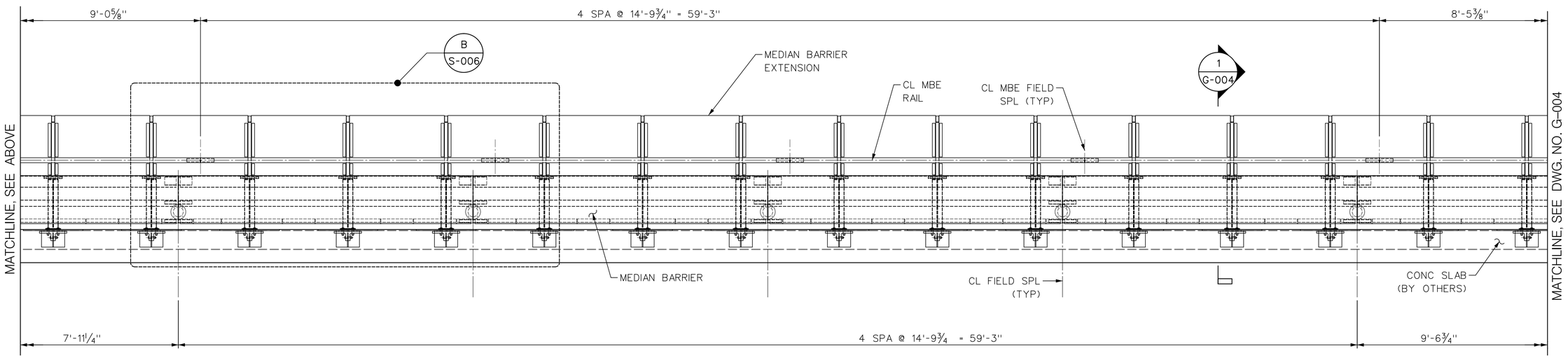
tbtg-68648.tbl
11:09:34 AM
gaaly



ELEVATION

1 0 1 2 3 4 5 6 7

⅜" = 1'-0"



ELEVATION

1 0 1 2 3 4 5 6 7

⅜" = 1'-0"

NOTES:

1. FOR MEDIAN BARRIER WORK POINT (WORK LINE) LOCATION DETAIL, SEE DWG. NO. G-004.
2. FOR MEDIAN BARRIER DETAILS SEE DWG. NOS. S-001 THRU S-005.
3. FOR MEDIAN BARRIER EXTENSION DETAILS SEE DWG. NOS. S-006 THRU S-012.
4. FOR CONCRETE SLAB DETAILS, SEE TTI FOUNDATION DETAILS 2018-11-26.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: ⅜" = 1'-0"

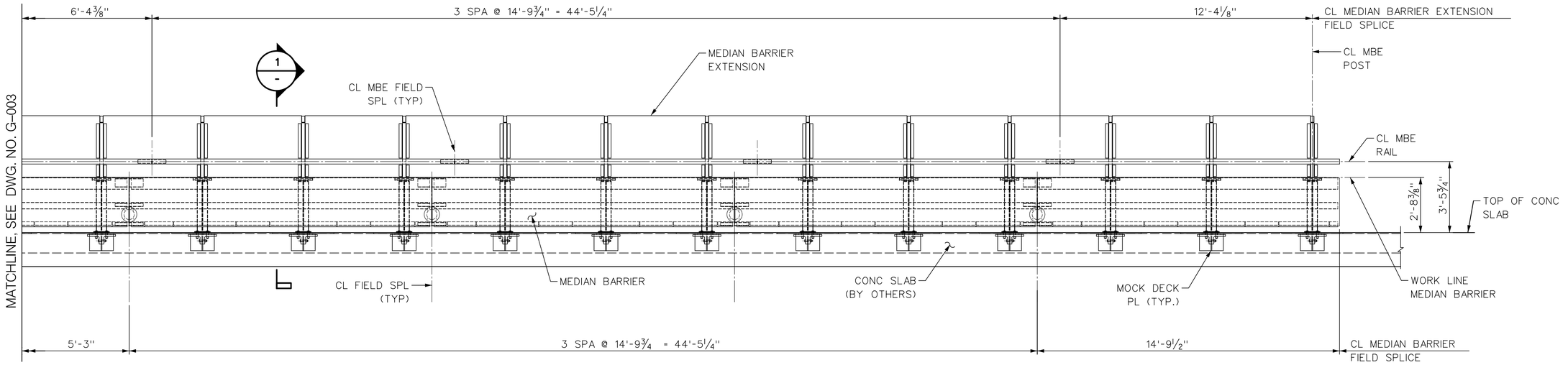
HNTB

Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE: GENERAL ELEVATION SHEET 1 OF 2

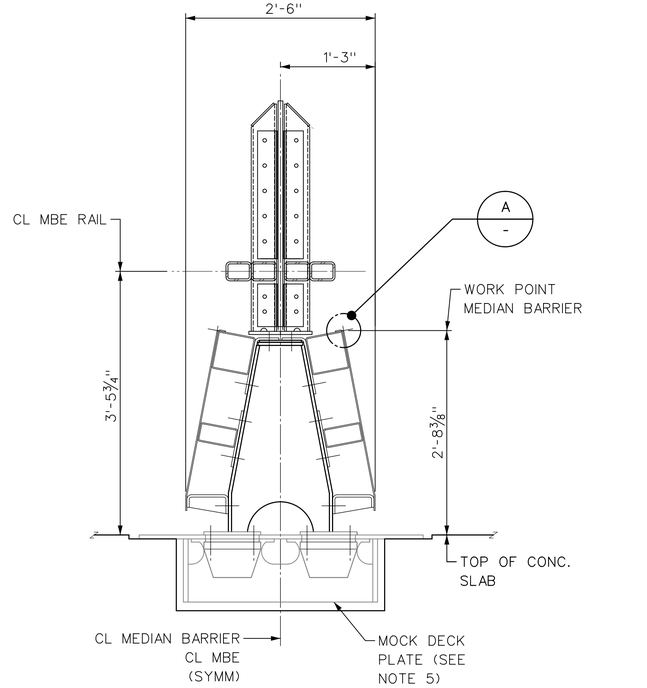
CONTRACT NO. PSC-16-2991
DRAWING NO. G-003
SHEET 004 OF 018
DATE JUNE 5, 2019
REVISION NO. 1
PROJECT NO. GFM-520H



GENERAL ELEVATION

1 0 1 2 3 4 5 6 7

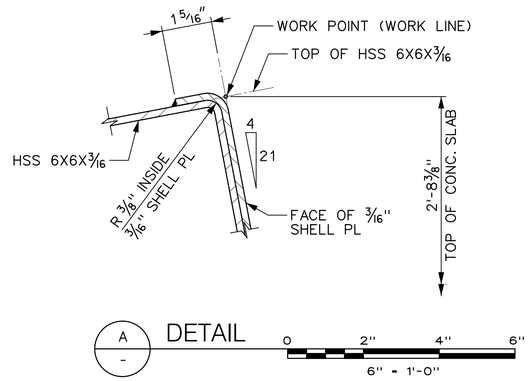
3/8" = 1'-0"



1 / G-003 — 1 / - SECTION

1 0 1 2

1" = 1'-0"



A / - DETAIL

0 2" 4" 6"

6" = 1'-0"

NOTES:

1. FOR TYPICAL MEDIAN BARRIER ELEVATION, SEE DWG. NO. S-001.
2. FOR TYPICAL MEDIAN BARRIER EXTENSION ELEVATION, SEE DWG. S-006.
3. WORK DETAIL A WITH DETAILS SHOWN ON DWG. NOS. S-002 TO S-005.
4. FOR CONCRETE SLAB DETAILS, SEE TTI FOUNDATION DETAILS 2018-11-26.
5. FOR MOCK DECK PLATE DETAILS, SEE DWG. NO. S-003A.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: 3/8" = 1'-0"

HNTB

Triborough Bridge and Tunnel Authority

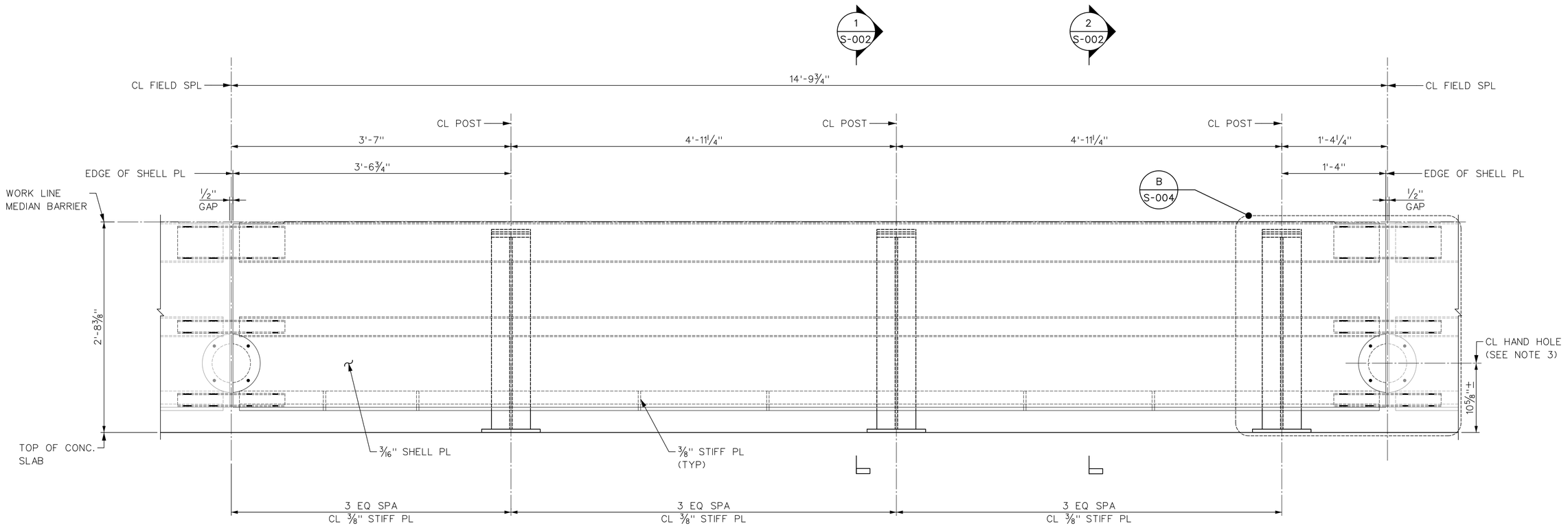
MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE: GENERAL ELEVATION SHEET 2 OF 2

CONTRACT NO. PSC-16-2991
DRAWING NO. G-004
SHEET 005 OF 018
DATE JUNE 5, 2019
REVISION NO. 1
PROJECT NO. GFM-520H

W0010004.dgn
$$rf$$
$$rf01$$
$$rf02$$
$$rf03$$

tbta-68648.tbl
1:09:40 AM
gdaly



A G-003 TYPICAL ELEVATION

1½" = 1'-0"

NOTES:

1. FOR MEDIAN BARRIER WORK POINT (WORK LINE) LOCATION DETAIL, SEE DWG. G-004.
2. FOR SHELL PLATE DETAIL, SEE DWG. NO. S-005.
3. OMIT HAND HOLES AT MEDIAN BARRIER END SEGMENTS WHERE NO FIELD SPLICES ARE PRESENT.
4. MEDIAN BARRIER EXTENSION NOT SHOWN FOR CLARITY, SEE DWG. NO. S-006 FOR DETAILS.
5. MOCK DECK PLATE AND CONCRETE SLAB NOT SHOWN FOR CLARITY, SEE DWG. NOS. S-003 AND S-003A FOR DETAILS.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER SIGNATURE AND DATE OF ALTERATION."

