

## AMERON QUARRY SITE

### **Native Birds:**

Native birds would not be expected to frequent the actual quarry site but several species of native, endangered waterbirds do occur at the nearby Kawainui Marsh. Of the four alternative landfill sites, Ameron Quarry poses the greatest potential threat to native birds through groundwater or flood water contamination of Kawainui Marsh.

### **Migratory Birds:**

The Pacific Golden-Plover occurs in open habitats around the quarry.

### **Alien (Non-native, Introduced) Birds:**

Common alien species in this area include but are not limited to:

Cattle Egret (*Bubulcus ibis*)

Spotted Dove (*Streptopelia chinensis*)

Zebra Dove (*Geopelia striata*)

Red-vented Bulbul (*Pycnonotus cafer*)

Common Myna (*Acridotheres tristis*)

Japanese White-eye (*Zosterops japonicus*)

Northern Cardinal (*Cardinalis cardinalis*)

Red-crested Cardinal (*Paroaria coronata*)

House Finch (*Carpodacus mexicanus*)

Common Waxbill (*Estrilda astrild*)

### **FERAL MAMMALS**

All four sites likely have some or all of the following feral mammals: cats, dogs, rats, mice and the Small Indian Mongoose.

### **CONCLUSIONS**

This report is only intended to provide a general overview of the more common species of birds and mammals that might be expected at the alternative landfill sites. An actual field survey would obviously yield a more complete assessment of faunal use of these areas. The only alternative site with potentially serious impact is the Ameron Quarry property. Its proximity to a wetland with endangered species could spell trouble in the form of water contamination from flooding or through groundwater drainage.

**Appendix G**

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Archaeological Inventory Survey  
Waimānalo Gulch Landfill Expansion Project, 2008



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**Archaeological Inventory Survey for the  
Waimānalo Gulch Sanitary Landfill Expansion Project  
Honouliuli Ahupua‘a, ‘Ewa District,  
Island of O‘ahu  
(TMK: [1] 9-2-003: por. 072 and 073)**

**Prepared for  
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(Job Code: HONOU 6)**

**September 2008**

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## Management Summary

Reference	Archaeological Inventory Survey for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu (TMK: [1] 9-2-003: por. 072 and 073) (Dalton and Hammatt 2008)
Date	September 2008
Project Number	Cultural Surveys Hawaii, Inc. (CSH) Job Code: HONOU 6
Investigation Permit Number	The fieldwork for this investigation was carried out under archaeological permit number 07-19, issued by the Hawai'i State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR), per Hawai'i Administrative Rules (HAR) Chapter 13-282.
Project Location	The proposed landfill expansion area is located immediately <i>mauka</i> (northeast) of the existing Waimānalo Gulch Sanitary Landfill. Waimānalo Gulch is generally located immediately inland of Farrington highway, roughly between the Honokai Hale residential subdivision and Ko Olina Resort to the southeast, and the Hawaiian Electric Co.'s (HECO) Kahe Power Plant to the northwest. This area is depicted on the 1998 'Ewa USGS 7.5 minute topographic quadrangle.
Project Funding and Land Jurisdiction	City and County of Honolulu (City)
Agencies	City Department of Environmental Services, SHPD
Project Description	The proposed landfill expansion area comprises approximately 90 acres of undeveloped land within the overall 200-acre Waimānalo Gulch Landfill property (TMK: [1] 9-2-003: 072 and 073). The proposed landfill expansion area is to be used for the disposal of municipal refuse, H-POWER associated ash and residue, and operational activities associated with running the landfill. The landfill expansion is meant to increase the capacity and lifespan of the existing Waimānalo Gulch Sanitary Landfill. Minimally, land disturbing activities associated with the landfill expansion project would include: major grading, including blasting of exposed rock surfaces, and excavation of the base and walls of Waimānalo Gulch to prepare the expansion area for landfill use; grading for a perimeter road around the expansion area; excavations for stockpiling of sediment for use as cover material; excavations for associated landfill infrastructure; excavation for the installation of a storm water runoff control channel along the west side of the gulch; and filling of the expansion area with refuse material.

Area of Potential Effect (APE)	The project's APE is defined as the entire approximately 90-acre proposed expansion area.
Definition of the Current Study Area.	Background research confirmed that the approximately 90-acre landfill expansion project area had been previously surveyed by CSH as part of an earlier archaeological inventory survey (AIS) of the entire 200-acre Waimānalo Gulch Landfill property (Hammatt and Shideler 1999). In early 2007, at the request of the project proponents, CSH completed additional AIS investigation, including systematic pedestrian inspection and limited subsurface testing, of a 36-acre portion of the overall 90-acre APE that represents the core of the expansion area (located within TMK: [1] 9-2-003: 073). This 36-acre portion of the overall 90-acre APE is defined as the study area for the current AIS investigation.
Historic Preservation Regulatory Context	As a City-funded project on City-owned land, the proposed landfill expansion is a project requiring compliance with State of Hawaii historic preservation review legislation. This investigation was performed to fulfill Hawaii State archaeological inventory survey standards (Hawaii Administrative Rules [HAR] Chapter 13-276) and support the project's historic preservation review under Hawaii Revised Statutes [HRS] Chapter 6E-8 and HAR Chapter 13-275. It also is intended to support the project's environmental review under HRS Chapter 343.
Fieldwork Effort	Fieldwork for the current AIS investigation of the study area was accomplished over a one-week period from January 25, 2007 to February 2, 2007. The CSH field crew consisted of Matt Bell, B.A., Amy Hammermiester, B.A., and Kevin Dalton, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). The field effort required 13 person-days to complete.
Results	Through the combined effort of the earlier AIS investigation of the entire 200-acre Waimanalo Gulch Landfill property (Hammatt and Shideler 1999) and the current AIS investigation of the 36-acre study area, all of the expansion area APE was subjected to systematic pedestrian inspection, with limited subsurface testing where appropriate. This effort located a single historic property: SIHP # 50-80-12-6903, three rock uprights, which are recommended eligible to the Hawai'i Register of Historic Places (Hawaii Register) under significance Criteria D (for information content) and E (for traditional-cultural significance to Native Hawaiians).

<p>Consultation Effort Related to SIHP # 50-80-12-6903</p>	<p>For the project's AIS consultation effort, CSH worked with the Office of Hawaiian Affairs, SHPD, and knowledgeable cultural consultants. This effort was dove-tailed with the cultural consultation effort for the project's cultural impact assessment, which CSH prepared pursuant to HRS Chapter 343 and the Office of Environmental Quality Control's guidelines for assessing cultural impacts. This consultation effort included several on-site, at the SIHP # 50-80-12-6903 location, meetings that included SHPD personnel (Mr. Adam Johnson, Ms. Teresa Davan, Ms. Linda Kaleo Paik, and Ms. Lauren Morawski), as well as knowledgeable cultural consultants, including Mr. McD Philpotts, Mr. Alike Silva, Mr. Glen Kila, Mr. Shad Kane, Mr. William Ailā, and Mr. Eric Enos. Through this consultation CSH sought the opinions of cultural consultants regarding the age, function, cultural affiliation, and significance of the three stone uprights. All cultural consultants felt the stones were significant Native Hawaiian cultural resources that were used in the past by traditional Hawaiian cultural practitioners. There is no clear consensus, however, regarding the specific function of the upright stones. Potential functions discussed included trail markers, markers for observation points for celestial observation and/or navigation, or markers used to calculate the location of specific coastal and/or off-shore resources. Potential mitigation measures for the stones, including preservation in place and relocation, were discussed with the cultural consultants.</p>
<p>Effect Recommendation</p>	<p>After weighing the options, the project proponents have determined that the three stones that make up SIHP # 50-80-12-6903 cannot be preserved in place in a safe and appropriate manner. Accordingly, a project effect determination of "effect with agreed upon mitigation commitments" is warranted.</p>

Mitigation Recommendation	<p>The project proponents propose the interim relocation of the three SIHP # 50-80-12-6903 stones to the vicinity of Battery Arizona, located in the southwestern portion of the Waimānalo Gulch Landfill property. The proposed relocation would ensure the safety of the stones during the landfill's expansion and would make them much more accessible to interested parties. The City &amp; County is willing to commit to move the stones back to, as close as possible, their original location and is prepared to commit to this in a Memorandum of Agreement. This relocation could only take place after that portion of the landfill had been filled. At this time there is some uncertainty regarding when that portion of the landfill would be closed but it seems likely it will take at least 15 years and could take as long as 50 years. The specifics of the proposed stone relocation would be the subject of the project's archaeological preservation/mitigation plan for SIHP # 50-80-12-6903. Additionally a Memorandum of Agreement will be drafted by the project proponents and will be reviewed by the SHPD prior to the implementation of the project.</p>
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## Section 1 Introduction

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### 1.1 Project Background

The City and County of Honolulu (City) intends to expand the active landfill operations within the 200-acre Waimānalo Gulch Sanitary Landfill property, located in Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu (TMK: [1] 9-2-003: 072 and 073). Waimanalo Gulch is generally located immediately inland of Farrington highway, roughly between the Honokai Hale residential subdivision and Ko Olina Resort to the southeast, and the Hawaiian Electric Co.'s (HECO) Kahe Power Plant to the northwest. This area is depicted on the 1998 'Ewa USGS 7.5 minute topographic quadrangle. The proposed expansion area includes approximately 90 acres of the overall property that is located generally *mauka* (northeast) of the existing and in-use landfill operations (Figure 1, Figure 2, & Figure 3).

The Waimānalo Gulch Sanitary Landfill was established in 1989; is owned by the City and County of Honolulu (C&C) under the jurisdiction of the Department of Environmental Services/Refuse Division, and operated by Waste Management of Hawai'i. The landfill currently takes in roughly 500,000 tons per year.

The proposed landfill expansion area of potential effect (APE) comprises approximately 90 acres of undeveloped land within the overall 200-acre Waimānalo Gulch Landfill property (TMK: [1] 9-2-003: 072 and 073). The proposed landfill expansion area is to be used for the disposal of municipal refuse, H-POWER associated ash and residue, and operational activities associated with running the landfill. The landfill expansion is meant to increase the capacity and lifespan of the existing Waimānalo Gulch Sanitary Landfill. Minimally, land disturbing activities associated with the landfill expansion project would include: major grading, including blasting of exposed rock surfaces, and excavation of the base and walls of Waimānalo Gulch to prepare the expansion area for landfill use; grading for a perimeter road around the expansion area; excavations for stockpiling of sediment for use as cover material; excavations for associated landfill infrastructure; excavation for the installation of a storm water runoff control channel along the west side of the gulch; and filling of the expansion area with refuse material.

As a City-funded project on City-owned land, the proposed landfill expansion is by definition a project requiring compliance with Hawaii State environmental (Hawaii Revised Statutes [HRS] Chapter 343) and historic preservation [HRS Chapter 6E-8 and Hawaii Administrative Rules (HAR) Chapter 13-275] review legislation. Accordingly, at the request of R.M. Towill Corporation, on behalf of the City, Cultural Surveys Hawai'i Inc. (CSH) conducted an archaeological inventory survey (AIS) to support the project's environmental and historic preservation review. This investigation was performed to fulfill Hawaii State archaeological inventory survey standards (HAR Chapter 13-276) and support the project's environmental and historic preservation review. An earlier (April 2008) draft of the present AIS was reviewed by the SHPD in their Chapter 6E-8 Historic Preservation review letter of August 29, 2008 (Log No 2008.1458, Doc No 0808LM10; present Appendix A). This revised AIS addresses the concerns enumerated.

Background research confirmed that the approximately 90-acre landfill expansion project area had been previously surveyed by CSH as part of an earlier archaeological inventory survey (AIS)

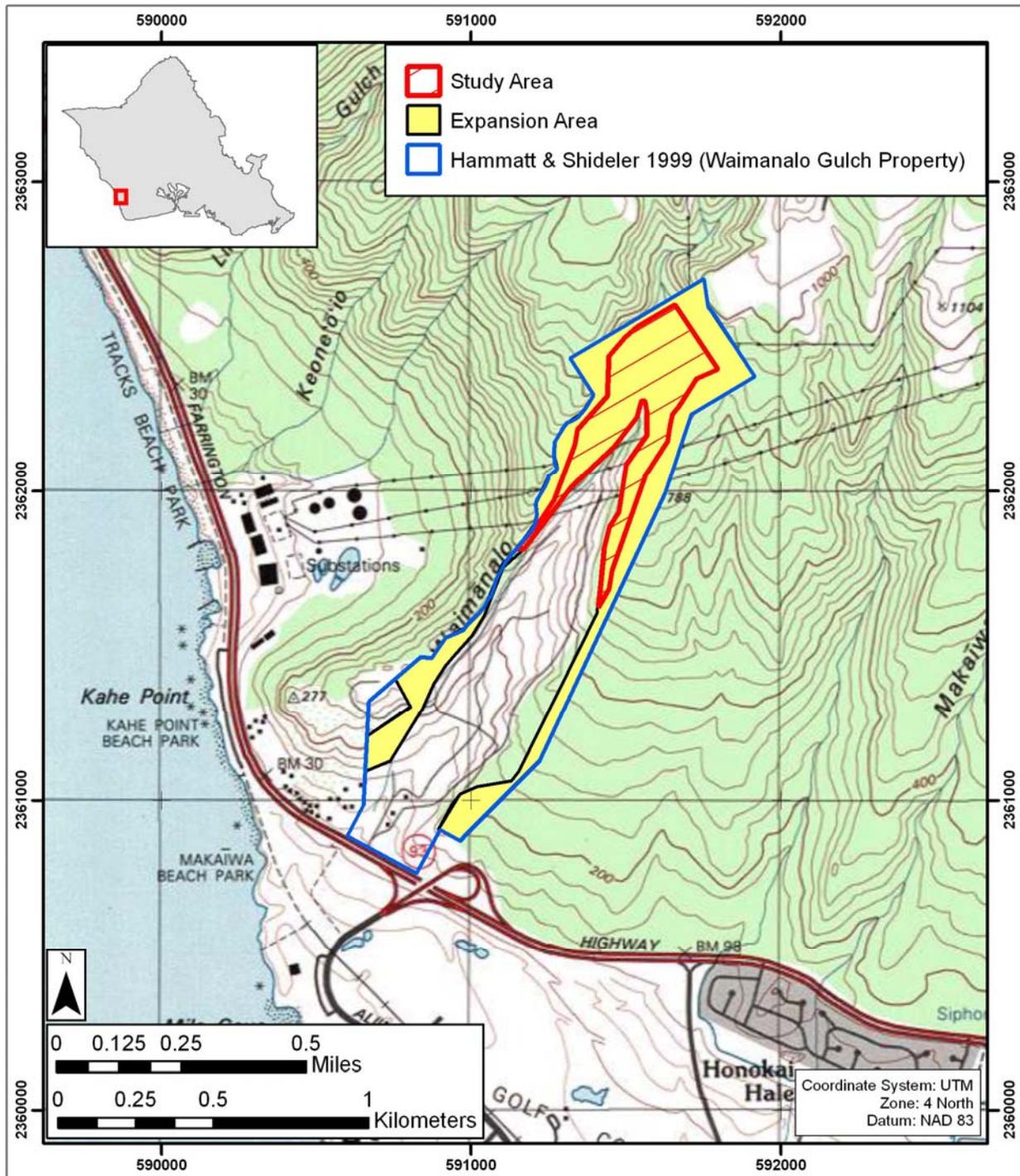


Figure 1. USGS 7.5 Minute Series Topographic Map, Ewa Quadrangle (1998), showing the location of the Hammatt & Shideler (1999) study area, the Waimānalo Gulch Sanitary Landfill proposed expansion area, and the current study area

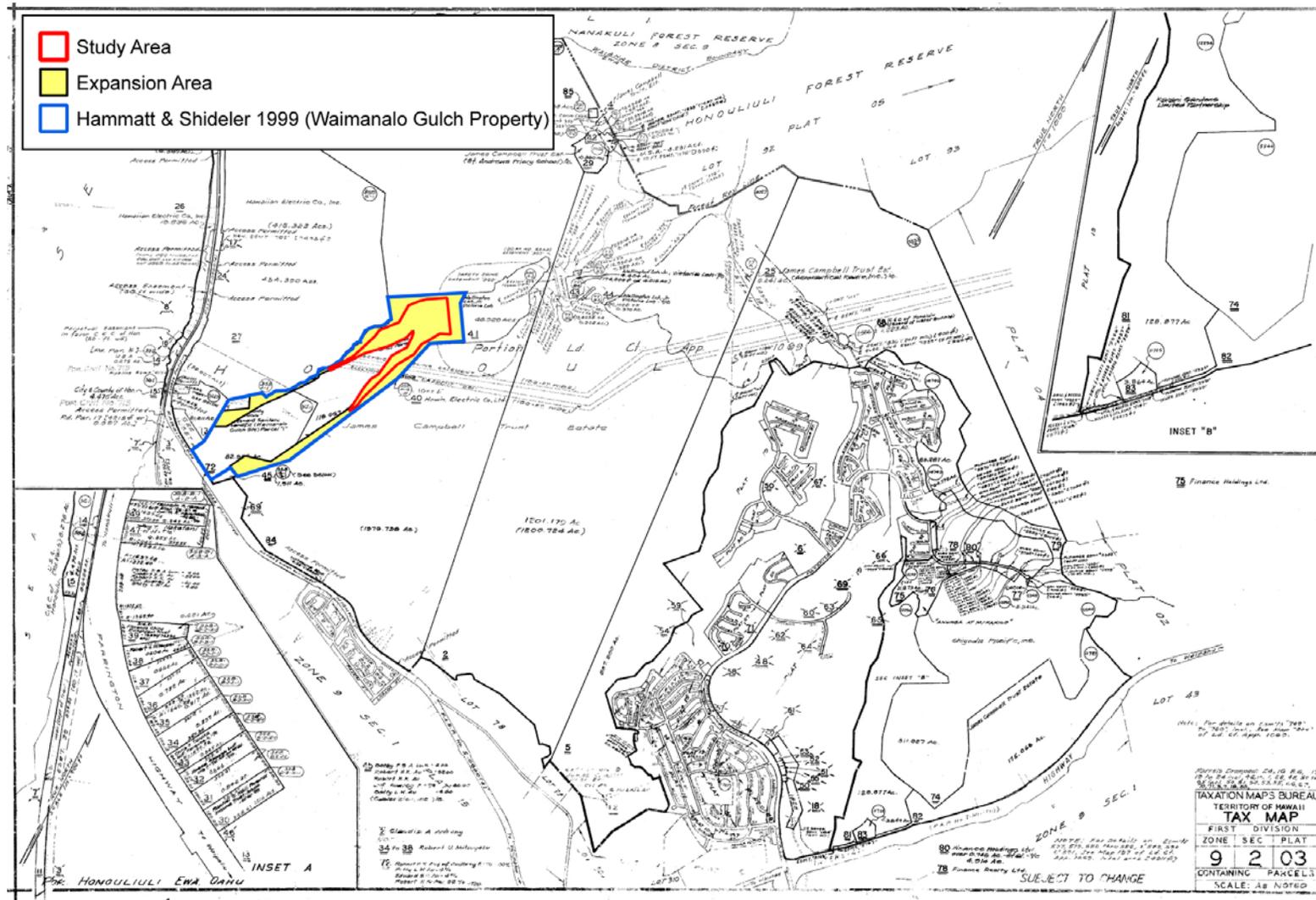


Figure 2. TMK [1] 9-2-03 showing the location of the Hammatt & Shideler (1999) study area, the Waimānalo Gulch Sanitary Landfill proposed expansion area, and the current study area

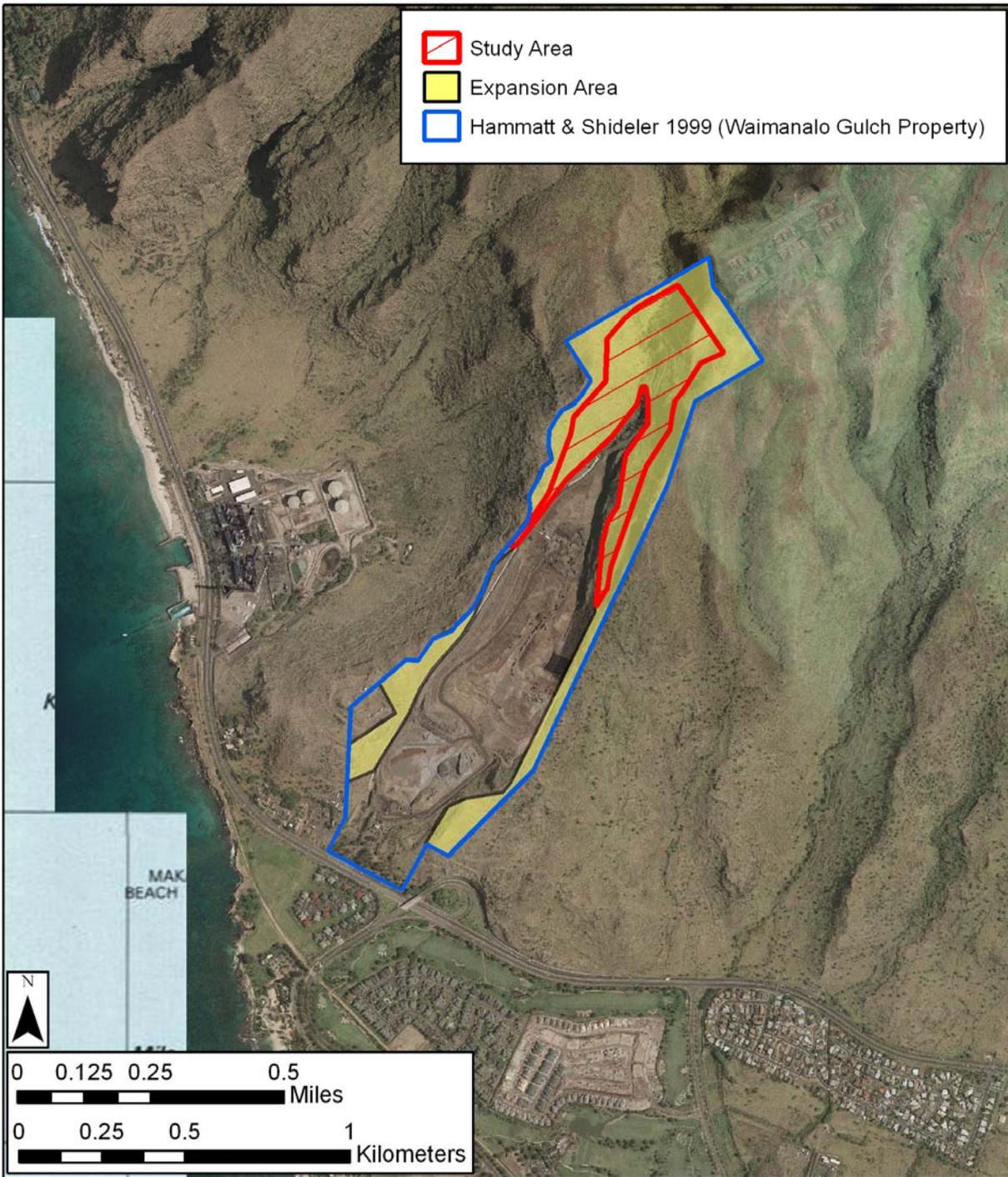


Figure 3. Aerial photograph showing the location of the Hammatt & Shideler (1999) study area, the Waimānalo Gulch Sanitary Landfill proposed expansion area, and the current study area (source: USGS Orthoimagery 2005)

of the entire 200-acre Waimānalo Gulch Landfill property (Hammatt and Shideler 1999). In early 2007, at the request of the project proponents, CSH completed additional AIS investigation, including systematic pedestrian inspection and limited subsurface testing, of a 36-acre portion of the overall approximately 90-acre landfill expansion APE (see Figure 1, Figure 2, & Figure 3). This 36-acre area represents the core of the expansion area (located within TMK: [1] 9-2-003: 073, refer to Figure 1). This 36-acre portion of the overall approximately 90-acre APE is defined as the study area for the current AIS investigation. Through the combined effort of the earlier AIS investigation of entire 200-acre Waimanalo Gulch Landfill property (Hammatt and Shideler 1999) and the current AIS investigation of the 36-acre study area, 100 percent of the project APE was subjected to systematic pedestrian inspection, with limited subsurface testing where appropriate.

## 1.2 Scope of Work

The archaeological inventory survey and its accompanying report document all historic properties within the project's APE. The following scope of work satisfies State and County requirements for an archaeological inventory survey [per HAR 13-13-276]:

1. A complete ground survey of the entire project area for the purpose of site inventory was completed. All sites were located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation included photographs and scale drawings of selected sites and complexes. All sites were assigned State Inventory of Historic Properties (SIHP) numbers.
2. Limited subsurface testing was conducted to determine if subsurface deposits were located in the project area (particularly in potential archaeological sites).
3. Research on historic and archaeological background, including search of historic maps, written records, and Land Commission Award documents. This research focused on the specific area with general background on the *ahupua'a* and district and emphasized settlement patterns.
4. As appropriate, consultation with knowledgeable individuals regarding the project area's history, past land use, and the function and age of the historic properties documented within the project area.
5. Preparation of this inventory survey report included the following:
  - a) A project description;
  - b) A section of a USGS topographic map showing the project area boundaries and the location of all recorded historic properties;
  - c) Historical and archaeological background sections summarizing prehistoric and historic land use of the project area and its vicinity;
  - d) Descriptions of all historic properties, including selected photographs, scale drawings, and discussions of age, function, laboratory results, and significance, per the requirements of HAR 13-276;

- e) A section concerning cultural consultations [per the requirements of HAR 13-276-5(g) and HAR 13-275/284-8(a)(2)].
- f) A summary of historic property categories, integrity, and significance based upon the Hawai'i Register of Historic Places criteria;
- g) A project effect recommendation;
- h) Treatment recommendations to mitigate the project's adverse effect on any historic properties identified in the project area that are recommended eligible to the Hawai'i Register of Historic Places.

This scope of work included coordination with the State Historic Preservation Division (SHPD), and County relating to archaeological matters.

## 1.3 Environmental Setting

### 1.3.1 Natural Environment

The proposed Waimānalo Gulch Landfill expansion area is located within Waimānalo Gulch, in the southern foothills of the Wai'anae Mountain range. The proposed expansion area is located approximately 400 to 970 meters east of the coastline. Elevations within the proposed expansion area range from approximately 90 to 1000 ft AMSL. Lands within the proposed expansion area generally consist of steep sloping gulch walls, with a dry stream channel at the base of the gulch. The stream channel is understood to only have running water during periods of heavy rainfall, which are relatively uncommon in dry leeward O'ahu. The proposed expansion area receives an average of approximately 600-700 mm (24-28 in.) of annual rainfall (Giambelluca et al. 1986).

Soils within the study area consist entirely of Rock Land (rRK) (Foote et al. 1972) (Figure 4). Rock Land is described as "made up of areas where exposed rock covers 25 to 90 percent of the surface...rock outcrops and very shallow soils are the main characteristics" (Foote et al. 1972).

With regards to the vegetation Frierson (1972) suggests that prior to the introduction of exotic vegetation in 1790, the slopes of the Wai'anae Range extending down to about 150 m (500 ft.) elevation supported a dry forest of native trees and shrubs between an upper 'ōhi'a wet forest and lower grassy savannah area. Frierson (1972:4) summarizes the following patterns suggested by J.F. Rock (1913) for the indigenous vegetation in the area prior to 1778:

- a) Lowland zone - open grassland on the leeward side
- b) Lower Forest - beginning about 1000 feet and richer in species than the rainforest: *kukui*, 'ōhi'a 'ai, *koa*, *kalia*, sandalwood, 'ōhi'a *lehua*, *hau*, *ti*, *ape*, *pia*, banana, ginger, birdnest fern and *honohono*, as well as grasses and cyperaceous plants.
- c) Specifically leeward lower forest – 'ohe, *wiliwili*, *maile*, *halapepe* and *alani*, with almost no undergrowth.

Historical accounts presented by Frierson (1972) describe these lower forest species as extending to 500 feet, with the presence of sandalwood observed down to as low as 300 feet. The lower forest then is hypothesized to have covered much of the current landfill expansion area.

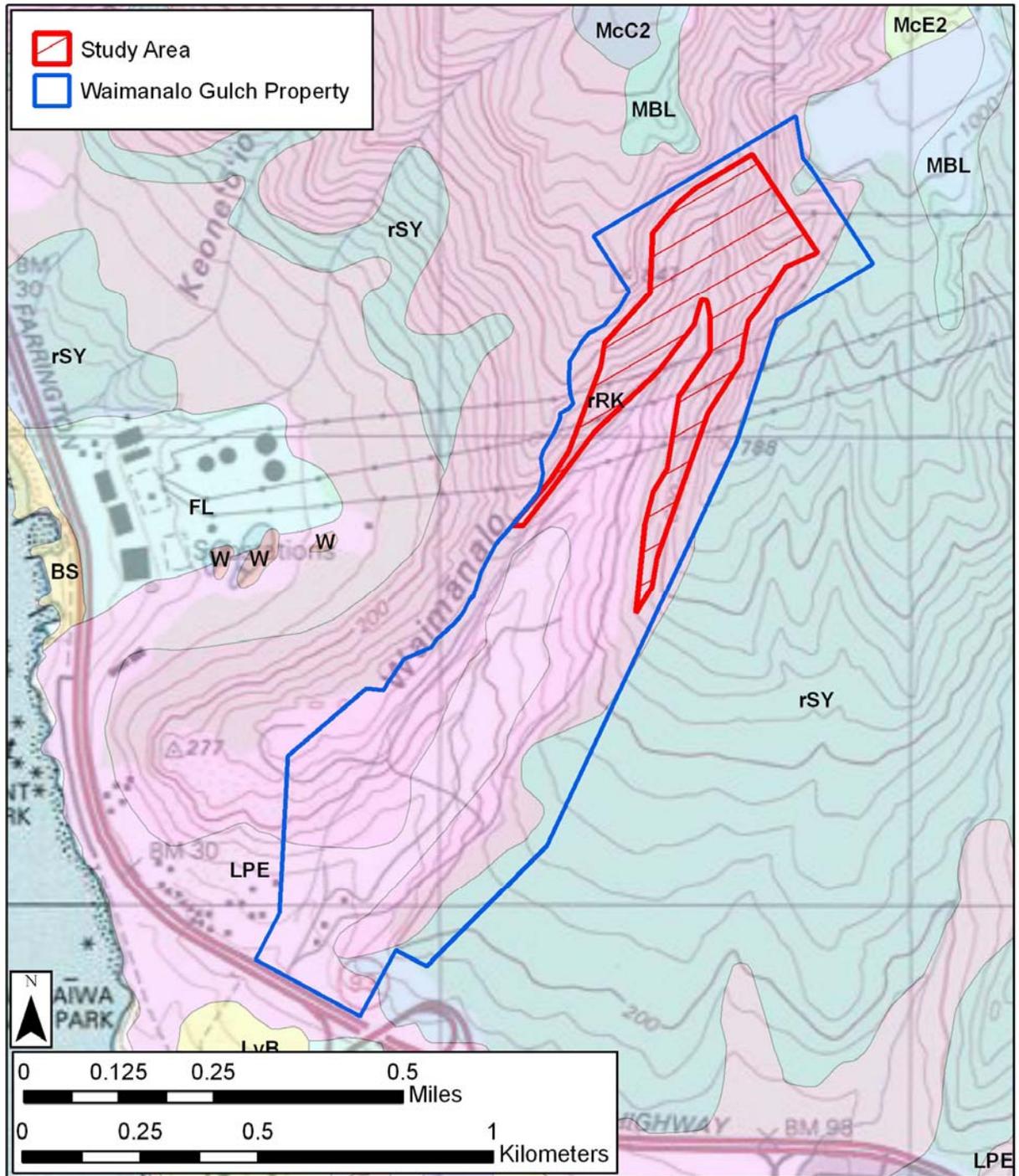


Figure 4. Overlay of Soil Survey of the State of Hawai'i (Foote et al. 1972), indicating sediment types within the study area (source: Soils Survey Geographic Database [SSUGRO] 2001, U.S. Department of Agriculture)

This was always a rain shadow slope and we may more accurately envisage a park land community rather than a thick forest in early Hawaiian times. The current vegetation in the project area is comprised mostly of scattered *koa haole* and various grasses. As a result of a relatively recent wildfire, the grasses within the project area have grown dense and thick, covering about 90% of the ground surface, making ground surface observation difficult throughout the project area (Figure 5 and Figure 6).

### 1.3.2 Built Environment

Lands within the study area are currently undeveloped, with the exception of unpaved access roads. Lands within Waimānalo Gulch, immediately *makai* (southwest) of the study area consist of the active Waimānalo Gulch Sanitary Landfill, and include solid waste disposal sites and associated landfill infrastructure. *Makai* (southwest) of the landfill site is the Ko Olina Resort, including a golf course and residential subdivision. West of the landfill site are the Kahe Point Homes residential subdivision and the HECO Kahe Power Plant. Lands to the east and north of the Waimānalo Gulch landfill are the undeveloped Makaiwa Hills and Palehua areas.

The present state of the study area can be seen in Figure 5 and Figure 6.



Figure 5. Photograph showing the *makai* portion of the study area, view to southwest



Figure 6. Photograph showing the *mauka* portion of the study area, view to northeast

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## Section 2 Methods

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### 2.1 Field Methods

Fieldwork was accomplished over a one-week period from January 25<sup>th</sup> to February 2<sup>nd</sup>, 2007. The CSH field crew consisted of Matt Bell, B.A., Amy Hammermiester, B.A., and Kevin Dalton, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). The field effort required 13 person-days to complete.

