



U.S. Department
of Transportation
**Federal Highway
Administration**

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

May 18, 2005

In Reply Refer To: HSA-10/B-136

Mr. Stephen Barratt
CYRO Industries, Inc.
100 Enterprise Drive, Suite 700
P.O. Box 5055
Rockaway, New Jersey 07853

Dear Mr. Barratt:

In his April 12 letter to Mr. Richard Powers of my staff, Mr. Eric Humphries provided preliminary information on your PARAGLAS SOUNDSTOP Noise Barrier System that was mounted on the back of a 32-inch tall single slope barrier. On May 12, a copy of the Midwest Roadside Safety Facility's April 22 test report entitled "Design and Evaluation of CYRO's PARAGLAS SOUNDSTOP Noise Barrier System" was delivered to this office.

The PARAGLAS SOUNDSTOP® TL-4 system consists of transparent PARAGLAS SOUNDSTOP® GS CC Noise Barrier Sheet panels supported by galvanized ASTM A36 steel W8 x 40 posts mounted to the back vertical face of a 32-inch tall concrete safety shape bridge rail. The patented GS CC Sheet panels are infused with polyamide filaments to contain fragments in the event the panel is hit and damaged during a collision. The tested installation was 19-feet high and its traffic face consisted of three galvanized TS 7 x 4 steel tubes set 38 inches, 60 inches and 128 inches above the ground. The lowest rail is 5/16-inch thick; the upper two are 3/16-inch thick. Enclosure 1 shows these major system components. In the test installation, the traffic faces of the horizontal rail elements were offset from the top of the concrete barrier by approximately 3.25 inches and the traffic faces of the vertical support members were offset approximately 10.25 inches. Two tests were run to ensure that the addition of the sound wall would not adversely affect the TL-4 performance of the 32-inch tall concrete bridge rail. Although some snagging on the support posts occurred both with the single-unit truck and with the pickup truck, the tests were deemed to meet all NCHRP Report 350 evaluation criteria. The sound wall was essentially undamaged in the tests, summaries of which are shown in Enclosure 2.

After reviewing the report and the crash test documentation, I conclude that the addition of your PARAGLAS SOUNDSTOP Noise Barrier System to the vertical backside of a 32-inch tall concrete safety shape bridge rail, including the NJ or F-shape profile as well as the tested single slope design, will not change the test level of the bridge rail. All such bridge railings would retain their TL-4 designation with the addition of the noise wall as described herein. If a



42-inch tall barrier is used, the lowest rail would not be needed, but the remaining two should be retained at their tested heights. Because of the added steel rails, the crash performance of the concrete safety shapes is essentially improved by limiting vehicle climb to some extent and by significantly reducing the roll angle of larger vehicles. If used behind a vertical concrete bridge railing rather than a safety shape, its performance is likely to be further improved over that seen in the crash tests.

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

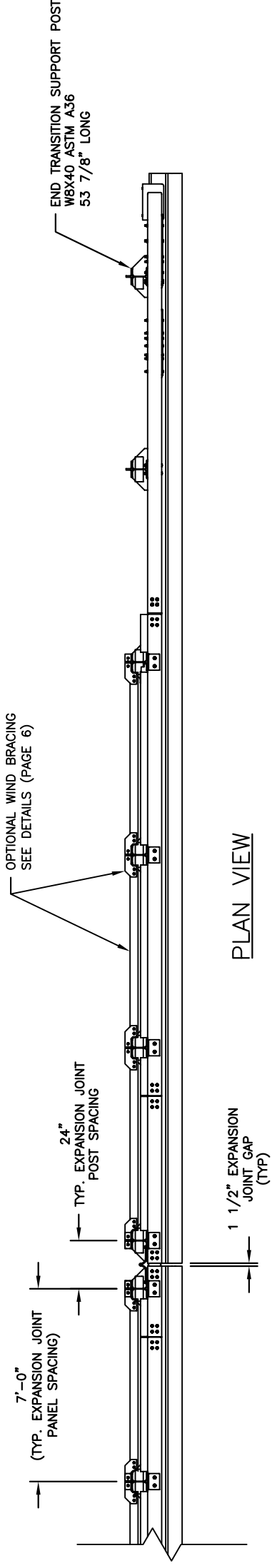
- Our acceptance is limited to the crashworthiness characteristics of the PARAGLAS SOUNDSTOP TL-4 System and is not intended to address its structural features.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device 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 detailed drawings and 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.
- To prevent misunderstanding by others, this letter of acceptance, designated as number B-136 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 PARAGLAS SOUNDSTOP TL-4 System is considered to be proprietary. If 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, a copy of which is enclosed (Enclosure 3) for your ready reference.

