NORTHPOINT
CONSULTING GROUP, INC.

July 7, 2022

TO: Humboldt County Planning Department
3015 H Street
Eureka, CA 95501

RE: Tsunami Hazard Assessment
North Wind Management, LLC
936 Vance Ave
Samoa, CA 95564
APN: 401-1122-030

Dear Planning Department,

NorthPoint Consulting has reviewed the subject project for compliance with applicable Tsunami Design and locations of nearby Tsunami Evacuation Areas. The proposed building in question is a proposed 50,875± square foot single story commercial building for cannabis cultivation, trimming, nursery, and drying space.

The building will be a Risk Category II / Tsunami Risk Category II structure per ASCE 7-16 design standards. According to section 6.1.1 (c) of ASCE 7-16, Tsunami Risk Category II structures are not required to be designed for tsunami loads unless required by a state or locally adopted building code. The exception below 6.1.1 (c) also states that Tsunami Risk Category II single-story buildings of any height without mezzanines or occupiable roofs without critical equipment or systems do not need to be designed for tsunami loads and effects. Since the proposed structure is single story with no mezzanines, no occupiable roofs, and no critical equipment or systems; it will not be required to be designed for tsunami loads and effects.

The exception to tsunami design does not mitigate the requirement for a tsunami evacuation plan for the employees at the site. The closest high dune area elevated above the anticipated maximum tsunami runup elevation according to the latest ASCE 7 Tsunami Design Geodatabase is just Southwest of the intersection of Bay Street and Vance Avenue, about 0.7 miles south of the proposed building (Attachments 1 and 2). High dunes safe areas are also shown on the Fairhaven & North Spit Tsunami Hazard Map (Attachment 3).

According to FEMA P-646, 2012 edition (Attachment 4), warning times and maximum travel distances from the evacuation area vary greatly depending on where the tsunami originates. FEMA P-646 recommends a travel distance of 6 miles for a warning time of 3-hours and 0.5 miles for a warning time of 15-minutes. These distances are based on an ambulatory speed of 2 miles per hour (mph), the average pace for mobility impaired populations. For the average healthy person, walking at 4 mph, the travel

distances for 3-hours and 15-minute warning times, are 12 miles and 1 mile, respectively. According to the 2019 Humboldt County Hazard Mitigation Plan, the travel time for a tsunami generated in Japan is approximately 11-hours.

The tsunami evacuation area is within the range recommended for an average healthy person, which is within the acceptable range to use as the tsunami evacuation area for the employees at the proposed building.

If you have any questions regarding this matter, please contact our office at (707) 798-6438.

Sincerely,

Annjanette Dodd
Principal Engineer

Attachments:

Attachment 1 - Tsunami Hazard Map from ASCE Tsunami Hazard Tool, asce7tsunami.online

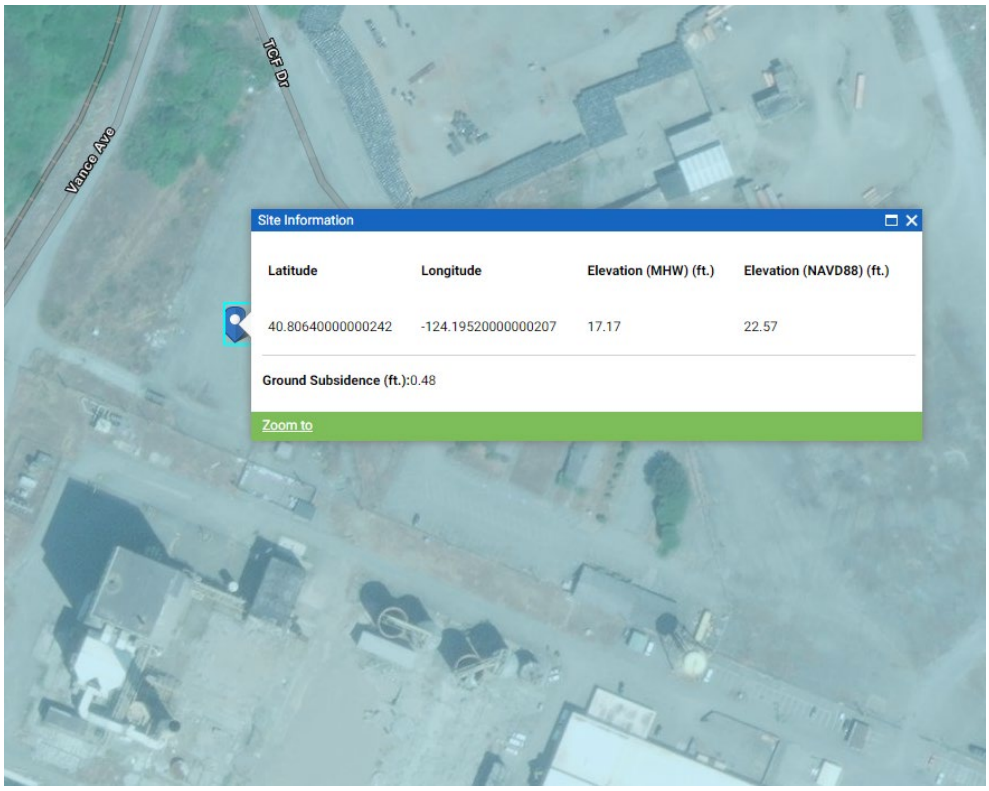
Attachment 2 - Google Maps Walking Directions to Tsunami Evacuation Area

