LINDSAY™ | INSTALLATION MANUAL

TAU-XR™

Redirective Non-Gating Crash Cushion

P/N 1828819 Rev D (ECN 63332)

lindsay.com

Important For Your Safety

We have provided important safety messages in this manual. ALWAYS read and obey all safety messages.

 This is the safety alert symbol.

This symbol alerts you to hazards that can kill or hurt you and others. All safety messages will be preceded by the safety alert symbol and the word “DANGER”, “WARNING”, or “CAUTION”.

These words mean:

DANGER **IMMEDIATE HAZARDS THAT WILL RESULT IN SEVERE PERSONAL INJURY OR DEATH.**

WARNING **Hazards or unsafe practices that COULD result in severe personal injury or death.**

CAUTION Hazards or unsafe practices that COULD result in minor personal injury or product or property damage.

This manual must be available to the person(s) overseeing and/or assembling the crash cushion system at all times. For additional copies, or if you have any questions about any portion of this manual, see below to contact Lindsay Transportation Solutions.

Contact Information

Lindsay Transportation Solutions

U.S. Toll Free: (888) 800-3691 or +1 (707) 374-6800

THIS MANUAL MAY BE UPDATED PERIODICALLY. PLEASE ENSURE THAT YOU ARE USING THE LATEST VERSION OF THE MANUAL, WHICH IS AVAILABLE (I) BY SCANNING THE QR CODE ON THE COVER OR (II) BY VISITING

https://www.lindsay.com/usca/en/infrastructure/resources/product-manuals/

Standard Limited Warranty

Lindsay Transportation Solutions, Inc. (collectively with its parent company Lindsay Corporation and all other subsidiaries and affiliates directly and indirectly owned by Lindsay Corporation, "LTS") has tested the impact performance of certain of its barriers, crash cushion systems, and other highway safety hardware at an ISO-certified crash testing laboratory under controlled conditions pursuant to the test matrix criteria of NCHRP 350, MASH or EN-1317, as applicable, as designated by the American Association of State Highway and Transportation Officials ("AASHTO") and the Federal Highway Administration ("FHWA"), or the European Committee for Standardization ("CEN"). Such tests do not replicate every possible crash scenario and they are not intended to represent the performance of barriers, crash cushion systems, and other highway safety hardware when impacted in every real world impact condition or by every vehicle type. It is widely recognized that there are impact conditions that exceed the performance expectations of all highway safety equipment.

The products with which this limited warranty is provided (the "Products") are intended to be installed, operated, and maintained in a manner not inconsistent with instructional materials provided by LTS, the AASHTO Roadside Design Guide (as applicable), and state and federal guidelines (as applicable). Selection and proper installation, operation, and maintenance of any highway safety product, including the Products, is the responsibility of the highway authority and state department of transportation.

LTS EXPRESSLY DISCLAIMS ANY WARRANTY OR LIABILITY FOR CLAIMS ARISING BY REASONS OF DEATH OR PERSONAL INJURY OR DAMAGE TO PROPERTY RESULTING FROM ANY IMPACT, COLLISION OR HARMFUL CONTACT WITH THE PRODUCTS OR NEARBY HAZARDS OR OBJECTS BY ANY VEHICLE, OBJECTS, OR PERSONS, REGARDLESS OF WHETHER THE PRODUCTS WERE INSTALLED IN CONSULTATION WITH LTS OR BY THIRD PARTIES.

LTS warrants that any Product or component part manufactured by LTS will be free from defects in material or workmanship. LTS will replace free of cost any Product or component part manufactured by LTS that contains such a defect.

THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

LTS, in its sole discretion, may elect to disclaim the foregoing warranty benefits with respect to (i) any Products that have been inspected and determined by LTS, in its sole discretion, (a) to have been subject to improper storage, accident, misuse, or unauthorized alterations, or (b) that have not been installed, operated, and maintained in accordance with approved procedures and guidelines (including but not limited to instructions included in materials provided by LTS and the AASHTO Roadside Design Guide) and (ii) any components manufactured by the Buyer.

LTS' LIABILITY UNDER THIS WARRANTY IS EXPRESSLY LIMITED TO REPLACEMENT FREE OF COST (IN THE FORM AND UNDER THE TERMS ORIGINALLY SHIPPED), OR TO REPAIR BY LTS, OF PRODUCTS OR PARTS NOT COMPLYING WITH LTS SPECIFICATIONS, OR, AT LTS' ELECTION, TO THE REPAYMENT OF AN AMOUNT EQUAL TO THE PURCHASE PRICE OF SUCH PRODUCTS OR PARTS, WHETHER SUCH CLAIMS ARE FOR BREACH OF WARRANTY OR NEGLIGENCE. LTS SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, OR SPECIAL LOSSES, DAMAGES, OR EXPENSES OF ANY KIND, INCLUDING, WITHOUT LIMITATION, ANY SUCH LOSSES, DAMAGES, OR EXPENSES ARISING DIRECTLY OR INDIRECTLY FROM THE SALE, HANDLING, OR USE OF THE PRODUCTS FROM ANY OTHER CAUSE RELATING THERETO, OR FROM PERSONAL INJURY OR LOSS OF PROFIT.

Any claim by the Buyer with reference to Products sold hereunder for any cause shall be deemed waived by the Buyer unless LTS is notified in writing, in the case of defects apparent on visual inspection, within ninety (90) days from the delivery date, or, in the case of defects not apparent on visual inspection, within twelve (12) months from the said delivery date. Products claimed to be defective may be returned prepaid to LTS' plant for inspection in accordance with return shipping instructions that LTS shall furnish to the Buyer forthwith upon receipt of the Buyer's notice of claim. If the claim is established, LTS will reimburse that Buyer for all carriage costs incurred hereunder.

W030587 Rev. 11 revised October 16, 2017

LINDSAY™ | 18135 Burke Street, Ste 100 | Omaha, NE 68022 | Tel. +1 (402) 829-6800 | Fax. +1 (402) 829-6334

TAU-XR™ Crash Cushion

Impact Performance Limitations and Warnings

Lindsay Transportation Solutions, LLC (LTS), developed the TAU-XR, a low maintenance fully redirective crash cushion, to the latest standards defined in the American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH), Second Edition, 2016, for Test Level 3 impacts.

Testing was conducted at Safe Technologies, LLC, under the direction of Holmes Solutions, an ISO-certified crash test laboratory, pursuant to the test matrix criteria for non-gating redirective crash cushions outlined in MASH.

According to MASH, testing guidelines cannot include all possible impact conditions that may be experienced in real life. The test matrix represents the 85th percentile of impact speeds and impact angles, the 5th and 95th percentile of vehicle weights, and critical impact points that are believed to represent the worst practical conditions.

Real life crashes may result in different outcomes than seen during crash testing due to the limitless variety of combinations of impact conditions.

The TAU-XR Crash Cushion is intended to be installed, operated, and maintained in a manner consistent with instructional materials provided by LTS, the AASHTO Roadside Design Guide, and applicable state and federal guidelines. Selection and proper installation, operation, and maintenance of any road safety product, including the TAU-XR Crash Cushion, is the responsibility of the highway authority and state department of transportation.

Impacts that deviate from the MASH test matrix criteria or involve an improperly installed, operated, or maintained TAU-XR Crash Cushion may result in significantly different outcomes than those experienced in testing. For the avoidance of doubt, LTS makes no representations or warranties with respect to the performance of the TAU-XR Crash Cushion (i) in impacts that deviate from the MASH test matrix criteria and/or (ii) if not installed, operated, and maintained as directed in instructional materials provided by LTS, the AASHTO Roadside Design Guide, and applicable state and federal guidelines.

If you need additional information, or have questions about the TAU-XR Crash Cushion, please call the LTS Customer Service Department at (866) 404-5049 (U.S. toll free) or (707) 374-6800.

Table of Contents

TAU-XR™ System Overview

The TAU-XR™ is a low maintenance, fully redirective, non-gating crash cushion designed to meet the latest test standards defined in the Manual for Assessing Safety Hardware (MASH), Second Edition, 2016 for Test Level 3 impacts. The TAU-XR system utilizes a rigid rail anchoring system, a backstop, a front support, 6 mid supports and 14 telescoping thrie-beam side panels to form 7 collapsible bays. The bays are equipped with varying arrays of crushable aluminum tubes designed to absorb the kinetic energy and safely contain vehicles during head on impacts while the side panels safely redirect vehicles during side impacts. The system has a nominal 819.15 mm (32 1/4 in) height, a
868.36 mm (34 3/16 in) width except at the front nose, which is 914.4 mm (36 in) wide, and a length of 7181.85 mm (282 ¾ in). The system was designed and tested to safely shield hazards up to 762 mm (30 in) wide.

The TAU-XR is comprised of a dual rail weldment; a compact backstop assembly; a front support; six mid supports; 16 rail sliders; two front side panels; 14 sliding panels; two end panels; two rubber bumpers; a cross brace; 28 sets of sliders and various sets of hardware such as nuts, bolts, springs, and washers. The seven collapsible bays contain 32 aluminum tubes distributed among the bays and nested into designated pockets to ensure correct placement. A retaining bar is installed across each end to maintain the position of the tubes.

The TAU-XR rail and backstop weldments are anchored to a concrete or asphalt foundation using 51 threaded rods secured in place with epoxy.

The TAU-XR utilizes standard corrugated thrie-beam panels which enable the application of standard transition methods to various roadside hardware and barrier systems. Proprietary transitions using nested angled and standard end panels were tested and are available.

Any delineation pattern, tape, or decal may be placed on the delineation plate which is part of the front support.

The TAU-XR may display identification decals, tags, or stamps for product identification, component tracking, and quality control. The identification method and location shall not affect the capacity, function, or performance of the TAU-XR.

The TAU-XR was tested with an ImpactAlert device, developed by Lindsay, to monitor and detect vehicle impacts and send notifications via SMS text or e-mail to designated repair crew or DOTs. The ImpactAlert was affixed to the downstream side of the backstop. The ImpactAlert is an optional device that does not affect the capacity, function, or performance of the TAU-XR.

Recommended Tools

NOTE: This list of tools, safety equipment, and traffic control equipment is a general recommendation and should not be considered a comprehensive list. Depending on the specific characteristics of the job site and the complexity of the repair or assembly, more or less tools may be necessary.

NOTE: For restoring a crashed system additional tools and machines may be required, such as a tow truck , shackle and tow rope.

Required Tools

- Tape Measure
- Chalk Line
- Marking Paint
- Rotary Hammer
- Wrenches
  1-5/16"
  1-1/4"
  1-1/8"
  9/16"
- Screwdriver
  (Flat or Phillips)
- Impact Wrench (1/2" drive min)
  (pneumatic or electric)
- Compressed Air
- 22 mm (7/8 in) Diameter Wire Brush
- 1/2" Drive Torque Wrench
  min. 50 ft-lbf (680 N-m)
- 1/2" Drive Sockets
  1-5/16" (normal)
  1-1/4" (deep)
  1-1/8" (deep)
  9/16" (deep)
- Masonry Bit
  22 mm (7/8 in) diameter x
  609 mm (24 in) long

Optional Tools

- 22mm x 915mm (7/8"x36") masonry drill bit
- Ratchet drive extensions
- Combination wrench
- Ratchet wrench
- Large sledge hammer.
- Electric drill with 22 mm (7/8 in) rebar cutter drill bit.

Safety Equipment

- Safety Glasses
- Hearing Protection
- Gloves
- Steel Toe Boots
- Hard Hat
- Safety Vest
- Dust Mask

Traffic Control Equipment

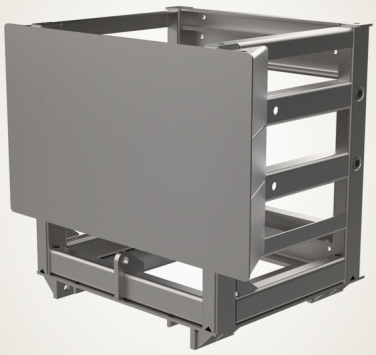
- Traffic Control Equipment

Parts Identification

⚠ WARNING **Use only Lindsay Transportation Solutions parts that are specified by Lindsay Transportation Solutions for use with the TAU-XR™ System. The use of unspecified parts is prohibited and could result in severe personal injury or death.**

NOTE: Hardware not shown.

1



FRONT SUPPORT

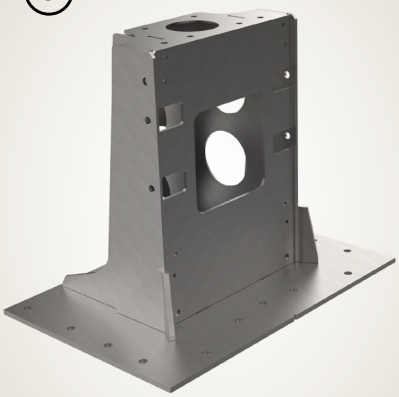
1829354

2

MID-SUPPORT

1829367

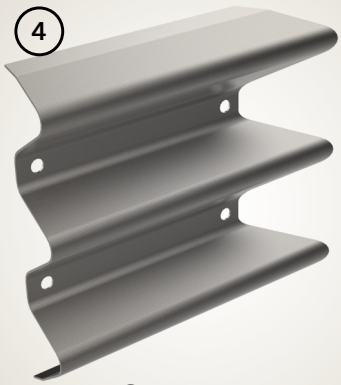
3



BACKSTOP

1829089

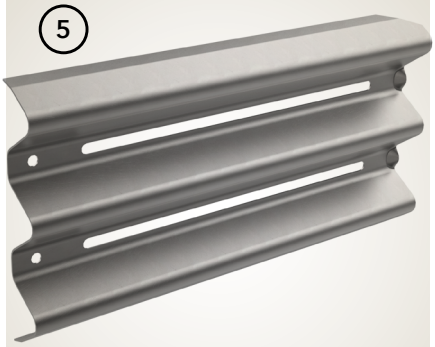
4



FRONT SUPPORT PANEL

1829084

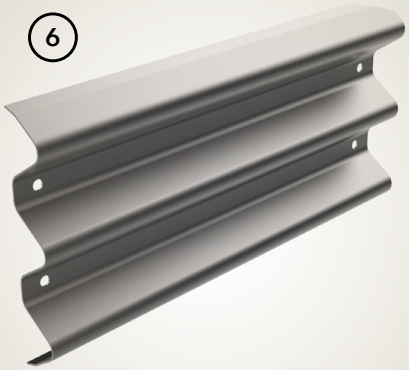
5



SLIDER PANEL

1825984

6



END PANEL

1825106

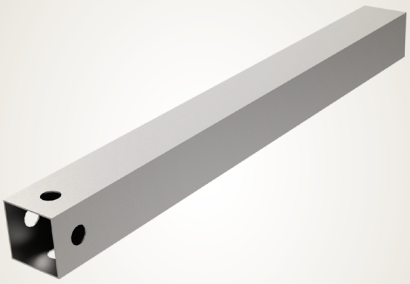
Parts Identification (Cont.)

7

RAIL

1826930

8



ALUMINUM TUBE

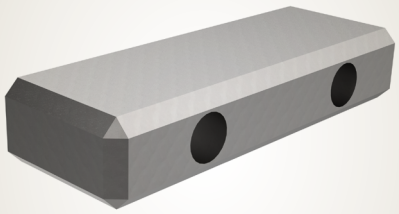
1824972

9

SPRING

1827426

10



SLIDER BLOCK

1826967

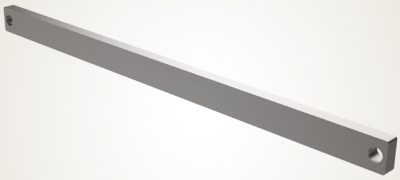
11

CROSS BRACE

1829569

Parts Identification (Cont.)

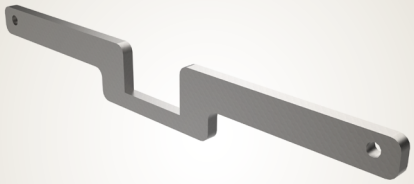
12



RETAINING BAR

1827159

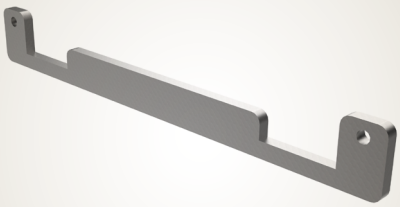
13



SINGLE TUBE HOLDER

1825832

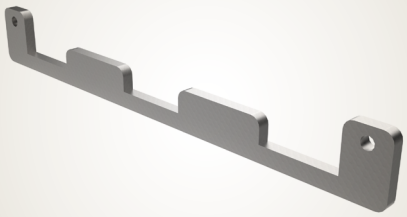
14



DOUBLE TUBE HOLDER

1825833

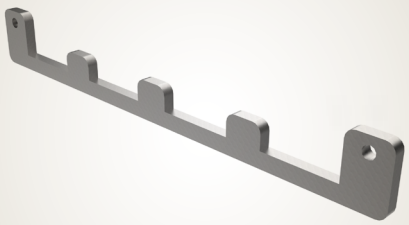
15



TRIPLE TUBE HOLDER

1825834

16



QUADRUPLE TUBE HOLDER

1825835

17

SLIDER

1827166

18

BUMPER

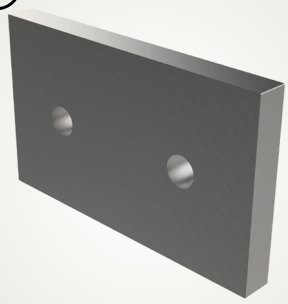
4002139

19

PANEL MOUNT

1827379

20



SPACER

1829312

Parts Identification (Cont.)

Bill of Materials, 1829560

Overall System

Item #	Part #	Description	QTY
1	1826930	WELDMENT, TAU-XR RAIL	1
17	1825106	END PANEL, THRIE-BEAM	2
18	1825984	PANEL, TAU-XR SLIDER	14
19	1829367	WELDMENT, TAU-XR MIDSUPPORT	6
32	1829354	WELDMENT, FRONT SUPPORT	1
33	1829084	PANEL, FRONT SUPPORT SIDE	2
35	1829569	WELDMENT, CROSS BRACE	1
Kit	1831841	ASSEMBLY, TAU-XR BACKSTOP	1
2	1829089	WELDMENT, TAU-XR BACKSTOP	1
3	1827379	WELDMENT, PANEL MOUNT	2
6	2001789	NUT HN 3/4-10 GR5 GEOMET	2
15	1825835	PLATE, QUADRUPLE TUBE HOLDER	2
16	1827159	BAR, TUBE RETAINER	2
23	1823982	SCREW,3/4-10X3.5" Gr5 HEX CAP	2
27	1827886	SCREW, 3/8-16 X 1-1/2 Gr5 HEX	8
29	1824115	WASHER, 3/8 SAE Gr8, FLAT	16
30	2001809	NUT HN, 3/8-16, GR5	8
Kit	1831051	KIT, TUBE HOLDER AND RETAINERS	1
12	1825832	PLATE, SINGLE TUBE HOLDER	4
13	1825833	PLATE, DOUBLE TUBE HOLDER	8
14	1825834	PLATE, TRIPLE TUBE HOLDER	4
15	1825835	PLATE, QUADRUPLE TUBE HOLDER	6
16	1827159	BAR, TUBE RETAINER	22
20	1829312	SPACER, BUMPER	2
Kit	1831052	KIT, TAU-XR PANEL HARDWARE	1
Kit	1831006	KIT, TAU-XR PANEL SLIDER	28
4	1827426	SPRING, 700 LB/IN COMPRESSION	1
5	1829086	BOLT, 3/4-10 X 6.75 A325 HEX	1
6	2001789	NUT HN 3/4-10 GR5 GEOMET	1
7	1827890	WASHER, F436 3/4" STRUC FLAT	1
31	1827166	SLIDER	1
Kit	1831875	KIT, PANEL HARDWARE W SPRING	4
25	1827888	SCREW, 3/8-16 X 2 GR5 HEX	4
29	1824115	WASHER, 3/8 SAE Gr8, FLAT	8
30	2001809	NUT HN, 3/8-16, GR5	4
Kit	1831876	KIT, FRNT SUPPORT PNL HARDWARE	4

Bill of Materials, 1829560 (continued)

Item #	Part #	Description	QTY
6	2001789	NUT HN 3/4-10 GR5 GEOMET	4
7	1827890	WASHER, F436 3/4" STRUC FLAT	8
24	1827439	SCREW, 3/4-10 X 2 GR8 HEX	4
Kit	1831053	KIT RAIL SLIDER	16
7	1827890	WASHER, F436 3/4" STRUC FLAT	2
22	1826967	BLOCK, RAIL SLIDER	1
24	1827439	SCREW, 3/4-10 X 2 GR8 HEX	2
Kit	1831356	KIT, TAU-XR CRUSH TUBE	1
11	1824972	TUBE, 80X2 SQ. ALUMINUM	32
Kit	1831344	KIT, TAU-XR MOUNTING HARDWARE	1
Kit	1831009	KIT,TAU-XR PANL BRACE HARDWARE	1
27	1827886	SCREW, 3/8-16 X 1-1/2 Gr5 HEX	2
36	2000096	WSHR FENDER 3/8 X 1.5 OD X .063 THK MGAL	2
Kit	1831865	KIT, 3/8-16 X 1-1/2 HARDWARE	2
27	1827886	SCREW, 3/8-16 X 1-1/2 Gr5 HEX	4
29	1824115	WASHER, 3/8 SAE Gr8, FLAT	8
30	2001809	NUT HN, 3/8-16, GR5	4
Kit	1831866	KIT, 3/8-16 X 2-1/2 HARDWARE	8
26	1827887	SCREW, 3/8-16 X 2-1/2 Gr5 HEX	4
29	1824115	WASHER, 3/8 SAE Gr8, FLAT	8
30	2001809	NUT HN, 3/8-16, GR5	4
Kit	1831867	KIT, 3/8-16 X4 BUMPER HARDWARE	1
21	4002139	RUBBER BUMPER	2
28	1829369	SCREW, 3/8-16 X 4", HEX CAP	4
29	1824115	WASHER, 3/8 SAE Gr8, FLAT	8
30	2001809	NUT HN, 3/8-16, GR5	4
Kit	1831868	KIT, 3/8-16 X 2 HARDWARE	4
25	1827888	SCREW, 3/8-16 X 2 GR5 HEX	4
29	1824115	WASHER, 3/8 SAE Gr8, FLAT	8
30	2001809	NUT HN, 3/8-16, GR5	4
Kit	1831877	KIT, RAIL HARDWARE	1
8	1823981	NUT, 7/8-9 GR5, HEX	2
9	1823980	WASHER, 7/8, FLAT	4
10	1823979	SCREW, 7/8-9 X 2.5 Gr5 HEX CAP	2
Kit	1832019	KIT, TAU-XR ASPHALT ADHESIVE*	1
Kit	1831960	KIT, TAU-XR ASPHALT ANCHOR*	1
Kit	1832018	KIT, TAU-XR CONCRETE ADHESIVE*	1
Kit	1824094	KIT, TAU-XR ANCHOR*	1

NOTE: Use appropriate anchor kit for your foundation.

