

# ArmorGuard™ Gate

Permanent Median Gate System

## INSTALLATION MANUAL



## ArmorGuard® Gate System Section Splice and Transition Installation Instructions

### Table of Contents

Preface .....	2
Introduction .....	2
System Overview .....	3
Required Tools .....	3
Section Splicing Instructions .....	4
Transition Installation Instruction .....	8
Limitations and Warnings .....	14

### **Appendix**

A. Anchoring Material Options .....	15
B. Anchoring Foundation and Barrier Cutout .....	16
C. System Assembly Drawings .....	18
D. Maintenance .....	29

### PREFACE

The Barrier Systems, Inc. (BSI), ArmorGuard Gate System (AGS), incorporates the newest roadside safety materials and engineering processes.

As with any roadside safety device, the AGS must be installed properly to insure proper performance. Thoroughly review and fully understand the installation instructions and product limitations before starting the installation. An instructional video is available from BSI to help explain the general installation requirements. Watch and fully understand the AGS *Section Splice and Hinge / Transition Installation and Assembly Video* before attempting to install the system. Do not start the installation without the proper plans and tools required for installation.

If you need additional information, or have questions about the ArmorGuard Gate System, please call the BSI Customer Service Department at (888) 800-3691 (U.S toll free) or (707) 374-6800.

### INTRODUCTION

The AGS has been fully tested in accordance with the evaluation parameters in NCHRP Report 350, Test Levels 3 (100 km/hr).

The system is a heavily reinforced steel barrier that is designed for emergency openings. It is ideally suited for permanent and stationary work zone barriers where emergency vehicles, maintenance crews and emergency evacuation access may be needed and positive barrier protection is required.

The system should be installed on a smooth firm surface that is capable of supporting the weight of the system. Generally a Portland Concrete Cement (PCC) surface is preferred but the system has been successfully installed and used on an Asphaltic Concrete surface. Please refer to Appendix B (Page 16).

## SYSTEM OVERVIEW

Longitudinal barriers are highway safety devices whose primary functions are to prevent vehicular penetration and to safely redirect an errant vehicle away from roadside or median hazards. The ArmorGuard Gate system is used as a moveable longitudinal barrier section that can be installed in openings of rigid barrier systems. The system is hinged at both ends and uses a compressed air powered jacking system or manual jack system to raise the gate section onto casters. This enables the system to be unhinged and swung open from either end, or the whole gate section can be disconnected at both ends and moved in any direction. The purpose of the system is to create a crashworthy closure for rigid longitudinal barrier openings that is capable of being opened by no more than two people in less than 5 minutes.

The system is approximately 28 inches (700 mm) wide and is 33 inches (830 mm) high. It is available in 4-meter (13') increments from 8 meters to 16 meters (26 to 52 feet) in length. The system can be quickly and easily opened or closed without expensive electrical power supplies or sophisticated control systems. Positive security can also be provided.

## REQUIRED TOOLS

1/2" (12 mm) medium depth sockets

1/2" (12 mm) Ratchet with extensions

Rotohammer for drilling holes in concrete

Torque wrenches

Measuring tape

Safety Equipment: Glasses, Gloves

1/2" (12 mm) Air impact wrench w/ sockets

**Note: The tools list above is a general recommendation. Depending on the specific characteristics of the job site, different tools may be necessary.**

## BEFORE INSTALLATION

Placement and use of the ArmorGuard Gate System should be accomplished in accordance with the guidelines and recommendations set forth in the "AASHTO Roadside Design Guide," FHWA memoranda and other state and local standards.

The AGS is a highly engineered safety device made up of a relatively small number of parts. Before starting the assembly, become familiar with the basic elements that make up the system.

Depending on the size of the system ordered, the gate sections will be shipped separately and the transition parts will be shipped on pallets. Assembly of the system is typically done at the worksite. (If preferred, the system can be assembled "off-site" and set into position as one piece, with a forklift or crane.)

8 and 12 meter gates are shipped fully assembled. 16 meter gates are shipped in (2) 8-meter sections with transitions on pallets.

Before beginning the assembly of the system, check the packing list to be certain that all of the system components were included in the shipment.

### **NOTE:**

**It is important to determine the system's installation position to optimize proper function and transition.**



## SECTION SPLICING INSTRUCTIONS

Depending on the length of the system ordered, the gate sections may need to be spliced together. The first part of this manual describes the process for splicing two AGS sections together. This procedure can also be used to replace a damaged 4-meter section.

The transition to permanent concrete barrier hardware installation instructions start on page 7.

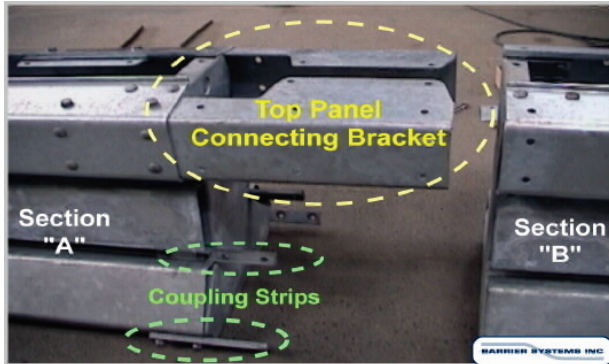


Figure 1.

For the sake of this manual, we will assume that two sections have been delivered and laid out in this orientation with the section on the left labeled Section "A" and the one on the right as Section "B". The Top Panel Connecting Brackets are already installed on Section "A". This manual will show you how to splice the two sections together with the Top Panel Connecting Bracket.



Figure 2.

### Step 1

Remove the Coupling Straps from both sides of Section "A". Use an impact wrench to remove the middle and upper Coupling Straps. Use a wrench or socket to remove the bottom coupling Strap. The bolts that attach the Side Coupling Straps screw into the Threaded Backing Plate (fig 3.) located on the inside of the assembly.

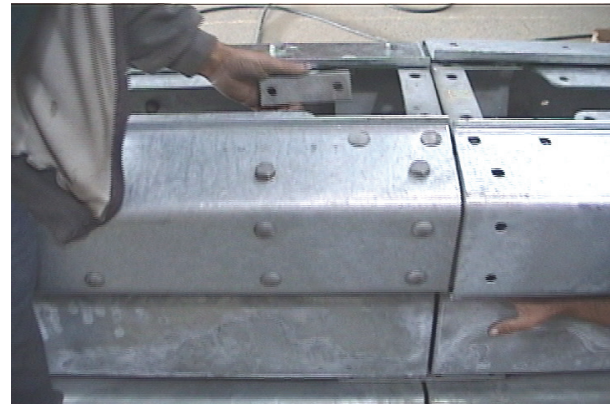


Figure 3.

Notice (Fig 4.) that the Bottom Coupling Straps are different from the Side Coupling Straps as the areas around the holes are cut out so that the Strap can be installed flush over the panel mounting nuts.

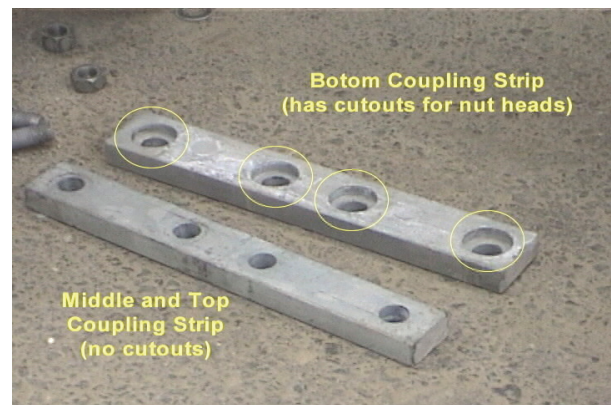


Figure 4.



Figure 5.

### Step 2

Remove any bolts in the Top Panel of Section "B". Insert a pry bar into adjacent holes to move the panels around so that the bolts can be easily removed.



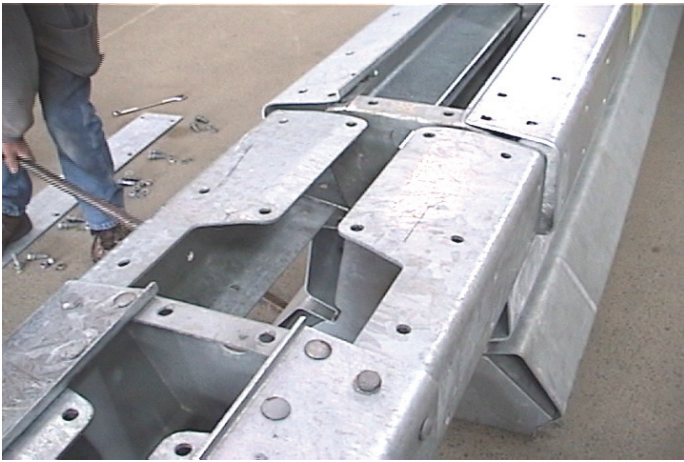


Figure 6.

### Step 3

Once all of the bolts on the Section “B” Top Panel are removed, you are ready to insert the Top Panel Connecting Bracket under the top panels of Section “B”. Use a pry-bar (figure 6) to make sure that the unit is aligned and that the top panel on Section “B” will go over the connecting hardware.



Figure 7.

**NOTE:** Before pushing on the end of Section “B”, place a spacer block on the hinge assembly (figure 7). This will prevent the forklift or other pushing device from contacting and possibly damaging the hinge bars.



Figure 8.

### Step 4

Push on the end of Section “B” moving the Top Panels over the Top Panel Connecting Bracket on Section “A”. (figure 8.)



Figure 9.

### Step 5

Use a pry bar to align the side panels so that the Bottom Coupling Strap can be re-installed. Make sure that the Bottom Coupling Strap is used and that the cutouts fit over the nut heads on the outside of the unit. Install the washers and nuts and tighten to 70 ft-lbs (95 N-m).



Figure 10.

### Step 6

Install the Side Coupling Straps. One person must hold the Threaded Backing Plate on the inside on the unit, while the other person threads the bolt through the Side Coupling Strap, the End Cap, and then into the Coupling Strap Nut.

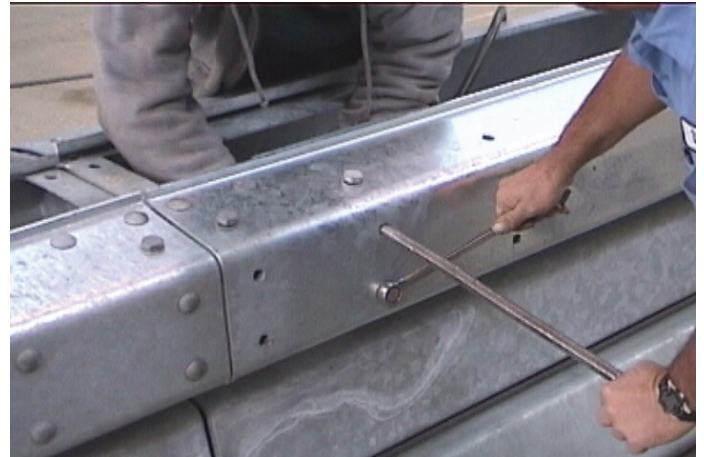


Figure 12.

### Step 8

Occasionally after the top bolts have been installed on the Top Panel, the side of the Top Panel will pull away from the assembly. Use a longer hex bolt to temporarily pull the side of the panel in. Install the hex bolt. Keep the holes aligned with the pry bar while tightening (figure 12).

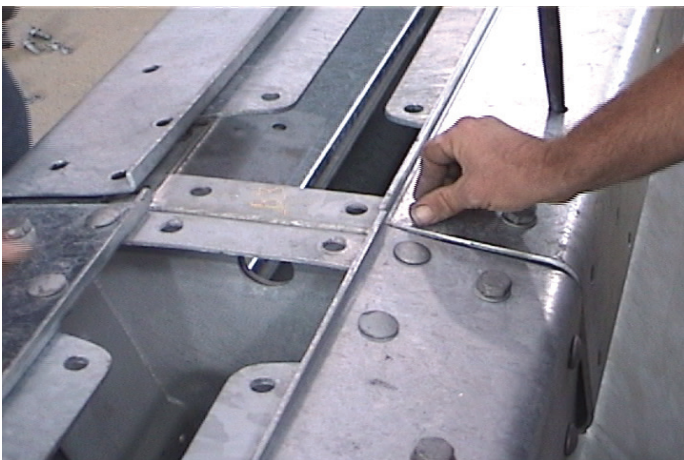


Figure 11.