Attachment 3 - Fairhaven & North Spit Tsunami Hazard Map, prepared by Humboldt State University and Redwood Coast Tsunami Work Group

Attachment 4 - Excerpts from FEMA P-646 – Tsunami Evacuation Spacing

Attachment 1

ASCE 7 Tsunami Hazard Tool Imagery, *asce7tsunami.online*



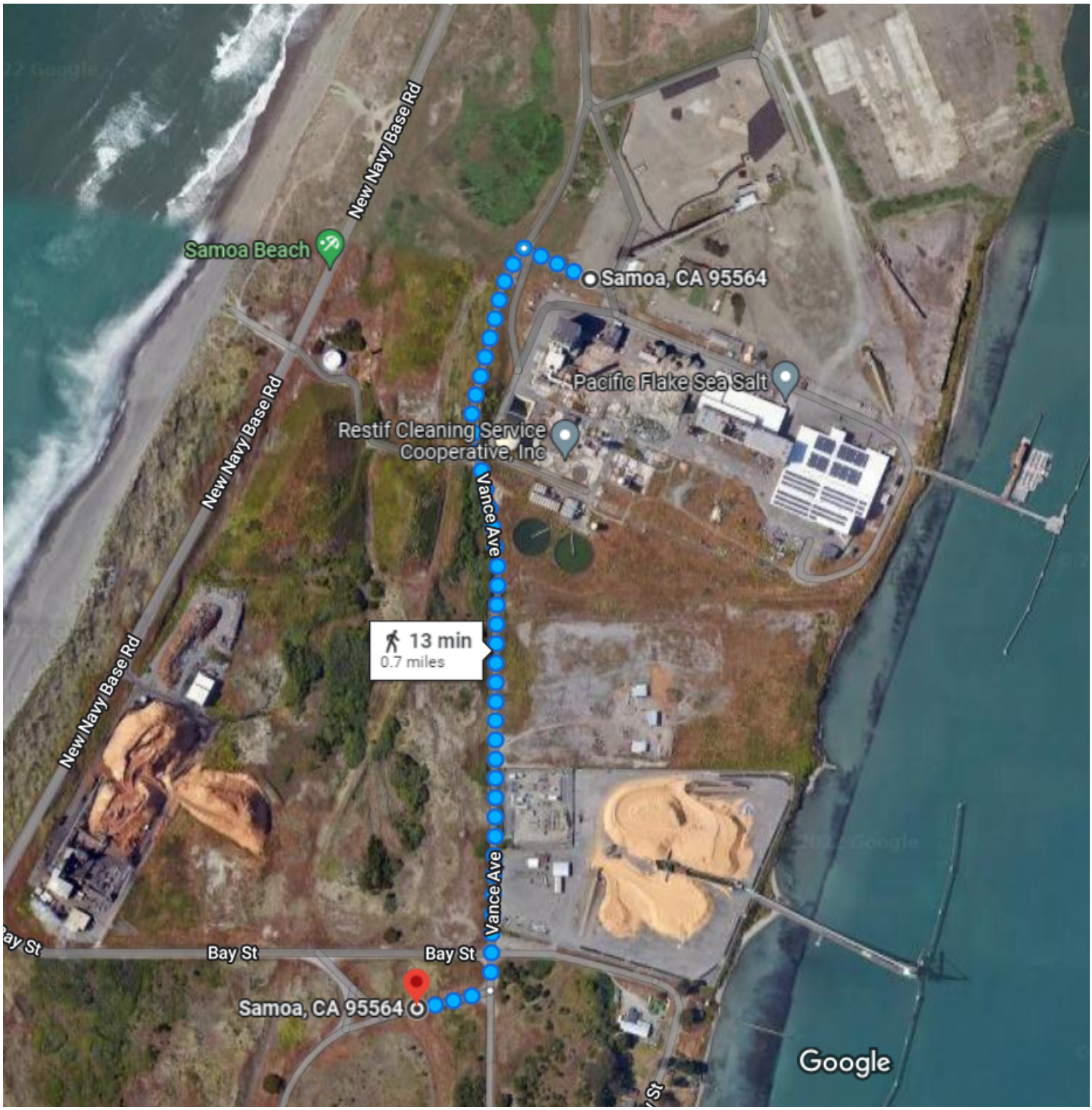
Attachment 2

Google Maps

Samoa, California 95564 to Samoa, California 95564

Walk 0.7 mile, 13 min

Tsunami Evacuation Route



Imagery ©2022 CNES / Airbus, Maxar Technologies, USDA Farm Service Agency, Map data ©2022 500 ft

via Vance Ave	13 min	
	0.7 mile	

Mostly flat

Attachment 3

What You Can Do Before the Next Tsunami:

BE PREPARED

- Know the best evacuation route — practice walking your route at night and in stormy weather.
- Keep a "grab and go" kit by the door with what you need to survive for a day.
- Create emergency plans and discuss with family, coworkers and neighbors.
- Consider how to evacuate pets — such as dogs on leashes and cats in crates.
- Prearrange assistance from neighbors if you need help evacuating.
- Time is of the essence! The largest tsunami will come from an earthquake you will feel. Evacuate as soon as you can safely move.

GET NOTIFIED

To sign up for County alerts and learn about other methods visit: **weather.gov/eureka/alerts**

Questions or want more information?

National Weather Service in Eureka • **(707) 443-6484**

Humboldt Co. Sheriff's Office of Emergency Services (OES) • **(707) 268-2500**

Del Norte County OES • **(707) 464-7255**

Mendocino County Sheriff's OES • **(707) 467-6497**

National Weather Service: Tsunami Warnings and Information • **tsunami.gov**

Redwood Coast Tsunami Workgroup **humboldt.edu/rctwg** and **facebook.com/rctwg**

Cal OES My Hazards • **myhazards.caloes.ca.gov**