Preparation

Foundation

The TAU-XR system must be installed on a concrete or asphalt pad as shown in the "Foundation Specifications" drawing.

Alternative foundation configurations shall be reviewed and approved by the engineer responsible for the project to ensure that the alternative design is equivalent or stronger than the foundation specified by Lindsay.

Transition

There are multiple approved transition configurations for the TAU-XR™ system.

See "Transitions" section for additional information.

Before installing the TAU-XR™ system, ensure that all the materials required for the system are on site and have been identified.

Anchoring Specifications

The TAU-XR system must be securely anchored to a concrete or asphalt foundation, utilizing all the holes provided in the backstop and rail.

The following are recommendations for the TAU-XR foundation and anchoring. For proposed alternatives or equivalents contact Lindsay prior to usage for approval.

Concrete Foundation Material	per LTS drawing 1830178
Concrete Foundation Depth	150 mm (6 in) with reinforcement per LTS drawing 1830622 or equivalent Or 200 mm (8 in) without reinforcement
Concrete Foundation Size	Per LTS drawing 1830622
Concrete Anchors	19 mm (3/4 in) ASTM A307 threaded rod
Concrete Anchor Embedment Depth	146 mm (5.75 in)
Concrete Installation Torque	61N-m (45ft-lbs)

Asphalt Foundation Material	per LTS drawing 1830178
Asphalt Foundation Depth	150 mm (6 in) per LTS drawing 1830178
Asphalt Foundation Size	Per LTS drawing 1831615
Asphalt Anchors	19 mm (3/4 in) ASTM A307 threaded rod
Asphalt Anchor Embedment Depth	410mm (16 in)
Asphalt Installation Torque	61N-m (45ft-lbs)

Adhesives

MANUFACTURER	MODEL
Hilti	HIT RE-500 HIT HY-200 HIT HY-100
Simpson	SET-3G AT-3G AT-XP
RedHead	A7+
Adhesives Tecnology	Ultrabond HS-1CC

Important Notes

- Ensure the TAU-XR™ system is properly transitioned in accordance with Federal, State, and Local standards.
- The TAU-XR system may or may not require a transition for certain applications. See page 12 for transition recommendations.
- **Sign Convention**
  - The term Upstream = Towards the Front Support
  - The term Downstream = Towards the Backstop

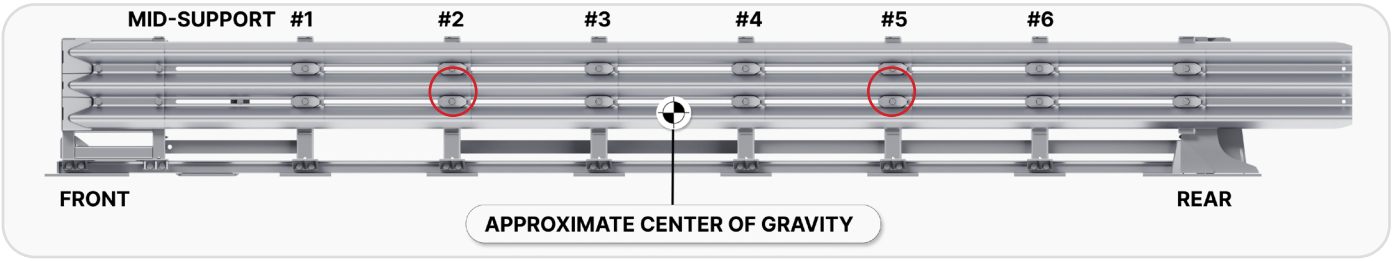
Installing a Pre-Built System

Lifting the preassembled TAU-XR™ System

⚠ DANGER **FOR LIFTING PURPOSES ENSURE SYSTEM IS PROPERLY BALANCED AROUND THE CENTER OF GRAVITY AND LIFTING DEVICES CAN SUPPORT THE SYSTEM WEIGHT OF 1724 KG (3800 LBS).**

1. Use a forklift to lift the assembled system by inserting forks under the rail with the Center of Gravity between the forks. Placing blocks under the rail will help aide getting the forklift forks under the rail.

2. If lifting the system from above utilize the 2nd and 5th mid-support and ensure the system is level while being lifted. Tubes should remain installed when lifting from above to avoid bays from collapsing.



Installing the preassembled TAU-XR system

⚠ CAUTION **Wear proper Personal Protective Equipment (PPE) when drilling and clearing debris.**

ATTENTION! Holes must be drilled to depth and cleared of debris to ensure proper anchorage adhesion is achieved.

Drilling Anchor Holes

1. Place the system on location and ensure alignment with hazard is correct.

2. Mark anchor hole locations.

3. Move system aside to drill holes.

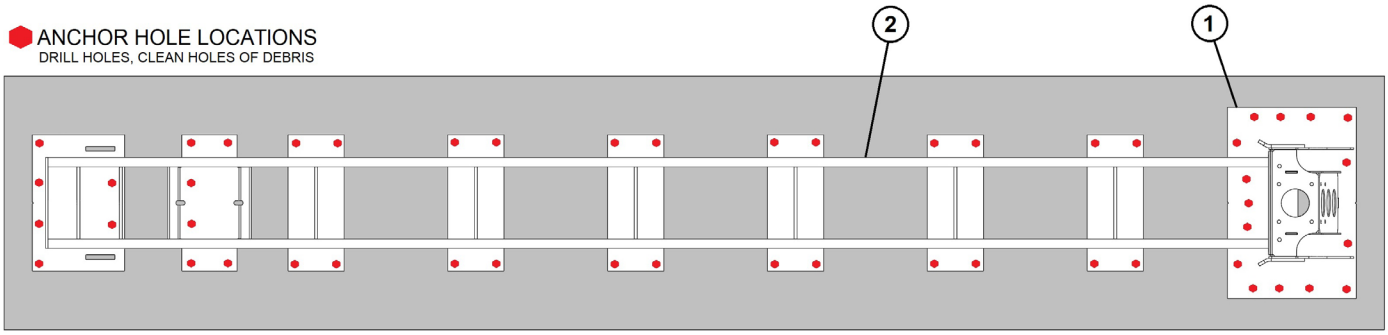
OR

1. Place the system on location and ensure alignment with hazard is correct.

2. Temporarily remove all tubes that block access to anchor holes. Use the holes in the Rail and Backstop anchor plates as a template and drill all anchor holes using a
22 mm (7/8 in) diameter mansonry drill bit to a minimum depth of 146 mm (5.75 in). A longer drill bit, 915 mm (36 in) long or longer, or a drill bit in combination with an extension can be used to access the holes without removing most of the aluminum tubes.

NOTE: A regular electric drill with a rebar cutting drill bit may need to be used in the event the masonry drill bit finds a rebar.

Thoroughly clear all anchor holes of debris and dust using compressed air and a 22 mm (7/8 in) diameter wire brush. Do not use compressed air for asphalt anchor holes.



ITEM #	PART #	DESCRIPTION	QTY
1	1829089	WELDMENT, TAU-XR BACKSTOP	1
2	1826930	WELDMENT, TAU-XR RAIL	1

Installing Anchors

⚠ WARNING **Threaded rod shall not extend more than 6.35 mm (1/4 in) above the nut when installed to avoid interference with any sliding parts of the system during an impact.**

PRO-TIP: Preassemble threaded anchor, washer, and nut with 6.35 mm (1/4 in) MAX of the anchor threads protruding beyond the top of the nut. Test fit assembled hardware into drilled holes to ensure holes are clear or debris and drilled to the proper depth.

Fill cleared holes with approved epoxy and insert threaded rods with washer and nut into each hole. Allow time for epoxy to fully cure before applying any torque load to anchors.

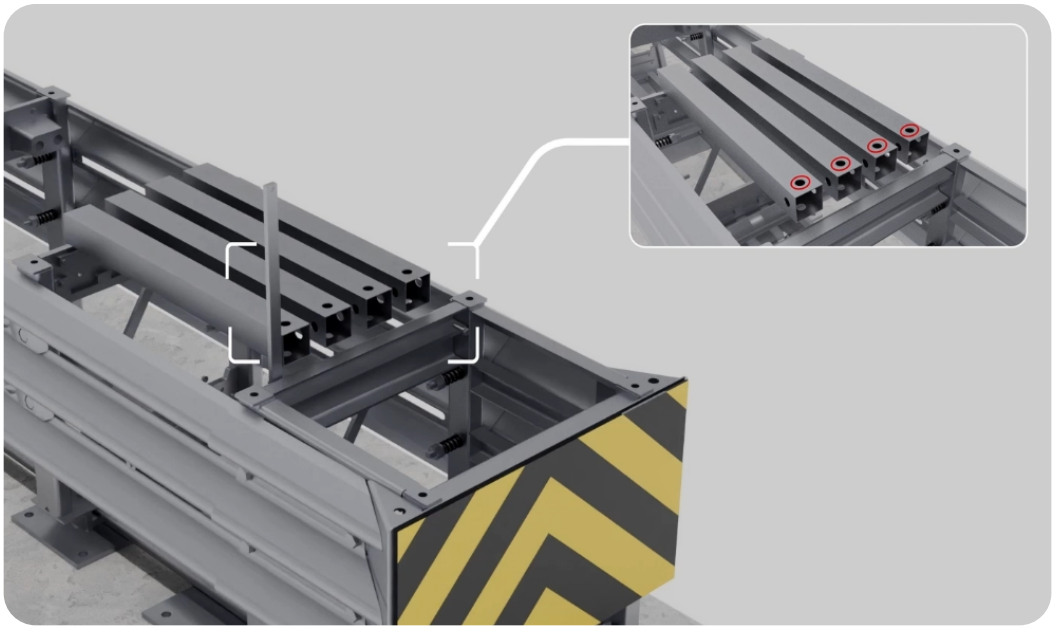
NOTE: Cure time information is supplied by the epoxy manufacturer.

Once epoxy is cured, torque anchor nuts to 61 N-m (45 ft-lbs) as specified in the "Anchoring Specifications" section.

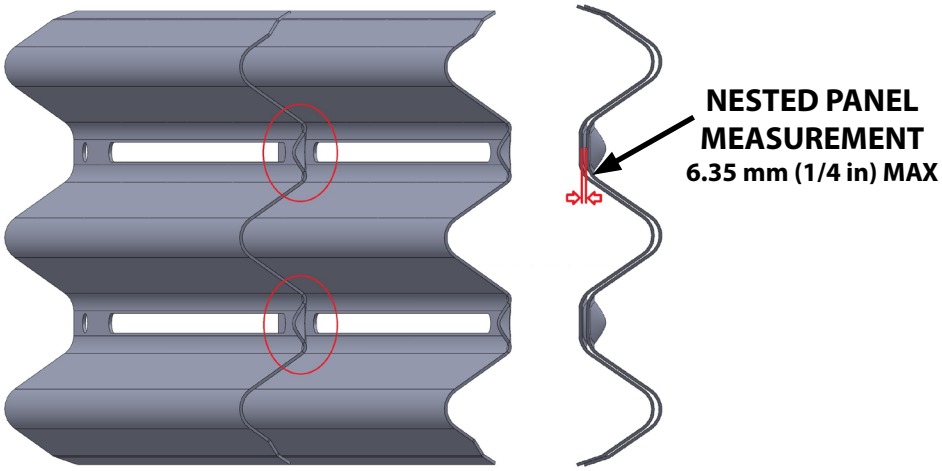
Final Steps / Inspection

ATTENTION! Tubes must be seated fully into tube holders in each bay and in the correct orientation.

1. Restore system after it is fully anchored in place.
   a. Re-install any tubes removed during anchor installation.
   b. Ensure all tubes have the trigger hole oriented to the front of the system.
   c. Ensure all springs are compressed to the pre-load length specified in the assembly drawing.



2. Ensure all panels are fully nested and the gaps between the panels at the valleys (see picture) do not exceed 6.35 mm (1/4 in).
   a. If additional nesting is required see "Replacement of Panels" section for nesting details.



ATTENTION! Panels must be fully nested to ensure proper function of panels.

Install Transition

Install any needed transitions per approved drawing.

Installation Inspection Checklist

Confirm all items in the checklist have been properly completed.

INSPECTION		
DATE	BY	ITEM
		All anchors are installed at rail and backstop and anchors do not protrude more than 6.35 mm (1/4 in) above anchor nut at any location.
		Correct torque on anchor nuts/bolts 61N-m (45ft-lbs)
		Panels are properly overlapping
		Panels are nested and maximum gap does not exceed 6.35 mm (1/4 in).
		All panel hardware is installed correctly and spring preload measurment is within spec at each support
		All 32 tubes are installed and trigger holes face towards front of system
		Correct tube count per bay.
		System is fully extended – empty bay is not collapsed
		All rail slider blocks on front and mid supports are installed and hardware is tightened

TAU-XR Maintenance & Repair

Securing A Safe Working Space

Appropriate traffic control shall be deployed in accordance with local standards.

Post Impact Inspection

After an impact, the system must be thoroughly inspected to determine which parts can be reused and which parts need to be replaced. The system must be repaired to its original condition to operate as designed during the next impact.

There can be instances where the impact is beyond the designed capacity of the Tau-XR. This may render the Tau-XR unable to be repaired and it should be completely replaced.

The system should be restored to its original length when evaluating parts for repair. If any damaged part prevents the system from being restored to its original length it should be repaired or replaced.

Conduct an inspection of all structural assemblies to ensure that all components are structurally sound, properly connected and there are no loose fasteners or damaged components.

Inspect each Aluminum Tube to ensure they have not been crushed at all and replace all tubes that show even the slightest amount of deformation.

ATTENTION! Any components observed to be deficient should be repaired or replaced in accordance with the manufacturer's instructions.

Rail/Foundation Damage

Inspect the foundation anchors. If the anchors have pulled up, moved, or if there are any cracks around the anchoring area, the foundation may need to be replaced or the system may need to be repositioned to a more stable area of the foundation. Inspect the Rail. Any damage that could prevent the Mid-Supports or Front Support from sliding freely on the rail (anything in excess of 4.76 mm (3/16 in). should be reported to Lindsay Engineering for evaluation. The rail may need to be repaired or replaced.

Mid Supports

Mid Supports that show bowing across the top cross brace should be evaluated. Replace or repair any Mid Supports that have bowed more than 4.7 mm (3/16 in).

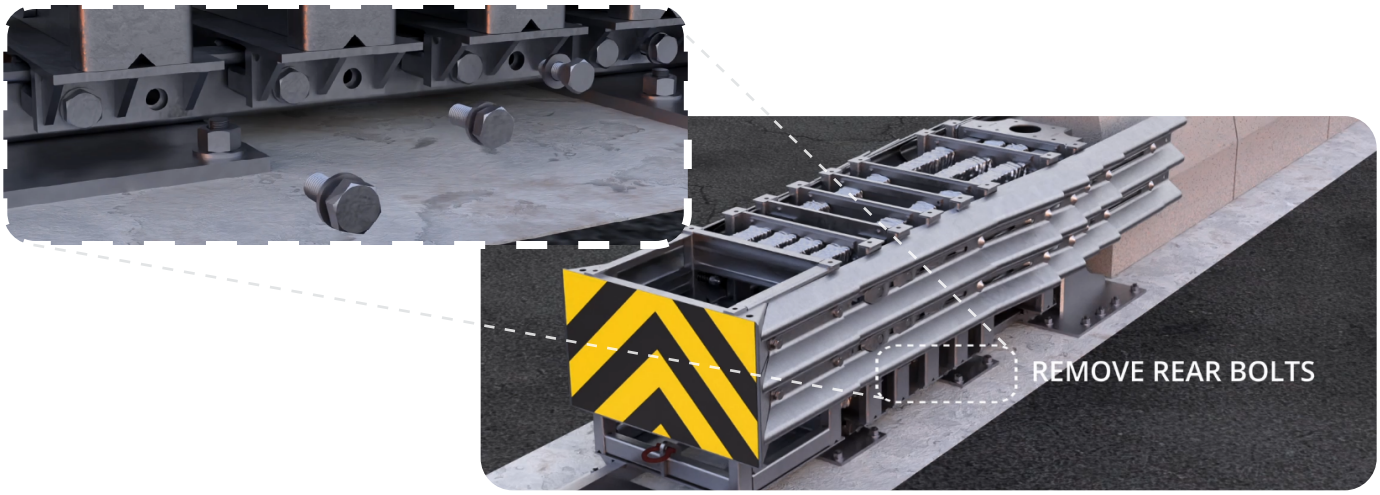
Front Supports

Front Supports that show bowing across the rear top cross brace should be evaluated. Replace or repair any Front Supports that have bowed more than 4.7 mm (3/16 in).

Fontal Impact Damage

⚠ WARNING **Stand a safe distance from the chains or straps under tension as they could break or become disconnected at any moment.**

1. Identify the bays that have collapsed as that is where most of the restoration work will need to be done.
2. Reduce the compression on the springs in the collapsed bays by un-threading the nuts on the slider bolts all the way to the ends of the bolts but do not remove them.
   Pro Tip: Remove the rear bolts of the slider blocks of the collapsed bays to prevent binding on the rail.

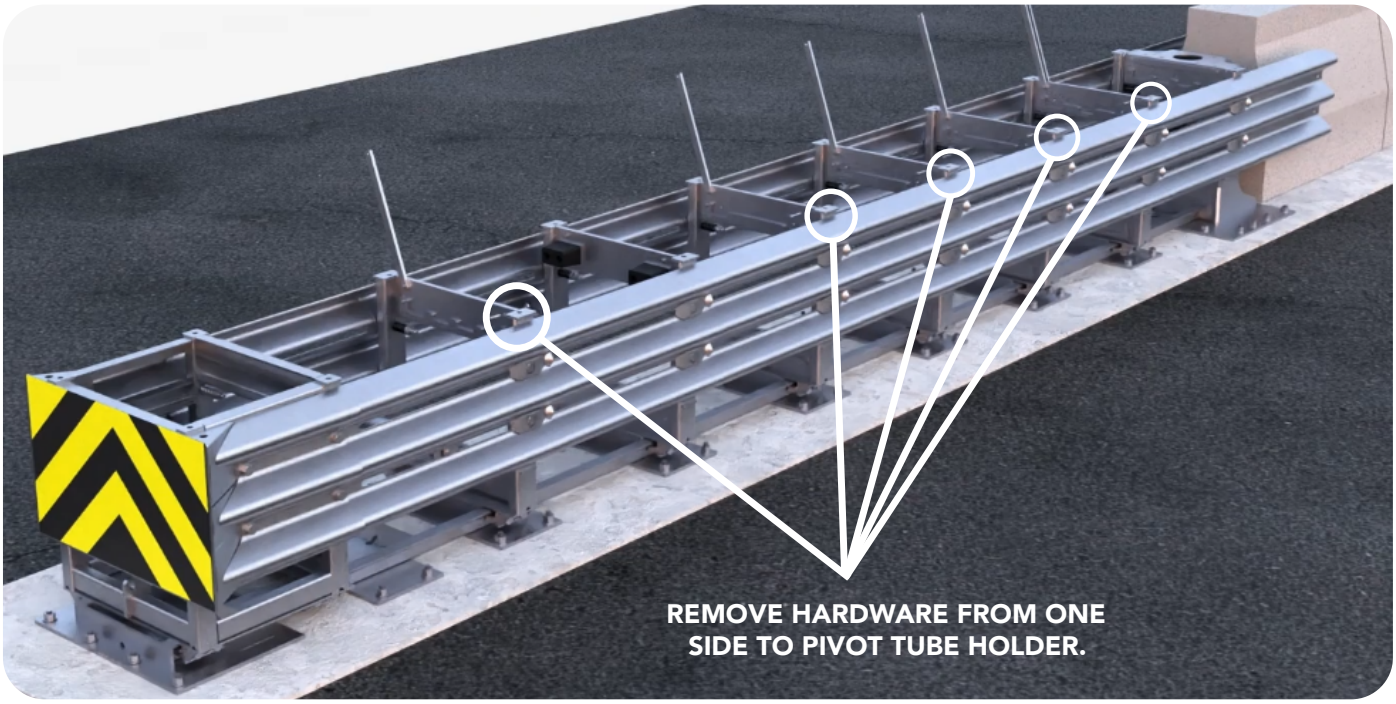


3. Attach a suitable chain or sling to the Tow Hook on the Front Support and slowly extend the system back to its original length.
   Stop as each bay becomes accessible and remove all of the tubes from the bay to ensure they won't fall and get jammed under the system.