Fieldwork consisted of a 100% coverage pedestrian inspection of the study area and limited subsurface testing at select locations. The pedestrian inspection of the study area was accomplished through systematic sweeps (transects). The spacing interval between archaeologists was 5-10 meters. Cliffs and rock overhangs were inspected thoroughly for evidence of burials or cultural activity. All potential historic properties encountered were recorded and documented with a written field description, site map, photographs, and located utilizing the Global Positioning System technology utilizing a Garmin GPSmap76S unit (three to five meter horizontal accuracy) or a Trimble PRO XR GPS (submeter horizontal accuracy).

Subsurface testing consisted of the partial excavation, by hand, of selected natural features located during the pedestrian survey. The purpose of the subsurface testing was to aid in determining if selected geological features (i.e. rock shelters, rock mounds, etc.) had been culturally modified or contained subsurface cultural deposits. All excavated material was sifted through a 1/8 in. wire mesh screen to separate out the soil matrix. Each test excavation was documented with a scale section profile, photographs, and sediment descriptions. Sediment descriptions included characterizations of Munsell color, compactness, texture, structure, inclusions, cultural material present, and boundary distinctness and topography.

### 2.2 Document Review

Background research included a review of previous archaeological studies on file at the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources (DLNR); a review of geology and cultural history documents at Hamilton Library of the University of Hawai'i, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai'i State Archives and the Archives of the Bishop Museum; and a study of historic maps at the Survey Office of the DLNR. Information on LCAs was accessed through Waihona 'Āina Corporation's Māhele Data Base ([www.waihona.com](http://www.waihona.com)).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected type and location of sub-surface pre and post-contact historic properties in the project area.

### 2.3 Consultation

For the project's archeological inventory survey consultation effort, carried out pursuant to the requirements of HAR 13-276-5(g) and HAR 13-275/284-8(a)(2), CSH worked with the

Office of Hawaiian Affairs (OHA), SHPD, and knowledgeable cultural consultants. This effort is dove-tailed with the cultural consultation effort currently underway for the project's cultural impact assessment, which CSH is also preparing pursuant to HRS Chapter 343 and the Office of Environmental Quality Control's guidelines for assessing cultural impacts. Table 1 summarizes the individuals and organizations/agencies that have been consulted.

Table 1. Cultural and/or Agency Consultants

<b>Name</b>	<b>Affiliation</b>
Ailā , William	Hui Malāma I Nā Kūpuna
Amaral, Annelle	'Ahahui Siwila Hawai'i O Kapolei Hawaiian Civic Club
Cope, Aggie	Hale O Na'auao Society
Desoto, Frenchy	Wai'anae Coast Archaeological Preservation Representative
Davan, Teresa	O'ahu Island Archaeologist, SHPD
Eaton, Arline	<i>Kupuna</i> at Iroquois Elementary School
Enos, Eric	Cultural practitioner and director of Ka'ala Farms
Flanders, Judith	Granddaughter of Alice Kamōkila Campbell
Greenwood, Alice	O'ahu Island Burial Council Member, Wai'anae District
Ho'ohuli, "Black" Jo	Wai'anae Neighborhood Board No 24
Rezentes, Cynthia	Wai'anae Neighborhood Board No 24
Johnson, Adam	Former O'ahu Island Archaeologist, SHPD
Johnson, Rubellite	Hawaiian scholar
Josephides, Analu	O'ahu Island Burial Council Member, Wai'anae District
Kanahele, Kamaki	President of Nānākuli Homestead Association
Kane, Shad	Member of the Makakilo, Kapolei, Honokai Hale Neighborhood Board and 'Ahahui Siwila Hawai'i O Kapolei Hawaiian Civic Club
Kila, Glenn	Koa Mana
Makaiwi, Martha	Makakilo, Kapolei, Honokai Hale Neighborhood Board No. 34
McKeaque, Kawika	O'ahu Island Burial Council member 'Ewa District
Momoa, Joseph	<i>Kama'āina</i> of Nānākuli and member of Kamo'i Canoe Club
Morawski, Lauren	O'ahu Island Archaeologist, SHPD
Nāmu'ō, Clyde	Administrator at Office of Hawaiian Affairs
Paik, Kaleo	Culture and Historic Branch, SHPD
Philpotts, McD	Cultural practitioner and long time resident of Waimānalo 'Ili
Silva, Alika	Koa Mana

<b>Name</b>	<b>Affiliation</b>
Tiffany, Nettie	Kahu of Lanikūhonua and Former O‘ahu Island Burial Council member, ‘Ewa District
Timson, Maeda	Member of the Makakilo, Kapolei, Honokai Hale Neighborhood Board No. 34 and President of Ua Au O Kapolei

This consultation effort has included written consultation letters, which were sent via email and U. S. post. These consultation letters were followed up with telephone communication. Additionally, project-related cultural consultation included several on-site meetings that included SHPD personnel (Mr. Adam Johnson, Ms. Teresa Davan, Ms. Linda Kaleo Paik, and Ms. Lauren Morawski), as well as knowledgeable cultural consultants, including Mr. McD Philpotts, Mr. Alike Silva, Mr. Glen Kila, Mr. Shad Kane, Mr. William Ailā, and Mr. Eric Enos. Through this consultation CSH has sought the opinions of cultural consultants regarding the age, function, cultural affiliation, and significance of the single historic property documented within the project’s APE. Potential historic property mitigation measures, including preservation in place and relocation, were discussed with these cultural consultants during the on-site meetings.

## Section 3 Background Research

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### 3.1 Traditional and Historical Background

#### 3.1.1 Historical Setting

Waimānalo Gulch is located in the western portion of Honouliuli Ahupua‘a, within the ‘Ewa District of Leeward O‘ahu (Figure 7). Honouliuli Ahupua‘a is the largest traditional land unit on O‘ahu, extending from the West Loch of Pearl Harbor in the east, to the border of Nānākuli Ahupua‘a at Pili o Kahe in the west. Honouliuli Ahupua‘a includes approximately 19 km (12 mi.) of open coastline from One‘ula westward to Pili o Kahe. The *ahupua‘a* extends *mauka* (almost pie-shaped) from West Loch nearly to Schofield Barracks in Wahiawā; the western boundary is the Wai‘anae Mountain crest running north as far as Pu‘u Hapapa (or to the top of Ka‘ala Mountain according to some).

Within Honouliuli Ahupua‘a, not only is there a long coastline fronting the normally calm waters of leeward O‘ahu, but there is also four miles of waterfront along the west side of West Loch of Pearl Harbor. The land immediately *mauka* of the coast consists of a flat, karstic raised limestone reef, forming a level nearly featureless "desert" plain marked in pre-contact times by a thin or non-existent soil mantle. The micro-topography is notable in containing countless sinkholes caused by chemical weathering (dissolution) of the limestone shelf. Proceeding *mauka* from this limestone plain, the shelf is overlain by alluvium deposited through a series of gulches draining the Wai‘anae Mountains. The largest of these is Honouliuli Gulch, located in eastern Honouliuli, which empties into the West Loch of Pearl Harbor. To the west are fairly steep gradient gulches forming a more linear than dendritic drainage pattern. The major gulches are, from east to west: Kalo‘i, Makakilo, Awanui, Pālailai, Makaīwa, Waimānalo, and Limaloa. These gulches are steep-sided in the uplands and generally of a high gradient until they emerge onto the flat ‘Ewa plain. The alluvium they have carried has spread out in delta fashion over the *mauka* portions of the plain, which comprises a dramatic depositional environment at the stream gradient change. These gulches are generally dry, but during seasonal Kona storms carry immense quantities of runoff onto the plain and into the ocean. As typical drainages in arid slopes they are either raging uncontrollably or are dry, and as such do not form stable water sources for traditional agriculture in their upper reaches. The western Honouliuli gulches, in contrast to those draining into Pearl Harbor to the east, do not have valleys suitable for extensive irrigated agriculture. However, this lack is more than compensated by the rich watered lowlands of the base of Honouliuli Gulch (the *‘ili* of Honouliuli).

Honouliuli Ahupua‘a, as a traditional land unit, had tremendous and varied resources available for exploitation by early Hawaiians. The “karstic desert” and marginal characterization of the limestone plain, which is the most readily visible terrain, does not do justice to the *ahupua‘a* as a whole. The richness of this land unit is marked by the following available resources:

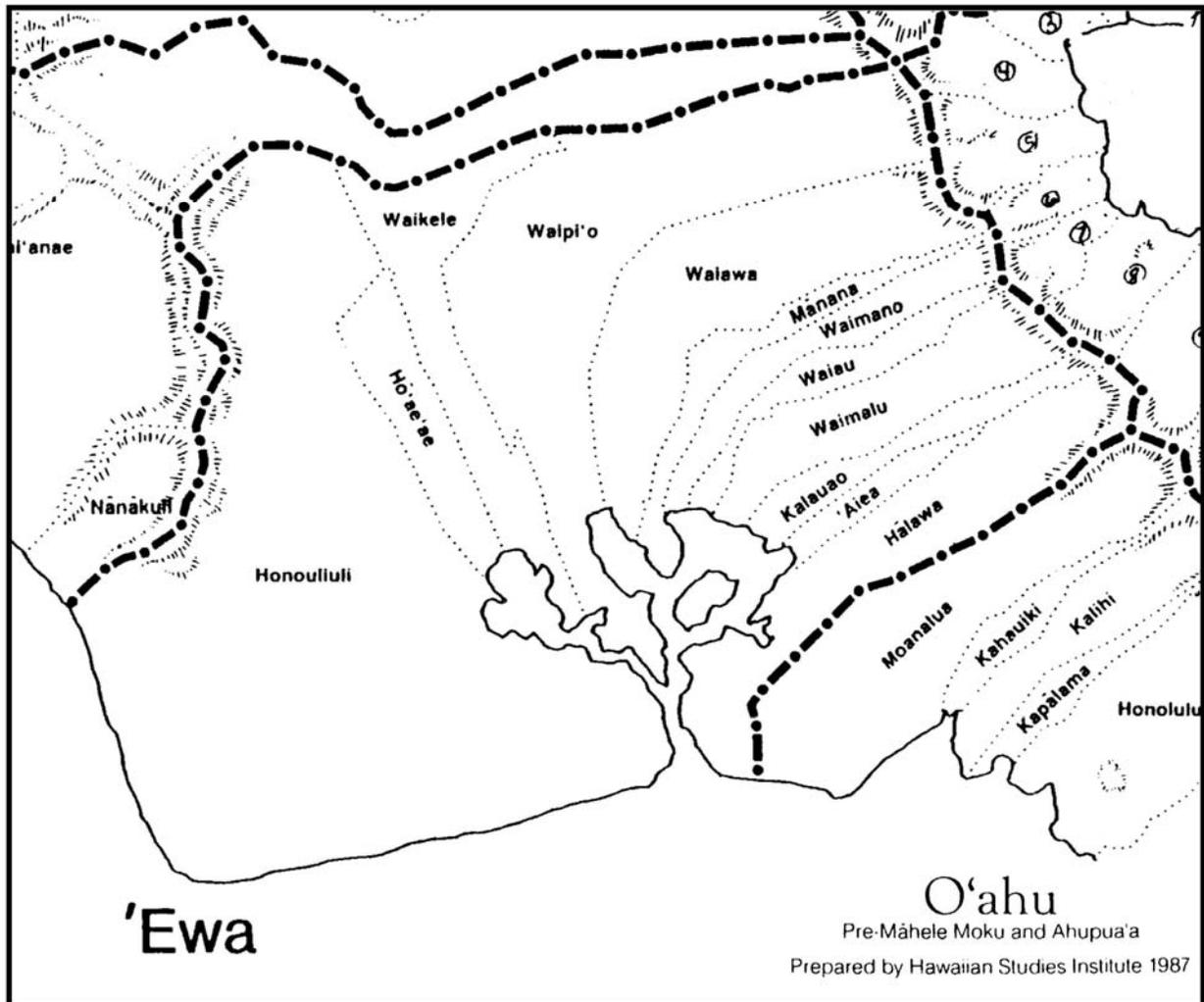


Figure 7. Portion of Hawaiian Studies Institute (1987) map of O'ahu, showing pre-Māhele *moku* (district) and *ahupua'a* boundaries

1. 12 miles of coastline with continuous shallow fringing reef, which offered rich marine resources.
2. Four miles of frontage on the waters of West Loch that offered extensive fisheries (mullet, *awa*, shellfish) as well as frontage suitable for development of fishponds (for example, Laulaunui).
3. The lower portion of Honouliuli Gulch in the 'Ewa plain offered rich level alluvial soils with plentiful water for irrigation from the stream as well as abundant springs. This irrigable land would have stretched well up the valley.
4. A broad limestone plain which, because of innumerable limestone sinkholes, offered a nesting home for a large population of avifauna. This resource may have been one of the early attractions to human settlement.
5. An extensive upland forest zone extending as much as 12 miles inland from the edge of the coastal plain. As Handy and Handy (1972:469) have pointed out, the forest was much more distant from the lowlands here than on the windward coast, but it was much more extensive. Much of the upper reaches of the *ahupua'a* would have had species-diverse forest with *kukui*, *'ohia*, *'iliahi* (sandalwood), *hau*, *ti*, banana, etc.

The political and cultural center of the Honouliuli Ahupua'a is understood to have been the relatively dense settlement and rich lands for irrigated taro cultivation at the *'ili* of Honouliuli located where Honouliuli Stream empties into the north portion of West Loch. The name of the *ahupua'a*, translated as "dark bay" (Pukui et al. 1974:51) may refer to the nature of the waters of West Loch at the mouth of Honouliuli Stream. Early accounts and maps indicate a large settlement at the *'ili* of Honouliuli and it may well be that the political power of this village was so great that it was able to extend its jurisdiction well to the northwest into an area which might have been anticipated to fall under the dominion of the Wai'anae ruling chiefs.

### 3.1.2 Mythological and Traditional Accounts

The traditions of Honouliuli Ahupua'a have been compiled and summarized numerous times, in studies by Sterling and Summers (1978), Hammatt and Folk (1981), Kelly (1991), Charvet-Pond and Davis (1992), Maly and Rosendahl (1993), and Tuggle & Tuggle (1997). Some of the themes of these traditions, include connections with Kahiki (the traditional homeland of Hawaiians, probably in reference to central Polynesia) and the special character and relationship of the places known as Pu'uokapolei and Kualaka'i (near Barbers Point).

Connections with Kahiki are found in numerous place names, traditional events, and with the beings associated with Honouliuli. There are several versions of Kaha'i leaving from Kalaeloa for a trip to Kahiki to bring breadfruit back to 'Ewa (e.g. Kamakau 1991:110). There are several stories that associate places in the region with Kamapua'a and the Hina family, as well as with Pele's sisters, all of whom have strong connections with Kahiki (cf. Kamakau 1961:111; Pukui et al. 1974:200).

Pu'uokapolei was one of the most sacred places in Honouliuli (cf Sterling and Summers 1978:33). Pu'uokapolei's connections with Kahiki are emphasized when it is noted that the hill was the home of Kamapua'a's grandmother, Kamaunuanoho, the Kahiki ancestor to the people of O'ahu (Fornander 1916-20, V:318; Kahiolo 1978:81, 107). By name, Kapolei is associated with the goddess Kapo, another connection with the Pele and Kamapua'a stories (Kamakau 1976:14).

McAllister (1933:108) records that a *heiau*, or temple, was located on Pu'uokapolei, but was destroyed before his survey of the early 1930s. The *heiau* may have been associated with the sun (Fornander 1916-20, III:292). The hill was used as a point of solar reference or as a place where such observations were made. Pu'uokapolei might have been understood as the gate of the setting sun. It is notable that the rising sun at the eastern gate of Kumukahi in Puna is associated with the Hawaiian goddess Kapo (Emerson 1978:41). There is little specific information for Pu'uokapolei, but the place name itself ("hill of beloved Kapo") is hard to ignore. It is mentioned in some cosmologies that Kū was the god of the rising sun, and Hina should be associated with the setting sun (Hina is the mother of Kamapua'a). Fornander (1916-20, III; 292) states, Pu'uokapolei may have been a jumping off place (also connected with the setting sun) and associated with the dead who roamed the adjacent Plain of Kaupe'a.

Pu'uokapolei was also the primary landmark for travelers between Pearl Harbor and the west O'ahu coast, with a main trail running just inland of it (T̄ī 1959:27, 29; Figure 8). Pu'uokapolei was probably the most common name used as a reference for the area of the 'Ewa Plain in traditional Hawai'i (cf. Fornander 1916-20, II: 318; E.M. Nakuina 1904, in Sterling and Summers 1978:34).

### 3.1.3 Early Historic Period

Although no specific documentation of pre-contact or early historic land use is known for the specific study area in Waimānalo Gulch, various Hawaiian legends and early historical accounts indicate that the *ahupua'a* of Honouliuli was once widely inhabited by pre-contact Hawaiian populations, including the Hawaiian *ali'i*. This substantial population is attributable for the most part to the plentiful marine and estuarine resources available at the coast, along which several sites interpreted as permanent habitations were located. Other attractive subsistence-related features of the *ahupua'a* included irrigated lowlands suitable for wetland taro cultivation (Hammatt and Shideler 1990), as well as the lower forest area of the mountain slopes for the procurement of forest goods.

Exploitation of the forest resources along the slopes of the Wai'anae Range - as suggested by E. S. and E.G. Handy - probably acted as a viable subsistence alternative during times of famine:

...The length or depth of the valleys and the gradual slope of the ridges made the inhabited lowlands much more distant from the 'wao, or upland jungle, than was the case on the windward coast. Yet the 'wao here was more extensive, giving greater opportunity to forage for wild foods during famine time. (Handy and Handy 1972:469-470)

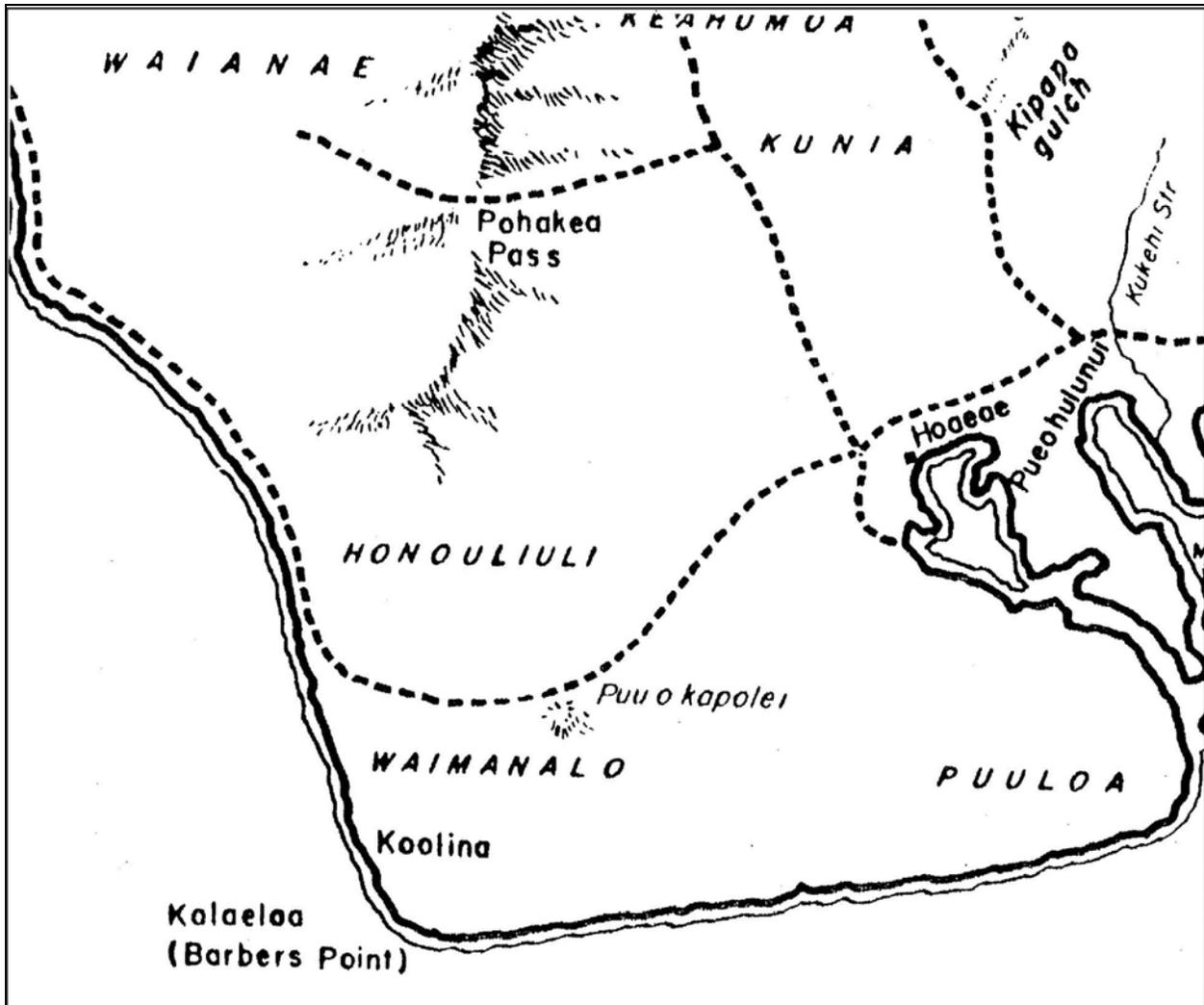


Figure 8. Trails of Leeward O'ahu as Described by John Papa 'Ī'ī; Map by Paul Rockwood ('Ī'ī 1983:96)

These upper valley slopes may have also been a significant resource for opportunistic quarrying of basalt for the manufacturing of stone tools. This is evidenced in part by the existence of a probable quarrying site (50-80-12-4322) in Makaīwa Gulch at 152 m (500 ft.) elevation, east of the current project area (Hammatt et al. 1991).

The Hawaiian *ali'i* were also attracted to the region. One historical account of particular interest refers to an *ali'i* residing in Ko Olina, southwest of the current project area:

Ko Olina is in Waimānalo near the boundary of 'Ewa and Wai'anae. This was a vacationing place for chief Kākuhihewa and the priest Napuaikamao was the caretaker of the place. Remember reader, this Ko Olina is not situated in the Waimānalo on the Ko'olau side of the island but the Waimānalo in 'Ewa. It is a lovely and delightful place and the chief, Kākuhihewa loved this home of his (Sterling and Summers 1978:41).

John Papa 'Ī'ī describes a network of Leeward O'ahu trails (see Figure 8) which in later historic times encircled and crossed the Wai'anae Range, allowing passage from West Loch to the Honouliuli lowlands, past Pu'u Kapolei and Waimānalo Gulch to the Wai'anae coast and onward circumscribing the shoreline of O'ahu ('Ī'ī 1959:96-98). Following 'Ī'ī's description, a portion of this trail network would have passed immediately *makai* (south) of the southern border of the Waimānalo Gulch property, roughly following the route of the present Farrington Highway.

'Ī'ī, who was born about 1800, also recounts an incident at Waimānalo that occurred when he was eight or nine years old. While the young 'Ī'ī was staying at Nānākuli, he learned:

...of the burning of the houses in Waimanalo. The overseer in charge of the burning told ['Ī'ī and his relatives] that it was so ordered by the royal court because the people there had given shelter to the chiefess, Kuwahine, who ran away from her husband Kalanimoku after associating wrongfully with someone. Kuwahine was the daughter of the Kaikioewa who reared Kamehameha III in his infancy. She had run away because she had been beaten for her offense and for other reasons, too, perhaps. She had remained hidden for about four or five days before she was found. Here we see the sadness that befell the people through the fault of the chiefs. The punishment fell on others, though they were not to blame. ('Ī'ī 1959:29)

'Ī'ī's sad account reveals that the coastal Waimānalo portion of Honouliuli Ahupua'a continued to be inhabited during the first portion of the 19<sup>th</sup> century.

Other early historical accounts of the general region typically refer to the more populated areas of the 'Ewa district, where missions and schools were established and subsistence resources were perceived to be greater. However, the presence of archaeological sites along the coral plains and coast of southwest Honouliuli Ahupua'a, indicate that pre-contact and early post-contact populations also adapted to less inviting areas, despite the environmental hardships.

Subsequent to western contact in the area, the landscape of the 'Ewa plains and Wai'anae slopes was adversely affected by the removal of the sandalwood forest, and the introduction of domesticated animals and new vegetation species. Domesticated animals including goats, sheep

and cattle were brought to the Hawaiian Islands by Vancouver in the early 1790s, and allowed to graze freely about the land for some time after. L.A. Henke reports the existence of a longhorn cattle ranch in Wai'anae by at least 1840 (in Frierson 1972:10). During this same time, perhaps as early as 1790, exotic vegetation species were introduced to the area. These typically included vegetation best suited to a terrain disturbed by the logging of sandalwood forest and eroded by animal grazing. The following dates of specific vegetation introduced to Hawai'i are given by R. Smith and outlined by Frierson (1972:10-11):

1. "early," c. 1790:

Prickly pear cactus, *Opuntia tuna*  
 Haole koa, *Leucaena leucocephala*  
 Guava, *Psidium guajava*

2. 1835-1840:

Burmuda [sic] grass, *Cynodon dactylon*  
 Wire grass, *Eleusine indica*

3. 1858:

Lantana, *Lantana camara*

The *kiawe* tree (*Prosopis pallida*) was also introduced during this period, either in 1828 or 1837 (Frierson 1972:11).

Intensive sandalwood harvesting, according to H. St. John (in Frierson 1972:7) occurred in the Hawaiian Islands between 1815-1830. As it is likely that sandalwood forests once occupied the lower, dry slopes of the Wai'anae Range, the current project area was likely impacted by the cutting and burning of these forests.

### 3.1.4 Mid- to late-1800s

Associated with the Māhele of 1848, 99 individual land claims in the *ahupua'a* of Honouliuli were registered and immediately awarded by King Kamehameha III. The vast majority of the Land Commission Awards (LCA) were located near the Pu'uloa Salt Works and the taro lands of the *'ili* of Honouliuli. The present study area appears to have been included in the largest award (Royal Patent 6071, LCA 11216, 'Āpana 8) granted in Honouliuli Ahupua'a to Miriam Ke'ahi-Kuni Kekau'ōnohi on January 1848 (Native Register). Kekau'ōnohi acquired a deed to all unclaimed land within the *ahupua'a*, including a total of 43,250 acres.

Kamaukau relates the following about Kekau'ōnohi as a child:

Kamehameha's granddaughter, Ke-ahi-Kuni Kekau-ōnohi...was also a tabu chiefess in whose presence the other chiefesses had to prostrate and uncover themselves, and Kamehameha would lie face upward while she sat on his chest. (in Hammatt and Shideler 1990:19-20)

Kekau'ōnohi was one of Liholiho's (Kamehameha II's) wives, and after his death, she lived with her half-brother, Luanu'u Kahala'i'a, who was governor of Kaua'i (Hammatt and Shideler

1990:20). Subsequently, Kekau'ōnohi ran away with Queen Ka'ahumanu's stepson, Keli'i-ahonui, and then became the wife of Chief Levi Ha'alelea. Upon her death on June 2, 1851, all her property was passed on to her husband and his heirs. When Levi Ha'alelea died the property went to his surviving wife, who in turn leased it to James Dowsett and John Meek in 1871 for stock running and grazing.

In 1877, James Campbell purchased most of Honouliuli Ahupua'a for a total of \$95,000. He then drove off 32,347 head of cattle belonging to Dowsett, Meek and James Robinson and constructed a fence around the outer boundary of his property (Bordner and Silva 1983:C-12). In 1879, Campbell brought in a well-driller from California to search the 'Ewa plains for water, and a "vast pure water reserve" was discovered (Armstrong and Bier 1983). Following this discovery, plantation developers and ranchers drilled numerous wells in search of the valuable resource. By 1881, the Campbell property of Honouliuli prospered as a cattle ranch with "abundant pasturage of various kinds" (Briggs in Haun and Kelly 1984:45). Within 10 years of the first drilled well in 'Ewa, the addition of a series of artesian wells throughout the island was supplying most of Honolulu's water needs (Armstrong and Bier 1983).

In 1889, Campbell leased his property to Benjamin Dillingham, who subsequently formed the O'ahu Railway & Land Co. (O.R. & L) in 1890. To attract business to his new railroad system, Dillingham subleased all land below 200 feet elevation to William Castle who in turn sublet the area to the 'Ewa Plantation Company for sugar cane cultivation (Frierson 1972:15)(Figure 9). Dillingham's Honouliuli lands above 200 feet elevation that were suitable for sugar cane cultivation were sublet to the O'ahu Sugar Co. Throughout this time and continuing into modern times, cattle ranching continued in the area, and Honouliuli Ranch established by Dillingham was the "fattening" area for the other ranches (Frierson 1972:15).

'Ewa Plantation Co. was incorporated in 1890 and continued in full operation up into modern times (Figure 9). The plantation grew quickly with the abundant artesian water. As a means to generate soil deposition on the coral plain and increase arable land in the lowlands, the 'Ewa Plantation Co. installed ditches running from the lower slopes of the mountain range to the lowlands and then plowed the slopes vertically just before the rainy season to induce erosion (Frierson 1972:17).

The O'ahu Sugar Co. was incorporated in 1897, and included lands in the foothills above the 'Ewa plain and Pearl Harbor. Prior to commercial sugar cultivation, the lands occupied by the O'ahu Sugar Co. were described as being "of near desert proportion until water was supplied from drilled artesian wells and the Waiāhole Water project" (Conde and Best 1973:313). The O'ahu Sugar Co. took control over the 'Ewa Plantation lands in 1970 and continued operations into the 1990s.

Dillingham's *mauka* lands in western Honouliuli that were unsuitable for commercial sugar production remained pasture for grazing livestock. From 1890 to 1892, the Ranch Department of the O.R. & L. Co. desperately sought water for their herds of cattle by tapping plantation flumes and searching for alternative sources of water. Ida von Holt leaves this account of her husband Harry's (Superintendent of the O.R. & L Ranch Dept.) search for water in the foothills of the Wai'anae Range:

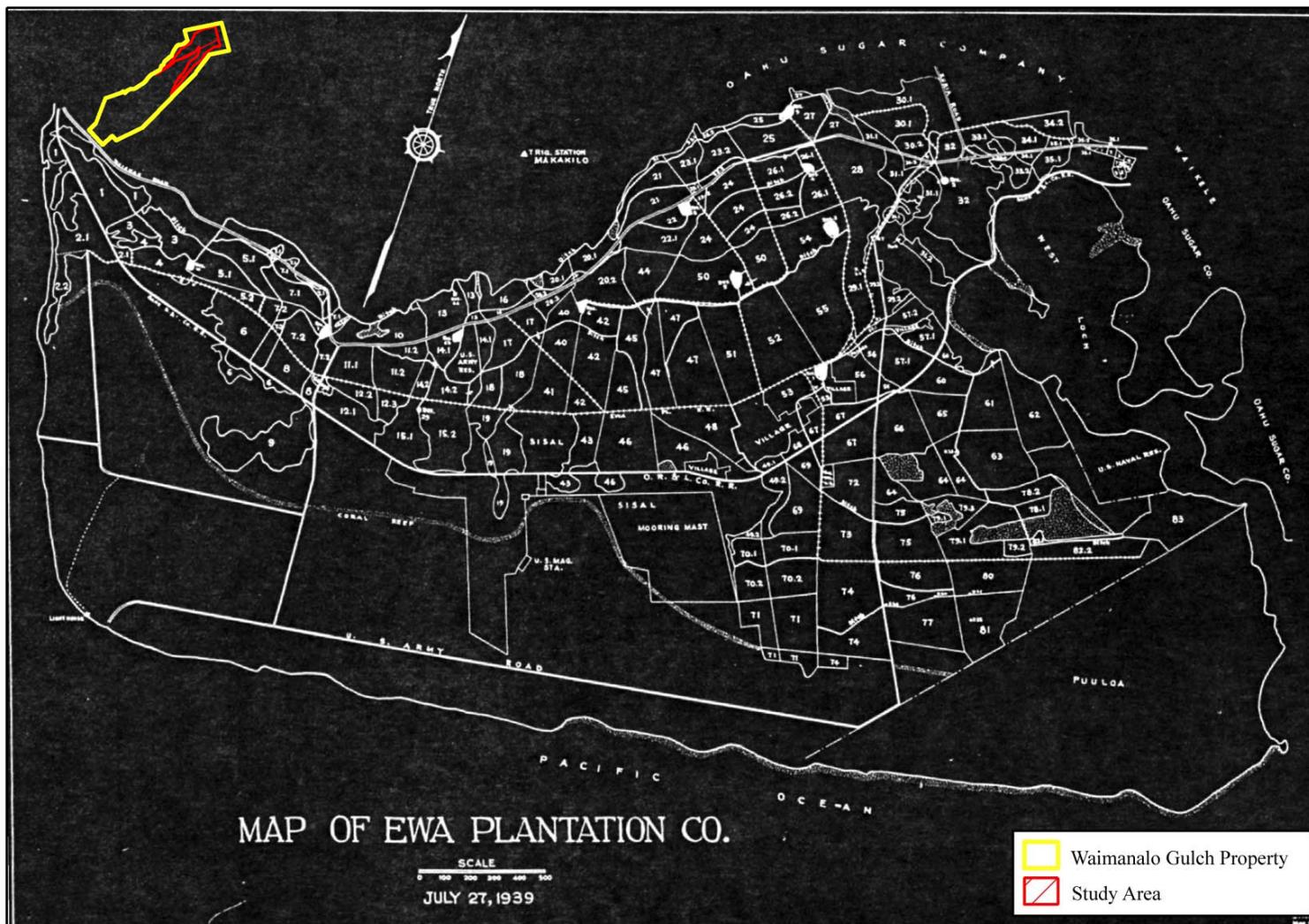


Figure 9. Map of ‘Ewa Plantation Co. (Conde and Best 1973:285), showing the extent of sugar cane cultivation in the vicinity of the study area.