Sincerely yours,

/original signed by/

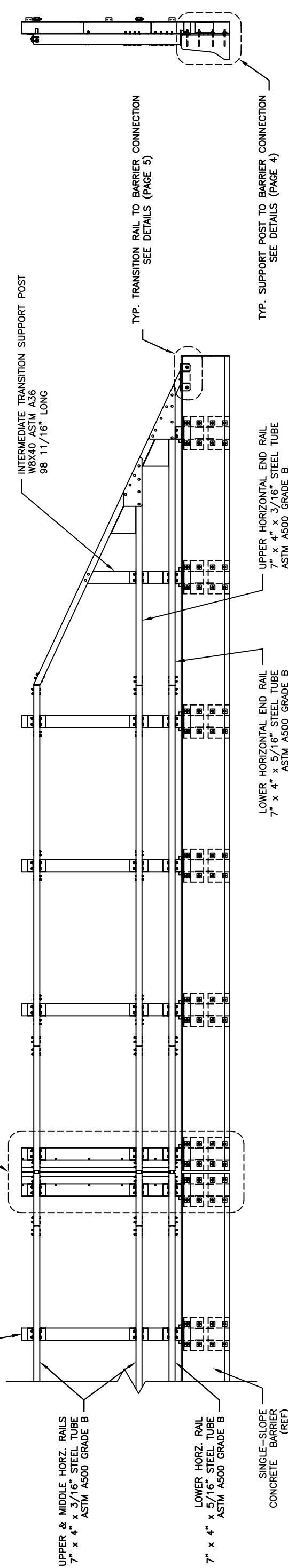
John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

3 Enclosures



TYP. VERTICAL SUPPORT POST W8X40 ASTM A36 LENGTH VARIES

TYP. EXPANSION JOINT SEE DETAILS (PAGE 8)



FRONT VIEW

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF CYRO INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF CYRO INDUSTRIES IS STRICTLY PROHIBITED.

TOLERANCE NOTE:
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE NOTED ARE (PLUS OR MINUS) MACHINING 0.030" AND STRUCTURAL 0.060". BENDS ARE (+ OR -) 1/2 DEGREE.