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: 1½" = 1'-0"

HNTB

Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

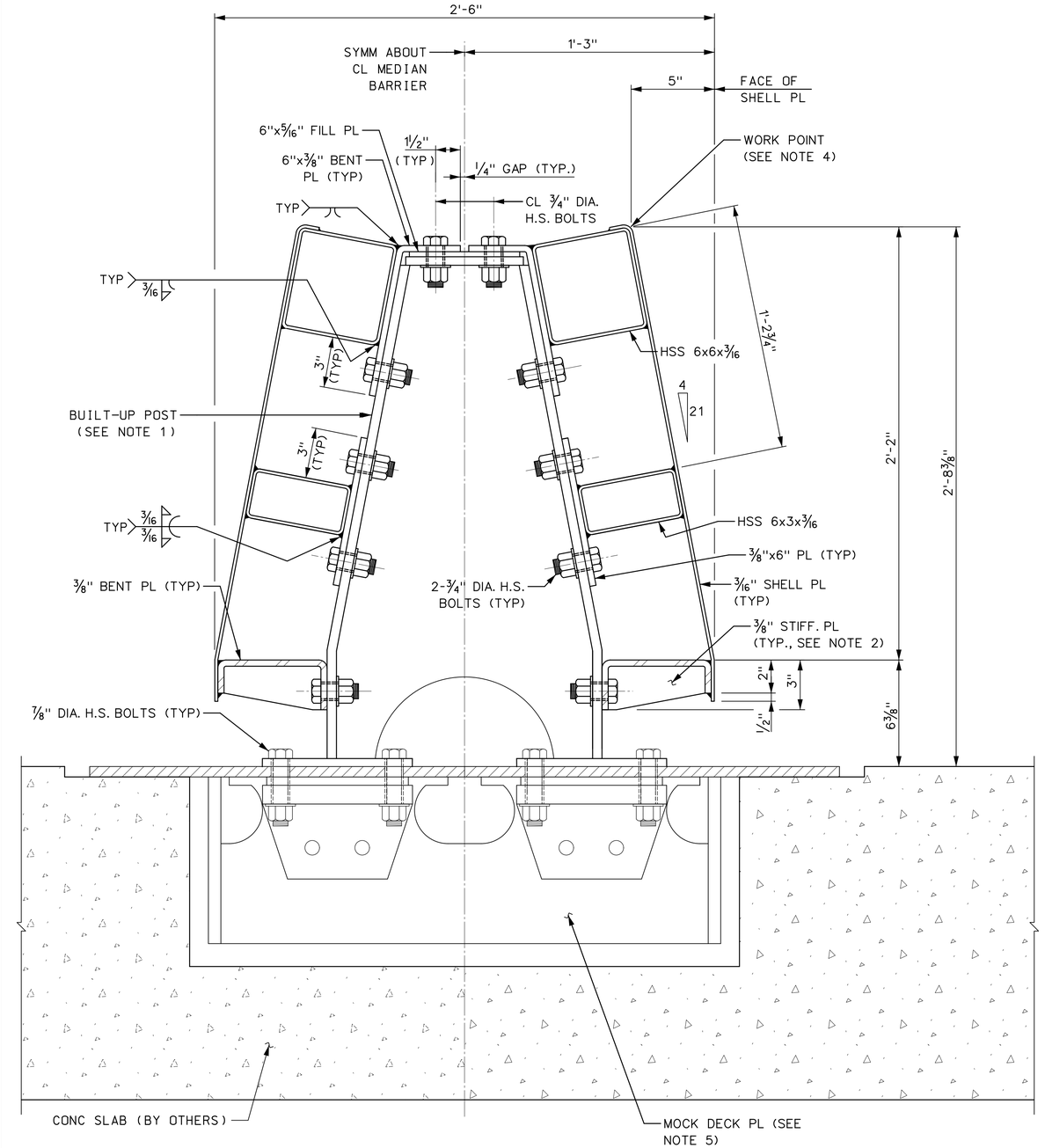
DRAWING TITLE
MEDIAN BARRIER
TYPICAL ELEVATION

PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. S-001
SHEET 006 OF 018
DATE JUNE 5, 2019
REVISION NO. 1

W001S001
$$pr$f$$
$$rgf01$$
$$rgf02$$
$$rgf03$$

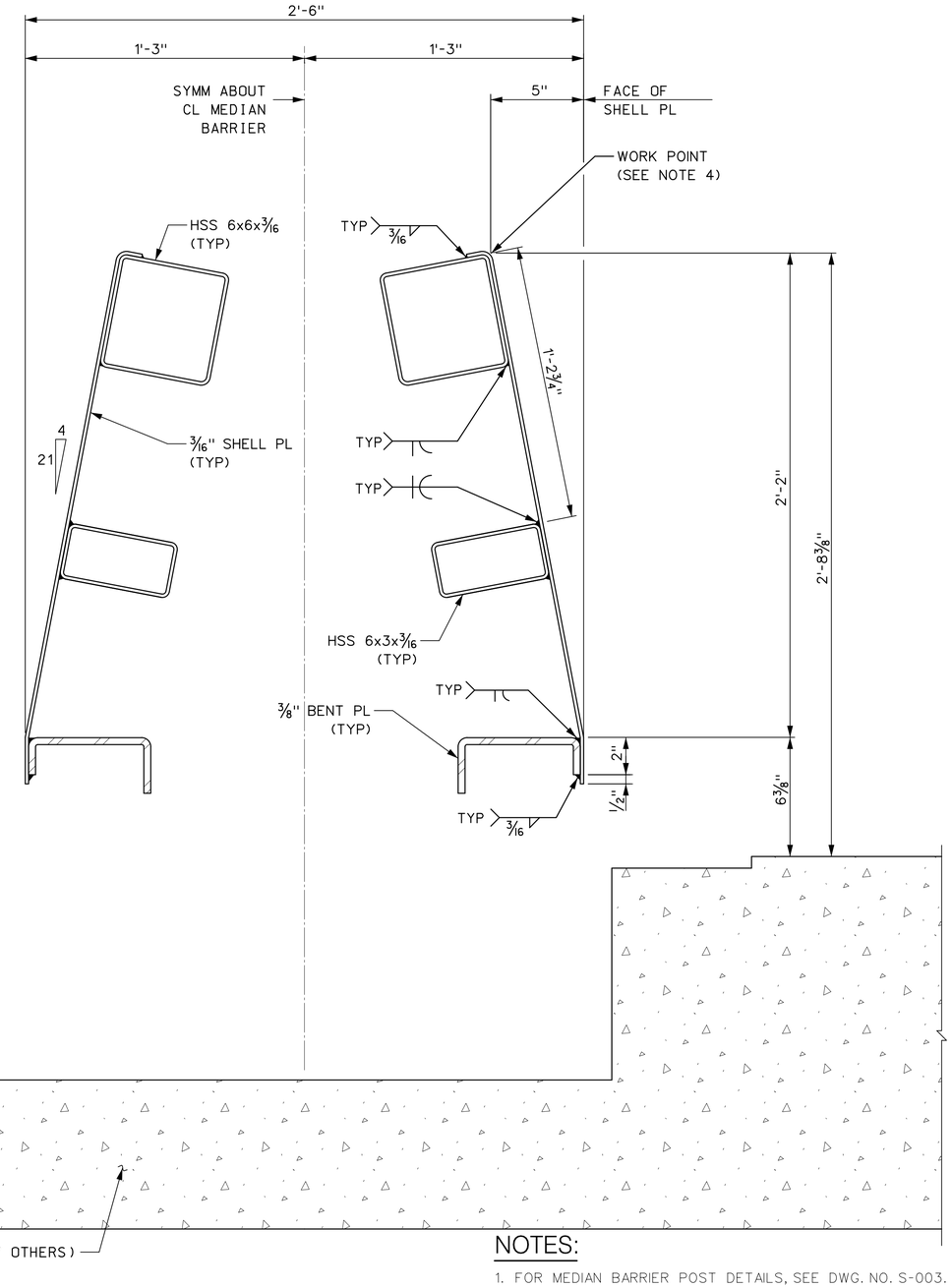
tbl-68648.tbl
11:09:42 AM
goldy



1 S-001 MEDIAN SECTION BARRIER AT POST

0 3" 6" 9" 1

3" = 1'-0"



2 S-001 SECTION

0 3" 6" 9" 1

3" = 1'-0"

NOTES:

1. FOR MEDIAN BARRIER POST DETAILS, SEE DWG. NO. S-003.
2. FOR BENT PLATE STIFFENER SPACING, SEE DWG. NO. S-001.
3. FOR ADDITIONAL RAILING DETAILS, SEE DWG. NO. S-005.
4. FOR WORK POINT DETAIL, SEE DWG. NO. G-004.
5. FOR MOCK DECK PLATE DETAILS SEE DWG. NO. S-003A.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: 3" = 1'-0"

HNTB

Triborough Bridge and Tunnel Authority

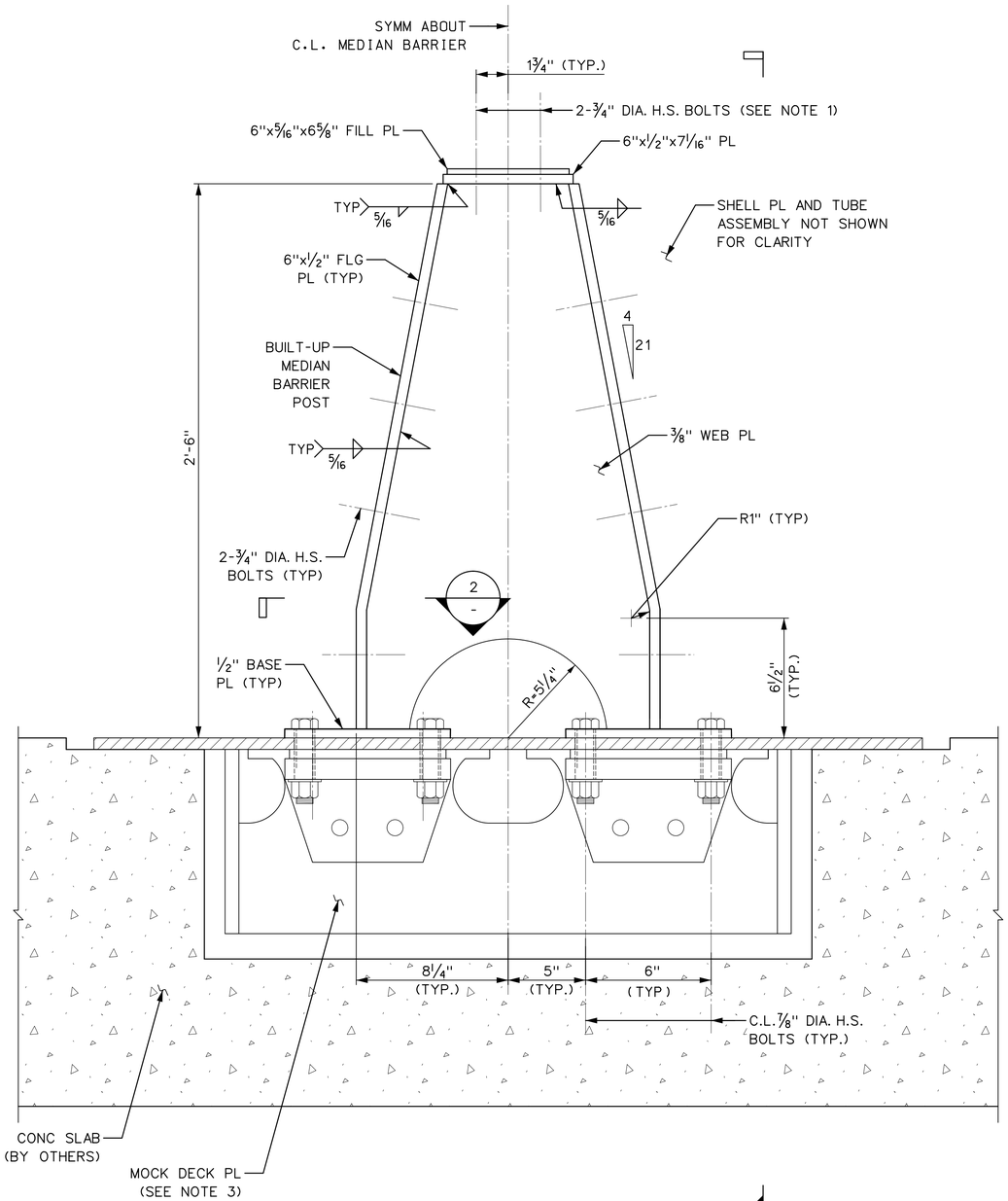
MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE: MEDIAN BARRIER TYPICAL SECTIONS

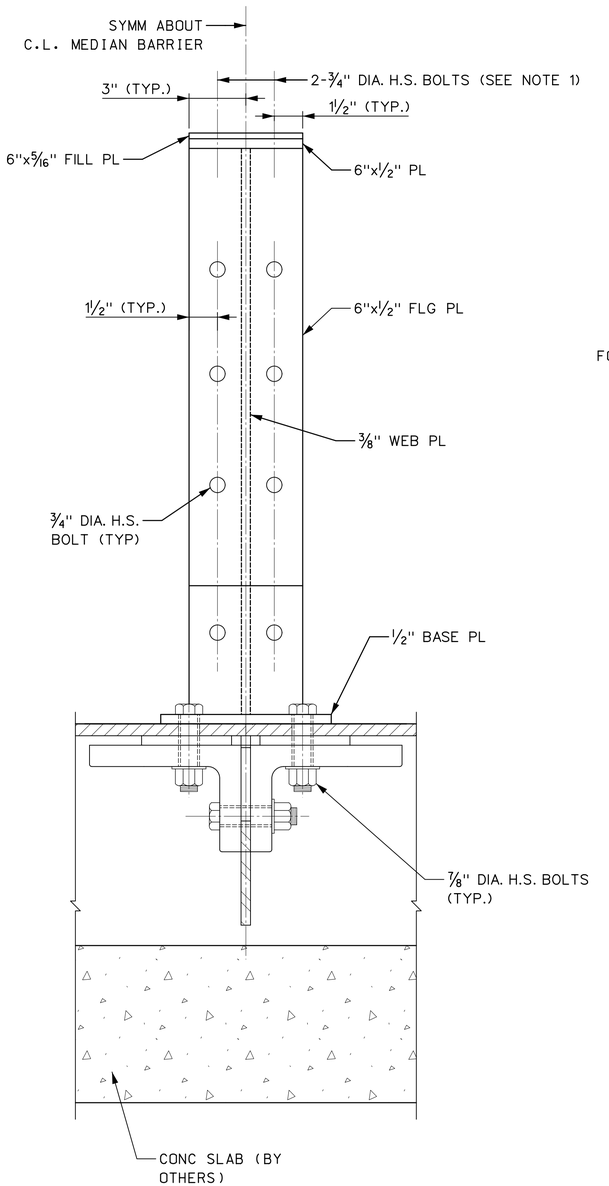
PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. S-002
SHEET 007 OF 018
DATE JUNE 5, 2019
REVISION NO. 1

