



**California Traffic Control Devices Committee (CTCDC)
Agenda Item Report**



Meeting Date: November 7, 2024	From: Andreas Krause, Caltrans
Item Number: 24-13	
Sponsored By: Amjad Obeid, Caltrans	Presented By: Andreas Krause, Caltrans
Description: Proposal to include three new Tsunami Hazard Zone signs, which were developed by the National Tsunami Hazard Mitigation Program, to the CAMUTCD revision 8. Add Section 2N.101(CA) titled Tsunami Signs (SG61(CA) Series), Figure 2N-1(CA), Table 2N-1(CA), and add a note to Table 2N-1 in the CAMUTCD revision 8.	

Recommendation:

Motion by the committee to recommend inclusion of three Tsunami Hazard Zone signs (SG61A(CA), SG61B(CA) and SG61C(CA)) to a new Section 2N.101(CA) to Chapter 2N of the CAMUTCD revision 8 and add a note to Table 2N-1.

Agency Making Request/Sponsor:

Requesting Agency is Caltrans. Amjad Obeid, Caltrans HQ Safety Programs; Andreas Krause, Caltrans District 1

Request supported by: California Governor's Office of Emergency Services, Tsunami Program, Yvette LaDuke, Program Manager.

Background:

All 20 coastal counties along the California coast (spanning Caltrans Districts 1, 4, 5, 7, 11, and 12) have officially mapped tsunami hazard zones. The National Tsunami Hazard Mitigation Program (NTHMP) is a partnership led by the National Oceanic and Atmospheric Administration (NOAA) that includes the Federal Emergency Management Agency, the U.S. Geological Survey and 28 U.S. states and territories. The State of California is a member of the NTHMP as represented by the California Governor's Office on Emergency Services (Cal OES) and the California Geological Survey (CGS). The NTHMP developed six tsunami hazard signs for use in California (EM-1a, EM-1B, EM-1Ce, EM-1CI, EM-1D, and EM-1E). These six tsunami hazard signs are important tools to communicate tsunami risk to the public and facilitate emergency evacuations. Thousands of these signs have already been installed throughout the 20 coastal counties of California. However, the California Manual on Uniform Traffic Control Devices (CAMUTCD) and new 11th edition of the Federal MUTCD currently only include one of these six tsunami signs (the EM-1a evacuation route sign). See Attachment A: CAMUTCD Figure 2N-1 for the currently approved EM Sign series.







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The public will only have minutes to hours to evacuate when a tsunami occurs. For the public to plan and execute a successful evacuation they must inherently understand the boundaries of tsunami hazard zones. The State of California has official maps of the tsunami hazard zones (<https://www.conservation.ca.gov/cgs/tsunami/maps>). The boundaries of tsunami hazard zones are often located in relative flat areas with no visible distinguishing features on the landscape that would indicate the start and end of tsunami hazard zone boundaries. Therefore, roadside signage is needed for the travelling public to understand the boundaries of tsunami hazard zones and when they reach safety when evacuating. The EM-1a tsunami evacuation route sign currently included in the CAMUTCD is insufficient to delineate tsunami hazard zone boundaries. Caltrans is proposing three new tsunami signs be added to the CAMUTCD to provide the public awareness needed to understand where tsunami hazard zone boundaries are located both before and during a tsunami. The three proposed signs include EM1-Ce (entering tsunami hazard zones), EM1-CI (leaving tsunami hazard zones), and the EM-1E (referencing continued travel within a tsunami hazard zone). These three proposed signs have the same background logo as the CAMUTCD approved EM-1a sign. See Attachment A: CAMUTCD Figure 2N-1 for the approved background logo of the EM-1a sign. The three proposed signs would be specific to California as they have not yet been adopted by the Federal MUTCD. Therefore, Caltrans is recommending that the sign numbering for adoption in the CAMUTCD be changed from the EM designations assigned by the NTHMP to a new California specific SG61 (CA) sign designation. Table 1 shows the existing and proposed tsunami signs for inclusion in the CAMUTCD and provides the original sign designations from the NTHMP and the new proposed California specific sign designations for CAMUTCD adoption. The signs in Table 1 proposed for inclusion in the CAMUTCD do not include the NTHMP signs EM-1B (Tsunami Hazard Zone) and EM-1D (Tsunami Evacuation Site) because these signs use a different background logo that has not been approved by the Federal MUTCD for use.

