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# ARCHAEOLOGICAL INVESTIGATIONS AT MAUNAWILA HEIAU: TRADITIONAL HAWAI'I IN HAU'ULA'S BACKYARD

A REPORT SUBMITTED TO THE GRADUATE DIVISION OF THE  
UNIVERSITY OF HAWAI'I AT MĀNOA IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

IN

ANTHROPOLOGY

APPLIED ARCHAEOLOGY TRACK

MAY 2014

By

Rosanna Mari Runyon Thurman

Committee:

James Bayman, Chairperson

Barry Rolett

Davianna McGregor

Keywords: Hawaiian archaeology, community involvement, *heiau*

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## ACKNOWLEDGEMENTS

This project was made possible through the landowner's persistence and good faith effort to preserve Maunawila Heiau. Through the diligence of the McGregor family, Hau'ula and neighboring communities have embraced the task of caring for, maintaining, and promoting understanding and appreciation of cultural sites found on the property. The scope of this project was designed by the landowner and the coordinator of the Applied Archaeology Program at the University of Hawai'i-Mānoa, Dr. James Bayman. Dr. Bayman put his trust in me to carry out this project, which I am very grateful for. It has been my privilege to work with the landowners Dr. Davianna McGregor, Lurline McGregor, Dr. Pua Aiu, and other members of the McGregor *'ohana*. The Hau'ula Community Association (HCA) has been integral to the success of the Maunawila Heiau project. The president of HCA, Dotty Kelly, coordinates community days for maintenance of the property, holds steering committee meetings to form a comprehensive management plan, plans community meetings to provide updates on archaeological work, and provides a link between the property and local student involvement. Two professors at Brigham Young University-Hawai'i (BYUH), Rebekah Walker, B.A. and Dr. Tevita Ka'ili, have created a successful educational program which provides opportunity for students to learn about Hawaiian culture using a hands-on approach. The neighboring land owner, Ben Lasery, deserves thanks for his allowance of vehicular and foot traffic on his property as often as is needed to access the site. Ben also maintains the access trail leading to Maunawila Heiau. These individuals are integral to the success of this project.

The Maunawila Heiau project was assisted by numerous individuals who were generous with their time and effort. Volunteers who participated in community days at the site include local residents and visitors, teachers, students, and distinguished specialists from throughout Hawai'i. Special thanks to Dr. Evert Wingert with the UH-Mānoa geography department for bringing his students to the site to assist with field mapping. Mapping the site was also assisted by archaeologist Maryanne Maigret, M.A. with the Hawai'i State Parks. Much appreciation is given to archaeological professionals who toured the site and provided guidance and personal interpretations, including David Shideler, M.A., Dr. Christopher Monahan, Matt McDermott, M.A., and Dr. Patrick Kirch. Historic and cultural background information concerning the site was graciously shared by Ahi Logan, Cy Bridges, and Jan Beckett.

Leading scientists from ancillary disciplines provided analyses of materials collected from Maunawila Heiau for a fraction of normal costs. Therefore, I would like to thank Dr. Peter Mills and Dr. Steve Lundblad at the University of Hawai'i-Hilo for the Energy-Dispersive X-Ray Fluorescence (EDXRF) analysis of recovered stone artifacts, Dr. Gail Murakami with International Archaeological Research Institute Inc. (IARII) for identifying charcoal species recovered from project excavations, Dr. Carl Christenson with the Bishop Museum, for analyzing collected landsnails, and Dr. Chris Lao and Dr. Becky Azama with the Department of Agriculture for analyzing collected seeds. Through these efforts this project has provided as an opportunity for inter-disciplinary coordination in support of the community and has helped to develop a renewed interest and understanding of this archaeological treasure.

I would also like to thank my fieldwork assistants Quy Tran, M.A. and my husband, Douglas Thurman, B.A. who worked tirelessly in the field and provided me with their unrelentless support, as well as my friend, Kristen Lucas, who assisted with sorting, counting, weighing, and bagging laboratory materials. Inspirational mentors who I have learned from also include Douglas Borthwick, B.A., Dr. Hallett H. Hammatt, Dr. Rolett, Dr. Jacquelyn Lewis-Harris, and Dr. Tim Bauman.

## INTRODUCTION

The Maunawila Heiau project is located on the northeast shore of O‘ahu within Hau‘ula Ahupua‘a, Tax Map Key (TMK): [1] 5-4-05: 010. This project was conducted per request of the landowners, the heirs of Daniel and Louise A‘oe McGregor, and has been organized in coordination with the McGregor ‘ohana (family), Dr. James Bayman (Coordinator of the Applied Archaeology Program at the University of Hawai‘i-Mānoa), and the Hau‘ula Community Association (HCA). This project was prompted by a planned change in land ownership of TMK: [1] 5-4-05: 010. The McGregor ‘ohana wanted to ensure preservation of archaeological features on the property. Support for preservation and maintenance of Maunawila Heiau was provided by the Ko‘olaupua Hawaiian Civic Club and local community members. The parcel is in the process of being purchased by the Hawai‘i Island Land Trust (HILT), with assistance from the Clean Water and Natural Lands Commission and the Legacy Lands Conservation Commission. The study area is presented on an island-wide USGS map (Figure 1), an aerial photograph (Figure 2), a USGS Hau‘ula quadrangle map (Figure 3), and a TMK map (Figure 4).

This project was completed in fulfillment of requirements for my degree in the Applied Archaeology Program at UH-Mānoa. Fieldwork was conducted under archaeological permits issued to the principle investigator, Dr. James Bayman (in accordance with Hawaii Regulatory Statutes [HRS] 13-13-281). This project was conducted in accordance with Hawai‘i Administrative Rules (HAR) for archaeological inventory surveys (13-13-279).

## SCOPE OF WORK

The project was conducted as a means to document archaeological features on the 9-acre land parcel, TMK: [1] 5-4-005: 010, and participate in community outreach. The scope of work for this project included: 1.) archaeological survey, 2.) vegetation removal, mapping, and limited sub-surface testing at Maunawila Heiau, 3.) documentation of additional features on the parcel, and 4.) community and student work days at the site, attending community meetings to provide progress updates, and dissemination of information.

Fieldwork was conducted in four phases. Phase I was performed during the Spring 2012 semester and included a parcel-wide archaeological surface survey, vegetation clearance from the perimeter and surface of Maunawila Heiau, mapping of Maunawila Heiau, and community work days. Phase II was performed during the Fall 2012 semester and included hand excavation within three features of Maunawila Heiau, community vegetation clearing days, and group tours. Excavation was assisted by Quy Tran, who was then a student in the UH-Mānoa Applied Archaeology program, and Douglas Thurman (contract archaeologist). In accordance with community consultation, Quy and I designed a “Research Goals and Sampling Strategy” plan for excavation work (Runyon and Tran 2012). The plan presented research questions regarding the function, use, and chronology of Maunawila Heiau. This plan was reviewed and approved by the State Historic Preservation Division (SHPD). Phase III was conducted during the Spring 2013 semester and included completion of excavation work, analysis of collected materials, documentation of additional features on the parcel, community vegetation clearing days, and group tours. The project was designed to generate sufficient data to assess sites for eligibility for nomination to the Hawai‘i State Register of Historic Places (State Register) and the National Register of Historic Places (NRHP).

A fourth phase of work was conducted through the Fall 2013 and Spring 2014 semesters. Phase IV included archaeological support in the form of monitoring community vegetation clearing efforts, providing educational tours, and attending community meetings. This work has developed into a separate grant-funded project.

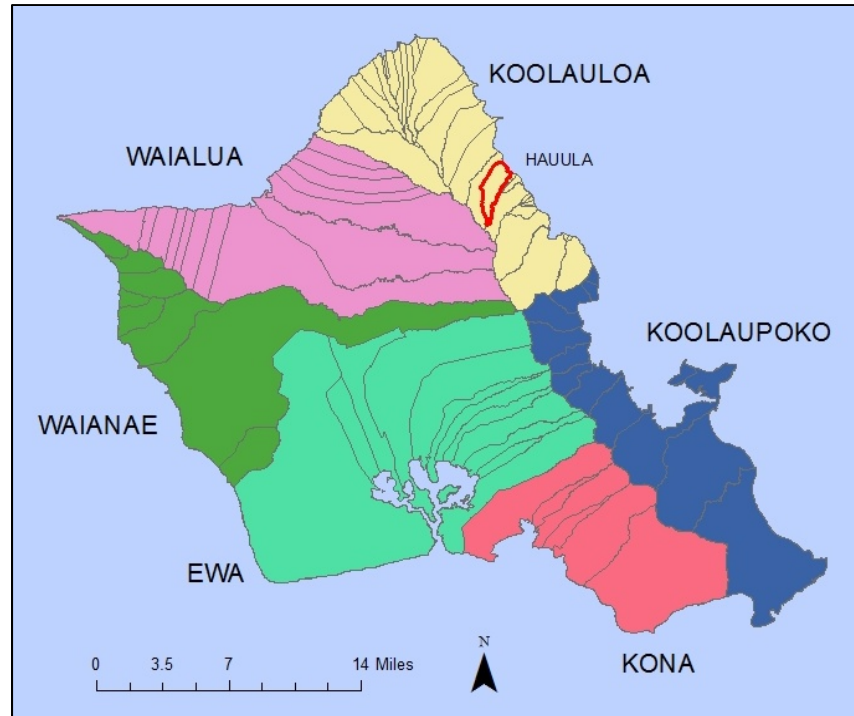


FIGURE 1. MAP OF O'AHU SHOWING DISTRICTS (COLOR-CODED) AND AHUPUA'A BOUNDARIES, HAU'ULA AHUPUA'A IS OUTLINED IN RED

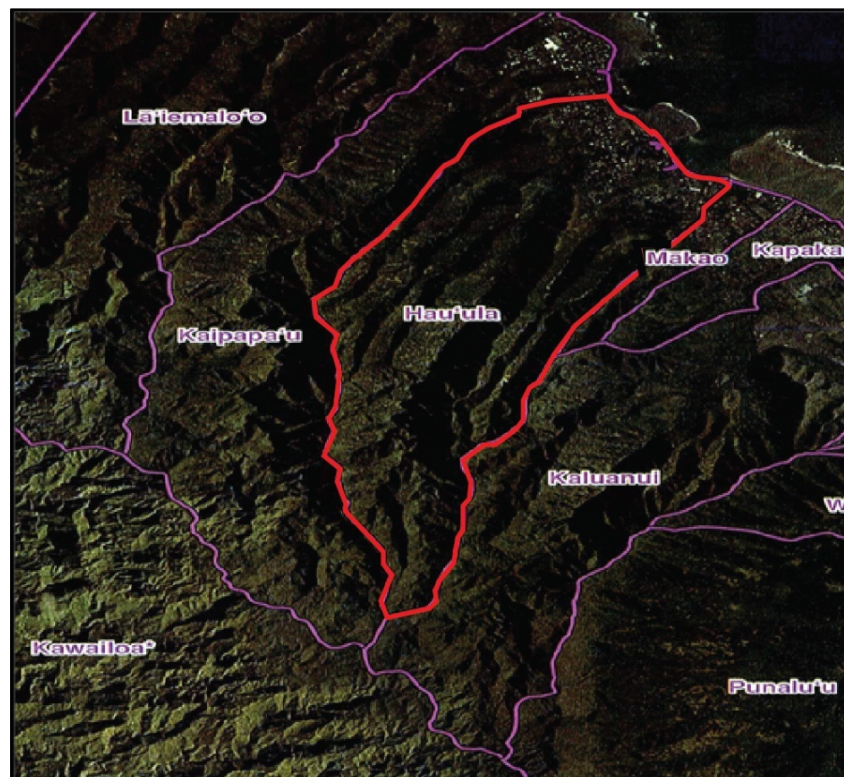


FIGURE 2. AERIAL PHOTO SHOWING HAU'ULA AND NEIGHBORING AHUPUA'A (USGS ORTHOPHOTO 2000)



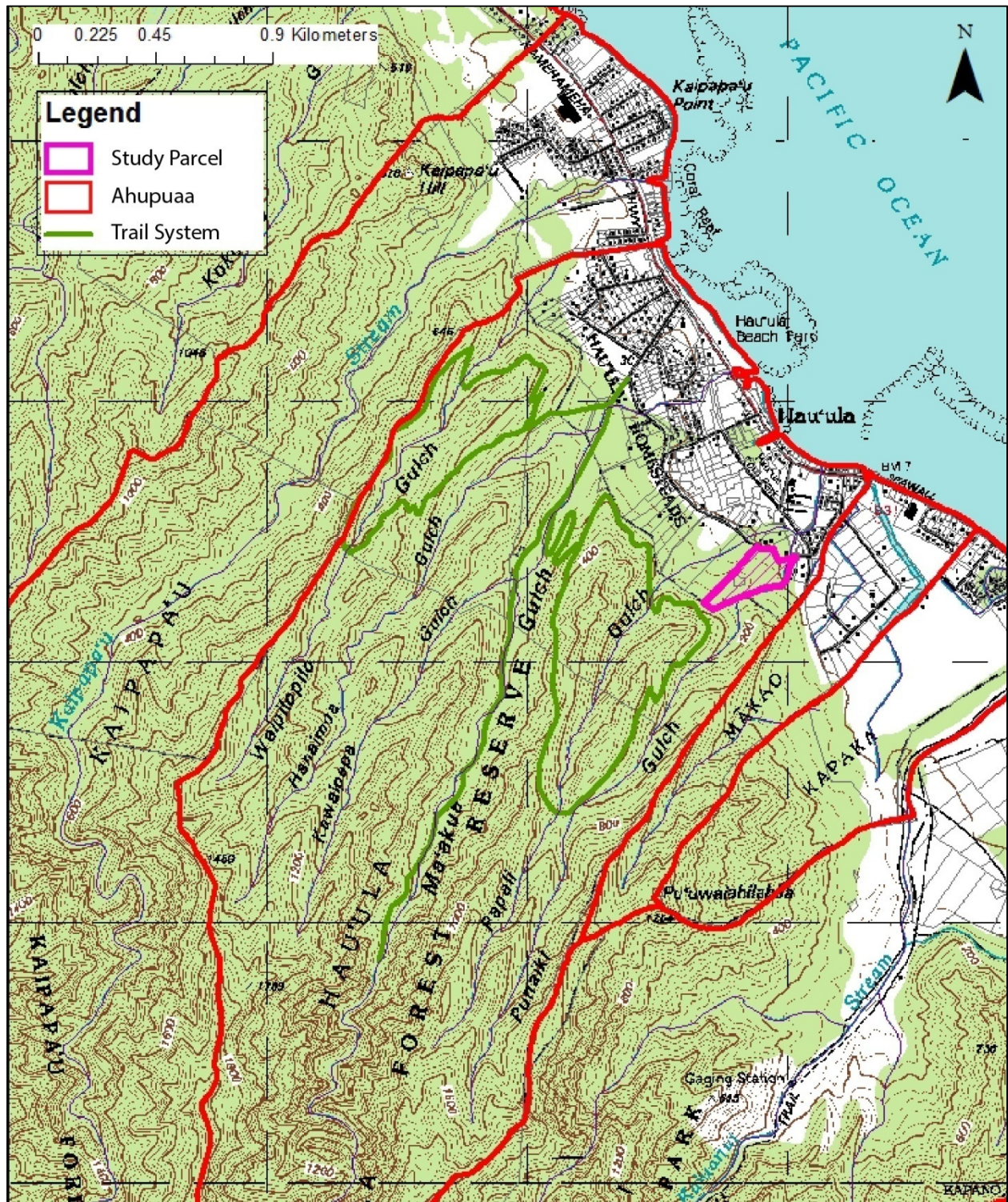


FIGURE 3. PORTION OF A 1992 USGS HAU'ULA QUADRANGLE MAP WITH AHUPUA'A BOUNDARIES (IN RED), MODERN TRAILS IN GREEN, AND THE LOCATION OF THE STUDY AREA (OUTLINED IN PINK)





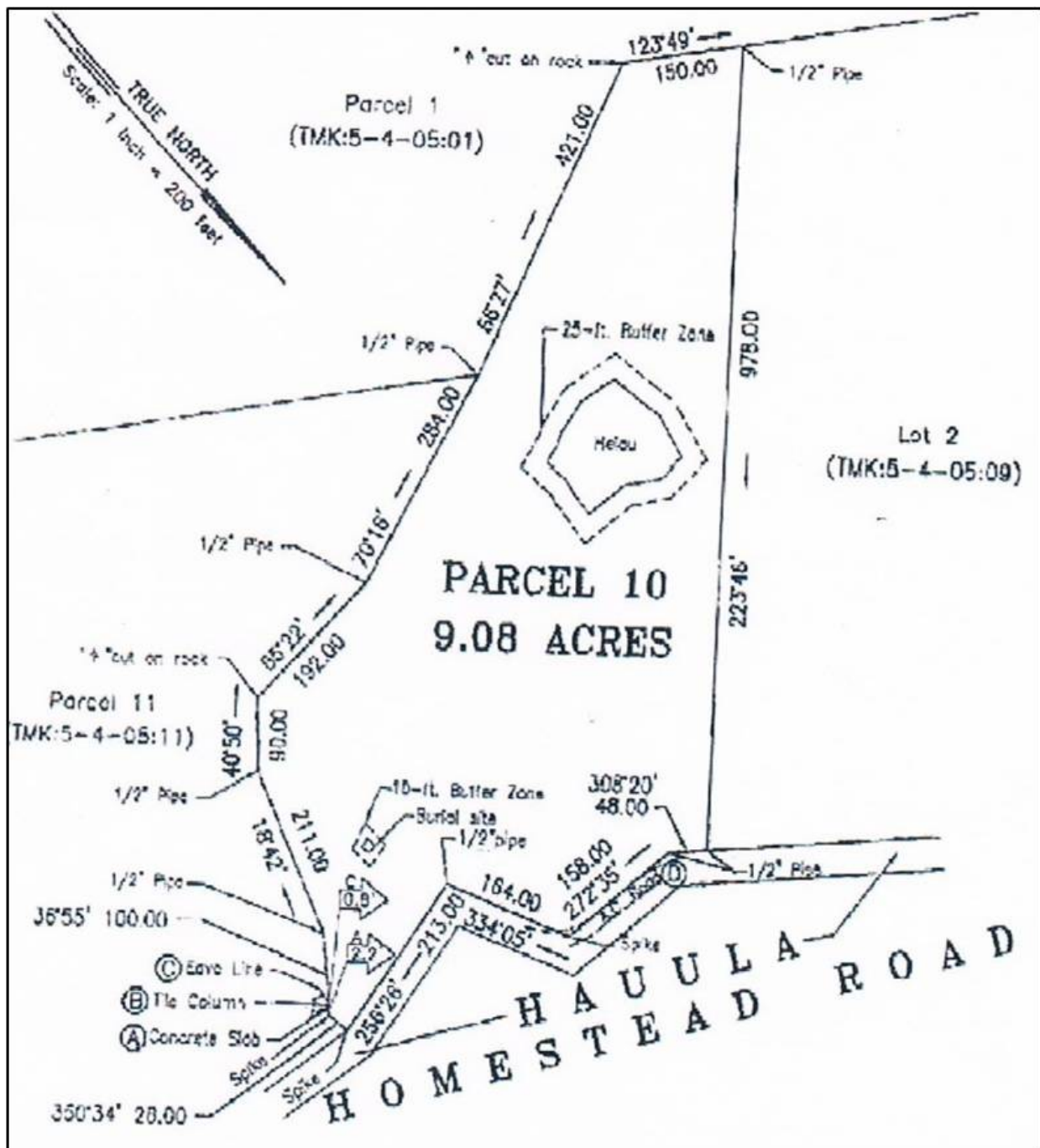


FIGURE 5. TMK: [1] 5-4-05:010 PARCEL MAP SHOWING TWO EXISTING HISTORIC PROPERTIES, MAUNAWILA HEIAU (INCLUDING A 25 FOOT BUFFER) AND A BURIAL SITE (INCLUDING A 10 FOOT BUFFER)

## REGULATORY REQUIREMENTS

This project was conducted for academic and educational purposes. There was no potential damaging threat to a known historic property in need of mitigation. Therefore, this study does not require review by the Department of Land and Natural Resources/State Historic Preservation Division (DLNR/SHPD). However, as a good faith effort to conduct quality work this report was written in fulfillment of Hawai'i Administrative Rules (HAR) for archaeological inventory surveys (13-13-276) (DLNR/SHPD 2002). Furthermore, as it is the landowner's and community's desire to have Maunawila Heiau listed on the State and National Registers of Historic Places, this report is written in accordance with standards set forth in Section 106 of the National Historic Preservation Act (36 CFR Part 800, Subpart B, 800.3 through 800.5), as applicable. These standards are designed to "ensure that historic properties listed on or eligible for listing on the National Register that may be affected by an undertaking receive due consideration" (DLNR/SHPD 2009). Therefore, this report complies with the following standards:

- 1.) Depict the area of potential effect (APE) on a USGS quad map, include a site plan of the APE with locations of historic sites and their relations to roads, public views, etc.;
- 2.) Include the Tax Map Key number, including the parcel and lot numbers;
- 3.) Include a description of the undertaking, including any federal involvement;
- 4.) Include the acreage of the APE;
- 5.) Include the steps taken to identify historic properties;
- 6.) Include photographs of existing conditions of the APE and other known historic properties;
- 7.) Include a summary of historic properties within the APE, include age and date of construction, if known;
- 8.) Include a determination of effect and the rationale for the determinations;
- 9.) Include a request for State review and comment on the determination of effect;
- 10.) Include documentation showing consultation efforts, to include the local government, Native Hawaiian organizations, and other appropriate individuals or organizations, including discussions of any raised concerns;
- 11.) Include the name, telephone, facsimile numbers, and email address for the main point of contact;
- 12.) Include land use history of the APE;
- 13.) Include reports or assessments of historic properties within or near the APE;
- 14.) Include oral and historical information regarding historic properties within or near the APE;
- 15.) Include a statement on whether all historic properties in the APE have been identified, including Traditional Cultural Properties, and any concerns by groups or individuals about potential damage to the properties.

## PROJECT SIGNIFICANCE

Most archaeological projects conducted in Hawai'i are prompted by a potential threat to a cultural site and require a mitigation decision to alleviate the impact. The Maunawila Heiau project is unique in that the site was not threatened by development prior to being studied. Rather, the landowner and community spearheaded an innovative approach to the preservation process. This project was accomplished due to the drive of the landowner, the community, teachers, and volunteers to uncover and compile history for the benefit of site preservation, sustainable maintenance, and engagement of local residents. The project has provided as an educational tool to better understand and appreciate the lands history through direct involvement of students and community members. The data collected through compiling place names and mythological accounts recounting connections between Hau'ula and the Hawaiian homeland (Kahiki), in discussing how Hawaiian society is symbolized in traditional architecture, in incorporating the community's perspectives and interpretations, and in obtaining scientific data through archaeology helps to develop the relevance of archaeological sites and of Hau'ula's place within the history of Hawai'i.

## ENVIRONMENTAL SURROUNDING

### HAU'ULA AHUPUA'A

Maunawila Heiau is located on the northeast (windward) side of O'ahu, within the traditional district (*moku*) of Ko'olauloa. Ko'olauloa is divided into more than thirty units of land called *ahupua'a* which span from the ocean to the mountains. Hau'ula Ahupua'a is situated near the center of Ko'olauloa District. Hau'ula Ahupua'a encompasses approximately 1,560 acres and is bordered by Kaipapa'u Ahupua'a to the north and Māka'o and Kaluanui Ahupua'a to the south (refer to Figure 2 and Figure 3). Hau'ula Ahupua'a includes rolling hills separated by six gulches and streams (south to north; Punaiki Stream, Papali Stream, Ma'akua Stream, Kawaipapa Stream, Hanaimoa Stream, and Waipilopilo Stream). Along the coastline a sandbar separates the streams from the ocean, creating small ponds called *muliwai*.

The town of Hau'ula is rather small and includes a commercial district centered along Kamehameha Highway. Hau'ula has a population of around 4,000 residents. The city contains a gas station, elementary school, church, fire station, police station, sports field and playground, and various shops and businesses. The coast of Hau'ula is divided into two beach parks, Hau'ula Beach Park and 'Aukai Beach Park. The beach parks adjoin a quarter-mile wide coral reef. A natural break in the reef, the Kilia Channel, separates the two beaches and provides a corridor between the land and sea. A large portion of inland Hau'ula is encompassed within a federal forest preserve.

Three well traversed hiking trails run along the interior slopes of Hau'ula. The Hau'ula Loop Trail is two and a half miles long, spanning the northern ridges of Hau'ula at approximately 700 foot elevation (Morey 1999). The Ma'akua Ridge Loop Trail or Papali Trail is three miles long, running at approximately 720 foot elevation along the southern ridges of Hau'ula, and in very close proximity to the current study area. Morey (1999:46) describes old stone walls covered in lichen along the Ma'akua Ridge trail. The Ma'akua Gulch Trail is four miles long, running at approximately 520 foot elevation within the central valley of Hau'ula (Morey 1999:49-50). Another well known hiking destination is located just south of Hau'ula in Kaluanui State Park (also referred to as Sacred Falls). Kaluanui Valley is steeped in Hawaiian mythology (Maly and Maly 2003).

Vegetation in the upper slopes and valleys of Hau'ula includes *hau* (*Hibiscus tiliaceus*), *kukui* (*Aleurites moluccana*), ironwood (*Casuarina equisetifolia*), Norfolk pine (*Araucaria heterophylla*), octopus trees (*Schefflera actinophylla*), strawberry guava (*Psidium cattleianum*), Christmas berry (*Schinus terebinthifolius*), mountain apple (*Syzygium malaccense*), swamp mahogany (*Eucalyptus robusta*), *hala* (*Pandanus tectorius*), mango (*Mangifera indica*), vervain (*Stachytarpheta* sp.), ferns, palms, and pockets of *ohia* (*Metrosideros* sp.), *'ūlei* (*Osteomeles anthyllidifolia*), *ti* (*Cordyline fruticosa*) and various other shrubs (Morey 1999:42-50).

TMK: [1] 5-4-005: 010

### ENVIRONMENT

TMK: [1] 5-4-005: 010 is located approximately 40 kilometers (0.25 miles or 1,330 feet) inland (*mauka*) from Hau'ula Beach Park on the island's northeast coastline. The parcel is located adjacent to Hau'ula Homestead Road which is the main residential route off Kamehameha Highway and is traveled regularly by local residents. The roadway has two sharp turns along the property's east boundary (refer to Figure 4). The study parcel is bordered to the south by Punaiki Stream, to the west by National Forest Reserve land, and to the north by a residential parcel.

The study area is an undeveloped parcel of land. No buildings or modern structures exist within the parcel. No power lines or known utility lines are present. The only current access onto the property is a modern dirt path that



was created as an all-terrain-vehicle (ATV) trail. This path provides access to the property from the north, off the neighboring private residential parcel owned by Mr. Ben Lasery. Mr. Lasery permits parking on his property and maintains the trail to facilitate community access to Maunawila Heiau. A separate access point onto the property lies adjacent to Hau'ula Homestead Road. Access from Hau'ula Homestead Road requires entry through a small break in vegetation.

The parcel is heavily vegetated with tall trees and shrubs. Vegetation includes mango (*Mangifera indica*), octopus trees (*Schefflera actinophylla*), strawberry guava (*Psidium cattleianum*), Christmas berry (*Schinus terebinthifolius*), ironwood (*Casuarina equisetifolia*), and hau (*Hibiscus tiliaceus*). The land ranges from nearly sea level to 200 feet above mean sea level. Rainfall ranges from 50 and 75 inches per year (Armstrong 1973:56). Soils within the TMK include three soil typologies (Foote et al. 1972) (Figure 6). The majority of the parcel contains Waialua stony silty clay (WIB) with slopes ranging from 3-8%. The seaward (*makai*) portion of the parcel contains Kawaihapai stony clay loam (KlaB) ranging from 2-6% slope. The most inland (*mauka*) portion of the parcel contains rock land (rRK) which generally ranges from 40-70% slope (Foote et al. 1972).