4. Ensure the length of the bay does not exceed the length of the Aluminum Tubes by more than 6.35 mm (1/4 in). If they do, remove the slider hardware in that bay and inspect the Slider Panel mounting holes to see if they are elongated. If they are, replace the panels.

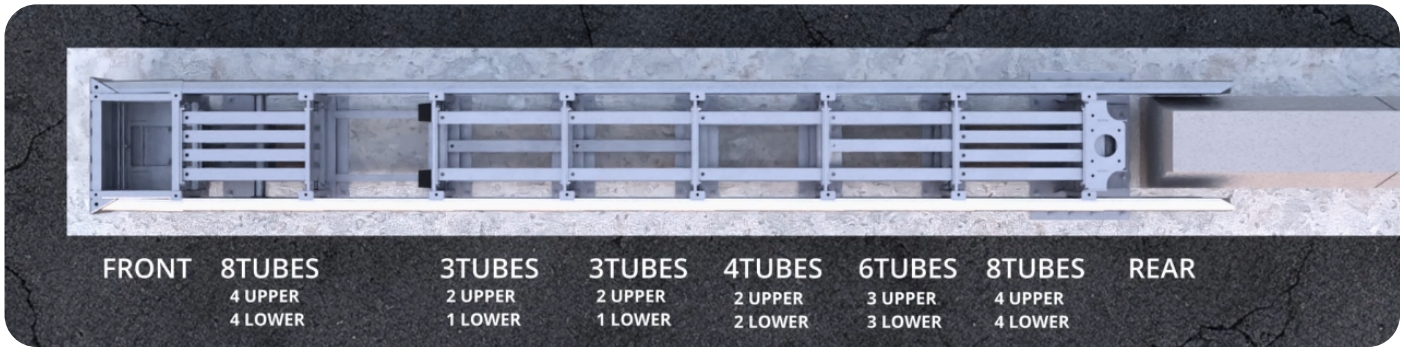
5. Replace all crushed or damaged (has kinks, bends, dents, tears, gouges, punctures, twists) Aluminum Tubes. Remove one bolt from each Retainer Bar at one end of the bay. This allows the retainer bar to pivot out of the way providing access for removing and re-installing tubes.

6. Lock tubes in place by reinstalling Retaining Bar hardware.



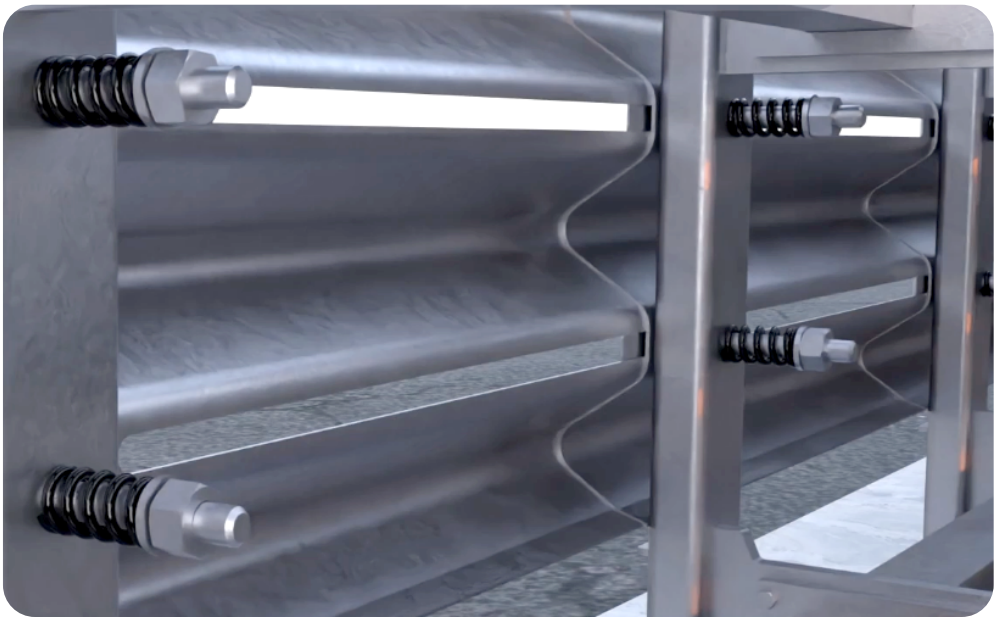
NOTE: Every tube holder shall be filled with an aluminum tube when the repair is completed. There are no empty tube holders. Use the diagram below for reference on correct tube count for each bay. Ensure all tubes have the trigger hole oriented to the front of the system.

Pro-Tip: Reinstall tubes starting with the bottom tubes first including securing the retaining bar before reinstalling upper tubes and upper retaining bar.



7. Inspect Springs in the bays affected by the crash. If the uncompressed length of the springs is less than 60.3 mm (2 3/8 in) the spring will need to be replaced.

8. Make sure all springs are installed and compressed to the correct pre-compressed length per the assembly drawing



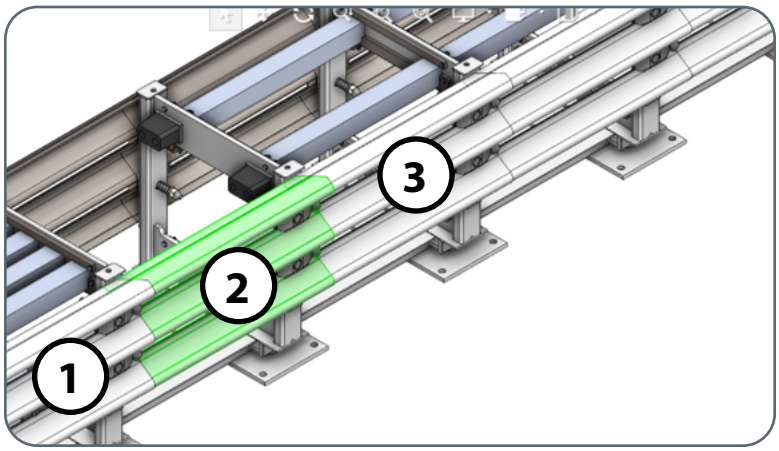
9. Reinstall all rail slider bolts that were removed for easier pull-out. Replace any damaged bolts as necessary.
10. Inspect the cross brace to ensure it is not bent or that the threaded holes are not stripped. If damaged, it will need to be repaired or replaced. Re-install the cross brace to the location specified in the assembly drawing.
11. Complete installation checklist to ensure system has been properly restored.

Side Impact Damage

1. Inspect the Front and side panels for any visible damage.
2. Replace Damaged Panels by removing the Slider Bolt/Spring assemblies from both ends of damaged panels.
3. Inspect the mid supports for any obvious signs of damage.

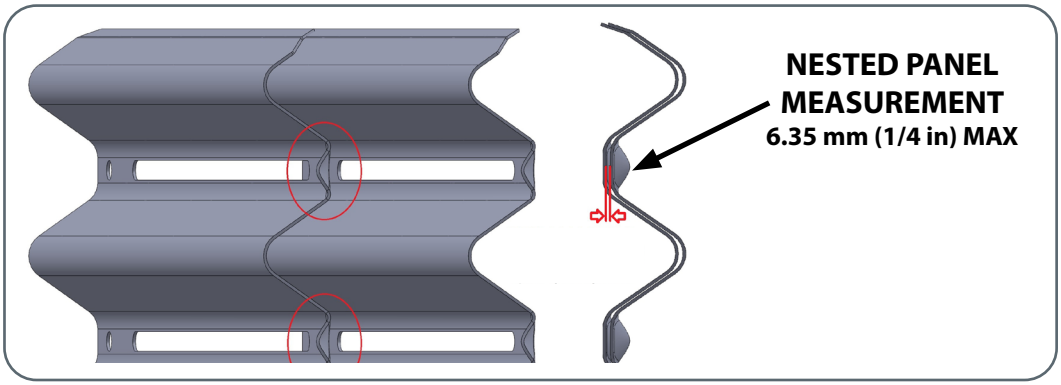
   NOTE: Any damage to the mid supports that could cause binding or prevent the mid supports from sliding freely on the rail, or damage that prevents aluminum tubes from seating properly, slider panels from being installed and aligned properly should be replaced.

4. When reinstalling new panels, ensure each panel overlaps the panel immediately behind it. Panels MUST be overlapped correctly from the front to back of the system t to allow the system to collapse properly if impacted. (Panel 1 overlaps panel 2, that panel 3, etc.)



5. Ensure all panels are fully nested. Any gaps between facing surfaces of the flats in the valleys should not exceed 6.35 mm (¼ in).

   PRO TIP: If the gap is larger than 6.35 mm (¼ in), remove both the upper and lower nuts and springs. Temporarily replace the spring with a spacer or nesting tool and tighten the nut with impact driver to compress the panels together.



After nesting the panels to no more than ¼-inch gap, remove the spacer and reinstall the springs and tighten the nut against the shoulder bolt. Make sure all springs are not damaged and are installed correctly and compressed to the proper pre-load length as shown in the assembly drawing.

NOTE: No torque value is required.

6. Inspect all the Slider Bolts assemblies. Ensure that the Slider Bolts are straight, assemble easily with the panel slider and hardware, and are properly aligned with the Slider Panels when installed. Replace any damaged parts in the Slider Bolt Assemblies. (Do not attempt to straighten a bent Slider Bolt.)

7. Inspect the front support for obvious signs of damage, any damage to the front support that prevents it from sliding freely on the rail or causing binding or damage that prevents aluminum tubes or slider panels form being installed properly aligned should be replaced.

8. Ensure the cross brace (part # 1829569) is installed and is properly located in the first bay as shown in the assembly drawing. The cross brace should be replaced if there is any visible damage.

Final Inspection

After the resetting of the Tau-XR is complete, verify by using the inspection checklists that all assembly bolts are tight and show no sign of damage.

Finally, check that no tools and other equipment or debris have been left within or around the Tau-XR system. Verify that no other damage unrelated to the most recent impact has occurred and that no significant corrosion or other deterioration has affected the system.

Maintenance Inspection

Walk-Up Inspections (Recommended Frequency – Twice a Year)

Before performing walk-up inspections, ensure traffic control is deployed in accordance with local guidelines.

Check for:

- Damage caused by vehicle impacts including damage to any of the aluminum tubes.
- Minor damage caused by impacts from roadside maintenance equipment.
- Misalignment of panels.
- Missing components.
- Vandalism.
- Any debris in and around the system.
- Grading around system.
- Loose hardware.

After inspection is complete, ensure all issues identified during the inspection process are corrected. The TAU-XR™ system shall be returned to proper condition as outlined in the installation instructions.

Maintenance Inspection Checklist

WALK-UP INSPECTION	
ITEM	**COMMENT**
Damage caused by vehicle impacts including damage to any of the aluminum tubes.	
Minor damage caused by impacts from roadside maintenance equipment.	
Misalignment of panels.	
Missing components.	
Vandalism.	
Any debris in and around the system.	
Grading around system.	
Loose hardware.	
Inspector Signature:	Date:
Print Name:	Location:

“THIS PAGE IS INTENTIONALLY LEFT BLANK”

TAU-XR System Assembly

The following instructions are for installing a system that has been ordered to ship unassembled.

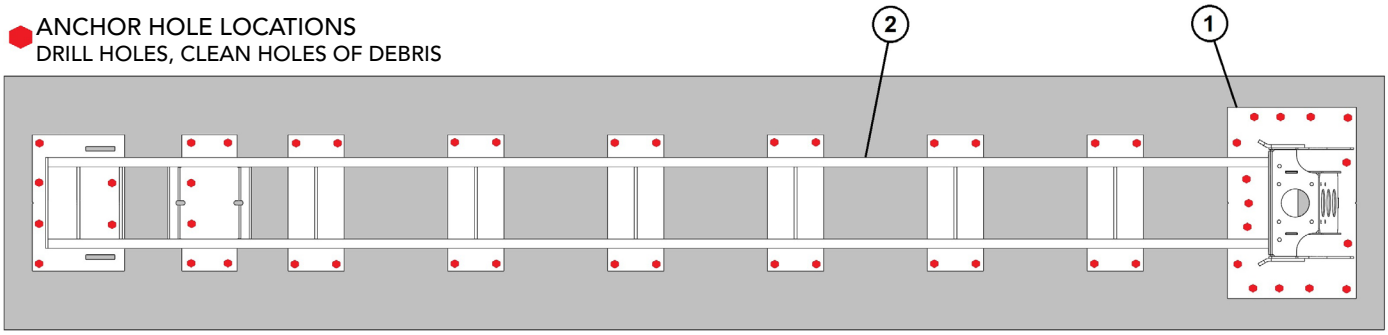
1. Connect the Rail (1826930) and the Backstop (1929089) using two 7/8-9 x 2.5 Gr5 Hex Cap Screws (1823979), two 7/8-9 Hex Nuts (1823981) and four 7/8 Flat Washers (1823980) as shown in the assembly drawing.

2. Place the Backstop/Rail assembly in the desired installation location as defined by the project engineer.

⚠ CAUTION **Wear proper Personal Protective Equipment (PPE) when drilling and clearing debris.**

ATTENTION! Holes must be drilled to the prescribed depth and thoroughly cleared of dust and debris to ensure proper anchorage adhesion is achieved.

3. Use the holes in the Rail and Backstop anchor plates as a template and drill all anchor holes minimum 146mm (5.75in) deep into the concrete using a 22 mm (7/8 in) diameter masonry drill bit. For Asphalt Applications, drill all anchor holes minimum 410 mm (16 in) deep.



ITEM #	PART #	DESCRIPTION	QTY
1	1829089	WELDMENT, TAU-XR BACKSTOP	1
2	1826930	WELDMENT, TAU-XR RAIL	1

NOTE: A regular electric drill with a rebar cutting drill bit may need to be used in the event the masonry drill bit finds a rebar.

4. Thoroughly clear all anchor holes of debris and dust using compressed air and a 22 mm (7/8 in) diameter wire brush. Do not use compressed air for asphalt anchor holes.

5. Preassemble all threaded anchors with the washers and nuts such that the nut sits less than 6.35 mm (1/4 in) from the end of the anchor.

6. Fill holes with epoxy (depending on temperature and the cure times of the epoxy you may want to fill one hole at a time). Slowly insert threaded rods into the holes spinning them clockwise as they are inserted.

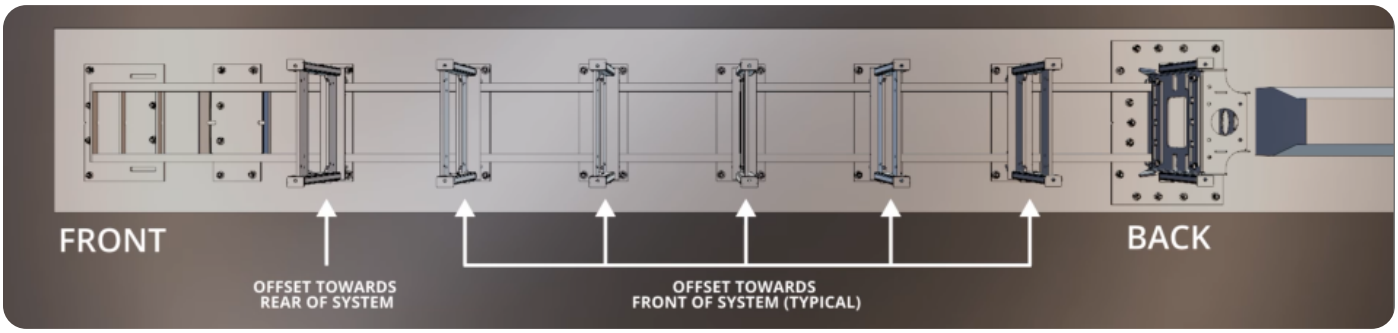
   Note: Cure time information is supplied by the epoxy manufacturer.

7. Once the epoxy is cured, torque anchor nuts to 61N-m (45 ft-lbs) minimum while not exceeding epoxy manufacturers maximum torque.

⚠ WARNING **Threaded rod shall not extend more than 6.35 mm (1/4 in) above the nut when installed to avoid interference with any sliding parts of the system during an impact.**

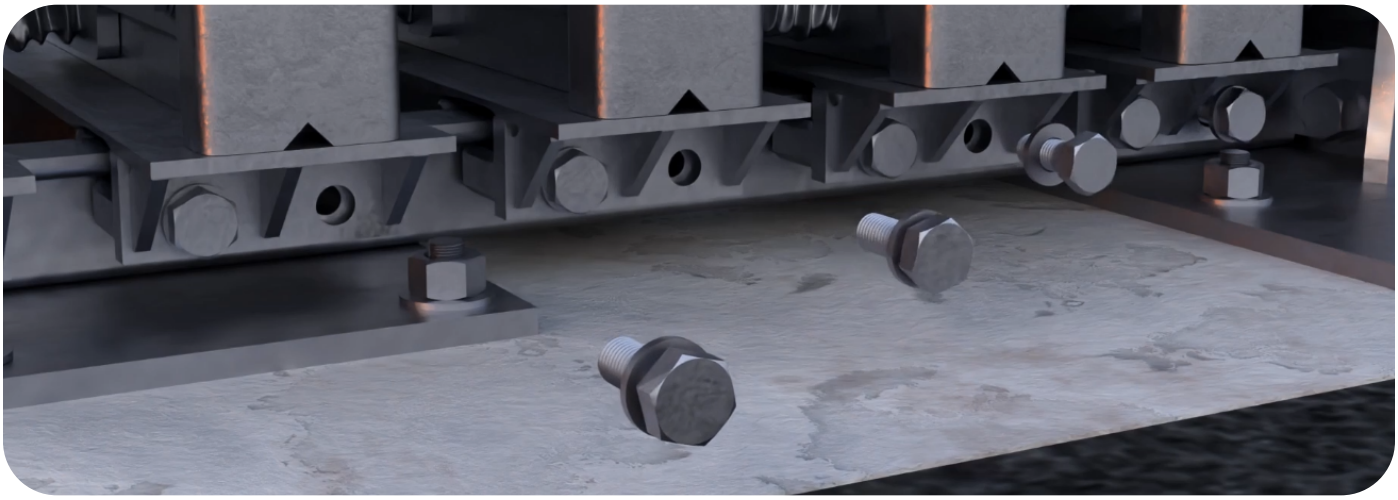
8. Place all six Mid Supports (1829367) on the Rail starting at the back of the system and moving forward. Use the anchor plates on the rail to roughly space the Mid Supports leaving around 840 mm (33 in) of space between them.

   Note: The Mid Supports are not symmetrical front to back. Place the Mid Supports on the rail with the horizontal plates of the Mid Supports oriented toward the front of the system in all instances except for the Mid Support closest to the front of the system. The most forward Mid Support is reversed, oriented such that its horizontal plates are shifted towards the back of the system.