One of those places is on the old trail to Palehua, and had evidently been a place of which the Hawaiians had known, for its name is Kaloi (the taro patch), and even in dry weather water would be standing in the holes made by the cattle, as they tried to get a drop or two. (Von Holt 1985:136)

A second account is given of the discovery of spring water in an area over the ridge on the north side of Kalo'i Gulch:

Shouting to the men to come over with their picks and shovels, he [Harry von Holt] soon got them busy clearing away lots of small stones and earth. Almost at once they could see that there were evidences of a paved well, and at about three feet down they came upon a huge flat rock, as large around as two men could span with their arms. Digging the rock loose and lifting it to one side, what was their astonishment to find a clear bubbling spring! (Von Holt 1985:138).

Following the discovery, two old Hawaiians began to ask Von Holt about the spring:

Finally he [Harry von Holt] got them to explain that the spring, called "Waihuna" (Hidden Spring) had been one of the principal sources of water for all that country, which was quite heavily populated before the smallpox epidemic of 1840...A powerful Kahuna living at the spring had hidden it before he died of the smallpox, and had put a curse on the one who disturbed the stone, that he or she would surely die before a year was out. (Von Holt 1985:138-140)

### 3.1.5 1900s

By 1920, the lands of Honouliuli were used primarily for commercial sugar cane cultivation and ranching (Frierson 1972:18). Much of the *mauka* lands in western Honouliuli, including ridges and deep gulches, were unsuitable for commercial sugar cultivation and remained pasture for grazing livestock. Historic maps of the Waimānalo Gulch area indicate a lack of any significant development in the area into the 1940s (Figure 10, Figure 11, & Figure 12). Modest constructions in the area included the realignment of the "Waianae Road" (present Farrington Hwy.) to run along the *makai* (southern) edge of the Waimānalo Gulch property, and a road the top of the Kahe Point ridge, within the Waimānalo Gulch property.

In the late 1920s, the main residential communities were at the northeast edge of the 'Ewa Plain. The largest community was still at Honouliuli village. 'Ewa was primarily a plantation town, focused around the sugar mill, with a public school as well as a Japanese School. Additional settlement was in Waipahu, centered around the Waipahu sugar mill, operated by the O'ahu Sugar Company.

Major land use changes came to western Honouliuli when the U.S. Military began development in the area. Long before the Japanese bombing of Pearl Harbor in December 1941, the U.S. military had initiated the Oahu Coast Defense Command, a series of coastal artillery batteries designed to assist in the defense of Pearl Harbor and to prevent invasion of O'ahu. Military installations were constructed both near the coast, as well as in the foothills and upland areas. The following military installations were located in the general vicinity of the current study area. Barbers Point Military Reservation (a.k.a. Battery Barbers Point, 1937-1942),

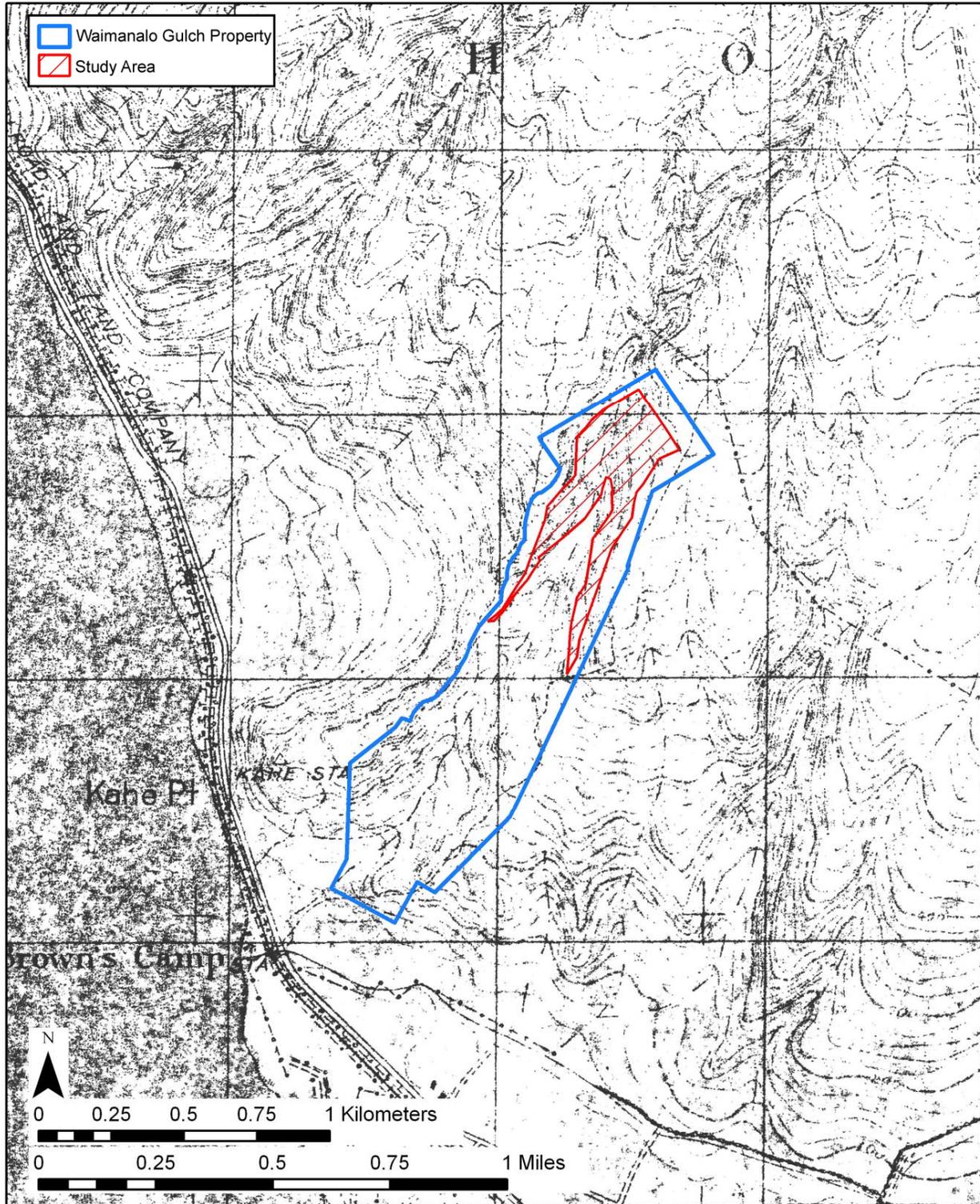


Figure 10. 1918 Fire Control Map, showing the location of the Waimānalo Gulch property and study area

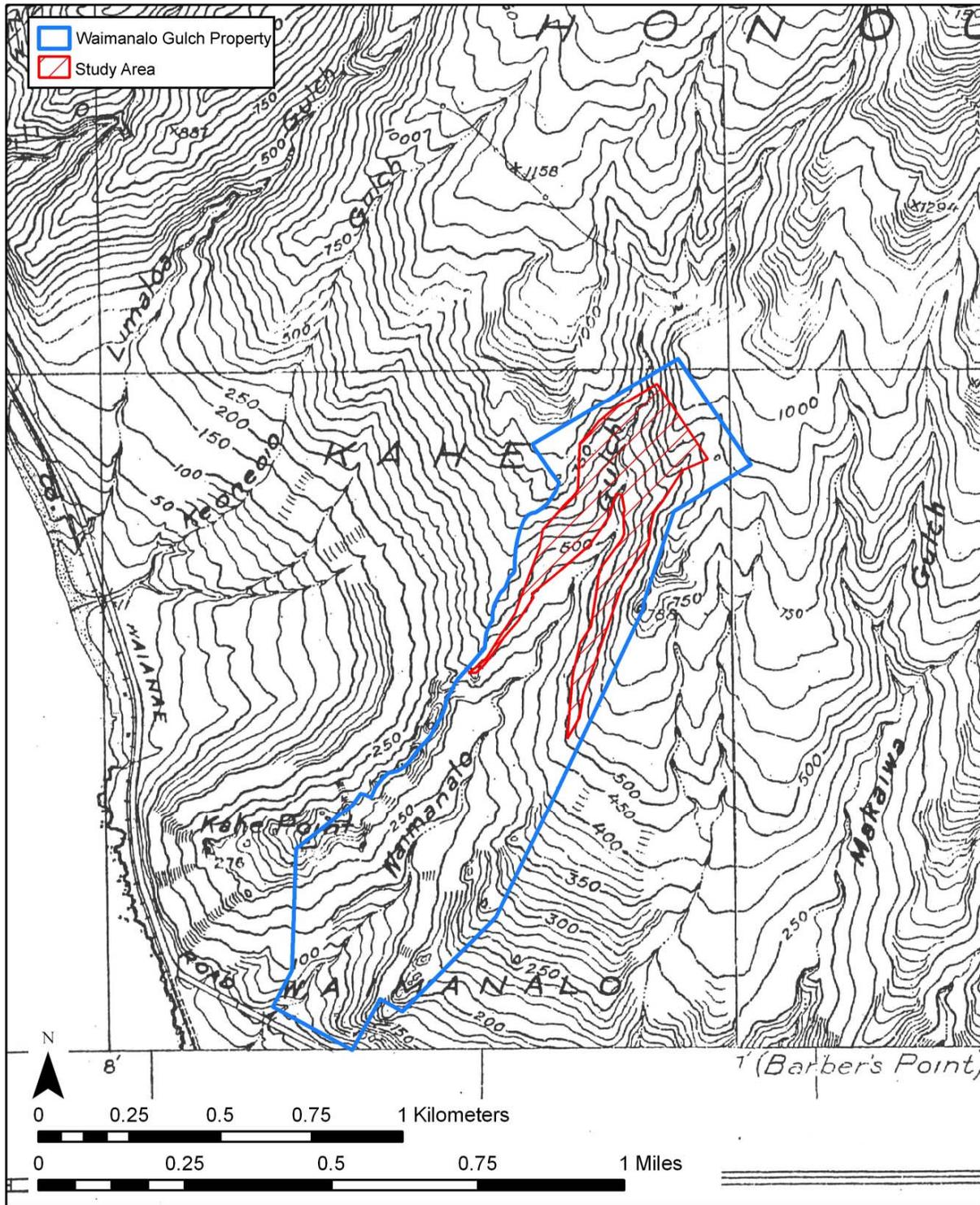


Figure 11. 1928 USGS Topographic Map, Wai'anae Quad, showing the location of the Waimānalo Gulch property and the study area

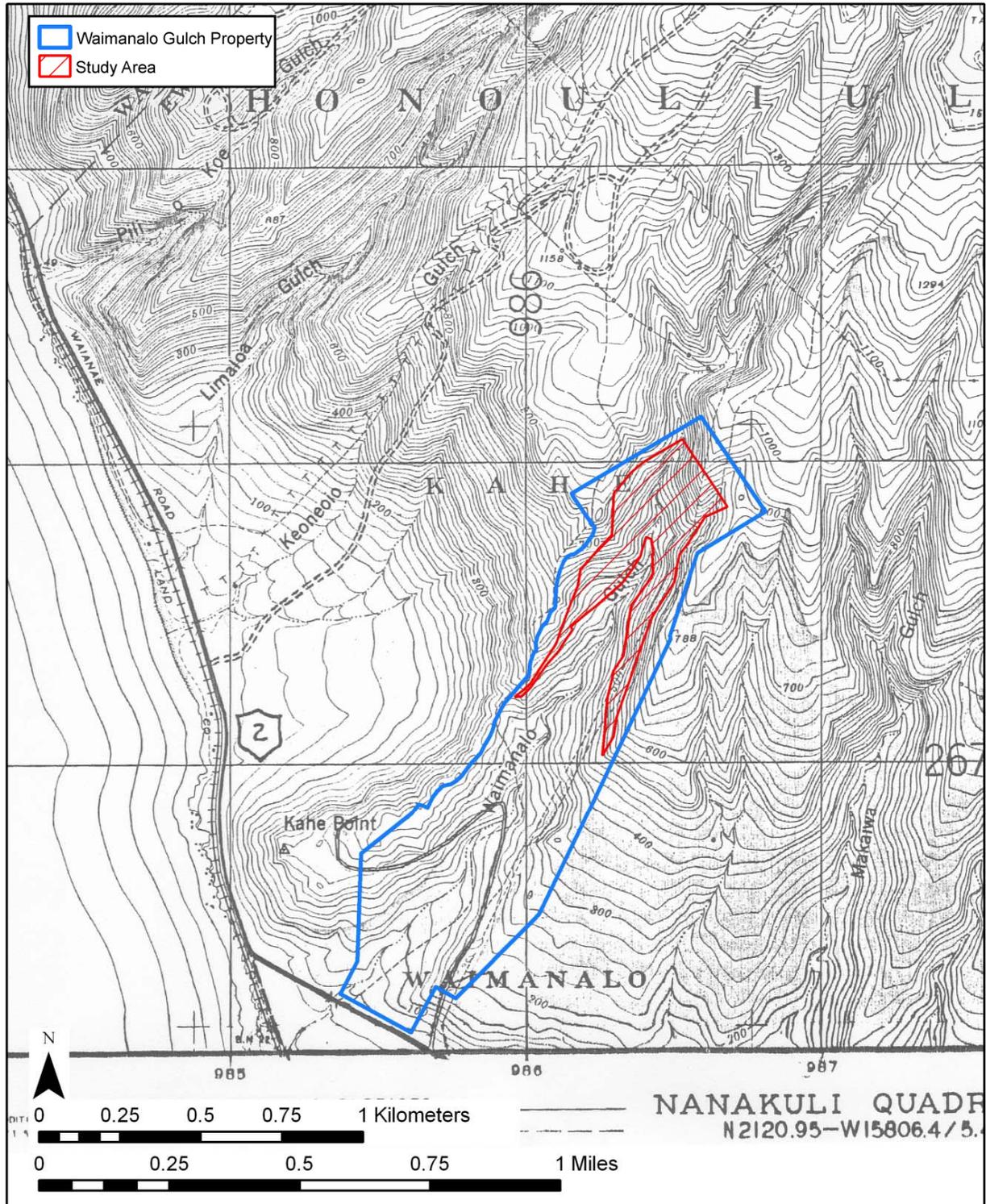


Figure 12. 1943 War Department Map, Nanakuli Quad, showing the location of the Waimānalo Gulch property and the study area

located at Barbers Point Beach, was used beginning in 1921 as a training area for firing 155 mm guns (Payette 2003). Camp Malakole Military Reservation (a.k.a. Honouliuli Military Reservation until 1941), located south of Barbers Point Harbor, was used from 1939 as an anti-aircraft artillery training firing point (Payette 2003). Gilbert Military Reservation, located east of Barbers Point Harbor, was used from 1922-1944 as a railway battery firing position (Payette 2003). Brown's Camp Military Reservation (a.k.a. Brown's Camp Battery from 1937-1944 and Battery Awanui from 1940-1945), located near Kahe Point (Figure 13), was a railway battery firing position (Payette 2003). Fort Barrette (a.k.a. Kapolei Military Reservation and Battery Hatch), located atop Pu'u Kapolei, was in use from 1931 to 1948 for housing four 3-inch anti-aircraft batteries (Payette 2003). In the 1950s, the site was used as a NIKE missile base. Palailai Military Reservation (a.k.a. Battery Palailai from 1942-1944), located atop Pu'u Palailai, was used from the 1920s and included Fire Control Station "B" (Payette 2003). Barbers Point NAS, in operation from 1942 into the 1990s, was the largest and most significant base built in the area. It housed numerous naval and defense organizations, including maritime surveillance and anti-submarine warfare aircraft squadrons, a U.S. Coast Guard Air Station, and the U.S. Pacific Fleet.

### 3.1.6 Battery Arizona

On the southwest ridge above Waimānalo Gulch are the subterranean remnants of Battery Arizona, an ambitious World War II military project. The attack of December 7, 1941 impelled the construction of further defensive armament for portions of the O'ahu coastline not protected by the existing batteries. Even the sunken ships at Pearl Harbor would be enlisted in O'ahu's defense. When, early in 1942, it was discovered that the two rear three-gun turrets of the U.S.S. Arizona were salvageable, an ambitious plan to mount them at two land installations on O'ahu was set into motion. The two sites chosen were the tip of Mōkapu Peninsula at Kāne'ohe Bay, designated Battery Pennsylvania, and Kahe Point above the Wai'ānae Coast, designated Battery Arizona.

Construction of Batteries Pennsylvania and Arizona commenced in April 1943. A formidable subterranean complex was contrived to house the turrets at the two sites. According to a U.S. Army Corps of Engineers report prepared in 1946:

The design that was eventually produced consists of a central barbette well of concrete set in rock, having an overall depth of about 60 ft. and an inside diameter of about 24 ft., with three levels below the bottom of the turret connected by stairways. Two tunnels radiate from this well to house projectiles and powder magazines immediately adjacent to the well. Beyond and in line with the projectile magazine is a large power room for three 125 KW generators, all miscellaneous switchgear, air conditioning, and ventilating equipment. In a separate tunnel off the main tunnel in the vicinity of the powder room is a 10,000 gallon emergency water tank to maintain the battery for several days in case of siege. Beyond the power room in a separate leg of the tunnel are the operations rooms. Because during prolonged action it might be necessary for the entire battery personnel to remain in the battery and be self sustaining, these gas proofed and air conditioned operations rooms normally comprised of radio and

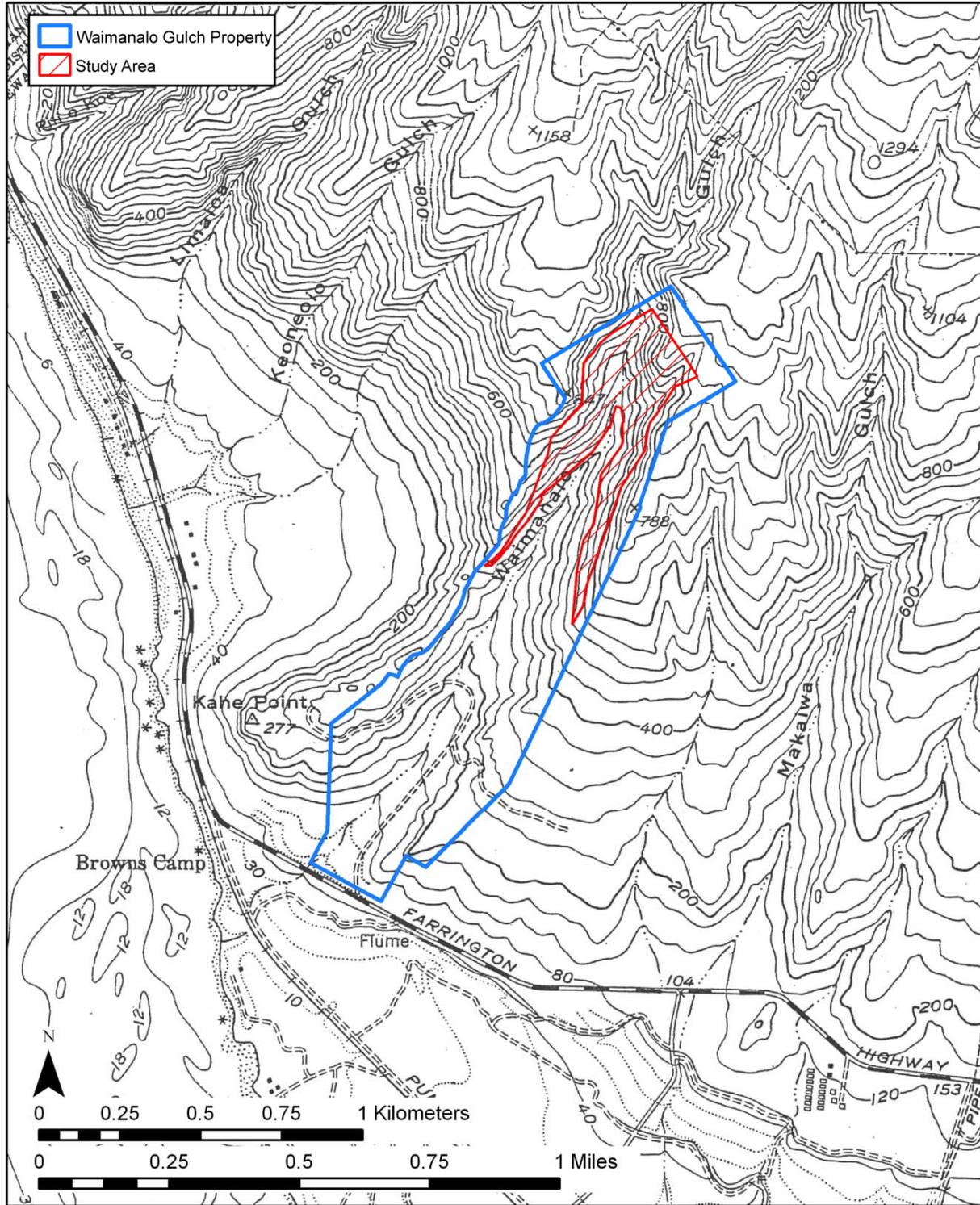


Figure 13. 1953 USGS Topographic Map, 'Ewa Quad., showing the location of the Waimānalo Gulch property and the study area

switchboard, plotting, and radar rooms included latrines for officers and enlisted men, a galley, first aid room, offices, and storerooms.

The salvaged turrets were stored at a facility on Pearl City Peninsula. Refurbishing of the turrets proved to be a formidable task:

An immediate complication arose from the fact that removal of the turrets from the Arizona was begun prior to any thought of their reuse; hence, much of the cutting was done rapidly and crudely with no consideration for future reassembly. As a result, the reconstruction frequently was held up by the painstaking realignment and joining of turret segments. Other difficulties arose from the initial damage and subsequent immersion suffered by the armament components. (Kirchner and Lewis 1967:432)

Records in the archives of the U.S. Army Museum at Ft. DeRussy reveal the months' long search across the Mainland for replacement parts, especially motors, and for parts to adapt the turrets to installation on land. It was finally determined that, because they had been so long under water, every part of the turrets' operating systems had to be repaired or replaced.

Perhaps appropriately for the former battleship armaments, the turrets were transported to their respective battery sites by sea. According to the 1946 Army Corps of Engineers report:

The heavy section of the turrets comprising three 14-inch guns were moved by barge from Pearl Harbor to beaches near the battery sites. Here they were cleaned, painted, and put into condition for installation in the barbette. Special equipment was designed at each site for raising the parts from the ground and lowering to their correct position in the barbette.

Construction of the two batteries continued through all of 1944 and into two-thirds of 1945. Problems--associated with wartime conditions and the unique engineering feat of adapting shipboard weaponry to land installation--dogged the two projects over the many months:

This work involving repair, replacement, or remanufacture of thousands of separate parts placed great demands upon the Army and Navy ordnance facilities and workers. Often, drawings were not available for damaged or missing items, and a particular stage of reconstruction had to be awaited before such parts could be reproduced...In one instance, well over a year was required to procure a single turret turning gear worm and pinion.

...The various problems were further complicated by the sheer mass of the armament and the size of the battery structures...Special heavy equipment...had to be erected at each installation for raising the turret members from the shore and for assembling the armament at the site. Some segments had to be moved on rollers along specially constructed roads, while the 71-ton gun tubes were lifted by parkbuckles from the beaches to the emplacements high above.

...Site peculiarities placed severe restrictions upon the battery layouts. The fire-control radars, for example, because of their sensitivity to concussion, could not be near the turrets; yet the ideal positions for the radars both technically and topographically were but a few yards away...

During late 1944, the battery construction reached a bottleneck stage when progress depended upon a few highly skilled technicians and the closely timed arrival of a few critical armament components. By Christmas, 1944, the number of personnel that could effectively work at the two installations was limited to about 35 specialists. At this time, Battery Pennsylvania's turret was roughly half assembled, while Battery Arizona was even further behind. (Kirchner and Lewis 1967:432-433)

The slow pace of construction of the two batteries reflected a diminishing urgency for defense of O'ahu and its military installations. The war front was moving west across the Pacific as successive defeats impelled Japan's retreat. Battery Pennsylvania at Mōkapu Point was near completion in August 1945 when its guns were test fired around the same time of Japan's surrender. Battery Arizona had not been completed by the war's end; its guns, though installed, were never fired.

Neither of the two batteries was ever placed in operation during the post-war years. The batteries had been rendered obsolete "due to the development of air power, new assault techniques and nuclear weapons. The guns were scrapped in 1949..." (Bouthillier 1995: 12).

A 1943 War Department map (see Figure 12) indicates a road was constructed within the *makai* (southern) portion of Waimānalo Gulch, ascending the western slope to the top of the Kahe Point ridge. This road, along with several other roads and trails indicated on the map, were likely constructed in association with the Battery Arizona complex and other military installations and training areas in the vicinity.

### 3.1.7 1950s to Present

Waimānalo would once again play a role in the O'ahu defense system when, sometime after 1959, the United States Army purchased or exchanged land with the Campbell Estate for the construction of a Nike-Hercules anti-aircraft missile base located at the head of Waimānalo Gulch (Figure 14). The Nike complex, in used between 1961 and 1968 consisted of two control sites and one double-sized launcher site (Murdock 2003). The tunnel complex of Battery Arizona was also used for civil defense circa 1960.

Development in the uplands of western Honouliuli have generally been limited to ranch related housing and infrastructure, military training and NIKE missile stations, as well as the construction of military and commercial communication and atmospheric observation stations on the ridges near Pālehua. In 1975, the U.S. Air Force constructed the Pālehua Solar Observatory with five solar optical telescopes. A circa 1980s aerial photograph (Figure 15) shows limited development in the vicinity of the Waimānalo Gulch landfill property.

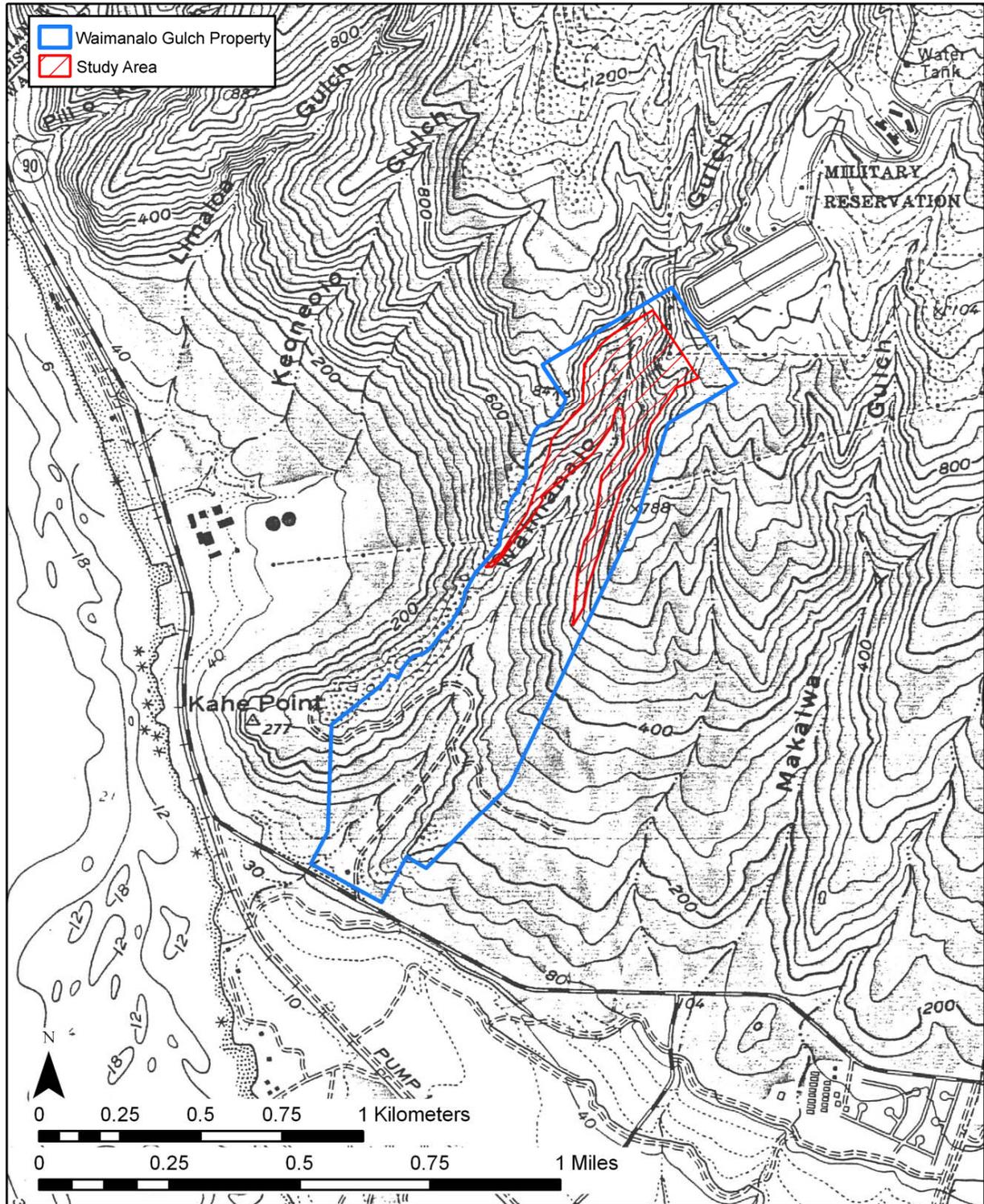


Figure 14. 1962 USGS Topographic Map, 'Ewa Quad., showing the location of the Waimānalo Gulch property and the study area

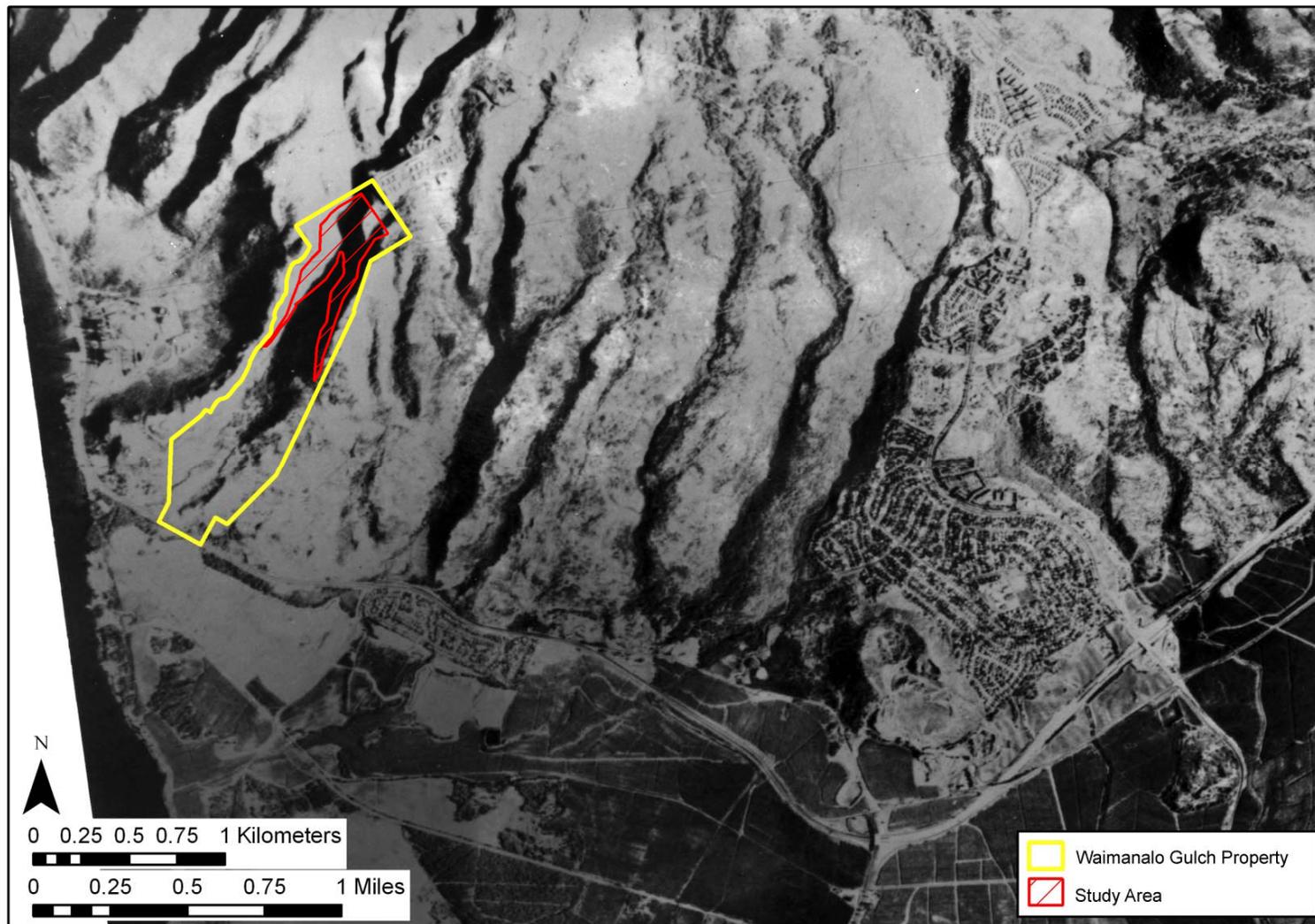


Figure 15. Circa 1980s aerial photograph of western Honouliuli, showing the location of the Waimānalo Gulch property and the study area

In 1985, the City and County of Honolulu condemned 81.5 acres of agricultural land in Waimānalo Gulch for use as a landfill to dispose of municipal refuse and ash from the H-POWER incinerator to be built nearby at Campbell Industrial Park. Work on the landfill began in 1987. In 1988, workers constructing the Waimānalo Gulch landfill were reporting strange incidents at the site. According to a newspaper article by Bob Krauss:

“We’ve been having funny things happen,” said one of the men on the site. “Unnatural things. In one case, a man was standing on a flat rock and the thing threw him over. All of a sudden, it just flipped over.”

