



## HAWAII DAM AND RESERVOIR SAFETY PROGRAM

*The Hawaii Dam and Reservoir Safety Program administered by the DLNR Engineering Division exists to protect the health, safety, and welfare of the citizens of the State by reducing the risk of failure of the dams or reservoirs*

### What are dams?

A barrier constructed to hold back water resulting in a pool that can be used for a variety of purposes; agriculture, water supply, electricity generation, flood or sediment mitigation.

### History of Dams in Hawaii

Since the late 1800's and early 1900's many dams were built to support agriculture across the state.

### Dam Safety Regulatory Program

- 1980 US Army Corps of Engineers – conducts Phase I inspection of High Hazard dams and develops the Hawaii regulated dam inventory
- 1987 Dam Safety Act (HRS 179D)
- 1989 Hawaii Administrative Rules (HAR) 13-190
- 2006 Kaloko Dam failure
- 2007 Update "Hawaii Dam and Reservoir Safety Act of 2007" (HRS 179D)
- 2012 Update "Dams and Reservoirs" (HAR 13-190.1)

### Regulatory size

- Greater than 25-ft high and 16.3 million gallons in volume, but nothing less than 6-ft tall, or 4.9 million gallons in volume

### October 2018 Statistics

- Regulates 131 dams and reservoirs statewide
  - Hawaii – 10
  - Maui – 56
  - Oahu – 13
  - Kauai – 52

### Q&A

#### 1. Why should I care about dams?

- a) Dams provide a great asset to the community by providing stored water for irrigation, drinking, energy generation and flood and sediment control. However, they come with risks if there were to be a dam failure. Not only the flooding of the community, but also the loss of the asset and its benefits.



*Nuuanu Reservoir No. 4 features a tower through which water drains from the reservoir pool.*

#### 2. What are risks associates with dams?

- a) Dam failures can be structural, mechanical or hydraulic in nature.
  - i. Structural – foundation defects causes the failure of the embankment
  - ii. Mechanical – malfunctioning gates or valves can cause a dam failure
  - iii. Hydraulic – overtopping due to inadequate spillway design or as a result of other causes

#### 3. Am I or could I be affected by a dam and what is the dam failure flood inundation area?

- a) Yes, potentially, if you live downstream of a dam. Flood inundation areas and water flow down natural tributaries can be modeled. There is a potential for stream banks and drainage ways to be overtopped during a dam break due to an increase in flow.
- b) You can find out if you live in a Dam Evacuation area by visiting <http://gis.hawaiiinfip.org/fhat/> or <http://dlnreng.hawaii.gov/dam/> for more information about the program.
- c) The evacuation area is a much larger area that may be affected by flooding. The evacuation area is designed by emergency managers to

control the movement of people in and out of the potential hazard zone, and determined by the roadway network of a particular neighborhood.

#### 4. Once I determine that my property is in a dam break inundation area, what's next?

- a) Know where the dam is located, compared to your location.
- b) Find out the downstream channel and tributary stream or drainageway downstream of the dam.
- c) Become familiar with the streets and major roadways that would be closed in the event of a potential dam break.
- d) Become aware of how to move away from the potential flood wave. Depending on the downstream tributary, which direction to move, including vertical evacuation.

### More Information

- 1. Dams Public Inventory: [dams.hawaii.gov](http://dams.hawaii.gov)
- 2. Dam Evacuation Area: [gis.hawaiiinfip.org/fhat/](http://gis.hawaiiinfip.org/fhat/)
- 3. More Information: [dlnreng.hawaii.gov/dam](http://dlnreng.hawaii.gov/dam)
- 4. See if your address is in a Nuuanu evacuation zone: [boardofwatersupply.com/dams](http://boardofwatersupply.com/dams)

## NUUANU RESERVOIR NO. 4 DAM INFORMATION

### Why am I receiving this notice?

The Board of Water Supply (BWS) is providing this information bulletin on the **Nuuanu Reservoir No. 4 Dam (OA-0001)** as a community service.