Table 1: Tsunami Sign Descriptions

Sign Panel				
Description	Tsunami Evacuation Route	Entering Tsunami Hazard Zone	Leaving Tsunami Hazard Zone	Tsunami Hazard Zone
NTHMP Sign Designation	EM-1a	EM-1Ce	EM-1CI	EM-1E
CAMUTCD Sign Designation	EM-1a	SG61A(CA)	SG61B(CA)	SG61C(CA)
CAMUTCD Status	Approved	Proposed	Proposed	Proposed

In July 2005, Caltrans HQ Traffic Operations requested interim approval from the Federal Highway Administration (FHWA) for use of five tsunami hazard signs. FHWA did not provide interim approval because the request did not meet all the interim approval conditions. However, FHWA recognized the urgency to deploy tsunami hazard zone signs and did grant experimental approval for the sign placement. The experimental approval came with the conditions that Caltrans submit a list of locations, length of experiment, and an evaluation plan. The request letter and FHWA approval are provided in Attachment B and C, and also on FHWA website for official rulings on the MUTCD under request #2-268:

https://mutcd.fhwa.dot.gov/reqdetails.asp?id=2-568_E.

Under the experimental approval from FHWA, Caltrans District 1 installed 206 tsunami hazard zone signs (EM-1Ce, EM-1CI or EM-1E) between 2008 and 2011. The signs were installed on the state highway at every tsunami hazard zone in the coastal counties of District 1 (Del Norte, Humboldt, and Mendocino). Caltrans District 1 partnered with the Geology Department at Cal Poly Humboldt (formerly Humboldt State University) to identify the tsunami hazard zone boundaries and sign placement locations. The District 1 tsunami signs are reaching the end of their life cycle age and are due for replacement and upgrade to modern retro-reflectively standards. Placing new tsunami hazard zone signs on the state highway (including updating the existing District 1 signs) is not allowed until the signs are incorporated into the CAMUTCD.



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Caltrans is not aware of any formal evaluation of the tsunami hazard zone signs as was requested by FHWA in their 2005 experimental approval letter. The travelling public has had upwards of 16 years to become familiar with the tsunami signs installed across California. There have been no reported negative traffic safety or operational impacts associated with the signs during this time period. The 2005 request to FHWA for interim approval to install Tsunami signs in California did not specify sign sizes. All tsunami hazard zone signs installed by Caltrans on the State Highway System range in size from 18" x 18" to 24" x 30" to be consistent with existing CAMUTCD size guidance for the EM-1a tsunami evacuation route sign. The District 1 experience is that the 24" X 30" signs are appropriate for lower speed roadways but are too small to read on high speed roadways like expressways and freeways. Therefore, the sizes for the proposed signs in Attachment A, Table 2N-1 (CA) "California Tsunami Sign Sizes" range from 18" X 18" up to a maximum of 42" X 48" to address sign installation on high-speed roadways. This maximum tsunami sign size is consistent with entering / leaving tsunami hazard zone sign size specification from the State of Oregon. Appendix A also recommends a revision to the notes for sign size table 2N-1 for the EM-1a tsunami evaluation route sign. The current 2N-1 table only specifies a minimum sign size with an existing note that "larger sign sizes may be used when appropriate. The recommended note revision adds a new note stating, "See Table 2N-1 (CA) for additional sign sizes applicable to the EM-1a sign." The purpose of this note revision is to standardize the optional larger sign sizes for the EM1-a sign with the larger sign sizes being specified for the new SG61 (CA) tsunami hazard zone signs on the higher speed roadways.

