SCI Products Inc.

SCI70GM AND SCI100GM DESIGN AND INSTALLATION MANUAL

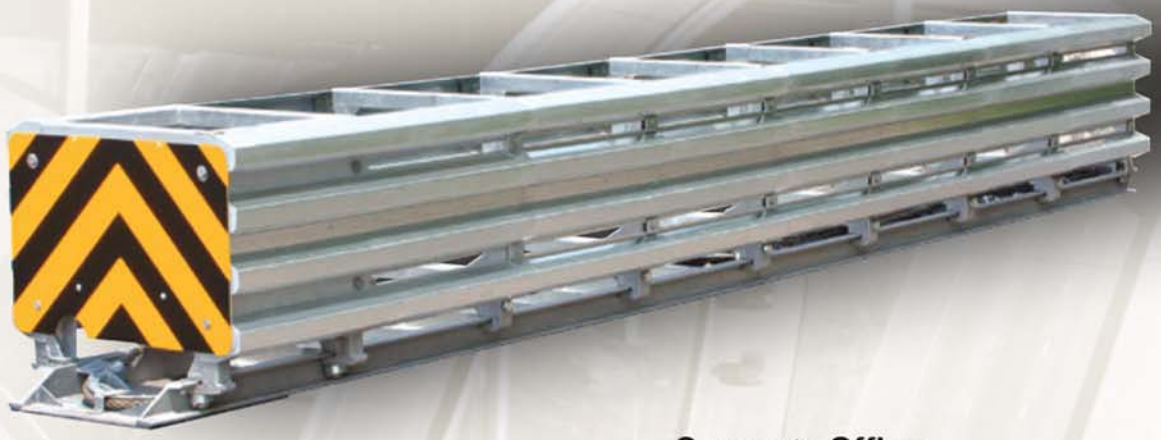
The World's Only

Speed-Dependent

Crash Attenuator

SMART CUSHION INNOVATIONS®

NCHRP 350 Approved



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Work Area Protection

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OVERVIEW

Product

The SMART CUSHION® impact attenuators are some of the many safety products manufactured and sold by SCI Products, Inc. They are NCHRP Report 350, Test Levels 2 and 3 (TL2 and TL3) compliant (Models SCI 70 GM and SCI 100 GM, respectively) and are fully redirective, non-gating, and bi-directional. SMART CUSHION® impact attenuators are used to help protect motorists from obstacles in both permanent and work zone locations. They can be attached to most types of median and roadside barriers.

The SMART CUSHION® attenuators use a patented system for stopping vehicles. The system is speed dependent and stops small and large vehicles by automatically regulating the stopping force exerted on a vehicle. Small vehicles are stopped more slowly than large vehicles to minimize the forces on the occupants and reduce the chance of injuries.

The SMART CUSHION® attenuators are slightly tapered from front to rear. This allows the side panel sections to collapse over the next section with minimum stress and damage. During collapse, the parts move freely past each other and do not become wedged upon impact.

Neither wide temperature variations nor temperature extremes affect the performance of SMART CUSHION® impact attenuators. The viscosity of the fluid in the shock-arresting cylinder has very little effect on performance.

Maintenance

SMART CUSHION® impact attenuators are low-maintenance units. In a two-year performance evaluation report submitted to the Federal Highway Administration, the average cost of parts to repair a SMART CUSHION® impact attenuator was $39, excluding two catastrophic impacts. More than four out of five of the reported repairs only required two shear bolts costing under $2. A trained, two-person maintenance crew can return most impacted SMART CUSHION® attenuators to full service within 30 – 60 minutes. This short repair time reduces the maintenance workers' exposure to traffic and minimizes motorist inconvenience. Side impacts usually result in no damage to the impact attenuator.

Crash Performance

The SMART CUSHION® impact attenuators broke new ground during NCHRP Report 350 crash testing. In the high-speed test, 100 kilometers per hour (63 miles per hour) the small vehicle's deceleration rate was significantly lower than any previously recorded value (-9.8 G's as compared to –13.4 G's). This means less impact forces on the vehicle's occupants and a reduced risk of injury occurrence and severity.

Another amazing fact is that all the tests were conducted on the same SMART CUSHION® unit over four consecutive days with no damage to non-expendable parts. The only parts replaced after each crash test were the two shear bolts, costing less than $2 for each reset.

SPECIFICATIONS

Description

The SMART CUSHION® is a redirective, non-gating crash attenuator that consists of a base, supporting frames, a sled, side panels, a wire rope cable, sheaves, and a shock-arresting cylinder. The base is anchored to the mounting surface and provides support for the frames that are mounted on it. The support frames hold the side panels that provide a flat outer redirective surface for side impacts. The sled provides redirective support for side impacts and deceleration force for frontal impacts. The SMART CUSHION® telescopes rearward upon frontal impact and can be reset with minimal repair parts. It is NCHRP 350 Test Levels 2 and 3 approved.

System Dimensions & Weight

Table 1 – Dimensions & Weight

	SCI 70 GM	SCI 100 GM
Width	24″ (610 mm)	24″ (610 mm)
Length	13 ½ ft (4115 mm)	21 ½ ft (6550 mm)
Height	33″ (840 mm)	33″ (840 mm)
Weight	2465 lbs (1120 kg)	3450 lbs (1570 kg)
NCHRP 350, Test Level	2	3

DESIGN CRITERIA

General

SMART CUSHION® impact attenuators comply with NCHRP Report 350, TL2 and TL3, and are designed for work zone and permanent applications.

Foundations

Foundations must be a flat surface with longitudinal and cross slopes of 10:1 (horizontal: vertical) or less. SMART CUSHION® impact attenuators should not be located over drainage basins or expansion joints. Portland cement concrete foundation pads are preferred for permanent installations; asphaltic concrete foundation pads are appropriate for work zone installations. The following table describes the foundations that may be used. See Appendices for drawings.

Table 2 – Foundations

Pad Material and Thickness	Anchor Embedment
6″ (150 mm) reinforced PCC [1]	5 ½″ (140 mm)
8″ (205 mm) non-reinforced PCC	5 ½″ (140 mm)
3″ (75 mm) AC [2,3] over 3″ (75 mm) non-reinforced PCC	16 ½″ (420 mm)
6″ (150 mm) AC over compacted subgrade [3]	16 ½″ (420 mm)
8″ (205 mm) AC [3]	16 ½″ (420 mm)

Notes: 1. Portland cement concrete
2. Asphaltic concrete
3. Minimum compaction: 95% of optimal

Concrete compressive strength shall be 4000 psi (28 MPa) at 28 days.

Foundation lengths may vary when using wide transitions.

Support Structure

SMART CUSHION® impact attenuators are self-supporting and do not require an additional support structure.

Location

The SMART CUSHION® impact attenuator's location determines its position and transition requirements.

1. Approach Zone – SMART CUSHION® impact attenuators should not be placed directly behind raised curbs. The longitudinal and cross slopes in front of the device should be 10:1 (horizontal: vertical) or less.
2. Barrier Width – SMART CUSHION® impact attenuators are 24" (610 mm) wide at the rear. Barriers 24" (610 mm) wide, or less, can be shielded without using a transition if there is no reverse direction traffic. Barriers that are wider than 24" (610 mm) and/or have reverse direction traffic require a transition, available from SCI Products, Inc.
3. Barrier Height – SMART CUSHION® impact attenuators are approximately 33 ⅜" (848 mm) high. Barriers should be as high, or higher, than the SMART CUSHION® to provide the proper support and transition attachment.
4. Barrier Shape – SMART CUSHION® transitions allow for connection to many barrier shapes. A rectangular concrete block provides the most economical and simplest shape to connect to.

Transition Design

SMART CUSHION® impact attenuators can be attached to many different barrier shapes. The attenuators are designed for direct attachment to 24" wide barriers and Jersey/F-Shape barriers with base widths up to 27 ½" (700 mm). **The SMART CUSHION® side panels move rearward beyond the end of the attenuator up to 30" (760 mm) upon impact.** This area is known as the travel zone. SMART CUSHION® transitions provide this travel zone in front of wider barriers and obstacles.

See appendices for SMART CUSHION® transition drawings. SCI Products, Inc. can make transitions for other applications. Contact us for details.

Transitions

Necessary Locations (see Figure 1 – Necessary Locations):

There is reverse direction traffic within the clear zone.
The barrier intrudes into the side panels' travel zone.

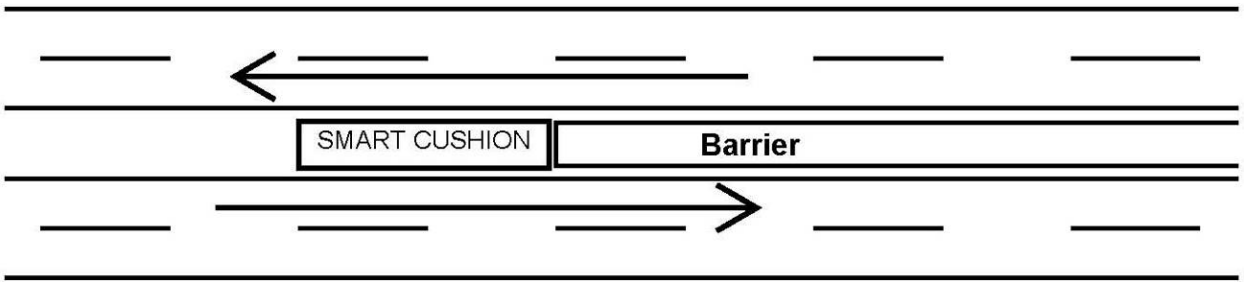


Figure 1 – Necessary Locations

Examples are median applications with bidirectional traffic, two lane roads with crossover potential, etc.

Unnecessary Locations (see Figure 2 – Unnecessary Locations):

No reverse direction traffic within the clear zone.
The barrier does not intrude into the side panels' travel zone.

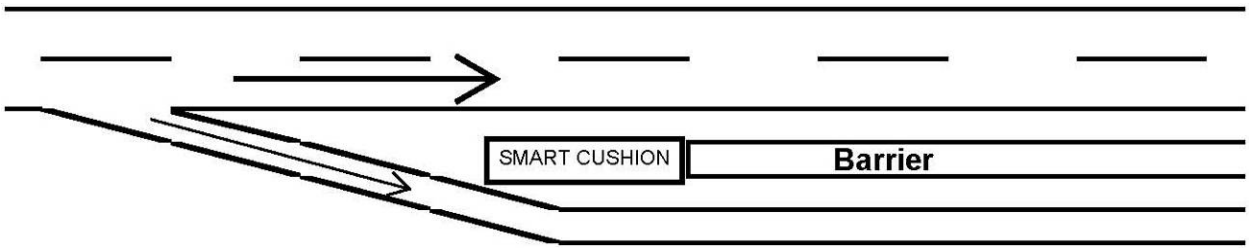


Figure 2 – Unnecessary Locations

Examples are traffic splits, shoulder applications with no crossover potential, one-way roads, etc.

Determining Side of Transition

The transition's side is determined by standing at the front of the attenuator looking rearward toward the barrier to choose between left and right.

Drawings

The following SMART CUSHION® transitions and layouts are available from SCI Products, Inc. Diagrams are shown in the Appendices as follows:

- Layout – Gore Assembly, Appendix F & F2 - Rigid design for wide obstacles.
- Layout – Gore Assembly Calculations, Appendix F3 - Used to calculate longitudinal distances and parts requirements.
- Transition - Jersey/F Shape, Appendix G - Used on standard Jersey/F shaped barriers with a 24" Base
- Transition - Concrete Block, 24", Appendix H - Used on 24" Concrete Block that must be 30" longitudinal length for our travel zone.
- Transition - Concrete Block, 30", Appendix I - Used on 30" Concrete Block and will extend our installation length 38".
- Transition - Concrete Block, 36", Appendix J - Used on 36" Concrete Block and will extend our installation length 53".
- Transition - Concrete Block, 30", Flared, Appendix K - Used on 30" Concrete Block/Pillars and will extend our installation length 54".
- Transition - Concrete Block, 36", Flared, Appendix L - Used on 36" Concrete Block/Pillars and will extend our installation length 71".
- Transition – Thrie-Beam Rigid Assembly, Appendix M - Rigid design for possible reverse direction impacts.
- Transition – W-Beam Rigid Assembly, Appendix N - Rigid design for possible reverse direction impacts.
- Transition – Jersey, 36" Base, Appendix O - Used on 32" high Jersey Shape that has a 19" starting width at the top of the barrier.
- Transition – Jersey, 36" Base, Appendix P - Used on 42" high Jersey Shape that has a 19" starting width at the top of the barrier.
- Transition – Single Slope Barrier, Appendix Q - Used on 42" and 48" Single Slope barrier up to 26" wide at the base.
- Transition – W-Beam 28" High, Appendix R – Connection to 28" high W beam Guardrail with no reverse direction traffic
- Transition – W-Beam 32" High, Appendix S – Connection to 32" high W beam Guardrail with no reverse direction traffic

Installation

Installation and Performance Statements

Proper performance within these limits depends on correct installation of the system on an approved foundation. Any crash cushion not installed according to the drawings and the requirements of this installation manual may present an unsafe condition and should be reinstalled accordingly.

Impacts with vehicles whose size or mass are outside of those tested according to NCHRP 350 or with vehicles traveling at speeds greater than those tested according to NCHRP 350 will not necessarily produce results within the test criteria. While the tests account for most crash conditions, they do not cover all situations. The crash cushion is in conformance with the requirements of NCHRP 350 Levels 2 & 3 but is not guaranteed to safely stop a vehicle in a situation not encompassed by the test conditions.

Safety

All work during installation, repair and inspection of the crash cushion should be performed according to federal, state and local laws.

Equipment List

See Appendix B

Site Preparation

Check to make sure there are no drains; expansion joints; or buried conduit, cables or utility lines in the footprint space where the attenuator will be placed. Remove any curbs or obstacles in front of or beside where attenuator will be installed for a minimum distance of 12 ft from any edge of the attenuator. Be sure to set up proper traffic control before beginning any installation or repair work at the site.

Foundations – (reference Appendices E1 and E2)

New foundations should be installed according to Appendix E – Foundation Drawing. Concrete should reach full cure strength before use. The surface of the foundation must be cleaned of all debris, dirt, mud, sand, etc., as the crash cushion must sit on a level plane, although cross slope of up to 10:1 (horizontal: vertical) is allowed.

Any of the following foundations will meet the minimum requirements:

- 6" reinforced concrete pad
- 8" non-reinforced concrete pad
- 3" asphalt over 3" of concrete
- 6" asphalt over 6" of compacted sub base
- 8" asphalt

Note: Concrete should be 28 MPa or 4000 psi minimum at full cure. The slope should not exceed 10:1.

Installing the crash cushion on an existing foundation may result in anchor bolt locations corresponding to rebar positions in the foundation. It may be necessary to use more elaborate drilling equipment than simply an impact drill with standard concrete bits.

Prior to installing the crash cushion on an existing foundation, the concrete must be thoroughly inspected for slope, signs of cracking, surface wear, shifting from original position, undercut of earth below or to the sides supporting the foundation, settling, and any other signs of age or deterioration which may make the foundation unusable. If any of these signs are evident, the foundation must be removed and a new one must be installed according to requirements stated. If prior bolt patterns are present, use proper engineering calculations to assure adequate strength in the new holes.

Placement of the Crash Cushion

Measure the correct distance and offset of the crash cushion according to the type of obstruction being shielded and the type of transition being used. The dimensions shown on the transition drawings may be used as a guide for this. System drawings are also available.

The crash cushion is shipped in one piece, fully assembled. Using a choked four-point attachment at the designated lift points on the appropriate panel support frames behind the sled, lift the crash cushion off the transporting vehicle with a boom or forklift of sufficient capacity and place it in the position marked on the foundation.

Once in place, double-check the measurements to be sure of the proper location of the crash cushion.

Warning: On a full collapse, the last set of side panels will telescope 30" beyond the last terminal brace at the rear of the crash cushion. All objects that may interfere with this motion can affect the performance of and cause undue damage to the crash cushion.

Anchor Installation

Embedment Requirements are as follows:

6" reinforced concrete pad – anchor embedment of 5 ½" and a torque value of 125 ft-lbs

8" non-reinforced concrete pad – anchor embedment of 5 ½" and a torque value of 125 ft-lbs

3" asphalt over 3" of concrete – anchor embedment of 16 ½" and a torque value of less than 10 ft-lbs

6" asphalt over 6" of compacted sub base – anchor embedment of 16 ½" and a torque value of less than 10 ft-lbs

8" asphalt – anchor embedment of 16 ½" and a torque value of less than 10 ft-lbs

Using the holes in the base as a template, drill ⅞" diameter holes to the proper depth as previously defined. If the crash cushion is being installed on an existing foundation and the drills are hitting rebar, use a core drill or rebar cutter to ensure that straight, vertical holes are made at each location. Take care that the holes do not break out the bottom of the foundation as this may result in loss of epoxy during anchor placement.

Once the holes are drilled, clean the hole of all debris using suitable means. To ensure epoxy adhesion, concrete holes MUST be cleaned with a bottle brush to remove embedded dust, and a final check conducted that all holes are clean of debris and dry. Inject the epoxy into each hole at an angle to avoid air entrapment. Use a sufficient amount of epoxy so that the hole will be filled when the bolt is inserted. Screw the nut on the anchor bolt flush with the end, put the washer on the stud, and immediately insert the anchor stud all the way to the bottom while turning the anchor. This method assures the anchor bolts are vertically plumb and the threads are coated with epoxy. ****Stud locations that can restrict the movement of the mobile sheaves should not project more than ½" above the nut after final torque is completed.**

There is a quantity of 48 anchors for the SCI 100 GM, TL-3 attenuator.
There is a quantity of 34 anchors for the SCI 70 GM, TL-2 attenuator.

The epoxy will be ready for bolt tightening after 30 minutes at 80 degrees F (27 degrees C). See the container label for other temperatures and bolt up times. After sufficient time has passed to allow the epoxy to cure, torque the anchor nuts to 170 N-m (125 ft-lbs). Substitute epoxy must match our specifications. Asphalt anchors are longer and should only be torqued to less than 10 ft-lbs.

Delineator Panel Attachment

Installation of the front delineation plate will be determined by the location of the attenuator and state regulations. A delineation plate is shipped with the yellow background applied and no striping. It is attached by four bolts. Applying the striping to the plate is easier while it is removed from the attenuator. Examples of the delineation plate are as follows:

Right Shoulder

Gore Area

Left Shoulder

Transition Installation

Transitions may be required. Any use of a crash cushion with a possible reverse direction impact will require a transition. In all applications, be sure to install the transition anchors that are exposed to traffic, so that there is no extension of the studs beyond the outside face of the nut. Refer to the transition drawings for details of the required anchor locations. For horizontal stud installation in concrete use mechanical anchors, or if using studs repeat the same epoxy installation process as the anchor bolts using plugs to retain the epoxy to secure the transition to the barrier. Transition drawings and parts explosions are in the appendices.

Final Inspection

After the anchor bolts have been tightened to the proper torque value, check that the crash cushion is not distorted in any way as might happen if the unit is secured to a foundation which is not an even surface. Check that the front section is pulled out to within 1" of the front stop bolts and that no part of the unit has been damaged by shipping and handling. Verify that all assembly

bolts are tight and have not come loose during shipping or installation. Finally, check that no tools or other equipment have been left within the crash cushion structure.

Resetting Crash Cushion after Impact

In the event of any impact, the crash cushion will require a full evaluation to determine the necessary repairs to return it to service. To do this, proceed as follows:

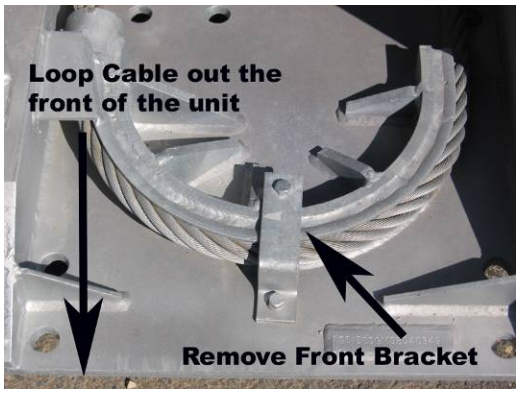
Site Preparation

Do not begin work until all accident debris has been cleared and the area declared safe and accessible by government authorities.

Re-Extension and Inspection after Frontal Impact

1. Remove the front delineator panel and attach pulling means to the **bottom brace** of the front sled.

2. Use wire or strap on the bottom brace at the front of the sled to hold the spelter socket up in the air while pulling out or it will catch on the base frame cross braces.



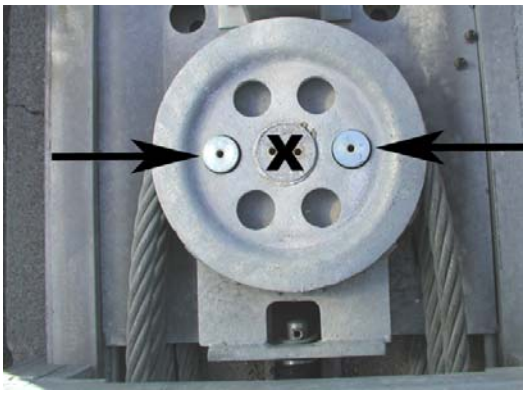
3. Remove the front cable bracket that is located on the front sheave at the front of the attenuator.

4. Pull the sled forward one to two feet to give you slack on the cable.

5. If necessary, use two long-handled flat screw drivers to break cable loose from the sheave at the front of the attenuator if the zinc coating has attached the cable to the sheave. Start feeding the cable out of the front of the unit.