#### HISTORY OF TMK: [1] 5-4-005:010

The TMK parcel has been owned by the McGregor family since the early twentieth century. The parcel was purchased by Mrs. Louise A'oe McGregor on August 25, 1906 (Britt 2013:8). The parcel was part of a government homestead which required residents to develop the land within five years. A land patent grant for the property was requested and approved in 1912 (Executive Frear 1912) (Appendix D). Mrs. McGregor's husband, Daniel Pāmawaho McGregor, Sr. was born and raised in Hau'ula. His grandfather, Kalimaha'alulu, had been a *konohiki* (land overseer) of the area and his genealogy can be traced to Hau'ula. The McGregor family lived on the property until around 1920 when their home was destroyed by a fire (Britt 2013:9). The family moved to Honolulu, raised their family, and later moved to Kaluanui Ahupua'a. Therefore, the study parcel has been considered vacant since circa 1920.

The current landowners, descendants of Mrs. Louise A'oe and Mr. Daniel Pāmawaho McGregor, wish to preserve all cultural sites on the property. The family was aware Maunawila Heiau and other significant features were located on the property. In 2004 they hired a surveyor to locate the boundary of the *heiau* and establish a twenty-five foot buffer zone around the structure to be added as a permanent encumbrance on the TMK (refer to Figure 5). The landowners also recounted that two infants passed away while the family lived on the property (McGregor and McGregor 2010). A burial mound and ten-foot buffer zone was also surveyed and added as an encumbrance on the TMK map. It is not known whether both infants were buried within the same location or if other stone mounds in the near vicinity may be associated with the historic use of the parcel.

The home in which the McGregor family lived is thought to have been located in the *makai* (seaward) portion (Makai Zone) of the parcel. No photos of the house or historic maps showing the location of the home have been uncovered during background research for this project. Current conditions on this portion of the parcel indicate modern use by squatters and trash disposal. Modern refuse such as plastic, styrofoam, glass bottles, shoes, and clothing were observed in areas just *mauka* (inland) of Hauula Homestead Road. Vegetation in the area includes large mango trees and dense hau bush.

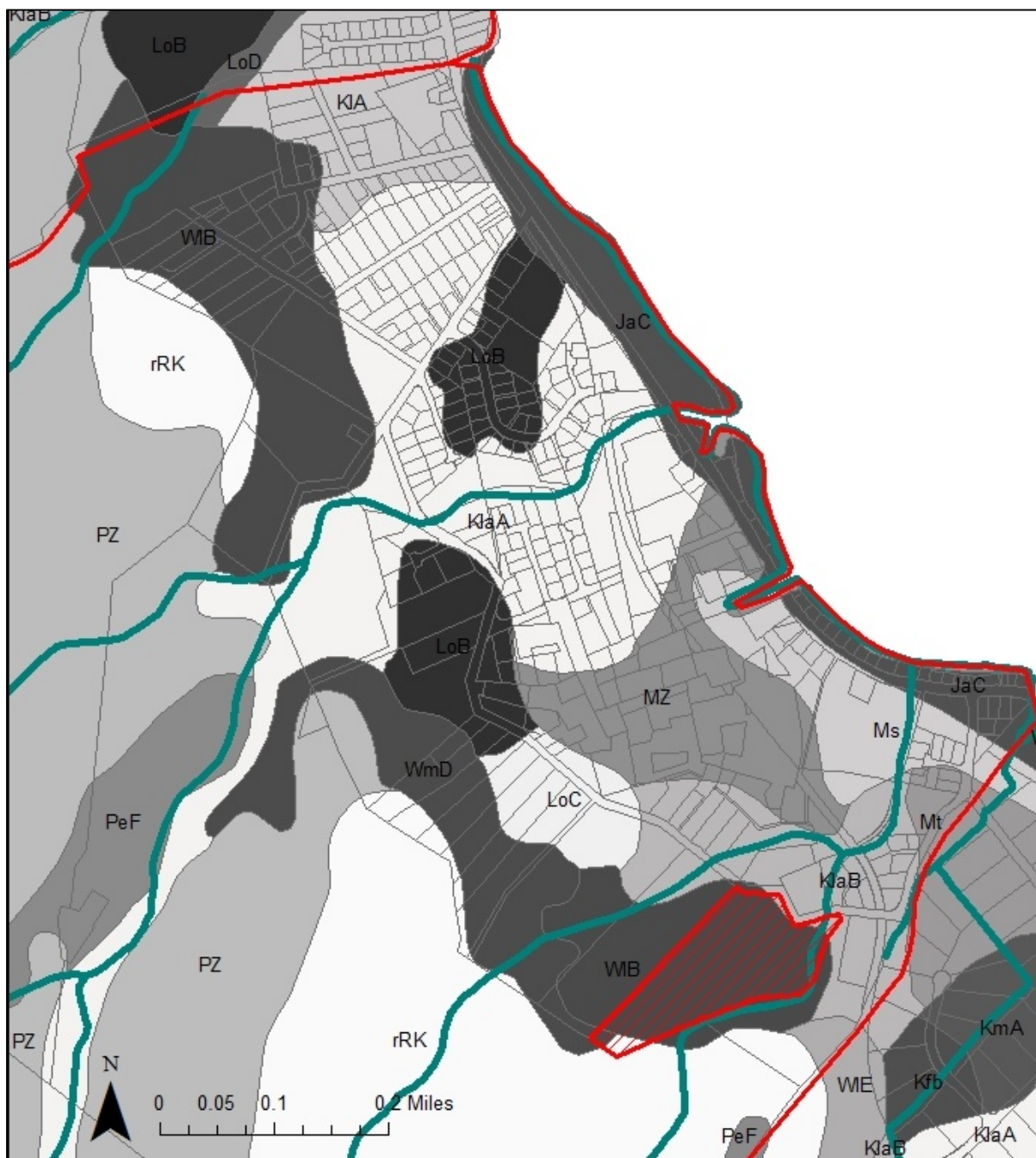


FIGURE 6. TMK MAP WITH OVERLAY OF SOILS FOUND IN COASTAL AREAS OF HAU'ULA AND THE STUDY AREA (FOOTE ET AL. 1972)

## METHODS

Fieldwork began November 15, 2011 and has continued to the present date. The project was undertaken with the general supervision of Dr. James Bayman (principle investigator), under archaeological permit number 13-04 (in accordance with HRS 13-13-281). I have expended more than 536 hours on this project, including 154 hours during the Spring 2012 semester (November 15, 2011- June 16, 2012), 249.5 hours during the Fall 2012 semester (August 19- December 22, 2012), 80 hours during the Spring 2013 semester (January 6- June 9, 2013), 30.5 hours during the Fall 2013 semester (September 26- November 9, 2013), and 22.5 hours during the Spring 2014 semester (January 8- April 19, 2014).

Cultural protocol and principles of archaeological ethics were followed during this project. A blessing ceremony was conducted at the *heiau* and each area of proposed testing was blessed prior to excavation. A *pule* (Hawaiian prayer) or Hawaiian chant was conducted prior to community events at the site. Furthermore, a reference pamphlet provided by the Hawai'i Tourism Authority, titled "Nā Wahi Pana, Respecting Hawaiian Sacred Sites" was consulted for standards in culturally appropriate behavior. Archaeological ethics established by the Society for Hawaiian Archaeology (SHA 2014) and the Society for American Archaeology (SAA 2013) guided fieldwork.

## FIELDWORK METHODS

Fieldwork was conducted in four phases. Phase I was performed during the Spring 2012 semester, Phase II was performed during Fall 2012, and Phase III was conducted during the Spring 2013 semester. Phase IV includes on-going work conducted since the Fall 2013 semester. As this project was only one of several UH classes attended each semester, fieldwork was mainly done on weekends and included intermittent week day work and evening events.

### PHASE I, SPRING 2012

Phase 1 included archaeological survey of the approximate 9-acre land parcel, vegetation removal from Maunawila Heiau and its immediate environment, mapping of Maunawila Heiau, and participation in community events associated with the site. The surface survey was completed using hand-held GPS devices with the TMK parcel shape uploaded for locational reference. Handheld GPS units were obtained from a local cultural resource management (CRM) archaeological firm, Cultural Surveys Hawai'i (CSH), through coordination with Dr. Hallett H. Hammatt and project managers David Shideler, M.A., Douglas Borthwick, B.A., and Matt McDermott, M.A. Surface survey was conducted intermittently from January 28 to March 17, 2012 with the assistance of archaeologists Douglas Thurman, B.A. and Ena Sroat, B.A. as well as several UH-Mānoa students from the Anthropology Department, Brian Lane, M.A., Tuyen Quang, M.A., Robert DiNapoli, M.A., and Eric Mendes, B.A. The parcel was surveyed by walking horizontal, northwest/southeast transects throughout the parcel. Spacing between each person ranged between approximately 4-8 meters throughout survey work. Survey tracks were recorded and GPS points were taken of potential archaeological sites, cultural features, and occasionally at parcel boundary end points to assess the strength and accuracy of the GPS signal. The handheld GPS devices retained moderate accuracy (1-5 meter accuracy).

Phase I fieldwork included identification of invasive vegetation on the parcel. Plant identification was assisted by Ena Sroat, B.A. Native plants were tagged with a metal identification label and flagging tape. These plants were pointed out prior to vegetation clearing as an intentional effort to avoid their removal. All invasive species and potentially destructive vegetation such as trees growing out of archaeological features and sprawling *hau* bush

were deemed eligible for removal. Vegetation removal focused on clearing the perimeter and surface of Maunawila Heiau. Vegetation clearing was assisted by the landowners, community members, and volunteers. A chainsaw, weed eater, saws, and hand tools were used to remove vegetation. Trees and branches were intentionally cut at angles to avoid direct impact with archaeological features when being felled. Brush piles were transported by hand or were gathered onto tarps and carried to larger piles located to the east and southeast of the *heiau*. A hand drill was used to bore holes within tree stumps which were filled with RoundUp weed killer in order to decompose roots. Photos were taken before and after vegetation clearing efforts. Vegetation removal methods were designed in accordance with other similar projects conducted at Hawaiian *heiau* (Yent 1997, Runyon et al. 2010, Thurman et al. 2010).

As Maunawila Heiau was exposed, the structure was mapped. Two datum points were created at Maunawila Heiau using survey-grade GPS (1-3 cm accuracy). The survey-grade GPS device was supplied early in the project during a student day with a UH-Mānoa Field Mapping class taught by Evert Wingert (Geography Department). The Field Mapping class also utilized Total Station mapping equipment to produce elevation/terrain data along the east and south sides of the *heiau*. A Trimbel GPS was obtained from CSH for pinpointing corners and select features of the *heiau* (sub-meter accuracy). A hand-drawn plan view map of the *heiau* was produced using tape and compass. Triangulation from the established datums was regularly done to increase locational accuracy and precision. Over the course of project fieldwork and continual vegetation removal the plan map was updated to include newly exposed features.

Five community days were conducted during Phase I. Community days were attended by Hau'ula residents (Hawaiian and non-Hawaiian) and visitors to Hau'ula. Community days began with a *pule* or blessing. All volunteers worked with hand tools to clear Maunawila Heiau of invasive vegetation and modern rubbish. Constructed features of the *heiau* were pointed out to volunteers. Features were avoided as much as possible so as to not dislodge stones or cause damage during clearing efforts by foot traffic or dragging of brush. Careful attention was paid to avoid disturbing the condition of Maunawila Heiau. Two meetings at the HCA office were held where the progress of the project was presented. Additionally, project fieldwork was presented for the UH-Mānoa Anthropology Graduate Student Symposium.

## PHASE II, FALL 2012

Phase II fieldwork focused on hand excavation of select features of Maunawila Heiau and active participation in community events at the site. Phase II fieldwork included full-time assistance by Quy Tran (UH-Mānoa Applied Archaeology student) and dedicated volunteer work by Douglas Thurman, B.A. Together, Quy Tran and I designed and wrote a "Research Goals and Sampling Strategy" plan for the project (Runyon and Tran 2012). This plan was reviewed and approved by the State Historic Preservation Division (SHPD). The plan was created from questions raised by the Hau'ula Community and it provided as a guide for Phase II fieldwork.

Three test units, measuring one meter by one meter, were hand excavated within Maunawila Heiau. The footprint of the structure encompasses approximately 1,000 square meters (10,764 square feet). Therefore, this project excavated approximately 0.3% of Maunawila Heiau. Features were documented, photographed, and mapped in detail prior to hand excavation. A datum was established for consistent elevational measurements within each unit. The datum was placed at the highest point of each feature. Excavation proceeded by stratigraphic layers and 10 cm increments within thicker strata. Excavation level record forms were completed for each stratigraphic layer and arbitrary level. These excavation level record forms included a graph in which to plot features and artifacts found within the unit and recorded initial observations, sediment descriptions, elevations, and descriptions of encountered materials. A photo log was completed, listing the photo number, date, time, orientation, and a short description. Photos typically contain a north arrow and a metric photo scale.

Once each test unit was excavated to the underlying natural sterile soil, containing non-cultural sediments, they were thoroughly documented. Profiles of each side wall were drawn and photographs were taken. Stratigraphic forms were completed for each stratigraphic layer using standard USDA soil description observations and terminology. Recorded sediment descriptions included Munsell color designations, texture, consistency, structure, plasticity, cementation, origin of sediments, descriptions of any inclusions, mottles, roots and cultural materials. The lower boundary of each stratum was described as an indication to distinguish from imported sediments which typically create a smooth and distinct separation from the underlying layer, or natural sediment which typically creates a wavy, naturally diffuse gradation into underlying sediment. A 30 cm long metal probe was used at the base of excavations to ensure that sterile clay sediments had been reached.

Excavated sediments were screened through a 1/8" wire mesh screen or were collected in bulk. Screened materials were examined to collect cultural materials (charcoal, faunal, artifacts), potential artifacts, and natural materials which could prove helpful in reconstructing environmental conditions at the site over time (i.e. landsnails, seeds). Collected charcoal was placed in labeled aluminum foil pouches. All other materials were collected within labeled plastic storage bags. The majority of all bulk samples collected from various stratigraphic layers and features were later screened and analyzed. Small portions or sub-samples of several sediment samples collected from cultural strata were not screened and were retained for potential future studies (i.e. pollen analysis). A master bag inventory was made of all collected materials. All analyzed materials were tabulated. Artifacts, including manuports (coral and water rounded stones), lithics, and faunal materials (animal bone, shell) were catalogued with individual accession numbers. Floral materials (charcoal, seeds) were not given accession numbers.

### PHASE III, SPRING 2013

Phase III fieldwork focused on documenting features found in two separate areas of the parcel (Makai Zone and Central Zone). Documentation was completed for a grouping of features found in good condition near Hau'ula Homestead Road (Makai Zone) and Maunawila Heiau, located in the center of the parcel (Central Zone). These areas were selected due to ease in access. Features found in these two locations were individually documented with hand drawn plan view maps, photographs, and feature forms. Feature forms described the feature type, potential function and age, condition, vegetation, topography, and general description. Photo logs were maintained. Photographs typically included a north arrow and meter photo scale for size comparison. An attempt was made to use a Trimbel GPS to pinpoint documented features, however, due to the high canopy and dense vegetation the GPS signal strength was too low to record many of the features.

Feature types were inferred in consultation with archaeologists, cultural practitioners, and community members, as well as through reference materials. The DLNR/SHPD (2002) defines a historic property as "any building, structure, object, district, area, or site which is over fifty years old" (276-2). Features identified as historic (over 50 years old), post-contact (post 1778), or pre-contact (pre-1778) construction were designated based on construction technique, condition, and presence of artifactual material.

### PHASE IV, FALL 2013 AND SPRING 2014

Phase IV consists of archaeological support at Maunawila Heiau to provide student and community tours, assist with designing and monitoring vegetation clearing efforts, and providing updates at community meetings. Three student and community work days and a community meeting were attended in association with Phase IV. Additional support included procurement of hand tools purchased under a city grant. Tools were researched, a proposal of costs was written and approved, and the tools were purchased and delivered to the Hau'ula Civic Center. A storage room was designated to hold all field supplies and project materials. Further fieldwork on the parcel and community meetings were conducted through a city Watershed Fellowship grant (in progress).

## LAB METHODS

Laboratory methods were undertaken in accordance with HAR 13-13-279-5 (6), pertaining to laboratory analyses for archaeological inventory surveys. All tabulated materials are listed within a master catalogue in Appendix A. The catalogue includes all faunal (animal bone) and floral (botanical/organic) remains collected. A sample of collected artifactual materials was shared and discussed at an HCA meeting. A curation room within the HCA Civic Center was determined to be the appropriate facility for housing collected materials.

## ARTIFACT ANALYSIS

Traditional artifacts were identified by material type and form, and were weighed, measured, researched, and photographed. Various reference materials were consulted for interpreting the function of encountered traditional artifacts (Buck 1957, Brigham 1974, Emory and Sinoto 1981). Adhering dirt was removed from artifacts, however traditional artifacts were not washed. This was due to the potential for future scientific analyses, such as residue analyses or phytolith analysis which can be used to recover trace amounts of organics on cutting edges of stone tools.

Historic artifacts were identified by material type, form, function, design, and specific manufacturing characteristics. Relatively few historic artifacts were collected during this project. However, abundant historic materials were observed along Hau'ula Homestead Road and were documented. These documented artifacts were researched according to manufacturing marks and identified diagnostic characteristics. Standard references were used to research date ranges and place of manufacture (Toulouse 1971, Lockhart 2010, Lindsey 2013, Whitten 2013).

## CHARCOAL IDENTIFICATION

Multiple samples of charcoal were sent to the International Archaeological Research Institute, Inc. (IARII) for taxa identification by Dr. Gail Murakami. The samples were viewed under magnification of a dissecting microscope and were compared with anatomical characteristics of known woods in the Pacific Islands Wood Collection at the Department of Botany, University of Hawai'i, and published descriptions (Murakami 2012, Wagner et al. 1999). Taxa identification of carbonized samples provided information for interpreting the environmental and cultural history of the site and helped determine a general time frame of land use by the presence of Polynesian and/or European introduced species. Following analysis the materials were returned. Results of the charcoal analysis is attached as Appendix B.

The modern approach to radiocarbon dating requires identification of plant taxon prior to radiocarbon dating (Dye 1999, Puseman and Klinger 2001, Reith et al. 2011). Identified short-lived plant species, such as shrubs, are used to pinpoint a short period of time in which the plant was gathered and burned. Long-lived tree species can skew dating results because radiocarbon dating targets when an organic material died rather than when it was burned or utilized. This causes a problem because long-lived species, such as trees, can die well before they are utilized. Therefore, long-lived species can provide an earlier date than the targeted date of cultural use. For this study, only identified short-lived species were radiocarbon dated.

## RADIOCARBON DATING

Four samples of identified short-lived charcoal specimens were sent to Beta Analytic, Inc. in Miami, Florida for Accelerator Mass Spectrometry (AMS) radiocarbon dating. The conventional radiocarbon age of each sample determined by Beta Analytic, Inc. was calibrated to calendar ages using OxCal Version 4.2. This calibration program was developed by the University of Oxford Radiocarbon Accelerator Unit (ORAU) and is available as share-ware over the Internet (OxCal 4.2).

## ENERGY DISPERSIVE X-RAY FLUORESCENCE (EDXRF)

A representative sample of collected lithic material was sent to Dr. Peter Mills and Dr. Steve Lundblad at the University of Hawai'i-Hilo for EDXRF analysis. EDXRF analysis is an effective way to determine elemental composition of a material. EDXRF analysis is a non-destructive technique which beams infrared light rays onto a material and measures peaks of high and low concentrations of trace elements (Shackley 2009). The material's composition is compared to a constant geological standard (BHVO-2) used as a control sample (Appendix C). Compilation of results within a database is compared to the analyzed materials for similarities of parent materials in order to potentially indicate where the material originated. With a large database of reference samples a distribution pattern of utilized materials can emerge on a regional scale. The database for O'ahu is currently not large enough to determine source locations for all lithic materials, however by having samples analyzed the island's database is expanding.

## SNAIL IDENTIFICATION

Collected landsnails were analyzed by Dr. Carl Christenson with the Bishop Museum Molocology Department. The snails were identified using museum reference collections and standard texts (Cowie 1997). Snails were identified to family, genus, or species when possible. Identification of landsnails can be used as a relative dating method, as there are endemic/native, Polynesian-introduced, and foreign (post-contact) landsnail species.

## SEED IDENTIFICATION

Collected seeds were identified by Dr. Chris Lao and Dr. Becky Azama with the Department of Agriculture in Honolulu. The seeds were identified using the department's seed reference collection and standard references (Wagner et al. 1999). Seeds were identified to family, genus, or species when possible. Identification of seeds can be used as a relative dating technique, similarly to snail identification.

## CURATION

All collected materials and site records will be housed at the HCA Civic Center in central Hau'ula. Collected materials include traditional and historic artifacts, charcoal, floral and faunal samples, as well as several bulk sediment samples from various stratigraphic layers exposed during excavation of Maunawila Heiau. The materials were curated using standard plastic bags with all provenience information written with a permanent black marker. All labeled bags contain a bag number and all artifacts and faunal specimens have an accession number. Acid-free paper labels listing provenience information are included in each artifact bag. Charcoal and fragile floral and faunal samples were placed within aluminum pouches inside plastic bags. A bag inventory listing all retained samples is included with the curated materials.

One species of landsnail is being curated at the Bishop Museum's Molocology Department. The landsnail, *Opeas beckianum*, is a foreign species to the Hawaiian islands and is considered rare. In order to curate the unique and fragile landsnail using best practices, the landowner agreed to curation at Bishop Museum. The *Opeas* sp. landsnails will be used as educational resources within a reference collection.

## MAPS AND FIGURES

Figures presented in this report were adapted from standard base maps and were generated by the author. Figures were created using Adobe Illustrator and Global Information Systems (GIS) 10.1 software. Utilized base maps can be found at the Hawai'i Land Survey Division headquarters, Hawai'i State Archives, and various on-line sources. All figures are included in the report's reference cited section.

## RESEARCH

Historic background research for this project was conducted at the UH-Mānoa Hamilton Library, the State Public Library in Honolulu, the State Archives, the State Historic Preservation Division (SHPD) library, and the library and database at Cultural Surveys Hawai'i (CSH). On-line references were also consulted including Ulukau Electronic Hawaiian Database, Papalio Database, the State Library on-line, and Wahona 'Aina Mahele database. Additionally, previous studies at *heiau* were consulted (Green 1970, Kirch 1985, Ladd 1985, Rosendahl and Carter 1988, Kolb 1990a, Kolb 1990b, Yent 1991, Maly n.d.).



## BACKGROUND RESEARCH

The island of O‘ahu is divided into six land districts (*moku*). These districts are relatively unchanged from pre-contact land boundaries (King 1935). Each district is divided into smaller units of land, called *ahupua‘a*, which run *mauka* (inland, mountain) to *makai* (seaward, ocean) and include both terrestrial and marine environments. An *ahupua‘a* typically included a sea fishery, beach, an open cultivatable plain referred to as *kula* land, and forest lands (Board of Commissioners 1929:IX). Limits of each *ahupua‘a* followed natural features of the landscape, including ridgelines and ravines, as well as natural features such as notable stones and formations, groups of trees, grass, bird habitats, and other resources (Board of Commissioners 1929:IX, XX; McGregor 2010:213). The term *ahupua‘a* is derived from the placement of an *ahu* or altar on the east side of each *ahupua‘a* boundary where it was intersected by a main road (Lyons 1875 cited in Valery 1985:155, Handy and Handy 1972:48). Taxes were paid yearly on this altar in the form of food offerings.

For this study, three *ahupua‘a* within Ko‘olauloa were researched including Hau‘ula and adjacent *ahupua‘a* of Kaipapa‘u, Māka‘o, and Kaluanui (Figure 7). The Ko‘olauloa District is described as fertile agricultural land steeped in mythology.

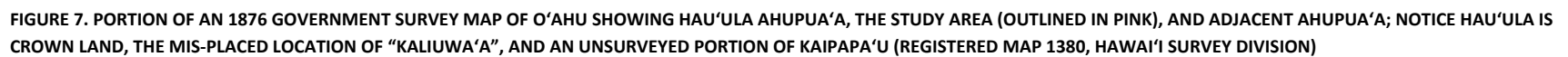
This area is that in which were enacted key episodes in mythological, traditional, and historical past. Here lived Wakea the sky-father and Haumea (sometimes called Papa, meaning flat stratum) the earth mother; here were born of their union the progenitor of the taro plant, Haloa-naka, and of the human race—the younger son Haloa..Here was located the most sacred *heiau* on Oahu, the shrine of Lono. This was the general area in which were enacted the early episodes of Kamapua‘a, his birth and youthful exploits. In historic times this was the scene of the training, as warrior and ruler.. (Handy and Handy 1972: 436)

Sources indicate Hau‘ula was extremely fertile and was planted in fields of taro. Handy (1940) states that traditionally “sweet potatoes were grown on the northwest coast from Kaena to Laie. Taro was grown from Kahuku to Waimanalo” (75). This statement places Hau‘ula within the taro planting region. This is further described by Handy (1940):

flats along the coast in Hau‘ula were once all in terraces, irrigated by the valley’s five streams..there are the remains of a few small terrace sections in the interior of Makua [Valley, in Hau‘ula]. A number of small wet taro plantations are still under continuous cultivation between Papale and Makua Streams. Some of the old terraces between these streams, just inland from the highway, were being rehabilitated in 1935 (91).

Kaipapa‘u was also very fertile land and likely shared a consistent pattern of agricultural terracing in lowlands and along valley streams. “The level land opening up below [Kaipapau] valley, now in cane, was presumably all in terraces. Hau‘ula natives say that there are old taro flats along the stream up the valley, which is very narrow and steep” (Handy 1940a:91).

Other than the fertile nature of the area little was historically documented on Hau‘ula and adjacent *ahupua‘a*. Therefore, multiple sources of information were reviewed in order to compile a broad understanding of the cultural and historical setting of the area. Four main categories of knowledge were consulted for this study: 1.) place names and mythological background; 2.) overview of traditional Hawaiian society; 3.) post-contact (1778) historic background; and 4.) archaeological studies in the *ahupua‘a* and nearby vicinity.



## PLACE NAMES

Place names have been preserved from traditional accounts and continue to be used throughout the Hawaiian Islands. These names were well established in pre-contact Hawai'i and provide insight into the history of specific locales and the larger cultural landscape.

Many of the place names which the Hawaiians gave to features are descriptive, others have to do with incidents which took place at certain locations. Some are of historical origin and their significance is lost in antiquity. (Coulter 1935:231)

Recordation of place names is not without error or Western influence. The Hawaiians did not use any form of writing prior to European contact, therefore place names were recorded from oral tradition and changes in nomenclature are well documented (Coulter 1935:231).

### HAU'ULA AHUPUA'A

Hau'ula is thought to be named after the native hibiscus bush (*hau*) and the color red (*ula*) (Pukui et al. 1974:43). One interpretation for the naming of Hau'ula is in reference to the summer bloom of the *hau* plant's yellow flowers which drop to the ground and turn red (Clark 2002). *Hau* (*Hibiscus tiliaceus*) is a Polynesian-introduced plant and was utilized for a variety of functions. The flower petals were used to make pink and lavender dyes (Krauss 1993:65) and the wood was used to make lightweight spears, kite frames, twine, fibers, and ropes for nets, slings, clothing, and sandals (Abbott 1992, Krauss 1993). *Hau* was used for canoe outrigger booms, which attach the canoe to the float (Abbott 1992:82, Krauss 1993:51). *Hau* was also used medicinally as a mild laxative, to cure dry throat, and for ease in birthing (Abbott 1992:101, Krauss 1993:102-103).