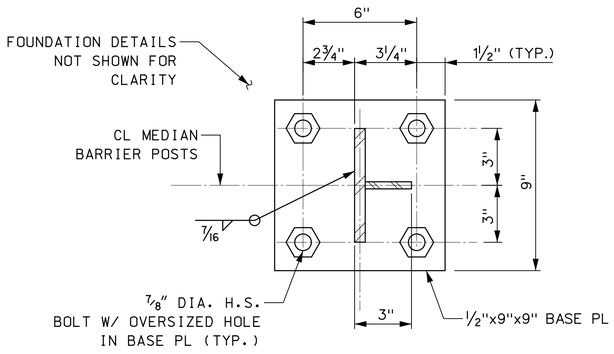
W0015002.DGN
$$rf$$
$$rf01$$
$$rf02$$
$$rf03$$
tbta-68648.tbl
1:09:44 AM
gdaly



POST DETAILS 0 3" 6" 9" 1
3" = 1'-0"



1 SECTION 0 3" 6" 9" 1
3" = 1'-0"



2 SECTION 0 3" 6" 9" 1
3" = 1'-0"

NOTES:

1. COORDINATE BOLT POSITIONS WITH MEDIAN BARRIER EXTENSION CONNECTION PLATE DETAILS, SEE DWG. NO. S-008.
2. COORDINATE WITH RAILING DETAILS, SEE DWG. NOS. S-002 AND S-005.
3. FOR MOCK DECK PLATE DETAILS, SEE DWG. NO. S-003A.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY. UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER SIGNATURE AND DATE OF ALTERATION."

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: 3" = 1'-0"

HNTB

Triborough Bridge and Tunnel Authority

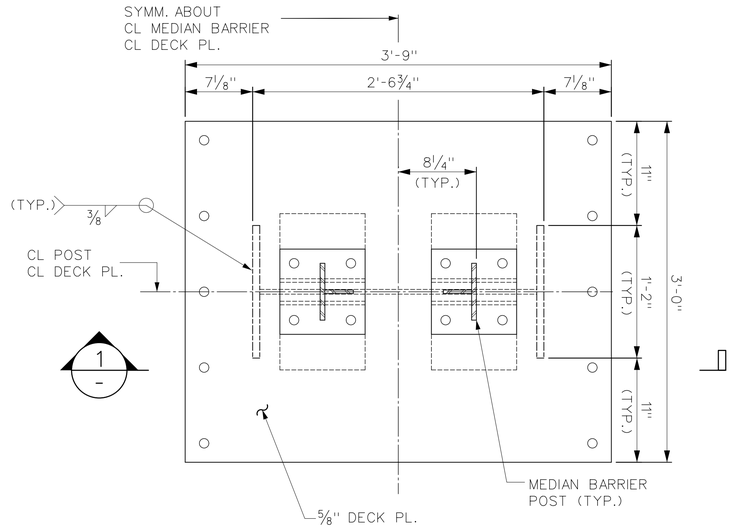
MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE
MEDIAN BARRIER POST DETAILS

PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. S-003
SHEET 008 OF 018
DATE JUNE 5, 2019
REVISION NO. 1

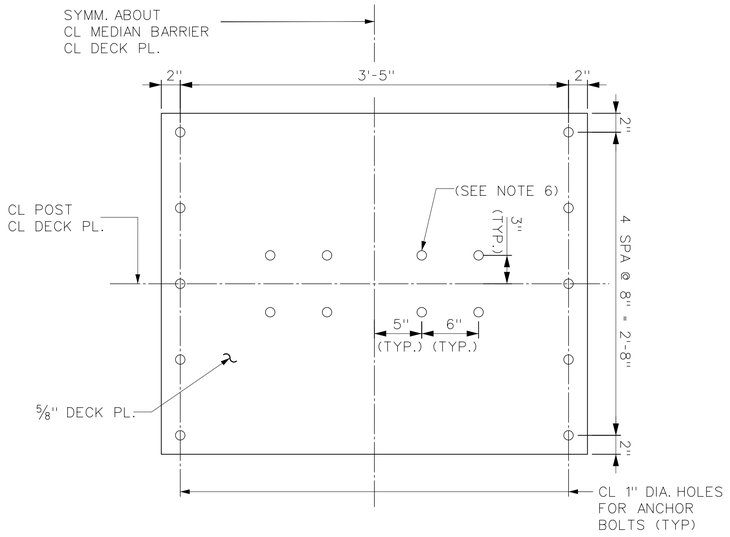
W001S003.DGN
$$prf$$
$$rfd01$$
$$rfd02$$
$$rfd03$$
tblta-68648.tbl
10:40:40 AM
gdaily



PLAN VIEW

1 0 1

1½" - 1'-0"



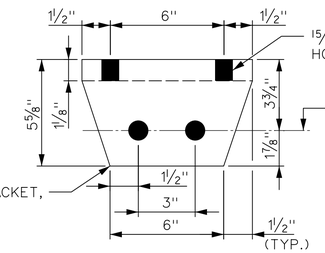
DECK PL. PLAN
HOLES LAYOUT

1 0 1

1½" - 1'-0"

NOTES:

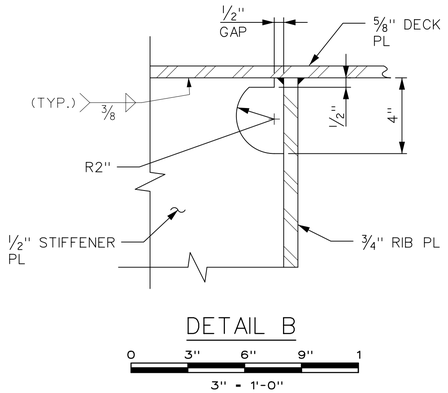
1. 42 DECK PLATE ASSEMBLIES TO BE FABRICATED TO MATCH NUMBER OF MEDIAN BARRIER POSTS INDICATED ON DWG. NOS. G-003 AND G-004.
2. ALL STRUCTURAL STEEL PLATES AND ANGLES FOR THE DECK PLATE ASSEMBLY SHALL CONFORM TO ASTM A709, GR 50.
3. ½" FILL PL. AND ANGLE BRACKET TO BE GALVANIZED. GALVANIZED FAYING SURFACES TO BE HAND WIRE BRUSHED FOR CLASS C FINISH. REMAINDER OF DECK ASSEMBLY TO BE SHOP PRIMED WITH FAYING SURFACES MASKED FOR CLASS A FINISH.
4. ENSURE WELDING DOES NOT DISTORT THE DECK PLATE FROM THE DIMENSIONS INDICATED.
5. DECK PLATE ASSEMBLY TO BE POST-INSTALLED INTO CONCRETE SLAB WITH ANCHOR BOLTS. CONCRETE SLAB AND ANCHOR BOLTS BY OTHERS.
6. STANDARD SIZE HOLES FOR ⅞" DIAMETER HIGH STRENGTH BOLTS IN ALL PLIES EXCEPT POST BASE PLATE WHICH ARE OVERSIZED PER DWG. NO. S-003. COORDINATE HOLE LOCATIONS WITH MEDIAN BARRIER POST BASE PLATE.
7. FOR ADDITIONAL NOTES SEE G-002.
8. FOR MEDIAN BARRIER POST DETAILS, SEE DWG. NO. S-003.
9. MOCK DECK PLATES TO BE ASSEMBLED WITH MEDIAN BARRIER SEGMENTS FOR SHIPPING TO TEST FACILITY.
10. FOR CONCRETE SLAB DETAILS, SEE TTI FOUNDATION DETAILS 2018-11-26.



ANGLE BRACKET DETAIL

0 3" 6" 9" 1

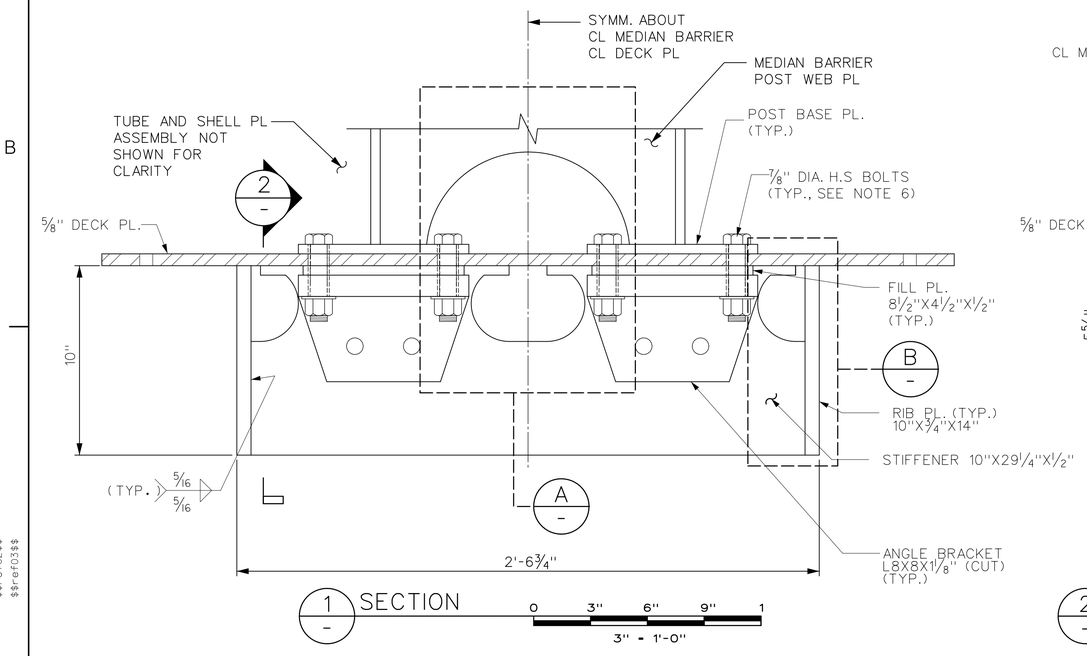
3" - 1'-0"



DETAIL B

0 3" 6" 9" 1

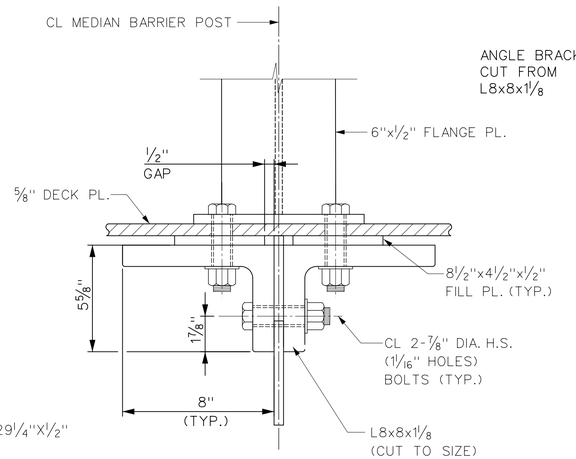
3" - 1'-0"



1 - SECTION

0 3" 6" 9" 1

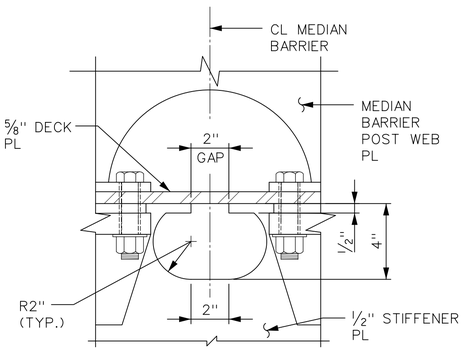
3" - 1'-0"



2 - SECTION

0 2" 4" 6"

6" - 1'-0"



DETAIL A

0 3" 6" 9" 1

3" - 1'-0"

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD
0	NEW SHEET ADDED	12/10/18	CG

"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER SIGNATURE AND DATE OF ALTERATION."

