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

September 9, 2005

Mr. Bill Neusch, President
Gibraltar
320 Southland Road
Burnet, Texas 78611

In Reply Refer To: HSA-10/B-137A

Dear Mr. Neusch:

In your August 11 letter to Mr. Richard Powers of my staff, you requested the Federal Highway Administration's (FHWA) acceptance of a modified version of your TL-3 Gibraltar cable barrier system that was tested to the NCHRP Report 350 test level 4 (TL-4). Copies of the August 5 report prepared by Exponent Failure Analysis Associates in Phoenix, Arizona entitled "NCHRP Report 350 Test 4-12 of the Gibraltar Longitudinal Cable Barrier System" and digital videos of the test were also submitted.

Your modified cable barrier system consists of three, 3/4-inch diameter 3 X 7 post-tensioned galvanized steel cables supported by steel C-posts 3.25 x 2.5 x 0.15-inches thick and 7-ft long, The posts, set on 14-foot centers, were driven to a depth of 3.5 feet and installed on alternate sides of the cables. The 3 cables are locked in place by a 7/16-inch diameter x 24-inch long galvanized steel hairpin and lock plate that fits inside each post. For your TL-4 design, the bottom, middle, and top cable heights are set at 20 inches, 30 inches and 39 inches, respectively. These details are shown in Enclosure 1, which also includes drawings of the terminal. This terminal is essentially identical to the TL-3 design developed for use with the original TL-3 Gibraltar Cable Barrier. The only modification needed in the terminal to match the higher cables in the TL-4 barrier design was the increased height of the center and top cables at terminal post 4. The barrier test installation was 350 feet long and each cable was tensioned to 4800 lbs. prior to the tests.

The NCHRP Report 350 test 4-12 was successfully conducted and the summary results are shown in Enclosure 2. Dynamic deflection was reported to be 7 feet in the 350-foot long test installation. Since the bottom cable remained at the same height as the TL-3 design, we agreed beforehand that tests with the small car and the pickup truck could be waived. Based on the test results, the Gibraltar Cable Barrier as described herein may be considered an NCHRP Report 350 TL-4 median barrier when the posts are set on alternate sides of the cables or as a TL-4 roadside barrier when the cables are all on the traffic side of the C-posts. Shorter, socketed line posts, as shown in the enclosed drawing may be used in lieu of driven posts.

Please note the following standard provisions that apply to the FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the tested device and does not cover its structural features, durability, or maintenance characteristics.

- Any design or material changes that may adversely affect the crashworthiness of the barrier will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the barrier being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number B-137A shall not be reproduced except in full. This letter, and the test documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.
- The Gibraltar Cable Barrier includes patented components and is considered proprietary. When proprietary devices are *specified by a highway agency* for use on Federal-aid projects, except exempt, non-NHS projects, they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists or; (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.

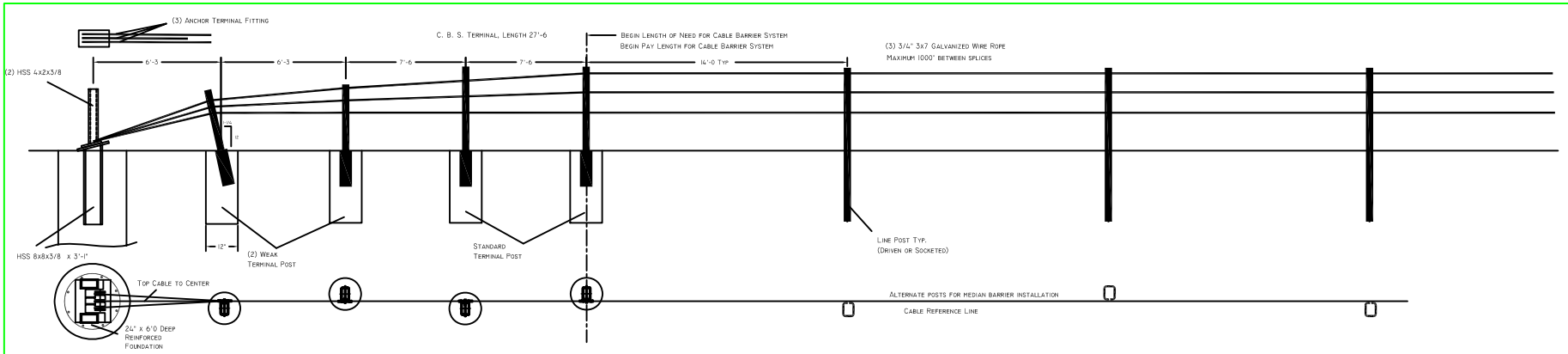
Sincerely yours,

/original signed by George E. Rice, Jr./

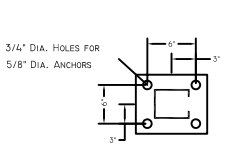
~for~

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

2 Enclosures

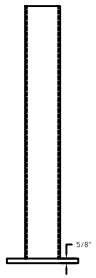


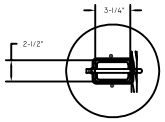
Cable Tension	
-10F	8210
0	7819
10	7447
20	7069
30	6677
40	6301
50	5928
60	5536
70	5155
80	4773
90	4390
100	4009
110	3627

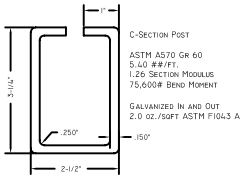


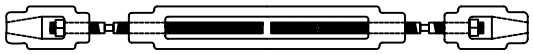
BASE-PLATED POST

For Use On Concrete
5/8" Mechanical Anchor
Min. Pullout Strength 10,000 lbs.