DESCRIPTION
PARAGLAS SOUNDSTOP®
TL4 NOISE BARRIER SYSTEM
OVERALL SYSTEM DETAILS

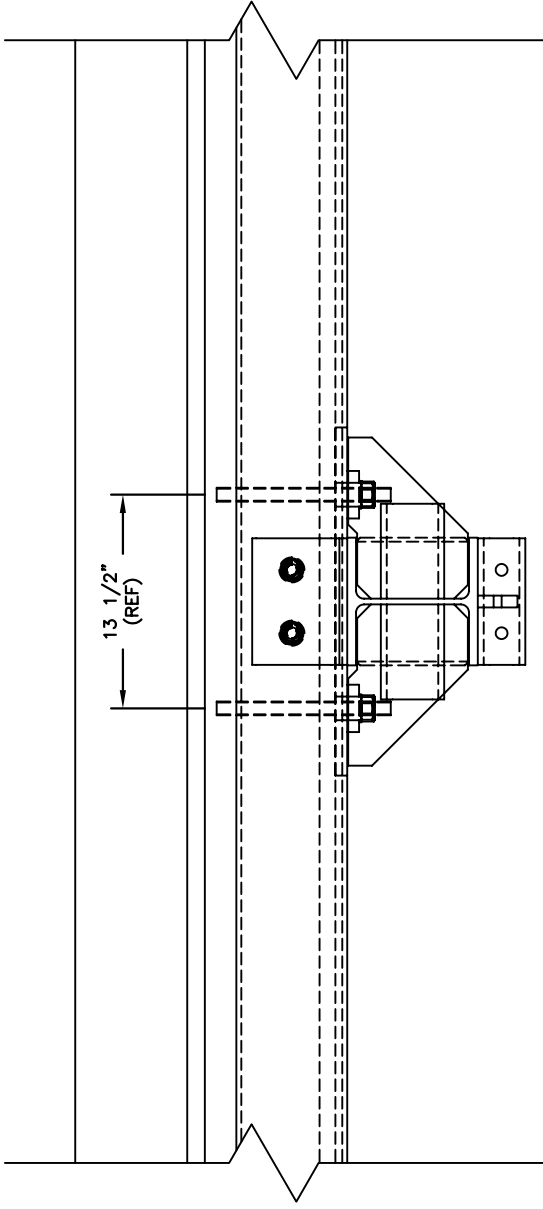
DR BY SAN 02/22/2005
CPD NO. 3575
DRAWING USAGE SUBMITTAL
ENG. APPROVAL CHECKED BY

valmont STRUCTURES

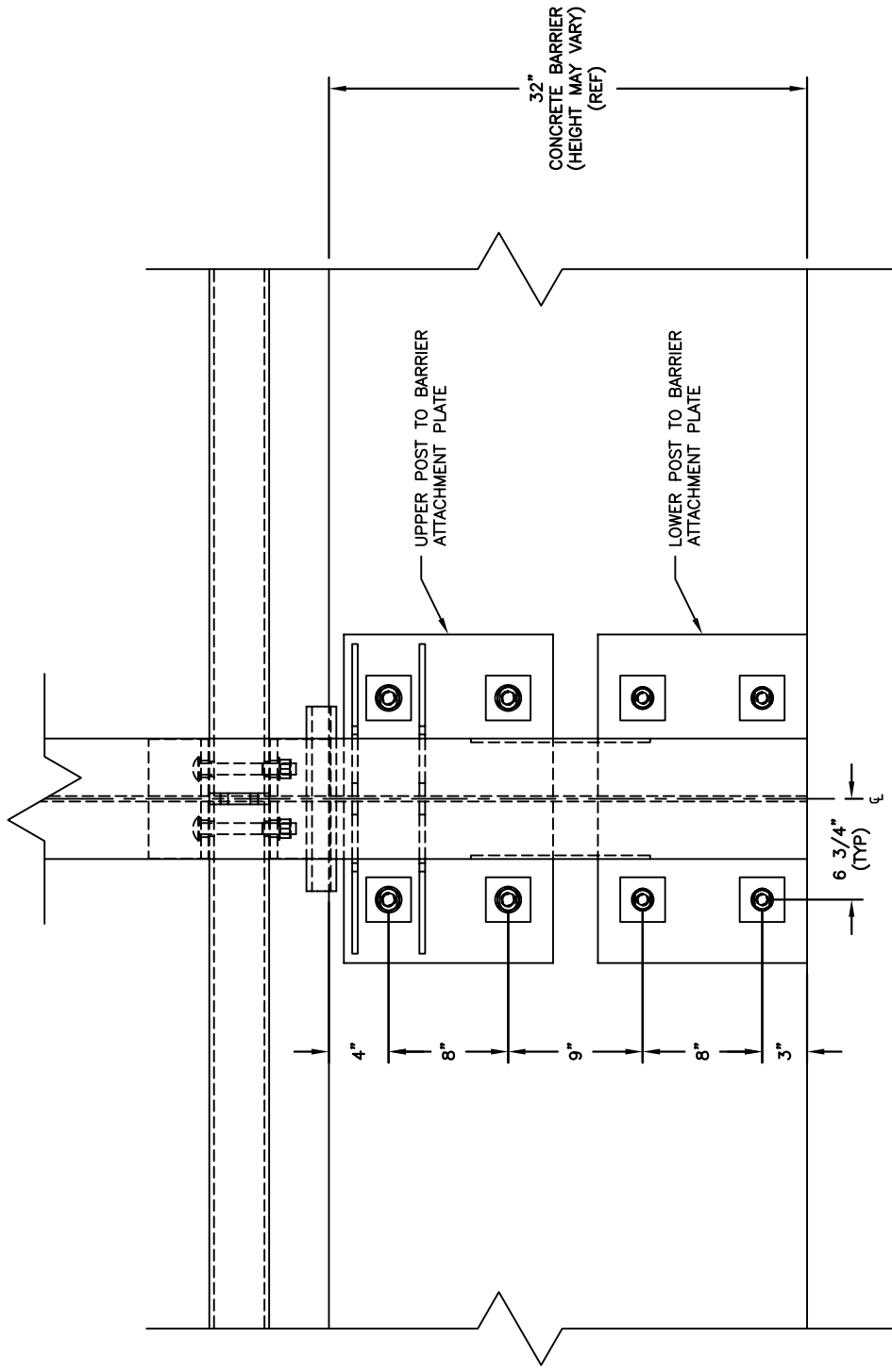
1-877-467-4763 Plymouth, IN
1-888-880-9191 Salem, OR