6. Pull the sled out the rest of the way in **short smooth increments** so you can help feed the cable out the front of the attenuator. This will give you a cable loop in front of the attenuator. **When you are past the last cross brace, you will need to remove the strap or wire to allow the cable to follow the path into the front sheave.** The sled **must** be fully extended to replace the shear bolts. The sled should be less than 1" from the stop bolts in the front.

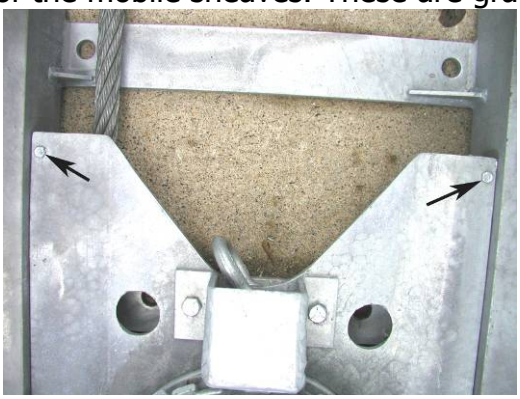
7. During frame pullout, inspect front part of the cable from the spelter socket, as it will be partially obscured after extension of the mobile frames and sheaves. **See the cable inspection procedure.**



8. Remove the front and rear sheave cover plates at each end of the cylinder by removing the two hex bolts that hold them down.

9. Remove the anti-rotation pins, which are the two outer pins, inserted through the holes in the sheaves from both the front and back sheaves. This will be easily done if you make a tool with a handle and a threaded ⅜" NC end to screw into the pins. SCI has a tool available for purchase for use during this step. **Caution: Do not remove the center pin. Also, the rear pins are longer than the front sheave pins and cannot be intermixed so leave them by their locations.**

10. Remove shear bolt remnants in the holes on both sides of the mobile sheaves. These are grade 8 bolts so they can be difficult to remove without a 90 degree pry bar with a claw to pry out.



11. Attach a pulling means to the shackle on the mobile sheaves.

12. Slowly pull out the mobile sheaves. **Be sure the cable doesn't ride up over the front sheave while the slack is taken up, as it will be difficult to regain slack. Do not stand inside the cable loop or be in the pulling strap danger zone.**

13. Finish pulling out the mobile sheaves until you can see through the shear bolt holes **but do not put in the shear bolts yet.**

14. If the cable passes inspection, release any tension on your pulling strap and reinstall the anti-rotation pins in the front and back sheave assemblies and reinstall the cover plates for those sheaves using marine grade anti-seize on the bolt threads. The sheaves may be aligned by inserting a pry bar into the sheave holes. Work your way from the bottom up.

15. Put tension on your pulling strap and replace the two ¼" Grade 8 shear bolts in the front corners of the mobile sheaves.

16. Inspect the cylinder, anchor bolts and side panels according to the procedures listed after this section.

Side Impact Inspection and Repair

17. Inspect and replace any damaged side panels.

18. Inspect and replace any damaged side keeper bolts on all panels. There are three styles of side keeper bolts. The winged style is for the panel connected to the sled and bolts through the first frame behind the sled. The center side keepers have a ½" shoulder while the last side keeper, which is bolted to the terminal frame, has a ¼" shoulder.

19. Inspect and repair any damaged side guides.

Cable Inspection and Replacement Procedure

The cable should be visually inspected for damage. The most common sign of rope deterioration is broken wires. The wire must be clean and not under tension to perform a visual inspection. The visual inspection should include looking for broken wire strands, localized wear or crowns. A sharp awl or marlin spike can be used to separate wires to check if internal damage is present, indicated by loose wires or crowns. If internal inspection shows any damage to any core wires, the cable should be replaced. If there are more than six random broken wires in one rope lay or three broken wires in one strand in one rope lay, the wire rope should be replaced. A rope lay is the length along the rope in which one strand makes a complete revolution around the rope.

Inspect the spelter socket for broken wires, damaged eyes or other fatigue. Any signs of broken wires at the spelter socket will require a new cable.

Replacement of the cable may be required. The anti-rotation pins in the sheaves will need to be removed for this procedure. Remove the wire rope clips on the old cable and pull the unattached spelter socket out through the front of the attenuator. Feed the new cable through the front sheave bell reducer, wrap around the sheave and back to the bottom rear sheave. Insert a pry bar through the holes to the rear of the sheaves to help guide the cable around the sheave. The cable arrangement travel path is as follows: bottom rear sheave, bottom front sheave, middle rear sheave, middle front sheave, top rear sheave, and top front sheave to cable adjustment bolt. The cable path to the adjustment bolt should be above all other cables. The cable will be marked where the Cable Adjustment bend will be. Attach the spelter socket. Adjust the cable adjuster eyebolt all the way out and thread cable through the eye loop. Wrap cable back against itself with the mark at the bolt eye. Start wire rope clips on the ends of the large loop. Work the wire rope clips up by clamping the wire rope loop in front of the clips. Work the last clip up to 4” from the eyebolt loop, then position the other three wire rope clips back at 3” intervals. When the wire clips are all positioned, tighten them to 225 ft-lbs or 305 N-m.

Cylinder Inspection

The cylinder should be inspected for:

- Dented or swollen tube jacket
- Visible cracks in any welds and fluid leakage from the welds
- Piston rod surface damage, bending or fluid leakage in seal area
- If fully collapsed or over design impact speed, disconnect piston rod from the mobile sheave after the unit is pulled out and push the piston rod in checking for free movement.

If any of these inspections are suspect, replace cylinder and have it examined by the manufacturer. Current models have PTFE seals with an unlimited static life.

Anchor Bolt Inspection

Anchor bolts may come loose or be damaged upon impact. These bolts can be replaced by welding a nut or putting a double nut on them and backing them out of the hole. Drill out the old epoxy and reinstall new bolts with new epoxy.

Side Panel Inspection

Side Panels are designed to nest and collapse with minimal or no damage upon frontal impact. The side keepers sustain a shock upon impact. These side keepers should be replaced if there are any signs of fatigue, bending or other visible damage. Inspect the side panels for any bending or torn metal. If damage is found, any side panel is removable by removing four bolts. It may be necessary to remove the bolts on the panel upstream to slide out a panel located in the middle of the unit. The side keepers used to hold the large front sled panels are different than the side keepers on the center panels. Also, the side keeper used on the last terminal brace, which is the rearmost support, has a shorter shoulder (¼" vs. ½"), as it does not have a panel overlap. These shoulders must seat into the outer overlapping panel and pin the inside panel to the frames using a torque value of 270 N-m (200 ft-lbs). Be careful not to pin the edge of the outside panel as it will restrict free sliding of that panel.

Side Guide Inspection

At the bottom of each support frame, there are two guides to stabilize and guide collapse of the attenuator. Inspect each side guide for damage. These guide assemblies are very rugged. The guides should be inspected for any damage. If they are not damaged they can be reused. Upon frontal impact, these guides should be inspected for damage. The torque value for the side guides is 920 N-m (680 ft-lb). These side guides are stronger than the rail, so visually inspect the rail for crowns. Any crowning of the rail can be straightened.

Final Inspection

After the resetting of the crash cushion is complete, verify by visual inspection 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 the crash cushion structure. Verify that no other damage unrelated to the most recent impact has occurred and that no significant corrosion or other deterioration has taken place.

Non-Repairable Impacts

There can be instances where the impact is outside the scope of the crash cushion's design. This may render the crash cushion unsafe to reuse and it should be replaced.

APPENDIX A—SCI ATTENUATOR PARTS LIST

SCI CRASH CUSHION PARTS LIST

Part No.	Description	Qty Per Unit TL2/TL3	Unit of Measure	Spare Parts Kit TL2/TL3
9400	Attenuator 24″ wide w/Concrete Anchors TL3			
9450	Attenuator 24″ Wide w/Asphalt Anchors TL3			
9451	Attenuator 24″ wide w/Concrete Anchors TL2			
9452	Attenuator 24″ wide w/Asphalt Anchors TL2			
9401	Bolt Concrete Anchor 3/4″ x 7″ TL3 *(included in P/N 9400)	*	KIT/48 pcs.	
9402	Bolt Asphalt Anchor 3/4″ x 18″ TL3 *(included in P/N 9450)	*	KIT/48 pcs.	
9453	Bolt Concrete Anchor 3/4″ x 7″ TL2 **(included in P/N 9451)	**	KIT/34 pcs.	
9454	Bolt Asphalt Anchor 3/4″ x 18″ TL2 **(included in P/N 9452)	**	KIT/34 pcs.	
9403	Bolt Cable Adjuster	1	EACH	
9404	Bolt Sled Side Panel	8	EACH	
9405	Bolt Front Stop	2	EACH	
9406	Bolt Shear	2	EACH	**10/10**
9407	Bolt Side Guide	12	EACH	
9408	Bolt Terminal Brace	4	EACH	
9409	Brace Terminal	1	EACH	
9410	Cable 1 1/8″ with Spelter Socket TL3	1	EACH	
9455	Cable 1 1/8″ with Spelter Socket TL2	1	EACH	
9411	Clip Wire Rope TL2 & TL3	4	EACH	
9412	Cylinder Shock Arresting TL3	1	EACH	
9445	Cylinder Shock Arresting TL2	1	EACH	
9413	Strap Cylinder TL3	1	EACH	
9448	Strap Cylinder TL2	1	EACH	
9414	Frame Mobile #1 TL3	0/1	EACH	
9415	Frame Mobile #2 TL3	0/1	EACH	
9416	Frame Mobile #3 TL3	0/1	EACH	
9417	Frame Mobile #4 TL2 & TL3	1	EACH	
9418	Frame Mobile #5 TL2 & TL3	1	EACH	
9419	Frame Mobile #6 TL2 & TL3	1	EACH	
9420	Guide Side TL2 & TL3	6/12	EACH	
9421	Keeper Side #3 (Sled Panels) TL2 & TL3	4	Each	**4/4**
9422	Keeper Side #1 (Side Panels) TL2 & TL3	8/20	EACH	**6/6**
9423	Keeper Side #2 (Rear Panels) TL2 & TL3	4	EACH	**2/2**
9424	Panel Delineator (Painted Yellow) TL3	0/1	EACH	**0/1**
9496	Panel Delineator (Painted Black) TL3		EACH	
9497	Panel Delineator Diamond Grade Chevron 6″ stripes TL3		EACH	

SCI CRASH CUSHION PARTS LIST				
Part No.	**Description**	**Qty Per Unit TL2/TL3**	**Unit of Measure**	**Spare Parts Kit TL2/TL3**
9498	Panel Delineator Diamond Grade Left 6" stripes TL3		EACH	
9499	Panel Delineator Diamond Grade Right 6" stripes TL3		EACH	
9456	Panel Delineator (Painted Yellow) TL2	1/0	EACH	**1/0**
9506	Panel Delineator (Painted Black) TL2		EACH	
9501	Panel Delineator Diamond Grade Chevron 6" stripes TL2		EACH	
9502	Panel Delineator Diamond Grade Left 6" stripes TL2		EACH	
9503	Panel Delineator Diamond Grade Right 6" stripes TL2		EACH	
9425	Panel Side TL2 & TL3	4/10	Each	**3/3**
9426	Panel Sled	2	EACH	**2/2**
9427	Panel Rear	2	EACH	**1/1**
9428	Sheave (pulley)	6	EACH	
9429	Sled (with guide rollers)24" TL3	0/1	EACH	
9457	Sled (with guide rollers) 24" TL2	1/0	EACH	
9439	Epoxy 28 oz. Cartridge and Nozzle ***	***	EACH	
9515	Epoxy Kit for TL3 Concrete Attenuator		EACH	
9516	Epoxy Kit for TL3 Asphalt Attenuator		EACH	
9517	Epoxy Kit for TL2 Concrete Attenuator		EACH	
9518	Epoxy Kit for TL2 Asphalt Attenuator		EACH	
9440	Nozzle Epoxy Mixing ***	***	EACH	
9441	Dispenser Epoxy	0	EACH	
9443	Boot Cylinder TL3	1	EACH	
9449	Boot Cylinder TL2	0	EACH	
9444	Spare Parts Kit TL3	0	EACH	
9458	Spare Parts Kit TL2	0	EACH	
9488	Reset Parts Kit TL3	0	EACH	
9489	Reset Parts Kit TL2	0	EACH	
9495	Tool Anti-Rotation Pin Removal	0	EACH	
9507	Anchor Drop-In	0	EACH	
9508	Pin Anti-Rotation Front	0	EACH	
9509	Pin Anti-Rotation Rear	0	EACH	
9510	Plate Sheave Cover	0	EACH	
9525	Cable Release Tool	0	EACH	

TRANSITIONS AND TRANSITION PARTS			
9431	Transition Jersey Barrier - Right	O	EACH
9432	Transition Jersey Barrier - Left	O	EACH
9433	Transition 24" Concrete - Left & Right	O	EACH
9437	Transition Thrie Beam - Right	O	EACH
9438	Transition Thrie Beam—Left	O	EACH
9511	Transition W Beam 28" High Right	O	EACH
9512	Transition W Beam 28" High Left	O	EACH
9513	Transition W Beam 32" High Right	O	EACH
9514	Transition W Beam 32" High Left	O	EACH
9459	Transition Assembly 30" Concrete Straight Connection	O	EACH
9460	Transition Assembly 36" Concrete Straight Connection	O	EACH
9461	Transition Assembly 30" Concrete Outside Connection	O	EACH
9462	Transition Assembly 36" Concrete Outside Connection	O	EACH
9475	Transition Assembly Gore to End of Flared Transition	O	EACH
9476	Transition Assembly Median Barrier 36B X 19T X 42H	O	EACH
9492	Transition Assembly Median Barrier 36B X 19T X 32H	O	EACH
9463	Transition 30" Concrete Straight Connection	O	EACH
9464	Transition 36" Concrete Straight Connection	O	EACH
9465	Transition 30" Concrete Outside Connection	O	EACH
9466	Transition 36" Concrete Outside Connection	O	EACH
9467	Transition Thrie Beam 10 Degree Flare - Right	O	EACH
9468	Transition Thrie Beam 10 Degree Flare - Left	O	EACH
9469	Transition Concrete Spanner Brace	O	EACH
9470	Transition Concrete #1 Tapered Spanner Brace	O	EACH
9471	Transition Concrete #2 Tapered Spanner Brace	O	EACH
9472	Transition Gore Tapered #1 Spanner Brace	O	EACH
9473	Transition Gore Tapered #2 Spanner Brace	O	EACH
9474	Thrie Beam Concrete Leg Brace	O	EACH
9477	Transition Median Barrier 36B X 19T X 42H Right	O	EACH
9478	Transition Median Barrier 36B X 19T X 42H - Left	O	EACH
9493	Transition Median Barrier 36B X 19T X 32H - Right	O	EACH
9494	Transition Median Barrier 36B X 19T X 32H - Left	O	EACH
9479	Transition Spanner Brace Median Barrier 36B	O	EACH
9480	Transition Rub Rail Median Barrier - Right	O	EACH
9481	Transition Rub Rail Median Barrier - Left	O	EACH
9490	Transition Single Slope 24-26 9/32" Wide Median Barrier - Right	O	EACH
9491	Transition Single Slope 24-26 9/32" Wide Median Barrier - Left	O	EACH
9504	Transition Profile B Right	O	EACH
9405	Transition Profile B Left	O	EACH
9524	Blockout	O	EACH

O = Optional

APPENDIX B—EQUIPMENT LIST

The following tools and equipment will be required to install and repair the Crash Cushion:

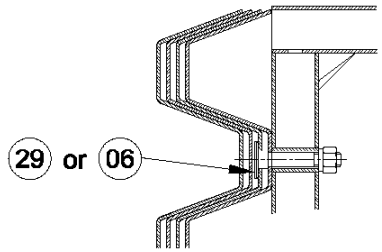
- Standard roadside work area safety equipment
- Personal safety equipment (gloves, latex gloves for epoxy, eye/face protection, etc.)
- Means of safely unloading 3500 lb
- Compressed air source/Vacuum
- 1" bottle brush (McMaster Carr # 73075T55)
- Safety goggles
- Four lifting slings or four-point sling
- Bosch rotary hammer drill 13 ½ amp #11263EVS Model 0 611 263 739 or equal
- ⅞" X 22" concrete drill bit for concrete installations or ⅞" X 28" drill bit for asphalt installations
- Renton rebar eater bit #RB-14 - ⅞" rebar cutter bit or equal
- 1" X 12" concrete drill bit for drop-in anchors on transitions
- Punch or setting tool for drop-in anchors.
- ½" electric drill for rebar bit and bottle brush (cordless will work for bottle brush)
- Epoxy dispenser for 28 oz dual cartridge system (should have spare in case of malfunction)
- Combination wrenches, deep sockets (Including 7/16" – ⅝", 1 ¼", 1 ½", 1 ⅝") and 3+" extension
- Socket wrench and breaker bar
- Torque wrench (225 ft-lb capacity) with 3 ft extension
- Measuring and layout equipment (tape measure, chalk line, markers, etc.)
- 5 ft wedge and round-ended pry bar
- Loctite #34395 marine grade anti-seize
- Suitable pulling means (strap or chain)
- 2 long-handled flat screwdrivers
- Misc. small tools (hammers, pliers, screw drivers, vise grips, etc.)
- Bear claw pry bar to remove ¼" shear bolt remnants

This list is adequate for general installation and repair. However, depending on site conditions, additional tools and equipment may be required.

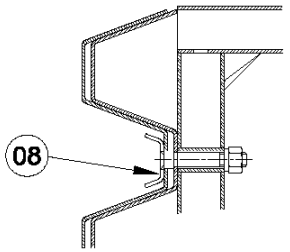
APPENDIX C - SMART CUSHION®, TEST LEVEL 2

PARTS LIST

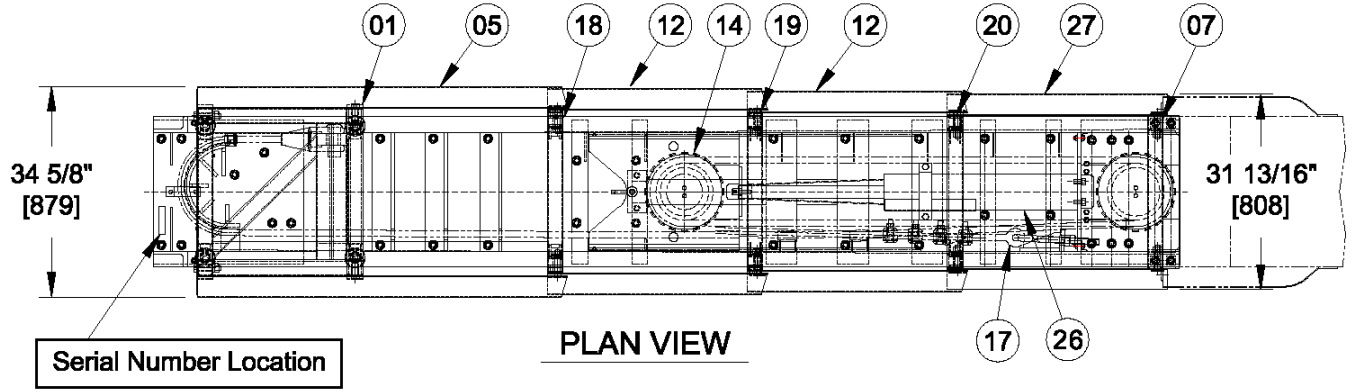
01 - Front Sled
02 - Cable Assembly
05 - Sled Panel
07 - Terminal Brace
09 - Anchor Bolts
12 - Side Panels
14 - Mobile Sheave Assembly
17 - Cable Adjuster Bolt
18-20 - Mobile Frames 4-6
26 - Cylinder
27 - Rear Panel
06, 08, 29 - Side Keepers