### Step 7

Use a pry bar to align the holes on the Top Panel and re-install the bolts (figure 11.). Refer to drawing #D010343 in the Appendix B (Page 17) to determine the position of the round head bolts and the hex head bolts.

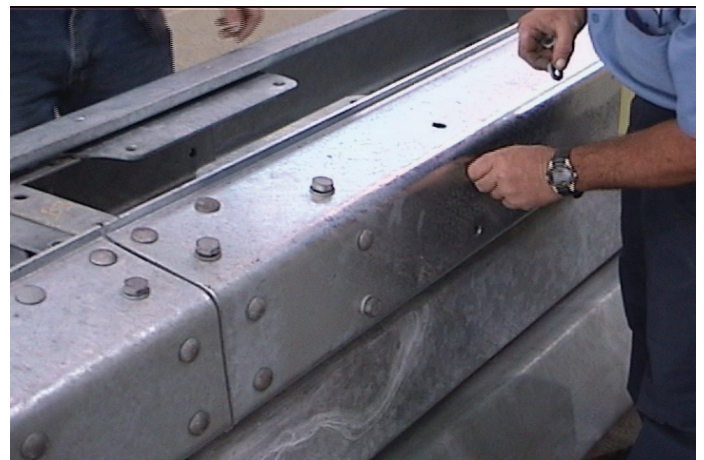


Figure 13.

### Step 9

Replace the rest of the side bolts. When all of the side bolts have been replaced, remove the hex bolt and replace it with a Round Head bolt.

The Round Head bolts will eliminate any vehicle snagging if the system is impacted.





Figure 14.

### Step 10

Finish attaching the top panel by installing the bolts on the bottom side of the Top Panel.



Figure 15.

### Step 11

Use an impact wrench to tighten all of the side Coupling Strap bolts (figure 15).



Figure 16.

### Step 12

Next, install the Middle Panel Connecting Rods (figure 16). These rods connect the Middle Panels of adjacent 4-meter sections. Install the washer and nut, and tighten with an impact wrench.



Figure 17.

### Step 13

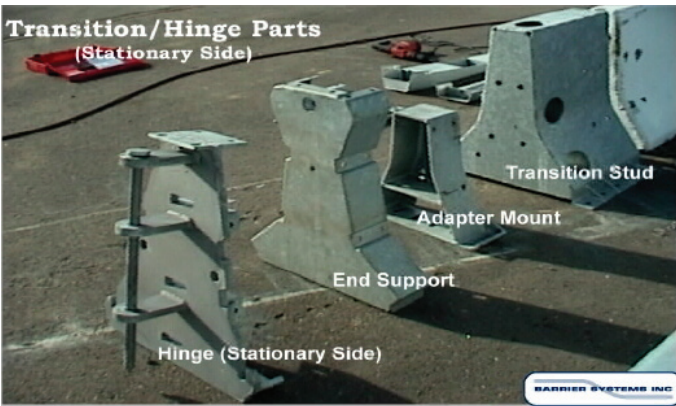
Once the Middle Panel Connecting Rods have been installed, the Coupling Shear Plate can be installed. The Coupling Shear Plate attaches across the tops of the two sections (figure 17). Tighten all of the bolts with an impact wrench.



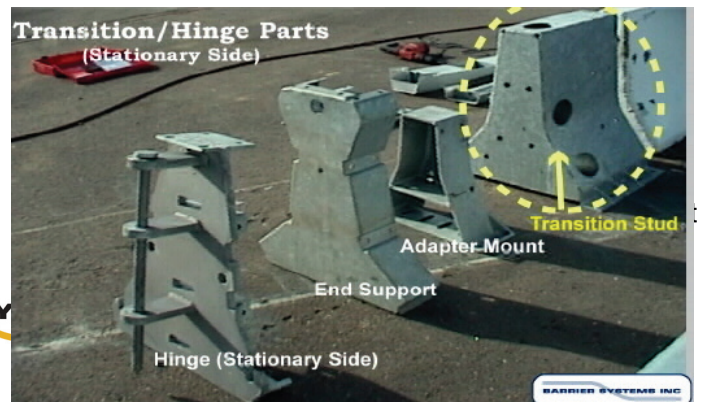
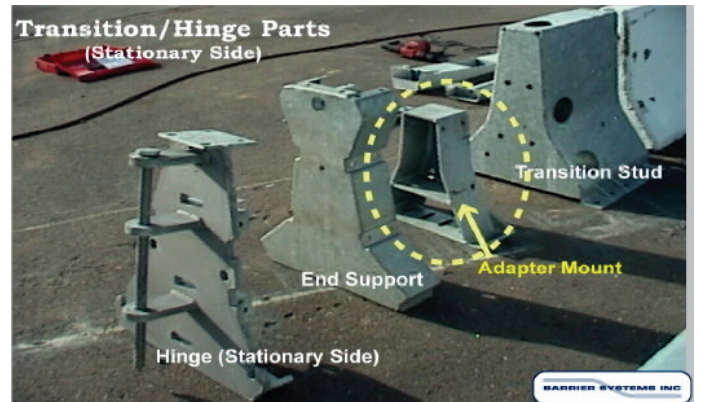
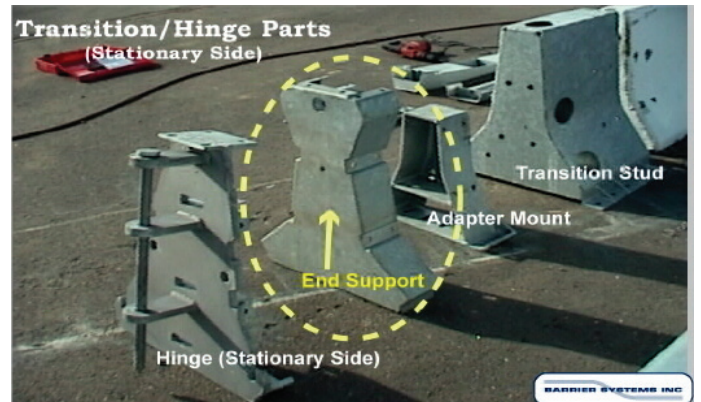
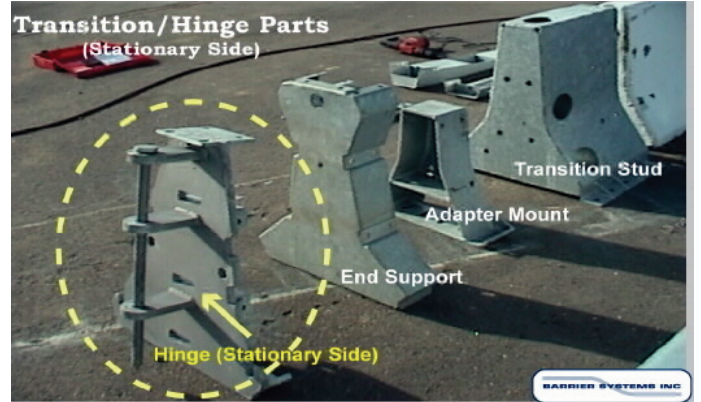
## TRANSITION INSTALLATION INSTRUCTIONS

The transition hardware for the ArmorGuard Gate System (AGS) will be delivered on pallets along with the gate. When requested, and shipping conditions allow, the transition will be shipped partially assembled.

These are the procedures for installing a AGS transition to a permanent concrete safety shaped barrier. The transition hardware consists of a number of parts that must be installed onto the permanent barrier in a particular sequence.



This is a view of the major components that make up the AGS transition to permanent concrete barrier. The components are shown above and to the right.





into place. A forklift could also be used to push the part into place.



Figure 26.

### Step 1

Slide the Transition Housing over the end of the permanent barrier. A pry bar should easily move the part into place. A forklift could also be used to push the part into place. Center the Gate and transitions within the predetermined opening, as described in Drawing B011025 (page 19).



Figure 27.

### Step 2

Use the holes in the Transition Housing as a template for marking the position of the anchor holes that will be drilled. Also, mark the holes at the base of the Transition Housing.



Figure 28.

### Step 3

Drill the holes for the Transition Housing side and bottom (Figure 28).

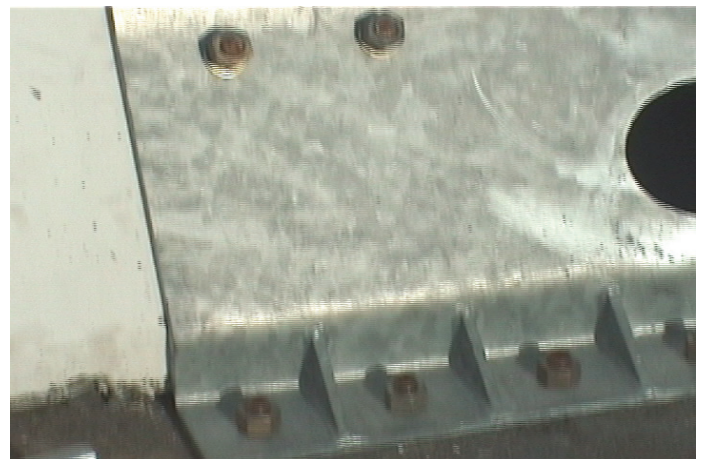


Figure 30.

### Step 4

Insert the enclosed threaded rods into the holes and epoxy in place as directed by instructions enclosed with the epoxy.

Install the Adapter Mount assembly over the Housings coming up through the top of the Spacer Plate and against the Transition Housing. Make sure that the Housings that come up through the Spacer Plate are aligned so that they come up through the bottom plate of the Adapter Mount.



Figure 31.



Figure 33.

### Step 5

After the anchor epoxy has properly cured, place the washer and nuts on the Housings and tighten. Torque to 120 ft/lbs.

### Step 7

Install the bolts that hold the Adapter Plate against the Transition Housing by inserting the washers and bolts. Use the access holes on the side of the Transition Housing to install the nuts and lock washers on the bolts. Use the access hole to hold a back-up on the nuts while the bolts are tightened with an impact wrench.



Figure 32.



Figure 34.

### Step 6



## Step 8

Install the nuts and washers onto the Housings that come up through the Spacer Plate and through the bottom of the Adapter Plate.



Figure 35.

## Step 9

Install the End Support over the Adapter Mount. The End Support will slide over and around the adapter.



Figure 36.

## Step 10

05/30/07 AGG06

At this point, start attaching the side transition panels that run back from the Hinge back onto the concrete barrier. Install the bottom panel first. One person has to hold the panel in place while another person installs the Bottom Coupling Strap. The bolts thread directly into the sides of the End Support.



Figure 37.

## Step 11

Follow the same steps to install the middle panel. (The middle panel is different from the bottom panel in that it has an insert. The insert will be used to connect a thru-rod later in the process).



Figure 38.

## Step 12

Finally the top rail is installed. It is easiest if two people hold the top rail in place while the third person installs the bolts.



Figure 39.

## Step 13

Install the two Round Head bolts in the top side of the Top Panel and hand tighten the nuts.



05/30/07 AGG06

Figure 40.  
BARRIER SYS

## Step 14

Install the Top Coupling Strap between the middle and top panel. **DON'T TIGHTEN** any of the coupling Strap bolts at this time.



Figure 41.

## Step 15

Next install the Hinge Assembly. Slide the tabs on the Hinge Assembly inside the Coupling Straps (see Fig. 41 and 42)



Figure 42.





Figure 43.

### Step 16

Install and tighten the bolts that attach the lower, (Figure 42) middle and top (Figure 43) coupling Straps to the Hinge Assembly.



Figure 45.

