



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

September 30, 2020

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

In Reply Refer To:
HSST-1/B-349

Mr. Samuel Summerville
Thornton Tomasetti, Inc.
40 Wall Street
New York, NY 10005
USA

Dear Mr. Summerville:

This letter is in response to your June 12, 2020 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-349 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:

- Throgs Neck 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: Throgs Neck Bridge Rail
Type of system: Longitudinal Barrier
Test Level: MASH Test Level 5 (TL5)
Testing conducted by: Texas A&M Transportation Institute (TTI)
Date of request: June 12, 2020

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

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-349 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
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	June 12, 2020	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	Samuel Summerville	
	Company:	Thornton Tomasetti, Inc.	
	Address:	40 Wall Street, New York, NY 10005	
	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)	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	Throgs Neck Bridge Rail	AASHTO MASH	TL5

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:	Edmond Knightly	Same as Submitter <input type="checkbox"/>
Company Name:	MTA Bridges and Tunnels	Same as Submitter <input type="checkbox"/>
Address:	4260 Throgs Neck Expressway, Bronx, NY 10465	Same as Submitter <input type="checkbox"/>
Country:	USA	Same as Submitter <input type="checkbox"/>

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

Texas A&M Transportation Institute (TTI) was contracted by MTA Bridges and Tunnels and Thornton Tomasetti, Inc. to perform full-scale crash testing of the Throgs Neck Bridge Rail. There are no shared financial interests in the Throgs Neck Bridge Rail by TTI, or between/among MTA Bridges and Tunnels and Thornton Tomasetti, Inc. and TTI, other than compensation of costs involved in the actual crash tests and reports for this submission to FHWA. Thornton Tomasetti holds no financial interests in the testing of the Throgs Neck Bridge Rail. Thornton Tomasetti does not benefit from the Throgs Neck Bridge Rail manufacture or future use, and will be compensated for their work by MTA Bridges and Tunnels regardless of acceptance by FHWA.

610921-01-1,2,3

PRODUCT DESCRIPTION

Help	
<p> <input checked="" type="radio"/> New Hardware or Significant Modification <input type="radio"/> Modification to Existing Hardware </p> <p> The test installation was a bridge rail, comprised of four HSS tubular rails, with the top and bottom rail each being 5 x 3 x 1/2 inch and the two middle rails each being 6 x 6 x 3/8 inch. The top of the uppermost of the four rails was 3 ft-6 inches from the top of the asphalt overlay, with 6-inch vertical spacings between the rails. The rails were supported by 29 posts, of which, 11 were installed on a 50 ft-10 inches long orthotropic steel deck, 4 were installed on a concrete beam foundation adjacent to the steel deck on the upstream side, and 14 were installed on a concrete beam foundation adjacent to the downstream side of the steel deck. The posts were spaced at 4 ft-11 1/4 inches on the steel deck, with some variations in spacing for the posts at either end on the concrete beam foundations. Total installation length was 136 ft 3 inches. The orthotropic steel deck was overlaid with a 2-inch thick lift of asphalt. </p> <p style="text-align: center;">CRASH TESTING</p> <p> 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. </p>	
Engineer Name:	Nauman Sheikh
Engineer Signature:	<div style="display: flex; align-items: center;"> <div style="font-size: 24pt; font-weight: bold; margin-right: 10px;">Nauman Sheikh</div> <div style="font-size: 12pt; margin-left: 10px;"> Digitally signed by Nauman Sheikh Date: 2020.06.11 13:06:43 -05'00' </div> </div>
Address:	1254 Avenue A, Bldg 7091, Bryan, Texas 77807 Same as Submitter <input type="checkbox"/>
Country:	USA Same as Submitter <input type="checkbox"/>

A brief description of each crash test and its result:

[Help](#)


Required Test Number	Narrative Description	Evaluation Results
5-10 (1100C)	<p>Test 5-10 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 splice between Posts 7 & 8.</p> <p>The results of the test conducted on February 3, 2020, are found in TTI Test Report No. 610921-01. The test vehicle was traveling at a speed of 63.4 mi/h as it made contact with the Throgs Neck Bridge Rail 3.3 ft upstream of the splice between Posts 7 & 8 and at an impact angle of 25.1°. After loss of contact with the bridge rail, the vehicle came to rest 201 ft downstream of the impact point and 16 ft toward the field side.</p> <p>The Throgs Neck Bridge Rail contained and redirected the 1100C vehicle. The vehicle did not penetrate, underide, or override the installation. The vehicle exited within the exit box criteria defined in MASH.</p> <p>Maximum dynamic deflection of the rail during the test was 0.7 inch. No permanent deformation was observed. Working width was 16 inches.</p> <p>No detached elements, fragments, or other debris were present to penetrate, or to show potential for penetrating, the occupant compartment, or to present undue hazard for others in the area.</p> <p>The 1100C vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 9° and 16°, respectively.</p> <p>Longitudinal OIV was 21.3 ft/s and lateral OIV was 35.1 ft/s.</p> <p>Maximum longitudinal occupant ridedown acceleration was 4.1 g, and maximum lateral occupant ridedown acceleration was 13.3 g. Occupant risk factors were within the maximum limits specified in MASH.</p> <p>Maximum exterior crush to the vehicle was 12.0 inches in the side plane in the front plane at the left front corner at bumper height. Maximum occupant compartment deformation was 2.25 inches in the right front floor pan area.</p> <p>The Throgs Neck Bridge Rail performed acceptably for MASH test 5-10.</p>	PASS

Required Test Number	Narrative Description	Evaluation Results
5-11 (2270P)	<p>Test 5-11 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 splice between Posts 7 & 8.</p> <p>The results of the test conducted on February 7, 2020, are found in TTI Test Report No. 610921-01. The test vehicle was traveling at a speed of 63.8 mi/h as it made contact with the Throgs Neck Bridge Rail 4.2 ft upstream of the splice between Posts 7 & 8 and at an impact angle of 25.5°. After loss of contact with the bridge rail, the vehicle came to rest 206 ft downstream of the impact point and 5 ft toward the field side.</p> <p>The Throgs Neck Bridge Rail contained and redirected the 2270P vehicle. The vehicle did not penetrate, underide, or override the installation. The vehicle exited within the exit box criteria defined in MASH.</p> <p>Maximum dynamic deflection during the test was 1.45 inches. No permanent deformation was observed. Working width was 16 inches.</p> <p>No detached elements, fragments, or other debris were present to penetrate, or to show potential for penetrating, the occupant compartment, or to present undue hazard for others in the area.</p> <p>The 2270P vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 18° and 10°, respectively. Longitudinal OIV was 24.3 ft/s and lateral OIV was 33.5 ft/s. Maximum longitudinal occupant ridedown acceleration was 5.9 g and maximum lateral occupant ridedown acceleration was 12.0 g. Occupant risk factors were within the maximum limits specified in MASH.</p> <p>Maximum exterior crush to the vehicle was 16.0 inches in the side plane at the right front corner at bumper height. Maximum occupant compartment deformation was 3.25 inch in the right side firewall area.</p> <p>The Throgs Neck Bridge Rail performed acceptably for MASH test 5-11.</p>	PASS

5-12 (36000V)	<p>Test 5-12 involves a 36000V vehicle impacting the test article at a target impact speed of 50 mi/h and target angle of 15°. The target CIP for the right corner of the front bumper was 1.0 ft downstream of splice between Posts 7 & 8.</p> <p>The results of the test conducted on March 2, 2020, are found in TTITest Report No. 610921-01. The test vehicle was traveling at a speed of 50.8 mi/h as it made contact with the Throgs Neck Bridge Rail 4.3 inches downstream of the splice between Posts 7 & 8 at an impact angle of 14.1°. After loss of contact with the bridge rail, the vehicle came to rest 288 ft downstream of the impact point and 28 ft toward the traffic lanesside.</p> <p>The Throgs Neck Bridge Rail contained and redirected the 36000V vehicle. The vehicle did not penetrate, underide, or override the installation. The vehicle exited within the exit box criteria defined in MASH.</p> <p>Maximum dynamic deflection during the test was 1.4 inches. Maximum permanent deformation was 1.25 inches. Working width was 41.3 inches.</p> <p>No detached elements, fragments, or other debris were present to penetrate or to show potential for penetrating the occupant compartment, or to present undue hazard for others in the area.</p> <p>The 36000V vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 10° and 50°, respectively.</p> <p>Longitudinal OIV was 2.3 ft/s, and lateral OIV was 9.8 ft/s. Maximum longitudinal occupant ridedown acceleration was 9.5 g, and maximum lateral occupant ridedown acceleration was 29.4 g.</p> <p>Maximum exterior crush to the vehicle was 16.0 inches in the side plane at the right front corner at bumper height. No occupant compartment deformation was observed.</p> <p>The Throgs Neck Bridge Rail performed acceptably for MASH test 5-12.</p>	PASS
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5-20 (1100C)	Tests for transition is not applicable for this bridge rail barrier system	Non-Relevant Test, not conducted
5-21 (2270P)	Tests for transition is not applicable for this bridge rail barrier system	Non-Relevant Test, not conducted
5-22 (36000V)	Tests for transition is not applicable for this bridge rail barrier system	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: 2020.06.11 13:41:48 -05'00' 	
Address:	1254 Avenue A, Bldg 7091, Bryan, Texas 77807	Same as Submitter <input type="checkbox"/>
Country:	USA	Same as Submitter <input type="checkbox"/>
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*: Samuel
Summerville

Digitally signed by Samuel
Summerville
Date: 2020.07.01 14:53:30 -04'00'

Submit Form

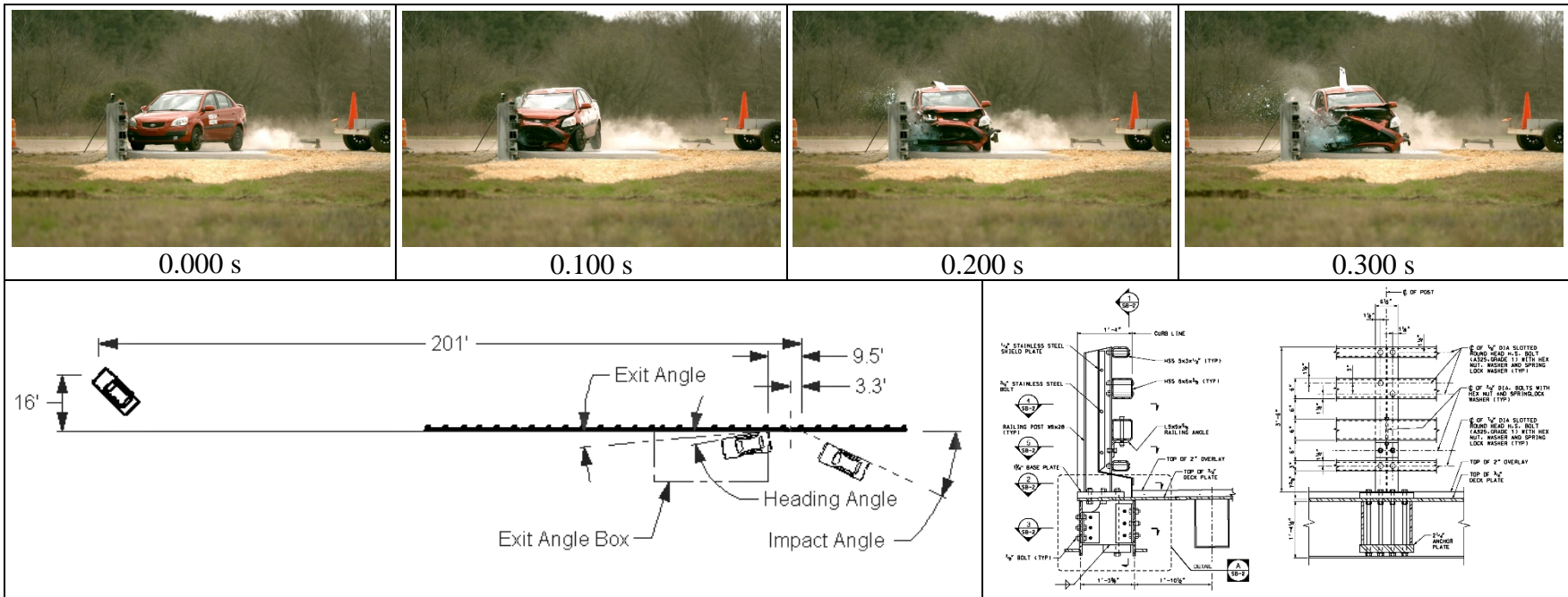
ATTACHMENTS

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



General Information

Test Agency..... Texas A&M Transportation Institute (TTI)
 Test Standard Test No. MASH Test 5-10
 TTI Test No. 610921-01-1
 Test Date 2020-02-03

Test Article

Type Longitudinal Barrier – Bridge Rail
 Name Throgs Neck Bridge Rail
 Installation Length..... 136 ft-3 inches
 Material or Key Elements ... Four HSS square tubing, top and bottom rails 5 x 3 x 1/2 inches and two middle rails 6 x 6 x 3/8 inches supported by steel posts

Soil Type and Condition

Steel orthotropic deck with asphalt overlay, Dry

Test Vehicle

1100C
 Type/Designation..... 2009 Kia Rio
 Make and Model 2435 lb
 Curb..... 2440 lb
 Test Inertial..... 165 lb
 Dummy 2605 lb
 Gross Static

Impact Conditions

Speed 63.4 mi/h
 Angle 25.1°
 Location/Orientation 3.3 ft upstream of splice btw posts 7&8

Impact Severity

59 kip-ft

Exit Conditions

Speed 50.8 mi/h
 Trajectory/Heading Angle... 7.2° / 7.2°

Occupant Risk Values

Longitudinal OIV 21.3 ft/s
 Lateral OIV 35.1 ft/s
 Longitudinal Ridedown 4.1 g
 Lateral Ridedown 13.3 g
 THIV 12.3 m/s
 ASI..... 2.81 g

Max. 0.050-s Average

Longitudinal -12.2 g
 Lateral..... -21.6 g
 Vertical..... 3.2 g

Post-Impact Trajectory

Stopping Distance..... 201 ft downstream
 16 ft twd field side

Vehicle Stability

Maximum Yaw Angle 39°
 Maximum Pitch Angle 16°
 Maximum Roll Angle 9°
 Vehicle Snagging..... No
 Vehicle Pocketing No

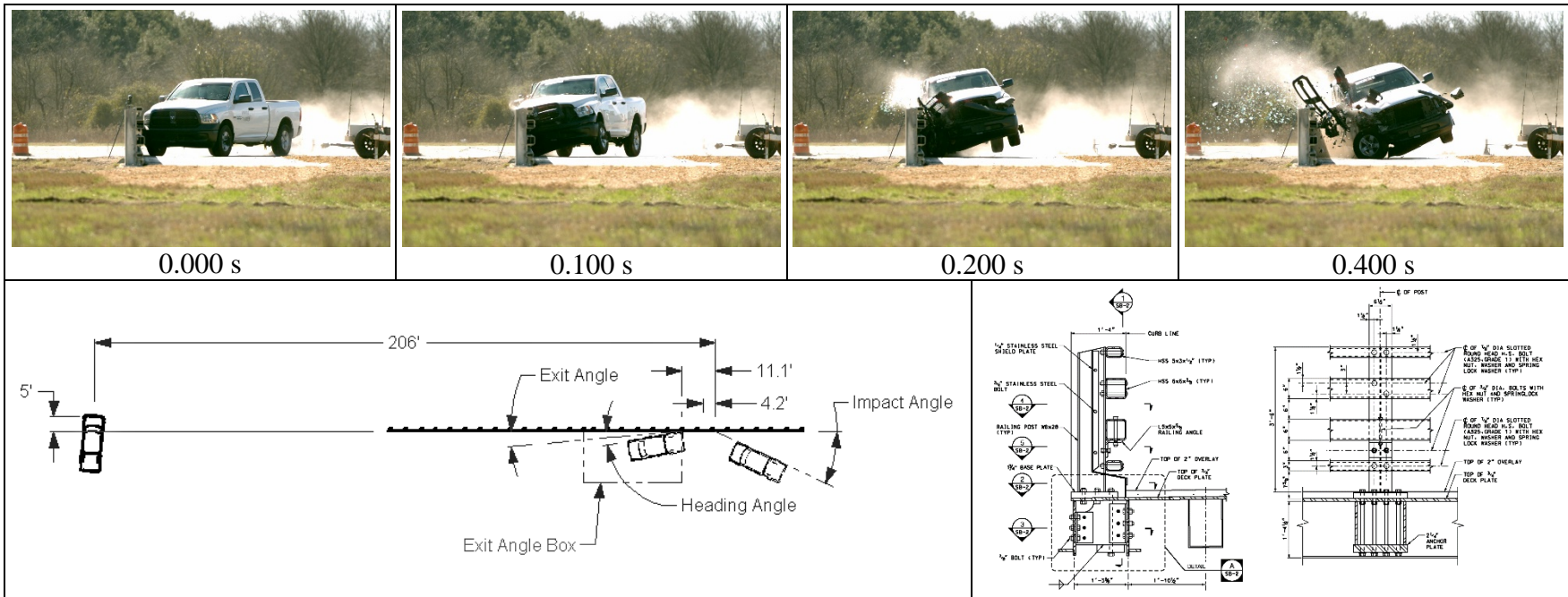
Test Article Deflections

Dynamic..... 0.7 inch
 Permanent None
 Working Width..... 16.0 inches
 Height of Working Width 1.75 inches

Vehicle Damage

VDS 01RFQ5
 CDC..... 01FREW4
 Max. Exterior Deformation..... 12.0 inches
 OCDI..... FR0100000
 Max. Occupant Compartment Deformation 2.25 inches

Figure 5.6. Summary of Results for MASH Test 5-10 on Throgs Neck Bridge Rail.



General Information

Test Agency..... Texas A&M Transportation Institute (TTI)
 Test Standard Test No. MASH Test 5-11
 TTI Test No. 610921-01-2
 Test Date 2020-02-07

Test Article

Type Longitudinal Barrier – Bridge Rail
 Name Throgs Neck Bridge Rail
 Installation Length..... 136 ft-3 inches
 Material or Key Elements ... Four HSS square tubing, top and bottom rails 5 x 3 x 1/2 inches and two middle rails 6 x 6 x 3/4 inches supported by steel posts
 Soil Type and Condition Steel orthotropic deck with asphalt overlay, Dry

Test Vehicle

Type/Designation..... 2270P
 Make and Model 2014 RAM 1500 Pickup Truck
 Curb..... 5008 lb
 Test Inertial..... 5064 lb
 Dummy 165 lb
 Gross Static 5229 lb

Impact Conditions

Speed 63.8 mi/h
 Angle 25.5°
 Location/Orientation 4.2 ft upstream of splice btw posts 7&8

Impact Severity

..... 128 kip-ft

Exit Conditions

Speed 51.2 mi/h
 Trajectory/Heading Angle... 6.7° / 13.7°

Occupant Risk Values

Longitudinal OIV 24.3 ft/s
 Lateral OIV 33.5 ft/s
 Longitudinal Ridedown 5.9 g
 Lateral Ridedown 12.0 g
 THIV 12.5 m/s
 ASI..... 2.54

Max. 0.050-s Average

Longitudinal -13.6 g
 Lateral..... -18.9 g
 Vertical..... 3.2 g

Post-Impact Trajectory

Stopping Distance..... 206 ft downstream
 5 ft twd field side

Vehicle Stability

Maximum Yaw Angle 44°
 Maximum Pitch Angle 10°
 Maximum Roll Angle 18°
 Vehicle Snagging..... No
 Vehicle Pocketing No

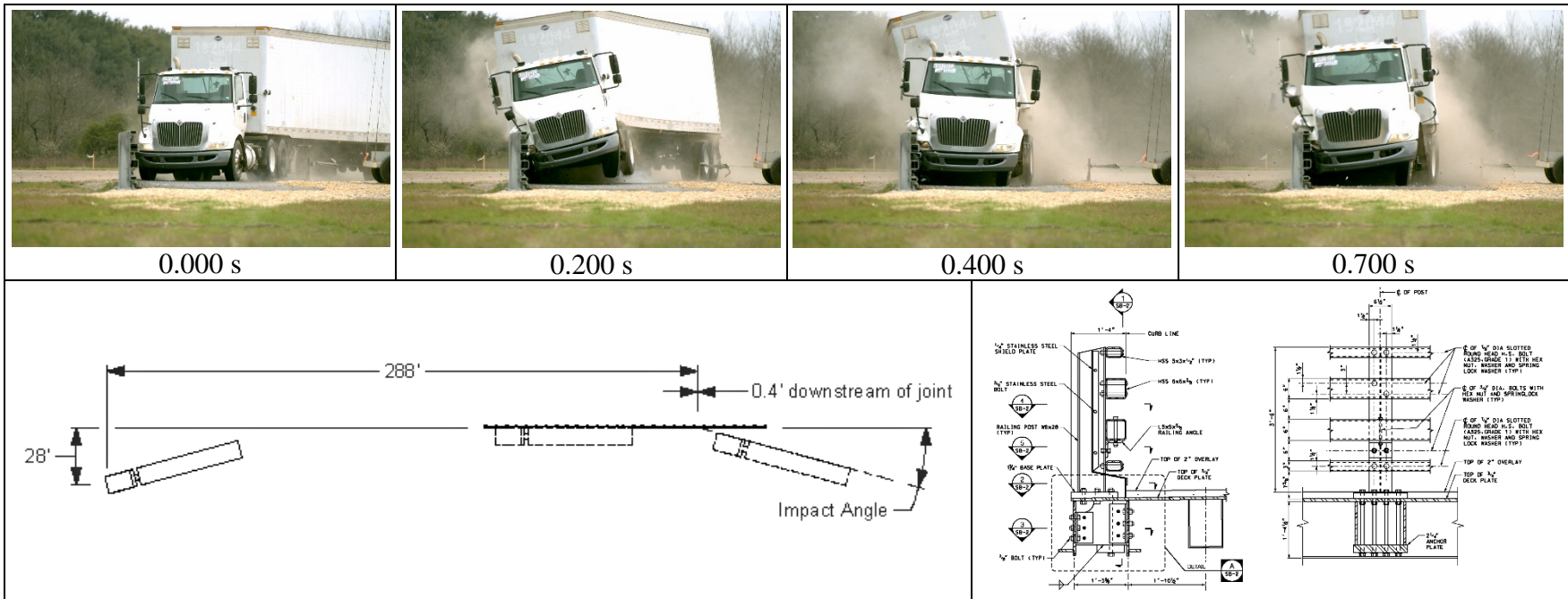
Test Article Deflections

Dynamic..... 1.45 inches
 Permanent None
 Working Width..... 16.0 inches
 Height of Working Width 1.75 inches

Vehicle Damage

VDS 01RFQ5
 CDC..... 01FREW4
 Max. Exterior Deformation..... 16.0 inches
 OCDI..... FR0020000
 Max. Occupant Compartment Deformation 3.25 inches

Figure 6.6. Summary of Results for MASH Test 5-11 on Throgs Neck Bridge Rail.



General Information

Test Agency..... Texas A&M Transportation Institute (TTI)
 Test Standard Test No. MASH Test 5-12
 TTI Test No. 610921-01-3
 Test Date 2020-03-02

Test Article

Type Longitudinal Barrier – Bridge Rail
 Name Throgs Neck Bridge Rail
 Installation Length..... 136 ft-3 inches
 Material or Key Elements . Four HSS square tubing, top and bottom rails 5 x 3 x 1/2 inches and two middle rails 6 x 6 x 3/8 inches supported by steel posts
 Soil Type and Condition ... Steel orthotropic deck with asphalt overlay, Dry

Test Vehicle

Type/Designation..... 36000V
 Make and Model 2006 International 8600 w/2002 53-ft Trailer
 Curb..... 29,270 lb
 Test Inertial..... 80,230 lb
 Dummy No dummy
 Gross Static 80,230 lb

Impact Conditions

Speed 50.8 mi/h
 Angle 14.1°
 Location/Orientation 4.3 inches dwnstrm of splice btwn 7 & 8

Impact Severity

..... 411 kip-ft

Exit Conditions

Speed Not obtainable
 Trajectory/Heading Angle... Not obtainable

Occupant Risk Values

Longitudinal OIV 2.3 ft/s
 Lateral OIV 9.8 ft/s
 Longitudinal Ridedown 9.5 g
 Lateral Ridedown 29.4 g
 THIV 1.8 m/s
 ASI..... 1.53

Max. 0.050-s Average

Longitudinal 3.7 g
 Lateral..... -11.5 g
 Vertical..... 10.1 g

Post-Impact Trajectory

Stopping Distance..... 288 ft downstream
 28 ft twd traffic lanes

Vehicle Stability

Maximum Yaw Angle 27°
 Maximum Pitch Angle 50°
 Maximum Roll Angle 10°
 Vehicle Snagging..... No
 Vehicle Pocketing No

Test Article Deflections

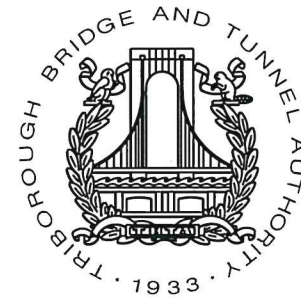
Dynamic..... 1.44 inches
 Permanent 1.25 inches
 Working Width..... 41.3 inches
 Height of Working Width 125.1 inches

Vehicle Damage

VDS NA
 CDC..... NA
 Max. Exterior Deformation..... 16.0 inches
 OCDI..... NA
 Max. Occupant Compartment Deformation None

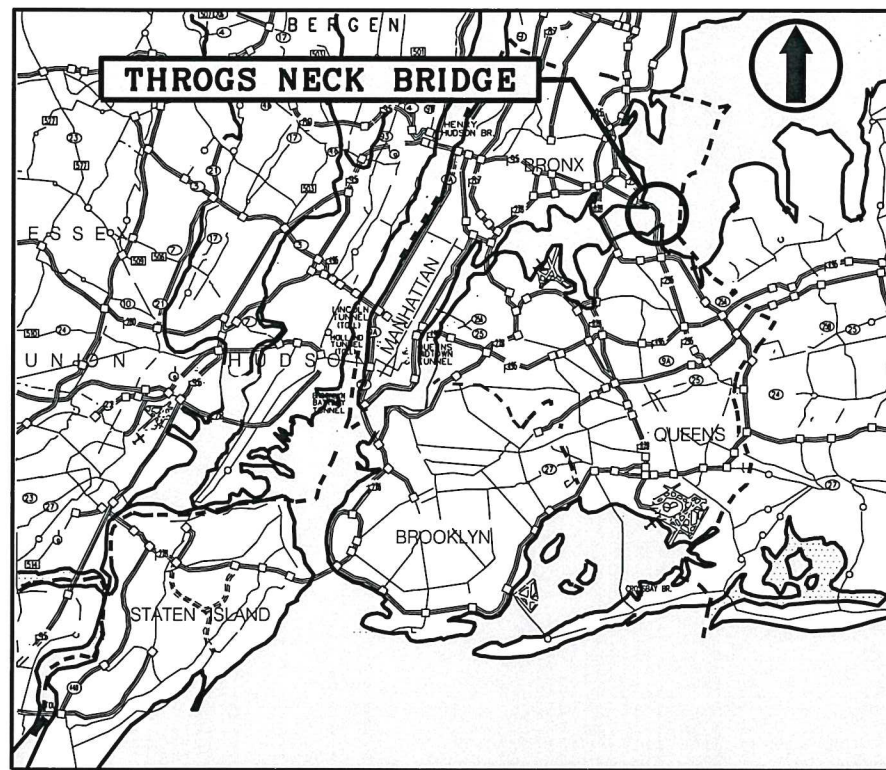
Figure 7.6. Summary of Results for MASH Test 5-12 on Throgs Neck Bridge Rail.