Another time a backhoe was knocking down kiawe trees. The trees have shallow roots systems so they usually just fall down. But one of the trees jumped up and did a somersault...

Then there was the payload loader filling in a huge hole where a \$17,000 fiberglass fuel tank had been placed. The story is that the driver put his machine in reverse but it jumped forward and leaped into the hole, smashing the tank (Honolulu Advertiser, 6/20/88:A-1, A-4).

Other incidents reported to Krauss were a truck that had flipped over, tools that had vanished, and a huge stone that had disappeared. The workers called in:

a woman recommended for lifting curses and banishing evil spirits. She said the trouble was caused by a certain stone, the “chief of the valley,” which was lying on its side.

The men quickly set the stone upright. But they got it upside down. Things went from bad to worse. The woman came out again and recommended they place the stone on the hill where it will not be covered by rubbish when the landfill opens (Honolulu Advertiser, 6/20/88:A-1, A-4).

According to Krauss, in April 1988, the stone was moved to a “nest of boulders so that it faces east,” at the “end of a Hawaiian Electric Co. Road to one of its relay stations on top of [a] hill.” This site lies close to the Battery Arizona bunkers in the southwest portion of the Waimānalo Gulch landfill property.

## 3.2 Previous Archaeological Research

The coral plains of ‘Ewa have been the focus of more than 50 archaeological studies over the last two decades, largely as the result of required compliance with county, state, and federal legislation. The Kalaeloa (Barber’s Point) area is one of the most studied places in Polynesia. In contrast, relatively little research has been conducted in the uplands of Honouliuli, along the southern slopes of the Wai‘anae Range. This discussion of previous archaeological research will focus on the results of this prior archaeological work at the southern end of the Wai‘anae range (Table 1).

Recent archaeological investigations in the southern Wai‘anae Range have generally been focused on deep gulch areas for potential landfill locations, lower slopes for residential development, and mountain peaks for antennae or satellite tracking infrastructure (Figure 16).

Table 1. Previous Archaeological Investigations in the in the Uplands of Honouliuli Ahupua‘a

Reference	Type of Investigation	General Location	Findings
Kelly 1959	Kū‘ula stone documentation	Along Pālehua Rd., TMK [1] 9-2-003: 002	One Kū‘ula stone documented (SIHP No. 50-80-08-2316).
Soehren 1964	House site documentation	Waimānalo Gulch, TMK [1] 9-2-003: 072	House site documented (SIHP No. 50-80-12-2317).
Bordner 1977a	Archaeological Reconnaissance	Proposed Makaīwa Gulch Landfill Site	No archaeological sites identified.
Bordner 1977b	Archaeological Reconnaissance	Proposed Kalo‘i Gulch Landfill Site	3 sites (-2600, -2601, -2602), low stacked boulder walls.
Bordner and Silva 1983	Archaeological Reconnaissance and Historical Documentation	Proposed Waimānalo Gulch Landfill Site	No archaeological sites identified.
Sinoto 1988	Archaeological Reconnaissance	Makakilo Golf Course	Low stacked boulder wall (-1975).
Bath 1989	Petroglyph Documentation	Waimānalo Gulch	3 petroglyphs (SIHP No. 50-80-12-4110).
Hammatt & Shideler 1989	Archaeological Reconnaissance	[1] 9-2-003: 027	One pre-Contact agricultural terrace observed.
Hammatt et al. 1991	Archaeological Inventory Survey	Makaīwa Hills Project Site, TMK: [1] 9-1-015: 005 & 017; 9-2-003: 002, 005, and 084.	34 sites, including prehistoric habitation and agricultural features, rock shelters, petroglyphs, <i>ahu</i> , and various sugar cane cultivation infrastructure.
Cleghorn & Anderson 1992	Archaeological Inventory Survey	Kahe Point “Tracks” Beach Park, TMK [1] 9-2-003: 26	Section of the previously recorded Oahu Railway and Land Company Right of Way (SIHP No. 50-80-12-9714) observed.

Reference	Type of Investigation	General Location	Findings
Hammatt 1992	Archaeological Inventory Survey	KAIM Radio Tower, Pālehua, TMK [1] 9-2-005: 013	No archaeological sites identified.
Nakamura et al. 1993	Archaeological Inventory Survey	Makakilo D and D-1 Development Parcels	Cement irrigation flume (-4664).
Borthwick & Hammatt 1997	Archaeological Assessment	Satellite Multi-Ranging Station, Pālehua, TMK: TMK: [1] 9-2-003: 002	No archaeological sites identified.
Dega et al. 1998	Archaeological Inventory Survey	UH West O'ahu, TMK: [1] 9-2-002: 001 & [1] 9-2-002: 001	Two historic site complexes, (50-80-08-5593 historic irrigation system and 50-80-09-2268 Waiāhole Ditch System).
Hammatt and Shideler 1999	Archaeological Inventory Survey and Assessment	Waimānalo Gulch Sanitary Landfill Project Site	Battery Arizona Complex and modern "shrine" site.
Hammatt and Shideler 2001	Archaeological Assessment	TMK: TMK: 9-2-03: 084	No archaeological sites identified.
Monahan 2004	Archaeological Inventory Survey	TMK: 9-2-03: 002	4 historic properties associated with 19 <sup>th</sup> or 20 <sup>th</sup> century commercial agriculture identified: SIHP No. 50-80-12-4341, water flume that is a component of the previously identified site by Hammatt et al. 1991; SIHP No. 50-80-12-6654, a stone ranch wall; SIHP No. 50-80-12-6655, a pair of concrete bridge supports; and SIHP No. 50-80-12-6656, low rock walls and rock stacking.

Reference	Type of Investigation	General Location	Findings
Tulchin, J and Hammatt 2004	Archaeological Field Inspection	Proposed HECO Meteorological Observation Stations	Three small stone features identified: an <i>ahu</i> , a stone terrace, and a small C-shape.
Tulchin, T. and Hammatt 2004a	Archaeological Inventory Survey	86-Acre Proposed Pālehua Community Association (PCA) Common Areas Parcels, Makakilo (TMK: 9-2-03: 78 por. and 79)	4 historic properties identified: a complex of concrete and iron structures associated with industrial rock quarry operations (Site 50-80-12-6680); three boulder mounds believed to be related to land clearing or ditch construction by the Oahu Sugar Co. (Site 50-80-12-6681); a small terrace believed to function as a historic water diversion feature (Site 50-80-12-6682); and a remnant portion of the Waiāhole Ditch (Site 50-80-09-2268).
Tulchin, T. and Hammatt 2004b	Archaeological Inventory Survey	Adjacent to Kahe Power Plant, TMK [1] 9-2-03: 027	A total of four archaeological sites (SIHP No. 50-80-12-6647, -6648, -6649, & -6650) comprising fifteen individual features were identified. Sites observed consisted of rock walls, mounds, and platforms. Site age ranged from historic to pre-Contact. Site function was determined to be predominantly agricultural in nature.
Hoffman et al. 2004	Archaeological Assessment	Adjacent to Kahe Power Plant, TMK [1] 9-2-03: 027	No historic properties identified.
Tulchin, T. and Hammatt 2005	Archaeological Inventory Survey	71-Acre Proposed Pālehua East B Project, Makakilo, (TMK: 9-2-03: 76 and 78)	Three historic properties identified: SIHP No. 50-80-12-6666 (pre-contact agricultural alignment and mound), SIHP No. -6667 (plantation-era stacked basalt boulder walls and a ditch), and SIHP No. -6668 (single alignment of upright basalt boulders and a small, low terrace).

Reference	Type of Investigation	General Location	Findings
O'Leary et al. 2007	Archaeological Inventory Survey Addendum	Makaīwa Hills Project Site, TMK: [1] 9-1-015: 005 & 017; 9-2-003: 002, 005, and 084.	Two historic properties identified: SIHP No. 50-80-12-6870, a terrace, three springs, and a small rock shelter; SIHP No. -6871, a paved area situated on a ridge top.
Tulchin & Hammatt 2007	Archaeological Field Inspection	TMK: [1] 9-2-003:002 por. and 005 por.	A total of 26 archaeological sites were identified. Archaeological features representing distinct periods of land use were observed, including: pre-contact indigenous Hawaiian habitation and associated agricultural and ceremonial features; historic ranching and related features; and historic quarrying and related features.
Tulchin & Hammatt 2008	Archaeological Field Inspection	TMK: [1] 9-2-003: 004, 009, 029, 084 por., & 085	Pedestrian inspection has confirmed the presence of 10 archaeological sites within the study area. Archaeological features representing distinct periods of land use were observed, including: pre-contact indigenous Hawaiian habitation; historic ranching; and historic railroad operations.

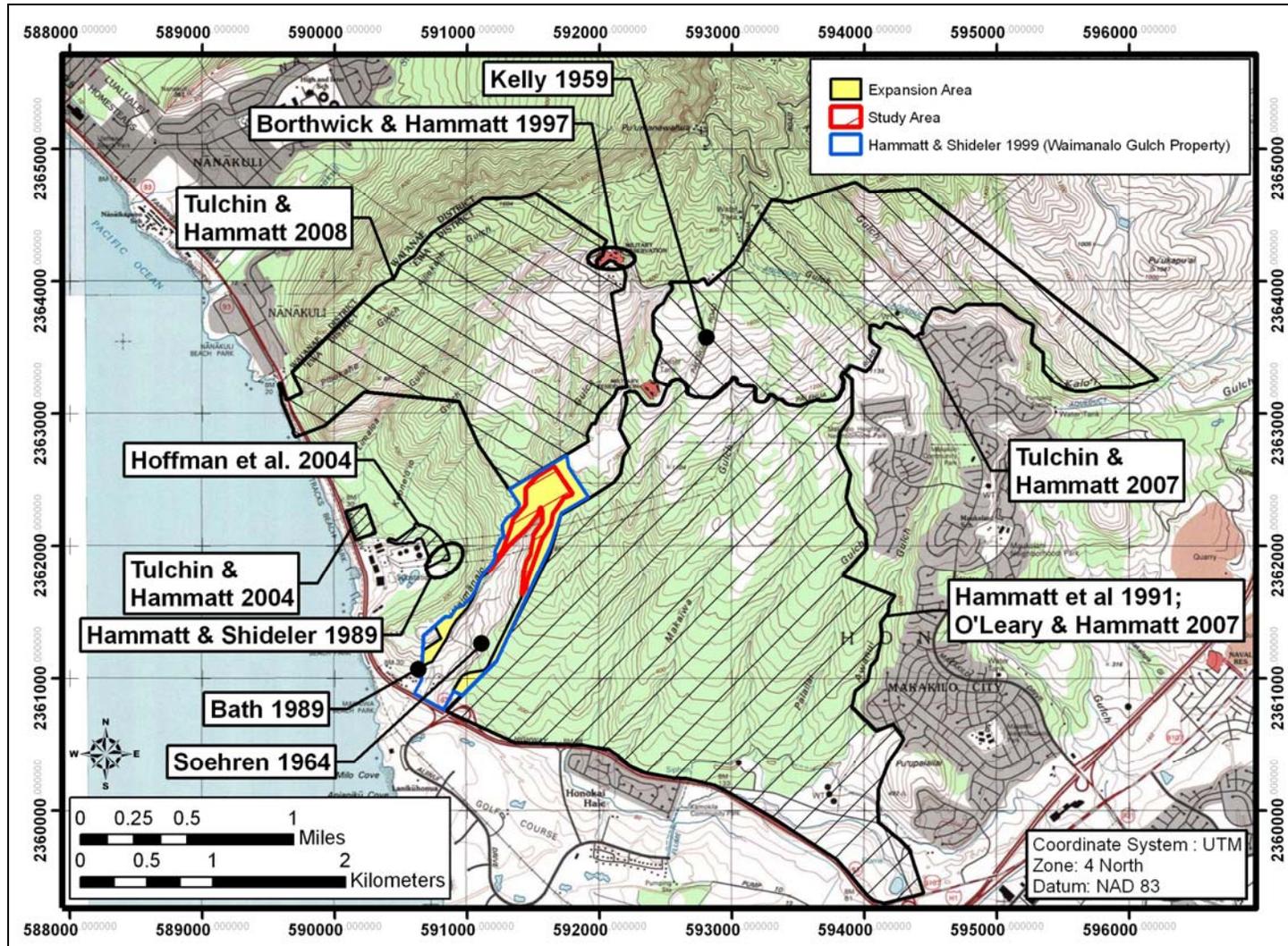


Figure 16. Previous archaeological investigations in the vicinity of the study area

The earliest attempt to record archaeological remains in Honouliuli Ahupua'a was made by Thrum (1906). He reports the existence of a *heiau* located on Pu'u Kapolei, approximately 5 km (3 mi.) southeast of the current study area. Pu'u Kapolei Heiau was described as "Ewa-size and class unknown. Its walls thrown down for fencing" (Thrum 1906:46).

In his surface survey of 1930, archaeologist J. Gilbert McAllister recorded the specific locations of important sites, and the general locations of less important sites (at least at Honouliuli). Archaeological investigations by McAllister along the southern slopes of the Wai'anae Range identified a number of sites which are of interest (Figure 17).

McAllister documents Pu'u Kapolei Heiau as Site 138 and notes:

The stones from the heiau supplied the rock crusher which was located on the side of this elevation, which is about 100 feet away on the sea side. There was formerly a large rock shelter on the sea side where Kamapuaa (the pig-god) is said to have lived with his grandmother (Kamaunuaiahio). (McAllister 1933:108)

McAllister's Site 136 is located near Mauna Kapu, northeast of the current study area, and is described as a small platform on the ridge dividing the 'Ewa and Wai'anae districts. The 4 to 6 square foot platform was constructed of coral and basalt stones, and was believed to be an altar (McAllister 1933:107). It is noted to have been destroyed by the time of Sterling and Summers' work in the late 1950's (Sterling and Summers 1978:32).

McAllister's Site 137 is located at Pu'u Ku'ua, a prominent landmark northeast of the current study area. Pu'u Ku'ua Heiau was described by McAllister as:

(Destroyed) The heiau was located on the ridge overlooking Nanakuli as well as Honouliuli at the approximate height of 1800 feet. Most of the stones of the heiau were used for a cattle pen located on the sea side of the site. The portion of the heiau which has not been cleared for pineapple has been planted in ironwoods. (McAllister 1933:32)

The presence of Pu'u Ku'ua *heiau*, provides some archaeological evidence of the Pu'u Ku'ua settlement described in the Hawaiian Newspaper "*Ka Loea Kalaiaina*" (see Section III: Honouliuli Settlement Patterns).

None of these sites are in the immediate vicinity of the current study area. However, the presence of extant or former archaeological remains demonstrates Hawaiian use of these *mauka* lands.

In 1959, the Bishop Museum was notified of a *kū'ula* stone (stone god used to attract fish) located along Pālehua Road. The *kū'ula* stone was briefly documented and assigned as SIHP No. 50-80-08-2316 (Kelly 1959). SIHP No. 50-80-08-2316 is located approximately 1500 m northeast of the current study area, along the western edge of Pālehua Road.

In 1964, the Bishop Museum was notified of a "house site" located in the lower elevations of Waimanalo Gulch. The site was briefly documented and assigned as SIHP No. 50-80-12-2317 (Soehren 1964). SIHP No. 50-80-12-2317 is located approximately 500 m southwest of the current study area.

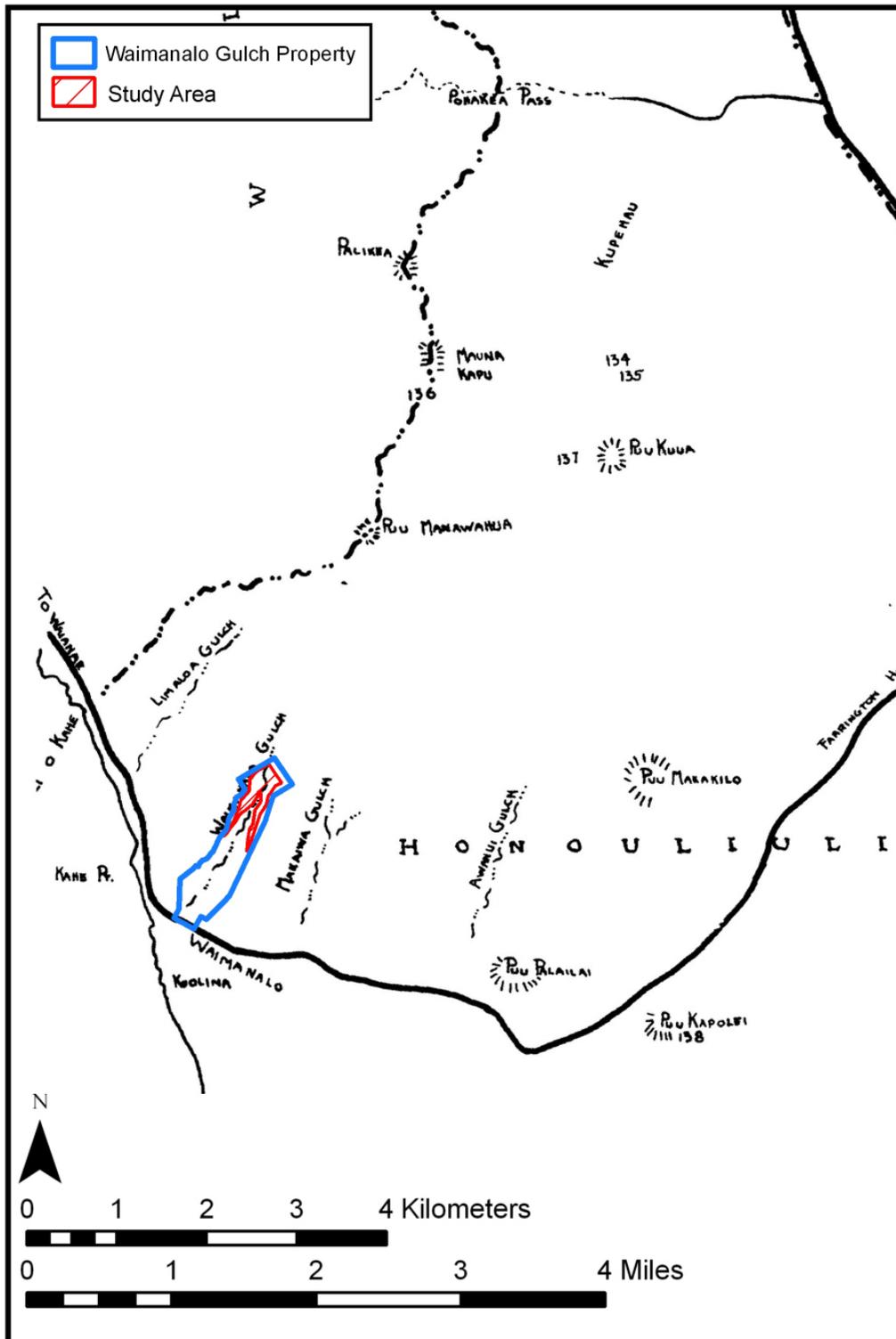


Figure 17. Portion of Map by Sterling and Summers (1978), showing the location of the Waimānalo Gulch property in relation to archaeological sites discussed in the text

In 1983, an archaeological survey of the lower portions of Waimānalo Gulch (the future site of the Waimānalo Gulch Sanitary Landfill), up to the 430-foot elevation, identified no archaeological sites (Bordner and Silva 1983).

In 1989, SHPD was notified of petroglyphs located in the lower elevations at the mouth of Waimanalo Gulch. Three petroglyphs were observed “pecked into black lava rock” (Bath 1989). Two were anthropomorphic and one consisted of abstract symbols. The site was briefly documented and assigned as SIHP No. 50-80-12-4110. SIHP No. 50-80-12-4110 is located approximately 900 m southwest of the current study area.

In 1989, CSH conducted an archaeological reconnaissance for a proposed HECO training facility located approximately 200 m west of the current study area (Hammatt & Shideler 1989). One small rock terrace was observed and documented. The terrace was thought to be associated with pre-contact agricultural activities.

An archaeological inventory survey of the “Makaīwa Hills” development project, just 80 m east of the current study area, located several pre-contact as well as post-contact archaeological sites (Hammatt et al. 1991). A total of 34 historic properties were located, including pre-contact habitation structures (temporary and permanent), agricultural features (terrace and mounds), rock shelters, petroglyphs, *ahu*, and various sugar cane cultivation infrastructure (Figure 18).

Within the “Makaīwa Hills” project area, habitation sites were found to be clustered in higher elevations above 1000 ft., and in lower elevations below 500 ft (Hammatt et al. 1991). The higher elevations would contain ample forest subsistence resources for gathering on both a continual basis, as well as during times of famine and drought. The lower elevations would be in close proximity to the shoreline and bountiful coastal resources.

In 1997, CSH conducted an archaeological assessment for the proposed Ministry of Transportation Satellite Multi-Ranging Station project site, located 1500 m to the northwest of the current study area (Borthwick & Hammatt 1997). No historic properties were identified.

In 1999, CSH conducted an archaeological inventory survey for the proposed Waimanalo Gulch Sanitary Landfill Project Site (Hammatt & Shideler 1999). The study area included a large section of Waimanalo Gulch, extending from the base of the gulch up to a 1000 ft elevation, and encompasses the proposed expansion area, including the current study area. The “Battery Arizona” military complex (WWII bunker complex) and a contemporary shrine site (two sacred stones and a petroglyph) were observed (Figure 19). The stones of the “shrine” site were understood to have been previously relocated from the central portion of Waimānalo Gulch circa 1988. Both sites are located within the Waimanalo Gulch property, but are outside of the proposed expansion area. It was recommended that impact to the southwestern portion of the Waimanalo Gulch Sanitary Landfill property, containing the Battery Arizona and the contemporary shrine, be avoided.

In 2004, CSH conducted an archaeological assessment of an approximately 30-acre parcel adjacent to the Kahe Power Plant, located approximately 640 m southwest of the current study area (Hoffman et al. 2004). No historic properties were observed.

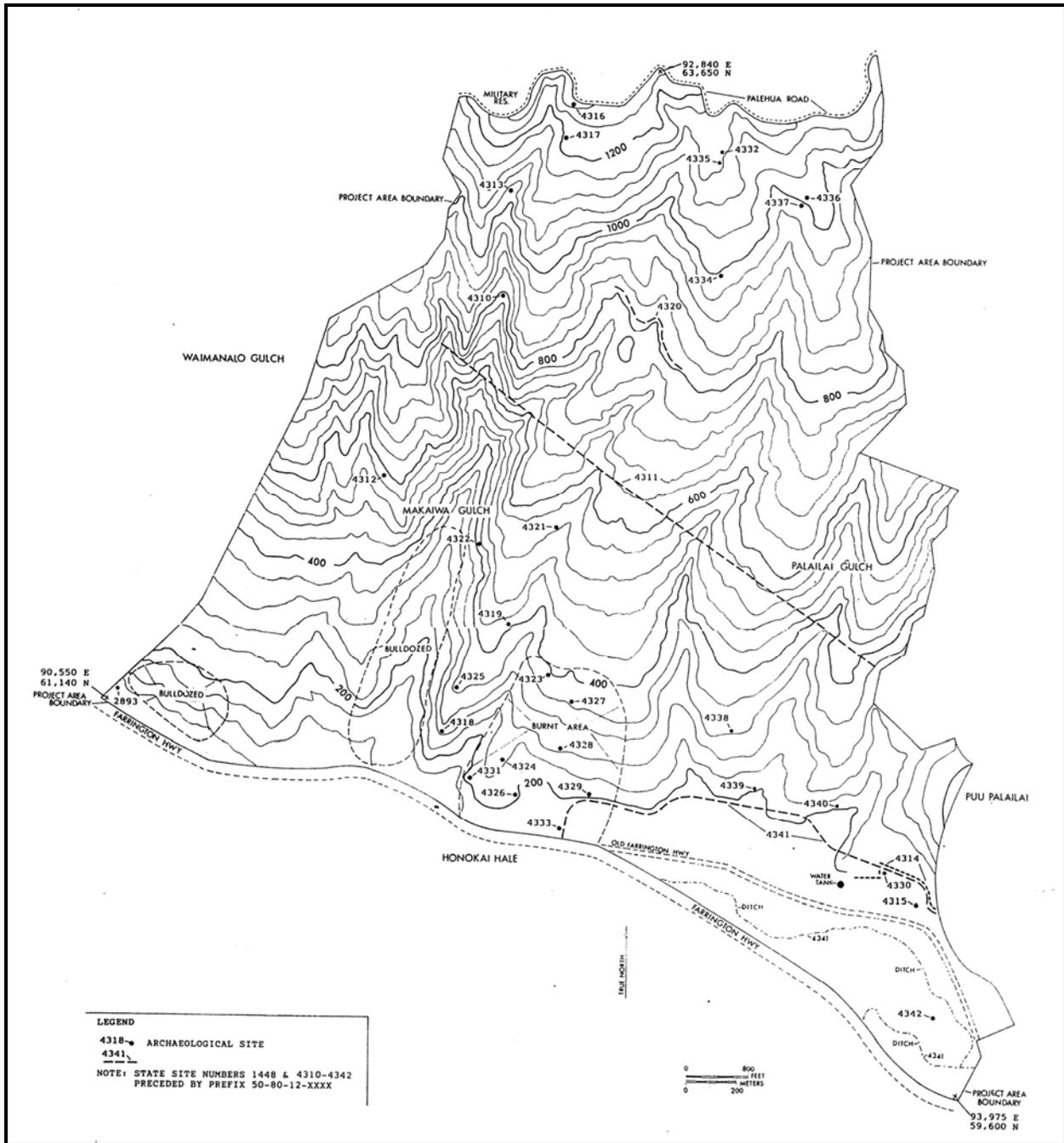


Figure 18 . Makaīwa Hills Project Area Showing the Location of Identified Archaeological Sites (Hammatt et al 1991:7)

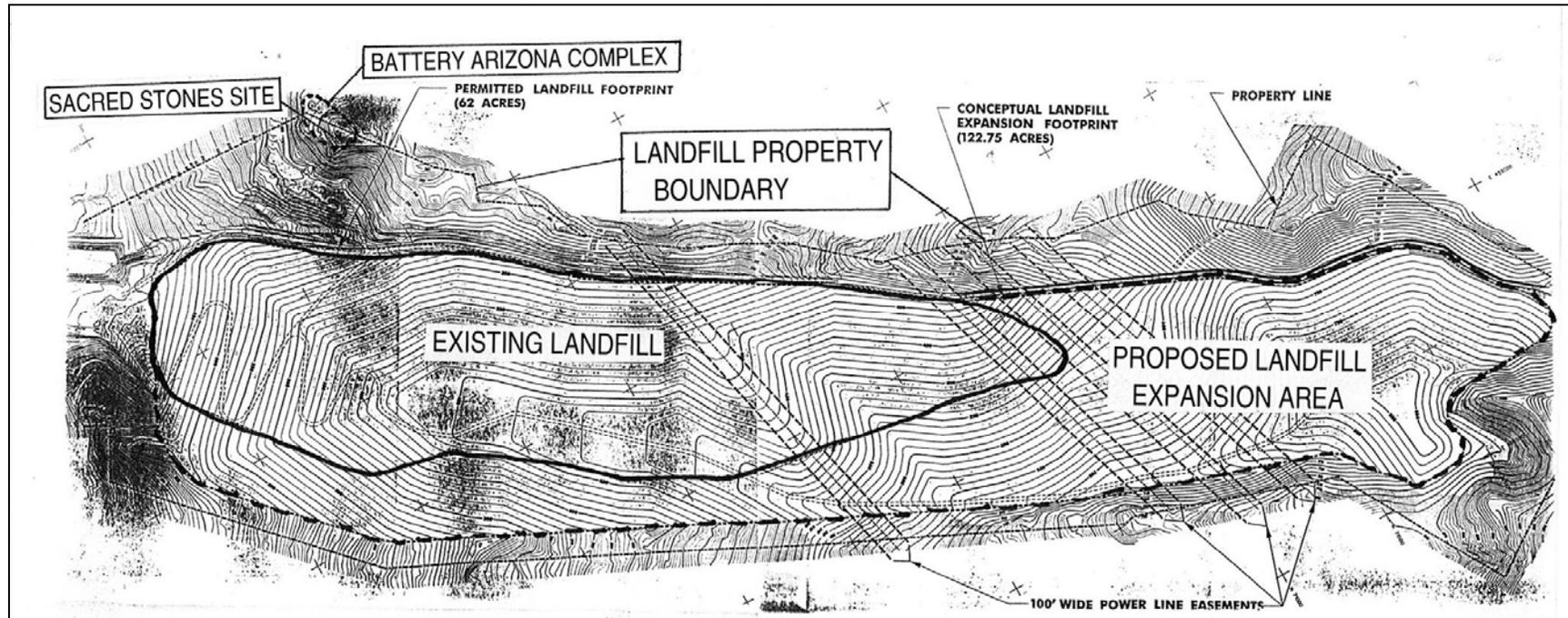


Figure 19. Waimanalo Gulch Sanitary Landfill Project Site Showing the Location of Identified Archaeological Sites (Hammatt & Shideler 1999)

In 2004, CSH conducted an archaeological inventory survey of an approximately 24-acre parcel adjacent to the Kahe Power Plant, located approximately 630 m south of the current study area (T. Tulchin & Hammatt 2004). A total of four archaeological sites (SIHP No. 50-80-12-6647, -6648, -6649, & -6650) comprising fifteen individual features were identified. Sites observed consisted of rock walls, mounds, and platforms. Site age ranged from historic to pre-Contact. Site function was determined to be predominantly agricultural in nature. Of note was the presence of a possible fishing shrine (*ko'a*) at the base of Keone'ō'io Gulch. The shrine is constructed of both upright and stacked limestone boulders creating a level paved platform. Branch coral and water rounded coral cobbles were observed within the interior cobble fill of the structure.

In 2007, O'Leary conducted an addendum to the archaeological inventory survey conducted for the "Makaīwa Hills" development project, originally surveyed by Hammatt et al in 1991 (see above). Because 15 years had passed since the last archaeological inspection of the project area CSH field personnel conducted a reconnaissance of the project area to relocate the 17 historic properties. During this fieldwork two additional historic properties were identified in the *mauka*/west corner of the project area. SIHP No. 50-80-12-6870 consists of a historic ranching-era terrace constructed to create a large level soil area in front of three natural springs. The second site, SIHP # 50-80-12-6871, consists of a paved area comprised of large basalt boulders prominently positioned on a ridge top overlooking the western half of the 'Ewa Plain, possibly functioning as a resting place, a trail marker, or possibly had a religious role. The excavation of test units at both sites did not reveal any further information regarding site function.

In 2007, CSH conducted an archaeological field inspection of an approximately 790-acre parcel at Pālehua, located just east of the current study area (J. Tulchin & Hammatt 2007). A total of 26 archaeological sites were identified. Archaeological features representing distinct periods of land use were observed, including: pre-contact indigenous Hawaiian habitation and associated agricultural and ceremonial features; historic ranching and related features; and historic quarrying and related features.

In 2008, CSH conducted an archaeological field inspection of an approximately 809-acre of Kahe Ranch Land, abutting the northeast corner of the current study area (J. Tulchin & Hammatt 2008). A total of 10 archaeological sites were identified. Archaeological features representing distinct periods of land use were observed, including: pre-Contact indigenous Hawaiian habitation; historic ranching; and historic railroad operations.

### 3.3 Background Summary and Predictive Model

Historical background research of Honouliuli Ahupua'a indicated that pre-contact settlement of the *ahupua'a* would have been centered around the rich cultivated lands of Honouliuli *'ili* for extensive wetland taro cultivation and abundant coastal resources. The extensive limestone plain would also include recurrent use habitations for fishermen and gatherers, and sometimes gardeners. The upland dry forest areas would be used for hunting and gathering of forest resources, but likely not for widespread permanent settlement. In the intermediate area between the limestone plain and the upland forests indigenous Hawaiian activities would have been limited to dry land agriculture within gulches or near springs, and *mauka/makai* transportation routes (i.e. trails) and associated temporary shelters.

By 1920, the lands of Honouliuli were used primarily for commercial sugar cane cultivation and ranching (Frierson 1972:18). Much of the *mauka* lands in western Honouliuli, including ridges and deep gulches, were unsuitable for commercial sugar cultivation and remained pasture land for grazing livestock. Historic maps indicate a lack of any significant development within the study area into the late 1920s, suggesting that the lands within the study area were unsuitable for commercial sugar cane cultivation and were utilized as pasture land for grazing livestock.

Major land use changes came to western Honouliuli when the U.S. Military began development in the area. Military installations were constructed both near the coast, as well as in the foothills and upland areas. A 1943 War Department map reflects the military presence and associated land use within and south of the study area during this time period. Access roads to power lines and telecommunications lines are indicated throughout the southeastern portion of study area. Also of note are the presence of access roads leading to the Battery Arizona, a subterranean WWII bunker complex identified by Hammatt and Shideler in 1999, situated on the southwest ridge above Waimānalo Gulch.

