

DEPARTMENT OF EMERGENCY MANAGEMENT  
CITY & COUNTY OF HONOLULU  
MAYOR RICK BLANGIARDI

# Disaster Preparedness

Presented by: **Crystal van Beelen**  
Title: **Disaster Preparedness Officer**



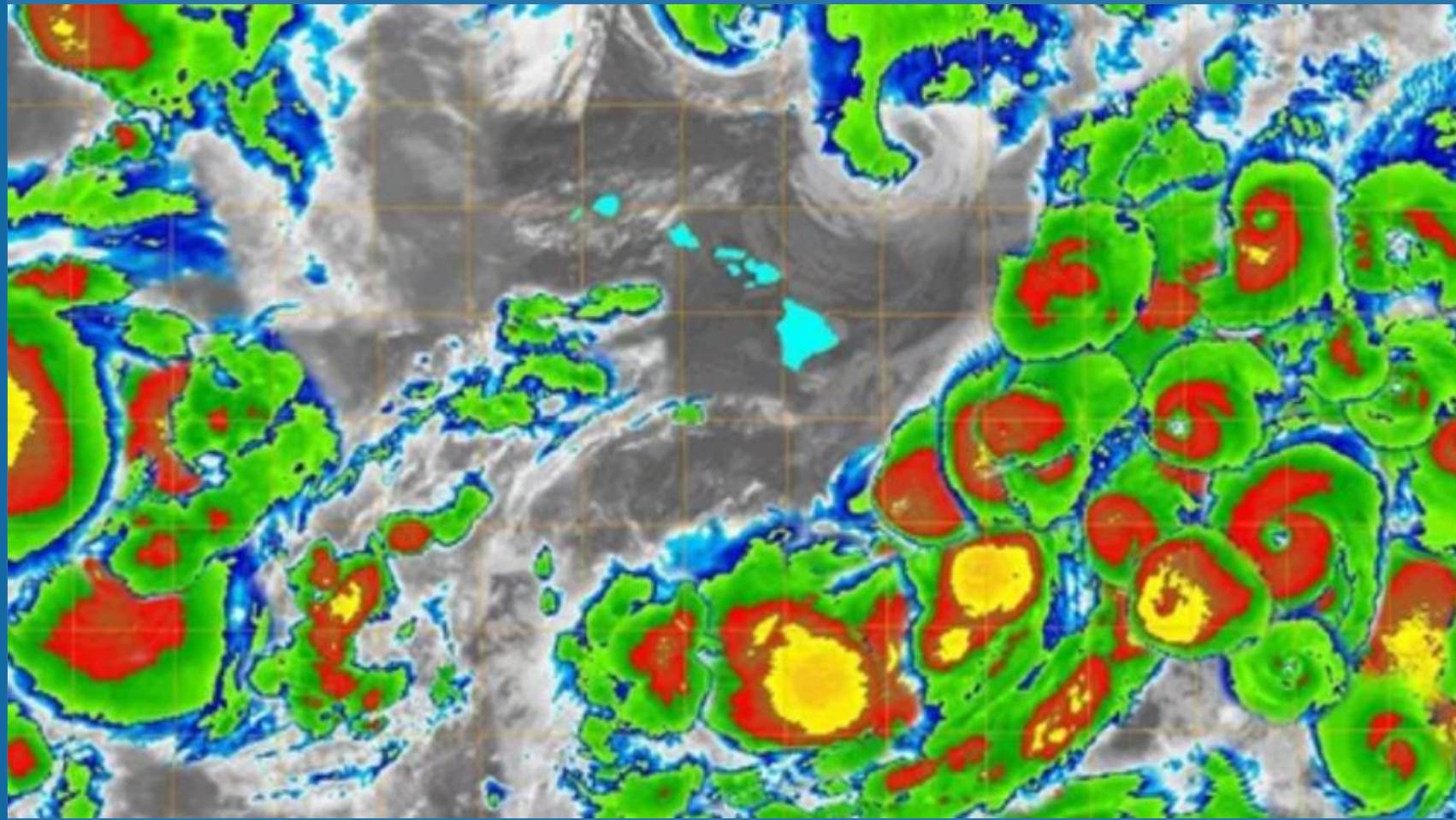
# UNIQUE CHALLENGES: ISOLATION

Oahu:

- 980,080 residents
- Average of 110,860 daily visitors (2018)
- 2,400 miles to continental US
- Highly dependent on imported goods







- Oahu has unique evacuation issues
- Hurricane/Tsunami evacuation is extremely difficult
- ~174,000 residents, employees, and visitors daily in coastal inundation zones
- Can't drive inland to wait out storm like in continental United States

## UNIQUE CHALLENGES: EVACUATION

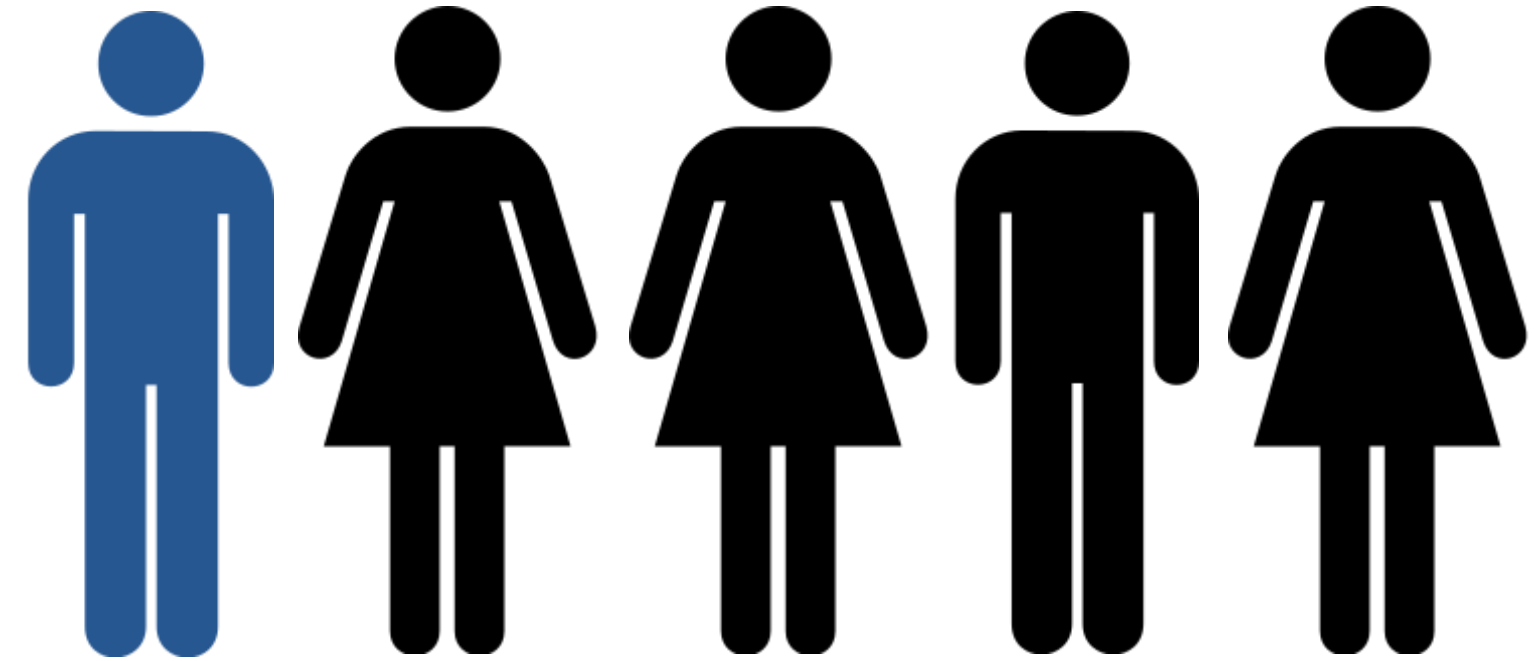




## UNIQUE CHALLENGES: SHELTERING

# 122

State DOE Schools  
doubling as hurricane  
evacuation shelters



That provide enough space for  
about 1/5 of Oahu's ~1 million  
residents and visitors

# UNIQUE CHALLENGES: DISASTERS

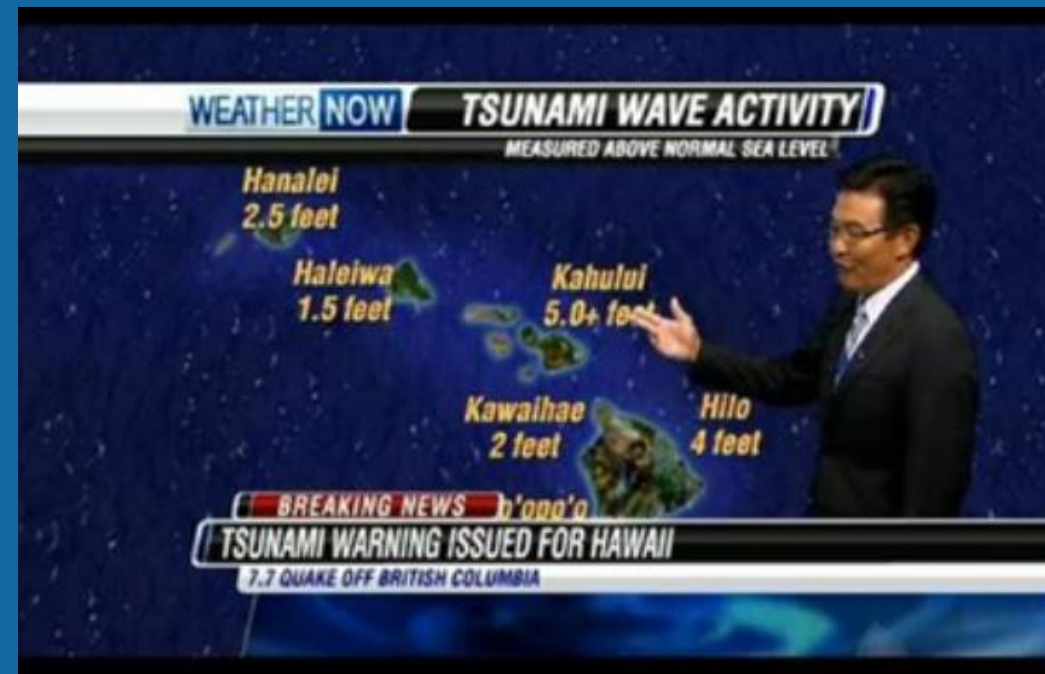
The State of Hawaii Multi-Hazard Mitigation Plan identifies the top THREE disasters that may impact Hawaii.

This includes an assessment of risks these events pose to the state and the City and County of Honolulu.