PART NO. 190526
DWG. NO. 190526

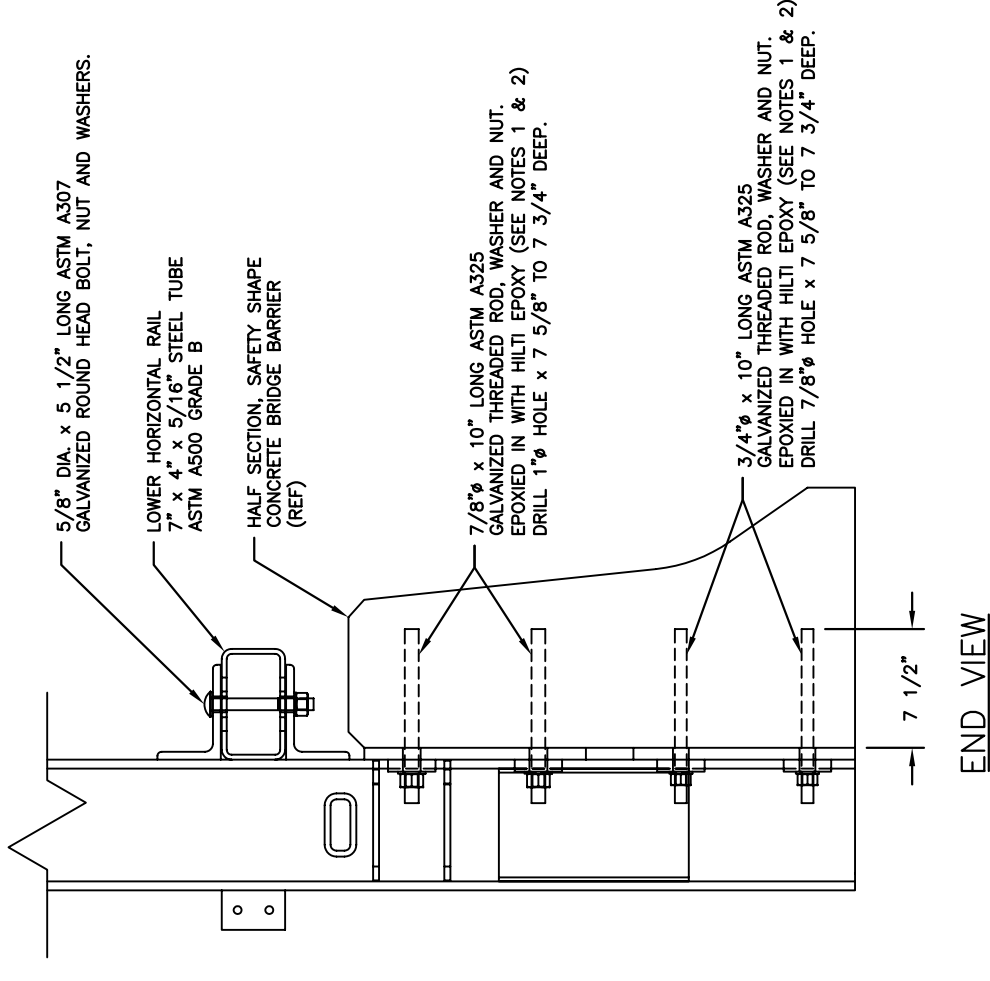
A	MISC. REVISIONS	3575	SAN 03/28/2005	CPD	BY	DATE
				DESCRIPTION OF REVISIONS		
<p>3</p> <p>PAGE OF 00</p>						