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY

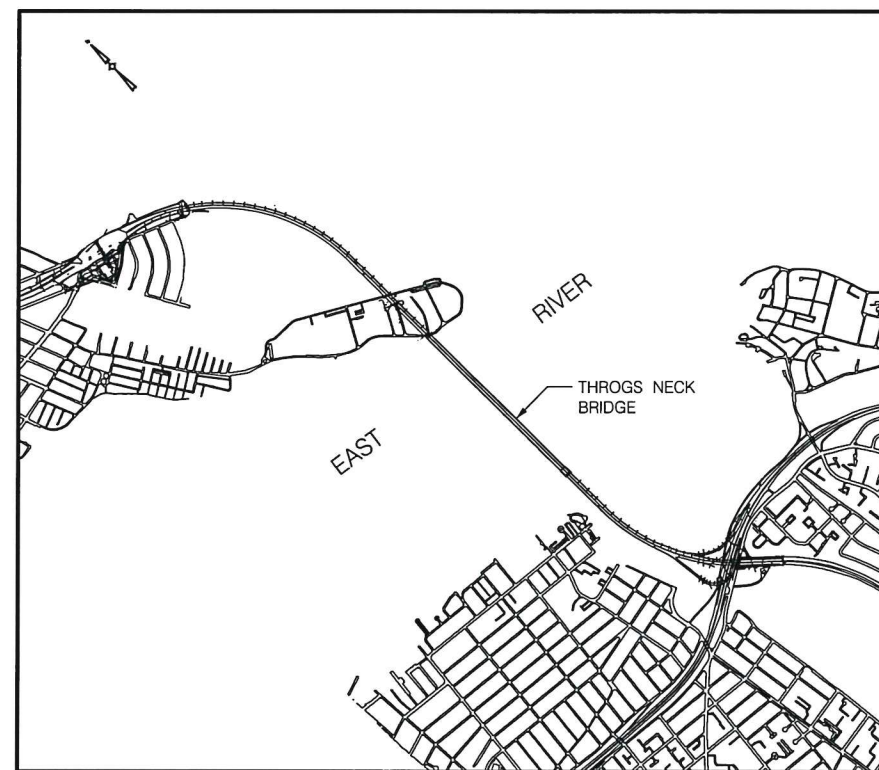


PROJECT GFM-520N, WORK ORDER #14 BARRIER CRASH TESTING FOR PROJECT TN-49

JULY 6, 2018



LOCATION PLAN
N.T.S.



KEY PLAN
N.T.S.

PREPARED BY: **Thornton Tomasetti**
40 WALL STREET, NEW YORK, NY 10005

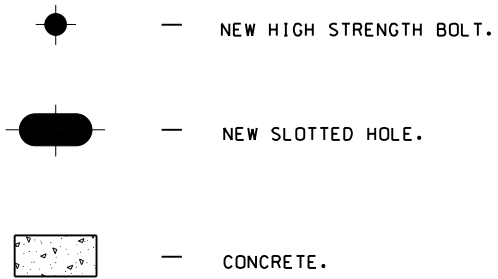
SAMUEL SUMMERVILLE, P.E.
PRINCIPAL - THORNTON TOMASETTI

7/26/18
DATE

DRAWING LIST

SHEET NO.	DWG. NO.	REV. NO.	DRAWING TITLE
GENERAL			
1	G-1	0	TITLE SHEET AND LOCATION PLAN
2	G-2	0	DRAWING LIST, SYMBOLS AND ABBREVIATIONS
3	G-3	0	GENERAL NOTES
STRUCTURAL			
4	S-1	0	ORTHOTROPIC DECK PANEL AND RAILING PLAN
5	S-2	0	FLOOR TRUSS DETAILS - 1
6	S-3	0	FLOOR TRUSS DETAILS - 2
7	S-4	0	LONGITUDINAL TRUSS DETAILS
8	S-5	0	DIAPHRAGM DETAILS - 1
9	S-6	0	DIAPHRAGM DETAILS - 2
10	SB-1	0	STEEL RAILING DETAILS - 1
11	SB-2	0	STEEL RAILING DETAILS - 2
12	SB-3	0	STEEL RAILING DETAILS - 3

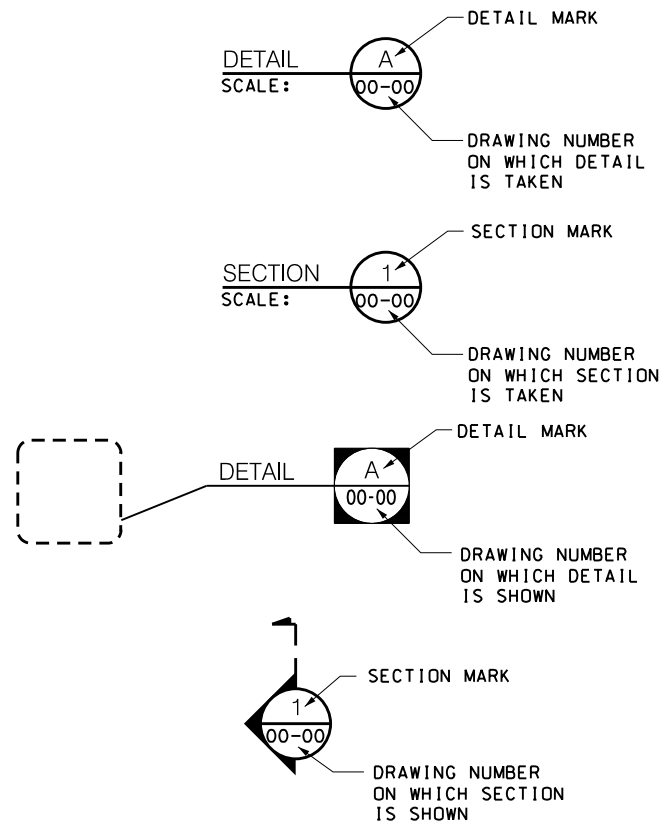
SYMBOLS



ABBREVIATIONS

ABT	-- ABOUT	NO	-- NUMBER
ANCH	-- ANCHORAGE	NOM	-- NOMINAL
AOBE	-- AS ORDERED BY ENGINEER	NS	-- NEAR SIDE
ASTM	-- AMERICAN SOCIETY OF TESTING MATERIALS	NTS	-- NOT TO SCALE
B TO B / BB	-- BACK TO BACK	OC	-- ON CENTER
BF	-- BACK FACE	OSL	-- OUTSTANDING LEG
BOT	-- BOTTOM	OPNG	-- OPENING
BRG	-- BEARING	OPP	-- OPPOSITE
BS	-- BOTH SIDES	PC	-- PIECE
BTWN	-- BETWEEN	PL	-- PLATE
C TO C / CC	-- CENTER TO CENTER	PP	-- PANEL POINT
CANT	-- CANTILEVER	PPGW	-- PARTIAL PENETRATION GROOVE WELD
CHD	-- CHORD	PTFE	-- POLYTETRAFLUOROETHYLENE
CI	-- CAST IRON	EXTER	-- EXTERIOR
CL	-- CENTER LINE	INTER	-- INTERIOR
CLR	-- CLEAR	LG	-- LENGTH
COL	-- COLUMN	PVC	-- POLYVINYLCHLORIDE
CONC	-- CONCRETE	PVMT	-- PAVEMENT
CONN	-- CONNECTION	R / RAD	-- RADIUS
CONSTR	-- CONSTRUCTION	RC	-- REINFORCED CONCRETE
CONT	-- CONTINUOUS	RDWY	-- ROADWAY
CORR	-- CORRUGATED	REF	-- REFERENCE
CPGW	-- COMPLETE PENETRATION GROOVE WELD	REINF	-- REINFORCEMENT
CTSK	-- COUNTERSUNK	REOD	-- REQUIRED
DET	-- DETAIL	RJT	-- RELIEF JOINT
DIA	-- DIAMETER	SDWK	-- SIDEWALK
DIAPH	-- DIAPHRAGM	SECT	-- SECTION
DWG	-- DRAWING	SP / SPA	-- SPACE / SPACING
ED	-- END DIAPHRAGM	SPL	-- SPLICE
EFC	-- ELECTRICAL	SQ	-- SQUARE
ELEV / EL	-- ELEVATION	SST	-- STAINLESS STEEL
EQ	-- EQUAL	STIFF	-- STIFFENER
EXIST / EXST	-- EXISTING	STL	-- STEEL
EXP	-- EXPANSION	STR / STRG	-- STRINGER
F	-- FAHRENHEIT	SYMM	-- SYMMETRICAL
FF	-- FRONT FACE	TBTA	-- TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY
FL	-- FLOOR	THD	-- THREAD
FLBM	-- FLOORBEAM	THRD	-- THREADED
FLG	-- FLANGE	THK	-- THICK
FS	-- FAR SIDE	THRU	-- THROUGH
FUT	-- FUTURE	TP	-- TURNING POINT
GALV	-- GALVANIZED	TYP	-- TYPICAL
HEX	-- HEXAGONAL	UON / UN	-- UNLESS OTHERWISE NOTED
HORIZ	-- HORIZONTAL	VERT	-- VERTICAL
HS	-- HIGH STRENGTH	WP	-- WORKING POINT
JT	-- JOINT	W/	-- WITH
MAX	-- MAXIMUM		
MIN	-- MINIMUM		
MOD	-- MODIFIED		
MPT	-- MAINTENANCE AND PROTECTION OF TRAFFIC		
NA	-- NOT APPLICABLE		
NIC	-- NOT IN CONTRACT		

LEGENDS FOR SECTION MARKS



DRAWN BY P. MANAYATH				Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	Triborough Bridge and Tunnel Authority	DRAWING TITLE		CONTRACT NO. GFM-520N
DESIGNED BY L. HERBERT						DRAWING LIST, SYMBOLS AND ABBREVIATIONS		DRAWING NO. G-2
CHECKED BY C. CLARK								SHEET 2 OF 12
REV.	DESCRIPTION	DATE	APP'D.	SCALE: NONE	PROJECT NO. GFM-520N, WORK ORDER #14		DATE JULY 6, 2018	REVISION NO. 0

"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."

D
C
B
A

GENERAL :

1. THE SCOPE OF WORK IN THE PROJECT CONSISTS OF THE FOLLOWING
 - A. FABRICATION OF DECK PANEL AND 4 RAIL STEEL BARRIER.
 - B. OBTAIN SERVICES OF A SHOP INSPECTION AGENCY, ACCEPTED BY THE ENGINEER, TO WITNESS, INSPECT, AND CERTIFY THAT ALL STRUCTURAL STEEL FURNISHED HAS BEEN FABRICATED IN ACCORDANCE WITH REQUIREMENTS STIPULATED BY CONTRACT DOCUMENT AND SPECIFICATIONS.
 - C. DELIVERY OF ORTHOTROPIC DECK AND SUPPORTS, 4 RAIL STEEL BARRIER, BOLTS, ANCHORS, AND PLATES TO TESTING FACILITY.
2. IF THE CONTRACTOR DAMAGES ANY EQUIPMENT OR MATERIALS WHICH ARE TO REMAIN IN PLACE OR ARE THE PROPERTY OF THE TESTING FACILITY, DAMAGED MATERIAL SHALL BE REPAIRED OR REPLACED IN A MANNER SATISFACTORY TO THE TESTING FACILITY AT THE EXPENSE OF THE CONTRACTOR.
3. THE CONTRACTOR SHALL PROMPTLY REMOVE ALL EXCESS MATERIALS, CONSUMERABLES AND TOOLS FROM THE TESTING FACILITY AFTER COMPLETION OF THE WORK.
4. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE TESTING FACILITY FOR ACCESS, POSSIBLE OBSTRUCTIONS, AND STAGING AREAS BEFORE FABRICATION OF DECK PANELS AND SUPPORTING FRAMES.
5. DESIGN SPECIFICATIONS:
 - A. NYS DOT LRFD BRIDGE DESIGN SPECIFICATIONS WITH ALL PROVISIONS IN EFFECT AS OF OCTOBER 2014.
 - B. NY STATE STEEL CONSTRUCTION MANUAL (NYSSCM) AND ADDENDUMS OCTOBER 2013.
 - C. NYS DOT BRIDGE DESIGN MANUAL 4TH EDITION WITH CURRENT ADDENDUM.
 - D. AASHTO/AWS D1.5-2015 BRIDGE WELDING CODE.
 - E. AASHTO/17TH EDITION.


STRUCTURAL STEEL :

1. MATERIALS SHALL CONFORM WITH THE FOLLOWING, UNLESS OTHERWISE NOTED
 - A. ORTHOTROPIC DECK STEEL ASTM A709, GRADE 50T, ZONE 2 CVN TOUGHNESS
 - B. STRUCTURAL TUBES STEEL ASTM A500, GRADE 46B.
 - C. BARRIER TUBES STEEL ASTM A500, GRADE 46B, GALVANIZED
 - D. BARRIER POSTS STEEL ASTM A709, GRADE 50, GALVANIZED
 - E. ALL OTHER STRUCTURAL STEEL STEEL ASTM A709, GRADE 50
 - F. H.S. BOLTS ASTM F3125 GR A325, TYPE 1, GALVANIZED
 - G. NUTS ASTM A563; WASHERS ASTM F436, GALVANIZED
2. ALL FASTENERS SHALL BE 7/8" DIAMETER AND SHALL INCLUDE HEAVY HEXAGONAL NUTS AND HARDENED WASHER UNDER THE PART TURNED, UNLESS OTHERWISE NOTED. ALL FASTENERS SHALL NOT BE REUSED.
3. ALL CONNECTIONS SHALL BE SLIP-CRITICAL UNLESS OTHERWISE NOTED.
4. UNLESS OTHERWISE NOTED, ALL ANCHOR BOLTS SHALL BE HILTI KWIK BOLT TZ EXPANSION ANCHORS OR APPROVED EQUAL.
5. EXCEPT AS REQUIRED ON THE PLANS AND IN THE SPECIFICATIONS, WELDING SHALL CONFORM TO THE NYS DOT STEEL CONSTRUCTION MANUAL, LATEST EDITION INCLUDING CURRENT ADDENDA AND SPECIFICATIONS. WELDING SHALL ONLY BE ON STEEL MEMBERS PROVIDED BY THE CONTRACTOR. WELD TO STEEL PROVIDED BY THE TESTING FACILITY SHALL NOT BE ALLOWED UNLESS APPROVED BY THE ENGINEER.
6. FILLET WELD SIZES NOT INDICATED SHALL BE 5/16" MINIMUM.
7. ALL WELDS SHALL BE MADE WITH MATCHING FILLER MATERIAL, PROVIDING ZONE 2 CVN TOUGHNESS IN THE "AS WELDED CONDITION".
8. ALL WELDS SHALL BE MADE BY CERTIFIED WELDERS AND SHALL CONFORM TO AWS D1.5 UNLESS NOTED OTHERWISE. ALL WELDS SHALL DEVELOP THE FULL STRENGTH OF THE MEMBERS OR COMPONENTS BEING CONNECTED UNLESS NOTED OTHERWISE.
9. ALL WELDS SHALL BE 100% VISUALLY INSPECTED. FILLET WELDS SHALL RECEIVE 20% MT.

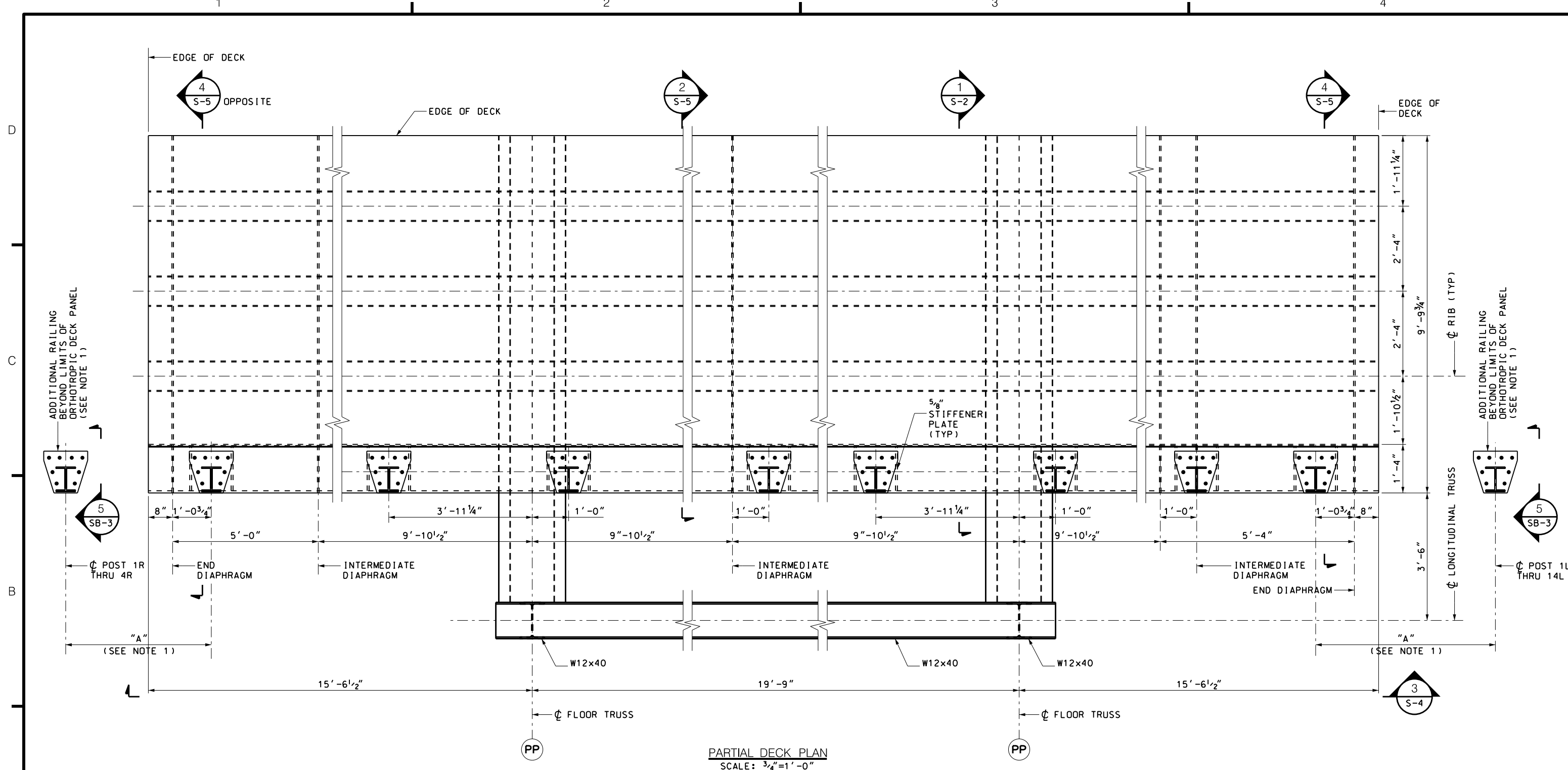
HANDLING AND STORAGE MATERIALS :

1. THE TESTING FACILITY AND CONTRACTOR ARE RESPONSIBLE FOR THE HANDLING AND STORAGE OF ALL CONSTRUCTION MATERIALS, INCLUDING ALL STEEL PIECES SUPPLIED BY THE STEEL FABRICATOR.
2. ALL STEEL PIECES SHALL BE KEPT COVERED, CLEAN, AND DRY WHILE STORED.

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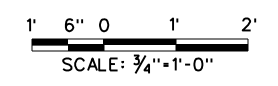
				DRAWN BY P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK	Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	 Triborough Bridge and Tunnel Authority	DRAWING TITLE GENERAL NOTES	CONTRACT NO. GFM-520N DRAWING NO. G-3 SHEET 3 OF 12
REV.	DESCRIPTION	DATE	APP'D.	SCALE: NONE				PROJECT NO. GFM-520N, WORK ORDER #14

"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."