### Step 18

Drill the holes through the transition panels into the permanent concrete barrier. Insert the Housings into the holes and epoxy in place. After the epoxy has properly cured, install the nuts and washers and torque to 120 ft-lbs (160 N-m).



Figure 44.

## Limitations and Warnings

The ArmorGuard Gate system has been rigorously tested and evaluated per the recommendations in the NCHRP Report 350 Guidelines for Test Level 3 (TL-3) longitudinal barriers. The impact conditions recommended in NCHRP 350 are intended to address typical in-service collisions.

When the ArmorGuard Gate system is properly installed and maintained, the system is capable of redirecting impacting vehicles in a predictable and safe manner under the NCHRP 350 impact conditions of:

Vehicles: Pickup (2000P) and small car (820C)

Mass: 4400 lbs. (2000 kg) & 1800 lbs. (820 kg)

Speed: 62 mph (100 km/hr)

Angle: 25 degrees for pickup and 20 degrees for small car

Vehicle impacts that vary from the NCHRP 350 impact conditions described for longitudinal barriers may result in significantly different results than those experienced in testing. Vehicle impact characteristics different than or in excess of those encountered in NCHRP 350 testing (speed and angle) may result in system performance that may not meet the NCHRP 350 evaluation criteria.



## APPENDIX A

### Anchoring Material Options

The anchoring package supplied with the ArmorGuard Gate system contains the necessary threaded rods and epoxy needed to install the system. (Fosroc Anchortite Polyester Epoxy and galvanized or stainless steel threaded rods 3/4" (20 mm) cut to length.) The epoxy has the following physical properties:

**Compressive Strength, ASTM C-109 (7 days):**  
14,000 psi (97 MPa)

**Tensile Strength, ASTM C-307 (7days):**  
2,000 psi (14 MPa)

**Heat Distortion, Temperature, ASTM D-648:**  
233°F (112°C)

**Coefficient of Linear Expansion:**  
 $2.55 \times 10^{-5}/^{\circ}\text{C}$

The proper ratio of filler/hardener to **resin** is two parts of filler/hardener to one part resin by volume.

Anchor bolt holes should be drilled using air-flushed or water-flushed rotary percussive drilling equipment. If diamond core or non-percussive drills are used, the hole must be thoroughly scoured using a coarse wire flue brush.

Other anchoring materials can be used if they comply with the following specifications: epoxy should meet the ASTM C307 tensile strength of 2,000 psi (14 MPa) and compressive strength of 10,000 psi (70 MPa) per ASTM C109 or C579. The anchoring compound (epoxy) should provide a pull out strength of 20,000 lb. (9070 kg) minimum in 4,000 psi (28 MPa) concrete. Products such as HILTI HIT HY150 injection Adhesive Anchor or HVA Adhesive Anchoring System fit this criteria.

If mechanical expansion anchors are provided with the P.C.B. anchoring package, they can be replaced with any corrosion resistant mechanical or chemical anchor that provides a shear capacity of at least 30,000 lb. (13607 KG) and a tensile capacity of at least 20,000 lb. (9070 KG), in 4,000 psi (28MPa) concrete. Appropriate sized threaded rod and specified epoxy can also be substituted.

### For additional information regarding this product, please contact:

Barrier Systems Sales and Service  
Customer Service Department  
180 River Road  
Rio Vista, CA 94571

U.S. Toll Free (888) 800-3691  
Phone: (707) 374-6800  
Fax: (707) 374-6801

**APPENDIX B**

**Anchoring Foundation and Barrier Cutout**

Placement and installation of the ArmorGuard Gate system must be accomplished in accordance with the guidelines and recommendations set forth in the "AASHTO Roadside Design Guide," FHWA memoranda and other state and local standards.

Foundation Detail,  
Transition to New Jersey Shaped P.C.B.  
Drawing # B011025 ..... **Page 17**

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Fax: (707) 374-6801



**NOTES:**

1. 6 IN [150 MM] MIN. REINFORCED 4000 PSI [28 MPa] P.C. CONCRETE PAD OR 8 IN [200 MM] MIN. NON-REINFORCED 4000 PSI [28 MPa] P.C. CONCRETE ROADWAY.
2. 4000 PSI [28 MPa] STONE AGGREGATE CONCRETE 145 LBS/CU.FT [2324 KG/CU.M].
3. TO COVER ENTIRE RANGE OF ANTICIPATED GATE TRAVEL: 4 IN [100 MM] MIN. NON-REINFORCED 4000 PSI [28 MPa] P.C. CONCRETE OR 6 IN [150 MM] ASPHALTIC CONCRETE ABOVE 8 IN [200 MM] D.G.A. BASE.
4. THE CONCRETE REINFORCEMENT SHOWN IS RECOMMENDED TO ENSURE ADEQUATE BARRIER INTEGRITY FOR PROPER IMPACT PERFORMANCE. VARIATIONS MAY BE REVIEWED AND DETERMINATIONS MADE AS TO EQUIVALENCE BY PROJECT ENGINEER.
5. PAD MUST BE DOWELED TO CONCRETE BARRIER FOOTING IF IT IS NOT CONTINUOUS.
6. ANCHORS ARE TO BE CORROSION RESISTANT,  $\frac{3}{4}$  IN [20 MM] DIA. WITH A MINIMUM OF 6 IN [150 MM] EMBEDMENT IN P.C. CONCRETE. ADHESIVE CAPACITY SHOULD MEET A TENSILE STRENGTH OF 2000 PSI [13.8 MPa] AND COMPRESSIVE STRENGTH OF 10000 PSI [68.9 MPa]. ANCHORING COMPOUND SHOULD PROVIDE A PULL OUT STRENGTH OF 20000 LB [9071 KG] IN 4000 PSI CONCRETE [28 MPa].
7. DIMENSION MAY BE ADJUSTED IF FOUNDATION BLOCK IS BIGGER THAN MINIMUM SHOWN.

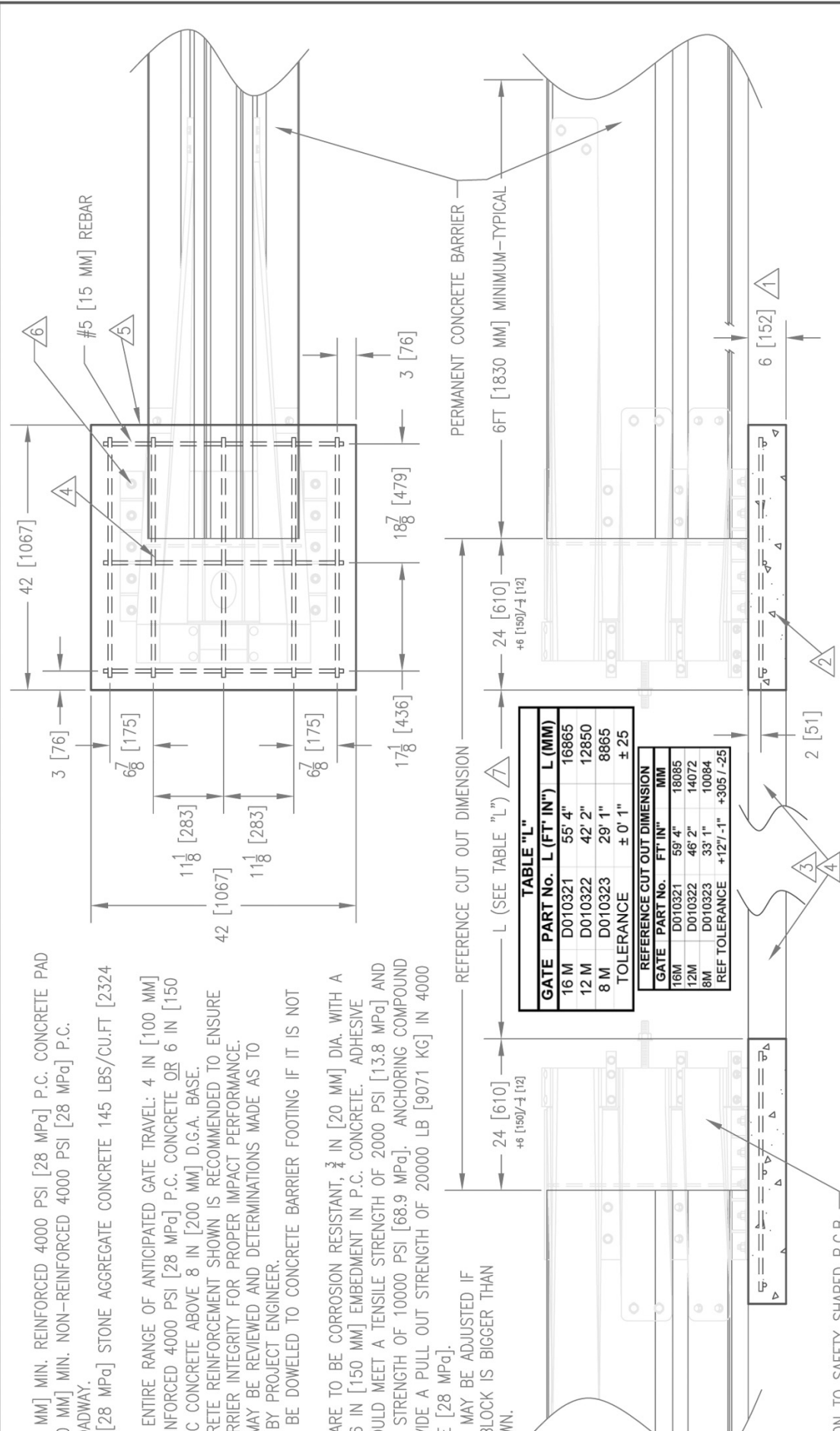


TABLE "L"		
GATE	PART No.	L (FT.' IN') L (MM)
16M	D010321	55' 4" 16865
12M	D010322	42' 2" 12850
8M	D010323	29' 1" 8865
TOLERANCE		± 0' 1" ± 25

REFERENCE CUT OUT DIMENSION		
GATE	PART No.	FT.' IN" MM
16M	D010321	59' 4" 18085
12M	D010322	46' 2" 14072
8M	D010323	33' 1" 10084
REF TOLERANCE		+12' / -1" +305 / -25

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TRANSITION TO SAFETY SHAPED P.C.B.

DIMENSIONS IN INCHES AND [MILLIMETERS] UNLESS OTHERWISE NOTED

SCALE: 1=15	DATE	INIT.	Standard Tolerance
DRAWN BY 10/17/01	10/17/01	JRM	Angular ± 1/2°
APPROV. BY 11/28/01	11/28/01	JSM	Fractional ± 1/16
			Dec .XX± ± .010
			Dec .XX± ± .030

TITLE: SAFEGUARD TRANSITION TO JERSEY BARRIER FOUNDATION DETAIL

REV.	CHANGES	DATE	BY	REQ'D	NEXT ASST.	ITEM
C	SEE ECN 00430	1/13/03	gao	1	D010323	1
B	SEE ECN 00393	9/12/02	gao	1	D010322	1
A	RELEASE PREP.	11/28/01	gao	1	D010321	1

APPENDIX B - Anchoring Foundation SafeGuard Gate Installation Manual

MODEL	DRAWING NUMBER	REV.
	B011025	C

## APPENDIX C

### System Assembly Drawings

Placement and installation of the ArmorGuard Gate system must be accomplished in accordance with the guidelines and recommendations set forth in the "AASHTO Roadside Design Guide," FHWA memoranda and other state and local standards.