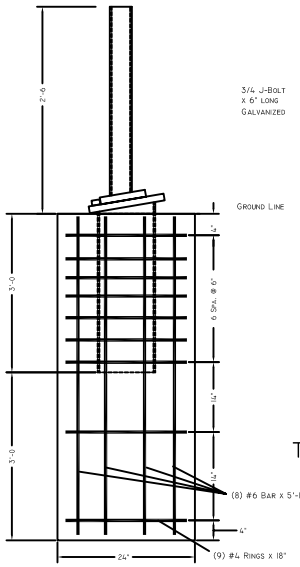


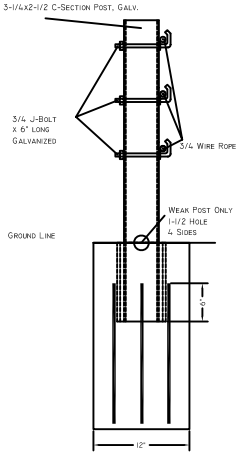




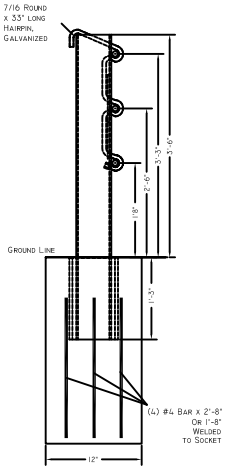


Cable Release Anchor Post



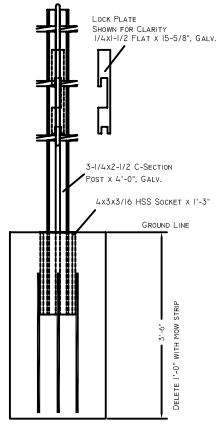


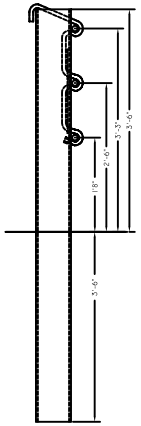
Terminal Post



Line Post (Socketed)

30" Deep with Min. 18" wide Mow Strip
42" Deep w/o Mow Strip





Line Post
(Driven)

General Notes

1. For additional information contact Gibraltar at 1-800-495-8957.
2. All concrete shall be 2500 psi.
3. For Additional Information see Manufacturer's Product Manual.
4. The Cable Barrier System is designed for bi-directional traffic flows. If installed for traffic in one direction install cables on traffic side of posts.
5. The Cable Barrier System shall be installed on median shoulders or on depressed medians with slopes of 6:1 or flatter without obstructions, depressions, etc. that may influence trajectory of an errant vehicle.

Date 8/10/05			Gibraltar 320 Southland Road Burnet, Texas 78611
Drawn by DM			
Issued For Construction			Cable Barrier System
Approver	Date		1 May 2005 Patent Pending

TEST FINDINGS SUMMARY

GENERAL INFORMATION		OCCUPANT RISK VALUES	
TEST AGENCY	EXPONENT	IMPACT VELOCITY	
TEST NO.	4-12	X-DIRECTION	(1)
DATE	8/5/05	Y-DIRECTION	(1)
TEST ARTICLE	GIBRALTAR CABLE BARRIER SYSTEM	THIV	(1)
TYPE	LONGITUDINAL BARRIER	RIDEDOWN ACCELERATIONS	
INSTALLATION LENGTH	106.7 m (350 ft)	X-DIRECTION	(1)
SOIL CLASSIFICATION (AASHTO M145) & MOISTURE CONDITION	A-4 7.3% MOISTURE CONTENT	Y-DIRECTION	(1)
TEST VEHICLE	8000S	PHD	(1)
TYPE	PRODUCTION	ASI	(1)
DESIGNATION	SINGLE-UNIT TRUCK	TEST ARTICLE DEFLECTION	
MAKE/ MODEL	INTERNATIONAL/ 4700	DYNAMIC	(2)
MASS (TEST INERTIAL)	8,000 kg (17,600 lb)	PERMANENT	(2)
ATD	OPTIONAL - NOT USED	VEHICLE DAMAGE	
IMPACT SPEED	80 km/hr (49.7 mph)	ENGAGEMENT WITH THE BARRIER CAUSED MINIMAL FRONT-END BODY DAMAGE AT THE BUMPER AND THE LEFT FRONT WHEEL WELL AND HOOD. DUE TO A COLLISION WITH A CONCRETE BARRIER AFTER DISENGAGEMENT FROM THE TEST ARTICLE, IT WAS NOT POSSIBLE TO ASCERTAIN THE EXTERNAL DAMAGE CAUSED BY THE TEST ARTICLE. NO INTRUSION OR PENETRATION INTO THE OCCUPANT COMPARTMENT OCCURRED.	
IMPACT ANGLE (Deg.)	15		
EXIT SPEED	55.9 km/hr (34.7 mph) at 5 seconds after initial impact		
EXIT ANGLE	LESS THAN 4-degrees		
(1) Not a requirement for a 4-12 test, but the data was recorded to obtain these values upon request of the test sponsor, Gibraltar. (2) The test article yielded as designed, which controlled lateral displacement of the test vehicle to approximately 2.13 m (7 ft) measured at the vehicle left rear outboard tire		POST IMPACT VEHICULAR BEHAVIOR	
		MAXIMUM ROLL ANGLE	4.4° LEFT DOWN, 5.6° RIGHT DOWN
		MAXIMUM PITCH ANGLE	7.6° NOSE UP
		MAXIMUM YAW ANGLE	15.9° TO RIGHT

Figure 3: TEST FINDINGS SUMMARY