Previous archaeological research in the vicinity of the study area has identified numerous pre-contact sites including: habitation structures (platforms and enclosures), agricultural features (walls, terraces, and mounds), and religious sites (*kū'ula* stone and *ko'a*). Within the "Makaīwa Hills" project area, which is abuts the southeastern boundary of the current study area, pre-contact habitation sites were found to be clustered in higher elevations above 1000 ft., and in lower elevations below 500 ft (Hammatt et al. 1991).

Historic archaeological sites identified in the vicinity of the study area include the Battery Arizona military complex (WWII bunker complex), sugar cane cultivation infrastructure, and walls and fences attributed to the Campbell Ranch.

Based on background research historic properties are not expected to be encountered within the study area. This is based on a review of the archaeological inventory survey for the proposed Waimanalo Gulch Sanitary Landfill Project Site conducted by CSH in 1999, in which no historic properties were identified within the current study area (Hammatt & Shideler 1999). However, if historic properties are encountered they are likely to include both pre-contact and historic archaeological sites. Pre-contact archaeological sites may include: dry land agricultural sites, including planting mounds and terraces in the vicinity of springs or drainage gulches; habitation sites, including enclosures and platforms; trail markers (*ahu*); religious sites including enclosures, terraces, platforms, and/or upright stones located on prominent hills or other significant locations; and burials located within discrete rock shelters and/or caves. Historic archaeological sites may include: ranch related structures including walls, fences, and maintained springs; and military related structures including concrete bunkers, radio towers and related infrastructure.

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## Section 4 Results of Fieldwork

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Fieldwork for the current AIS investigation of the study area was accomplished over a one-week period from January 25, 2007 to February 2, 2007. The CSH field crew consisted of Matt Bell, B.A., Amy Hammermiester, B.A., and Kevin Dalton, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). The field effort required 13 person-days to complete. CSH completed the archaeological assessment fieldwork under state archaeological permit No. 07-19 issued by SHPD, per HAR Chapter 13-13-282. Fieldwork involved a 100% pedestrian inspection of the study area with limited subsurface testing.

### 4.1 Survey Findings

Pedestrian inspection of the study area identified one historic property, State Inventory of Historic Properties (SIHP) # 50-80-12-6903, within the study area (Figure 20). SIHP #50-80-12-6903 is of pre-contact origin, and consists of three large upright boulders potentially utilized as trail or boundary markers. A detailed description of this historic property is presented in Section 4.3 below.

Numerous caves and rock shelters were observed within the study area. These caves and rock shelters were thoroughly inspected for cultural modifications and/or the presence of human burials. Where significant sediment deposits were observed, subsurface testing in the form of controlled hand excavation was undertaken to establish if any subsurface cultural deposits were present. Documentation of the inspection and testing of these natural geologic features is presented in Section 4.2 below.

The observed topography within the study area consisted of talus slopes with an average slope of 65°. The observed geology consisted of exposed basalt outcrops with minimal soil deposition. Figure 21 shows the topography and geology encountered during the survey of the study area.

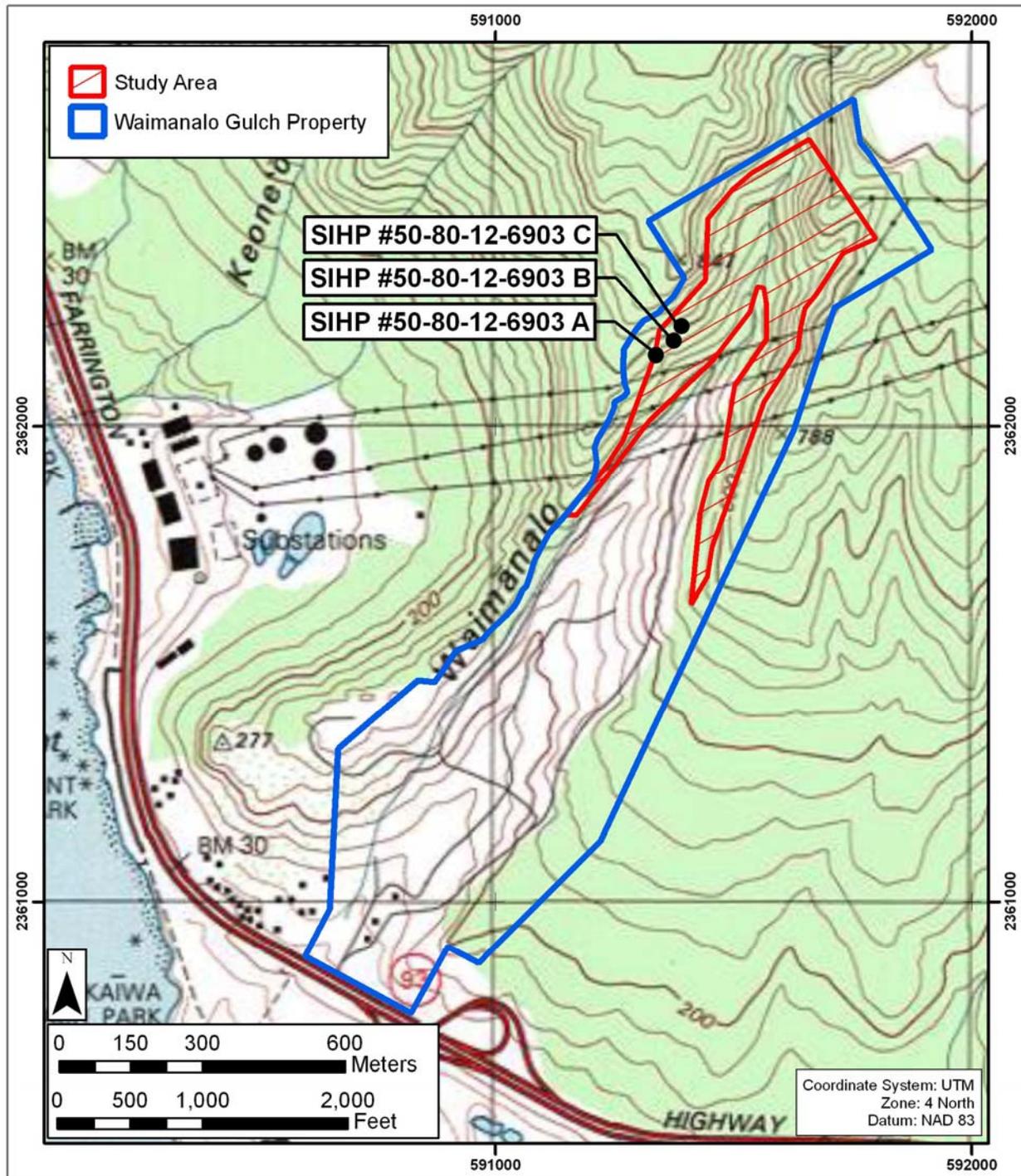


Figure 20. USGS 7.5 Minute Series Topographic Map, Ewa Quadrangle (1998), showing location of SIHP #50-80-12-6903 (Features A-C)



Figure 21. Photograph looking west, showing the topography and geology of the study area

## 4.2 Inspection and Subsurface Testing of Geologic Features

Numerous natural caves and rock overhangs area were discovered and investigated during the pedestrian inspection of the study area. The larger caves and overhangs (greater than two meters in depth and 4 meters in width) were documented and their position mapped using a Garmin GPSmap76S unit or a Trimble PRO XR GPS (Figure 22).

Also of note was a rock alignment (CSH 3) located near the northeastern edge of the study area. The alignment was determined to be of modern origin due to its location along a talus slope, in which soil erosion and rainwater runoff channels were observed. If the feature was of antiquity it would reflect disturbances associated with erosion and/or rainwater runoff, such as the retention of eroding rock and soil or the displacement of boulders incorporated into the alignment. Subsurface testing was conducted at this alignment to confirm the initial age determination of this feature.

### 4.2.1 Cave 1

Cave 1 is located on the western slope of Waimānalo Gulch, situated at the base of a small rock outcrop (see Figure 22). The mouth of the cave opens to the northeast and measures 1.5 m high (Figure 23). The internal dimensions of the cave are as follows: 8.0 m wide and 4.0 m deep, with a maximum ceiling height of 1.2 m. No cultural material or human skeletal remains were observed on the surface of the cave floor.

Due to the presence of soil within the cave interior, two 0.5m<sup>2</sup> test units (TU 1 & TU 2) were excavated in order to determine if any subsurface cultural deposits were present (Figure 24). The stratigraphy of Test Unit 1 (TU 1) consisted of a single stratum of sandy loam (Stratum I) overlying bedrock (Figure 25 & Table 2). No cultural material was observed during the excavation of this test unit.

The stratigraphy of Test Unit 2 (TU 2) consisted of consisted of a sandy loam deposit (Stratum I) overlying a thin layer of decomposing bedrock (Stratum II) (Figure 26 & Table 3). No cultural material was observed during the excavation of this test unit.

### 4.2.2 Cave 2

Cave 2 is located on the western slope of Waimānalo Gulch, situated at the base of a pronounced rock outcrop (see Figure 22). The mouth of the cave opens to the east and measures 1.3 m high (Figure 27). The internal dimensions of the cave are as follows: 8.0 m wide and 4.1 m deep, with a maximum ceiling height of 0.8 m. The roof of the cave has experienced some collapse and now covers approximately 70 percent of the floor (Figure 28). No cultural material or human skeletal remains were observed on the surface of the cave floor.

Due to the presence of soil within the cave interior, two 0.5m<sup>2</sup> test units (TU 1 & TU 2) were excavated in order to determine if any subsurface cultural deposits were present. The stratigraphy of Test Unit 1 (TU 1) consisted of a sandy loam deposit (Stratum I) followed by a layer of decomposing bedrock (Stratum II) (Figure 29 & Table 4). No cultural material was observed during the excavation of this test unit.

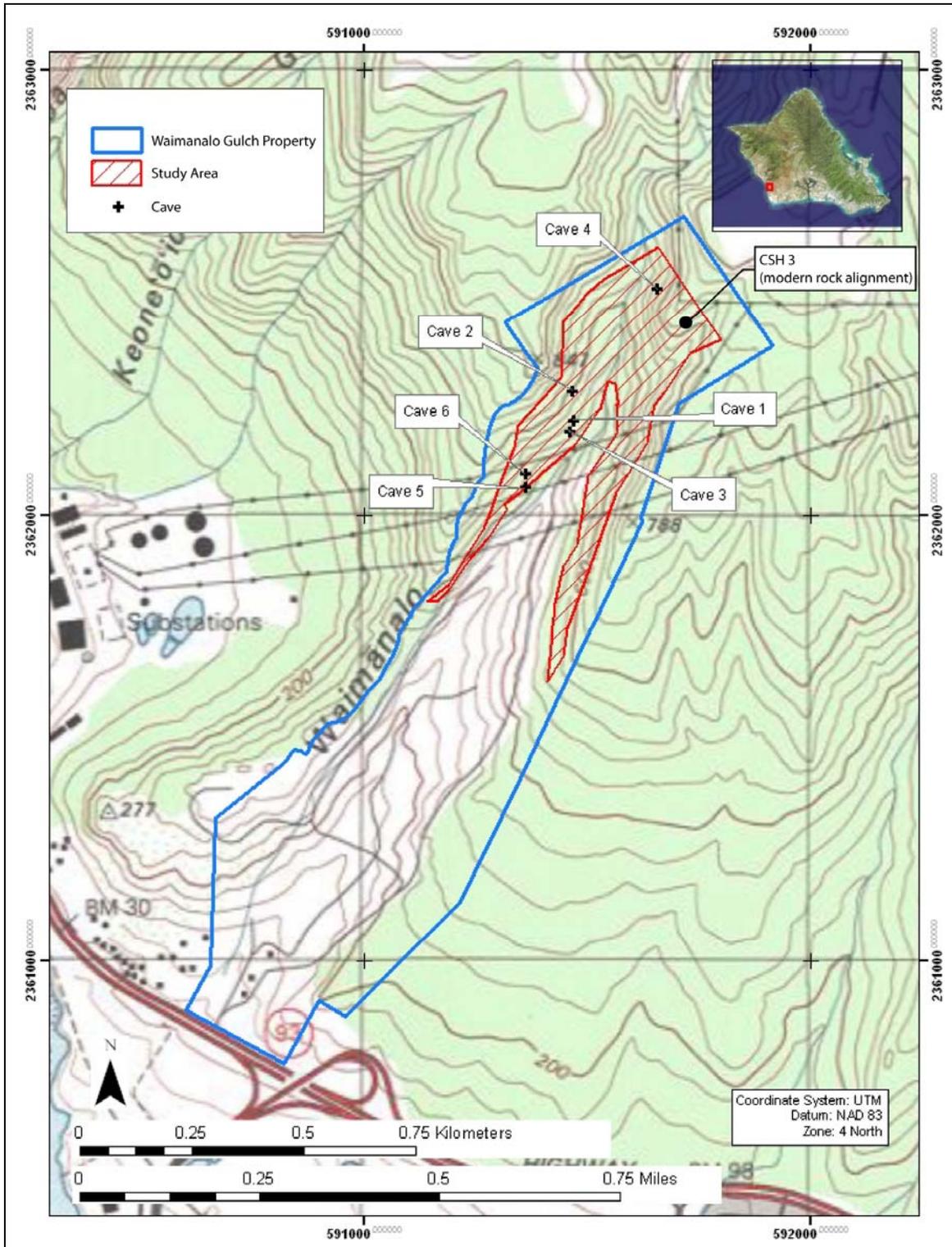


Figure 22. USGS 7.5 Minute Series Topographic Map, Ewa Quadrangle (1998), showing the location of documented caves within the study area



Figure 23. Photograph of opening of Cave 1, view to north



Figure 24. Photograph of interior of Cave 1, view to south

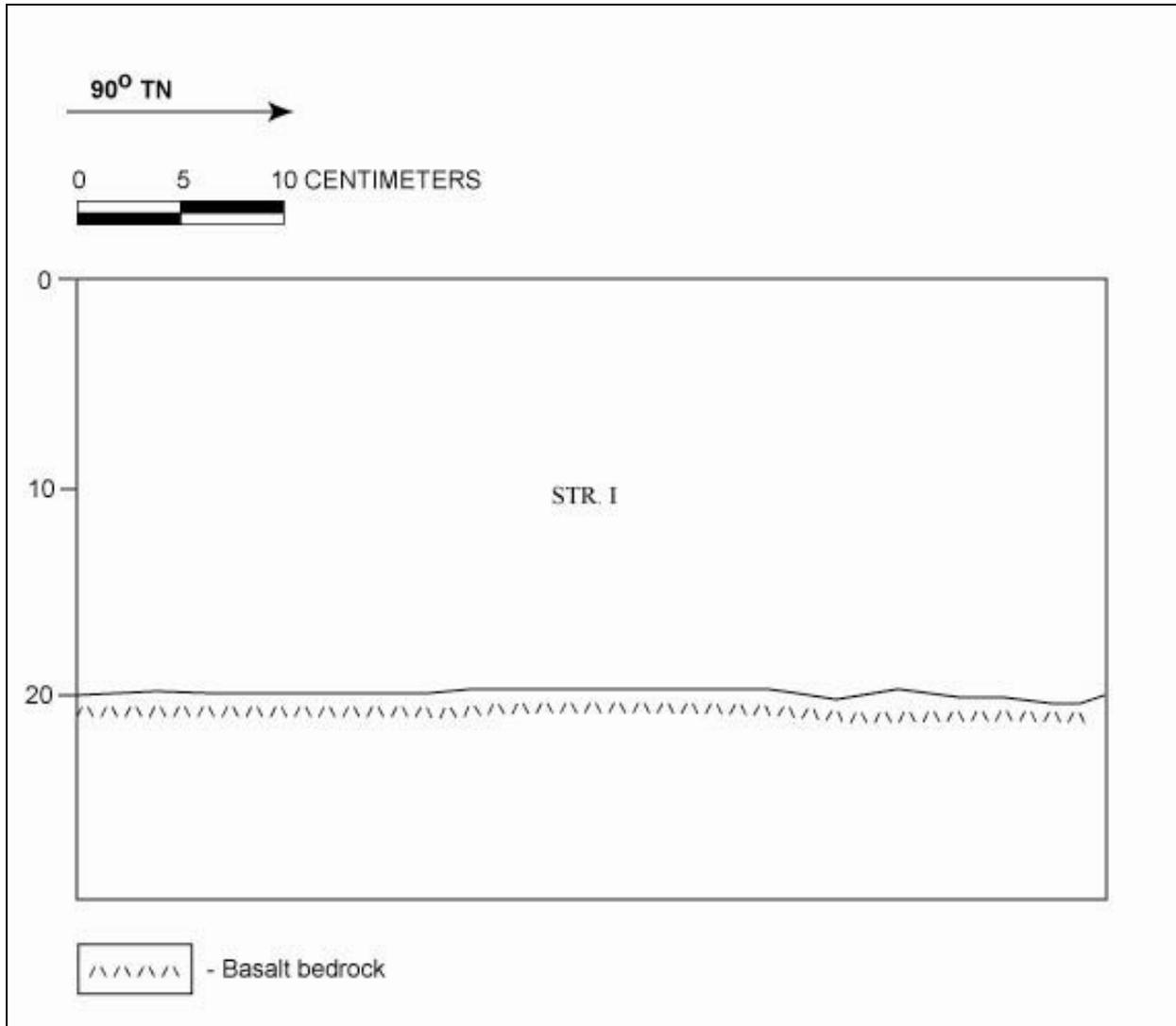


Figure 25. Cave 1, profile of the east wall of Test Unit 1

Table 2. Strata Observed at Cave 1, Test Unit 1

Stratum	Depth (cmbs)	Description
I	0 – 20	10 YR 3/2, dark brown; sandy loam; weak, fine, crumb structure; weakly coherent dry consistency; non plastic; no cementation; terrestrial origin; clear boundary; smooth topography. Stratum I is comprised of loose volcanic soil of aeolian origin. No cultural material observed.

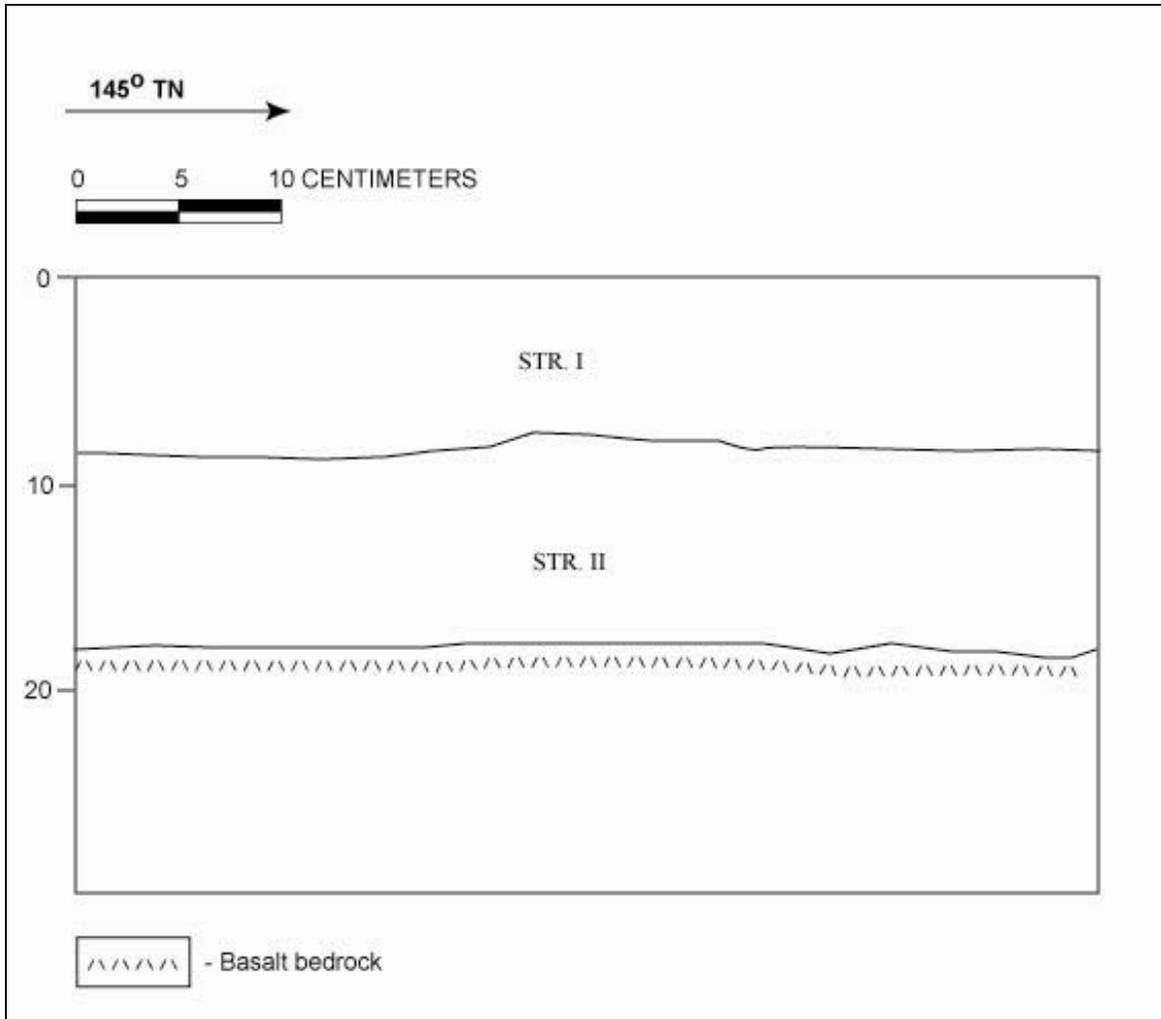


Figure 26. Cave 1, profile of the south wall of Test Unit 2

Table 3. Strata Observed at Cave 1, Test Unit 2

Stratum	Depth (cmbs)	Description
I	0 – 8	10 YR 3/2, very dark grayish brown; sandy loam; weak, fine, crumb structure; weakly coherent dry consistency; non plastic; no cementation; terrestrial origin; clear boundary; smooth topography. Stratum I is comprised of loose volcanic soil of aeolian origin. One fish vertebra was observed. No cultural material observed.
II	8 - 18	10 YR 5/4, yellowish brown; deteriorated bedrock; weak, coarse, crumb structure; slightly hard dry consistency; non plastic; weak cementation; terrestrial origin; abrupt boundary; irregular topography. Sediment is a mixture of aeolian silt and decomposing bedrock. No cultural material observed.



Figure 27. Photograph of Cave 2 opening, view to the northwest



Figure 28. Photograph Cave 2 interior, view to the west

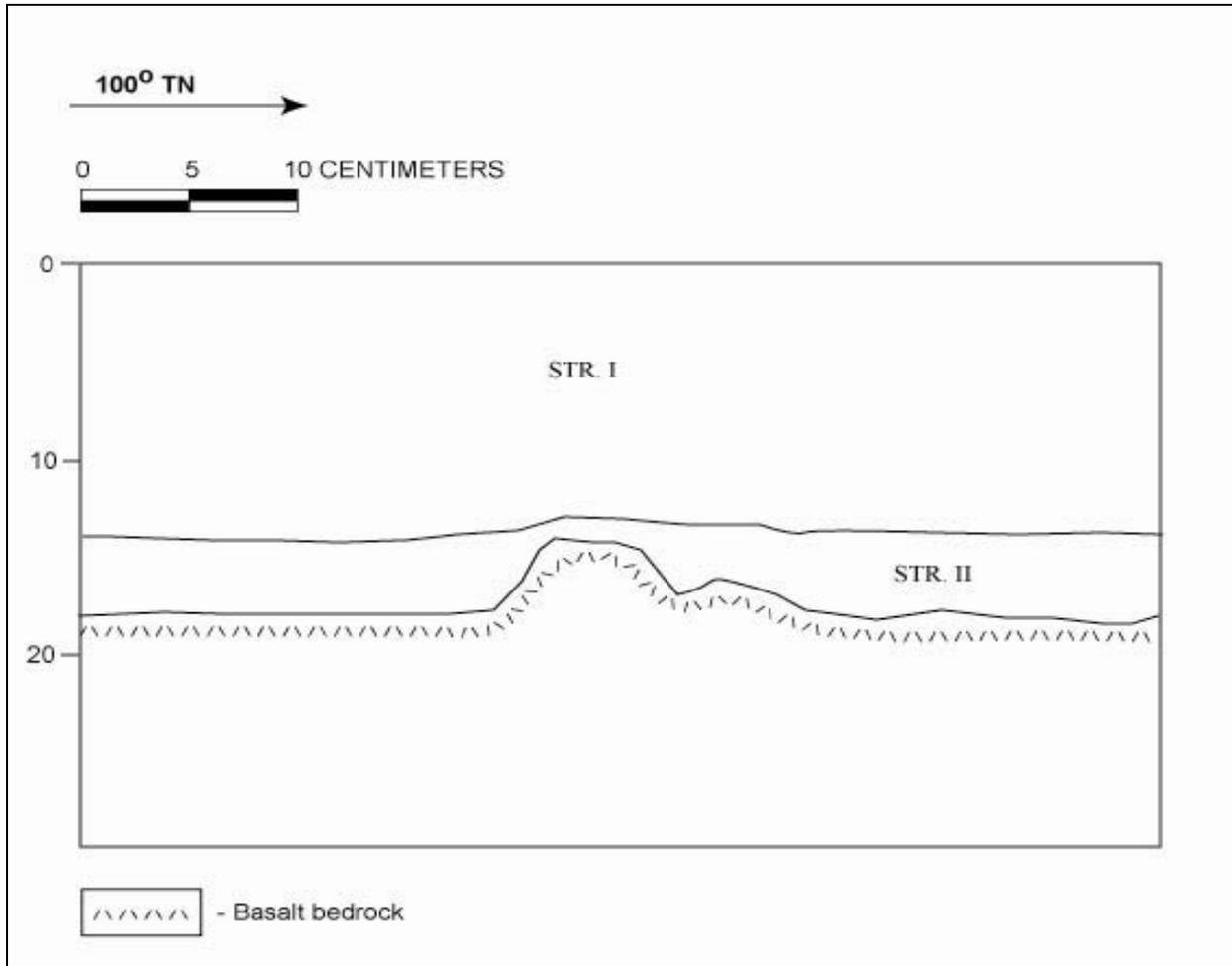


Figure 29. Cave 2, profile of the north wall of Test Unit 1

Table 4. Strata Observed at Cave 2, Test Unit 1

Stratum	Depth (cmbs)	Description
I	0 – 14	10 YR 3/3, dark brown; sandy loam; weak, fine, granular structure; weakly coherent dry consistency; non plastic; no cementation; terrestrial origin; clear boundary; irregular topography. Stratum I is comprised of loose volcanic soil of aeolian origin. No cultural material observed.
II	14 - 18	10 YR 4/6, dark yellowish brown; deteriorated bedrock and sandy loam mix; weak, coarse, crumb structure; slightly hard dry consistency; non plastic; weak cementation; terrestrial origin; abrupt boundary; irregular topography. Sediment is a mixture of aeolian silt and decomposing bedrock. No cultural material observed.

The stratigraphy of Test Unit 2 (TU 2) consisted of sandy loam (Stratum I) overlying bedrock (Figure 30 & Table 5). No cultural material was observed during the excavation of this test unit.

#### **4.2.3 Cave 3**

Cave 3 is located on the western slope of Waimānalo Gulch (see Figure 22). The mouth of the cave opens to the south and measures 1.2 m high. The internal dimensions of the cave are as follows: 4.0 m wide and 2.0 m deep, with a maximum ceiling height of 1.2 m. No cultural material or human skeletal remains were observed on the surface of the cave floor.

Only minimal soil deposits were observed within the cave interior and thus no subsurface testing was conducted at Cave 3.

#### **4.2.4 Cave 4**

Cave 4 is located on the eastern slope of Waimānalo Gulch (see Figure 22). This cave consists of a rock overhang situated at the base of the large rock outcrop (Figure 31). The mouth of the cave opens to the west and measures 2.0 m high. The internal dimensions of the cave are as follows: 10.0 m wide and 4.0 m deep, with a maximum ceiling height of 2.5 m. A pair of small skeleton keys was observed within the cave (Figure 32). No other cultural material or human skeletal remains were observed on the surface of the cave floor.

Only minimal soil deposits were observed within the cave interior and thus no subsurface testing was conducted at Cave 4.

#### **4.2.5 Cave 5**

Cave 5 is located on the western slope of Waimānalo Gulch, situated near the southwestern end of the study area, overlooking the modern landfill (see Figure 22). The mouth of the cave opens to the south and measures 1.0 m high. The internal dimensions of the cave are as follows: 1.4 m wide and 1.3 m deep, with a maximum ceiling height of 0.8 m. No cultural material or human skeletal remains were observed on the surface of the cave floor.

Only minimal soil deposits were observed within the cave interior and thus no subsurface testing was conducted at Cave 5.

#### **4.2.6 Cave 6**

Cave 6 is located on the western slope of Waimānalo Gulch (see Figure 22). The mouth of the cave opens to the east and measures 1.2 m high. The internal dimensions of the cave are as follows: 2.4 m wide and 1.5 m deep, with a maximum ceiling height of 0.7 m. No cultural material or human skeletal remains were observed on the surface of the cave floor.

Only minimal soil deposits were observed within the cave interior and thus no subsurface testing was conducted at Cave 6.

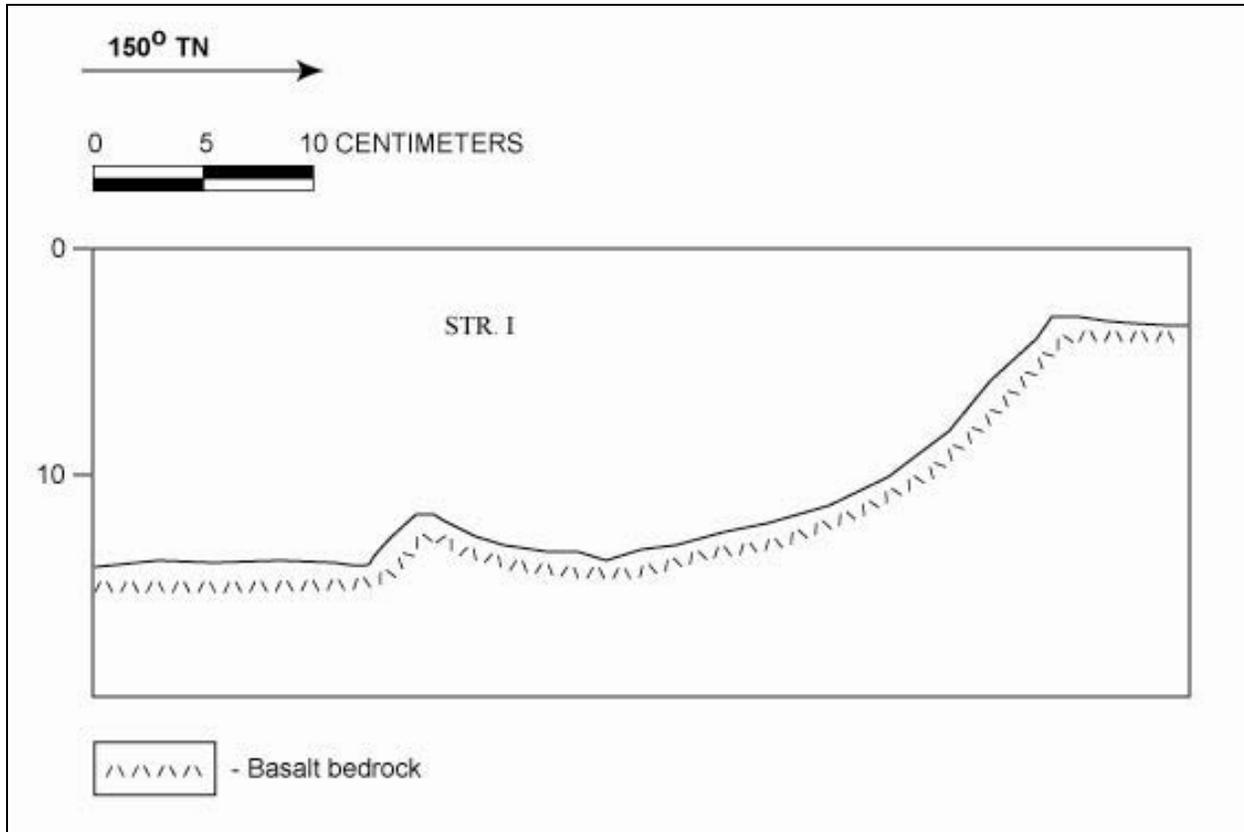


Figure 30. Cave 2, profile of the north wall of Test Unit 2

Table 5. Strata Observed at Cave 2, Test Unit 2

Stratum	Depth (cmbs)	Description
I	0 - 14	10 YR 3/3, dark brown; sandy loam; weak, fine, granular structure; weakly coherent dry consistency; non plastic; no cementation; terrestrial origin; clear boundary; irregular topography. Stratum I is comprised of loose volcanic soil of aeolian origin. No cultural material observed.



Figure 31. Photograph of Cave 4 opening, view to the northeast



Figure 32. Photograph of skeleton keys from Cave 4

#### 4.2.7 Modern Rock Alignment (CSH 3)

A linear rock alignment (CSH 3) was located near the northeastern edge of the study area (see Figure 22). The alignment is constructed of a single course of six small boulders, situated on the eastern slope of Waimānalo Gulch (Figure 33 & Figure 34). It measures 1.2 m long and 0.6 m wide, and is aligned cross slope. The alignment was determined to be of modern origin due to its location along a talus slope, in which soil erosion and rainwater runoff channels were observed. If the feature was of antiquity it would reflect disturbances associated with erosion and/or rainwater runoff, such as the retention of eroding rock and soil or the displacement of boulders incorporated into the alignment. No cultural material was observed on the ground surface in the vicinity of this feature.