Over the last decade, Cal OES used funding provided through NOAA's National Weather Service NTHMP grant program to procure thousands of new and replacement signs that were distributed to local agencies in California's coastal counties. These signs were installed by the local agencies within the tsunami hazard areas across California to provide potentially life-saving guidance to the millions of people who live, work, and recreate along California's coast each year. The signs procured through the NOAA grant program include all six sign types developed by the NTHMP and range in size from 8" X 10" to 24" X 30".

This request represents a two-prong approach for including tsunami hazard signs in the CAMUTCD. First, this request from Caltrans recognizes the urgent need to include tsunami hazard zone signs in the CAMUTCD. To facilitate expedited approval by the CTCDC, this request focuses on the three tsunami hazard zone signs that are consistent with the 2005 FHWA experimental approval; contain background symbols that are already approved in the Federal and California MUTCD's; and reclassifies the sign number to indicate these are special California signs since they are not yet approved in the Federal MUTCD. Additionally, this request limits the proposed sign sizes to be consistent with the existing size specification in the CAMUTCD for the



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approved EM-1a tsunami evacuation route sign but also specifies larger sign sizes for high-speed roadways. Second, the Cal OES Tsunami Program plans to work with the NTHMP to engage FHWA separately to include all six tsunami sign types developed by the NTHMP into the Federal MUTCD. The Cal OES effort for Federal MUTCD adoption will also explore creating a wider range of sign sizes, including signs smaller than 18" X 18". If the Cal OES effort to obtain Federal MUTCD approval is successful, these additional sign types and sign sizes will eventually be able to be adopted in the CAMUTCD.

Attachments:

Attachment A: Proposed New Section 2N.101(CA), CAMUTCD Figure 2N-1 (currently approved EM Sign series), Proposed Figure 2N-1(CA) and proposed Table 2N-1(CA) of the CAMUTCD. Proposed note revision to Table 2N-1.

Attachment B: Caltrans Request to FHWA dated July 13, 2005 for Interim Sign Approval for Tsunami Hazard Zone Signs

Attachment C: Response letter from FHWA dated September 15, 2005



ATTACHMENT A

NOTES:

Black text is consistent with the Federal MUTCD.

Blue text is current text as amended for use in California.

~~Struck out blue text~~ is to be deleted from the CA MUTCD.

Red text is newly proposed text.

Proposed New Section 2N.101(CA) to the CAMUTCD

Section 2N.101(CA) Tsunami Hazard Zone Signs (SG61A(CA), SG61B(CA), and SG61C(CA))

Support:

The California Governor's Office of Emergency Services (Cal OES) and California Geologic Survey provide the official tsunami hazard zone maps for California. Cal OES also provides guidance and support to local jurisdictions who are responsible for developing tsunami emergency response plans and defining tsunami evacuation routes. Tsunami evacuation routes developed by local jurisdictions can include portions of the State Highway System.

Guidance:

The ENTERING TSUNAMI HAZARD ZONE (SG61A(CA)) sign and the LEAVING TSUNAMI HAZARD ZONE (SG61B(CA)) sign should be installed on State Highways and other roads to delineate the tsunami hazard zone boundaries as defined by Cal OES and the California Geologic Survey.

The TSUNAMI HAZARD ZONE (SG61C(CA)) sign should be installed on road segments within tsunami hazard zones that are not officially defined as tsunami evacuation routes. The EM-1a tsunami evacuation route sign should be used instead of the SG61C(CA) sign on road segments officially defined as tsunami evacuation routes. The SG61C(CA) sign should also be placed at public places within the tsunami hazard zones such as: beaches, parks, parking lots, harbors, ports, vista points, trails, and other places deemed necessary.