16-Meter Manual Assembly Drawing # D010321 .....	Page 19
12-Meter Manual Assembly Drawing # D010322 .....	Page 20
8-Meter Manual Assembly Drawing # D010323 .....	Page 21
16-Meter Pneumatic Assembly Drawing # D020703 .....	Page 22
12-Meter Pneumatic Assembly Drawing # D020837 .....	Page 23
8-Meter Pneumatic Assembly Drawing # D020838 .....	Page 24
Hinge Mount Set Drawing # B010342 .....	Page 25
Coupling Set Drawing # B010343 .....	Page 26
Transition to New Jersey Shaped Barrier Assembly Drawing # B010406 .....	Page 27
Assembled Transition .....	Page 28

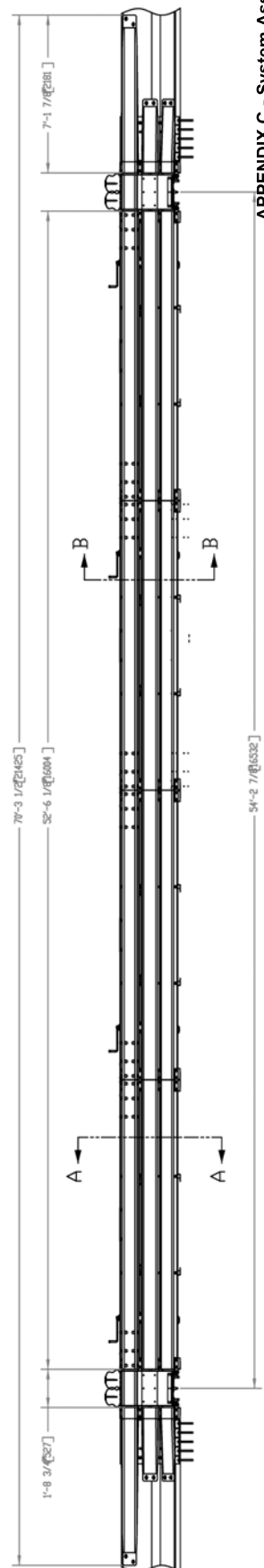
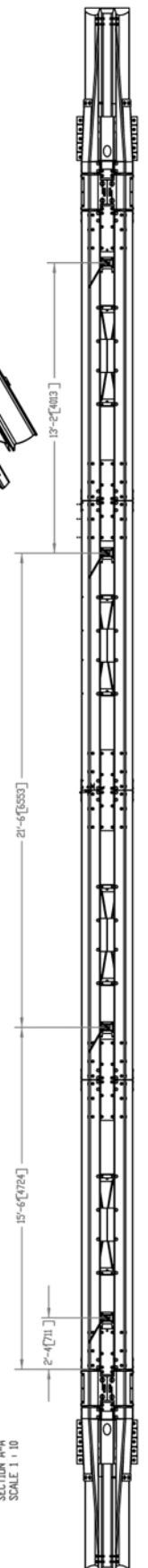
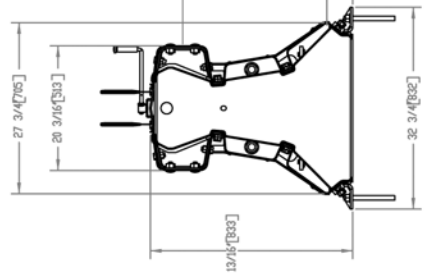
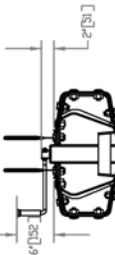
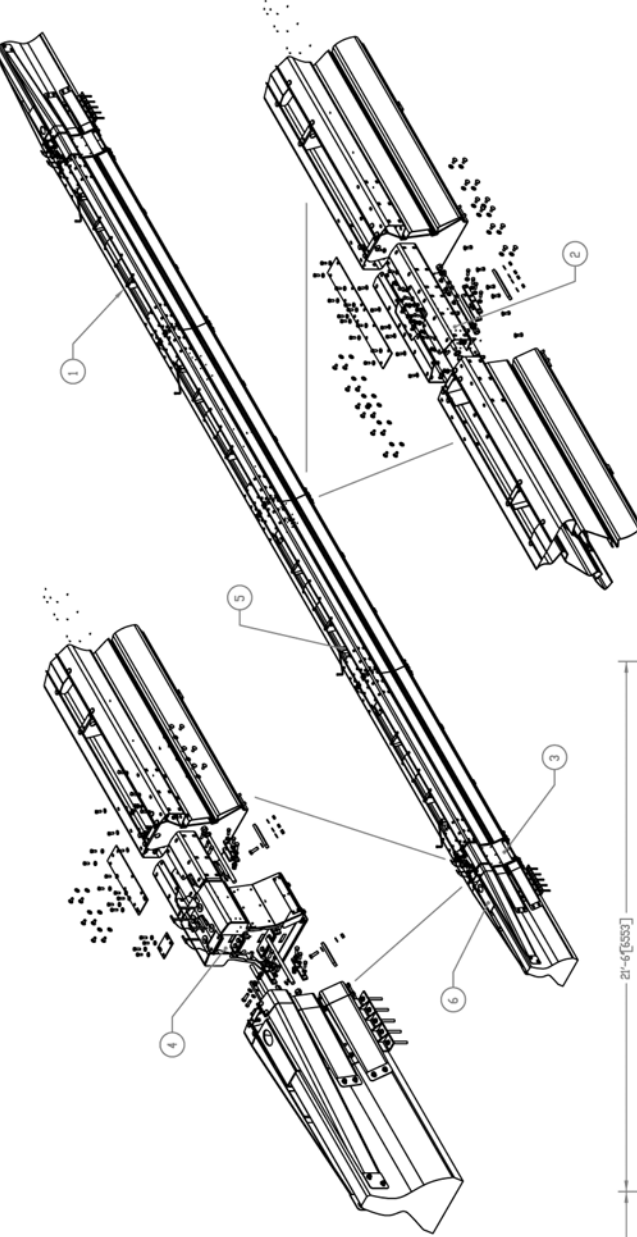
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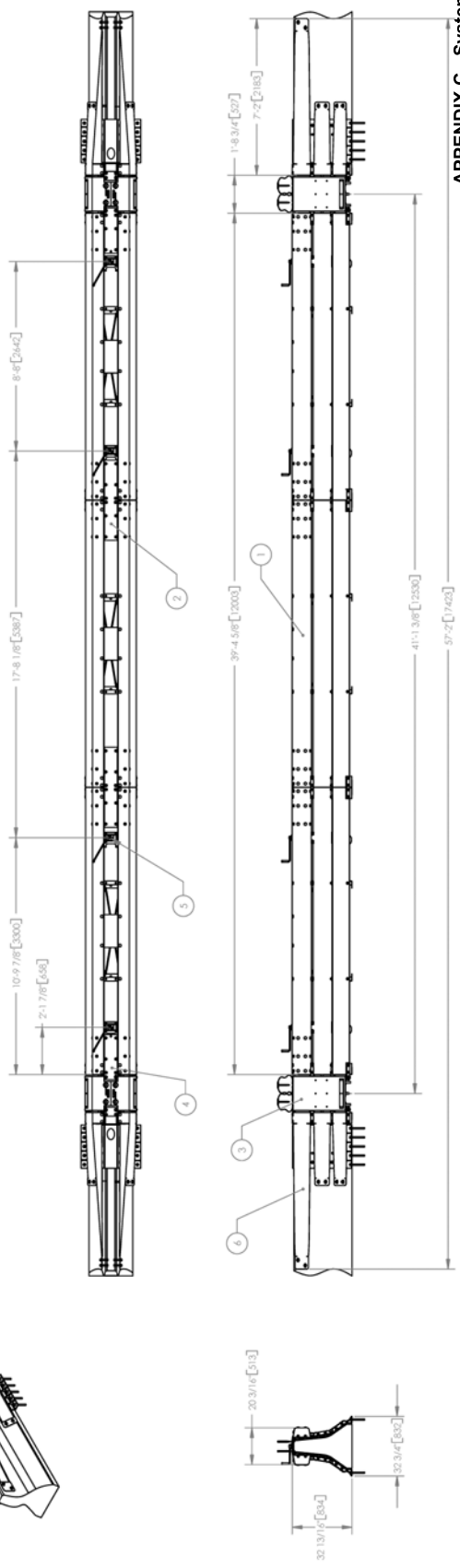
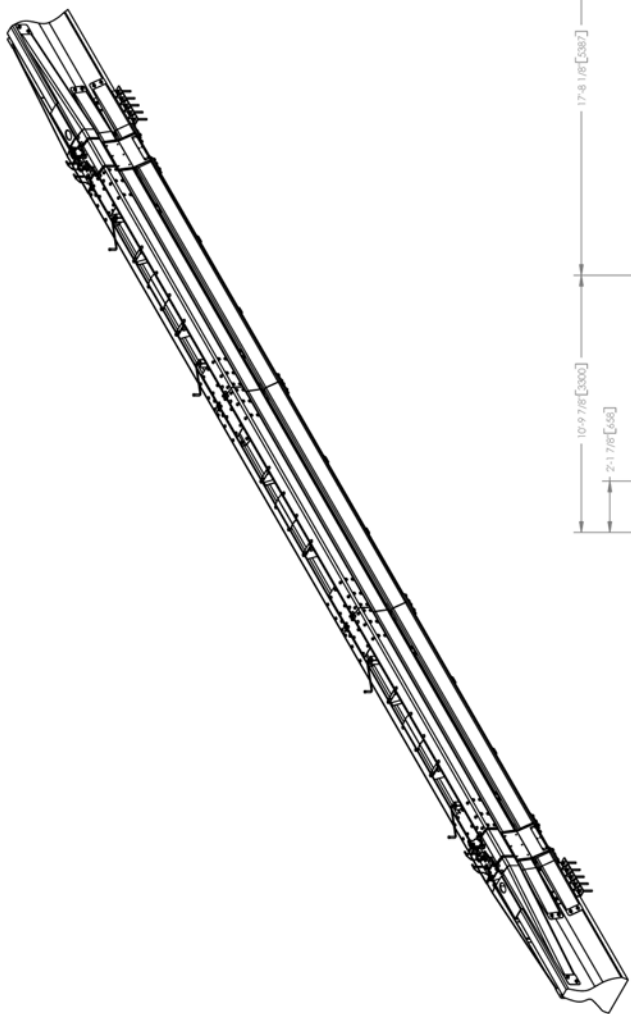
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3	2	HINGE ASSEMBLY	NA	8600000
4	2	MANGAL CASTER WHEEL	NA	8602041
5	2	TRANSITION TO N/PCB	NA	8675066



**APPENDIX C - System Assembly**  
**Safe Guard Gate Installation Manual**

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DATE: 11/10/04	PROJECT: 002085	REV. NUMBER: 10010321
PROJECT: 002085	TITLE: MANUAL, ELECTRICAL TRANSITION TO N/PCB	REV. NUMBER: 10010321
DESIGNER: SEE ECDN 002085	CHECKED: [Signature]	DATE: BY: [Signature]
DATE: 11/10/04	PROJECT: 002085	REV. NUMBER: 10010321

REV	DATE	DESCRIPTION	BY	CHKD
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2		REVISIONS	NA	NA
3		REVISIONS	NA	NA
4		REVISIONS	NA	NA
5		REVISIONS	NA	NA
6		REVISIONS	NA	NA
7		REVISIONS	NA	NA
8		REVISIONS	NA	NA