#1

Hurricanes



#2

Tsunamis



#3

Flash Floods



# DISASTERS IN HAWAII



EVENT	COST (2020\$)	LIVES	YEAR	LOCATION(S)
Hurricane Iselle	162.0-million	1	2014	Hawaii County
<b>Hurricane Iniki</b>	<b>5.7-billion</b>	3	1992	Kauai/Oahu
Hurricane Iwa	827.0-million	1	1982	Kauai/Oahu
Hurricane Dot	53.3-million	0	1959	Statewide
Tsunami	345.0-million	<b>173</b>	1946	Statewide
Tsunami	210.0-million	<b>61</b>	1960	Statewide
Floods	129.0-million	0	2018	Oahu
Floods	74.-million	0	1988	Oahu
Floods	13.9-million	7	2006	Kauai/Oahu





# UNIQUE CHALLENGES: HURRICANES



A MAJORITY OF OAHU HOMES WERE BUILT  
PRE-2006 INTERNATIONAL BUILDING CODE  
FOR HURRICANE RESISTANCE

The major hazards associated with hurricanes are:

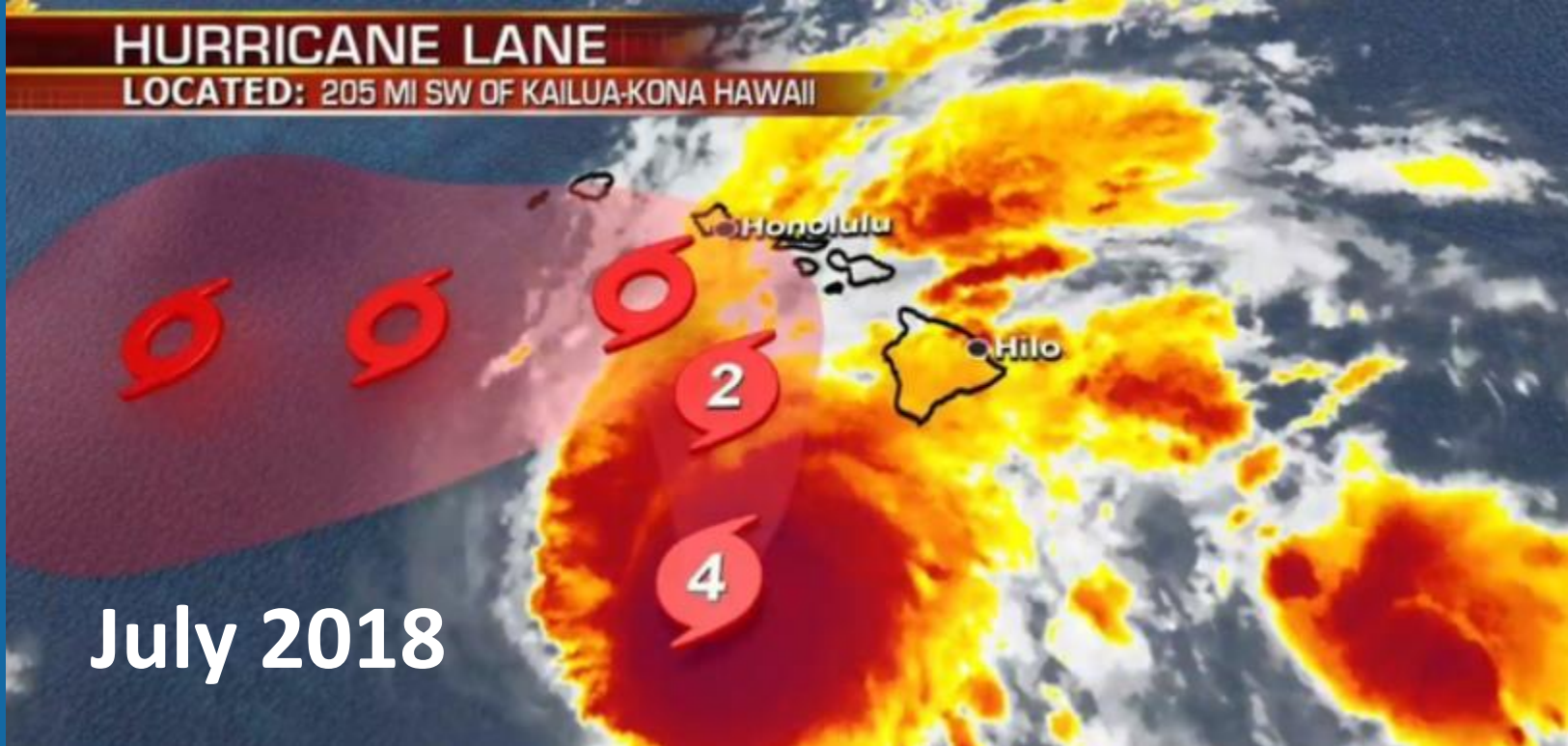
- Storm surge and storm tide
- Heavy rainfall and inland flooding
- High winds



Iniki coastal damage in Poipu, Kauai in 1992



Looking back on 2018

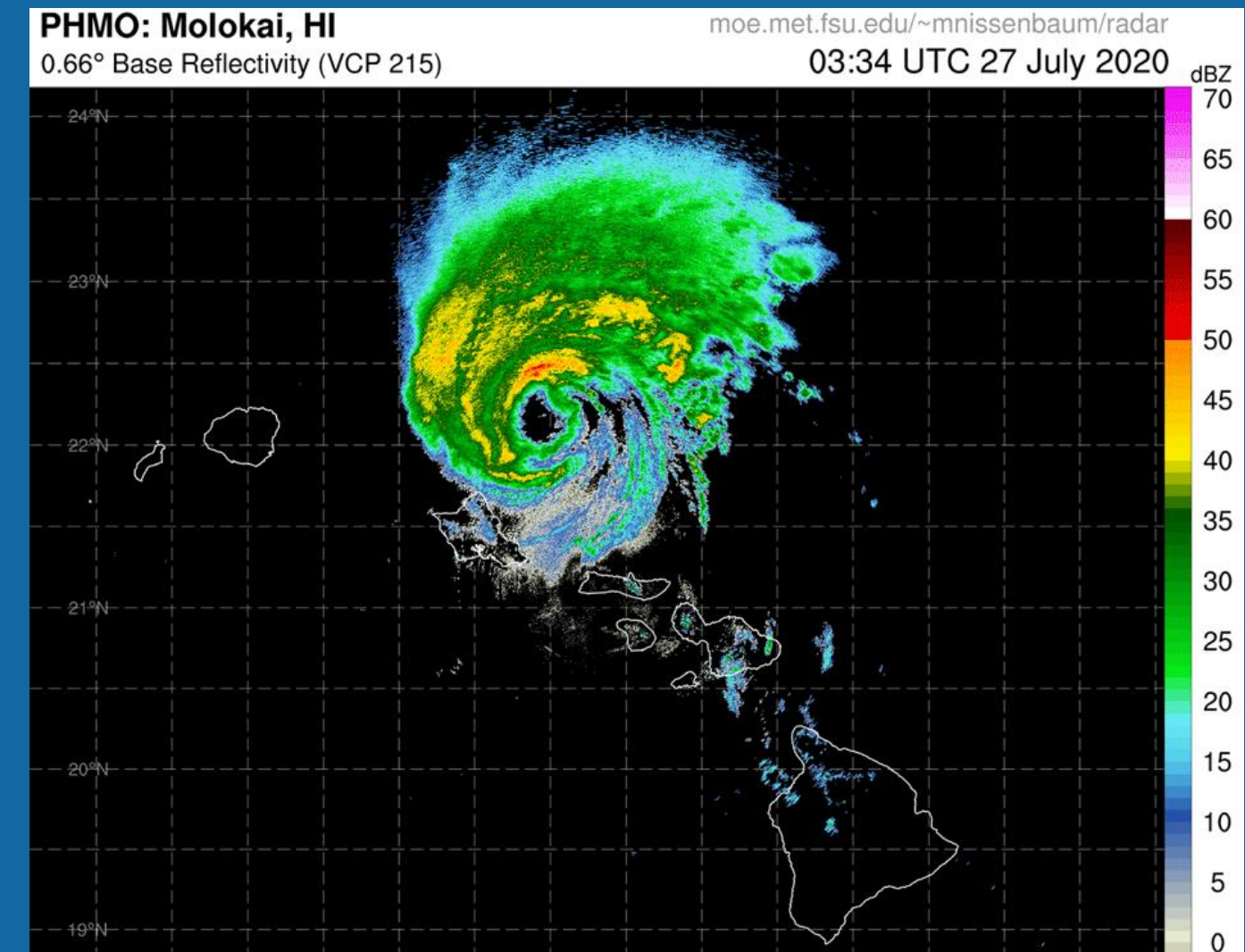




# 2020 HURRICANE SEASON SUMMARY

NOAA predicted a near or below-normal 2020 hurricane season predicted for Central Pacific

- The 2020 hurricane season featured two tropical cyclones in the Central Pacific which is below the seasonal average.
- **Tropical Depression Boris** – 1st first tropical cyclone of the season in the Central Pacific, moving from the east on June 27 and weakening to a remnant low on June 28
- **Hurricane Douglas** entered the basin on July 24 as a category 4 major hurricane. Hurricane Douglas quickly and steadily tracked to the west-northwest toward Hawaii and gradually weakened, eventually passing within 30 miles north of the state on July 26 as a category 1 hurricane.



Hurricane Douglas passing 30-miles north of Oahu on July 27, 2020.