Standard:

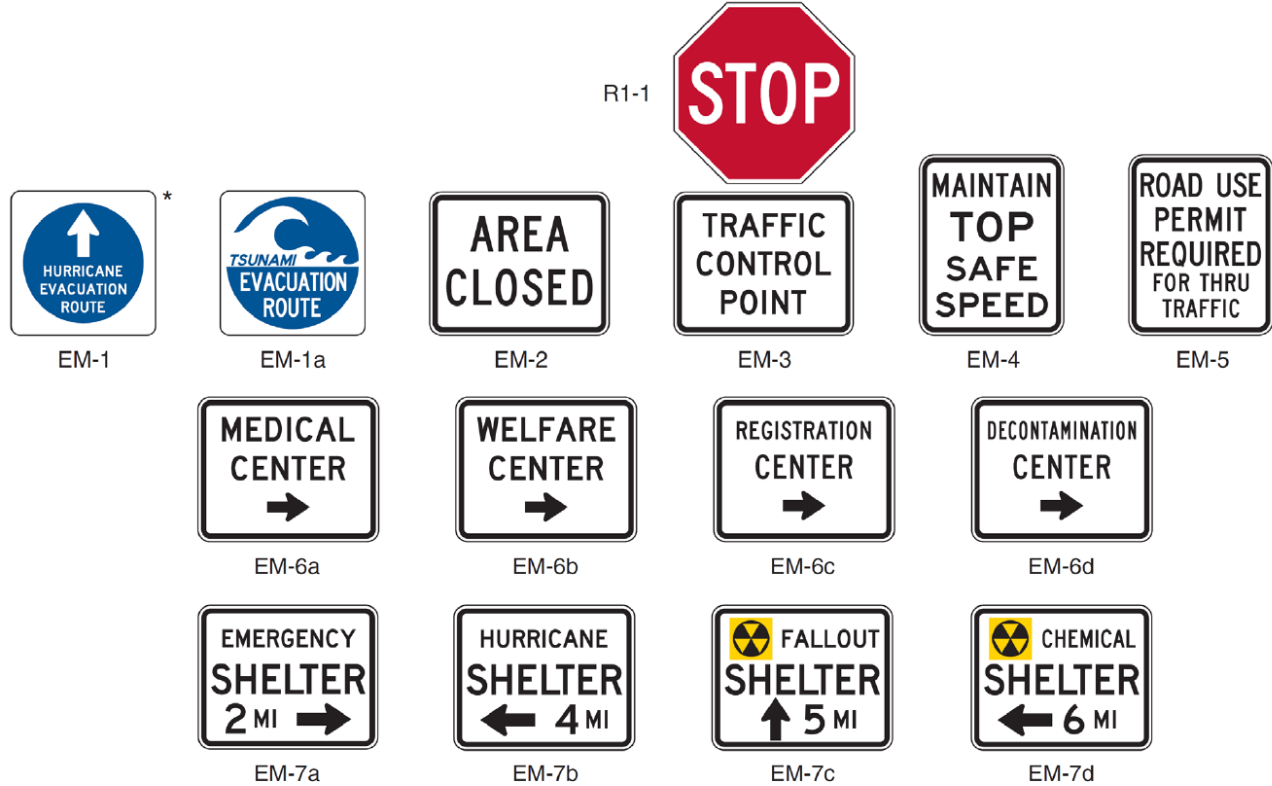
Tsunami Hazard Zone signs shall not be placed where they will conflict with other signs. Where conflict in placement would occur between the Tsunami Hazard Zone sign and a standard regulatory sign, the regulatory sign shall take precedence.

Option:

In case of conflict with guide or warning signs, the Tsunami Hazard Zone sign may take precedence.

CAMUTCD Figure 2N-1 (currently approved EM Sign series)

Figure 2N-1. Emergency Management Signs



* HURRICANE is an example of one type of evacuation route. Legends for other types may also be used, or this line of text may be omitted.