TOP VIEW



BACK-SIDE VIEW



END VIEW

NOTES:

- (1) ANCHOR RODS ARE TO BE EMBEDDED 7 1/2" INTO THE CONCRETE BARRIER. FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR PLACING EMBEDDED EPOXYED RODS IN CONCRETE BARRIER.
- (2) USE HILTI HIT HY 150/HIT-ICE INJECTION ADHESIVE ANCHOR SYSTEM FOR PLACEMENT OF ANCHOR RODS INTO EXISTING CONCRETE BARRIER.
- (3) ALTERNATIVE ANCHORAGE DEVICES/METHODS MAY BE USED FOR DEVELOPING THE FULL CAPACITY OF THE HORIZONTAL RODS, INCLUDING CAST-IN-PLACE STEEL CAGES OR INSERTS. THESE ALTERNATIVES ARE TO BE SPECIFIED BY THE BRIDGE OR DESIGN ENGINEER.

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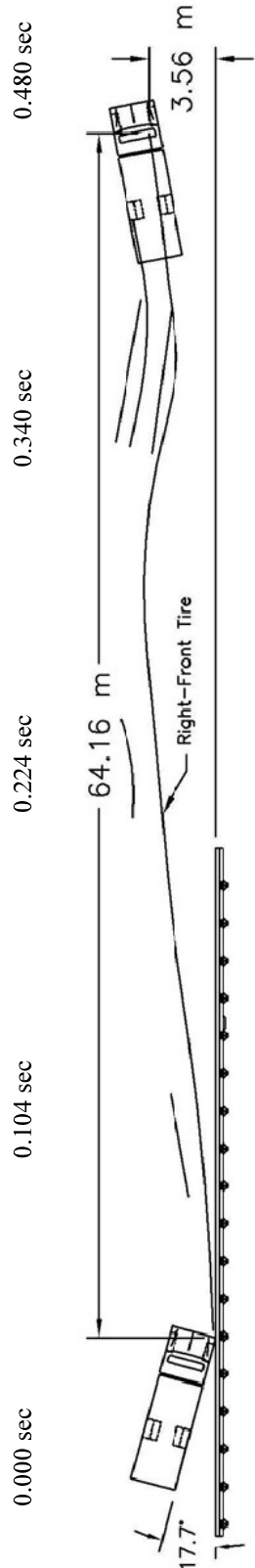
DESCRIPTION
PARAGLAS SOUNDSTOP®
TL4 NOISE BARRIER SYSTEM
SUPPORT POST TO BARRIER
ATTACHMENT DETAILS

