

# Revised Archaeological Monitoring Plan for Phase I Geotechnical Testing at Kuaokalā Ridge

*Ka'ena Ahupua'a, Waialua District and Keawa'ula  
Ahupua'a, Wai'anae District, Island of O'ahu*

*[TMK 6-9-003:001 and 8-1-001:014]*

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## **Missile Defense Agency**

*Ka'ena Ahupua'a, Waialua District and Keawa'ula Ahupua'a,  
Wai'anae District, Island of O'ahu*

*[TMK 6-9-003:001 and 8-1-001:014]*

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### **TYPE OF WORK**

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## Abstract

HDR Inc. has prepared this archaeological monitoring plan (AMP) for the Missile Defense Agency's (MDA) proposal to conduct Phase I Geotechnical Testing on Kuaokalā Ridge, Ka'ena Ahupua'a, Waialua District and Keawa'ula Ahupua'a, Wai'anae District, Island of O'ahu. MDA proposes to conduct the testing to determine the constructability of possible future MDA projects at the location. A pedestrian archaeological inventory survey of the area of potential effect (APE) was completed in July 2018, which identified two archaeological and cultural sites: Moka'ena Heiau (SIHP 188) and Pu'u O Pōhaku Hāpaina. These sites will be protected and avoided during the geotechnical testing. Keala Pono Archaeological Consulting will conduct archaeological monitoring of ground-disturbing activities during the geotechnical testing. Garcia and Associates is providing cultural monitoring for the project. HDR Inc. will provide oversight of monitoring activities and senior technical review of the resulting report on behalf of MDA.

The archaeological and cultural monitoring described in this plan are among MDA's mitigation commitments made to the Division of Forestry and Wildlife in association with the Divisions recommended finding of effect under Chapter 6E-42 of the Hawai'i Revised Statutes. Although the testing will not occur within any known archaeological sites or burial sites, the archaeological and cultural monitoring will ensure that the physical features at Site 188 and Site 8777 are avoided, and that any unanticipated discoveries of historic properties or burials are treated promptly and appropriately. The archaeological monitoring will also serve to characterize the potential for subsurface archaeological deposits in the area of potential effect (APE) to inform future undertakings, including the HDR-H undertaking.

This plan outlines monitoring procedures designed to identify and document the archaeological potential of the APE and any new historic properties that may be encountered during the course of geotechnical testing. This AMP also outlines the use of a cultural monitor during the project and procedures to follow in the event of the discovery of human remains or significant cultural objects. Following monitoring and laboratory processing of collected data, an archaeological monitoring report will be submitted to the Hawaii State Historic Preservation Division (SHPD).

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## Abbreviations and Acronyms

A.D.	Anno Domini
AIS	archaeological inventory survey
AMP	archaeological monitoring plan
APE	area of potential effect
CFR	Code of Federal Regulations
cm	centimeter
DLNR	Department of Land and Natural Resources
DOFAW	Division of Forestry and Wildlife
GPS	global positioning system
HAR	Hawai'i Administrative Rules
HDR	HDR, Inc.
HDR-H	Homeland Defense Radar – Hawai'i
HRHP	Hawai'i Register of Historic Places
ICRMP	Integrated Cultural Resource Management Plan
Keala Pono	Keala Pono Archaeological Consulting, LLC
KPSTS	Ka'ena Point Satellite Tracking Station
LCA	Land Commission Award
m	meter
MDA	Missile Defense Agency
NAGPRA	Native American Graves Protection and Repatriation Act
NHO	Native Hawaiian Organization
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
ROE	Right-of-Entry
SHPD	State Historic Preservation Division
SMDC	Space and Missile Defense Command
TMK	Tax Map Key
WWII	World War II

# 1. Introduction

HDR Inc. (HDR) has prepared this archaeological monitoring plan (AMP) for the Missile Defense Agency's (MDA) proposal to conduct Phase I Geotechnical Testing on Kuaokalā Ridge, Ka'ena Ahupua'a, Waialua District and Keawa'ula Ahupua'a, Wai'anae District, Island of O'ahu (Tax Map Key [TMK] 6-9-003:001 and 8-1-001:014) (Figure 1). MDA proposes to conduct the testing in support of potential future MDA actions and alternative selection related to the Homeland Defense Radar – Hawai'i (HDR-H) project, for which Kuaokalā Ridge is a candidate location. The testing will occur on State land leased by Ka'ena Point Satellite Tracking Station (KPSTS) and on State land managed by the Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW).

As a federal undertaking with the potential to affect historic properties, the Phase I Geotechnical Testing project is subject to Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) and its implementing regulations in 36 Code of Federal Regulations (CFR) § 800. MDA made a determination of "no adverse effect" under Section 106 and has requested concurrence on this determination from the SHPD.

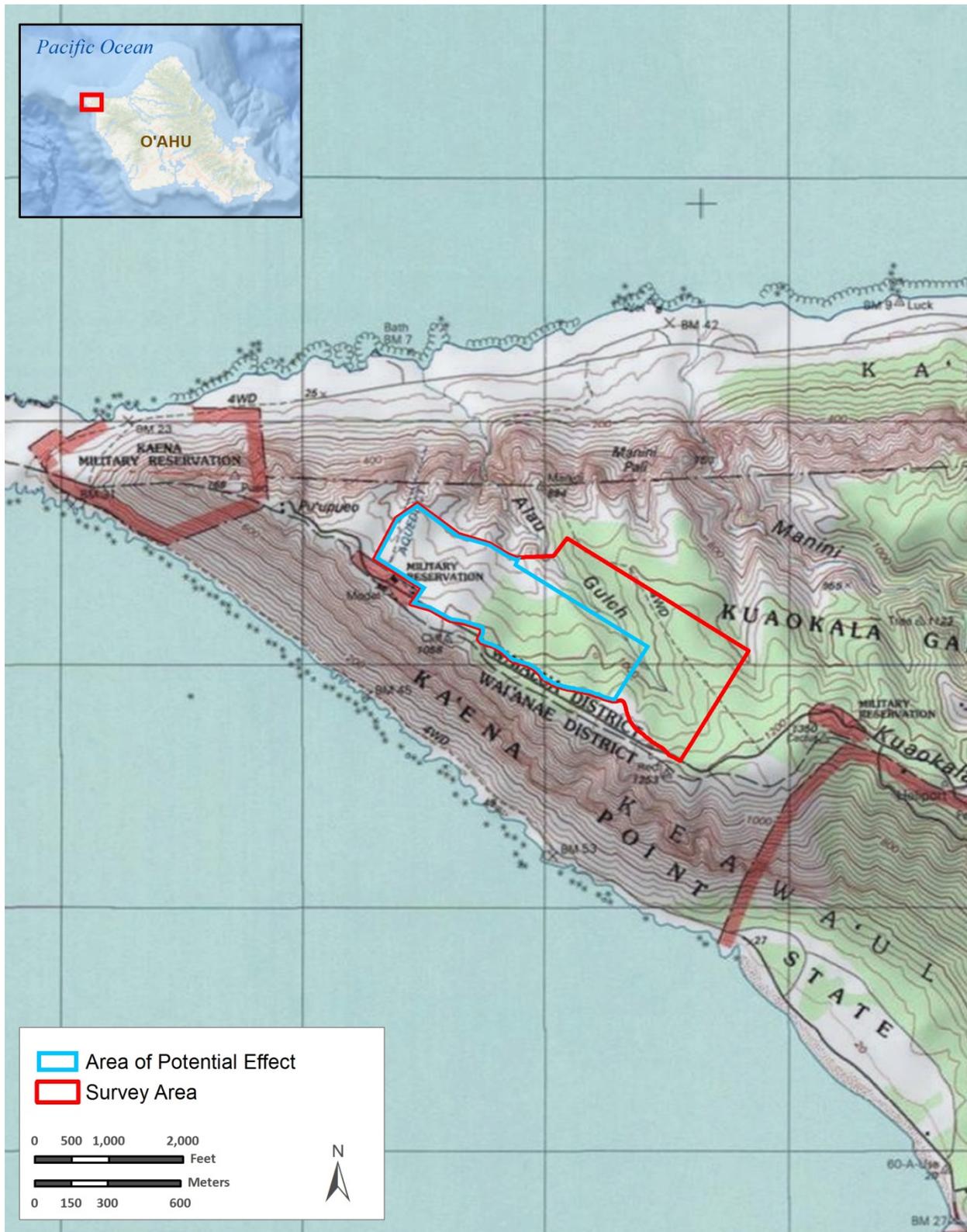
The geotechnical testing requires a Special Use (ROE) permit from DLNR and is therefore also subject to Hawai'i Revised Statutes 6E-42 and Hawai'i Administrative Rules (HAR) 13-284. DOFAW has recommended to SHPD a finding under Chapter 6E-42 of "Effect, with Agreed upon Mitigation Commitments."

