U.S. Department of Transportation
Federal Highway Administration

1200 New Jersey Ave., SE
Washington, D.C. 20590

April 21, 2020

In Reply Refer To:
HSST-1/B-330

Mr. Adrian Bullock
Highway Care Ltd.
The Highlands, Detling, Maidstone, Kent
ME14 3HT
United Kingdom

Dear Mr. Bullock:

This letter is in response to your September 3, 2019 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number B-330 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

Decision

The following device is eligible within the length-of-need, with details provided in the form which is attached as an integral part of this letter:

- HighwayGuard TL-4

Scope of this Letter

To be found eligible for Federal-aid funding, new roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials'(AASHTO) Manual for Assessing Safety Hardware (MASH). However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

Eligibility for Reimbursement

Based solely on a review of crash test results and certifications submitted by the manufacturer, and the crash test laboratory, FHWA agrees that the device described herein meets the crash test and evaluation criteria of the AASHTO's MASH. Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions.

Name of system: HighwayGuard TL-4
Type of system: Longitudinal Barrier
Test Level: MASH Test Level 4 (TL4)
Testing conducted by: Holmes Solutions LP
Date of request: September 3, 2019

FHWA concurs with the recommendation of the accredited crash testing laboratory on the attached form

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

This eligibility letter is issued for the subject device as tested. Modifications made to the device are not covered by this letter. Any modifications to this device should be submitted to the user (i.e., state DOT) as per their requirements.

You are expected to supply potential users with sufficient information on design, installation and maintenance requirements to ensure proper performance.

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of AASHTO's MASH.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.

Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number B-330 shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed upon request.

- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.

- This FHWA eligibility letter is not an expression of any Agency view, position, or determination of validity, scope, or ownership of any intellectual property rights to a specific device or design. Further, this letter does not impute any distribution or licensing rights to the requester. This FHWA eligibility letter determination is made based solely on the crash-testing information submitted by the requester. The FHWA reserves the right to review and revoke an earlier eligibility determination after receipt of subsequent information related to crash testing.

Sincerely,

Michael S. Griffith

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	3rd September 2019	• New ○ Resubmission
	Name:	Adrian Bullock	
	Company:	Highway Care Ltd	
	Address:	The Highlands, Detling, Maidstone, Kent. ME14 3HT	
	Country:	UK	
	To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies	

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

Device & Testing Criterion - Enter from right to left starting with Test Level !-!-! !-!-!

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'B': Rigid/Semi-Rigid Barriers	• Physical Crash Testing ○ Engineering Analysis	Highway Guard TL-4	AASHTO MASH	TL4

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the evaluation results meet the appropriate evaluation criteria in the MASH.

Individual or Organization responsible for the product:

Contact Name:	Adrian Bullock	Same as Submitter ☒
Company Name:	Highway Care Ltd	Same as Submitter ☒
Address:	The Highlands, Detling, Maidstone, Kent. ME14 3HT	Same as Submitter ☒
Country:	UK	Same as Submitter ☒

Enter below all disclosures of financial interests as required by the FHWA `Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.

Holmes Solutions LP completed all of the documented testing activities under a commercial contract with HighwayCare. In accordance with the requirements of ISO 17025, all testing activities completed by Holmes Solutions LP were undertaken free from any undue commercial influence. For the completion of this testing service, Holmes Solutions LP received payment in the form of professional fees. The fees received for the testing activities were not linked to the technical performance of the product nor the outcome of the tests. Holmes Solutions LP does not have, nor ever had, any financial interest in Highway Care, and has no ownership of any of the products IP. Holmes Solutions LP does not receive any research funding (or other forms of research support) from Highway Care.

PRODUCT DESCRIPTION

Help

(•) New Hardware or Significant Modification ( ) Modification to Existing Hardware

HighwayGuard isasteel barrier formed from two profiled, thin gauge sheets being welded together along the join at the top, and to feet at the base, to form a long hollow section, the overall dimensions of each barrier section is 540mm wide at the base, 250mm wide at the top, 800mm high and 6,000mm long. Each longitudinal section can be connected to an adjoining section using a unique T-connector which engages with vertical pins located at the end of each section. These barrier sections are joined together and laid out along the road surface to create a longitudinal barrier system (wall). The barrier system can be installed with multiple ground anchor configurations. This barrier system incorporates ground anchors at a maximum of 60.0m between ground anchors in itsstandard configuration.

