U.S. Department
of Transportation
Federal Highway Administration

400 Seventh St., S.W.
Washington, D.C. 20590

March 11, 2005

In Reply Refer To: HSA-10/CC-59A

Mr. Barry D. Stephens, P.E.
Senior Vice President Engineering
Energy Absorption Systems, Inc.
3617 Cincinnati Avenue
Rocklin, California 95678

Dear Mr. Stephens:

Your February 21, 2005, letter was recently delivered to Mr. Richard Powers of my staff by Mr. Douglas Bernard. In this letter, you requested formal Federal Highway Administration review and acceptance of a modified version of your Safe Stop TMA that was originally accepted as a test level 3 (TL-3) TMA by our office in April 1999 (reference acceptance letter HMHS-CC59). The original acceptance letter noted that both optional TMA tests (3-52 and 3-53) were run but that the ride-down accelerations in test 3-52 exceeded the 20 G limit recommended in Report 350. You made revisions to the original design and re-ran test 3-52. To support your request for acceptance of the modified Safe Stop design, you enclosed drawings of the modified system, a test report prepared by E-Tech Testing Services documenting the new test, and a crash test video.

The original Safe Stop TMA is a mobile crash attenuator designed for attachment to the back of a moving shadow vehicle and can be tilted upward 90 degrees from horizontal for transport. The modified Safe Stop TMA maintained its original dimensions (3.98 m long x 2.36m wide x .79 m tall), and its principle energy dissipating elements, but several system modifications were made. These included 1) replacing the trigger release bolts incorporated into the frame hinges with lateral release cables that release at the same load level as the original trigger bolts 2) adding lightweight sheet metal cartridge guides to keep the cartridges in alignment during both head-on and off-set impacts 3) adding lightweight corner gussets at strategic corners of the frame to allow outward arm rotation but to restrict inward rotation and 4) adjusting the lengths of the front and back frame arms that make up the bay closest to the truck to provide an improved collapse geometry while maintaining overall bay length. These modifications are shown in the attached drawing (Enclosure 1). You stated that none of these system modifications would negatively affect the successful results previously submitted for tests 3-50,3-51 and 3-53 and, based upon the reduced ridedown acceleration of 19.1Gs in the second 3-52 test, I concur with your assessment. As can be seen in the test summary sheet (Enclosure 2), all occupant risk, vehicle trajectory, and structural adequacy requirements were fully met.