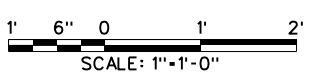
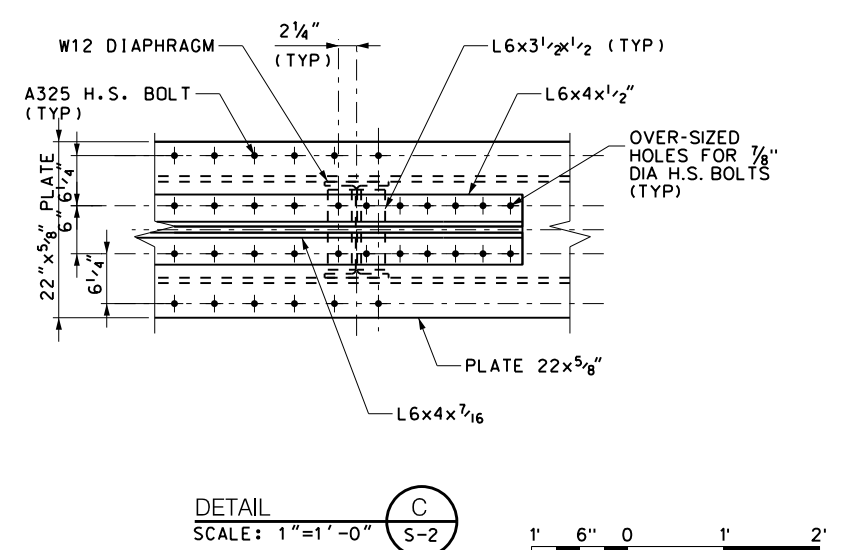
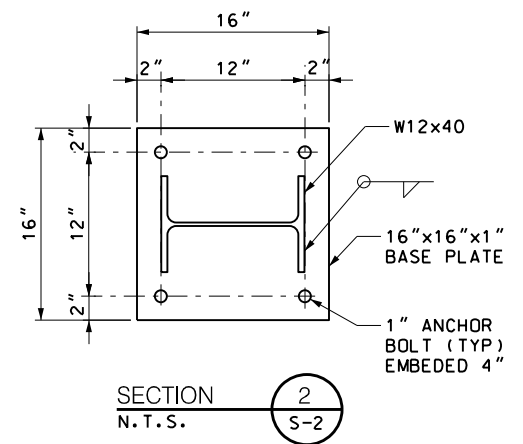
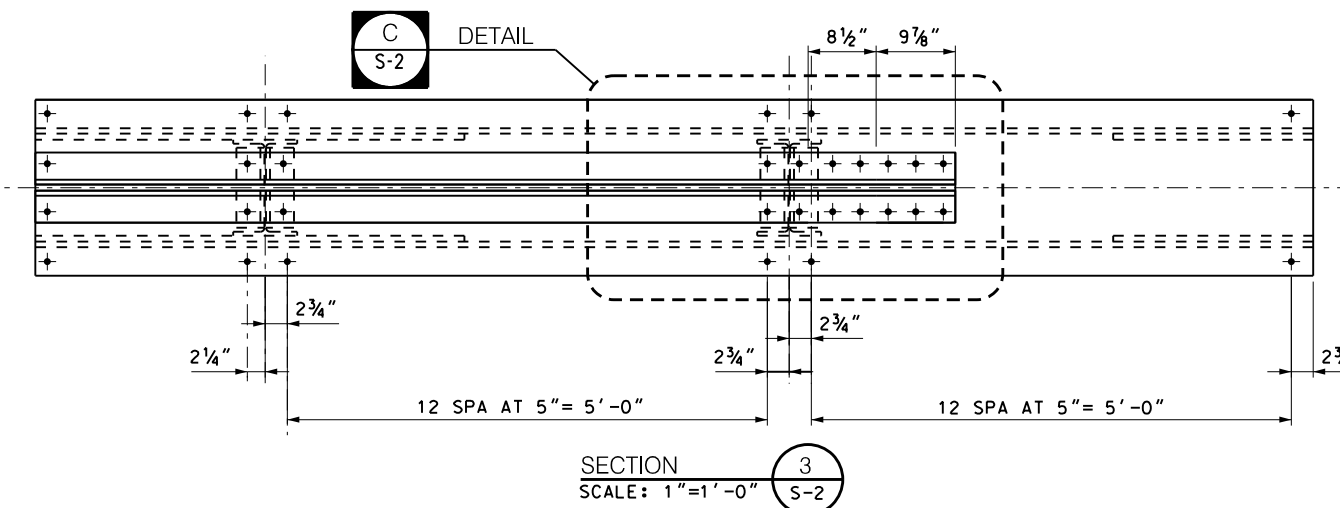
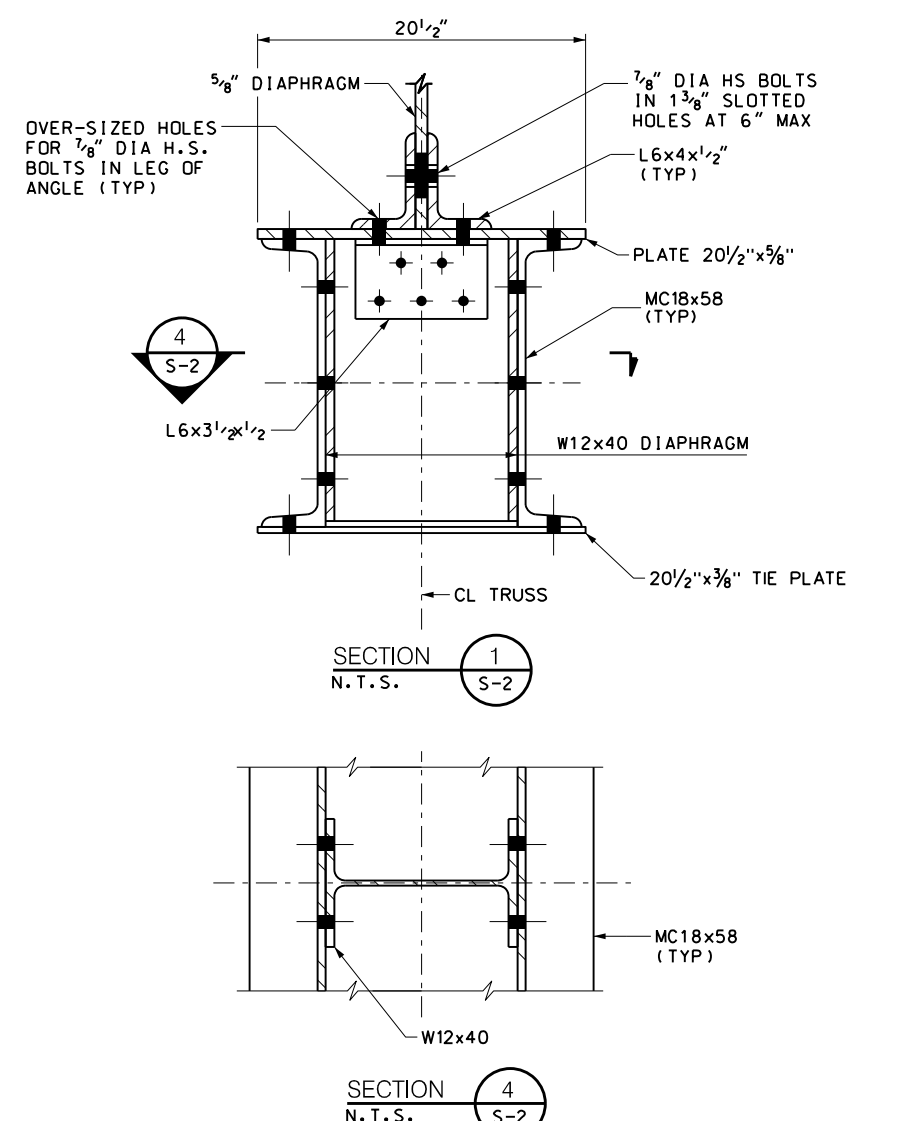
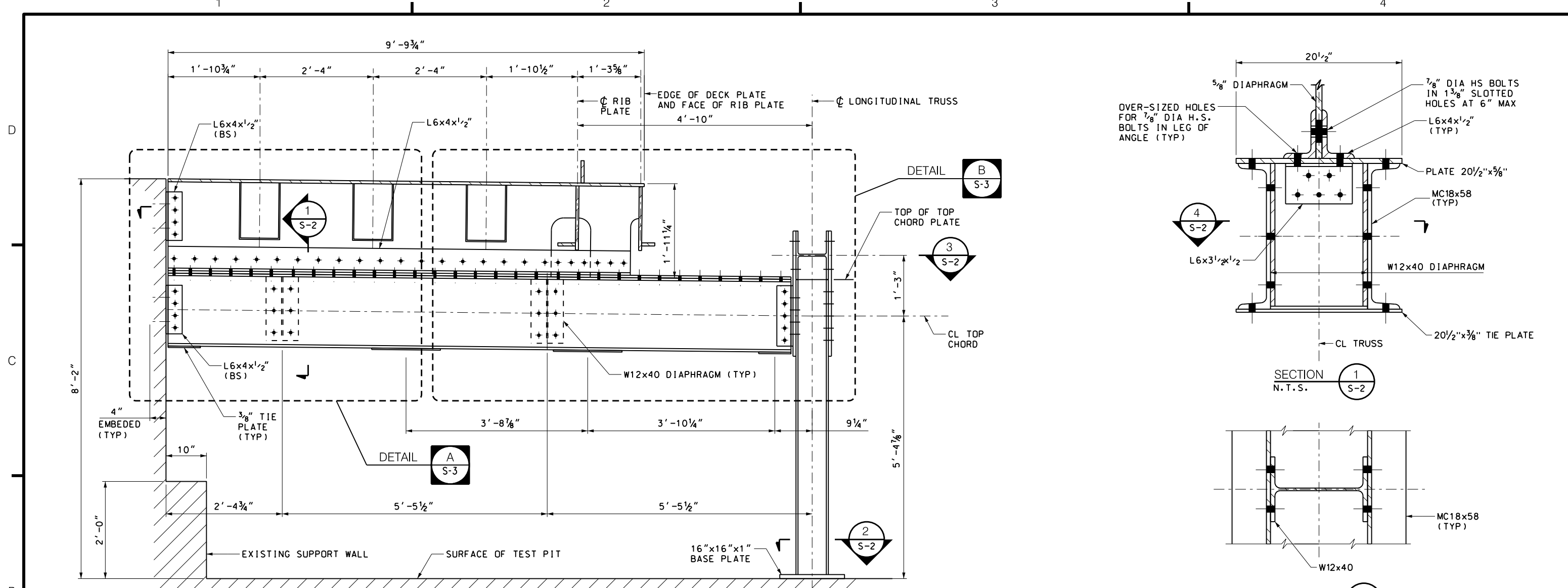


PARTIAL DECK PLAN
SCALE: 3/4"=1'-0"

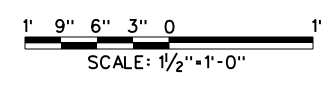
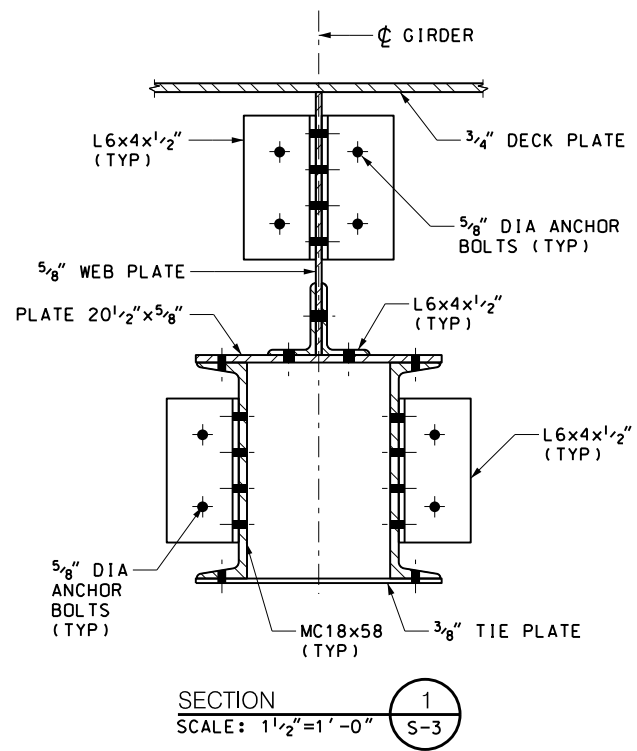
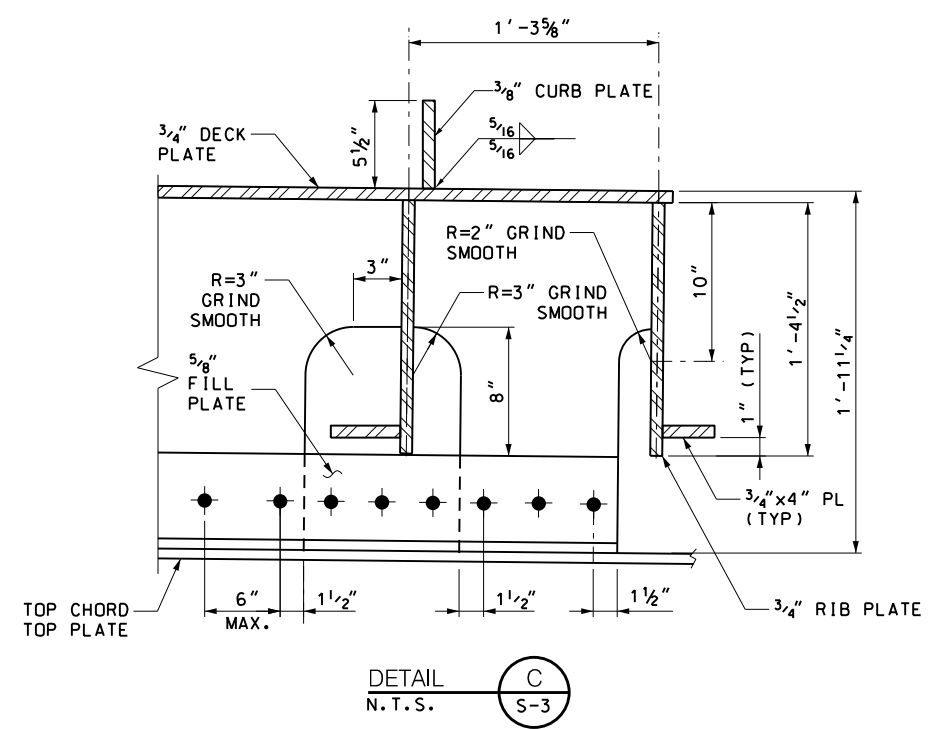
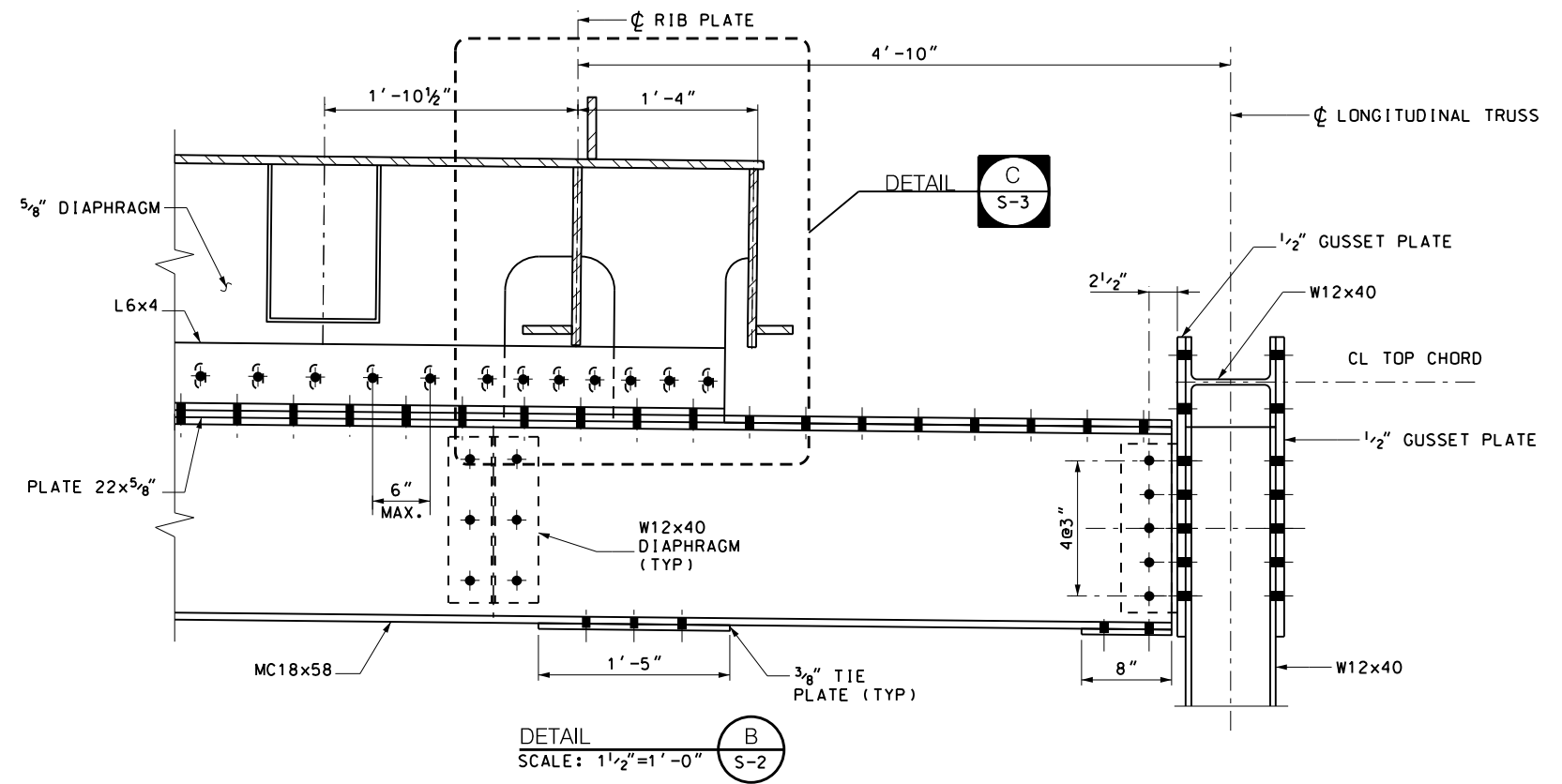
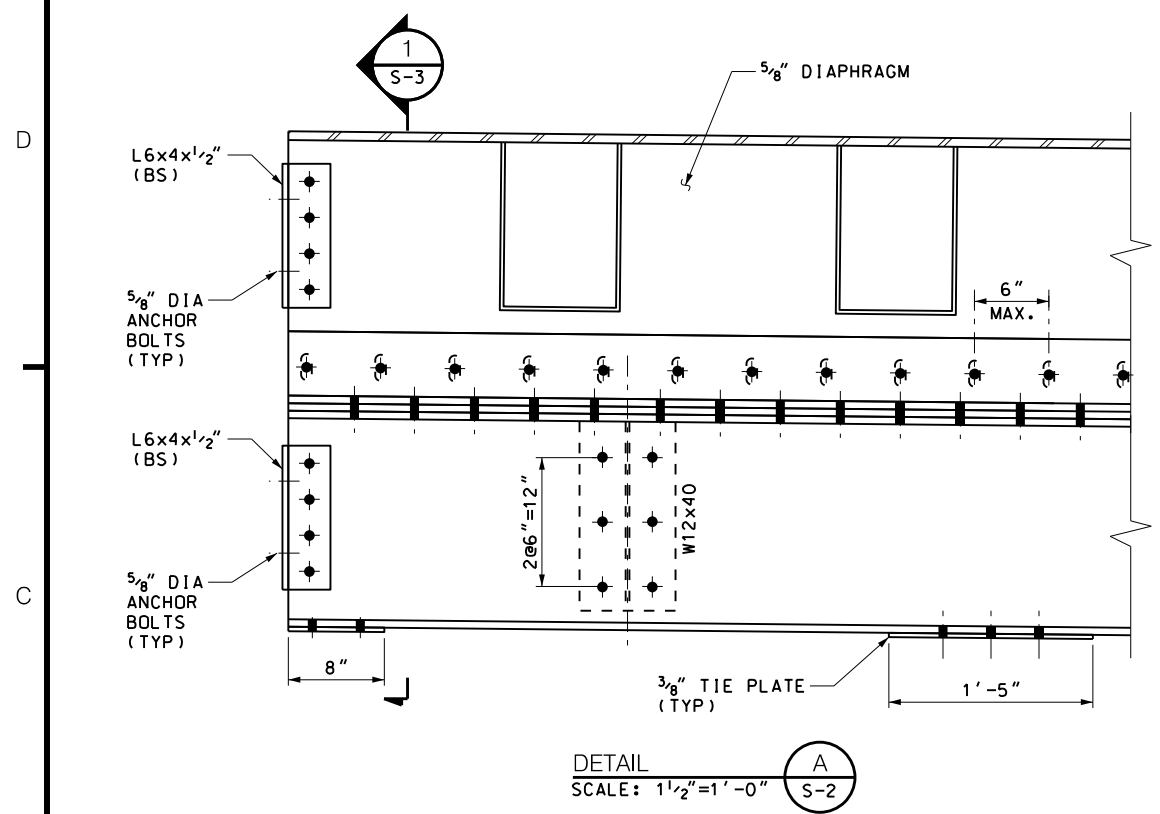
- NOTES:
1. FOR POST LOCATION AND INSTALLATION TYPE, SEE TABLE 1 ON DWG. NO. SB-4.



DRAWN BY P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK SCALE: 3/4"=1'-0"				Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005		Triborough Bridge and Tunnel Authority BARRIER CRASH TESTING FOR PROJECT TN-49		DRAWING TITLE ORTHOTROPIC DECK PANEL AND RAILING PLAN PROJECT NO. GFM-520N, WORK ORDER #14		CONTRACT NO. GFM-520N DRAWING NO. S-1 SHEET 4 OF 12 DATE JULY 6, 2018 REVISION NO. 0	
REV.	DESCRIPTION	DATE	APP'D.	"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 P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK SCALE: AS NOTED				Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005		Triborough Bridge and Tunnel Authority		DRAWING TITLE FLOOR TRUSS DETAILS - I		CONTRACT NO. GFM-520N DRAWING NO. S-2 SHEET 5 OF 12 DATE JULY 6, 2018 REVISION NO. 0	
REV. DESCRIPTION DATE APP'D.				PROJECT NO. GFM-520N, WORK ORDER #14		BARRIER CRASH TESTING FOR PROJECT TN-49					
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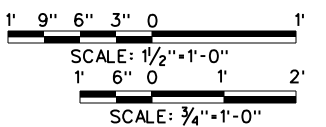
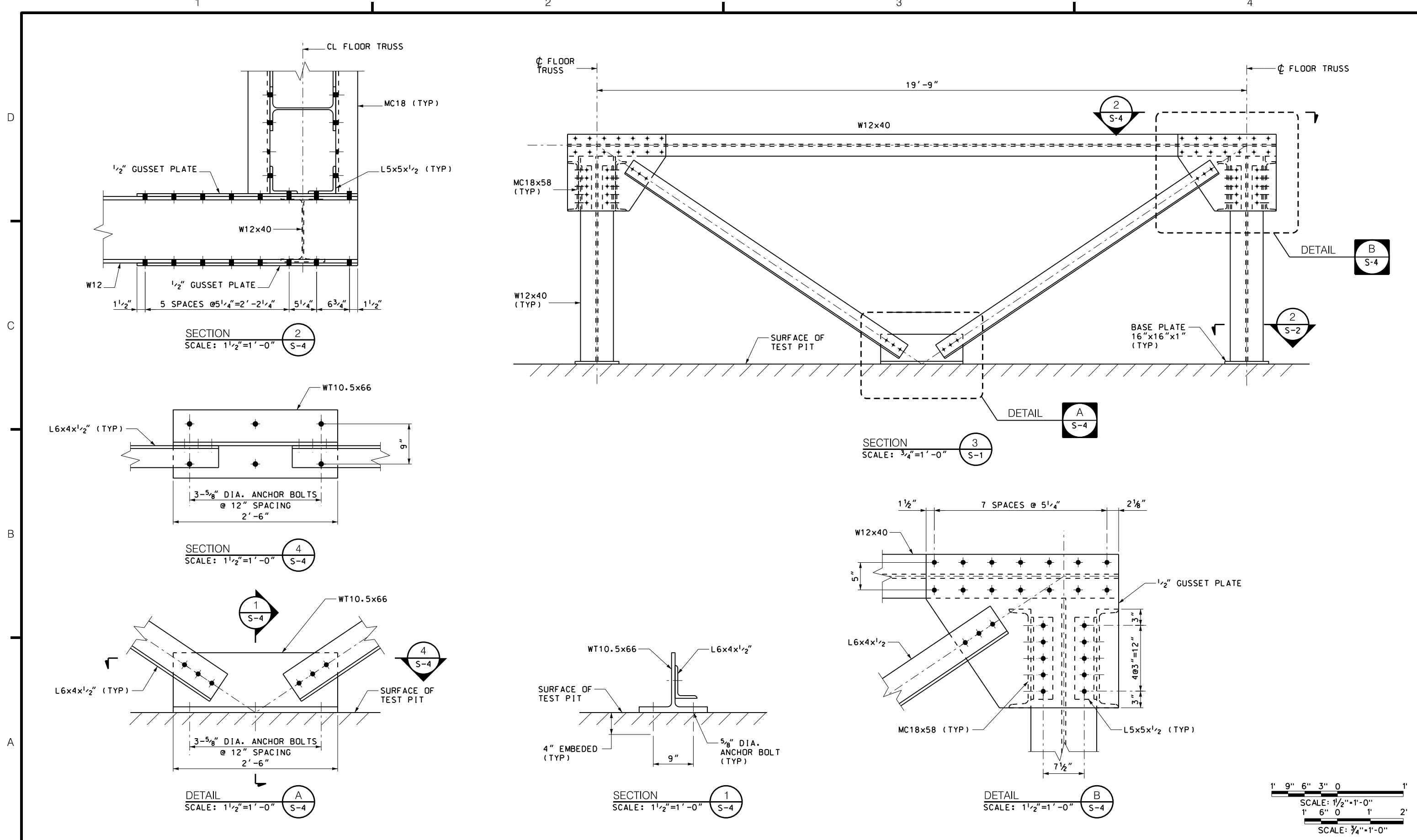
REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
				C. CLARK
DRAWN BY P. MANAYATH				SCALE: AS NOTED
DESIGNED BY L. HERBERT				

Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005



BARRIER CRASH TESTING
FOR PROJECT TN-49

DRAWING TITLE	CONTRACT NO.
FLOOR TRUSS DETAILS - 2	GFM-520N
PROJECT NO.	DRAWING NO.
GFM-520N, WORK ORDER #14	S-3
	SHEET 6 OF 12
	DATE
	JULY 6, 2018
	REVISION NO.
	0



REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY

DRAWN BY	P. MANAYATH
DESIGNED BY	L. HERBERT
CHECKED BY	C. CLARK
SCALE:	AS NOTED

Thornton Tomasetti
 40 WALL STREET
 NEW YORK, NY 10005



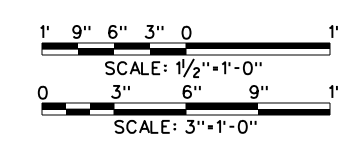
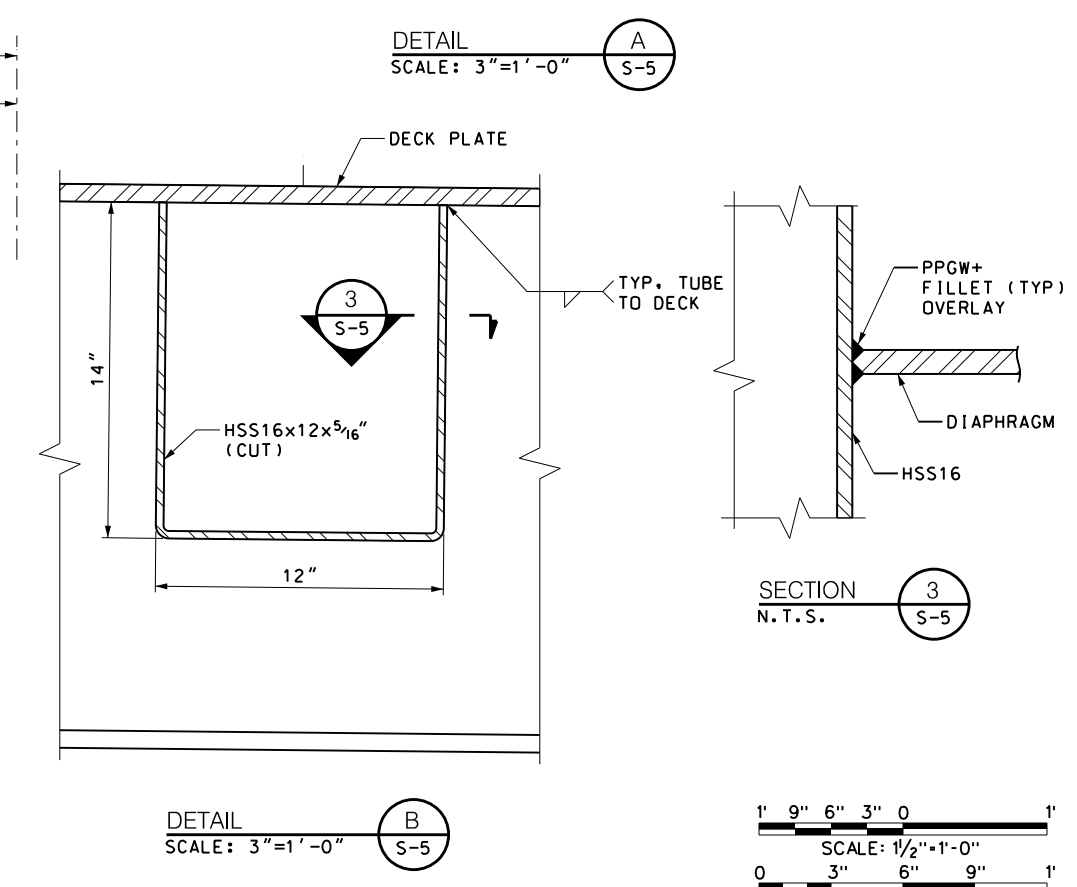
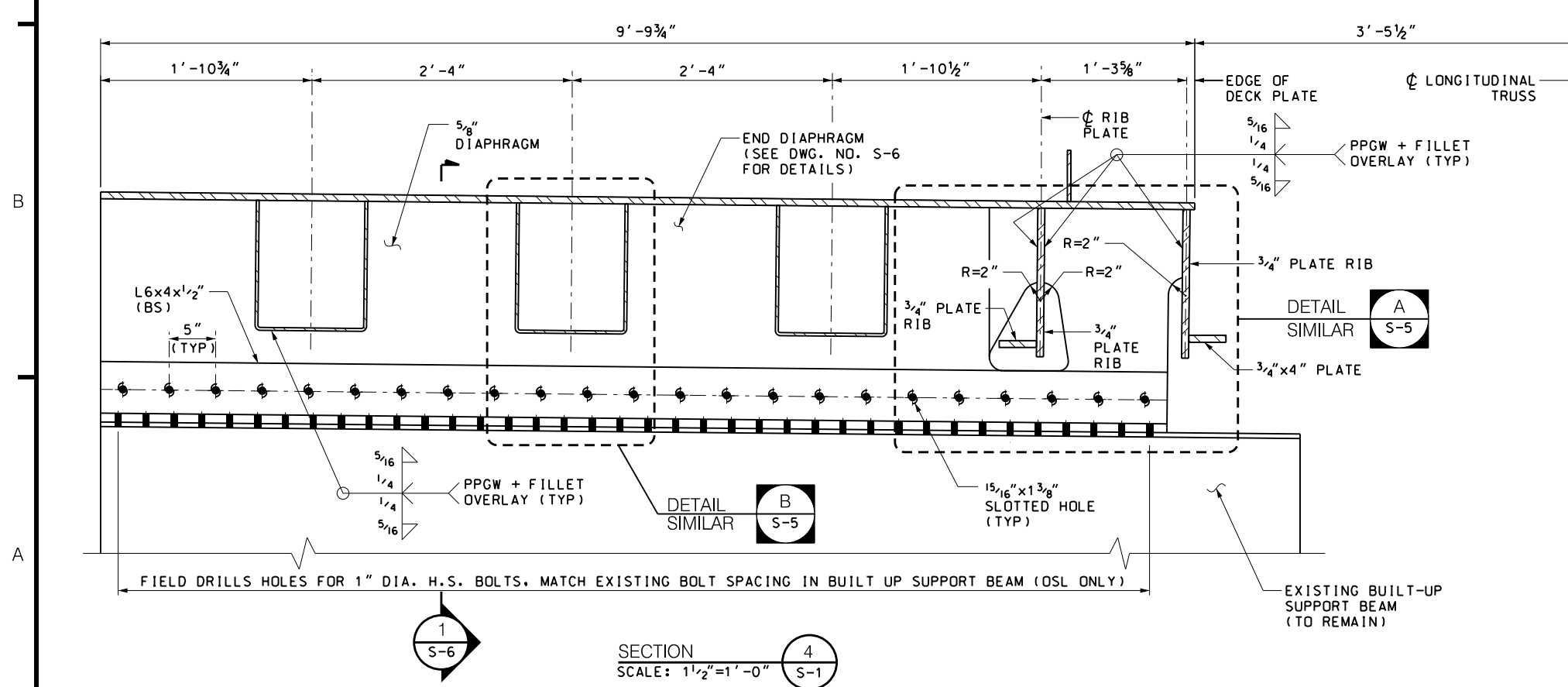
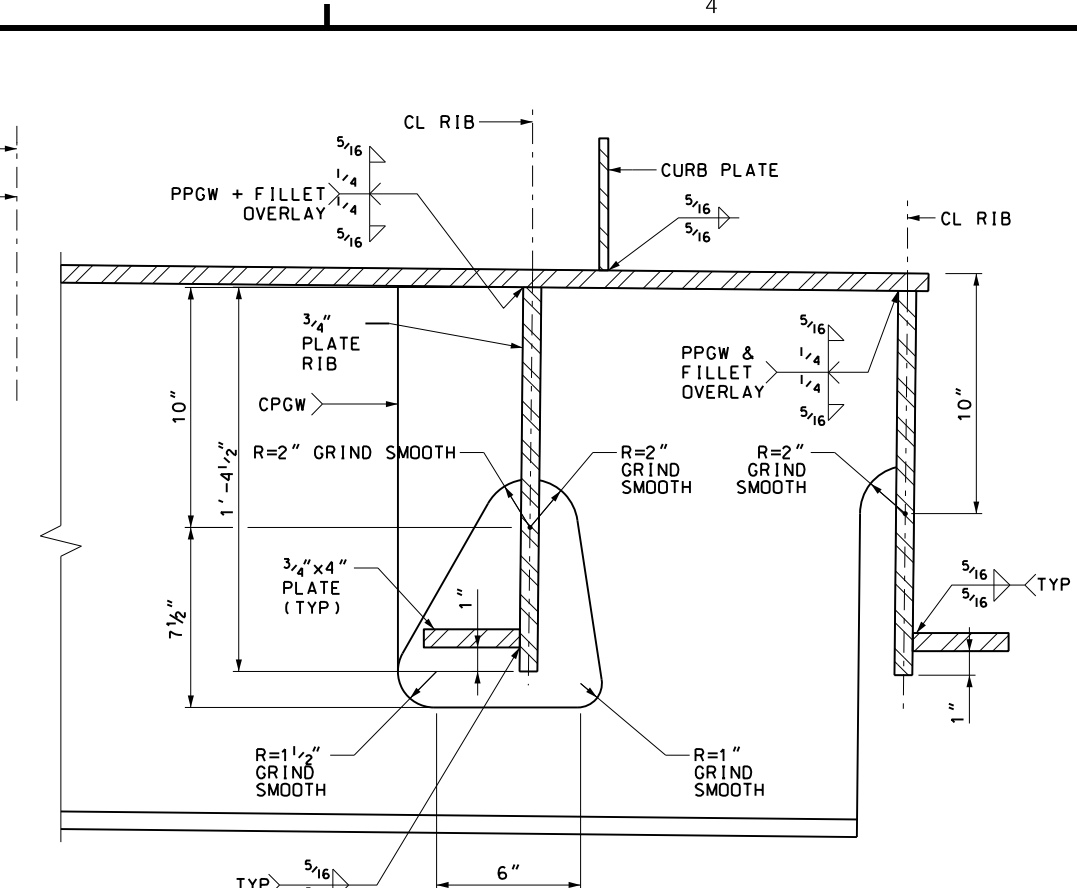
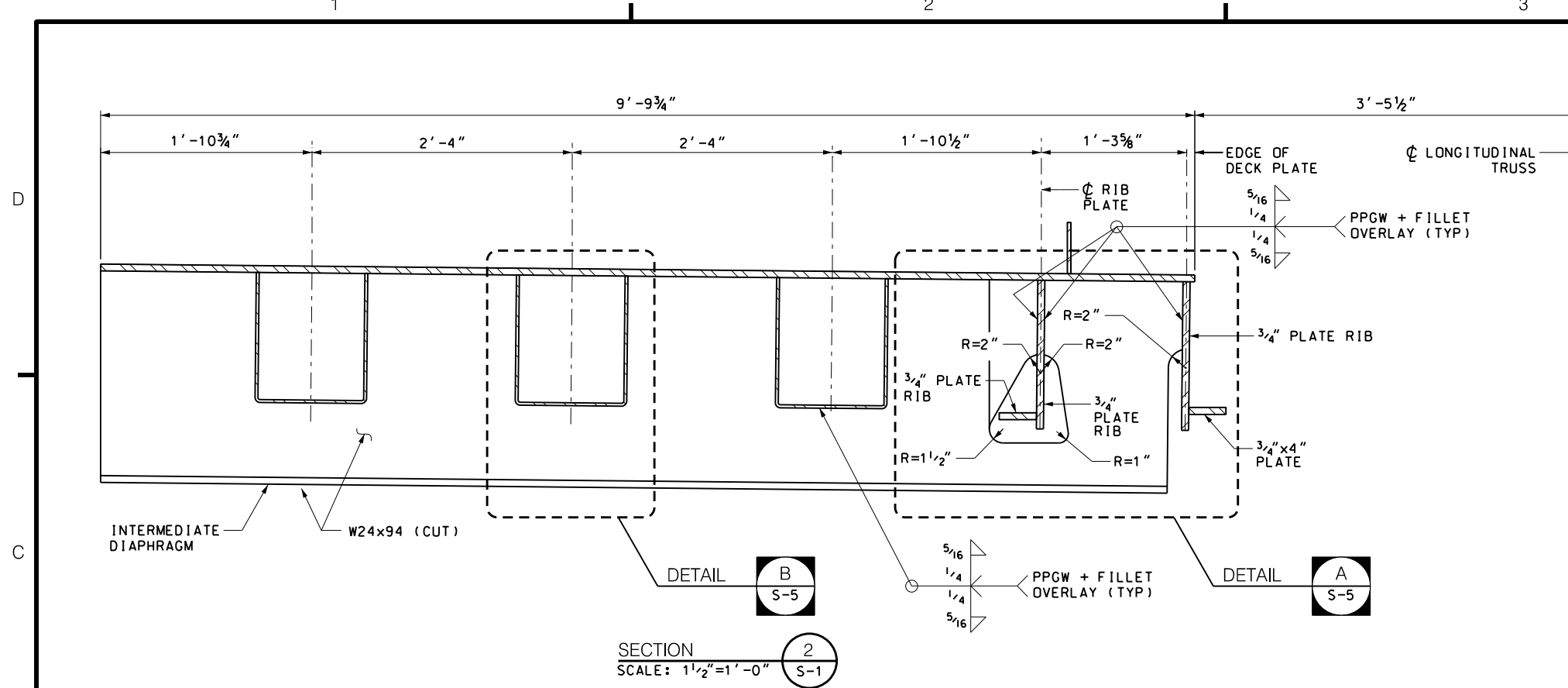
Triborough
 Bridge and Tunnel
 Authority

BARRIER CRASH TESTING
 FOR PROJECT TN-49

DRAWING TITLE	LONGITUDINAL TRUSS DETAILS
PROJECT NO.	GFM-520N, WORK ORDER #14

CONTRACT NO.	GFM-520N
DRAWING NO.	S-4
SHEET	7 OF 12
DATE	JULY 6, 2018
REVISION NO.	0

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REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
				C. CLARK
DRAWN BY P. MANAYATH				DESIGNED BY L. HERBERT
CHECKED BY C. CLARK				SCALE: AS NOTED

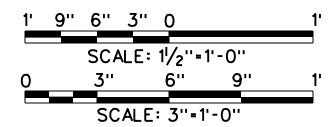
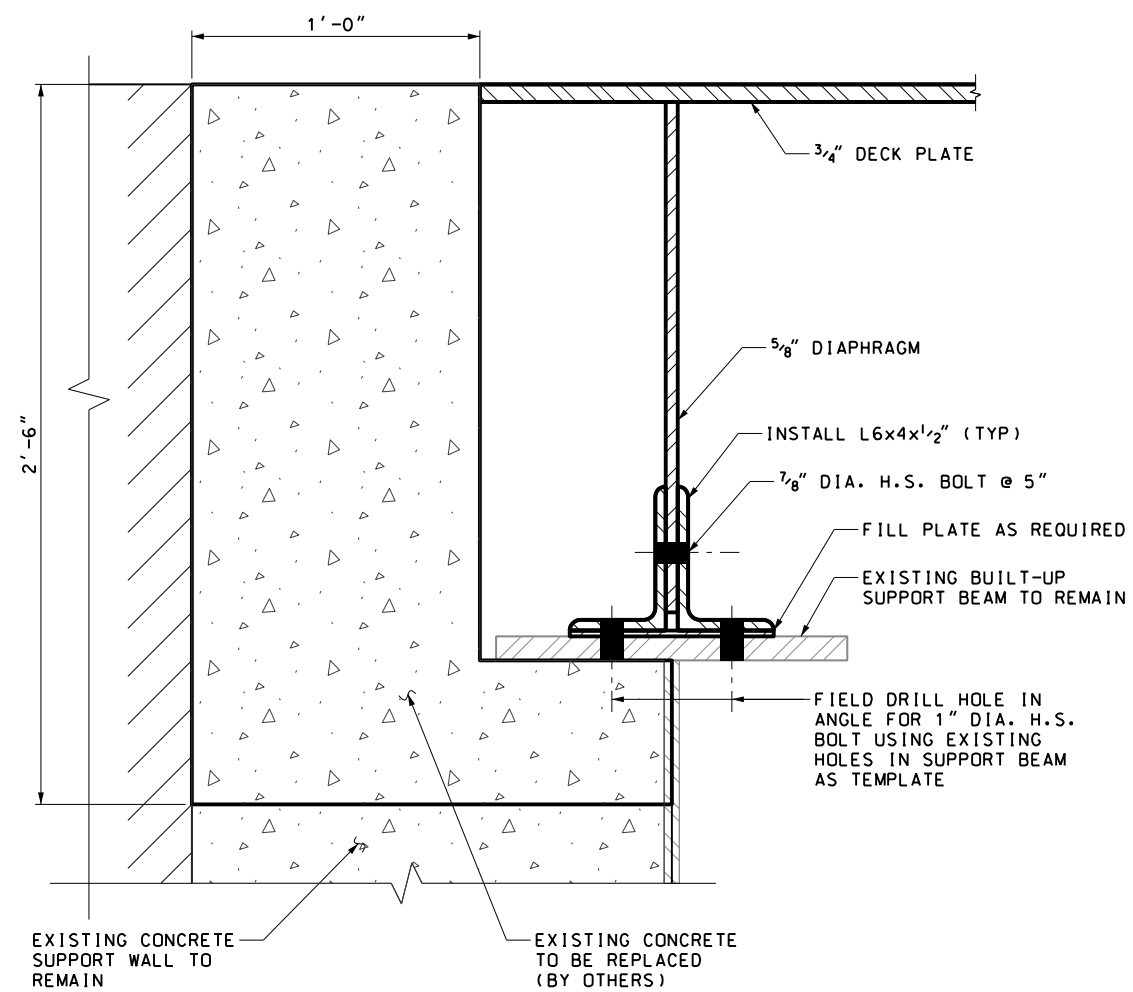
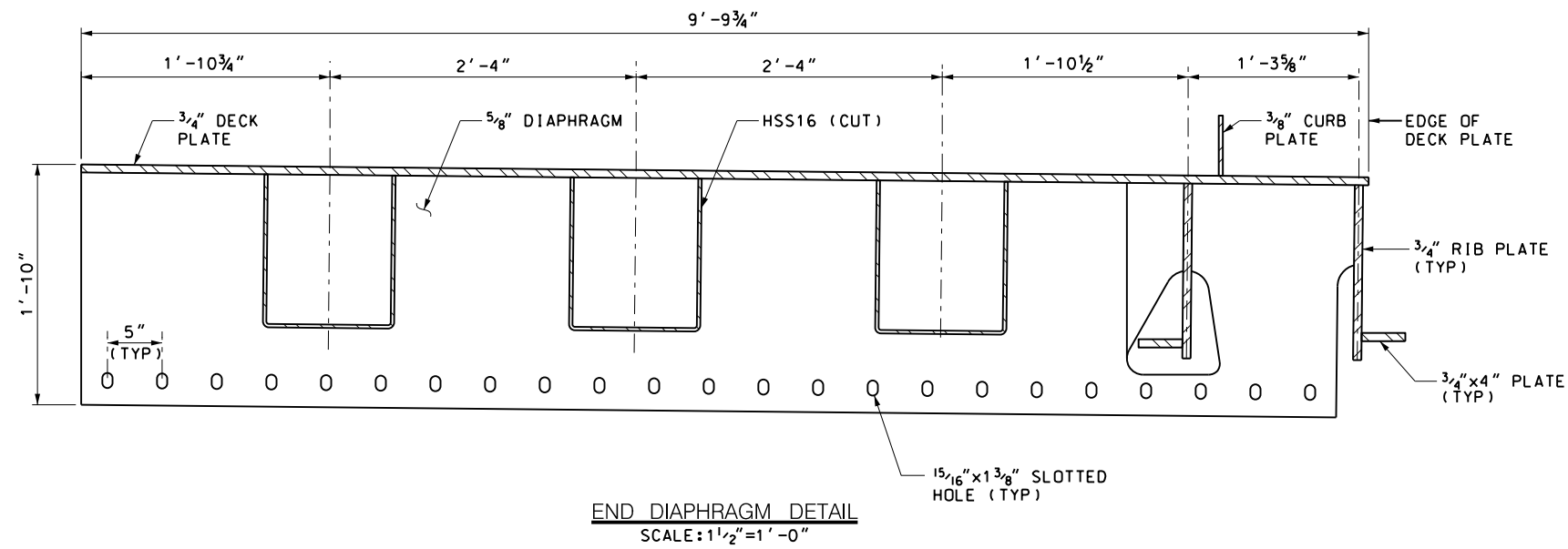
Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005

Triborough
Bridge and Tunnel
Authority

BARRIER CRASH TESTING
FOR PROJECT TN-49

DRAWING TITLE	DIAPHRAGM DETAILS - 1	CONTRACT NO.	GFM-520N
PROJECT NO.	GFM-520N, WORK ORDER #14	DRAWING NO.	S-5
		DATE	JULY 6, 2018
		REVISION NO.	0

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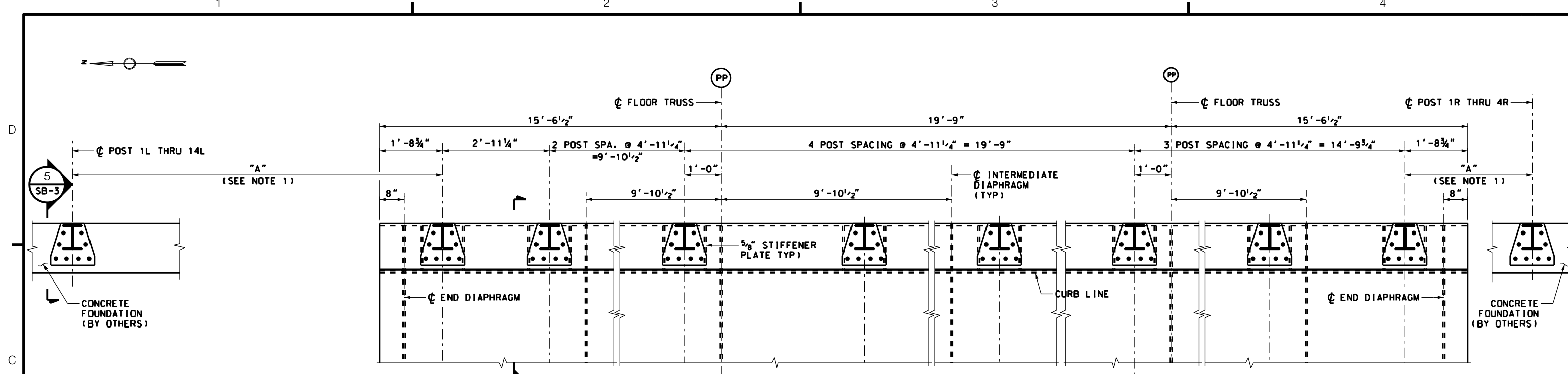
REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
DRAWN BY P. MANAYATH				DESIGNED BY L. HERBERT
CHECKED BY C. CLARK				SCALE: AS NOTED

Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005

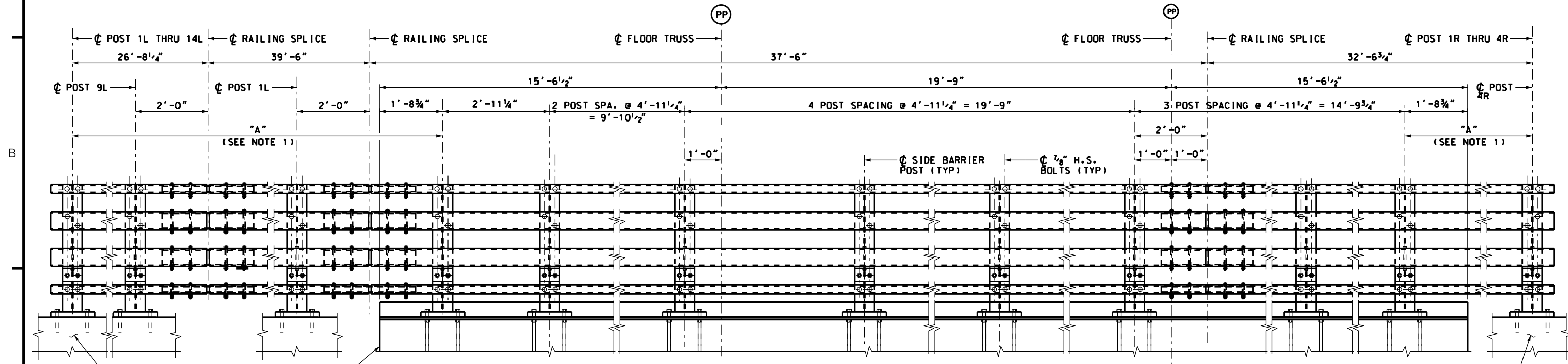
Triborough Bridge and Tunnel Authority
BARRIER CRASH TESTING
FOR PROJECT TN-49

DRAWING TITLE	CONTRACT NO.
DIAPHRAGM DETAILS - 2	GFM-520N
PROJECT NO.	DRAWING NO.
GFM-520N, WORK ORDER #14	S-6
DATE	SHEET 9 OF 12
JULY 6, 2018	REVISION NO. 0

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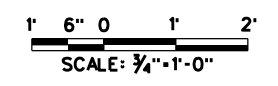


SIDE BARRIER SUPPORTS AT TYPICAL PANEL
SCALE: 3/4"=1'-0"



SIDE BARRIER ELEVATION AT TYPICAL PANEL
SCALE: 3/4"=1'-0"

NOTES:
1. FOR POST LOCATION AND INSTALLATION TYPE, SEE TABLE 1 ON DRAWING NO. SB-4.