Tsunami preparedness activities • **tsunamizone.org**

Great California ShakeOut • **shakeout.org**

U.S. Geological Survey **earthquake.usgs.gov/learn/preparedness.php**

California Geological Survey **conservation.ca.gov/cgs/geohazards**

HUMBOLDT STATE UNIVERSITY

Redwood Coast **Tsunami Work Group** a member of the Earthquake Country Alliance *We're all in this together*

How to survive a TSUNAMI

THE NORTH SPIT and FAIRHAVEN, CALIFORNIA

A component of *Living on Shaky Ground*

What is a Tsunami?

A tsunami is a series of water surges usually caused by an earthquake beneath the sea floor.

TSUNAMIS CAN TRICK YOU!

- **The first surge is not the largest.**
- **It is not unusual for tsuami surges to last at least 12 hours and in some cases much longer.**
- **Just when you think it is all over, another very large surge may come.**

What areas are at risk?

Beaches, harbors, bays, and river mouths are at the greatest risk. If you are in the **YELLOW** areas on the map (inside), you should leave after feeling an earthquake that lasts a long time. If you are in the green area, stay where you are.

How do I know if an earthquake is big enough to cause a tsunami?

- If you are on the beach and feel an earthquake, no matter how small, **move inland or to high ground immediately.**
- If you are in a tsunami hazard zone and feel an earthquake that lasts a long time, evacuate as soon as it is safe to move. Not sure if the earthquake is long enough? When in doubt, **DRILL IT OUT**. Every earthquake is an opportunity to practice evacuating.
- **GO ON FOOT.** Roads and bridges may be damaged by strong ground shaking. Avoid downed power lines. If evacuation is impossible, go to the upper floor of a sturdy building or climb a tree — but only as a last resort.