MDA's mitigation commitments consist of:

- Archaeological monitoring
- Cultural monitoring
- 30 m protective buffer around identified archaeological sites and historic properties
- Cultural sensitivity training for geotechnical testing personnel
- Invitation to native Hawaiian cultural practitioners to perform appropriate protocols ahead of geotechnical testing
- Return of soil samples to excavations, to the extent practical
- Replacement of the current barbed wire fence around Moka'ena Heiau, expanded to the revised site boundary

This AMP outlines the archaeological and cultural monitoring procedures and protective measures that will be implemented to protect known significant historic properties in the area of potential effect (APE). The archaeological monitoring will primarily serve to ensure that ground disturbing activities do not affect the tangible features of two identified sites in the APE. Although the area outside these sites is not known to be archaeologically sensitive, the monitoring will ensure that unanticipated archaeological sites, should any occur, are promptly identified and appropriately treated per federal and state statutes. The archaeological monitoring will also serve to characterize the potential for subsurface archaeological deposits in the APE to inform future undertakings. This AMP will require the approval of the Hawaii State Historic Preservation Division (SHPD) prior to commencing the geotechnical testing.

Figure 1. Project Area and Area of Potential Effect



The cultural monitoring described in this plan will ensure that unanticipated discoveries of human remains or significant cultural materials, should any occur, are also promptly identified and protected until a treatment plan is developed under 43 CFR 10. In this AMP, “significant cultural materials” refers to burial sites as defined in HAR 13-300-2 and human remains, funerary objects, sacred objects, or objects of cultural patrimony subject to the Native American Graves Protection and Repatriation Act (NAGPRA).

## 1.1 Description of the Undertaking and APE

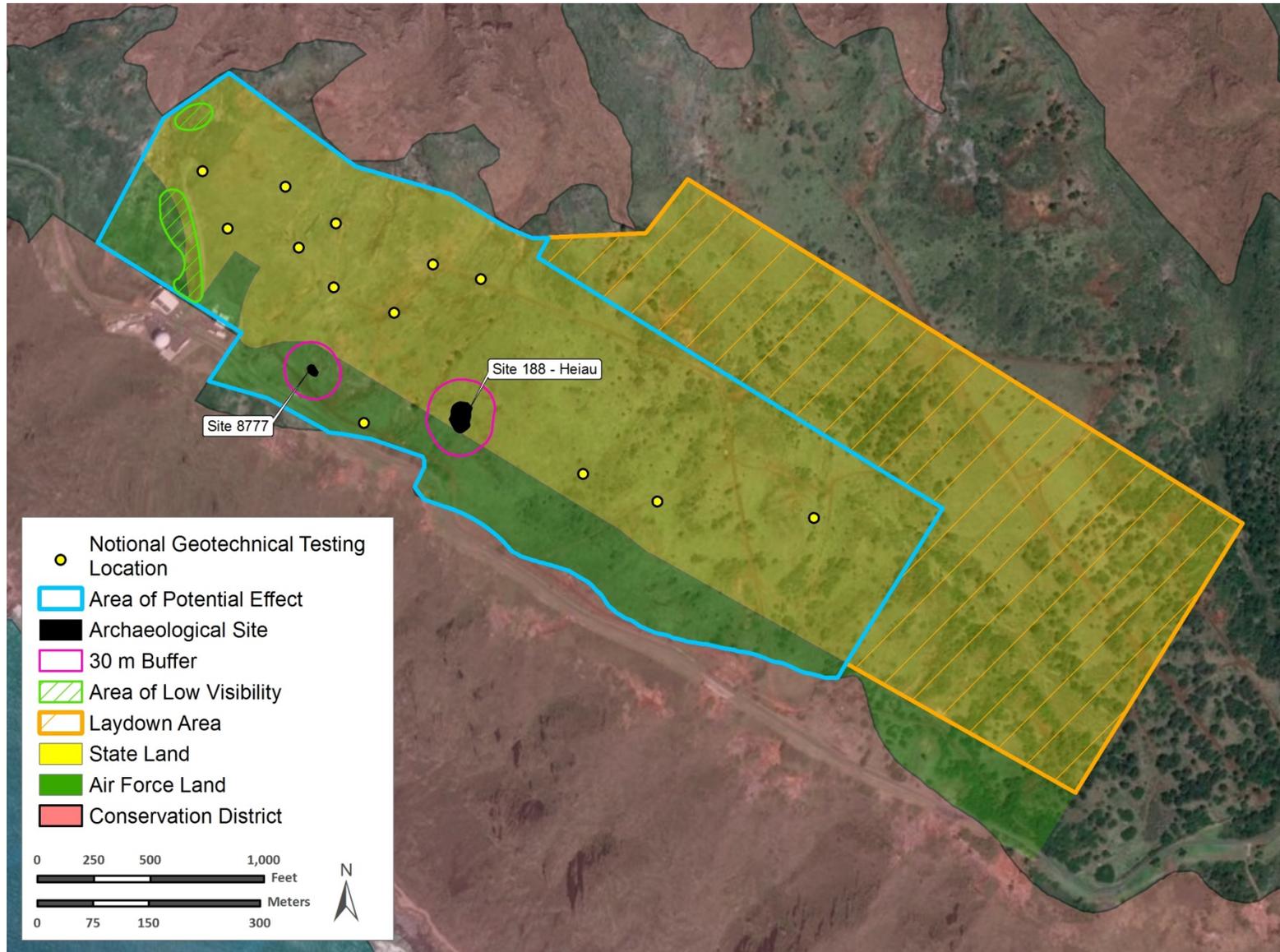
The undertaking is defined as obtaining a right-of-entry permit and conducting Phase I Geotechnical Testing in support of potential future MDA actions and alternative selection related to the HDR-H project. The HDR-H candidate site at Kuaokalā Ridge totals approximately 160 acres, composed of approximately 28 acres of KPSTS existing leased land, approximately 67 acres of State land where the HDR-H project would be located if the Kuaokalā site is selected as the deployment location, and approximately 65 acres of State land that would be used as a construction laydown area to stage equipment and vehicles. The Phase I Geotechnical Testing undertaking would occur in approximately 22 acres of KPSTS existing leased land and the approximate 67-acre parcel of State land where the HDR-H project could be constructed, identified in blue in Figure 2. This approximate 89-acre area is the undertaking’s APE.