Proposed New Figure 2N-1(CA)

Figure 2N-1(CA) California Emergency Management Signs



Proposed New Table 2N-1(CA)

Table 2N-1(CA). California Tsunami Sign Sizes

Sign or Plaque	Sign Designation	Section	Single Lane Conventional Highway *	Multi Lane Conventional Highways	Expressway	Freeway
Entering Tsunami Hazard Zone	SG61A(CA)	2N.101(CA)	24 x 30	36X42	42 x 48	42 x 48
Leaving Tsunami Hazard Zone	SG61B(CA)	2N.101(CA)	24 x 30	36X42	42x 48	42x 48
Tsunami Hazard Zone	SG61C(CA)	2N.101(CA)	24 x 24	36X36	42X42	42X42

* A minimum sign size of 18 X 18 may be used on low-volume roadways or roadways with speeds of 25 mph or less.

Notes: 1. Dimensions in inches are shown as width x height

2. Sign sizes are also applicable to EM-1a sign.



Add Note 3 to Table 2N-1

Table 2N-1. Emergency Management Sign Sizes

Sign or Plaque	Sign Designation	Section	Minimum Size
Evacuation Route	EM-1,EM-1a	2N.03	24 x 24*
Area Closed	EM-2	2N.04	30 x 24
Traffic Control Point	EM-3	2N.05	30 x 24
Maintain Top Safe Speed	EM-4	2N.06	24 x 30
Permit Required	EM-5	2N.07	24 x 30
Emergency Aid Center	EM-6a to EM-6d	2N.08	30 x 24
Shelter Directional	EM-7a to EM-7d	2N.09	30 x 24

* A minimum size of 18 x 18 may be used on low-volume roadways or roadways with speeds of 25 mph or less

- Notes:
1. Larger signs may be used when appropriate
 2. Dimensions in inches are shown as width x height
 3. See Table 2N-1(CA) for additional sign sizes applicable to EM-1a sign.



ATTACHMENT B:

Caltrans Request to FHWA dated July 13, 2005 for Interim Sign Approval for Tsunami Hazard Zone Signs



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STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

ARNOLD SCHWARZENEGGER, Governor

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DIVISION OF TRAFFIC OPERATIONS
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*Flex your power!
Be energy efficient!*

July 13, 2005

Ms. Regina McElroy, Director
Office of Transportation Operations
U.S. Department of Transportation
Federal Highway Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Ms. McElroy:

The California Department of Transportation (Caltrans) requests permission to place tsunami signing in California under interim approval. The enclosed report provides details and pertinent information regarding the proposed tsunami signs.

The basis of this request for interim approval is experience in the United States, Puerto Rico and other countries. This experience and enclosed report satisfy the intent and requirements of Section 1A.10 of the 2003 Manual on Uniform Traffic Control Devices (MUTCD) regarding interim approval to place a traffic control device.

The State of Oregon adopted four basic designs for tsunami signs that it helped develop under the auspices of the National Tsunami Hazard Mitigation Program, which was a federally sponsored and funded project. Caltrans is proposing to adopt three of Oregon's signs and modify one other. Essentially, Caltrans is proposing to use the same design for TSUNAMI EVACUATION ROUTE and TSUNAMI HAZARD ZONE signs currently used in the States of Alaska, Oregon, and Washington. In addition, Chile, Puerto Rico, and Thailand use the same type of signs.

Over one thousand of these signs have been installed worldwide with success and public acclamation. These signs have been in use since 1996 in Chile and since 1997 in the United States, and recently Thailand has begun installing these signs. The signs are not in the 2003 MUTCD. To maintain uniformity and public familiarity on the Continental Pacific Coast, Caltrans prefers to use the same signs as its neighboring States. The public has become accustomed to the familiar tsunami wave-symbol used on the signs.

California is introducing a modification to Oregon's ENTERING/LEAVING TSUNAMI HAZARD ZONE sign to make it consistent with the TSUNAMI EVACUATION ROUTE sign for public recognition. Oregon has agreed conceptually with this modification. In addition, the

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California version of the TSUNAMI EVACUATION ROUTE sign will have a square-shaped background and black border like the federal EVACUATION ROUTE (EM-1) sign. Oregon also intends to change to the square-shaped background for this sign.