Hau'ula includes a long list of traditional place names (Figure 8, Figure 9 and Table 1). Many of the names are associated with the landscape, fishing, the Hawaiian pig god Kamapua'a, and the legendary prophet Makuakaumana from Kahiki (the Hawaiian homeland). Traditional place names referring to the landscape identify peaks, ridges, streams, gulches, and the coral reef. Place names associated with fishing include *Wahi o pua* (small fry place) which is a stone enclosure (called Papua) built on the semi-circular reef adjacent to Hau'ula Beach Park to hold juvenile fish (fry) (Handy and Handy 1972:460). The enclosure is said to have been constructed by *menehune* (legendary race of small people).

The shore and sea opposite Helu-moa. It was here that the menehune built a stone enclosure, connected with the shore. The enclosure was named Pa-pua or "small-fry fence." It is broken and submerged by the sea. (Pukui 1953 cited in Sterling and Summers 1978:161)

Place names associated with the Hawaiian pig god, Kamapua'a, include Helumoa and Makaluhi. Helumoa is the name given to a relatively flat, low hill where Lanakila Church was built and the Congregational Church now stands in Hau'ula (Pukui 1953 cited in Sterling and Summers 1978:161). Helumoa (chicken scratch or to count chickens) is thought to reference Kamapua'a's antics of stealing chickens from this area (Thrum 1919:77). It should also be noted that Kamakau (1976) makes reference to the necessity for animals not to scratch agricultural patches after cultivation (27). "The patches must not be trodden upon, lest nesting places be made for caterpillars and cutworms; and chickens must not be allowed to scratch there" (Kamakau 1976:27). Therefore, the reference could additionally refer to disturbance caused by animals rooting through agricultural fields.



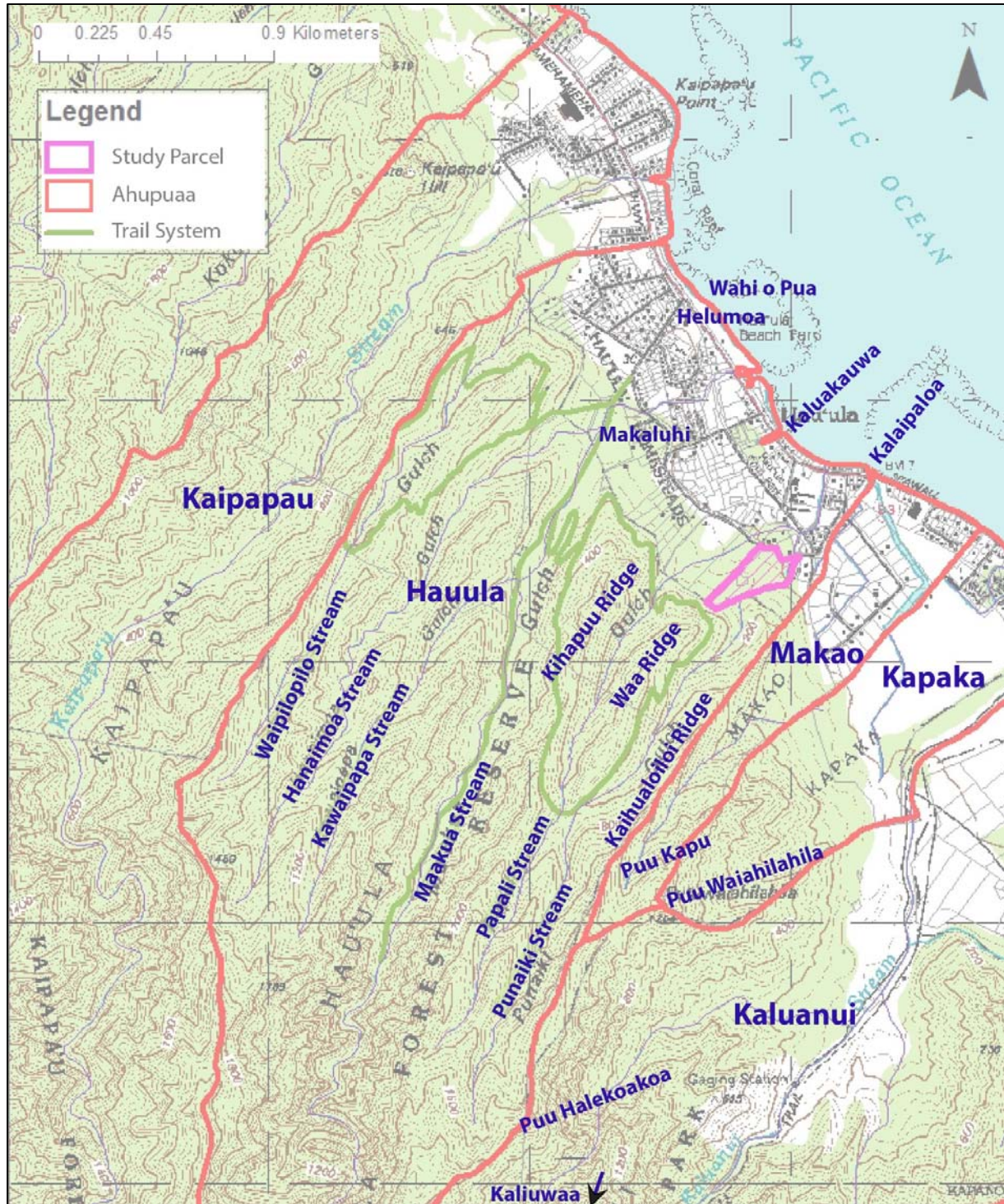


FIGURE 8. PORTION OF A 1992 USGS HAU'ULA QUADRANGLE MAP WITH AHUPUA'A BOUNDARIES (IN RED), MODERN TRAILS IN GREEN, THE STUDY AREA (OUTLINED IN PINK), AND APPROXIMATED LOCATIONS OF PLACE NAMES BASED ON RESEARCH



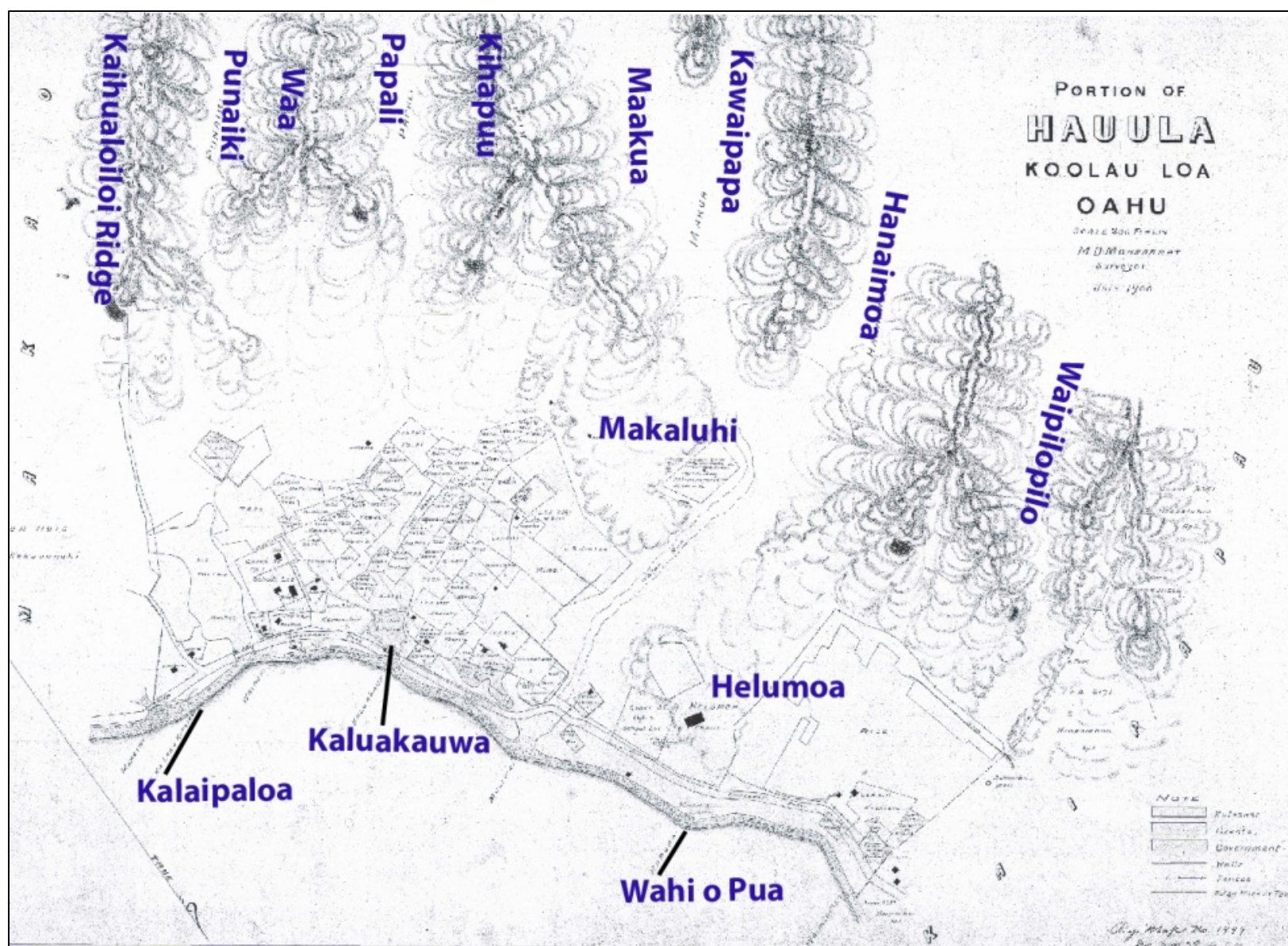


FIGURE 9. 1900 MONSARRAT MAP SHOWING APPROXIMATED LOCATIONS OF PLACE NAMES (HAWAII STATE ARCHIVES)

TABLE 1. TABLE LISTING PLACE NAMES WITHIN HAU'ULA AND IN THE NEAR VICINITY

| Place Name   | Meaning   | Type/ Location  | Reference  |
|--|---|---|--|
| Hanaimoa   |   | gulch and stream in Hau'ula   | Monsarrat 1900   |
| Hau'ula  | red <i>hau</i> tree or red <i>hau</i> flower            | entire <i>ahupua'a</i>  | Pukui et al. 1974:43, Clark 2002, Soehren 2010                                 |
| Helumoa  | chicken scratch; or to count chickens                   | area of the old Lanakila Church and current Congregational Church   | Pukui 1953 cited in Sterling and Summers 1978:161, Thrum 1919:77, Soehren 2010 |
| Kaihualoilo  | the damselfish nose                                     | ridge between Mākao and Hau'ula, runs to Pu'u Halekoakoa  | Soehren 2010, Ulukau 2004  |
| Kaipapa'u  | shallow sea   | <i>ahupua'a</i> north of Hau'ula, valley and river that flows to the sea  | Westervelt 1987:236, Ulukau 2004   |
| Kaliuwa'a  | canoe hold or canoe leak                                | waterfall in Kaluanui (685 feet amsl)   | Sterling and Summers 1978:162, Soehren 2010                                    |
| Kaluakauwā   | pit of the servant                                      | <i>muliwai</i> or brackish pond adjacent to 'Aukai Beach Park, north of old Hau'ula Fire Station  | Pukui et al. 1974, Clark 2002  |
| Kaluanui   | the big pit or the canoe hold                           | <i>ahupua'a</i> south of Mākao, sand beach, Sacred Falls, channel through reef  | Clark 2002, Soehren 2010, Ulukau 2004  |
| Kālaipāloa (Kapalaoa, Kalaeokapalaoa, Kalaekapalaoa) | the point of the whale, the whale, or cape of the whale | Along the shore directly opposite from the former Hau'ula Court House (later historic maps indicate it is off the shore of Kapaka Ahupua'a) | Pukui et al. 1974:73, Sterling and Summers 1978:161, Soehren 2010              |
| Kapaka   | the rain drop   | <i>ahupua'a</i> south of Mākao  | Clark 2002, Ulukau 2004  |
| Kawaipapa  | the stratum stream                                      | gulch in Hau'ula, stream joins with Ma'akua Stream  | Pukui et al. 1974:99, Soehren 2010   |
| Kihapuu  |   | ridge in Hau'ula  | Monsarrat 1900   |
| Ma'akua  | way of the gods (?)                                     | gulch in Hau'ula  | Pukui et al. 1974:137, Soehren 2010, Ulukau 2004                               |
| Mākao  | Macao, China  | <i>ahupua'a</i> south of Hau'ula, beach, surf site  | Pukui et al. 1974:141, Soehren 2010, Clark 2002                                |
| Makaluhi   | tired eyes  | fronting Hau'ula Homestead Road, site of Cooper's Ranch   | Pukui et al. 1974:141, Sterling and Summers 1978:161, Soehren 2010             |
| Papali   |   | Stream and gulch in Hau'ula   | Monsarrat 1900   |
| Punaiki  |   | stream and gulch in Hau'ula   | Monsarrat 1900   |
| Pu'u Halekoakoa                                      |   | peak at extreme southern corner of Mākao at Hau'ula boundary (1,115 feet)   | Soehren 2010, Ulukau 2004  |
| Pu'u Kapu  | sacred hill   | peak in Kawailoa, Mākao (1,350 feet)  | Soehren 2010, Ulukau 2004  |
| Pu'u Waiahilahila                                    | Bashful hill (?)  | boundary peak at <i>mauka</i> corner of Kapaka, Mākao, and Kaluanui   | Soehren 2010, National Ocean Survey 1978, USGS 1992                            |
| Waa  |   | ridge in Hau'ula between Punaiki Gulch and Papali Gulch   | Monsarrat 1900   |

| Place Name                      | Meaning                        | Type/ Location                                      | Reference   |
|---------------------------------|--------------------------------|---|---|
| Wahi o Pua or Wahiopua or Papua | small fry place                | off-shore of Hau'ula Beach Park, fishing site, reef | Handy and Handy 1972:460, Sterling and Summers 1978:161, Clark 2002 |
| Waipilopilo                     | smelly water or stagnant water | gulch along northern border of Hau'ula              | Pukui et al 1974:227, Soehren 2010                                  |

Makaluhi (“tired eyes”) is named after “the tired warriors of Olopana” who stopped to rest at this location after searching for the pig god Kamapua’a (Pukui et al. 1974:141). The pig god was hunted for stealing the chief’s chickens. The name Makaluhi is given to an area of land fronting Hauula Homestead Road at the old Copper’s Ranch location (Pukui et al. 1974:141, Soehren 2010) (refer to Figure 4).

Kālaipāloa or Kalaeokapalaoa (point of the whale) makes reference to the legend of Makuakaumana, a prophet from Kahiki. Early historic maps (refer to Figure 9) and references place Kālaipāloa across from the old Hau’ula Court House in Hau’ula (Pukui 1953 cited in Sterling and Summers 1978:161), however later historic maps place the site much further south, within Kapaka Ahupua’a (1928 through 1953 USGS maps). According to Westervelt (1987):

A big wave came up from the sea and swept over the beach. When the water flowed back there was left a great whale, the tail on the shore and the head out in the sea. The people came to see the whale. They thought that it was dead. They played on its back and leaped into the sea from its head. Their shouts of joy and loud laughter reached the ears of the priest, who was living inland..The old priest was very anxious to see the marvelous fish. He forgot the warning of the gods and went to the seaside. The old priest stood by the tail of the great fish. The tail moved. He climbed on the back and ran to the head and leaped into the sea. The people cheered and he returned to the beach and a second time approached the whale. Again there was the motion of the tail and again he ran along the back, but as he leaped the whale caught him and carried him away to Tahiti. Therefore a name was given to a point of land not far from this place—the name “*Ka-loe-o-ka-palaoa*” (the cape of the whale). (237)

The *kahuna* (priest) in this story is thought to be the legendary figure from Kahiki, Makuakaumana (Rice 1923, Westervelt 1987).

Another place name, Kaluakauwā (“the pit of the servant”), was a brackish-water pond or muliwai (pond separated from the ocean by a sandbar) in Hau’ula. This pond was located on the north side of the former location of the Hau’ula Fire Station (and former Hau’ula Courthouse) prior to the construction of Kamehameha Highway (Clark 2002). Kaluakauwā was said to be the home of a supernatural eel.

An additional reference was found stating that in front of ‘Aukai Beach Park is called Kaluakauwā, *muliwai* of Meheiwī, at Kalaeokapalaoa (Clark 1977:146-150). A *muliwai* named Meheiwī appears on maps on the southern coast of Hau’ula (refer to Figure 9). Several place names found on historic maps are not referenced in historic accounts or the meanings have not been translated.

## KAIPAPA‘U AHUPUA‘A

Kaipapa‘u is named after Kaipapa‘u Valley and Stream, located just north of Hau‘ula. Kaipapa‘u (shallow sea) stream flows from the mountains to the sea. The modern boundary of Kaipapa‘u was likely created in the late nineteenth to early twentieth century. An 1876 government survey map and a 1902 Wall map show an unsurveyed tract of land just inland of Hau‘ula (refer to Figure 7 and Figure 10). Later maps identify this tract of land as part of Kaipapa‘u.

Hawaiian mythology indicates two *kahuna* lived in Kaipapa‘u. Handy and Handy (1972) state “there is still a spring in the uplands of Kaipapau, the adjacent district, named for the famous seer who dwelt in the vicinity, Puna-a-Makuakaumana” (460). A legend described by Westervelt (1987) tells of a *kahuna* that lived in Kaipapa‘u Valley, whose gods visited his sister’s home, then returned along the coast, over a *muliwai* and back to the priest’s home.

Here lived an old *kahuna*, or priest, who always worshipped the two great gods Kane and Kanaloa. These gods had their home in the place where the old man continually worshipped them, but they loved to go away from time to time for a trip around the island. Once the gods came to their sister’s home and received from her dried fish for food. This they carried to the sea and threw into the waters, where it became alive again and swam along the coast while the gods journeyed inland. By and by they came to the little river on which the old man had his home. The gods went inland along the bank of the river, and the fish turned also, forcing their way over the sand bank which marked the mouth of the little stream. Then they went up the river to a pool before the place where the gods had stopped. Ever since, when high water has made the river accessible, these fish, named *ulua*, have come to the place where the gods were worshipped by the *kahuna* and where they rested and drank *awa* with him. When the gods had taken enough of the *awa* of the priest they turned away with the warning that, when he heard a great noise on the shore, he must not go down to see what the people were doing. If it was a shark or a great fish, he was to remain at home. (Westervelt 1987:236-237)

A second legend regarding *kahuna* in Kaipapa‘u is recounted by Fornander (1919-1920) and Kalākaua (1888). According to Fornander (1919-1920), “Kapukaihaoa was the famous priest of Oahu. He could discern mysteries and secrets and forthcoming events. He lived in Kaipapa‘u, Koolauloa” (Vol VI:158). Kalākaua (1888) describes Kapukaihaoa as a priest of Kukaniloko and places him within the Legend of Laieikawai. The legend tells that a chief of the Ko‘olauloa Districts, Kahauokapaka, and his wife Malaekahana vowed to slay all daughters until they birthed a boy child. However, after the birth and death of several baby girls, Malaekahana decided to hide her latest twin girls. She gave one to their grandmother and one to Kapukaihaoa. Kapukaihaoa took the child, Laielohelohe, to Kukaniloko to protect her (Kalākaua 1888:457). The legend states Kapukaihaoa later became prime minister of Kaua‘i (Kalākaua 1888:474).

## MĀKAO AHUPUA‘A

Mākao is a historically formed land division. The boundary of Mākao extended further south in a 1902 Wall map (Figure 10), than in modern maps (Figure 8). The land was named after Macao in Canton, China (Pukui et al. 1974:137, Clark 2002, Ulukau 2004). Very little is known of the land prior to it being named Mākao. There is one reference of it “being a place where much *tapa* [barkcloth] is made” (Chamberlain 1828 cited in Sterling and Summers 1978:162). Mākao contains a sand beach and a popular surf site at the edge of the reef on the south side of the bay (Clark 2002).



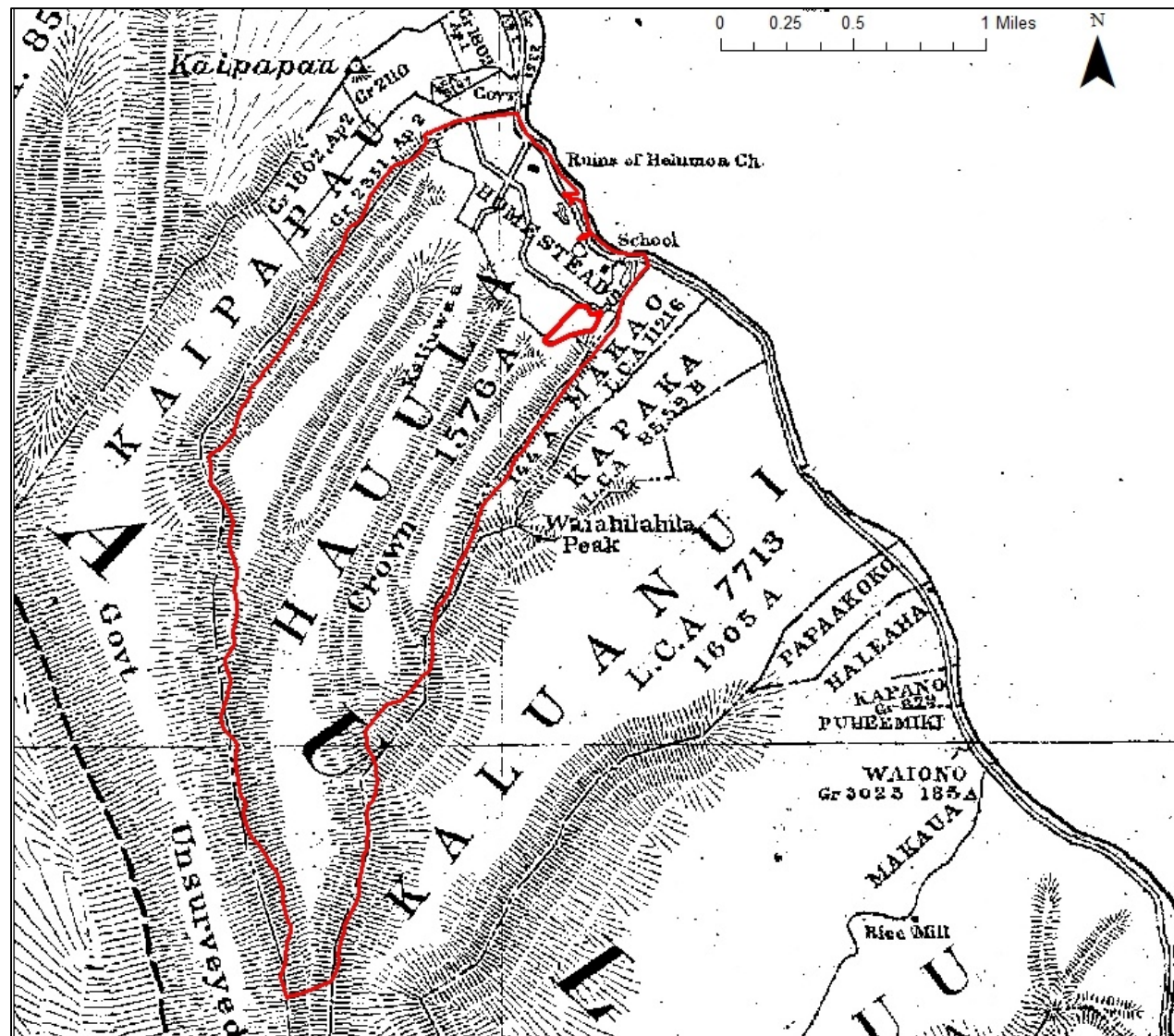


FIGURE 10. PORTION OF A 1902 WALTER A. WALL MAP SHOWING HAU'ULA AND NEIGHBORING AHUPUA'A, NOTICE PONDS NEAR THE SHORE IN HAU'ULA, THE ROAD FOR HAU'ULA HOMESTEADS, A MIS-PLACED LABEL READING "KALIUWA'A" IN HAU'ULA, AND THE MĀKAO BOUNDARY EXTENDING FURTHER SOUTHWARD THAN LATER RECORDED (REGISTERED MAP 2374, HAWAII SURVEY)

Clark (2002) states that Chinese farmers lived and grew rice in Mākao and that the land is named after the former Chinese farming community. Chinese people began immigrating to Hawai'i shortly after the formation of the Royal Hawaiian Agricultural Society in 1850. Foreign labor was supplied due to the decline of the Hawaiian population (Thrum 1894:71-72). From 1852-1866 ship captains from Hawai'i, including Captain Cass of the bark *Thetis*, were importing Chinese laborers. "1306 Chinese, of whom only 54 were women, and 5 children were imported, 900 of these came from Hong Kong and Macao, and 406 from San Francisco" (Thrum 1894:72). These ships from China would anchor at Mākao. Census information regarding the Chinese population in Hawai'i indicate the Chinese made up approximately 1.9% of the population in 1866, 3.4 % in 1872, 10% in 1878, and 22% in 1884 (Thrum 1890:82). A letter in the Honolulu State archives, dated August 14, 1873, indicates a dispute with the boundary of Mākao encroaching into Hau'ula Ahupua'a (Kuaea 1873). Therefore, it is likely the *ahupua'a* was formed in the mid 1800s and based on historic maps the boundary was not finalized until the twentieth century.

#### KALUANUI AHUPUA'A

Kaluanui is a land division which holds a significant amount of cultural importance due to its association with the pig god Kamapua'a and the presence of a large sacred waterfall, Kaliuwa'a. Early maps show Kaliuwa'a within Hau'ula (refer to Figure 7 and Figure 10). However, the falls are just south of Hau'ula within Kaluanui. Kaluanui Ahupua'a has more than twenty-seven place names chronicling the chase of Kamapua'a into the valley by chief 'Olopana's warriors (Sterling and Summers 1978:163-164). The extensive list of place names and mythology is not presented in this report, please refer to Maly and Maly 2003 and Sterling and Summers 1978:162 for place names and more in depth background on Kaluanui. Kaliuwa'a (canoe hold or canoe leak) is where Kamapua'a morphed into a large pig as high as the ridgeline and allowed his followers and grandmother, Ka-maunu-a-Niho, to escape 'Olopana's warriors (Pukui and Elbert 1984:395). This area is now referred to as Sacred Falls State Park.

#### MYTHOLOGICAL BACKGROUND OF HAU'ULA

Traditional Hawaiian myths and knowledge were preserved historically through writing down of oral traditions and personal accounts, compilations by Hawaiian aristocrats and scholars, and through mediums such as early newspapers and periodicals (Thrum 1890-1919, Westervelt 1915, Fornander 1916-1920, K. Kamakau 1919-20; Kepelino 1932; Malo n.d., 1951; 'Ūi 1963; Kamakau 1976, 1991). Various versions of these myths have been recorded. This reports attempts to provide a compilation of relevant myths. References to Hau'ula in Hawaiian literature include the use of Hau'ula for its beach access, fishing grounds, and as a natural canoe landing.

In Fornander's (1998) account of the Legend of Halemano, he indicates that after leaving the Puna District of the Big Island for O'ahu, the brother of his abducted lover Kamalalawalu, landed in Hau'ula. There the brother, Kumukahi, saw a standing image named Malaekahana, which he became enraptured by and enticed him to stay in Hau'ula (Fornander 1998:236, Sterling and Summers 1978:161). To avoid pursuit of the beautiful Kamalalawalu by the king of O'ahu, Halemano and his family, including Kumukahi, were forced to flee to Moloka'i. They traveled along the windward coast from "Waialua; then to Laiewai; then to Hau'ula and from there on to Kualoa, Kahaluu and Moelana" (Fornander 1998:238). Upon growing unhappy with his relationship, Halemano returned to O'ahu. He "touched at Kailua, Oahu; and from this place continued on to Kualoa at the Kaoio Point; then on the Hau'ula; then to Malaekahana; then Laiewai; then Waialua (Fornander 1998:260). When Kamalalawalu returned to O'ahu, she "took a canoe and set out from Kauai and landed at Kaena Point; from this place she continued on her way to Waialua. From there she journeyed to Kahuku; then to Hau'ula; then to Kualoa, where she met Waiahole, a chief of that place...and they resided there together" (Fornander 1998:260). This myth indicates Hau'ula was a common beach landing.

