U.S. Department of Transportation
Federal Highway Administration

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

February 21, 2013

In Reply Refer To:
HSST/ SS-178

Mr. Ron Powell
Chief Executive Officer
Ground Connection, LLC
P.O. Box 5668
Pine Bluff, Arkansas 71611

Dear Mr. Powell,

This letter is in response to your request for the Federal Highway Administration (FHWA) to review a roadside safety system for eligibility for reimbursement under the Federal-aid highway program.

Name of system:	Ground Connection Ground Screw Foundation
Type of system:	Base for breakaway slip bases
Test Level:	NCHRP Report 350 Test Level 3
Testing conducted by:	Texas Transportation Institute
Date of request:	October 24, 2012
Date initially acknowledged:	November 13, 2012
Date of completed package:	November 13, 2012

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

Ground Connection, LLC, Ground Screw Foundation with integral break away plate.

Based on a review of crash test results submitted by the manufacturer certifying the device described herein meets the crash test and evaluation criteria of the National Cooperative Highway Research Program (NCHRP) Report 350, the device is eligible for reimbursement under the Federal-aid highway program. Eligibility for reimbursement under the Federal-aid highway program does not establish approval or endorsement by the FHWA for any particular purpose or use.

The FHWA, the Department of Transportation, and the United States Government do not endorse products or services and the issuance of a reimbursement eligibility letter is not an endorsement of any product or service.

FHWA:HSST:NArtimovich:sf:x61331:2/12/13
File: s://directory folder/HSST/SS178_GroundConnectionFIN.docx
cc: HSST: NArtimovich

Requirements
To be found eligible for Federal-aid funding, roadside safety devices should meet the crash test and evaluation criteria contained in the NCHRP Report 350 or the American Association of State Highway and Transportation Officials' Manual for Assessing Safety Hardware (MASH).

Description
The device and supporting documentation are described in the attached form. Test 510602-GCL P1 consisted of a 4 foot x 8 foot sign mounted on a 2 ½ diameter schedule 80 pipe support on a Texas triangular slip base of ½-inch thick steel. The sign assembly was bolted to a triangular slip base plate welded to a single 3 ½-inch diameter, 42-inch long ground screw installed in standard soil. The generic slip base hardware had been crash tested under NCHRP Report 350 criteria on numerous occasions on rigid foundations. It is commonly referred to as the "omni-directional," "three-bolt," or "triangular" slip base. The Ground Screw Foundation is considered a modification to the foundation of the previously tested slip-base system. Because there was no change to the slip base mechanism itself, FHWA agreed that the system may be tested and evaluated under NCHRP Report 350 criteria.

Summary and Standard Provisions
Therefore, the system described and detailed in the attached form and drawing is eligible for reimbursement and may be installed under the range of conditions tested.

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

- This finding of eligibility does not cover other structural features of the systems, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may influence system conformance with NCHRP Report 350 criteria will require a new reimbursement eligibility letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals safety problems, or that the system is significantly different from the version that was crash tested, we reserve the right to modify or revoke this letter.
- You are expected to supply potential users with sufficient information on design and installation 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 crash test and evaluation criteria of the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of eligibility is designated as number SS-178 and 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 at our office 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. The FHWA does not become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

- The Ground Connection LLC anchors are patent-pending products and considered proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects: (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the 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,

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

Enclosures

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of Transportation
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Washington, D.C. 20590

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Sincerely yours,

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:	October 24, 2012	(•) New ( ) Resubmission
	Name:	Ron Powell, CFO	
	Company:	Ground Connection, LLC	
	Address:	2912 West Second Pine Bluff, AR 71511	
	Country:	USA	
	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.

Help

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'SS': Breakaway Sign Support	(•) Physical Crash Testing ( ) FEA & V&V Analysis	Ground screw foundation with integral break away plate provided by Ground Connection LLC	NCHRP Report 350	TL3

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 NCHRP Report 350 (Report 350) and that the evaluation results meet the appropriate evaluation criteria in the Report 350.

