



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

December 27, 2019

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

In Reply Refer To:  
HSST-1/WZ-384

Mr. Felipe Almanza  
Traffix Devices Inc.  
160 Avenida La Pata  
San Clemente California 92673

Dear Mr. Almanza:

This letter is in response to your March 28, 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 WZ-384 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:

- Little Buster Sign Stand w/Rigid Sign

### **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: Little Buster Sign Stand w/Rigid Sign

Type of system: Work Zone

Test Level: MASH Test Level 3 (TL3)

Testing conducted by: KARCO

Date of request: March 28, 2019

FHWA concurs with the recommendation of the accredited crash testing laboratory per the attached form for the above device using a 48" x 48" aluminum sign.

**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**

**Standard Provisions**

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number WZ-384 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,

A handwritten signature in black ink that reads "Michael S. Griffith". The signature is written in a cursive, flowing style.

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

Enclosures



## Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

|                  |                  |                                                                      |                                                                         |
|------------------|------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Submitter</b> | Date of Request: | March 19, 2019                                                       | <input checked="" type="radio"/> New <input type="radio"/> Resubmission |
|                  | Name:            | Robert Ramirez                                                       |                                                                         |
|                  | Company:         | Traffix Devices, Inc.                                                |                                                                         |
|                  | Address:         | 160 Ave La Pata, San Clemente, CA 92673                              |                                                                         |
|                  | Country:         | United States                                                        |                                                                         |
|                  | To:              | Michael S. Griffith, Director<br>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 |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------|------------|
| 'WZ': Crash Worthy Work Zone Traffic Control Devices | <input checked="" type="radio"/> Physical Crash Testing<br><input type="radio"/> Engineering Analysis | Little Buster Sign Stand w/ Rigid Sign | AASHTO MASH       | 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 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: | Robert Ramirez                          | Same as Submitter <input checked="" type="checkbox"/> |
| Company Name: | Traffix Devices, Inc.                   | Same as Submitter <input checked="" type="checkbox"/> |
| Address:      | 160 Ave La Pata, San Clemente, CA 92673 | Same as Submitter <input checked="" type="checkbox"/> |
| Country:      | United States                           | Same as Submitter <input checked="" type="checkbox"/> |

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

Traffix Devices Inc. and Applus IDIADA Karco Engineering LLC share no financial interests between the two organizations. This includes no shared financial interest but not limited to:

- i. Compensation including wages, salaries, commissions, professional fees, or fees for business referrals
- iii. Research funding or other forms of research support;
- iv. Patents, copyrights, licenses, and other intellectual property interests;
- vi. Business ownership and investment interests;

## PRODUCT DESCRIPTION

☒ New Hardware or Significant Modification
 ☐ Modification to Existing Hardware

The Traffix Devices Little Buster Sign Stand is a temporary work-zone device consisting of six main components: one steel base assembly, one outer steel mast, one inner steel telescoping mast, one rigid sign bracket, one safe sleeve, and one 48" x 48" aluminum sign.

The steel base consists of a dual spring assembly at the base of the outer mast. When deployed, the steel legs form an X-footprint that has overall dimensions of 38.50 in. [978 mm] x 79.50 in. [2019 mm].

The inner mast telescopes through the outer mast and locks into place when fully extended using a push button.

The rigid sign bracket and the safe sleeve are designed to hold the aluminum sign in place. The sign is removed by loosening the rigid sign bracket to provide clearance for the sign to be lifted and removed from the sign stand.

The Little Buster Sign Stand can be used on concrete, asphalt, gravel, or dirt surfaces. The test was conducted on a concrete surface. The Little Buster Sign Stand can be used with or without flags. Flags were installed for these tests.

The overall dimensions of the Little Buster Sign Stand without optional warning flags is approx. 38.50 in. [978 mm] x 79.50 in. [2019 mm] x 92.0 in. [2336 mm]. Sand bags can be placed on the legs as needed for ballast.