One 0.5m<sup>2</sup> test unit (TU 1) was excavated in the center of the rock alignment (CSH 3) to prospect for subsurface cultural deposits and to confirm the initial age determination of this feature. The stratigraphy of Test Unit 1 (TU 1) consisted of sandy loam (Stratum I) overlying bedrock (Figure 35 & Table 6). No cultural material was observed during the excavation of this test unit. Test excavation confirmed that the alignment consisted of only a single course of boulders and that no buried wall construction was present, thus confirming the modern origin of the feature.



Figure 33. Photograph of CSH 3, view to west



Figure 34. Photograph of CHS 3, view to south

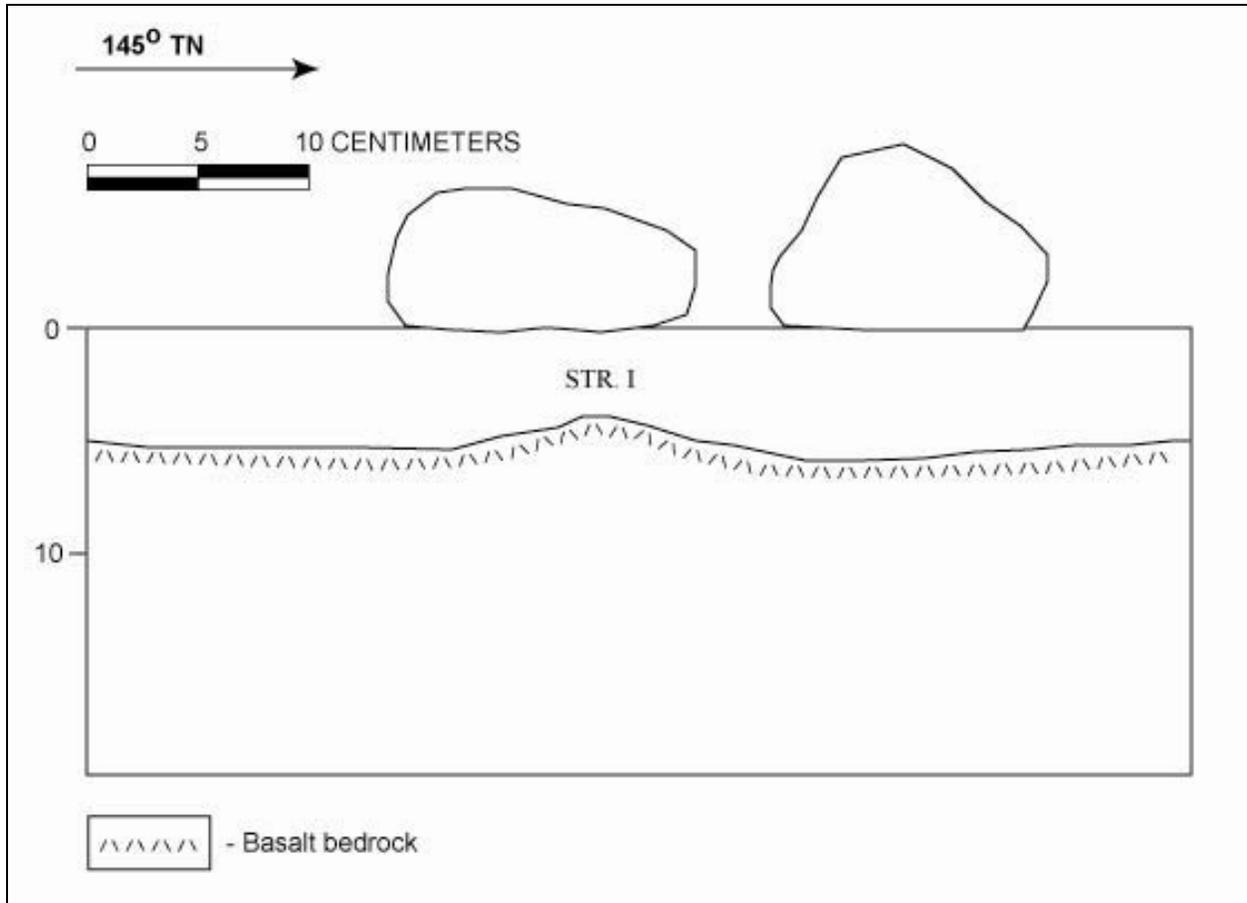


Figure 35. CSH 3, profile of the east wall of Test Unit 1

Table 6. Strata Observed at CSH 3, Test Unit 1

Stratum	Depth (cmbs)	Description
I	0 - 5	10 YR 3/2, dark brown; sandy loam; weak, fine, granular structure; weakly coherent dry consistency; non plastic; no cementation; terrestrial origin; clear boundary; irregular topography. Stratum I is comprised of loose volcanic soil of aeolian origin. No cultural material observed.

## 4.3 Historic Property Descriptions

### 4.3.1 SIHP # 50-80-12-6903

<b>FORMAL TYPE:</b>	Rock uprights
<b>FUNCTION:</b>	Trail / boundary marker
<b># OF FEATURES:</b>	3
<b>AGE:</b>	Pre-contact
<b>DIMENSIONS:</b>	80 m long (NE-SW) x 10 m wide (NW-SE)
<b>LOCATION:</b>	Waimānalo Gulch
<b>TAX MAP KEY:</b>	TMK: [1] 9-2-003:073
<b>LAND JURISDICTION:</b>	City and County of Honolulu

SIHP #50-80-12-6903 consists of three large upright boulders (Features A-C) utilized as trail or boundary markers, located approximately 1320 m (4330 ft) inland of the coast along the western edge of the study area (see Figure 20). The site is situated approximately 140 m (459 ft) north of existing Waimanalo Landfill operations. The topography of the immediate area is moderately sloping to the southwest, while the geology consists of exposed basalt bedrock outcrops with pockets of shallow soil. *Koa haole* and exotic grasses dominate the surrounding landscape.

SIHP# 50-80-12-6903 Feature A consists of a large upright basalt boulder measuring 1.20 m length, 1.12 m wide, and 2.10 m high (Figure 36 & Figure 37). There appears to be no intentionally placed rocks surrounding the base of this upright. The flat face of this stone is directed south, as to mark a trail or boundary for a traveler moving up slope. The face of this feature is discolored and appears to have once rested on the ground. Feature A is interpreted as being of pre-contact origin, and its function is determined to be a trail or boundary marker. No cultural material was observed on the ground surface in the vicinity of this feature.

SIHP # 50-80-12-6903 Feature B consists of a large triangular upright basalt boulder measuring 1.63 m long, 0.75 m wide, and 1.78 m high (Figure 38 & Figure 39). The upright appears to have one or more stones intentionally set at its western base. However, the majority of the upright's base rests upon naturally exposed bedrock. Feature B is interpreted as being of pre-contact origin, and its function is determined to be a trail or boundary marker. No cultural material was observed on the ground surface in the vicinity of this feature.

SIHP # 50-80-12-6903 Feature C consists of a large upright basalt boulder measuring 2.3 m long, 1.7 m wide, and 2.5 m high (Figure 40 & Figure 41). This feature is believed to be in a natural upright position. Feature C is interpreted as being of pre-contact origin, and its function is determined to be a trail or boundary marker. No cultural material was observed on the ground surface in the vicinity of this feature.

Cultural consultation with knowledgeable community members was utilized to better establish the age, function, cultural affiliation, and significance of this historic property (see Section 5 below).



Figure 36. Photograph of SIHP #50-80-12-6903 Feature A, upright boulder, view to north



Figure 37. Photograph of SIHP #50-80-12-6903 Feature A, upright boulder, view to west

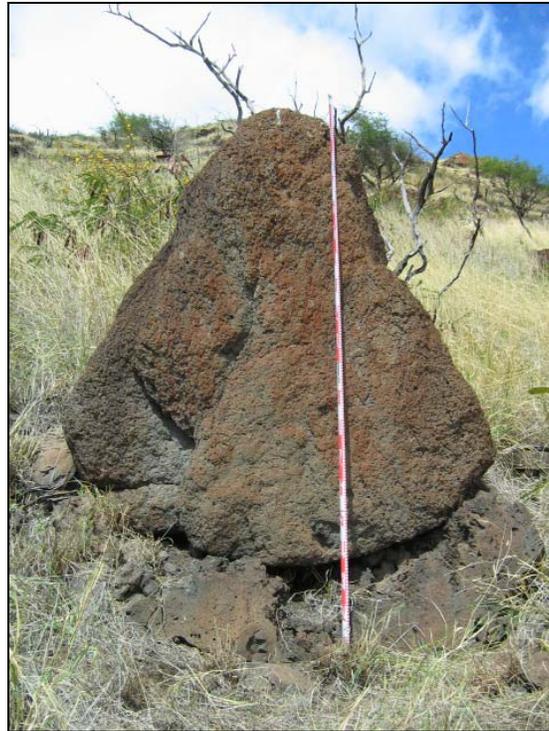


Figure 38. Photograph of SIHP #50-80-12-6903 Feature B, upright boulder, view to north



Figure 39. Photograph of SIHP #50-80-12-6903 Feature B, upright boulder, view to west



Figure 40. Photograph of SIHP #50-80-12-6903 Feature C, upright boulder, view to west



Figure 41. Photograph of SIHP #50-80-12-6903 Feature C, upright boulder, view to northwest

## Section 5 Cultural Consultation Results

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Pursuant to the requirements of State of Hawaii archaeological inventory survey regulations [HAR 13-276-5(g)] and State of Hawaii historic preservation review legislation [HAR 13-275-8(a)(2)], CSH carried out cultural consultation for this archaeological inventory survey investigation. This cultural consultation effort focused on locating any additional cultural and/or historical land use information for the study area. It also focused on better establishing the age, function, cultural affiliation, and significance of the historic property documented within the study area. Finally, this consultation effort focused on the development of appropriate mitigation for the significant historic property that will be affected by landfill expansion.

This consultation effort focused particularly on SIHP #50-80-12-6903, three large upright boulders utilized as trail or boundary markers. The following discussion is arranged chronologically and documents the effort and the results.

### 5.1 Chronology of Consultation Effort and Results

#### March 13, 2007

During an SHPD site visit to the study area, then Oahu Island Archaeologist Mr. Adam Johnson toured the location of SIHP #50-80-12-6903 and its vicinity. At this on-site meeting SHPD directed CSH to proceed with cultural consultation to establish the cultural significance of the three upright stones. Mr. Johnson indicated that, based on the results of this consultation, it was likely that the upright stones would be determined significant under criteria D (information content) and E (traditional cultural significance to an ethnic group) of the Hawaii Register of Historic Places.

#### March 27 2007

CSH conducted a cultural consultant site visit of SIHP #50-80-12-6903 and its vicinity with Mr. William Ailā (Hui Malāma I Nā Kūpuna), Mr. Eric Enos (cultural practitioner and Director of Ka'ala Farms), Mr. Shad Kane ('Ahahui Siwila Hawai'i O Kapolei Hawaiian Civic Club), and Mr. McD Philpotts (long-time resident of Waimānalo 'Ili). At this meeting the age, function, cultural affiliation, and significance of the upright stones were discussed. Potential functions for the stones included trail markers, markers for observation points for celestial observation and/or navigation, or markers used to calculate the location of specific coastal and/or off-shore resources. Although there was no clear consensus regarding the function of the stones, all of the cultural consultants present indicated that the stones were significant and that they had been used by traditional Native Hawaiian cultural practitioners in the past. They indicated that the stones' location was likely an important part of their cultural significance and function. Potential mitigation measures, including preservation in place and relocation were discussed.

The cultural consultants at this meeting expressed concern regarding the final appearance of the landfill once it has reached capacity and will no longer be used. They wanted to see the new surface of the landfill naturalized with the random placement of basalt boulders and more natural vegetation, preferably Native Hawaiian dry land species, so that the final landfill surface appears more like the surrounding hill sides.

**May 1 2007**

CSH mailed out a consultation letter to the Office of Hawaiian Affairs (OHA). This consultation was initiated pursuant to HAR Chapter 13-276-5 and 13-275-6. Appendix B is a copy of this consultation letter.

**May 24 2007**

OHA provides a response to CSH's May 1 2007 consultation letter. Appendix C is a copy of this letter. With its response letter, OHA asked for additional project-related cultural consultation with members of the Koa Mana organization, as well as Ms. Nettie Tiffany of Lanikūhonua. Additionally, the letter queried whether or not subsurface testing was undertaken as part of the project's archaeological inventory survey. Finally, OHA's letter took the position that the single historic property documented in the project area, SIHP #50-80-12-6903--three upright stones, should be preserved through adjustment of the current study area boundaries.

CSH responded to OHA's May 24 2007 letter in a March 7 2008 mitigation consultation letter, see discussion below. As a result of OHA's suggestions, members of the Koa Mana organization came out to the SIHP #50-80-12-6903 location and its vicinity and provided their input. Additionally, Ms. Nettie Tiffany was included in further cultural consultation.

**July 18 2007**

CSH held another on-site cultural consultant visit to the SIHP #50-80-12-6903 location and its vicinity. Mr. Glenn Kila and Mr. Alike Silva from Koa Mana were present, along with Ms. Kaleo Paik from the SHPD Culture and History Branch. At this meeting the age, function, cultural affiliation, and significance of the upright stones were discussed. Potential mitigation measures, including preservation in place and relocation were discussed. Once again, there was no clear consensus regarding the function of the stones, all of the cultural consultants present indicated that the stones were significant and that they had been used by traditional Native Hawaiian cultural practitioners in the past.

**October 5 2007**

CSH holds another on-site meeting at the SIHP #50-80-12-6903 location with the current SHPD Oahu Island Archaeologists, Ms. Lauren Morawski and Ms. Teresa Davan. The archaeological inventory survey effort and results are discussed and the three upright stones are observed. CSH provided the SHPD archaeologists with a summary of the project's cultural consultation effort to date.

**March 7 2008**

A mitigation consultation letter was sent out to OHA, SHPD, Mr. William Ailā (Hui Malāma I Nā Kūpuna), Mr. Eric Enos (cultural practitioner and Director of Ka'ala Farms), Mr. Shad Kane ('Ahahui Siwila Hawai'i O Kapolei Hawaiian Civic Club), Mr. McD Philpotts (long-time resident of Waimānalo 'Ili), Ms. Nettie Tiffany (Lanikūhonua), Mr. Glenn Kila (Koa Mana) and Mr. Alike Silva (Koa Mana). This consultation letter included response information to OHA's May 24, 2007 letter. It included the results of the project's archaeological inventory survey investigation and a description of SIHP #50-80-12-6903, the three upright stones. It also summarized the project's cultural consultation effort to date. Finally, it described the proposed mitigation measures for SIHP #50-80-12-6903. Appendix D is a copy of this consultation letter.

In March 2008, following the posting and emailing of the March 7 2008 consultation letter, CSH attempted to contact letter recipients by email and telephone to obtain their feedback and comments. As a result of this effort on March 20 2008, CSH was contacted by telephone by Mr. Shad Kane ('Ahahui Siwila Hawai'i O Kapolei Hawaiian Civic Club) and Mr. McD Philpotts (long-time resident of Waimānalo 'Ili). Their comments are summarized below.

Mr. Doug "McD" Philpotts telephoned Matt McDermott of CSH at 3:45 pm on March 20 2008. Mr. Philpotts had four general comments based on his review of the March 7 2008 mitigation consultation letter:

- 1) He confirmed that he felt the stones were indeed naturally occurring and that they had not been modified or set up-right by human hands.
- 2) He and his son went out in his canoe to see how visible the stones were from offshore Lanikūhonua, *makai* of Waimanalo Gulch. He said he could see the stones faintly, by knowing where to look, but that the stones did not stand out on the Waimanalo Gulch slope and were hard to see. He said the stones did line up with the location of a fishing spot he knew, but that other landscape features were more easily discernable and made much better geographic reference points for triangulation.
- 3) He finds the proposed treatment of the stones, their movement to the Battery Arizona location, an acceptable form of mitigation
- 4) He is most concerned about the final look of the landfill once it reaches capacity and the area will no longer be used. He feels the new final surface of the landscape needs to be landscaped to be more natural, with native Hawaiian dry-land vegetation, and a more natural land covering of basalt stones. He thinks this naturalization of the surface will make the area much more useful in the future.

Mr. Shad Kane telephoned Matt McDermott of CSH at 5:45 pm on March 20 2008. Mr. Kane had five general comments based on his review of the March 7 2008 mitigation consultation letter:

- 1) He is disappointed about the landfill project as a whole as well as the proposed movement of the three stones (SIHP #50-80-12-6903)—but he understands the need and why the landfill needs to be expanded and the stones need to be moved.
- 2) He indicated that the stones' meaning and significance will be lost once they are moved from their original location.
- 3) He is interested in having research continue on the stones after they were moved. This further research should focus on determining the stones past use and/or significance to Native Hawaiian cultural practitioners.
- 4) He is in favor of interpretation of the stones based on the results of further research, with signage and public access.
- 5) He would like to see the stones moved back to as close as possible to their original location, from temporary curation at Battery Arizona, after the landfill has reached capacity and it would be safe to move the stones back.

As a result of follow up telephone contact to the March 7, 2008 consultation letter, Ms. Nettie Tiffany (Lanikūhonua) telephoned Matt McDermott of CSH at 8:45 am on March 31, 2008. Although Ms. Tiffany had not participated in the previous site visits to the SIHP # 50-80-12-

6903 location, she did have four general comments based on her review of the mitigation consultation letter:

- 1) She indicated the description of the stones, their location, and photographs included in the consultation letter accurately portrayed what her mother described to her as trail markers that marked *mauka/makai* trails. These trails were used by Native Hawaiians to support *mauka/makai* trade and/or resource distribution. They were also used by bird catchers to access the *mauka* forests.
- 2) She was disappointed with the Landfill expansion project and that the stones could not be left in place.
- 3) She felt that the stones significance as trail markers would be ruined if the stones are relocated.
- 4) She would like to see the stones moved back to as close as possible to their original location, from temporary curation at Battery Arizona, after the landfill has reached capacity and it would be safe to move the stones back.

### **March 25 2008**

SHPD staff Ms Kaleo Paik (Culture and History Branch) and Oahu Island Archaeologists Ms. Lauren Morawski and Ms. Teresa Davan met with CSH to discuss the project's ongoing consultation effort results. The project proponent's proposed mitigation for SIHP #50-80-12-6903 where also discussed. The SHPD staff had the following comments regarding the stones and their proposed mitigation:

- 1) Ms. Kaleo Paik thought it was unlikely that the stones would have functioned for marking coastal or offshore locations or resources, because of their position and the difficulty of seeing the stones from a distance.
- 2) All felt that the stones should be preserved in place if at all possible because their significance and function are likely tied to their current location.
- 3) If preservation in place is truly not an option, they were in favor of temporary relocation of the stones to Battery Arizona, with movement back of the stones to as near as possible to their original location once the landfill is closed.
- 4) They all were in favor of further research regarding the stones significance and function, with eventual public signage and interpretation for the stones once they are moved back to as close as possible to their original location.

## **5.2 Consultation Summary**

This cultural consultation effort focused on locating any additional cultural and/or historical land use information for the study area. It also focused on better establishing the age, function, cultural affiliation, and significance of SIHP #50-80-12-6903, three large upright boulders documented within the study area. Finally, this consultation effort focused on the development of appropriate mitigation for the significant historic property (SIHP #50-80-12-6903) that will be affected by landfill expansion.

Consultation efforts determined that there was no clear consensus regarding the function of SIHP #50-80-12-6903, however, all of the cultural consultants indicated that the stones were significant and that they had been used by traditional Native Hawaiian cultural practitioners in the past. All cultural consultants also felt that the stones should be preserved in place if at all possible because their significance and function are likely tied to their current location. If preservation in place is truly not an option, most were in favor of temporary relocation of the stones to Battery Arizona, with movement of the stones back to as near as possible to their original location once the landfill is closed.

Some cultural consultants expressed an interest in having research continue on the stones after they were moved. This further research would focus on determining the stones past use and/or significance to Native Hawaiian cultural practitioners. Once the results of this additional research were interpreted, public access to the stones with interpretive signage was felt to be appropriate.

The cultural consultants also expressed concern regarding the final appearance of the landfill once it has reached capacity and will no longer be used. They wanted to see the new surface of the landfill naturalized with the random placement of basalt boulders and more natural vegetation, preferably Native Hawaiian dry land species, so that the final landfill surface appears more like the surrounding hill sides.

CSH would like to thank all the cultural consultants and OHA and SHPD representatives for their time and consideration during the project's archaeological consultation effort. Their input is extremely valuable and will help all concerned parties make the best, most well-informed management decisions for the historic property in the project APE.

## Section 6 Summary and Interpretation

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In compliance with and to fulfill applicable Hawai'i state historic preservation legislation, CSH completed this archaeological inventory survey investigation for the proposed Waimānalo Gulch Landfill Expansion. Land disturbing activities associated with the landfill expansion would include: major grading, including blasting of exposed rock surfaces, and excavation of the base and walls of Waimānalo Gulch to prepare the expansion area for landfill use; grading for a perimeter road around the expansion area; excavations for stockpiling of sediment for use as cover material; excavations for associated landfill infrastructure; excavation for the installation of a storm water runoff control channel along the west side of the gulch; and filling of the expansion area with refuse material.

Per the Hawai'i state requirements for archaeological inventory surveys [HAR Chapter 13-276], this inventory survey investigation includes the results of cultural, historical, and archaeological background research, cultural consultation, and fieldwork. The background research focused on summarizing the study area's pre- and post-contact land use, cultural significance, and types and locations of potential historic properties within the study area and its vicinity. The cultural consultation focused on potential mitigation measures for the single historic property identified within the study area.

Pedestrian inspection of the study area identified one historic property, SIHP #50-80-12-6903. SIHP #50-80-12-6903 is located along the western edge of the study area, situated on the western slope of Waimānalo Gulch (see Figure 20). It is of pre-contact origin, and consists of three large upright boulders (Features A-C) utilized potentially as trail or boundary markers.

The inventory survey fieldwork also involved a thorough inspection of caves and rock shelters observed within the study area (see Figure 22). These caves and rock shelters were inspected for cultural modifications and/or the presence of human burials. Where significant sediment deposits were observed, subsurface testing in the form of controlled hand excavation was undertaken to establish if any subsurface cultural deposits were present. All observed and inspected caves contained no indications of cultural modification, subsurface cultural deposits, or use a human interment site.

Also of note was a rock alignment (CSH 3) located near the northeastern edge of the study area (see Figure 22). The alignment was determined to be of modern origin due to its location along a talus slope, in which soil erosion and rainwater runoff channels were observed. If the feature was of antiquity it would reflect disturbances associated with erosion and/or rainwater runoff, such as the retention of eroding rock and soil or the displacement of boulders incorporated into the alignment. Test excavations yielded no cultural material and confirmed the modern construction of the alignment.

These findings are largely in keeping with expectations, based on background research. An archaeological inventory survey of the "Makaīwa Hills" development project, totaling 1850 acres and encompassing large portions of Makaīwa and Pālailai gulches, identified pre-contact habitation sites clustered in higher elevations above 1000 ft., and in lower elevations below 500 ft (Hammatt et al. 1991). Hammatt et al. (1991) indicated that the higher elevations would contain ample forest subsistence resources for gathering on both a continual basis, as well as

during times of famine and drought, while the lower elevations would be in close proximity to the shoreline and bountiful coastal resources. The current study area is located 80 m east of the “Makaīwa Hills” development project, contains a similar topographic and geologic setting, and is situated within an elevation range of 400 to 900 ft, the zone in which pre-contact archaeological sites were absent in the neighboring “Makaīwa Hills” study area. Thus, the fact that only a single historic property was identified within the current study area is not surprising as it is consistent with the pattern observed by Hammatt et al. in 1991. Furthermore the historic property (SIHP #50-80-12-6903) consists of trail and/or boundary markers utilized by pre-contact populations, suggesting that portions of the study area were utilized for transportation to more resource rich areas (i.e. the coast and upland forest).

Both the Hammatt et al. (1991) study and the current archaeological inventory survey are important because they have provided valuable data towards establishing a settlement pattern for the leeward gulches and ridges of Honouliuli Ahupua‘a. The current study area has been determined to be situated in an intermediate zone between the coast and the upland forest. This intermediate zone is defined by an extremely arid environment, a lack of vegetation, and steep rocky terrain which would have made pre-contact habitation and agriculture very difficult. This intermediate zone is focused between 500 and 1000 ft elevations and was most likely utilized for transportation between the more hospitable coast and upland forest areas.

## Section 7 Significance Assessments

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The inventory survey investigation and documentation of the project area's single historic property have provided sufficient information for significance evaluations. Significance is determined after evaluation of each historic property in light of the five broad criteria used by the Hawai'i State Registers of Historic Places (HAR 13-275-6). The criteria are the following:

- A Historic property reflects major trends or events in the history of the state or nation.
- B Historic property is associated with the lives of persons significant in our past.
- C Historic property is an excellent example of a site type.
- D Historic property has yielded or may be likely to yield information important in prehistory or history.
- E Historic property has cultural significance to an ethnic group, including, but not limited to, religious structures and burials.

SIHP #50-80-12-6903, three rock uprights, has integrity of location and materials and is recommended eligible to the Hawai'i Register under criteria D & E

## Section 8 Project Effect and Mitigation Recommendations

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It is the position of the project proponents (the City and County of Honolulu) that, as the only municipal landfill site on the island of O‘ahu, the continued use of the Waimānalo Gulch facility is of utmost importance to the health and safety of the island’s population. The expansion of the existing Waimānalo Gulch facility is crucial to the facility’s continued operation over the next approximately 15 year period of anticipated use. After weighing the options, the project proponents have determined that the three stones that make up SIHP #50-80-12-6903 cannot be preserved in place in a safe and appropriate manner.

Preservation in place would require a significant reduction of the overall area and volume of the proposed facility expansion. Additionally, with the proposed blasting, mass grading, and excavation in the vicinity of the stones, the safety of the stones cannot be guaranteed if they were preserved in place. For example, refer to Figure 42, which shows the stones’ proximity to the large storm water drainage channel and Cell E6, immediately above and below the stones’ location. The controlled blasting, mass grading, and excavation associated with the installation of needed landfill infrastructure would subject the stones to repeated vibration over the next approximately 15 years as the landfill expansion progressed. The vibrations from mass grading, controlled blasting, and related earthwork would potentially be sufficient to dislodge the stones from their current resting place, causing them to roll down the steep slope they rest on. Finally, the relocation of the stones would be considered a more culturally sensitive treatment that would provide for their future preservation.

### 8.1 Project Effect

After weighing the options, the project proponents have determined that the three stones that make up SIHP # 50-80-12-6903 cannot be preserved in place in a safe and appropriate manner. Accordingly, a project effect determination of “effect with agreed upon mitigation commitments” is warranted.

### 8.2 Mitigation Recommendations

The project proponents propose the relocation of the three SIHP # 50-80-12-6903 stones to the vicinity of Battery Arizona, located in the southwestern portion of the Waimānalo Gulch facility (Figure 43). There is a precedent for this relocation as three noteworthy stones of cultural significance to Native Hawaiians have already been relocated to the Battery Arizona site from the expanding Waimānalo Gulch Landfill. These stones, described by Hammatt and Shideler (1999), were relocated to the Battery Arizona site in 1988. Figure 44 shows the location of this already established stone repository in relation to the Battery Arizona features. Figures 48 and 49 are photographs, showing the proposed relocation area for SIHP # 50-80-12-6903 along the southeast facing slope at Battery Arizona and in relation to the already established stone repository. The proposed relocation would ensure the safety of the stones during the landfill’s expansion and would make them much more accessible to interested parties.

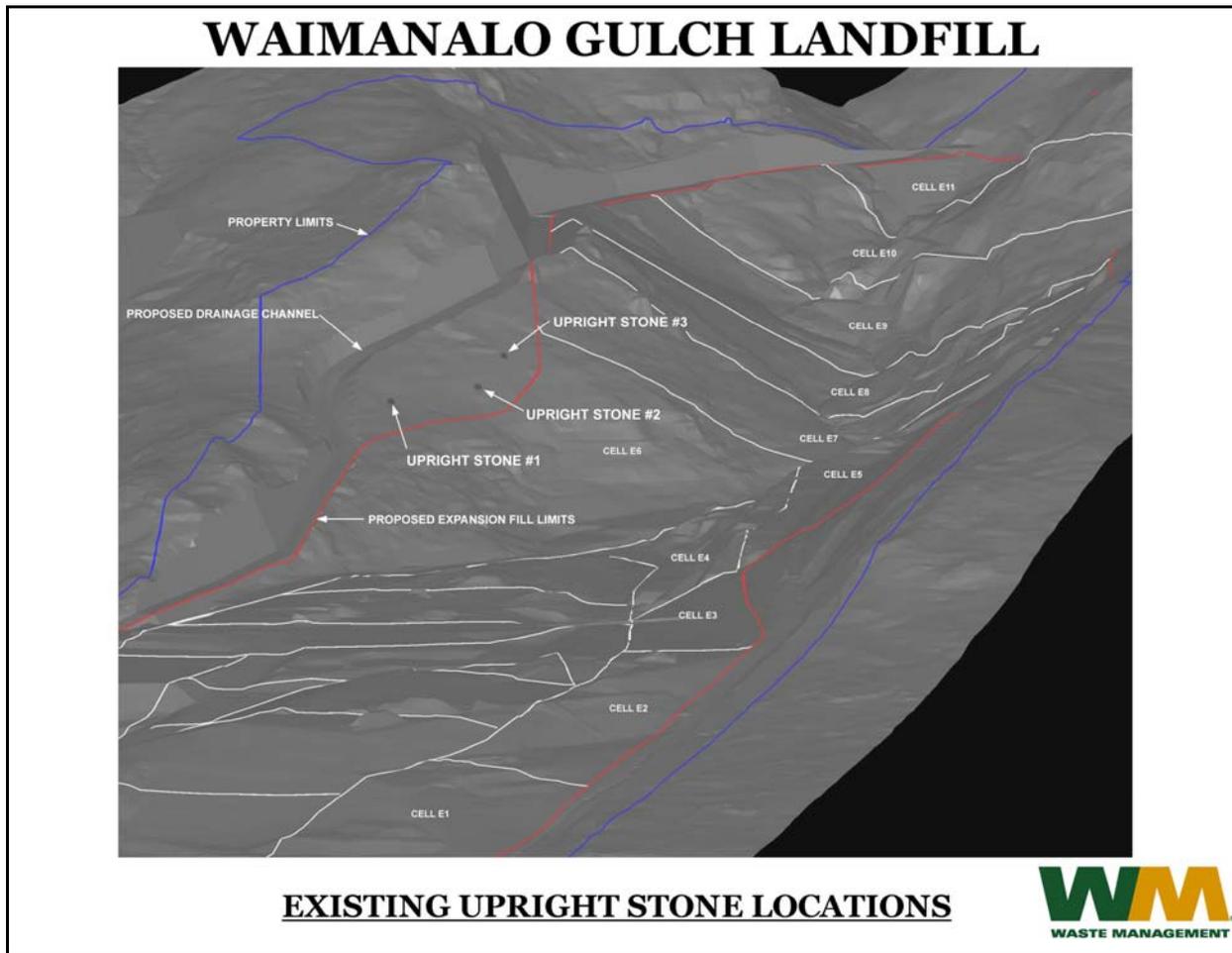


Figure 42. Three-dimensional graphic showing the proposed landfill expansion in relation to the three stones of SIHP # 50-80-12-6903. Note the large drainage channel upslope of the stones and the cell E6 immediately down slope

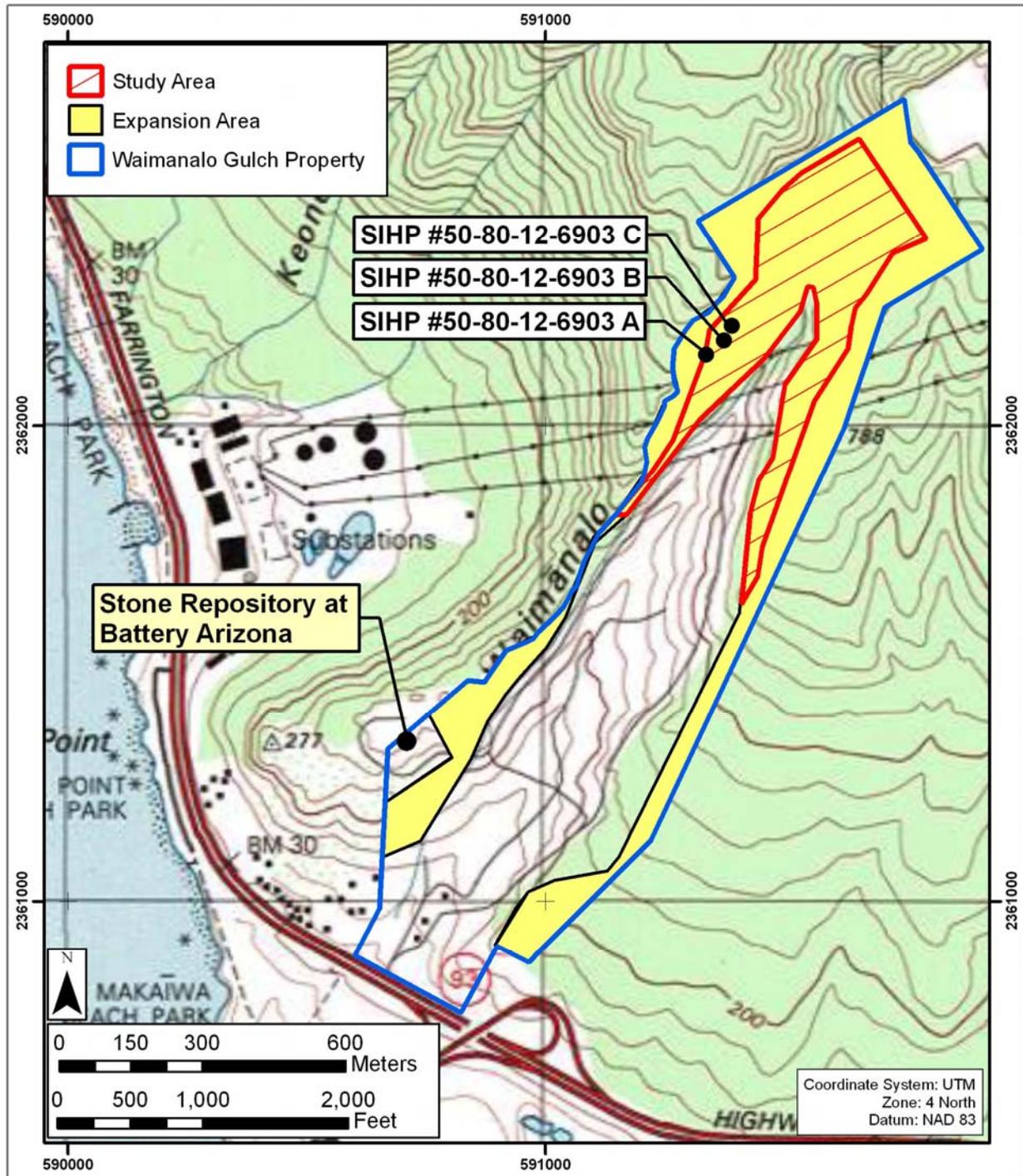


Figure 43. Portion of the 1998 'Ewa USGS 7.5-minute topographic quadrangle showing the Waimānalo Gulch property boundaries, the boundaries of the proposed 90-acre expansion area, the 36-acre study area, the location of Features A, B, and C of SIHP #50-80-12-6903, and the previously established stone repository at Battery Arizona.