Identification of the individual or organization responsible for the product:

Contact Name:	Ron Powell, CFO	Same as Submitter ☒
Company Name:	Ground Connection, LLC	Same as Submitter ☒
Address:	2912 West Second Pine Bluff, AR 71511	Same as Submitter ☒
Country:	USA	Same as Submitter ☒

PRODUCT DESCRIPTION

( ) New Hardware	(•) Modification to Existing Hardware	Non-Significant - Effect is positive or Inconsequential
Ground Connection sign foundation anchors (small to medium signs) supporting Texas triangular slip base, standard or strong soils		

CRASH TESTING

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-60 (820C)	low speed pendulum test used as a surrogate approximating impact conditions resisted by a new foundation system supporting previously approved break-away sign support device	WAIVER REQUES
S3-60 (700C)	this test is optional and not required	WAIVER REQUES

Required Test Number	Narrative Description	Evaluation Results
3-61 (820C)	high speed test not critical; critical activation of slip base occurs at low speeds	WAIVER REQUES
S3-61 (700C)	this test is optional and not required	WAIVER REQUES

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:	Texas Transportation Institute	
Laboratory Contact:	Dr. Roger Bligh, Ph.D., P.E.	Same as Submitter ☐
Address:	3135 TAMU College Station, TX 77843-3135	Same as Submitter ☐
Country:	USA	Same as Submitter ☐
Accreditation Certificate Number and Date:	A2LA certificate number 2821.01 dated April 30, 2013	

ATTACHMENTS

Attach to this form:

1) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
2) 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 key to understanding the performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

Eligibility Letter		AASHTO TF13	
Number	Date	Designator	Key Words

GLENN TRACY, P.E.

Consulting Engineer
Firm Registration # F-002575
(972) 254-4873 (office)
glenn.tracy@verizon.net (e-mail)

Mailing Address:
P.O. Box 154551
Irving, TX 75015-4551

Office Address:
1400 W. Irving Blvd, Suite 404
Irving, TX 75061

October 24, 2012

Federal Highway Administration
United States Department of Transportation
1200 New Jersey Avenue, SE
Washington DC 20590

attn: Nick Artimovich
202-366-1331
routing: HSST
mail stop: E71322

Re: Request Eligibility for Federal Aid Reimbursement
Ground screw foundation with integral break away plate provided by Ground Connection LLC

Dear Nick Artimovich:

I am a consulting engineer retained by Ground Connection, LLC to assist with engineering needs of their new ground screw foundation products. Part of my services have included coordinating full scale impact testing with Dr. Roger Bligh, P.E., Texas Transportation Institute and assembling this submittal package to you.

Ground Connections, LLC is proud to submit TTI's full scale impact test report and product data sheets for your review and acceptance. Ground Connection's new product is a ground screw foundation with integral break-away (slip type) lower plate. This foundation system installs quickly and can be loaded immediately after installation - upper break-away device components and supported small to medium sized signs simply bolt in-place. Ground screw installation is self-tapping and requires no concrete hole auguring, no concrete placement and requires no delays for concrete curing. Ground screw installations are easily removable and reusable at other locations.

This submittal includes the following:

- Request for Federal Aid Reimbursement Eligibility
- Summary Report by Texas Transportation Institute
- Test Data Summary Sheet prepared by Texas Transportation Institute
- Full Test Video (two)
- Isometric line drawing with detailed specifications, intended use, and contact information
- Product Brochure <hardcopy>

Please feel free to contact me if you have engineering questions or Ron Powell, Ground Connections (870-534-6411, x101) with all other needs. Thank you for your prompt review of this submittal.

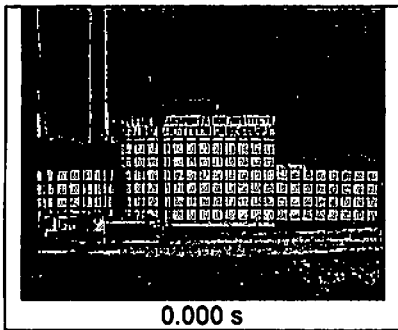
Sincerely,

Glenn Tracy, P.E.

The seal appearing on this document was authorized by Glenn Tracy, P.E. on October 24, 2012.