The Phase I Geotechnical Testing would consist of approximately 10 soil test borings and 3 auger borings. The soil test borings will be 4 to 6 inches in diameter and up to 100 feet deep. The auger borings will be conducted using a 12-inch or smaller diameter auger, drilled to a depth of approximately 6 feet. Following each test boring, the lower portion of the boring will be backfilled with a bentonite grout, as specified by State of Hawai‘i regulations, and the top portion backfilled with drill spoils and on-site soils. Each auger borehole will be backfilled with drill spoils. Prior to the start of the geotechnical testing, the geotechnical survey crew will conduct site visits and field reconnaissance, and stake out proposed boring locations. The survey crew will adjust boring locations as needed to accommodate existing conditions, such as topography, utilities, vegetation, and sensitive resources. Vegetation may be locally cleared to form temporary pathways and work areas. Equipment may include a truck- and/or track-mounted drill rig, water truck, flat-bed support truck, track-loader, low-boy trailer, and pickup trucks and/or sport utility vehicles. Equipment will be delivered to the site using the existing KPSTS access road.

## 1.2 Known Archaeology

Keala Pono Archaeological Consulting, LLC (Keala Pono) conducted an archaeological inventory survey (AIS) in July 2018 that addressed the entire approximate 160-acre Kuaokalā candidate site, including the entire approximate 89-acre APE for the Phase I Geotechnical Testing undertaking (McElroy and Duhaylonsod 2018). The survey identified two sites, SIHP 50-80-03-188 (Moka‘ena Heiau) and SIHP 50-80-03-8777 (Pu‘u O Pohaku Hāpaina). Both sites are in the APE (Figure 2). Site 188 is culturally significant as a traditional Hawaiian ceremonial site. The site is significant under Chapter 6E and is eligible for listing in the NRHP. Site 8777 is also significant under Chapter 6E; however, additional information is needed to determine eligibility for NRHP listing under these criteria.

Figure 2. Area of Potential Effect with Notational Geotechnical Testing Locations



Data Source: World Imagery

## 1.3 Site Protection

MDA will avoid both Site 188 and Site 8777 during the undertaking by a minimum distance of 30 meters beyond the recorded site boundaries. Construction fencing will be installed around the 30 meter buffer to ensure equipment and personnel do not inadvertently enter the buffer. In addition, cultural sensitivity training will be provided to the geotechnical testing crew. The training will include information on the avoidance requirement, the monitoring requirement and procedures, and Native Hawaiian perspectives of the landscape and the significance of the two sites.

## 1.4 Monitoring Requirement

Although the entire APE was subject to intensive pedestrian survey, it remains possible that unknown sites remain in the APE. The AIS used pedestrian survey with an 8-m transect spacing; however, dense vegetation in some portions of the APE may have obscured archaeological sites on the surface (see Figure 2). Further, the potential for the APE to contain subsurface archaeological deposits is unknown. The archaeological monitoring will provide data on the stratigraphy and subsurface potential in the APE. If any buried archaeological deposits are encountered, the archaeological monitor would ensure the testing activities cease and the site is protected until further consultation can occur. The monitor would also record data from the already-disturbed archaeological deposits.

Previous archaeological work and consultation with some Native Hawaiian Organizations (NHOs) indicate that iwi kupuna, or burial sites, are unlikely occur in the APE; however, during consultation MDA received comments from others that burials may be present along the ridge and possibly within the APE (Leclerc and Barnes 2018). Due to the presence of the two culturally significant sites and the potential for human remains or significant cultural materials, a cultural monitor will also be present during the geotechnical testing to ensure any unanticipated discoveries of human remains or significant cultural materials.

## 1.5 Plan Organization

This AMP establishes background information, field and laboratory methods, and curatorial and reporting procedures to guide the monitoring effort. Background information on the environment, traditional and current land use, and previous archaeological work in the APE is presented in Section 2. Monitoring procedures are described in Section 3; and laboratory, curatorial, and reporting procedures are discussed in Section 4. Section 5 provides references for documents cited in this AMP. Appendix A provides procedures and points of contact in the event archaeological, cultural, or human remains are found. Protective measures for known historic properties were presented in Section 1.2.

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## 2. Background

### 2.1 Environmental Description

The APE is on Kuaokalā Ridge, the northernmost ridge of the Wai'anae Range and boundary between the Waialua and Wai'anae districts. Most of the APE is in the Waialua District, but the southwestern margin extends into the Wai'anae District. Northwest of the APE, Kuaokalā Ridge narrows to a point called Pu'u Pueo, which overlooks Ka'ena Point that extends westward from the toe of the ridge. Ka'ena Point is the closest point of O'ahu to Kaua'i, which is visible on clear days. The APE is on a wide, dissected portion of the ridge where elevations range from 850 feet to 1,050 feet above mean sea level. The southwest side of the ridge drops sharply toward the coast with slopes in excess of 30 degrees. Slopes on the northeast side decline more gradually toward Ālau Gulch.

Kuaokalā Ridge is characterized by basalts of the Wai'anae Volcanic Series capped with saprolitic soils derived from weathered volcanic material mixed with volcanic ash. Soils in the APE consist of silty clay loams of the Mahana series and Mahana-Badlands complex with areas of rock outcrop and rock land. The soils are well-drained; however, slopes from 10 to 30 percent produce conditions with medium to rapid run-off and high susceptibility to erosion (NRCS 2018). There is no permanent surface water in the APE; however, ephemeral surface waters are sometimes present after heavy rains during the winter.

The APE is in a relatively dry, lowland climate. Average annual precipitation in the general area is less than 40 inches with most precipitation occurring in the winter months (Giambelluca et al. 1986). Temperatures range from 67 to 78 degrees Fahrenheit during the summer and 63 to 70 degrees Fahrenheit in the winter. Winds in the APE can be high and variable. The predominant trade winds from the north and northeast compress and accelerate against the northern face of the Wai'anae mountains and are forced up and over Kuaokalā Ridge. The ridge is also under a diurnal regime of air exchange between the land and sea. Winds are typically calmest in the early morning, strongest mid-day, and gradually subside in the evening (Higginbotham/Briggs n.d:l-10 in Tomonari-Tuggle 2008).

Much of the native vegetation around the APE has been removed by forest cutting and grazing and replaced with non-native and invasive species. Areas surrounding the buildings and roads at KPSTS are landscaped and maintained. Elsewhere, vegetation is unmanaged and consists primarily of *koa haole* (*Leucaena leucocephala*) and various exotic grasses. Native species are scattered throughout the area and are most prevalent in rock outcroppings on steep slopes on the west end of Kuaokalā Ridge. These species include 'a'ali'i (*Dodonaea viscosa*), *alahe'e* (*Canthium odoratum*), 'ākia (*Wikstroemia* sp.), *naio* (*Myoporum sandwicensis*), *nehe* (*Lipochaeta integrifolia*), *pā'ū-o-Hi'iaka* (*Jacquemontia sandwicensis*), *pili* (*Heteropogon contortus*), 'ūlei (*Osteomeles anthyllidifolia*), *wiliwili* (*Erythrina sandwicensis*), and 'āheahea (*Chenopodium oahuense*) (Hammatt and Borthwick 1987:13).