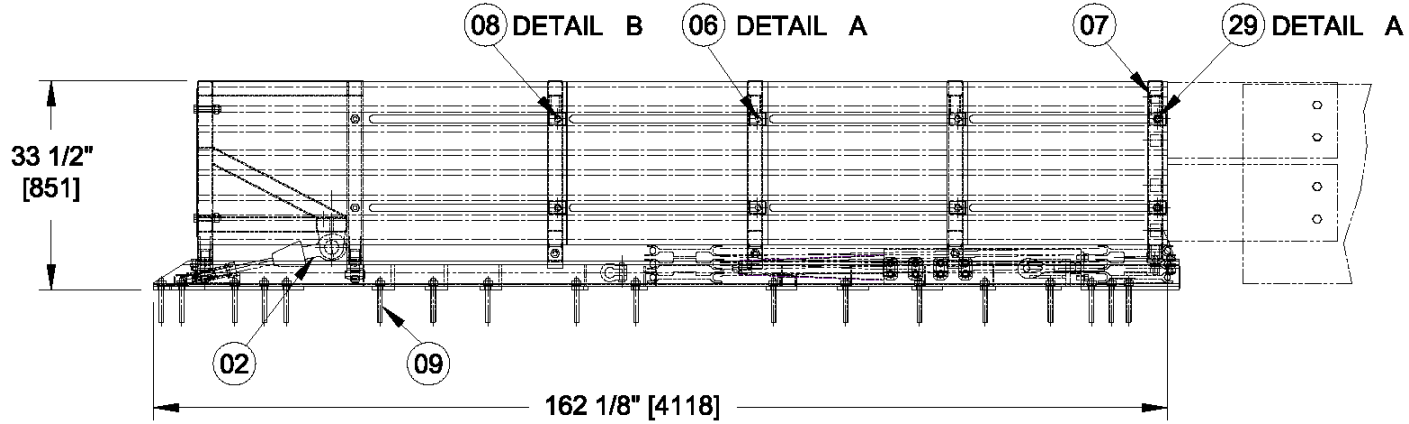
DETAIL A



DETAIL B



PLAN VIEW

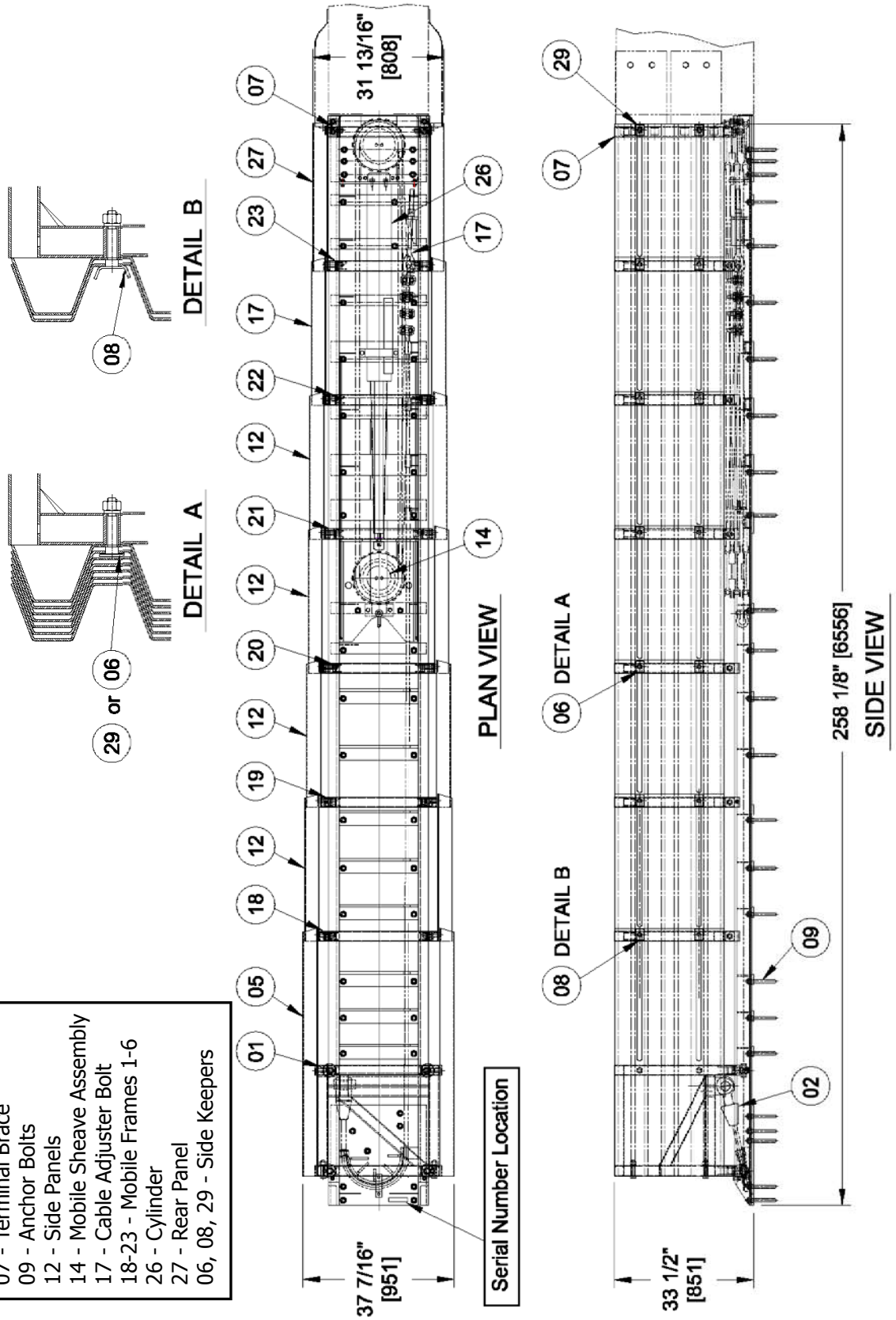


SIDE VIEW

APPENDIX D - SMART CUSHION ®, TEST LEVEL 3

PARTS LIST

01 - Front Sled
02 - Cable Assembly
05 - Sled Panel
07 - Terminal Brace
09 - Anchor Bolts
12 - Side Panels
14 - Mobile Sheave Assembly
17 - Cable Adjuster Bolt
18-23 - Mobile Frames 1-6
26 - Cylinder
27 - Rear Panel
06, 08, 29 - Side Keepers



APPENDIX E1 - TEST LEVEL 2 FOUNDATION

Cross Slope at Top Surface not to Exceed 1 in 10
Foundation must be a Level Plane

* * * * * Wide Hazards and Transitions may require the foundation to be longer. See Transition Drawings.

SPECIFICATIONS

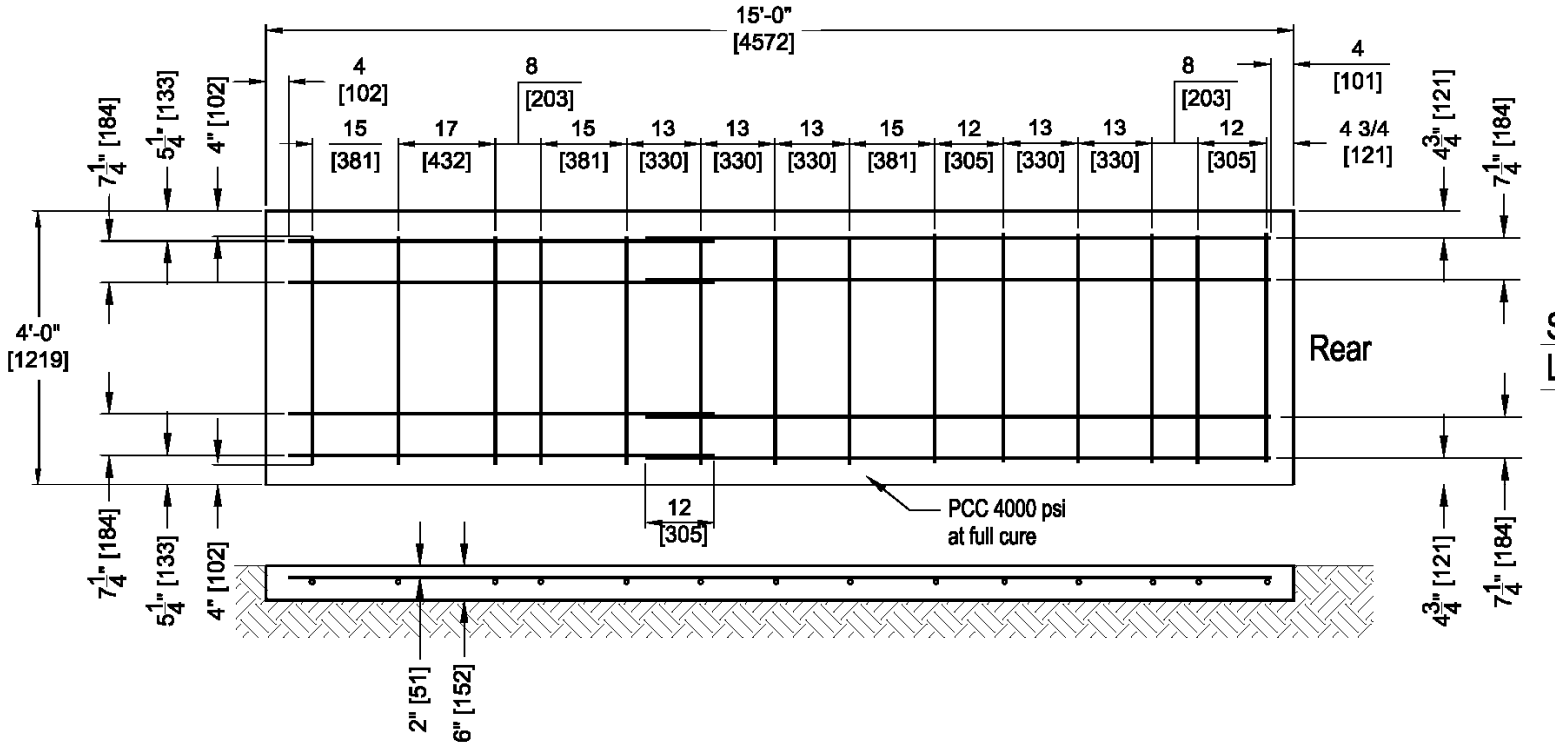
All reinforcing steel - straight #4 ASTM-A36

Embedment requirements:

- 6" reinforced concrete pad with anchor embedment of 5 1/2"
- 8" non-reinforced concrete pad with anchor embedment of 5 1/2"
- 3" asphalt over 3" concrete with anchor embedment of 16 1/2"
- 6" asphalt over 6" of compacted subbase with anchor embedment of 16 1/2"
- 8" asphalt with anchor embedment of 16 1/2"

The contractor shall furnish a certification for material installed to the following requirements:

- 6" reinforced concrete (PCC) sampling per ASTM C31-84, testing per ASTM C39-84
- 8" non-reinforced concrete (PCC) sampling per ASTM C31-84, testing per ASTM 39-84
- 3" asphalt over 3" concrete - Type SP 12.5 Level C or higher
- 6" asphalt over 6" of compacted subbase - same as above
- 8" asphalt (AC) - Type SP 12.5 Traffic Level C or higher



APPENDIX E2 - TEST LEVEL 3 FOUNDATION

Cross Slope at Top Surface not to Exceed 1 in 10
Foundation must be a Level Plane

* * * * * Wide Hazards and Transitions may require the foundation to be longer. See Transition Drawings.

SPECIFICATIONS

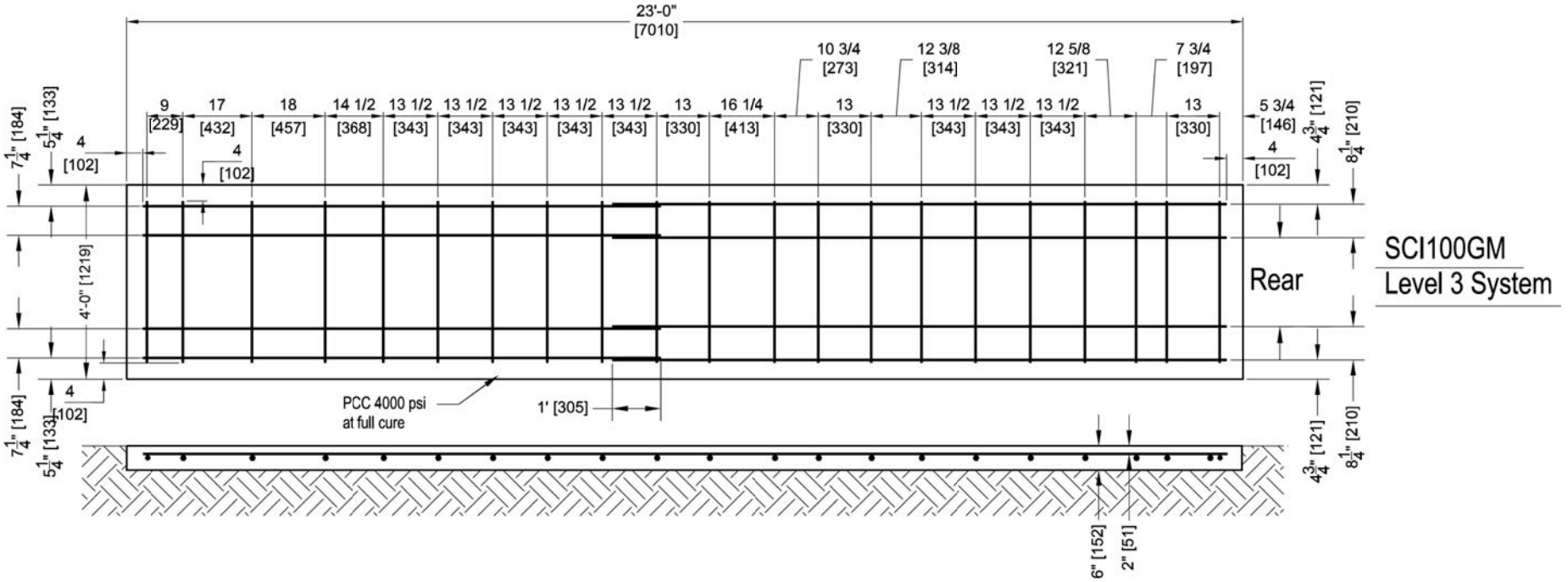
All reinforcing steel - straight #4 ASTM-A36

Embedment requirements:

- 6" reinforced concrete pad with anchor embedment of 5 1/2"
- 8" non-reinforced concrete pad with anchor embedment of 5 1/2"
- 3" asphalt over 3" concrete with anchor embedment of 16 1/2"
- 6" asphalt over 6" of compacted subbase with anchor embedment of 16 1/2"
- 8" asphalt with anchor embedment of 16 1/2"

The contractor shall furnish a certification for material installed to the following requirements:

- 6" reinforced concrete (PCC) sampling per ASTM C31-84, testing per ASTM C39-84
- 8" non-reinforced concrete (PCC) sampling per ASTM C31-84, testing per ASTM 39-84
- 3" asphalt over 3" concrete - Type SP 12.5 Level C or higher
- 6" asphalt over 6" of compacted subbase - same as above
- 8" asphalt (AC) - Type SP 12.5 Traffic Level C or higher



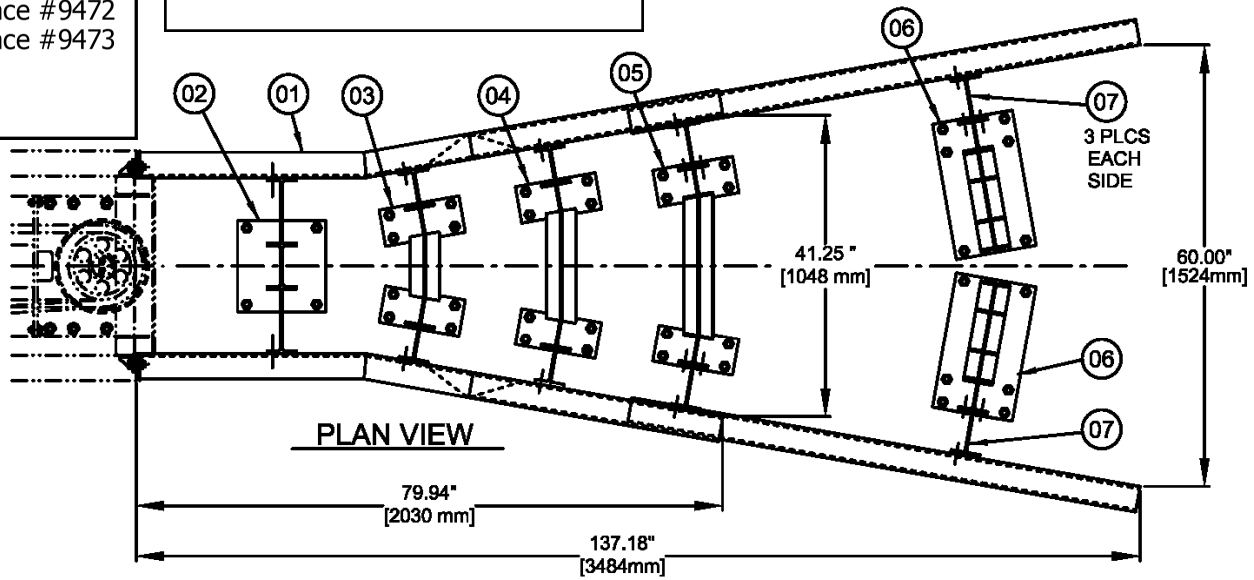
APPENDIX F - TRANSITION, GORE ASSEMBLY

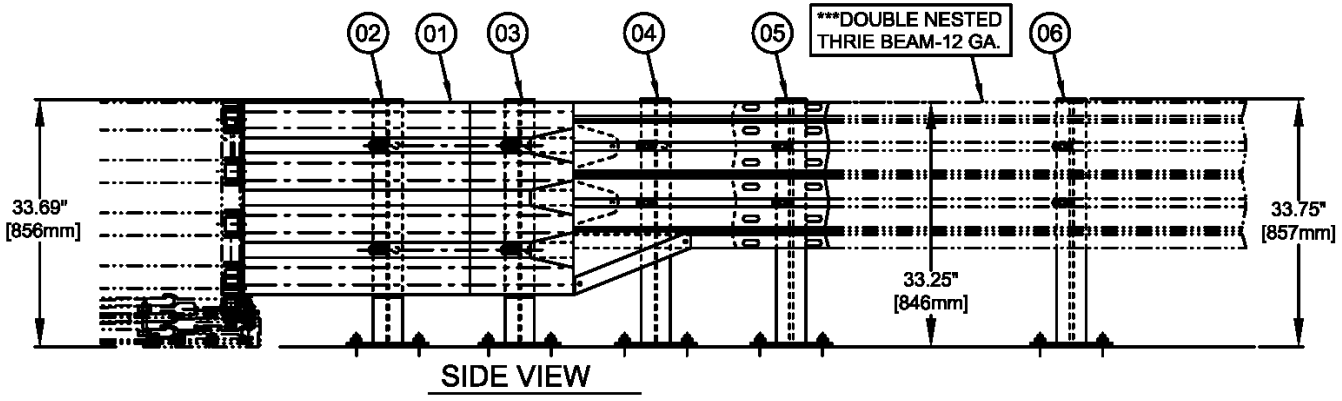
PARTS LIST

Gore Assembly #9475
01 - Transition 10 Degree Flare Right #9467
01 - Transition 10 Degree Flare Left #9468
02 - Transition Concrete Spanner Brace #9469
03 - Transition Concrete #1 Spanner Brace #9470
04 - Transition Gore Tapered #1 Spanner Brace #9472
05 - Transition Gore Tapered #2 Spanner Brace #9473
06 - Thrie Beam Concrete Leg Brace #9474
07 - Thrie Beam Blockout (AASHTO PWB02)

SPLICE BOLTS AND GUARDRAIL SUPPLIED BY OTHERS

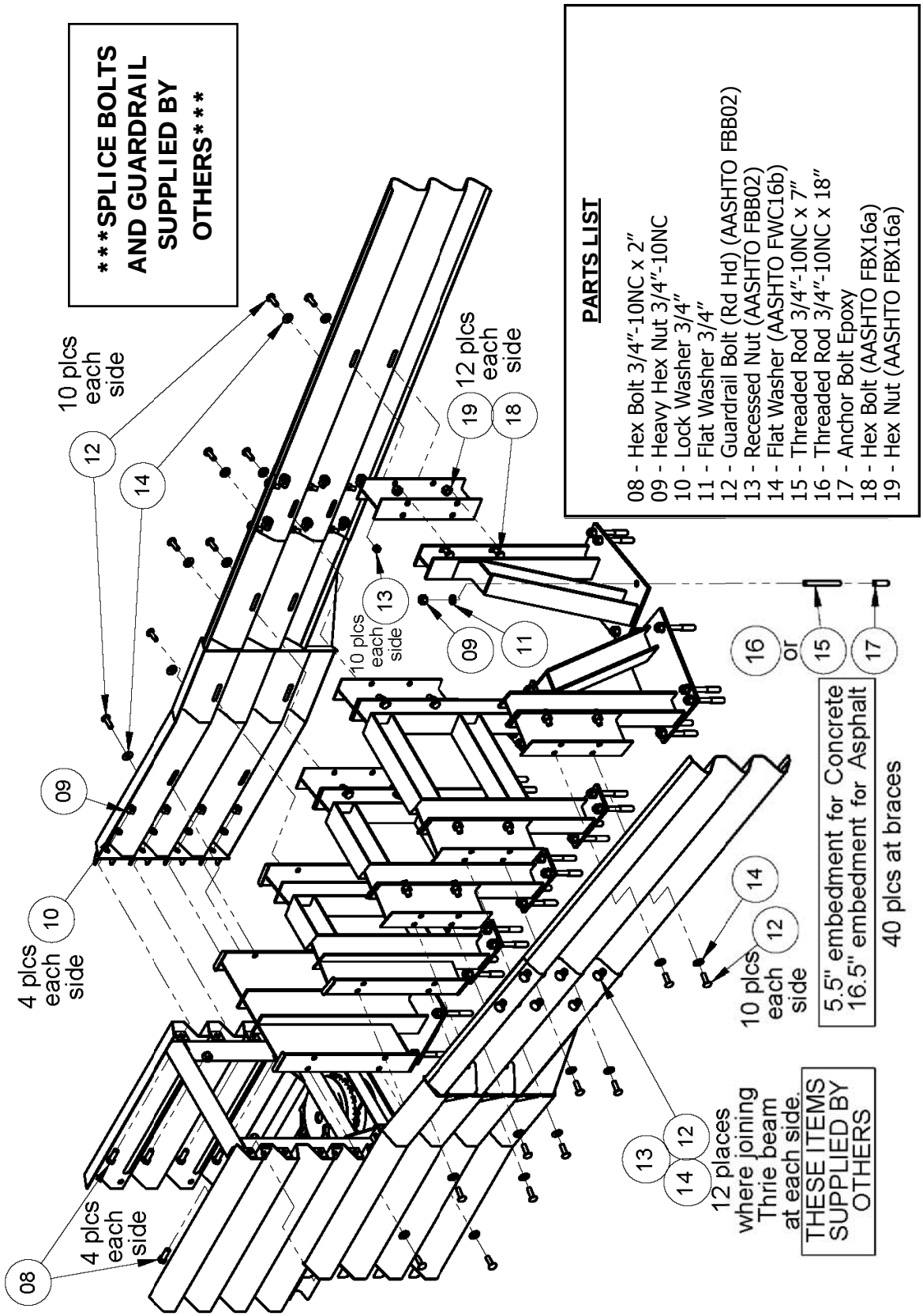
NOTES:
1) DIMENSIONS SHOWN ARE FOR 60" WIDTH
2) FOR EACH 1" OF WIDTH CHANGE, ADD OR SUBTRACT THE FOLLOWIING:
   2.88" [73.15mm] TO LENGTH OF GUARDRAIL
   2.84" [72.13mm] TO OVERAL LENGTH
3) ADD OR SUBTRACT ADDITIONAL POST ON EACH SIDE FOR EACH 13" [330mm] CHANGE IN WIDTH.
4) GUARDRAIL TERMINATION - YOU MUST ADD THE GUARDRAIL OVERLAP LENGTH AND TERMINATE PER STATE REGULATIONS.





