

## HOW THE CRATER WAS FORMED

The pronounced seaward summit, deeply eroded ridges, and ovoid-shaped crater are evidence of Lē'ahi's very dynamic geological history. The creation of O'ahu began around 2.5 to 4 million years ago with volcanic eruptions from 2 shield volcanoes. A period of extensive erosion followed, leaving the Ko'olau and Wai'anae Mountain Ranges as the remnants of these volcanoes.

After about 1.3 million years of volcanic inactivity, the southeastern end of the Ko'olau Range erupted. These eruptions occurred under the ocean, where the magma was broken down into ash and fine particles by the water and steam. Blown into the air, these particles were cemented together into a rock called tuff which created tuff cones, such as Lē'ahi.

Lē'ahi is believed to have been formed about 300,000 years ago during a single, brief eruption. The broad crater covers 350 acres with its width being greater than its height. The southwestern rim is highest because winds were blowing ash in this direction during the eruption. Since the eruption, the slopes of the crater have been eroded and weathered by rain, wind, and the pounding of the sea. A coral reef now protects the seaward slopes of the crater.

Today, Lē'ahi (Diamond Head) is the most recognized landmark in Hawai'i. It was designated a National Natural Landmark in 1968 as an excellent example of a tuff cone.

## ENVIRONMENT



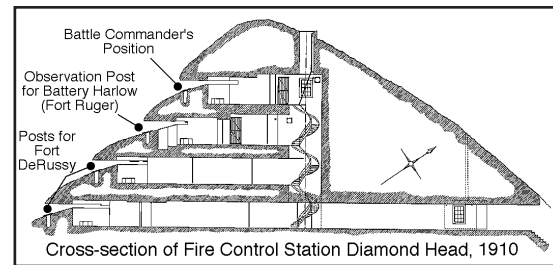
The semi-arid climate, the steep rocky slopes, and the shallow soil of Diamond Head support mostly low shrubs and herbs. Botanists believe that the crater was once covered by a dryland forest, but only a few native Hawaiian species, such as 'ilima, remain. Rainwater collects on the crater floor in the winter, creating a small lake that was frequented by native ducks and waterbirds until the early 1900s.

Most of the plants and animals you see in the crater today were introduced to Hawai'i after the 1800s. Dominant plants are the *kiawe*, a relative of the mesquite, and *koa haole*. Both of these plants were brought in as cattle feed and have adapted well to the hot, dry conditions. You may see some of the common introduced birds, such as cardinals, doves, and sparrows.

## THE EARLY HISTORY

It is said that Hi'iaka, sister of the fire goddess Pele, gave Lē'ahi its name because the summit resembles the forehead (*lae*) of the 'ahi fish. Another translation is "fire headland" and refers to the navigational fires that were lit at the summit to assist canoes travelling along the shoreline. The *heiau* (temple) built on the summit was dedicated to the god of wind as protection against strong updrafts that could put out these navigational fires. Today, the Diamond Head Light, built in 1917, provides a visual aid for navigation.

In the late 1700s, Western explorers and traders visited Lē'ahi and mistook the calcite crystals in the rocks on the slope of the crater for diamonds. Thus, the name Diamond Head became the common name for the crater.



## MILITARY HISTORY

With its panoramic view from Koko Head to Wai'anae, the summit of Diamond Head was an ideal site for the coastal defense of O'ahu. In 1904, Diamond Head was purchased by the Federal government and designated for military use. Fortification began in 1908 with the construction of gun emplacements and an entry tunnel through the north wall of the crater from Fort Ruger known as the Kapahulu Tunnel.

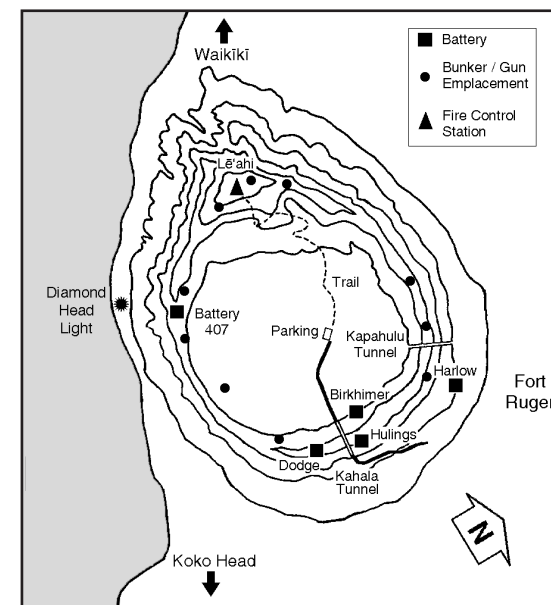
Batteries were built to house the coastal artillery. A total of 5 batteries were built at Diamond Head Crater: Harlow (1910) on the northern exterior, Dodge and Hulings (1913) which tunnel through the eastern crater wall, Birkhimer (1916) which is largely below ground inside the crater, and Battery 407 (1943) which tunnels through the southern wall of the crater and faces seaward.