The story of why Hilu fish are striped is tied to Hau'ula (Westervelt 1987). The story connects voyages between Hawai'i and Tahiti which have been preserved in Hawaiian chant and oral history. The myth tells of two fish (or canoes) who journeyed from Tahiti to Makapu'u on the northeast coast of O'ahu (Westervelt 1987:233). Here the fish split up, one going north and one south. The fish that traveled northward "found no good resting place until it came to the fishing village of Hau'ula" (Westervelt 1987:233). A battle ensued, "the fish from Tahiti was caught by the fisherman of Hau'ula. They killed it and cut it up in pieces for food" (Westervelt 1987:234). The second fish traveled around the island and landed in Kahuku to search for their companion on land, as men. They were invited to a feast and were told of a battle against a great fish in Hau'ula. They heard of how the fish was cut up and divided among neighboring lands. The people of Kahuku presented their share to the men from Tahiti, who recognized the fragments as parts of their companion (Westervelt 1987:235). They took the remains to the ocean, threw them in, and the bloody fish came back to life. The name "Hilu-ula" or red hilu has since been used to name the red-striped fish (Westervelt 1987:235). The taboo created by this myth ensured that red *hilu* fish must always be cooked over fire before eaten, in order to purify its flesh (Westervelt 1987:236). Whereas the blue *hilu* fish may be eaten raw. Thus, the colors of the striped *hilu* fish are said to have been determined by the two fish that came from Tahiti.

To seek revenge the fish from Tahiti created a great flood. It is thought that this myth is associated with Ma'akua Valley in Hau'ula (Ulukau 2004).

They went up to the *kapu* land back of Hau'ula. They pulled up the kapu flags. Then they dammed up the waters of the valley above the village until there was sufficient for a mighty flood. The storms from the heavy clouds drove the people into their homes. Then the Tahitians opened the floodgates of their mountain reservoir and let the irresistible waters down upon the village. The houses and their inhabitants were swept into the sea and destroyed. (Westervelt 1987:236)

#### PĀ'AO AND MAKUAKAUMANA

The legend of Pā'ao is one of the most well known and published stories of traditional Hawaiian history. The legend provides a late Polynesian connection with the Hawaiian homeland, referred to as Kahiki. Pā'ao is a legendary chief and *kahuna* (priest) from Kahiki who sailed to Hawai'i in a canoe of notable travelers, including an important prophet named Makuakaumana (also spelled Makuaka'ūmana [Kamakau 1991:97]) (Emerson 1893, Kamakau 1991). It is thought that the Hawaiian Islands were well populated by the time Pā'ao landed. Pā'ao is accredited with promoting stringent religious practices and a chiefly lineage from Kahiki. Pukui and Elbert (1984) describe Pā'ao as:

Pā'ao. A priest from Tahiti who landed at Puna, Hawaii. He built the *heiau* Mo'o-kini at Hawaii, and is said to have introduced human sacrifice, walled *heiaus*, red-feather girdles as a sign of rank, taboo songs, the prostrating taboo, and the feather god Kā'ili. He made a return trip to Kahiki. (395)

The legend of Pā'ao tells of a quarrel between him and his brother Lonopele, over the accusation that Pā'ao's son stole Lonopele's fruits (Stokes 1927:42-43, Beckwith 1970:371, Kamakau 1991:3-5 and 97-99, Henry 1995). In order to prove his son's innocence, Pā'ao cut open his son's stomach finding no fruit. Upon building voyaging canoes, Pā'ao killed Lonopele's son and placed his body under a canoe for ritual use to release *kapu* (taboo) associated with newly crafted canoes. Lonopele found his son encompassed in a swarm of flies and told Pā'ao to leave their home island. The canoes were named Kanaloamuia (the swarming of flies). As Pā'ao was sailing out of the bay, prophets who wanted to join his voyage attempted to leap from the top of a cliff named Ka'akōheo. Three prophets attempted and were killed by rocks below. Then Makuakaumana called out to join the canoe.

References of the legend of Makuakaumana are somewhat inconsistent (Beckwith 1970, Kamakau 1991). However, all researched accounts agree that just when Pā'ao's canoes were nearly out of site, Makuakaumana called from on top of Ka'akōheo.

He called two or three times before Pā'ao heard the faint sound of his voice. He looked back and saw the man on the cliff. He asked, "What are you?" "A prophet." Pā'ao asked again, "What is your name?" "Makuaka'ūmana," answered the prophet. Pā'ao said, "The canoe is full; there is only one place left –the *momoa*, the projection at the stern." That will be my place," was the answer. Pā'ao told him to leap. Makuaka'ūmana did so, flying like a bird, and perched on the *momoa* and held onto the *manu*, the endpiece of the canoe. He said, "Here I am; where shall I go? "Onto the *pola*, the platform between the canoes," said Pā'ao. (Kamakau 1991:99)

Beckwith (1970) suggests this leaping event may have had a strong symbolic meaning (374). The leap tests Makuakaumana's divinity and proves his courage and worthiness. As a prophet, Makuakaumana would have been regarded as a living embodiment of the gods, as spirits could possess a prophet's body and faculties (Handy 1927:159). Therefore, it is possible his presence on the canoe may have helped to overcome obstacles encountered during the voyage.

Makuakaumana is also referenced in several chants. The success of Makuakaumana's leap is referenced in the following chant:

You are like a flying fish  
Skimming easily through the sky,  
Traversing the dark waters of the ocean,  
O Halulu at the foundation house of heaven,  
Kane, Makua-kau-mana,  
The prophet who made the circuit of the island,  
Who circled the pillars of Kahiki (Beckwith 1970:371)

In the *wānana* (prophecy) of Kalai-kua-hulu, Makuakaumana is quoted as chanting the following:

A fragile tailed fish am I,  
Moving swiftly before the heavens,  
Traveling the dark, dark ocean  
That roars at Halekumukalani.  
I am the man, Makuaka'ūmana,  
The prophet who traveled the islands,  
Who went 'round the back of the Pillars of Kahiki,  
Who leapt and sat on Kaulia ["a pearching place"] (Kamakau 1991:99-100)

The Legend of Makuakaumana continues with his life on O'ahu (Rice 1923:116-132, Pukui and Curtis 1960:55). Beckwith (1970:69-70) presents multiple versions of his legend told by Rice (1923), Green (1936), Westervelt (1915), and others, indicating continued reflection on this myth and its high significance in Hawaiian mythology. The most complete version of the legend is told by Rice (1923):

Makua-kau-mana is a pious worshiper of Kane and Kaneloa who lives in north Oahu at Kaulua-nui with his only son, whose mother died at his birth, and cultivates daily his garden patch, being careful always to call upon his gods in so doing. The two gods visit him in the disguise of strangers, note his piety and his hospitality to strangers, and give him a digging stick and a carrying pole to relieve his labor. They come again disguised as old men and teach him how to pray, offer sacrifices, and keep the *tapus* for Kane-huli-honua, giver of land, and Kane-pua'a, god

of rich crops; for Hina-puku-ai, goddess of vegetable food, and Hina-puku-i'a, who gives abundance of fish. A third time they come dressed like chiefs and bring a red loincloth (*malo pukuai*) and a colored bedspread (*kuina-kapa-papa'u*). To test Makua's steadfastness they complain that his son has broken the eating *tapu* of the gods. Makua would have slain his son, but the gods stay his hand. They send a great fish and when Makua goes to dive from its back, they cause the fish to swallow him and bear him away to the hidden land of Kane-huna-moku...[He is then] borne back to his old home and cast upon the beach, where his son rejoices over him but his friends reproach him for losing the joys of that good land. He lives to a good old age and is buried on Oahu. (116-132, and quoted in Beckwith 1970:69)

The Rice (1923) version ends with Makuakaumana's death and his son wrapping the body in tapa and carrying him to a cave near Ko'olaupoko (132).

This legend as told by Pukui and Curtis (1960) tells of Makuakaumana praying for training of his son in the ways of the gods. Rather than Makuakaumana being eaten by the whale, it was his son who was swallowed. The son was brought to Kahiki to be trained by Kāne and Kanaloa. He was then brought back to O'ahu where he became a great *kahuna* and wise leader (Pukui and Curtis 1960:58).

The Legend of Pā'ao tells us that he returned to Kahiki to find a high ranking chief who could be brought to Hawai'i, for he found Hawai'i to be devoid of a proper ruler (Emerson 1893:9). A chant, performed by Makuakaumana, offers the throne of Hawai'i to the high chief of Kahiki (Henry 1995:158-159, Fornander 1996:18-19). The chief, Lono Kaeho, refused and offered another priest, Pilika'ai'ea, instead (Fornander 1996:22). They then returned to Hawai'i where Pilika'ai'ea became chief and his descendants continued to rule until the last Kamehameha (Emerson 1893:11, Kamakau 1961:235, Fornander 1996:22, 33). Pilika'ai'ea is thought to have introduced '*aha ali'i*', a chiefly council, to Hawai'i (Abad 2000:275). The '*aha ali'i*' served to trace pure bloodlines and preserve legitimate leadership within the highest ranked *ali'i* (royalty).

Chronologically, the time period corresponding with the migration of Pā'ao varies greatly depending on the source. Pā'ao's arrival in Hawai'i is thought to have occurred sometime between AD 1100-1200 (Stokes 1927:40) up to AD 1530-1600 (Beckwith 1932:20). Using *mo'olelo* (traditional mythology) and historic accounts describing Hawaiian genealogy, Cachola Abad (2000) developed a chronological sequence of *ali'i* (royalty) for O'ahu, Hawai'i, Maui, and Hawai'i Islands. Abad (2000) places Pā'ao within the second generation of recorded Hawaiian history (278). The major issue with developing Hawaiian chronology stems from a lack of determinate time periods for reigning kings throughout pre-contact history. Abad (2000) attempted to define calendar dates based on standard durations of chiefly lineages (five year increments from fifteen to thirty-five years). Based on the broad range of an average reign presented in Abad (2000), Generation 2 is approximated between AD 1015-1435. This uses an average reign of fifteen (AD 1435), twenty (AD 1330), twenty-five (AD 1225), thirty (AD 1120), and thirty-five (AD 1015) years (Abad 2000:225). For this study only the fifteen to twenty-five year range of chiefly reign will be presented, based on modern practice (Hommon 2013). Hommon (2013) examines Hawaiian history as phases of emergence from Polynesian colonization to a political state through chronologically tracing genealogies recorded in traditional mythology, historic accounts, and archaeological evidence. Hommon's (2013) three phases include discovery and colonization (Phase I, AD 980-1350), and advancing stages of agricultural and political development (Phase II, AD 1350-1680 and Phase III, AD 1680-1790) (Hommon 2013:7). Therefore, the arrival of Pā'ao, Makuakaumana, and Pilika'ai'ae falls somewhere within Hommon's (2013) Phase I colonization era into the formative years of Phase II.

## KAMAPUA'A

Place names within Hau'ula and Kaluanui indicate a close connection with the legendary pig god, Kamapua'a. Kamapua'a is translated as "hog man" (Pukui and Elbert 1984:386). Kamapua'a was born in Kaluanui and he resided at Kaliuwa'a (Sacred Falls) with his grandmother and siblings (Kame'eiehiwa 1996:14). Kamapua'a and his brothers were taro farmers who planted in the uplands and lowlands. However, Kamapua'a was known to be quite mischievous and persistently stole chickens throughout windward O'ahu (Kame'eiehiwa 1996:23). When he stole the chickens of chief 'Olopana in Kailua and ate many of his warriors, the chief waged war and called upon warriors from throughout the island to capture Kamapua'a at Kaliuwa'a. Resulting battles ended in the deaths of many warriors and eventually even 'Olopana (Kame'eiehiwa 1996:26-43). Pukui and Elbert (1984) describe Kamapua'a as:

The pig demigod whose rootings created valleys and springs. He leaned against the cliffs at Kaliu-wa'a, Oahu (where a troughlike depression is still visible) to allow his family to climb up his body and escape Chief 'Olopana. He had many affairs and is a symbol of lechery. He exchanged ribald taunts with Pele and called on his plant forms...Other forms included a handsome man, grass, clouds, the humuhumu-nukunukua-pua'a fish, and the god Lono.

According to Abad (2000), the reign of 'Olopana and the exploits of Kamapua'a can be relatively dated (202-203). This is based on *mo'olelo* describing that after the death of 'Olopana, Kamapua'a fled O'ahu and arrived on the Big Island during the reign of chiefs associated with Generation 5. Based on compiled materials, Generation 5 spans from AD 1300-1480, when using fifteen (AD 1480), twenty (AD 1390), and twenty-five (AD 1300) years for the length of a chiefly reign (Abad 2000:225).

## OVERVIEW OF PRE-CONTACT HAWAII

### HAWAIIAN GODS

Hawaiian religion was animistic in design and incorporated a wide variety of natural phenomenon. Significant natural resources were regarded as ancestral descendants of the gods (Handy 1940b:320). Subsequently, Hawaiian religion incorporated a multitude of gods, goddesses, and demigods. The progenitors of the islands, gods, and man were Wakea, the sky father, and Papa, the earth mother (Malo 1951, Beckwith 1970). For this study, the four major gods Kāne, Kū, Lono, and Kanaloa were researched.

### KĀNE

Kāne ("man") was the father of all living creatures (Westervelt 1987:iii). Kāne was a fertile god, a procreator, god of the heavens and the earth (Krauss 1993:112). He was worshiped as the ancestor of both chiefs and commoners, and was evoked by family worship of ancestral deities or *amakua* (Beckwith 1970:42, 47). Pukui and Elbert (1984) provide a description of Kāne.

The leading god among the great gods; a god of creation and the ancestor of chiefs and commoners; a god of sunlight, freshwater, and forests to whom no human sacrifices were made..Kanaloa was his constant companion, but Kāne's name always preceded..The twenty-seventh night of the lunar month was sacred to Kāne. (387)

In the Polynesian Legend of Kumuhonua, Kāne is the first man created by the gods (Beckwith 1970:42). Kāne is assisted by Kū and Lono, who create a trilogy called *lahui akua* (union of gods). "Man if formed after the image of Kane with Ku as the workman, Lono as general assistant. Kane and Ku spit (or breathe) into the nostrils, Lono into the mouth, and the image becomes a living being" (Fornander 1919-20:267, 267, 273-276 cited in Beckwith 1970:43). Fornander (1919-20) states that "old Hawaiians make the front door face the east as a sign of Kāne

worship and turn toward the sun when they offer their morning prayer” (275). Kāne is said to have taught Lono the properties of medicinal plants (Malo 1951:111). Kāne is symbolized by sugar cane (*kā*), the *‘ōhia lehua* tree, and the taro plant (Handy 1940b:320, Mitchell 1982:72). Kāne stones, or *pōhaku o Kāne*, are shrines consisting of upright stone(s) and a small altar. *Pōhaku o Kāne* can be at a domestic temple, a fishing temple, or found at a transition point such as a boundary or pass (Valeri 1985:174-175). The stones are often phallic in form. “A slab-shaped or pointed stone (*pohaku*) which stands upright is called male, *pohaku-o-Kane*; a flat (*papa*) or rounded stone is called female, *papa-o-Hina* or *pohaku-o-Hina*, and the two are believed to produce stone children” (Beckwith 1970:13).

## KŪ

Kū was the god of war and was associated with human sacrifice and *luakini heiau* (temple of human sacrifice) (Westervelt 1987:iv). Kū is worshiped to produce abundant crops, good fishing, long life, and prosperity (Beckwith 1970:13). Kū was also worshipped as a god of the forest, god of canoe makers, fowlers and feather craftsmen, the digging stick, as well as others (Krauss 1993:112). Kū was symbolized by the *‘ōhi’a* tree and the hawk (*‘io*) (Mitchell 1982:72). Kū is described by Pukui and Elbert (1984):

In some accounts, Kū and Hina were the first gods to reach Hawaii, and were followed next by Kāne and Kanaloa, and last by Lono. Kū (upright) represented male generating power, and Hina (prostrate) was the expression of female fecundity and the power of growth. Kū also refers to the rising sun, and Hina to the setting sun; hence their realm includes the whole earth and the heavens and all generations of man born and unborn...Various forms of Kū were appealed to for rain and growth, fishing, and sorcery, but he is best known as the god of war. When gathering medicine with their right hands, people prayed to Kū for success. The third, fourth, fifth, and sixth nights of the lunar month were sacred to Kū. He sometimes assumed the form of the *‘ōhi’a* tree or the *‘io* hawk. (389)

Together, Kū and Hina represent the earth (Beckwith 1970:12-13). Kū (raising upright) represents the rising sun and all male spirits. Hina (leaning down) represents the afternoon and all female spirits. The balance between opposing forces, including male and female and mountains and sea, was central to the Hawaiian way of life.

## LONO

Lono was the god of peace, fertility, rain, agriculture, games and enjoyment (Westervelt 1987:iv). Lono is associated with natural phenomenon such as thunder, lightning, earthquakes, rainbows, and mudslides (Beckwith 1970:31). Lono is also a god of medicine and is referred to as a *kahuna lapa’au* (Malo 1951:111). Lono was symbolized by the *kukui* tree, sweet potato, taro leaves, and gourd (*ipu*) (Mitchell 1982:73). Lono is further described by Pukui and Elbert (1984) as:

The last [god] to come from Kahiki, considered a god of clouds, winds, the sea, agriculture, and fertility. He had also the form of the pig man, Kama-pua’a. He was the patron of the annual harvest *makahiki* festivals [*Lono-i-ka-makahiki*], and his image (*Lono-makua*) was carried on tax-collecting circuits of the main islands. Some fifty Lono gods were worshiped. (392)

Lono was offered red fish, white fish, black coconut, and *awa* (Beckwith 1970:32). Lono was symbolically worshipped by commoners by hanging a gourd within their prayer house, covered and hung with wickerwork and filled with food, fish, and *awa* (*kava* leaves) (Beckwith 1970:33, Kamakau 1976:133). Lono was worshiped during the Makahiki or New Year’s festival which was held during the rainy season and celebrated agricultural fertility.

## KANALOA

Kanaloa ruled the land of departed spirits (Westervelt 1987:iv). Kanaloa was god of the squid or octopus (*he'e*) and healed those under influence of sorcery (Beckwith 1970:60). Kanaloa was also known as the god of the ocean and ocean winds (Mitchell 1982:73). Kanaloa and Kāne were offered red fowl, pig, and *awa* (Beckwith 1970:32). Kanaloa was symbolized by the octopus and a medicinal herb, *'uhaloa* (*Waltheria indica*) (Mitchell 1982:74). Pukui and Elbert (1984) say of Kanaloa:

His companion and leader was Kāne. They were renowned as *kava* drinkers, and they found water in many places. Three days of the lunar month were sacred to Kanaloa –the twenty-fourth, twenty-fifth, and twenty-sixth. Some considered him a god of the sea, and in Christian times he was equated with Satan. (387)

Kāne and Kanaloa are thought to live in a mythical cloud land called *Kāne-huna-moku* (hidden land of Kane) (Beckwith 1970:67). As quoted in Rice's (1923:116-132) version of the Legend of Makuakaumana, Beckwith (1970:68) makes reference that Makuakaumana was pious enough to visit this nearly unobtainable land of Kanehunamoku and return back to his life on earth.

## GODDESSES

A few significant female deities should also be briefly summarized. Some of the more highly worshiped goddesses include Papa (goddess of fertility and the earth), Haumea (goddess of child birth), Hina (goddess of womanly duties and *kapa* beating), Pele (volcano goddess), and Laka (goddess of *hula*) (Beckwith 1970, Westervelt 1987:iv). Papa is closely associated with goddess Haumea. Goddess Hina was "the mother of Kamapua'a by Kahiki-ula and was referred to in chants by her mother Kamaunua Niho in order to save Kamapua'a in time of peril" (Pukui and Elbert 1984:383).

According to David Malo (Kupihea), gods came to Hawai'i at different times. Kū and Hina were the gods of the earliest Hawaiians, later came Kāne and Kanaloa, followed by Lono (Beckwith 1970). These gods were publically worshipped at religious temples or *heiau*. Gods were represented by images made of stone, wood, and wicker and were embellished with human hair, feathers, and marine shell (Krauss 1993:112-113). The gods were invoked for a wide variety of purposes, from the felling of a tree, a religious campaign, the birth of a child, or to sacrifice the first crops of a harvest (first fruits) (Valeri 1985: 38-44). Not all religious worship was conducted at the *heiau*, Hawaiian families worshiped their own personal ancestral guardian spirit or *amakua* at a family altar.

## PRE-CONTACT HAWAIIAN SOCIETY

Traditional Hawaiian society was highly stratified. The Hawaiian population was divided into strict social classes, consisting of kings (*moi*), chiefs (*ali'i*), priests (*kahuna*), commoners (*noa* or *maka'aina*), and servants or slaves (*kauwā*) (Beckwith 1932:124, Beckwith 1970:7, Dunford 1980:28). This stratified system was inherent in most aspects of daily life (Ladefoged 1998). Social classes were largely designated by inherited rank and inferred decreasing levels of *mana* (strength). *Mana* is the power that a person or thing of high rank possess (Westervelt 1987:iv). A person with great *mana* has supernatural skills, such as unbelievable courage or magical powers. *Mana* is obtained from descent, adhering to taboos, offering sacrifices, and reciting prayers and rituals (Westervelt 1987:iv). *Mana* is dangerous to those with lesser amounts, therefore a taboo system or "*kapu* system" was instilled within Hawaiian society. The *kapu* system was enforced with strict penalties and worked as a form of governance.

The *ali'i* class of people included chief councilors, priests, war leaders, strategists, warriors, historians, and the like (Beckwith 1932:124). *Konohiki* were lesser chiefs who took care of an *ahupua'a* for higher chiefs. They oversaw agricultural production, maintenance of irrigation canals, water supply, fishing rights, and collected taxes (Handy



and Handy 1972:321, Pukui et al. 1972:38, Dunford 1980:31, McGregor 1996:7). Royal emblems were worn by the king and other high ranking *ali'i*. Royal paraphernalia included feathered helmets and cloaks, capes, and carved whales tooth pendants (*lei niho pālaoa*) which hung on finely braided strands of hair (Kāne 1997:32, Mitchell 1982:96-103). Other ornamental objects included wraps of *kapa* (cloth made of pounded wood), feathered head *lei* (ornamental garland), boar's tusk bracelets, tortoise shell bracelets, and feathered sticks called *kāhili*.

The *maka'ainana* provided labor for agricultural fields, hunted, fished, played, fought, worshipped, and worked in various trades (Handy 1950:171, Handy and Handy 1972:323). These commoners also helped to maintain lands owned by the chiefs and participated in large construction works. The family unit (*'ohana*) included large extended groups of relatives who typically lived close to one another (Dunford 1980:32). Commoners shared subsistence crops to support their extended family groups. *'Ohana* living upland would exchange foods and gifts with *'ohana* near the shore (Handy 1950:178). This collaboration was an integral cultural practice. The *'ohana* system encouraged transmission of inter-generational values and practices (McGregor 1996).

The *kauwā* class of people were looked down upon and avoided by commoners (Dunford 1908:34). The *kauwā* class was thought to have no *mana* (Kāne 1997:52). Therefore, strict *kapu* prohibited any association with people of this class (Malo 1951:70-71). Regularly, people of the *kauwā* class were collected and sacrificed to the god Kū (Handy and Handy 1972:324).

Taboo's or (*kapu*) were established rules that were strictly enforced, particularly regarding the roles of men and women (Malo 1951:27). Traditionally, on O'ahu most of the work conducted outside of the house was men's work (S. Kamakau 1992:238-239). Men maintained the fields and irrigation ditches, caught fish, maintained canoes, constructed houses, made weapons and tools, and cooked foods in the underground oven (*imu*) (Handy and Handy 1972:301, Mitchell 1982:79). Men cooked food for the women in a separate *imu*. Only men were allowed to eat pork, certain kinds of fish, and most types of bananas (Abbott 1992:19, Kāne 1997:53). Women conducted domestic tasks, cared for infants and young children, made *kapa* cloth, matting, cordage, and gourd containers, gathered wild fruits, berries, and herbs, and harvested salt, seaweed, shellfish, shrimps, and small fish (Handy and Handy 1972:304, Dunford 1980:37, Kāne 1997:51). *Kapu* included laws of death, including punishing the negligence to prostrate in the presence of a chief, not sitting when the chief's bathing water is being carried past, or walking about while chantings of a chief are being performed, among many others (Beckwith 1932:12). *Kapu* were enforced in order to preserve *mana* and prevent spiritual defilement.

#### AGRICULTURE

Polynesians brought a variety of plant and animal species to Hawai'i (Buck 1957:7, Handy and Handy 1972:13, Dunford 1980:23). Polynesian-introduced plants included food items such as *taro* (*kalo*), sweet potatoes (*'uala*) (from South America), yams (*uhi*), arrowroot (*pia*), bananas (*mai'a*), sugar cane (*kō*), breadfruit (*'ulu*), coconut (*niu*), and mountain apple (*'ōhi'a 'ai*). Polynesian-introduced plants used for craftwork and common utilities included pandanus (*puhala*), *kukui*, bamboo, *hau*, paper mulberry (*wauke*), *ti* tree, *kou*, *milo*, *olonā* bushes, and gourds (*ipu*). Plants used for medicinal purposes included *'ōlena*, *noni*, and *'awa*. The Hawaiians maintained their *'aina* (land) or fields of crops mainly using only one tool type, hardwood digging sticks (*'ō'ō*) (Handy 1950).

Hawaiians hunted and fished, gathered plants and marine resources, and practiced horticulturalism. Polynesian-introduced animals included the pig (*pua'a*), chicken (*moa*), dog (*'ilio*), and rat (*'iole*). The animals were kept in stone enclosures or pens and also roamed the valleys. Pigs were bred in large numbers and were commonly used as religious offerings and as a common method of payment for taxes (Buck 1957:2, Mitchell 1982:121). Dogs were bred in large numbers to serve as a main source of food and for use in paying taxes (Buck

1957:3, Mitchell 1982:121-122). Chickens were eaten and could also be offered to the gods (Buck 1957:3-4, Mitchell 1982:122).

The principle crop on O'ahu was wet land taro (*lo'i*), cultivated in constructed shallow ponds along the banks of waterways and in areas where the ground was naturally soft and moist (Kamakau 1992:237). Dryland taro was typically cultivated in uplands where natural rainwater fed the plants. This staple crop was pounded and thinned into *poi*, the staple of the Hawaiian diet (Handy 1950:175). *Kula* lands were open pastures or fields for farming that sloped between the mountains and sea (Handy and Handy 1972:55). Fishponds were common along coastlines. Fishponds were used to raise mullet (*'anae*), milkfish (*awa*), and flagtail (*āholehole*) and could be reserved for *ali'i* use or shared as a community (Kāne 1997:76).

#### MAKAHIKI

The Makahiki was a yearly harvest festival where goods were provided as tax and months of enjoyment ensued. The festival coincided with the rising of the Pleiades in the evening sky (Handy and Handy 1972:329, 'I'i 1963:72 cited in Valeri 1985:201). Lono-i-ka-makahiki was the god of the Makahiki festival (Buck 1957:466). He was symbolized by a *tapa* (barkcloth) banner suspended on a mast with a tiny carving of a human head at the top (Malo 1951:143-145). No large work projects, domestic ceremonial duties, war, or politics were conducted during the Makahiki season (Malo 1951:141, Kāne 1997:44). A procession around the entire island was made carrying the image of Lono. Altars at the edge of each district were erected for offerings or gifts of craftwork and food. The gifts were taken by the chiefs, paid as taxes, and some were re-distributed to lesser chiefs and followers (Malo 1951:143, Kāne 1997:44). The festival included other important images including a "short god" (*akua poko*) and a god of sports (*aku paani*) (Malo 1951:145, Valeri 1985:207). During the procession around the island, rituals were conducted, people feasted, mock battles were performed, and people enjoyed sporting events and games (Handy and Handy 1972:331).