## 2.2 Traditional and Historical Setting

### 2.2.1 *Mo'olelo* and Oral Traditions

The traditional and historic setting of the project area is well documented in Keala Pono's AIS report (McElroy and Duhaylonsod 2018), the KPSTS Integrated Cultural Resources Management Plan (ICRMP), and other previous survey reports (Hammatt and Borthwick 1987; Rasmussen 2007; Tomonari-Tuggle 2008). A brief overview is presented here to provide context for the archaeological monitoring effort.

The project area is in a landscape rich in traditional history with many *mo'olelo*, or narratives, related to nearby place names and events. Ka'ena Point, northwest of the project area, is the nearest location on O'ahu to Kaua'i. This proximity is notable as Kaua'i is the only island in the Hawaiian chain that is not visible from another island except on exceptionally clear days (Tomonari-Tuggle 2008:21). Ka'ena Point is the site of several legends connecting O'ahu and Kaua'i. Emerson (1993:104) recounts Maui's attempts to bring O'ahu and Kaua'i together in his quest to unite the islands into a solid mass:

Having chosen his station at Kaena Point, the western extremity of Oahu, from which the island of Kaua'i is clearly visible on a bright day, he cast his wonderful hook, Mana-ia-ka-lani, far out into the ocean that it might engage itself in the foundations of Kaua'i. When he felt that it had taken a good hold, he gave a mighty tug at the line. A huge boulder [*sic*], the Pohaku o Kaua'i, fell at his feet.

Westervelt (1963) describes another tradition related to the Pōhaku-o-Kaua'i (Rock of Kaua'i). The Kaua'i chief Hau-pu is awakened by the noise of a fishing party led by the O'ahu chief Ka'ena. Thinking that his people are under attack, Hau-pu throws a large boulder into the group of fishermen and kills several of them, including Ka'ena:

The waves swept sand upon the shore until in time a long point of land was formed. The remaining followers of the dead chief named this cape "Kaena".

The rock thrown by Hau-pu embedded itself deeply in the bed of the ocean, but its head rose far above the water, even when raging storms dashed turbulent waves against it. To this death dealing rock the natives gave the name "Rock of Kauai." (Westervelt 1963:25).

In another link between the islands, the *heiau* Moka'ena and Kuaokalā are said to have been built by people from Kaua'i (McAllister 1933:127), although Fornander (1917) attributes their construction to the *menehune*, a mythical race of beings. The latter *heiau*, which shares its name with the Kuaokalā Ridge, has not been located. Kuaokalā means "back of the sun" (Pukui et al. 1974:119).

Ka'ena Point and Pu'u Pueo on Kuaokalā Ridge are traditionally associated with *leina a ka 'uhane*, or 'a leaping place of the spirit,' where spirits travel and leap into the afterlife. Traditional beliefs hold that the soul would travel west after it left the body:

As the newly released soul approached the point [Ka'ena Point], it was met by the souls of ancestors or friends who had preceded it. They might send it back to

the body if death were not real. On the other hand, if the disintegration were to be final, they conducted it to Leinakauhane, whence the soul would make its plunge into the sea on its way to eternity. (*Honolulu Advertiser* 1933 in Sterling and Summers 1978:94).

Rasmussen (2007:9) reports a related tradition whereby spirits of the newly dead would go to a place in Keawa'ula Ahupua'a called Ka-ho'ilo'aina-Wākea, which translates to "Wākaea's turning-back place." Here the spirit would be turned back to re-enter the body if the person's *'aumakua*, a personal god or spirit, thought they were not ready to die.

Ka'ena Ahupua'a has been described as poor in terrestrial resources but rich with ocean resources. Handy and Handy (1972:467) described the area as:

a dry coastal strip with poor soil and only four rather insignificant streams reaching the sea from the rocky mountain gulches or valleys. Its compensatory feature was the exceptionally rich deep-sea fishing available off and beyond Ka'ena Point, where the great current pressed by the northeast trade winds flows in a westerly direction along these shores. It was here that the ancient chief Kawelo distinguished himself as a fisherman; and there are also many stories of the culture hero Maui as a great fisherman identified with this area. Much of the coast hereabouts is marked by steeply built-up, shifting sand dunes and treacherously rough seas, which probably accounts for the acclaim connected with particular fishing exploits of the past.

'ĪĪ (1959:98) describes Keawa'ula, the *ahupua'a* on the south side of Kuaokalā Ridge, as "the land that has the fishing grounds for *aku* and for *'ahi* fish."

### 2.2.2 Traditional Land Use

The archaeological history of the area demonstrates that the area around Ka'ena Point was settled relatively late compared to the postulated sequence for Hawai'i and was probably used only on a semi-permanent or seasonal basis until the 1700s. The general chronological model begins with colonization by people from central Polynesia, possibly between A.D. 700 and 800 (Athens et al. 2002). Settlements were first established in resource-rich areas, such as fertile windward valleys with sporadic use of leeward areas favorable to subsistence activities (e.g., fishing or arable dryland agriculture). The first half of the second millennium A.D. was a period of burgeoning populations, intensifying agriculture, increasing social stratification, and the development of an elaborate religious complex (Tomonari-Tuggle 2008:23). Communities continued to expand into new areas, including marginal areas such as Ka'ena Point.

There is little archaeological data specific to the Ka'ena region. Radiocarbon dating of materials from a probable fishing camp at Ka'ena Point (Site 50-80-03-1183) yielded a date calibrated within a two-sigma range of A.D. 1453 to 1644 (Dagher 1994).

The Keawa'ula coastal flat was likely occupied on a permanent basis by the mid-eighteenth century, based on Land Commission Award (LCA) testimonies from Keawa'ula. One claimant dated their family's tenancy back to the time of Kahahana, an O'ahu chief of the mid-1700s

(LCA 5557) and a second dated to the time of Peleiōhōlani, who reigned a generation earlier (Tomonari-Tuggle 2008:23).

### 2.2.3 Historic Land Use

The earliest European account of the project area was made by Captain George Vancouver in 1793, who described the Wai‘anae coast as “one barren rocky waste, nearly destitute of verdure, cultivation, or inhabitants, with little variation all the way to the west point of the island” (McAllister 1933:112). Censuses in 1831-1832 and 1853 reflect a low population density in northwestern O‘ahu as well as a declining population over the nineteenth century. In 1831-1832, the Waialua and Wai‘anae districts were the least populated of the island, with counts of 2,640 and 1,868 respectively. By 1872, the population of Waialua was 851 and the combined population of Wai‘anae and ‘Ewa was 1,671 (Schmitt 1977). This decline reflects a larger trend across the Hawaiian Islands resulting from a combination of disease, low fertility, and out-migration to urban areas.

In the mid-nineteenth century, lands in Hawai‘i were divided among the king, high chiefs, and the government through a process called the Māhele. Commoners were allowed to claim lands they used and occupied through the Land Commission process. As a result of this process, most of the lands surrounding the project area were turned over to the government except Māhele Award 14, a 210-acre parcel in Keawa‘ula given to La‘amaikahiki, and two LCAs on the coastal flat of Keawa‘ula awarded to Kaio (LCA 5557) and Lonoahiilei (LCA 5999).

Large land areas were soon used for commercial ranching. Samuel Andrews leased the area between Mākua Valley and Keawa‘ula until 1897, when L. L. McCandless purchased Andrews’ interests, adding to his ranch that encompassed a large portion of the Wai‘anae District (Tomonari-Tuggle 2008). At the end of the nineteenth century, the O‘ahu Railway and Land Company extended its rail line to Wai‘anae and around Ka‘ena Point. By the end of the century the area had been largely abandoned for permanent habitation and most people who worked in Keawa‘ula lived in Mākua.