- **NOAA 2021 Hurricane Season forecast – May 23rd**

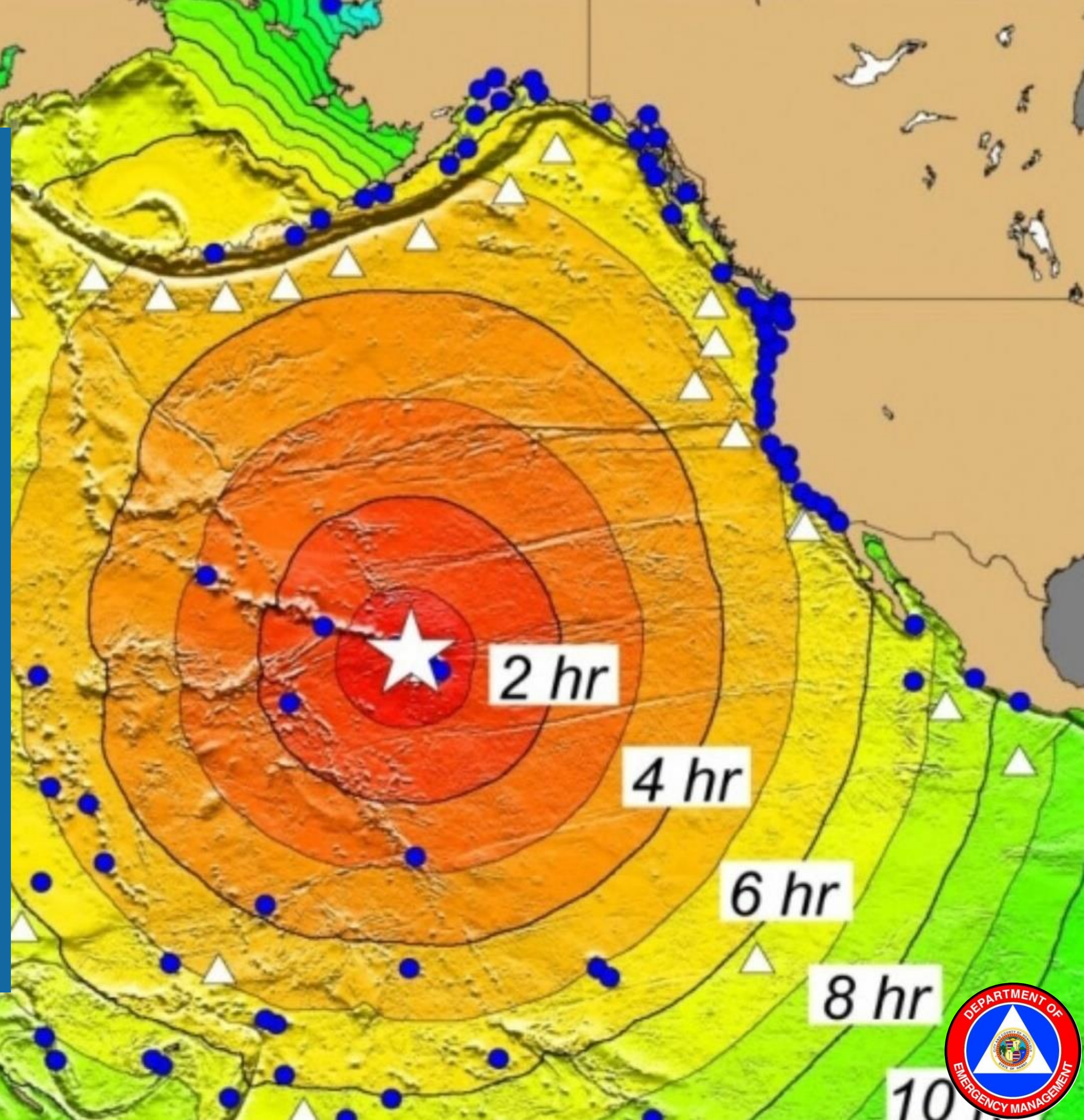




## UNIQUE CHALLENGES: HISTORIC TSUNAMI

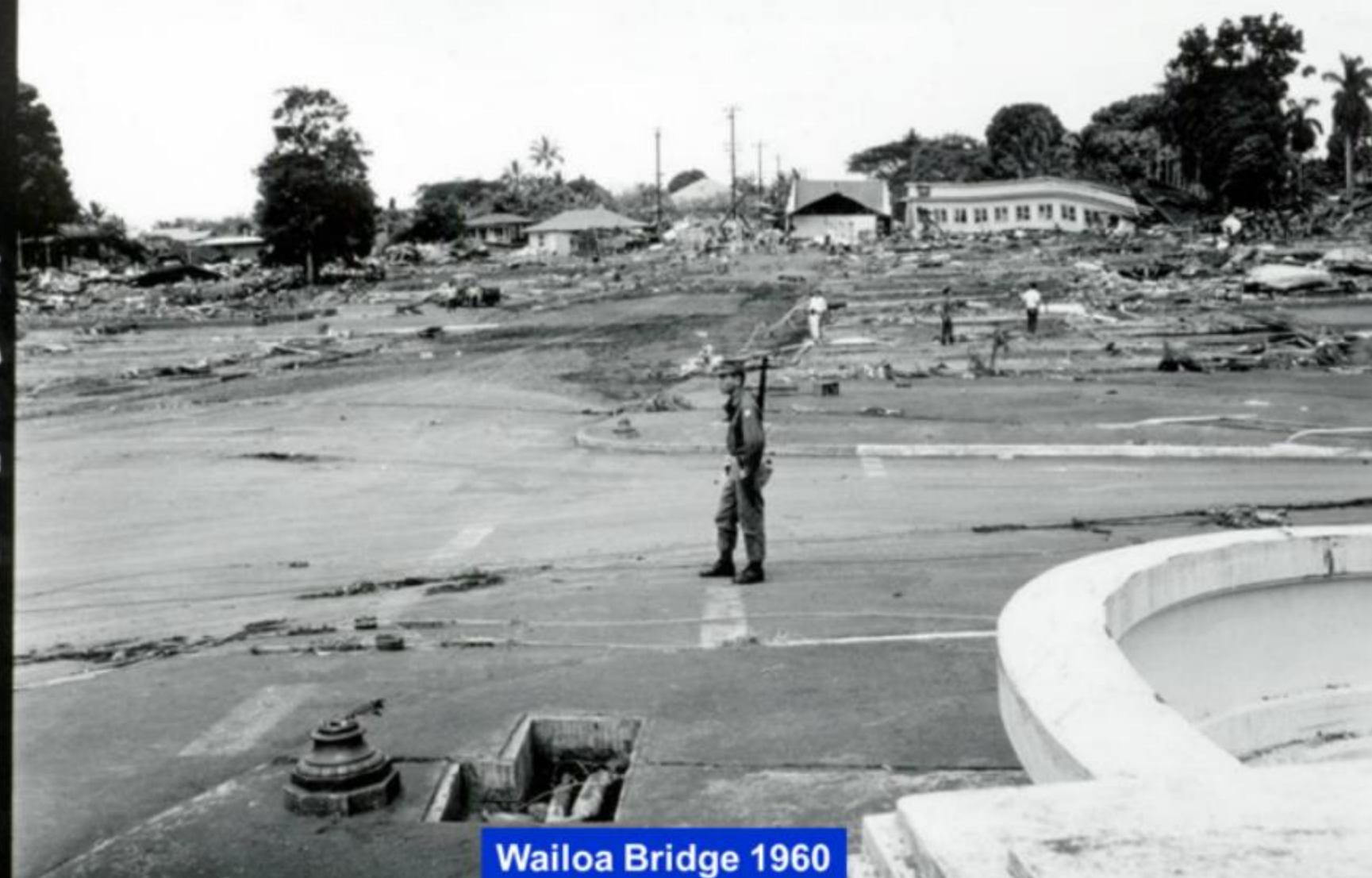


- Most deadly natural disaster for Hawaii
- More than 220 deaths since 1946 due to "historic" tsunami events- including six on Oahu
- All shorelines at risk- including waterways leading inland
- Tsunami events can have short lead time for evacuation- **less than four hours** for locally generated and up to 14 for distant events





SAFETY FILM  
H-1888-9  
9



Wailoa Bridge 1960



Wailoa Bridge 2007



Kamehameha Ave 1946



Kamehameha Ave. 2007





# UNIQUE CHALLENGES: EXTREME TSUNAMI

## GREAT ALEUTIAN TSUNAMI (GAT)

- Potential 30-foot, or higher, tsunami triggered by a 9.0 or greater earthquake in the Aleutians
- Estimated to occur every 1,000 years- same probability as Japan's 2011 Tohoku earthquake
- Damage, destruction, and loss of life could be three times greater than the 1946 Aleutian Islands earthquake and tsunami
- More than 400k residents and visitors could be impacted
- \$1.8 billion essential facility loss
- \$26.3 billion economic loss possible



-Rhett Butler, 2016 and Honolulu City/County Mitigation Plan 11/18





## TWO TSUNAMI EVACUATION ZONES

- **HISTORIC - RED**
- **EXTREME - YELLOW**

•For most Tsunami Warnings, evacuate out of the red zone; in the unlikely case of an "Extreme Tsunami Warning", evacuate out of the red and yellow zones

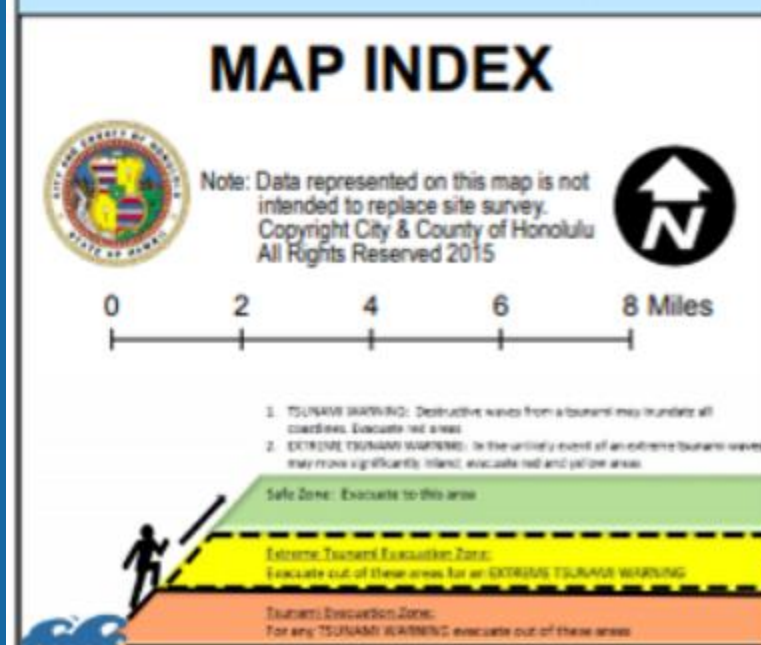
•Remain at least 100 feet away from inland waterways and marinas connected to the ocean due to wave surges and possible flooding

•Boaters should move vessels to at least 50 fathoms (300 ft) deep and 2 miles away from harbor entrances; follow all directions from the Captain of the Port

•Structural steel or reinforced concrete buildings of ten or more stories provide increased protection on or above the fourth floor; if you are caught near the shoreline consider using vertical evacuation

•These maps do not consider the destructive effects of a locally generated tsunami. If you feel shaking, move inland immediately, well inland from the red tsunami evacuation zone

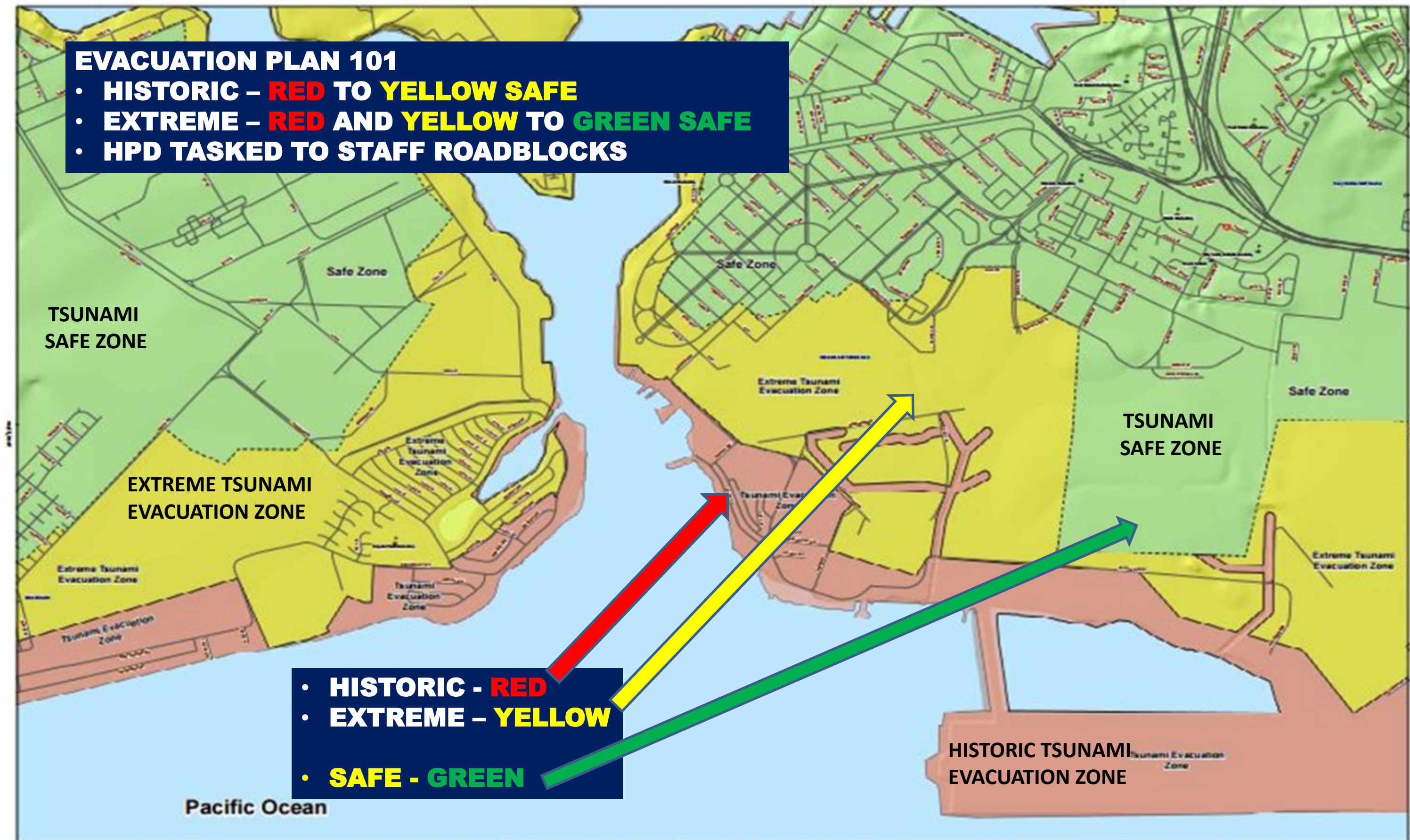
•The evacuation zone is a guideline and should be considered the minimum safe evacuation distance





## EVACUATION PLAN 101

- HISTORIC – RED TO YELLOW SAFE
- EXTREME – RED AND YELLOW TO GREEN SAFE
- HPD TASKED TO STAFF ROADBLOCKS



- HISTORIC - RED
- EXTREME - YELLOW
- SAFE - GREEN

Ewa Beach to Airport  
Map 18 Inset 2



Note: Data represented on this map is not intended to replace site survey.  
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All Rights Reserved 2016.  
Date Prepared: April 2016



If you must evacuate, evacuate out of the red zone in the direction of the yellow zone, evacuate out of the yellow zone in the direction of the green zone.

