



## 2012 National Awards in Excellence Nomination Form

Presented at the National Earthquake Conference  
Memphis, Tennessee  
April 10-14, 2012

### Award Category (check all that apply)

- Mitigation
- Response & Recovery
- Plans/Materials
- Use of New Technology
- Innovations (i.e. Private/Public Partnership)
- Research
- Non-Profit Agency Efforts
- Multi-Jurisdictional Planning
- Outreach

### Nominated Program, Project, or Product

Nominated Program, Project or Product: **Project Safe Haven**

Nominated Administering Organization: **Washington State Emergency Management Division, University of Washington, Washington Department of Natural Resources**

Contact Name/Title: **Mr. John D. Schelling, Earthquake Program Manager**

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### Nomination Made By *(must be nominated by someone outside the nominated organization)*

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1. Please write a **one-page** summary describing the program, product, or project that details the issue addressed, the nature of the work, and any resulting materials/products. (Please submit such materials electronically.) The summary will be posted on the conference website at [www.earthquakeconference.org](http://www.earthquakeconference.org) and [www.wsspc.org](http://www.wsspc.org).

Recent catastrophic tsunamis (i.e., 2004 Indian Ocean, 2009 Samoa, 2010 Chile, and 2011 Japan) have raised awareness of tsunami hazards around the world. Coastal communities in many parts of the United States have identified local tsunami hazards, like the Cascadia Subduction Zone off the west coast, that could inundate a nearby community only minutes after the occurrence of substantially damaging earthquake. Traditional tsunami evacuation methods for locally generated tsunamis encourage at-risk populations to move on foot to areas of refuge, such as naturally occurring high ground, upon feeling the ground shake or witnessing any of ‘nature’s warnings’ like ground shaking, water receding from the shoreline, or a loud ocean roar.

Successful pedestrian evacuations are possible in many areas of Washington State given the short distances that at-risk populations would need to travel in order to reach high ground. However, in several densely populated areas, there are significant horizontal distances that at-risk populations must cover in the minutes they have between initial earthquake and subsequent tsunami inundation. For example, in several areas of the outer coast of Washington State, residents and tourists would need to travel over 6.8 miles in 30 to 40 minutes to reach areas outside of predicted tsunami-hazard zones associated with a Cascadia Subduction Zone earthquake. In these situations, alternatives to traditional horizontal evacuation approaches are required to protect lives.

To address this shortfall in existing evacuation capacity, Project Safe Haven, a grassroots process to develop community supported ideas and strategies for integration of vertical evacuation safe havens within the natural and built environments, was established in 2009-10. The development of this community-based planning approach for tsunami vertical evacuation is the first of its kind in the United States and several other states and territories, like Oregon, New York and Puerto Rico, are examining the process that was used and the local results. Project Safe Haven is led by Washington State Emergency Management, University of Washington’s College of Built Environments, the Washington State Department of Natural Resources, along with a steering committee of federal and local officials.

Project Safe Haven is based upon planning guidance that was authored by the Applied Technology Council and jointly published in June 2008 by the Federal Emergency Management Agency and the National Oceanic and Atmospheric Administration as “Guidelines for Design of Structures for Vertical Evacuation from Tsunamis (FEMA P646). The Safe Haven project uses a nine-phased methodology to assess the vertical evacuation needs in each of the at-risk communities that have been identified as having limited natural high ground readily available given the previously identified constraints. Generally, the concept is to use a ‘top-down’ project approach to vertical evacuation planning where the community members participating in the project are at the top providing direction and input to a group of relevant subject matter experts in land use planning, architecture and urban

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design, emergency management, structural engineering, and geology /hazard assessment. The subject matter experts in turn provide facilitated discussion and seek to capture the input from community members to develop a community based plan.

The nine phases included selection of steering committee and communities, site survey and development of approach, identification of alternatives and preferred strategies, community mulling and acceptance of preferred strategy, reassessment of preferred strategy, and community design charrettes, cost estimation, and plan development/presentation.