DR BY	CPD NO.	DRAWING USAGE
SAN	02/22/2005	3575 SUBMITTAL
ENG. APPROVAL		CHECKED BY

1-877-467-4763 Plymouth, IN
1-888-880-9191 Salem, OR

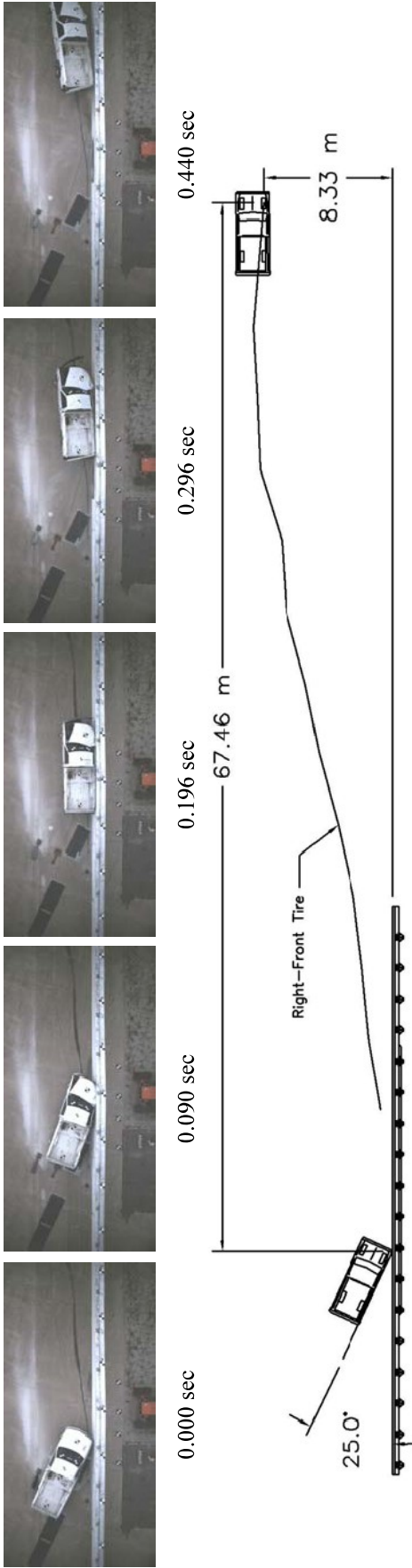
PART NO.	4	PAGE OF	00
DWG. NO.	190526		

REV.	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	MISC. REVISIONS	3575	SAN	03/28/2005



● Test Number	..... CYRO-1	● Impact Location	..... 724 mm upstream centerline post no. 6
● Date	..... 8/18/04	● Vehicle Speed	..... 82.4 km/h
● NCHRP 350 Test Designation	..... 4-12	● Exit	..... 70.7 km/h
● Apparatus	..... CYRO Paraglas Soundstop Noise Wall Barrier	● Vehicle Angle	..... 17.7 deg
● Total Length	..... 34.56 m	● Impact	..... 5.4 deg
● Overall Height	..... 5,869 mm	● Exit	..... Minor
● Crash Rail Elements	..... Galvanized Steel	● Vehicle Snagging	..... Satisfactory
● Material	..... Galvanized Steel	● Vehicle Stability	..... Satisfactory
● Length	..... 5,988 mm	● Occupant Ridedown Deceleration (10 msec avg.)	..... 6.00 g's < 20 g's
● Dimensions	.....	● Lateral (not required)	..... 7.86 g's
● Lower Rail	..... TS 178 mm x 102 mm by 7.9 mm thick	● Occupant Impact Velocity	.....
● Middle Rail	..... TS 178 mm x 102 mm by 4.8 mm thick	● Longitudinal (not required)	..... 3.30 m/s < 12 m/s
● Upper Rail	..... TS 178 mm x 102 mm by 4.8 mm thick	● Lateral (not required)	..... 4.48 m/s
● Top Mounting Height	.....	● Vehicle Damage	..... Moderate
● Lower Rail	..... 965 mm	● TAD ⁴	..... 1-RFQ-5
● Middle Rail	..... 1,524 mm	● SAE ⁵	..... 1-RFAW5
● Upper Rail	..... 3,251 mm	● Vehicle Stopping Distance	..... 64.16 m downstream
● Post Nos. 1-18	.....	● Barrier Damage	..... Minimal
● Material	..... Galvanized, ASTM A36 Steel	● Maximum Rail Deflections	.....
● Dimensions	..... W203x59.5 by 5,817 mm long	● Permanent Set	..... NA
● Spacing	..... 2,000 mm	● Dynamic	..... 45 mm (top of wall)
● Paraglas Soundstop Panels	.....	● Working Width	..... 668 mm
● Upper Panel	..... 1,905 mm x 1,170 mm by 20 mm thick		
● Lower Panel	..... 1,905 mm x 3,585 mm by 20 mm thick		
● Vehicle Model	..... 1988 Ford F-800 Single-Unit Truck		
● Curb	..... 5,452 kg		
● Test Inertial	..... 8,092 kg		
● Gross Static	..... 8,092 kg		