1	RAILING SPLICE LOCATION	8/27/18	APP'D.	DRAWN BY P. MANAYATH
REV.	DESCRIPTION	DATE	APP'D.	DESIGNED BY L. HERBERT
				CHECKED BY C. CLARK
"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."				SCALE: 3/4"=1'-0"

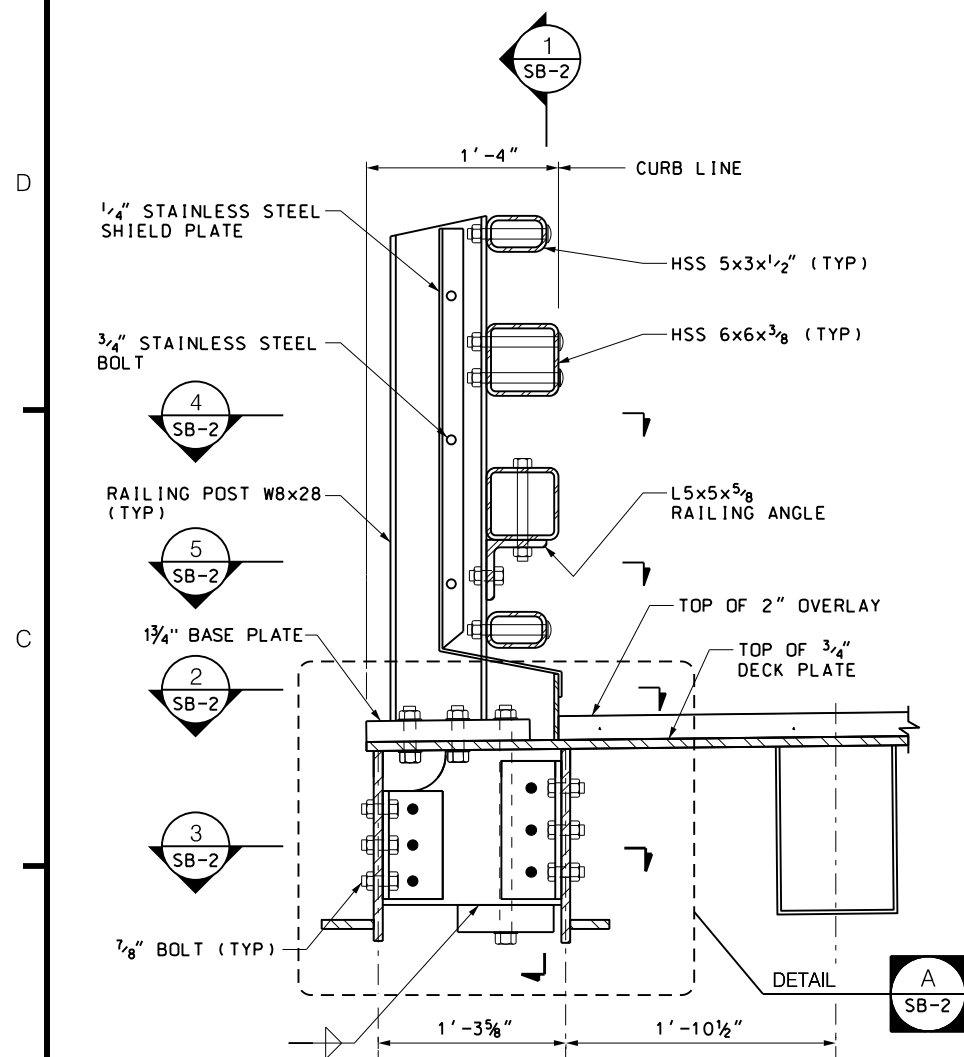
Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005



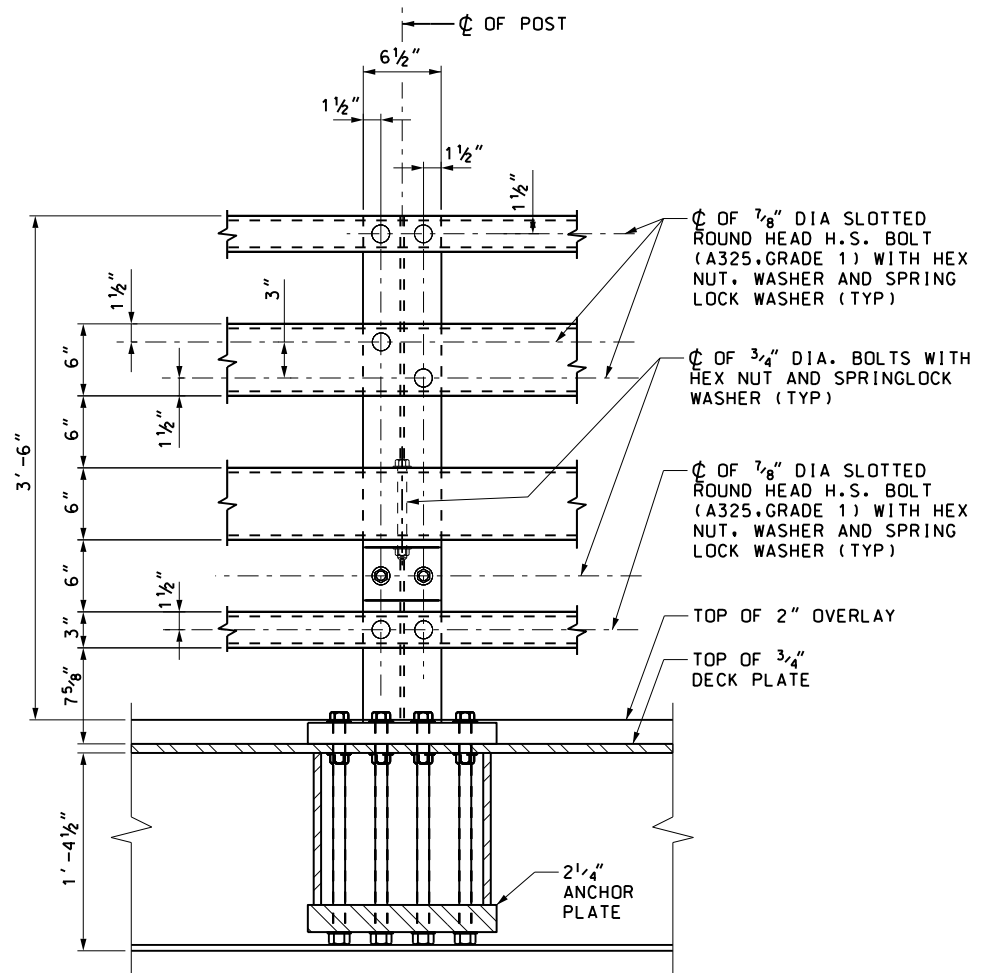
Triborough
Bridge and Tunnel
Authority

BARRIER CRASH TESTING
FOR PROJECT TN-49

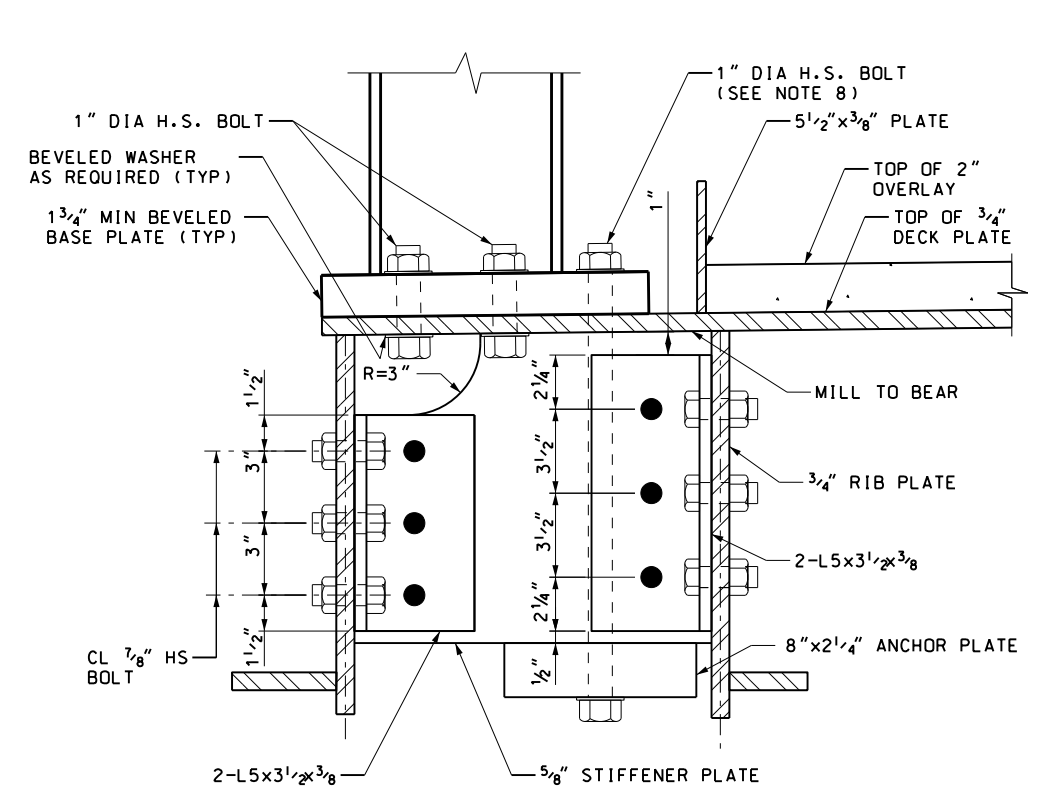
DRAWING TITLE	CONTRACT NO. GFM-520N
STEEL RAILING DETAILS - 1	DRAWING NO. SB-1R
PROJECT NO. GFM-520N, WORK ORDER #14	SHEET 10R OF 12
	DATE JULY 6, 2018
	REVISION NO. 1



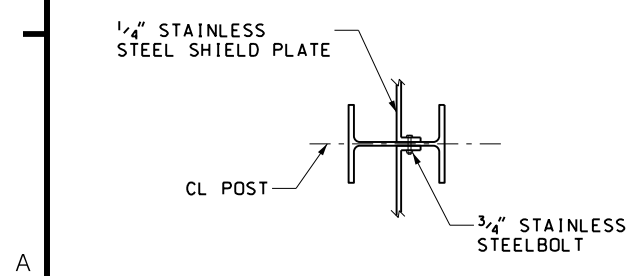
SECTION 1
SCALE: 1 1/2" = 1'-0"
SB-1



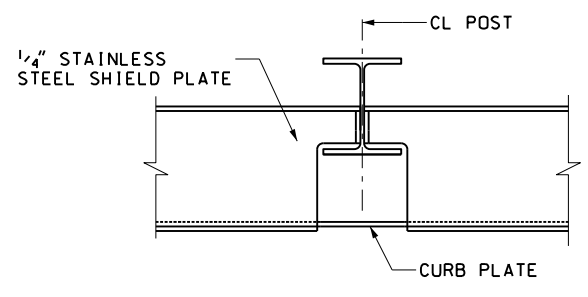
SECTION 1
SCALE: 1 1/2" = 1'-0"
SB-2



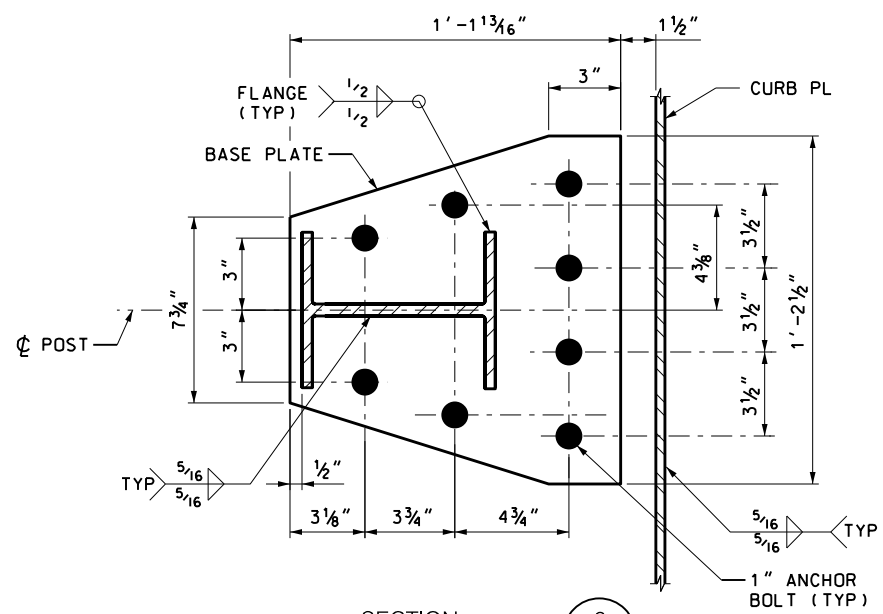
DETAIL A
SCALE: 3" = 1'-0"
SB-2



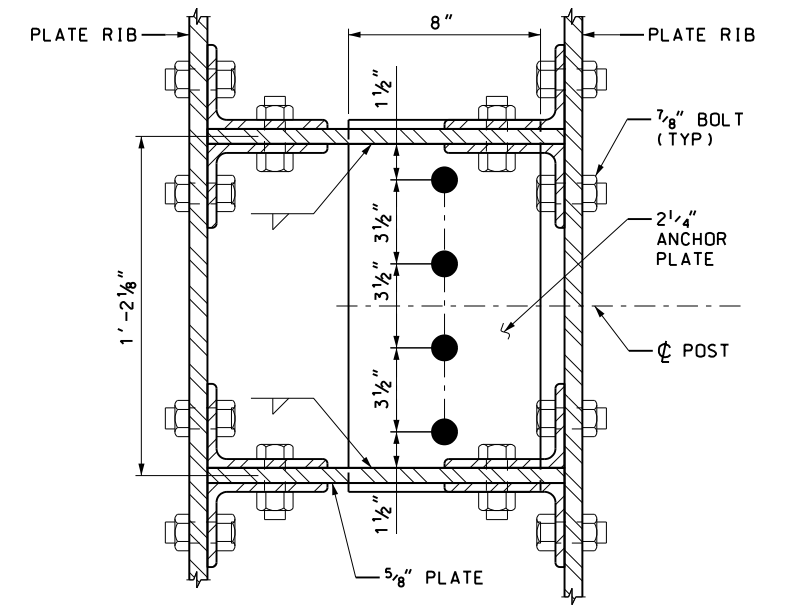
SECTION 4
SCALE: N.T.S.
SB-2



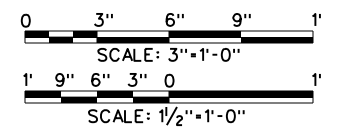
SECTION 5
SCALE: N.T.S.
SB-2



SECTION 2
SCALE: 3" = 1'-0"
SB-2



SECTION 3
SCALE: 3" = 1'-0"
SB-2



REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
DRAWN BY P. MANAYATH				DESIGNED BY L. HERBERT
CHECKED BY C. CLARK				SCALE: AS NOTED

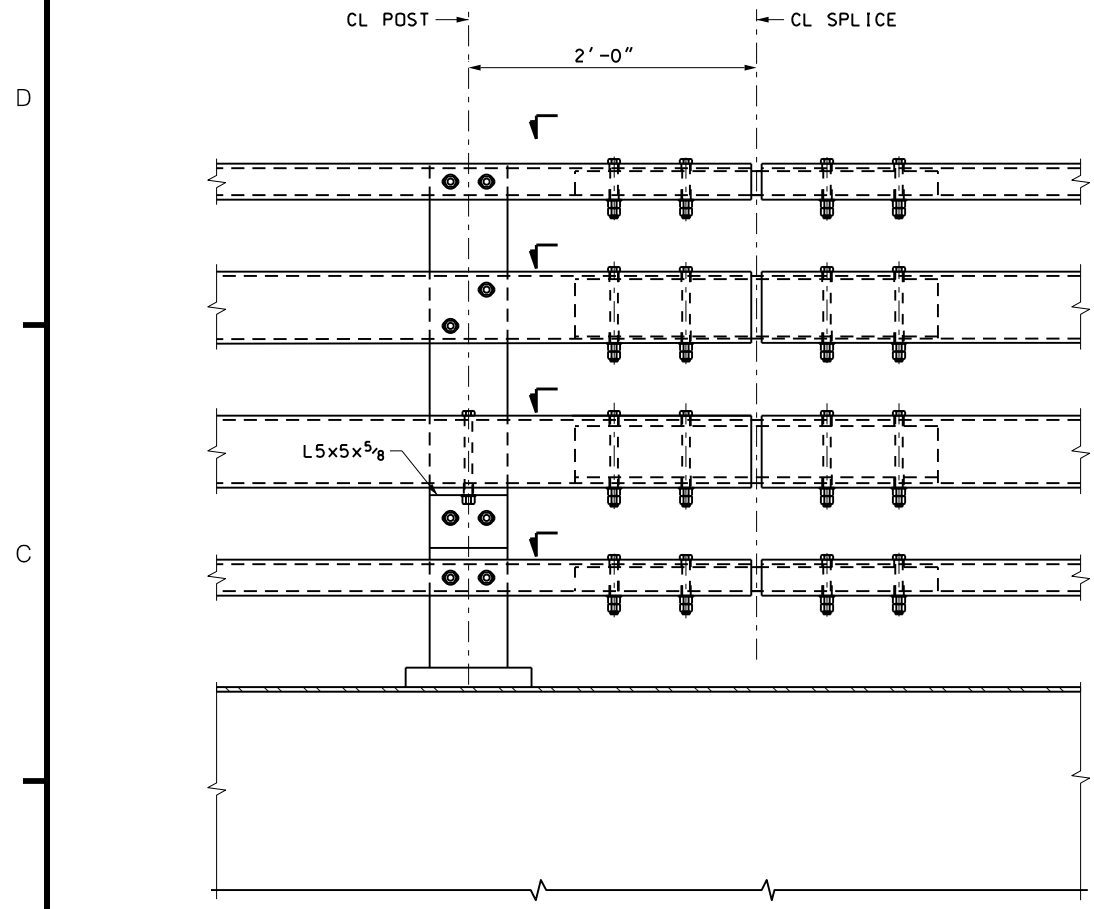
Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005



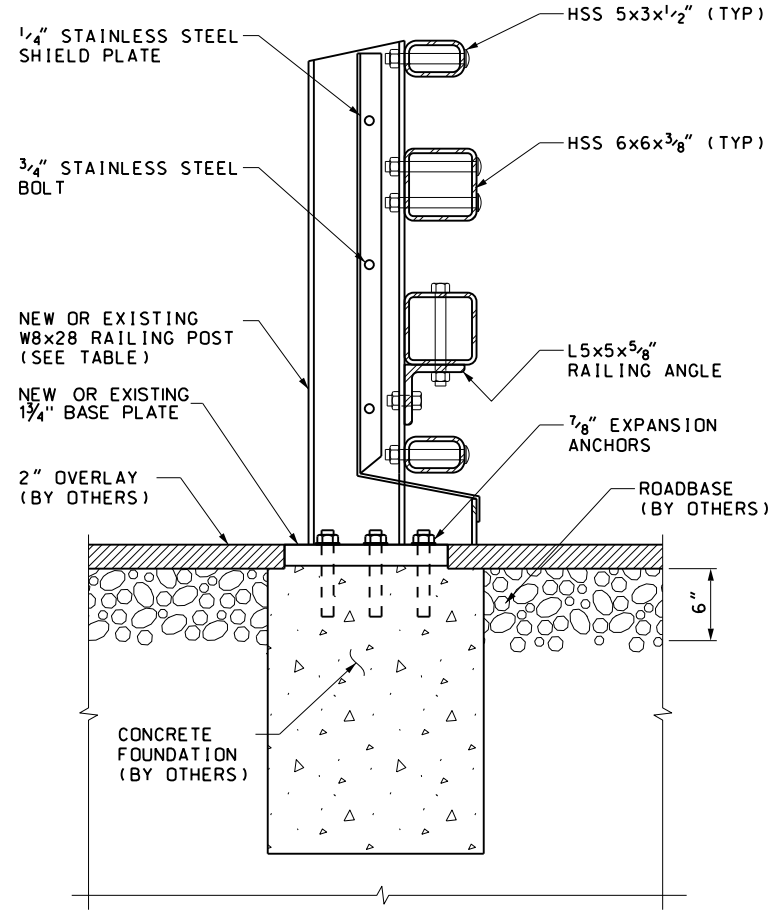
Triborough
Bridge and Tunnel
Authority

BARRIER CRASH TESTING
FOR PROJECT TN-49

DRAWING TITLE	CONTRACT NO.
STEEL RAILING DETAILS - 2	GFM-520N
PROJECT NO.	DRAWING NO.
GFM-520N, WORK ORDER #14	SB-2
DATE	SHEET 11 OF 12
JULY 6, 2018	REVISION NO. 0



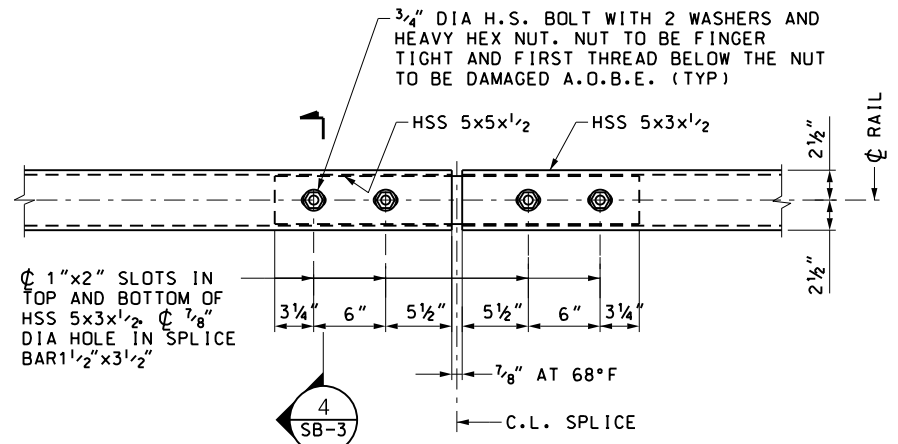
SIDE BARRIER SPLICE DETAIL
SCALE: 1 1/2" = 1'-0"



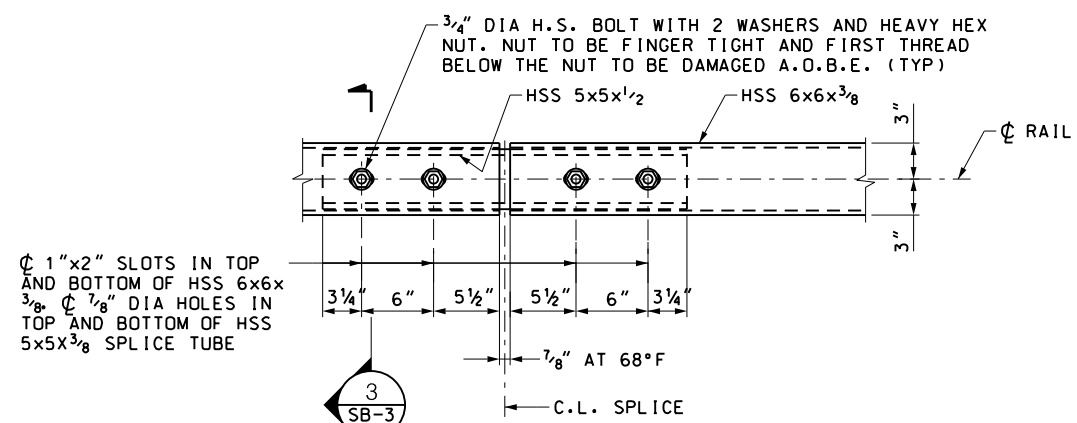
SECTION 5
SCALE: 1 1/2" = 1'-0"

POST NUMBER	POST TYPE	"A"
1L	NEW	4' - 11 1/4"
2L	EXISTING	9' - 3 3/4"
3L	NEW	14' - 9 3/4"
4L	NEW	19' - 9"
5L	NEW	24' - 8 1/4"
6L	NEW	29' - 7 1/2"
7L	NEW	34' - 6 3/4"
8L	NEW	39' - 6"
9L	NEW	44' - 5 1/4"
10L	NEW	49' - 4 1/2"
11L	NEW	54' - 3 3/4"
12L	EXISTING	58' - 9 3/4"
13L	NEW	64' - 2 1/4"
14L	NEW	69' - 1 1/2"
1R	NEW	4' - 11 1/4"
2R	EXISTING	9' - 3 3/4"
3R	NEW	14' - 9 3/4"
4R	NEW	19' - 9"

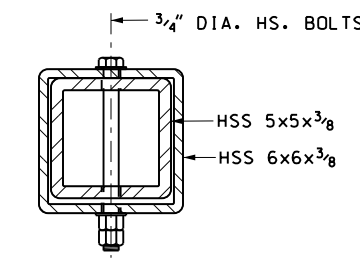
PIECE	QUANTITY	LENGTH
HSS 5x3x1/2"	2	40'-0"
HSS 6x6x3/8"	2	40'-0"
W8x28 POST	3	AS DETAILED
1 3/4" BASE PLATE	3	AS DETAILED
L5x5x5/8"	3	6 1/2"
1" BOLT	12	4 1/2"
1" BOLT	12	1' - 7 1/2"
7/8" BOLT	12	7"
7/8" BOLT	6	8"
3/4" BOLT	3	8"
3/4" BOLT	6	2 1/2"



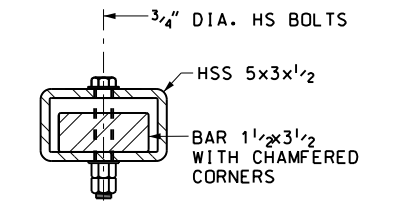
SECTION 1
SCALE: 1 1/2" = 1'-0"



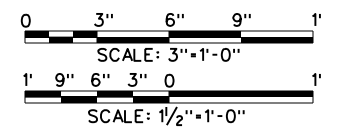
SECTION 2
SCALE: 1 1/2" = 1'-0"



SECTION 3
SCALE: 3" = 1'-0"



SECTION 4
SCALE: 3" = 1'-0"



REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
DRAWN BY P. MANAYATH				DESIGNED BY L. HERBERT
CHECKED BY C. CLARK				SCALE: AS NOTED

Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005

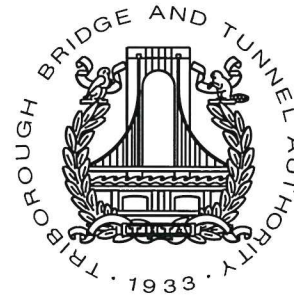
Triborough
Bridge and Tunnel
Authority

BARRIER CRASH TESTING
FOR PROJECT TN-49

DRAWING TITLE	CONTRACT NO.
STEEL RAILING DETAILS - 3	GFM-520N
PROJECT NO.	DRAWING NO.
GFM-520N, WORK ORDER #14	SB-3
	SHEET 12 OF 12
	DATE
	JULY 6, 2018
	REVISION NO.
	0

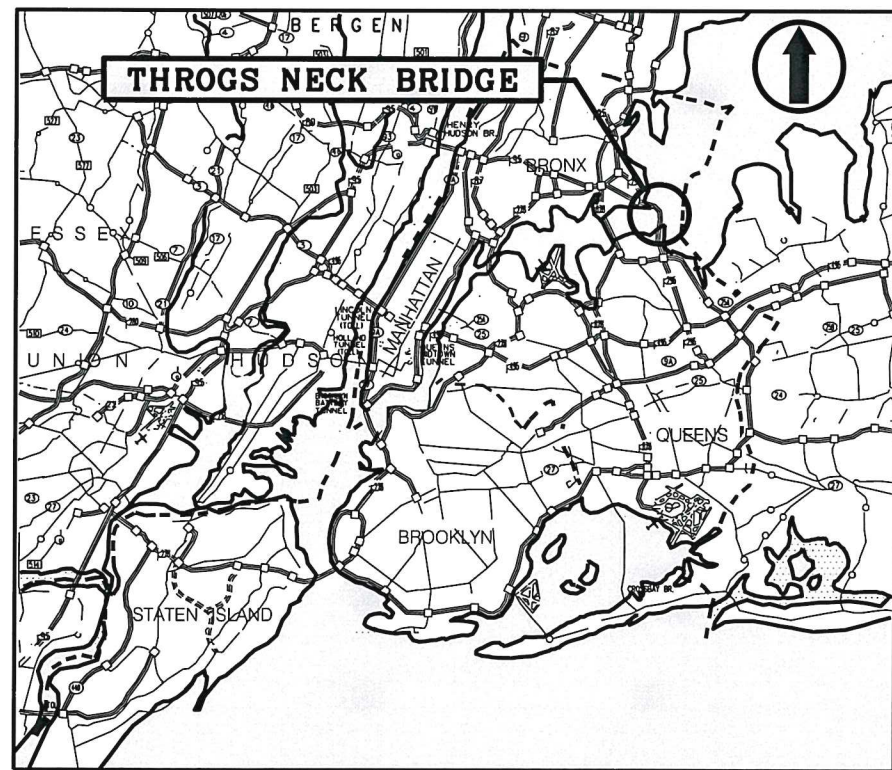
"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER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

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY

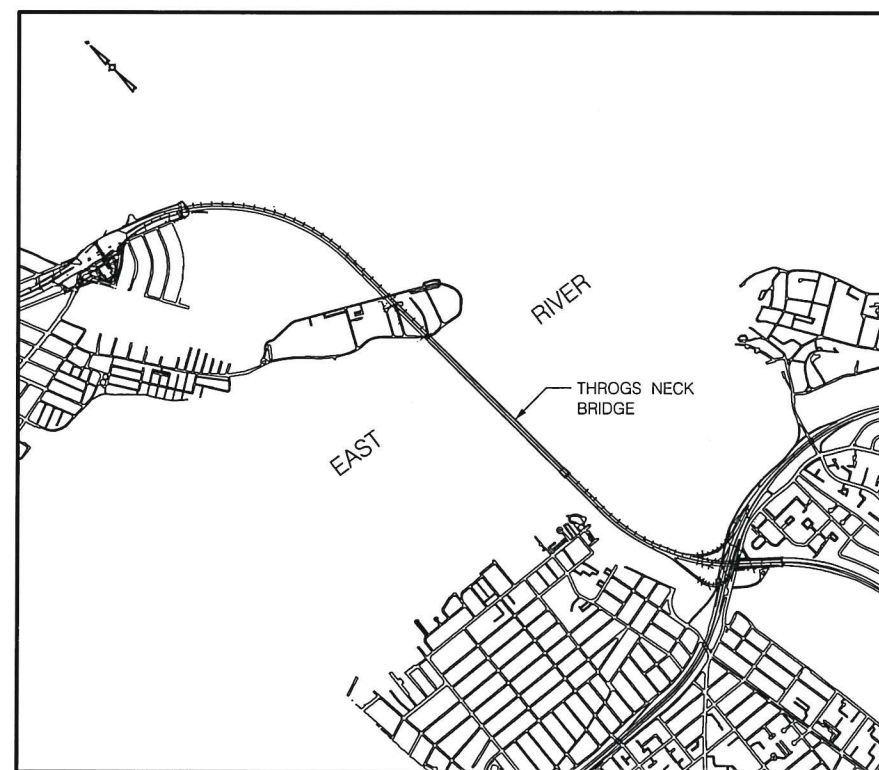


PROJECT GFM-520N, WORK ORDER #14 TEST PIT DETAILS FOR PROJECT TN-49

JULY 6, 2018




LOCATION PLAN
N.T.S.