Additional details are requested in the following questions.

2. How long has the program been operational? Since: Month September Year 2010  
(Note: In order to be considered for a 2012 National Award in Excellence the program must have been operational since at least December 2010.)
3. What are the major purposes of the program? What problem(s) or issue(s) was it designed to address?

Recent catastrophic tsunamis (i.e., 2004 Indian Ocean, 2009 Samoa, 2010 Chile, and 2011 Japan) have raised awareness of tsunami hazards around the world. Coastal communities in many parts of the United States have identified local tsunami hazards, like the Cascadia Subduction Zone off the west coast, that could inundate a nearby community only minutes after the occurrence of substantially damaging earthquake. Traditional tsunami evacuation methods for locally generated tsunamis encourage at-risk populations to move on foot to areas of refuge, such as naturally occurring high ground, upon feeling the ground shake or witnessing any of 'nature's warnings'. Educating coastal residents and visitors about the dangers of tsunamis and how these groups can reduce their risk is a primary focus of WSSPC State Tsunami Programs.

Successful pedestrian evacuations are possible in some areas of Washington State given the short distances that at-risk populations would need to travel in order to reach high ground. However, in many other areas, there are significant horizontal distances that at-risk populations must cover in the minutes they have between initial earthquake and subsequent tsunami inundation. For example, in several areas of the outer coast of Washington State, some people would need to travel over 6.8 miles in 30 to 40 minutes to reach areas outside of predicted tsunami-hazard zones associated with a Cascadia Subduction Zone earthquake. In these situations, alternatives to traditional horizontal evacuations are required to protect lives.

Traditional tsunami evacuation practices are not possible or practical given three key variables. First and foremost, the elevation of naturally existing high ground is below the maximum level of modeled tsunami inundation from a M 8-9+ Cascadia generated tsunami. Secondly, some initial flooding is anticipated to occur following the earthquake due to coastal subsidence and tsunami inundation will follow shortly afterward, in approximately 30-40 minutes, leaving precious little time to reach safety. The earthquake is expected to produce substantial ground shaking that will damage roadways, generate road-blocking debris and cause landslides further inhibiting rapid evacuation. Thirdly, the majority of coastal residents in tsunami hazard zones are aged 65+ and many have substantial mobility challenges that preclude them from running or even briskly walking to an area that is high enough to escape the modeled tsunami. In addition to the aged populations, several primary schools and day care facilities that must evacuate small children are not located in necessary proximity to high ground. Given all of these constraints, the only practical solution is to

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seek safety through vertical evacuation which may occur in specially designed structures such as towers, platforms, reinforced parking garages, or engineered berms.

To address this shortfall in existing evacuation capacity, Project Safe Haven, a grassroots process to develop community supported ideas and strategies for development and integration of vertical evacuation “safe havens” within the natural and built environments, was established in 2009-10. The development of this community-based planning approach for tsunami vertical evacuation is the first of its kind in the United States. Several other states and territories, including Oregon, New York and Puerto Rico, are examining the Project Safe Haven planning process and the local results. Project Safe Haven is led by a steering committee of federal and local officials with technical assistance and support from Washington State Emergency Management, University of Washington’s College of Built Environments, the Washington State Department of Natural Resources.

Project Safe Haven was developed utilizing planning guidance authored by the Applied Technology Council and jointly published in June 2008 by the Federal Emergency Management Agency and the National Oceanic and Atmospheric Administration in the publication “Guidelines for Design of Structures for Vertical Evacuation from Tsunamis (FEMA P646).

4. Describe the specific activities and operations of the program.

Project Safe Haven uses a nine-phased methodology to assess the vertical evacuation needs in each of the at-risk communities identified as having limited natural high ground readily available given the previously identified constraints. The project attempted to invert the traditional ‘top-down’ project approach in the vertical evacuation planning by placing participating community members at the top to provide direction and input to a group of relevant subject matter experts in land use planning, architecture and urban design, emergency management, structural engineering, and geology /hazard assessment. The subject matter experts in turn organized facilitated discussions to capture the input from community members and integrate it in the development community based plans.