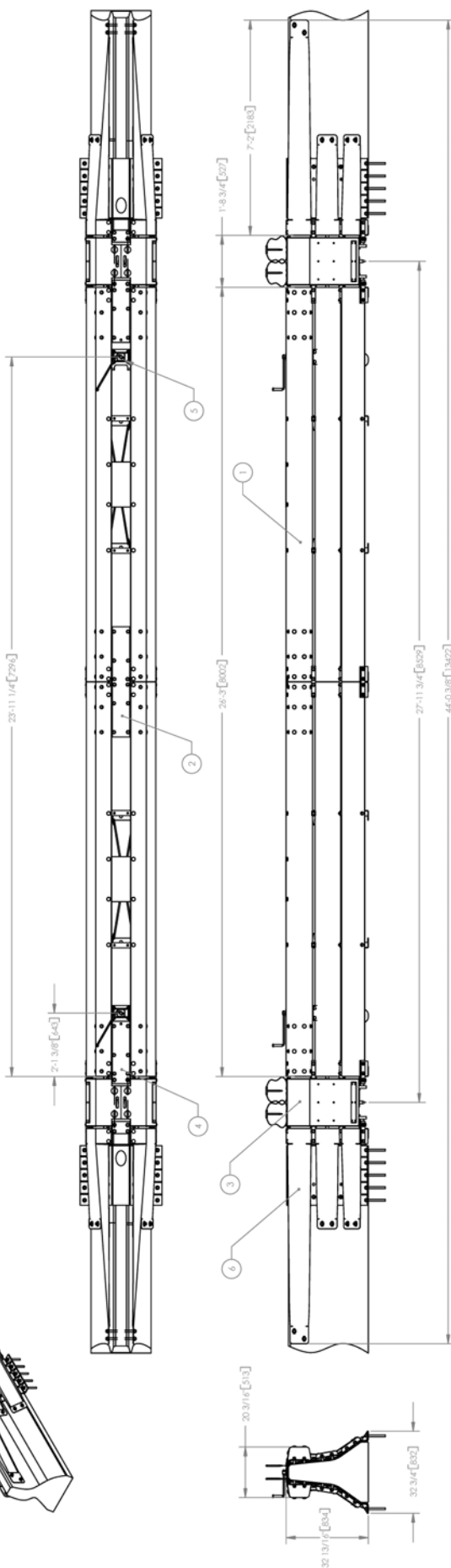
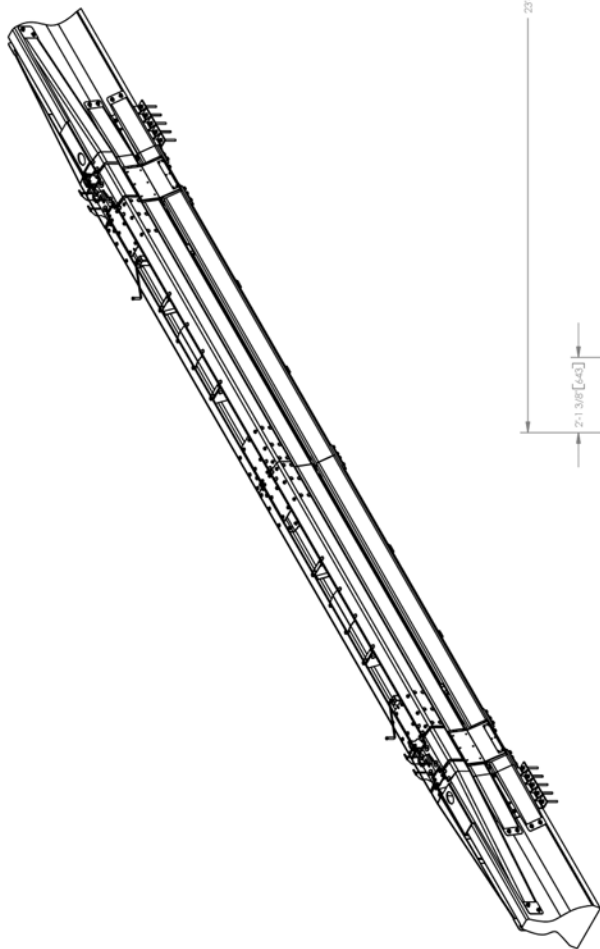
**APPENDIX C - System Assembly**  
**SafeGuard Gate Installation Manual**

SCALE	DATE	BY	CHKD	REV	CHANGES	DATE	BY	CHKD	REV	REVISION NUMBER
										0010322

NOTE: ALL DIMENSIONS ARE TO THE CENTERLINE UNLESS OTHERWISE NOTED.  
 DIMENSIONS IN PARENTHESES ARE FOR INFORMATION ONLY.  
 DIMENSIONS IN BRACKETS ARE FOR INFORMATION ONLY.  
 DIMENSIONS IN SQUARE BRACKETS ARE FOR INFORMATION ONLY.  
 DIMENSIONS IN CIRCLES ARE FOR INFORMATION ONLY.



ITEM	QTY	PART DESCRIPTION	REVISION	DATE
1	1	INTERSECTION ASSEMBLY - IN	0000	
2	1	ROUNDER	0000	
3	1	ROUNDER	0000	
4	1	ROUNDER	0000	
5	1	ROUNDER	0000	
6	1	TRANSITION TO 5/8" SFP	0000	
7	1	TRANSITION TO 5/8" SFP	0000	
8	1	TRANSITION TO 5/8" SFP	0000	



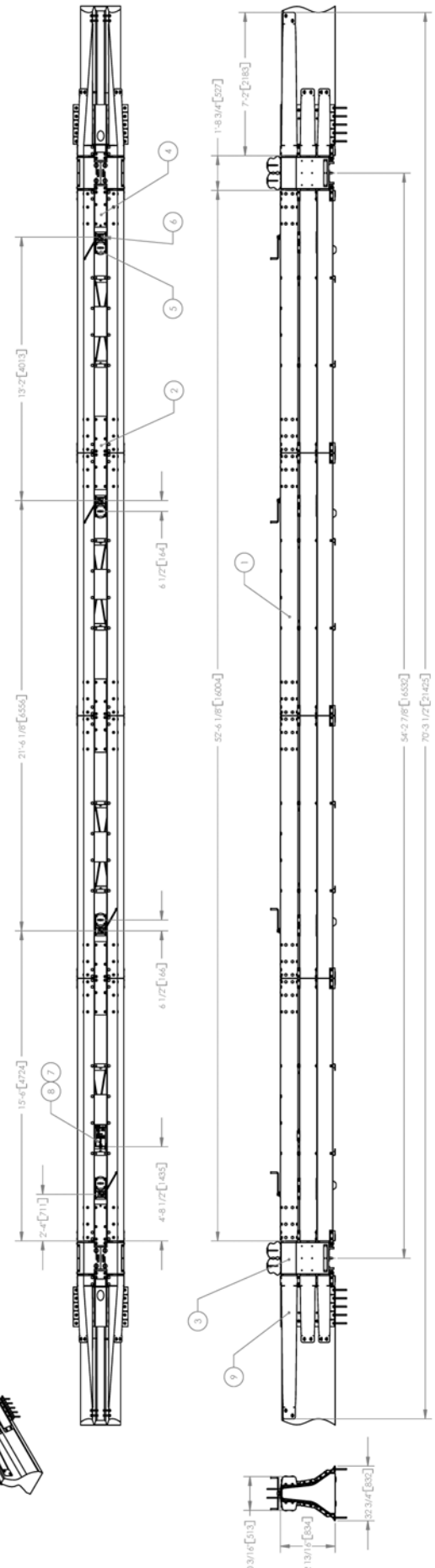
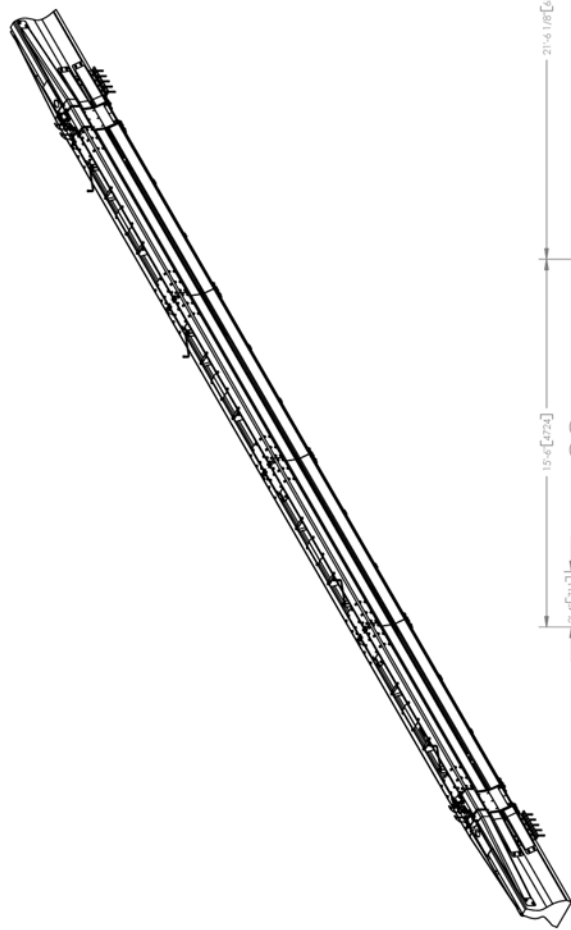
NOTE:  
DIMENSIONS SHOWN IN PARENT  
UNITS ARE TO BE EQUAL  
TO THE NUMBER OF FIGURES  
INDICATED IN PARENT UNITS  
UNLESS OTHERWISE NOTED

DATE	BY	REV	DESCRIPTION
		A	SEE ECHN 000385
			CHANGES
			DATE
			BY
			DESCRIPTION

TITLE	SCALE	DRAWING NUMBER	MODEL
SAFE GUARD GATE INSTALLATION	1:30	0010020	0010020
DATE	BY	REV	DESCRIPTION

## APPENDIX C - System Assembly SafeGuard Gate Installation Manual

ITEM NO.	PART #	DESCRIPTION	SPECIFICATION	PART #
1	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
2	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
3	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
4	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
5	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
6	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
7	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
8	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
9	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
10	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
11	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
12	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
13	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
14	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
15	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
16	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
17	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
18	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
19	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000
20	1000000000	SAFEGUARD GATE ASSEMBLY	SAFEGUARD GATE ASSEMBLY	1000000000

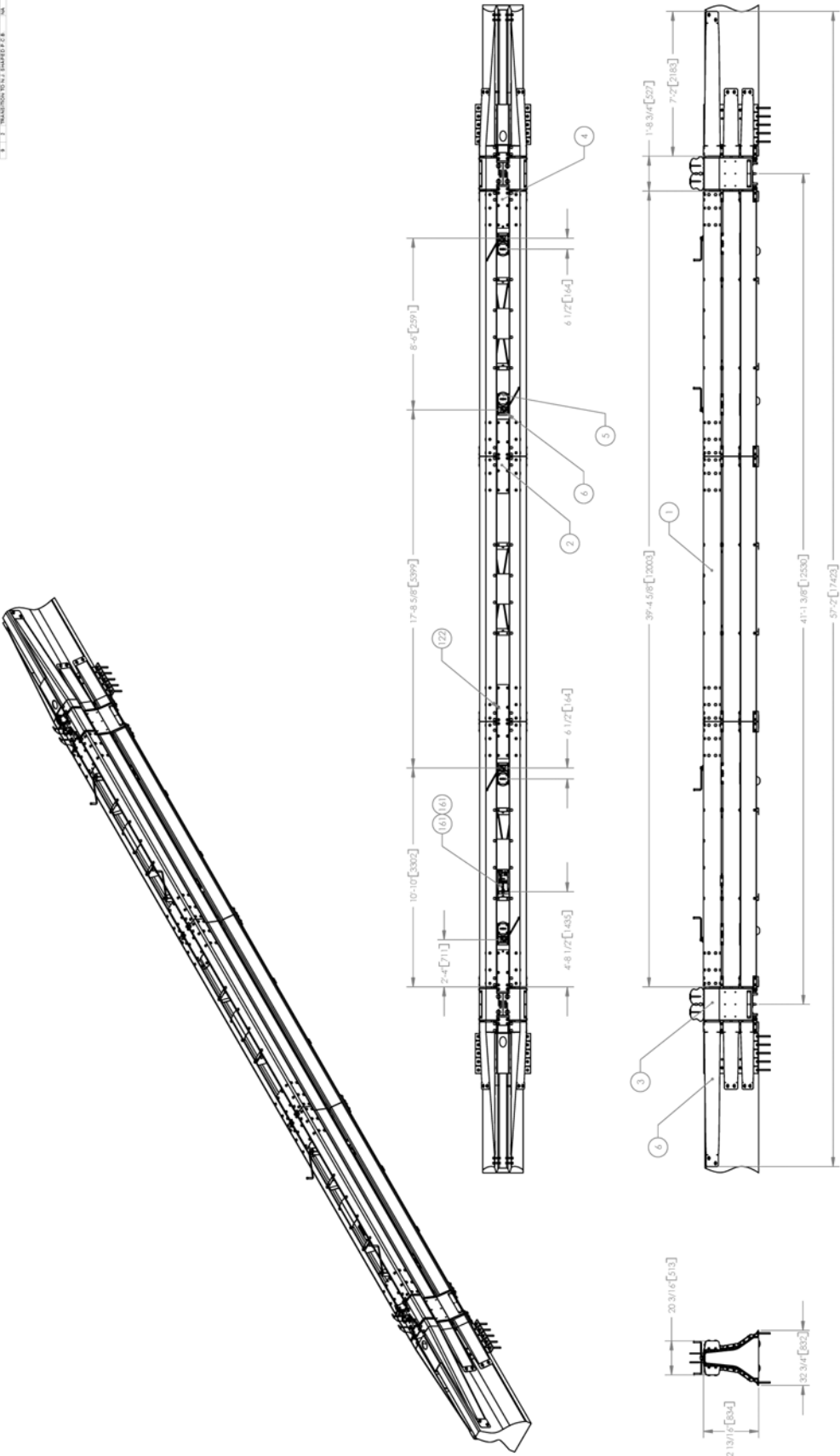


SCALE: 1/8" = 1'-0"	DATE: 01/11/11	DESIGNED BY: J. J. [REDACTED]	CHECKED BY: J. J. [REDACTED]	APPROVED BY: J. J. [REDACTED]
TITLE: SAFEGUARD GATE ASSEMBLY	MODEL: DRAWING NUMBER: 0000703	REV: 1	REV: 2	REV: 3
NOTES:	1. THIS DRAWING IS THE PROPERTY OF SAFEGUARD SYSTEMS, INC. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN. IT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF SAFEGUARD SYSTEMS, INC.			