**NO EVACUATIONS ARE BEING CALLED.**

Nuuanu Reservoir No. 4 Dam is located on the Diamond Head-side of Pali Highway above Nuuanu Pali Dr.

### BWS operation of the Nuuanu Reservoir No. 4 Dam

BWS keeps the reservoir at least half full, or at a water depth of approximately 30 feet to maintain adequate flood control storage capacity, by keeping the middle gate of the intake tower open. Water from the reservoir drains via a 24-inch diameter pipeline through the dam and into Lulumahu Stream and ultimately Nuuanu Stream.

### What level does the water need to reach to require mandatory evacuation?

When the water level reaches a foot below the top of the dam, a mandatory evacuation notice will be issued. (The City Department of Emergency Management (DEM) and the State Dept. of Land and Natural Resources (DLNR) are currently reviewing evacuation triggers and will update their plans as necessary.) BWS is working with DEM to coordinate the evacuation plan, which includes public evacuation notification and designation of evacuation centers, only if needed.

### If I need to be evacuated, how will BWS notify me?

**BWS will work with the City Department of Emergency Management (DEM) and other city agencies to provide notice to the affected residents.** Should evacuation become mandatory, personnel from the Honolulu Police Department, Honolulu Fire Department, and DEM will notify the community.

### Do you have a list of streets in the evacuation zone so I can see if I live in that area?

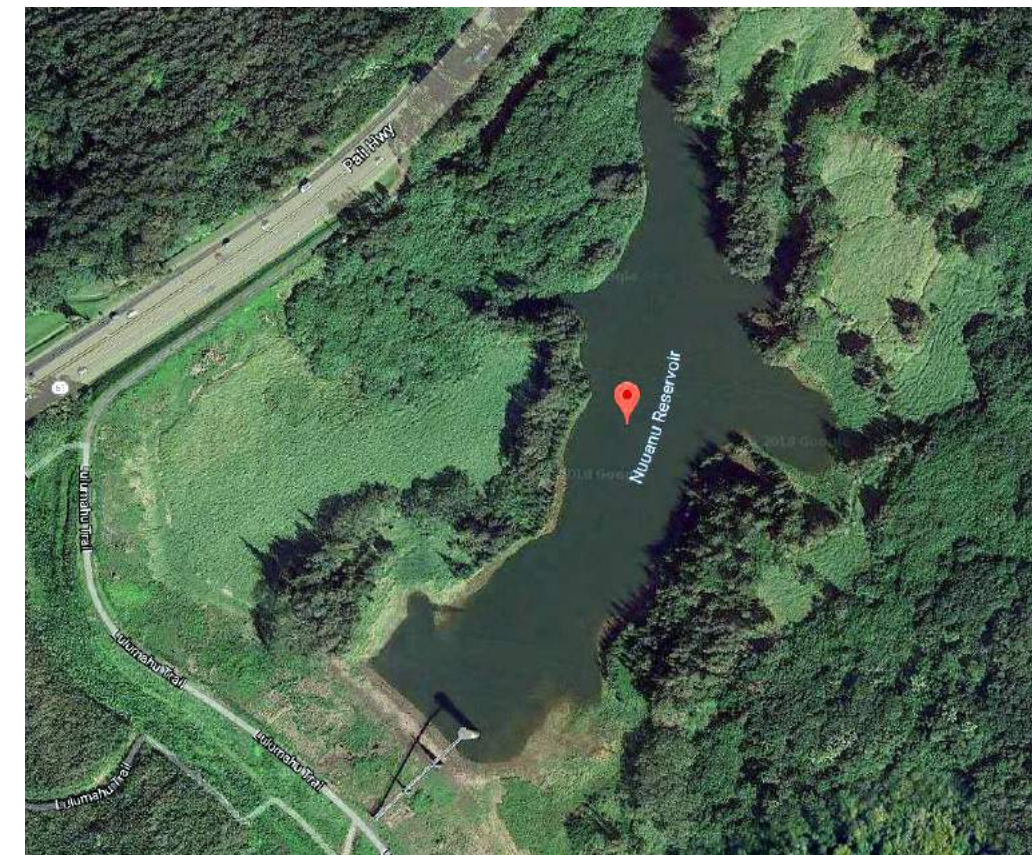
BWS worked with DEM to determine the extent of the evacuation zone. A map is on

the other side of this sheet.