2011–JAPAN in Kesennuma, cars and other debris were swept away by tsunamis.

2004–THAILAND When the water rushed in, it looked like a river in flood.

Two Ways to Know if a Tsunami is Coming:

Natural Warnings

GROUND SHAKING, a **LOUD OCEAN ROAR,** or the **WATER RECEDING UNUSUALLY FAR** exposing the sea floor are all nature's warnings that a tsunami may be coming. If you observe any of these warning signs, **immediately walk to higher ground or inland.** A tsunami may arrive within minutes and damaging surges are likely to occur for at least 12 hours or longer. **Stay away from coastal areas** until officials permit you to return.

Official Warnings

You may not feel a large earthquake from far away. Notifications that a Tsunami Warning has been issued may come via reverse calling (make sure to sign up for County alerts), Wireless Emergency Alerts, TV, radio stations, door-to-door contact by emergency responders, NOAA weather radios, or in some cases, by outdoor sirens and announcements from airplanes. Move away from the beach and seek more information without using a phone. Tune into local radio or television stations for more information. Follow the directions of emergency personnel who may ask you to evacuate low-lying coastal areas.

NATURAL AND OFFICIAL WARNINGS ARE EQUALLY IMPORTANT. RESPOND TO WHICHEVER YOU HEAR OR OBSERVE FIRST!

How to use this Map:

Locate where you live, work, and play. Use this map to plan a safe evacuation route. **If you are in the yellow area and need to evacuate, go immediately on foot as soon as it is safe to do so.** Practice evacuating so that you and your family know what to do during a real tsunami. Remember — **GO ON FOOT.** Roads are likely to be impassable.

Tsunami Zone signs are placed within the yellow zone as a reminder to evacuate this area when an earthquake occurs. **Entering** and **Leaving Tsunami Zone Signs** are placed on roads near where you cross from the green safe area into the yellow hazard zone. Take note of where these signs are located. If a large earthquake occurs, return at least as far as this point to be in a safe area. If you cannot reach this point, go as far or as high as you can. Every foot inland or upwards can make a difference.

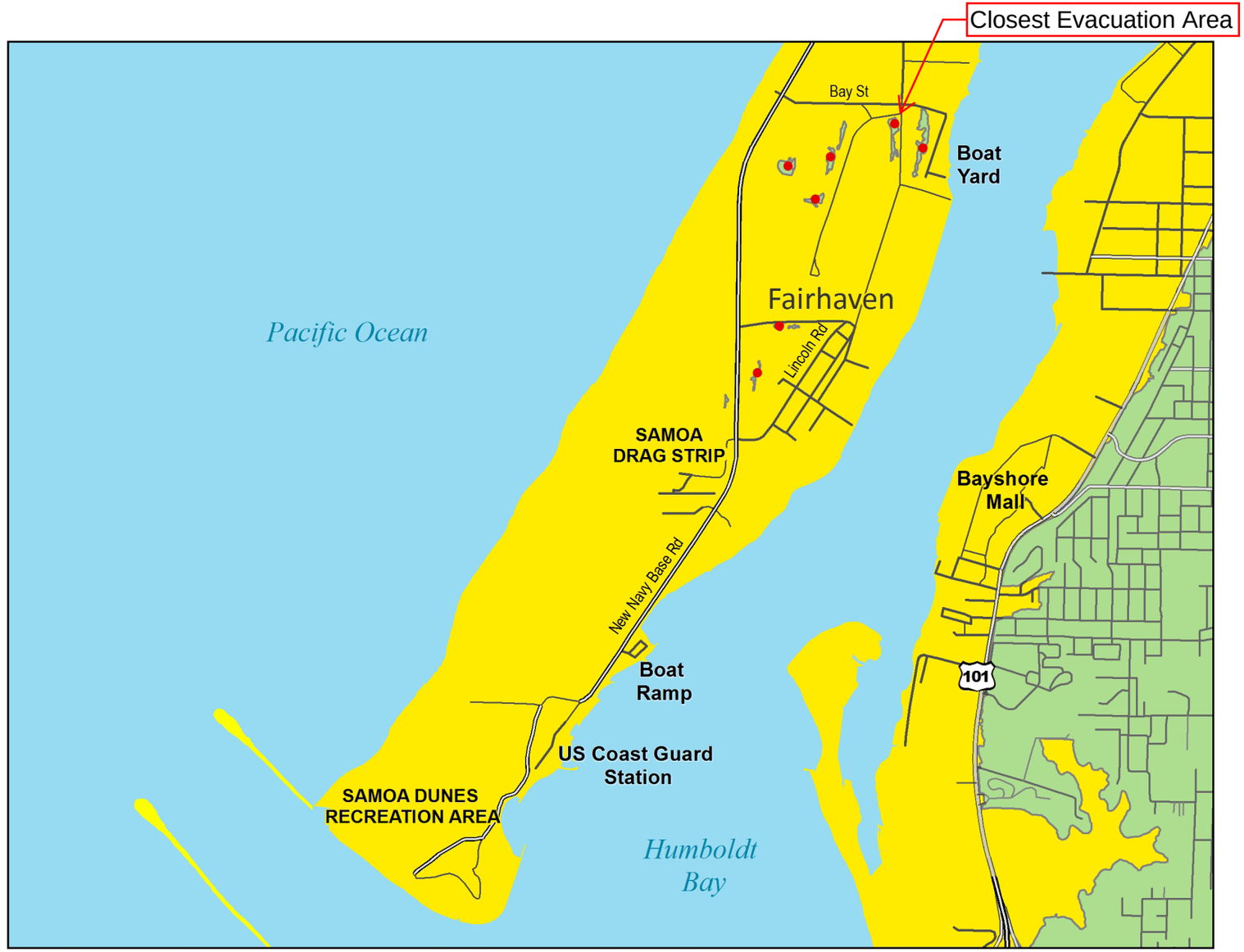
Outside the map area? Use signs to guide you to safe areas. If there are no signs, head to high ground or inland, without re-entering the tsunami zone, and keep moving until you feel safe. Every foot inland or upwards can make a difference. An interactive hazard map for Northwest California is posted at **weather.gov/eureka/tsunami_map**