The nine phases included selection of steering committee and at risk communities to work with, site surveys and development of approach, identification of evacuation alternatives and preferred strategies, community mulling and identification of preferred strategies, reassessment of preferred strategies, conducting community planning design “charrettes”, cost estimation, and plan development/presentation. Each phase is discussed in greater detail, below.

Phase I – Steering Committee Selection

The first phase was to establish a steering committee for each locality in order to guide the research developments and provide oversight for the plans generation, with members ranging from local officials to emergency managers and scientists. Frequent meetings and conference calls were conducted to discuss relevant, new, and changing information about the project.

Phase II – Community Site Survey

In the second phase, the research team visited the study areas for site surveying to collect important preliminary geographical and community attributes as well as to identify opportunities for, and barriers to, potential vertical evacuation projects.

#### Phase III – Initial Community ‘Conversation Café’ Meeting

In this phase, an initial community wide meeting was designed to solicit ideas using a World Café methodology at which community members were encouraged to discuss the possibilities of three vertical evacuation options (berms, towers, and buildings). Meeting participants used interactive hazard maps to discuss conceptual locations for the structures, and the pros and cons of each structure type. The World Café process is a “café style” conversation to facilitate small group brainstorming.

#### Phase IV- Alternatives Analysis

The objectives of this phase were to (1) assess the location and type of each proposed vertical evacuation alternative using the data collected in the previous phase; and (2) develop a number of candidate strategies for vertical evacuation accordingly. Each strategy consisted of a configuration of distributed evacuation structures. Providing technical support for these activities, the research team analyzed the proposed vertical evacuation locations and the area of life safety coverage provided by each. They also analyzed the proposed types of structures and the service they can provide at each location. Through this process various configurations of structures were developed and gaps in life safety coverage identified.

#### Phase V – Identify Preferred Strategy

The objective of the fifth phase was to (1) present a number of candidate vertical evacuation strategies to each community; (2) discuss the strengths, weaknesses, opportunities, and threats (SWOT) of each candidate strategy; and (3) assist in the identification of a preferred strategy for each community. To this end, a second community-wide meeting was held using an open house format to present alternative strategies. These strategies were presented both as maps and text. The research team then facilitated a large group brainstorming session regarding the strengths and weaknesses of each alternative using SWOT analysis techniques. The SWOT analysis, used as a planning tool, helped identify supporting and unfavorable internal and external factors that could impact planned projects. Accordingly, this meeting resulted in building consensus among attendees and development a preferred vertical evacuation strategy.

#### Phase VI –Community Validation of Preferred Strategy

After the series of initial community meetings were complete, the research team allowed time for the community to mull over and build support for the preferred community strategies. The mulling process provided opportunities for both formal and informal community discussions about the preferred strategies. This period was also used to achieve two other important objectives: (1) verified assumptions on walking distances and speeds; and (2) proposed site investigations.

#### Phase VII - Conducting Community Design Charrette

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The product emerging from the previous phases was a preferred strategy for vertical evacuation structures, which included the general types and locations for structures that enhanced the life safety of community members and tourists in case of a near-source tsunami event. This phase was designed to explore the potential multi-functionality in the proposed structures to improve economic feasibility by designing structures to provide day-to-day service to the community in addition to the emergency life safety functions. Urban designers within the research team created a third community wide activity using a three-day “Charrette” planning method to identify multi-function opportunities presented by the proposed vertical evacuation strategy. This process identified specific structure locations and how these structures could best fit into the context of the existing natural and built environments.