DRAWN BY C. GAUNT

DESIGNED BY C. GAUNT

CHECKED BY G. DALY

SCALE:

HNTB

Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE

MOCK DECK PLATE DETAILS

PROJECT NO. GFM-520H

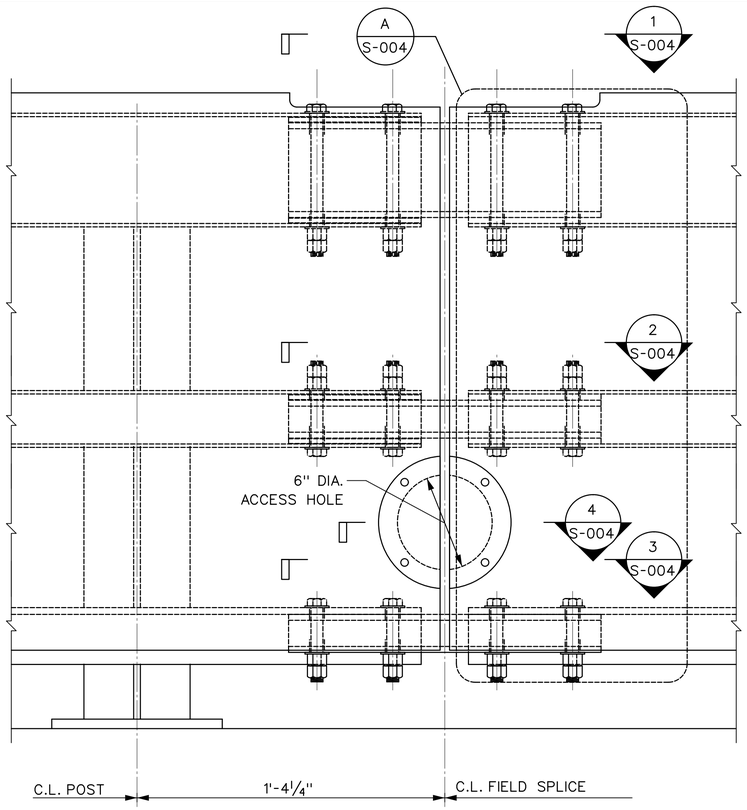
CONTRACT NO. PSC-16-2991

DRAWING NO. S-003A

SHEET 008A OF 018

DATE DECEMBER 10, 2018

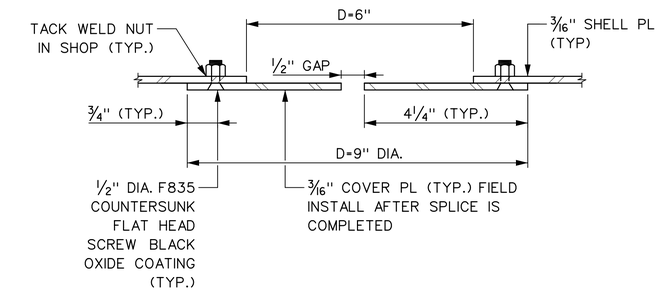
REVISION NO. 1



B S-001 MEDIAN BARRIER SPLICE (DEVELOPED VIEW)

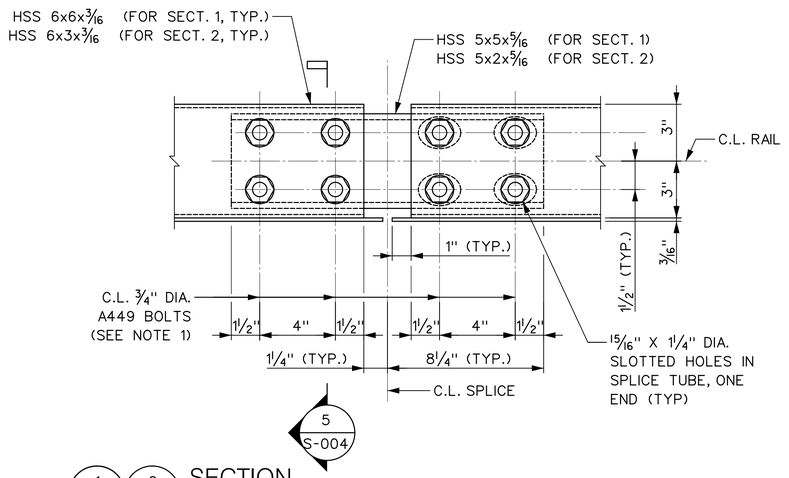
0 3" 6" 9" 1

3" - 1'-0"



4 S-004 SECTION

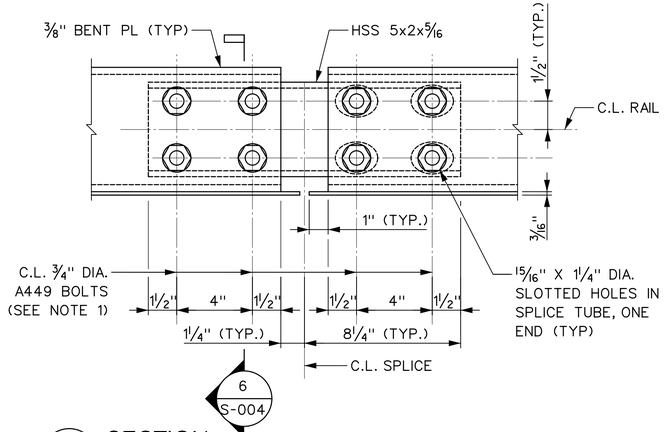
N.T.S.



1 S-004 2 S-004 SECTION

0 3" 6" 9" 1

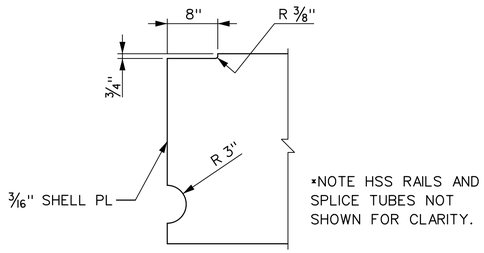
3" - 1'-0"



3 S-004 SECTION

0 3" 6" 9" 1

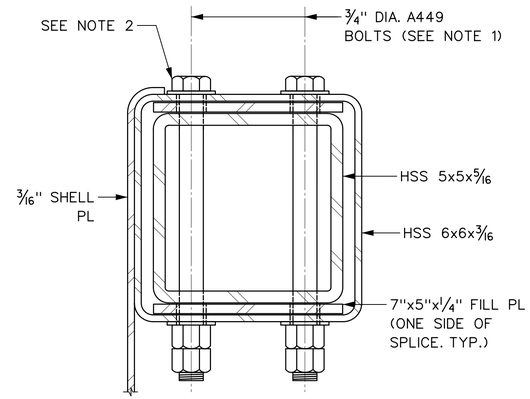
3" - 1'-0"



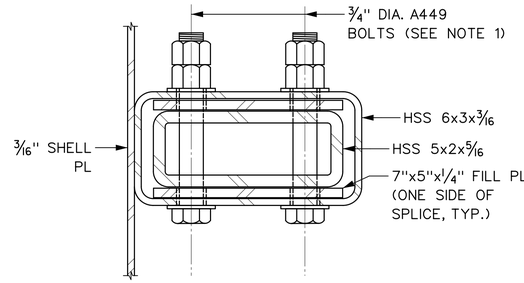
A S-004 COPE DETAIL

1 0 1 2

1" - 1'-0"



FOR HSS 6x6x3/16

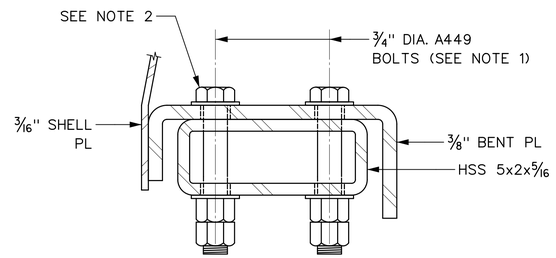


FOR HSS 6x3x3/16

5 S-004 SECTION

0 2" 4" 6"

6" - 1'-0"



6 S-004 SECTION

0 2" 4" 6"

6" - 1'-0"

NOTES:

1. ALL 3/4" DIA. A449 BOLTS FOR MEDIAN BARRIER RAIL SPLICES SHALL BE INSTALLED SNUG TIGHT. EACH BOLT SHALL CONTAIN TWO (2) HARDENED WASHERS AND TWO (2) HEAVY HEX NUTS.

2. RAIL SPLICE BOLTS FOR THE TOP TUBE AND BOTTOM BENT PL ONLY SHALL BE INSTALLED WITH NUTS ON THE BOTTOM SIDE OF THE TUBE.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY. UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER SIGNATURE AND DATE OF ALTERATION."

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: AS NOTED

HNTB

Triborough Bridge and Tunnel Authority

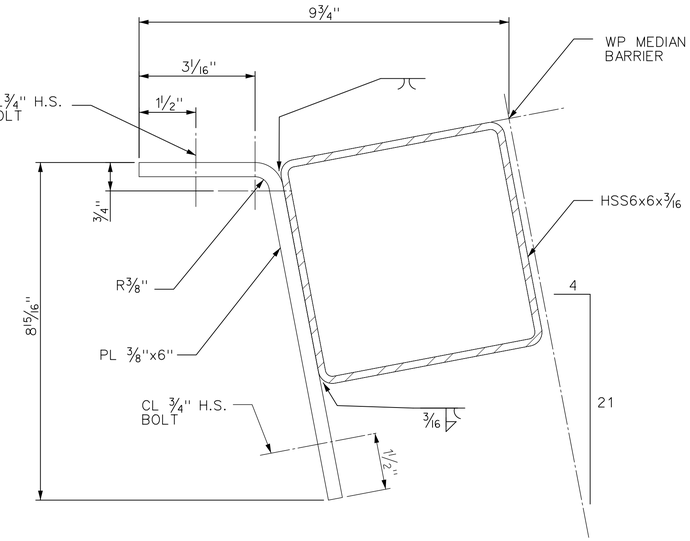
MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

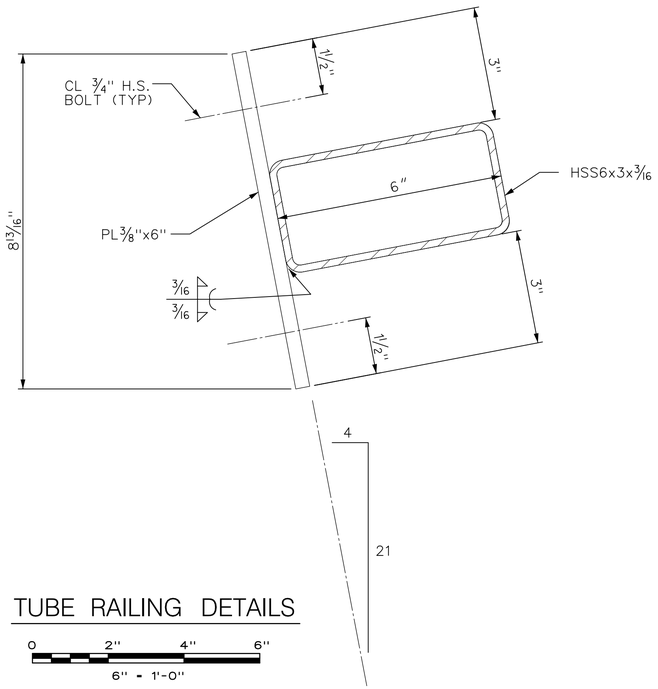
DRAWING TITLE: MEDIAN BARRIER SPLICE DETAILS

PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. S-004
SHEET 009 OF 018
DATE JUNE 5, 2019
REVISION NO. 1

W001S004.DGN
$$pref$$
$$pref01$$
$$pref02$$
$$pref03$$
tb1o-68648.tb1
11:09:51 AM
gadly

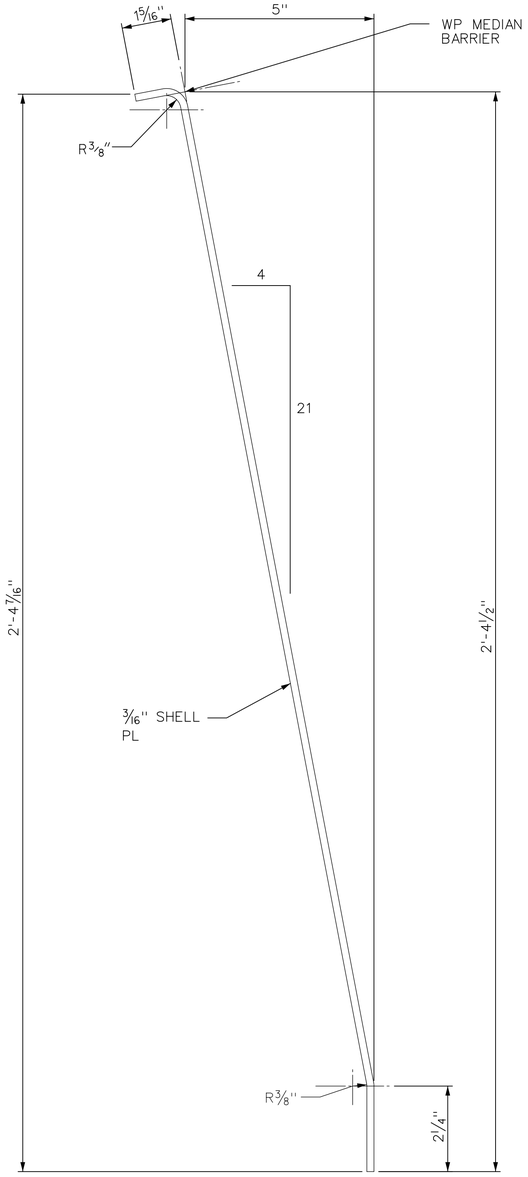




TUBE RAILING DETAILS

0 2" 4" 6"