Evacuate at least 100 feet away from inland waterways and marine structures to the ocean due to wave surges and possible flooding.

Residents should move quickly to at least 60 feet (20 ft) deep and 2 miles away from inland waterways, follow all directions from the Captain of the Port.

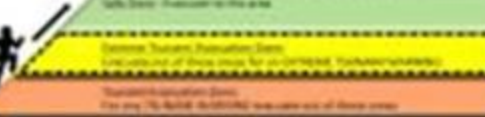
Shelter at least in reinforced concrete buildings of six or more stories, provide increased protection on or above the fourth floor, if you are caught near the shoreline consider using vertical evacuation.

These maps do not consider the destructive effects of a locally generated tsunami. If you feel shaking, move inland immediately, well inland from the red tsunami evacuation zone.

The evacuation zone is a guideline and should be considered the minimum safe evacuation distance.



0 500 1,000 2,000 3,000 4,000  
Scale in Feet

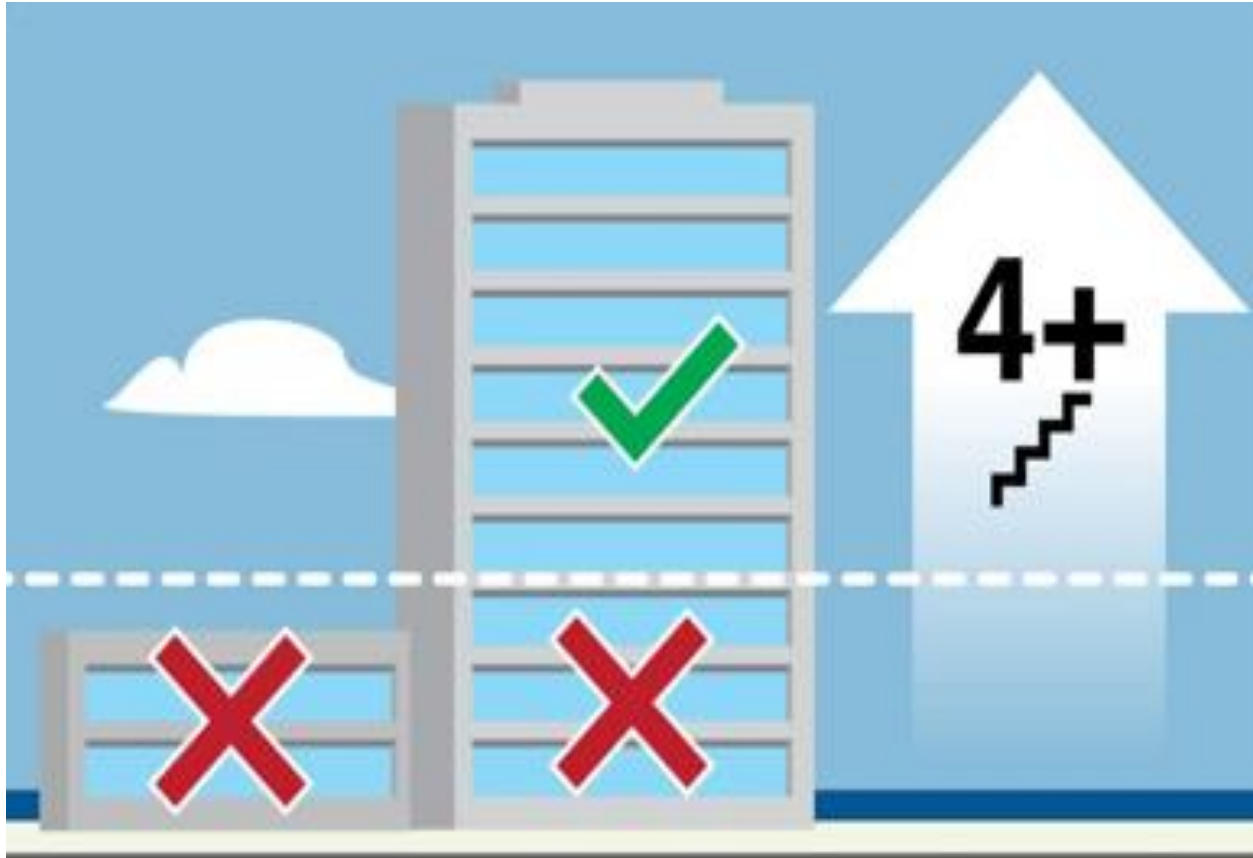


### Legend

- Fire Station
- Hospital
- EMS
- Police
- Public/Private School
- Safe Zone
- Extreme Tsunami Evacuation Zone
- Tsunami Evacuation Zone
- Major Street
- Street



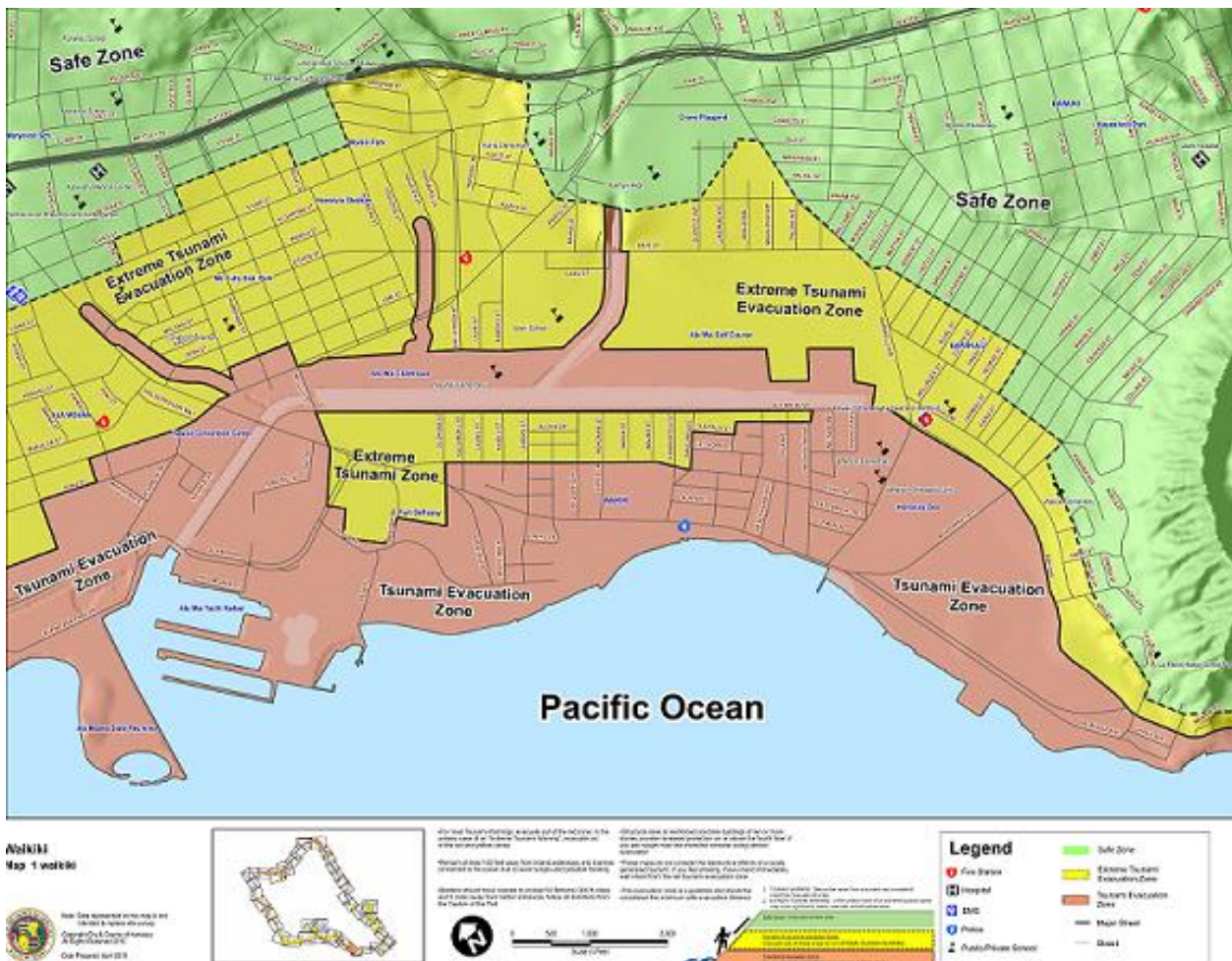




# TSUNAMI EVACUATION

## Vertical Evacuation

- ❖ If you are in a tsunami inundation zone in a building that is TEN stories or taller, you can safely evacuate to the FOURTH floor or higher.



## Inland Evacuation

- ❖ If you are in a tsunami zone and cannot vertically evacuate, pre-plan a route to a safe area.







## UNIQUE CHALLENGES: FLOODS

Major flooding events in Hawaii caused by storms, storm surge, high surf, and tsunamis.

Floods estimated to cause \$13 million in damage per year

Between 1915 and 2000, flooding has:

- Claimed over 140 lives
- Caused over \$200 million of direct and indirect damage

October 30, 2004 Manoa Flood:

- Over 10" of rain fell in Manoa
- Caused an estimated \$85 million in damage





# APRIL 2018 FLOOD



Aina Haina



CALVARY BY THE SEA CHURCH DAMAGE  
AINA HAINA

khon 2  
78° 6:06 PM



Montessori School, Aina Haina



Niui Circle, Niu Valley





## UNIQUE CHALLENGES: OTHER DISASTERS



Earthquake

Volcano

Landslide/Rockfall

Wildfire

Tornado

Drought

Strong Winds

High Surf

Severe Weather

Transportation Incident

Dam Failure

Radiological Event

Terrorism

Cyber Attack

Ballistic Missile Attack

Urban Fire

Utility Outage

HAZMAT (Release/Spill)

Disease Outbreak



# Outreach / Shelter Support

- Disaster Preparedness – Self and Family Readiness
- Disaster Alert Messaging – Relaying Alerts
- Evacuation Support –Evacuation Bus Escort
- Shelter Worker – Outreach Liaison at Shelter(s)

## Activation / Coordination

- DEM EOC will send activation request to PIC
- PIC to activate network of partners to support City's notification, evacuation and shelter operations
- Partners who respond may be assigned to:
  - Distribute Pre-Scripted emergency alert messages
  - Coordinate people to established meeting points for evacuation bus pickup to shelter
  - Escort people on evacuation bus to shelter
  - Serve as the Outreach Liaison at the shelter





# ARE YOU 2 WEEKS READY?

## BUILD KITS

Have Go Bags ready for work, each family member, pets, & a vehicle safety kit too.