Other beach hazards:

Sneaker waves can wash over rocks, levees, and far up beaches without warning. There can be more than twenty minutes of small waves between sneaker waves. Don't be fooled by an ocean that looks calm – stay back from the surf and never turn your back on the ocean.

Rising tides can cut off your route or force you to walk dangerously close to the surf. Know the tides and plan for rising water.

SAMOA, CA–Residents practice tsunami evacuation in an annual drill.



FAIRHAVEN & NORTH SPIT

Tsunami Hazard Map

Tsunami Zone — Safe Area

If you feel an earthquake, go to safe area

High Dunes Safe Area

0 0.45 Miles

August 2020

This map is to help you protect yourself from the worst-case tsunami expected along our coast. *It is based on the Relative Tsunami Hazard Maps developed by Humboldt State University and tsunami inundation mapping by the California Geological Survey. It uses the best currently available information and may be changed or updated as additional scientific information becomes available. It includes no information about the probability of a tsunami hitting our area and does not reflect how an actual tsunami may impact the region.* ***It is intended to support tsunami evacuation planning and should not be used for any other purposes.***

Attachment 4

Chapter 5
Siting, Spacing, Sizing, and Elevation Considerations

Implementation of vertical evacuation requires a distribution of structures throughout the community that are suitable for providing refuge from the effects of tsunami inundation, and that are appropriately sized for the population. Ample availability of vertical evacuation refuge options may also reduce the congestion of horizontal evacuation routes and enhance the effectiveness of a community evacuation plan.

This chapter provides guidance on siting, spacing, sizing, and elevation considerations for the distribution of vertical evacuation refuge structures throughout a community

5.1 Siting Considerations

Vertical evacuation structures should be located such that all persons designated to take refuge can reach the structure within the time available between tsunami warning and tsunami inundation. Travel time must also take into consideration vertical circulation within the structure to levels above the tsunami inundation elevation. Structures located at one end of a community may be difficult for some users to reach in a timely fashion. Routes to the structure should be easily accessible and well-marked with approved tsunami warning signs.

Vertical evacuation structures should be located such that all persons designated to take refuge can reach the structure within the time available between tsunami warning and tsunami inundation.