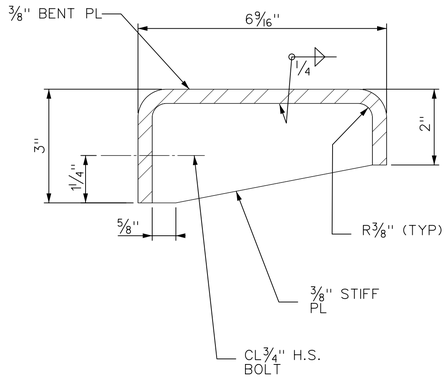
6" - 1'-0"



SHELL PLATE DETAIL

0 2" 4" 6"

6" - 1'-0"



BENT PLATE RAIL DETAIL

0 2" 4" 6"

6" - 1'-0"

NOTES:

1. DETAILS SHOWN ON THIS SHEET ARE SIMILAR AND OPPOSITE HAND ABOUT THE CENTERLINE OF THE MEDIAN BARRIER.
2. COORDINATE THESE DETAILS WITH DETAILS SHOWN ON DWG. NOS. S-002 AND S-003.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY C. GAUNT
DESIGNED BY C. GAUNT
CHECKED BY E. ZUKER
SCALE: 3" = 1'-0"

HNTB

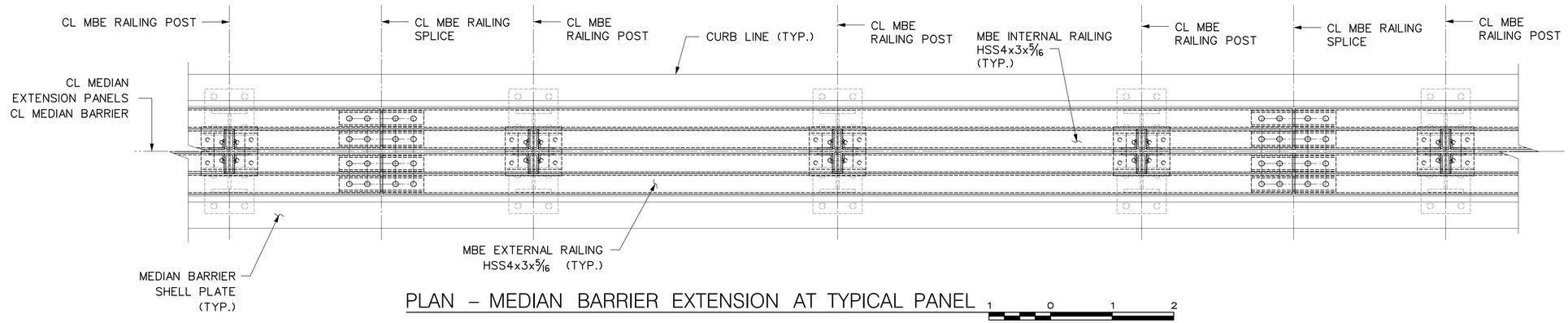
Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE: MEDIAN BARRIER RAILING DETAILS

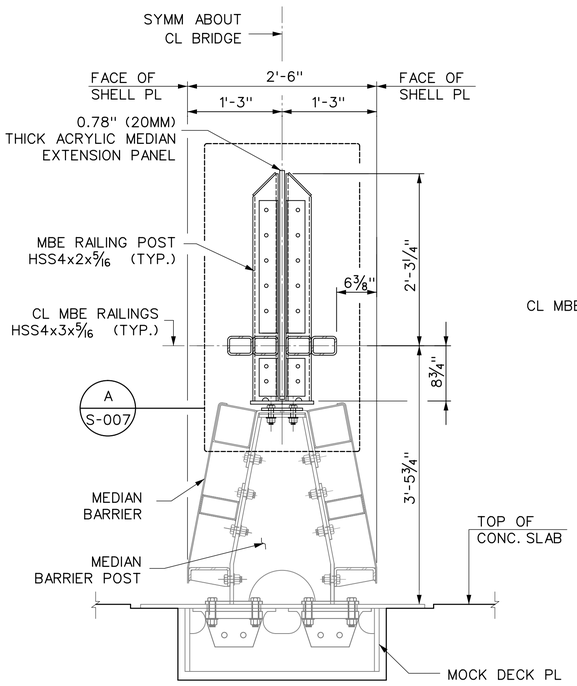
PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. S-005
SHEET 010 OF 018
DATE JUNE 5, 2019
REVISION NO. 1



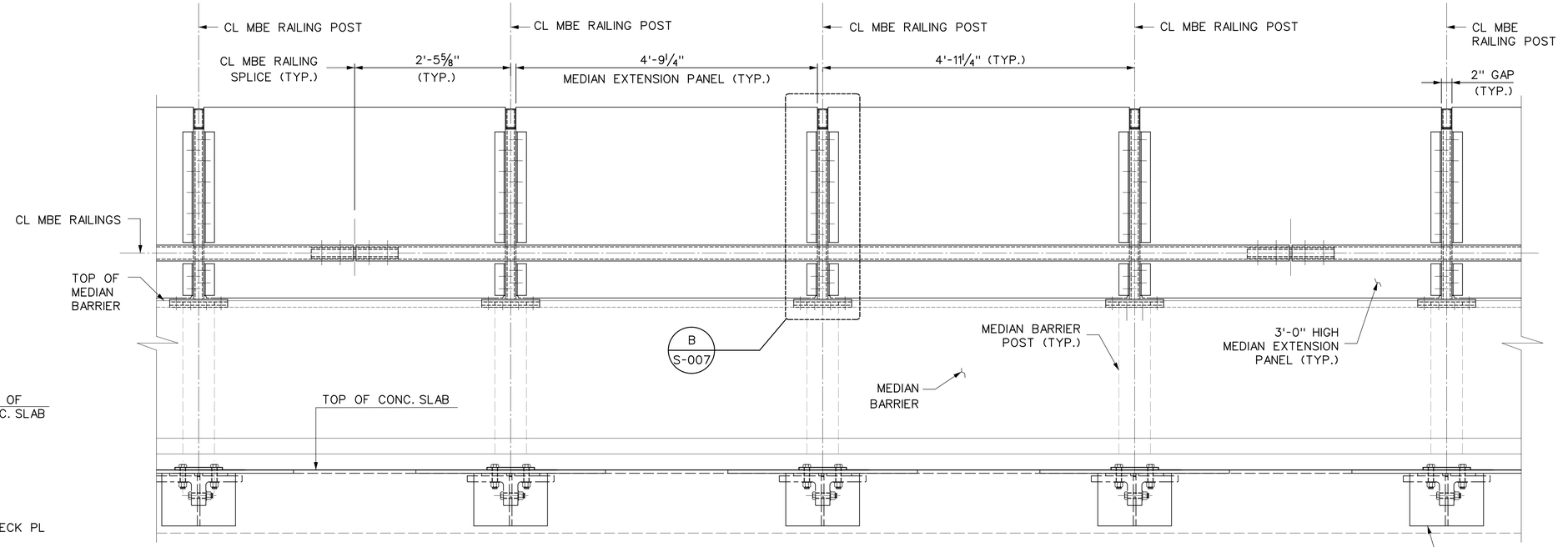
PLAN – MEDIAN BARRIER EXTENSION AT TYPICAL PANEL

1" = 1'-0"



TYPICAL MEDIAN BARRIER SECTION AT POST

1" = 1'-0"



B G-003 TYPICAL FRONT ELEVATION OF MEDIAN BARRIER EXTENSION

1" = 1'-0"

NOTES:

1. FOR MBE RAILING SPLICE DETAIL, REFER TO DWG. NO. S-012.
2. PRIOR TO GALVANIZING, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/16".
3. EXTERNAL VENT HOLES SHALL BE DRILLED IN THE RAIL TUBES AS REQUIRED TO FACILITATE GALVANIZING AND DRAINAGE.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY G. DALY
DESIGNED BY G. DALY
CHECKED BY E. ZUKER
SCALE: 1" = 1'0"

HNTB

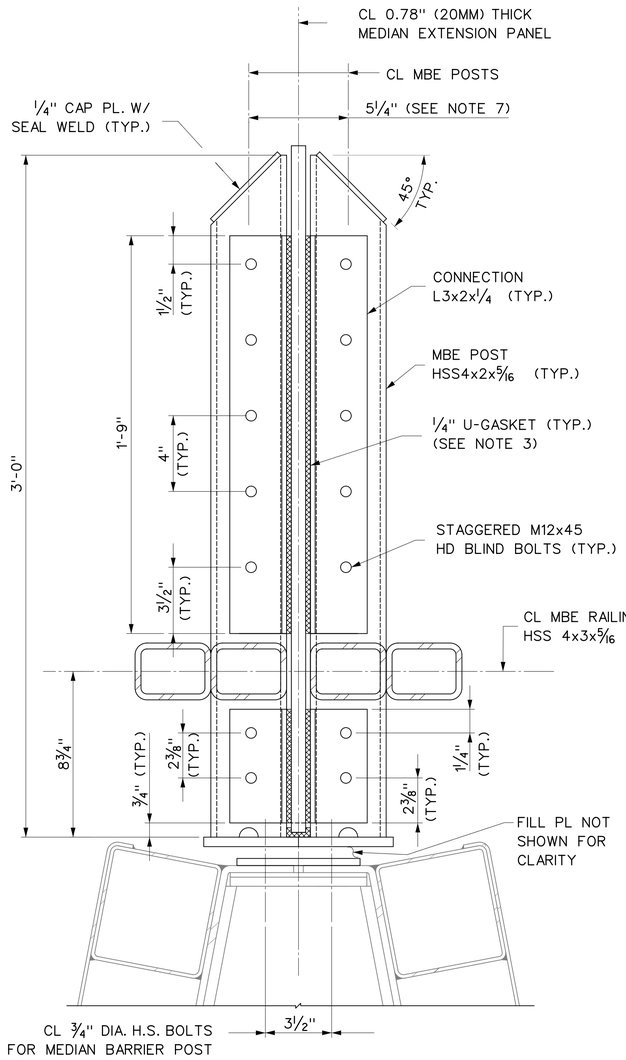
Triborough Bridge and Tunnel Authority

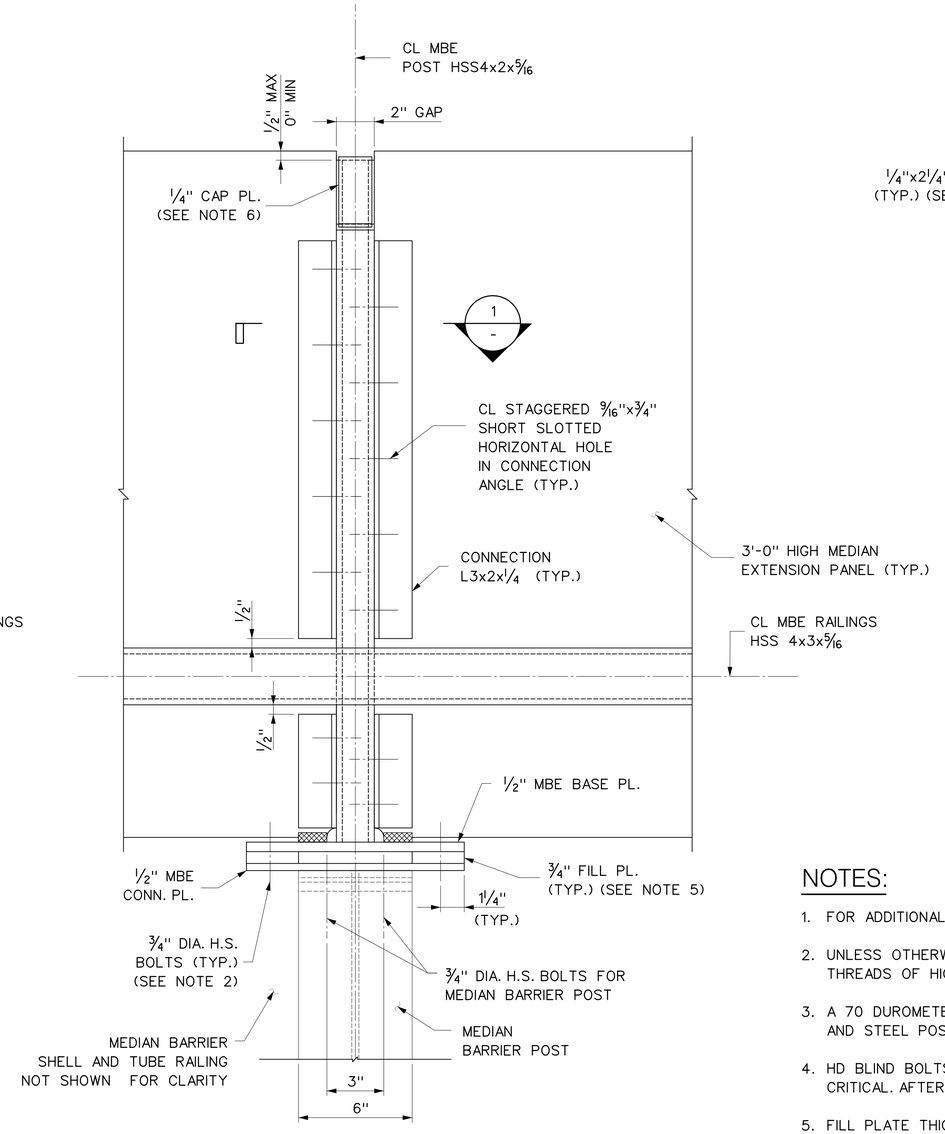
MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