Personal Preparedness

## PLAN TO BE ON YOUR OWN FOR AT LEAST 2 WEEKS

Water (1 gal. per person/day)  
Food (Non-perishable)  
First Aid Kit  
Medical Equipment  
Medications  
NOAA Alert Radio  
Extra Batteries

Flashlight  
Can Opener  
Tools  
Warm Clothes  
Sturdy Shoes  
Personal Hygiene Items  
Toilet Paper

Pet Supplies  
Fire Extinguisher  
Glasses/Eye Care  
Cash  
Identification  
Important Documents  
Comfort/Entertainment





# PLAN FOR YOUR FAMILY

- Make sure your family is disaster prepared at home.
- Disasters and emergencies can occur at anytime.
- You could be away from home, at work or even off island.
- Your family will feel much more safe and secure in your absence.





# WHAT CAN YOU DO?



**Make a Plan**



**Build a Kit**



**Stay Informed**



# #1 MAKE A PLAN

- **Know your hazards!** What can affect you? (hurricane, tsunami, flood, what else?)
- Do you need to evacuate for any of the above?
- How will you keep in touch with your family?
- Do you have an off-island contact?
- How will you reunite with your family?
- What special considerations do you need to take into account (pets, keiki, kupuna, disabilities and other access and functional needs)?
- Does your insurance cover the hazards that affect you?





# COVID-19 Considerations for Evacuation Sheltering

## REVIEW



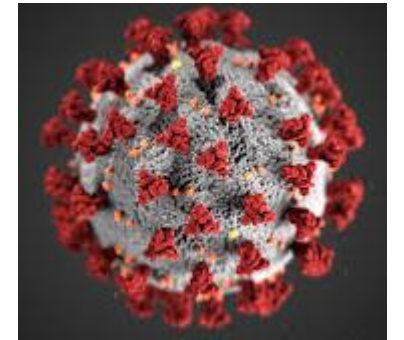
Review your family plan for where you will stay during a hurricane or other disaster.

## CHOOSE



If an evacuation shelter is your only safe option, be prepared to take additional steps to prevent the spread of illness at the shelter.

## PREPARE



Take cleaning items with you like soap, hand sanitizer, disinfecting wipes, or general household cleaning supplies to disinfect surfaces you may need to touch regularly. Bring 2-3 cloth face coverings per person and detergent to wash them regularly.





# DISASTER PREPAREDNESS RESOURCES



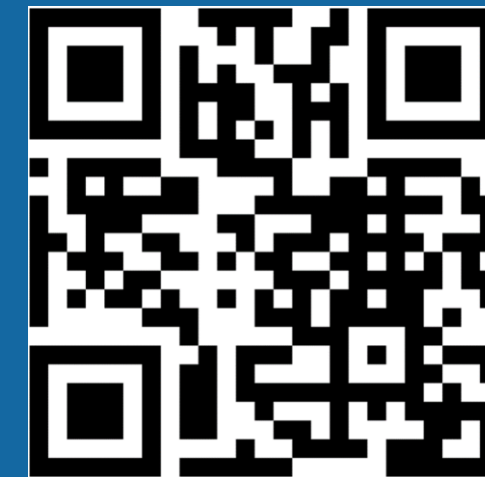
**Department of Emergency Management**  
[www.honolulu.gov/dem](http://www.honolulu.gov/dem)



**Hawaii Emergency Management Agency**  
<https://dod.hawaii.gov/hiema/>



**One Oahu – COVID-19 Information**  
[www.oneoahu.org](http://www.oneoahu.org)





# SHOULD I STAY OR GO?

Depending on the situation, you may decide to shelter-in-place or evacuate.

## Hurricanes



- When was your house built?
- Have you retrofitted?
- Do you live in a coastal inundation zone?
- Do you have a refuge space?

## Tsunamis



- Do you live in a Tsunami Evacuation Zone (TEZ) or Extreme Tsunami Evacuation Zone (XTEZ)?
- Do you live on the 4<sup>th</sup> floor or higher in a building that is higher than 10 floors?

## Flash Floods



- Is your home in a low-lying area?
- Is your home or neighborhood prone to flooding?



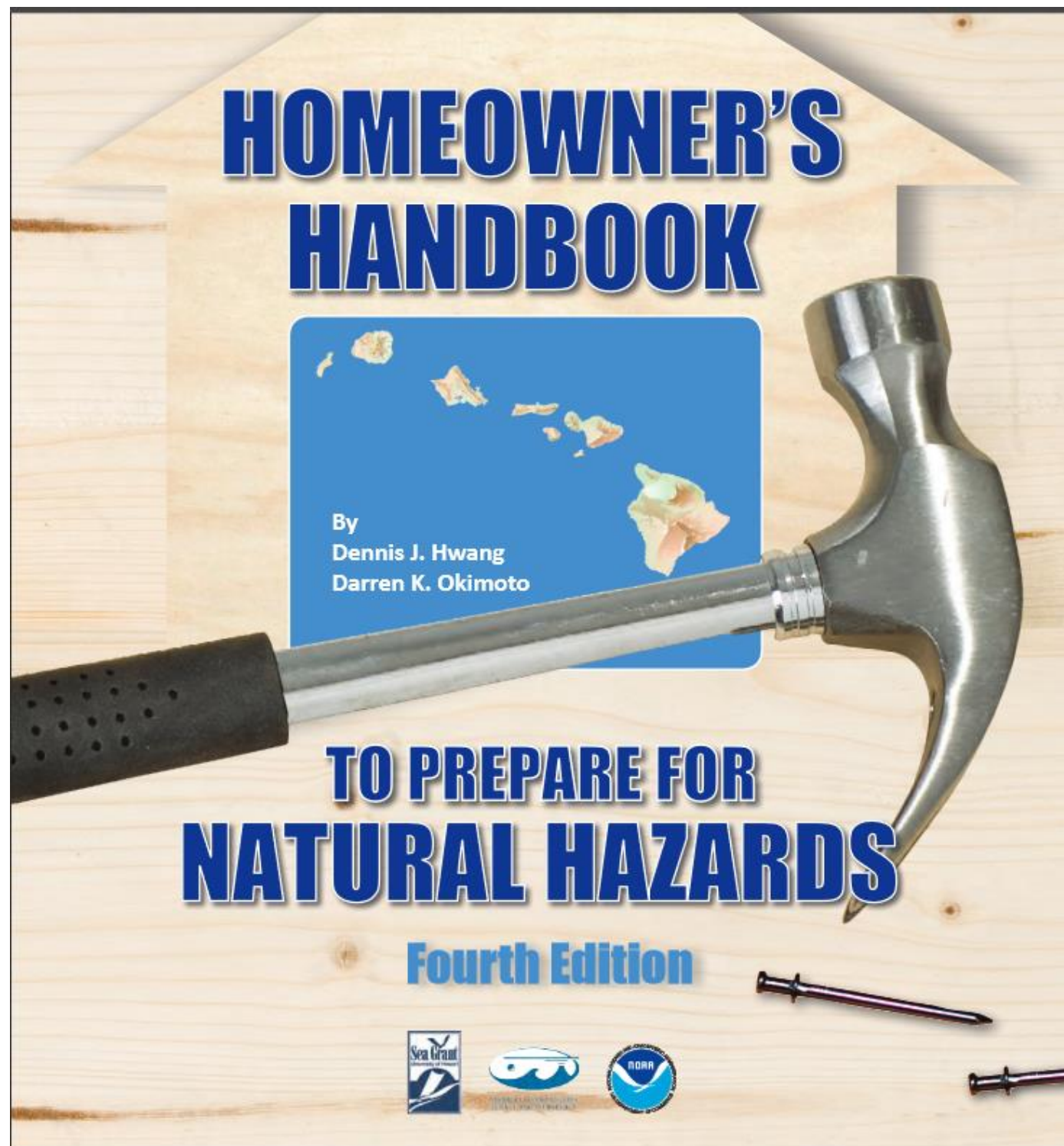


# CONTACT AND COMMUNICATIONS

Selecting an out-of-state family or friend as a “check-in-contact” person for everyone to call (it may be easier to call long-distance)







# Homeowners Handbook to Prepare for Natural Hazards

- ❖ **Recognize** the hazards that can affect you and your family and what you must do to ensure their safety.
- ❖ **Understand** the importance of emergency supplies and evacuation planning.
- ❖ **Learn** how your home can be your emergency shelter and learn how to build a **FEMA Residential Safe Room**.



<https://seagrantsoest.hawaii.edu/homeowners-handbook-to-prepare-for-natural-hazards/>





## #2 BUILD A KIT

- Based on your plan and needs, make sure you specialize your kit for your family!
- Enough supplies for 14-days
- Food, water, first aid kit and other essentials
- Toiletries, bedding, clothes
- Important documents & cash
- Pet food and supplies

# PLAN AND PREPARE NOW FOR THE NEXT DISASTER

**Make Your 14-Day Disaster Supply Kit (minimum of 14 days for each person)**

☐ **Water** One gallon of water per person per day for drinking and sanitation.

☐ **Food** Non-perishable food that does not require cooking. Survival foods such as peanut butter, protein shakes, dried fruits, & nuts. Infant Formula & food for special needs.

☐ **Utensils** Plates, utensils and a manual can opener.

☐ **Radio** Battery-powered or hand crank radio with NOAA Weather alert.

☐ **Flashlight** with extra batteries.

☐ **Cell phone** and solar charger.

☐ **Whistle** Important for signaling for help. A whistle carries much farther than the human voice and uses less energy than yelling.

☐ **Dust mask** Helps to filter contaminated air.

**LEARN**  
Educate yourself on disasters that can affect you and your family.

**PLAN**  
Create and practice a family disaster plan. Designate a secondary meeting place and an off-island contact.

**Individual, Family and Business Disaster Planning**  
Disaster planning is everyone's responsibility. Carefully review this information and take the time today to discuss & plan preparedness strategies with family, friends, neighbors and co-workers.

☐ **Sanitation** Moist towelettes, heavy-duty garbage bags with ties, hand sanitizer, toilet paper, baking soda/kitty litter to absorb odors, and gloves for personal sanitation.

☐ **Tools** Wrench or pliers to turn off utilities, basic tool kit, duct tape.

☐ **Important documents and cash** Carry vital papers in a waterproof container.

☐ **Maps** Local area maps.


☐ **Medical** Prescription medications, glasses/contact lenses, medical devices, and a first aid kit.

☐ **Pets** Pet food and extra water.

☐ **Hygiene** Feminine products, personal hygiene items, diapers, incontinence supplies.

☐ **Pictures** Carry a photograph of you, your family & friends to help locate each other if you are separated.

☐ **HNL.info** Use HNL.info to stay informed about emergencies, weather advisories, traffic bulletins, and much more via SMS or Email.



**Department of Emergency Management  
City and County of Honolulu**  
Kirk Caldwell, Mayor  
650 South King Street  
Honolulu, HI 96813  
(808) 723-8960  
Fax (808) 524-3439  
www.honolulu.gov/dem  
dem@honolulu.gov





# WHAT DOES A KIT LOOK LIKE?



Build and customize each kit to fit your needs for sheltering in place at home and/or for evacuating to the nearest shelter or refuge area.