Fire Control Station Diamond Head was built at the summit between 1908-1910 and housed instruments and plotting rooms to direct artillery fire from several batteries. This fortification was an engineering marvel of its time.

From this observation station, observers could triangulate targets and aim artillery and mortar fire from Batteries Randolph and Dudley at Fort DeRussy in Waikiki and Battery Harlow at Fort Ruger on the outer slopes of the crater. Consisting of 4 levels, the exterior of the Fire Control Station was camouflaged with rubble embedded in concrete. Slits with metal shutters on each level provided seaward viewing for potential sea and air attacks. The 4 levels and the summit were accessed by a spiral staircase and ladders between the levels.

Additional coastal defense was provided by long range guns installed on the outer slopes and rim of the crater around 1915. Diamond Head was prepared to defend O'ahu from attack but no artillery was ever fired during a war.

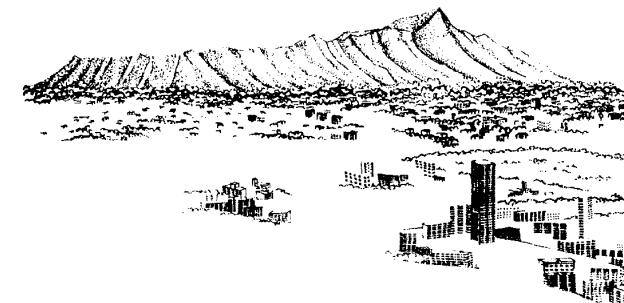
The military features of Diamond Head are part of the Fort Ruger Historic District.



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# DIAMOND HEAD (Lē'ahi) STATE MONUMENT



## Honolulu, O'ahu



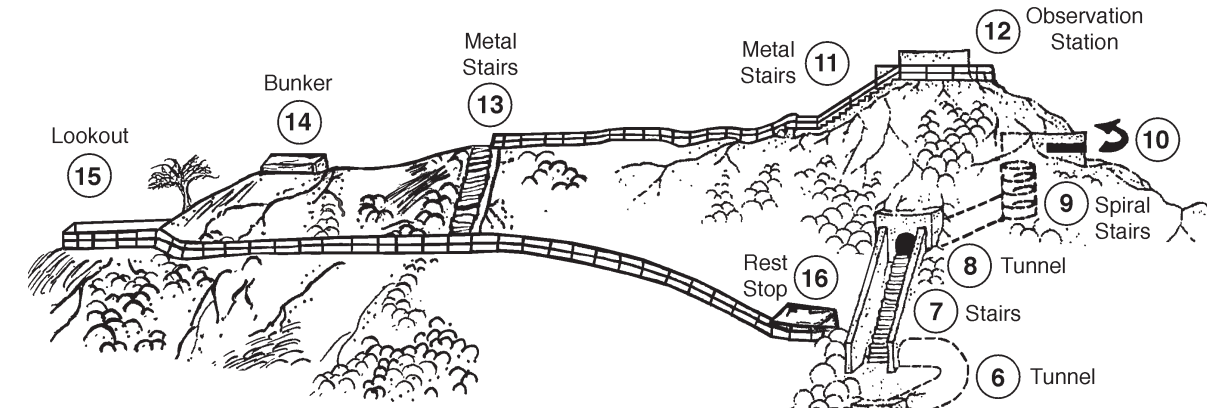
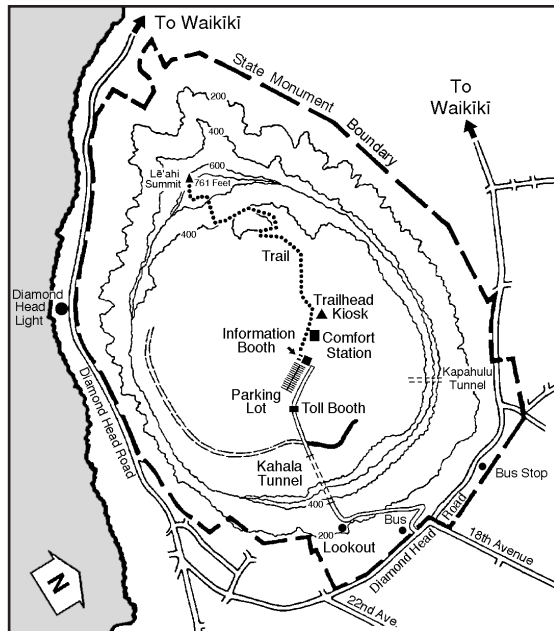
## HISTORIC TRAIL TO THE SUMMIT