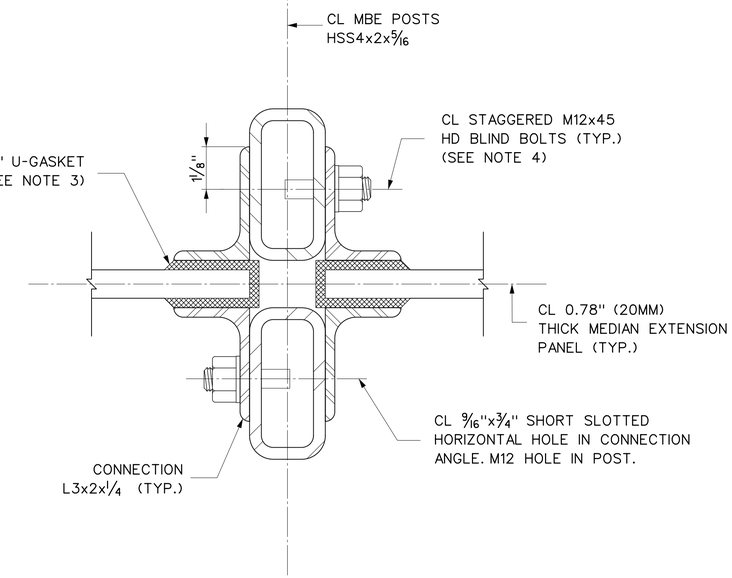
DRAWING TITLE
TYPICAL ELEVATION AND CROSS SECTION OF MEDIAN BARRIER EXTENSION

PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. S-006
SHEET 011 OF 018
DATE JUNE 5, 2019
REVISION NO. 1







1 - SECTION 0 2" 4" 6"
6" = 1'-0"

A S-006 DETAIL 0 3" 6" 9" 1
3" = 1'-0"

B S-006 DETAIL 0 3" 6" 9" 1
3" = 1'-0"

NOTES:

1. FOR ADDITIONAL NOTES AND DETAILS SEE DWG. NOS. S-006 AND S-008.
2. UNLESS OTHERWISE NOTED, HIGH STRENGTH BOLTS SHALL CONFORM TO AASHTO M164, ASTM A325, TYPE 1. THREADS OF HIGH STRENGTH BOLTS SHALL BE EXCLUDED FROM SHEAR PLANES.
3. A 70 DUROMETER EPDM GASKET OR APPROVED EQUAL SHALL BE PROVIDED BETWEEN ACRYLITE PANEL FACE AND STEEL POST CONTACT POINTS.
4. HD BLIND BOLTS TO BE STAGGERED EITHER SIDE OF EACH POST TO AVOID CONFLICT. CONNECTION IS SLIP CRITICAL. AFTER GALVANIZING HAND WIRE BRUSH SURFACE OF L3x2x¼ FOR CLASS C FAYING SURFACE.
5. FILL PLATE THICKNESS TO PROVIDE CONSISTENT HEIGHT OF MEDIAN BARRIER EXTENSION FRAMING AND CLEARANCE ABOVE BOLTS OF MEDIAN BARRIER POST.
6. ALL POST CAP PLATE CORNERS SHALL HAVE RADIUS TO MATCH HSS POSTS.
7. COORDINATE POST TRANSVERSE SPACING WITH GASKET THICKNESS.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY. UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER SIGNATURE AND DATE OF ALTERATION."

DRAWN BY G. DALY
DESIGNED BY G. DALY
CHECKED BY E. ZUKER
SCALE: 3" = 1'-0"

HNTB

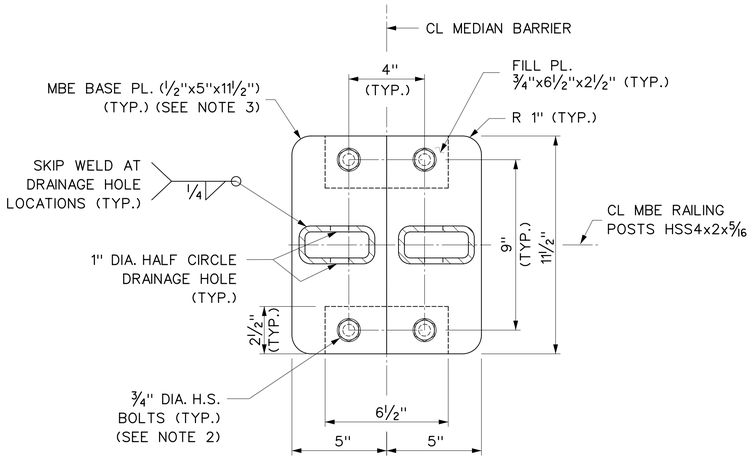
Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE
MEDIAN BARRIER EXTENSION
TYPICAL DETAILS – 1

PROJECT NO. GFM-520H

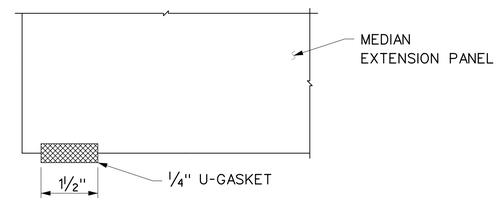
CONTRACT NO. PSC-16-2991
DRAWING NO. S-007
SHEET 012 OF 018
DATE JUNE 5, 2019
REVISION NO. 1



BASE PLATE DETAIL

0 3" 6" 9" 1

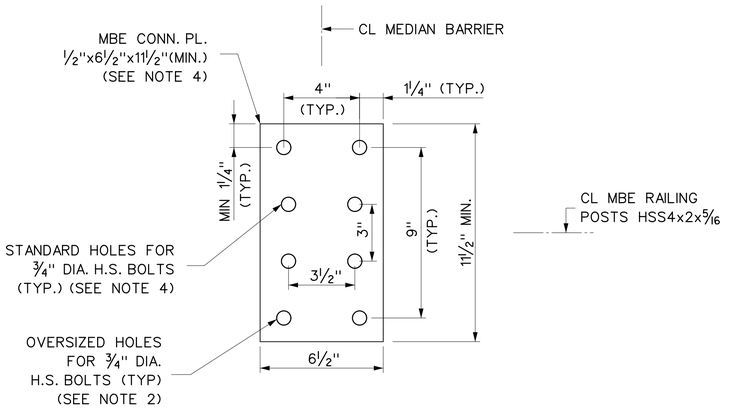
3" - 1'-0"



PANEL BASE DETAIL

0 2" 4" 6"

6" - 1'-0"



CONNECTION PLATE DETAIL

0 3" 6" 9" 1

3" - 1'-0"

NOTES:

1. FOR ADDITIONAL NOTES SEE DWG. NO. S-007.
2. CONNECTION PLATE BOLT HOLES ARE OVERSIZE. BASE PLATE AND FILL PLATE HOLES ARE STANDARD SIZE.
3. EACH MBE POST TUBE HAS A SEPARATE 5" WIDE BASE PLATE TO ALLOW FOR EASE OF INSTALLATION.
4. COORDINATE CONNECTION PLATE LENGTH AND BOLT HOLE POSITIONS WITH TOP OF MEDIAN BARRIER POST, SEE DWG. NO. S-003.
5. FAYING SURFACES FOR BOLTED CONNECTIONS WITH OVERSIZED HOLES TO BE HAND WIRE BRUSHED FOR CLASS C FINISH.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY G. DALY
DESIGNED BY G. DALY
CHECKED BY E. ZUKER
SCALE: 3" = 1'-0"

HNTB

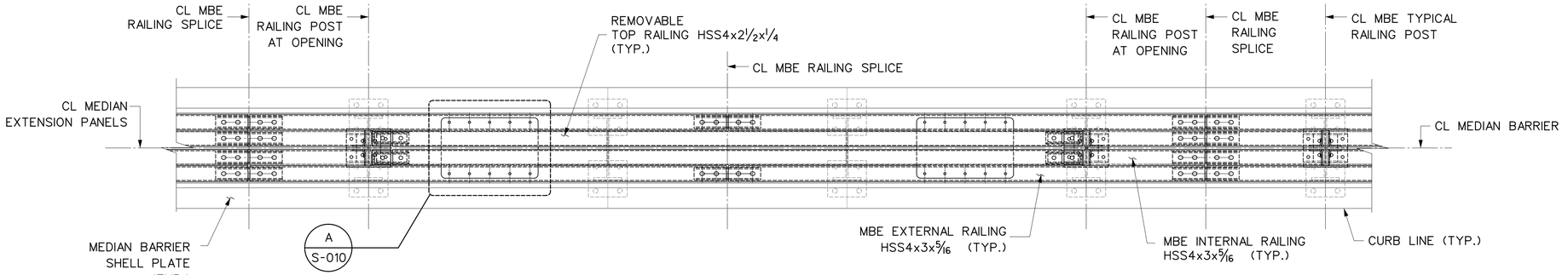
Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE
MEDIAN BARRIER EXTENSION
TYPICAL DETAILS – 2

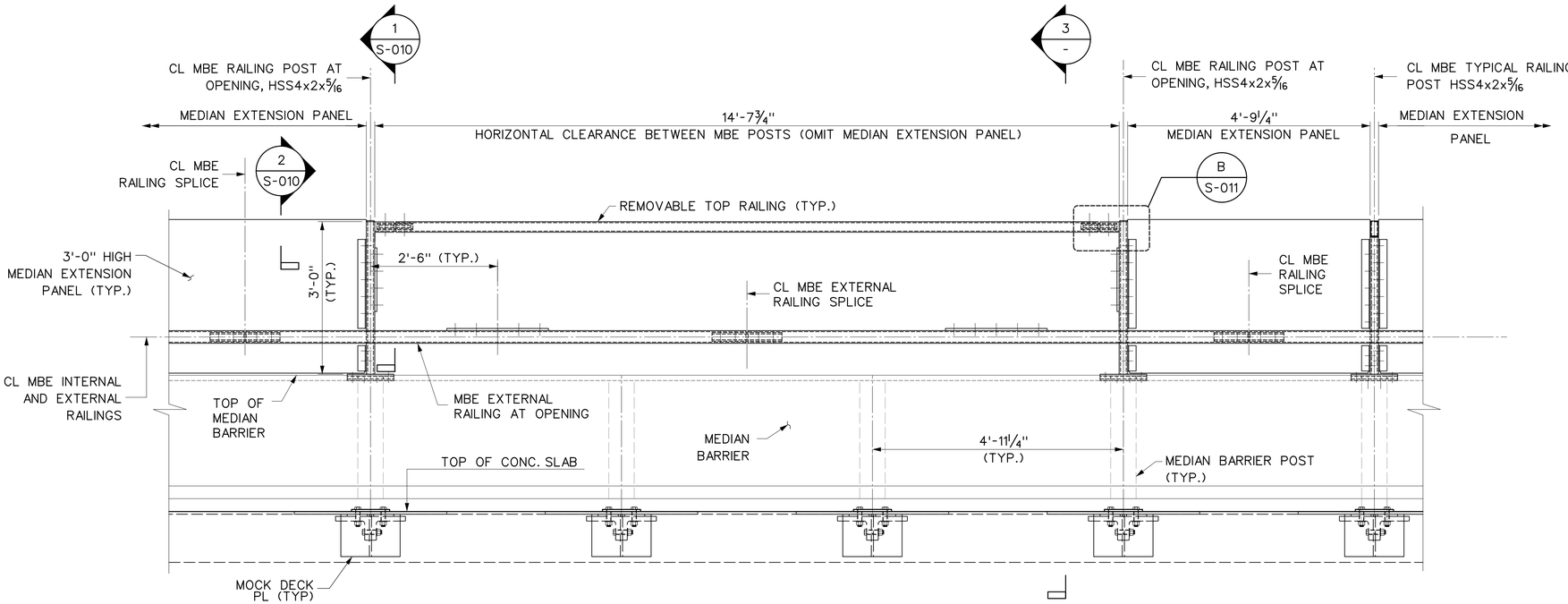
PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. S-008
SHEET 013 OF 018
DATE JUNE 5, 2019
REVISION NO. 1