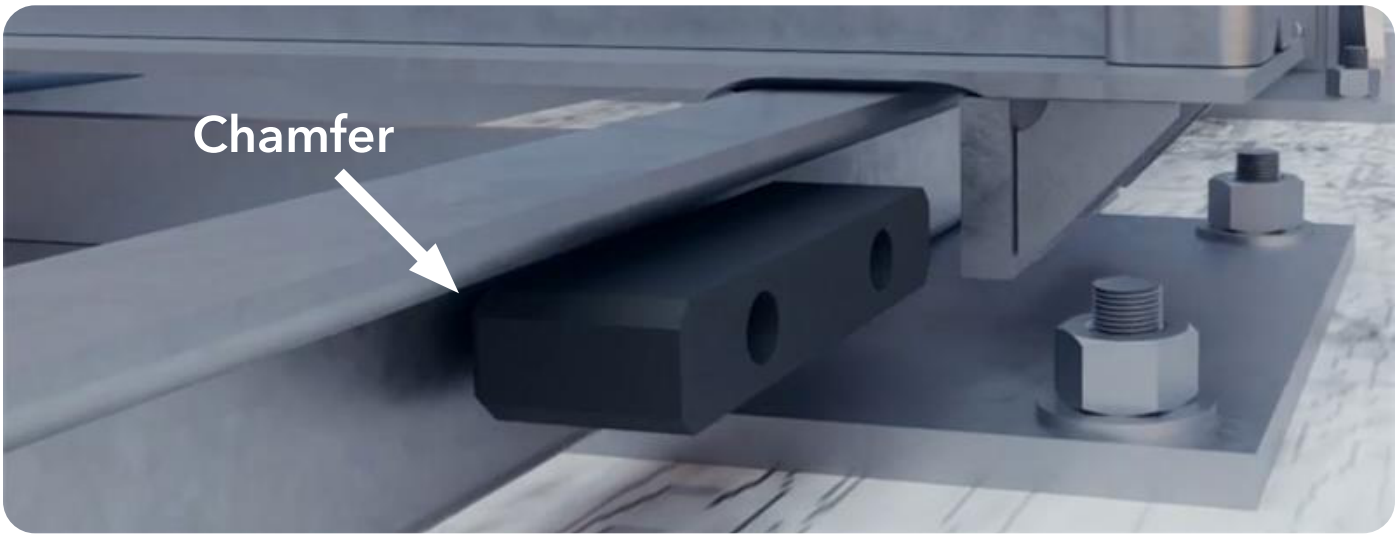


9. Place the Front Support Weldment on the Rail.

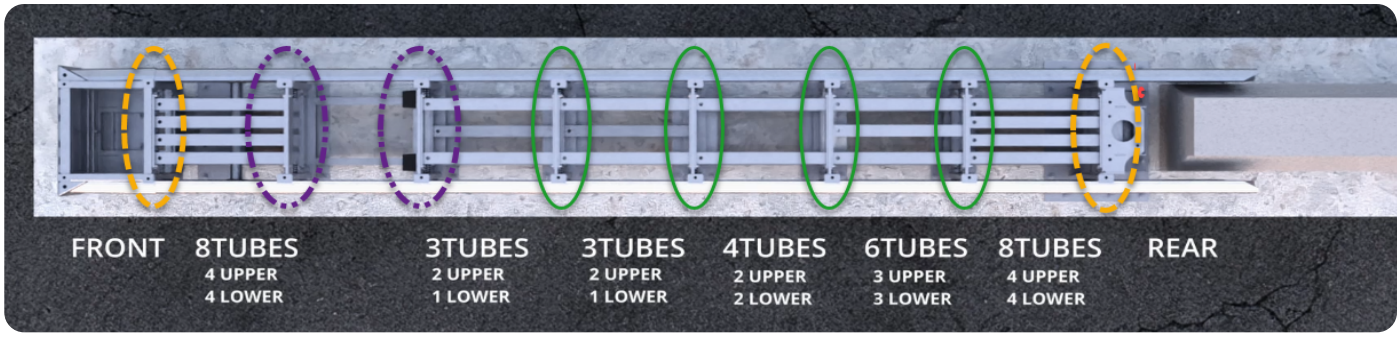
10. Install all sixteen (16) Slider Blocks (1826967). Each Mid Support is secured to the rail using two Slider Blocks. The Front Support is secured to the rail using four Slider Blocks.



Important: The chamfered edges of the Slider Blocks must be facing inward towards the Rail, and the square edges face toward the mounting flange . Each Slider Block is attached using two 3/4-10 x 2 Gr8 Hex Screws (1827349) and two 3/4 in structural Flat Washers (1827890).

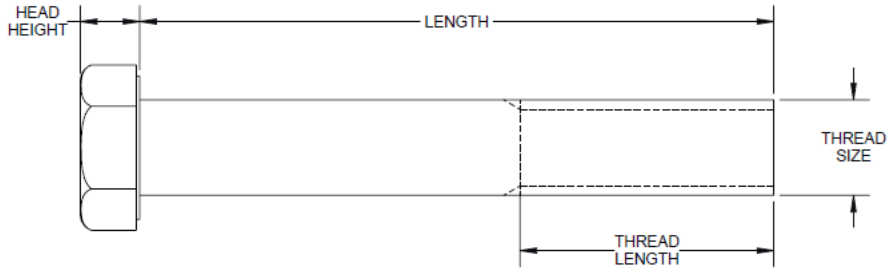


11. Install all Tube Holders (single, double, triple and quadruple) onto the Front Support, Mid Supports and Backstop using associated hardware as shown in the assembly drawings. Take care to install the appropriate tube holder for the number of tubes as specified in the assembly drawing. The Tube Holders sit back-to-back against the Mid Supports with matching holes and are attached to the Mid Supports using the same set of hardware.



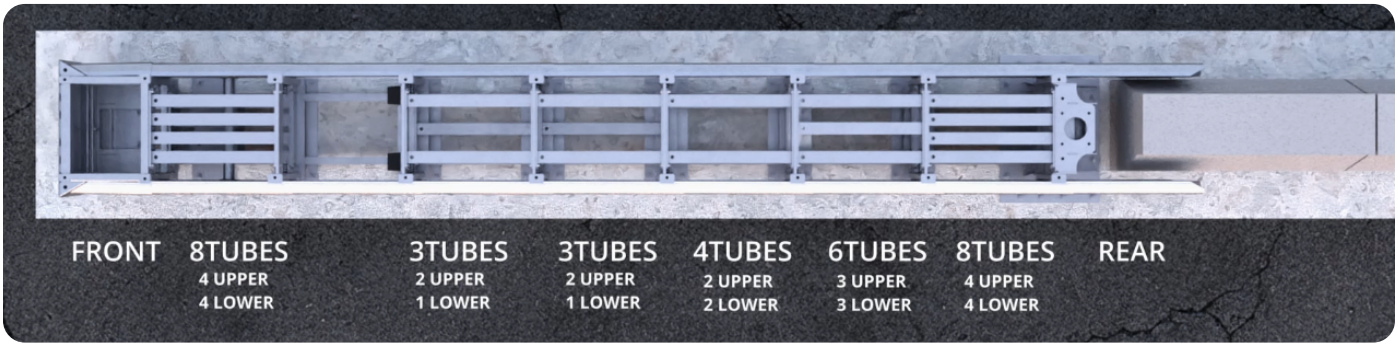
NOTE: Hardware length changes by bay. See below table and/or assembly drawing for hardware usage. The bays at the front and the backstop, with one single sided holders use reduced length hardware. All bays with holders on both side use 2 ½" length fasteners.

LOCATION	PART #	DESCRIPTION	QTY
- - - -	1827886	3/8-16 x 1 ½" LENGTH HEX SCREW	18
— • • — • • —	1827888	3/8-16 x 2" LENGTH HEX SCREW	14
———	1827887	3/8-16 x 2 ½" LENGTH HEX SCREW	32



12. Install the Rubber Bumpers (4002139) into the second bay. Each Bumper sits on top of a Spacer (1829312) and is attached to the Mid Support using 4" 3/8-16 hardware (1829369) as shown in the assembly drawing. Note: One of the bolts goes through the Mid Support upper horizontal plate while the other bolt also attaches the Tube Holder on the other side of the Mid Support. Note the rubber bumpers

13. Install the Aluminum Tubes at the bottoms of the bays starting at the back of the system. Place the Aluminum Tubes into the Tube Holders and lock them in place using the Retaining Bars and associated hardware. As with the Tube Holders, the Retaining Bars are attached back-to-back on the Mid Supports using the same set of hardware. If needed adjust spacing of mid supports to ensure proper spacing for tube installation. See above note on length of fasters by bay type.



PANEL INSTALLATION

1. Starting with the End Panels (1825106), install the panels from the back of the system progressively forward. Sequentially starting from the back will ensure the correct panel overlap, where each panel closer to the front is placed on the outside of the panel behind it.

2. For each Slider Panel (1825984) prepare two Sliders (1827166), two 3/4-10 Hex Bolts ten x 172 mm (6.75 in) Hex Bolts (1829086), two Springs (1827426), two Washers (1827890), and two 3/4-10 GR5 Nuts. Feed the Hex Bolts through the Sliders.

3. The Slider Panels and the End Panels are oriented such that the corner chamfers are pointing towards the rear of the system.

4. This step will most likely require two people. Install the first (closest to the rear) Slider Panel on top of the End Panel by passing the Hex Bolts through the Sliders then through the slots of the Slider Panel and through the front holes on the End Panel. Lift the panels and feed the Hex Bolts through the matching holes of the Panel Mount and the Backstop. Install the Springs, Washers, and Nuts onto the Bolts to secure the Panels in place. Tighten the Nuts until the Springs are engaged but do not fully compress the Springs.

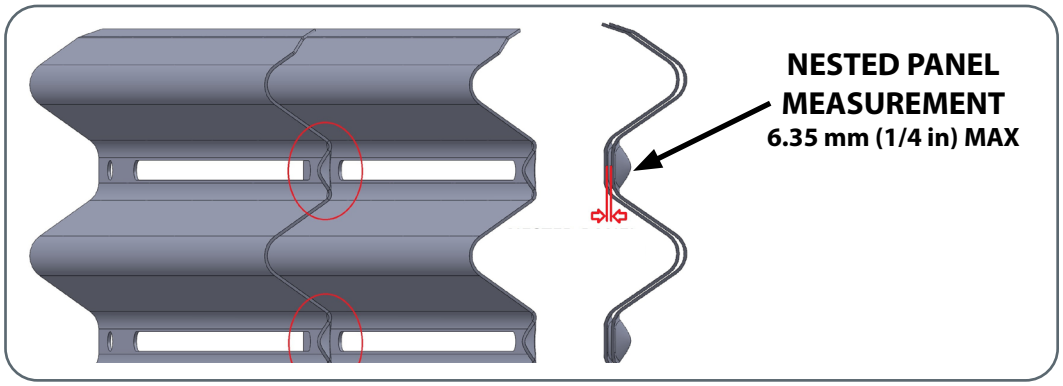
5. Install the next set of Slider Panels in a similar manner, feeding the Hex Bolt through the Sliders then through the slots of the Slider Panels and through the front holes of the previous Slider Panel. Feed the Hex Bolts through the matching holes on the rearmost Mid Support. Install the Springs, Washers, and Nuts onto the Bolts to secure the Panels in place. Tighten the Nuts until the Springs are engaged but do not fully compress the Springs.

6. Pull the Mid Support forward as far as the panel slots allow to establish the correct bay length. Check to make sure the Aluminum Tubes (1824972) can easily fit into the bay.

7. Continue installing the next set of Slider Panels forming each bay as described in the previous steps, properly overlapping each Panel, and pulling each Mid Support forward to establish the correct bay length. Note, the 2nd bay will be slightly shorter as it does not contain any Aluminum Tubes.

8. The Front Support Panels (1829084) will be installed similarly to the Slider Panels except that the front of the Panels will be attached to the Front Support using 3/4-10 x 2" Hex Bolts (1827439) without Sliders and without Springs.

9. NESTING THE PANELS: Inspect each panel overlap as shown in the following picture. If the gap between the panels exceeds 6.35 mm (1/4 in) the panels will need to be nested.
   If a panel needs to be nested, temporarily remove the Springs, and replace them with two Nesting Tools (A large socket can be used instead of a nesting tool). Tighten down on the Nuts so that the overlapped Panels are compressed into each other eliminating the gap. Once nested, remove the Nesting Tools, one at a time, and reinstall the Springs. Continue to use the panel nesting tools to nest any panels that exceed the 6.35 mm (1/4 in) gap.



10. SET SPRING PRELOADS: Tighten down on the Nuts at each Spring until the Spring length is 57mm +/- 3mm (2-1/4 +/- 1/8 in) as shown in the assembly drawing. In some cases the nut will bottom out on the threads of the bolts.

11. Install any remaining Aluminum Tubes at the bottoms of the bays starting at the back of the system. Place the Aluminum Tubes into the Tube Holders and lock them in place using the Retaining Bars and associated hardware. As with the Tube Holders, the Retaining Bars are attached back-to-back on the Mid Supports using the same set of hardware.

12. Install the Cross Brace (1829569) into the First Bay using two Fender Washers (2000096) and two 3/8-16 x 1 1/2 in Hex Screws (1827886). Ensure the Cross Brace is located properly as shown in the assembly drawing.

13. Install the Upper Aluminum Tubes locking them in place using the Retaining Bars and associated hardware. As with the bottom Tubes, start at the back of the system and progress forward, ensuring the tube quantities match those shown on the assembly drawing.

14. Complete the Installation Inspection Checklist.

Long-Term Storage

Store materials under cover in dry, well-ventilated conditions, away from doorways open to the environment.

Provide adequate ventilation between stacked pieces. Elevate and separate articles stacked outdoors with spacers (poplar, ash, spruce).

Incline parts to allow for maximum drainage.

Avoid stacking material directly on soil or decaying vegetation.

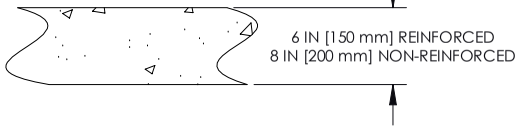
For crated items, remove the lids to provide better ventilation and drying of the galvanized parts. Customers will need to remove kits packed in cardboard boxes from the crates and store them inside.

FOUNDATION SPECIFICATIONS

THE TAU-XR CRASH CUSHION SYSTEM HAS BEEN DESIGNED TO ATTACH TO CONCRETE OR ASPHALT FOUNDATIONS.

ANCHORAGE DETAILS APPLY TO STANDARD TAU-XR ANCHORS - ¾" THREADED ROD AND ADHESIVE. ANCHOR LENGTHS AND EMBEDMENT DEPTHS MAY VARY FOR ALTERNATIVE ANCHORS.

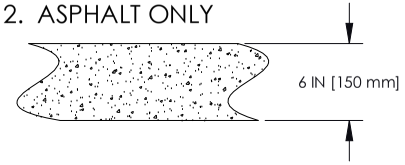
1. CONCRETE PAD



FOUNDATION:
MINIMUM 6 IN. [150 mm] REINFORCED CONCRETE PAD OR 8 IN. [200 mm] NON-REINFORCED CONCRETE PAD.

ANCHORAGE: 3/4 IN. [20 mm] X 8 1/4 IN. [210 mm] GALVANIZED ANCHOR WITH 6 IN. [150 mm] EMBEDMENT

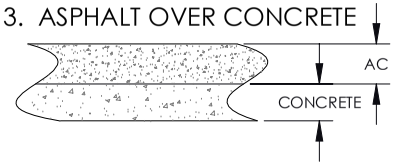
2. ASPHALT ONLY



FOUNDATION:
MINIMUM 6 IN. [150 mm] ASPHALTIC CONCRETE.

ANCHORAGE: 3/4 IN. [20 mm] X 18 IN. [460 mm] GALVANIZED ANCHORS WITH 16 IN. [410 mm] EMBEDMENT

3. ASPHALT OVER CONCRETE

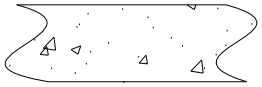


FOUNDATION:
ASPHALT OVER CONCRETE

ANCHORAGE: 3/4 IN. [20 mm] GALVANIZED ANCHORS WITH MINIMUM 6 IN. [150 mm] EMBEDMENT IN CONCRETE.
OR
IF 6 IN. [150 mm] EMBEDMENT IN CONCRETE IS NOT POSSIBLE USE 3/4 IN. [20 mm] X 18 IN. [460 mm] GALVANIZED ANCHORS WITH 16 IN. [410 mm] EMBEDMENT.

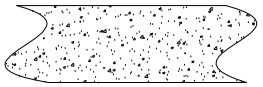
MATERIAL SPECIFICATIONS

CONCRETE



STONE AGGREGATE CONCRETE MIX, 4,000 PSI [28 MPa] MINIMUM COMPRESSIVE STRENGTH (SAMPLING PER ASTM C31-84 OR ASTM C42-84A, TESTING PER ASTM C39-84)

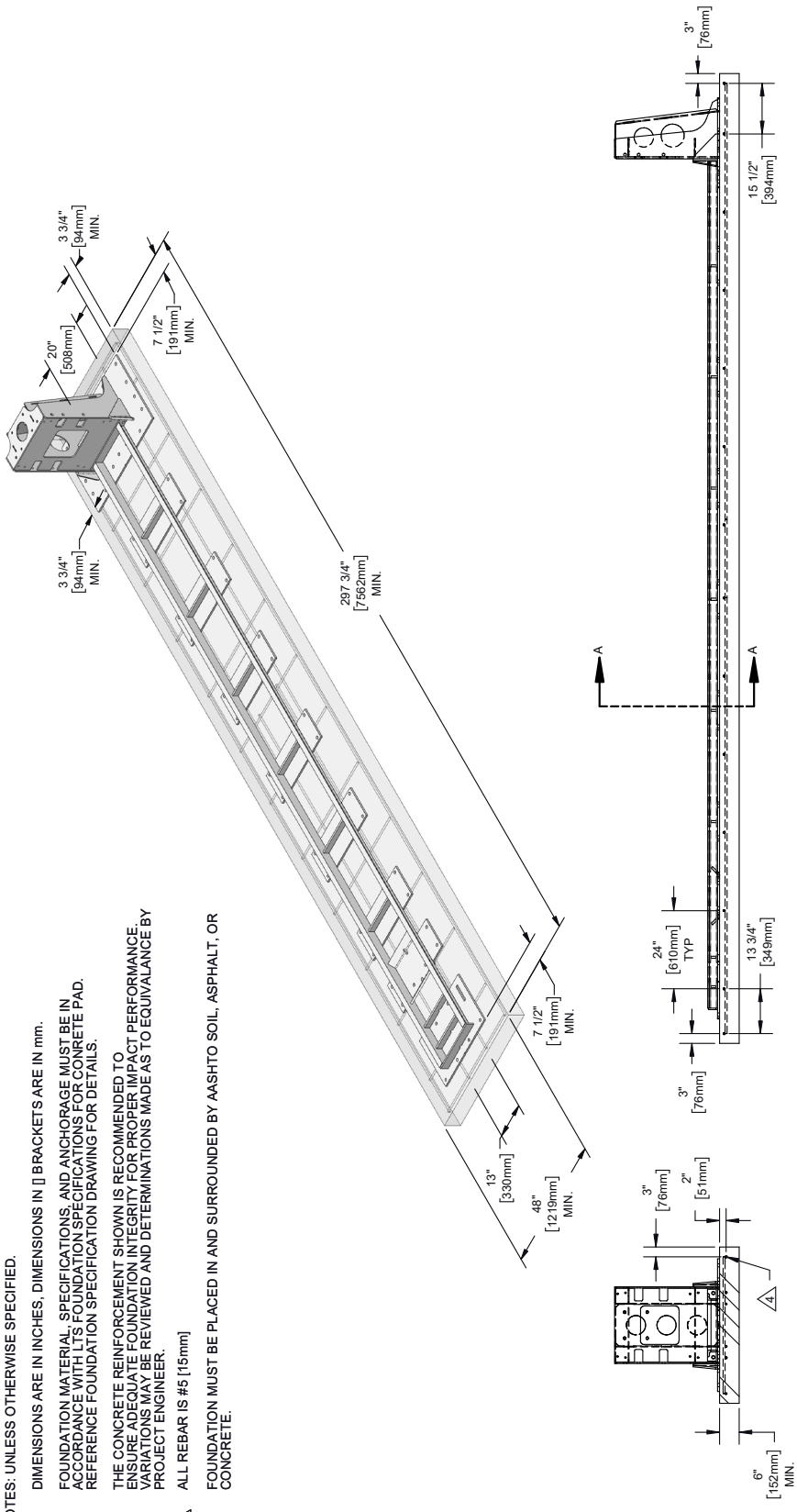
ASPHALTIC CONCRETE (AC)



AR-4000 A.C. (PER ASTM D3381 '83) .75" MAXIMUM, MEDIUM (TYPE A OR B) AGGREGATE

SIEVE SIZE	% PASSING
1"	100
3/4"	95-100
3/8"	65-80
No. 4	49-54
No. 8	36-40
No. 30	18-21
No. 200	3-8

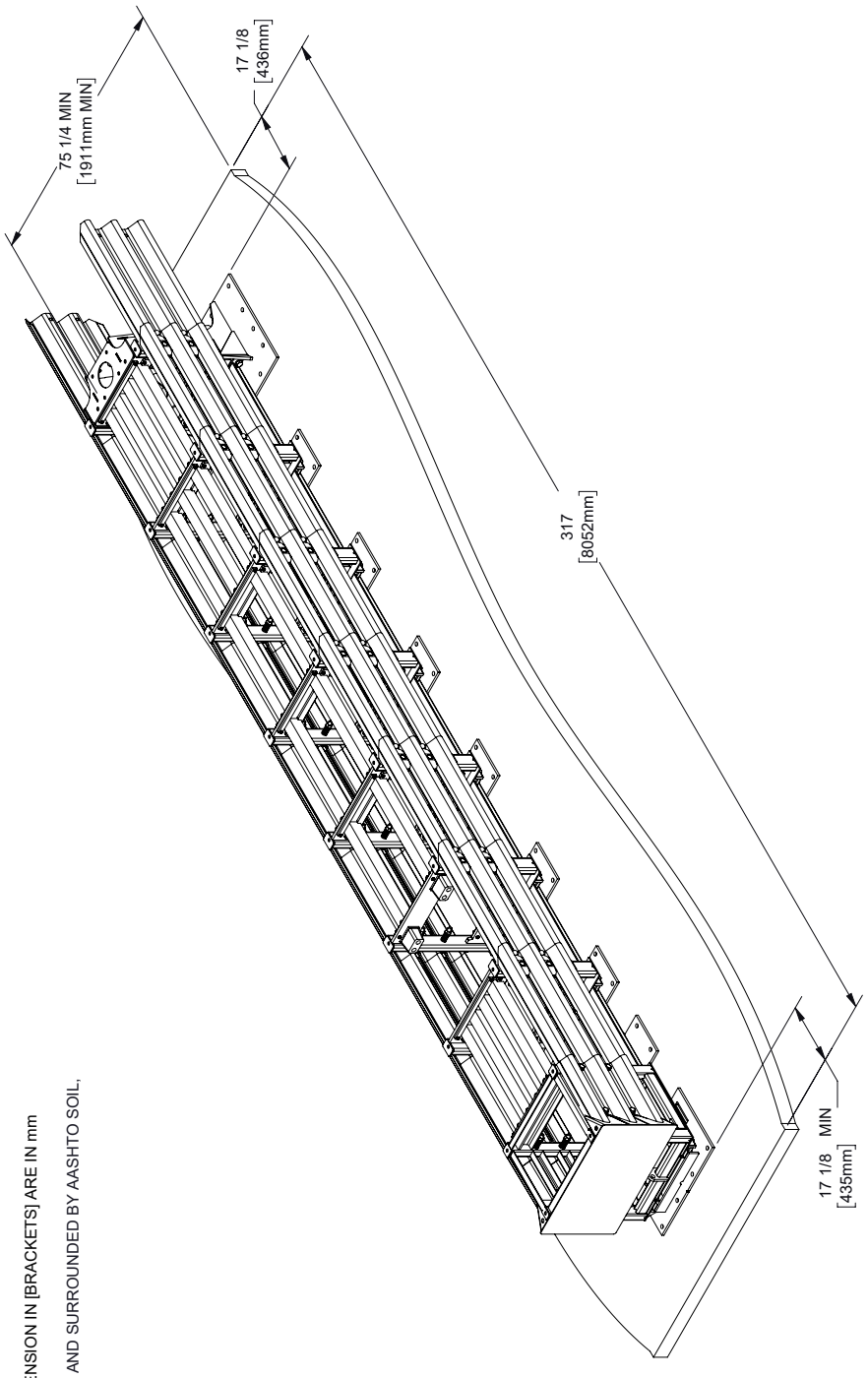
Drawings TAU-XR CONCRETE FOUNDATION, 1830622



NOTES: UNLESS OTHERWISE SPECIFIED.