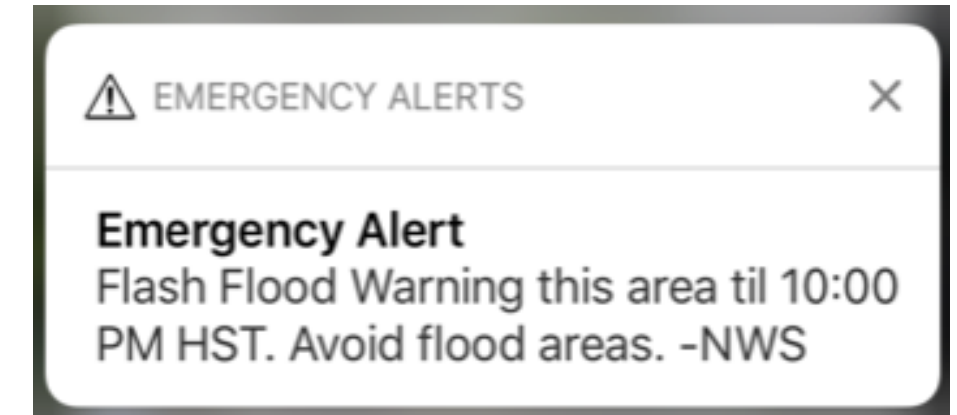




## #3 STAY INFORMED

### Emergency Notification Alert Redundancy

1. Wireless Emergency Alerts (WEA) on Smart Phones- make sure this is on.
2. Outdoor Warning Siren System
3. Emergency Alert System (EAS) – Local TV and Radio
4. NOAA FM/AM Weather Radio
5. HNL Info Alerts







## Other Considerations - **Preparing Your Home**

LookIntoHawaii.com

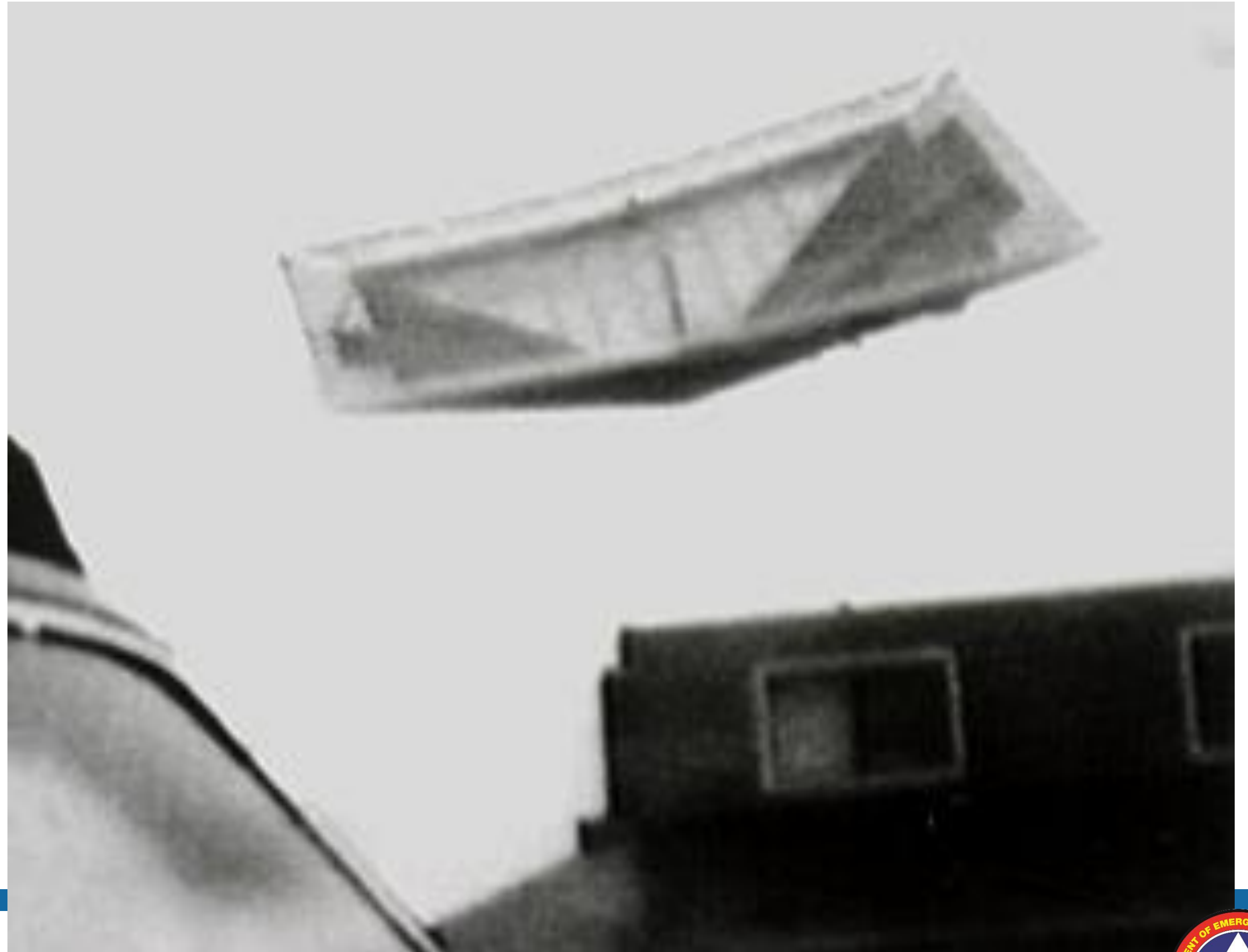
Hurricane Iniki damage, 1992





# PROTECT YOUR HOUSE

Hurricane Iniki - 1992  
90-95 mph winds





# HURRICANE INIKI (9/11/1992)

- Almost 41% of the 15,200 homes were damaged or destroyed
- Over 7,000 were left homeless (Kauai Civil Defense).

## Lessons Learned:

- FEMA Building Performance Assessment
- “Continuous load transfer paths from the roof to the foundation.”
- “Failure of glasswork..”



