

# INFORMATION HANDOUT

## FOR

### **1. Quickchange Moveable Barrier and Crash Cushion Absorb 350**

### **2. Alternative Crash Cushion System (Test Level 3):**

- A. Crash Cushion (Type CAT)
- B. Crash Cushion System (Type BRAKEMASTER 350)
- C. Crash Cushion System (Type X-Tension Median Attenuator)

**1. Quickchange Moveable Barrier and Crash Cushion  
Absorb 350**

### **Quickchange Moveable Barrier**

The QMB system is designed to create a positive traffic barrier between opposing lanes of traffic and between motorists and construction work areas. The Barrier Transfer Machine (BTM) laterally transfers the barrier wall, one lane or more, at speeds of up to 7 mph (11 km/h). This allows the roadway to be reconfigured to maximize the number of traffic lanes in the peak traffic direction and to make the road system operate more efficiently. The Reactive Tension System Quickchange® Moveable Barrier (RTS-QMB) is used in both permanent and construction applications. RTS-QMB creates managed lanes that cost effectively increase highway capacity and reduce congestion by making more efficient use of new or existing roadways. These applications include high volume highways where additional right-of-way may not be available, where environmental concerns may exist, or where the lack of funding may slow or inhibit support for new construction. Moveable barrier provides a “fast-build” solution for improving highway capacity without having to wait for time consuming study reviews. For construction applications, RTS-QMB is designed to accelerate construction, improve traffic flow and safeguard work crews and motorists by positively separating the work area and traffic. RTS-QMB reduces work zone congestion by enabling more lanes to be open during peak hour traffic. The work zone can be expanded during off peak periods, providing greater access for work crews which speeds construction.

### **Crash Cushion ABSORB 350**

ABSORB 350 is a non-redirective, gating crash cushion that offers maintenance workers and contractors a reliable and easy method to protect the ends of concrete barriers. At two feet wide, it is ideally suited for narrow areas where road and workspace are limited. The ABSORB 350 is easier to restore after an impact than other non-redirective, gating crash cushions.

### **Quotations (for estimating purpose only) :**

	<b>3 Mo.</b>	<b>6 Mo.</b>	<b>1 Year</b>
<b>Construction Barrier Transfer Machine</b>	\$91,000	\$103,000	\$171,000
<b>Construction Quickchange Moveable Barrier</b>	\$35 per foot	\$42 per foot	\$55 per foot

ABSORB-350 Crash Cushion sale cost:	TL-2 \$5,000	TL-3 \$7,400
ABSORB-350 Crash Cushion rental cost:	Contact Statewide Safety 522 Inga Road Nipomo, CA 93444 800-559-7080	

**2. Alternative Crash Cushion System (Test Level 3):**

A. Crash Cushion (Type CAT)

B. Crash Cushion System (Type BRAKEMASTER 350)

C. Crash Cushion System (Type X-Tension Median Attenuator)

## Alternative Crash Cushion System (Test Level 3)

This section of the information handout shows three alternative crash cushions shown in the Non-Standard Special Provision (NSSP) Alternative Crash Cushion (Test Level 3) for this project EA 05-0M750. For more information refer to the Contract Special Provisions, the manufacturers of each crash cushion and the Engineer.

The three alternative crash cushions and their respective manufacturers are:

- (1) CRASH CUSHION (TYPE CAT) - Crash cushion (Type CAT) shall be a CAT-350 Crash Cushion Attenuating Terminal as manufactured by Trinity Industries, Inc., and shall include all the items detailed for crash cushion (Type CAT) shown on the plans. Crash cushion (Type CAT) backup shall consist of items detailed for crash cushion (Type CAT) backup shown on the plans and shall conform to the provisions in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications. Excluding the crash cushion (Type CAT) backup, arrangements have been made to ensure that any successful bidder can obtain the CAT-350 Crash Cushion Attenuating Terminal from the manufacturer, Trinity Industries, Inc., P.O. Box 99, 950 West 400S, Centerville, UT 84014, Telephone 1-800-772-7976.
- (2) CRASH CUSHION SYSTEM (TYPE BRAKEMASTER 350) – Crash cushion system (Type BRAKEMASTER 350) shall include all the items detailed for crash cushion system (Type BRAKEMASTER 350) shown on the plans and on the manufacturer's plans. The successful bidder can obtain from the following distributors the crash cushion system (Type BRAKEMASTER 350) manufactured by Energy Absorption Systems, Inc., 35 East Wacker Drive, Chicago, Illinois 60601, Telephone (312) 467-6750:
  - A. Southern California: Traffic Control Service, Inc., 1818 East Orangethorpe, Fullerton, California 92831, Telephone 800-222-8274, FAX 714-526-9521.
  - B. Northern California: Traffic Control Service, Inc., 8585 Thys Court, Sacramento, California 95828, Telephone 800-884-8274, FAX 916-387-9734.
- (3) CRASH CUSHION SYSTEM (TYPE X-TENSION MEDIAN ATTENUATOR) - Crash cushion system (Type X-Tension Median Attenuator) as manufactured by Barrier Systems Incorporated, 180 River Road, Rio Vista, California 94571, Telephone (888) 800-3691 and shall include all the items detailed for Crash cushion system (Type X-Tension Median Attenuator) shown on the plans and on the manufacturer's plans. The successful bidder can obtain Crash cushion system (Type X-Tension Median Attenuator) from the distributor, Statewide Safety and Signs, 522 Lindon Lane, Nipomo, California 93444, Telephone (805) 929-5070, FAX (805) 929-5786.

**CAT-350™**

Trinity offers the Crash Cushion Attenuating Terminal (CAT™) which is designed to absorb energy during impact.

**CAT-350™**

The Crash Cushion Attenuating Terminal (CAT™) is an energy-absorbing attenuator available for use where blunt ends of rigid barriers and fixed objects are in the median or on the shoulder.

**Features:**

- CAT™ can be used as a longitudinal barrier end treatment and as a crash cushion either in the median or on the shoulder.
- Various post and post/sleeve options are available.
- NCHRP Report 350 Test Level 3 compliant.

**Installation and Repair Advantages:**

- No torque requirements on bolts.
- Requires no concrete pads (can be installed in soil). Foundations and deadmen anchors are not required.
- Material below ground is typically found undamaged after impact, allowing for simple repair and replacement of damaged parts.

**CAT-350™ USAGE**

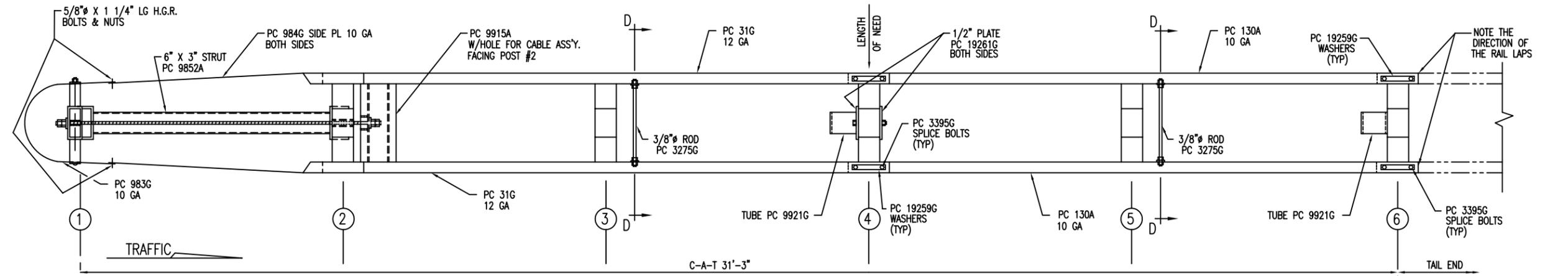
- HIGHWAY
- PERMANENT
- UNIDIRECTIONAL TRAFFIC
- BI-DIRECTIONAL TRAFFIC
- BRIDGES/TUNNELS

**CHOOSE  
ANOTHER  
PRODUCT****CRASH CUSHIONS****TRUCK MOUNTED  
ATTENUATORS****END TERMINALS****POSTS****CABLE BARRIERS****OFFSET BLOCKS****GUARDRAIL****EN 1317  
PRODUCTS****TECHNICAL  
INFORMATION****CAT-350™**