Encl:	Item	Document on Disk
	Cover Letter	Cover Letter.pdf
	Request for Federal Aid Reimbursement Eligibility	Ground Connection LLC_Ground Screw Foundation_10-24-2012.pdf
	TTI report	TM-GCL-P1-P3-slipbase(v5).pdf
	Test Data Summary Sheet	GCL_Test Data Summary Sheet.pdf
	Full Test Video	510602-GCL_P1A.wmv
	Full Test Video	510602-GCL_P1B.wmv
	Isometric line drawing with detailed specifications, intended use, and contact information	Ground Screw Isometric.pdf
	Product Brochure	<hardcopy>

Table D1. Summary of results for pendulum test 510602-GCL P1.



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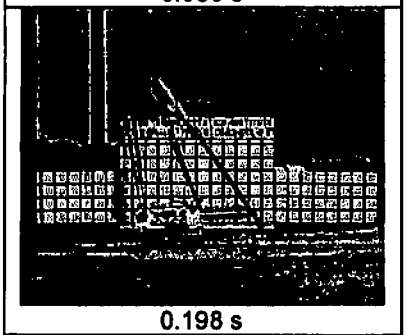

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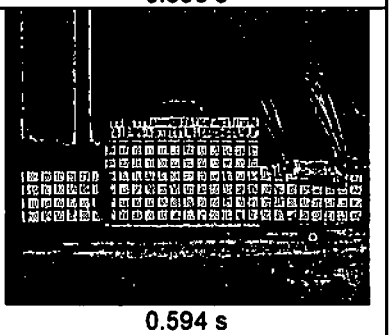

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General Information

Test Agency..... Texas Transportation Institute
Test No.....510602-GCL P1
Date.....2012-05-10

Test Article

Type .....Break-away ground anchor
Name.....Kinner Ground Screw Anchor
Installation Height .....84 inches
Material of Key Element.....4 ft × 8 ft extruded aluminum sign panel on 2½-inch diameter schedule 80 pipe support on Texas triangular slip base of ½-inch thick triangular slip base plate welded to a 3½-inch diameter, 42-inch long ground screw