CRASH TESTING

By signature below, the Engineer affiliated with the testing laboratory, agrees in support of this submission that all of the critical and relevant crash tests for this device listed above were conducted to meet the MASH test criteria. The Engineer has determined that no other crash testsare necessary to determine the device meets the MASH criteria.

Engineer Name:	EmersonRyder	
Engineer Signature:	EmersonRyder Digitally signed by EmersonRyder Date: 2019.09.04 10:32:12 +12'00'	
Address:	254 Montreal Street Christchurch	Same as Submitter ☐
Country:	New Zealand	Same as Submitter ☐

A brief description of each crash test and its result: Help

Required Test Number	Narrative Description	Evaluation Results
4-10 (1100C)	The longitudinal barrier successfully contained and redirected an 1100C test vehicle impacting the test article at 24.9 degrees with a velocity of 100.3 km/h. No debris or detached elements penetrated or showed potential to penetrate the occupant compartment. No fragments were distributed outside of the vehicle trajectory and therefore did not present any undue hazard to other traffic, pedestrians or work zone personnel. The vehicle remained upright during and after the impact and vehicle stability was considered satisfactory. Occupant risk factors satisfied the test criteria and the vehicle exit trajectory remained within acceptable limits. Dynamic Deflection was 1.41 m. Working Width was 1.80 m	PASS

Required Test Number	Narrative Description	Evaluation Results
4-11 (2270P)	The longitudinal barrier successfully contained and redirected an 2270P test vehicle impacting the test article at 24.6 degrees with a velocity of 98.0 km/h. No debris or detached elements penetrated or showed potential to penetrate the occupant compartment. No fragments were distributed outside of the vehicle trajectory and therefore did not present any undue hazard to other traffic, pedestrians or work zone personnel. The vehicle remained upright during and after the impact and vehicle stability was considered satisfactory. Occupant risk factors satisfied the test criteria and the vehicle exit trajectory remained within acceptable limits. Dynamic Deflection was 1.93 m. Working Width was 2.32 m	PASS
4-12 (10000S)	The longitudinal barrier successfully contained and redirected a 10000S test vehicle impacting the test article at 14.6 degrees with a velocity of 88.5 km/h. No debris or detached elements penetrated or showed potential to penetrate the occupant compartment. No fragments were distributed outside of the vehicle trajectory and therefore did not present any undue hazard to other traffic, pedestrians or work zone personnel. The vehicle remained upright during and after the impact and vehicle stability was considered satisfactory. Occupant risk factors satisfied the test criteria and the vehicle exit trajectory remained within acceptable limits. Dynamic Deflection was 2.16 m. Working Width was 3.36 m at a height of 3.49 m above ground level	PASS
4-20 (1100C)		Non-Relevant Test, not conducted
4-21 (2270P)		Non-Relevant Test, not conducted
4-22 (10000S)		Non-Relevant Test, not conducted

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

Laboratory Name:	HolmesSolutionsLP	
Laboratory Signature:	Emerson Ryder — Digitally signed by Emerson Ryder Date: 2019.09.04 10:36:33 +12'00'	
Address:	254 Montreal Street Christchurch	Same as Submitter ☐
Country:	New Zealand	Same as Submitter ☐
Accreditation Certificate Number and Dates of current Accreditation period :	1022 NZS ISO/IEC 17025:2005 Accreditation period valid until July 2020	

Submitter Signature*:

Submit Form

ATTACHMENTS

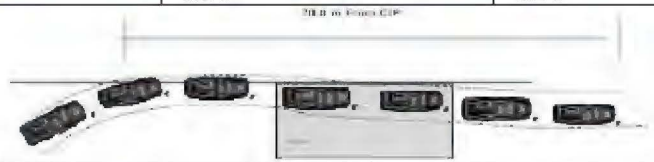
Attach to this form:

1) Additional disclosures of related financial interest as indicated above.
2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [Hardware Guide Drawing Standards]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words