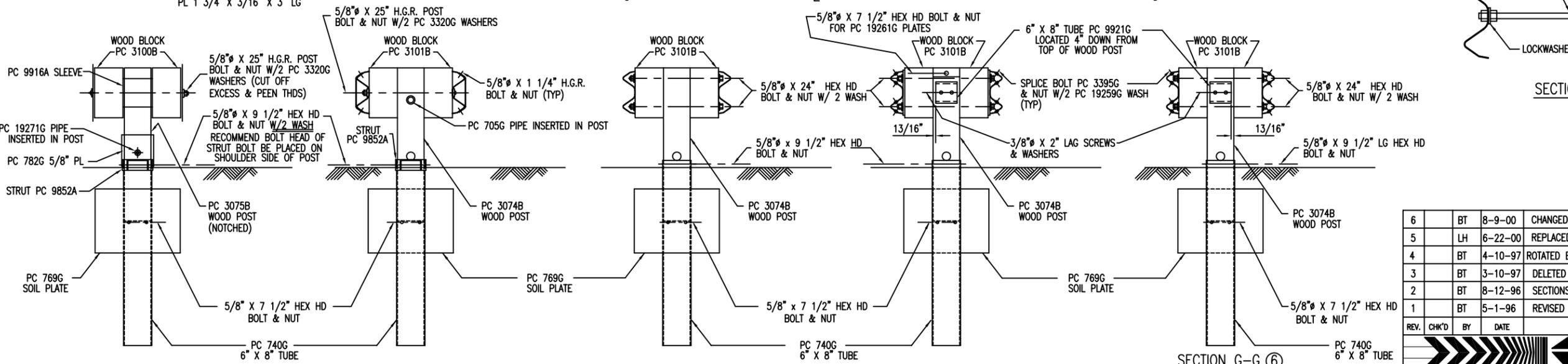
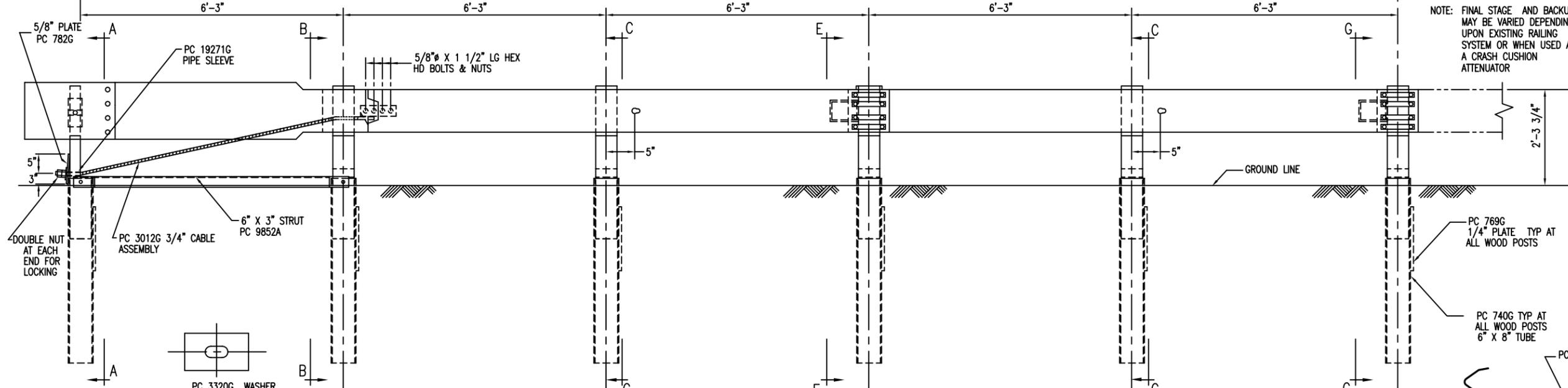
- Installation Instructions
- Specifications
- Drawing

You will need the free Adobe Reader to view information.