Figure 26. Summary of Test Results and Sequential Photographs, Test CYRO-1



● Test Number	..... CYRO-2	● Impact Location	..... 2,305 mm upstream centerline post no. 9
● Date	..... 10/19/04	● Vehicle Speed	..... 99.0 km/h
● NCHRP 350 Test Designation	..... 4-11	● Exit	..... 82.1 km/h
● Apparatus	..... CYRO Paraglas Soundstop Noise Wall Barrier	● Vehicle Angle	..... 25.0 deg
● Total Length	..... 34.56 m	● Impact	..... 3.0 deg
● Overall Height	..... 5,869 mm	● Exit	..... Moderate
● Crash Rail Elements	..... Galvanized Steel	● Vehicle Snagging	..... Satisfactory
● Material	..... 5,988 mm	● Vehicle Stability	..... Satisfactory
● Dimensions	..... TS 178 mm x 102 mm by 7.9 mm thick	● Occupant Ridedown Deceleration (10 msec avg.)	..... 7.59/-9.01 g's < 20 g's
● Lower Rail	..... TS 178 mm x 102 mm by 4.8 mm thick	● Longitudinal	..... 15.21/-15.66 g's
● Middle Rail	..... TS 178 mm x 102 mm by 4.8 mm thick	● Lateral (not required)	..... 5.40 m/s < 12 m/s
● Upper Rail	..... TS 178 mm x 102 mm by 4.8 mm thick	● Occupant Impact Velocity	..... 8.52 m/s
● Top Mounting Height	..... 965 mm	● Longitudinal	..... 17.93 g's
● Lower Rail	..... 1,524 mm	● Lateral	..... 10.21 m/s
● Middle Rail	..... 3,251 mm	● Vehicle Damage	..... Moderate
● Upper Rail	..... Galvanized, ASTM A36 steel	● TAD ⁴	..... I-RFQ-6
● Post Nos. 1-18	..... W203x59.5 by 5,817 mm long	● SAE ⁵	..... I-RFAW7
● Material	..... 2,000 mm	● Vehicle Stopping Distance	..... 67.46 m downstream
● Dimensions	..... 1,905 mm x 1,170 mm by 20 mm thick	● Barrier Damage	..... Minimal
● Spacing	..... 1,905 mm x 3,585 mm by 20 mm thick	● Maximum Rail Deflections	..... NA
● Paraglas Soundstop Panels	..... 1998 GMC C2500 ¾-ton pickup	● Permanent Set	..... 20 mm (top of wall)
● Upper Panel	..... 1,954 kg	● Dynamic	..... 642 mm
● Lower Panel	..... 2,013 kg	● Working Width	..... 642 mm
● Vehicle Model	..... 2,013 kg		
● Curb	..... 2,013 kg		
● Test Inertial	..... 2,013 kg		
● Gross Static	..... 2,013 kg		

Figure 50. Summary of Test Results and Sequential Photographs, Test CYRO-2