0.0 s	0.1 s	0.2 s	0.3 s	0.4 s



Test Article:	HighwayGuard
Total Length	120.0 m
Key Elements - Barrier	MASH TL4-10
Description	Temporary Steel Barrier 60.0 m Anchor spacing
Length of Barrier Installation	120.0 m
Barrier Height	800 mm
Ground Conditions	Asphalt
Test Vehicle	
Designation	1100C
Make/Model	Nissan Tiida
Dimensions (LxWxH)	4395 mm x 1695 mm x 1520 mm
Curb Wt	1094.5 kg
Test Inertial Wt	1095.0 kg
Gross Static	1170.0 kg
Impact Conditions	
Speed	100.3 km/h
Angle	24.9°
Impact Point	331 mm Upstream of barrier 11
Exit Conditions	
Exit Speed:	100 km/h estimated
Exit Angle:	1.8°
Test Number	135137.4-10
Test Date	9th May 2019

Post Impact Vehicle Behaviour		
Vehicle Stability	Good	
Stopping Distance	70.0 m from CIP (Remote brakes)	
Vehicle Snagging	None	
Vehicle Pocketing	None	
Occupant Impact Velocity		
Longitudinal	0.7 m/s	
Lateral (optional)	5.6 m/s	
Occupant Ride-down Deceleration		
X-direction	-3.0	(0.2868 - 0.2968 seconds)
Y-direction	7.4	(0.2450 - 0.2550 seconds)
THIV (optional) m/s	6.0 at 0.1021 seconds on left side	
PHD (optional) g	7.5	(0.2449 - 0.2549 seconds)
ASI (optional)	1.05	(0.0264 - 0.0764 seconds)
Test Article Damage	Minor	
Test Article Deflections		
Dynamic	1.41 m (4.63 ft)	
Permanent	1.30 m (4.27 ft)	
Working Width	1.80 m (5.90 ft)	
Vehicle Damage Exterior		
VDS	11LF-3	
CDC	11LFEE3	
Maximum Deformation	155 MM	

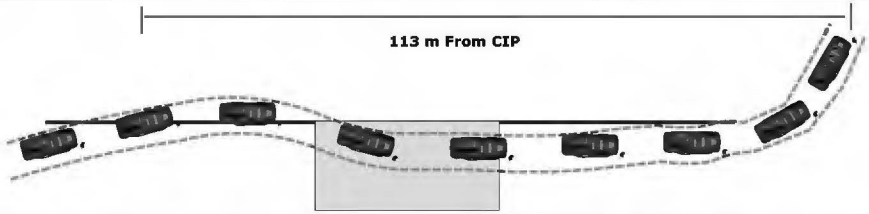

0.0 s


0.1 s


0.2 s


0.3 s


0.4 s



Test Article:	Highway Guard
Total Length	120.0 m
Key Elements - Barrier	MASH TL4-11
Description	Temporary Steel Barrier 60.0 m Anchor spacing
Length of Barrier Installation	120.0 m
Barrier Height	800 mm
Ground Conditions	Asphalt
Test Vehicle	
Designation	2270P
Make/Model	Dodge Ram 1500
Dimensions (LxWxH)	5830 mm x 2000 mm x 1845 mm
Curb Wt	2248.5 kg
Test Inertial Wt	2282.0 kg
Gross Static	2282.0 kg
Impact Conditions	
Speed	98.0 km/h
Angle	24.6°
Impact Point	292 mm Upstream of barrier 11
Exit Conditions	
Exit Speed:	76.5 km/h estimated
Exit Angle:	6.36°
Test Number	135137.4-11
Test Date	10 th May 2019

Post Impact Vehicle Behaviour	
Vehicle Stability	Good
Stopping Distance	113 m from CIP
Vehicle Snagging	None
Vehicle Pocketing	None
Occupant Impact Velocity	
Longitudinal	3.4 m/s
Lateral (optional)	4.0 m/s
Occupant Ride-down Deceleration	
X-direction	-2.7 (0.2504 - 0.2604 seconds)
Y-direction	9.4 (0.3814 - 0.3914 seconds)
THIV (optional) m/s	5.3 at 0.1808 seconds on left side
PHD (optional) g	9.5 (0.3815 - 0.3915 seconds)
ASI (optional)	0.69 (0.0741 - 0.1241 seconds)
Test Article Damage	Minor
Test Article Deflections	
Dynamic	1.93 m (6.33 ft)
Permanent	1.42 m (4.66 ft)
Working Width	2.32 m (7.61 ft)
Vehicle Damage Exterior	
VDS	11LF-3
CDC	11LFEE3
Maximum Deformation	190 mm (estimated)