C-A-T BILL OF MATERIAL		
PRODUCT CODE	QTY	DESCRIPTION
31G	2	12/12/6/0 CAT (GUARDRAIL)
130A	2	10/12/6/5/10:6/8/SP CAT (GUARDRAIL)
705G	1	2" x 5 1/2" PIPE
740G	6	4"6 TUBE SLEEVE
769G	6	1/4 x 18 x 24 SOIL PLATE
782G	1	5/8" x 8" x 8" BEARING PLATE
983G	1	10/NOSE PLATE/CAT/ROLLED
984G	2	10/SIDE PLATE CAT
3012G	1	CABLE 3/4 x 8/0/DBL SWG
3074B	5	WD 3/6 POST #2, 3, 4, 5, 6 CAT
3075B	1	WD 3/6 POST #1 CAT
3100B	2	WD BLOCK 1/2 #1 CAT
3101B	10	WD BLOCK 1/2 #2-6 CAT
3255G	4	3/8" FLAT WASHER
3263G	4	3/8" x 2" LAG SCREW
3275G	2	3/8" x 24 1/2" RESTRAINT ROD
3300G	20	5/8" FLAT WASHER
3320G	4	3/16" x 1 3/4" x 3" RECT WASHER
3340G	85	5/8" G.R. NUT
3360G	16	5/8" x 1 1/4" G.R. BOLT
3380G	8	5/8" x 1 1/2" HEX BOLT
3395G	32	5/8" x 1 3/4" HEX BOLT CAT
3478G	13	5/8" x 7 1/2" HEX BOLT
3497G	6	5/8" x 9 1/2" HEX BOLT
3650G	2	5/8" x 25" G.R. BOLT
3900G	2	1" FLAT WASHER
3910G	4	1" HEX NUT
4252G	8	3/8" HEX NUT
4258G	4	3/8" LOCK WASHER
4640G	8	5/8" x 24" HEX BOLT
9852A	1	CHANNEL STRUT x 6'-6"
9915A	1	SPACER CHANNEL CAT
9916A	1	10/BENT PLATE SLEEVE
9921G	2	6" SLEEVE 6 x 8
19259G	32	3/16" x 2" x 10" PLATE WASHER
19261G	2	1/2 x 3 x 7 POST PLATE
19271G	1	1" x 2 1/2" PIPE SLEEVE CAT



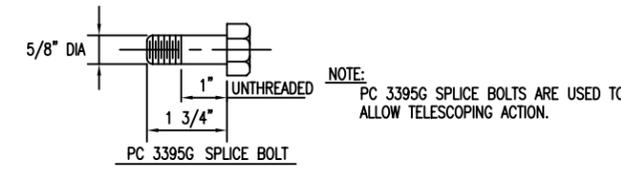
REV.	CHK'D	BY	DATE	REMARKS
6	BT		8-9-00	CHANGED SYSTEM HEIGHT, WAS 2'-3"
5	LH		6-22-00	REPLACED PC 766 WITH PC 769, CHANGED TITLE BLOCK
4	BT		4-10-97	ROTATED BLOCK PC 9921 90° AT POST 4 & 6
3	BT		3-10-97	DELETED PC 3072, 3073, 4470, CHG QTY 3074 & 3478
2	BT		8-12-96	SECTIONS A-A & B-B, CORRECTED PIPE SLEEVE PC No
1	BT		5-1-96	REVISED PC No 31G & 130A

**C-A-T**

CRASH-CUSHION ATTENUATING TERMINAL  
PLAN, ELEVATION & SECTIONS FOR USE  
AS A LONGITUDINAL MEDIAN BARRIER TERMINAL  
OR CRASH CUSHION ATTENUATOR

TRINITY INDUSTRIES, INC.  
HIGHWAY SAFETY PRODUCTS  
2525 STEMMONS FREEWAY, DALLAS, TX 75207

DRAWN	BT
CHECKED	EN
SCALE	N.T.S.
DATE	7-15-94
ENG. FILE #	SS245-01E
SHT.No.	E1 OF 1
DRAWING NO.	SS-245
REV.	6



This drawing and the information shown thereon is the sole property of TRINITY INDUSTRIES, INC. Neither the drawing nor such information is to be used for any purpose other than that for which it was specifically furnished by TRINITY INDUSTRIES, INC., nor is any reproduction authorized without written permission.

# BRAKEMASTER<sup>®</sup> 350 SYSTEM

## THE EASY-TO-INSTALL GUARDRAIL END TREATMENT



### OVERVIEW

The Brakemaster 350 is the quick and easy solution for shielding dangerous guardrail ends at wide median and roadside sites with adequate clear zones. It provides superior bi-directional protection and DOES NOT REQUIRE A CONCRETE ANCHOR OR PAD, making it fast and easy to install. The Brakemaster 350 is available at a VERY COMPETITIVE PRICE. Plus additional cost savings are realized because of reduced installation time.