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN [] BRACKETS ARE IN mm.
2. FOUNDATION MATERIAL, SPECIFICATIONS, AND ANCHORAGE MUST BE IN ACCORDANCE WITH LTS FOUNDATION SPECIFICATIONS FOR CONRETE PAD. REFERENCE FOUNDATION SPECIFICATION DRAWING FOR DETAILS.
3. THE CONCRETE REINFORCEMENT SHOWN IS RECOMMENDED TO ENSURE ADEQUATE FOUNDATION INTEGRITY FOR PROPER IMPACT PERFORMANCE. VARIATIONS MAY BE REVIEWED AND DETERMINATIONS MADE AS TO EQUIVALANCE BY PROJECT ENGINEER.
4. ALL REBAR IS #5 [15mm]
5. FOUNDATION MUST BE PLACED IN AND SURROUNDED BY AASHTO SOIL, ASPHALT, OR CONCRETE.

Drawings *TAU-XR ASPHALT FOUNDATION, 1831615*

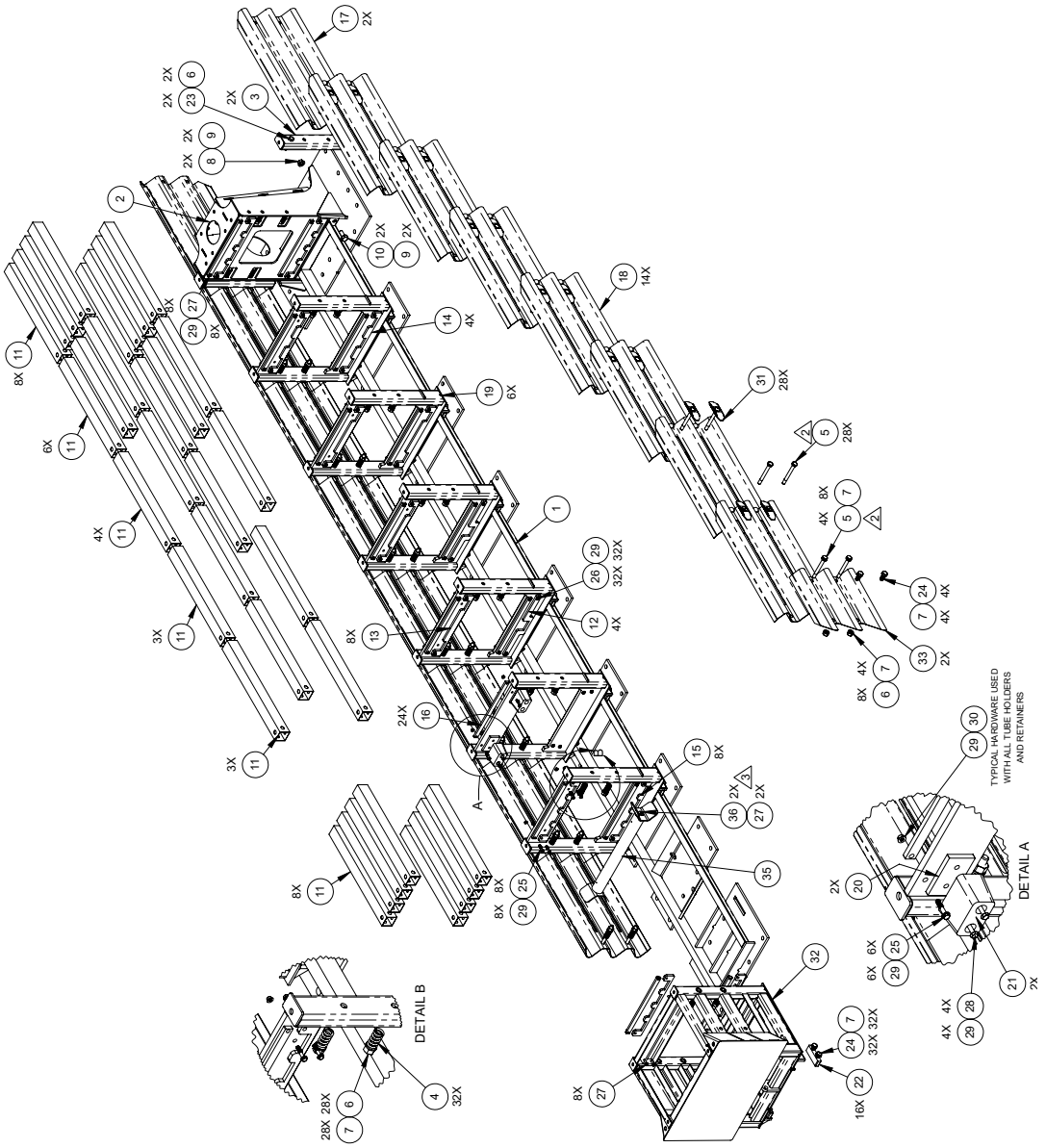


NOTES: UNLESS OTHERWISE SPECIFIED

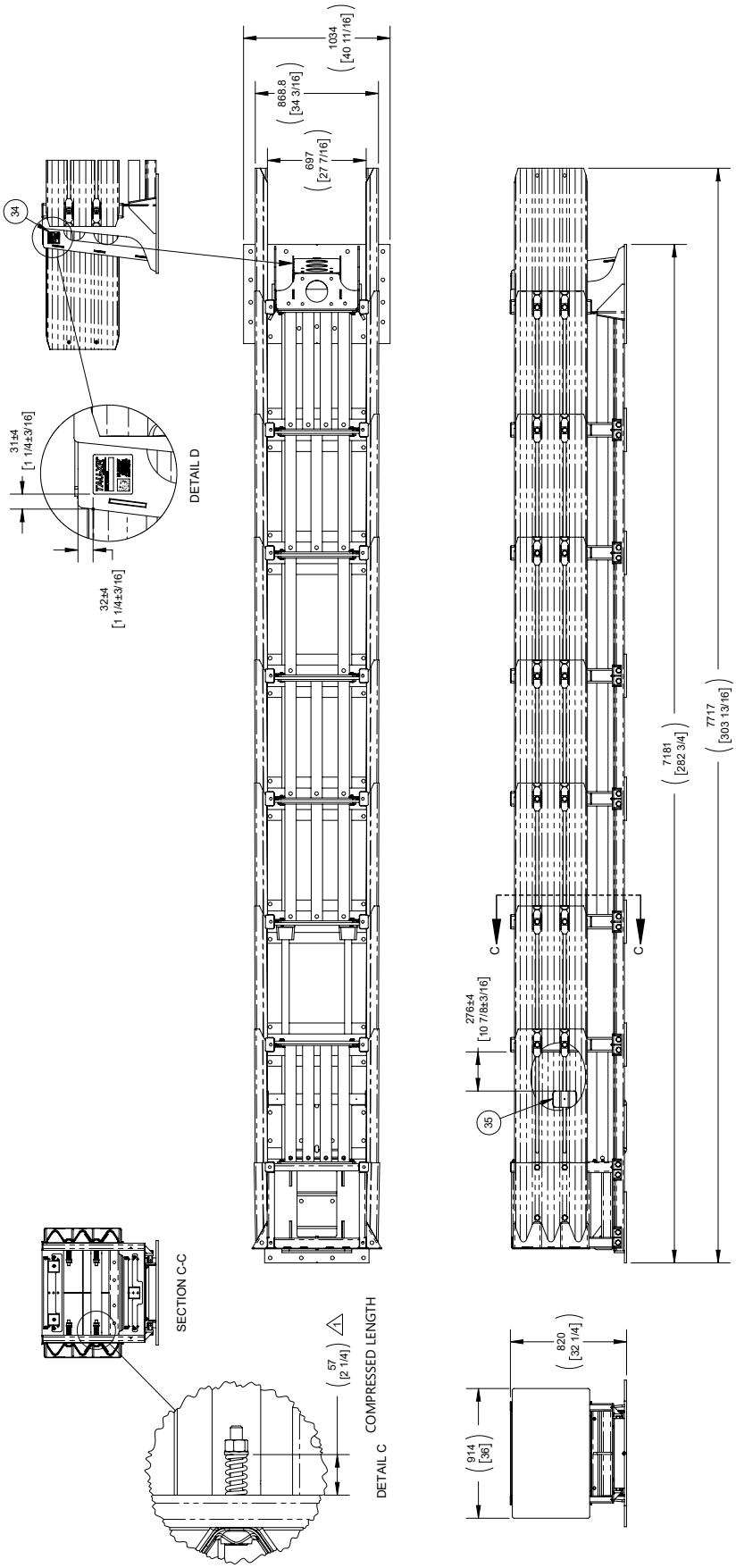
1. FOUNDATION MATERIAL, SPECIFICATIONS, AND ANCHORAGE MUST BE IN ACCORDANCE WITH LTS FOUNDATION SPECIFICATIONS FOR ASPHALTIC CONCRETE FOUNDATIONS. REFERENCE DRAWING 1830178.
2. DIMENSIONS ARE IN INCHES. DIMENSION IN [BRACKETS] ARE IN mm
3. FOUNDATION MUST BE PLACED IN AND SURROUNDED BY AASHTO SOIL, ASPHALT, OR CONCRETE.

Drawings 1829560 ASSEMBLY, TAU-XR

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1826930	WELDMENT, TAU-XR RAIL	1
2	1829089	WELDMENT, TAU-XR BACKSTOP	1
3	1827379	WELDMENT, PANEL MOUNT	2
4	1827426	SPRING, 700 LB/IN COMPRESSION	32
5	1829086	BOLT, 3/4-10 X 6.75 A325 HEX	32
6	2001789	NUT HN 3/4-10 GR5 GEOMET	38
7	1827890	WASHER, F436 3/4" STRUC FLAT	76
8	1823981	NUT, 7/8-9 GR5, HEX	2
9	1823980	WASHER, 7/8, FLAT	4
10	1823979	SCREW, 7/8-9 X 2.5 Gr5 HEX CAP	2
11	1824972	TUBE, 80X2 SQ, ALUMINUM	32
12	1825832	PLATE, SINGLE TUBE HOLDER	4
13	1825833	PLATE, DOUBLE TUBE HOLDER	8
14	1825834	PLATE, TRIPLE TUBE HOLDER	4
15	1825835	PLATE, QUADRUPLE TUBE HOLDER	8
16	1827159	BAR, TUBE RETAINER	24
17	1825106	END PANEL, THRIE-BEAM	2
18	1825984	PANEL, TAU-XR SLIDER	14
19	1829367	WELDMENT, TAU-XR MIDSUPPORT	6
20	1829312	SPACER, BUMPER	2
21	4002139	RUBBER BUMPER	2
22	1826967	BLOCK, RAIL SLIDER	16
23	1823982	SCREW,3/4-10X3.5" Gr5 HEX CAP	2
24	1827439	SCREW, 3/4-10 X 2 GR8 HEX	36
25	1827888	SCREW, 3/8-16 X 2 GR5 HEX	14
26	1827887	SCREW, 3/8-16 X 2-1/2 Gr5 HEX	32
27	1827886	SCREW, 3/8-16 X 1-1/2 Gr5 HEX	18
28	1829369	SCREW, 3/8-16 X 4", HEX CAP	4
29	1824115	WASHER, 3/8 SAE Gr8, FLAT	132
30	2001809	NUT HN, 3/8-16, GR5	66
31	1827166	SLIDER, PANEL	28
32	1829354	WELDMENT, FRONT SUPPORT	1
33	1829084	PANEL, FRONT SUPPORT SIDE	2
34	1828062	LABEL, TAU-XR IDENTIFICATION	1
35	1829569	WELDMENT, CROSS BRACE	1
36	2000096	WSHR FENDER 3/8 X 1.5 OD X .063 THK MGAL	2



Drawings 1829560 ASSEMBLY, TAU-XR



Transitions

Placement and installation of the TAU-XR system and transitions must be accomplished in accordance with the guidelines and recommendations set forth in the "AASHTO Road Side Design Guide", FHWA memorandum, and other state and local standards.

There are multiple approved transition configurations for the TAU-XR system including but not limited to those in the following pages. Single sided transitions are shown. Combinations of different transitions for the left and right side are allowed depending on the traffic configuration. For additional information or details for a specific application, contact Lindsay Transportation Solutions.

Transitions connecting to portable or temporary concrete barriers require the barrier to be anchored in place. See drawings for additional details.

Portable Concrete Barrier Anchoring Details

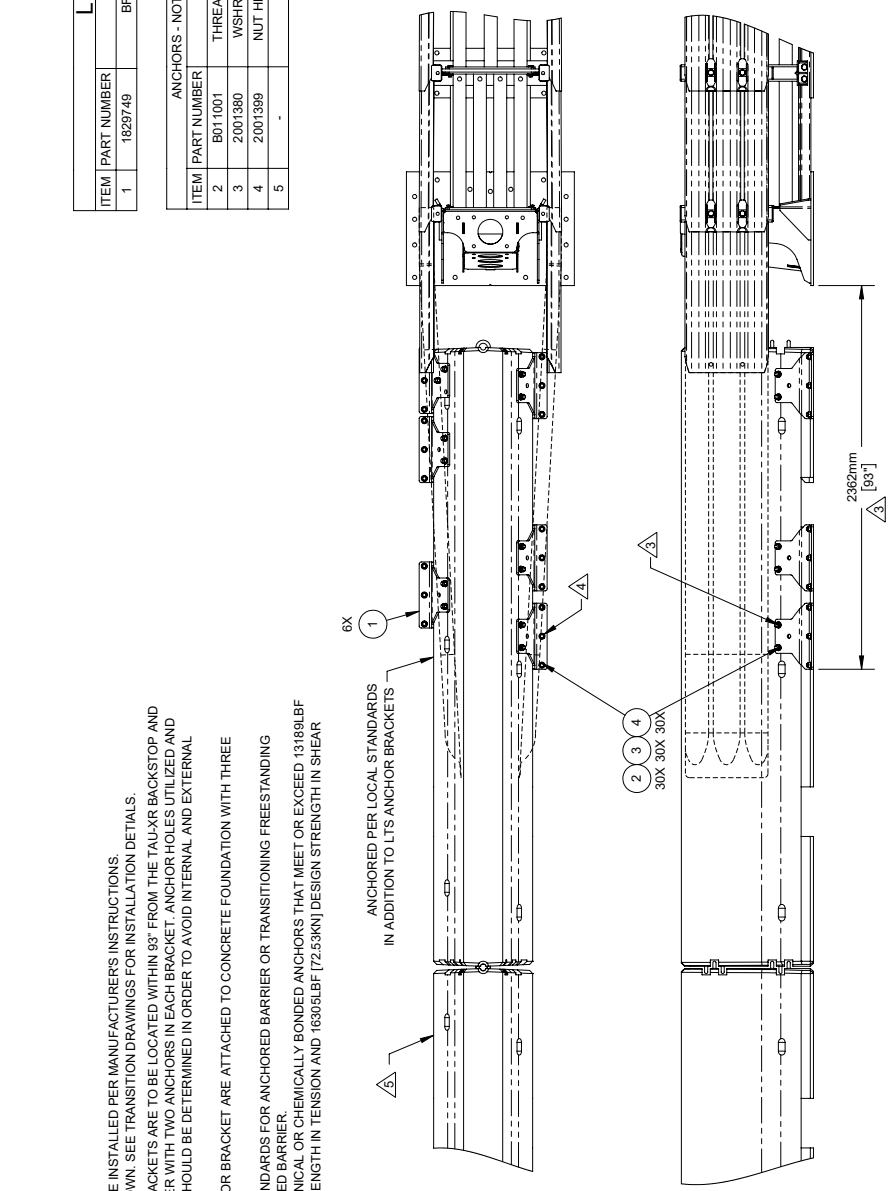
Transition Details for Rigid Hazards

Transition Details for Guardrail

Transitions 1830613 Safety Shape Barrier Anchoring

LINDSAY				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1829749	BRACKET, PCB ANCHOR	6	EA

ANCHORS - NOT INCLUDED (SEE NOTE 6)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
2	B011001	THREADED ANCHOR 3/4-10 X 8 1/4	30	EA
3	2001380	WSHR 3/4 F436 FLAT RD STRUCT	30	EA
4	2001399	NUT HN 3/4-10 HVY A536 HD GALV	30	EA
5	-	ADHESIVE	-	-



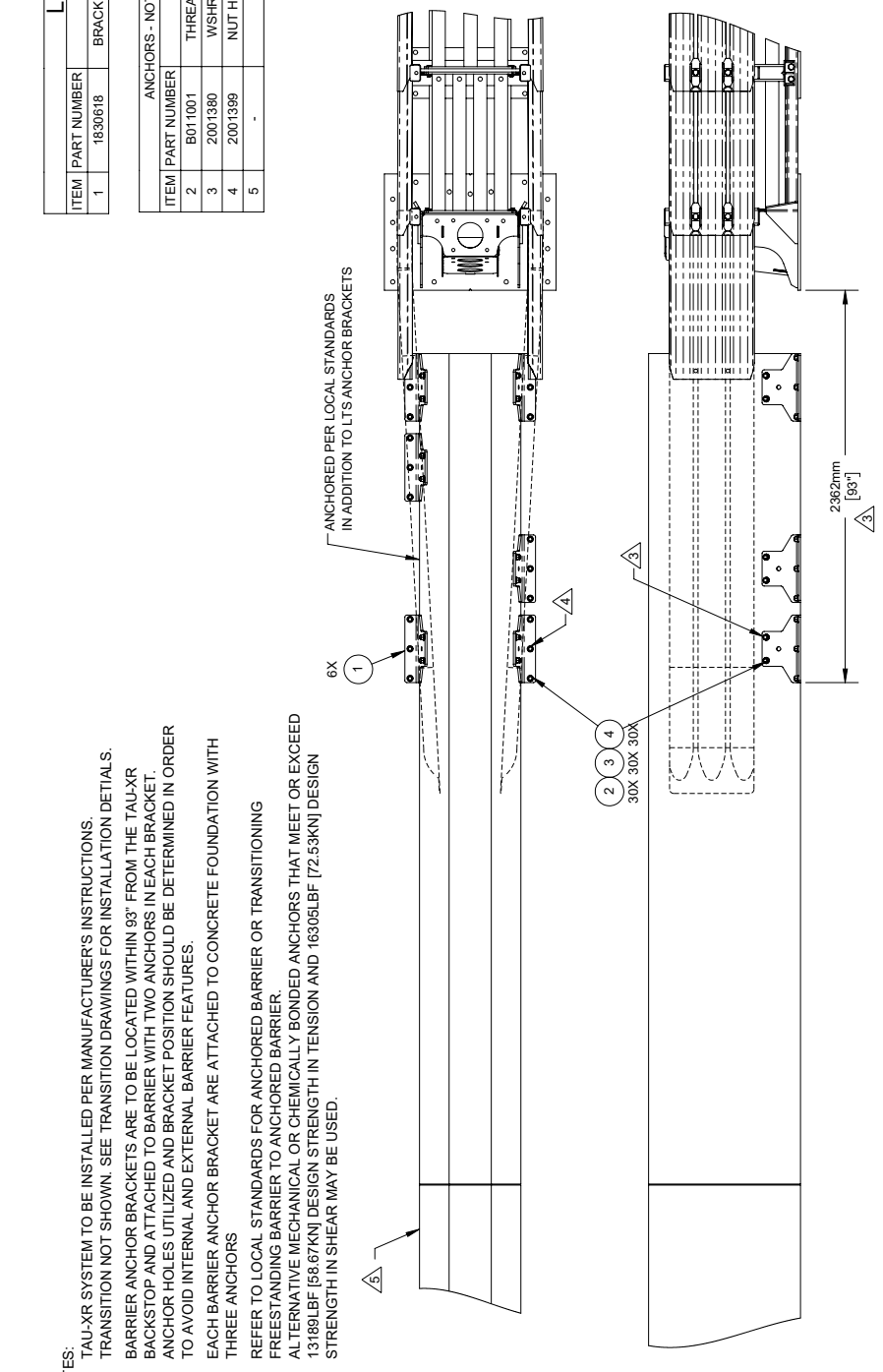
NOTES:

1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
2. TRANSITION NOT SHOWN. SEE TRANSITION DRAWINGS FOR INSTALLATION DETIALS.
3. BARRIER ANCHOR BRACKETS ARE TO BE LOCATED WITHIN 93" FROM THE TAU-XR BACKSTOP AND ATTACHED TO BARRIER WITH TWO ANCHORS IN EACH BRACKET. ANCHOR HOLES UTILIZED AND BRACKET POSITION SHOULD BE DETERMINED IN ORDER TO AVOID INTERNAL AND EXTERNAL BARRIER FEATURES.
4. EACH BARRIER ANCHOR BRACKET ARE ATTACHED TO CONCRETE FOUNDATION WITH THREE ANCHORS
5. REFER TO LOCAL STANDARDS FOR ANCHORED BARRIER OR TRANSITIONING FREESTANDING BARRIER TO ANCHORED BARRIER.
6. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 13189LBF [58.67KN] DESIGN STRENGTH IN TENSION AND 16305LBF [72.53KN] DESIGN STRENGTH IN SHEAR MAY BE USED.