The MASH tested and passed Little Buster Stand, described above, is based on the previously tested and passed NCHRP-350 Little Buster Sign Stand (Reference WZ-206).

## 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 tests are necessary to determine the device meets the MASH criteria.

|                     |                                   |                                                                                                                                                                                            |
|---------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Engineer Name:      | Steven Matsusaka                  |                                                                                                                                                                                            |
| Engineer Signature: | <b>Steven Matsusaka</b>           | Digitally signed by Steven Matsusaka<br>DN: cn=Steven Matsusaka, ou=Applus+IDIADA KARCO Engineering, LLC,<br>ou,email=Steven.Matsusaka@idiada.com, c=US<br>Date: 2019.03.28 18:13:45 -0700 |
| Address:            | 9270 Holly Rd, Adelanto, CA 92301 | Same as Submitter <input type="checkbox"/>                                                                                                                                                 |
| Country:            | United States of America          | Same as Submitter <input type="checkbox"/>                                                                                                                                                 |

A brief description of each crash test and its result:

| Required Test Number | Narrative Description                                                                                                                                                                                                                                                                                                                               | Evaluation Results               |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 3-70 (1100C)         | Designed to evaluate the ability of a small car to activate any breakaway, fracture or yielding mechanism. Test 3-70 is considered optional for work-zone traffic control devices weighing less than 220 lbs (100 kg). The as-tested Little Buster weighted approximately 36 lbs (16 kg) therefore the test was non-relevant and was not conducted. | Non-Relevant Test, not conducted |

| Required Test Number | Narrative Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Evaluation Results |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 3-71 (1100C)         | <p>For this test, two Little Buster Sign Stands were impacted. The first test article was aligned at 90° and the second test article was aligned at 0° to the impacting vehicle's direction of travel. This test is intended to evaluate the sign stand's behavior when impacted by an 1100C test vehicle. The primary evaluation is based on intrusion into the occupant compartment, windshield damage, and vehicle stability. The initial test was conducted on November 21, 2017 however the first device interfered with the second device resulting in a re-test of the second device oriented at 0° on December 11, 2017. The front bumper and windshield were replaced after the first test. According to MASH lightweight devices under 220 lbs (100 kg), such as the Little Buster cannot cause sufficient velocity change that would result in exceeding occupant risk criteria limits. The as-tested devices weighed approximately 36 lbs (16 kg), therefore Test 3-71 was conducted without instrumentation for evaluating occupant risk values. The test was conducted using a commercially available 2014 Hyundai Accent 4 door sedan with a test inertial mass of 2,388.7 lbs. (1,083.5 kg). The test vehicle impacted the first sign stand (oriented at 90°) at a velocity of 62.14 mph (100.00 km/h). Upon impact the aluminum sign rotated about the front end of the vehicle and the bottom corner of the sign released from its bracket. The re-test of the second device (oriented at 0°) used the same commercially available 2014 Hyundai Accent 4 door sedan with a test inertia mass of 2,388.7 lbs. (1,083.5 kg). The test vehicle impacted the sign stand at a velocity of 63.84 mph (102.74 km/h). Upon impact the mast separated at the telescoping joint. The mast and other accessories rotated over the top of the vehicle. The vehicle's occupant compartment was not penetrated by the test articles and the intrusion limits did not exceed the allowable limits in MASH. Debris from the test articles did not block the driver's vision. The vehicle remained upright and the roll angle did not exceed 75°. The vehicle cleared both devices in a controlled and stable manner. The Little Buster Sign Stand met all the requirements for MASH Test 3-71.</p> | PASS               |