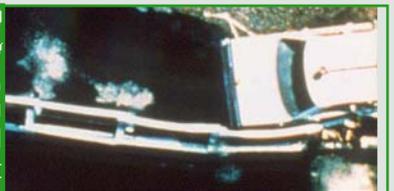
### SATISFIES NCHRP 350, TEST LEVELS 1, 2, & 3

The Brakemaster System successfully meets NCHRP 350, Test Level 3 as a redirective gating end treatment. The system's unique design consists of a framework of w-beam steel guardrail panels which move rearward during head-on impacts. The system also safely redirects vehicles in side impacts. As a gating system, it requires sufficient clear zone behind the system.

### FEATURES AND BENEFITS

- ▶ Meets NCHRP 350, Test Level 3 as a redirective, gating guardrail end treatment.
- ▶ Easy installation requires only two anchor foundation tubes (compared to six tubes for competitive systems).
- ▶ Metal diaphragm posts rest on "slip bases" that set right on the ground — no wood post holes to dig!
- ▶ Absolutely no concrete is required.
- ▶ All replacement components are above ground for fast replacement after impact — no wood posts to remove!

The Brakemaster 350 System successfully meets NCHRP 350, Test Level 3 as a redirective gating end treatment



**ENERGY ABSORPTION  
SYSTEMS, INC.**



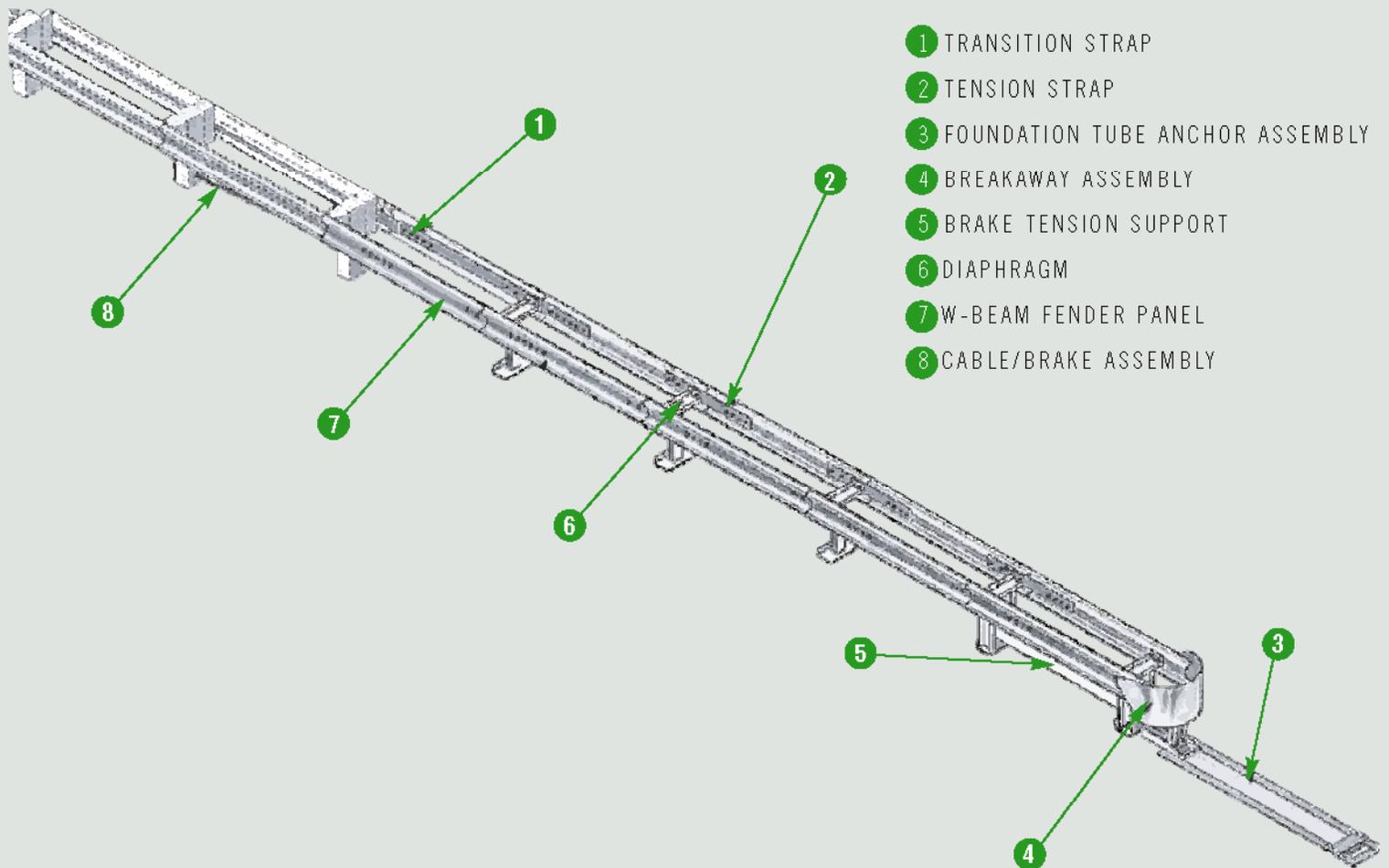
**SAVING LIVES BY DESIGN**

## FHWA GUIDELINES ON GATING

The FHWA recommends that gating end terminals have a minimum clear zone of 22.5 x 6 meters (75 x 20 feet). This area should be clear of trees, poles, drop-offs, oncoming vehicle traffic and other hazards that a vehicle might encounter when it gates behind the terminal after an angle impact at or near the nose of the system, and attempts to recover. It is extremely important to consider clear zone requirements when selecting an end treatment for guardrail applications. Typically an end treatment for median applications requires bi-directional capability utilizing double-faced guardrail. Narrow medians should always be protected with non-gating end treatments.