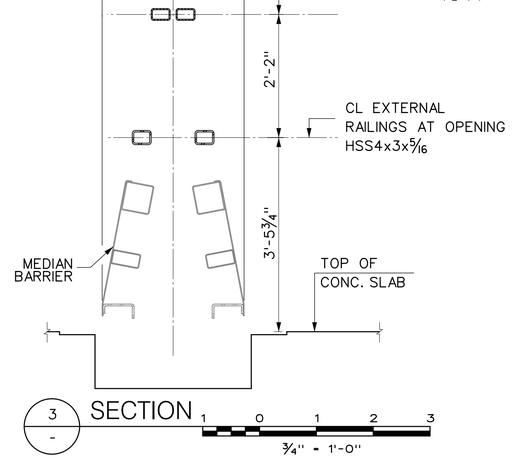
PLAN – OPENING SECTION

3/4" - 1'-0"



C G-003 ELEVATION – OPENING SECTION

3/4" - 1'-0"



3 - SECTION

3/4" - 1'-0"

NOTES:

1. FOR TYPICAL DETAILS AND MBE RAILING SPLICE SEE DWG. NOS. S-007, S-008, S-012.
2. PRIOR TO GALVANIZING, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/16".
3. EXTERNAL VENT HOLES SHALL BE DRILLED IN THE RAIL TUBES AS REQUIRED TO FACILITATE GALVANIZING AND DRAINAGE.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY G. DALY
DESIGNED BY G. DALY
CHECKED BY E. ZUKER
SCALE: 3/4" = 1-0"

HNTB

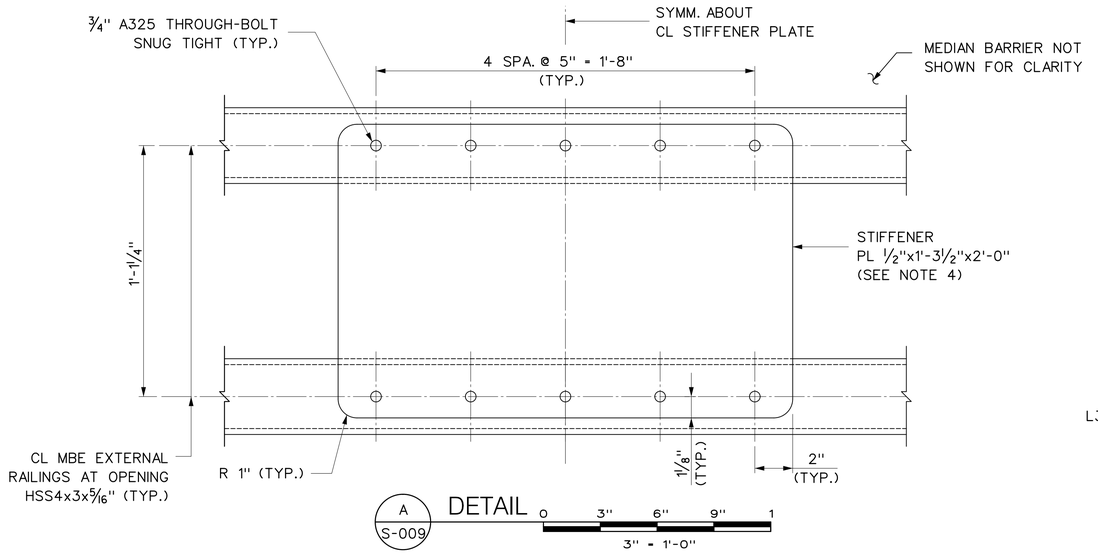
Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

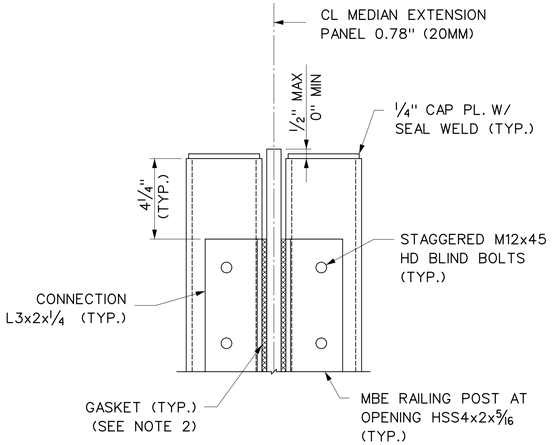
DRAWING TITLE
MEDIAN BARRIER EXTENSION OPENING FOR STANDPIPE VALVES

PROJECT NO. GFM-520H

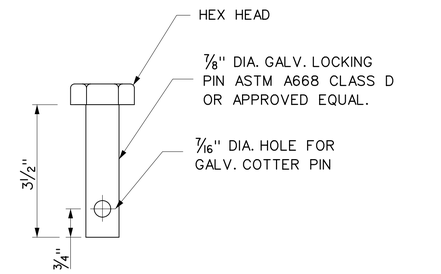
CONTRACT NO. PSC-16-2991
DRAWING NO. S-009
SHEET 014 OF 018
DATE JUNE 5, 2019
REVISION NO. 1



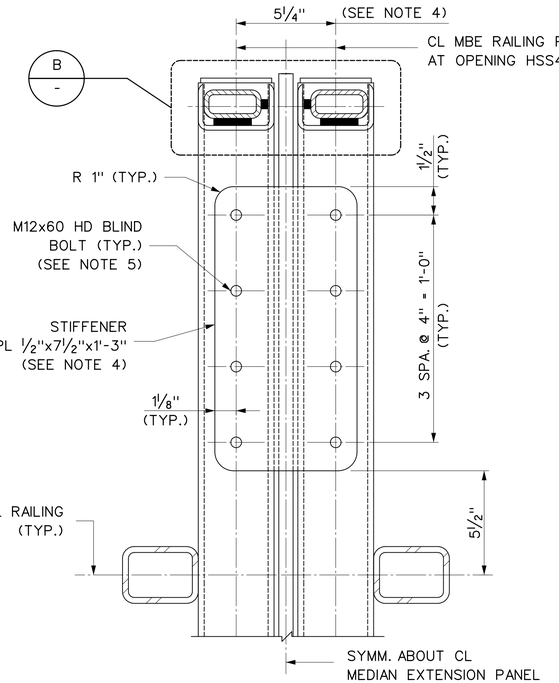
A S-009 DETAIL 0 3" 6" 9" 1
3" = 1'-0"



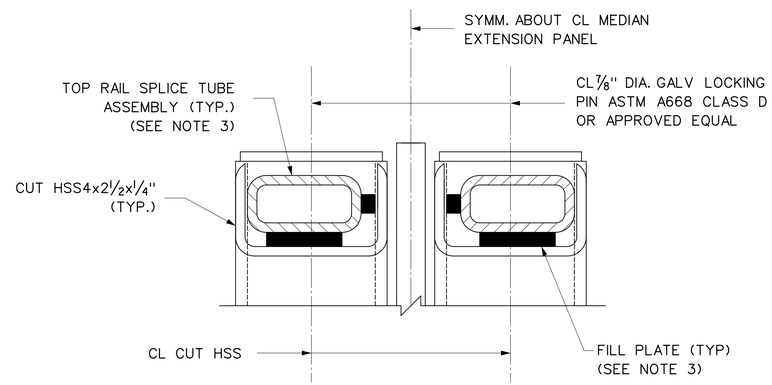
2 S-009 SECTION 0 3" 6" 9" 1
3" = 1'-0"



C - LOCKING PIN DETAIL 0 2" 4" 6"
6" = 1'-0"



1 S-009 SECTION 0 3" 6" 9" 1
3" = 1'-0"



B - DETAIL 0 2" 4" 6"
6" = 1'-0"

NOTES:

1. FOR ADDITIONAL NOTES, SEE DWG NOS. S-006 AND S-009.
2. A 70 DUROMETER EPDM GASKET OR APPROVED EQUAL SHALL BE PROVIDED AT ALL INTERFACES BETWEEN ACRYLITE PANEL AND STEEL POST CONTACT POINTS.
3. SEE DETAILS ON S-011.
4. COORDINATE PANEL GASKET THICKNESS WITH POST TRANSVERSE SPACING AND STIFFENER PLATE WIDTH.
5. COORDINATE VERTICAL STIFFENER PLATE BOLTS WITH PANEL CONNECTION ANGLE BOLTS ON REAR SIDE OF POST.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY G. DALY
DESIGNED BY G. DALY
CHECKED BY E. ZUKER
SCALE: 3" = 1'-0"

HNTB

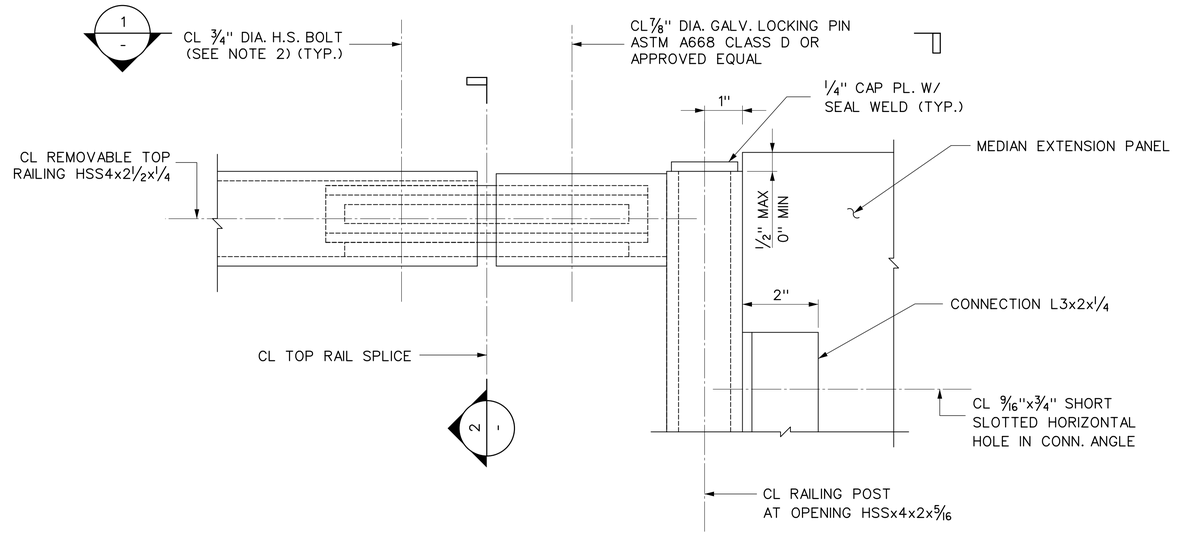
Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