Location of vertical evacuation structures within a community should take into account potential hazards in the vicinity of a site that could jeopardize the safety of the structure, and should consider the natural behaviors of persons attempting to avoid tsunami inundation.

5.1.1 Warning, Travel Time, and Spacing

The National Tsunami Warning Center (NTWC) in Alaska, and the Pacific Tsunami Warning Center (PTWC) in Hawaii, monitor potential tsunamis and warn affected populations of an impending tsunami. Table 5-1 summarizes approximate warning times associated with the distance between a tsunami-genic source and the site of interest. A far-source-generated tsunami originates from a source that is far away from the site, and could have 3 hours or more of advance warning time. A near-source-generated tsunami

originates from a source that is close to the site, and could have 60 minutes or less of advance warning time. Sites experiencing near-source-generated tsunamis will generally feel the effects of the triggering event (e.g., shaking caused by a near-source earthquake), and these effects will likely be the first warning of the impending tsunami. A mid-source-generated tsunami is one in which the source is somewhat close to the site of interest, but not close enough for the effects of the tsunami generating event to be felt at the site. Mid-source-generated tsunamis would be expected to have between one and three hours of advance warning time.

Table 5-1 Tsunami Sources and Approximate Warning Times

Location of Source	Approximate Warning Time (t)
Far-source-generated tsunami	$t > 3$ hours
Mid-source-generated tsunami	1 hour $< t < 3$ hours
Near-source-generated tsunami	$t < 60$ min

Maximum spacing between vertical evacuation structures depends on warning time, ambulatory speed, and the surrounding population density.

Consideration must be given to the time it would take for designated occupants to reach a refuge. To determine the maximum spacing of tsunami vertical evacuation structures, the critical parameters are warning time and ambulatory capability of the surrounding community. Once maximum spacing is determined, size must be considered, and population becomes an important parameter. Sizing considerations could necessitate an adjustment in the number and spacing of vertical evacuation structures if it is not feasible to size the resulting structures large enough to accommodate the surrounding population at the maximum spacing. Sizing considerations are discussed in Section 5.2.

The average, healthy person can walk at approximately 4 mph. Portions of the population in a community, however, may have restricted ambulatory capability due to age, health, or disability. The average pace of a mobility-impaired population can be assumed to be about 2 mph.

Assuming a 3-hour warning time associated with far-source-generated tsunamis, vertical evacuation structures would need to be located a maximum of 6 miles from any given starting point. This would result in a maximum spacing of approximately 12 miles between structures. Similarly, assuming a 30 minute warning time, vertical evacuation structures would need to be located a maximum of 1 mile from any given starting point, or 2 miles between structures. Shorter warning times would require even closer spacing. Table 5-2 summarizes maximum spacing of vertical evacuation structures assuming the ability of mobility-impaired populations to sustain travel over the entire duration of the available warning time. In setting

maximum spacing between vertical evacuation structures, however, consideration should also be given to the potentially limited absolute range of travel associated with mobility-impaired populations.

Table 5-2 Maximum Spacing of Vertical Evacuation Structures Based on Ambulatory Speed and Warning Time

Warning Time	Ambulatory Speed	Travel Distance	Maximum Spacing
3 hours	2 mph*	6 miles	12 miles
1 hour	2 mph*	2 miles	4 miles
30 minutes	2 mph*	1 mile	2 miles
15 minutes	2 mph*	½ mile	1 mile

* Based on the average pace for mobility-impaired populations, consideration should be given to the potentially limited absolute range of travel associated with mobility-impaired populations.

5.1.2 Ingress and Vertical Circulation

Tsunami vertical evacuation structures should be spaced such that people will have adequate time not only to reach the structure, but to enter and move vertically within the structure to areas of refuge that are located above the anticipated level of tsunami inundation.

Travel time to safety should include:

- traveling from original location to the vertical evacuation site;
- accessing the structure; and
- vertical circulation to the appropriate level of the structure.

Increased travel times may need to be considered if obstructions exist, or could occur, along the travel or ingress route. Unstable or poorly secured structural or architectural elements that collapse in and around the entrance, or the presence of contents associated with the non-refuge uses of a structure, could potentially impede ingress. Allowance for parking at a vertical evacuation refuge may decrease travel time to the refuge, but could complicate access if traffic jams occur.