## SPECIFICATIONS

Length	9601 mm	(31'6")
Height	686 mm	(27")
Width	635 mm	(25")
Weight	920 kg	(2025 lb)

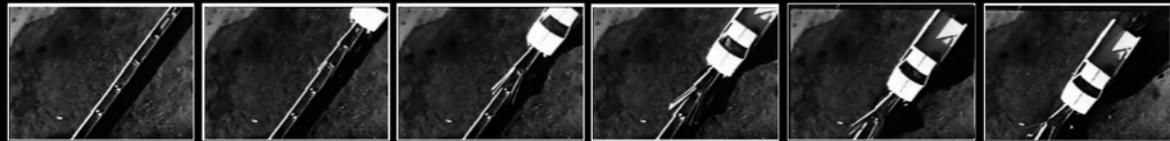


WWW.QUIXTRANS.COM



35 East Wacker Drive • Chicago, IL 60601  
 Tel: (312) 467-6750 • Fax: (312) 467-9625  
 www.energyabsorption.com

## SAVING LIVES BY DESIGN



Distributed By:

General specifications for the Brakemaster 350 System are subject to change without notice to reflect improvements and upgrades. Additional information is available in the Product Manual for this system. Contact Energy Absorption Systems for details.

## X-MAS (X-Tension™ Median Attenuator System)

### NCHRP 350 TL-3 Re-Directive, Bi-Directional, Non-Gating Impact Attenuator

The fully redirective, non-gating, NCHRP 350 TL-3 accepted X-MAS features excellent impact performance and easy installation at an affordable price, with no foundation required. By using standard guardrail parts and superior engineering, this low cost median terminal offers the same life saving performance expected of traditional fully redirective crash cushions without the cost.

#### Features and Benefits

- Affordable, Non-Gating Performance
- Attaches Directly to Double Faced Guardrail
- Uses Standard Guardrail Components
- Easy To Install
- No Foundation Required
- No Backup Required
- No Custom Transitions Required

#### General Specifications

**Hazard Width Range w/o transitions** - 22-28"

[560 - 710 mm]

**TL-3 Length** - 40 ft. [12 m]

**Height** - 32 in. [813 mm]

**BLON** - 4 ft. [1.2 m]



**Quotation provided by:**

**Byron F. West Jr.**

Western States Regional Manager

Office: 541-899-0888

Fax: 541-899-0999

Mobile: 209-483-3049

**Corporate Office Contact Info**



**Barrier Systems**

3333 Vaca Valley Pkwy

Vacaville, CA 95688

Phone: (707) 374-6800

Fax.: (707) 374-6801

Email: [info@barriersystemsinc.com](mailto:info@barriersystemsinc.com)