In the 1920s entrepreneur C. D. Pringle attempted to establish a pineapple plantation on the Kuaokalā plateau northeast of the project area. Pringle began building a road and cable arrangement on the north side of Ālua Gulch to move equipment and produce on and off the 800-foot plateau. Pringle abandoned the cable project before its completion and reportedly had short-term success with the steep wagon road before abandoning the venture (Hammatt et al. 1993; Sterling and Summers 1978). The area reverted to cattle ranching, which continued to the north of the project area until 1995.

Kaena Point Military Reservation was created in July 1923 under Executive Order 4679. A radar station was developed during World War II (WWII) and the site was eventually acquired by the U.S. Air Force in April 1958. The site was developed as part of a five station network to support the Discoverer Satellite Program launched in February 1959 (Higginbotham/Briggs n.d.:I-7 in Tomonari-Tuggle 2008). The station participated in several Department of Defense space programs throughout the Cold War, including a satellite communications network (Advent), the Missile Detection and Alarm System, and the Satellite and Missile Observation System (Tomonari-Tuggle 2008:27).

## 2.3 Archaeological Background

### 2.3.1 Previous Archaeological Research

In July 2018, Keala Pono conducted an AIS of the APE with pedestrian survey transects spaced at 8 m (McElroy and Duhaylonsod 2018). The survey covered the entire APE; however, the report notes that dense vegetation in the northwest portion of the APE may have affected the identification of archaeological sites in certain areas (see “Area of Low Visibility” in Figure 2). The survey located the previously recorded Site 188, the Moka’ena Heiau, and identified one new site, Site 8777, Pu’u O Pōhaku Hapaina. Keala Pono performed detailed recording and mapping of both sites and also recorded two isolated historic bottles.

Keala Pono’s survey is the latest in a series of archaeological reconnaissance surveys, inventory surveys, and assessments conducted on Kuaokalā Ridge mainly since the 1980s. The area was included in J. Gilbert McAllister’s island-wide reconnaissance in 1929, during which McAllister provided the first archaeological recording of Moka’ena Heiau. A reconnaissance level survey was completed at KPSTS and adjacent areas in 1987 (Hammatt and Borthwick 1987). This survey inventoried 300 to 400 acres of land on both sides of the station road along Kuaokalā Ridge. The survey area extended between 300 and 2,000 feet northeast of the road to include “any relatively gentle slope area that may eventually be part of facilities expansion” (Hammatt and Borthwick 1987:27). It is unclear how much of the APE was covered during the survey. Hammatt and Borthwick recorded nine sites, including Site 188.

Additional archaeological assessments and project-specific archaeological inventory surveys have since been completed at and around KPSTS for U.S. Air Force projects (DiVito and Dye 2014; Hammatt et al. 1993; Jourdan and Dye 2006; Kawachi 1997; McElroy 2010, 2012; Rasmussen 2007; T.S. Dye & Colleagues 2015). In 1997, Kawachi (1997) conducted an archaeological literature review of known historic properties for the DOFAW grazing management plan. In 2006, International Archaeological Research Institute, Inc. performed an archaeological assessment of known sites at KPSTS, including Site 188, and collected additional digital photographs, written notes, measurements, and locational data to update site information (Rasmussen 2007). In 2012, archaeological monitoring was conducted nearby on KPSTS during construction of an antenna and relocation of the existing helipad (McElroy 2010, 2012). No new sites were recorded during the project.

### 2.3.2 Known Archaeological Sites

The cultural resource inventory at KPSTS consists of 14 archaeological sites, of which 7 are eligible for NRHP listing, 6 are determined or recommended not eligible, and one needs additional data (Table 1). Five sites are traditional Hawaiian, three sites are possible traditional Hawaiian, two sites are non-military historic sites, and four are associated with WWII military activities. Only two sites are within the APE, Sites 188 and 8777, which are described individually below.

**Table 1. Previously Recorded Sites at KPSTS**

Site Number (50-80-03-)	Description	Inferred Origin	Significance
0184	Poha Cave (possibly part of 2805)	Traditional Hawaiian	Criterion D; Cultural
0188	Moka'ena Heiau	Traditional Hawaiian	Criterion D; Cultural
2805	Keawa'ula Complex	Traditional Hawaiian, historic	Criterion D; Cultural
3708	Earth terraces with rock alignments (determined to be natural)	Natural, geological terrace	Not Eligible
3714	Leveled area with rock retaining walls, foundation, and barbeque facility	WWII	Criteria A, D
3715	Wooden platform with wire cable	WWII	Criteria A, D
3716	Rectangular boulder platform	Ranching	Criterion D
3717	Stone scatter with alignment; bulldozed remnant	WWII with modern disturbance	Not Eligible
3718	Alignments with adze on surface (alignments determined to be natural)	Traditional Hawaiian, natural	Not Eligible
3719	Stone/brick pile and enclosure	Historic/Modern	Not Eligible
3720	Rock alignment (determined to be natural)	Natural	Not Eligible
8777	Possible terrace and rock alignment	Traditional Hawaiian	Needs Data
Temp-1	Remnant rock alignment (determined to be bulldozer push pile)	Cold War	Not Eligible
Temp-2	Excavated ledge	WWII	Criterion D

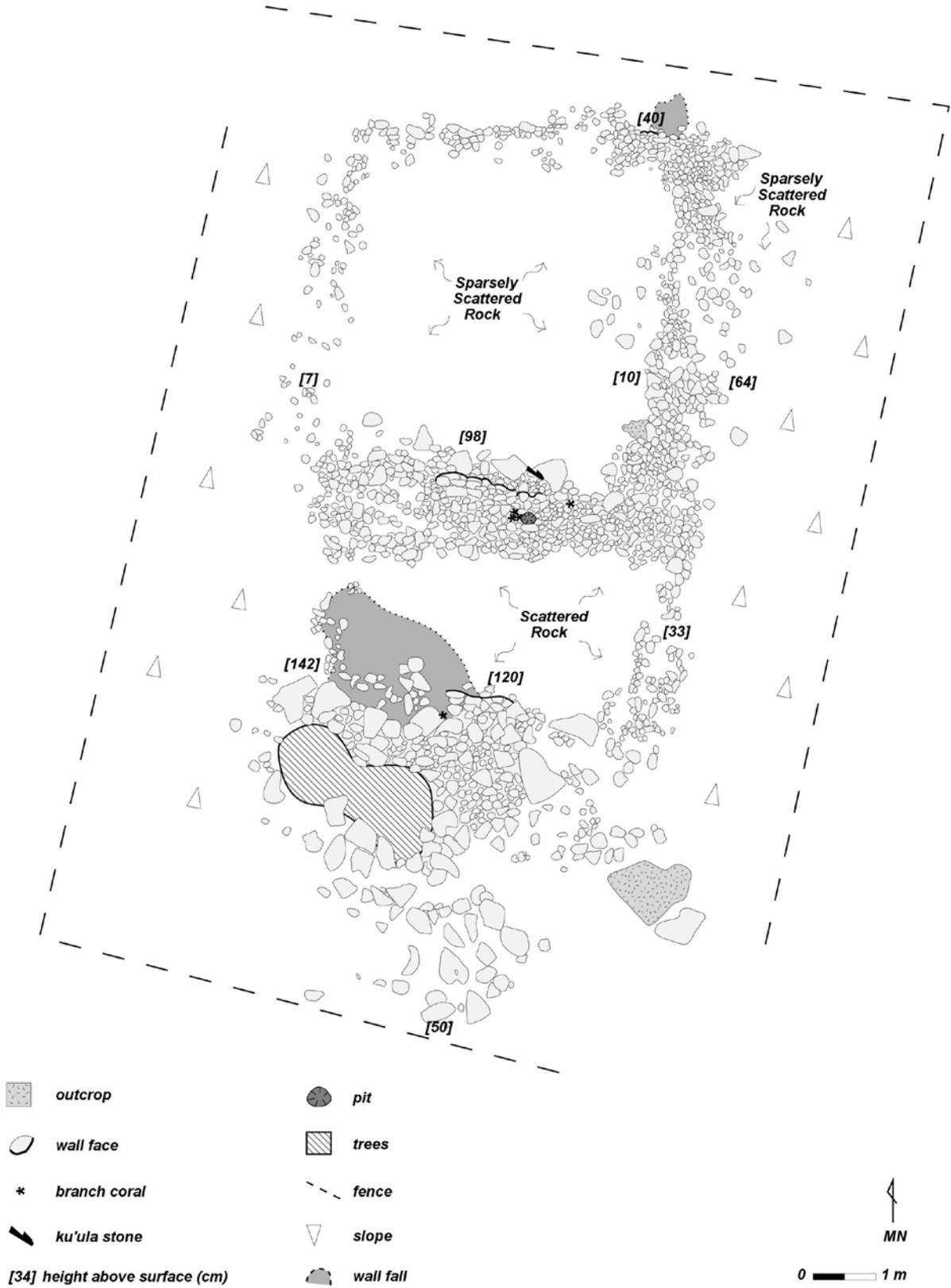
*Source: McElroy and Duhaylonsod 2018; Tomonari-Tuggle 2008*