I would appreciate expeditious approval of this request. Because of the recent event in the Indian Ocean and an earthquake off the coast near Crescent City, California, there is a sense of urgency to place signs along the California coast.

If you need additional information, please contact me by telephone at (916) 654-4551 or by email at < gerry_meis@dot.ca.gov >.

Sincerely,

GERRY MEIS
Chief
Office of Signs, Markings and Permits

Enclosure

"Caltrans improves mobility across California"



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bcc: Kris Balaji
Asif Haq
Greg Edwards
Nancy Dean – NOAA < Nancy.Dean@noaa.gov >
Matt Schmitz – FHWA < matthew.schmitz@fhwa.dot.gov >
Greg Stellmach < Gregory.F.Stellmach@state.or.us >

"Caltrans improves mobility across California"

**Request for Interim Approval
Tsunami Signs in California**

A. Problem Statement

The National Oceanic and Atmospheric Administration (NOAA) has asked the California Department of Transportation (Caltrans) to adopt tsunami signs like those signs currently used in Alaska, Oregon, and Washington. Caltrans has not adopted these tsunami signs for California. These signs are not contained in the federal 2003 Manual on Uniform Traffic Control Devices (MUTCD).

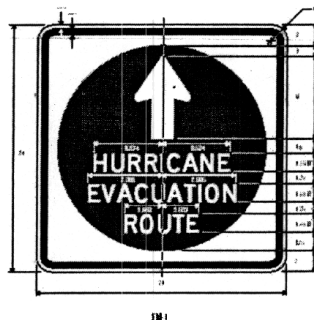
The Pacific coastline of the United States has a geological history of catastrophic tsunamis. The frequency of seismic-activity along the California coast, coupled with the recent Indian Ocean tsunami disaster, has elevated the need for tsunami signs in California. Except the Crescent City area in northern California, there are no signs along the California coast. During the past century, the waters off the Alaskan coast generated four large tsunamis. In 1964, one of them devastated the small northern California community of Crescent City and caused damage as far south as Long Beach Harbor. Caltrans wants to do everything possible in the interest of public safety, including installation of signs in an expeditious manner and adopting signs which local agencies may use.

An estimated 489 coastal communities within the Pacific Northwest States of Alaska, California, Hawaii, Oregon, and Washington are susceptible to tsunamis; as many as 900,000 residents of these communities are in tsunami-inundation areas.

B. Description of Proposed Change

1. The current standard for tsunami evacuation route signing is the federal EVACUATION ROUTE (EM-1) sign shown below. It is found in Figure 2I-1 "Emergency Management Signs" of the 2003 MUTCD. However, there is very little support for using this sign along the California coast for various reasons discussed in the ensuing report.

Federal EM-1 Evacuation Route Sign



© 2003 CALTRANS - WHITE INTERMEDIATE/BLACK
MUTCD 2003 - 2I.1.1 - 18" X 18" PLATE

July 12, 2005

2. Instead of the federal EVACUATION ROUTE (EM-1) sign, Caltrans is requesting interim approval to use proposed new signs (shown below) in tsunami-inundation areas along the coast of California. There is strong support for these signs.

California Proposed Tsunami Signs



A

B

C

C (Alt)

D

Caltrans has made minor modifications to Oregon traffic sign specifications to develop the above signs. Signs will be available in various sizes appropriate for the roadway type. Attached are California traffic sign specifications for these tsunami signs. Blue color and font will be in accordance with standards set forth in the 2003 MUTCD. Essentially, these signs are consistent with the tsunami signs now used in Alaska, Oregon, and Washington, Chile, Puerto Rico, and Thailand.

A
Local emergency-management officials will designate routes and locations for placement of the TSUNAMI EVACUATION ROUTE sign. Alaska, Oregon and Washington use this sign. Other than the wave-symbol, it is consistent with the federal EVACUATION ROUTE (EM-1) sign.