KEY PLAN
N.T.S.

PREPARED BY: **Thornton Tomasetti**
40 WALL STREET, NEW YORK, NY 10005


SAMUEL SUMMERVILLE, P.E.
PRINCIPAL - THORNTON TOMASETTI

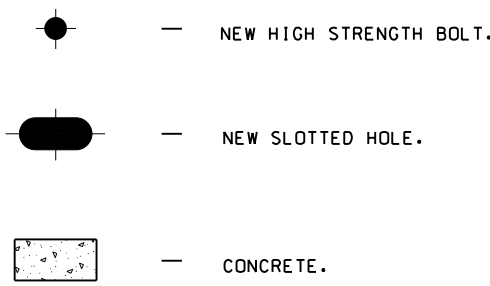
7-26-18
DATE

DRAWING LIST

SYMBOLS

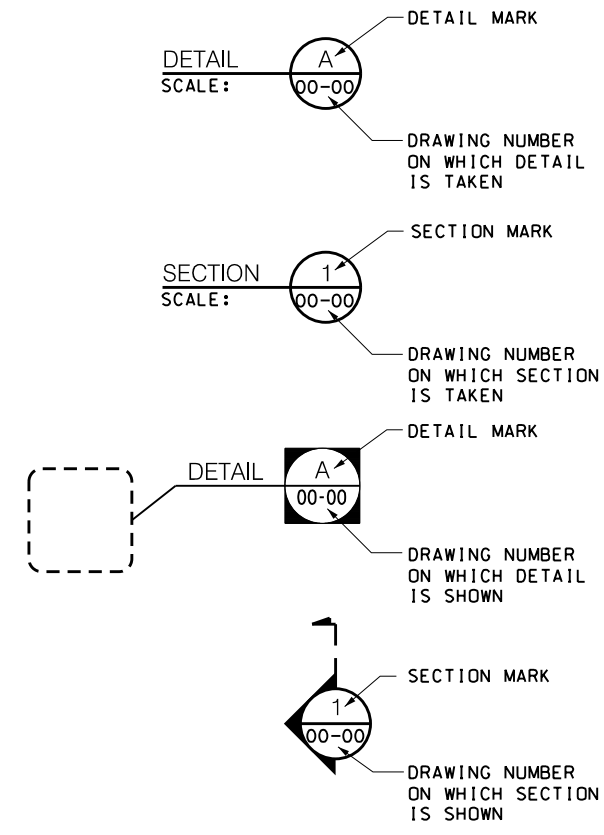
ABBREVIATIONS

SHEET NO.	DWG. NO.	REV. NO.	DRAWING TITLE
GENERAL			
1	G-1	0	TITLE SHEET AND LOCATION PLAN
2	G-2	0	GENERAL NOTES, DRAWING LIST, SYMBOLS AND ABBREVIATIONS
STRUCTURAL			
3	P-1	0	TEST PIT PLAN
4	P-2	0	FOOTING AND RETAINING WALLS DETAILS - 1
5	P-3	0	FOOTING AND RETAINING WALLS DETAILS - 2
6	P-4	0	FOOTING AND RETAINING WALLS DETAILS - 3
7	P-5	0	FOOTING AND RETAINING WALLS DETAILS - 4
8	P-6	0	REINFORCEMENT DETAILS - 1
9	P-7	0	REINFORCEMENT DETAILS - 2
10	P-8	0	STEEL RAILING POST ANCHORAGE DETAILS
DEMOLITION			
11	D-1	0	TEST PIT DEMOLITION PLAN
12	D-2	0	DEMOLITION DETAILS - 1
13	D-3	0	DEMOLITION DETAILS - 2
14	D-4	0	DEMOLITION DETAILS - 3
15	D-5	0	DEMOLITION DETAILS - 4



ABT	-- ABOUT	NO	-- NUMBER
ANCH	-- ANCHORAGE	NOM	-- NOMINAL
AOBE	-- AS ORDERED BY ENGINEER	NS	-- NEAR SIDE
ASTM	-- AMERICAN SOCIETY OF TESTING MATERIALS	NTS	-- NOT TO SCALE
B TO B / BB	-- BACK TO BACK	OC	-- ON CENTER
BF	-- BACK FACE	OSL	-- OUTSTANDING LEG
BOT	-- BOTTOM	OPNG	-- OPENING
BRG	-- BEARING	OPP	-- OPPOSITE
BS	-- BOTH SIDES	PC	-- PIECE
BTWN	-- BETWEEN	PL	-- PLATE
C TO C / CC	-- CENTER TO CENTER	PP	-- PANEL POINT
CANT	-- CANTILEVER	PPGW	-- PARTIAL PENETRATION GROOVE WELD
CHD	-- CHORD	PTFE	-- POLYTETRAFLUOROETHYLENE
CI	-- CAST IRON	EXTER	-- EXTERIOR
CL	-- CENTER LINE	INTER	-- INTERIOR
CLR	-- CLEAR	LG	-- LENGTH
COL	-- COLUMN	PVC	-- POLYVINYLCHLORIDE
CONC	-- CONCRETE	PVMT	-- PAVEMENT
CONN	-- CONNECTION	R / RAD	-- RADIUS
CONSTR	-- CONSTRUCTION	RC	-- REINFORCED CONCRETE
CONT	-- CONTINUOUS	RDWY	-- ROADWAY
CORR	-- CORRUGATED	REF	-- REFERENCE
CPGW	-- COMPLETE PENETRATION GROUTS WELD	REINF	-- REINFORCEMENT
CTSK	-- COUNTERSUNK	REOD	-- REQUIRED
DET	-- DETAIL	RJT	-- RELIEF JOINT
DIA	-- DIAMETER	SDWK	-- SIDEWALK
DIAPH	-- DIAPHRAGM	SECT	-- SECTION
DWG	-- DRAWING	SP / SPA	-- SPACE / SPACING
ED	-- END DIAPHRAGM	SPL	-- SPLICE
ELEC	-- ELECTRICAL	SQ	-- SQUARE
ELEV / EL	-- ELEVATION	SST	-- STAINLESS STEEL
EO	-- EQUAL	STIFF	-- STIFFENER
EXIST / EXST	-- EXISTING	STL	-- STEEL
EXP	-- EXPANSION	STR / STRG	-- STRINGER
F	-- FAHRENHEIT	SYMM	-- SYMMETRICAL
FF	-- FRONT FACE	TBTA	-- TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY
FL	-- FLOOR	THD	-- THREAD
FLBM	-- FLOORBEAM	THRD	-- THREADED
FLG	-- FLANGE	THK	-- THICK
FS	-- FAR SIDE	THRU	-- THROUGH
FUT	-- FUTURE	TP	-- TURNING POINT
GALV	-- GALVANIZED	TYP	-- TYPICAL
HEX	-- HEXAGONAL	UON / UN	-- UNLESS OTHERWISE NOTED
HORIZ	-- HORIZONTAL	VERT	-- VERTICAL
HS	-- HIGH STRENGTH	WP	-- WORKING POINT
JT	-- JOINT	W/	-- WITH
MAX	-- MAXIMUM		
MIN	-- MINIMUM		
MOD	-- MODIFIED		
MPT	-- MAINTENANCE AND PROTECTION OF TRAFFIC		
NA	-- NOT APPLICABLE		
NIC	-- NOT IN CONTRACT		

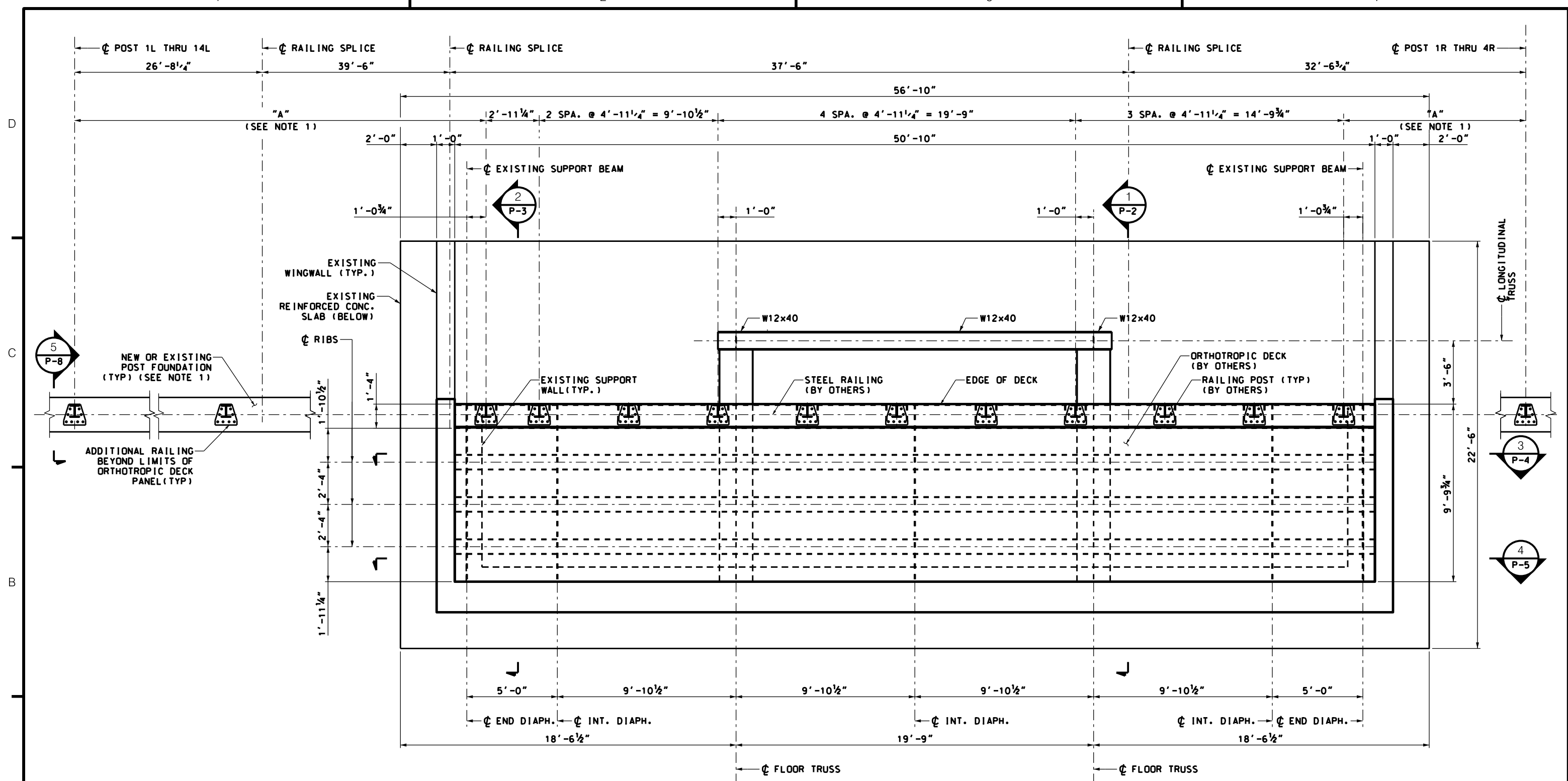
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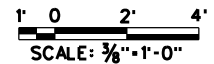
NOTES:

- GENERAL:**
- WORK THESE DRAWINGS WITH "BARRIER CRASH TESTING FOR PROJECT TN-49".
 - THE SCOPE OF WORK FOR THIS PROJECT CONSISTS OF FABRICATION (BY OTHERS), ERECTION, AND CRASH TESTING OF DECK PANEL AND 4 RAIL STEEL BARRIERS.
 - IF THE CONTRACTOR DAMAGES ANY EQUIPMENT OR MATERIALS WHICH ARE TO REMAIN IN PLACE OR ARE THE PROPERTY OF THE TESTING FACILITY, DAMAGED MATERIALS SHALL BE REPAIRED OR REPLACED IN A MANNER SATISFACTORY TO THE TESTING FACILITY AT THE EXPENSE OF THE CONTRACTOR.
 - THE CONTRACTOR SHALL PROMPTLY REMOVE ALL EXCESS MATERIALS, CONSUMERABLES, AND TOOLS FROM THE TESTING FACILITY AFTER COMPLETION OF THE WORK.
 - THE CONTRACTOR SHALL PROVIDE WORK PLATFORMS AND SUPPORTS AS REQUIRED FOR THE ERECTION OF THE SUPPORT TRUSSES AND DECK PANEL. THE COST OF ALL PLATFORMS AND SUPPORTS SHALL BE INCLUDED IN THE BID UNIT PRICES. ALL ENGINEERING DESIGN WORK SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER CURRENTLY LICENSED IN THE STATE OF TEXAS AND SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.
- STRUCTURAL STEEL:**
- ALL STRUCTURAL STEEL, BOLTS, ANCHORS, AND PLATES SHALL BE PROVIDED BY THE STEEL FABRICATOR.
 - UNLESS OTHERWISE NOTED, ALL EXISTING STEEL SHALL BE REMOVED. SEE DEMOLITION DRAWINGS FOR DETAILS.

DRAWN BY P. MANAYATH				<p>Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005</p>	<p>Triborough Bridge and Tunnel Authority</p>	DRAWING TITLE GENERAL NOES, DRAWING LIST, SYMBOLS AND ABBREVIATIONS	CONTRACT NO. GFM-520N DRAWING NO. G-2 SHEET 2 OF 15 DATE JULY 6, 2018 REVISION NO. 0
DESIGNED BY L. HERBERT							
CHECKED BY C. CLARK							
REV.	DESCRIPTION	DATE	APP'D.	SCALE: NONE	TEST PIT DETAILS FOR PROJECT TN-49	PROJECT NO. GFM-520N, WORK ORDER #14	
"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."							



TEST PIT PLAN
SCALE: 3/8"=1'-0"



REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
				C. CLARK
DRAWN BY P. MANAYATH				DESIGNED BY L. HERBERT
SCALE: 3/8"=1'-0"				

Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005

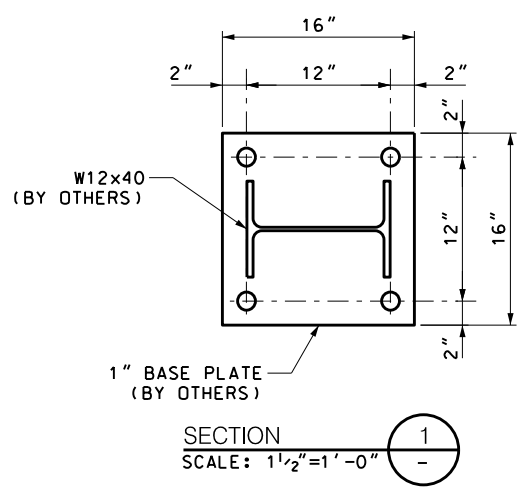
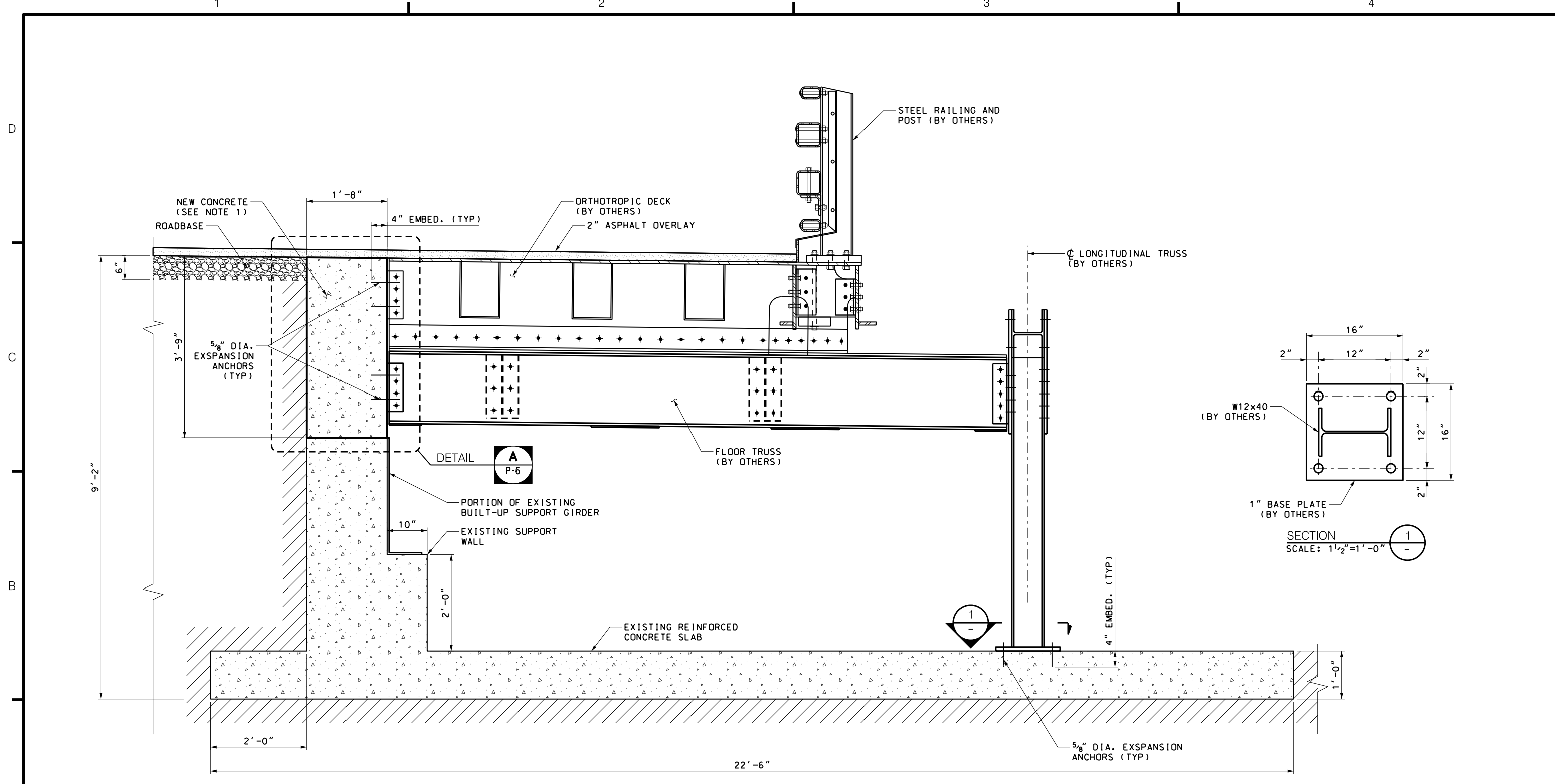


TEST PIT DETAILS
FOR PROJECT TN-49

DRAWING TITLE	TEST PIT PLAN
PROJECT NO.	GFM-520N, WORK ORDER #14

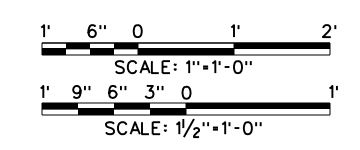
CONTRACT NO.	GFM-520N
DRAWING NO.	P-1
SHEET	8 OF 15
DATE	JULY 6, 2018
REVISION NO.	0

"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."



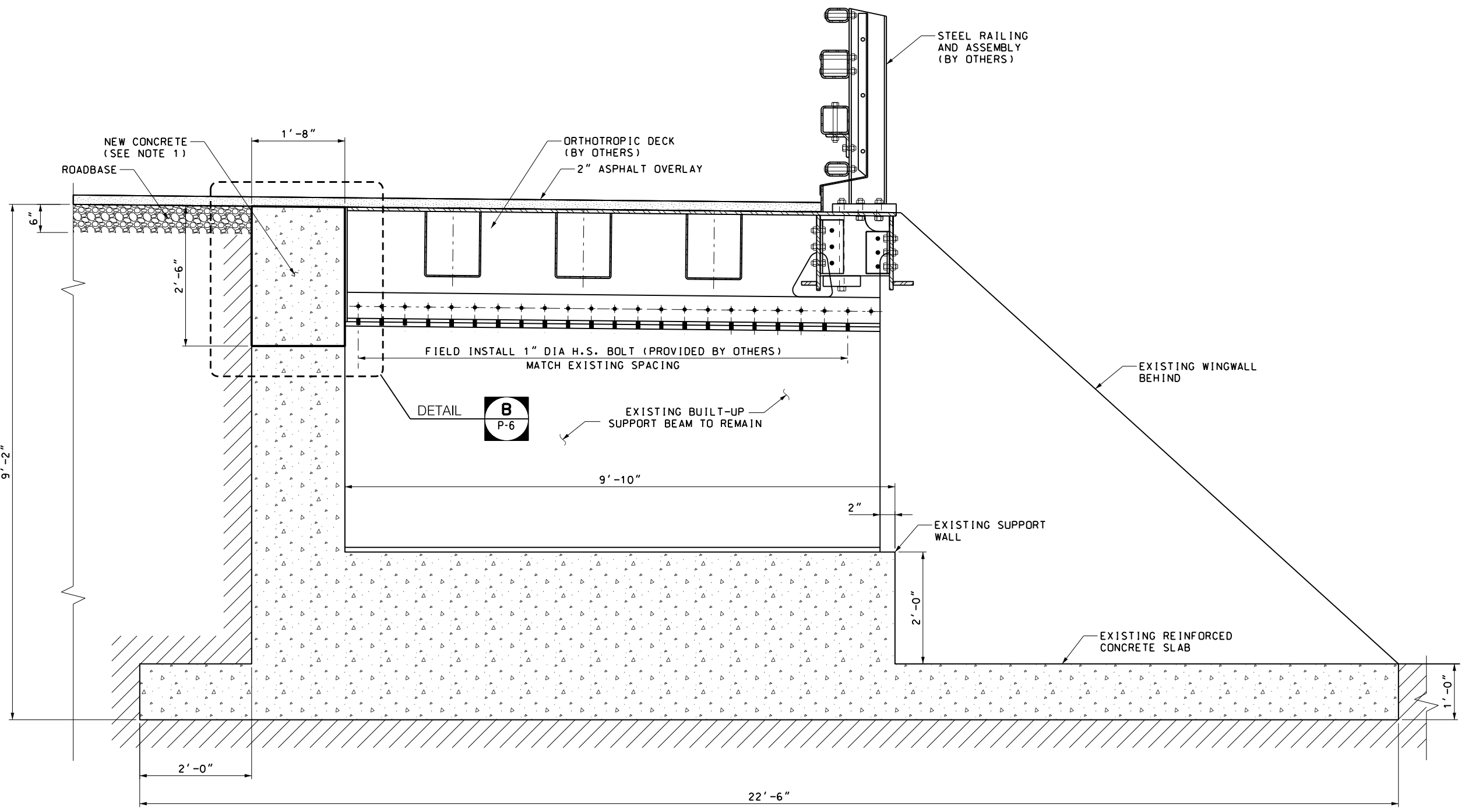
SECTION AT FLOOR TRUSS 1
SCALE: 1"=1'-0" P-1

NOTES:
1. REBAR NOT SHOWN FOR CLARITY, SEE DRAWINGS P-6 AND P-7 FOR DETAILS.