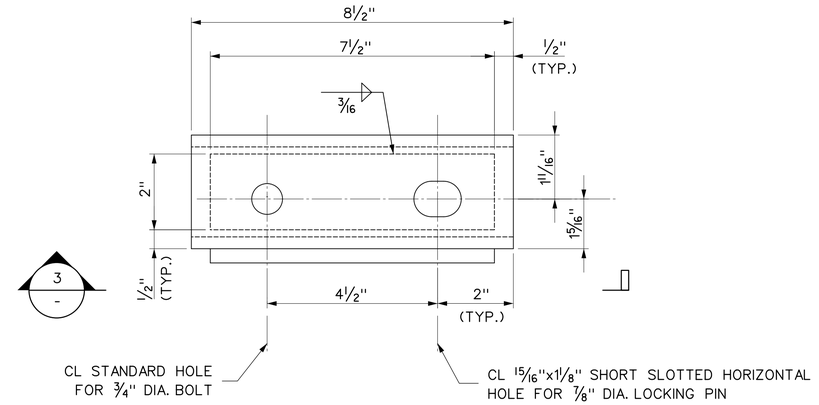
DRAWING TITLE
MEDIAN BARRIER EXTENSION DETAILS FOR STANDPIPE VALVE OPENING – 1

PROJECT NO. GFM-520H

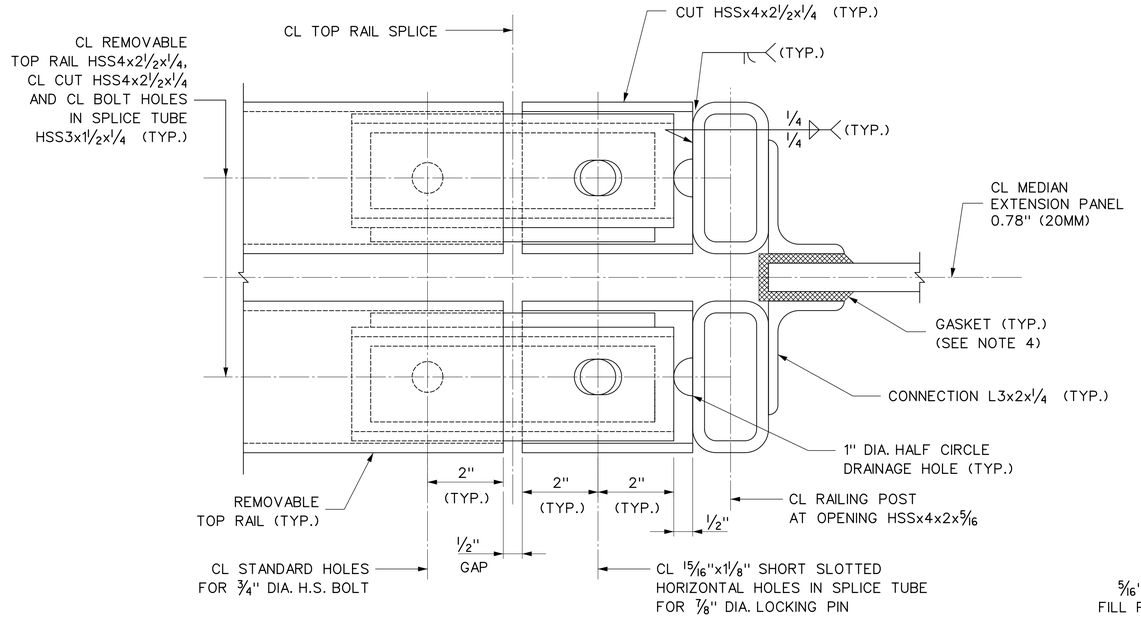
CONTRACT NO. PSC-16-2991
DRAWING NO. S-010
SHEET 015 OF 018
DATE JUNE 5, 2019
REVISION NO. 1



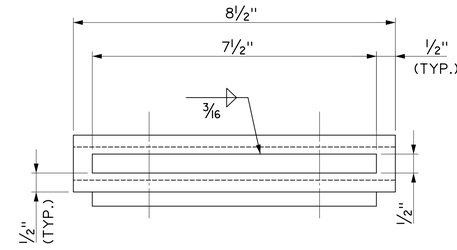
B S-009 DETAIL 0 2" 4" 6" — 6" = 1'-0"



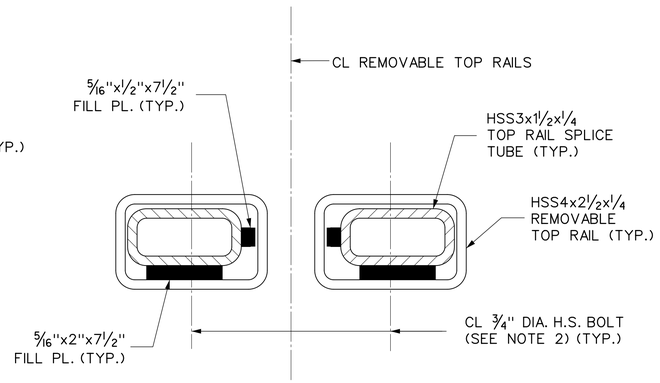
TOP RAIL SPLICE TUBE 0 2" 4" 6" — 6" = 1'-0"



1 - SECTION 0 2" 4" 6" — 6" = 1'-0"



3 - SECTION 0 2" 4" 6" — 6" = 1'-0"



2 - SECTION 0 2" 4" 6" — 6" = 1'-0"

NOTES:

1. UNLESS OTHERWISE NOTED, HIGH STRENGTH BOLTS SHALL CONFORM TO AASHTO M164, ASTM A325, TYPE 1. THREADS OF HIGH STRENGTH BOLTS SHALL BE EXCLUDED FROM SHEAR PLANES.
2. TWO WASHERS AND A HEAVY HEX NUT ON EACH BOLT, NUT TO BE FINGER TIGHT AND THE FIRST THREAD BELOW THE NUT TO BE DAMAGED A.O.B.E.
3. FOR ADDITIONAL NOTES, SEE DWG. NOS. S-006 AND S-010.
4. A 70 DUROMETER EPDM GASKET OR APPROVED EQUAL SHALL BE PROVIDED BETWEEN ACRYLITE PANEL FACE AND STEEL POST CONTACT POINTS.
5. PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE RAILINGS, SPLICE TUBES, AND FILL PLATES.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY. UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER SIGNATURE AND DATE OF ALTERATION."

DRAWN BY G. DALY
DESIGNED BY G. DALY
CHECKED BY E. ZUKER
SCALE: 3" = 1'-0"

HNTB

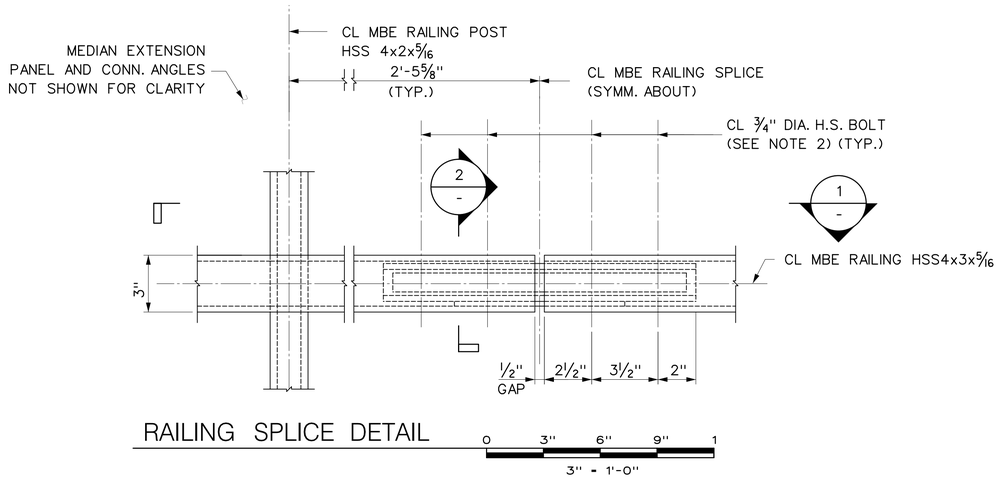
Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE
MEDIAN BARRIER EXTENSION DETAILS FOR STANDPIPE VALVE OPENING – 2

PROJECT NO. GFM-520H

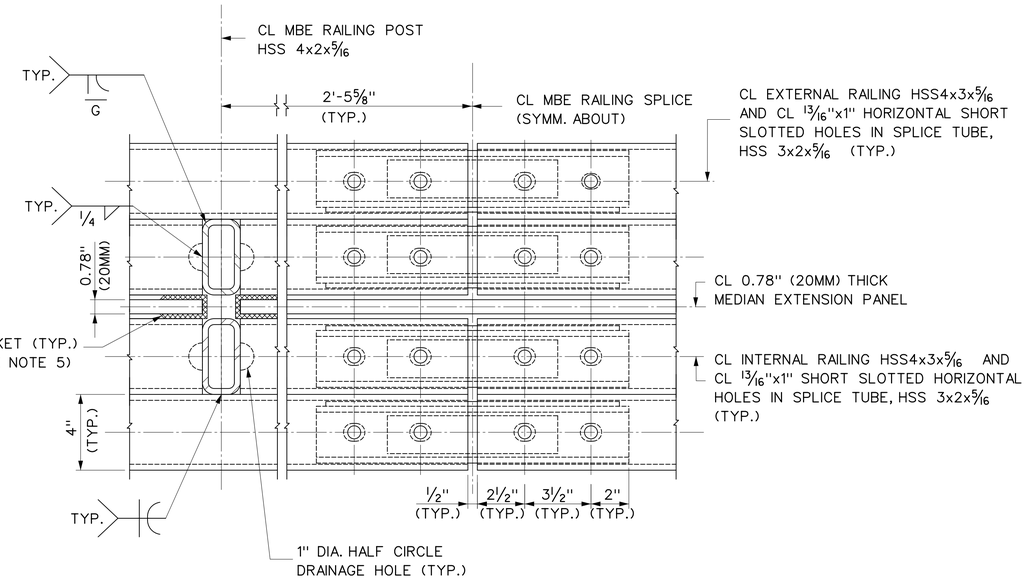
CONTRACT NO. PSC-16-2991
DRAWING NO. S-011
SHEET 016 OF 018
DATE JUNE 5, 2019
REVISION NO. 1



RAILING SPLICE DETAIL

0 3" 6" 9" 1

3" = 1'-0"

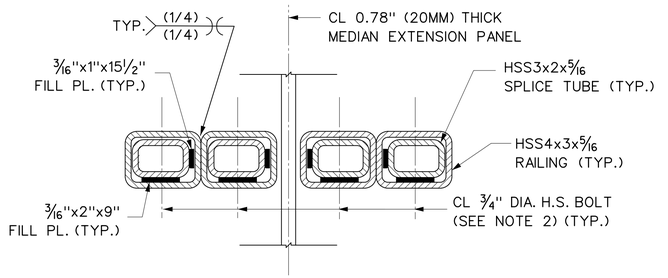


*NOTE PANEL CONN.
ANGLES NOT SHOWN
FOR CLARITY

1 - SECTION

0 3" 6" 9" 1

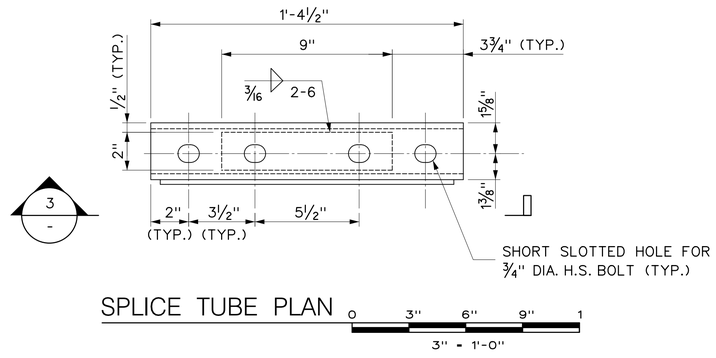
3" = 1'-0"



2 - SECTION

0 3" 6" 9" 1

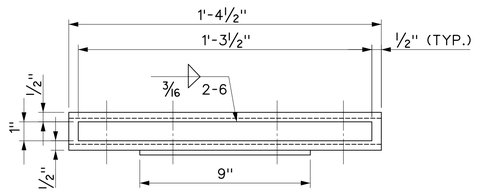
3" = 1'-0"



SPLICE TUBE PLAN

0 3" 6" 9" 1

3" = 1'-0"



3 - SECTION

0 3" 6" 9" 1

3" = 1'-0"

NOTES:

1. FABRICATOR TO ADD SPLICES WHERE DEEMED NECESSARY FOR FIT-UP.
2. TWO WASHERS AND A HEAVY HEX NUT ON EACH BOLT, NUT TO BE FINGER TIGHT AND THE FIRST THREAD BELOW THE NUT TO BE DAMAGED A.O.B.E.
3. HIGH STRENGTH BOLTS SHALL CONFORM TO AASHTO M164, ASTM A325, TYPE 1. THREADS OF HIGH STRENGTH BOLTS SHALL BE EXCLUDED FROM SHEAR PLANES.
4. FOR ADDITIONAL NOTES, SEE DWG. NO. S-006.
5. A 70 DUROMETER EPDM GASKET OR APPROVED EQUAL SHALL BE PROVIDED BETWEEN ACRYLITE PANEL FACE AND STEEL POST CONTACT POINTS.
6. PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE RAILINGS, SPLICE TUBES, AND FILL PLATES.

REV.	DESCRIPTION	DATE	APP'D.
1	AS-BUILT UPDATES	06/05/19	GPD

DRAWN BY G. DALY
DESIGNED BY G. DALY
CHECKED BY E. ZUKER
SCALE: 3" = 1'-0"

HNTB

Triborough Bridge and Tunnel Authority

MISCELLANEOUS DESIGN SERVICES ON AN AS-NEEDED BASIS – TASK ORDER 21
CRASH TEST FABRICATION DRAWINGS

DRAWING TITLE
MEDIAN BARRIER EXTENSION
TYPICAL SPLICE DETAILS

PROJECT NO. GFM-520H

CONTRACT NO. PSC-16-2991
DRAWING NO. S-012
SHEET 017 OF 018
DATE JUNE 5, 2019
REVISION NO. 1