Stairs or elevators are traditional methods of ingress and vertical circulation in buildings. If elevators are to be used to reach the refuge levels, they will need to be designated as critical non-structural components, requiring design for immediate operation after the preceding earthquake and potential power loss. Ramps, such as the ones used in sporting venues and parking garages, however, can be more effective for moving large numbers of people to refuge areas in a structure. Estimates of travel time may need adjustment for different methods of vertical circulation. Disabled users may need to travel along a special route that accommodates wheelchairs (e.g., a wrap-around ramp), and those with special needs may require assistance from others to move within the structure.

When locating vertical evacuation structures, natural and learned behaviors of evacuees should be considered. Many coastal communities have educated

their populations to "go to high ground" in the event of a tsunami warning. Also, a natural tendency for evacuees will be to migrate away from the shore. Vertical evacuation structures should therefore be located on the inland side of evacuation zones and should take advantage of naturally occurring topography that would tend to draw evacuees towards them. Figure 5-1 illustrates an arrangement of vertical evacuation structures in a hypothetical community based on these principles.

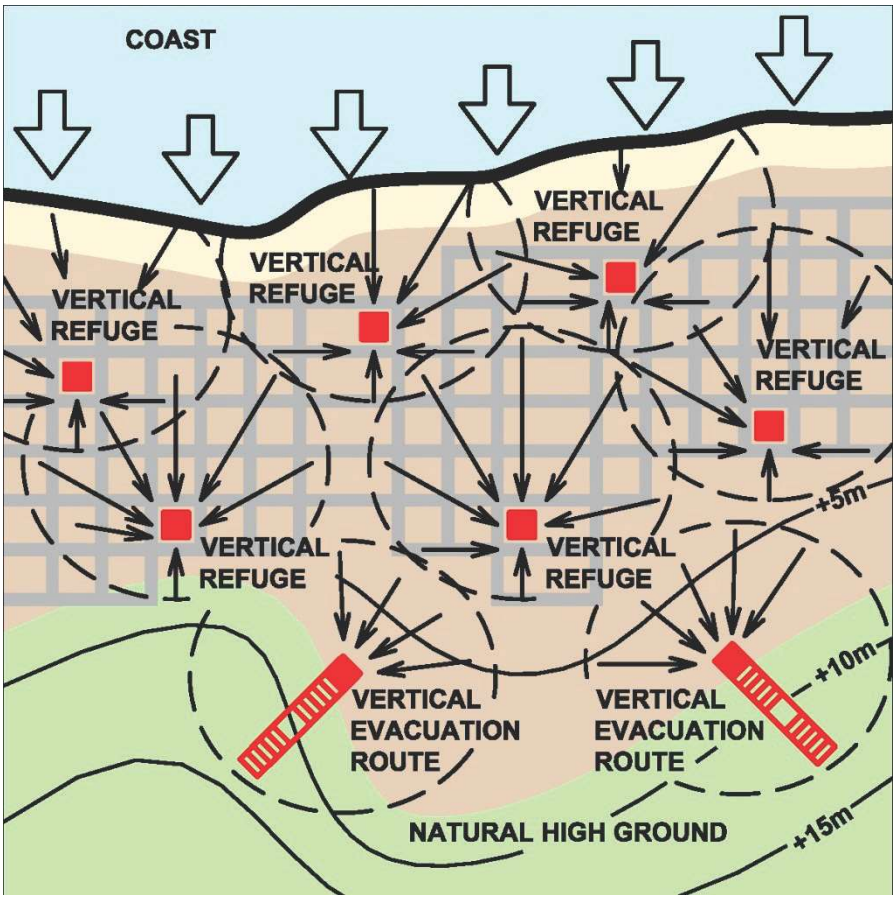


Figure 5-1 Vertical evacuation refuge locations considering travel distance, evacuation behavior, and naturally occurring high ground. Arrows show anticipated vertical evacuation routes.

5.1.3 Consideration of Site Hazards

Where possible, vertical evacuation structures should be located away from potential hazards that could result in additional damage to the structure and reduced safety for the occupants.

Special hazards in the vicinity of each site should be considered in locating vertical evacuation structures. Site hazards include breaking waves, sources of large waterborne debris, sources of waterborne hazardous materials, liquefaction, landslides, and the potential for collapsed structures and downed power lines in the immediate vicinity. Where possible, vertical evacuation structures should be located away from potential hazards that could result in additional damage to the structure and reduced safety for the