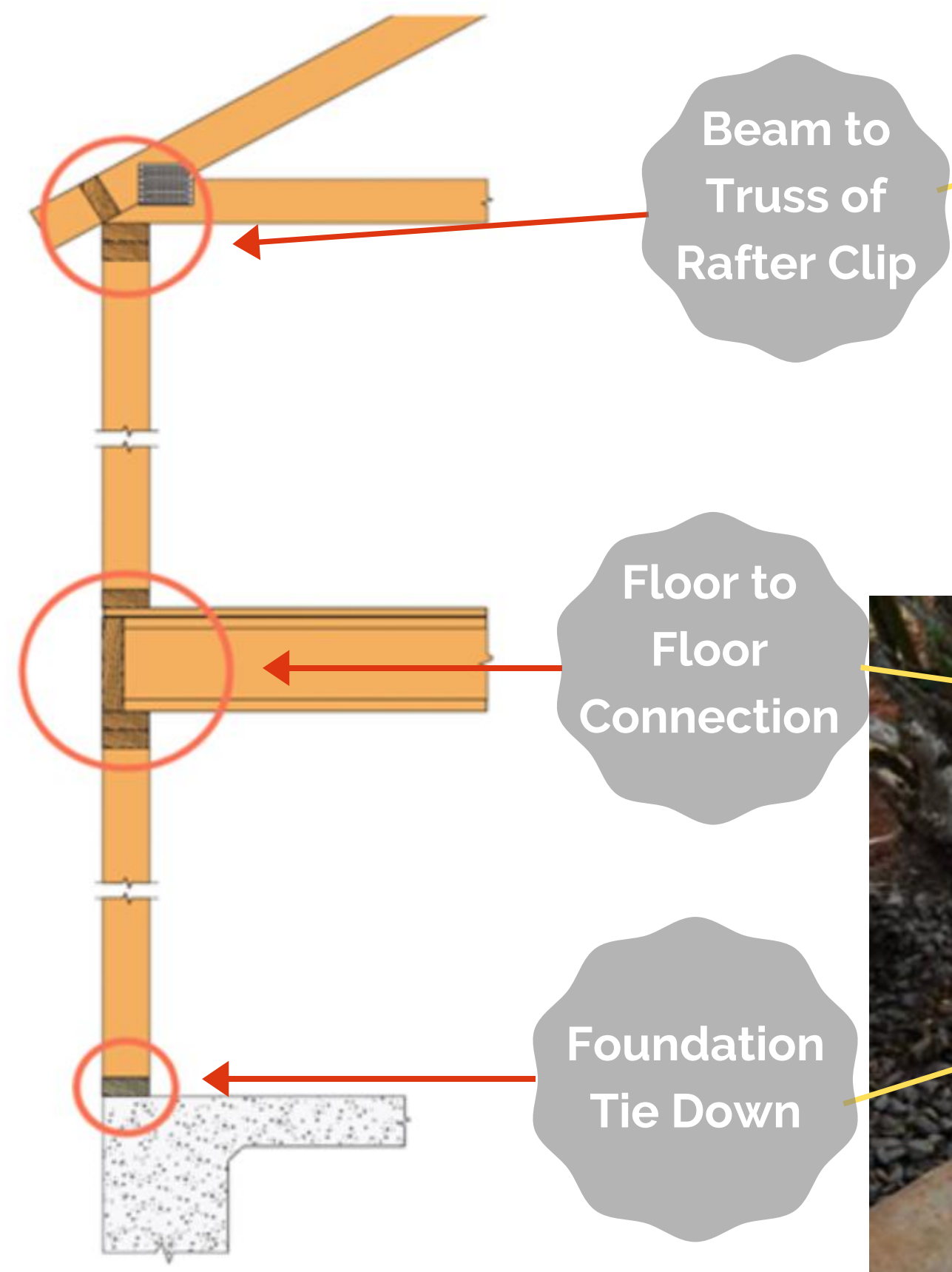


# COMMON INIKI DAMAGE





# CONTINUOUS LOAD PATH CONNECTION

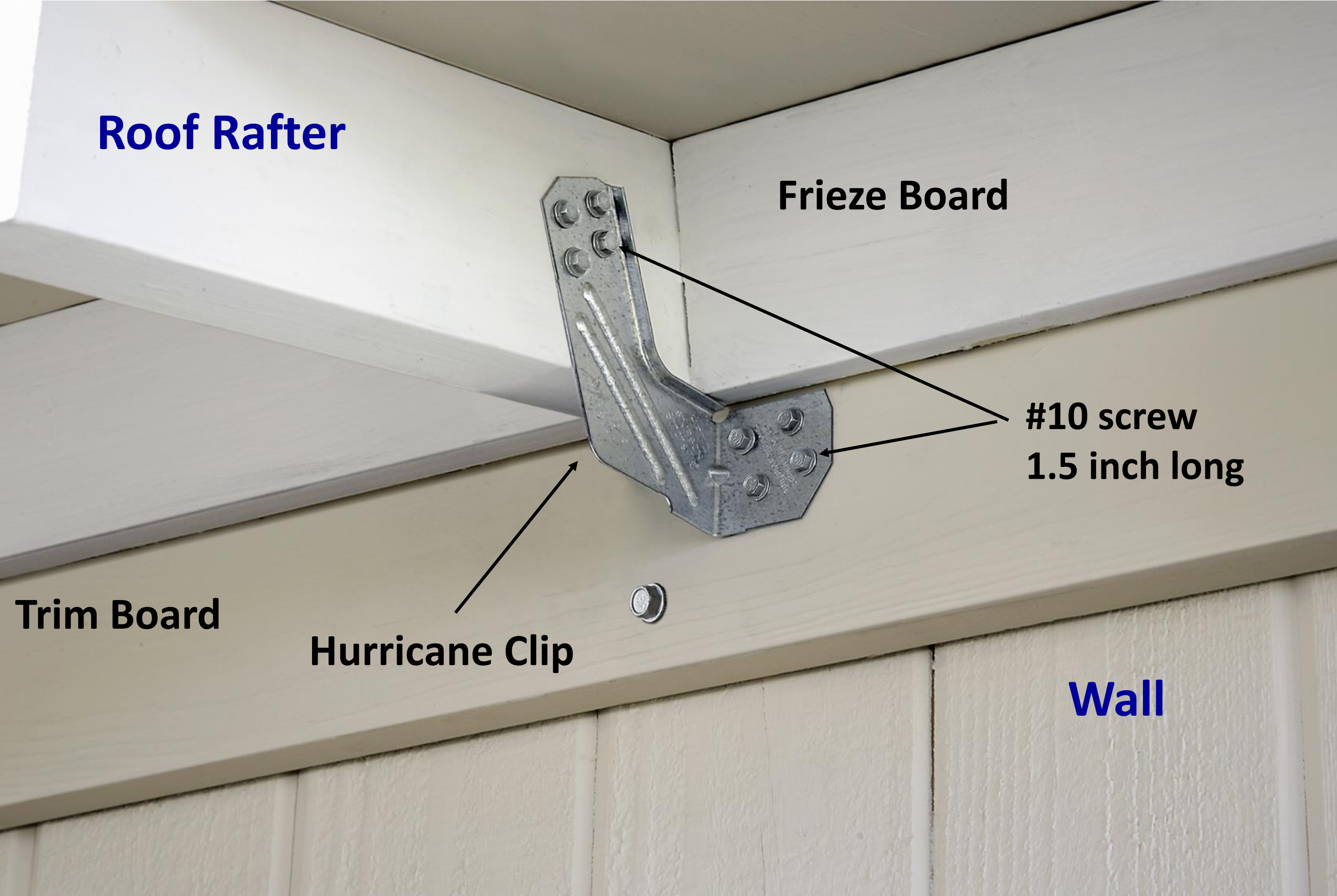


**\*\*\*Install Hurricane Straps and Clips to Reinforce the Roof\*\*\***





# HURRICANE CLIP INSTALLATION







# CONTINUOUS LOAD PATH CONNECTION

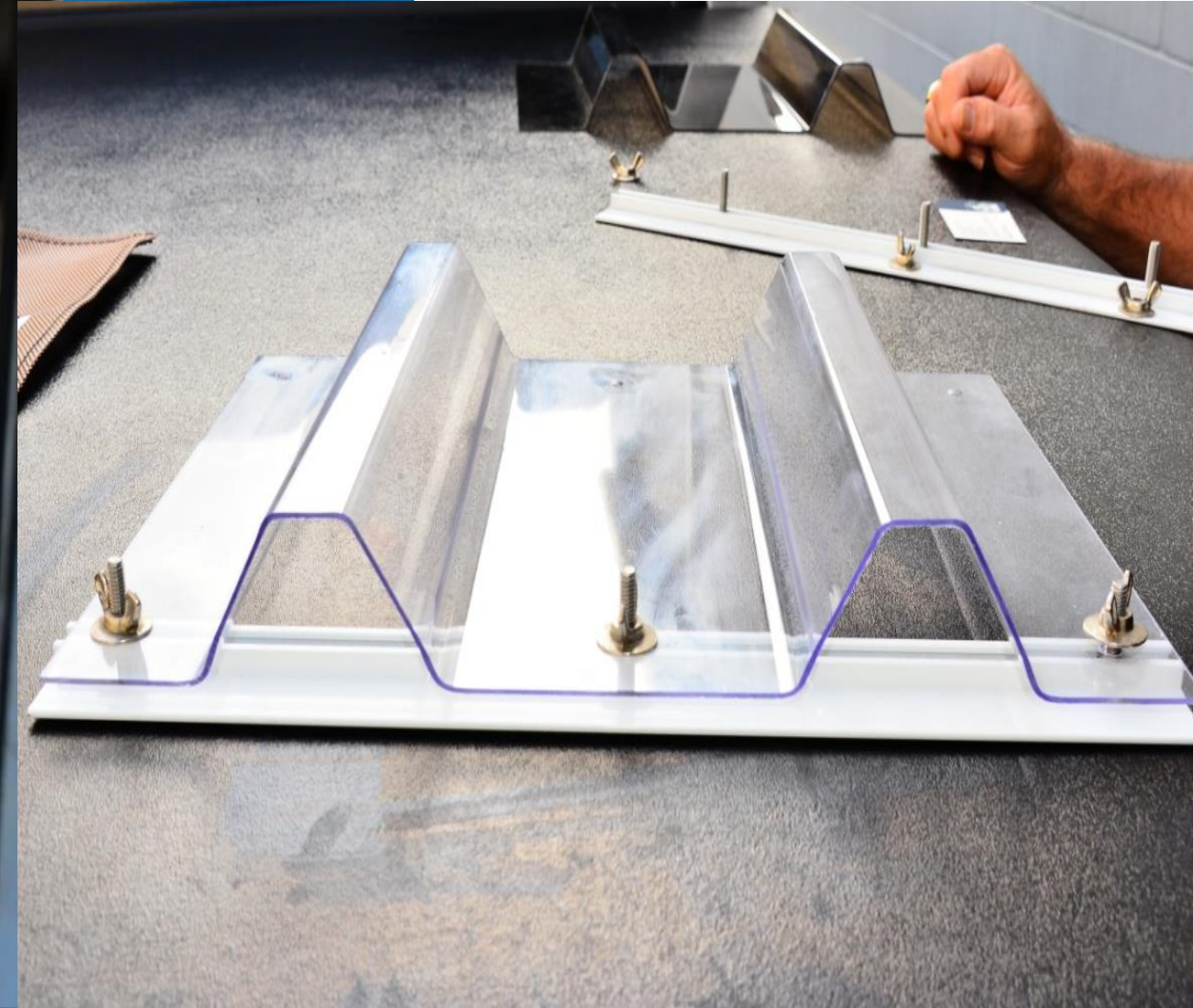


Pier and Post Support  
Robertson & Chock,  
2009





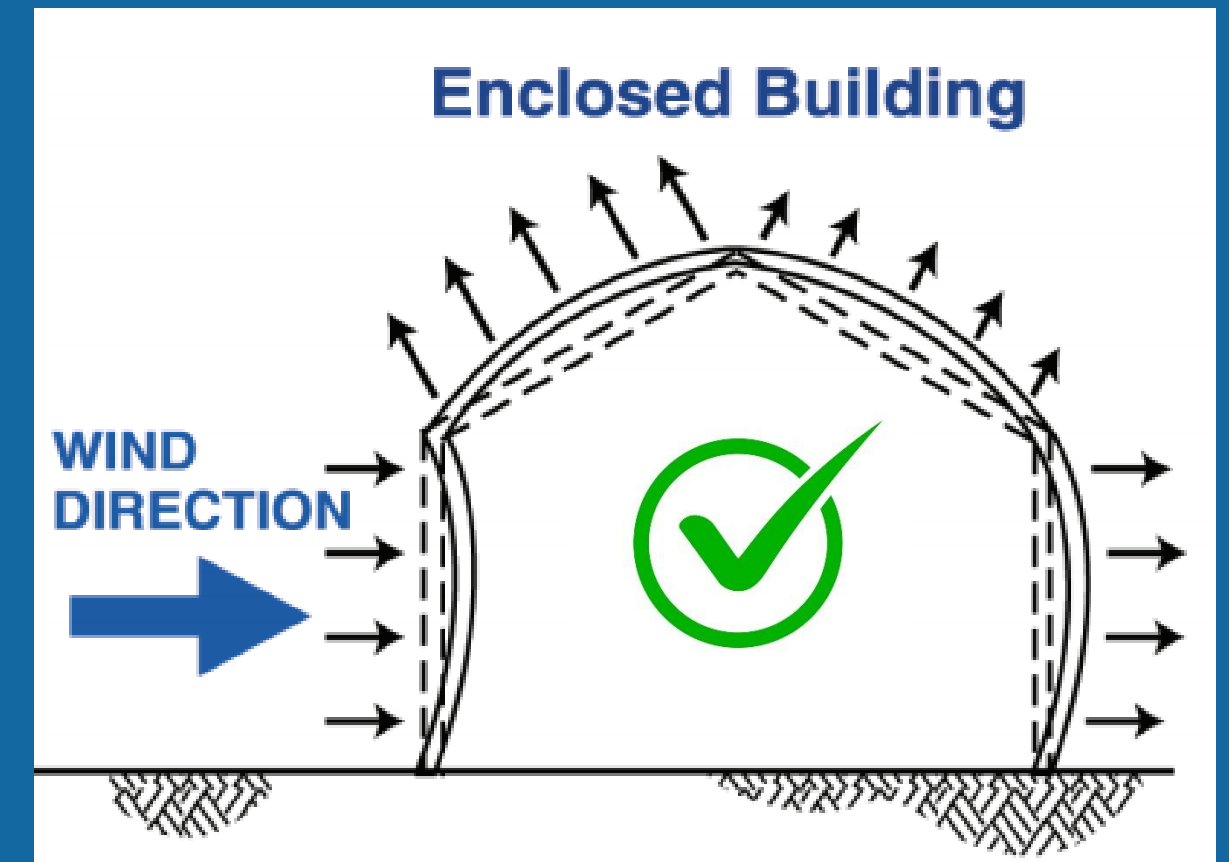
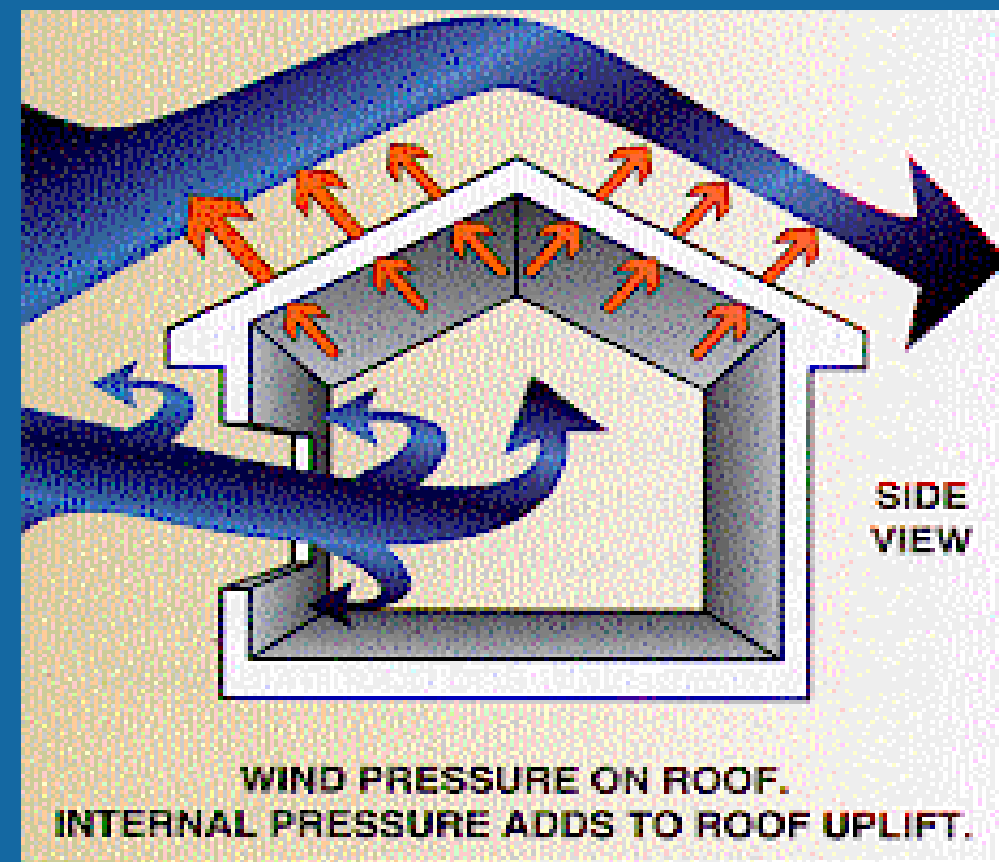
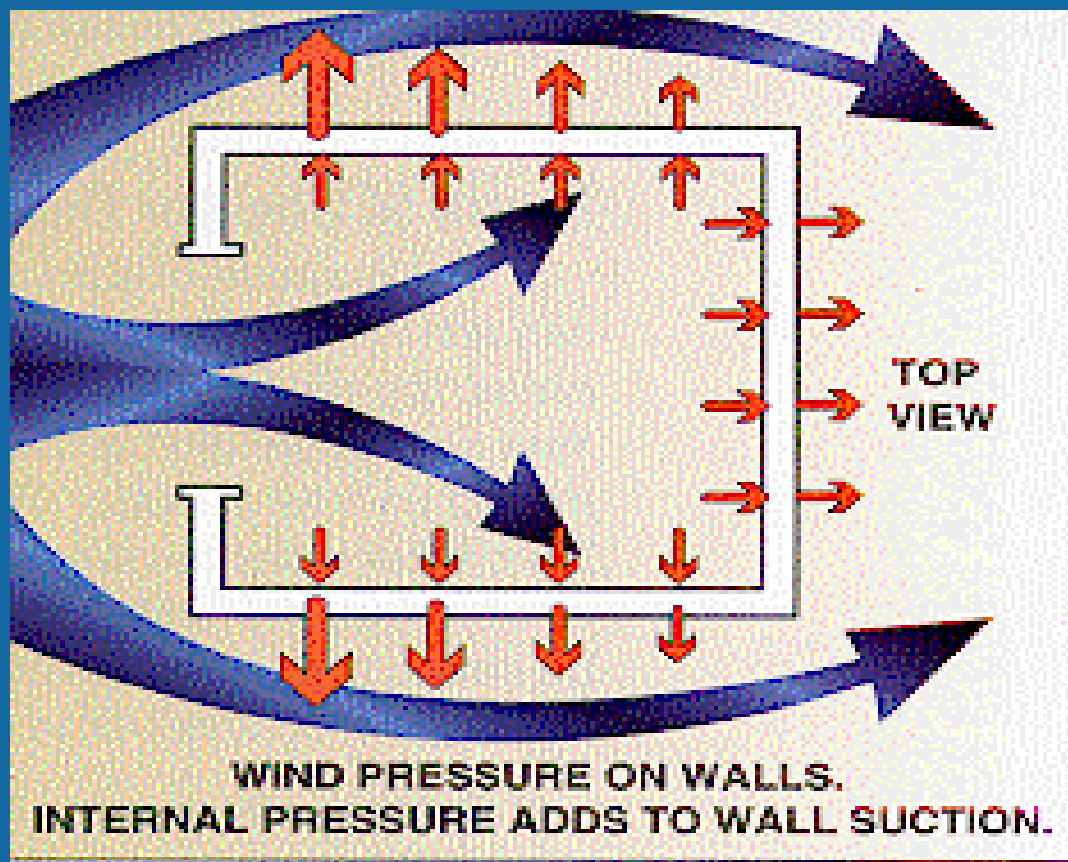
# PROTECTING THE MOST VULNERABLE PART OF YOUR HOME