**APPENDIX C - System Assembly**  
**Safeguard Gate Installation Manual**



ITEM NO.	PART DESCRIPTION	SPECIFICATION	PART #
1	SAFE GUARD SYSTEM	30	801000
2	SAFE GUARD SYSTEM	30	801000
3	SAFE GUARD SYSTEM	30	801000
4	SAFE GUARD SYSTEM	30	801000
5	SAFE GUARD SYSTEM	30	801000
6	SAFE GUARD SYSTEM	30	801000
7	SAFE GUARD SYSTEM	30	801000
8	SAFE GUARD SYSTEM	30	801000
9	SAFE GUARD SYSTEM	30	801000
10	SAFE GUARD SYSTEM	30	801000
11	SAFE GUARD SYSTEM	30	801000
12	SAFE GUARD SYSTEM	30	801000
13	SAFE GUARD SYSTEM	30	801000
14	SAFE GUARD SYSTEM	30	801000
15	SAFE GUARD SYSTEM	30	801000
16	SAFE GUARD SYSTEM	30	801000
17	SAFE GUARD SYSTEM	30	801000
18	SAFE GUARD SYSTEM	30	801000
19	SAFE GUARD SYSTEM	30	801000
20	SAFE GUARD SYSTEM	30	801000



**APPENDIX C - System Assembly**  
**SafeGuard Gate Installation Manual**

NOTE: DIMENSIONS OF WELD TO BE EQUAL TO THE DIMENSIONS OF THE PARTS. WELDS TO BE MADE IN ACCORDANCE WITH THE WELDING PROCEDURE SPECIFICATION (WPS) FOR THE WELDED JOINTS. WELDED JOINTS SHALL BE MADE IN ACCORDANCE WITH THE WELDING PROCEDURE SPECIFICATION (WPS) FOR THE WELDED JOINTS.

SCALE: 1/8" = 1'-0"

DATE: 11/11/11

DESIGNED BY: [REDACTED]

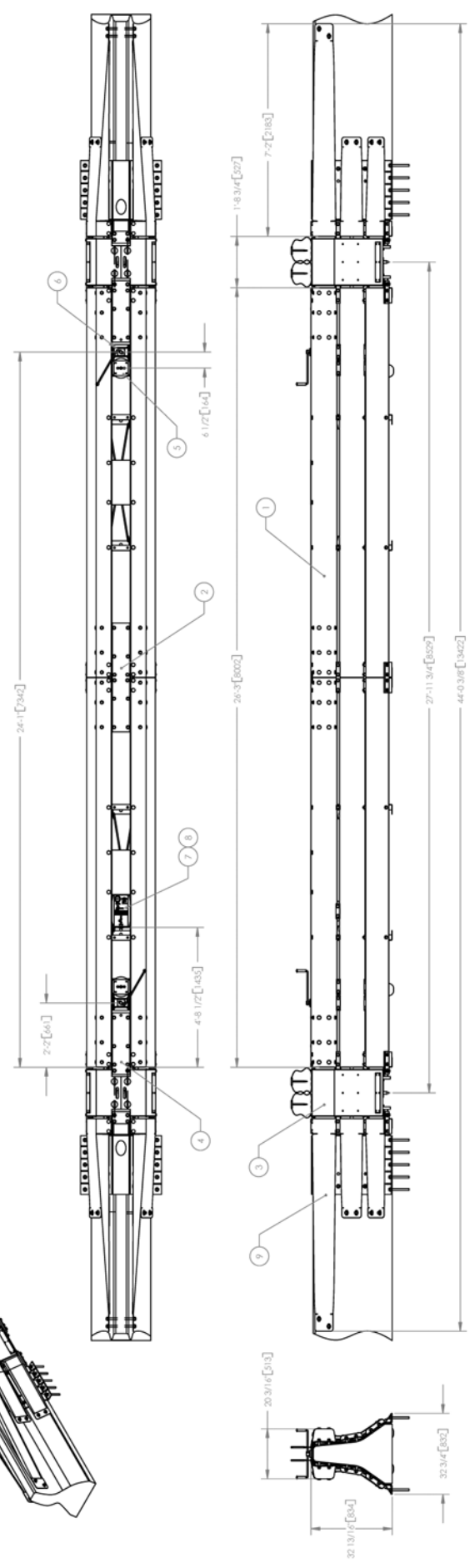
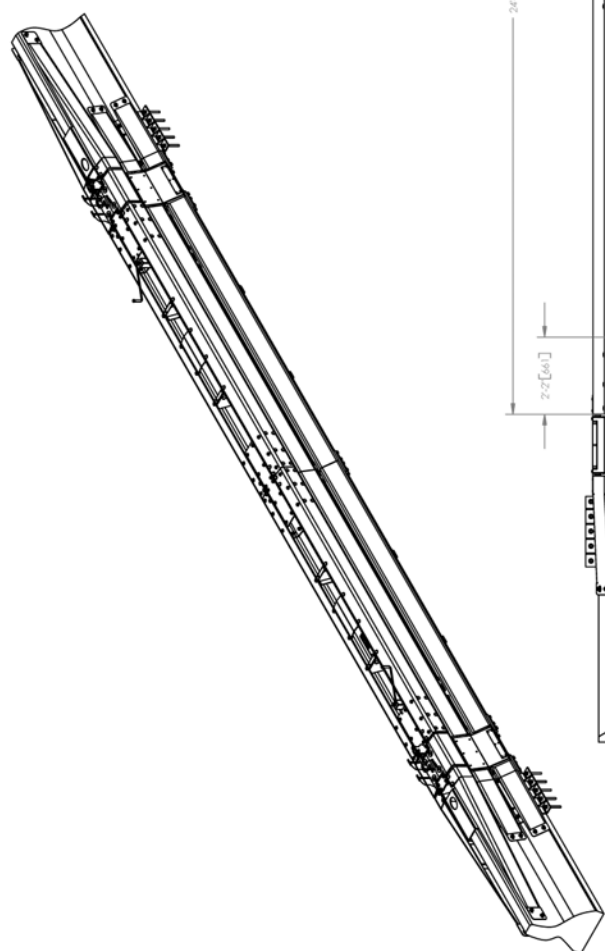
CHECKED BY: [REDACTED]

APPROVED BY: [REDACTED]

PROJECT NO.: [REDACTED]

DRAWING NUMBER: D00837

REV	DATE	DESCRIPTION	DESIGNATION	PART #
1		ISSUED FOR FABRICATION	NA	NA
2		ISSUED FOR ASSEMBLY	NA	NA
3		ISSUED FOR WELDING	NA	NA
4		ISSUED FOR FINISHING	NA	NA
5		ISSUED FOR SHIPMENT	NA	NA
6		ISSUED FOR INSTALLATION	NA	NA
7		ISSUED FOR MAINTENANCE	NA	NA
8		ISSUED FOR REPAIR	NA	NA

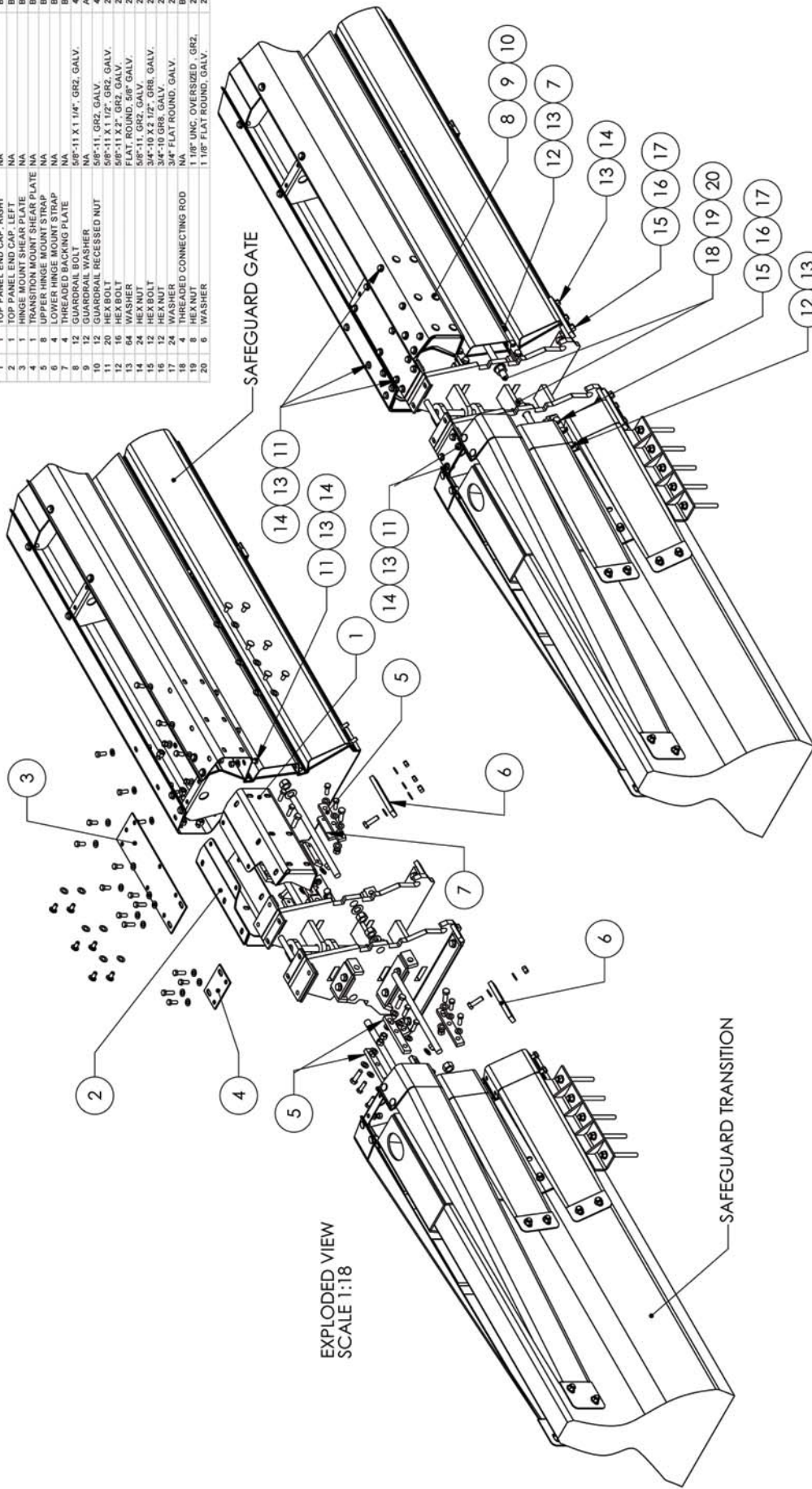


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SCALE	1:32	DATE	10/10/10	REV	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
DESIGNER		DRAWN		MODEL		DRAWING NUMBER		REV																
TITLE	SAFE GUARD GATE ASSEMBLY																							
MODEL	SAFE GUARD GATE ASSEMBLY																							
DRAWING NUMBER	D000000																							
REV																								