The use of the last brace will be determined by whether the Thrie Beam can be attached to the obstruction or not. If the Thrie Beam distance from the last brace is 40 inches or less and can be attached, you will not need a brace at the obstruction. If you cannot attach to the obstruction, you may need a brace and drill holes in the Thrie Beam at the furthest rearward location.

APPENDIX F(2) - TRANSITION, GORE ASSEMBLY



APPENDIX F(3) - TRANSITION, GORE ASSEMBLY CALCULATIONS

SCI GM WIDE TRANSITION CALCULATIONS

Guardrail

12.6" Splice overlap at Transition end

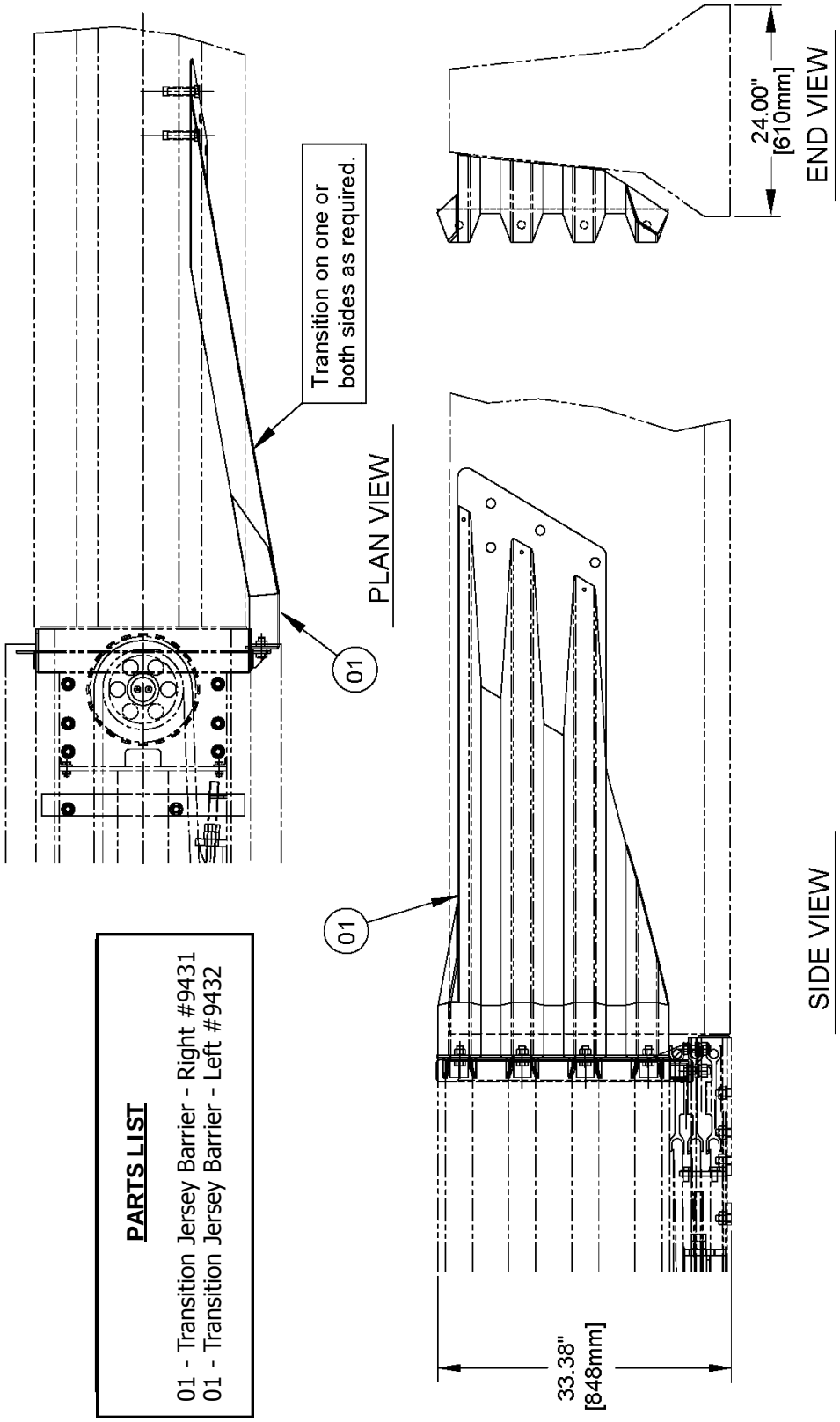
Must add length for barrier overlap and end termination per state specifications

Longitudinal distance increases 2.84" for each 1" increase in width

Thrie Beam Length increases 2.88" for each 1" increase in width

Gore Width Inches	Additional Long. Distance Inches	Additional Long. Distance Feet	Thrie Beam Length Inches	Overall System Length Feet	Additional Brace Count
41	79.2	6.6	12.6	28.1	All 4 Spanner Braces # 9469, 9470, 9472, 9473
48	99.1	8.3	32.8	29.8	All 4 Spanner Braces # 9469, 9470, 9472, 9473
55	118.9	9.9	52.9	31.4	Add 2-Thrie Beam Concrete Leg Brace #9474
60	133.1	11.1	67.3	32.6	Add 2-Thrie Beam Concrete Leg Brace #9474
68	155.8	13.0	90.4	34.5	Add 4-Thrie Beam Concrete Leg Brace #9474
69	158.6	13.2	93.2	34.7	Add 4-Thrie Beam Concrete Leg Brace #9474
81	192.7	16.1	127.8	37.6	Add 6-Thrie Beam Concrete Leg Brace #9474
88	212.5	17.7	148.0	39.2	Add 6-Thrie Beam Concrete Leg Brace #9474
94	229.5	19.1	165.2	40.6	Add 8-Thrie Beam Concrete Leg Brace #9474
100	246.5	20.5	182.5	42.1	Add 8-Thrie Beam Concrete Leg Brace #9474
107	266.4	22.2	202.7	43.7	Add 10-Thrie Beam Concrete Leg Brace #9474
112	280.6	23.4	217.1	44.9	Add 10-Thrie Beam Concrete Leg Brace #9474
120	303.3	25.3	240.1	46.8	Add 12-Thrie Beam Concrete Leg Brace #9474
126	320.3	26.7	257.4	48.2	Add 12-Thrie Beam Concrete Leg Brace #9474
133	340.1	28.3	277.6	49.9	Add 14-Thrie Beam Concrete Leg Brace #9474

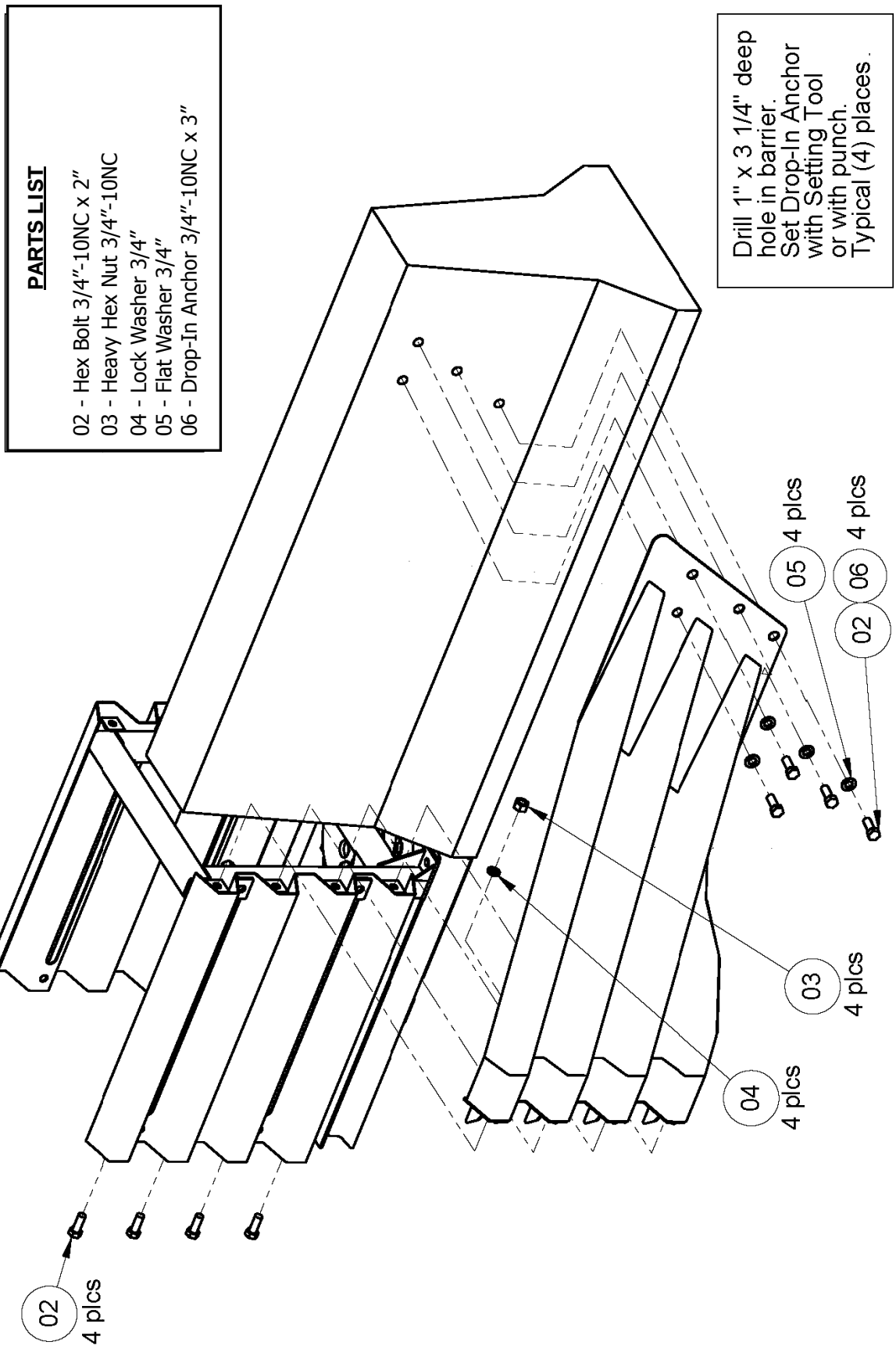
APPENDIX G - TRANSITION, JERSEY/F SHAPE BARRIER



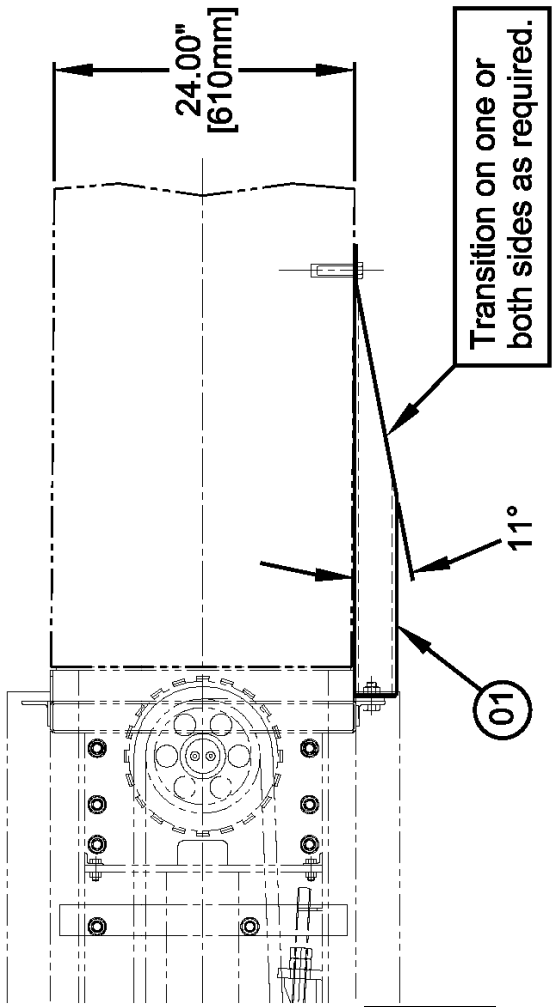
PARTS LIST

01 - Transition Jersey Barrier - Right #9431
01 - Transition Jersey Barrier - Left #9432

APPENDIX G(2) - TRANSITION, JERSEY/F SHAPE BARRIER



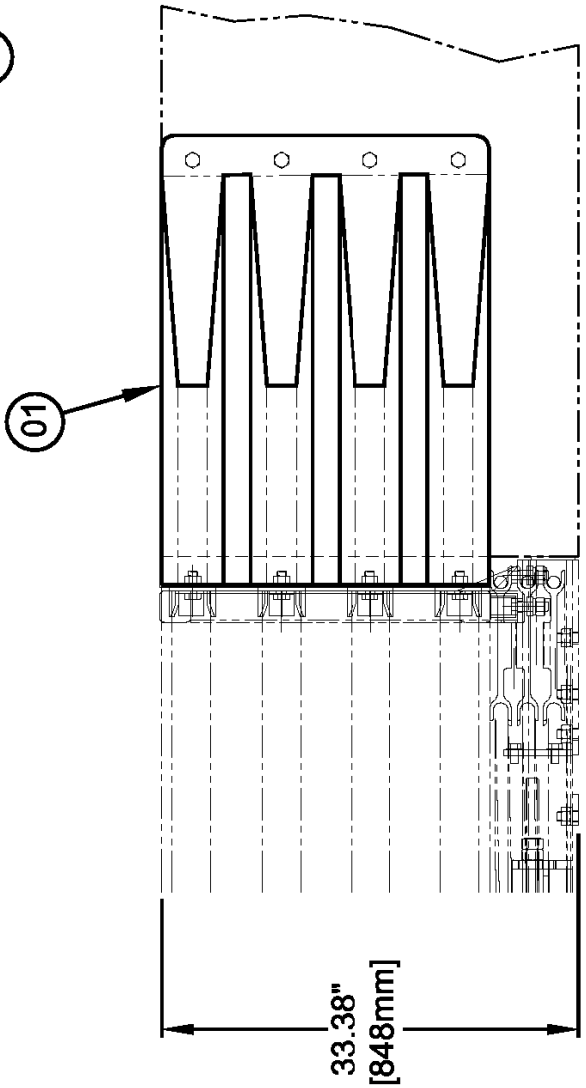
APPENDIX H - TRANSITION, CONCRETE BLOCK, 24 INCH (610mm)



PLAN VIEW

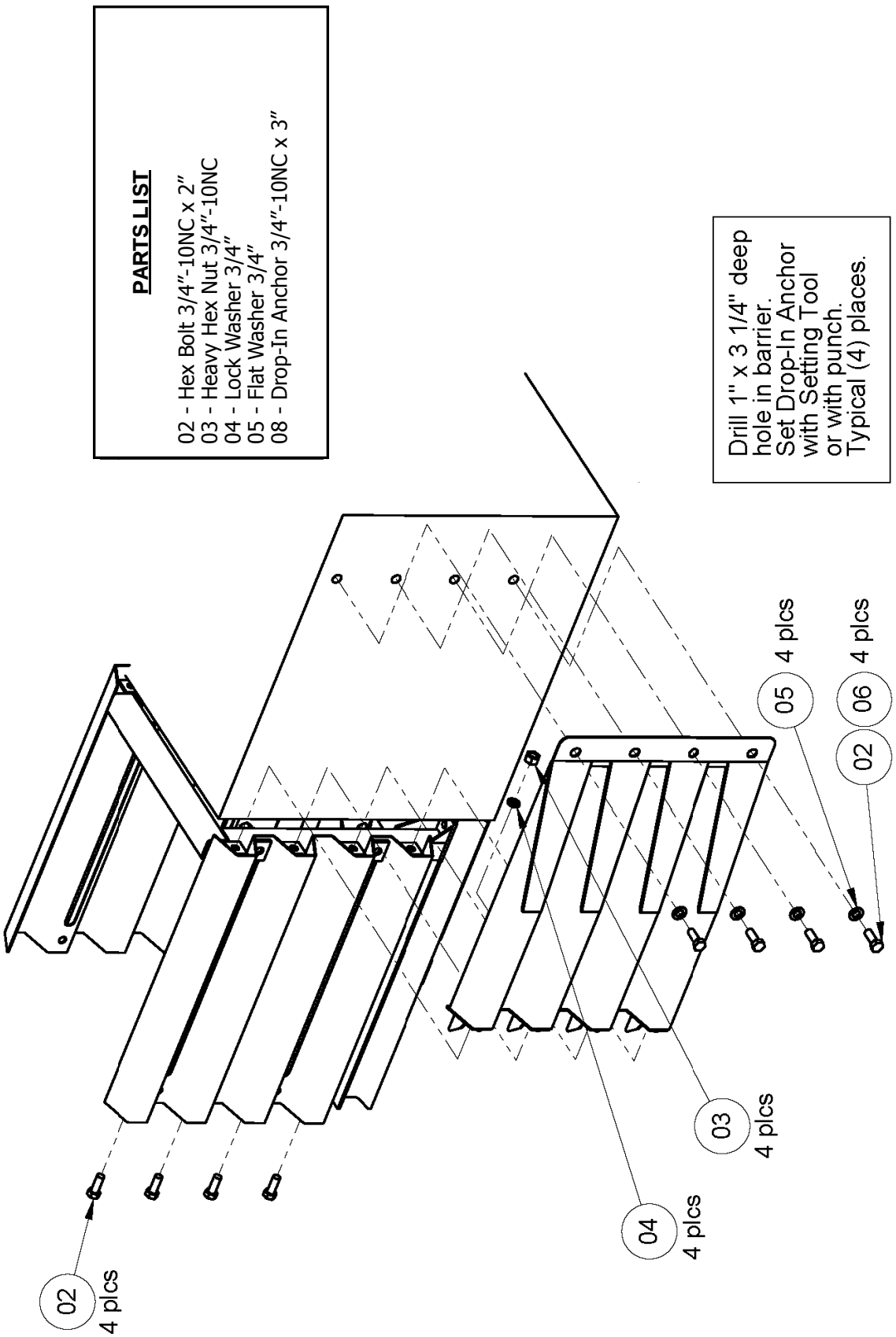
PARTS LIST

Transition 24″ Concrete Block Right or Left #9433



SIDE VIEW

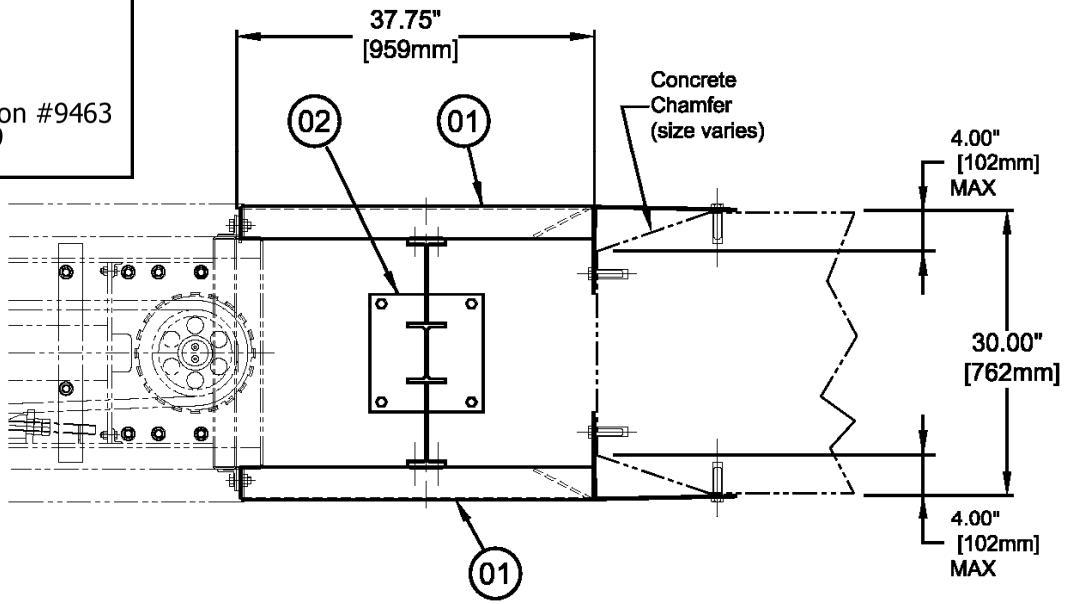
APPENDIX H(2) - TRANSITION, CONCRETE BLOCK, 24 INCH (610mm)