#### HAWAIIAN HOUSEHOLD

Hawaiians built houses of many types, some of which were constructed to maintain separate spaces between men and women. Houses (*hale*) were built on soil or commonly on a rock platform, with smaller rocks or pebbles on top for flooring (paving), followed by fern leaves and a mat (Handy 1950:185, Handy et al. 1972:76, Dunford 1980:130). The house structure was built of wooden posts and a rafter or ridge pole and the roof was thatched with *pili* grass, sugar cane leaves, pandanus, or *ti* leaves, according to particular use (Malo 1951:119, Buck 1957:103).

A commoner (*maka'āinana*) household typically consisted of a one room house (*hale noho*). Extended families and familiar groups (*'ohana*) formed a *kauhale* or complex of houses near water sources and/or fishing grounds (Handy 1950:179, Handy et al. 1972:77, Dunford 1980:132). The social and religious division between sexes is reflected by multiple habitation structures, including a house for *imu* cooking (*hale imu*), the men's eating house (*hale mua*), the women's eating house (*hale 'aina*), a menstruation hut (*hale pe'a*), a house for *kapa* beating and women's work (*hale kuku* or *hale kua*), and a house where men and women can sleep together (*hale noa*) (Malo 1951:122, Handy et al. 1972:76-77, Valeri 1985:124, Kamakau 1992:238). Other structures included a canoe house (*hālau*), a house for family images (*hale heiau*), and food storehouses (*hale papa'a* or *hale ho'āhu*) (Mitchell 1982:157-158). The *hale noa* or sleeping house had a walking area and a raised sleeping area (Handy 1950:182). Houses contained a variety of items including clothing of *tapa*, soft mats, pillows, blankets of *tapa*, wooden bowls, pounding boards, containers made from gourds, baskets, coconut utensils and cups, knives of stone flakes or bamboo, scrapers, peelers, and cutters (Buck 1957:107, Kāne 1997:62).

## HEIAU

Traditional places of worship included simple altars or shrines (*kauhu* or *ko'a*) and larger temples, which are termed *heiau* in this report. Shrines were built for various occupations such as fishing or bird hunting (*ko'a*), worship of family deities (*'aumākua*), and as trail markers (Buck 1957:528-529, Krauss 1993:116). Shrines were erected for the making of offerings to associated spirits, whether for abundance or to pass into a new land area (Krauss 1993:116-117). A shrine could be a simple stone, such as *pōhaku o Kāne*, found at a boundary point or prominent spot in the landscape where offerings are placed every time it was passed (Valeri 1985:175). Locations and the type of *heiau* were carefully chosen and built by professional architects called *kahuna kuhikui pu'uone* (Kamakau 1967:130, Krauss 1993:117).

*Heiau* represent the stratified social and political structure of Hawai'i and were places to propagate and maintain power and sustain ideological beliefs (Shimizu 1980:10, 12; Kirch 1990, Ladefoged 1998, Kolb 2006, Kirch 2010a, McCoy et al. 2011). *Heiau* were places of *kapu*, allegiance to the gods and king, and redistribution of wealth. A chain of tribute payments began with commoners who provided tax to the *konohiki* and chiefs, who then provided tribute to higher chiefs and the king (Kirch 2010a:35). This process was the foundation of Hawaiian political, economic, and social customs. High-ranking *ali'i* could only eat foods which were consecrated at a *heiau* (Valeri 1985:126). Therefore, the temples provided as an institutionalized and sustainable system of obtaining resources from the *'aina* to the *ali'i*.

Offerings were placed at *heiau* for appeasement of gods, for taxation purposes, and in ritual offering of first fruits. Agricultural firstfruits included a family or individual's field harvest or first-born animals, and the first portion of every meal (Valeri 1985:43). Consecration of firstfruits to a deity were made to ritually free the harvest or a large catch of fish (Valeri 1985:75-76). Firstfruits gathered from fishing were consecrated to a form of Kū, named Kū'ulakai. Firstfruits collected from farming were primarily sacrificed to Lono, however, this was dependent on the time of year and family deity. Traditional offerings presented at *heiau* were of animal (typically pig or fish), vegetable (*taro*, sugar cane, bananas, coconuts, etc.), or a material with symbolic value such as *kapa* (Dunford 1980:49). Pigs used for temple offerings had to be "fine ones, fattened until the snout almost disappeared and the neck rolled with fat, the ears drooping, and the mouth standing open like a gaping cock. The gods would not eat an offering of poor quality" (Kamakau 1976:139). Offerings were sacrificed to the gods by a *kahuna* (priest). Valeri (1985) defines sacrifice as the consecration of an offering or gift to a deity (37, 60). Sacrifices were conducted for various occasions including births, rites of passage, commencement and completion of activities, preparation for war, healing, purification, and consecration of firstfruits in agriculture, fishing, or a product of labor sacred to the gods (Valeri 1985: 38-44).

*Kahuna* are people with various specialized skills who were utilized for all aspects of *heiau* design and use, from selecting the location and orientation to conducting ceremonial rites (Malo 1951, Handy and Handy 1972:322, Valeri 1985:137). *Kahuna* could be from the *ali'i* class or could be a *maka'ainana* (Dunford 1908:34, Handy and Handy 1972:323). *Kahuna* were spiritual advisors and invoked spiritual assistance and guidance (Mitchell 1982:80). Priests of high rank could not leave sacred places, they had to only eat pure or consecrated foods and could not come into contact with impure things such as menstruating women, corpses, excrement, or people of inferior rank (Valeri 1985:133). There are other rules which aimed to "perpetuate the integrity of these sacred persons" including not cutting their hair or beards (Valeri 1985:133). Thus, *heiau* and their keepers, the *kahuna*, were bound to strict rules of purity and integrity. *Kahuna* had more advanced knowledge than commoners and held a higher rank so it was easier for them to access the gods. The strict *kapu* system was followed by the highest ranking individuals to ensure a superior connection with the divine.

*Heiau* were constructed for various purposes. Functions of *heiau* included the *luakini*, utilized as a place of human sacrifice, agricultural *heiau* (*waihau* or *mapele*), healing *heiau* (*ho'ola*), and a variety of others, including a place of refuge (*pu'uhonua*) where persons who had broken a *kapu* could receive ritual cleansing and families could retreat during times of war (Mitchell 1982:80). Specific *heiau* were dedicated to various practices such as war, agricultural productivity, *hula*, child birth, surfing, love, poisoning, circumcision, or prophecy (Bennett 1930:69).

The size and function of the *heiau* relate to the gods in which they are dedicated. *Luakini* temples, dedicated to the war god Kū, were the largest temples and were used by the king and high chiefs (Kamakau 1976:130, Mitchell 1982:81). Agricultural temples (*waihau* or *unu*) dedicated to god Lono functioned to receive and promote an abundance of crops and were a range of sizes (Mitchell 1982:81). *Waihau* could be built by priests, chiefs, and commoners (Kamakau 1976:129). Agricultural *heiau* dedicated to the god Lono were called *hale o Lono*. These temples were smaller than *luakini* style *heiau* and did not contain as many structures (Shimizu 1980:26). The size of the *heiau* directly related to the degree of political involvement and labor invested in building the structure. Larger temples required political support from a central organization and enforced participation (custodial labor), whereas smaller *heiau* could be constructed and maintained by communities or low level elites (Kamakau 1976:135, Kolb and Snead 1997). The class, and thus the size of the *heiau*, may reflect how stringent established *kapu* were enforced. Some low level temples were considered "comfortable" and did not have as strict *kapu* to adhere to as at *luakini heiau* (Malo 1951:159, Kamakau 1976:129).

Healing or medical temples are referred to as *heiau ho'ola* (Mitchell 1982:81). Medical temples were typically dedicated to Kāne, however some did exist which were associated with Lono and Kū (coupled with Hina) (Valeri 1985:186). Medical practitioners who treated with natural herbs were called *kāhuna lā'au lapa'au* (Krauss 1993:100). Plant roots, stems, leaves, flowers, bark, fruits, and seeds were brewed and pounded to extract juices to create infusions (Krauss 1993:101). , 'I'i describes healing *heiau* as:

Where offerings were made and methods of healing were taught. The location of all diseases they had sought and found in man were marked by the placing of pebbles. This helped them to recognize the nature of the disease. Feeling the hands indicated whether the disease would be fatal or was curable if treated then. They learned the proper remedy, the methods of treatment, the results to expect, and the island where the disease was first discovered...A live pig, squealing on the way, was brought to the kahuna as a gift from the patient. If there were many kinds of diseases in a patient, the methods of treatment were many and it was understood that the expense would be great. (46)

*Heiau* are known to vary greatly in design (Bennett 1930, Buck 1957:514, Shimizu 1980). *Heiau* forms were influenced by their location, materials, and function. *Heiau* were most commonly built in the plains and upland areas and tended to cluster near land boundaries (Shimizu 1980:35). Large *heiau* were built on prominent ridges and hilltops, whereas smaller *heiau* were built in villages, mountain slopes, inland valleys, and in areas which could easily serve a community (Kolb 1992:15). *Heiau* typically contained terraces, platforms, and enclosure walls (Bennett 1930, Kolb 1992). A terrace consists of a long retaining face at the base of a slope with rock fill and/or sediment used to create a level surface. To level the terrace the upslope hillside was cut away or soil at the base of the facing was removed and used as fill (Bennett 1930:22-23, Kolb 1992:18). *Heiau* on slopes were most easily enlarged by adding additional terraces below the first. A platform was constructed with three to four vertical faces. A wall was constructed as free standing and double-faced with stacked stones and cobble fill. "Large boulders often determined foundation lines. The chief process was one of facing and filling" (Bennett 1930:22).

Although each *heiau* is unique, repetitive design elements were used to create the sacred space. There is more documentation of *luakini heiau* than other types of *heiau*. However, general characteristics of *heiau* were wide

spread. *Heiau* typically contained an open courtyard to accommodate a public assemblage for certain ceremonies (Buck 1957:516, Neller 1989:6). The court was on top of the *heiau* and could be covered in earth, made of sand and dirt, or paved with stones. “Water-worn pebbles were carried from the nearest beach and strewn over the uneven floor, making a comparatively smooth place over which the naked feet of the temple dwellers passed” (Westervelt 1915:1). “Coral was often strewn on the *heiaus*, over the floors and in the walls” (Bennett 1930:28). Temples typically included thatched houses, altars, a wooden tower called an *‘anu‘u* or oracle tower, temple images (*ki‘i*), and refuse pits (Bennet 1930, Buck 1957:519, Shimizu 1980:15, Kamakau 1992:238). Temple images of carved wood and wicker-work were presented on *heiau* (Buck 1957:488, 521-522). *Heiau* contained from one to many wooden idols or *ki‘i* (Bennett 1930:50).

Houses or *hale* within the temple included *hale mana*, *hale pahu*, *hale waiea*, and *hale umu* (Buck 1957:520-521, Neller 1989:7, Krauss 1993:118). The *hale mana* was a large house where temple idols were stored. The *hale pahu* was a small drum house. The *hale waiea* was where the priests consulted on the progress of stages of ritual and which was associated with the *‘aha* cord (Buck 1957:521). The *‘aha* cord was used for measuring and was also referred to as *‘aha hele honua* or the cord binding the land (Buck 1957:520). “The cutting of the *‘aha* cord was symbolical of successful incantations and ceremonies” (Bennett 1930:35). The *hale umu* was the earth-oven house which held fires and was utilized in preparation of sacred foods (Bennett 1930:35).

*Heiau* included a variety of structural components. Offerings were placed on stone pavements (*kipapa*), until the priest sacrificed them to the gods (Buck 1957:522, Malo 1951:162, Shimizu 1980:19, Neller 1989:8). Once they were sacrificed, the offerings were placed on a wooden stand (*lele*) positioned on the court, where they remained “until they rotted or were thrown into the refuse pit to make way for fresh offerings connected with subsequent temple ceremonies” (Buck 1957:523). The *lele* stand was usually erected near the *kipapa*. An oracle tower (*lana nu‘u mamao*), ranging from twenty to fifty feet high, was a typical feature of *heiau*. The oracle tower contained three tiers (Malo 1851:176, Buck 1957:520, Neller 1989:7). The lowest tier, the *lana*, was used for offerings. The second tier, the *nu‘u*, was used by the high priest and attendants and was considered sacred. The highest tier, the *mamao*, was so sacred only the high priest and king were allowed on it. Refuse pits (*luakini* or *luapa‘u*) were for organic refuse such as decaying temple offerings (Buck 1957:525, Shimizu 1980:19, Neller 1989:8). In *luakini* temples the pits were for disposal of human sacrificial remains. Some smaller pits found on the *heiau* were for idols and to store or conceal ceremonial objects (Bennett 1930:43).

The layout of *heiau* features have been analyzed through historic accounts and existing architecture remains. Figure 11 through Figure 13 shows various renditions of *heiau* layout and design. The oracle tower stood at the platform end of a temple and was dressed in white tapa cloth (Malo 1951:162, Buck 1957:519, Krauss 1993:118). The *hale mana* was commonly built at the opposite end of the *heiau* from the oracle tower and *lele* altar (Bennett 1930:34). It is likely that priests or the king lived in the *hale mana*, or at least nearby to the *heiau* (Bennett 1930:36, Kirch et al. 2010). The *hale pahu* faced the altar and was positioned before the *hale mana* (Bennett 1930:35, Buck 1957:520).

Several structures commonly located in the vicinity of *heiau* are also known. Often a house site or guard house was built near the entrance to the *heiau*. A *hale o Papa* was built separate from a main *heiau* for females of the *ali‘i* class (Bennett 1930:55, Buck 1957:521, Kamakau 1976:129, Shimizu 1980:18). The *hale o Papa* aided in child birth and was a retreat during menstruation (Bennett 1930:69). Other structures found near *heiau* include the priest’s house, pens for animals, and burial platforms and mounds (Bennett 1930:55).

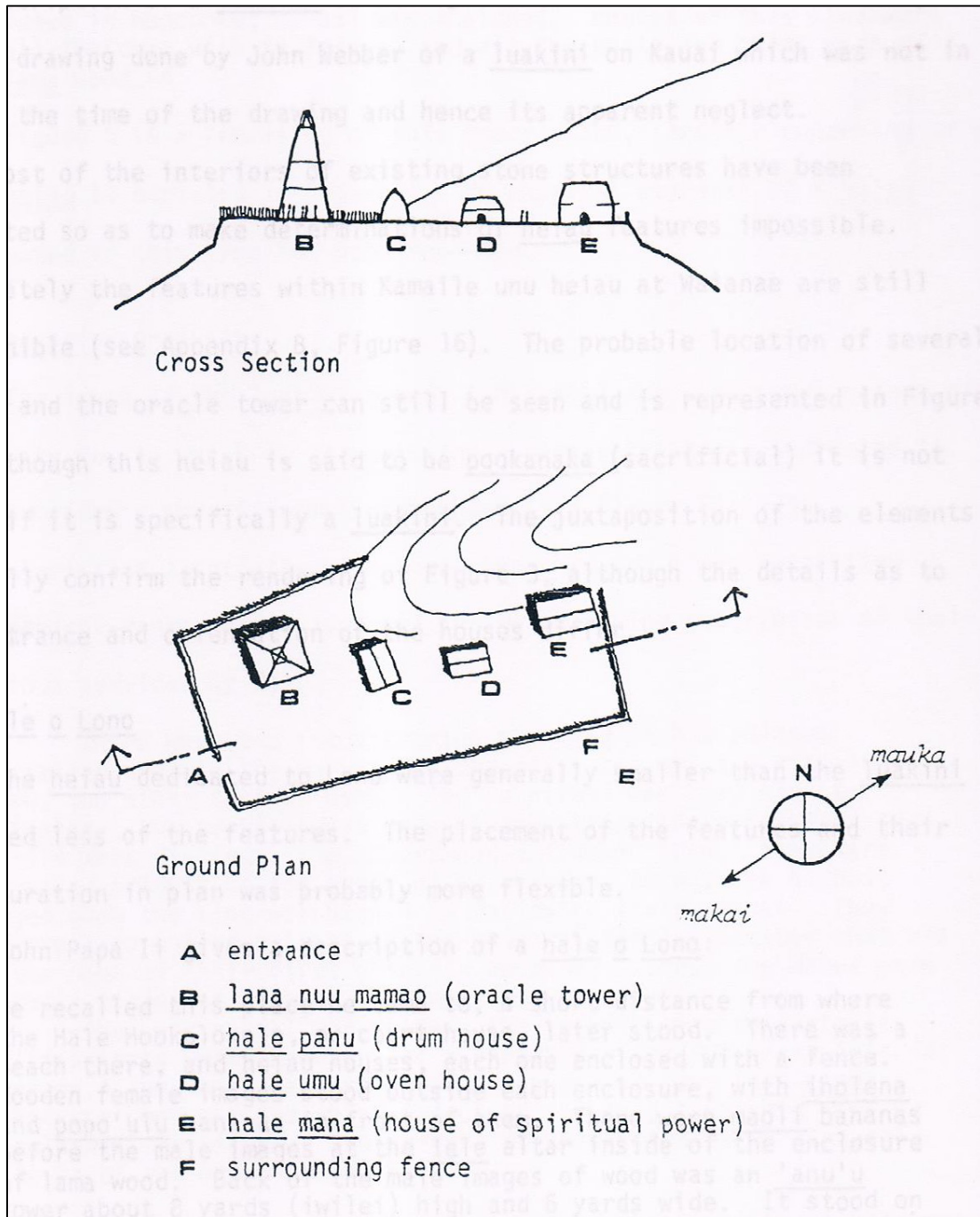


FIGURE 11. REPRESENTATION OF A HEIAU (KAMAILEUNU HEIAU IN WAIANAE, SITE 161) (SHIMIZU 1980:25)

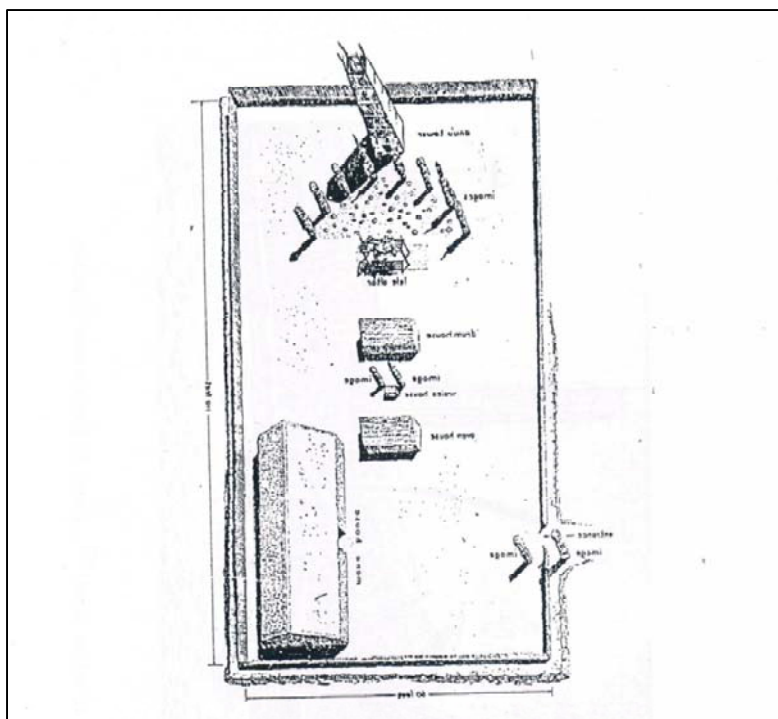


FIGURE 12. FIGURE OF A LUAKINI HEIAU, DRAWN BY PAUL ROCKWOOD BASED ON A DESCRIPTION BY JOHN PAPA 'I'I (SHIMIZU 1980:23)

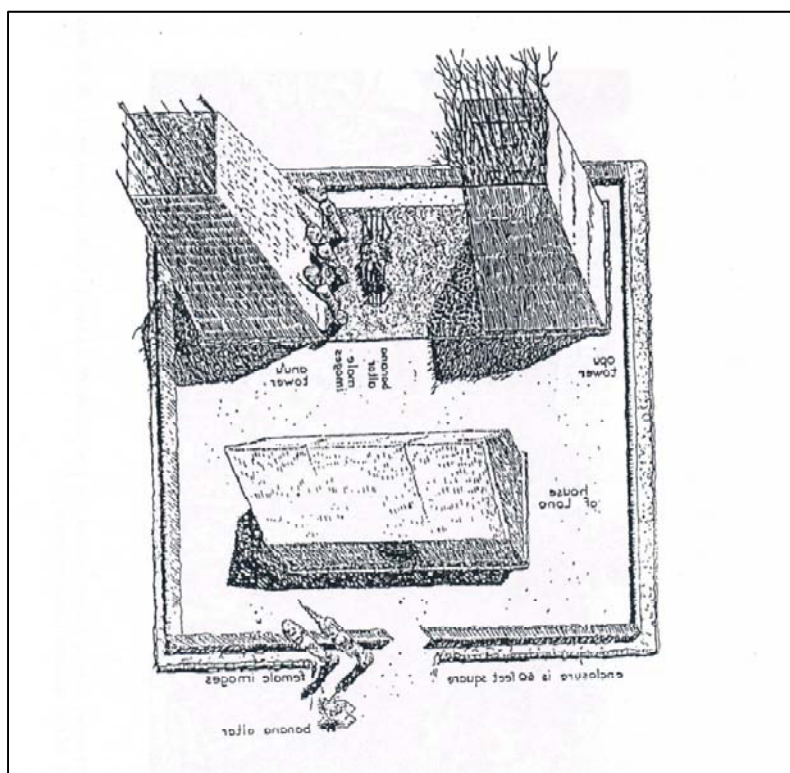


FIGURE 13. FIGURE OF A HALE O LONO, DRAWN BY PAUL ROCKWOOD BASED ON A DESCRIPTION BY JOHN PAPA 'I'I (SHIMIZU 1980:28)

It is thought that the function of *hale* were distinguished by the type of wood used to construct them. *Luakini* temples used the red wood of 'ōhi'a trees to build the *hale mana*, oracle tower, temple images, and surrounding fence (Malo 1951:159). Agricultural *heiau*, called *mapele*, had *hale* built of *lama* wood (Handy and Handy 1972:447). However, the use of specific woods is not definite. Thrum (1909) notes *luakini heiau* also included a house of *lama* wood (54). Valeri (1985) indicates that perhaps it is the location of each wood that varies according to a certain circumstance and purpose (181).

Kings and priests were permitted to reside at the temples, however at times the temples were unoccupied. Between major events at the *heiau*, the temples were often left unattended. Bennett (1930) discusses maintenance of *heiau*:

Many of the temples were not in constant use, and in the interims they were allowed to stand neglected. Indeed no one was permitted to enter the sacred structure. When the temple was to be used again the fences were repaired, the idols renewed, the houses rebuilt, and the whole structure was given a general overhauling. (30-31)

Temples underwent changes and building events over a period of time (Kolb 1999, 2006). "Some features were abandoned and new details were elaborated" (Buck 1957:513). Handy (1927) describes maintenance of Polynesian temples in an attempt to create an attractive place in which the gods would like to come (178). Handy (1927) quotes a prayer that was recited during refurbishing of the temple:

May the land live! The marae is restored, it is weeded and become handsome. The carved ornaments are renewed. The altars are renewed. The house of the gods is renewed. The gods will all come, and gather in the darkness.

It is thought that temple design changed over time. Early temple styles were combined with later influences of Pā'ao and Makuakaumana (Kamakau 1967:135). Early temples are thought to have been simple platforms of stone and truncated pyramids dedicated to the god Kāne (Fornander 1880:59, Kirch 2012:69). Early temple rites incorporated the chief, priest, and the congregation, however later temple design used constructed walls which separated the ritual space from the congregation who were "seated on the ground outside the walls, mute, motionless, ignorant of what was passing within the Heiau until informed by the officiating priest or prompted to the responses by his acolytes" (Fornander 1880:59). The introduction of new religious rites, specifically attributed to Pā'ao, enforced strict taboos (*kapu*) and caused changes to temple ritual and *heiau* design (Thrum 1907:48; Buck 1957:513, 531; Stokes 1927:41). Fornander (1996) states that following the presence of Pā'ao, *heiau* began being built in quadrangular or parallelogram form (35-36). Pā'ao is thought to have put all prior *kahuna* to death (Beckwith 1932:58). It is thought that prior to Pā'ao, Kāne temples did not contain idols, however afterward all temples practiced image worship (Beckwith 1932:58). Kepelino states that the worship instated by Pā'ao was the second time that Hawai'i turned to image worship (Beckwith 1932:58).

A common ceremonial drink, *kava*, is a Polynesian introduced plant which was utilized for its intoxicating effects during ritual activities (Abbott 1992:115). "By drinking 'awa offered to a deity in a sacrificial context, the deity's knowledge and power of vision are thought to be acquired" (Valeri 1985:59). Kava ('awa) roots were washed, scraped, dried, and chewed. Saliva rendered starch grains within the *kava* to become more easily absorbed and produced a stronger effect than if pounded (Buck 1957:67). The *kava* was not swallowed during the chewing process, rather the root was chewed into a "pulpy bolus" then deposited into a bowl, mixed with water, strained, and was drank (Buck 1957:66-69, Handy and Handy 1972:194).



## ABOLISHMENT OF TRADITIONAL RELIGION

In 1891, during the reign of King Liholiho, the traditional Hawaiian religious system or *kapu* system was abolished. “An extraordinary event marked the period of Liholiho's rule in the breaking down of the ancient *tabus*, the doing away with the power of the *kahunas* to declare *tabus* and to offer sacrifices, and the abolition of the *tabu* which forbade eating with women” (Kamakau 1992:222). The overthrow of the religious system was most publically symbolized by the egregious act of men and women eating together (Kamakau 1992:222-228, Kuykendall 1938:67-68). According to Kuykendall (1938), the food taboo was officially broken at an event hosted by King Liholiho.

Two tables were in the European fashion, one for men and one for women. After the guests were seated, and had begun to eat, the king took two or three turns round each table, as if to see what passed at each; and then suddenly, and without any previous warning to any but those in the secret, seated himself in a vacant chair at the women's table, and began to eat voraciously, but was evidently much perturbed. The guests, astonished at this act, clapped their hands, and cried out, "*Ai noa*,—the eating *tabu* is broken.

When the meal was over, Liholiho issued orders to destroy the *heiaus* and burn the idols, and this was done from one end of the kingdom to the other. The date of this event can be definitely determined by contemporary notices to fall within the first week of November, 1819. The diary of the Spaniard Marin shows that on November 6 orders were received in Honolulu from the king directing that men and women should eat together and should eat equally of foods formerly prohibited to the women; on the following day Marin noted that women ate pork and the *heiaus* were destroyed. (68)

Waha'ula, the first temple built by Pā'ao in Hawai'i, is said to have been the last temple destroyed. Westervelt (1915) recounts “at that time the grass houses of the priests were burned and in these raging flames were thrown the wooden idols back of the altars and the bamboo huts of the soothsayers and the rude images on the walls, with everything combustible which belonged to the ancient order of worship. Only the walls and rough stone floors were left in the temple” (3).

The abolishment of the *kapu* system completely altered social and political structure of the Hawaiian people. Hawaiians could only secretly continue to honor ancestral deities, practice natural healing, and teach *hula* and chants (McGregor 1966:9, Shimizu 1980:3). Hawaiian lifeways slowly began to incorporate foreign goods and ways of life. The array of foreign influences imposed on the Hawaiians caused varying outlets of change and modification to Hawaiian society and cultural materials (Bayman 2009:149).

## HISTORIC BACKGROUND OF HAU'ULA AHUPUA'A

The post-contact or historic time period of Hawai'i's history follows the arrival of Captain James Cook on January 18, 1778. The Hawaiian Islands were soon regularly frequented by explorers, merchants, traders, and missionaries. Established maritime routes incorporated Hawai'i as a port for provisioning and obtaining valuable Hawaiian resources including sandalwood and whaling goods. The sandalwood trade began in the early 1800s and lasted until around 1825 when the sandalwood supply greatly diminished (Lydgate 1916:55, Kuykendall 1938:85-86). Hawaiians hauled the sandalwood from the mountains, requiring much time and effort. This subsequently strained the productivity of their agricultural crops (Lydgate 1916, McGregor 1996:8). Missionaries first visited the islands in 1820. Whaling was a major industry in Hawai'i from around 1819 to 1871 (Kuykendall 1938:70, Mitchell 1982:172). Steamships operated along the coasts starting in 1846 (Mitchell 1982:172).