**APPENDIX C - System Assembly**  
SafeGuard Gate Installation Manual

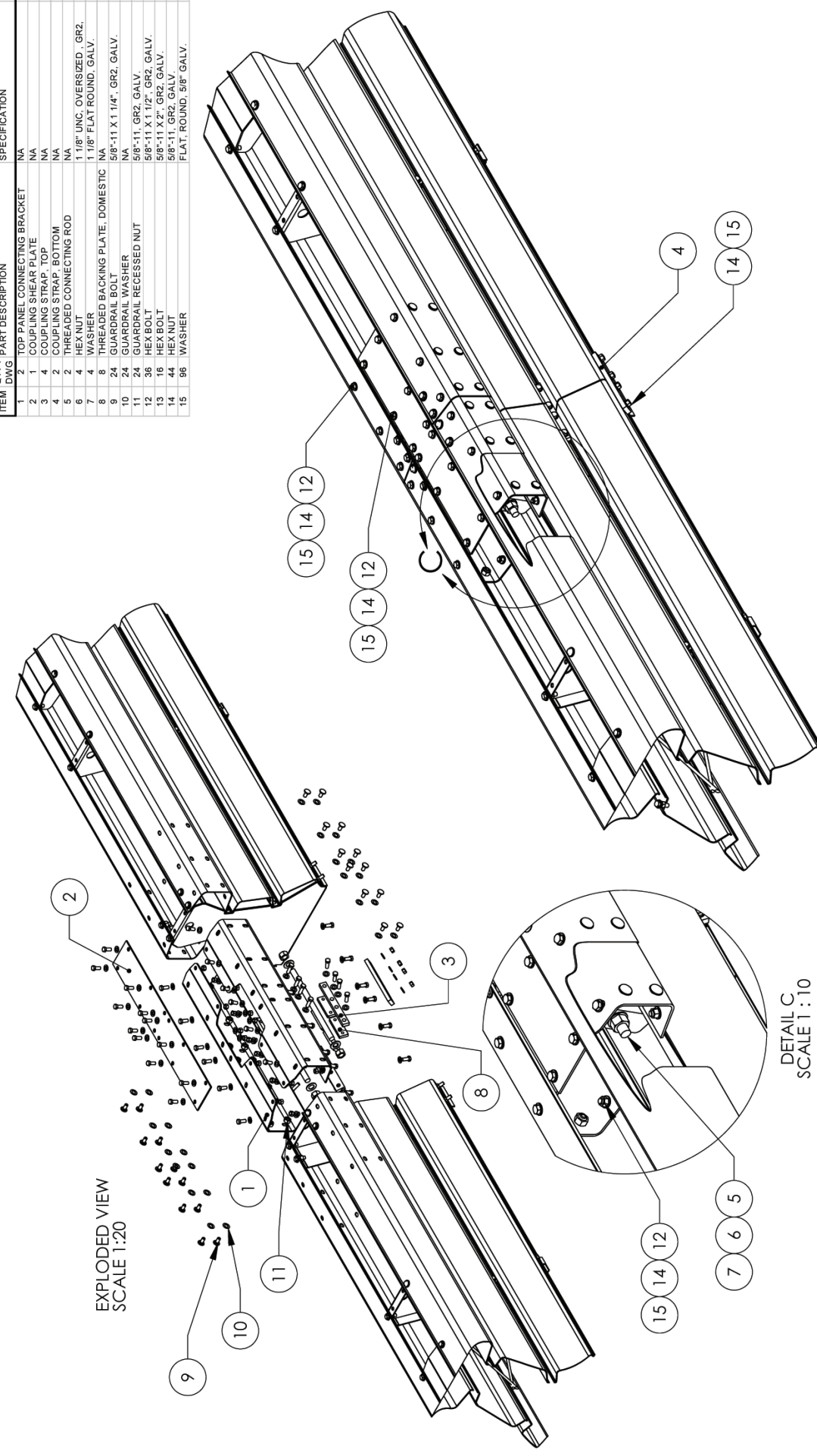


ITEM	QTY	PART DESCRIPTION	SPECIFICATION	DWG #
1	1	TOP PANEL END CAP - RIGHT	NA	B020510
2	1	TOP PANEL END CAP - LEFT	NA	B020511
3	1	HINGE MOUNT SHEAR PLATE	NA	B020513
4	1	TRANSITION MOUNT SHEAR PLATE	NA	B011229
5	8	UPPER HINGE MOUNT STRAP	NA	B020514
6	4	LOWER HINGE MOUNT STRAP	NA	B020515
7	4	TRANSITION MOUNT STRAP	NA	B020516
8	12	GUARDRAIL BOLT	5/8"-11 X 1 1/4", GR2, GALV.	4001115
9	12	GUARDRAIL WASHER	5/8"-11, GR2, GALV.	A020718
10	12	GUARDRAIL RECESSED NUT	5/8"-11, GR2, GALV.	4001116
11	20	HEX BOLT	5/8"-11 X 1 1/2", GR2, GALV.	2001406
12	20	HEX NUT	5/8", GR2, GALV.	2001407
13	15	WASHER	1 1/8" X 1 1/2", GR2, GALV.	2001408
14	24	HEX NUT	5/8"-11, GR2, GALV.	2001409
15	12	HEX BOLT	3/4"-10 X 2 1/2", GR8, GALV.	2001398
16	12	HEX NUT	3/4"-10 GR8, GALV.	2001399
17	24	WASHER D CONNECTING ROD	3/4" FLAT ROUND, GALV.	2001380
18	8	HEX NUT	1 1/8" UNC, OVERSIZED, GR2.	2001404
19	8	HEX BOLT	1 1/8" FLAT ROUND, GALV.	2001405
20	6	WASHER	1 1/8" FLAT ROUND, GALV.	2001405



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B SEE ECN 00394 A SEE ECN 00385	07/13/02 GAD 07/29/02 GAD	07/29/02 GAD 07/29/02 GAD	TITLE: HINGE MOUNT SET, SAFEGUARD GATE, DOMESTIC	MODEL: DRAWING NUMBER B010342	REV B
DATE BY REV 07/29/02 GAD 2 07/29/02 GAD 4	DATE BY REV 07/29/02 GAD 2 07/29/02 GAD 4	DATE BY REV 07/29/02 GAD 2 07/29/02 GAD 4	TITLE: HINGE MOUNT SET, SAFEGUARD GATE, DOMESTIC	MODEL: DRAWING NUMBER B010342	REV B

ITEM	QTY./DWG	PART DESCRIPTION	SPECIFICATION	DWG #
1	2	TOP PANEL CONNECTING BRACKET	NA	B020509
2	1	COUPLING SHEAR PLATE	NA	B020512
3	4	COUPLING STRAP, TOP	NA	B020701
4	2	COUPLING STRAP, BOTTOM	NA	B020702
5	2	THREADED CONNECTING ROD	NA	B020226
6	4	HEX NUT	1 1/8" UNC. OVERSIZED, GR2,	2001404
7	4	WASHER	1 1/8" FLAT ROUND, GALV.	2001405
8	8	THREADED BACKING PLATE, DOMESTIC	NA	B020703
9	24	GUARDRAIL BOLT	5/8"-11 X 1 1/4", GR2, GALV.	4001115
10	24	GUARDRAIL WASHER	NA	A020718
11	24	GUARDRAIL RECESSED NUT	5/8"-11, GR2, GALV.	4001116
12	36	HEX BOLT	5/8"-11 X 1 1/2", GR2, GALV.	2001406
13	16	HEX BOLT	5/8"-11 X 2", GR2, GALV.	2001205
14	44	HEX NUT	5/8"-11, GR2, GALV.	2000134
15	96	WASHER	FLAT, ROUND, 5/8" GALV.	2001206



SCALE: 1:15 DATE: 07/23/02 DRAWN BY: GAD APPR'D BY: JSM		Standard Tolerance Angular: +/- 1/2 Deg. Fractional: +/- .116 Dec: .XXX +/- .010 Dec: .XX +/- .030
TITLE: COUPLING SET, SAFEGUARD, DOMESTIC		MODEL: B010343
REV: A	DRAWING NUMBER: B010343	REV: A

SEE ECN 00385 CHANGES	DATE: 07/24/02 BY: GAD	REQD: 3	ITEM: 2
NEXT ASSY.	DATE: 07/24/02 BY: GAD	REQD: 3	ITEM: 2

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**NOTE:**  
 THICKNESS OF WELD TO BE EQUAL TO THE THINNER OF 2 PIECES BEING JOINED. WELD TO BE ALL AROUND UNLESS OTHERWISE SPECIFIED.

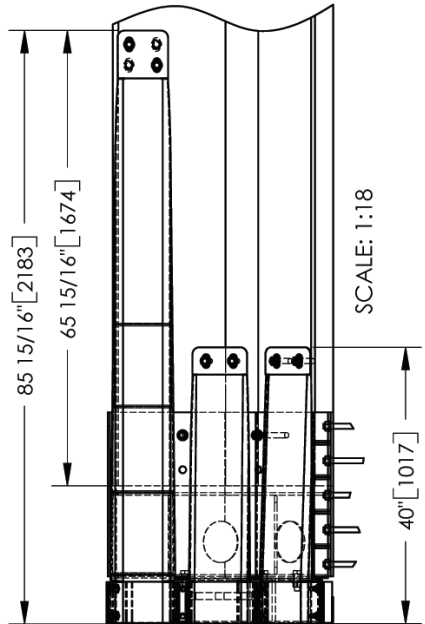
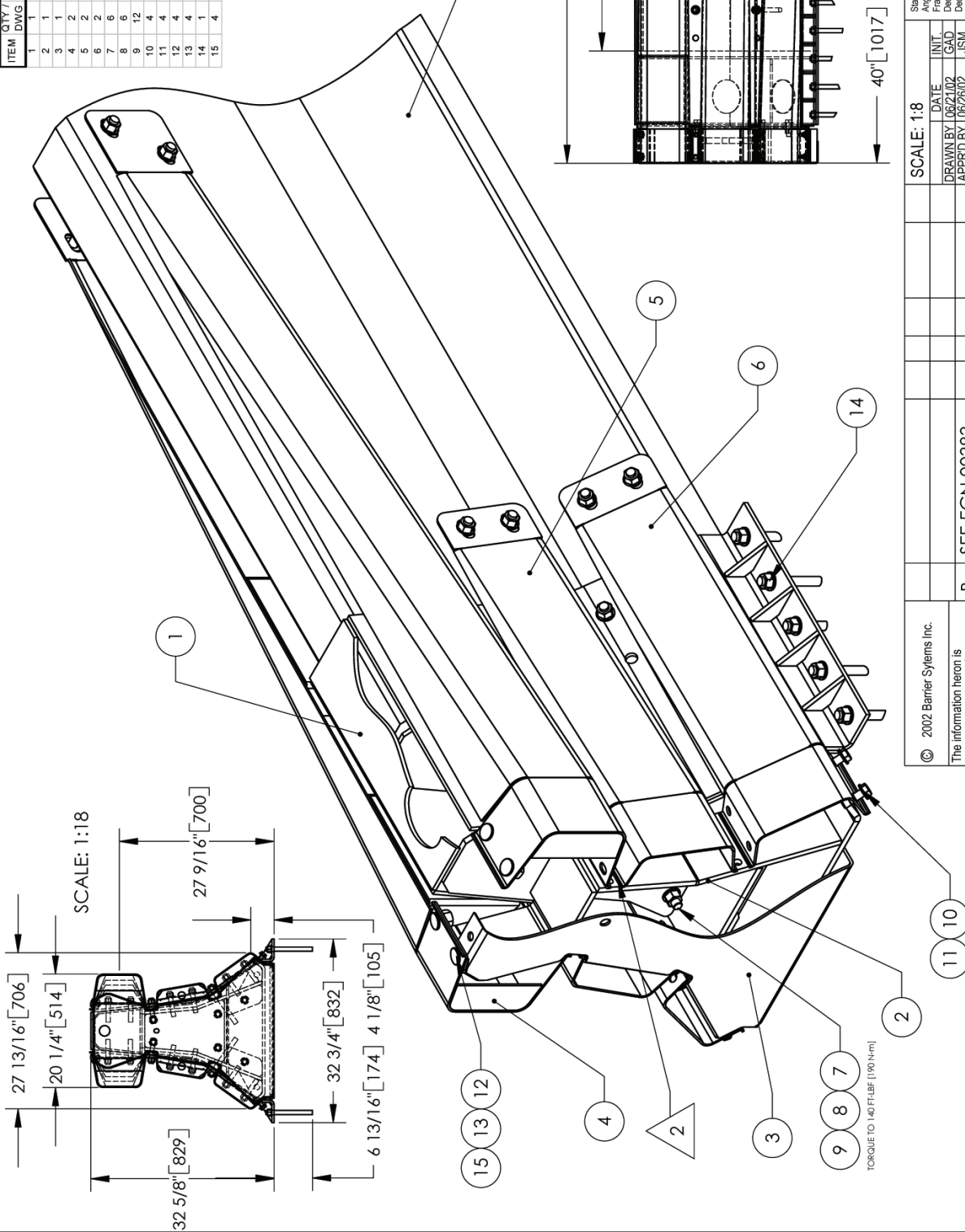
DETAIL C  
 SCALE 1:10