Transitions 1830615 Single Slope Barrier Anchoring

LINDSAY			
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830618	BRACKET, SINGLE SLOPE ANCHOR	6	EA

ANCHORS - NOT INCLUDED (SEE NOTE 6)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
2	B011001	THREADED ANCHOR 3/4-10 X 8 1/4	30	EA
3	2001380	WSHR 3/4 F436 FLAT RD STRUCT	30	EA
4	2001399	NUT HN 3/4-10 HVY A536 HD GALV	30	EA
5	-	ADHESIVE	-	-



NOTES:

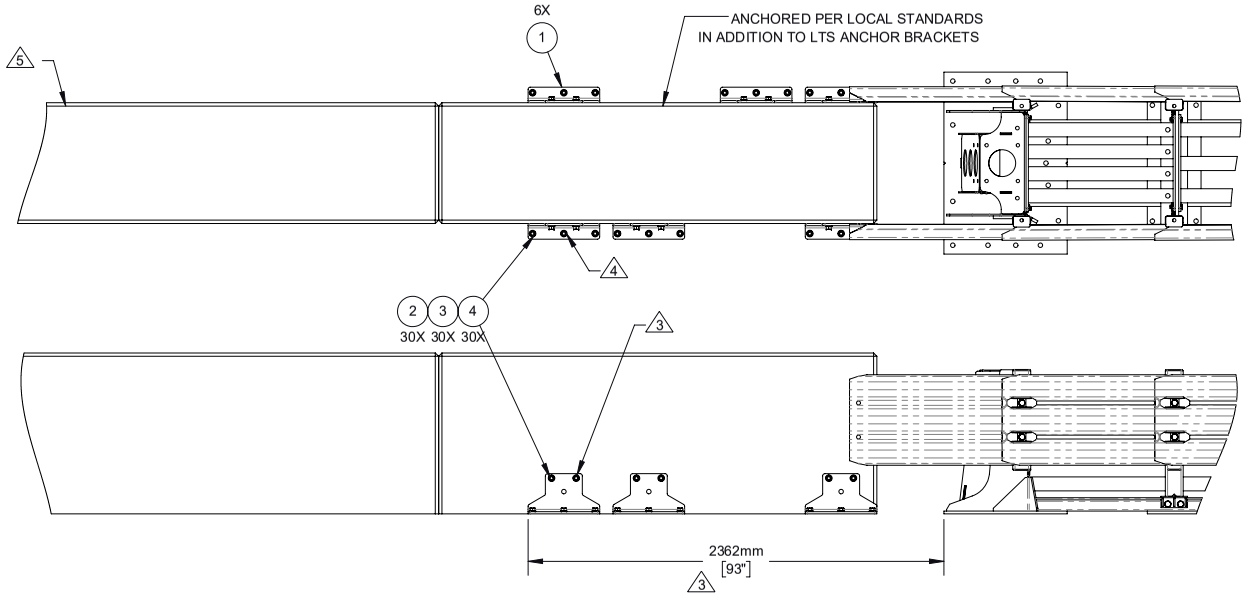
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
2. TRANSITION NOT SHOWN. SEE TRANSITION DRAWINGS FOR INSTALLATION DETIALS.
3. BARRIER ANCHOR BRACKETS ARE TO BE LOCATED WITHIN 93" FROM THE TAU-XR BACKSTOP AND ATTACHED TO BARRIER WITH TWO ANCHORS IN EACH BRACKET. ANCHOR HOLES UTILIZED AND BRACKET POSITION SHOULD BE DETERMINED IN ORDER TO AVOID INTERNAL AND EXTERNAL BARRIER FEATURES.
4. EACH BARRIER ANCHOR BRACKET ARE ATTACHED TO CONCRETE FOUNDATION WITH THREE ANCHORS
5. REFER TO LOCAL STANDARDS FOR ANCHORED BARRIER OR TRANSITIONING FREESTANDING BARRIER TO ANCHORED BARRIER.
6. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 13189LBF [58.67KN] DESIGN STRENGTH IN TENSION AND 16305LBF [72.53KN] DESIGN STRENGTH IN SHEAR MAY BE USED.

Transitions 1830638 Vertical Barrier Anchoring

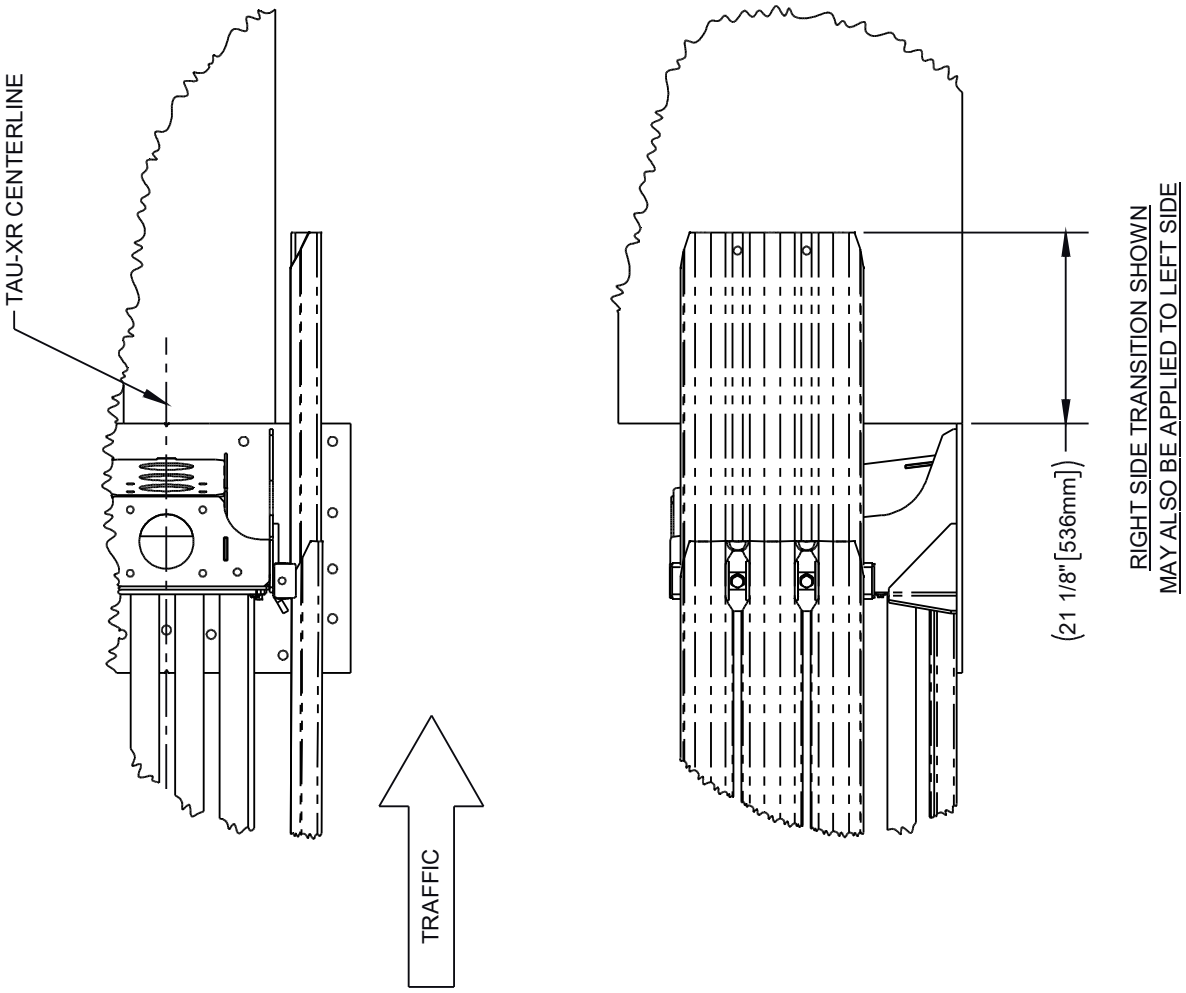
NOTES:
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
2. TRANSITION NOT SHOWN. SEE TRANSITION DRAWINGS FOR INSTALLATION DETIALS.
3. BARRIER ANCHOR BRACKETS ARE TO BE LOCATED WITHIN 93" FROM THE TAU-XR BACKSTOP AND ATTACHED TO BARRIER WITH TWO ANCHORS IN EACH BRACKET. ANCHOR HOLES UTILIZED AND BRACKET POSITION SHOULD BE DETERMINED IN ORDER TO AVOID INTERNAL AND EXTERNAL BARRIER FEATURES.
4. EACH BARRIER ANCHOR BRACKET ARE ATTACHED TO CONCRETE FOUNDATION WITH THREE ANCHORS
5. REFER TO LOCAL STANDARDS FOR ANCHORED BARRIER OR TRANSITIONING FREESTANDING BARRIER TO ANCHORED BARRIER.
6. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 13189LBF [58.67KN] DESIGN STRENGTH IN TENSION AND 16305LBF [72.53KN] DESIGN STRENGTH IN SHEAR MAY BE USED.

LINDSAY				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830637	BRACKET, PCB ANCHOR VERT	6	EA

ANCHORS - NOT INCLUDED (SEE NOTE 6)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
2	B011001	THREADED ANCHOR 3/4-10 X 8 1/4	30	EA
3	2001380	WSHR 3/4 F436 FLAT RD STRUCT	30	EA
4	2001399	NUT HN 3/4-10 HVY A536 HD GALV	30	EA
5	-	ADHESIVE	-	-



Transitions *1829895 NO TRANSITION, UNANCHORED STANDARD END PANEL*



NOTES:
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. TAU-XR END PANELS ARE NOT REQUIRED TO CONNECT TO HAZARD.
3. APPLIES TO VERTICAL, SAFETY SHAPE, AND SINGLE SLOPE HAZARD PROFILES.

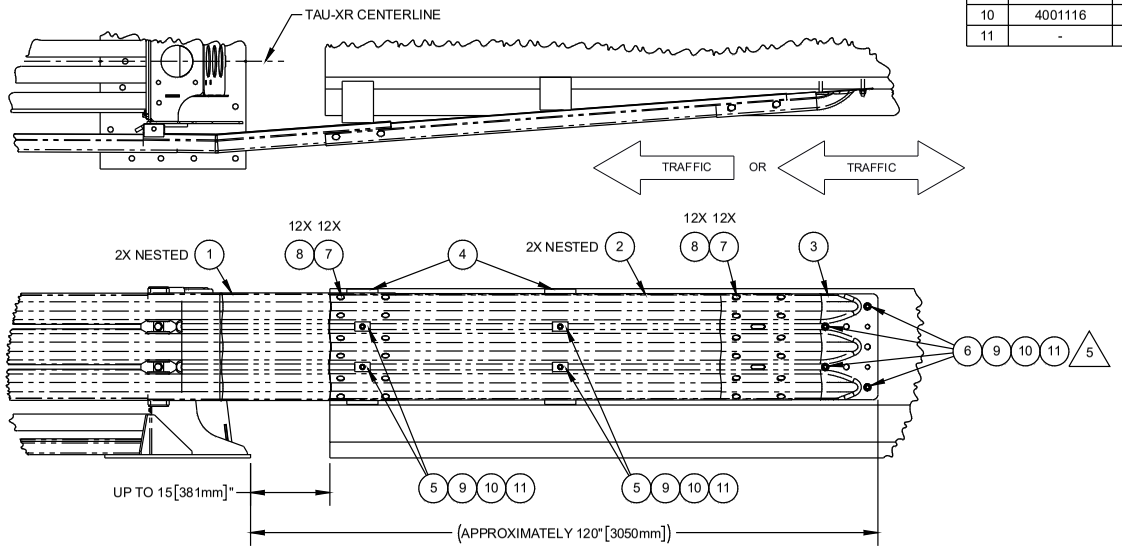
Transitions 1829896 Angled Transition End Panel, Half Length Thrie Beam

NOTES:

1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. TAU-XR END PANEL REPLACED WITH ANGLED END PANELS. TAU-XR SLIDING PANEL MUST OVERLAP THE ANGLED END PANELS REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM. ANGLED END PANELS, THRIE BEAM PANELS, AND THRIE BEAM TERMINAL CONNECTOR TO BE LAPPED ACCORDING TO TRAFFIC DIRECTION.
3. ANGLED END PANELS, THRIE BEAM PANELS, AND THRIE BEAM TERMINAL CONNECTOR ARE SPLICED TOGETHER WITH STANDARD GUARDRAIL HARDWARE. SPLICE BOLT SLOTS IN OVERLAPPED PANELS MAY BE FIELD DRILLED AS NECESSARY FOR BOLT ALIGNMENT.
4. ANGLED END PANEL AND THRIE BEAM PANEL ARE CONNECTED TO HAZARD THROUGH BLOCKOUTS AND UTILIZE RECTANGULAR WASHERS PER AASHTO M180.
5. THRIE BEAM TERMINAL CONNECTOR ANCHORED TO HAZARD IN A MINIMUM OF 4 LOCATIONS RECOMMENDED AS SHOWN. ALTERNATIVE HOLES IN THRIE BEAM TERMINAL CONNECTOR MAY BE USED AS NECESSARY TO AVOID INTERNAL STRUCTURE OF HAZARD.
6. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 10170LBF [45.24kN] DESIGN STRENGTH IN TENSION AND 5288LBF [23.52kN] DESIGN STRENGTH IN SHEAR MAY BE USED.
7. BLOCKOUTS TO BE FIELD TRIMMED OR BUILT UP AS NECESSARY. BLOCKOUTS MAY BE OMITTED WHERE THERE IS NOT SUFFICIENT GAP BETWEEN TRANSITION PANELS AND HAZARD.
8. APPLIES TO VERTICAL, SAFETY SHAPE, AND SINGLE SLOPE HAZARD PROFILES.

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1821932	END PANEL ANGLED, SPLICE	2	EA
2	1830066	THRIE BEAM, HALF, 2SPA, 12GA	2	EA
3	4002049	THRIE-BEAM TERMINAL CONNECTOR	1	EA
4	4002050	THRIE BEAM WOOD BLOCK OUT 6x8	2	EA
5	4002051	GRDRAIL WSHR Rect AASHTO FWR03	4	EA
6	2001636	WASHER, 5/8 F436 STRUCT	4	EA
7	4001115	GUARDRAIL BOLT 5/8-11X 1 1/4	24	EA
8	4001116	NUT, 5/8-11 GR-2 RECESSED	24	EA

ANCHORS - NOT INCLUDED (SEE NOTE 6)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
9	BSI-1309061-00	THREADED ROD, 5/8-11 x 24"	8	EA
10	4001116	NUT, 5/8-11 GR-2 RECESSED	8	EA
11	-	ADHESIVE	-	-



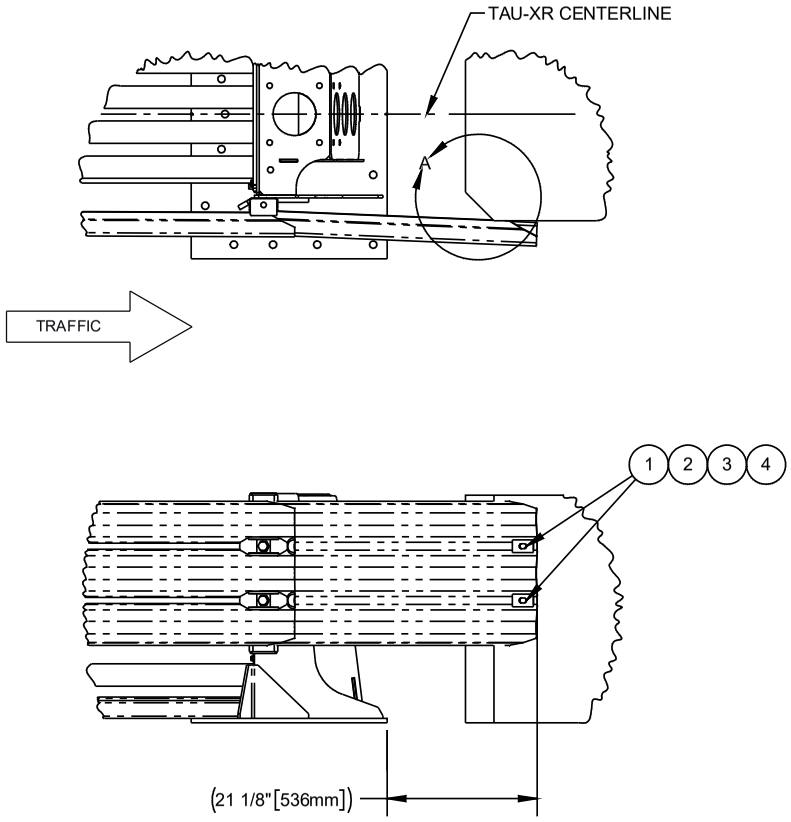
RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

NOTES:

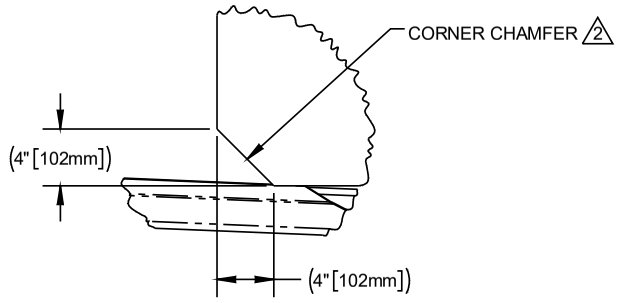
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. HAZARD CORNER MUST BE CHAMFERED TO REDUCE CHANCE OF WHEEL SNAG. APPROXIMATELY 4" [102mm] CHAMFER IS RECOMMENDED.
3. TAU-XR END PANEL ANCHORED TO HAZARD UTILIZING RECTANGULAR WASHERS PER AASHTO M180.
4. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 10170LBF [45.24kN] DESIGN STRENGTH IN TENSION AND 5288LBF [23.52kN] DESIGN STRENGTH IN SHEAR MAY BE USED.
5. APPLIES TO VERTICAL HAZARDS.