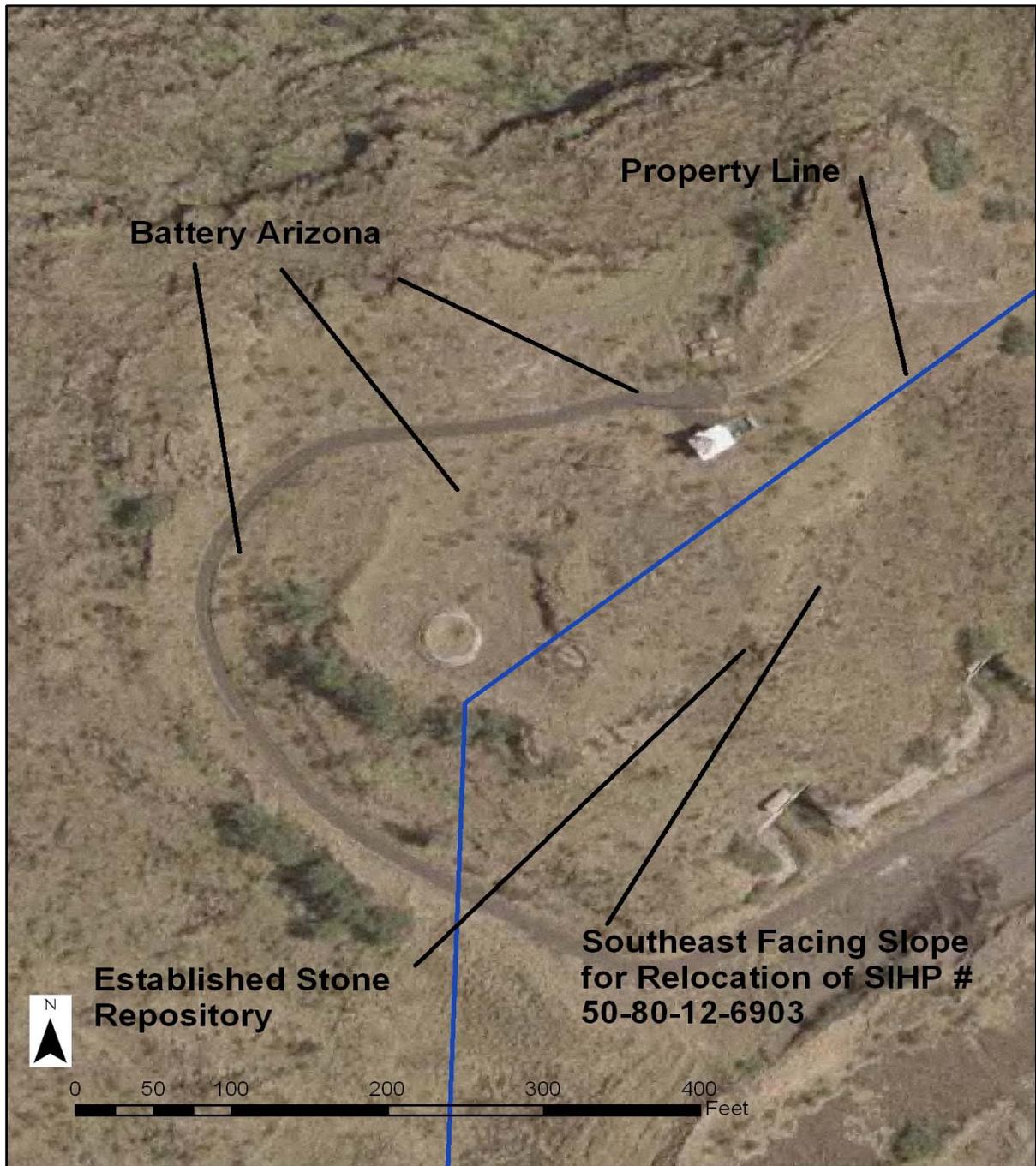


Figure 44. Aerial photograph of Battery Arizona showing the established stone repository and the proposed relocation area for SIHP # 50-80-12-6903



Figure 45. Photograph, view to the south, of the proposed relocation area at Battery Arizona for SIHP # 50-80-12-6903

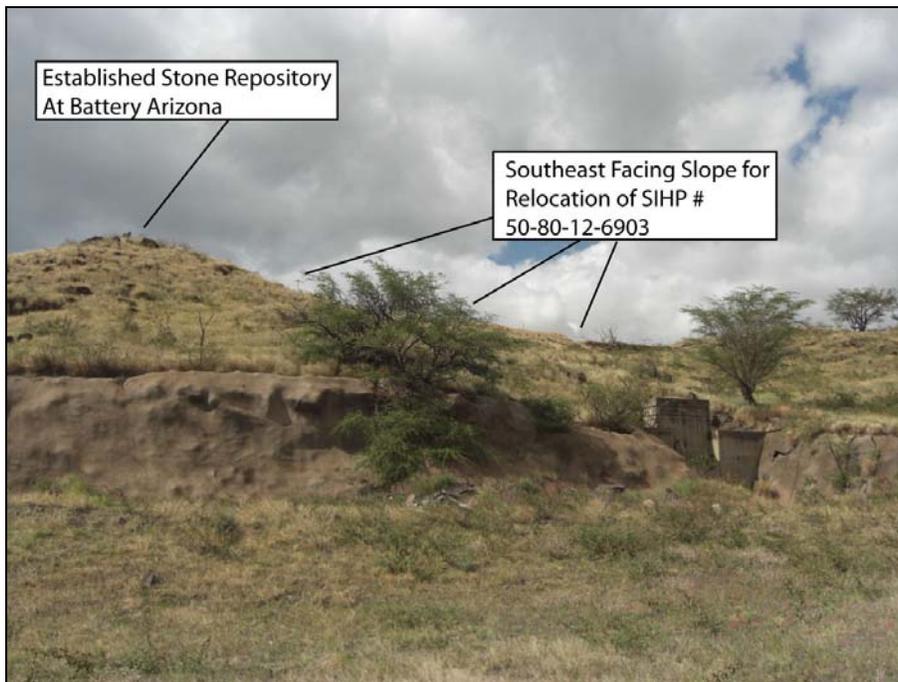


Figure 46. Photograph, view to the north, of the proposed relocation area at Battery Arizona for SIHP # 50-80-12-6903

The specifics of the proposed stone relocation would be the subject of the project's archaeological mitigation plan for SIHP # 50-80-12-6903. These specifics would be worked out through further consultation with cultural consultants, SHPD, and the project proponents. Based on the results of cultural consultation, cultural informants would prefer to see the stones eventually returned to near their original resting places, once the landfill is no longer active, with interpretive signage based on further background research and public access. The City & County of Honolulu is willing to commit to putting the stones back, as close as possible to their original resting places. Figure 47 is a modified photograph that shows approximately what this would look like from coastal Honouliuli. This relocation could only take place after that portion of the landfill had been filled. At this time there is some uncertainty regarding when that portion of the landfill would be closed but it seems likely it will take a minimum of approximately 15 years.

A Preservation/Mitigation Plan detailing the relocation and interim preservation methods and the long term preservation including appropriate signage and interpretation will be submitted and reviewed by the SHPD. Additionally a Memorandum of Agreement will be drafted by the project proponents and will be reviewed by the SHPD prior to the implementation of the project.

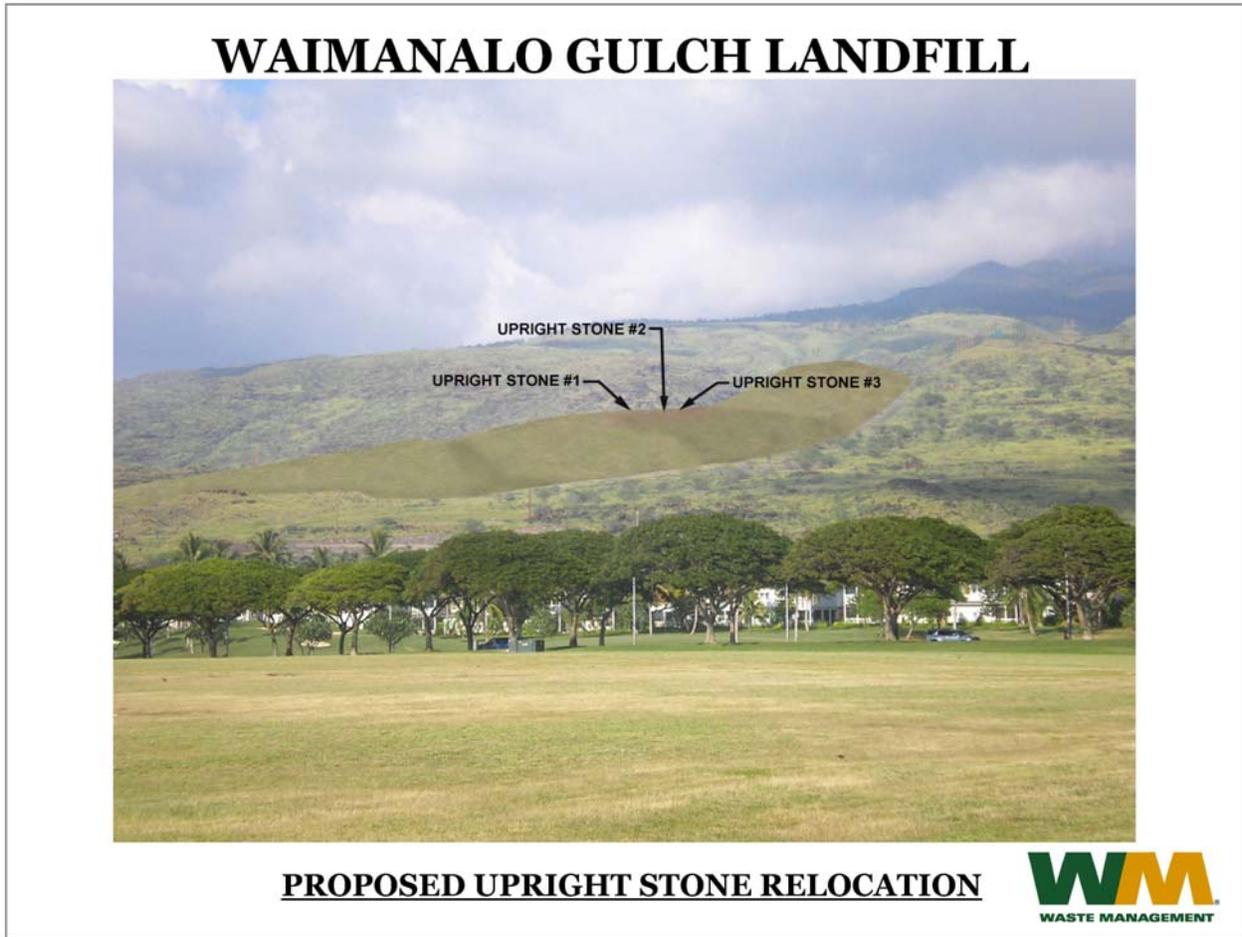


Figure 47. Altered photograph showing the planned landfill surface topography in 15 years. The potential SIHP # 50-80-12-6903 relocation site, on top of the new landfill surface, is shown

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# **Appendix A SHPD Chapter 6E-8 Historic Preservation Review of August 29, 2008**

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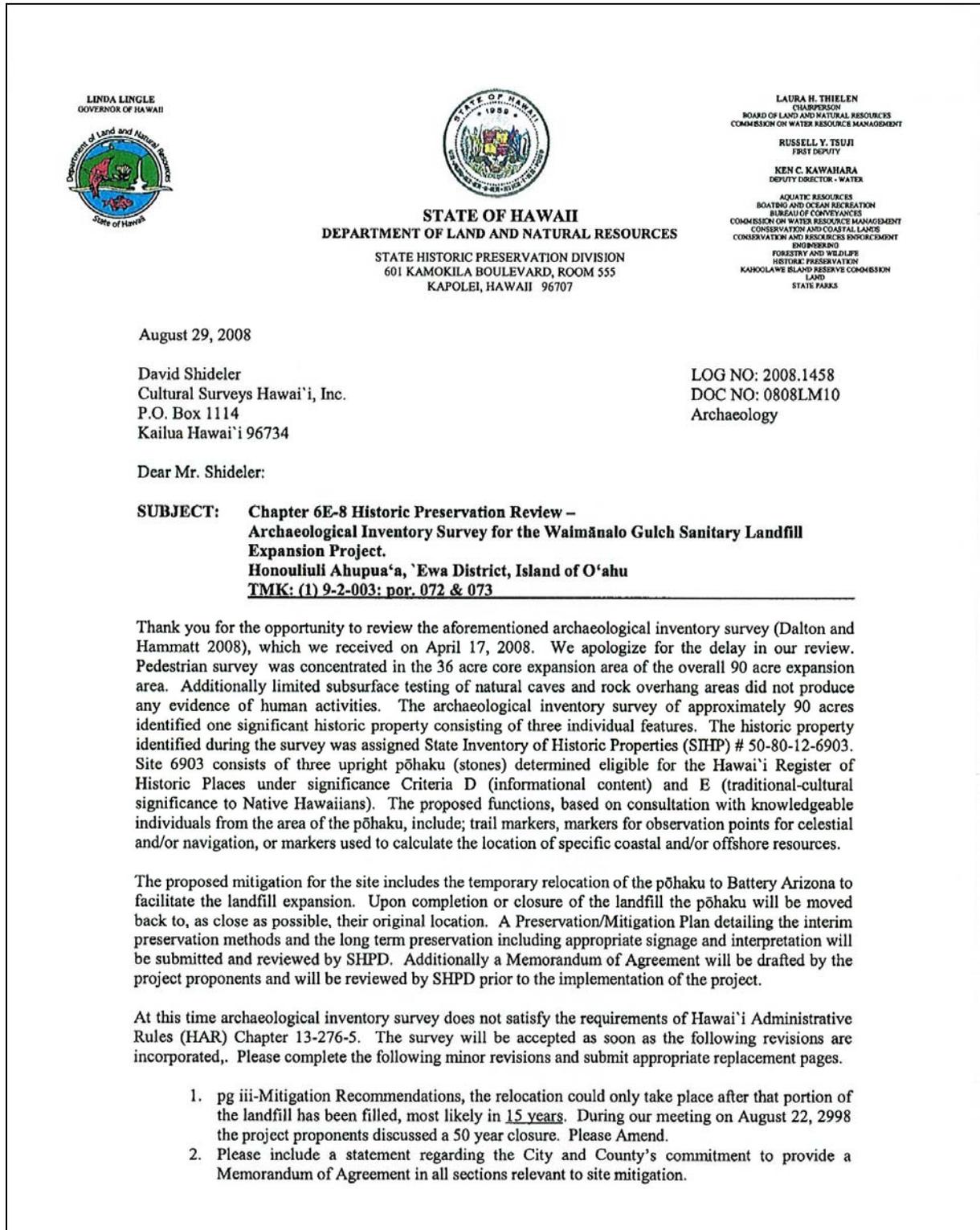


Figure 48. SHPD Chapter 6E-8 Historic Preservation Review letter of August 29,2008, page 1

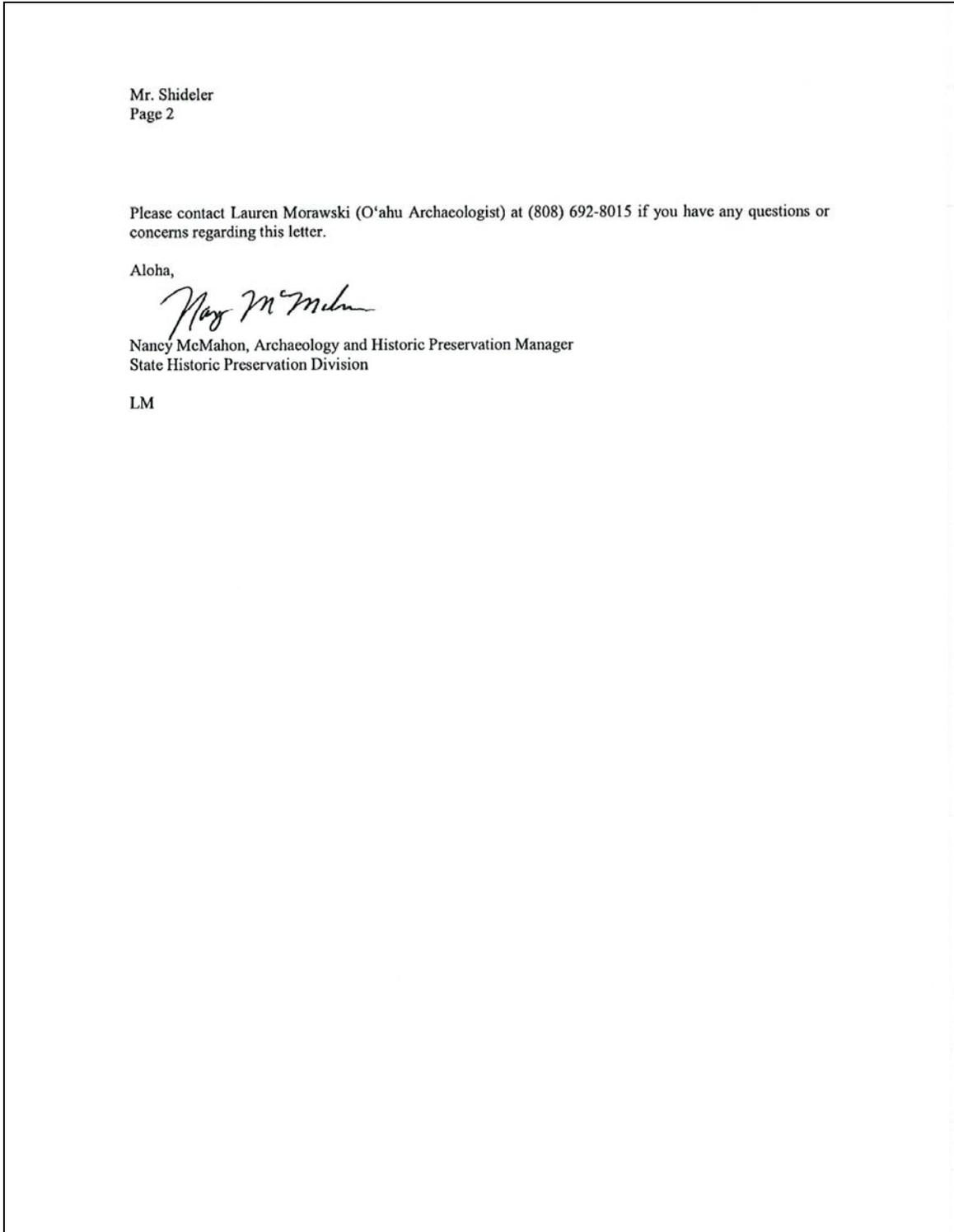


Figure 49. SHPD Chapter 6E-8 Historic Preservation Review letter of August 29,2008, page 2



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# **Appendix B CSH Request for Cultural Consultation from OHA**

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**Cultural Surveys Hawai'i Inc.**

Archaeological and Cultural Impact Studies  
Hallett H. Hammatt, Ph.D., President



Providing Excellence in Cultural Resource Management

1 May 2007

Mr. Clyde W. Nāmu'o  
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CSH Job Code: HONOU 6

Subject: CSH's request to OHA for cultural consultation and/or comment regarding the archaeological inventory survey fieldwork results, historic property significance evaluations, and proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill expansion project Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu  
TMK: [1] 9-2-003:073 por.

Dear Mr. Nāmu'o:

Cultural Surveys Hawai'i, Inc. (CSH) recently completed fieldwork for an archaeological inventory survey associated with the Waimānalo Gulch Sanitary Landfill expansion. The landfill expansion area is located immediately mauka of the existing Waimānalo Gulch Sanitary Landfill. Waimānalo Gulch is generally located immediately inland of Farrington highway, roughly between the Honokai Hale residential subdivision and Ko Olina Resort to the southeast, and the Hawaiian Electric Co.'s (HECO) Kahe Power Plant to the northwest. Please refer the to Figure 1 for area orientation.

The proposed landfill expansion area is comprised of approximately 36-acres of undeveloped land within the Waimānalo Gulch Landfill property. The proposed landfill expansion area is to be used for the disposal of municipal refuse. The landfill expansion is meant to increase the capacity and lifespan of the existing Waimānalo Gulch Sanitary Landfill. Minimally, land disturbing activities associated with the landfill expansion project would include: major grading and excavation of the base and walls of Waimānalo Gulch to prepare the expansion area for landfill use; grading for a perimeter road around the expansion area; excavations for stockpiling of sediment for use as cover material; excavations for associated landfill infrastructure; and filling of the expansion area with refuse material. The project's area of potential effect (APE) is defined as the entire proposed expansion area.

With this letter, CSH is providing OHA with a summary of the archaeological inventory survey fieldwork results and the significance assessments and potential mitigation recommendations for one historic property located within the project area. This historic property (SIHP # 50-80-12-6903) was discovered during the archaeological inventory survey near the southwest edge of the Waimānalo Gulch Sanitary

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Clyde W. Nāmuʻo

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Landfill expansion area. This resource is comprised of three rock uprights designated Features A-C, which may have been placed upright or may be in a natural standing position. These features rest on an east facing slope, they are situated on exposed outcrops, with Feature A and Feature B along the same outcrop, and Feature C located on an outcrop upslope, they are spaced 50-60 meters apart. This resource is interpreted as traditional Native Hawaiian, and may have functioned as a trail or boundary markers. No additional cultural constituents were observed near this location. In consultation with the State Historic Preservation Division, this historic property is recommended eligible to the Hawai'i Register of Historic Places (Hawai'i Register) under criterion D, for its potential to yield information important in prehistory or history, and under criterion E, for its cultural significance to an ethnic group.

Pursuant to Hawai'i Administrative Rules (HAR) Chapter 13-276-5 and 13-275-6, CSH is hereby seeking OHA's input regarding the significance and treatment of these historic properties.

As part of this cultural consultation effort, CSH is working with SHPD and knowledgeable cultural consultants, including Mr. William Aila and Mr. Shad Kane. In mid-March 2007 SHPD Oahu Island Archaeologist Mr. Adam Johnson visited the site with CSH personnel. In late March 2007, CSH made a site visit to SIHP # 50-80-12-6903 with Mr. William Aila and Mr. Shad Kane, where their opinions regarding the age, function, and significance of the site were discussed. Throughout April 2007 CSH has worked with the cultural consultants to obtain their input regarding the site. This input will be included in the project's archaeological inventory survey report.

The project's archaeological inventory survey fieldwork was carried out in January and February 2007. Background research confirmed that that some of the project area had been surveyed by Cultural Surveys Hawaii previously, however due to changes in the project area and the political context of this project, a new 100% pedestrian survey was conducted of the entire proposed expansion area. The archaeological inventory survey resulted in the location of one new historic property (SIHP # 50-80-12-6903). This historic property is briefly described below and shown on the attached USGS topographic map (Figure 2 and Figure 3).

SIHP # 50-80-12-6903 was discovered during the archaeological inventory survey near the southwest edge of the Waimānalo Gulch Sanitary Landfill expansion area and is comprised of three stone uprights designated Features A-C.

SIHP # 50-80-12-6903 Feature A measures 1.20 m maximum length, 1.12 m maximum width, and 2.10 m maximum height. There appear to be no intentionally placed rocks surrounding the base of this upright. The flat face of this stone is directed south. The face of this feature is discolored and appears to have once rested on the ground (Figure 4 and Figure 5).

SIHP # 50-80-12-6903 Feature B measures 1.63 m maximum length, .75 m maximum width, and 1.78 m maximum height. The upright appears to have one or more stones at its western base, which may have been intentionally placed, however the majority of this uprights base rests in a natural area of exposed bedrock. Once identified this feature could be clearly scene from the landfill below. Feature B is triangular in shape forming a small point at its apex (Figure 6 and Figure 7).

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Clyde W. Nāmuʻo

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SIHP # 50-80-12-6903 Feature C measures 2.3 m maximum length, 1.7 m maximum width, and 2.5 m maximum height. The upright is believed to be in a natural standing position. This upright has a natural crack in the east face, which may give it a feminine association (Figure 8 and Figure 9).

It is CSH's understanding that this resource will be removed under the current landfill expansion plan. Potential ideas for mitigation include: preservation, relocation, and or adjustment of the expansion area.

I hope the attached summary provides the information you require to comment on the inventory survey findings and the proposed historic property significance assessments and treatment. Per the requirements of HAR Chapter 13-276-8, CSH is interested in OHA's input and comment regarding the significance of these resources.

Thank you very much for your assistance with this matter. Please contact me with any questions.

Sincerely,



Matt McDermott  
Projects Manager, Cultural Surveys Hawaii, Inc.  
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Kailua, Hawaii 96734  
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Clyde W. Nāmuʻo

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Attachments:

Figure 1. Aerial photograph showing the location of the Waimānalo Gulch Sanitary Landfill property and the proposed expansion project area (source: USGS Orthoimagery 2005)

Figure 2. USGS 7.5 Minute Series Topographic Map, Ewa Quadrangle (1998), showing the location of the Waimānalo Gulch Sanitary Landfill property, the proposed expansion project area, and the newly documented historic property (SIHP # 50-80-12-6903)

Figure 3. USGS 7.5 Minute Series Topographic Map, Ewa Quadrangle (1998), showing a close-up view of the location of historic property (SIHP # 50-80-12-6903)

Figure 4. SIHP # 50-80-12-6903 Feature A, Photograph of face of rock upright, view to the north

Figure 5. SIHP # 50-80-12-6903 Feature A Photograph of side profile of rock upright, view to the south

Figure 6. SIHP # 50-80-12-6903 Feature B, Photograph of face of rock upright, view to the northwest

Figure 7. SIHP # 50-80-12-6903 Feature B, Photograph of side profile of rock upright, view to the south

Figure 8. SIHP # 50-80-12-6903 Feature C, Photograph of side profile of rock upright, view to the

Figure 9. SIHP # 50-80-12-6903 Feature B, Photograph of side profile of rock upright, view to the southwest

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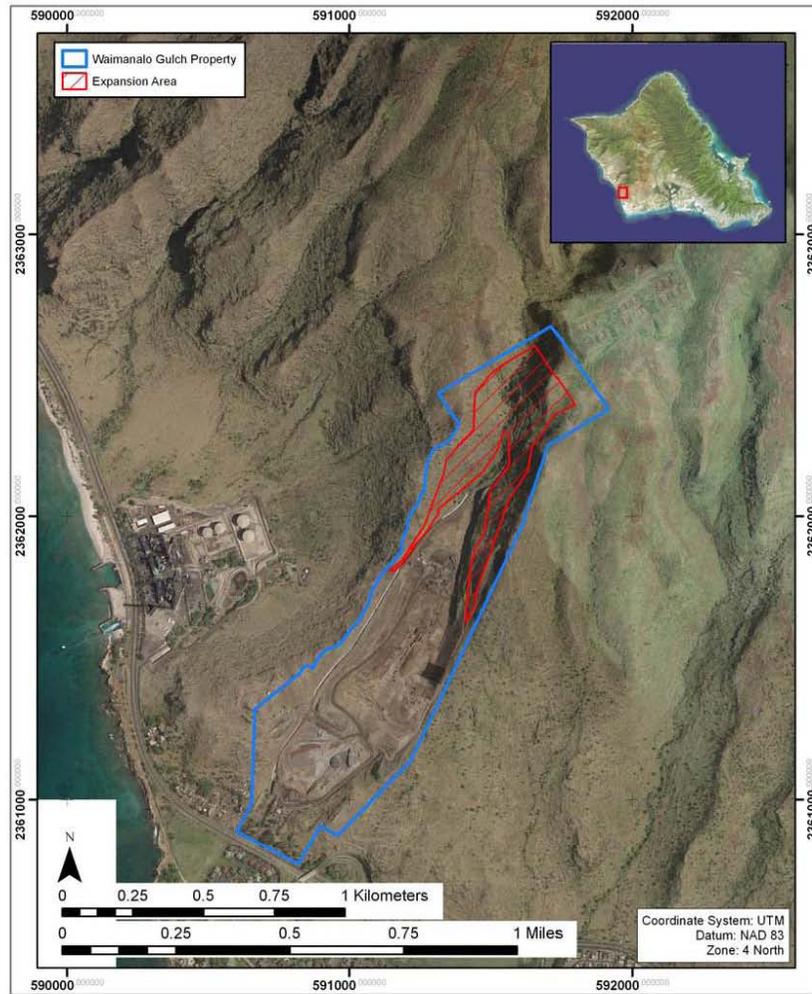


Figure 1. Aerial photograph showing the location of the Waimānalo Gulch Sanitary Landfill property and the proposed expansion project area (source: USGS Orthoimagery 2005)

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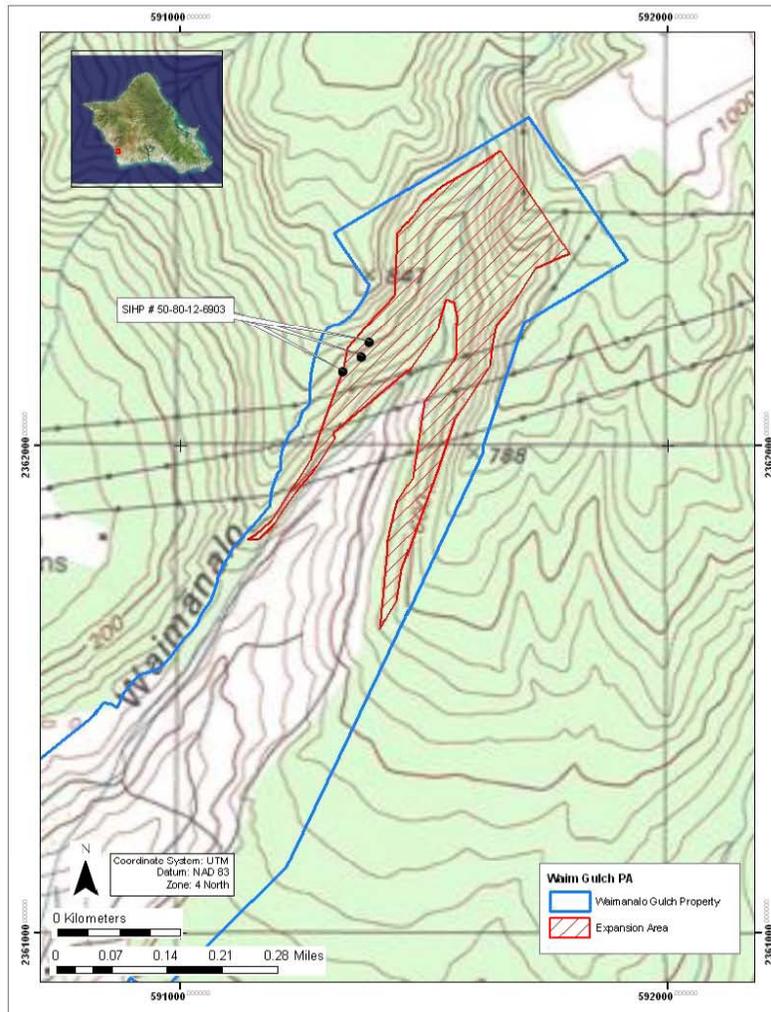


Figure 2. USGS 7.5 Minute Series Topographic Map, Ewa Quadrangle (1998), showing the location of the Waimānalo Gulch Sanitary Landfill property, the proposed expansion project area, and the newly documented historic property (SIHP # 50-80-12-6903)

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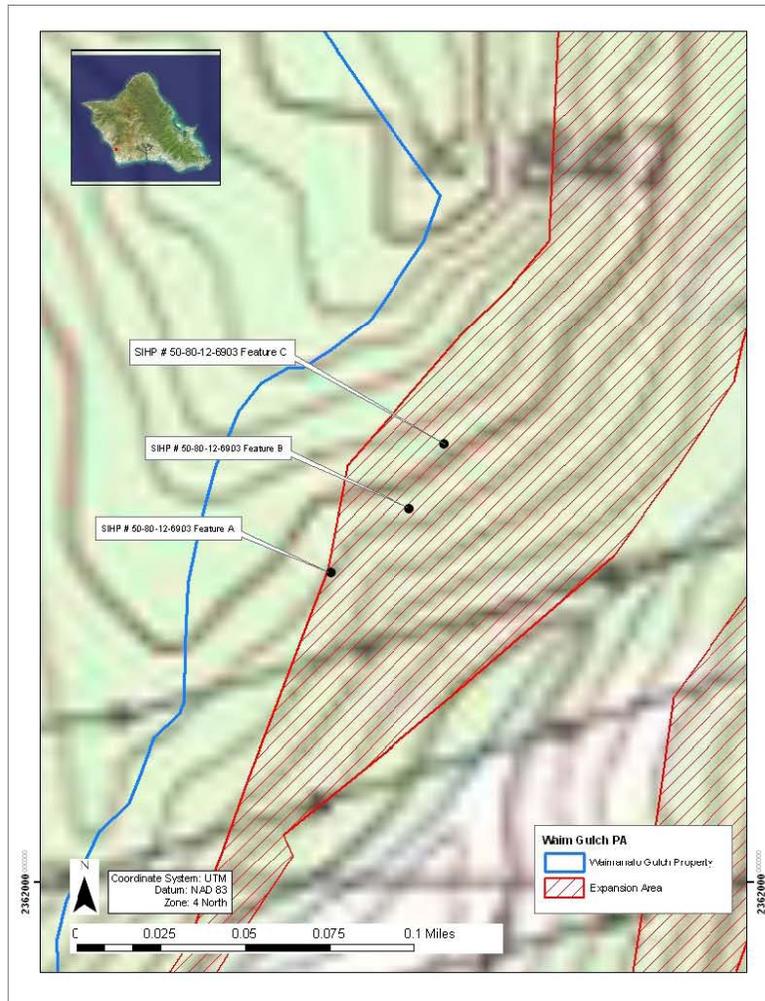


Figure 3. USGS 7.5 Minute Series Topographic Map, Ewa Quadrangle (1998), showing a close-up view of the location of historic property (SIHP # 50-80-12-6903)

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Figure 4. SIHP # 50-80-12-6903 Feature A, Photograph of face of rock upright, view to the north



Figure 5. SIHP # 50-80-12-6903 Feature A Photograph of side profile of rock upright, view to the south

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Figure 6. SIHP # 50-80-12-6903 Feature B, Photograph of face of rock upright, view to the northwest



Figure 7. SIHP # 50-80-12-6903 Feature B, Photograph of side profile of rock upright, view to the south

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Clyde W. Nāmuʻo

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Figure 8. SIHP # 50-80-12-6903 Feature C, Photograph of side profile of rock upright, view to the west



Figure 9. SIHP # 50-80-12-6903 Feature B, Photograph of side profile of rock upright, view to the southwest

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# **Appendix C OHA Response to CSH Request for Cultural Consultation**

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PHONE (808) 594-1888

FAX (808) 594-1865



**STATE OF HAWAII**  
**OFFICE OF HAWAIIAN AFFAIRS**  
711 KAPI'OLANI BOULEVARD, SUITE 500  
HONOLULU, HAWAII 96813

May 24, 2007

HRD07\_2765C

Matt McDermott, Projects Manager  
Cultural Surveys Hawai'i, Inc.  
P.O. Box 1114  
Kailua, Hawai'i 96734

Dear Mr. McDermott

**Re: Request for cultural consultation and/or comment regarding the archaeological inventory survey fieldwork results, historic property significance evaluations, and proposed historic property treatment/mitigation for the Waimanalo Gulch Sanitary Landfill expansion project  
Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu  
TMK: (1) 9-2-003:073 por.**

The Office of Hawaiian Affairs (OHA) is in receipt of your May 1, 2007 letter which provides a summary of archaeological inventory survey fieldwork results and the significance assessments and potential mitigation recommendations for one historic property (SIHP # 50-80-12-6903) identified within the subject project area.