### 2.3.2.1 Site 188, Moka'ena Heiau

Site 188 is eligible for listing in the NRHP and is culturally significant as a traditional Hawaiian ceremonial site. A detailed description of the *heiau* and its recording history are provided in McElroy and Duhaylonsod (2018). The *heiau* is the highest of any on O'ahu and according to Native Hawaiian consulting parties is associated with sun worship, worship to the god Kāne, and the relationship between O'ahu, Kaua'i, and the fishing grounds between them. Oral history share during consultation for the Phase I Geotechnical Testing undertaking also described the *heiau* as having an important role during Kamehameha I's conquest by providing warning to the people of Kaua'i. The *heiau* may be part of a larger cultural complex or traditional cultural property or landscape encompassing portions of Kuaokalā Ridge and Ka'ena Point. The *heiau* consists of four terraces composed of boulders, stacked stones, and cobbles (Figure 3). The total site boundary is 38 m by 22 m. Keala Pono recorded the following observations:

The current condition of the *heiau* is roughly consistent with earlier maps and descriptions. McAllister (1933:127) described the *heiau* as a "3-division structure" measuring 22.9 by 10.7 m. Hammatt and Borthwick (1987:41) noted "4 distinct terraces" measuring 23.8 m by 10.7 m. The current assessment considers the uppermost boulder area as a terrace and is thus in agreement with Hammatt and

Figure 3. Plan Map of Site 188, Moka'ena Heiau (McElroy and Duhaylonsod 2018:31)



Borthwick's (1987) count of four terraces. Including this boulder area and possible wall fall around the structure, the current measurements are approximately 28 m long and 12 m wide...

The uppermost terrace is composed mainly of boulders, some of which are piled...The middle two terraces include intact wall faces which are made up of stacked stones and cobbles with a few boulders. The tallest height of the intact facing is 1.2 m. The walls of the lowest terrace are primarily made up of piled stones and cobbles. Several offerings of branch coral were observed within the structure and in a stone-lined pit...and a possible kū'ula (stone image used to attract fish) is located at the base of one of the walls...A stone with the appearance of a long face was noted within the third terrace...Hammatt and Borthwick (1987) also observed a row of possible post holes, two inches in diameter each, on the third terrace, but these were not identified in the current survey (McElroy and Duhaylonsod 2018).

Hammatt and Borthwick (1987) conducted test excavations consisting of four test units around the perimeter of the structure at Site 188. Three test units measured 50 square centimeters and one test unit was 1 square meter. The excavation units were placed 2.7 to 9 m from the edge of the structure. No artifacts were recovered; however, a possible buried rock alignment or paving and charcoal flecking were observed in excavations north-northeast and west of the feature.

Moka'ena Heiau is eligible for listing in the NRHP for association with events important to our history (Criterion A) and the potential to yield data significant to understanding history or prehistory (Criterion D). The site similarly meets Chapter 6E significance Criteria "a" and "d" and is also significant to the Hawaiian people due to associations with cultural practices, traditional beliefs, events, or oral accounts (Criterion "e"). Keala Pono recommended the site be avoided during any future construction and that a preservation plan be completed should construction occur in the vicinity of the *heiau*. The preservation plan should consider the *heiau's* viewshed. Similarly, the KPSTS ICRMP recommends protective measures for Moka'ena Heiau, including an unspecified protective buffer, preservation of view planes to the north and east, and monitoring of development in the immediate area. Keala Pono also recommended replacement and expansion of a barbed wire fence that currently surrounds the heiau and is in extreme disrepair. As discussed in Section 1.2, MDA will avoid the site during geotechnical testing and will install temporary construction fencing to provide a 30-m buffer around the site. MDA will also replace and expand the barbed wire fence around the site.

#### 2.3.2.2 Site 8777

Site 8777 is ceremonial site with an alignment and a possible terrace located within the APE, 35 m northeast of KPSTS Building 30. The site is 12.8 m by 3.7 m. The terrace is 2.7 m long, 3.7 m wide, and 60 centimeters (cm) tall with stacked stones and cobbles in a roughly rectangular plan. A c-shaped rock alignment 1.1 m long, 70 cm wide, and 15 cm tall is slightly uphill of the terrace. Archaeologically, the site is in poor condition and not well defined, though data recovery may provide information about function and age of occupation. During consultation, Pu'u O Pōhaku Hāpaina was identified as a place where kāhuna-in-training were tested. A specific test that took place at Pu'u O Pōhaku Hāpaina was the moving of a boulder with one's spiritual

power. If the kahuna-in-training was able to do this, then that person was advanced to the next level. This ability was used to construct the Moka'ena Heiau.

Pu'u O Pōhaku Hāpaina is currently unevaluated for eligibility for NRHP listing. Additional data is needed to establish the site's historic context and evaluate the site's significance under NRHP Criteria A and D. The site is significant under Chapter 6E for association with important cultural practices, traditional beliefs, and oral accounts (Criterion "e").

## 2.4 Archaeological Implications for Monitoring

Historical and archaeological data have several implications for archaeological monitoring and the potential for archaeological and cultural remains in the area that may be affected by Phase I Geotechnical Testing:

1. The surrounding area is rich in traditional history. Many *mo'olelo* and oral traditions are associated with the area, as well as the flats and coastal areas below the ridge. Both sites within the APE have important cultural value to Native Hawaiians.
2. Archaeological surveys in and around the APE have identified several archaeological sites in the vicinity. Two are located within the APE. Although Keala Pono's 2018 AIS used tight transect spacing, dense vegetation may have prevented identification of surface sites in some areas. There is some potential for unidentified surface sites in the APE.
3. The highest potential for buried sites would be expected at the two known sites. Previous testing at Moka'ena Heiau encountered a possible buried terrace but no associated deposits. The lack of subsurface deposits at Site 188 and at other pre-contact sites on KPSTS presume a low potential for buried sites in the APE. However, isolated artifacts or buried human remains are possible.
4. There are no known WWII or Cold War-era features in the APE.