B
Local emergency-management officials will designate appropriate locations for placement of the TSUNAMI HAZARD ZONE / IN CASE OF EARTHQUAKE, GO TO HIGHER GROUND OR INLAND sign. Generally, these locations will be low-speed streets near the coast, parking lots, parks and beaches. Caltrans does not plan to use this sign on high-speed facilities or along an evacuation route. Alaska, Oregon, Washington, Chile, Puerto Rico, and Thailand use this sign.

C
The ENTERING / LEAVING TSUNAMI HAZARD ZONE sign will delineate the boundary of potential inundation areas on State highways, and local streets and roads. This is a modification of the Oregon sign. The modification is necessary to make the sign consistent with the TSUNAMI EVACUATION ROUTE sign for public recognition. Oregon has agreed conceptually with this modification.

D
Local emergency-management officials will designate sites and locations for placement of the EVACUATION SITE sign, which directs road users and pedestrians to a safe area. Oregon uses this sign. Alaska uses a similar sign.



ATTACHMENT C:

Response letter from FHWA dated September 15, 2005



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Mr Jim Baron, ATSSA



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

September 15, 2005

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

Refer to: HOTO-1

Mr. Gerry Meis
Chief
Office of Signs, Markings and Permits
California Department of Transportation
1120 N Street, MS 36
Sacramento, CA 94273-0001

Dear Mr. Meis:

Thank you for your July 13 request for Interim Approval to install the Tsunami Symbol Sign in California. We have reviewed the background material that was included with your request.

When considering whether issuance of an Interim Approval (IA) under MUTCD Section 1A.10 might be appropriate for a new traffic control device (TCD), a revised application or manner of use of an existing TCD, or a provision not specifically described in the MUTCD, the following criteria must be satisfied:

1. Research and/or review of experience with the item proposed for IA has been completed and clearly shows the item is successful, and:
 - a. It has a low risk of safety or operational concerns.
 - b. Potential safety, operational, or cost benefits merit earlier implementation by agencies that wish to use it.
2. The item would be for optional use and the IA would not create a new mandate or recommendation for use.
3. There is an indication of strong consensus in the practitioner community in support of optional use of the item under IA. This consensus can be gauged by discussions of the item at the NCUTCD meetings and/or other forums as appropriate.
4. Low risk of significant negative reaction to the issuance of an IA by industry or other stakeholder groups.

These criteria set a high standard of safety and effectiveness because Interim Approvals provide for the widespread application of new traffic control devices in diverse settings. Your Interim Approval request package did not include any documented research or any other evidence that shows that road users can clearly comprehend the Tsunami Symbol and that this symbol has a low risk of safety and operational concerns. Also, the broader traffic control practitioner community has not had an opportunity to review the Tsunami symbol. Therefore, we are unable to approve your Interim Approval request at this time. In the event of a Tsunami warning, it is critical that road users comprehend the Tsunami Symbol Sign and be able to react in a safe and expected manner.





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2

Given the urgency to install these signs arising from recent Tsunami events in the Indian Ocean, we are approving experimentation of the five requested signs included in your letter. However, this approval is conditional upon your submittal of an evaluation plan, a list of the location sites or areas where these signs will be installed, and the length of the experimentation. In case you have not finalized the locations where these signs will be installed for experimentation, you can submit a tentative list of locations that can be amended later upon your request. This office will help you develop an evaluation plan for testing these signs and provide advice on how to collect data which would address the issue of how do unfamiliar drivers respond to the Tsunami Symbol.

We appreciate the opportunity to provide this information and look forward to working together in this effort. For recordkeeping purposes, we have assigned the following official ruling number to your request: "2-568(E)—Tsunami Symbol (CA)." If you have additional questions, please contact Ms. Linda Brown of my staff at 202-366-2192 or email Ms. Linda L. Brown at Linda.L.Brown@fhwa.dot.gov.

Sincerely yours,

Regina S. McElroy
Director, Office of Transportation
Operations

cc: Mr. Jim Baron, ATSSA