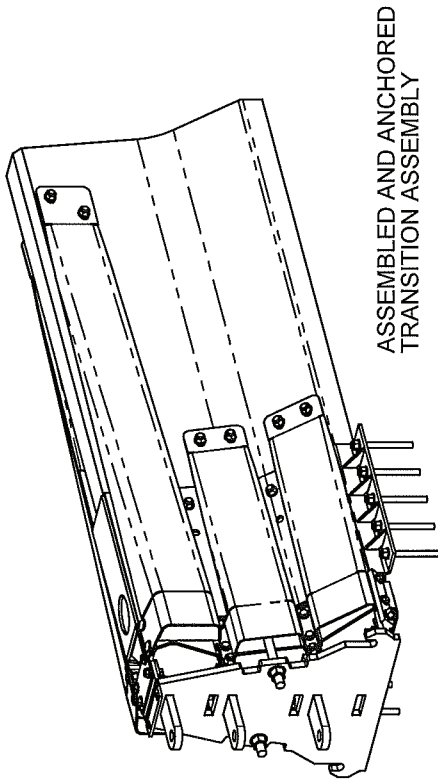
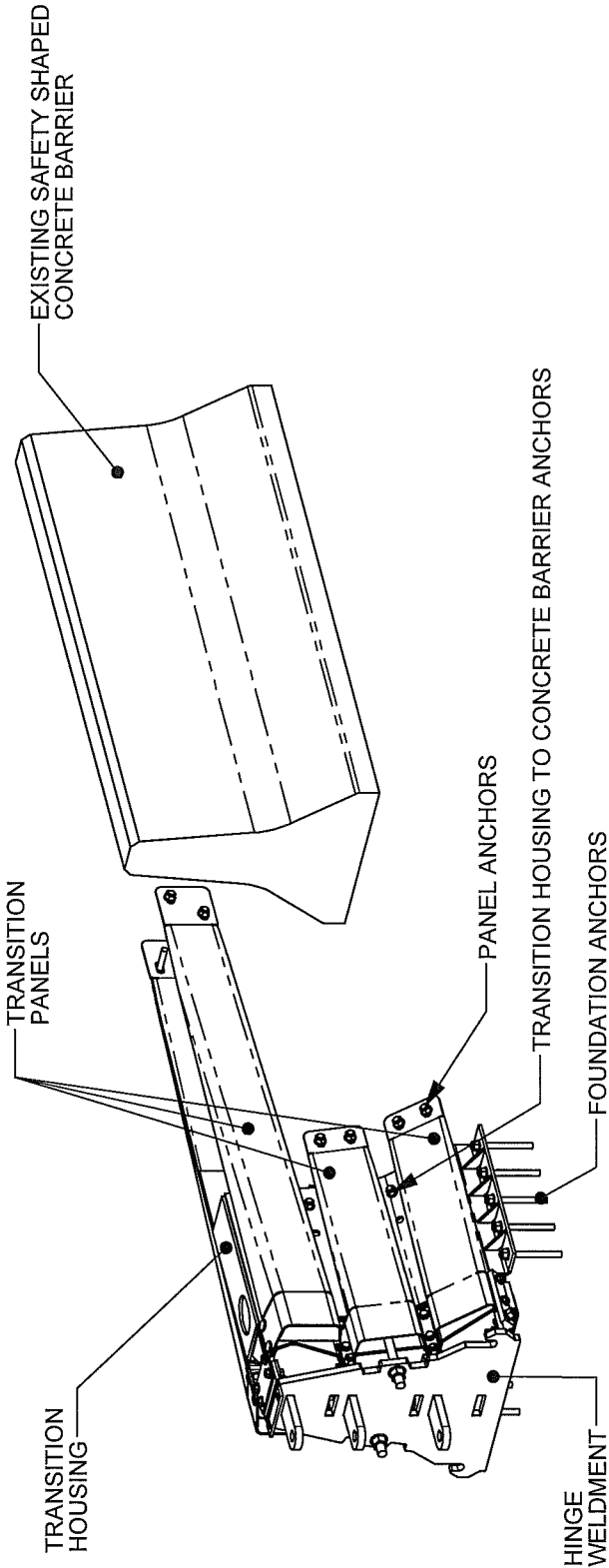
ITEM	QTY / DWG	PART DESCRIPTION	SPECIFICATION	DWG #
1	1	TRANSITION HOUSING	NA	B010539
2	1	ADAPTER MOUNT WELDMENT	NA	B010356
3	1	END SUPPORT	NA	B011228
4	2	TOP TRANSITION PANEL	NA	B020661
5	2	MIDDLE TRANSITION PANEL	NA	B020709
6	2	BOTTOM TRANSITION PANEL	NA	B020706
7	6	HEX BOLT	3/4"-10 HX HD X 2 1/2", GR2	2001388
8	6	HEX NUT	3/4"-10, GR2, GALV	2001389
9	12	FLAT WASHER	3/4" FLAT RD, GALV	2001380
10	4	HEX BOLT	5/8"-11 HX HD X 2.0", GR2, GALV	2001205
11	4	FLAT WASHER	5/8" FLAT RD, GALV	2001206
12	4	GUARDRAIL BOLT (RD HEAD)	5/8"-11 RD HD X 1 1/4", GALV	4001115
13	4	RECESSED NUT	5/8"-11, HVT RECESSED, GALV	4001116
14	1	ANCHORING PACKAGE, SG	NA	B020692
15	4	GUARDRAIL WASHER	NA	A020718

NOTES:

- 1.) NEW JERSEY SHAPED CONCRETE BARRIER.
- 2.) USED WITH HINGE MOUNTING KIT, B010342.



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B	SEE ECN 00383	7/19/02	GAD	1	D010321	1	REV.
A	SEE ECN 00379	06/24/02	GAD	1	D010321	1	REV.
TITLE: SAFEGUARD TRANSITION TO NEW JERSEY SHAPED CONCRETE BARRIER						MODEL:	DRAWING NUMBER: B010406
						REV:	B



**ASSEMBLED TRANSITION INSTALLATION PROCEDURE:**

- 1.) SLIDE ASSEMBLY OVER EXISTING SAFETY SHAPED CONCRETE BARRIER. TRANSITION HOUSING MUST OVERLAP BARRIER AT LEAST 6" (150 mm). PLACE BOTH TRANSITION ASSEMBLIES IN PLACE.
- 2.) POSITION GATE ASSEMBLY BETWEEN THE TRANSITIONS PLACED ON CONCRETE BARRIERS.
- 3.) ALIGN THE HINGES ON THE GATE WITH THE TRANSITIONS AND CENTER THE MASTER PIN IN THE SLOTS ON THE HINGE WELDMENTS. THE TRANSITIONS ARE ADJUSTED BY SLIDING THEM LONGITUDINALLY ON THE CONCRETE BARRIER. MAKE SURE THE PINS ALIGN VERTICALLY ALSO.
- 4.) ANCHOR ALL OF THE TRANSITION'S PANELS AS SHOWN WITH THE ANCHORING PACKAGE PROVIDED. ANCHOR THE TRANSITION HOUSING TO THE FOUNDATION AND TO THE CONCRETE BARRIER. ONLY TWO ANCHORS ARE NECESSARY FOR ANCHORING THE TRANSITION HOUSING TO THE CONCRETE BARRIER PER SIDE.
- 5.) THE HINGE ATTACHMENT HARDWARE PROVIDE ADDITIONAL ADJUSTMENTS AFTER THE TRANSITION IS ANCHORED IF NECESSARY.

SCALE: 1:25

Standard Tolerance	±	1/2°
Angular	±	1/16"
Fractional	±	.010
Dec. XXX-	±	.030
Dec. XX=	±	

DATE	INIT.
3/19/07	GAD
DRAWN BY	APPR'D BY

TITLE :

TRANSITION INSTALLATION INSTRUCTIONS,  
ASSEMBLED TRANSITION, SG-GATE

**BARRIER SYSTEMS INC**

180 RIVER RD, RIO VISTA, CA 94571  
TEL: 707-374-6800 FAX: 707-374-6801

SHEET	DRAWING NUMBER	REV.
1 OF 1	INSTALLATION DOC	

REV.	CHANGES	DATE	BY	REQ'D	NEXT ASSY.	ITEM

## APPENDIX D

### Maintenance

#### Periodic Maintenance

The ArmorGuard Gate System has been designed to minimize the need for periodic maintenance. The only periodic maintenance items that need to be addressed are as follows:

- Apply grease (Chevron EP NLGI 2 grease or equivalent) to the zerk fittings on the caster wheels at least annually.
- If the system is supplied with an onboard air tank, the air pressure should be checked at least monthly to ensure that adequate pressure is available to operate the system.

#### General Inspection and Maintenance

##### Drive-by Inspection

Drive-by type inspections should be performed at least monthly. The purpose of the drive-by inspection is to observe for the following characteristics:

- Any evidence of vehicle impacts.
- Structural damage.
- Loose or out of place components.
- Excessive debris build-up that would not allow the system to be operated.

If any of these conditions are observed, a walk-up inspection is required.

##### Walk-up Inspections

Walk-up inspections should be conducted at least annually and whenever deemed appropriate from a drive-by inspection. A walk-up inspection should consist of the following items:

- Structural components – 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. The hinge pins should be in position and free to move and the hinge covers properly fitted and connected. Any components observed to be non-conforming to the manufacturer's drawings should be replaced or repaired.
- Operating systems – Raise, hold, and lower the system in accordance with the operating instructions and ensure that the hinge covers, hinge pins, valves, pneumatic system, casters and other functional components operate in the proper manner. Any components observed to be deficient should be repaired or replaced in accordance with the manufacturer's instructions.
- General cleaning – The area around and within the internal and external operating area should be kept free of debris that could affect either the impact performance or restrict the ability to open or close the system when needed.

#### **For additional information regarding this product, please contact:**

Barrier Systems Sales and Service  
Customer Service Department  
180 River Road  
Rio Vista, CA 94571

U.S. Toll Free (888) 800-3691  
Phone: (707) 374-6800  
Fax: (707) 374-6801