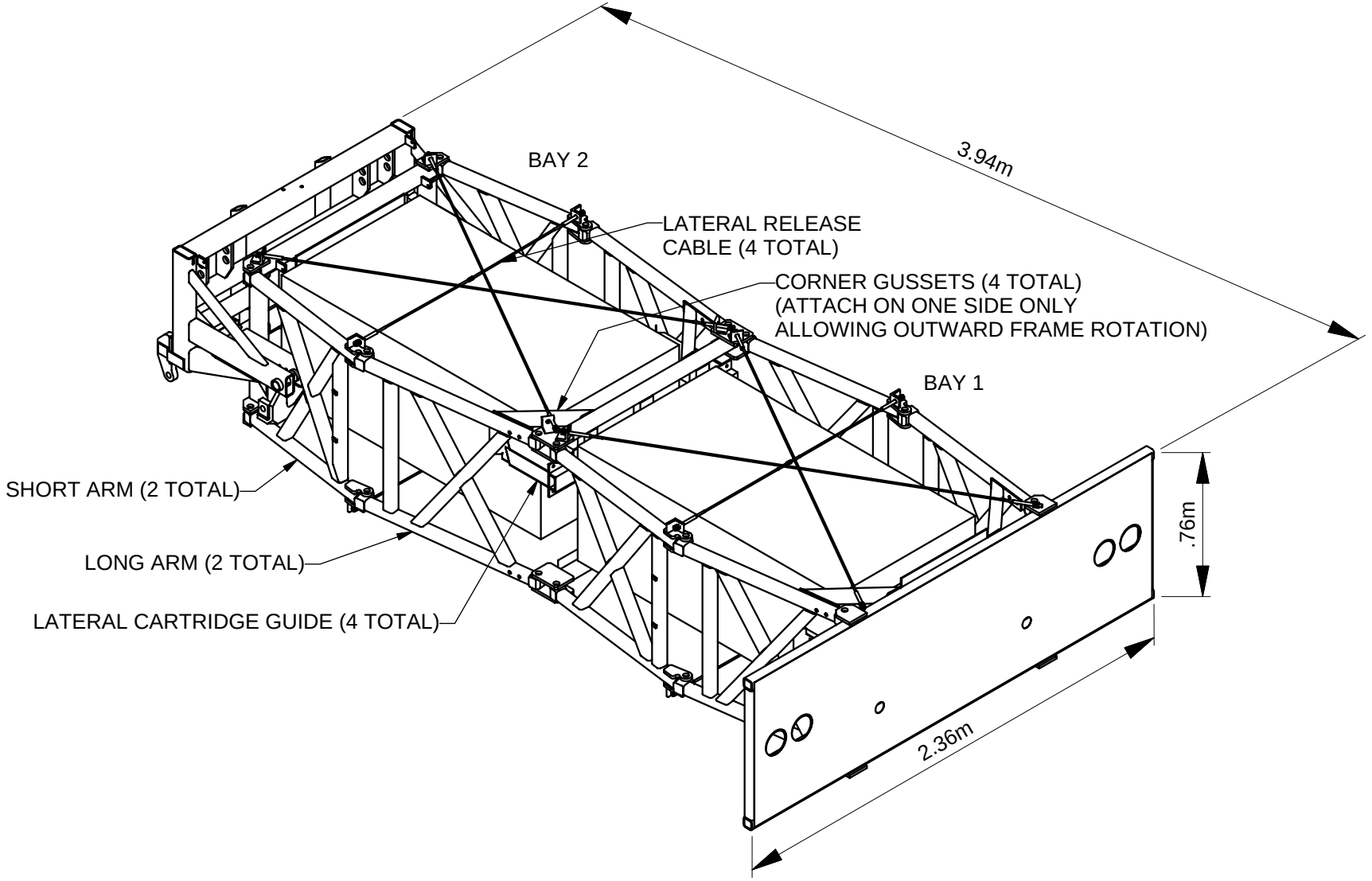
Based upon your submittal, I agree that Energy's original Safe Stop TMA, with the above system modifications, fully meets the TMA evaluation criteria in the National Cooperative Highway Research Program Report 350 for both the standard and optional TMA crash tests for TL-3 impact conditions and may be used on the National Highway System when such use is acceptable to the contracting authority.

Sincerely yours,

/Original Signed by/

John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

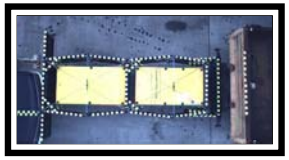
2 Enclosures



NOTE:
1. THIS DRAWING DEPICTS THE ENHANCEMENTS MADE TO THE ORGINAL SAFESTOP TMA TO IMPROVE PERFORMANCE.

DRAWN: acox	DATE: 2/17/2005	ENERGY ABSORPTION SYSTEMS, INC. ENGINEERING AND RESEARCH DEPARTMENT
DESIGNED: acox	DATE:	
CHECKED:	DATE:	Safe-Stop TMA (ENHANCEMENTS)
APPROVED:	DATE:	
Q.C.	DATE:	