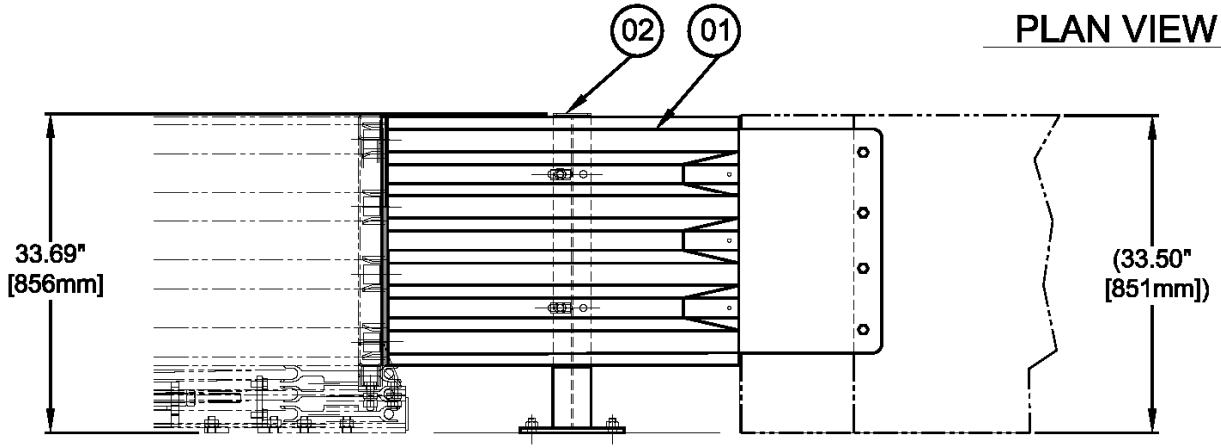
APPENDIX I - TRANSITION, CONCRETE BLOCK, 30 INCH (762mm)

PARTS LIST

Two Sided Full Assembly #9459
01 - Transition 30" Concrete Straight Connection #9463
02 - Transition Concrete Spanner Brace #9469



PLAN VIEW

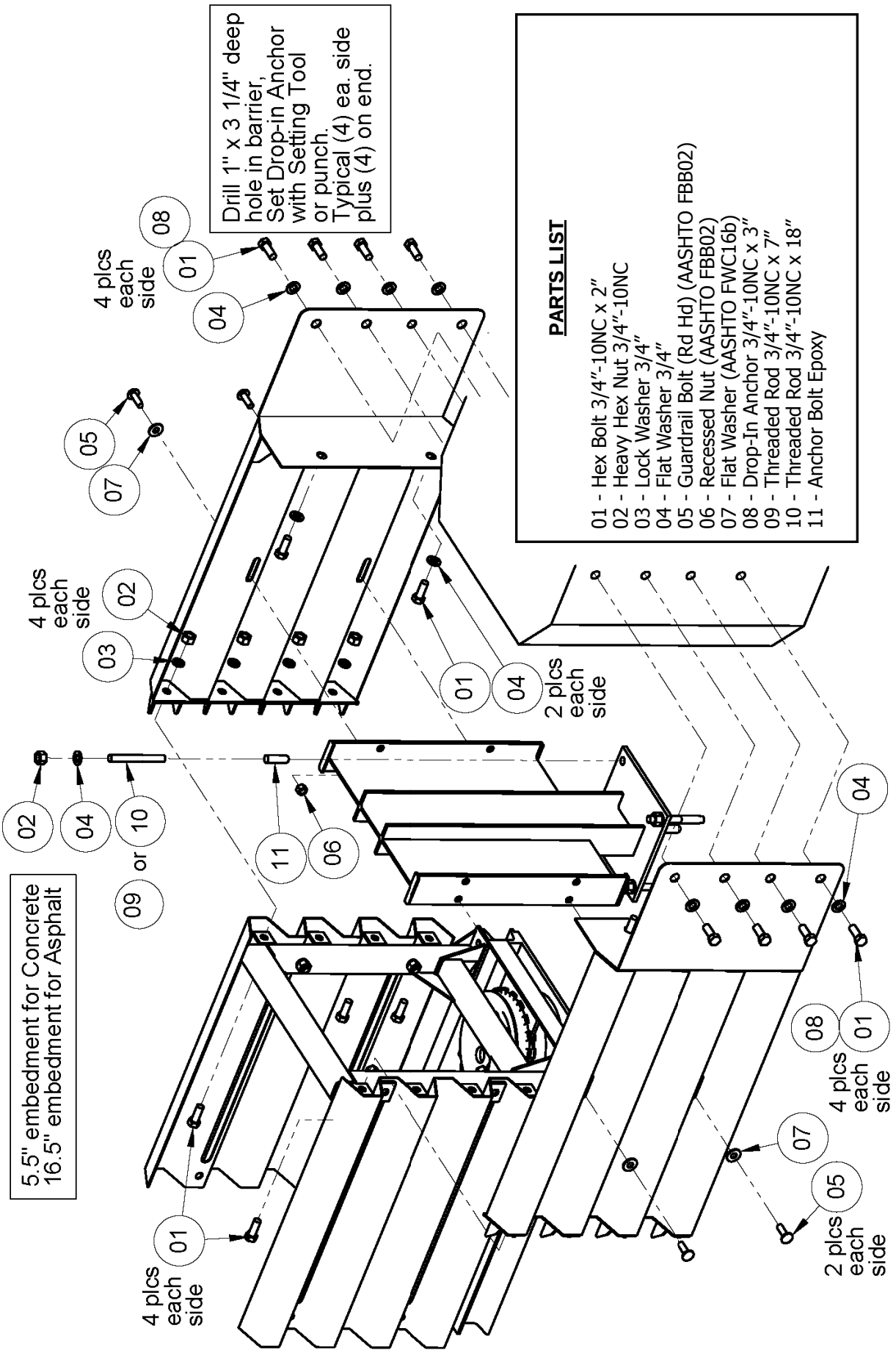


SIDE VIEW

USED FOR:
1. Unchamfered Concrete Block
2. Chamfered Concrete Block ***

***Chamfer limited to <4"

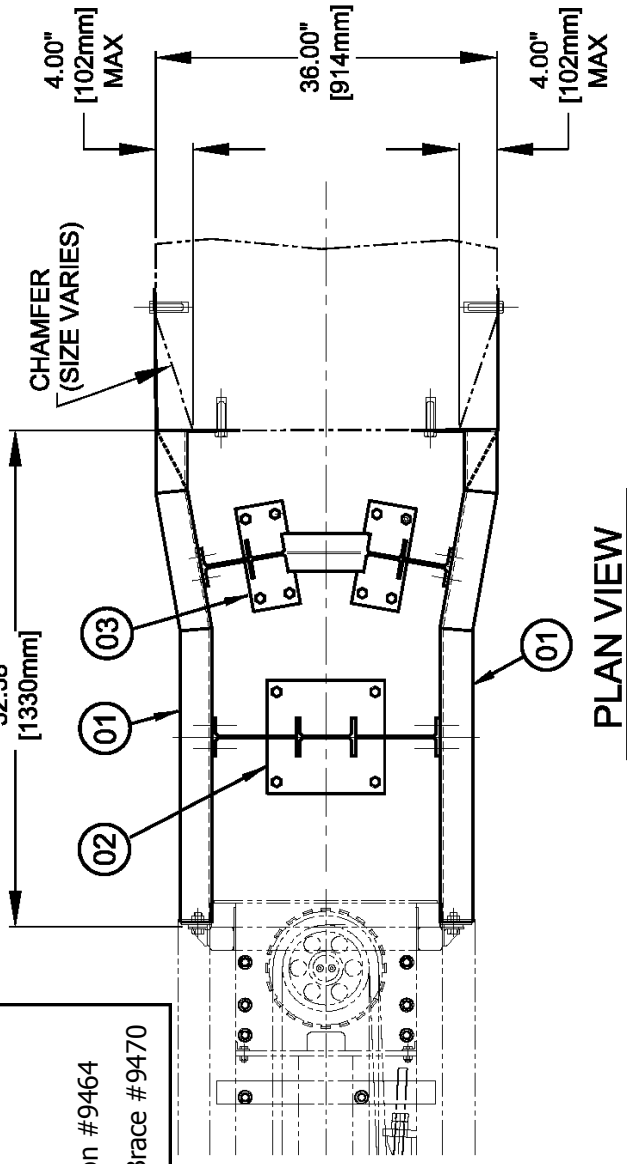
APPENDIX I(2) - TRANSITION, CONCRETE BLOCK, 30 INCH (762mm)



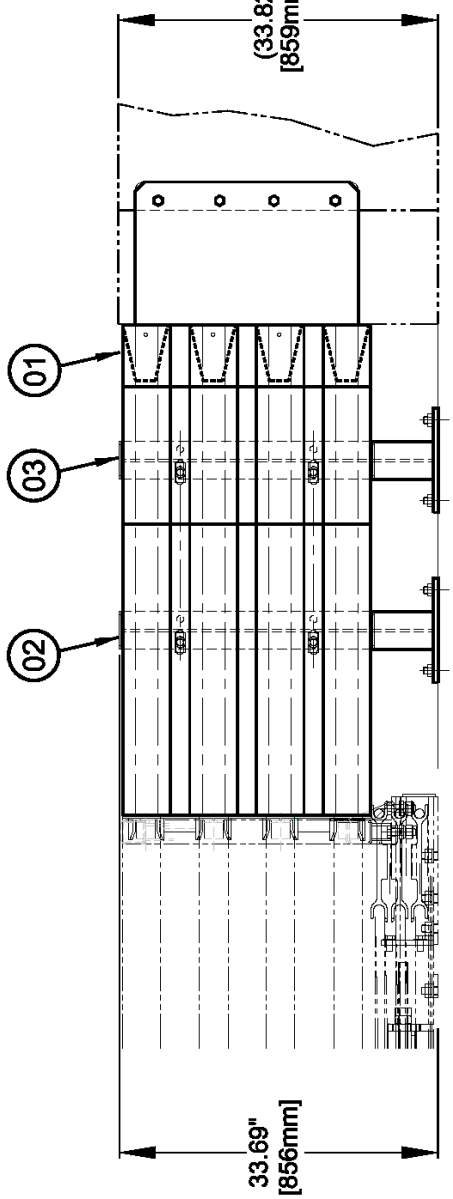
APPENDIX J - TRANSITION, CONCRETE BLOCK, 36 INCH (915mm)

PARTS LIST

Two Sided Full Assembly #9460
01 - Transition 36" Concrete Straight Connection #9464
02 - Transition Concrete Spanner Brace #9469
03 - Transition Concrete #1 Tapered Spanner Brace #9470



PLAN VIEW

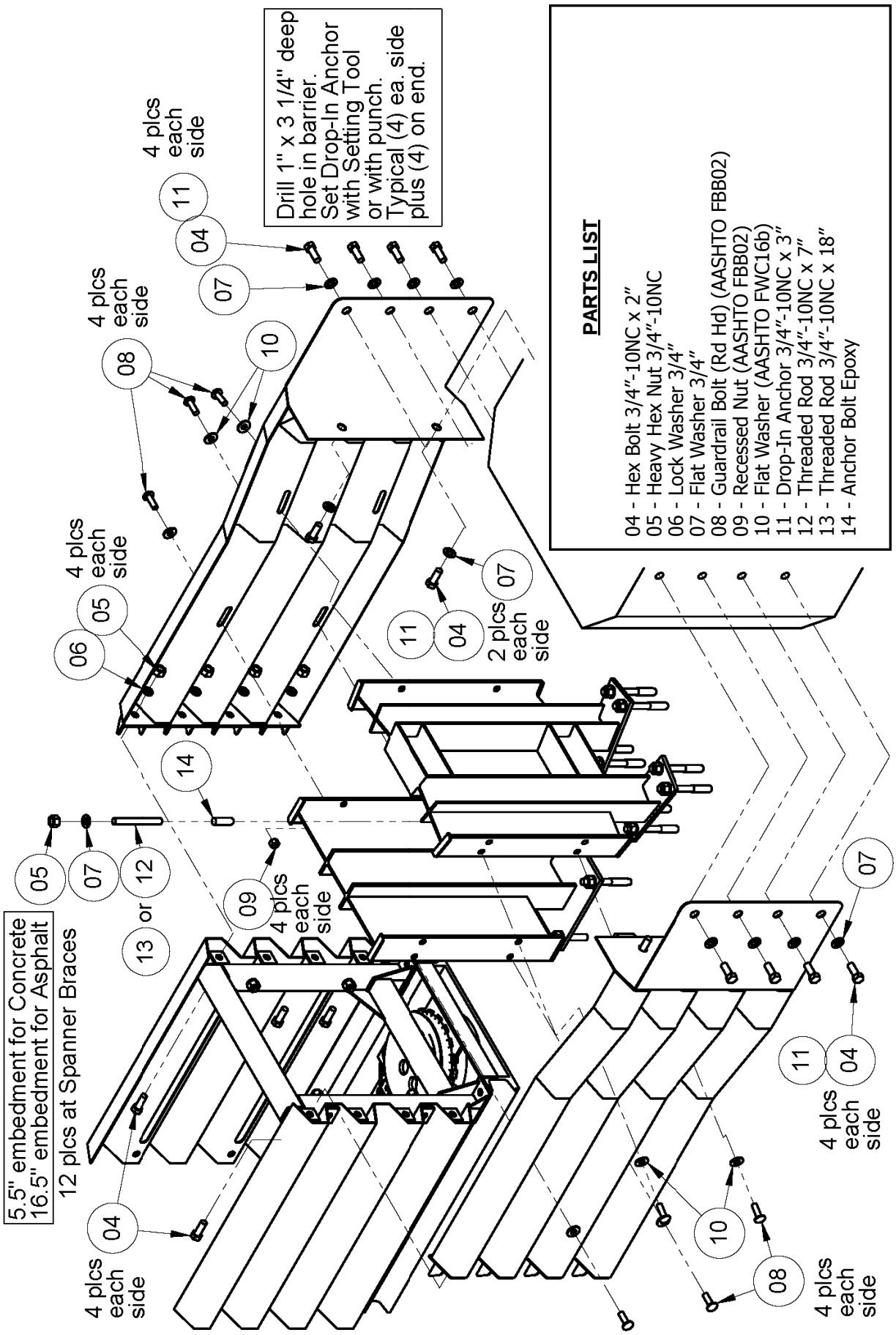


SIDE VIEW

USED FOR:
1. Unchamfered Concrete Block
2. Chamfered Concrete Block ***

***Chamfer limited to <4"

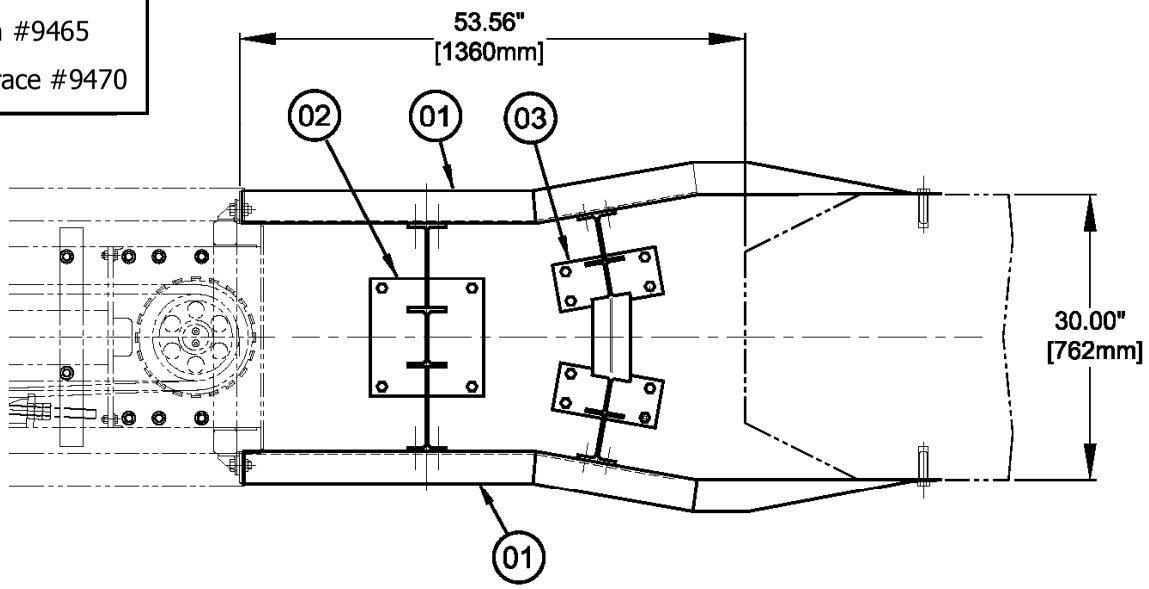
APPENDIX J(2) - TRANSITION, CONCRETE BLOCK, 36 INCH (915mm)



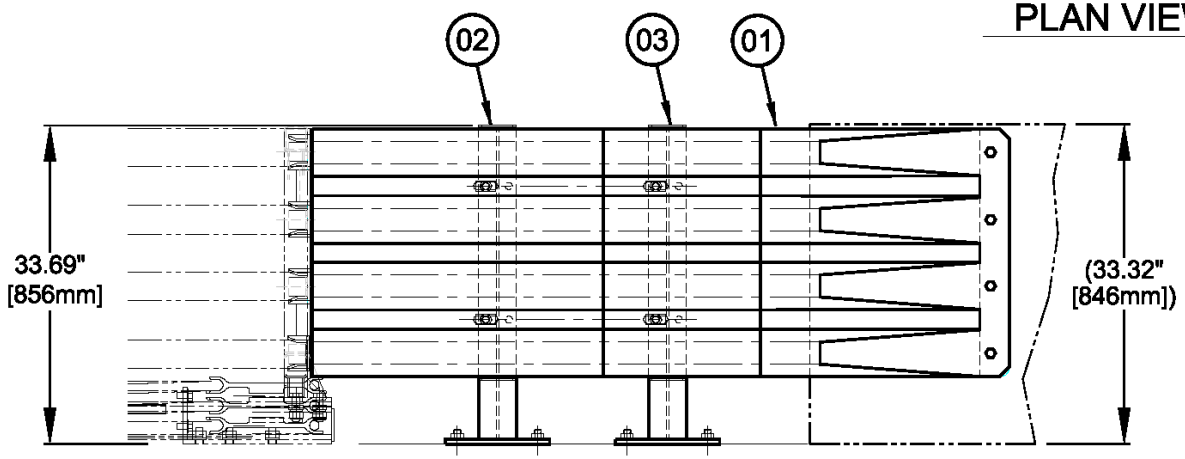
APPENDIX K - TRANSITION, CONCRETE BLOCK, 30 INCH (762mm) FLARED

PARTS LIST

Two Sided Full Assembly #9461
01 - Transition 30" Concrete Outside Connection #9465
02 - Transition Concrete Spanner Brace #9469
03 - Transition Concrete #1 Tapered Spanner Brace #9470