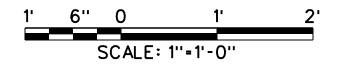
				DRAWN BY P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK	Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	Triborough Bridge and Tunnel Authority	DRAWING TITLE FOOTING AND RETAINING WALL DETAILS - 1	CONTRACT NO. GFM-520N DRAWING NO. P-2 SHEET 4 OF 15
REV.	DESCRIPTION	DATE	APP'D.	SCALE: AS NOTED			PROJECT NO. GFM-520N, WORK ORDER #14	DATE JULY 6, 2018 REVISION NO. 0
<small>"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."</small>								


D
C
B
A



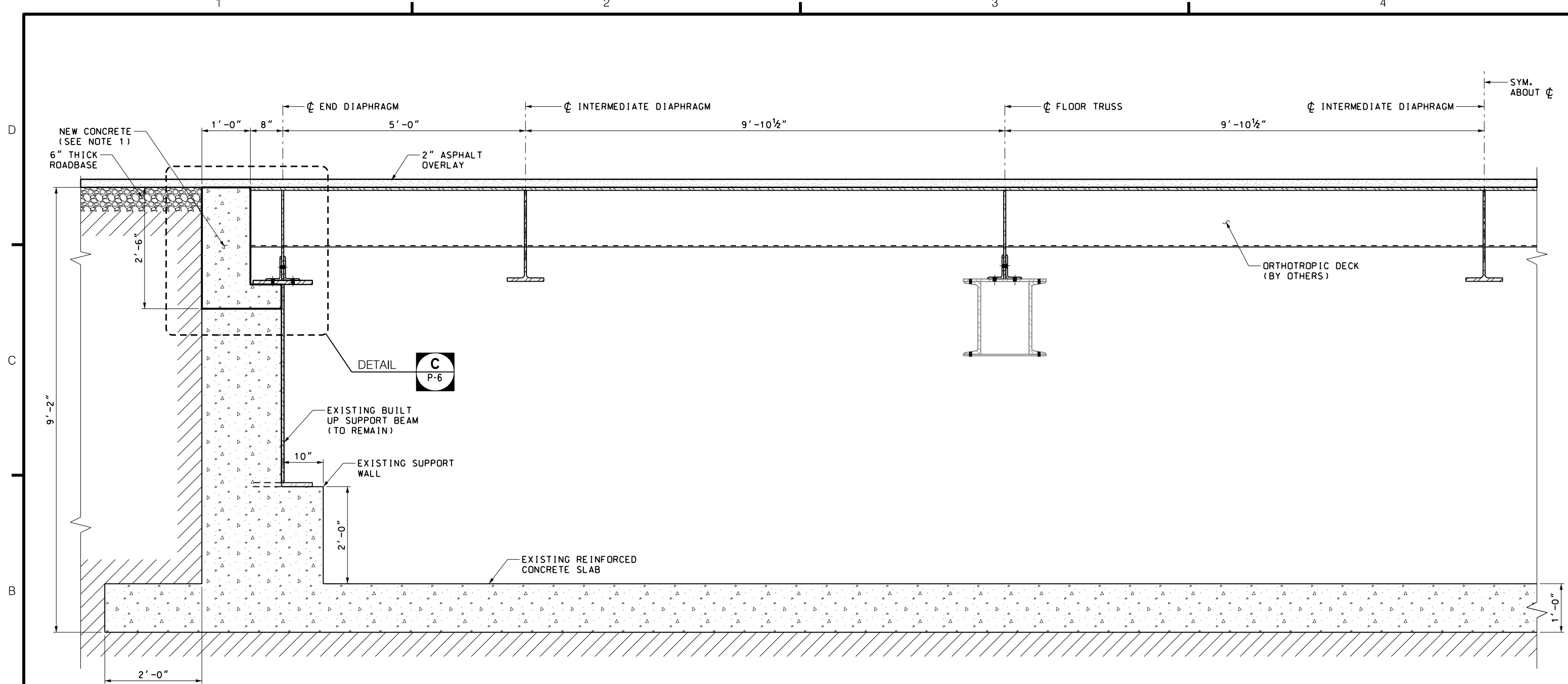
SECTION AT END DIAPHRAGM (2) P-1
SCALE: 1"=1'-0"
(INTERMEDIATE DIAPHRAGM SIMILAR)

NOTES:
1. REBAR NOT SHOWN FOR CLARITY. SEE DRAWINGS P-6 AND P-7 FOR DETAILS.



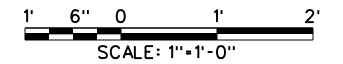
<table border="1"> <tr> <td>REV.</td> <td>DESCRIPTION</td> <td>DATE</td> <td>APP'D.</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>				REV.	DESCRIPTION	DATE	APP'D.					<table border="1"> <tr> <td>DRAWN BY</td> <td>P. MANAYATH</td> </tr> <tr> <td>DESIGNED BY</td> <td>L. HERBERT</td> </tr> <tr> <td>CHECKED BY</td> <td>C. CLARK</td> </tr> <tr> <td>SCALE:</td> <td>1"=1'-0"</td> </tr> </table>	DRAWN BY	P. MANAYATH	DESIGNED BY	L. HERBERT	CHECKED BY	C. CLARK	SCALE:	1"=1'-0"	<p>Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005</p>  <p>Triborough Bridge and Tunnel Authority</p> <p>TEST PIT DETAILS FOR PROJECT TN-49</p>	<table border="1"> <tr> <td>DRAWING TITLE</td> <td>FOOTING AND RETAINING WALL DETAILS - 2</td> </tr> <tr> <td>PROJECT NO.</td> <td>GFM-520N, WORK ORDER #14</td> </tr> </table>	DRAWING TITLE	FOOTING AND RETAINING WALL DETAILS - 2	PROJECT NO.	GFM-520N, WORK ORDER #14	<table border="1"> <tr> <td>CONTRACT NO.</td> <td>GFM-520N</td> </tr> <tr> <td>DRAWING NO.</td> <td>P-3</td> </tr> <tr> <td>SHEET</td> <td>5 OF 15</td> </tr> <tr> <td>DATE</td> <td>JULY 6, 2018</td> </tr> <tr> <td>REVISION NO.</td> <td>0</td> </tr> </table>	CONTRACT NO.	GFM-520N	DRAWING NO.	P-3	SHEET	5 OF 15	DATE	JULY 6, 2018	REVISION NO.	0
REV.	DESCRIPTION	DATE	APP'D.																																		
DRAWN BY	P. MANAYATH																																				
DESIGNED BY	L. HERBERT																																				
CHECKED BY	C. CLARK																																				
SCALE:	1"=1'-0"																																				
DRAWING TITLE	FOOTING AND RETAINING WALL DETAILS - 2																																				
PROJECT NO.	GFM-520N, WORK ORDER #14																																				
CONTRACT NO.	GFM-520N																																				
DRAWING NO.	P-3																																				
SHEET	5 OF 15																																				
DATE	JULY 6, 2018																																				
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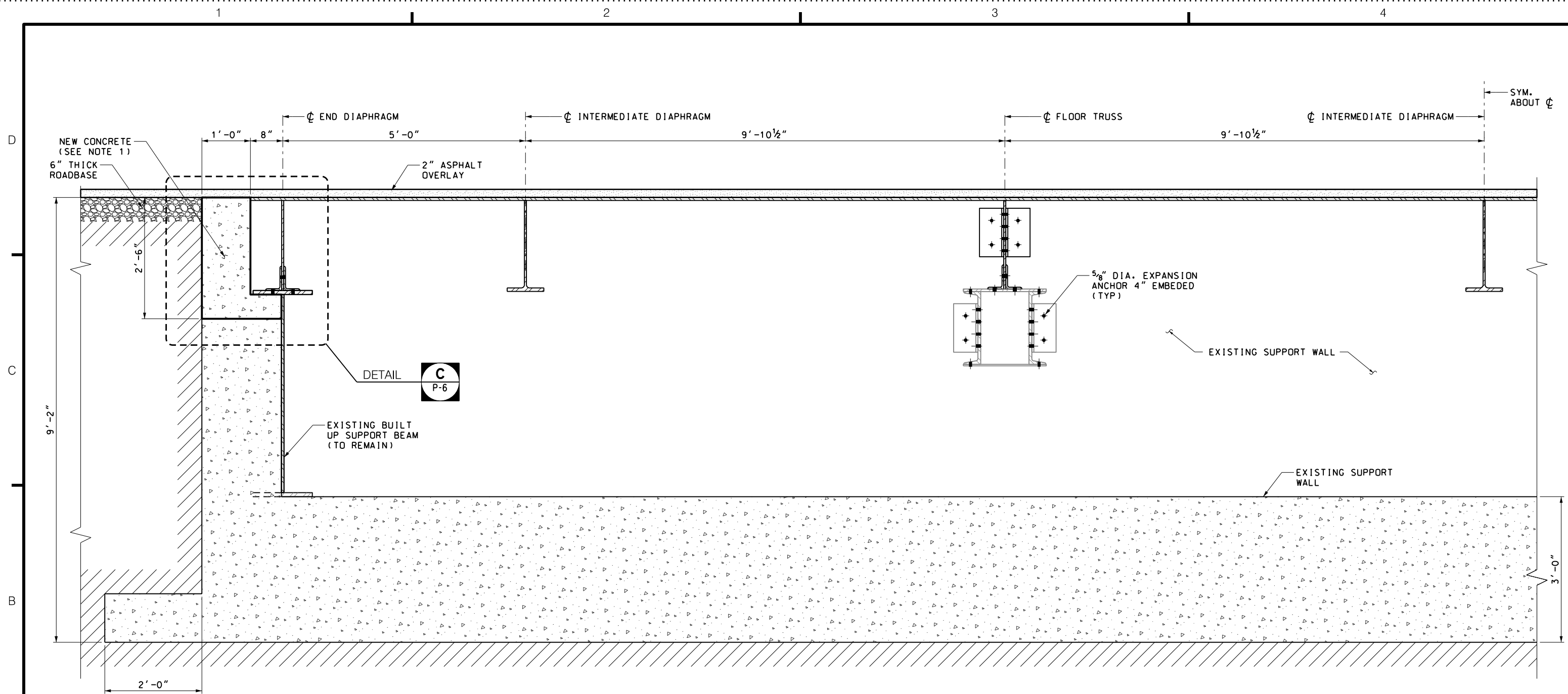


SECTION 3
SCALE: 1"=1'-0" P-1

- NOTES:**
1. REBAR NOT SHOWN FOR CLARITY. SEE DRAWINGS P-6 AND P-7 FOR DETAILS.

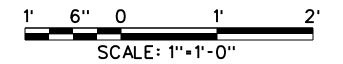



				DRAWN BY P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK	Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	 Triborough Bridge and Tunnel Authority	DRAWING TITLE FOOTING AND RETAINING WALL DETAILS - 3	CONTRACT NO. GFM-520N DRAWING NO. P-4 SHEET 6 OF 15
REV. DESCRIPTION <small>"IT IS A VIOLATION 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."</small>	DATE APP'D.	SCALE: 1"=1'-0"	PROJECT NO. GFM-520N, WORK ORDER #14	DATE JULY 6, 2018 REVISION NO. 0				

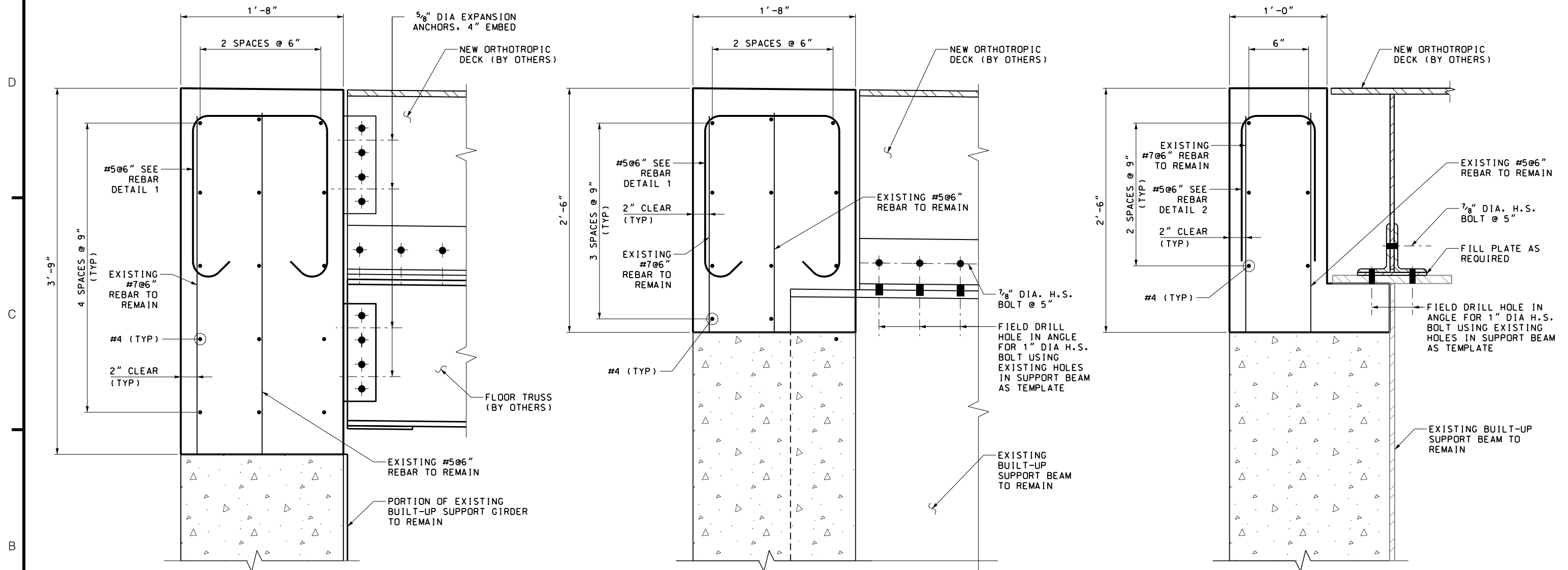


SECTION 4
SCALE: 1"=1'-0" P-1

NOTES:
1. REBAR NOT SHOWN FOR CLARITY. SEE DRAWINGS P-6 AND P-7 FOR DETAILS.



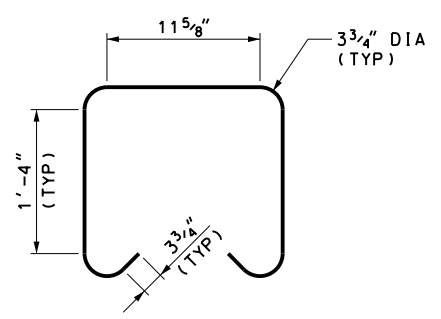
				DRAWN BY P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK SCALE: 1"=1'-0"	Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	 Triborough Bridge and Tunnel Authority	DRAWING TITLE FOOTING AND RETAINING WALL DETAILS - 4 PROJECT NO. GFM-520N, WORK ORDER #14	CONTRACT NO. GFM-520N DRAWING NO. P-5 SHEET 7 OF 15 DATE JULY 6, 2018 REVISION NO. 0
REV.	DESCRIPTION	DATE	APP'D.					
<small>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.</small>								



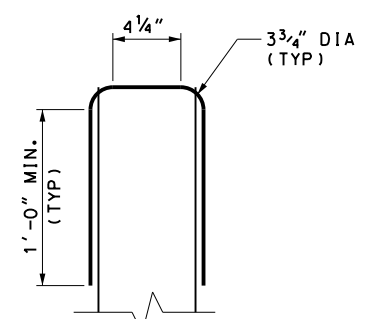
DETAIL A
N.T.S.

DETAIL B
N.T.S.

DETAIL C
N.T.S.



REBAR DETAIL 1
N.T.S.



REBAR DETAIL 2
N.T.S.

NOTES:

1. CONCRETE SHALL BE IN ACCORDANCE WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH OF $F'c = 4000$ psi.
2. REINFORCING STEEL SHALL BE EPOXY COATED AND CONFORM TO ASTM A615, GRADE 60.
3. MINIMUM CLEAR COVER TO REINFORCING STEEL SHALL BE 2", UNLESS NOTED OTHERWISE.

REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
DRAWN BY P. MANAYATH				DESIGNED BY L. HERBERT
CHECKED BY C. CLARK				SCALE: NOT TO SCALE

Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005

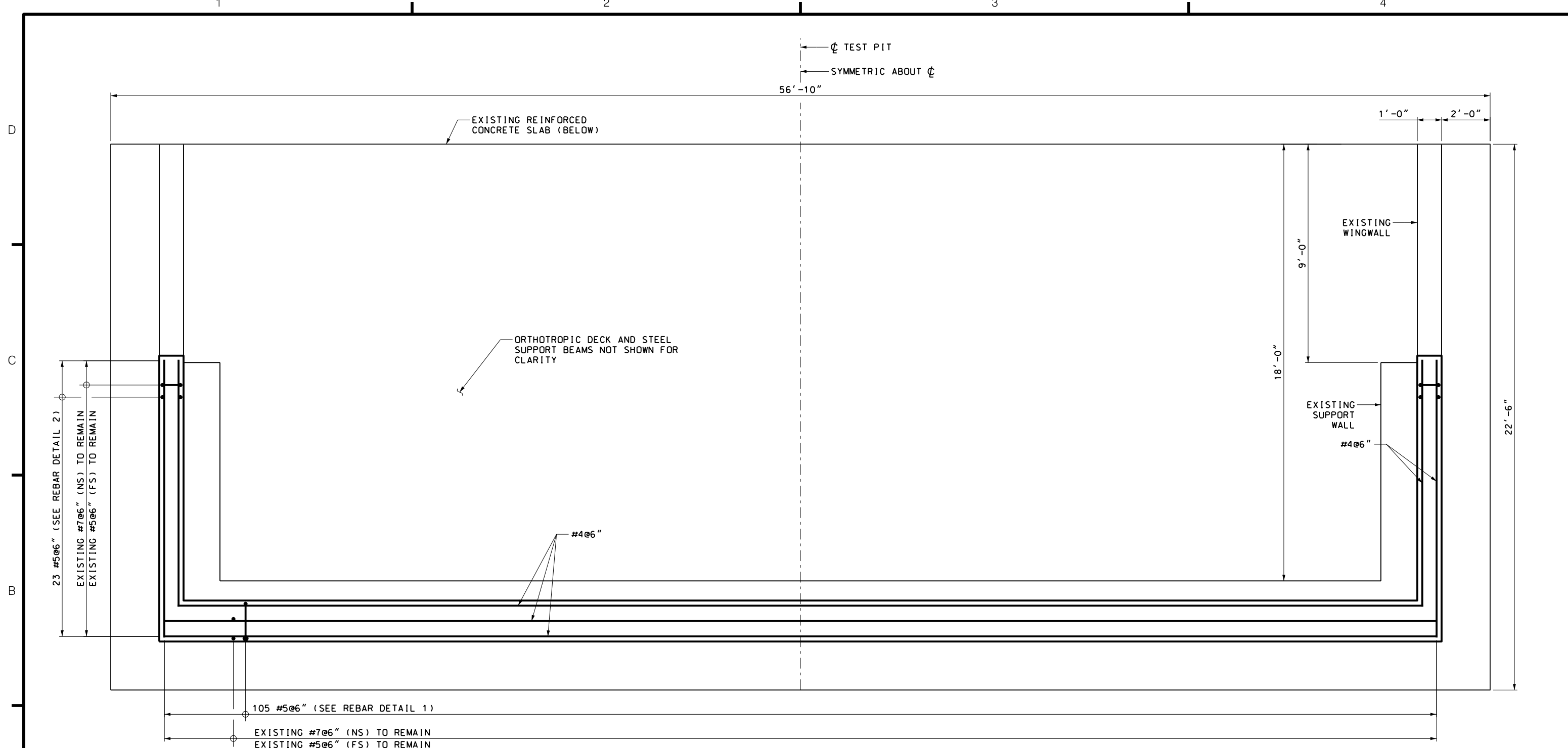


Triborough
Bridge and Tunnel
Authority

TEST PIT DETAILS
FOR PROJECT TN-49

DRAWING TITLE	CONTRACT NO.
REINFORCEMENT DETAILS - 1	GFM-520N
PROJECT NO.	DRAWING NO.
GFM-520N, WORK ORDER #14	P-6
	SHEET 8 OF 15
	DATE
	JULY 6, 2018
	REVISION NO.
	0

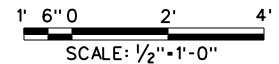
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REINFORCEMENT PLAN
SCALE: 1/2"=1'-0"

NOTES:

1. CONCRETE SHALL BE IN ACCORDANCE WITH THE SPECIFIED MINIMUM 28-DAY COMPRESSIVE STRENGTH OF F'c = 4000 PSI, 3/4", 565.
2. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31 (ASTM A615) GRADE 60.
3. MINIMUM CLEAR COVER TO REINFORCING STEEL SHALL BE 2", UNLESS NOTED OTHERWISE.



REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
				C. CLARK
DRAWN BY P. MANAYATH				DESIGNED BY L. HERBERT
SCALE: 3/8"=1'-0"				

Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005

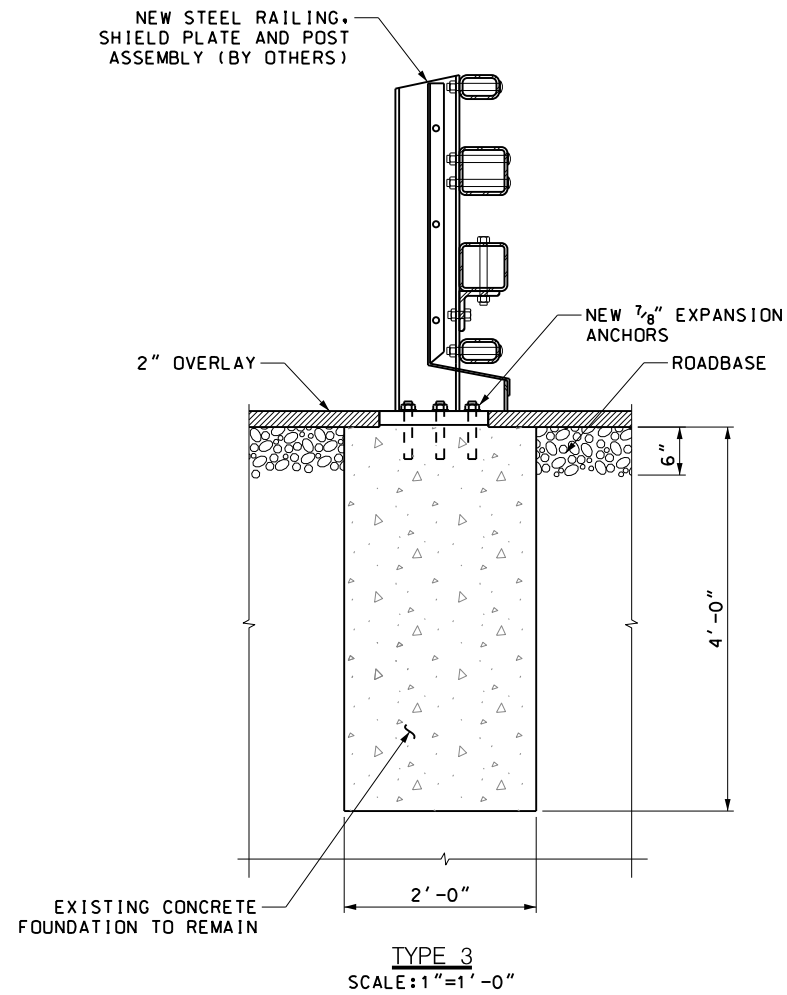
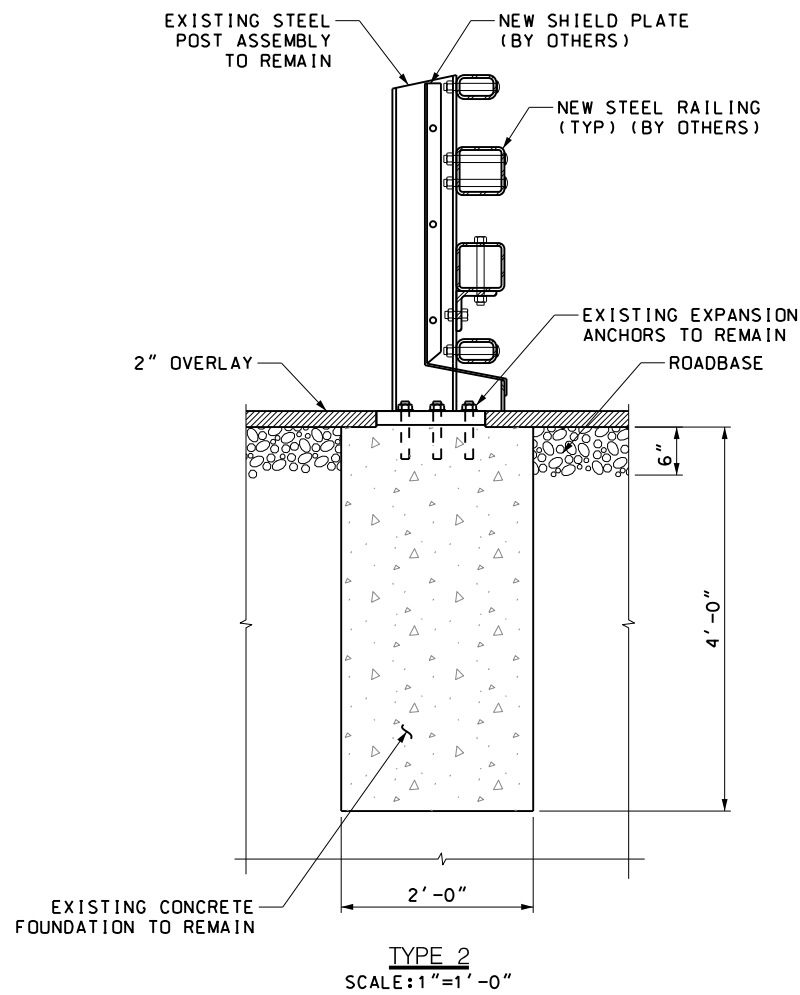
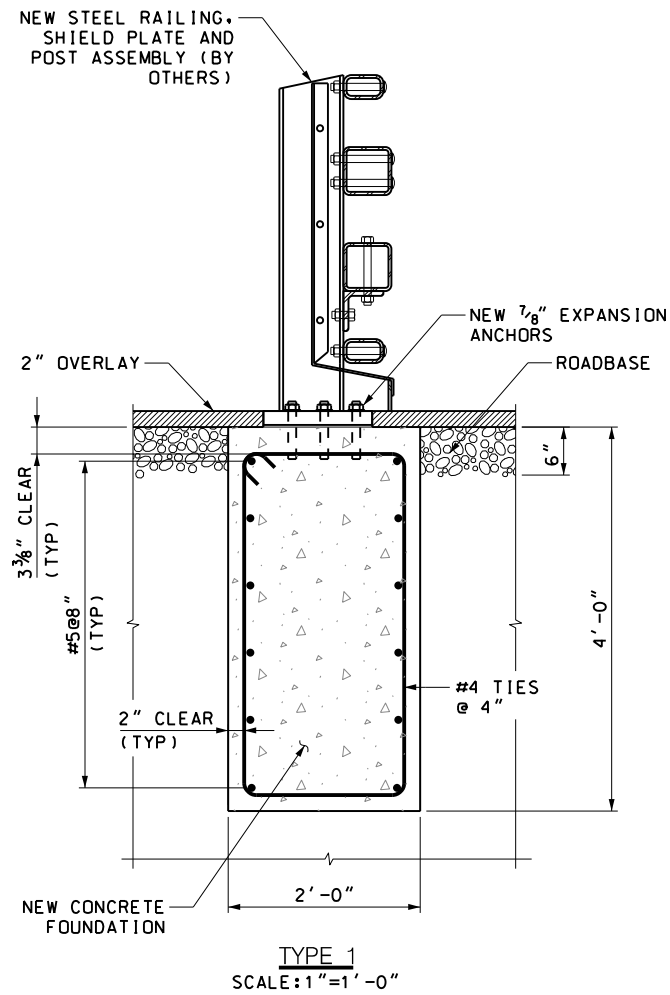


Triborough
Bridge and Tunnel
Authority

TEST PIT DETAILS
FOR PROJECT TN-49

DRAWING TITLE	CONTRACT NO.
REINFORCEMENT DETAILS - 2	GFM-520N
PROJECT NO.	DRAWING NO.
GFM-520N, WORK ORDER #14	P-7
	SHEET 9 OF 15
	DATE
	JULY 6, 2018
	REVISION NO.
	0

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SECTION 5
SCALE: 1"=1'-0" P-1

TABLE 1 – POST INSTALLATION		
POST NUMBER	POST TYPE	"A"
1L	1	4' - 11 1/4"
2L	2	9' - 3 3/4"
3L	3	14' - 9 3/4"
4L	3	19' - 9"
5L	3	24' - 8 1/4"
6L	3	29' - 7 1/2"
7L	3	34' - 6 3/4"
8L	3	39' - 6"
9L	3	44' - 5 1/4"
10L	3	49' - 4 1/2"
11L	3	54' - 3 3/4"
12L	2	58' - 9 3/4"
13L	3	64' - 2 1/4"
14L	1	69' - 1 1/2"
1R	1	4' - 11 1/4"
2R	2	9' - 3 3/4"
3R	3	14' - 9 3/4"
4R	1	19' - 9"

NOTES:

1. CONCRETE SHALL BE IN ACCORDANCE WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH OF F'c=4000 psi.
2. REINFORCING STEEL SHALL BE EPOXY COATED AND CONFORM TO ASTM A615, GRADE 60.
3. MINIMUM CLEAR COVER TO REINFORCING STEEL SHALL BE 2", UNLESS NOTED OTHERWISE.