|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 3-72 (2270P) | <p>For this test, two Little Buster Sign Stands were impacted. The first test article was aligned at 90° and the second test article was aligned at 0° to the impacting vehicle's direction of travel. This test is intended to evaluate the sign stand's behavior when impacted by a 2270P test vehicle. The primary evaluation is based on intrusion into the occupant compartment, windshield damage, and vehicle stability. According to MASH lightweight devices under 220 lbs (100 kg), such as the Little Buster Sign Stand cannot cause sufficient velocity change that would result in exceeding occupant risk criteria limits. The as-tested devices weighed approximately 36 lbs (16 kg), therefore Test 3-72 was conducted without instrumentation for evaluating occupant risk values.</p> <p>The test was conducted using a commercially available 2011 RAM 1500 4 door pickup with a test inertia mass of 5,002.2 lbs. (2,269.0 kg). The test vehicle impacted the first sign stand (oriented at 90°) at a velocity of 61.97 mph (99.73 km/h). Upon impact the mast separated at its connection point to the base. The aluminum sign and top bracket rotated over the top of the vehicle and did not contact the windshield.</p> <p>The test vehicle continued along its path and impacted the second sign stand (oriented at 0°) at a velocity of 60.68 mph (97.65 km/h). Upon impact the vertical mast separated at its telescoping joint. The vehicle's occupant compartment was not penetrated by the test articles and there was negligible in cab deformation. Debris from the test articles did not block the driver's vision. The vehicle remained upright and the roll angle did not exceed 75°. The vehicle cleared both devices in a controlled and stable manner. The Little Buster Sign Stand met all the requirements for MASH Test 3-72.</p> | PASS |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|

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:                                                                   | Applus IDIADA KARCO Engineering, LLC                                                                                                                                                                                                       |                                            |
| Laboratory Signature:                                                              | <b>Steven Matsusaka</b><br><small>Digitally signed by Steven Matsusaka<br/> DN: cn=Steven Matsusaka, o=Applus IDIADA KARCO Engineering, LLC, ou,<br/> email=Steven.Matsusaka@idiada.com, c=US<br/> Date: 2019.03.28.18:15:33 -0700</small> |                                            |
| Address:                                                                           | 9270 Holly Rd, Adelanto, CA 92301                                                                                                                                                                                                          | Same as Submitter <input type="checkbox"/> |
| Country:                                                                           | United States of America                                                                                                                                                                                                                   | Same as Submitter <input type="checkbox"/> |
| Accreditation Certificate<br>Number and Dates of current<br>Accreditation period : | TL-371, September 14, 2018 - July 1, 2019                                                                                                                                                                                                  |                                            |

Submitter Signature\*: Robert Ramirez Digitally signed by Robert Ramirez  
Date: 2019.03.29.09:11:21 -0700

**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 |
|                    |      |           |



# MASH 2016 Test 3-71 Summary

90° CIA

0° CIA



## GENERAL INFORMATION

Test Agency..... KARCO Engineering, LLC.  
KARCO Test No..... P37343-01  
Test Designation..... 3-71  
Test Date..... 11/21/17

## TEST ARTICLE

Name / Model..... Little Buster  
Type..... Work Zone Device  
Device Height..... 7.7 ft. (2.3 m)  
Key Elements..... 0.080" Aluminum Substrate  
Road Surface..... Concrete

## TEST VEHICLE

Type / Designation..... 1100C  
Year, Make, and Model..... 2014 Hyundai Accent  
Curb Mass..... 2,466.9 lbs (1,119.0 kg)  
Test Inertial Mass..... 2,388.7 lbs (1,083.5 kg)  
Gross Static Mass..... 2,536.4 lbs (1,150.5 kg)

## Impact Conditions

Impact Velocity Device 1..... 62.14 mph (100.00 km/h)  
Impact Velocity Device 2..... 63.84 mph (102.74 km/h)  
Device 1 Angle..... 90°  
Device 2 Angle..... 0°  
Device 1 Kinetic Energy..... 308.3 kip-ft (418.0 kJ)  
Device 2 Kinetic Energy..... 325.4 kip-ft (441.2 kJ)