PLAN VIEW

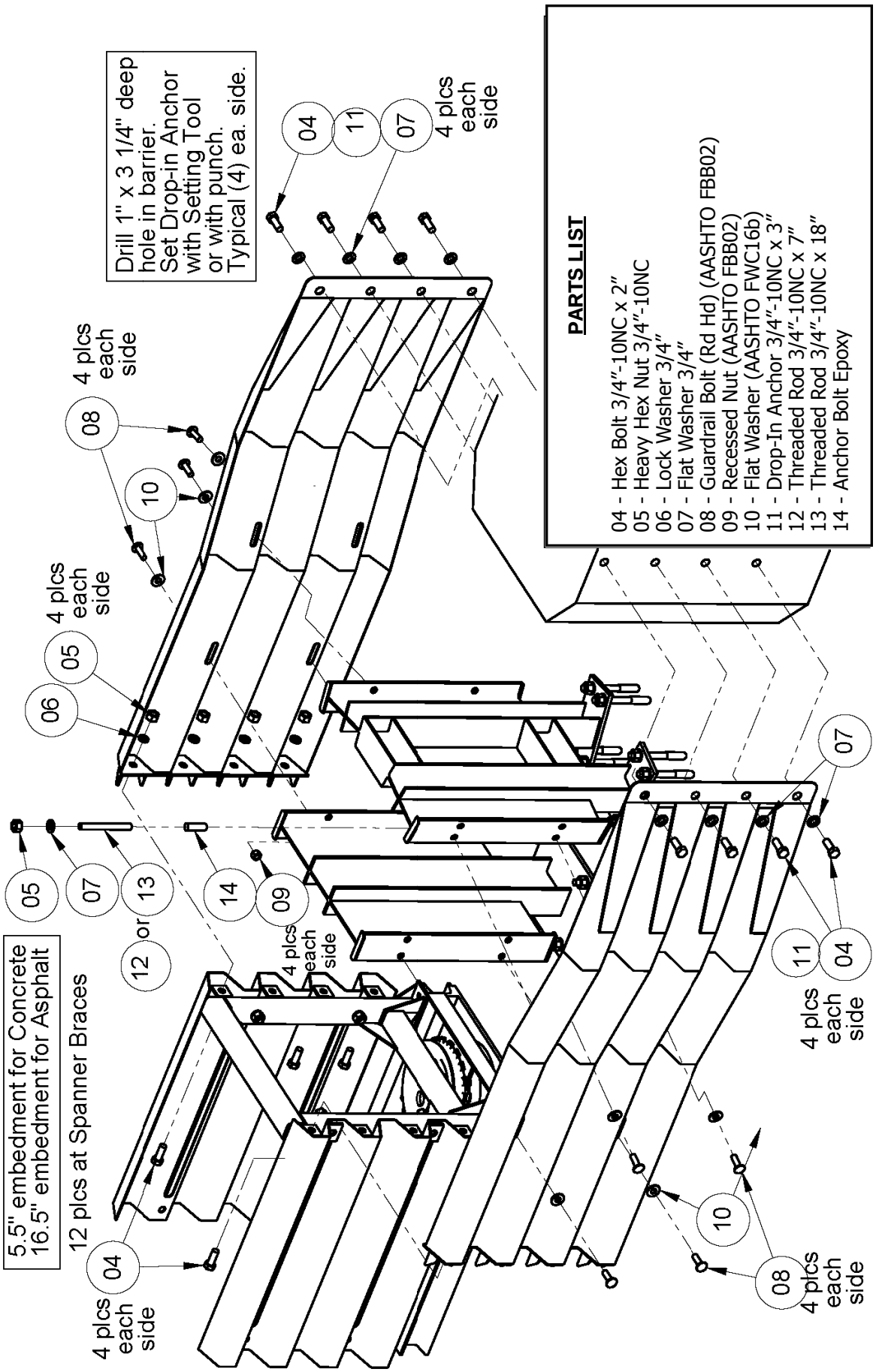


SIDE VIEW

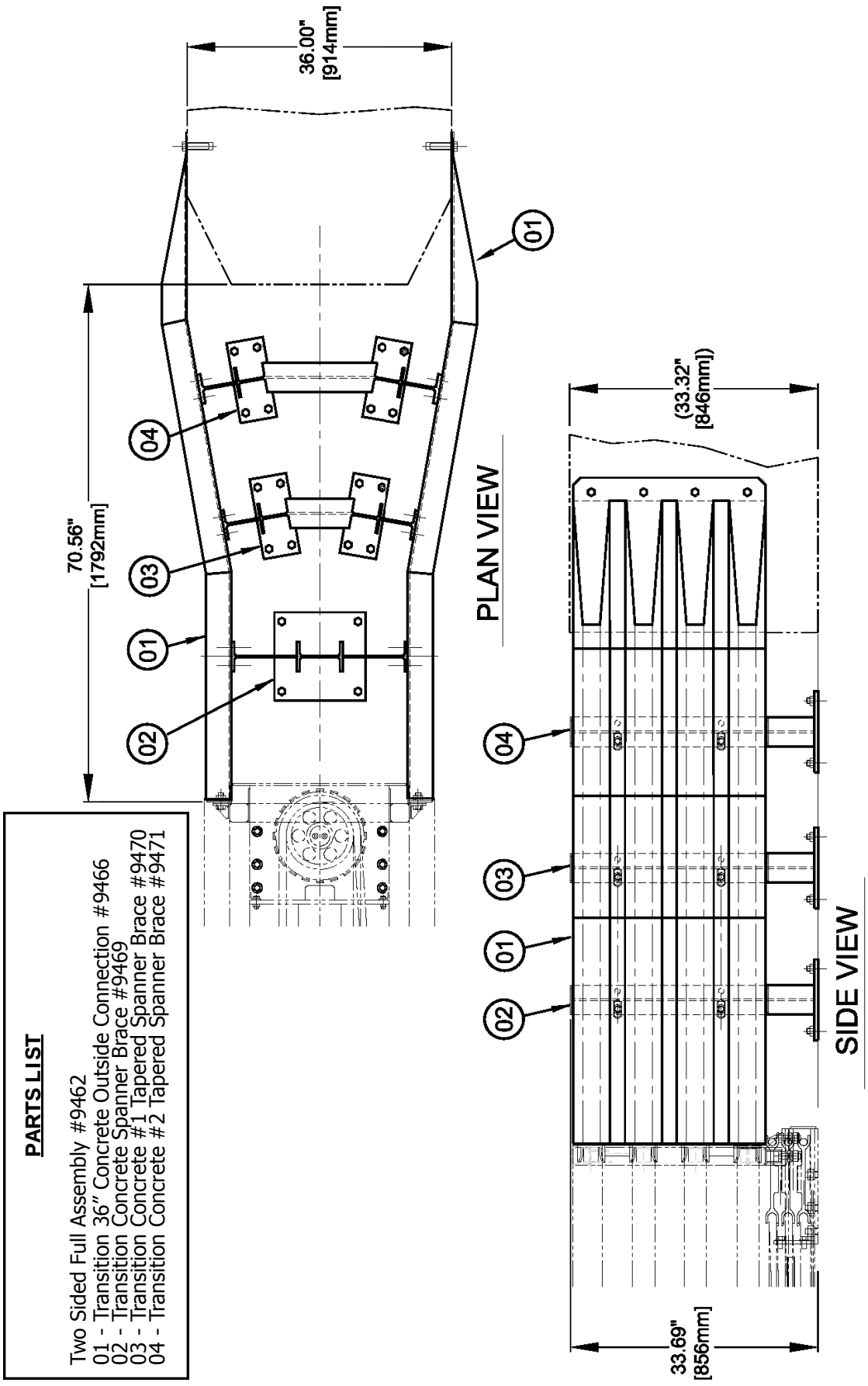
USED FOR:
1. Unchamfered Concrete Block
2. Chamfered Concrete Block ***

***Chamfer limited to <4"

APPENDIX K(2) - TRANSITION, CONCRETE BLOCK, 30 INCH (762mm) FLARED



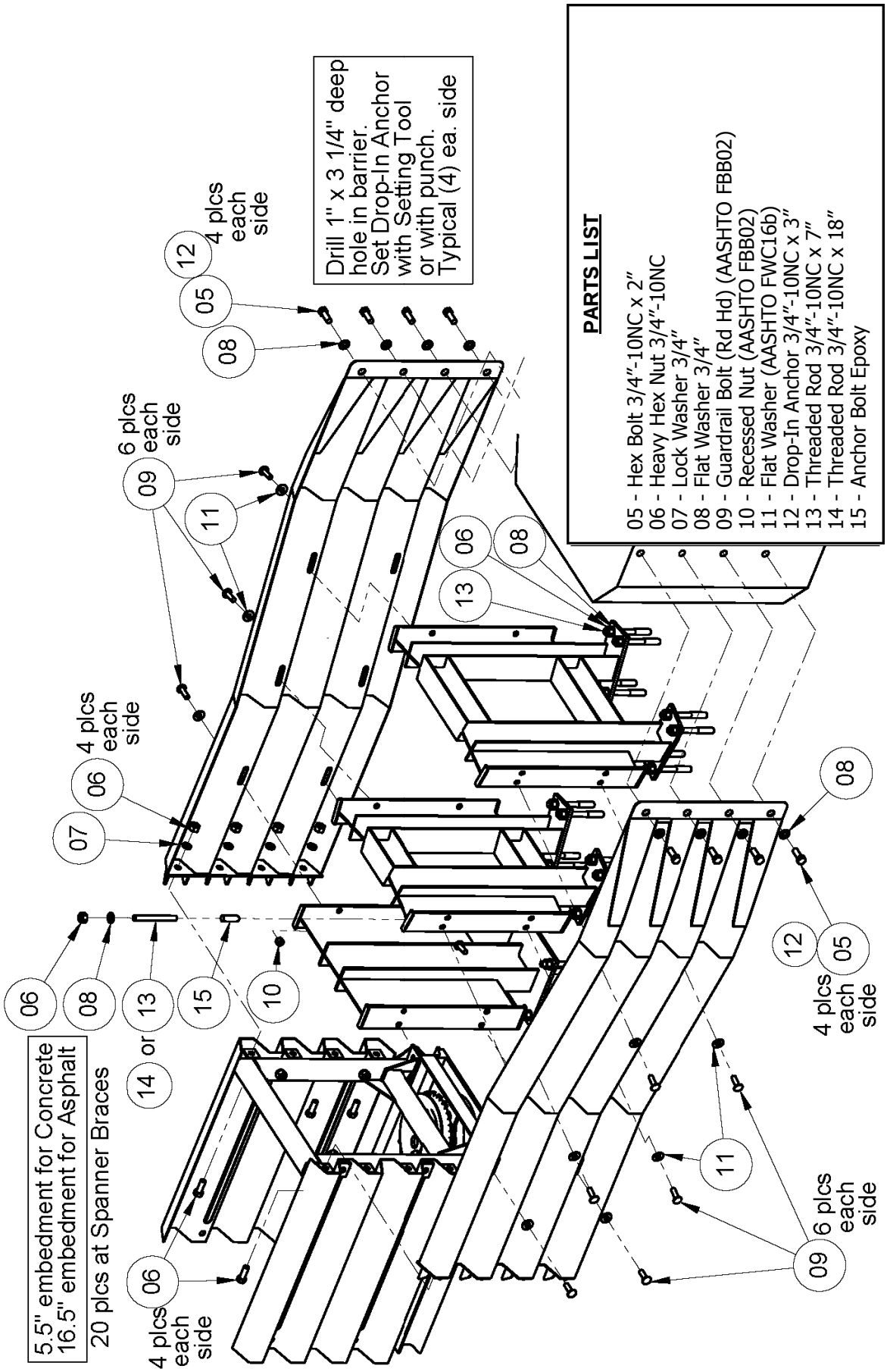
APPENDIX L - TRANSITION, CONCRETE BLOCK, 36 INCH (915mm) FLARED



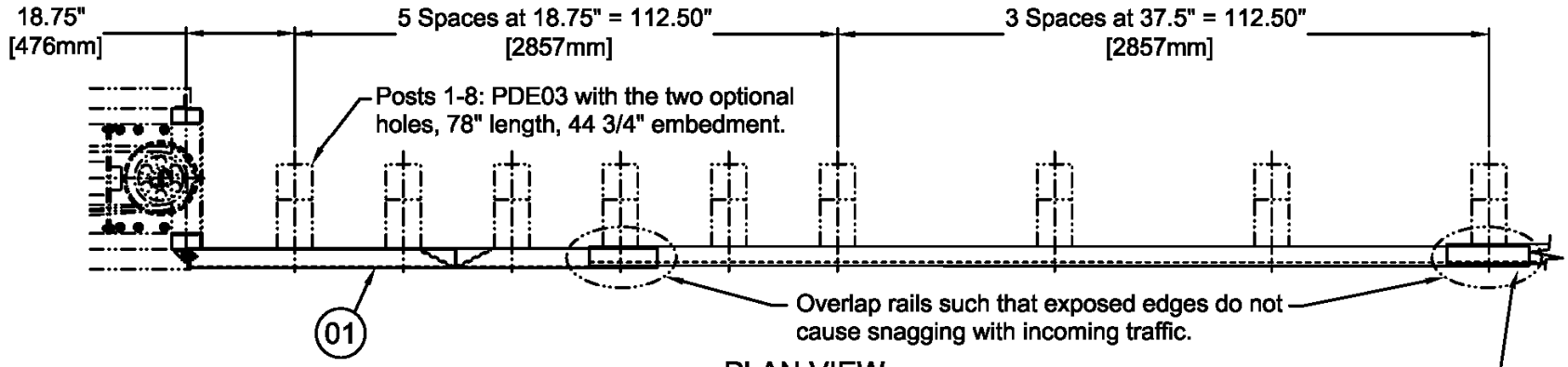
PARTS LIST

Two Sided Full Assembly #9462
01 - Transition 36" Concrete Outside Connection #9466
02 - Transition Concrete Spanner Brace #9469
03 - Transition Concrete #1 Tapered Spanner Brace #9470
04 - Transition Concrete #2 Tapered Spanner Brace #9471

APPENDIX L(2) - TRANSITION, CONCRETE BLOCK, 36 INCH (915mm) FLARED



APPENDIX M - TRANSITION, THRIE BEAM

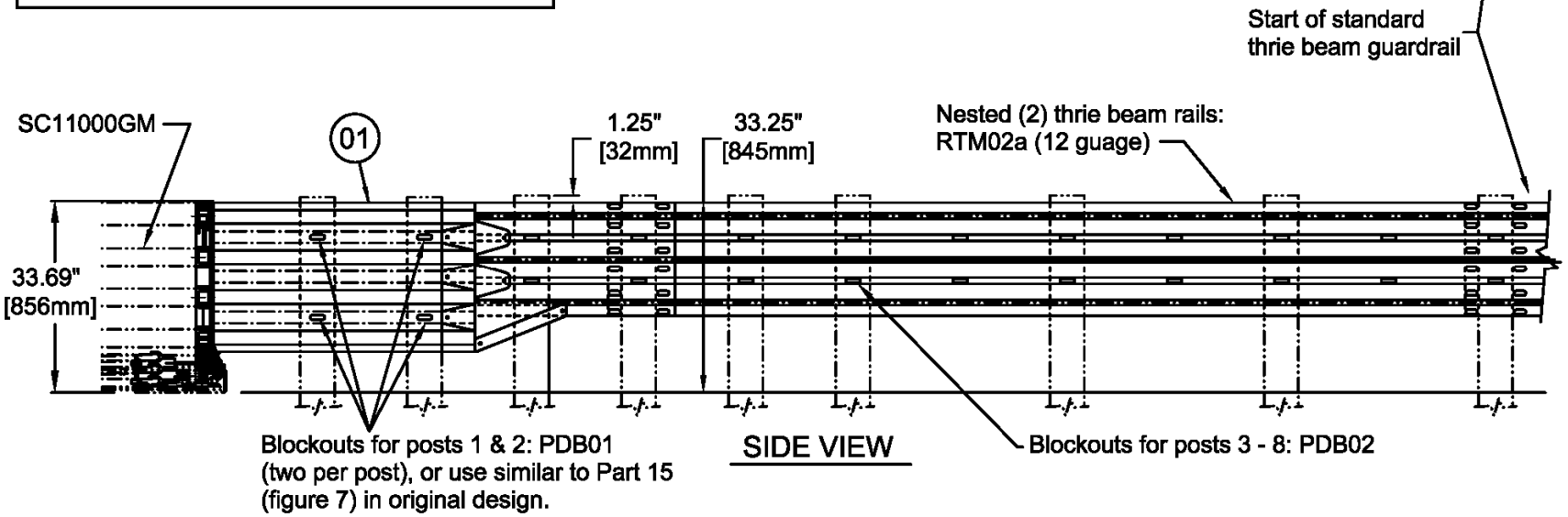


PLAN VIEW

PARTS LIST

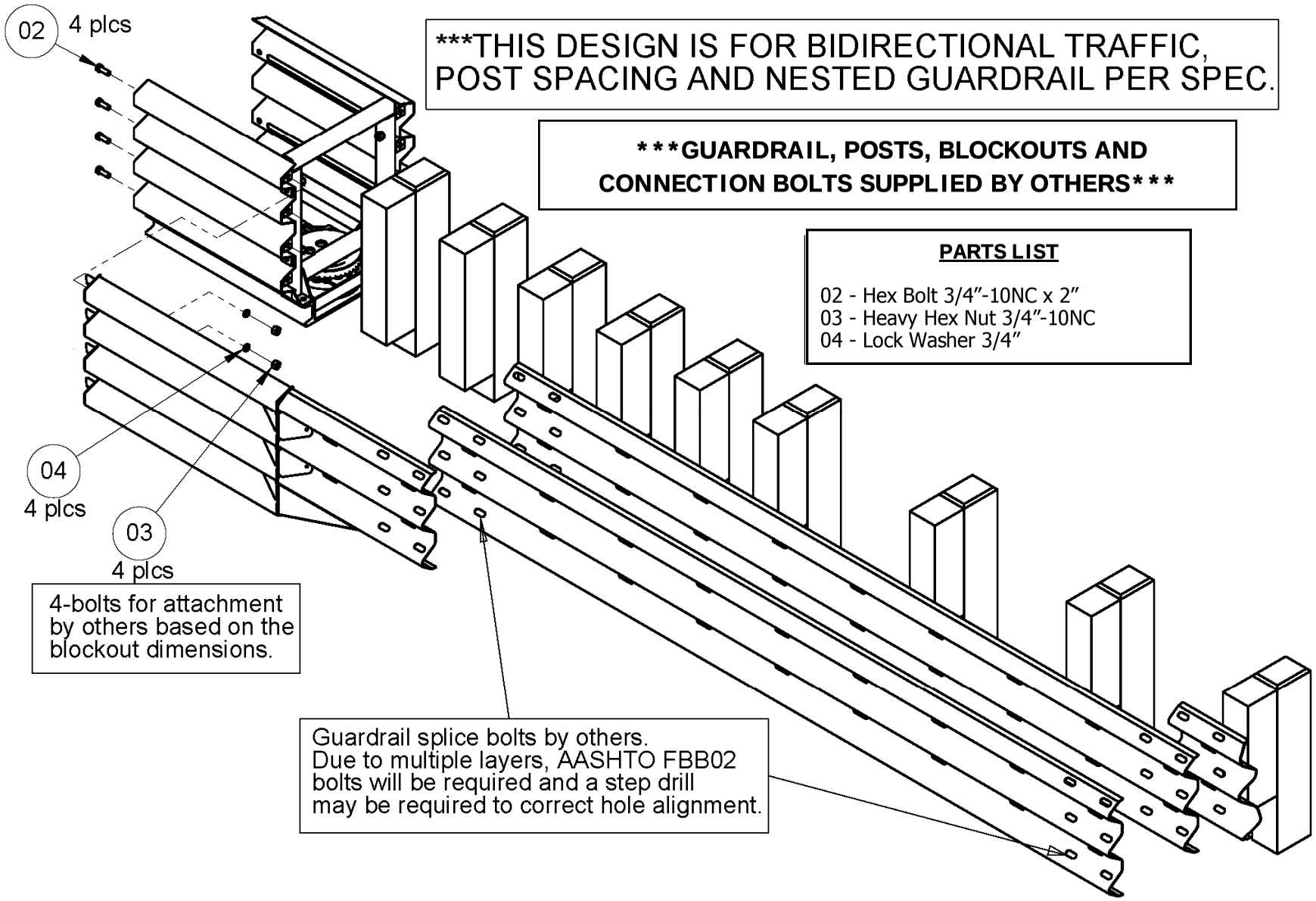
01 - Transition Thrie & W Beam - Right #9437
01 - Transition Thrie & W Beam - Left #9438