Phase VIII - Performing Conceptual Cost Estimating

The objective of this phase was to estimate the costs of the proposed vertical evacuation structures, which serves as a starting point to developing further data on the economic feasibility of constructing these tsunami safe haven structures. T

Phase IX: Present Final Plans (see attached)

The purpose of this phase was to formally present the final products to the communities and collect feedback on their priorities for development among safe haven structures. To this end, the final preferred strategies and the accompanying maps for each community were presented at countywide, open house meetings. The attendees were encouraged to provide verbal and written comments. Additional information about estimated costs, community processes and the tsunami hazard were also presented. Attendees were then asked to vote for the most important proposed vertical evacuation locations. Dissemination of products including maps, reports and posters are throughout the community encouraged additional mulling of the strategies presented.

5. Does it take a new and creative approach or method? If yes, please describe.

Yes, planning for integration of tsunami vertical evacuation refuges into existing at-risk communities is a new phenomenon for the United States. Discussion of this new evacuation strategy for communities that have shortfalls in evacuation capacity due to geographic or time constraints has been previously limited to a few local case studies that do not easily replicated at broader state, regional, or national level.

Project Safe Haven represents the establishment of a clearly defined planning methodology and easily replicated approach to community stakeholder engagement for integrating this new evacuation strategy into tsunami threatened local and tribal jurisdictions.

6. What were the start-up costs and source(s) of funding?

Budget: **\$80,000/year for a 4-year period** Source: **National Tsunami Hazard Mitigation Program (NTHMP)**

What are the annual operational costs and source(s) of funding?

Budget: \$ **TBD** Source: **Unknown**

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7. How many employees (full-time equivalent) work(ed) with the program? **18 contributors, plus 6 part-time graduate students.**

8. To the best of your knowledge, did the program originate with you? \_\_\_ Yes \_\_\_ **X** No

Are you aware of similar programs elsewhere? \_\_\_ Yes \_\_\_ **X** No

9. Has the program been fully implemented? \_\_\_ Yes \_\_\_ **X** No  
If no, what actions remain to be taken?

The initial planning has been completed for Pacific County communities, Grays Harbor County communities, the Shoalwater Bay Tribal Reservation, and the Quinault Indian Reservation. Implementation of the community-based plans will require funding to construct structures etc. This is expected to occur over the long-term, however, funding sources for some demonstration projects are being investigated and construction may be possible in the near-term.

The results of this study will be integrated with the Washington State Seismic Safety Committee's Resilient Washington State Initiative to reduce long-term risk and vulnerability from seismic hazards and secondary effects.

10. Is there evidence that the program has been effective in achieving its stated purpose(s)?  
Briefly summarize evaluations (pro and con) of how well it has addressed the defined problem(s) or issue(s).

The development of the Pacific County Safe Haven Plan is the evidence that this first-of-its-kind tsunami mitigation planning approach is successful in bringing together a very diverse group of community members and working with subject matter experts to achieve a community-based implementation plan. The final plan clearly defines a solution to the evacuation challenges faced by coastal communities that have limited time and access to natural high ground.

This approach also leverages limited federal funding by enlisting a variety of subject matter experts at the state and university level as well as supporting graduate level students by providing real-world work experience for these individuals. Upon graduation, graduate students involved with Project Safe Haven have been able to obtain employment with organizations like the Federal Emergency Management Agency and local non-profit entities.

While the Project Safe Haven plan for Pacific County has been recently published, stakeholder engagement continues and funding opportunities for implementation continue.

11. How has the program changed since its inception? What limitations or obstacles might others expect to encounter if they attempt to adopt it?

Yes, the program has adapted over time to meet the needs of the various local jurisdictions that have been participating. However, the key components have remained intact.

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12. Additional comments:

**Deadline:** All nominations and supporting materials must be completed and received by WSSPC by **Friday, December 30, 2011**, to be considered for the *2012 National Awards in Excellence*.

Email completed application and supporting materials to Amy Lewis: [alewis@wsspc.org](mailto:alewis@wsspc.org).



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