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## 3. Monitoring Procedures

### 3.1 Personnel

Monitoring will consist of both archaeological and cultural monitoring. Keala Pono will provide the Principal Investigator and archaeological monitor for the project. The Principal Investigator will possess the professional qualification standards established in HAR 13-281, as well as the Secretary of the Interior's *Professional Qualification Standards for Archaeology*. The Principal Investigator is responsible for managing fieldwork, laboratory analysis, and report production; and ensuring the work is of high quality and meets professional standards. The Principal Investigator may conduct field visits and supervise field personnel. The archaeological monitor will have sufficient fieldwork experience in Hawai'i or have completed sufficient college-level coursework in Anthropology and Hawaiian Archaeology.

Garcia and Associates is providing cultural monitoring for the project. The cultural monitor shall:

- have a generational and/or cultural affiliation with the affected project area
- have familiarity with cultural properties in the area and their significance
- have sensitivity and the ability to represent and communicate with MDA on behalf of Native Hawaiians
- be familiar with state and federal regulations and standards for archaeological investigations, reporting, and burial discovery
- be familiar with the project scope of work, expectations, requirements, project boundaries, responsibilities, and chain of command
- if desired and deemed appropriate by the monitor, provide opportunity for daily opening and closing *pule* and/or *'oli* (prayers and/or chants).

The archaeological and cultural monitors are responsible for daily monitoring activities, as described below, and have authority to stop ground-disturbing activities in the event potentially significant archaeological, cultural, or human remains are observed.

HDR archaeologists are responsible for overall project organization and communication with MDA. HDR will be onsite to observe the first week of monitoring, and provide quality control of daily field notes of both the archaeologist and cultural monitor throughout the monitoring effort. HDR will also provide senior technical review of the archaeological monitoring report for MDA.

### 3.2 Archaeological Monitoring

Before geotechnical testing begins, the archaeological and cultural monitors will meet with the geotechnical testing team to provide a sensitivity training and discuss monitoring procedures and requirements. The monitors will review the cultural significance of the area and the known sites. The monitors will ensure that the geotechnical testing team understands the monitoring requirements and that the monitors have authority to halt geotechnical testing activities. The monitors will also discuss safety protocols for close inspection or sampling of exposures, and procedures for protecting exposed archaeological or cultural deposits and materials should consultation with SHPD or additional recording be needed.

The monitors will create daily notes on the locations and monitored activities, environmental conditions, and daily activities. All documentation produced during monitoring will meet the Secretary of the Interior's *Standards and Guidelines for Archaeological Documentation*.

Each active piece of ground-disturbing equipment will require an archaeological monitor. The monitor will directly observe all ground disturbance related to the borings. The monitor will directly observe soils recovered from the borings and record observations on stratigraphy and soil character.

At the discretion of the monitors, spoils from the borings will be sieved through ¼ inch mesh. If archaeological materials are recovered during screening, the monitor will collect the materials for laboratory processing and curation. Notes on location, depth, type, and quantity will be documented for collected materials.

Soil test locations will be collected with a GPS. The monitor will also collect locations for all drawings (if applicable), photograph locations, and any archaeological materials, cultural deposits, or human remains that are identified. Photographs will be taken of each soil test location.

If archaeological deposits (e.g., features or artifacts) are observed during monitoring, geotechnical testing activities will immediately cease so that the archaeological monitor can investigate the materials and determine whether the deposit is potentially significant pursuant to criteria of significance codified at 36 CFR § 60 and HAR 13-275-6(b). If the deposit is not potentially significant, geotechnical testing may continue. If the deposit is potentially significant, the monitor will notify the geotechnical testing team and HDR archaeologists, who in turn will notify MDA. Geotechnical testing may not resume at that location until post-review discovery procedures are completed per 36 CFR 800.13 and/or HAR 13-284-12, as appropriate. However, geotechnical testing may continue elsewhere. The project superintendent will take appropriate steps to protect exposed deposits and secure the area from further disturbance.

The monitor will collect information on the nature and character of the archaeological deposit to assist in making significance and eligibility determinations and developing a treatment plan in consultation with the SHPD, if appropriate. Such information may include feature type, the nature of the archaeological materials, the potential for chronometric dating or environmental sampling, and the potential extent of the deposit. The monitor will create plan drawings as appropriate and photograph the deposits. The monitor will provide this information to HDR along with an eligibility recommendation and potential treatment measures, and HDR will prepare documentation on the discovery for submittal to MDA and then to SHPD. Step-by-step discovery procedures and points of contact are provided in Appendix A. Appropriate treatment measures may include (but are not limited to): avoidance, illustration of plan views, sampling for laboratory processing, or additional archaeological testing.

### 3.3 Cultural Monitoring and Human Remains

The primary task of the cultural monitor will be to observe intrusive surface and subsurface boring and digging activities in conjunction with the archaeological monitor. Each active piece of ground-disturbing equipment will require a cultural monitor. The cultural monitor will work

closely with the onsite and HDR archaeologists to provide insight and recommendations if properties of traditional religious and cultural importance are discovered or inadvertently impacted, and to assist in the identification and treatment of such sites. Some of the items falling within the purview of the cultural monitor include Native Hawaiian graves and artifacts; natural resources used for food, ceremonies, or traditional crafts; and places that have special cultural or historic significance.

During monitoring work, the cultural monitor will accomplish the following tasks, as needed:

- provide insight and recommendations concerning properties of traditional religious and cultural importance
- assist in the identification of such sites
- assist in the development of short and long-term protection measures for such sites
- communicate with Native Hawaiians about the identification process and treatment of cultural resources
- liaise between the Government and the Native Hawaiian community regarding cultural resources.

Recommendations on avoidance of adverse effects on properties or areas of traditional religious and cultural importance from construction or construction related activities will be compiled and submitted on a weekly basis to the Principal Investigator by the cultural monitor. The cultural monitor will review such observations and recommendations for confidentiality concerns. After review, appropriate observations will be provided to the on duty archaeological monitor on the first work day following the week of observations.

If suspected human remains or culturally significant materials are observed during geotechnical testing, activity at that location will immediately cease in the vicinity of the find and the cultural and archaeological monitors will investigate the discovery. If the discovery is determined not to be of cultural significance, then geotechnical testing may continue. If the discovery proves to be human remains, funerary objects, sacred objects, or objects of cultural patrimony, geotechnical testing may not resume until removal has been accomplished. Alternatively, testing may be moved to a new site and the discovery preserved in place.

Upon the discovery of human remains or culturally significant materials, the archaeological and cultural monitors will immediately notify the project superintendent and HDR archaeologists of the find. The monitor will take steps necessary to protect exposed remains or deposits and secure the area from further disturbance. HDR will immediately notify MDA, which will in turn notify the state archaeologist, SHPD, appropriate Native Hawaiian representatives, and, in the case of human remains, the Honolulu County Medical Examiner and Coroner's Office and appropriate law enforcement. From this point forward, MDA will adhere to the provisions of NAGPRA, 6E-43.6, and their implementing regulations. Discovery procedures and points of contact are provided in Appendix A. The project superintendent will take steps necessary to protect the discovery and secure the area from further disturbance.