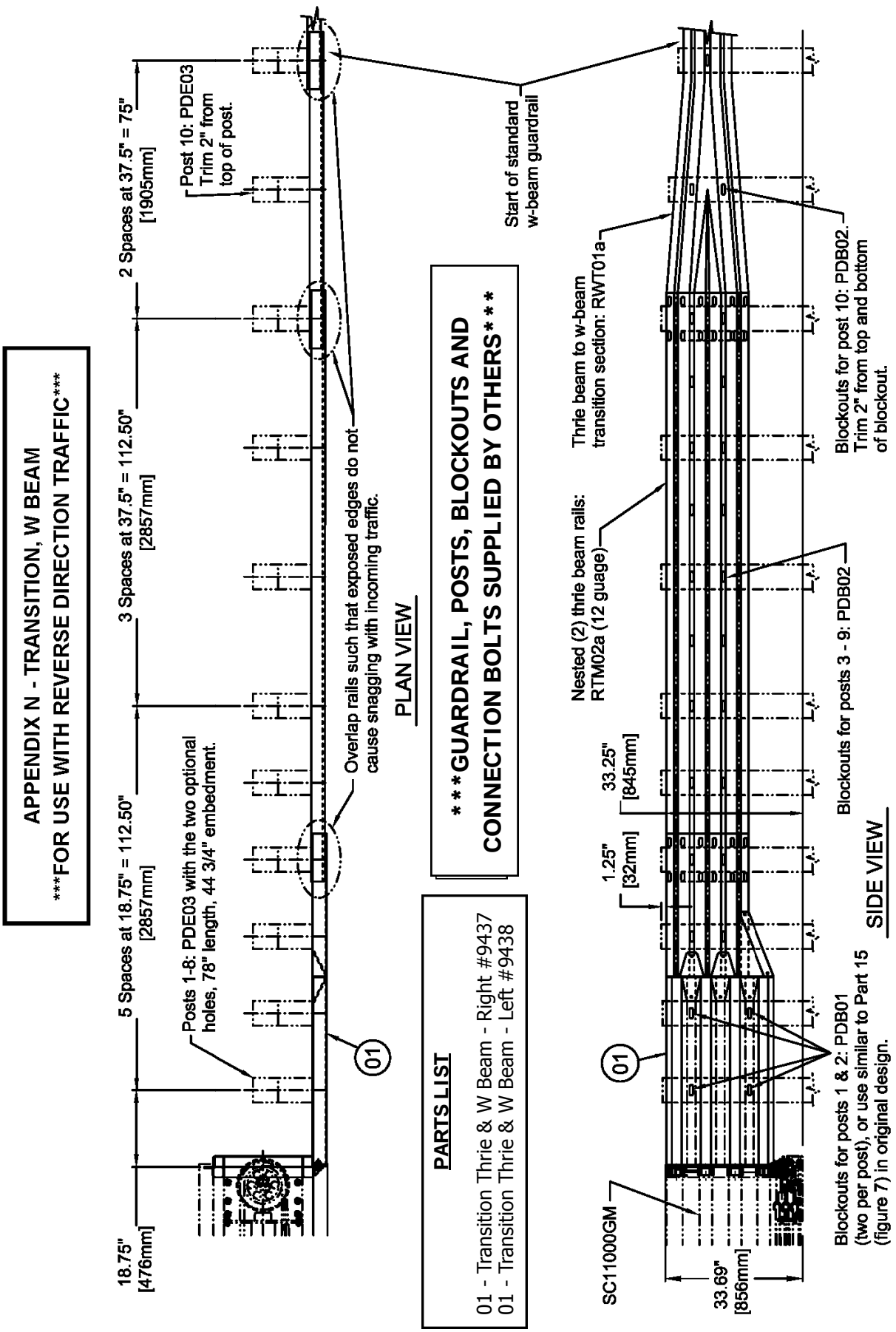
*****GUARDRAIL, POSTS, BLOCKOUTS AND CONNECTION BOLTS SUPPLIED BY OTHERS*****



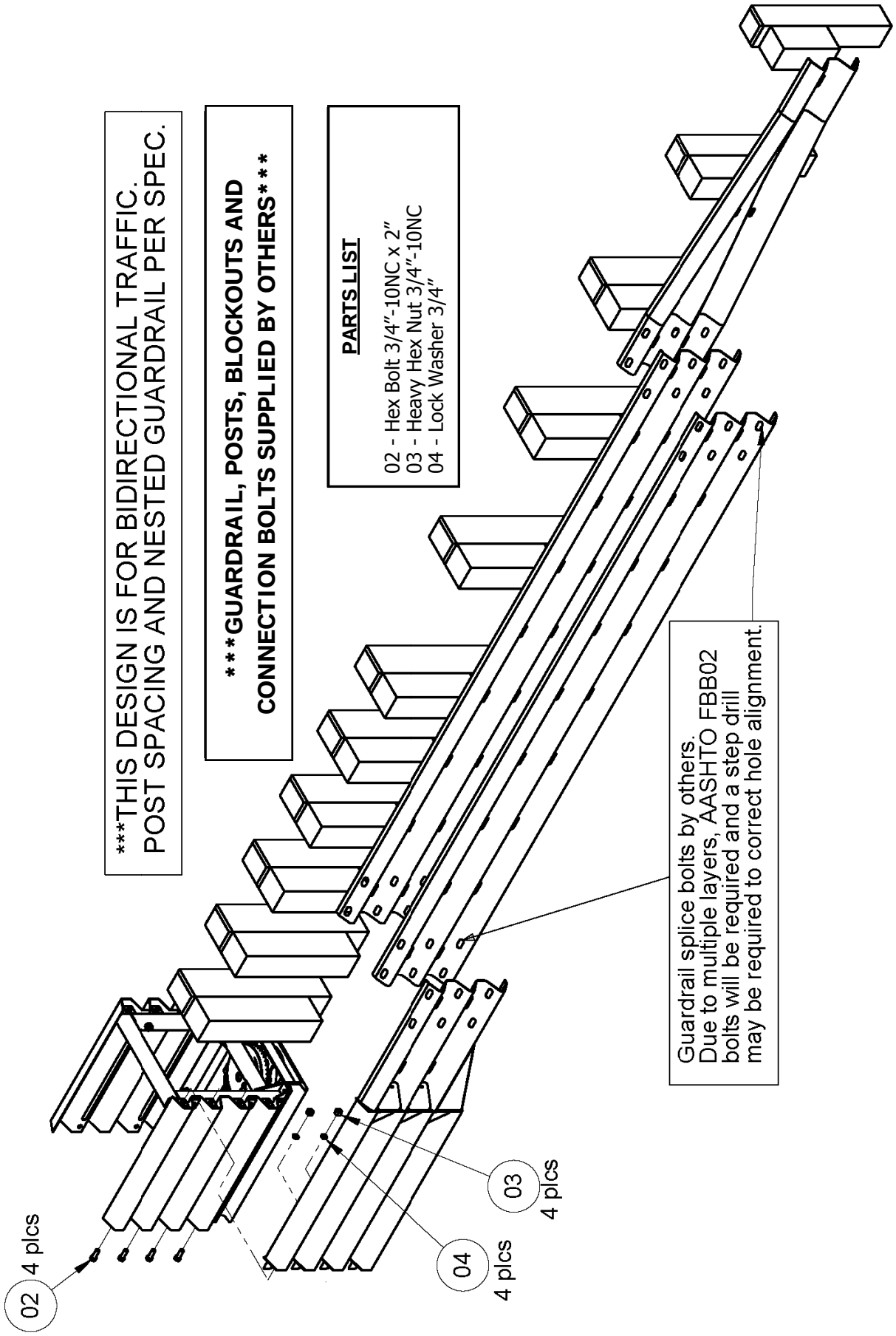
SIDE VIEW

APPENDIX M(2) - TRANSITION, THRIE BEAM




APPENDIX N - TRANSITION, W BEAM
FOR USE WITH REVERSE DIRECTION TRAFFIC
18.75" [476mm]
5 Spaces at 18.75" = 112.50" [2857mm]
3 Spaces at 37.5" = 112.50" [2857mm]
2 Spaces at 37.5" = 75" [1905mm]
Posts 1-8: PDE03 with the two optional holes, 78" length, 44 3/4" embedment.
Post 10: PDE03 Trim 2" from top of post.
Start of standard w-beam guardrail
Overlap rails such that exposed edges do not cause snagging with incoming traffic.
01
PLAN VIEW
GUARDRAIL, POSTS, BLOCKOUTS AND CONNECTION BOLTS SUPPLIED BY OTHERS
PARTS LIST
01 - Transition Thrie & W Beam - Right #9437
01 - Transition Thrie & W Beam - Left #9438
Nested (2) thrie beam rails: RTM02a (12 guage)
Thrie beam to w-beam transition section: RWT01a
1.25" [32mm]
33.25" [845mm]
Blockouts for post 10: PDB02. Trim 2" from top and bottom of blockout.
Blockouts for posts 3 - 9: PDB02
SC11000GM
33.69" [856mm]
Blockouts for posts 1 & 2: PDB01 (two per post), or use similar to Part 15 (figure 7) in original design.
SIDE VIEW

APPENDIX N(2) - TRANSITION, W BEAM

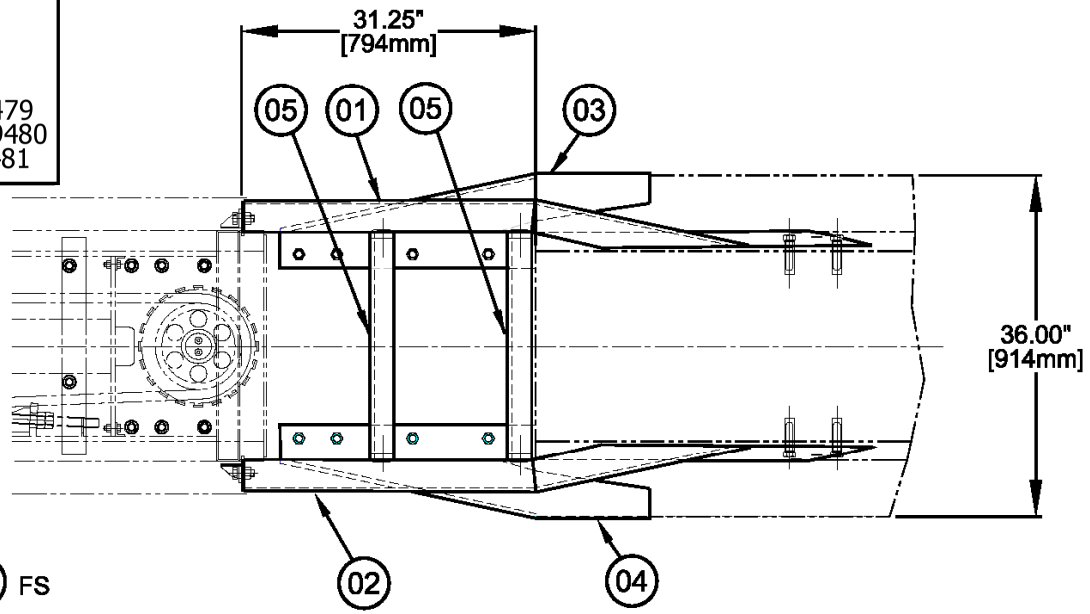


APPENDIX O - TRANSITION, JERSEY/F SHAPE BARRIER - 36 INCH (915mm) BASE X 32 INCH (813mm) TALL

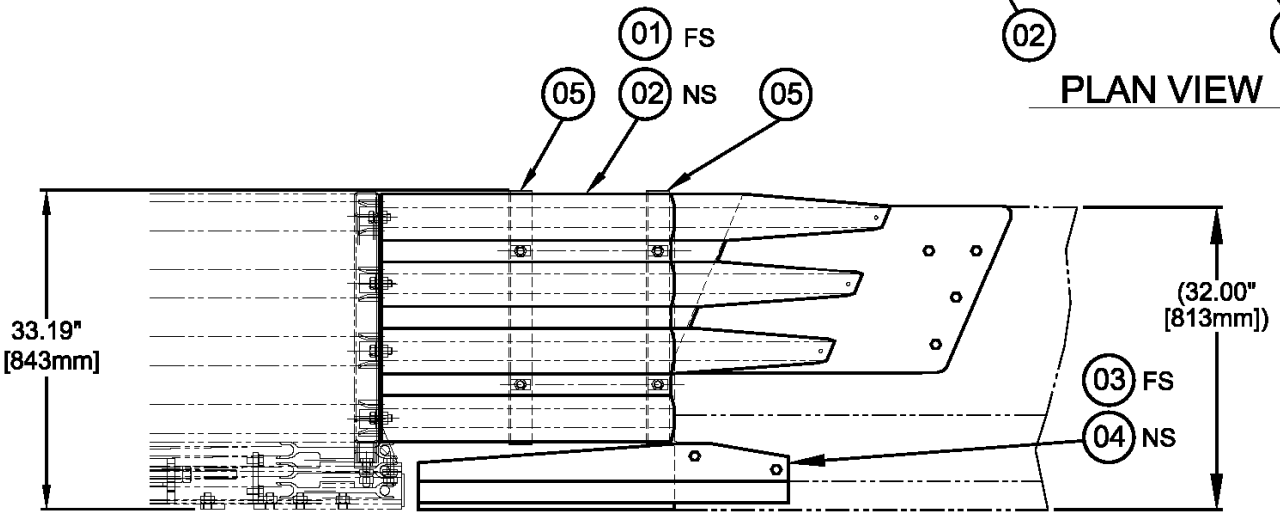
PARTS LIST

Double Sided Median Barrier 36″ Base:
Two Sided Full Assembly #9492
02 - Transition Median Barrier - Right #9493
01 - Transition Median Barrier - Left #9494
05 - Transition Spanner Brace Median Barrier #9479
04 - Transition Rub Rail Median Barrier - Right #9480
03 - Transition Rub Rail Median Barrier - Left #9481

Barrier width at top can have a variance from 19" - 21"

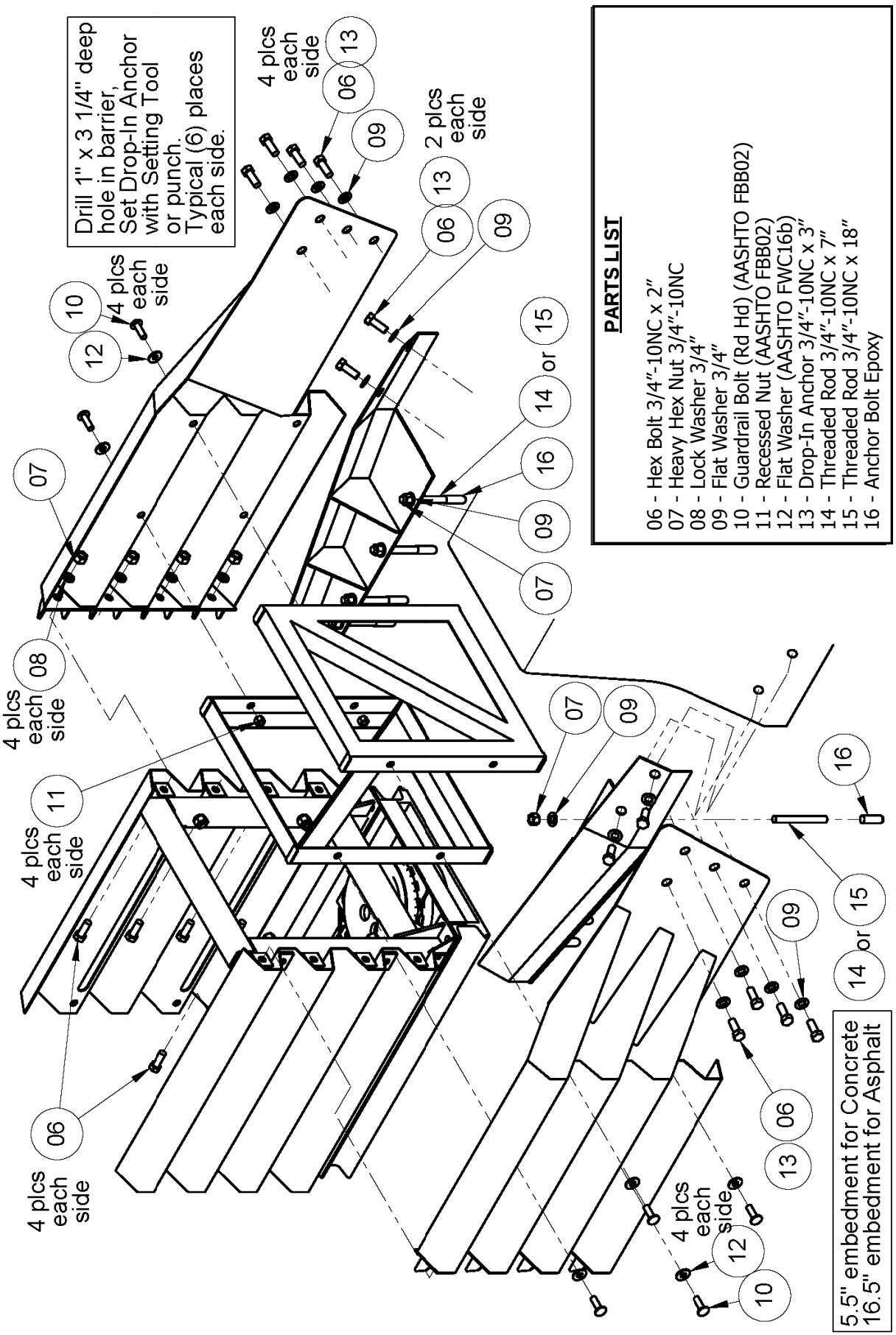


PLAN VIEW



SIDE VIEW

APPENDIX O(2) - TRANSITION, JERSEY/F SHAPE BARRIER - 36 INCH (915mm) BASE X 32 INCH (813mm) TALL

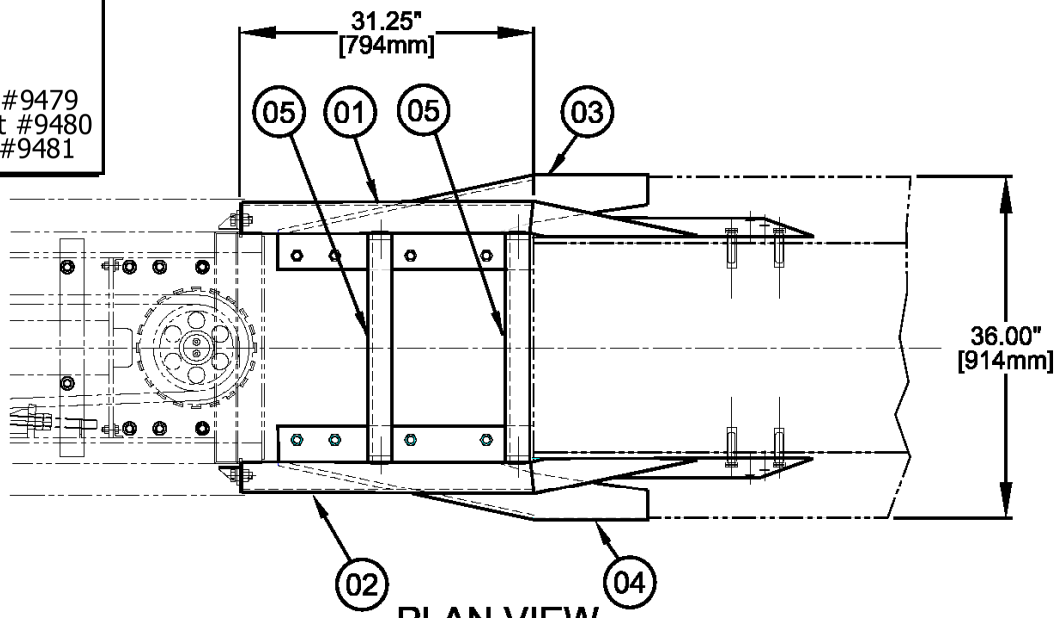


APPENDIX P - TRANSITION, JERSEY/F SHAPE BARRIER - 36 INCH (915mm) BASE X 42 INCH (1067mm) TALL

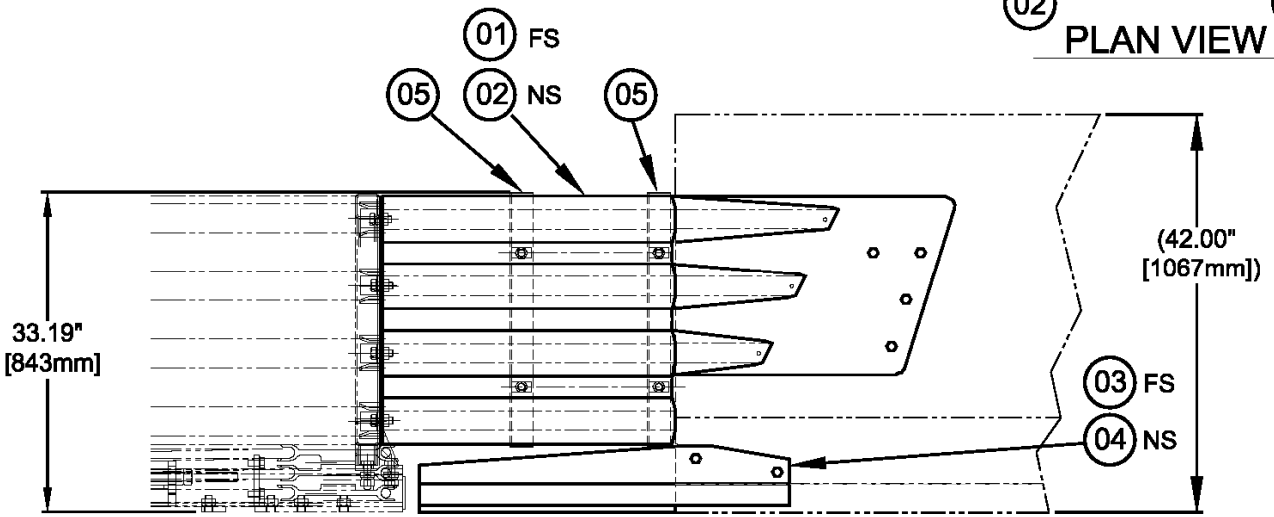
PARTS LIST

Double Sided Median Barrier 36" Base:
Two Sided Full Assembly #9476
02 - Transition Median Barrier - Right #9477
01 - Transition Median Barrier - Left #9478
05 - Transition Spanner Brace Median Barrier #9479
04 - Transition Rub Rail Median Barrier - Right #9480
03 - Transition Rub Rail Median Barrier - Left #9481

Barrier width at top can have a variance from 19" - 21"

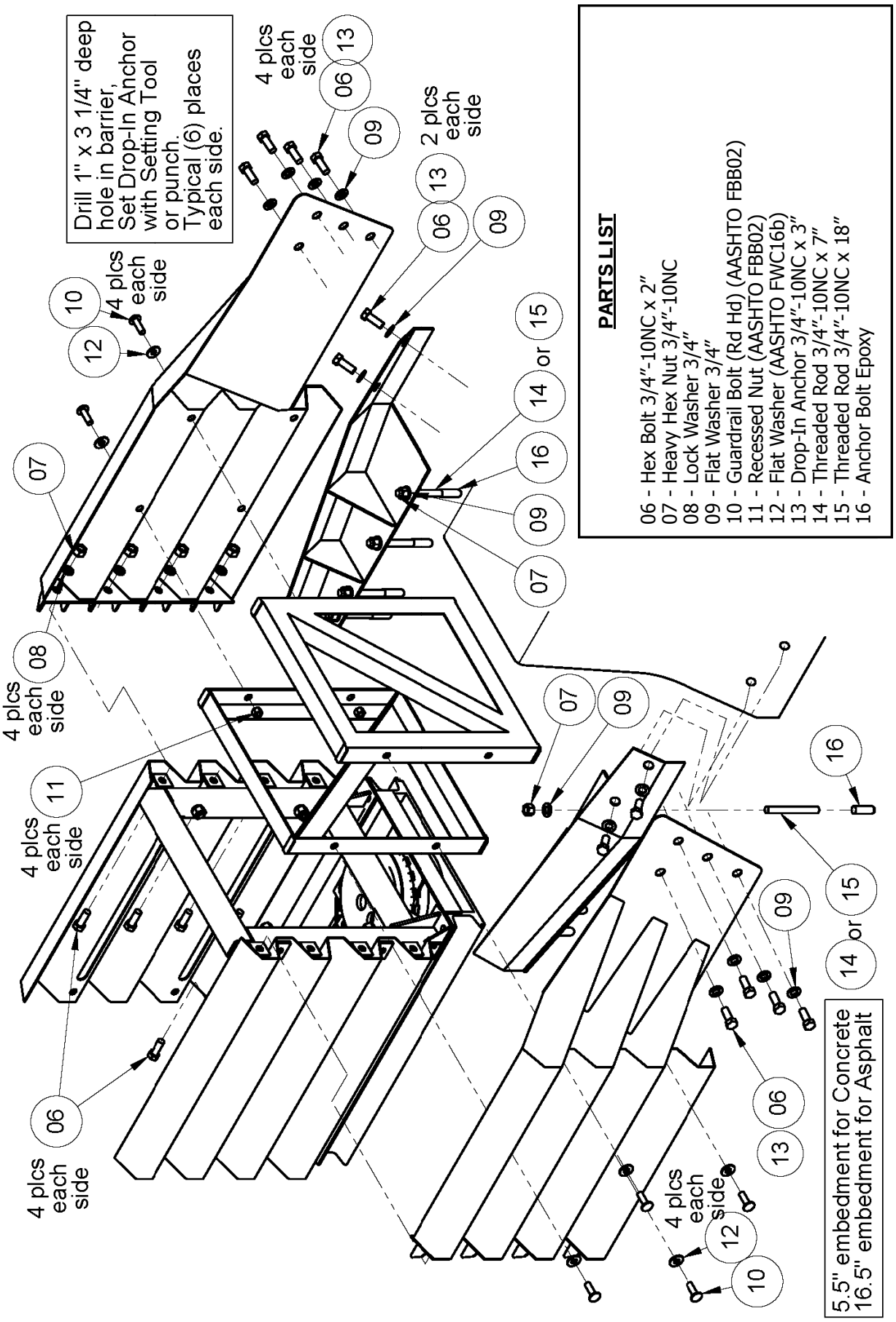


PLAN VIEW



SIDE VIEW

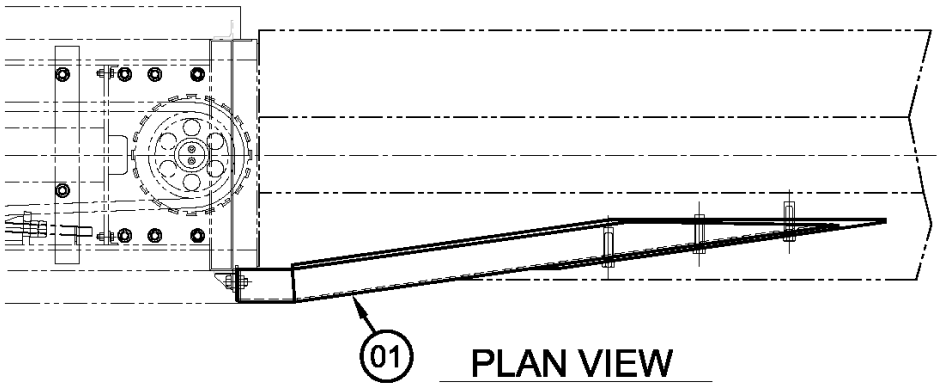
APPENDIX P(2) - TRANSITION, JERSEY/F SHAPE BARRIER - 36 INCH (915mm) BASE X 42 INCH (1067mm) TALL