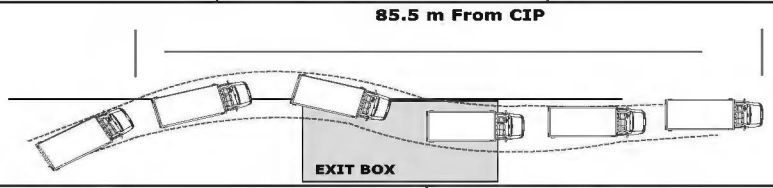
0.0 s

0.1 s

0.2 s

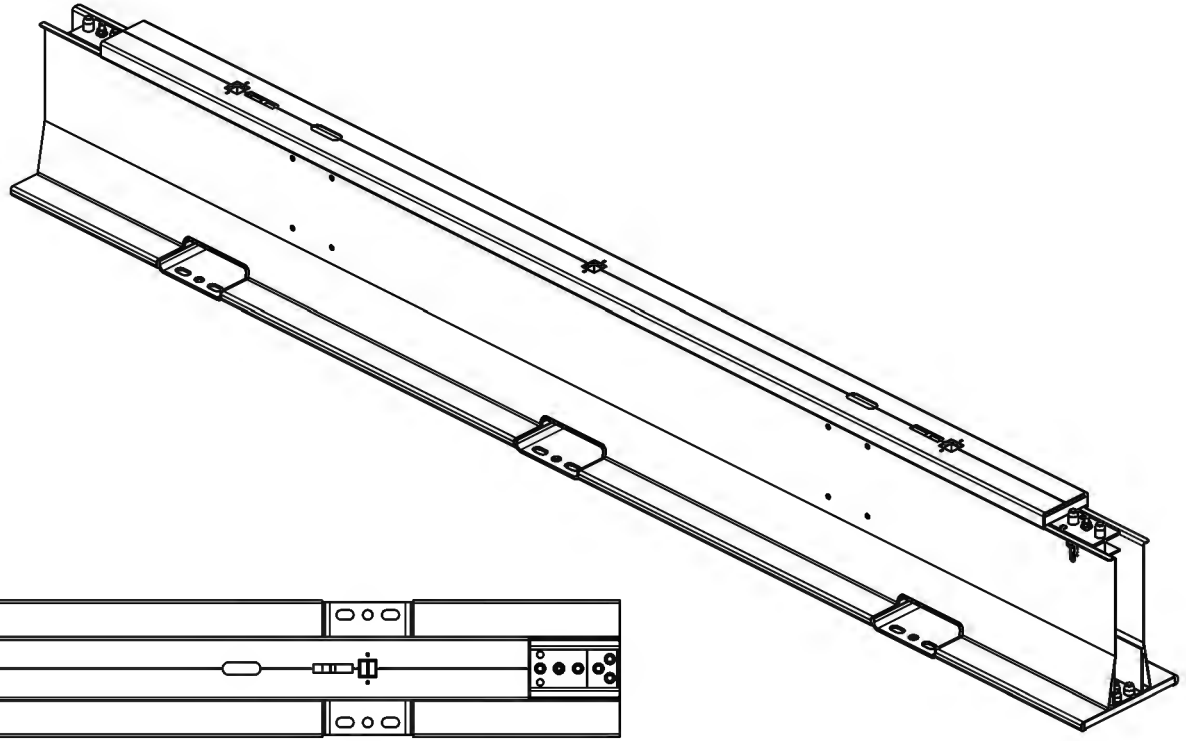
0.3 s

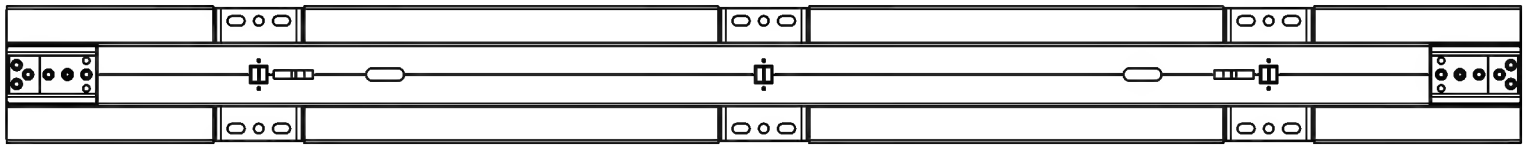
0.4 s

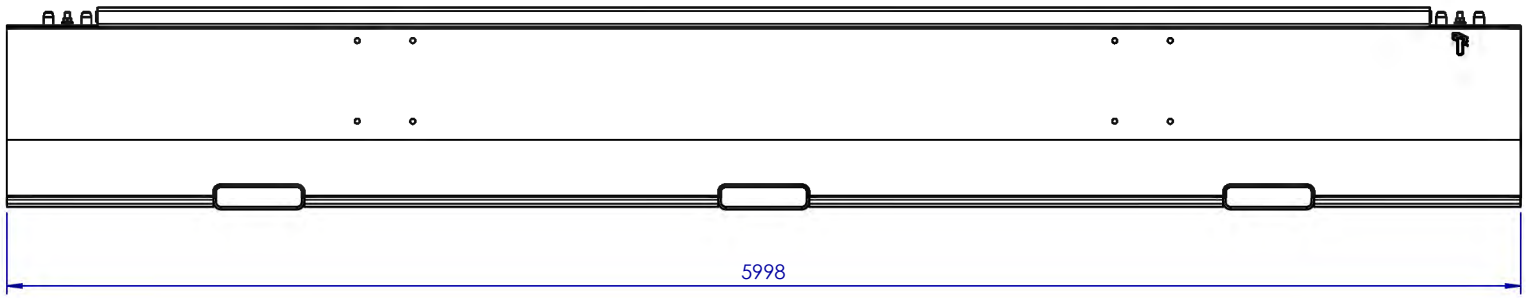


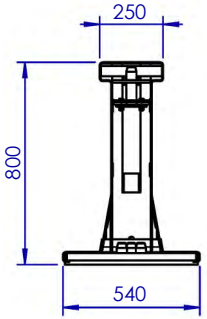
Test Article:	Highway Guard
Total Length	120.0 m
Key Elements - Barrier	MASH TL4-12
Description	Temporary Steel Barrier 60.0 m Anchor spacing
Length of Barrier Installation	120.0 m
Barrier Height	800 mm
Ground Conditions	Asphalt
Test Vehicle	
Designation	10000S
Make/Model	Freightliner M2-106
Dimensions (LxWxH)	8450 x 2340 x 3710 mm
Curb Wt	6660 kg
Test Inertial Wt	10020 kg
Gross Static	10020 kg
Impact Conditions	
Speed	88.5 km/h
Angle	14.6°
Impact Point	1550 mm upstream of barrier 11A
Exit Conditions	
Exit Speed:	65.0 km/h
Exit Angle:	10.68°
Test Number	135137.4-12
Test Date	25-06-19

Post Impact Vehicle Behaviour	
Vehicle Stability	Acceptable
Stopping Distance	85.5m
Vehicle Snagging	None
Vehicle Pocketing	None
Occupant Impact Velocity	
Longitudinal (m/s)	1.8 at 0.3130 seconds on front of interior