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	4002051	GRDRAIL WSHR Rect AASHTO FWR03	2	EA

ANCHORS - NOT INCLUDED (SEE NOTE 4)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
2	BSI-1309061-00	THREADED ROD, 5/8-11 x 24"	2	EA
3	4001116	NUT, 5/8-11 GR-2 RECESSED	2	EA
4	-	ADHESIVE	-	-



RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

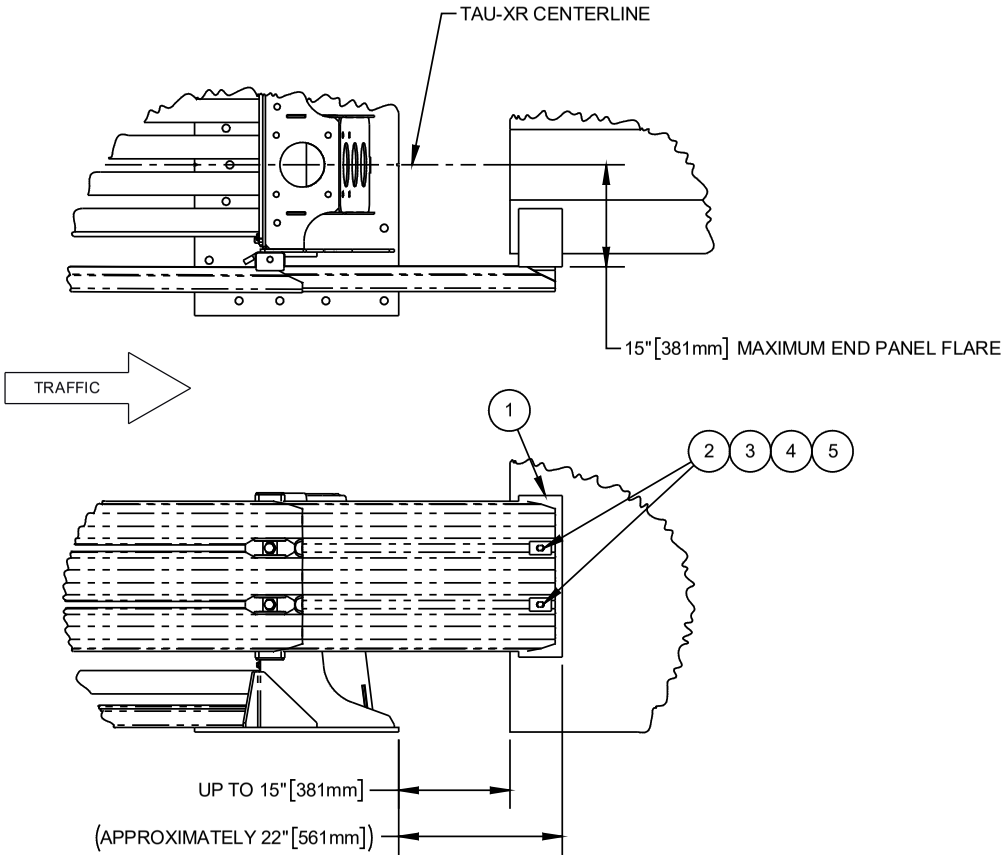


DETAIL A
SCALE 1 : 10

NOTES:
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. TAU-XR END PANEL IS CONNECTED TO HAZARD THROUGH BLOCKOUT AND UTILIZES RECTANGULAR WASHER PER AASHTO M180.
3. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 10170LBF [45.24kN] DESIGN STRENGTH IN TENSION AND 5288LBF [23.52kN] DESIGN STRENGTH IN SHEAR MAY BE USED.
4. TAU-XR END PANEL MAY FLARE OUTWARDS TO A MAXIMUM OF 15" [381mm] FROM TAU-XR CENTERLINE.
5. BLOCKOUT TO BE FIELD TRIMMED OR BUILT UP AS NECESSARY.
6. APPLIES TO VERTICAL, SAFETY SHAPE, AND SINGLE SLOPE HAZARD PROFILES.

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	4002050	THRIE BEAM WOOD BLOCK OUT 6x8	1	EA
2	4002051	GRDRAIL WSHR Rect AASHTO FWR03	2	EA

ANCHORS - NOT INCLUDED (SEE NOTE 3)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
3	BSI-1309061-00	THREADED ROD, 5/8-11 x 24"	2	EA
4	4001116	NUT, 5/8-11 GR-2 RECESSED	2	EA
5	-	ADHESIVE	-	-



RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

Transitions 1830306 No Transition, Non-Traffic Side

NOTES:

1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. TAU-XR END PANELS ARE NOT REQUIRED TO CONNECT TO HAZARD.
3. TAU-XR END PANEL MAY FLARE OUTWARDS TO A MAXIMUM OF 15" [381mm] FROM TAU-XR CENTERLINE. HAZARD OFFSET AT 10 7/8" [277mm] HEIGHT MUST NOT EXCEED 15" [381mm].
4. APPLIES TO VERTICAL, SAFETY SHAPE, AND SINGLE SLOPE HAZARD PROFILES.

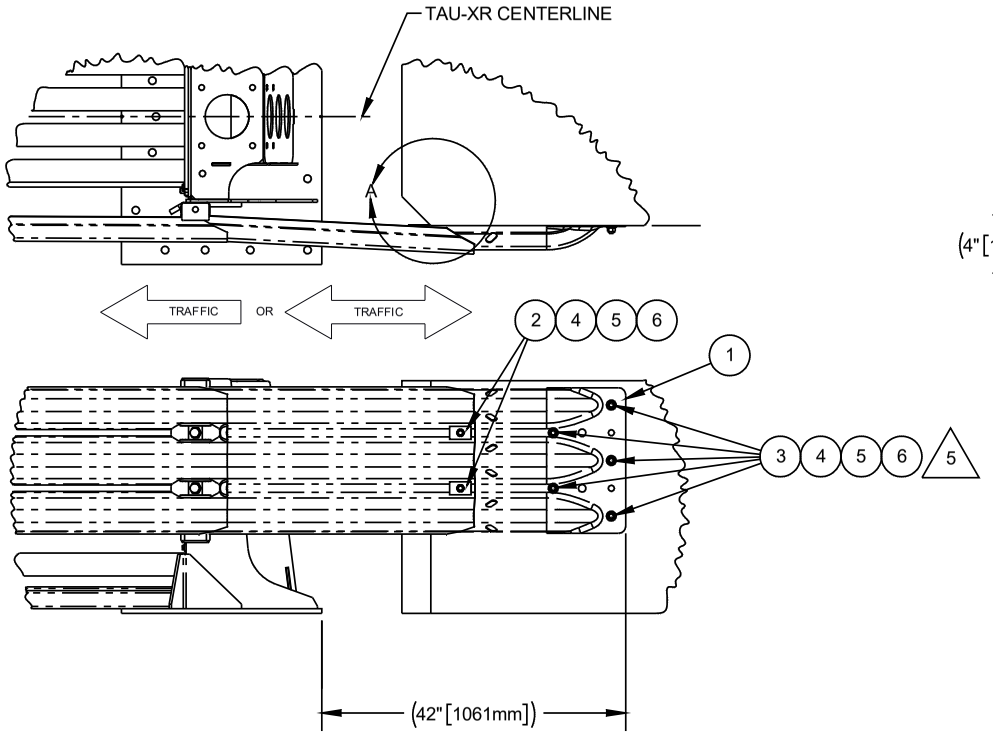
Transitions 1830387 Anchored Standard End Panel, End Shoe

NOTES:

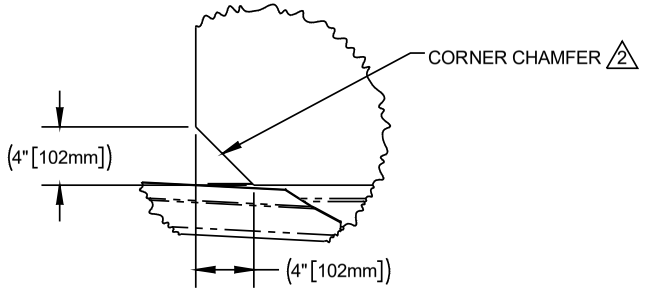
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. HAZARD CORNER MUST BE CHAMFERED TO REDUCE CHANCE OF WHEEL SNAG. APPROXIMATELY 4" [102mm] CHAMFER IS RECOMMENDED.
3. TAU-XR END PANEL MUST OVERLAP THRIE BEAM TERMINAL CONNECTOR REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM.
4. TAU-XR END PANEL ANCHORED TO HAZARD UTILIZING RECTANGULAR WASHERS PER AASHTO M180.
5. THRIE BEAM TERMINAL CONNECTOR ANCHORED TO HAZARD IN 5 LOCATIONS RECOMMENDED AS SHOWN. ALTERNATIVE HOLES IN THRIE BEAM TERMINAL CONNECTOR MAY BE USED AS NECESSARY TO AVOID INTERNAL STRUCTURE OF HAZARD.
6. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 10170LBF [45.24kN] DESIGN STRENGTH IN TENSION AND 5288LBF [23.52kN] DESIGN STRENGTH IN SHEAR MAY BE USED.
7. APPLIES TO VERTICAL HAZARDS.

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	4002049	THRIE-BEAM TERMINAL CONNECTOR	1	EA
2	4002051	RECTANGULAR GUARDRAIL WASHER	2	EA
3	2001636	WASHER, 5/8 F436 STRUCT	5	EA

ANCHORS - NOT INCLUDED (SEE NOTE 6)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
4	BSI-1309061-00	THREADED ROD, 5/8-11 x 24"	7	EA
5	4001116	NUT, 5/8-11 GR-2 RECESSED	7	EA
6	-	ADHESIVE	-	-



RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE



DETAIL A
SCALE 1 : 10

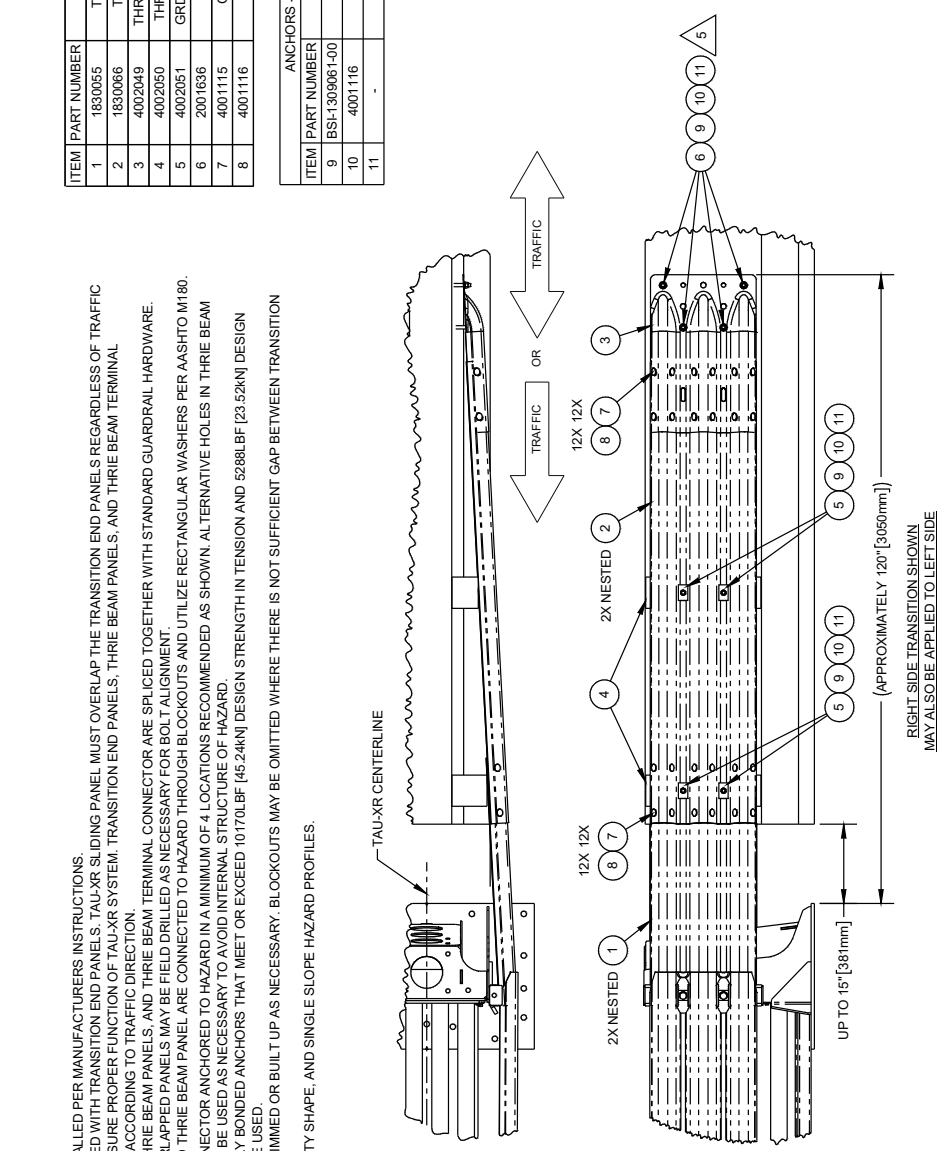
Transitions 1830457 Straight Transition End Panel, Half Length Thrie Beam

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830055	THRIE BEAM, END TRANS, 12GA	2	EA
2	1830066	THRIE BEAM, HALF, 2SPA, 12GA	2	EA
3	4002049	THRIE-BEAM TERMINAL CONNECTOR	1	EA
4	4002050	THRIE BEAM WOOD BLOCK OUT 6x8	2	EA
5	4002051	GRDRAIL W/SHR Rect AASHTO FW/R03	4	EA
6	2001636	WASHER, 5/8 F436 STRUCT	4	EA
7	4001115	GUARDRAIL BOLT 5/8-11X 1 1/4	24	EA
8	4001116	NUT, 5/8-11 GR-2 RECESSED	24	EA

ANCHORS - NOT INCLUDED (SEE NOTE 6)

ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
9	BSI-1309061-00	THREADED ROD, 5/8-11 x 24"	8	EA
10	4001116	NUT, 5/8-11 GR-2 RECESSED	8	EA
11	-	ADHESIVE	-	-

NOTES:
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. TAU-XR END PANEL REPLACED WITH TRANSITION END PANELS. TAU-XR SLIDING PANEL MUST OVERLAP THE TRANSITION END PANELS REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM. TRANSITION END PANELS, THRIE BEAM PANELS, AND THRIE BEAM TERMINAL CONNECTOR TO BE LAPPED ACCORDING TO TRAFFIC DIRECTION.
3. TRANSITION END PANELS, THRIE BEAM PANELS, AND THRIE BEAM TERMINAL CONNECTOR ARE SPLICED TOGETHER WITH STANDARD GUARDRAIL HARDWARE. SPLICE BOLT SLOTS IN OVERLAPPED PANELS MAY BE FIELD DRILLED AS NECESSARY FOR BOLT ALIGNMENT.
4. TRANSITION END PANEL AND THRIE BEAM PANEL ARE CONNECTED TO HAZARD THROUGH BLOCKOUTS AND UTILIZE RECTANGULAR WASHERS PER AASHTO M180.
5. THRIE BEAM TERMINAL CONNECTOR ANCHORED TO HAZARD IN A MINIMUM OF 4 LOCATIONS RECOMMENDED AS SHOWN. ALTERNATIVE HOLES IN THRIE BEAM TERMINAL CONNECTOR MAY BE USED AS NECESSARY TO AVOID INTERNAL STRUCTURE OF HAZARD.
6. MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 10170LBF [45.24kN] DESIGN STRENGTH IN TENSION AND 5288LBF [23.52kN] DESIGN STRENGTH IN SHEAR MAY BE USED.
7. BLOCKOUTS TO BE FIELD TRIMMED OR BUILT UP AS NECESSARY. BLOCKOUTS MAY BE OMITTED WHERE THERE IS NOT SUFFICIENT GAP BETWEEN TRANSITION PANELS AND HAZARD.
8. APPLIES TO VERTICAL, SAFETY SHAPE, AND SINGLE SLOPE HAZARD PROFILES.



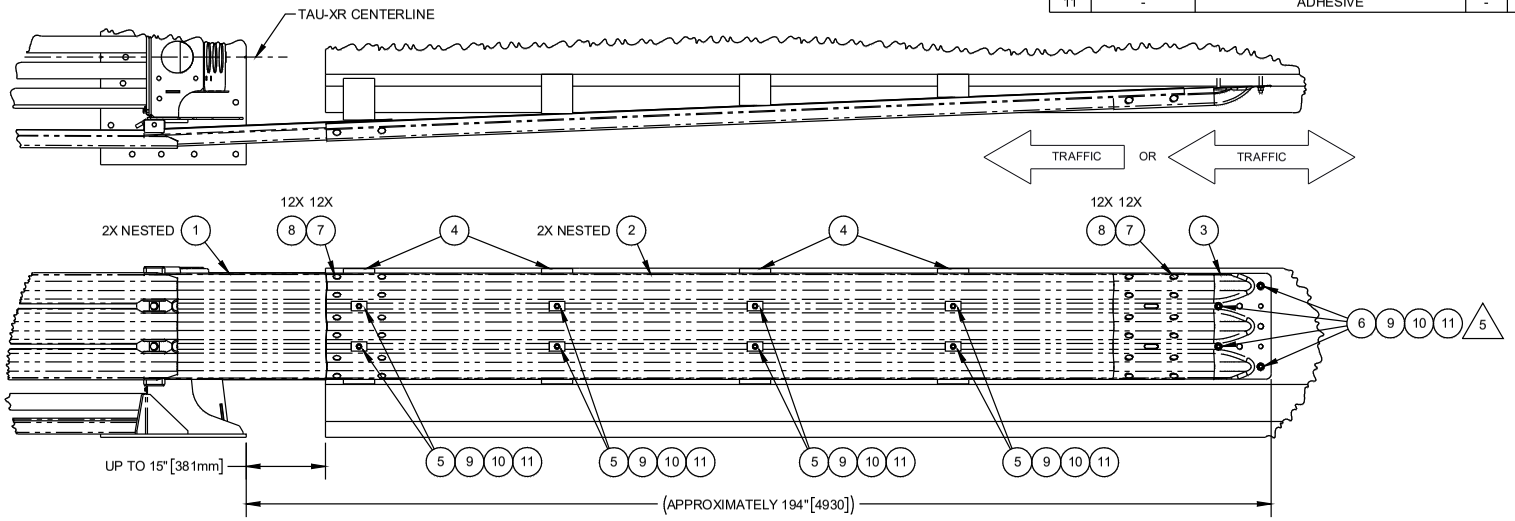
Transitions 1830503 Straight Transition End Panel, Full Length Thrie Beam

NOTES:

1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. TAU-XR END PANEL REPLACED WITH TRANSITION END PANELS. TAU-XR SLIDING PANEL MUST OVERLAP THE TRANSITION END PANELS REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM. TRANSITION END PANELS, THRIE BEAM PANELS, AND THRIE BEAM TERMINAL CONNECTOR TO BE LAPPED ACCORDING TO TRAFFIC DIRECTION.
3. TRANSITION END PANELS, THRIE BEAM PANELS, AND THRIE BEAM TERMINAL CONNECTOR ARE SPLICED TOGETHER WITH STANDARD GUARDRAIL HARDWARE. SPLICE BOLT SLOTS IN OVERLAPPED PANELS MAY BE FIELD DRILLED AS NECESSARY FOR BOLT ALIGNMENT.
4. TRANSITION END PANEL AND THRIE BEAM PANEL ARE CONNECTED TO HAZARD THROUGH BLOCKOUTS AND UTILIZE RECTANGULAR WASHERS PER AASHTO M180.
5. THRIE BEAM TERMINAL CONNECTOR ANCHORED TO HAZARD IN A MINIMUM OF 4 LOCATIONS RECOMMENDED AS SHOWN. ALTERNATIVE HOLES IN THRIE BEAM TERMINAL CONNECTOR MAY BE USED AS NECESSARY TO AVOID INTERNAL STRUCTURE OF HAZARD.
6. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 10170LBF [45.24kN] DESIGN STRENGTH IN TENSION AND 5288LBF [23.52kN] DESIGN STRENGTH IN SHEAR MAY BE USED.
7. BLOCKOUTS TO BE FIELD TRIMMED OR BUILT UP AS NECESSARY. BLOCKOUTS MAY BE OMITTED WHERE THERE IS NOT SUFFICIENT GAP BETWEEN TRANSITION PANELS AND HAZARD.
8. APPLIES TO VERTICAL, SAFETY SHAPE, AND SINGLE SLOPE HAZARD PROFILES.