SIHP # 50-80-12-6903 consists of three component features spaced 50-60 meters apart, is currently interpreted as traditional Native Hawaiian, and is believed to have functioned as a trail or boundary marker. This cultural resource is currently recommended eligible to the Hawai'i Register of Historic Places under criterion D for its potential to yield information important in prehistory and history, and under criterion E for its cultural significance to an ethnic group.

OHA commends you for initiating a consultation effort, and conducting site visits with State Historic Preservation Division staff and knowledgeable individuals, including Mr. William Aila and Shad Kane. OHA recommends that you also initiate consultation with Mr. Alike Silva and Mr. Glen Kila of the community group Koa Mana, and Ms. Nettie Tiffany of Lani Ku Honua.

Matt McDermott, Project Manager  
Cultural Surveys Hawai'i Inc.  
May 24, 2007  
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There is also institutional knowledge within OHA which indicates reinterments of Native Hawaiian burials have occurred mauka of Farrington Highway in the general vicinity of the project area.

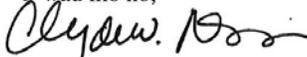
OHA initially questions whether the transect distances used during the pedestrian survey were adequate, and whether subsurface testing was conducted during archeological inventory survey fieldwork.

Should SIHP # 50-80-12-6903 prove to function as a trail marker, it is highly probable that such a trail would continue beyond the currently identified boundaries of the site. Consideration should also be given for modern access to the trail for protected cultural and traditional purposes.

It appears that the site is located on the periphery of the project area, and OHA maintains a position that the site should be preserved through adjustment of the current project area and appropriate mitigation measures established.

Thank you for the opportunity to review and provide comment on the archaeological inventory survey fieldwork results, historic property significance evaluations, and proposed historic property treatment/mitigation for the Waimanalo Gulch Sanitary Landfill project area. Should you have any questions, please contact Keola Lindsey, Lead-Advocate-Culture at (808) 594-1904 or [keolal@oha.org](mailto:keolal@oha.org).

'O wau iho nō,



Clyde W. Nāmu'o  
Administrator



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# Appendix D CSH Response to OHA

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# CULTURAL SURVEYS HAWAII

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL DOCUMENTATION SERVICES - SINCE 1982



7 March 2008

Mr. Clyde W. Nāmu'o  
Administrator  
State of Hawai'i Office of Hawaiian Affairs (OHA)  
711 Kapi'olani Boulevard, Suite 500  
Honolulu, Hawai'i 96813

Subject: Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-2-003:073 por.



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Cultural Surveys Hawaii, Inc (CSH). Job Code: HONOU 6

Aloha Mr. Nāmu'o:

## **Background to This Letter and Purpose**

In a May 1<sup>st</sup>, 2007 letter to the Office of Hawaiian Affairs (OHA), CSH asked for cultural consultation regarding the archaeological inventory survey results, historic property significance evaluations, and proposed historic property treatment for the proposed Waimānalo Gulch Sanitary Landfill Expansion Project. This consultation was initiated pursuant to Hawai'i Administrative Rules (HAR) Chapter 13-276-5 and 13-275-6. OHA responded in a May 24<sup>th</sup>, 2007 letter, asking for additional cultural consultation with members of the Koa Mana organization, as well as Ms. Nettie Tiffany of Lani Ku Honua. Additionally, the letter queried whether or not subsurface testing was undertaken as part of the project's archaeological inventory survey. Finally, OHA's letter took the position that the single historic property documented in the project area, State Inventory of Historic Properties (SIHP) # 50-80-12-6903--three upright stones, should be preserved through adjustment of the current project area boundaries.

With this letter, CSH is responding to OHA's May 24<sup>th</sup>, 2007 letter, providing a response to OHA's request for information, and offering an update concerning CSH's on-going project-related cultural consultation with knowledgeable parties. Additionally, CSH is hereby seeking OHA's input regarding the proposed mitigation of SIHP # 50-80-12-6903.

## **Project Description**

The landfill expansion area is located immediately *mauka* of the existing Waimānalo Gulch Sanitary Landfill. Waimānalo Gulch is generally located immediately inland of Farrington Highway, roughly between the Honokai Hale residential subdivision and Ko Olina Resort to the southeast, and the Hawaiian Electric Co.'s (HECO) Kahe Power Plant to the northwest. Please refer the to Figure 1 for area orientation.

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The proposed landfill expansion area is comprised of approximately 92.5-acres of undeveloped land within the Waimānalo Gulch Landfill property. The proposed landfill expansion area is to be used for the disposal of municipal refuse, H-POWER associated ash and residue, and operational activities associated with running the landfill. The landfill expansion is meant to increase the capacity and lifespan of the existing Waimānalo Gulch Sanitary Landfill. Minimally, land disturbing activities associated with the landfill expansion project would include: major grading, including blasting of exposed rock surfaces, and excavation of the base and walls of Waimānalo Gulch to prepare the expansion area for landfill use; grading for a perimeter road around the expansion area; excavations for stockpiling of sediment for use as cover material; excavations for associated landfill infrastructure; excavation for the installation of a storm water runoff control channel along the west side of the gulch; and filling of the expansion area with refuse material. The project's area of potential effect (APE) is defined as the entire proposed expansion area.

#### **Archaeological Inventory Results and Description of SIHP # 50-80-12-6903**

Background research confirmed that the 92.5-acre landfill expansion project area had been surveyed by CSH as part of an earlier archaeological inventory survey of Waimānalo Gulch (Hammatt and Shideler 1999). In early 2007, at the request of the project proponents, CSH completed additional archeological inventory survey investigation, including systematic pedestrian inspection and limited subsurface testing, of a 36-acre portion of the overall 92.5-acre APE that represents the core of the expansion area (refer to Figure 1 where the 36-acre survey area is shown in red and labeled the Expansion Area). For the investigation's pedestrian inspection there was a 10 to 15 meter interval between archaeologists (the general standard in Hawaii for archaeological inventory surveys). CSH's subsurface testing program for this project's archaeological inventory survey included the excavation of controlled test units in several natural rock shelters/overhangs that were noted in the project area. Although there were no surface indications of archaeological deposits in these natural features, this testing was carried out to determine if buried cultural deposits were present. No cultural deposits were found as a result of this subsurface testing.

The single historic property (SIHP # 50-80-12-6903) that was documented during the archaeological inventory survey was found near the southwest edge of the Waimānalo Gulch Sanitary Landfill expansion area (Figure 1). This resource is comprised of three rock uprights designated Features A-C, which, based on available information are naturally upright standing. These stone uprights rest on a steep southeast facing slope, are spaced 50-60 meters apart, and are situated on exposed outcrops (Figure 2). Feature A and Feature B are along the same outcrop, while Feature C is located on a higher outcrop upslope. This resource is interpreted as traditional Native Hawaiian, and may have functioned as trail or boundary markers. No additional feature components were observed near this location. In consultation with the State Historic Preservation Division (SHPD), this historic property is recommended eligible to the Hawai'i Register of Historic Places (Hawai'i Register) under criterion D, for its potential to yield information important in prehistory or history, and under criterion E, for its cultural significance to Native Hawaiians. This historic property is briefly described below and shown on the attached USGS topographic map and photograph (Figure 1 and Figure 2). Figures 3 and 4, a map and photograph respectively, show SIHP # 50-80-12-6903 as viewed from coastal Honouliuli.

SIHP # 50-80-12-6903 Feature A measures 1.20 m maximum length, 1.12 m maximum width, and 2.10 m maximum height. There appear to be no intentionally placed rocks surrounding the base of this upright.

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Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, Ewa District, Island of O'ahu TMK: [1] 9-2-003:073 por.

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The flat face of this stone is directed south. One surface of this stone is discolored and appears to have once rested on the ground (Figure 5 and Figure 6).

SIHP # 50-80-12-6903 Feature B measures 1.63 m maximum length, 0.75 m maximum width, and 1.78 m maximum height. The upright appears to have one or more stones at its western base, which may have been intentionally placed, however the majority of this upright's base rests in a natural area of exposed bedrock. Feature B is triangular in shape, forming a small point at its apex (Figure 7 and Figure 8).

SIHP # 50-80-12-6903 Feature C measures 2.3 m maximum length, 1.7 m maximum width, and 2.5 m maximum height. The upright is believed to be in a natural standing position. This upright has a natural crack in the east face, which may give it a feminine association (Figure 9 and Figure 10).

#### **Summary of Consultation Effort**

For the project's archeological inventory survey consultation effort, CSH is working with OHA, SHPD and knowledgeable cultural consultants. This effort is dove-tailed with the cultural consultation effort currently underway for the project's cultural impact assessment, which CSH is also preparing pursuant to HRS Chapter 343 and the Office of Environmental Quality Control's guidelines for assessing cultural impacts. Table 1 summarizes the individuals and organizations/agencies that have been consulted.

Table 1. Cultural and/or Agency Consultants

<b>Name</b>	<b>Affiliation</b>
Ailā, William	Hui Malāma I Nā Kūpuna
Amaral, Annelle	'Ahahui Siwila Hawai'i O Kapolei Hawaiian Civic Club
Cope, Aggie	Hale O Na'auao Society
Desoto, Frenchy	Wai'anae Coast Archaeological Preservation Representative
Davan, Teresa	O'ahu Island Archaeologist, SHPD
Eaton, Arline	<i>Kupuna</i> at Iroquois Elementary School
Enos, Eric	Cultural practitioner and director of Ka'ala Farms
Flanders, Judith	Granddaughter of Alice Kamōkila Campbell
Greenwood, Alice	O'ahu Island Burial Council Member, Wai'anae District
Ho'ohuli, "Black" Jo	Wai'anae Neighborhood Board No 24
Rezentes, Cynthia	Wai'anae Neighborhood Board No 24
Johnson, Adam	Former Oahu Island Archaeologist, SHPD
Johnson, Rubellite	Hawaiian scholar
Josephides, Analu	O'ahu Island Burial Council Member, Wai'anae District
Kanahele, Kamaki	President of Nānākuli Homestead Association
Kane, Shad	Member of the Makakilo, Kapolei, Honokai Hale Neighborhood Board and 'Ahahui Siwila Hawai'i O Kapolei Hawaiian Civic Club
Kila, Glenn	Koa Mana
Makaiwi, Martha	Makakilo, Kapolei, Honokai Hale Neighborhood Board No. 34

Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-2-003:073 por.

**Mr. Clyde W. Nāmu'o****Page 4****7 March 2008**

McKeaque, Kawika	O'ahu Island Burial Council member 'Ewa District
Momoa, Joseph	Kama'āina of Nānākuli and member of Kamo'i Canoe Club
Morawski, Lauren	O'ahu Island Archaeologist, SHPD
Nāmu'o, Clyde	Administrator at Office of Hawaiian Affairs
Paik, Kaleo	Culture and Historic Branch, SHPD
Philpotts, McD	Cultural practitioner and long time resident of Waimānalo 'Ili
Silva, Alikea	Koa Mana
Tiffany, Nettie	Kahu of Lanikūhonua and Former O'ahu Island Burial Council member, 'Ewa District
Timson, Maeda	Member of the Makakilo, Kapolei, Honokai Hale Neighborhood Board No. 34 and President of Ua Au O Kapolei

This consultation effort has included several on-site, at the SIHP # 50-80-12-6903 location, meetings that included SHPD personnel (Mr. Adam Johnson, Ms. Teresa Davan, Ms. Linda Kaleo Paik, and Ms. Lauren Morawski), as well as knowledgeable cultural consultants, including Mr. McD Philpotts, Mr. Alikea Silva, Mr. Glen Kila, Mr. Shad Kane, Mr. William Ailā, and Mr. Eric Enos. Through this consultation CSH has sought the opinions of cultural consultants regarding the age, function, cultural affiliation, and significance of the three stone uprights.

All cultural consultants felt the stones were significant Native Hawaiian cultural resources that were used in the past by traditional Hawaiian cultural practitioners. There is no clear consensus, however, regarding the specific function of the upright stones. Potential functions discussed included trail markers, markers for observation points for celestial observation and/or navigation, or markers used to calculate the location of specific coastal and/or off-shore resources. Potential mitigation measures for the stones, including preservation in place and relocation, were discussed with these cultural consultants during the on-site meetings.

#### **Proposed Mitigation**

It is the position of the project proponents (the City and County of Honolulu) that, as the only municipal landfill site on the island of O'ahu, the continued use of the Waimānalo Gulch facility is of utmost importance to the health and safety of the island's population. The expansion of the existing Waimānalo Gulch facility is crucial to the facility's continued operation over the next decades. After weighing the options, the project proponents have determined that the three stones that make up SIHP # 50-80-12-6903 cannot be preserved in place in a safe and appropriate manner.

Preservation in place would require a significant reduction of the overall area and volume of the proposed facility expansion. Additionally, with the proposed blasting, mass grading, and excavation in the vicinity of the stones, the safety of the stones cannot be guaranteed if they were preserved in place. For example, refer to Figure 11, which shows the stones' proximity to the large storm water drainage channel and Cell E6, immediately above and below the stones' location. The blasting, mass grading, and excavation associated with the installation of these needed landfill features would subject the stones to repeated vibration and blasting debris over the next approximately 15 years as the landfill expansion progressed. The vibrations from blasting and mass grading would potentially be sufficient to dislodge the stones from

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Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-2-003:073 por.

**Mr. Clyde W. Nāmuʻo**

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their current resting place, causing them to roll down the steep slope they rest on. Finally, considering the use of the site as a landfill, preservation in place is not thought to be an appropriate mitigation treatment for the stones, considering their cultural sensitivity.

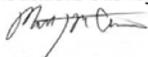
The project proponents propose the relocation of the three SIHP # 50-80-12-6903 stones to Battery Arizona, located in the southwestern portion of the Waimānalo Gulch facility (refer to Figure 1). There is a precedent for this relocation as three noteworthy stones of cultural significance to Native Hawaiians have already been relocated to the Battery Arizona site from the expanding Waimānalo Gulch Landfill. These stones, described by Hammatt and Shideler (1999), were relocated to the Battery Arizona site in 1988. Figure 12 shows the location of this already established stone repository in relation to the Battery Arizona features. Figures 13 and 14 are photographs, showing the proposed relocation area for SIHP # 50-80-12-6903 along the southeast facing slope at Battery Arizona and in relation to the already established stone repository. The proposed relocation would ensure the safety of the stones during the landfill's expansion and would make them much more accessible to interested parties.

The specifics of the proposed stone relocation would be the subject of the project's mitigation plan for SIHP # 50-80-12-6903. These specifics would be worked out through further consultation with cultural consultants. There is the option of putting the stones back near their original resting places. Figure 15 is a modified photograph that shows approximately what this would look like from coastal Honouliuli. This relocation could only take place after that portion of the landfill had been filled, most likely in approximately 15 years. The permanent relocation of the stones to Battery Arizona is another, more feasible mitigation option.

Versions of this consultation letter will be sent to SHPD and the cultural consultants that made site visits to the project area. Along with OHA's response, the archaeological inventory survey report will summarize the input from these cultural consultants.

Thank you very much for your assistance with this matter. Please contact me with any questions.

Sincerely,  
Cultural Surveys Hawaii, Inc.



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Projects Manager, Cultural Surveys Hawaii, Inc.  
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Tel. (808) 262-9972  
Fax. (808) 262-4950  
mmcdermott@culturalsurveys.com

**C: Mr. Keola Lindsey, OHA; Ms. Linda Kaleo Paik and Ms. Lauren Morawski, SHPD**

Hammatt, Hallett H. and David Shideler  
1999 *An Archaeological Inventory Survey for the Waimānalo Gulch Sanitary Landfill Project Site, Honouliuli, ʻEwa, Oʻahu*. Cultural Surveys Hawaii, Inc. Kailua, HI.

Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu TMK: [1] 9-2-003:073 por.

**Mr. Clyde W. Nāmu'o****Page 6****7 March 2008****Attachments:**

Figure 1. Portion of the 1998 'Ewa USGS 7.5-minute topographic quadrangle showing the Waimānalo Gulch property boundaries, the boundaries of the proposed 36-acre expansion area, the location of Features A, B, and C of SIHP # 50-80-12-6903, and the previously established stone repository at Battery Arizona.

Figure 2. Photograph of the southeast facing slope of Waimānalo Gulch, showing the locations of features A, B, and C of SIHP # 50-80-12-6903

Figure 3. Map showing the location from which the Figure 4 photograph was taken

Figure 4. Photograph of the SIHP # 50-80-12-6903 location, taken from coastal Honouliuli, view to the northeast (refer to Figure 3), showing the stones' visibility from the coast

Figure 5. SIHP # 50-80-12-6903 Feature A, Photograph of face of rock upright, view to the north

Figure 6. SIHP # 50-80-12-6903 Feature A Photograph of side profile of rock upright, view to the south

Figure 7. SIHP # 50-80-12-6903 Feature B, Photograph of face of rock upright, view to the northwest

Figure 8. SIHP # 50-80-12-6903 Feature B, Photograph of side profile of rock upright, view to the south

Figure 9. SIHP # 50-80-12-6903 Feature C, Photograph of side profile of rock upright, view to the

Figure 10. SIHP # 50-80-12-6903 Feature B, Photograph of side profile of rock upright, view to the southwest

Figure 11. Three-dimensional graphic showing the proposed landfill expansion in relation to the three stones of SIHP # 50-80-12-6903. Note the large drainage channel upslope of the stones and the cell E6 immediately down slope

Figure 12. Aerial photograph of Battery Arizona, refer to Figure 1 for its location within the project area, showing the established stone repository and the proposed relocation area for SIHP # 50-80-12-6903

Figure 13. Photograph, view to the south, of the proposed relocation area at Battery Arizona for SIHP # 50-80-12-6903

Figure 14. Photograph, view to the north, of the proposed relocation area at Battery Arizona for SIHP # 50-80-12-6903

Figure 15. Altered photograph showing the planned landfill surface topography in 15 years. The potential SIHP # 50-80-12-6903 relocation site, on top of the new landfill surface, is shown

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Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-2-003:073 por.

7 March 2008

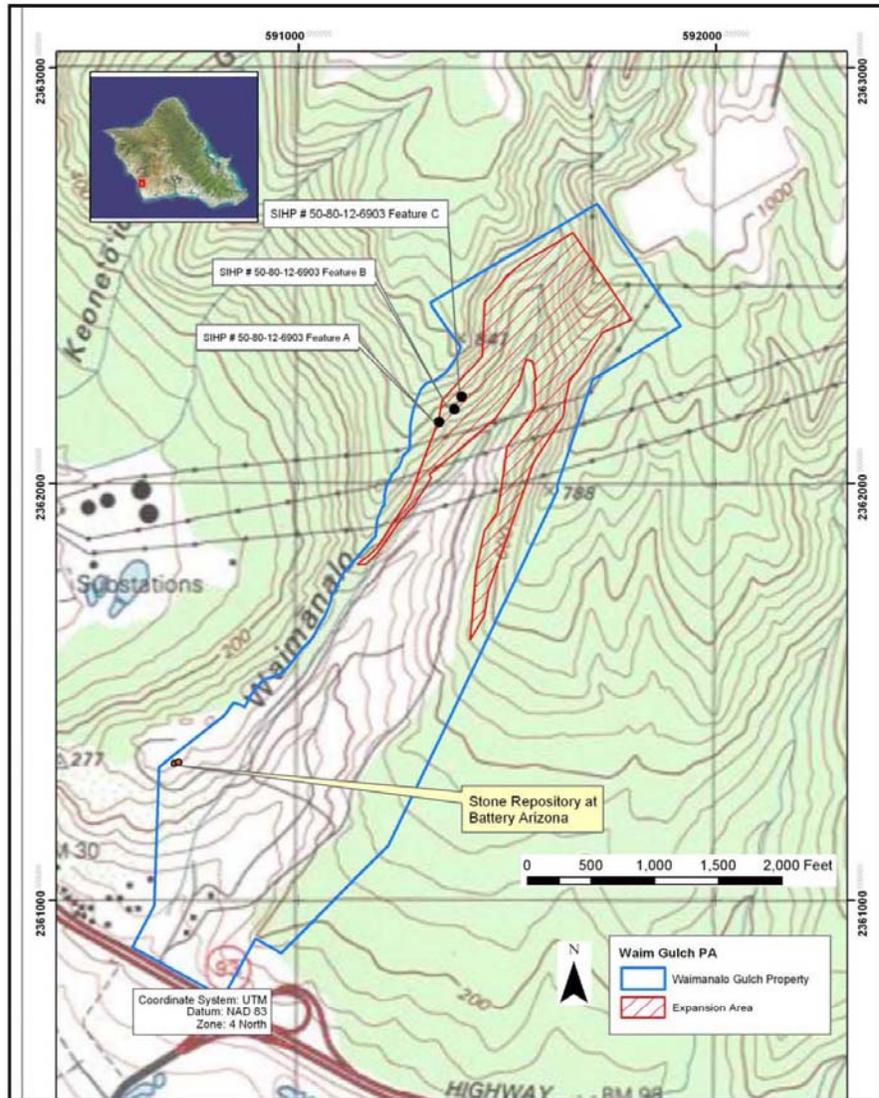


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Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-2-003:073 por.

Mr. Clyde W. Nāmu'o

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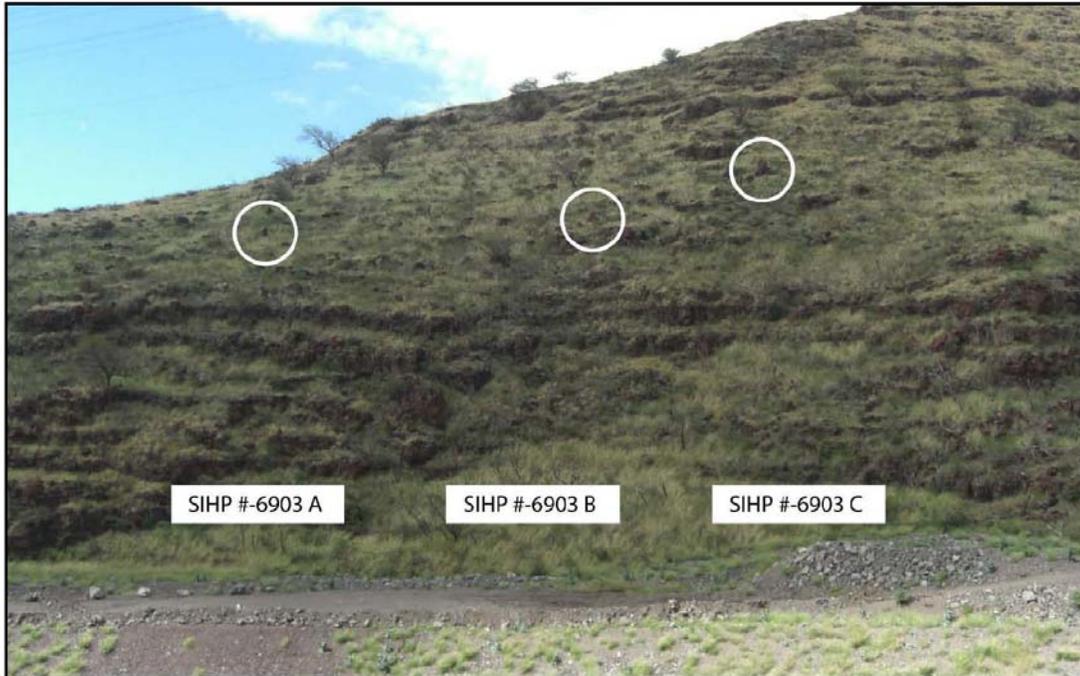


Figure 2. Photograph of the southeast facing slope of Waimānalo Gulch, showing the locations of features A, B, and C of SIHP # 50-80-12-6903

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Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-2-003:073 por.

Mr. Clyde W. Nāmu'o

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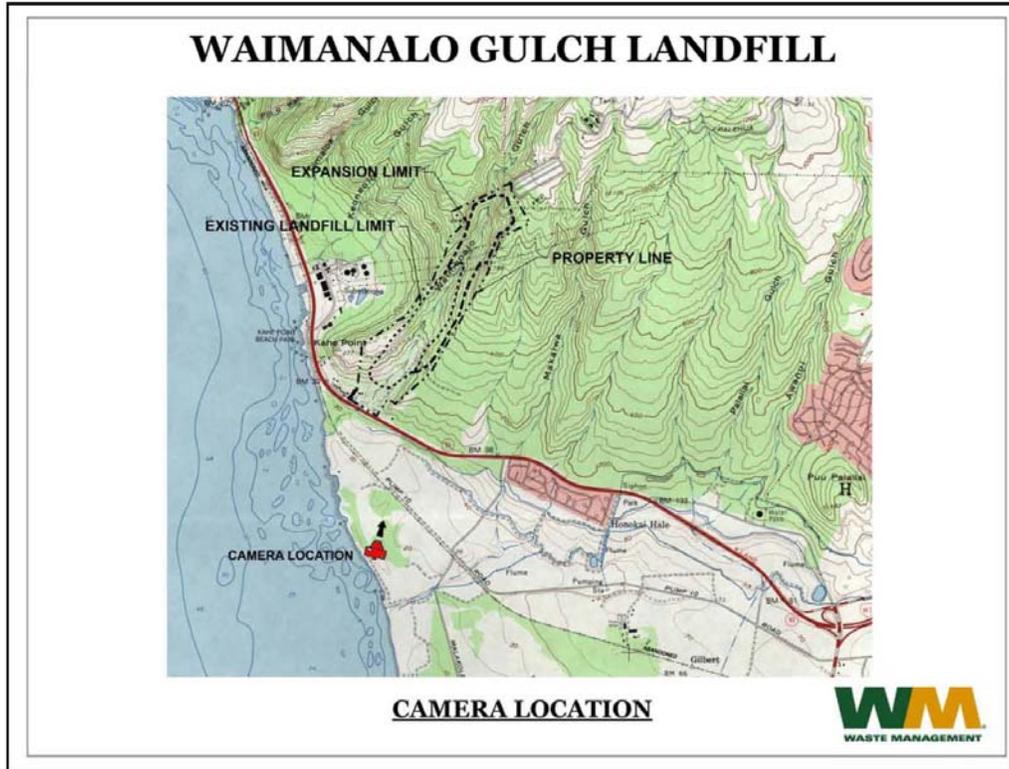


Figure 3. Map showing the location from which the Figure 4 photograph was taken

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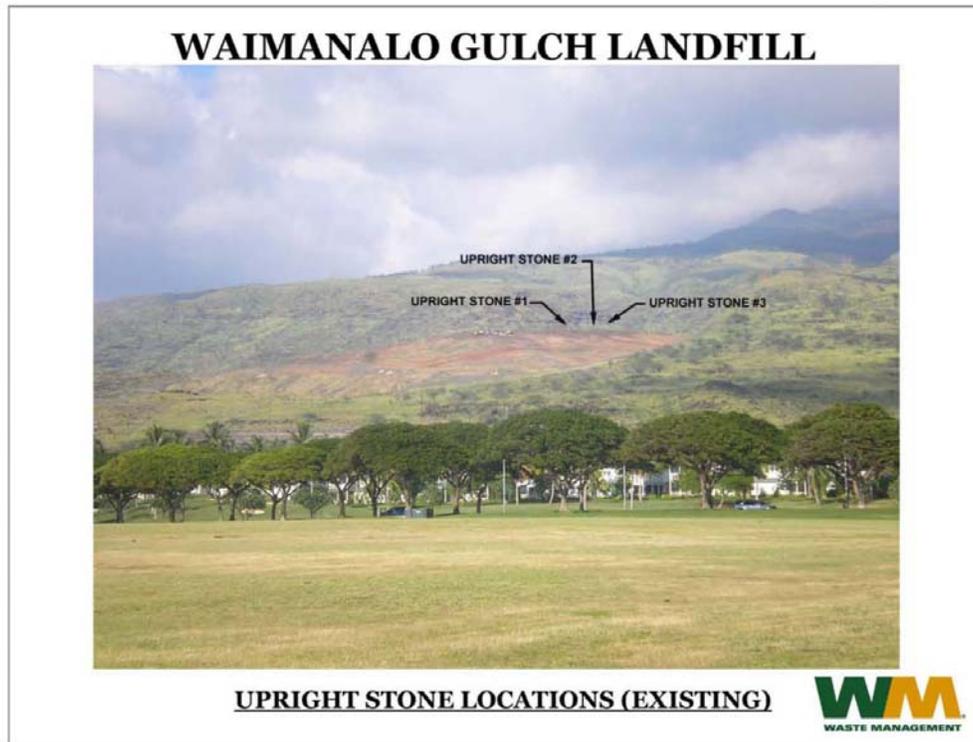


Figure 4. Photograph of the SIHP # 50-80-12-6903 location, taken from coastal Honouliuli, view to the northeast (refer to Figure 3), showing the stones' visibility from the coast

Proposed historic property treatment/mitigation for the Waimānalo Gulch Sanitary Landfill Expansion Project, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-2-003:073 por.