1' 6" 0 1' 2'
SCALE: 1"=1'-0"

REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY
				C. CLARK
				SCALE: NOT TO SCALE

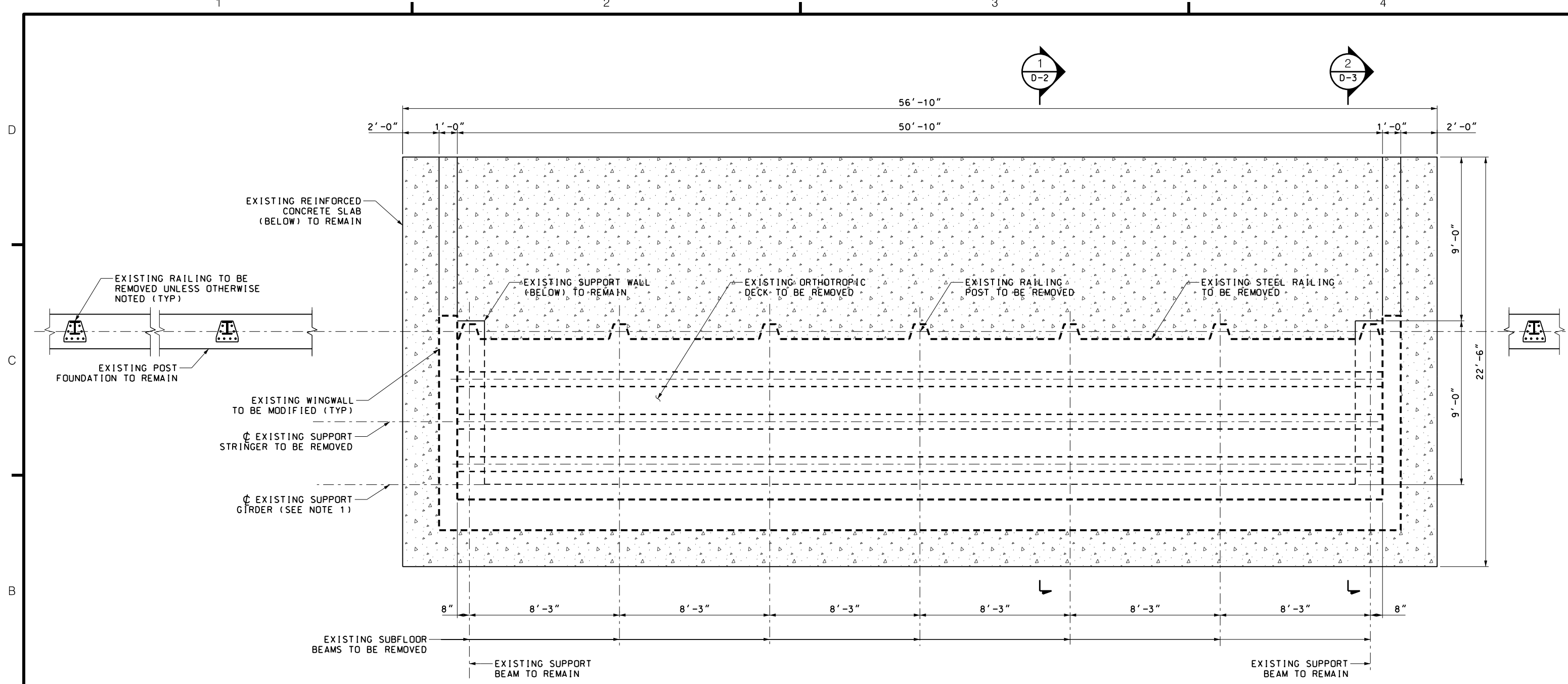
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Thornton Tomasetti
40 WALL STREET
NEW YORK, NY 10005

Triborough
Bridge and Tunnel
Authority

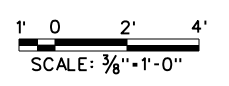
TEST PIT DETAILS
FOR PROJECT TN-49

DRAWING TITLE	CONTRACT NO.
STEEL RAILING POST ANCHORAGE DETAILS	GFM-520N
PROJECT NO.	DRAWING NO.
GFM-520N, WORK ORDER #14	P-8
	SHEET 10 OF 15
	DATE
	JULY 6, 2018
	REVISION NO.
	0



TEST PIT DEMOLITION PLAN
SCALE: 3/8"=1'-0"

- NOTES:**
- SECTIONS OF EXISTING SUPPORT GIRDER SHALL BE REMOVED TO FACILITATE THE INSTALLATION OF NEW FLOOR TRUSS SUPPORT. SEE DWG NO D-2 AND D-5 FOR DETAILS.



				DRAWN BY P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK	Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	Triborough Bridge and Tunnel Authority	DRAWING TITLE TEST PIT DEMOLITION PLAN	CONTRACT NO. GFM-520N DRAWING NO. D-1 SHEET 11 OF 15
REV. DESCRIPTION <small>"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."</small>	DATE APP'D.	SCALE: 3/8"=1'-0"	PROJECT NO. GFM-520N, WORK ORDER #14	DATE JULY 6, 2018 REVISION NO. 0				

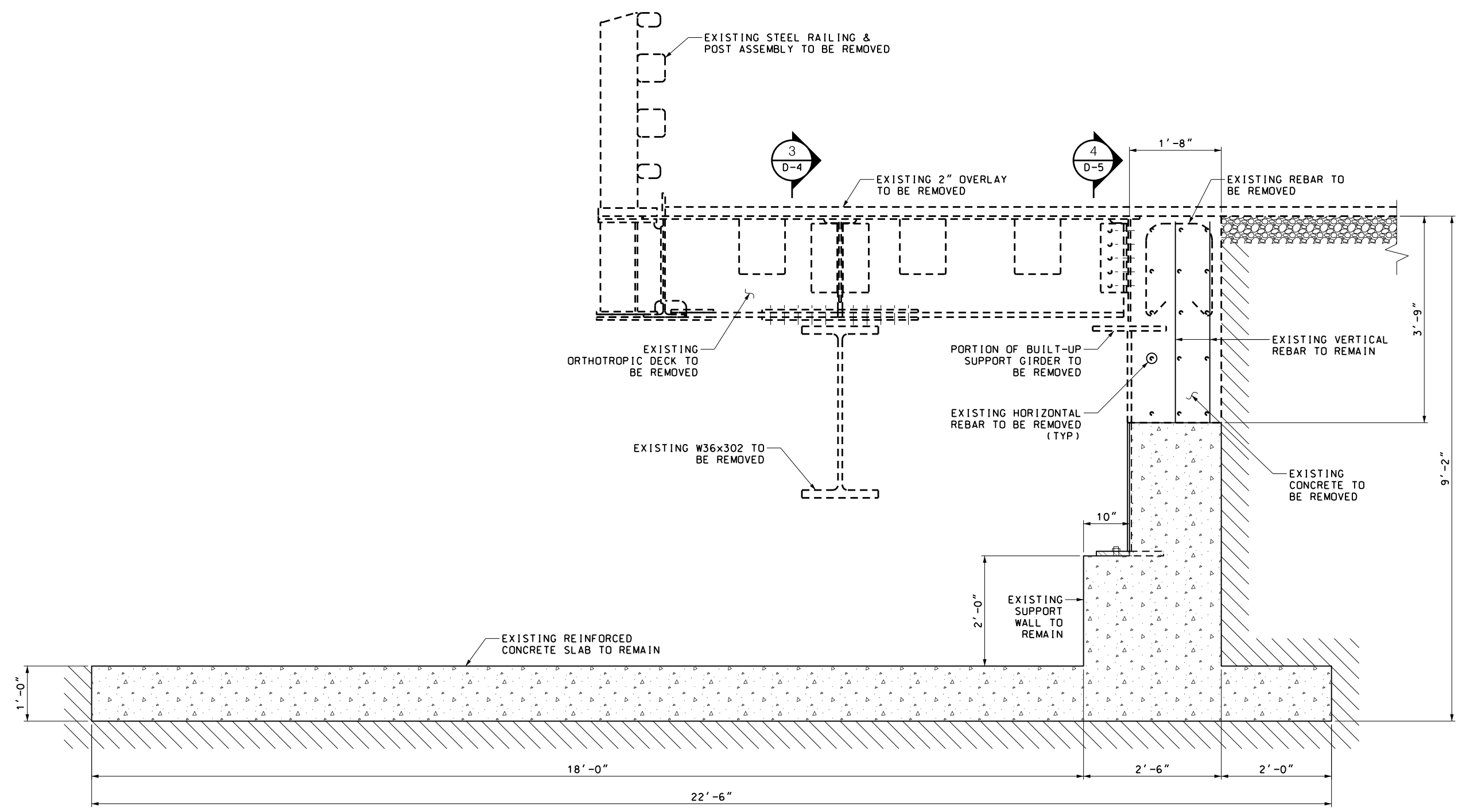
D
C
B
A

1

2


3

4



SECTION 1
SCALE: 1"=1'-0" D-1

1' 6" 0 1' 2'
SCALE: 1"=1'-0"

				DRAWN BY P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK	Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	 Triborough Bridge and Tunnel Authority	DRAWING TITLE DEMOLITION DETAILS - 1	CONTRACT NO. GFM-520N
REV.	DESCRIPTION	DATE	APP'D.	SCALE: AS NOTED				TEST PIT DETAILS FOR PROJECT TN-49

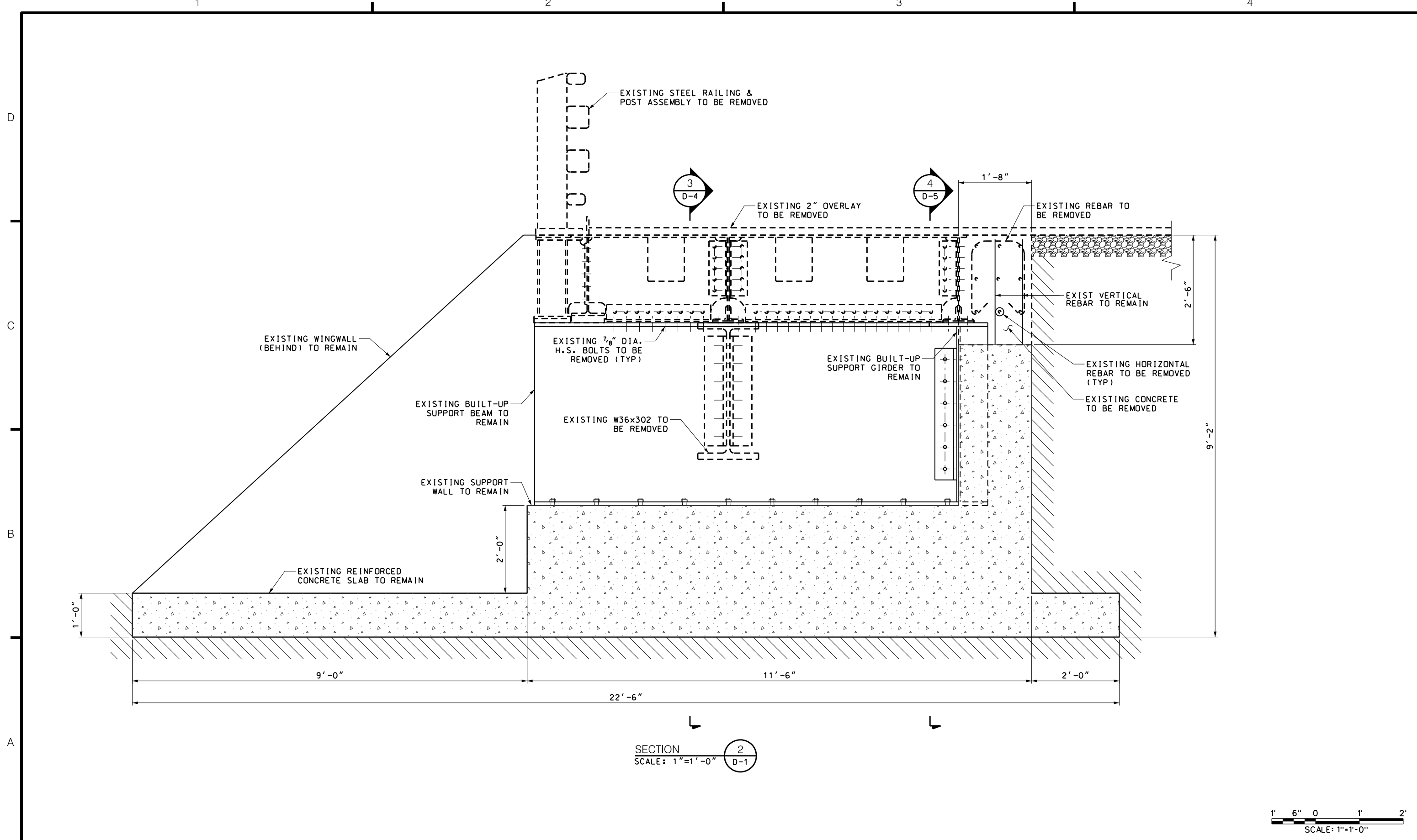
"IT IS A VIOLATION OF THE PROFESSIONAL LICENSE LAW FOR ANY PERSON TO ALTER THIS DRAWING IN ANY WAY, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER/ARCHITECT AS APPLICABLE. THE ALTERING ENGINEER/ARCHITECT SHALL AFFIX HIS/HER SEAL AND THE NOTATION 'ALTERED BY' FOLLOWED BY HIS/HER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

1

2


3

4

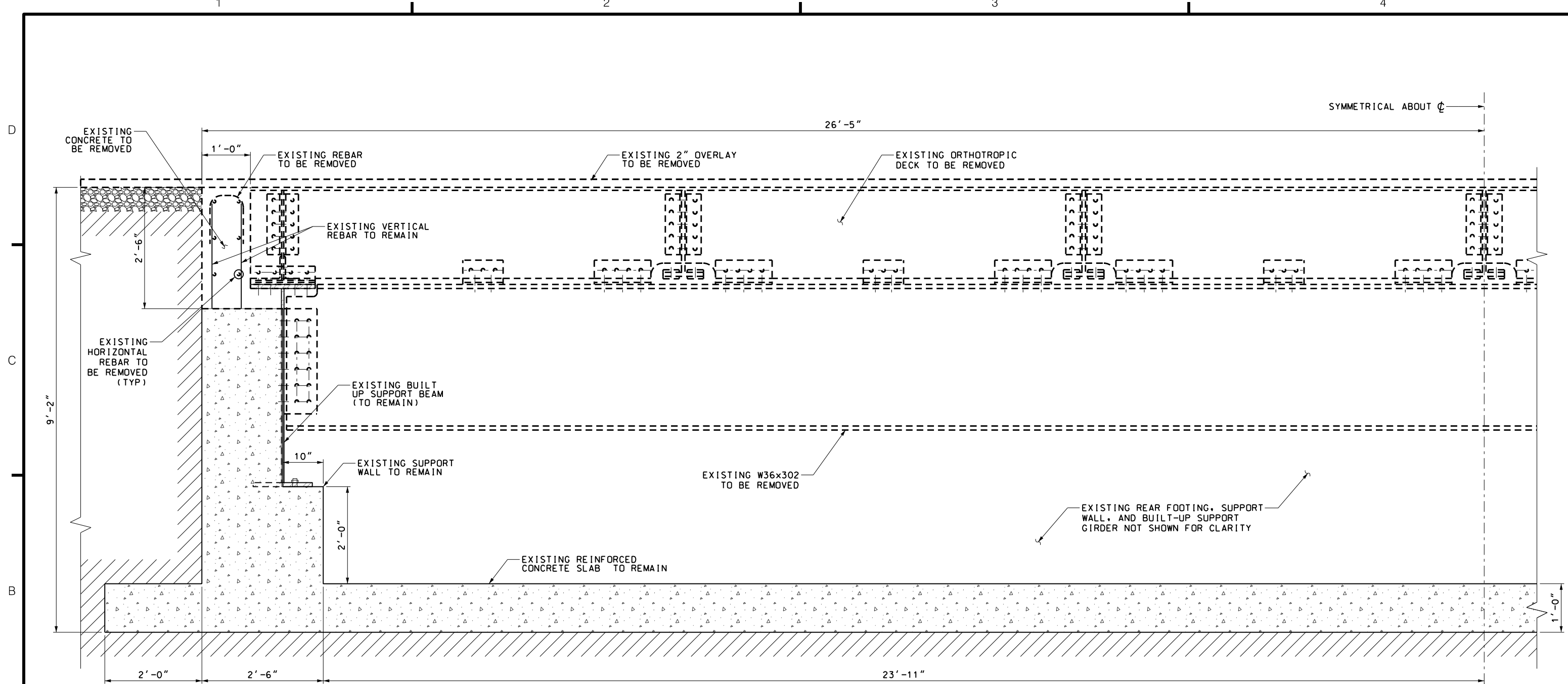


SECTION 2
SCALE: 1"=1'-0" D-1

1' 6" 0 1' 2'
SCALE: 1"=1'-0"

				DRAWN BY P. MANAYATH DESIGNED BY L. HERBERT CHECKED BY C. CLARK	Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	 Triborough Bridge and Tunnel Authority	DRAWING TITLE DEMOLITION DETAILS - 2		CONTRACT NO. GFM-520N DRAWING NO. D-3 SHEET 13 OF 15
REV.	DESCRIPTION	DATE	APP'D.	SCALE: AS NOTED			TEST PIT DETAILS FOR PROJECT TN-49		PROJECT NO. GFM-520N, WORK ORDER #14

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SECTION 3 3
 SCALE: 1"=1'-0" D-2 D-3

1' 6" 0 1' 2'
 SCALE: 1"=1'-0"

REV.	DESCRIPTION	DATE	APP'D.	CHECKED BY	SCALE:
				C. CLARK	1"=1'-0"

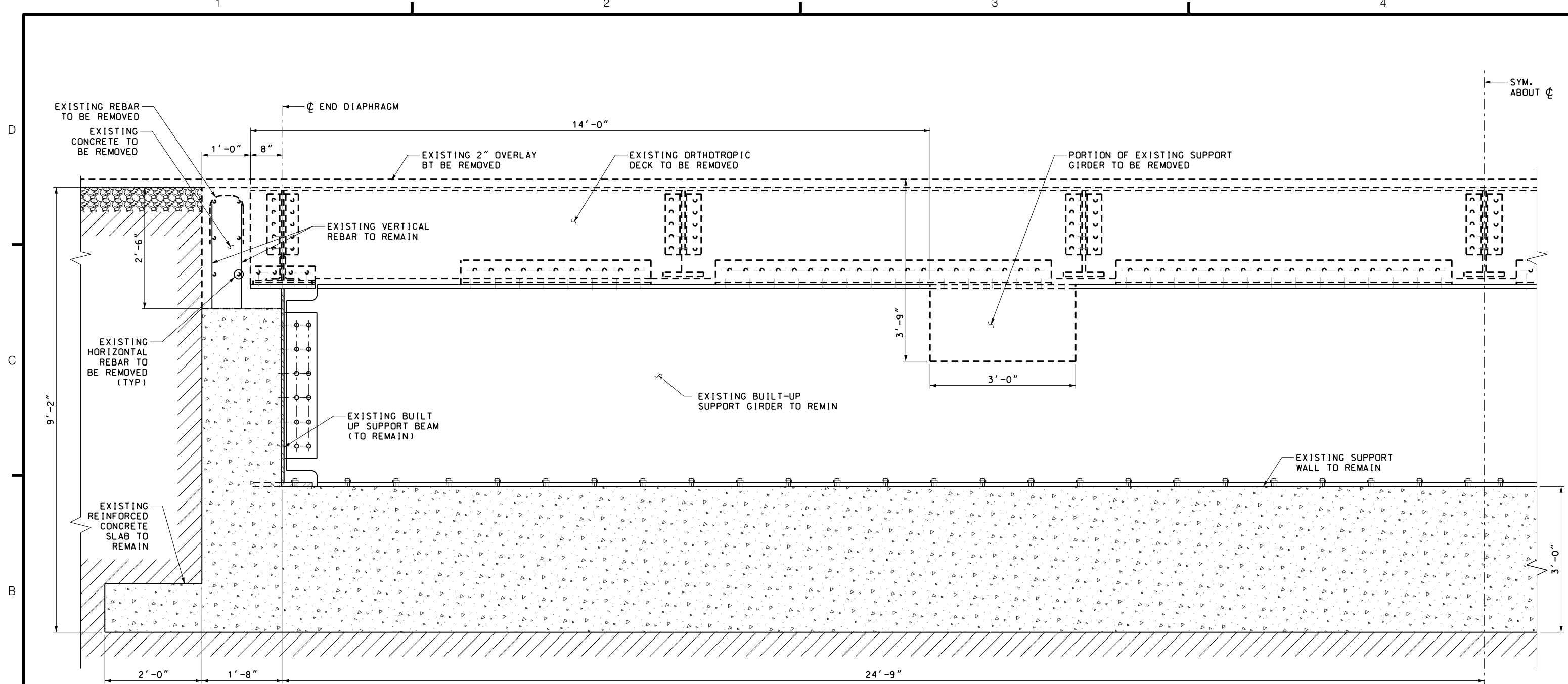
Thornton Tomasetti
 40 WALL STREET
 NEW YORK, NY 10005

Triborough Bridge and Tunnel Authority
 TEST PIT DETAILS
 FOR PROJECT TN-49

DRAWING TITLE
DEMOLITION DETAILS - 3
 PROJECT NO. GFM-520N, WORK ORDER #14


CONTRACT NO. GFM-520N
 DRAWING NO. **D-4**
 SHEET 14 OF 15
 DATE JULY 6, 2018
 REVISION NO. 0

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SECTION 4 4
 SCALE: 1"=1'-0" D-2 D-3

1' 6" 0 1' 2'
 SCALE: 1"=1'-0"

REV.	DESCRIPTION	DATE	APP'D.	DRAWN BY	P. MANAYATH	Thornton Tomasetti 40 WALL STREET NEW YORK, NY 10005	 Triborough Bridge and Tunnel Authority	DRAWING TITLE DEMOLITION DETAILS - 4	CONTRACT NO.	GFM-520N	
				CHECKED BY	C. CLARK				DRAWING NO.	D-5	
"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."				SCALE:	1"=1'-0"	TEST PIT DETAILS FOR PROJECT TN-49		PROJECT NO.	GFM-520N, WORK ORDER #14	DATE	JULY 6, 2018
										REVISION NO.	0

SHEET 15 OF 15