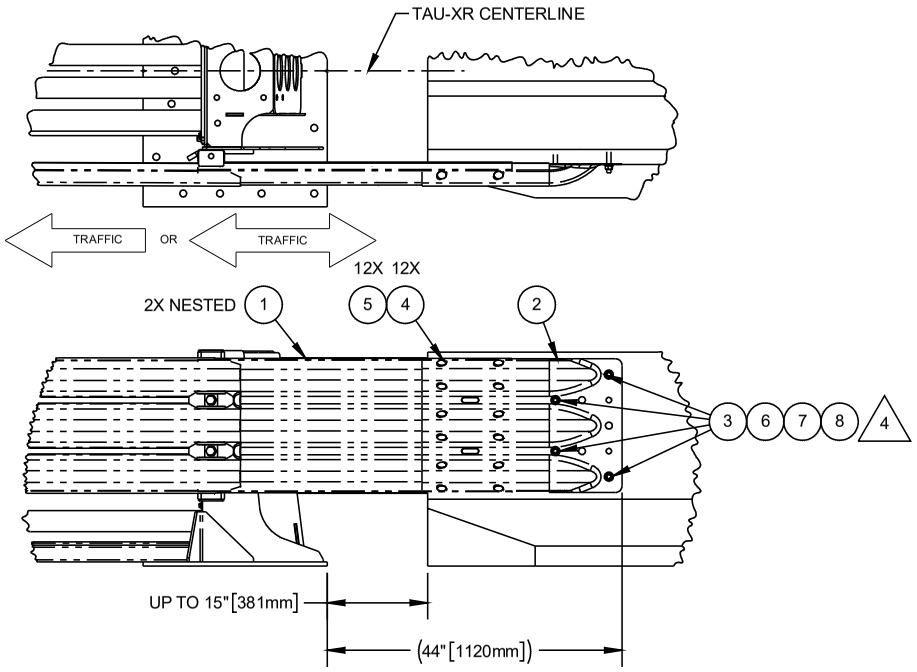
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830055	THRIE BEAM, END TRANS, 12GA	2	EA
2	1830067	THRIE BEAM, 12'-6", 4SPA, 12GA	2	EA
3	4002049	THRIE-BEAM TERMINAL CONNECTOR	1	EA
4	4002050	THRIE BEAM WOOD BLOCK OUT 6x8	4	EA
5	4002051	GRDRAIL WSHR Rect AASHTO FWR03	8	EA
6	2001636	WASHER, 5/8 F436 STRUCT	4	EA
7	4001115	GUARDRAIL BOLT 5/8-11X 1 1/4	24	EA
8	4001116	NUT, 5/8-11 GR-2 RECESSED	24	EA

ANCHORS - NOT INCLUDED (SEE NOTE 6)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
9	BSI-1309061-00	THREADED ROD, 5/8-11 x 24"	12	EA
10	4001116	NUT, 5/8-11 GR-2 RECESSED	12	EA
11	-	ADHESIVE	-	-



RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

1830623 Straight Transition End Panel, End Shoe



RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

NOTES:

1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
2. TAU-XR END PANEL REPLACED WITH TRANSITION END PANELS. TAU-XR SLIDING PANEL MUST OVERLAP THE TRANSITION END PANELS REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM. TRANSITION END PANELS AND THRIE BEAM TERMINAL CONNECTOR TO BE LAPPED ACCORDING TO TRAFFIC DIRECTION.
3. TRANSITION END PANELS AND THRIE BEAM TERMINAL CONNECTOR ARE SPLICED TOGETHER WITH STANDARD GUARDRAIL HARDWARE. SPLICE BOLT SLOTS IN OVERLAPPED PANELS MAY BE FIELD DRILLED AS NECESSARY FOR BOLT ALIGNMENT.
4. THRIE BEAM TERMINAL CONNECTOR ANCHORED TO HAZARD IN A MINIMUM OF 4 LOCATIONS RECOMMENDED AS SHOWN. ALTERNATIVE HOLES IN THRIE BEAM TERMINAL CONNECTOR MAY BE USED AS NECESSARY TO AVOID INTERNAL STRUCTURE OF HAZARD.
5. ALTERNATIVE MECHANICAL OR CHEMICALLY BONDED ANCHORS THAT MEET OR EXCEED 10170LBF [45.24kN] DESIGN STRENGTH IN TENSION AND 5288LBF [23.52kN] DESIGN STRENGTH IN SHEAR MAY BE USED.
6. IF APPROACH TRAFFIC IS PRESENT WITH THIS TRANSITION, HAZARD TOE MUST BE CHAMFERED. CHAMFER IS NOT REQUIRED IF ONLY REVERSE TRAFFIC IS PRESENT.
7. APPLIES TO SAFETY SHAPE AND SINGLE SLOPE HAZARD PROFILES.

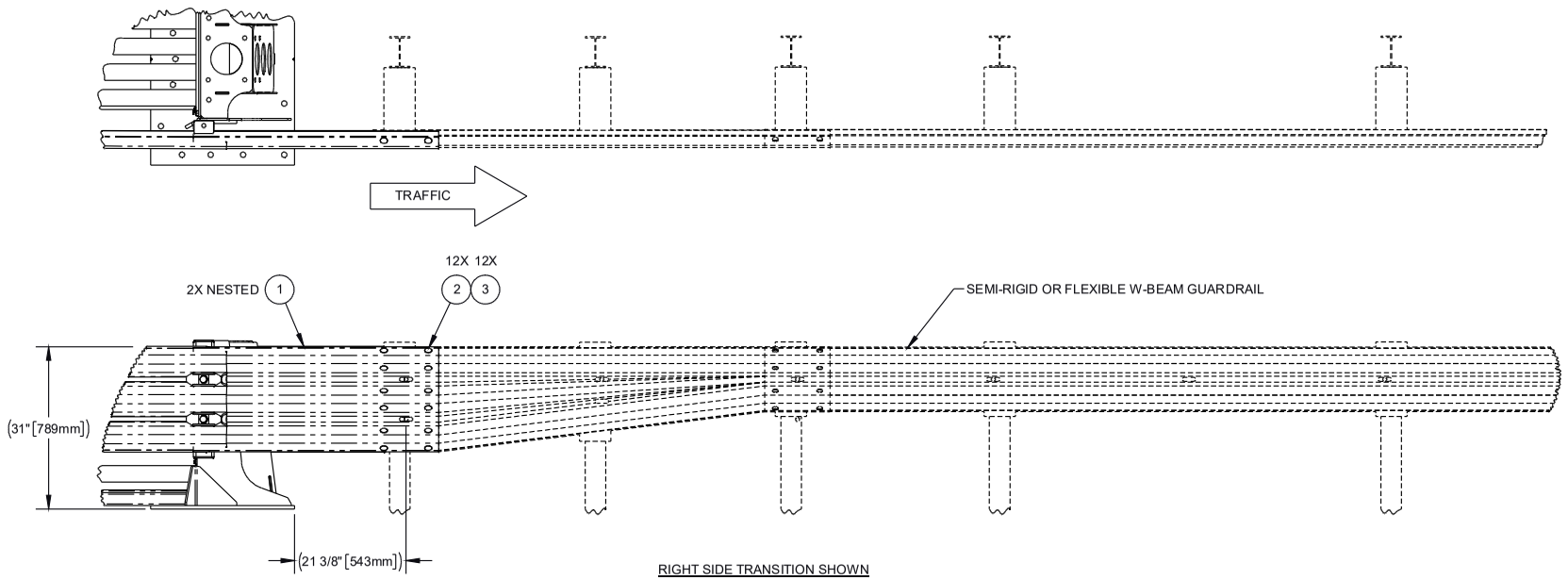
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830055	THRIE BEAM, END TRANS, 12GA	2	EA
2	4002049	THRIE-BEAM TERMINAL CONNECTOR	1	EA
3	2001636	WASHER, 5/8 F436 STRUCT	4	EA
4	4001115	GUARDRAIL BOLT 5/8-11X 1 1/4	12	EA
5	4001116	NUT, 5/8-11 GR-2 RECESSED	12	EA

ANCHORS - NOT INCLUDED (SEE NOTE 5)				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
6	BSI-1309061-00	THREADED ROD, 5/8-11 x 24"	4	EA
7	4001116	NUT, 5/8-11 GR-2 RECESSED	4	EA
8	-	ADHESIVE	-	-

Transitions 1830645 Transition to W-Beam

NOTES:
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
2. TAU-XR END PANEL REPLACED WITH TRANSITION END PANELS. TAU-XR SLIDING PANEL MUST OVERLAP THE TRANSITION END PANELS REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM. TRANSITION END PANELS AND W-THRIE BEAM TRANSITION SECTION TO BE LAPPED ACCORDING TO TRAFFIC DIRECTION.
3. FOR GUARDRAIL TRANSITIONS, THE TAU-XR SYSTEM SHOULD BE CONSIDERED RIGID.
4. W-THRIE BEAM TRANSITION SECTION AND W-BEAM GUARDRAIL INCLUDING POSTS AND BLOCKOUTS ARE SHOWN FOR REFERENCE AND MUST BE PER LOCAL STANDARDS.
5. LEFT AND RIGHT SIDE GUARDRAIL TRANSITIONS MAY SHARE POSTS WHERE NECESSARY. BLOCKOUTS MAY BE BUILT UP OR TRIMMED AS NECESSARY TO TRANSITION TO ALLOWABLE TAU-XR SYSTEM WIDTH.

1830639				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830055	THRIE BEAM, END TRANS, 12GA	2	EA
2	4001115	GUARDRAIL BOLT 5/8-11X 1 1/4	12	EA
3	4001116	NUT, 5/8-11 GR-2 RECESSED	12	EA

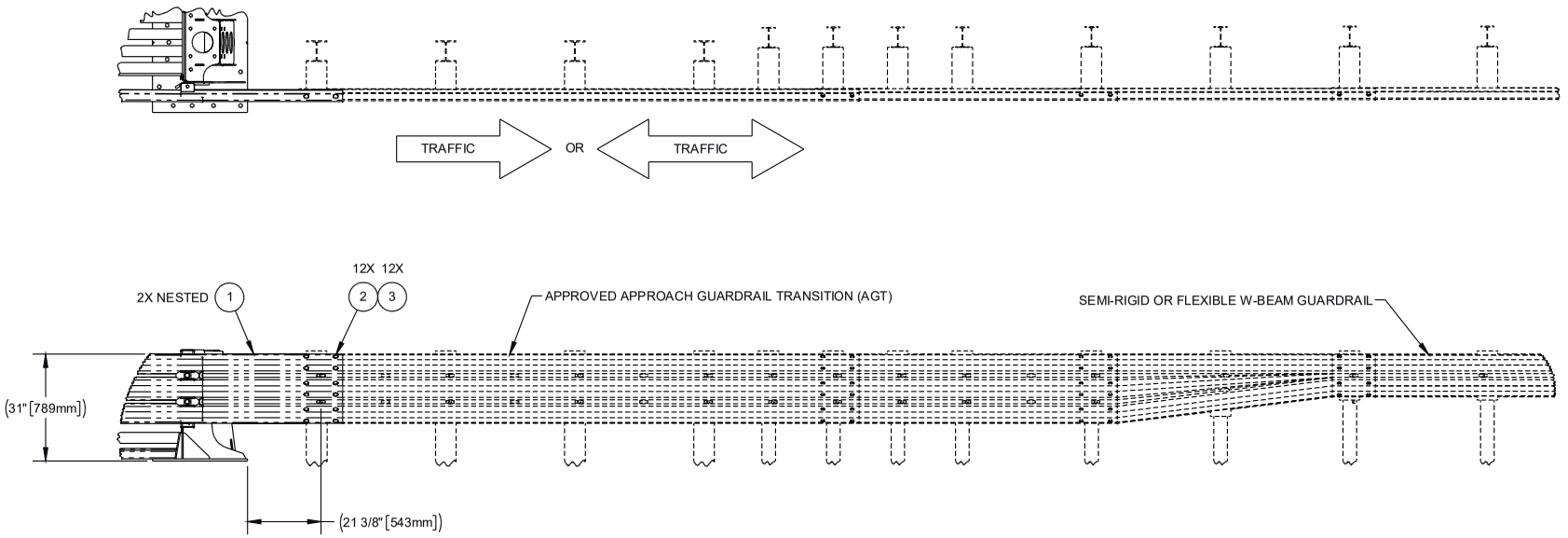


RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

1830679 Stiffened Transition to W-Beam

NOTES:
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
2. TAU-XR END PANEL REPLACED WITH TRANSITION END PANELS. TAU-XR SLIDING PANEL MUST OVERLAP THE TRANSITION END PANELS REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM. TRANSITION END PANELS AND THRIE BEAM PANEL TO BE LAPPED ACCORDING TO TRAFFIC DIRECTION.
3. FOR GUARDRAIL TRANSITIONS, THE TAU-XR SYSTEM SHOULD BE CONSIDERED RIGID.
4. APPROACH GUARDRAIL TRANSITION AND W-BEAM GUARDRAIL INCLUDING POSTS AND BLOCKOUTS ARE SHOWN FOR REFERENCE AND MUST BE PER LOCAL STANDARDS.
5. LEFT AND RIGHT SIDE GUARDRAIL TRANSITIONS MAY SHARE POSTS WHERE NECESSARY. BLOCKOUTS MAY BE BUILT UP OR TRIMMED AS NECESSARY TO TRANSITION TO ALLOWABLE TAU-XR SYSTEM WIDTH.

1830639				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830055	THRIE BEAM, END TRANS, 12GA	2	EA
2	4001115	GUARDRAIL BOLT 5/8-11X 1 1/4	12	EA
3	4001116	NUT, 5/8-11 GR-2 RECESSED	12	EA

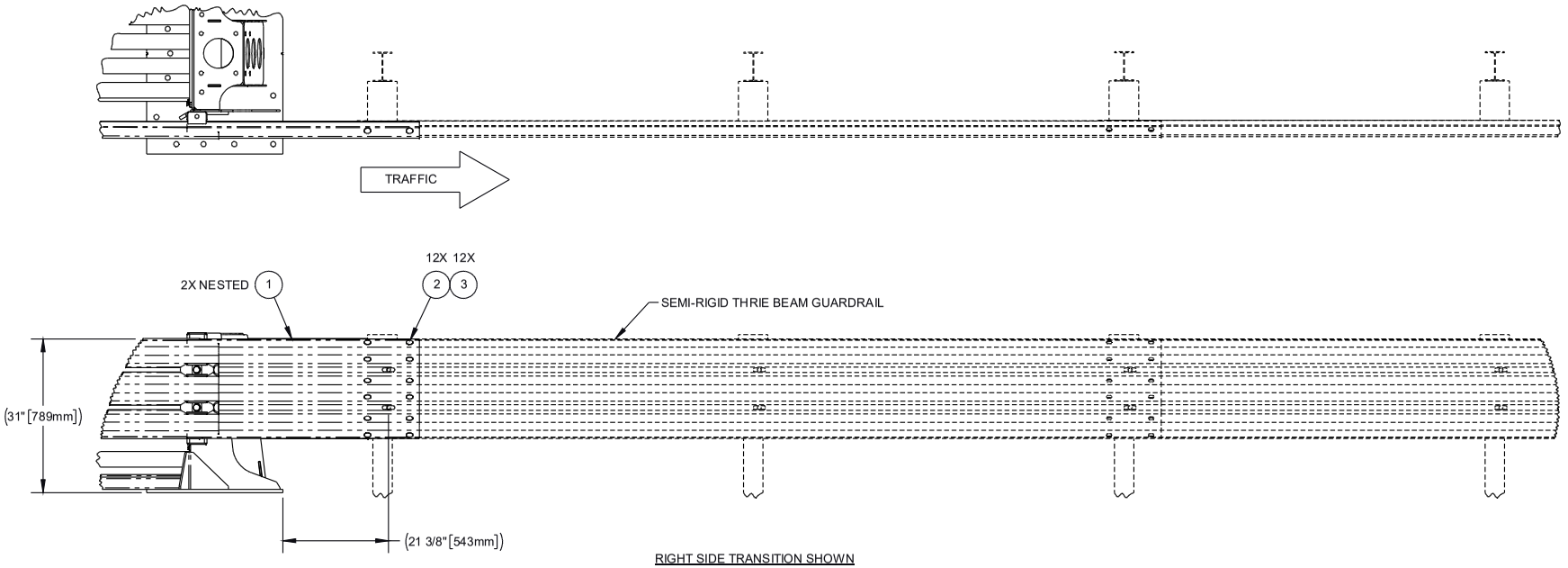


RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

Transitions 1830684 Transition to Thrie Beam

NOTES:
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
2. TAU-XR END PANEL REPLACED WITH TRANSITION END PANELS. TAU-XR SLIDING PANEL MUST OVERLAP THE TRANSITION END PANELS REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM. TRANSITION END PANELS AND THRIE BEAM PANEL TO BE LAPPED ACCORDING TO TRAFFIC DIRECTION.
3. FOR GUARDRAIL TRANSITIONS, THE TAU-XR SYSTEM SHOULD BE CONSIDERED RIGID.
4. THRIE BEAM GUARDRAIL INCLUDING POSTS AND BLOCKOUTS ARE SHOWN FOR REFERENCE AND MUST BE PER LOCAL STANDARDS.
5. LEFT AND RIGHT SIDE GUARDRAIL TRANSITIONS MAY SHARE POSTS WHERE NECESSARY. BLOCKOUTS MAY BE BUILT UP OR TRIMMED AS NECESSARY TO TRANSITION TO ALLOWABLE TAU-XR SYSTEM WIDTH.

1830639				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830055	THRIE BEAM, END TRANS, 12GA	2	EA
2	4001115	GUARDRAIL BOLT 5/8-11X 1 1/4	12	EA
3	4001116	NUT, 5/8-11 GR-2 RECESSED	12	EA

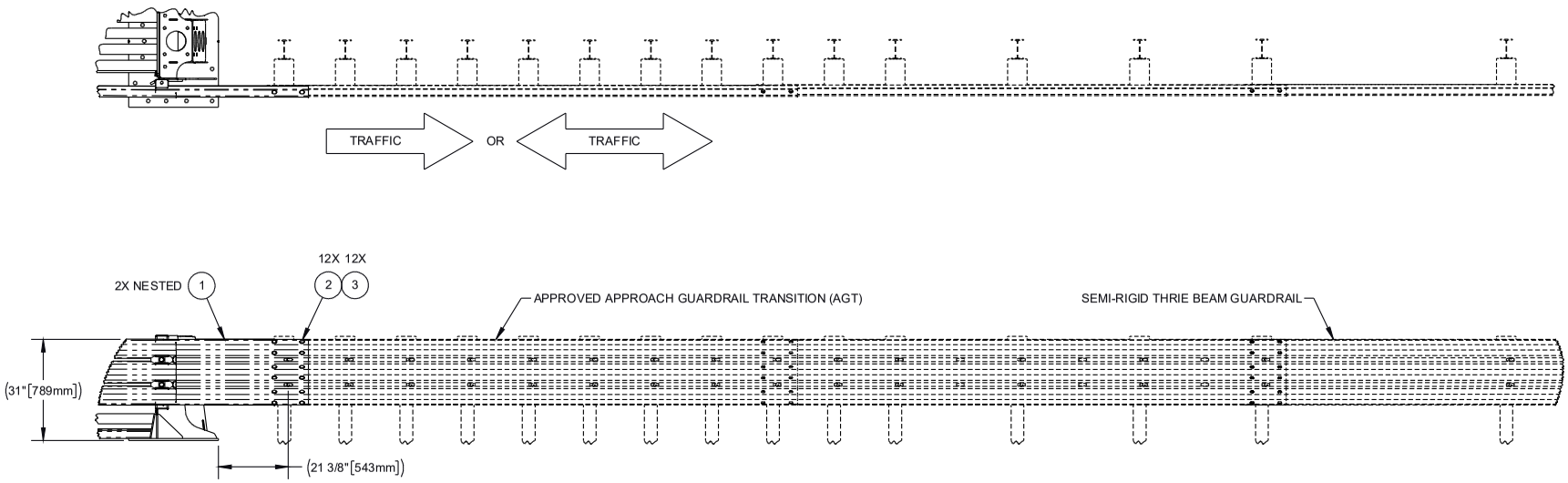


RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

1830685 Stiffened Transition to Thrie Beam

NOTES:
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
2. TAU-XR END PANEL REPLACED WITH TRANSITION END PANELS. TAU-XR SLIDING PANEL MUST OVERLAP THE TRANSITION END PANELS REGARDLESS OF TRAFFIC DIRECTION IN ORDER TO ENSURE PROPER FUNCTION OF TAU-XR SYSTEM. TRANSITION END PANELS AND THRIE BEAM PANEL TO BE LAPPED ACCORDING TO TRAFFIC DIRECTION.
3. FOR GUARDRAIL TRANSITIONS, THE TAU-XR SYSTEM SHOULD BE CONSIDERED RIGID.
4. APPROACH GUARDRAIL TRANSITION AND THRIE BEAM GUARDRAIL INCLUDING POSTS AND BLOCKOUTS ARE SHOWN FOR REFERENCE AND MUST BE PER LOCAL STANDARDS.
5. LEFT AND RIGHT SIDE GUARDRAIL TRANSITIONS MAY SHARE POSTS WHERE NECESSARY. BLOCKOUTS MAY BE BUILT UP OR TRIMMED AS NECESSARY TO TRANSITION TO ALLOWABLE TAU-XR SYSTEM WIDTH.

1830639				
ITEM	PART NUMBER	DESCRIPTION	QTY	UNIT
1	1830055	THRIE BEAM, END TRANS, 12GA	2	EA
2	4001115	GUARDRAIL BOLT 5/8-11X 1 1/4	12	EA
3	4001116	NUT, 5/8-11 GR-2 RECESSED	12	EA



RIGHT SIDE TRANSITION SHOWN
MAY ALSO BE APPLIED TO LEFT SIDE

“THIS PAGE IS INTENTIONALLY LEFT BLANK”

Revisions

DATE	ECN	PUBLISHED ECN	REVISION	DESCRIPTION OF CHANGE
02/19/2024	61785	61785	A	New release
03/04/2024	62347	62347	B	pages 6, 7, 12, 13, 16, 19, 27, 28, 32, 33, 34 - updates to support asphalt pad installation
05/15/2025	62800	62800	C	Pages 1, 5, 7, 8,9,10, 13, 15, 17, 20, 21, 22, 23, 24, 27, 28, 29, 30, 31, - updated content and images
06/09/2025	63332	63332	D	Title change Page 8 - text changes

LINDSAY™

18135 Burke Street, Suite 100 | Omaha, NE 68022
+1 (402) 829-6800 | U.S. Toll Free: (888) 800-3691

lindsay.com

P/N 1828819 Rev D (ECN 63332)