## Exit Conditions

Device 1 Exit Velocity..... 59.6 mph (96.0 km/h)  
Device 2 Exit Velocity..... 61.6 mph (99.1 km/h)  
Vehicle Resting Position..... 335.6 ft. (102.3 m) Downstream  
1.2 ft. (0.4 m) Left  
Vehicle Stability..... Satisfactory  
Maximum Roll Angle..... N/A\*  
Maximum Pitch Angle..... N/A\*  
Maximum Yaw Angle..... N/A\*

## Occupant Risk\*

Longitudinal OIV..... N/A  
Lateral OIV..... N/A  
Longitudinal RA..... N/A  
Lateral RA..... N/A  
THIV..... N/A  
PHD..... N/A  
ASI..... N/A

## Test Article Deflections

Debris Field (longitudinal)..... 314.5 ft. (95.9 m)  
Debris Field (lateral)..... 32.3 ft. (9.8 m)

## Vehicle Damage

Vehicle Damage Scale..... 12FD1  
CDC..... 12FDAW1  
Maximum Intrusion..... 2.0 in. (51 mm)

\* Not Applicable, device weighs less than 220 lbs (100 kg)

Figure 2 Summary of Test 3-71

## MASH 2016 Test 3-72 Summary

90° CIA

0° CIA



### GENERAL INFORMATION

Test Agency..... KARCO Engineering, LLC.  
KARCO Test No..... P37343-02  
Test Designation..... 3-72  
Test Date..... 11/17/17

### TEST ARTICLE

Name / Model..... Little Buster  
Type..... Work Zone Device  
Device Height..... 7.7 ft. (2.3 m)  
Key Elements..... 0.080" Aluminum Substrate  
Road Surface..... Concrete

### TEST VEHICLE

Type / Designation..... 2270P  
Year, Make, and Model..... 2011 RAM 1500  
Curb Mass..... 5,142.2 lbs (2,332.5 kg)  
Test Inertial Mass..... 5,002.2 lbs (2,269.0 kg)  
Gross Static Mass..... 5,002.2 lbs (2,269.0 kg)

### Impact Conditions

Impact Velocity Device 1..... 61.97 mph (99.73 km/h)  
Impact Velocity Device 2..... 60.68 mph (97.65 km/h)  
Device 1 Angle..... 90°  
Device 2 Angle..... 0°  
Device 1 Kinetic Energy..... 642.2 kip-ft (870.7 kJ)  
Device 2 Kinetic Energy..... 615.7 kip-ft (834.7 kJ)

### Exit Conditions

Device 1 Exit Velocity..... 61.2 mph (98.4 km/h)  
Device 2 Exit Velocity..... 59.5 mph (95.7 km/h)  
Vehicle Resting Position..... 333.7 ft. (101.7 m) Downstream  
0.7 ft. (0.2 m) Right  
Vehicle Stability..... Satisfactory  
Maximum Roll Angle..... N/A\*  
Maximum Pitch Angle..... N/A\*  
Maximum Yaw Angle..... N/A\*

### Occupant Risk\*

Longitudinal OIV..... N/A  
Lateral OIV..... N/A  
Longitudinal RA..... N/A  
Lateral RA..... N/A  
THIV..... N/A  
PHD..... N/A  
ASI..... N/A