Lateral (m/s) (optional)	-1.7
Occupant Ride-down Deceleration	
X-direction	-1.8 (0.6097 - 0.6197 seconds)
Y-direction	3.2 (0.8508 - 0.8608 seconds)
THIV (optional) m/s	
PHD (optional) g	3.2 (0.8508 - 0.8608 seconds)
ASI (optional)	0.25 at 0.3015 seconds on left side of interior
Test Article Damage	Moderate
Test Article Deflections	
Dynamic	2.16 m (7.09 ft)
Permanent	1.91 m (6.27 ft)
Working Width	3.36 m (11.02 ft) at 3.49 m above the ground
Vehicle Damage Exterior	
VDS	11LF-3
CDC	11LFEE3
Maximum Deformation	145 mm









Approx Mass: 517 Kg

Ensure drawing is the correct issue and release before using.

Highway Care LTD
The Highlands
Detling
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Kent ME14 3HT
Tel. +44 (0) 1622 734215
www.highwaycare.co.uk

Rev.	Details.	Dwn.	Date.	Ch'k'd	App'd
A	ECN 324	LH	12/11/18	ST	PD
B	ECN 374	LH	03/06/19	ST	PD

Title: HighwayGuard - 6m Barrier Assembly

DWG No. **HG-10-01-ID**

SHEET 1 OF 1

ISO A4 Landscape	DO NOT SCALE	SCALE 1:30 ALL DIMENSIONS IN mm
Revision	**B**	Status: Released