The trail to the summit of Lē'ahi was built in 1908 as part of the U.S. Army Coastal Artillery defense system. Entering the crater from Fort Ruger, through the Kapahulu Tunnel, the trail scaled the steep interior western slopes of the crater to the summit. The dirt trail with numerous switchbacks was designed for mule and foot traffic. The mules hauled materials on this trail for the construction of Fire Control Station Diamond Head located at the summit. Other materials were hoisted from the crater floor by a winch and cable to a midway point along the trail. The Kahala Tunnel was built in the 1940s and is the public entrance today.

## HIKING THE TRAIL

From the trailhead to the summit of Diamond Head Crater, you will hike 0.8 mile (1.3 km) one way and climb 560 feet (171 m) from the crater floor. The trail follows an uneven and steep terrain requiring caution and appropriate footwear. Portions of the trail involve steep stairways - take your time. Other portions of the trail go through a long tunnel which is lighted. Allow 1.5 to 2 hours for a safe and leisurely round-trip hike.

After exiting the tunnel, turn right and take the 99 steps into the Fire Control Station up to the summit. To avoid congestion, take the loop trail along the rim and interior slope back to the tunnel.



## HAVE A SAFE HIKE

The weather here is always hot - a hat, sunscreen and plenty of water are recommended.

- The tunnel gate closes at 6:00pm (1800 hours) and reopens at 6:00am. Do not get locked in!
- Last time to start the hike is 4:30pm.
- Pack out what you pack in - do not litter.
- Do not deface the historic structures.
- Do not enter closed or unauthorized areas.
- In case of emergency, call 911.



*Lē'ahi is a fragile resource. By staying on the trails and not taking shortcuts, you save plants and reduce erosion.*

*Mahalo*

## POINTS OF INTEREST ON THE TRAIL

- 1 The elevation at the trailhead on the crater floor is about 200 feet (61 m).
- 2 The former pistol ranges consist of earthen berms that are visible from the concrete path.
- 3 The trail conforms to the 1908 alignment with switchbacks up the steep interior slope.
- 4 Concrete Landing/Lookout. This concrete foundation held a winch and cable to lift materials from the crater floor to this point.
- 5 Steep stairway of 74 concrete steps leads into the first narrow tunnel.
- 6 Tunnel is lighted and 225 feet long.
- 7 Second stairway consisting of 99 steep steps with overhead beams to place camouflaging.
- 8 At the top of the stairs is the entry to the lowest level of the Fire Control Station with observation equipment for Fort DeRussy at Waikiki.
- 9 The lighted spiral staircase accessed the 4 levels of the Fire Control Station. Go up the 52 stairs to the third level where the mounts for the observation equipment are still present.
- 10 Exit to the exterior of the crater through slits once covered with metal shutters. Note the rock and concrete that camouflage the outside.
- 11 The 54 metal stairs were installed in the 1970s and replaced the ladder to the summit.
- 12 The elevation of the crater summit and the uppermost level of the Fire Control Station is 761 feet (232 m).
- 13 From the summit, follow the trail along the rim and take the 82 metal steps down to the lower trail. This trail loops back to the tunnel.
- 14 Bunkers along the crater rim were built in 1915. Area closed - emergency helicopter landing.
- 15 Lookout provides sweeping views of southeastern O'ahu coastline towards Koko Head and the offshore islands of Moloka'i, Lana'i and Maui.
- 16 Rest stop offers views of the crater before heading back down through the tunnel.