## THE MAHELE

In pre-contact Hawai'i, land tenure was formally given by the king to his principle chiefs. Land was partitioned by chiefs to land managers or *konohiki*, who then portioned land into smaller parcels for household groups and tenants (*hoa'aina*) (McGregor 1996:2, Kirch 2012:140). Post-contact Hawai'i brought powerful foreign influences and utilization of lands for various commercial pursuits, prompting a change in land acquisition and ownership. In the 1840's King Kamehameha III waived his right to full authority over the land, portioning out land for his personal use (crown lands) and then dividing the rest of his territory into land for the government, land for the chiefs (*konohiki* lands), and land for tenants or commoners (*kuleana land*) (Alexander 1882, Board of Commissioners 1929). The entire *ahupua'a* of Hau'ula was retained by King Kamehameha III as crown land (Board of Commissioners 1929:27) (refer to Figure 7, Figure 10, and Figure 14).

In 1846, a Board of Commissioners to Quiet Land Titles was established to review land claims. The Board reviewed claims for all the Hawaiian Islands, confirming some 11,309 land commission awards (LCA's) (Alexander 1882:10). In order to claim land, the claimant had to pay for their land boundaries to be surveyed, file a claim with the Board of Commissioners, provide testimony for lands they occupy and improve, and obtain approval of the award (Alexander 1882:10). The Board of Commissioners completed the "Mahele Book" or Book of Division in 1848. However, claimants still had to present evidence to obtain the formal award. The Board of Commissioners was dissolved in 1855, but extensions for *konohiki* land claims continued until 1862 (Alexander 1882:18-19). Subsequent to receiving an LCA, a Royal Patent could be purchased in fee-simple. Royal patents issued to tenants of government lands were termed "grants" (Alexander 1882:22). Research found thirty LCA's that were awarded in Hau'ula (Table 2). Some tenants were awarded more than one parcel, therefore a total of fifty-six parcels were awarded (Waihona 'Aina 2013). These LCA records provide valuable information on land use in the 1850's. A 1900 Monsarrat map shows the location of the Hau'ula LCA's (Figure 15). The map indicates that LCA's were clustered around streams and adjacent to lands being used for *taro*, rice, and ponds. The LCA testimonials describe heavy use of the lowlands for *taro* farming, *kula* lands, and houses. Several LCA's also mention forest plots and fishing rights.

Government land titles increased through the ceding of lands by chiefs, land purchases, the forfeit of tenant land, and gifting of crown lands to the government by the king (Alexander 1882:16, 22). Between 1850 and 1860, a large portion of all government lands were sold as grants. The Act of 1850 partitioned one-twentieth of all government lands for educational purposes (Alexander 1882:24, Mitchell 1982:264). However, government lands could be sold as needed for additional income if deemed appropriate. In 1893, due to the overthrow of the monarchy, remaining Crown Lands were made public domain (Mitchell 1982:263).

## HOMESTEAD LOTS

An Act of 1884 facilitated the settlement of Homestead Lots on public lands. These lands were "surveyed and laid out in lots not over twenty and not less than two acres in extent in dry or *kula* land, and not over two acres in extent in wet or *taro* land, with convenient roads in connection therewith" (Alexander 1882:11). Homestead Lots were acquired with a ten dollar application fee and quarter-yearly rent or interest in advance.

By this agreement, the applicant is allowed to occupy the lot for five years free from taxes for the same, on condition that he build a dwelling house upon it within one year, and fence it within two years, and pay quarterly in advance, the quarterly interest of the purchase price at ten per cent., and at the end of the five years pay the purchase price or the unpaid balance of it in full, or deliver a mortgage to secure his note for the unpaid balance with interest.

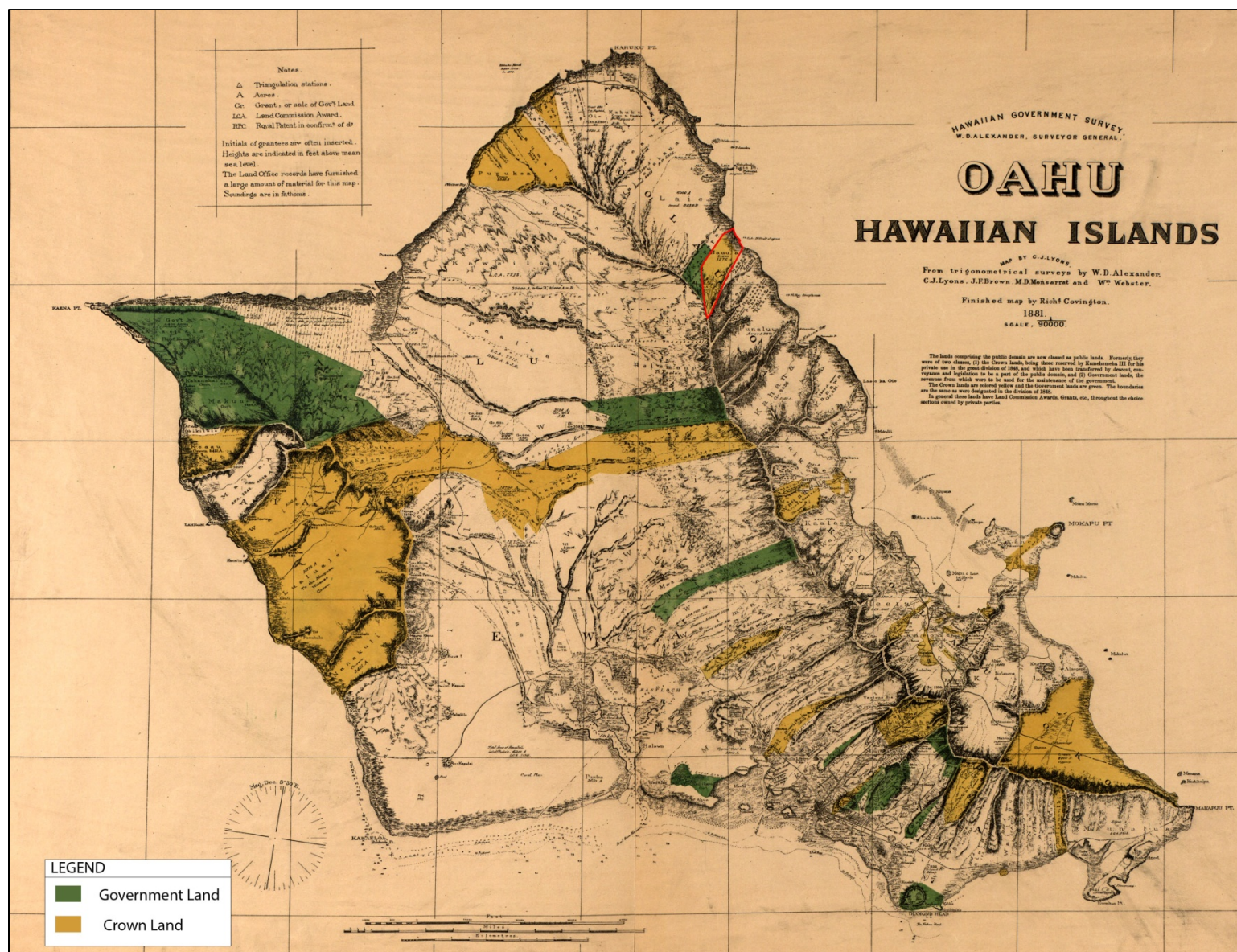


FIGURE 14. 1881 LYON'S MAP SHOWING CROWN LANDS (IN YELLOW) AND GOVERNMENT LANDS (IN GREEN) DESIGNATED DURING THE MAHELE (HAWAI'I SURVEY DIVISION)



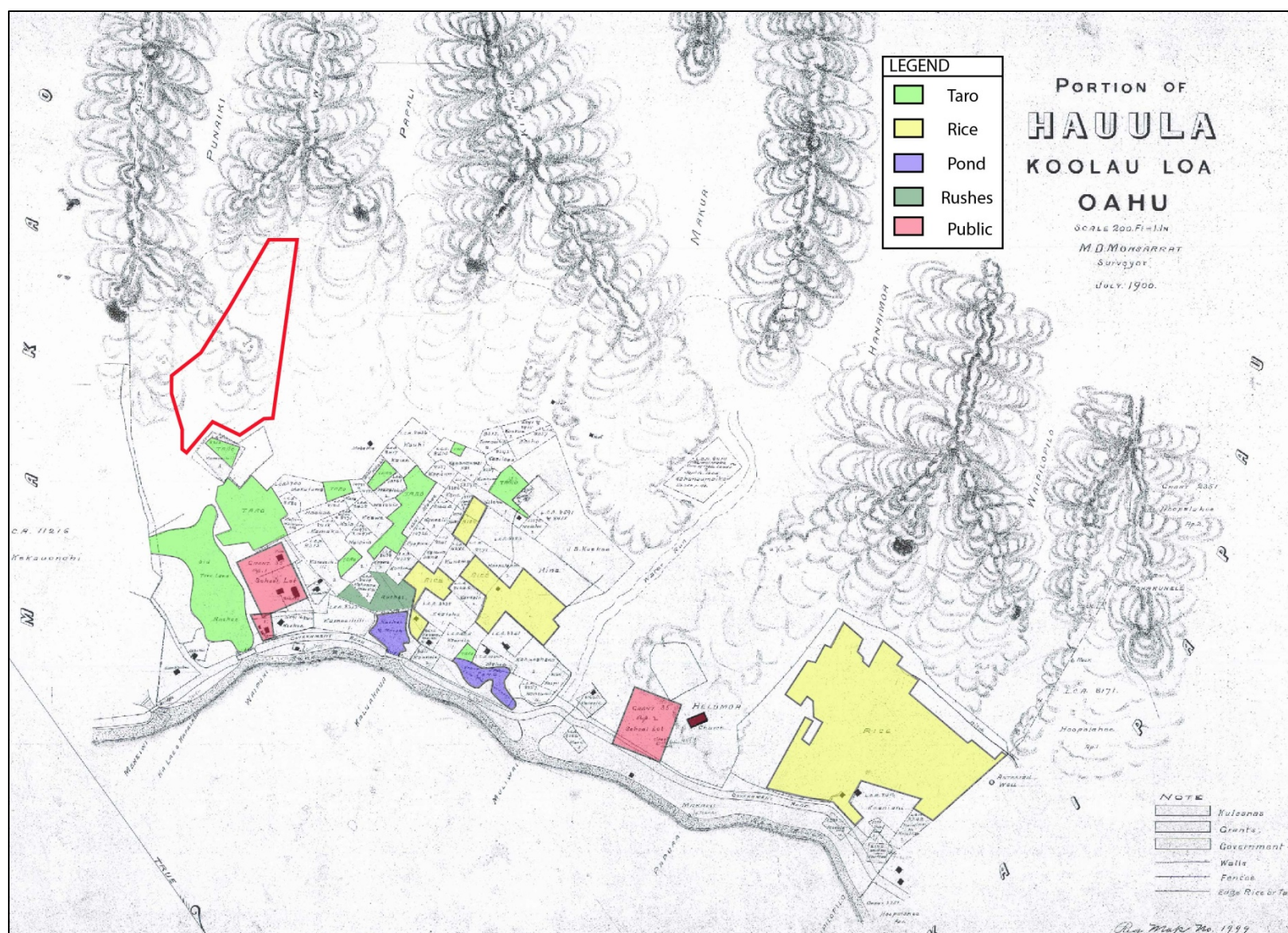


FIGURE 15. 1900 MONSARRAT MAP OF HAUULA, KO'OLAULOA SHOWING LCA'S AND VARIOUS RESOURCES (TARO, KALO, RICE, PONDS, RUSHES, AND PUBLIC LANDS)

TABLE 2. TABLE LISTING LAND COMMISSION AWARDS (LCA) AWARDED IN HAU'ULA AHUPUA'A

| LCA            | Royal Patent  | Claimant             | Hau'ula Apana | Contents   |
|----------------|---------------|----------------------|---------------|--|
| 3700           | 1312          | Mokulama             | 3             | <i>lo'i</i> , <i>kula</i> gourd, 'uala, wauke, hau, koa canoe trees, house lot   |
| 4285           | 2910          | Kuhema               | 1             | <i>lo'i</i> , <i>kula</i> , <i>uala</i> , <i>wauke</i>   |
| 5357C          | 1314          | Nalehu               | 2             | <i>lo'i</i> , house lot made into a church   |
| 8164/<br>8164C | 1527/<br>2049 | Hoopii/Kanealii      | 4             | <i>lo'i</i> , <i>kula</i> , two house lots (one enclosed)  |
| 8171           | 1319          | Hoopalahe            | 1             | <i>lo'i</i> , fenced <i>kula</i> with a <i>kihapai</i> (garden or orchid), house lot bound by stream   |
| 8174           | 1526          | Hoai                 | 1             | <i>lo'i</i> , and an abandoned <i>kula</i>   |
| 8183           | 1321          | Hina                 | 1             | <i>lo'i</i> , watermelons, enclosed <i>kula</i> cultivated between 1848-1849   |
| 8184           | 1525          | Haehae               | 1             | <i>lo'i</i>  |
| 8313           | 2914          | Kamooiilili          | 4             | <i>lo'i</i> , fisheries, 3 house lots  |
| 8337           | 1313          | Kaneumi              | 4             | <i>lo'i</i> , <i>kula</i> , upland claim, house lot enclosed by stone wall   |
| 8338           | 1318          | Kealoha              | 2             | <i>lo'i</i>  |
| 8340           | 2050          | Kaiwinui             | 2             | <i>lo'i</i> , <i>kula</i> , house lot, upland area, fishery  |
| 8341           | 1320          | Kahunahana           | 2             | <i>lo'i</i> , <i>kula</i> , upland area, fishery, and a house lot with 3 houses (built around 1849), hog wall on east boundary; some <i>kula</i> destroyed by animal trampling |
| 8342           | 2051          | Kaailau              | 1             | <i>lo'i</i> , house lot, sweet potatoes  |
| 8356           | None          | Kane                 | 3             | <i>lo'i</i> , <i>kula</i> , fishpond, houselot, and <i>muliwai</i>   |
| 8411           | 1357          | Kaunele              | 2             | <i>lo'i</i> , <i>kula</i> , a house site near ocean, a former house site just inland (used 1830s-1840s)  |
| 8414           | 1315          | Kahanauimaikai, I.A. | 3             | <i>lo'i</i> , <i>kula</i> , coffee, house lots; bounded by a fishpond, hog pen, and stream   |
| 8415           | 1317          | Koekoe, G.P.         | 3             | <i>lo'i</i> , <i>kula</i> with wooden fence, house lot enclosed with stone wall; river; same as LCA 8591   |
| 8416           | 8156          | Koaniani             | 1             | <i>lo'i</i> , house lot with four houses   |

| LCA   | Royal Patent | Claimant        | Hau'ula Apana | Contents   |
|-------|--------------|-----------------|---------------|--|
| 8417  | 5292         | Kaioe           | 1             | <i>lo'i, kula</i> land on mountain   |
| 8418  | 2333         | Kamaka          | 1             | <i>lo'i, kula</i> ; uncultivated due to animals  |
| 8436  | 1316         | Kauhi           | 1             | <i>lo'i, kula</i> , wooded upland area, fishery  |
| 8437  | 4199         | Keoho           | 1             | <i>lo'i, kula</i>  |
| 8438  | 1528         | Keawe           | 2             | <i>lo'i, kula</i> , wooded upland area, fishing rights, <i>kalo</i> destroyed by hogs                      |
| 8444  | 1356         | Kaia            | 1             | <i>kalo</i> ; same as LCA 8271   |
| 8580  | 6898         | Kelliwaiwaiiole | 1             | <i>lo'i</i> , house lot  |
| 10241 | 1529         | Mahoe           | 2             | <i>lo'i</i> , upland area, fishery, <i>kalo</i> land used as pasture for horses, hog wall on west boundary |
| 10261 | 1434         | Makalohi        | 2             | <i>lo'i</i>  |
| 10726 | 1435         | Poopuu, wahine  | 1             | <i>lo'i</i>  |
| 10975 | 2913         | Waiauwia        | 2             | <i>lo'i, kula</i> , and a high hill ( <i>kuahiwi</i> ); same as LCA 10972                                  |

Furthermore, this agreement cannot be assigned to any third party. At the end of the said term of five years, on the fulfillment of the above agreement, the occupant of the lot shall receive a Royal Patent for the same. (Alexander 1882:12)

The lowlands of Hau'ula were surveyed in 1900 for Homestead Lots for “natives who have long been residents on the land” (Executive and Foreign Office 1900). A 1902 Wall map shows the Homestead road system, which has largely remained unchanged up to the present time period (Figure 10). Historic maps and background research suggests Hau'ula Homestead Lots were numbered one through thirty-seven (Figure 17). Table 3 lists the names of the land patent number, grantee, and lot number. Table 4 lists special agreements made for Homestead Land. Table 5 lists leases for Homestead Lands in Hau'ula.

#### PARCELS IN HAU'ULA ASSOCIATED WITH THE MCGREGOR FAMILY

Archival research indicates Louise McGregor also had interest in lands adjacent to TMK: [1] 5-4-005:010. Mrs. McGregor is known to have purchased the current property (Lot 1 1/2) in 1906 (Britt 2013). Table 4 indicates that in 1907, A. Wong Kong, which is the maiden name of Louise A. McGregor, also received Special Agreement 278 for land within Lot 1. However, Table 3 indicates that Lot 1 and 2 were purchased in 1906 by S. I. Shaw. It is unknown what “special agreement” was made, but Lot 2 was given to J. N. Wood under a Special Agreement as well. Table 5 indicates that in 1915, Homestead Lease 26 regarding Lot 2, was also held by Mrs. McGregor. A letter dated November 1, 1915 explains that Mrs. McGregor obtained Lot 2 under a Cash Free Hold Agreement (Executive Pinkham 1915b). Therefore, it appears the McGregor's held three adjacent lots, Lot 1, Lot 1 1/2, and Lot 2. A land



patent, securing ownership of a lot, was only sought for Lot 1 1/2, corresponding with the current study area (TMK: [1] 5-4-005:010).

#### FAMILY HISTORY REGARDING TMK: [1] 5-4-005:010

An interview with Mrs. Marion McGregor Lee Loy (2007), daughter of Louise A'oe McGregor and Daniel Pāmawaho McGregor, Sr., provides family history (Rossi and Oshiro 2007). Daniel McGregor's father passed away when he was only a year old so he was raised by his grandfather Kalimaha'alulu. As *kohoniki* of the area, Kalimaha'alulu was a tax assessor. Marion McGregor remembers her father Daniel McGregor recounting how "once a year people would come up [to their home] to pay what they call 'auhau, which were the taxes for that area. Maybe they'd bring so many pigs and so many this and that" (Rossi and Oshiro 2007:24).

Louise A'oe McGregor was born A'oe Wong Kong. Louise was born on Maui and was half Chinese, half Hawaiian (Rossi and Oshiro 2007:24). Louise and Daniel McGregor met "at a one-room school in Hau'ula" where Louise was a teacher and Daniel was a substitute (Rossi and Oshiro 2007:24). Louise A'oe Wong Kong McGregor was the first woman to graduate from Kamehameha Schools in 1897 (Nupepa 2012). An award dedicated in her honor is given yearly for the Kamehameha Schools Song Contest Outstanding Student Director (Kamehameha Schools 2013). No additional data on Mr. McGregor or his grandfather Kalimaha'alulu was located.

#### LANAKILA CHURCH

With the arrival of missionaries in 1820 churches and schools began to be established throughout Hawai'i. Lanakila Church was a Protestant church constructed in the early 1850's on the grounds of Helumoa (Interior Department 1853, Thrum 1919). According to Thrum (1919) the church measured "96 x 34 feet, inside measurement, with walls 13 feet high and 2 ½ feet thick on a foundation of stone of some 4 ½ feet" (77). The church was built of stones from an off-shore stone enclosure, Wahi o Pua, and of coral mixed with lime (Thrum 1919:78, Clark 1977:147 cited in Ishihara and Hammatt 2011:69).

Lanikila Church services ended around 1897, when a new smaller church was built in Hau'ula which used lumbar and materials taken from Lanikila Church. Lanikila Church is shown on many historic maps. A 1902 Wall map refers to the location as "Ruins of Helumoa Church" (Figure 10). The current structure, named the Hau'ula Congregational Church, was built in 1926 near the original structure. A large graveyard associated with both Lanakila Church and the Hau'ula Congregational Church surrounds the property. The graveyard plot is shown on a 1914 Wall map (Figure 17).

#### HAU'ULA TOWN

The end of the 1800's and beginning of the 1900's marks the developmental stage of Hau'ula Town. Agricultural-producing wetlands became utilized for commercial and residential parcels. Two large ponds and agricultural lands are shown on a 1900 Monsarrat and 1902 Wall map (Figure 10 and Figure 15). By 1906, most of the agricultural lands previously used for taro and rice were designated as residential Homestead Lots (Figure 17 and Figure 17). These maps show the progression of land development and change to the landscape of Hau'ula.

In the 1880's, land was acquired to build a court house and jail near the current southern intersection of Kamehameha Highway and Hau'ula Homestead Road (Interior Department 1885). The beginning of 1900 saw the acquisition of two plots of land for public schools in Hau'ula. One school house was planned very near to Lanakila Church (Public Instruction 1901). This school is not shown on maps after 1900. A school house was also built closer to the southern end of Hau'ula, in the current location of Hau'ula Elementary School.

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TABLE 3. TABLE LISTING GRANTEES OF HOMESTEAD LOTS IN HAU'ULA

| Land Grant Number | Grantee                   | Lot   | Date           | Reference  |
|-------------------|---------------------------|-------|----------------|--|
| 4927              | Shaw, S.I.                | 1, 2  | Jan. 16, 1906  | Executive and Foreign Office 1906a   |
| 4928              | Rodick, Pauline E.        | 3, 4  | Jan. 16, 1906  | Executive and Foreign Office 1906a; went into non-compliance, Executive Frear 1913                           |
| 4929              | Humburg, August           | 5, 6  | Jan. 16, 1906  | Executive and Foreign Office 1906a   |
| 4930              | Morgan, James F.          | 7     | Jan. 16, 1906  | Executive and Foreign Office 1906a   |
| 4931              | Bradley, Walter H.        | 8     | Jan. 16, 1906  | Executive and Foreign Office 1906a   |
| 5322              | Aubrey, Bertha A.         | 28    | June 2, 1910   | Executive and Foreign Office 1910  |
| 5619              | Olsen, Olaf R.            | 13    | Dec. 21, 1911  | Executive and Foreign Office 1911; Refuted by Louis McGregor, Executive Frear 1911                           |
| 5620              | Christoffersen, C.        | 14    | Dec. 21, 1911  | Executive and Foreign Office 1911  |
| 5656              | Kekai, Abraham K.         | 12    |                | Refuted by Louise McGregor, Executive Frear 1911   |
| 5703              | McGregor, Louise A.       | 1 1/2 | May 31, 1912   | Executive Frear 1912   |
| 6143              | Brown, C.A.               | 4A    | May 29, 1914   | Executive Pinkham 1914a  |
| 6171              | Johnson, Edward           | 6     | July 31, 1914  | Executive Pinkham 1914b  |
| 6502              | Kaluna, W.                | 7     | Dec. 17, 1915  | Executive Pinkham 1914c  |
| 6503              | Makapo, Sam               | 11    | Dec. 17, 1915  | Executive Pinkham 1915a; mortgage to William R. Castle Trustee 1921, Executive CPL 1921b                     |
| 6637              | Aubrey, Arthur C.         | 5     | Aug. 5, 1916   | Executive Pinkham 1916a  |
| 7014              | Shaw, Seeley I.           |       | Feb. 25, 1918  | Executive Pinkham 1918b  |
| 7049              | Hollinger, Thomas         | 4     | May 27, 1918   | Executive Pinkham 1918a  |
| 7055              | Paoo, John L.             | 9     | May 27, 1918   | Executive Pinkham 1918a  |
| 7057              | Kaleialii, Mary (widow)   |       | June 5, 1918   | Executive Pinkham 1918c  |
| 7215              | Christoffersen, Christian | 10    | March, 11 1919 | Executive CPL 1919a; transferred from R.T. Christofferson to C. Christofferson 1914, Executive Pinkham 1914c |
| 7363              | Lucas, Abbie              | 3     | Nov. 10, 1919  | Executive CPL 1919b  |

TABLE 4. TABLE LISTING SPECIAL AGREEMENTS RELATING TO HAU'ULA HOMESTAD LANDS

| Agreement # | Grantee                  | Lot | Date           | Reference                          |
|-------------|--------------------------|-----|----------------|------------------------------------|
| 1           | Christofferson, C.       | 14  | Oct. 22, 1906  | Executive and Foreign Office 1906c |
| 3           | Kekai, A. K.             | 12  | Sept. 18, 1906 | Executive and Foreign Office 1906b |
| 7           | Wood, J. N.              | 2   | Oct. 22, 1906  | Executive and Foreign Office 1906c |
| 9           | Burnette, Ida C.         | 5   | Sept. 18, 1906 | Executive and Foreign Office 1906b |
| 10          | Savidge, Emily           | 6   | Sept. 18, 1906 | Executive and Foreign Office 1906b |
| 11          | Johnson, Alfred          | 7   | Oct. 22, 1906  | Executive and Foreign Office 1906c |
| 12          | Woodd, L. B.             | 8   | Sept. 18, 1906 | Executive and Foreign Office 1906b |
| 13          | Carlyle, W. W.           | 9   | Sept. 18, 1906 | Executive and Foreign Office 1906b |
| 14          | McKeague, R. J.          | 3   | Sept. 18, 1906 | Executive and Foreign Office 1906b |
| 278         | Kong, Wong A.            | 1   | March 19, 1907 | Executive and Foreign Office 1907  |
| 281         | Hay, Joseph              | 4   | Dec. 4, 1906   | Executive and Foreign Office 1906d |
| 282         | Olsen, Olaf R.           | 13  | Dec. 4, 1906   | Executive and Foreign Office 1906d |
| 528         | Aubrey, Bertha<br>Amelia | 28  | June 24, 1909  | Executive and Foreign Office 1909  |

In 1921, Executive Order No. 87 was passed which set aside land in Hau'ula for Hau'ula Beach Park (Executive CPL 1921a). Hau'ula Beach Park included a two-story building with concessions. The original Hau'ula Beach Park was torn down and the current park was constructed in 2000 (Bush and Hammatt 2002). In 1932, the Territory of Hawai'i bought the rights to beach property owned by Alfred 'Aukai 'Āluli. In 1940 the land was given to the City and County to create 'Aukai Beach Park (Ishihara and Hammatt 2011:14).