## 4. Post-Field Procedures

### 4.1 Laboratory Procedures

Laboratory procedures may vary according to the results of the archaeological and cultural monitoring. The monitoring procedures outlined in this AMP will produce soil characterizations and photographs and may produce drawings and collected artifacts retrieved from sieved soils.

Collected materials will be cleaned using appropriate methods and prepared for analysis. Artifacts will be measured, weighed, counted, sketched or photographed, and identified as to material, form, and function. Faunal remains will be weighed, counted, and taxonomically identified to the highest level of detail possible. Soil descriptions will be analyzed to draw conclusions on stratigraphy, site formation processes, and archaeological sensitivity.

If archaeological deposits are discovered during monitoring, these may require treatment actions that produce collections or samples requiring additional laboratory processing and analysis. Laboratory procedures associated with such collections would be detailed in a corresponding treatment plan and are outside the scope of this monitoring plan

### 4.2 Curation

Materials not associated with burials will be temporarily stored at the contracted archaeologist's facility and will be turned over to the landowner at the close of the project. Final archiving shall be done in consultation with SHPD and the landowner. Any departure from these provisions will be in consultation with and have written concurrence from SHPD.

### 4.3 Reporting

Following the completion of the geotechnical testing, Keala Pono Archaeological Consulting will prepare an archaeological monitoring report that documents the results of the archaeological and cultural monitoring. The report will meet the Secretary of the Interior's *Standards and Guidelines for Archaeological Documentation* and SHPD's *Rules Governing Standards for Archaeological Monitoring Studies and Reports* (HAR 13-279-4).

The report will include photographs and plan maps to illustrate activity locations and results. The report will also include descriptions of any identified archaeological or cultural sites or human remains and the status of resulting consultation and treatment actions. The report will include a discussion of the archaeological and cultural sensitivity of the APE that could influence future development decisions, including a list of known archaeological or cultural sites, historic properties, and culturally sensitive areas within and near the APE. A draft report will be submitted to the SHPD within 120 days of completing monitoring. A final report will be prepared and submitted within 90 days of receiving comments.

If archaeological materials, significant cultural materials, or human remains are identified during monitoring that require additional treatment, these actions may require preparation of additional letters, memos, and/or reports beyond the archaeological monitoring report.

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# A

## Inadvertent Discovery Procedures and Points of Contact

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## A.1 Procedures for Archaeological Discoveries

Upon the discovery of potentially significant archaeological deposits (e.g., features or artifacts), the archaeological monitor will implement the following procedures:

1. The monitors will immediately notify the project superintendent or on-site manager and HDR archaeologists, who in turn will notify MDA. The project superintendent or on-site manager will immediately halt activity in vicinity of the discovery. The project superintendent will ensure that a reasonable effort is made to secure the area and protect the discovery from damage. This may include cordoning the area and covering exposed items with a tarp or thin layer of soil.
2. MDA will notify the State Parks Archaeologist of the discovery.
3. The archaeological monitor will collect data on the nature and context of the discovery, and prepare plan drawings, as appropriate. No materials not already disturbed will be removed from the ground. Keala Pono Archaeological Consulting will provide this data to HDR within 24 hours of the discovery as well as recommendations on NRHP eligibility. If the site is evaluated to be significant and cannot be avoided during geotechnical testing, Keala Pono Archaeological Consulting will recommend treatment measures.
4. Within 2 days of the discovery, HDR will submit documentation on the discovery to MDA. Within 3 days of the discovery, MDA will notify SHPD and provide the prepared documentation with recommended NRHP eligibility. MDA will consult with SHPD, NHOs, and other consulting parties on the development of a treatment plan (such as a mitigation plan) as required.
5. MDA will implement the treatment plan and upon completion, prepare and submit to SHPD a report that documents treatment actions and results.

## A.2 Procedures for Human Remains and NAGPRA Cultural Items

Upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony subject to NAGPRA, the archaeological and cultural monitors will implement the following procedures:

1. The monitors will immediately notify the project superintendent or on-site manager and HDR archaeologists, who in turn will notify MDA. The project superintendent or on-site manager will immediately halt activity in the vicinity of the discovery. The project superintendent will ensure that a reasonable effort is made to secure the area and protect the discovery from damage. This may include cordoning off the area and covering exposed items with a tarp or thin layer of soil.
2. MDA will notify the State Parks Archaeologist of the discovery. In the case of human remains, MDA will also notify the SHPD Burial Sites Program, the O'ahu Burial Council, the Office of Hawaiian Affairs, the Honolulu County Medical Examiner and Coroner's Office, and law enforcement. If the discovery occurs on a weekend or holiday, MDA shall

notify the Division of Conservation and Resources Enforcement in addition to the SHPD Burial Sites Program. The Honolulu County Medical Examiner and Coroner’s Office will inspect the remains to ensure they are not of recent origin.

3. Within one working day of the discovery, the monitors will examine the discovery using non-invasive means to evaluate the origin and nature of the discovery. In the case of human remains, the monitors will attempt to identify ethnicity. The cultural monitor may collect oral or written testimony to help establish ethnicity.
4. Human remains will be protected from the sun and will not be photographed. The archaeological monitor will also evaluate whether the discovery is a historic property subject to Section 106 of the NHPA, in which case the procedures for archaeological discoveries outlined in Section A.1 will also be implemented.
5. If the discovery is on federal land, MDA will coordinate among the USAF, SHPD Burial Sites Program, O’ahu Island Burial Council, and NHOs, as appropriate, to develop and implement a Plan of Action under the provisions of NAGPRA. If the discovery is on state land, MDA will coordinate among DOFAW, the SHPD Burial Sites Program, O’ahu Island Burial Council, and NHOs, as appropriate, to implement the procedures under Chapter 6E-43.6 and HAR 13-300-40.

### A.3 Points of Contact

Title	Address	Phone
<b>MDA</b>		
Buff L. Crosby, PhD MDA/DPFE	Missile Defense Agency Building 5222, Martin Road Redstone Arsenal, AL 35898	(256) 955-4032
<b>US Army SMDC</b>		
David Hasley US Army SMDC	USASMDC/ARSTRAT PO Box 1500 Huntsville, AL 35807-3801	(256) 955-4170
<b>Kaena Point Satellite Tracking Station</b>		
Lance Hayashi Detachment 3, 21st Space Operations Squadron		(808) 697-4312
<b>DOFAW/State Parks</b>		
State Parks Archaeologist	Division of State Parks Department of Land and Natural Resources Honolulu, HI 96813	(808) 587-0287
<b>SHPD</b>		
SHPD Archaeologist – O’ahu	State Historic Preservation Division Kakuhihewa Building, Room 555 601 Kamokila Blvd. Kapolei, HI 96707	(808) 692-8015
SHPD Burial Program	State Historic Preservation Division Kakuhihewa Building, Room 555 601 Kamokila Blvd.	(808) 692-8015

Title	Address	Phone
	Kapolei, HI 96707	
<b>Other State Contacts</b>		
Division of Conservation and Resources Enforcement	Kalanimoku Building 1151 Punchbowl St. Honolulu, HI 96813	(808) 587-0400
Honolulu County Medical Examiner & Coroner's Office	835 Iwilei Road Honolulu, Hawaii 96817	(808) 768-3090
Honolulu Police Department	801 South Beretania Street Honolulu, HI 96813	(808) 529-3111
Office of Hawaiian Affairs	711 Kapaiolani Blvd, Suite 500 Honolulu, HI 96813	(808) 594-1930

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