**MYTH: Leaving a door/window open opposite to wind...**

**MYTH: Taping my windows will protect me and my home...**



**DON'T DO IT!**





# PROTECTING THE MOST VULNERABLE PART OF YOUR HOME

## Plywood:

- Pre-purchased
- Pre-cut
- Pre-labeled
- Pre-drilled





# Honeycomb Panels



## Roll Down Shutters







**Impact Resistant  
Glass**



**Laminates**



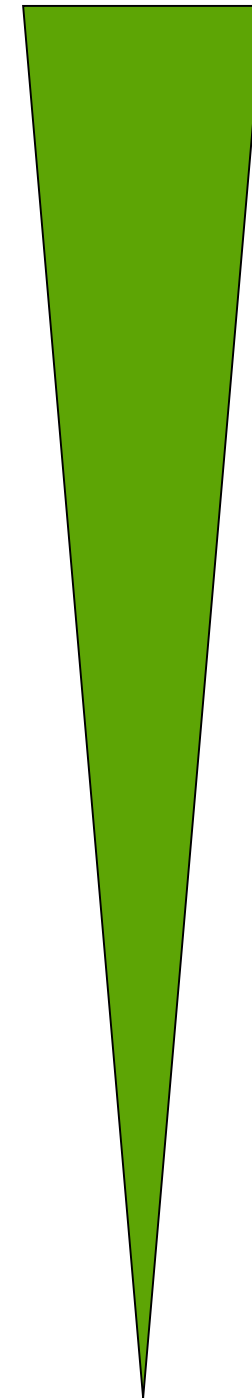
**Hurricane Screen**



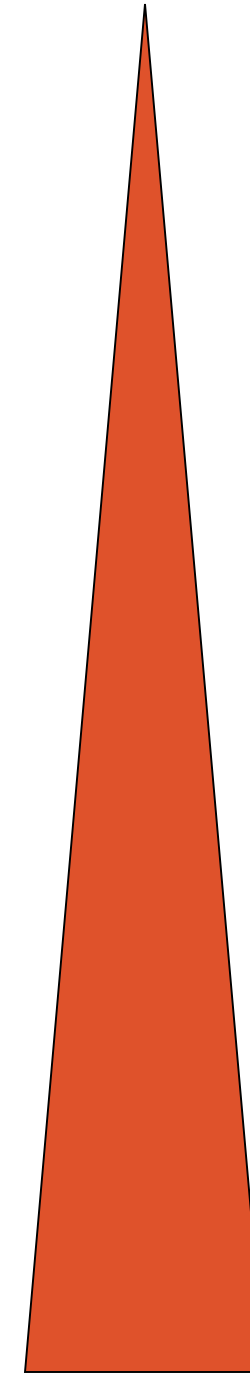
# WINDOW COVERINGS

- Roll Downs
- Impact Resistant Glass
- Accordion Shutters
- Laminates
- Storm Panels
- Plastic Honeycomb Panels
- Hurricane Screen
- Plywood

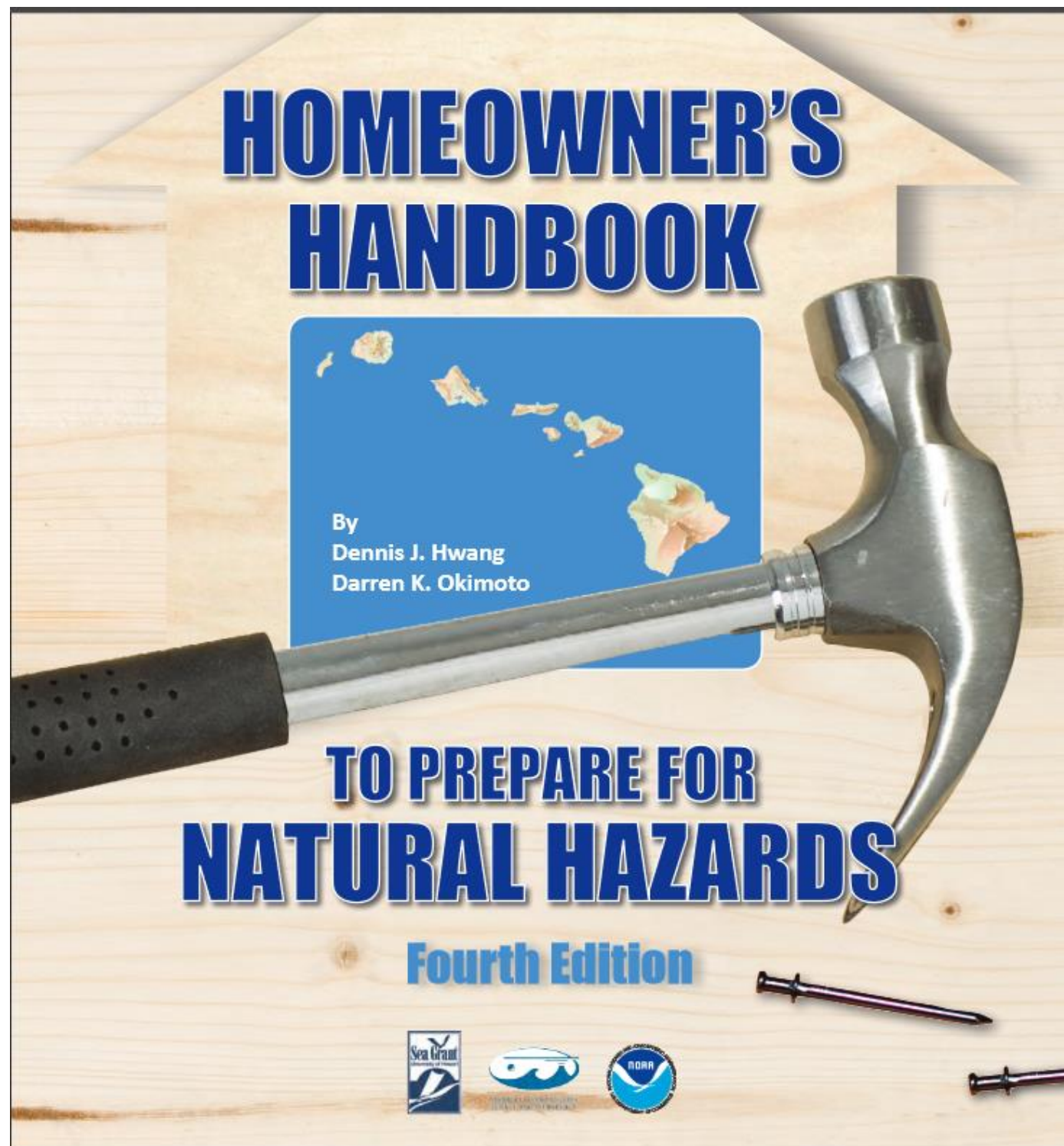
Cost



Time to  
Deploy







# Homeowners Handbook to Prepare for Natural Hazards

- ❖ **Recognize** the hazards that can affect you and your family and what you must do to ensure their safety.
- ❖ **Understand** the importance of emergency supplies and evacuation planning.
- ❖ **Learn** how your home can be your emergency shelter and learn how to build a **FEMA Residential Safe Room**.



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# STRATEGIES FOR RENTERS & CONDO DWELLERS

- Discuss preparedness with landlord; identify mutual benefit
- Know your rights (and limitations)
- Work with association or building manager
- Learn about your building's structure & windows-vulnerabilities
- Plan for the future but plan with what you've got today
- Renter's insurance
- Understand what your insurance covers





## MONITOR LOCAL TV

1. KHNL9 Hawaii News Now
2. KHON2 News
3. KITV4 Island News



Remember to have a backup plan for when the power goes out.

## MONITOR LOCAL RADIO

1. KSSK 590AM, KHPR 88.1FM, K203EL 88.5FM, KIPO 89.3FM, and KRTR 96.3FM
2. KZOO 1210AM (Japanese), KREA 1540AM (Korean)
3. KNDI 1270AM (Multi-Cultural Language Station that includes: Ilocano, Tagalog, Spanish, Cantonese, Mandarin, Laotian, Okinawan, Vietnamese, Samoan, Tongan, Marshallese, Chuukese, Pohnpeian, and English)

**Purchase a NOAA Weather Radio or a hand crank radio to listen even when the power is out.**







# DEPARTMENT OF EMERGENCY MANAGEMENT



**MAHALO!**

Crystal van Beelen

Disaster Preparedness Officer

Department of Emergency Management

808-723-8956

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