TABLE 5. TABLE LISTING LEASES TO HAU'ULA HOMESTEAD LAND

| Lease # | Grantee                 | Lot     | Date           | Reference   |
|---------|-------------------------|---------|----------------|---|
| 8       | Lane, W. C.             | 24, 11A | May 21, 1913   | non-compliance, Executive CPL 1919  |
| 10      | Holi, Harvy             | 29, 29A | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 11, 13  | Keaunui, Andrew M.      | 26, 26A | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 12      | Mahalua, Sam            | 32, 32A | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 14      | Thompson, Emily Hoolewa | 17, 17A | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 15      | Kekala (w)              | 18, 12A | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 16      | Malolo, J.              | 25, 9A  | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 17      | Wahineaukai Nai         | 34      | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 18      | Aalona, Lucy            | 33, 33A | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 19      | Kapiko, John Waiolohia  | 31A     | March 16, 1914 | Executive Pinkham 1914b, Honolulu Star Bulletin 1914  |
| 26      | McGregor, Louise Aoe    | 2       | Nov. 1, 1915   | Obtained under Cash Free Hold Agreement, Executive Pinkham 1915b; non-compliance, transferred to In Koon Kin, Executive Pinkham 1916b |
| 27      | Kukeanana, Piko         | 30, 30A | March 16, 1914 | Executive Pinkham 1914b   |
| 28      | Sylvester, M. E.        | 23, 24  | March 9, 1914  | Executive Pinkham 1914d   |
|         | Nui, Moke K.            | 28A, 36 | March 18, 1914 | Honolulu Star-Bulletin  |
|         | Paoao, Pika Kamai       | 15A, 35 | March 18, 1914 | Honolulu Star-Bulletin  |



## COMMERCIAL AGRICULTURE

In the late 1800s to early 1900's old agricultural lands became utilized for a variety of commercial markets, including sugar cane, rice, coffee, bananas, pineapples, cattle, and sheep. The 1900 Monsarrat map shows a mixture of taro and rice lands throughout the lowlands of Hau'ula. These marshlands can be seen on historic maps through the 1950s (Figure 18 and Figure 19). As the lands in Hau'ula were used for residential purposes, no large plantations were built in the town.

The closest plantations to Hau'ula were the Kahuku Plantation and Laie Plantation to the north and the Koolau Agricultural Company to the south. Kahuku Plantation ran from 1891-1971, Laie Plantation operated from 1872-1931, and the Koolau Agricultural Company was in business from 1909-1925 (Kaukali and Subica 2010:49). The Kahuku Plantation was a leader in manufacturing, being the only mill to produce white sugar rather than refined sugar, and used molasses to fuel the factory and as a valued product (Kaukali and Subica 2010:53-54). Laie and Koolau plantations ground their cane at the Kahuku Mill. Laie Plantation was a small mule-driven mill which grew cane, taro, and pineapple and used about 500 acres for grazing of livestock (Kaukali and Subica 2010:55). The Koolau Agricultural Company grew sugarcane and rice.

The first railroad on O'ahu was built 1895 by the Oahu Railway and Land Company (Hart 1936:4). By 1898, the railroad wrapped around Ka'ena Point to Kahuku (Thrum 1899:155, Mitchell 1982:171). In 1908, the Koolau Railway Company built tracts from Kahuku to Kahana to facilitate marketing of agricultural products (Thrum 1919:94). Historic maps show the railroad tracts ran through the lowlands of Hau'ula (Figure 18, Figure 19, and Figure 20). The Koolau Agricultural Company, Koolau Railway Company, and Koolau Water Company ran until 1926 when the companies were absorbed by Zion's Securities in Lā'ie and then were leased to the Kahuku Plantation Company in 1931 (Maly and Maly 2003:115). The railroad industry declined with the construction of major roadways and ceased operation in the mid 1940s.

In 1900, water began to be diverted from the Ko'olau Mountains for commercial agricultural use (Thomas 1903:72a). Soon thereafter lands were set aside in Ko'olauloa as part of a Forest Reserve Program. "The primary function of early forestry programs in the Hawaiian Islands was the protection of forest watersheds to ensure a viable water supply for the growing interests in sugar and pineapple plantations" (Maly and Maly 2003:150). Land was reserved for the Kaipapau Forest Reserve by 1904 and by 1918 the Hau'ula Forest Reserve was established. Shortly thereafter the Waiāhole Tunnel was built to supply water from the Ko'olau's to leeward O'ahu.

The area includes land which supports a "water-bearing forest" composed of the usual native trees such as koa, ohia, kukui, hala, hau.. Many industries are dependent on the water emanating from this forest, viz: the sugar cane in Lower Kaluanui, Punaluu and Kahana valleys, the rice in Punaluu Valley, and from the headwaters of the main Kahana Stream, at an elevation of about 750 feet, water is taken by tunnel south along the mountain, then through the main Waiahole tunnel to far distant cane fields in the upper Ewa basin. The importance of protecting and maintaining the forest on this area for the conservation of water is therefore apparent.

While of the total area of 9193 acres, shown on the following list, only 1143 acres, or a little over 12.4 per cent (the land of Hau'ula), belongs to the government. On the lower boundary across the government land of Hau'ula, which is cut up by six narrow valleys, the Hau'ula homesteaders have recently completed the construction of a fence which now keeps their cattle from getting into the forest. The building of this fence was done under an arrangement made with the homesteaders by the Land Commissioner in 1913, but it was only by my personal efforts in keeping after them and assisting by furnishing durable wire and a few posts that the project was finally accomplished. (Board of Commissioners 1918:488-489)



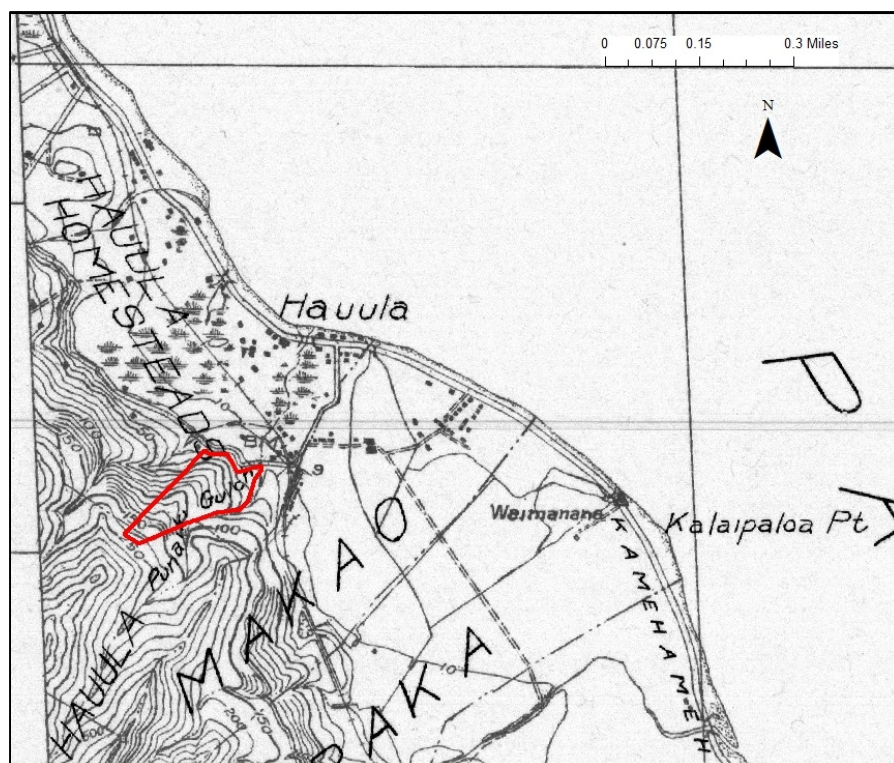


FIGURE 18. PORTION OF A 1928 USGS, KAHANA QUADRANGLE, 7.5-MINUTE SERIES TOPOGRAPHIC MAP SHOWING THE STUDY PARCEL

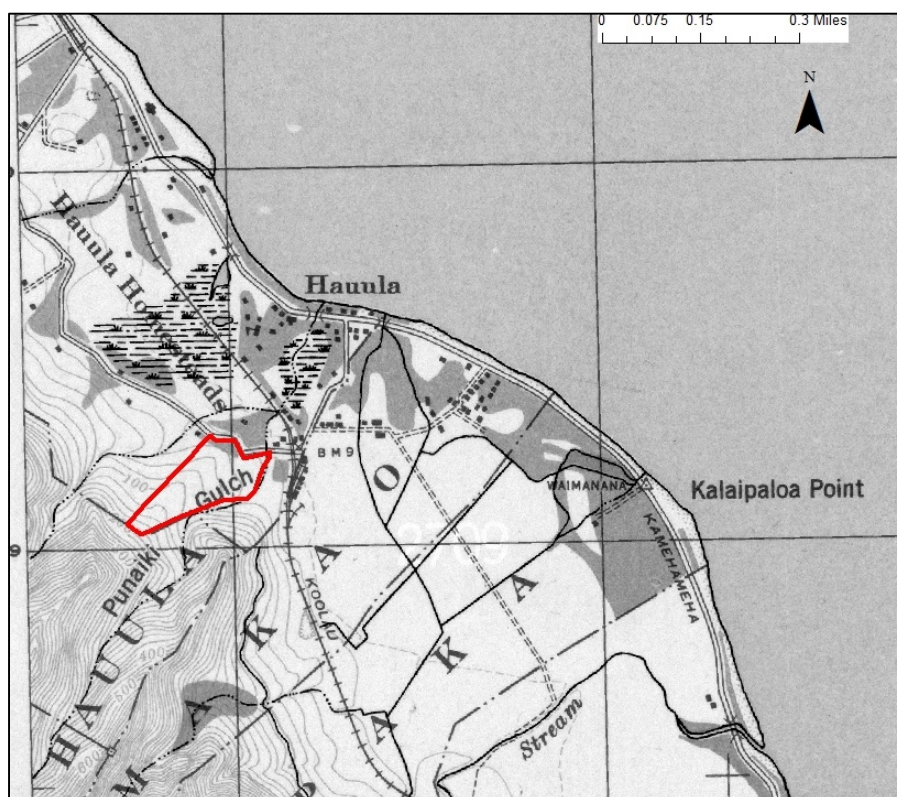


FIGURE 19. PORTION OF A 1936 USGS KAHANA QUADRANGLE, 7.5-MINUTE SERIES TOPOGRAPHIC MAP SHOWING THE STUDY PARCEL



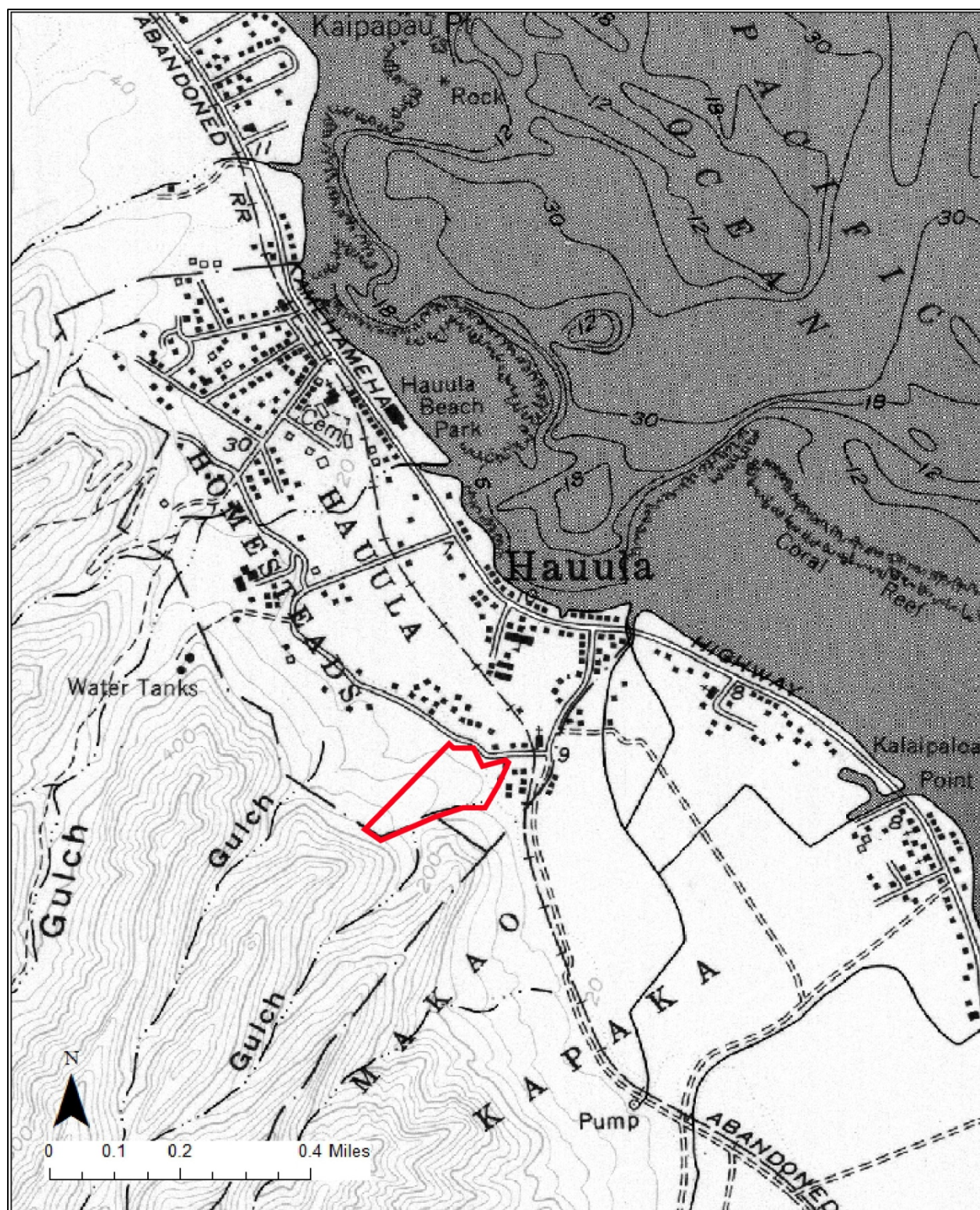


FIGURE 20. PORTION OF A 1953 USGS MAP, HAU'ULA QUADRANGLE, 7.5-MINUTE TOPOGRAPHIC MAP SHOWING THE STUDY PARCEL

## ARCHAEOLOGICAL BACKGROUND

### COLONIZATION OF HAWAI‘I

Archaeological sites within Hawai‘i have recently been re-dated in order to better understand when Hawai‘i was colonized. This is due to the advent of new standards in radiocarbon dating, including selection of identified short-lived plant species. The previously accepted long chronology of Hawai‘i began around AD 100-300, however using more “accurate and valid” scientific methods, Hawaiian archaeology has been found to adhere to a shorter chronology beginning around AD 1000-1261 (Dye 1999, Dye and Pantaleo 2010, Kirch 2010a and b, Wilmshurst 2010, Dye 2011, Kirch 2011, Reith et al. 2011).

### ARCHAEOLOGICAL STUDIES OF THE REGION

The first thorough archaeological study conducted within Ko‘olauloa District was during an island-wide survey of O‘ahu performed by J. G. McAllister (1933). McAllister described and mapped hundreds of archaeological sites throughout O‘ahu, including five within the *ahupua‘a* of Hau‘ula, Kaipapa‘u, Māka‘o, and Kaluanui. The sites include five *heiau* (Sites 286 through 289) and one sacred valley (Site 290). McAllister’s work was reproduced and expanded by Sterling and Summers (1978). The descriptions of these five sites are presented below.

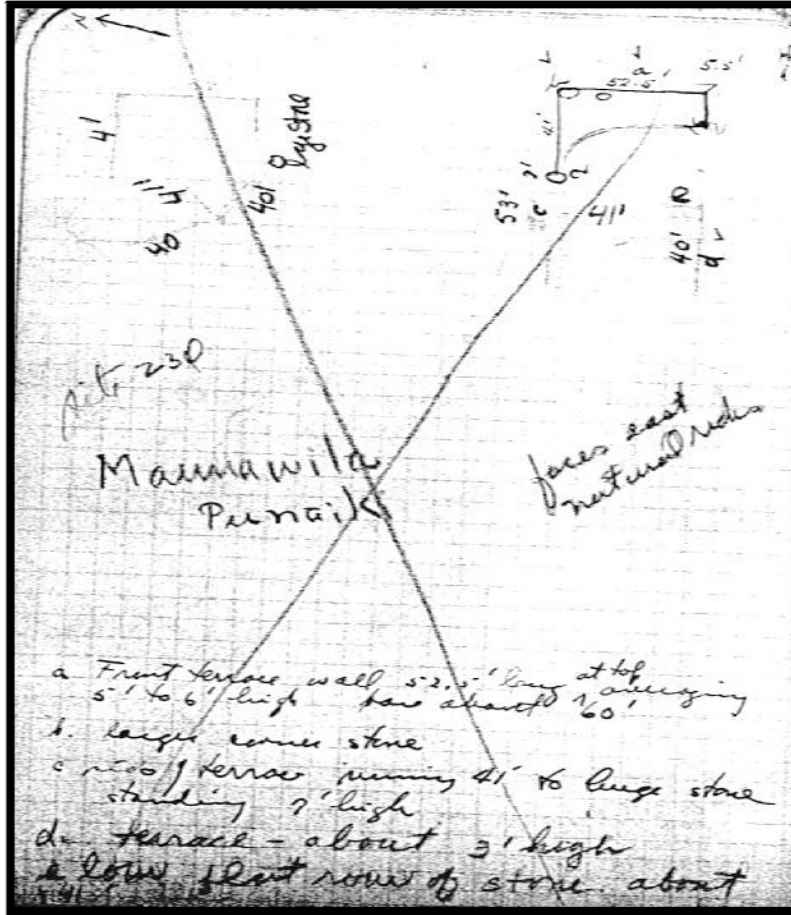
#### Kaunihokahi Heiau

Site 286. Only the upper platforms or portions on the mountain side of this *heiau* remain. The lower platforms have been used to make cattle pens for the dairy now located on the site. The remains of this one platform, which is roughly 160 by 40 ft., indicate a large *heiau*. The longest side, which is a high terrace ranging between 10 ft. and 15 ft. in length, is nearly parallel with the sea and faces almost due east. (McAllister 1933:158, Sterling and Summers 1978:160)

Kaunihokahi Heiau has been designated Hawai‘i Inventory of Historic Places (SIHP) site number 50-80-05-286. A field check was conducted on the site in 1988 (McMahan 1988). McMahan concluded “Due to the fact that very few heiaus exist on the Koolauloa coast, there is the potential for recording a considerable amount of information for future archaeological research of this unusually large heiau” (1). The site was recently visited during a Cultural Impact Assessment conducted in Hau‘ula and was observed to be heavily overgrown but containing intact stone walls and a possible *ahu* (shrine or altar) (Ishihara and Hammatt 2011:60).

In the yearly *Hawaii Almanac and Annual*, Thrum (1909, 1938) refers to a *heiau* named Unihokahi in Makalohi, Hau‘ula (42). Makalohi likely refers to “Makaluhi” (tired eyes), in which Pukui et al. (1974) and Sterling and Summers (1978) place near the old Coopers Ranch in Hau‘ula. In mythology, Unihokahi was a one-toothed shark god, also referred to as Ka-uniho-kahi (Westervelt 1910:123, Sterling and Summers 1978:159) and Mano-niho-kahi (Rice 1923:111). Thrum (1909) describes Unihokahi as “a platform *heiau* covering about one-fourth acre, in ruins, class unknown. It’s front wall runs east and west about 100 feet” (42). Shimizu (1980) lists Kaunihokahi and Unihokahi as separate *heiau* in Hau‘ula.

Maunawila Heiau has been designated SIHP # 50-80-05-287. The site was originally documented by McAllister (1933), later by Sterling and Summers (1978), and more recently by Becket and Singer (1999) and Ishihara and Hammatt (2011). The only known map of Maunawila Heiau was produced by McAllister (1933) and appears to not be more than rough field notes (Figure 21). The original site description is as follows:



**FIGURE 21. MCALLISTER (1933) MAP OF MAUNAWILA HEIAU (BISHOP MUSEUM ARCHIVES)**

Maunawila Heiau

Site 287 Maunawila Heiau. Punaiki, near the mountain side of the Hau'ula Courthouse

Advantageously located on the spur of the ridge overlooking the sea. The little that remains of the heiau is now covered with heavy growth of lantana and guava. The end of the rock-built terrace is the most conspicuous feature. It is 53 feet in length at the top, with a base of about 7 feet longer and stands 5 to 6 feet high and faces east. The entire terrace was about 60 feet in width; the 20 foot end on the east side was built up of heavy stones, with a fill of smaller stones for leveling. A second terrace to the southwest is 3 feet higher than the first and appears to have been built at an angle to the first. This second terrace faces more nearly north than east. The limits on the mountain side cannot be defined; there are no stone walls now standing. At the west end of the first terrace and against the facing of the second, is a line of fine stones 10 feet long, which may be the foundation for a wall for an enclosure or the limits of a smaller elevation on the first terrace. Throughout the heiau, large natural stones have been utilized. This apparently accounts for the irregularity of the structure. Some of these stones are as much as 7 feet high and may have been significant features of the Heiau. (McAllister 1933:158-159, Sterling and Summers 1978:161)



Jan Becket has visited and photographed Maunawila Heiau multiple times during 1993, 2000, 2006, and 2011 (Ishihara and Hammatt 2011:59). Mr. Becket recounted that a “house once occupied by squatters stood on the north side of the upper terrace during his first visit in 1993 and appeared to have integrated portions of the heiau features into its yard landscaping” (Ishihara and Hammatt 2011:59). He also relates that features along the current access trail have destroyed features he once photographed. Maunawila Heiau was described by Becket and Singer in 1999:

At the *makai* end of Maunawila, a minimal facing of stones runs along the front of one low terrace and a paving of ‘*ili’ili* delineates another a short distance away. Farther mauka, the small, irregularly shaped stone..lies in the middle of a circle of stone paving. The heiau makes unique use of large boulders scattered throughout the site, giving it an unusually random appearance. As McAllister suggests, some of these stones may have played as role in ceremonies at the heiau. At the mauka end of the heiau, a large terrace fifty-three feet long and six to seven feet high still exists, in fine condition. A property line and fence cut through the terrace, however, making it hard to relocate all of the features McAllister describes. Local residents appear to be clearing the site; unfortunately vandals have spray-painted some of its stones.(119)

The Ishihara and Hammatt (2011) study included pictures of a “remaining wall of Maunawila Heiau” and basalt boulders found near the *heiau*, including one “stone shape” found near Punaiki Stream (18). The stone shape has anthropomorphic features and corresponds with a large boulder referred to in this report as a “Face Rock” (see Feature 12d of this study). Additionally, the report includes interviews with local residents. Cy Bridges reported a recent ongoing debate regarding the function of Maunawila Heiau. The report relates that “one rumor of the function of Maunawila Heiau was that members of the *kauwā* caste were drowned on the beach and later carried to the *luakini* heiau. Mr. Bridges is unsure of where the story originated from” (66). Mr. Bridges also shared mythology passed down to him from his family regarding Makuakaumana. He conveys that Makuakaumana came to O’ahu with four other priests, known today as the Wizard Stones of Waikīkī (Ishihara and Hammatt 2011:66). Mr. Bridges also reported a depression on the *makai* side of Hau’ula Elementary School in an open field which is thought to be where the whale beached itself and later carried Makuakaumana back to Tahiti (Kalaekapalaoa), described in the legend of Makuakaumana (Ishihara and Hammatt 2011:66-67).

The McGregor family indicates Maunawila Heiau may have been spelled differently at one time. The family suggests rather than Mauna-wila, the site may have ended with –uila or –uwila. The meaning of Mauna-wila can be translated as “twisted mountain”. Whereas, Mauna-uwila or Mauna-uila could be translated as “lightning mountain” (Ulukau 2003). Another alternate spelling, Mana-uwila, could be translated to “powerful lightning” (Ulukau 2003). Lightning is associated with god Kāne and goddess Pele, as well as the myth of Laieikawai which is connected to Lā’ie just north of Hau’ula (Kalākaua 1888, Soehren 2010).

Kapoho Heiau (Site 288) was located in Mākao Ahupua’a. Kapoho (“depression”) is also the name of a shallow depression on Mōkapu Peninsula where salt was made from evaporated sea water (Ulukau 2004). The original site description is as follows:

Site 288. Inclosures [possibly Kapoho Heiau], inland from Hau’ula on the land known as Makao at the mouth of Kapoho Valley.

The inclosures are nearly obliterated. They form rectangles about 15 to 20 ft. long and 10 to 15 ft. wide. One which is larger than the others has interior dimensions of 70 by 60 ft., side walls and walls on the mountain side hat appear to have been 8 ft. thick, and a front wall with a 20 ft. slope toward the sea. This may have been Kapoho heiau. Cane has been planted in and about all of these sites and has destroyed any other features that may have existed. On the low level land

below the sites are traces of old taro patches that are being plowed for cane. (McAllister 1933:159, Sterling and Summers 1978:162)

Lua ali'i Heiau (Site 289) was located in Mākao Ahupua'a. The site description is as follows:

Luaalii Heiau (destroyed)

Site 289. Luaalii heiau, Makao, Hau'ula. This heiau was destroyed many years ago, but its site is still remembered, as well as the peculiar feature of a pond within the walls of the structure, around which were placed the images. (McAllister 1933:160, Sterling and Summers 1978:162)

Kaliuwa'a Valley (Site 290) is located in Kaluanui Ahupua'a. The site description states:

Site 290. Famous because of its connection with Kamapuaa, after whom many places are named. Pohaku-pee-o-Kamapuaa is one of his hiding places; Kawaa-o-Kamapuaa is his canoe; Uhakohi is the place where he caused a flood; and the waterworn channel to the left of the stream just below the falls is where Kamapuaa assumed the form of a gigantic hog and, placing his back in the groove, allowed his followers to escape over his body, to the summit, from his pursuing foes...Many little "forest shrines," small piles of stones with leaves and bits of twigs or flowers placed upon them, are now made by the visitors to Sacred Falls. It is said that this is a continuation of the former Hawaiian custom.

A note by Brigham contained in the Stokes manuscript (72): In the olden time a guard was stationed at the entrance of the gorge and no woman liturgically unclean was allowed to pass on the pain of death: the kapu was very strict. The housing of the pool at the head of the gorge forms a most solemn and beautiful temple, though we know nothing of the ancient service, not even to what god it was dedicated. There is a rock on the lower border near the outlet which may have been an altar. (McAllister 1933:160 cited in Sterling and Summers 1978:162)

Thrum (1909) lists an un-named *heiau* located in Punaiki, Hau'ula. The site is described as a "small walled *heiau*, class unknown, now in ruins" (Thrum 1909:42). Soehren (2010) makes reference to this *heiau* as Nalowale (lost or forgotten). Punaiki is the gulch and stream of which Maunawila Heiau is associated. However, Maunawila Heiau is not a small or walled *heiau*. Therefore, it is possible the reference describes a nearby temple such as Kapoho or Lua ali'i Heiau, or a yet undocumented site.

#### CULTURAL RESOURCE MANAGEMENT (CRM) PROJECTS CONDUCTED IN HAU'ULA AHUPUA'A

Multiple cultural resource management (CRM) archaeology projects have been conducted within Hau'ula (Table 6). CRM studies are mandated by the state and/or federal government to assess the presence of cultural resources within areas proposed for development. These studies also provide mythological accounts of the area, historic background, information on past land use, and the present use and condition of an area. Several forms of archaeological investigations are conducted. Archaeological reconnaissance surveys consist of surface observation to determine presence or absence of cultural resources within a specific project area. Archaeological inventory surveys are more intensive and include surface survey as well as a sub-surface component. Data recovery investigations are more rigorous in design and include controlled excavations of particular archaeological sites. Archaeological monitoring is conducted during construction and is designed as a way to document any cultural resources which may be encountered during construction work.