### Test Article Deflections

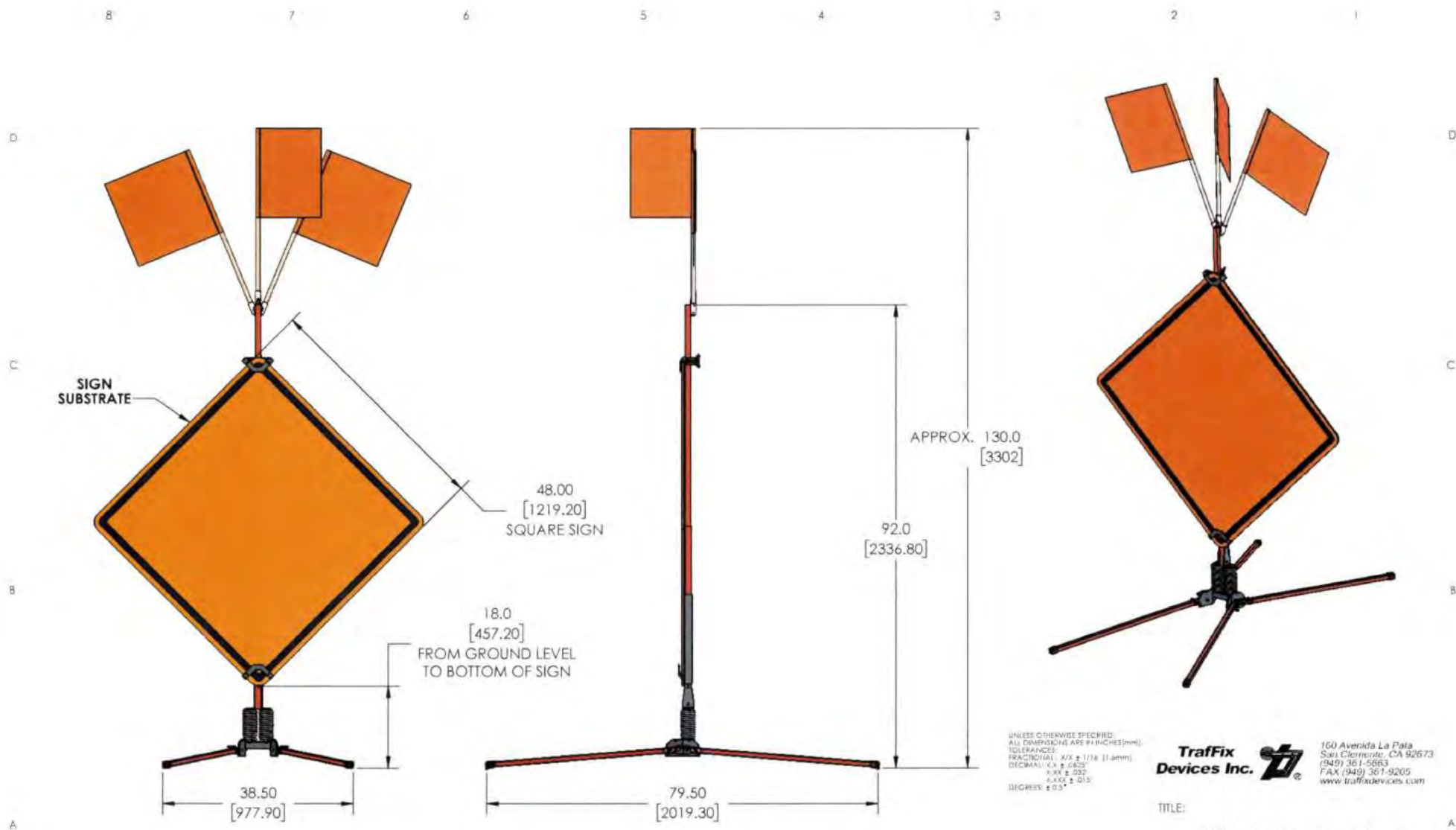
Debris Field (longitudinal)..... 138.8 ft. (42.3 m)  
Debris Field (lateral)..... 19.9 ft. (6.1 m)

### Vehicle Damage

Vehicle Damage Scale..... N/A  
CDC..... N/A  
Maximum Intrusion..... 0.0 in. (0 mm)

\* Not Applicable, device weighs less than 220 lbs (100 kg)

Figure 2 Summary of Test 3-72



# Little Buster Sign Stand

1. Units: Inches [mm]

**NOTES: UNLESS OTHERWISE SPECIFIED**

DRAWN BY:  
Christopher J. Smith  
CHECKED BY:  
FA  
APPROVED BY:  
FA

DATE:  
1/15/17  
DATE:  
1/15/17  
DATE:  
1/15/17

SIZE  
**B**

DWG. NO.  
500-205

REV  
**A**

SHEET 1 OF 1