### In the event of a mandatory evacuation, where can I find an evacuation center?

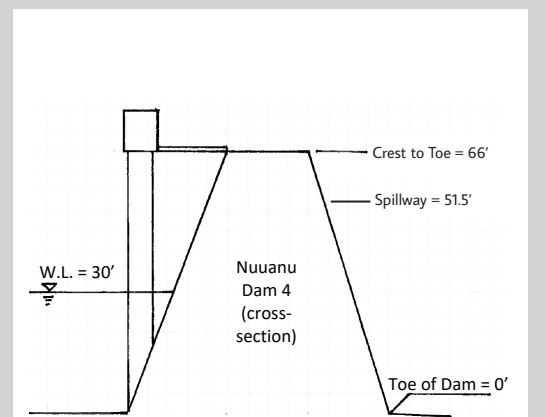
Locations of evacuation centers would be provided to community leaders and the media to share with the public. **Stay tuned to local news media and social media channels for up-to-the-minute information.**

*Information presented in this document was the best available at the time of printing and is subject to change and update as new information becomes available.*



## NUUANU DAM NO 4

- State Dam ID: OA-0001
- Year completed: 1910 (Original)  
1933 (Reconstruction)
- Purpose: flood control; water supply
- Dam type: Earthen
- Dam height: 66 feet
- Minimum crest width: 25 feet
- Dam length: 2,120 feet
- Storage: 79 million gallons
- Surface area: 25 acres





## NUUANU RESERVOIR NO. 4 DAM EMERGENCY EVACUATION PLAN

If evacuation should become necessary, the **City Department of Emergency Management (DEM)** would notify residents in the flood zone of the potential need to evacuate their properties due to possible flooding from Nuuanu Reservoir No. 4.

BWS keeps the water level in the reservoir constant by letting water out via a 24-inch diameter pipeline through the dam. Occasionally, due to severe weather events, rainfall and inflow rates could exceed the discharge capacity of the 24-inch pipeline. In that case, additional pumping units can be brought in to help reduce the water level in the reservoir.

In the event that water levels reach 1 ft. below the top of the dam, a mandatory evacuation notice will be issued to downstream areas. This evacuation could affect as many as 12,000 residents. **(Please see the yellow-outlined area on the map.)** Potential shelter locations would be identified.

**Disclaimer:** Information shown on this map is approximate and should be used as a guideline for emergency response. While the best available data has been utilized as inputs into a dam failure computer model, the final modeled product results should be interpreted as "best available estimates" of the evacuation areas. The computer models assume that the dam fails from a defect in the embankment structure, while full at maximum capacity, under dry (no rain) conditions and no discharge through the spillway. Dam breaches during flooding or other hazard events could differ or be larger than the area identified.

Should evacuations be initiated, listen to instructions from your local emergency management/civil defense agency, and directives from the police and fire departments. Based on the anticipated dam hazard or multiple hazards facing the community, this evacuation area may be altered by the local emergency management agency. The dam evacuation area is different from FEMA flood zone maps or the Tsunami Evacuation Maps (those can be viewed at: [gis.hawaiiinfip.org](http://gis.hawaiiinfip.org)). Although the modeled dam failure area utilized to create the evacuation zone maps were conducted by PDC for the State DLNR, the displayed evacuation map is the product and property of the local County Emergency Management or Civil Defense Agency. Any usage or alteration of this map should be cleared with that respective county agency.

**For more information: contact local Emergency Management/Civil Defense Agency or visit: <http://dlnreng.hawaii.gov/dam>**

### BOARD OF WATER SUPPLY

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