FILE: Safe-Stop TMA	SCALE:	DRAWING: Safe-Stop TMA	SHEET: 1 of 1	REV



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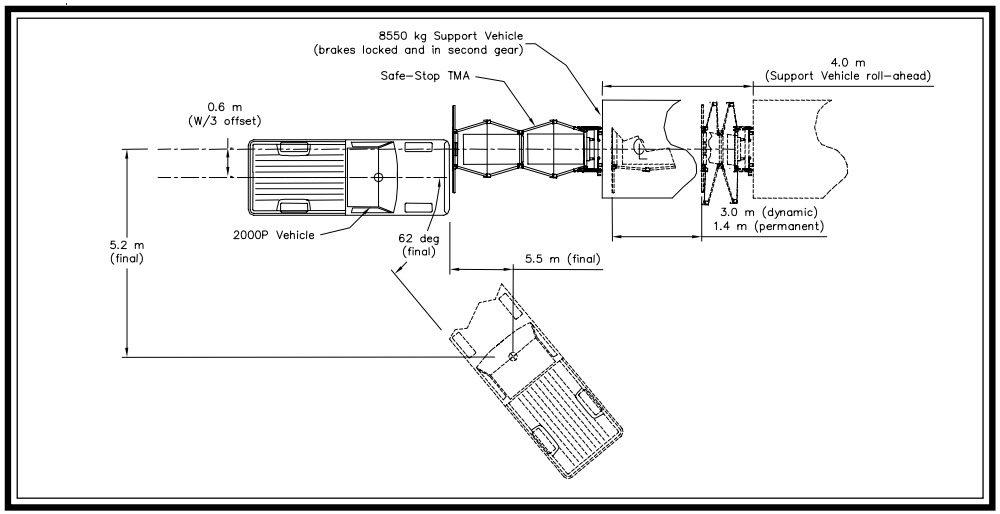

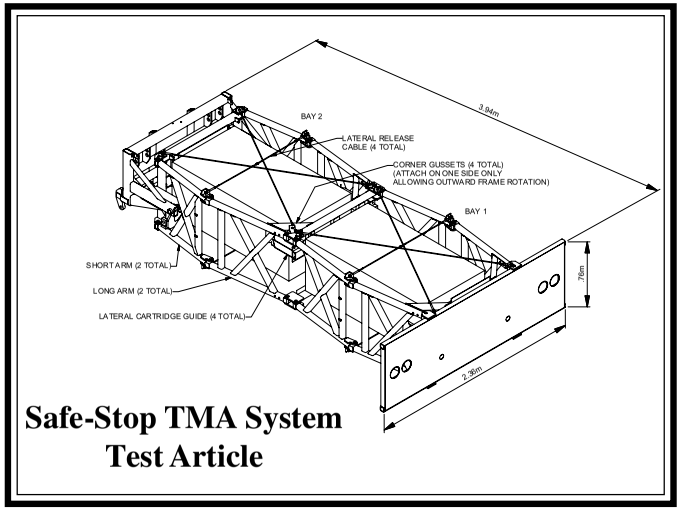

Safe-Stop TMA System Test Article

General Information	
Test Agency	E-TECH Testing Services, Inc.
Test Designation	NCHRP 350 Test 3-52
Test No.	01-7618-005
Date	1/27/05
Test Article	
Type	Energy Absorption Systems, Inc.
	Safe-Stop™ System
Installation Length	3.94 m (overall system)
Material and key elements	(2) Aluminum Cartridges;
	1.5 m long, 0.81 m wide
Foundation Type and Condition	Concrete,
	clean and dry
Test Vehicle	
Type	Production Model
Designation	2000P
Model	1989 GMC C2500
Mass (kg)	
Curb	2004
Test inertial	1993
Dummy	N/A
Gross	1993
Impact Conditions	
Speed (km/h)	99.0
Angle (deg)	0
Impact Severity (kJ)	753.4
Exit conditions	
Speed (km/h)	N/A
Angle (deg - veh. c.g.)	N/A

Occupant Risk Values	
Impact Velocity (m/s)	
x-direction	9.0
y-direction	0.7
Ridedown Acceleration (g's)	
x-direction	-19.1
y-direction	8.1
Support Vehicle Acceleration (g's)	
x-direction	4.1
European Committee for Normalization (CEN) Values	
THIV (km/h)	32.3
PHD (g's)	19.6
ASI	1.1
Test Article Deflections (m)	
Dynamic	3.0
Permanent	1.4
Vehicle Damage (Primary Impact)	
Exterior	
VDS	FL-6
CDC	12FYEW6
Interior	
VCDI	AS0000000
Maximum Deformation (mm)	None
Post-Impact Vehicular Behavior (deg - rate gyro)	
Maximum Roll Angle	-11.9
Maximum Pitch Angle	-9.2
Maximum Yaw Angle	-118.2

Figure 1. Summary of Results - Safe-Stop TMA NCHRP 350 Test 3-52