Soil Type .....Standard Soil

Test Vehicle

Type .....Bogie
Designation.....Pendulum
Test Inertia Mass ..... 1848 lb

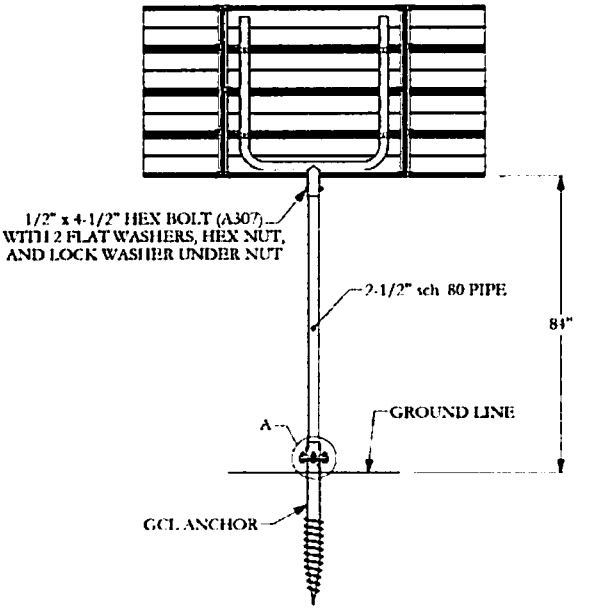
Impact Conditions

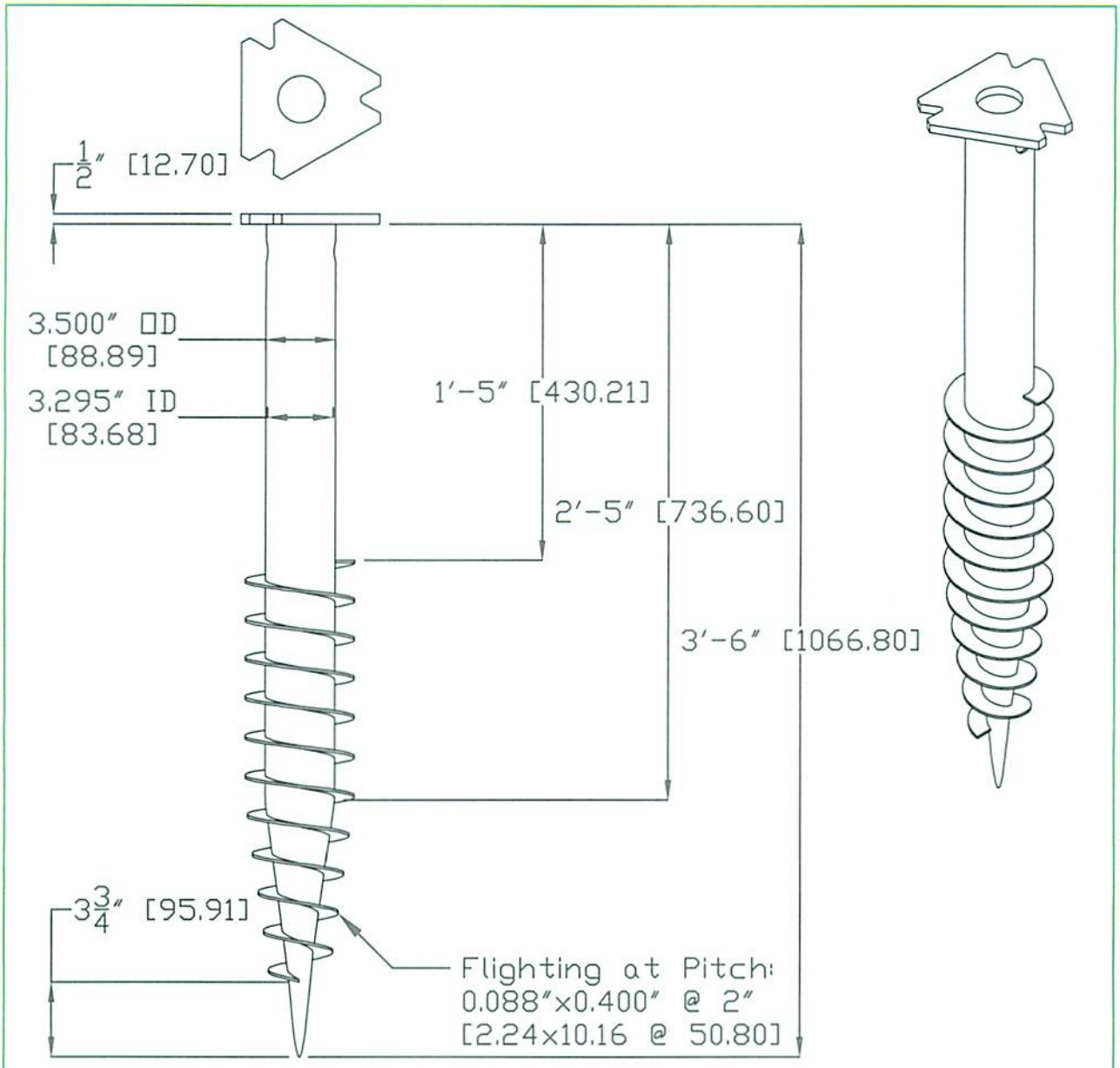
Speed.....21.9 mi/h
Angle ..... 90 deg

Occupant Risk Values

Impact Velocity
Longitudinal direction..... 7.5 ft/s
Ridedown Accelerations
Longitudinal direction..... -1.2 Gs

Maximum Change in Velocity .....Did not lose contact





GROUND CONNECTION GROUND SCREW FOUNDATION WITH INTEGRAL BREAK-AWAY (SLIP TYPE) LOWER PLATE.
THIS FOUNDATION SYSTEM INSTALLS QUICKLY AND CAN BE LOADED IMMEDIATELY AFTER INSTALLATION - UPPER BREAK-AWAY DEVICE COMPONENTS AND SUPPORTED SMALL TO MEDIUM SIZED SIGNS SIMPLY BOLT IN-PLACE. GROUND SCREW INSTALLATION IS SELF-TAPPING AND REQUIRES NO CONCRETE HOLE AUGURING, NO CONCRETE PLACEMENT AND REQUIRES NO DELAYS FOR CONCRETE CURING. GROUND SCREW INSTALLATIONS ARE EASILY REMOVABLE AND REUSABLE AT OTHER LOCATIONS.

Ground Connection Ground Screw Foundation

GROUND CONNECTION, LLC
2912 WEST SECOND
PINE BLUFF, AR 71611

ATTN: RON POWELL
RON@GROUNDCONNECTION.US.COM

1½" = 1'

SHEET NO.	DATE:
1 of 1	10/24/12