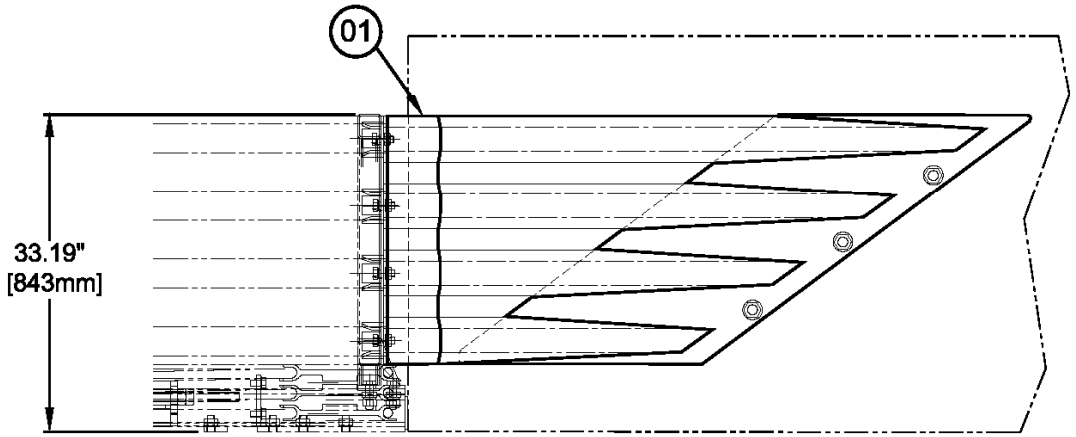
APPENDIX Q - TRANSITION, MEDIAN BARRIER - SINGLE SLOPE

PARTS LIST

01 - Transition Single Slope Median Barrier - Right #9490
01 - Transition Single Slope Median Barrier - Left #9491

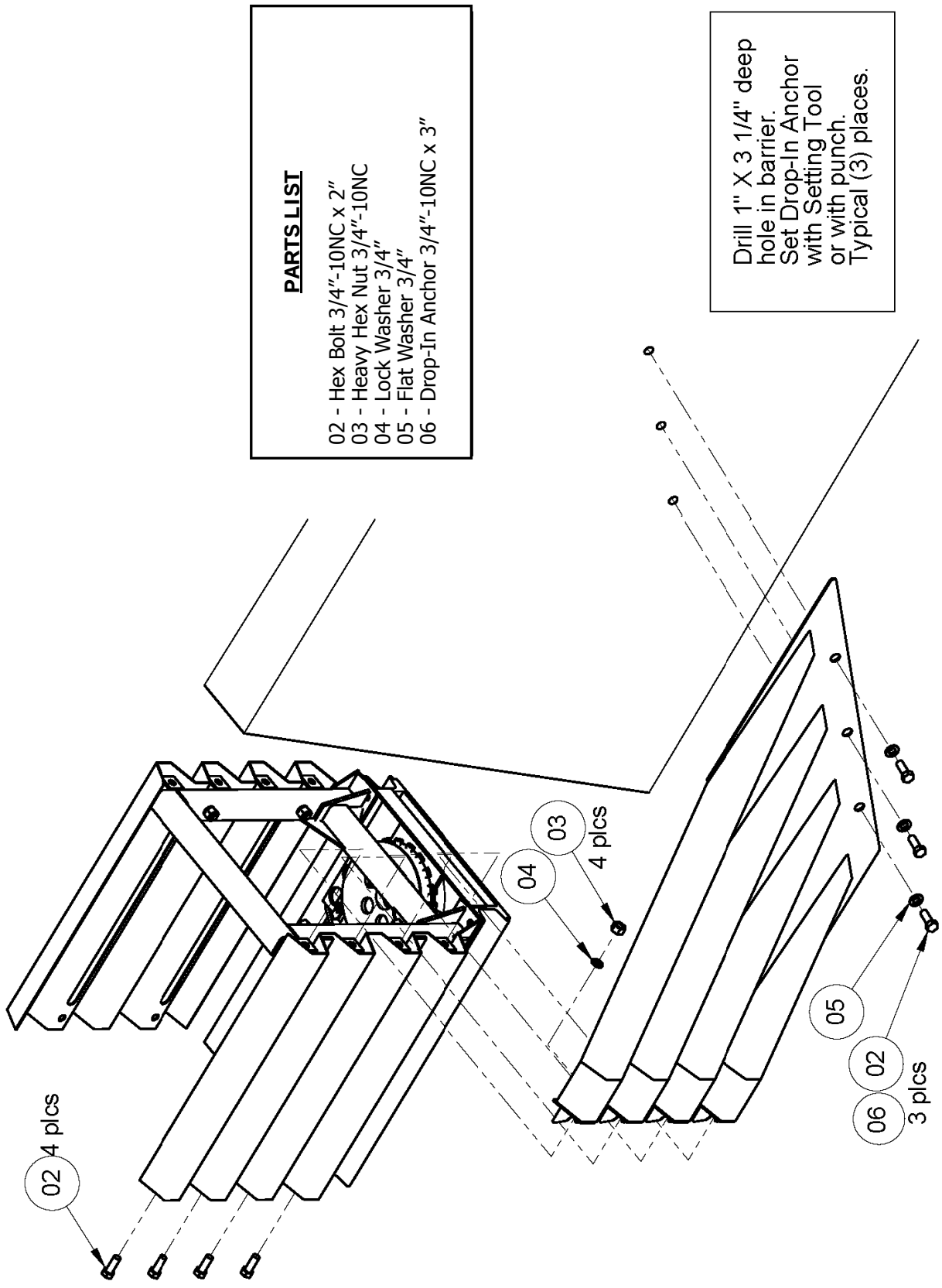


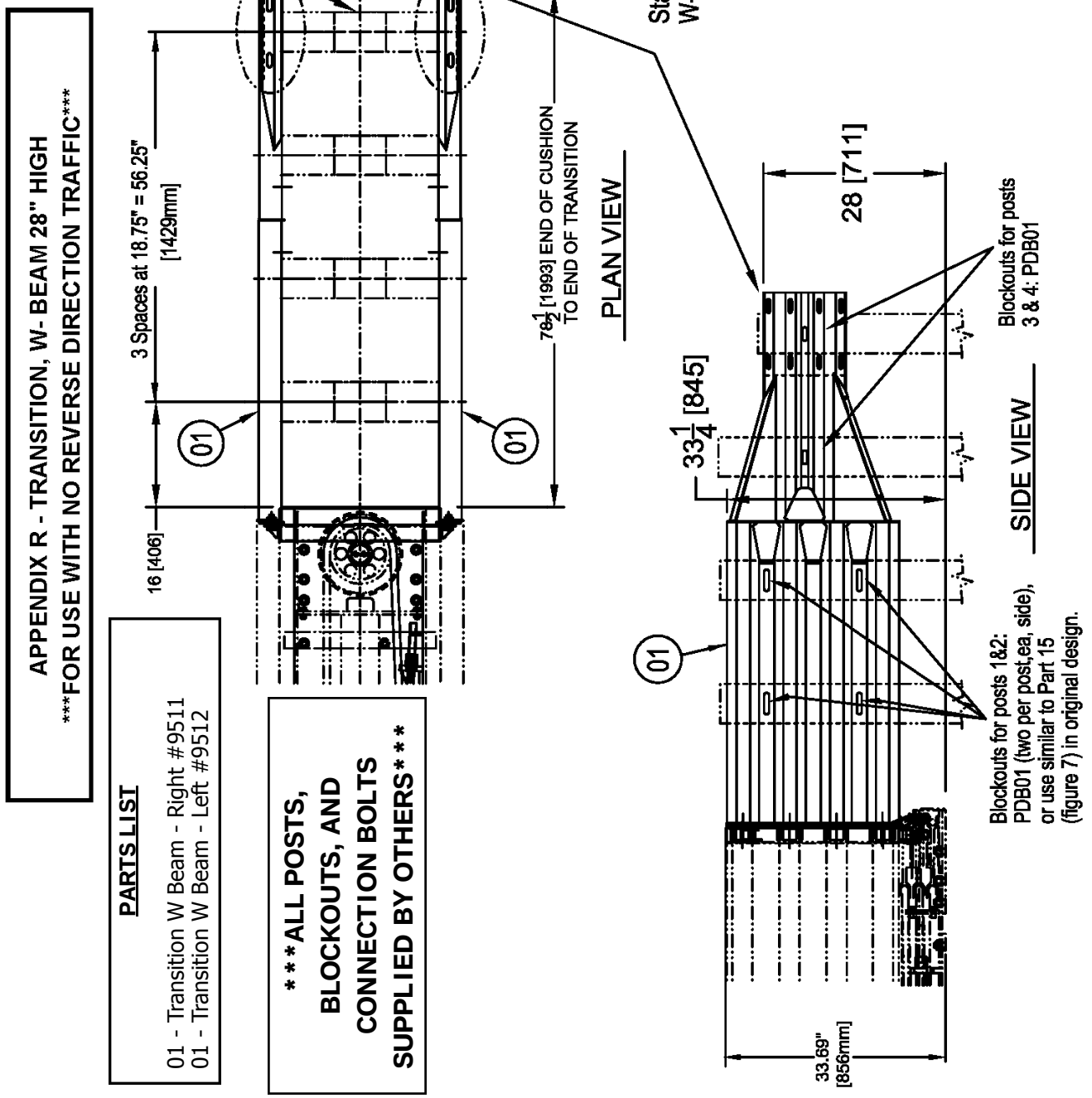
PLAN VIEW



SIDE VIEW

APPENDIX Q(2) - TRANSITION, MEDIAN BARRIER - SINGLE SLOPE



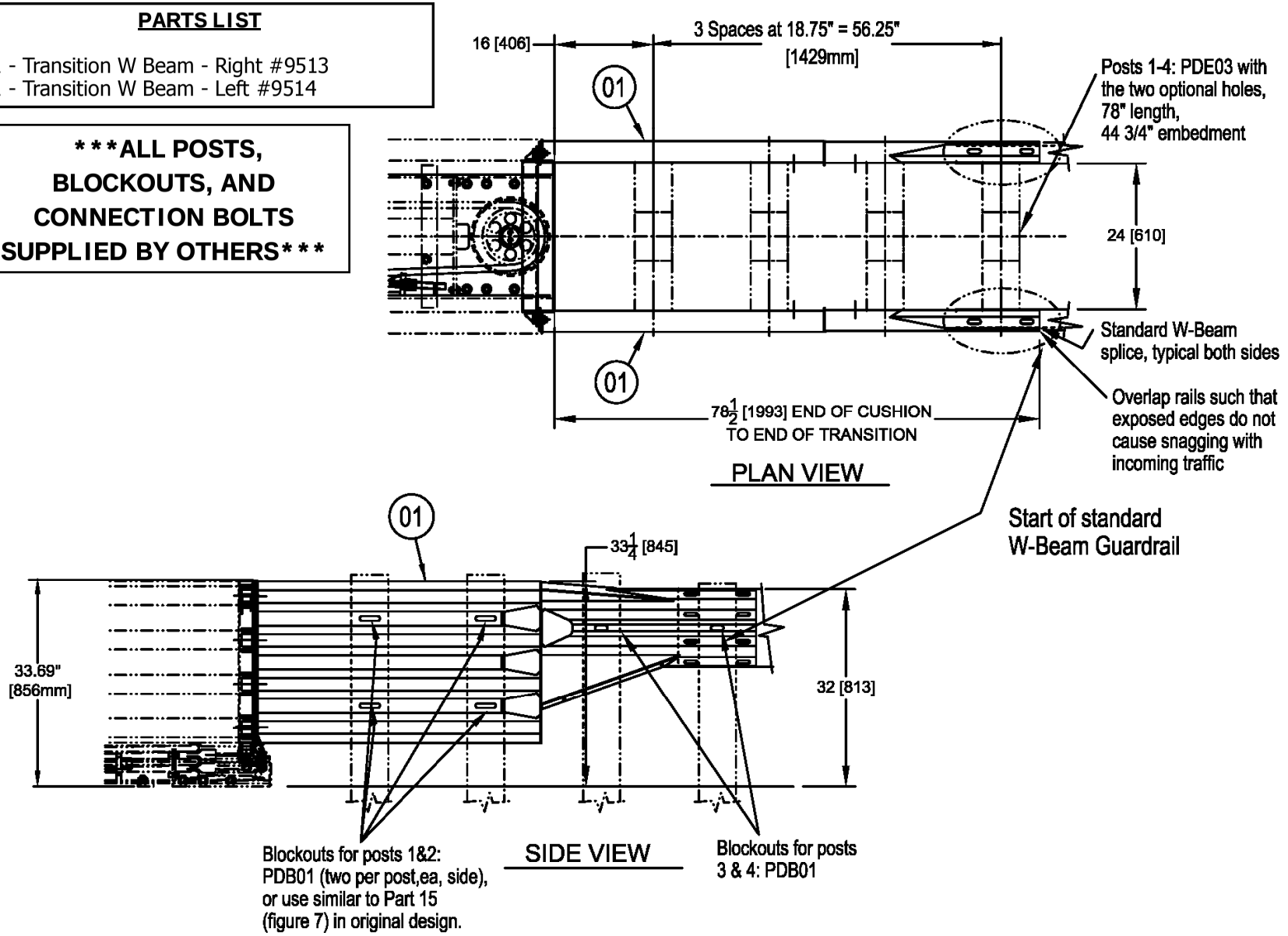

APPENDIX R - TRANSITION, W- BEAM 28" HIGH
FOR USE WITH NO REVERSE DIRECTION TRAFFIC
PARTS LIST
01 - Transition W Beam - Right #9511
01 - Transition W Beam - Left #9512
ALL POSTS, BLOCKOUTS, AND CONNECTION BOLTS SUPPLIED BY OTHERS
Posts 1-4: PDE03 with the two optional holes, 78" length, 44 3/4" embedment
24 [610]
Standard W-Beam splice, typical both sides
Overlap rails such that exposed edges do not cause snagging with incoming traffic
3 Spaces at 18.75" = 56.25" [1429mm]
16 [406]
78 1/2 [1993] END OF CUSHION TO END OF TRANSITION
Start of standard W-Beam Guardrail
01
PLAN VIEW
28 [711]
33 1/4 [845]
Blockouts for posts 3 & 4: PDB01
Blockouts for posts 1&2: PDB01 (two per post,ea, side), or use similar to Part 15 (figure 7) in original design.
SIDE VIEW
33.69" [856mm]

APPENDIX S - TRANSITION, W- BEAM 32" HIGH
FOR USE WITH NO REVERSE DIRECTION TRAFFIC

PARTS LIST

01 - Transition W Beam - Right #9513
01 - Transition W Beam - Left #9514

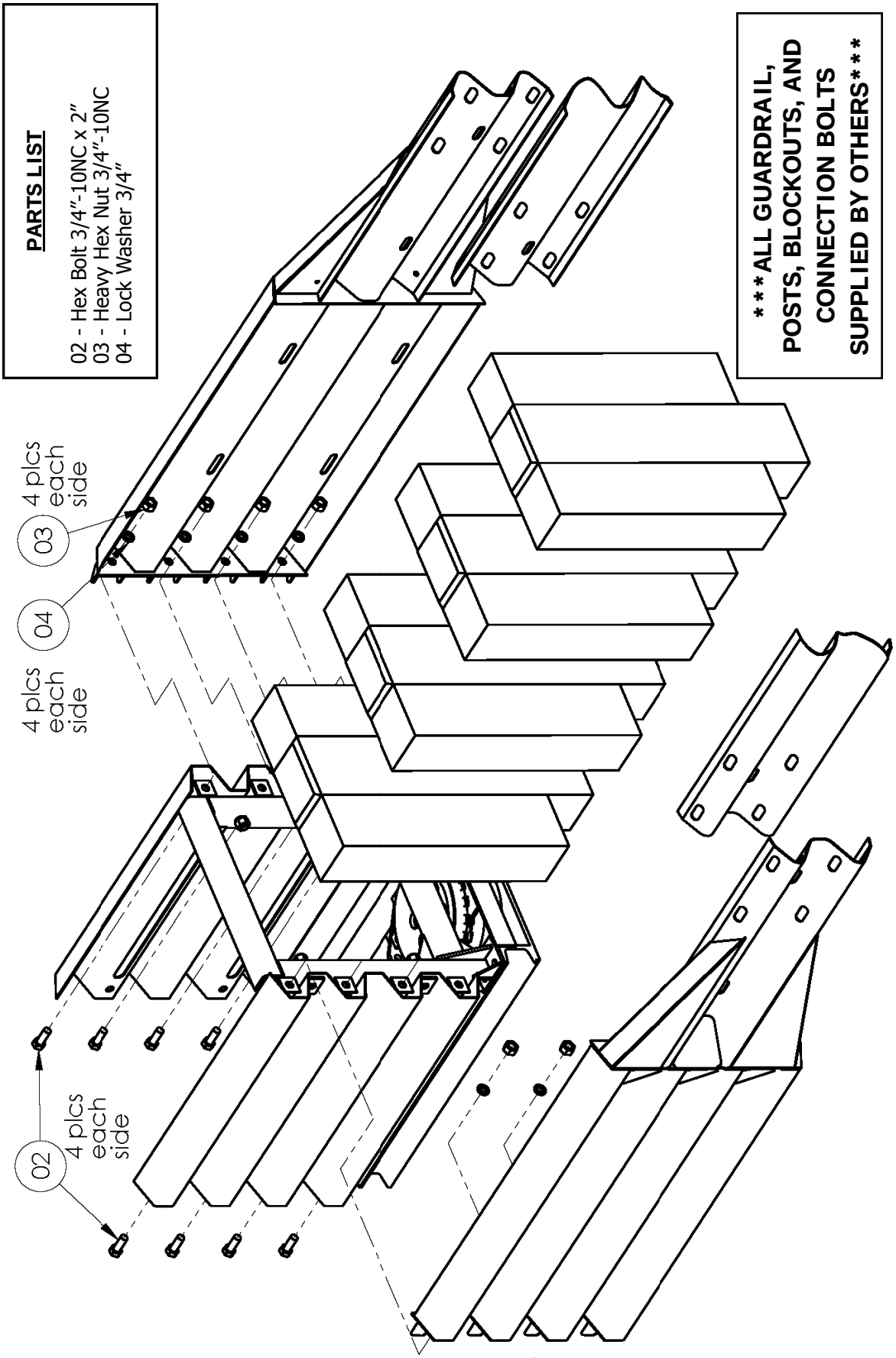
ALL POSTS, BLOCKOUTS, AND CONNECTION BOLTS SUPPLIED BY OTHERS



APPENDIX R(2) & S(2) - TRANSITION, W- BEAM 28" & 32" HIGH

PARTS LIST

02 - Hex Bolt 3/4"-10NC x 2"
03 - Heavy Hex Nut 3/4"-10NC
04 - Lock Washer 3/4"



*****ALL GUARDRAIL, POSTS, BLOCKOUTS, AND CONNECTION BOLTS SUPPLIED BY OTHERS*****

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SCI70/100GM CRASH CUSHION COMMERCIAL 1-YEAR WARRANTY

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This warranty is contingent upon proper use of the System and does not cover Systems that have been modified (including the addition of parts) without the approval of SCI PRODUCTS INC. or which are in need of repair due to damage from external cause, including accident, collision, improper handling, improper transporting, failure to properly maintain the System as recommended by SCI PRODUCTS INC., abuse, misuse or which have been damaged by outside parties not employed by SCI PRODUCTS INC., whether in installation or otherwise.

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