TABLE 6. TABLE LISTING ARCHAEOLOGICAL PROJECTS CONDUCTED WITHIN HAU'ULA

| REFERENCE                 | STUDY TYPE AND LOCATION   | TMK                          | HISTORIC PROPERTIES  |
|---------------------------|---|------------------------------|--|
| McAllister 1933           | Archaeological Reconnaissance of O'ahu  | Island-wide                  | 2 Sites in Hau'ula: SIHP #50-80-05-286 (Kaunihokahi Heiau), -287 (Maunawila Heiau)   |
| Steer and Morin 1978      | Archaeological Reconnaissance, Ma'akua Gulch  |                              | SIHP #50-80-05-4227 (agricultural complex)   |
| Connolly 1980             | Archaeological Reconnaissance Survey, Hau'ula Playground                                      | 5-4-1:001 & 009 and 5-4-08   | No sites recorded  |
| Barrera 1981              | Archaeological Inventory Survey), Hau'ula Kai Shopping Center                                 | 5-4-003:003, 052, 053, & 054 | SIHP #50-80-06-1430 (human burial, midden deposit, and coral concentration)  |
| Barrera 1984              | Archaeological Reconnaissance, Ma'akua  |                              | Recorded a complex of stone walls and structures (later recorded as SIHP #50-80-05-3394 and -4227)   |
| Riford 1984               | Archaeological Reconnaissance, Hau'ula 711 (Helumoa)  |                              | No sites recorded  |
| McMahon 1988              | Investigation of Possible Heiau, off Hauula Homestead Road                                    | 5-4-05:006                   | Re-visited SIHP# 50-80-05-286 (Kaunihokahi Heiau), concrete remains of historic dairy  |
| Walker and Rosendahl 1988 | Archaeological Testing, Ma'akua Exploratory Well and access Road, Ma'akua Gulch               | 5-4-05:001                   | SIHP #50-80-05-3394 (double enclosure, possible agricultural <i>heiau</i> or habitation feature), testing found coral manuports  |
| Shun and Dies 1991        | Archaeological Monitoring, Ma'akau Exploratory Well, Ma'akua Gulch                            | 5-4-05:001                   | SIHP #50-80-05-3394 (double enclosure, possible agricultural <i>heiau</i> or habitation feature), SIHP #50-80-05-4227 (walled enclosure and stone paving, possible habitation feature)   |
| Landrum 1992              | Archaeological Site Evaluation and Impact Assessment, Ma'akua Exploratory Well, Ma'akua Gulch | 5-4-05:001                   | SIHP #50-80-05-3394 (double enclosure, possible agricultural <i>heiau</i> or habitation feature), SIHP #50-80-05-4227 (walled enclosure and stone paving); recommends monitoring, long-term management,, preservation, and data recovery |
| Wolforth 1996, 1997       | Archaeological Inventory Survey, Kukuna Road in central Hau'ula                               | 5-4-01:022,044               | SIHP #50-80-06-5449 (St. Samuel's Chapel, historic cemetery, cultural deposit), -5450 (pre-contact habitation site), -5451 (historic habitation), -5452 (taro pond field), -5453 (stone wall)  |
| Masterson et al. 1997     | Archaeological Monitoring, Kamehameha Highway Waterline, from Kapaka to Lā'ie                 | (Hau'ula) 5-4-01, 09 & 010   | SIHP #50-80-06-4792 (cultural layer and 7 human burials, dated from AD 1450), -4793 (cultural deposit), -4794 (cultural deposit and human burial, dated to AD 1890-1910), -4795 (cultural deposit and burial), -4796 (human burial)      |



| REFERENCE                       | STUDY TYPE AND LOCATION   | TMK  | HISTORIC PROPERTIES  |
|---------------------------------|---|--|--|
| Clark, Major and Riford 1998    | Archaeological Data Recovery and Monitoring, Ma'akua Well       | 5-4-05:001                                   | SIHP #50-80-05-3394 (agricultural heiau) dated to around AD 1440-1600  |
| Masterson et al. 1998           | Archaeological Inventory Survey, Hau'ula Beach Park             | 5-4-02:022                                   | No new sites; tested near SIHP #50-80-06-4794 and -4795 (cultural layers and human burials), feature associated with SIHP # -4795 dated to AD 1390-1530)   |
| Elmore and Kennedy 1999         | Burial Recovery, Hau'ula Elementary School                      | 5-4-9:004                                    | SIHP #50-80-05-5765 (human burial)   |
| Moore et al. 2001               | Archaeological Monitoring, Hau'ula Elementary School            | 5-4-9:004                                    | SIHP #50-80-05-5917 (human burial)   |
| Bush and Hammatt 2001           | Archaeological Monitoring, Hau'ula Baseyard                     | 5-4-02:012                                   | No sites recorded  |
| Bush and Hammatt 2002           | Archaeological Monitoring, Hau'ula Beach Park                   | 5-4-002:022, coastline between Kalaekapalaoa | SIHP #50-80-06-5801 (human burial) and observation of a previously disturbed cultural layer  |
| Bush, Shideler and Hammatt 2002 | Archaeological Inventory Survey, Hau'ula Fire Station           | 5-4-14:003                                   | No sites encountered   |
| Perzinski and Hammatt 2004      | Burial Memorandum, Hau'ula Community Park                       | 5-4-009:008                                  | SIHP #50-80-05-6541 (human burial)   |
| Moore and Kennedy 2005          | Archaeological Inventory Survey, Kukuna Road in central Hau'ula | 5-4-01: 044                                  | SIHP #50-80-06-5449 (cemetery), -5450 (habitation site), -5451 ( habitation, dated to AD 1256-1328), -5452 (taro pond field, pollens of <i>taro</i> and <i>ti</i> , dated to AD 1342-1398), -5453 (stone wall) |
| Kennedy and Moore 2007          | Data Recovery Report, Kukuna Road in central Hau'ula            | 5-4-01: 044                                  | SIHP #50-80-06-5449 (St. Samuel Chapel, cemetery, cultural layer), -5450 (habitation site), -5451 (habitation site), dates from 13 <sup>th</sup> century to present  |
| Yucha and McDermott 2013        | Archaeological Inventory Survey, Hau'ula Community Park         |  | SIHP #50-80-05-6913 (four human burials and a cultural layer)  |

Previous archaeological work in Hau'ula has documented a variety of sites. Documented feature types include *heiau*, agricultural terraces, stone walls, buried cultural layers, human burials, a taro pond field, and a historic chapel and cemetery. Three *heiau* have been documented in Hau'ula, including Maunawila Heiau, Kaunihokahi Heiau, and Site # -3394. Kaunihokahi and Site # -3394 are located in Ma'akua Valley. Human burials were found in dune deposits along the coastline. Radiocarbon dates obtained from archaeological sites in Hau'ula span from the 13<sup>th</sup> century to the twentieth century.

## COMMUNITY INVOLVEMENT AT MAUNAWILA HEIAU

Community-based archaeological projects can strengthen relationships between local communities, the scientific community, and the public in general. These types of projects attempt to incorporate native knowledge, practices, and cultural values with scientific methods (Nicholas 2008). Furthermore, the coordination between universities and local communities can re-establish archaeological sites as places of learned knowledge and promote continued involvement. The training and participation of native and local students provides an opportunity for sustained management of cultural resources, active involvement, and first hand education on cultural and archaeological terminology, methods, and interpretation. In turn, this unites culture and science, alleviating skepticism of scientific motives and practices (Spriggs 1991, White and Tengan 2001, Watkins 2005, Marshal 2012, Kawelu 2013). Community-based archaeological projects include the normal parameters of any archaeological project with an added component of attendance at community meetings and events, presentation of project updates, and completion of comprehensive, understandable maps and documentation to be used for the benefit of the community.

## PRIOR COMMUNITY CONSULTATION

This project was spearheaded by the land owner, Davianna McGregor and the McGregor *‘ohana*. Fieldwork and community involvement was largely coordinated through Dotty Kelly, president of the Hau‘ula Community Association (HCA). Preservation and conservation of Maunawila Heiau is supported by the Association of Hawaiian Civic Clubs and Ko‘olaupoko Hawaiian Civic Club. In 2005 a resolution was passed by the Association of Hawaiian Civic Clubs, urging the Office of Hawaiian Affairs (OHA) to purchase the TMK parcel (AHCC 2005, McGregor and McGregor 2010). The resolution stated “nearly all of the large traditional Hawaiian cultural structures along the Ko‘olaupoko coast have been heavily damaged or completely destroyed, much more so than in the adjacent *moku* of Waialua or Ko‘olaupoko” (AHCC 2005:1). The resolution lists *heiau* throughout Ko‘olaupoko District which have been heavily impacted or completely destroyed and references *heiau* as irreplaceable links with *kūpuna* (ancestors) and foci for cultural revival, community building, and promotion of cultural education. In October 2010, the Ko‘olaupoko Hawaiian Civic Club agreed to assist with conservation of Maunawila Heiau (McGregor and McGregor 2010).

Discussions with Mr. Cy Bridges, a Cultural Director of the Polynesian Cultural Center and Hawaiian culture and history expert, indicated an association with the *heiau* and a legendary figure of Hawaiian history. He stated that his family knowledge places the renowned prophet (*kaula*) Makuakaumana as the caretaker of three *heiau* in Hau‘ula: Maunawila Heiau, Kaunihokahi Heiau, and Kapoho Heiau (McGregor 2011:3). Mr. Bridges indicated that the three *heiau* were connected and Maunawila Heiau was a *heiau ho‘ola* or healing *heiau*, while the other two *heiau* were associated with agriculture. Mr. Bridges also referenced a former pond called Lua Kauwa (*kauwā* pit) in which he offered that if Maunawila Heiau was a sacrificial (*luakini*) *heiau*, the pool could have been a sacrificial drowning pond, where victims would then be offered at Maunawila Heiau. However, he thinks Maunawila Heiau was a place of life and the pool was more likely a bathing pond for the *kauwā* class, the lowest class of Hawaiian society.

## COMMUNITY INVOLVEMENT WITH THE MAUNAWILA HEIAU PROJECT

Community involvement was a large component of this project. During Phase 1 fieldwork (November 15, 2011- June 16, 2012) five community days, one student day, two community meetings at the HCA office (Hau‘ula Civic Center), and one formal presentation at UH-Mānoa were completed. Community days included participation of community members and regular visitors of Hau‘ula to remove vegetation and modern debris from Maunawila

Heiau. The student day included approximately thirty UH-Mānoa students from an UH-Mānoa Geography Department, Field Mapping class. The students cut and removed vegetation and mapped the east and southeast boundaries of Maunawila Heiau using Total Station mapping equipment. The student day was headed by Dr. Evert Wingert and was assisted by Dr. Maryanne Maigret. Doug Thurman, B.A. and I monitored all activities and assisted with mapping. Community meetings were attended to present activities conducted at the site, provide progress updates, share draft maps of the *heiau*, and receive feedback from the community. A public presentation focusing on the progress and future plans of the project was given at the UH-Mānoa Anthropology Graduate Student Symposium.

During Phase 2 fieldwork (August 19- December 22, 2012) five community days, three student days, one community meeting at the HCA office, and two formal presentations were conducted. Community days included monthly vegetation clearing events and site tours attended by residents of Hau'ula. Student days included groups of students from twenty to forty in number from Brigham Young University-Hawai'i (BYUH) who were provided a tour of archaeological sites in the parcel and conducted vegetation clearing on Maunawila Heiau. A project update was provided at an HCA community meeting. Public presentations were given at the 2012 Society for Hawaiian Archaeology (SHA) conference and in a BYUH auditorium for two cultural anthropology classes.

During Phase III fieldwork (January 6- June 9, 2013) one community day, two student days, three meetings, and one formal presentation were completed. The community day included vegetation clearing by residents of Hau'ula. The student days included groups of forty students from BYUH who were provided a tour of the archaeological sites in the parcel and conducted vegetation clearing on Maunawila Heiau. Meetings were held for project updates to the Hau'ula community and to my advisors/ committee members at UH-Mānoa. A public presentation was given at the 2013 Society for American Archaeology (SAA) conference.

The Maunawila Heiau project is on-going and maintains active community involvement (Table 11). This project has had substantial support from the Hau'ula community as well from neighboring communities. The HCA holds regular community meetings and formed a Steering Committee for Maunawila Heiau for all interested residents to share ideas and support the conservation of sites on the property. The committee created a Management Plan and works toward continuation of Maunawila Heiau as a resource for community building and education. The Maunawila Heiau Management Plan includes a vision statement and discusses tasks to perform at the site, access options, and development of educational programs. Additionally, a chant is being written specifically for use at Maunawila Heiau.

TABLE 7. TABLE LISTING THE TOTAL NUMBER OF HOURS SPENT BY R. THURMAN

| TERM                 | HOURS        |
|----------------------|--------------|
| PHASE 1, SPRING 2012 | 154          |
| PHASE 2, FALL 2012   | 249.5        |
| PHASE 3, SPRING 2013 | 80           |
| PHASE 4, FALL 2013   | 30.5         |
| PHASE 4, SPRING 2014 | 22.5         |
| <b>TOTAL HOURS</b>   | <b>536.5</b> |





FIGURE 22. PHOTOS SHOWING COMMUNITY AND STUDENT GROUPS AT MAUNAWILA HEIAU

TABLE 8. TABLE LISTING TASKS AND PARTICIPATION HOURS BY R. THURMAN, NOV. 15, 2011 THROUGH JUNE 16, 2012

| PHASE 1, SPRING 2012 |                      |  |   |       |
|----------------------|----------------------|--|---|-------|
| Date                 | Purpose              | Task   | Participants  | Hours |
| 11/15/2011           | Community Site Visit | site tour with landowner, photos, initial site description | Hau'ula Community Assoc (HCA), Ko'olauloa Civic Club (KCC), Hawaii Island Land Trust (HILT), Davianna McGregor (landowner)  | 7     |
| 11/21/2011           | Site Visit           | photos, field prep   | Leslie Runyon, William Runyon, Candy Knight   | 2.5   |
| 12/3/2011            | Student Day          | veg clearing, mapping with Total Station, photos           | UH Field Mapping class, Everett Wingert (UH professor), Maryanne Maigret (NPS archaeologist), Doug Thurman (contract archaeologist)   | 11.5  |
| 12/11/2011           | Site Visit           | identification of native veg, survey                       | Ena Sroat (CSH)   | 3     |
| 1/14/2012            | Mapping              | tape and compass mapping                                   | Doug Thurman (CSH)  | 3     |
| 1/21/2012            | Veg Clearing         | veg clearing   | Doug Thurman (CSH)  | 3     |
| 1/22/2012            | Veg Clearing         | veg clearing, mapping                                      | Doug Thurman (CSH)  | 7     |
| 1/28/2012            | Survey               | survey, feature mapping                                    | Eric Mendes (UH student), Doug Thurman (CSH)  | 7     |
| 2/11/2012            | Survey               | survey, mapping, veg clearing                              | Doug Thurman (CSH)  | 7     |
| 2/18/2012            | Community Day        | veg clearing   | Davianna McGregor and Lurline McGregor (landowners), Leslie Runyon, Mona Maiman, Brett and Fred Haring, David and Brew Rudd, John Olszowka (PCC & BYU teacher), talk story with Ahi Logan | 6     |
| 2/25/2012            | Veg Clearing         | veg clearing- rain out                                     | Doug Thurman (CSH)  | 2     |
| 2/26/2012            | Veg Clearing         | veg clearing   | Doug Thurman (CSH)  | 3.5   |
| 3/10/2012            | Mapping              | tape and compass mapping                                   | R. Thurman only   | 5.5   |
| 3/15/2012            | Veg Clearing         | veg clearing   | Doug Thurman (CSH)  | 5.5   |
| 3/16/2012            | Veg Clearing         | veg clearing   | Doug Thurman (CSH)  | 7     |

| PHASE 1, SPRING 2012 (CONTINUED) |                         |  |  |            |
|----------------------------------|-------------------------|--|--|------------|
| Date                             | Purpose                 | Task   | Participants   | Hours      |
| 3/17/2012                        | Survey                  | survey                                       | Brian Lane (UH student), Robert DiNapoli (UH student), Tuyen Quang (UH student)          | 5.75       |
| 3/18/2012                        | Mapping                 | mapping                                      | Doug Thurman (CSH)   | 3          |
| 4/4/2012                         | Mapping                 | mapping, survey                              | Doug Thurman (CSH)   | 3          |
| 4/5/2012                         | UH Presentation         | presentation, drafting of maps               | UH Anthropology Graduate Student Symposium, 15mn presentation                            | 8.25       |
| 4/10/2012                        | HCA Meeting             | PowerPoint presentation, provided draft maps | Hau'ula Community Association Meeting, 4:15-9pm, rode with Davianna and Lurline McGregor | 8.5        |
| 4/20/2012                        | Mapping                 | mapping                                      | Doug Thurman (CSH)   | 3.75       |
| 4/21/2012                        | Community Day           | veg clearing                                 | Krista Nielson and Husband, Umi Jenson   | 5.25       |
| 5/5/2012                         | Site Tour, Veg Clearing | archaeological tour, then veg clearing       | David Shideler (CSH supervisor)  | 7.5        |
| 5/12/2012                        | Site Tour, Veg Clearing | archaeological tour, then veg clearing       | Christopher Monahan (CSH supervisor), Matt McDermott (CSH supervisor)                    | 7.5        |
| 5/19/2012                        | Community Day           | trash removal, veg clearing                  | Davianna, Lurline, Pua Aiu (SHPD), Dotty Kelly (HCA), community members                  | 5          |
| 5/28/2012                        | Mapping                 | mapping, photos                              | Amanda Eggers (SDSU)   | 2.5        |
| 5/31/2012                        | HCA Meeting             | provided progress update and draft maps      | Hau'ula Community Association Meeting, 5-9:30pm  | 8.5        |
| 6/16/2012                        | Community Day           | veg clearing, mapping                        | community members  | 5          |
| <b>TOTAL</b>                     |                         |  |  | <b>154</b> |

TABLE 9. TABLE LISTING TASKS AND PARTICIPATION HOURS BY R. THURMAN, AUGUST 19, 2012 THROUGH DEC. 22, 2013

| PHASE 2, FALL 2012 |                             |  |   |       |
|--------------------|-----------------------------|--|---|-------|
| Date               | Purpose                     | Task   | Participants  | Hours |
| 8/19/2012          | Community Day               | veg clearing, mapping                                    | Dotty and Peter Kelly, Tyler, D. Thurman  | 5     |
| 8/25/2012          | Survey/Tour                 | field prep, on-site orientation                          | Quy Tran  | 8.5   |
| 8/28/2012          | Student Day                 | tour, veg clearing                                       | Rebekah Walker, 12 BYUH students, Quy Tran, Peter   | 2.5   |
| 8/30/2012          | Drafting, Project Meeting   | drafting of field maps, prep for excavation work         | Quy Tran  | 5     |
| 9/1/2012           | Mapping and Photos          | Detailed mapping, photos of proposed test unit locations | Quy Tran  | 5.5   |
| 9/5/2012           | Drafting                    | Drafting of field maps                                   | R. Thurman only   | 6     |
| 9/6/2012           | Report Writing              | Creation of Research Goals and Testing Strategy          | Q. Tran, D. Shideler (CSH), D. Borthwick (CSH), Dr. Bayman                                | 6     |
| 9/8/2012           | Community Day               | Tour, blessing, gathering                                | HILT members, Davianna, Lurline, Community Members, Q. Tran, D. Thurman, lunch at Dotty's | 6.5   |
| 9/14/2012          | Fieldwork                   | Prep for TU1, cleared, mapped, photos                    | Quy Tran  | 8     |
| 9/15/2012          | Community Day and Fieldwork | Excavation of TU1  | Ken, Daniel, Quy Tran   | 11    |
| 9/16/2012          | Fieldwork                   | Excavation of TU1  | D. Thurman, Q. Tran   | 2     |
| 9/22/2012          | Fieldwork                   | Excavation of TU1  | D. Thurman, Q. Tran   | 9     |
| 9/23/2012          | Fieldwork                   | Excavation of TU1  | D. Thurman, Q. Tran   | 8     |
| 9/29/2012          | Fieldwork                   | Excavation of TU1  | D. Thurman, Q. Tran   | 8.5   |
| 10/5/2012          | Fieldwork                   | Prep for TU2 & TU3, clear, map, photos                   | Quy Tran  | 8     |
| 10/6/2012          | Fieldwork                   | Exc of TU2   | D. Thurman, Q. Tran   | 8.5   |
| 10/12/2012         | Fieldwork                   | Exc of TU2   | Quy Tran  | 9     |



| <b>PHASE 2, FALL 2012 (CONTINUED)</b> |                           |  |  |              |
|---------------------------------------|---------------------------|--|--|--------------|
| <b>Date</b>                           | <b>Purpose</b>            | <b>Task</b>  | <b>Participants</b>  | <b>Hours</b> |
| 10/13/2012                            | Student Day and Fieldwork | tour, veg clearing, excavation of TU2                          | Rebekah Walker, Tevita Ka'ili, 40 BYUH students, Q. Tran, D. Thurman         | 10           |
| 10/17/2012                            | HCA Meeting               | Project update, Discussion of Artifacts                        | D. Thurman, Q. Tran  | 1.5          |
| 10/20/2012                            | Conference Presentation   | Society for Hawaiian Archaeology (SHA) conference presentation | SHA members; 15 mn presentation  |              |
| 10/27/2012                            | Fieldwork                 | Exc of TU2   | Mandy Lawson (CSH), D. Thurman, Q. Tran                                      | 8.5          |
| 10/28/2012                            | Community Day             | Tour, luncheon   | Patrick Kirch, community members, Q. Tran, D. Thurman                        | 6            |
| 11/3/2012                             | Fieldwork                 | Exc of TU2   | Doug Thurman   | 6            |
| 11/6/2012                             | BYUH Presentation         | evening lecture, presentation                                  | 90 students, Rebekah Walker, Tevita Ka'ili, Q. Tran; 1 hour plus preparation | 2.5          |
| 11/9/2012                             | Vegetation clearing       | chain sawing   | Doug Thurman   | 2            |
| 11/10/2012                            | Student Day               | Tour, veg clearing   | Rebekah Walker, Tevita Ka'ili, 40 BYUH students, Q. Tran, D. Thurman         | 4.5          |
| 11/24/2012                            | Fieldwork                 | Exc of TU2   | Quy Tran   | 9            |
| 11/30/2012                            | Fieldwork                 | Exc of TU2   | Quy Tran   | 8            |
| 12/1/2012                             | Fieldwork                 | Exc of TU2   | Quy Tran   | 7.5          |
| 12/7/2012                             | Fieldwork                 | Exc of TU2   | Quy Tran   | 8            |
| 12/8/2012                             | Community Day             | Tour, veg clearing   | community members, Q. Tran   | 4            |
| 12/12/2012                            | Fieldwork                 | Ex of TU2 & TU3  | D. Thurman, Q. Tran  | 8            |
| 12/13/2012                            | Fieldwork                 | Ex of TU2 & TU3  | D. Thurman, Q. Tran  | 8            |
| 12/14/2012                            | Fieldwork                 | Ex of TU2 & TU3  | D. Thurman, Q. Tran  | 10           |
| 12/19/2012                            | Fieldwork                 | Excav of TU3   | D. Thurman, Q. Tran  | 4.5          |
| 12/20/2012                            | Fieldwork                 | Excav of TU3   | Q. Tran  | 11           |
| 12/21/2012                            | Fieldwork                 | Excav of TU3   | Q. Tran  | 11           |
| 12/22/2012                            | Fieldwork                 | Excav of TU3   | D. Thurman, Q. Tran  | 2.5          |
| <b>TOTAL</b>                          |                           |  |  | <b>249.5</b> |

TABLE 10. TABLE LISTING TASKS AND PARTICIPATION HOURS BY R. THURMAN, JANUARY 6 THROUGH JUNE 9, 2013

| PHASE 3, SPRING 2013 |                           |  |  |           |
|----------------------|---------------------------|--|--|-----------|
| Date                 | Purpose                   | Task                                       | Participants   | Hours     |
| 1/6/2013             | Fieldwork                 | Documentation                              | Doug Thurman   | 4         |
| 1/12/2013            | Fieldwork                 | Excav of TU3                               | Doug Thurman   | 4         |
| 1/13/2013            | Fieldwork                 | Excav of TU3                               | Doug Thurman   | 6         |
| 1/21/2013            | Fieldwork                 | Excav of TU3                               | Doug Thurman   | 6         |
| 1/24/2013            | HCA Meeting               | Project update                             | Community members  | 3         |
| 1/25/2013            | UH Meeting                | Grad Committee Meeting                     | Davianna McGregor, Jim Bayman, Barry Rolett; 1 hour plus preparation | 3         |
| 2/7/2013             | Vegetation                | Removal of black tarps on <i>heiau</i>     | Rebekah Walker, Mamo and Nachez (residents)                          | 1         |
| 2/9/2013             | Student Day               | Tour, vegetation clearing                  | Rebekah Walker, Tevita Ka'ili, 40 BYUH students, Q. Tran, D. Thurman | 4         |
| 2/17/2013            | Mapping                   | Mapping, photos, forms                     | Mamo, D. Thurman   | 2.5       |
| 3/2/2013             | Documentation             | Mapping, photos, forms                     | R. Thurman only  | 5         |
| 3/9/2013             | Student Day and fieldwork | Tour, veg clearing, mapping, photos, forms | Rebekah Walker, Tevita Ka'ili, 40 BYUH students, Q. Tran, D. Thurman | 7         |
| 3/19/2013            | Documentation             | Mapping, photos, forms                     | R. Thurman only  | 3         |
| 3/23/2013            | Documentation             | Mapping, photos, forms                     | Scott Belluomini (UH Anthro student)                                 | 7         |
| 4/7/2013             | Conference Presentation   | Society for American Archaeology (SAA)     | SAA members; 15 mn presentation                                      |           |
| 5/4/2013             | Fieldwork                 | excav of TU3                               | Doug Thurman   | 2.5       |
| 5/11/2013            | Fieldwork                 | Excav of TU3                               | Doug Thurman   | 4         |
| 5/21/2013            | HCA Meeting               | Project update                             | Did not attend, hours for prep of materials                          | 3         |
| 5/27/2013            | Fieldwork                 | Excav of TU3                               | Doug Thurman   | 3         |
| 6/1/2013             | Fieldwork                 | Excav of TU3                               | Doug Thurman   | 4         |
| 6/8/2013             | Community Day             | veg clearing                               | Tevita Ka'ili and student  | 3         |
| 6/9/2013             | Fieldwork                 | Finished excav of TU3 and profiles         | Doug Thurman   | 5         |
| <b>TOTAL</b>         |                           |  |  | <b>80</b> |

TABLE 11. TABLE LISTING TASKS AND PARTICIPATION HOURS BY R. THURMAN, PHASE 4, FALL 2013

| PHASE 4, FALL 2013 |                               |  |  |             |
|--------------------|-------------------------------|--|--|-------------|
| Date               | Purpose                       | Task   | Participants   | Hours       |
| 9/26/2013          | HCA Meeting                   | Discussion on Progress of Land Acquisition and Grant Funding | Steering Committee and Community Members   | 2.5         |
| 10/16-10/18/2014   | Procure Field Tools           | Research, write proposal, pick up and deliver tools          | R. Thurman, Kristen Lucas, D. Thurman  | 16          |
| 10/19/2013         | Student Day                   | Tour, vegetation clearing                                    | Rebekah Walker, Tevita Ka'ili, 40 BYUH students, D. Thurman  | 3.5         |
| 10/21/2013         | Student Day and Tour for City | Educational tour and meeting at HCA                          | Rebekah Walker, Tevita Ka'ili, 25 Hau'ula Elementary students, City officials, Janet Britt, Dotty Kelly, Brew Rudd, D. Thurman | 5           |
| 11/16/2013         | Student Day                   | Educational tour   | Rebekah Walker, Tevita Ka'ili, 40 BYUH students  | 3.5         |
| <b>TOTAL</b>       |                               |  |  | <b>30.5</b> |

TABLE 12. TABLE LISTING TASKS AND PARTICIPTION HOURS BY R. THURMAN, PHASE 4, SPRING 2014

| PHASE 4, SPRING 2014 |                         |   |   |             |
|----------------------|-------------------------|---|---|-------------|
| Date                 | Purpose                 | Task  | Participants  | Hours       |
| 1/8/2014             | Tour & Educational Prep | tour, discussion of potential trail locations and outreach activities | Jacquelyn Lewis-Harris  | 3           |
| 1/31/2014            | Student Day Prep        | chainsaw  | R. Thurman only   | 3           |
| 2/1/2014             | Student Day             | tour, vegetation clearing   | Tevita Ka'ili, 40 BYUH students                                       | 5.5         |
| 2/18/2014            | HCA Meeting             | project update  | City, HCA, Steering Committee, community                              | 2           |
| 3/8/2014             | Student & Community Day | tour, vegetation clearing   | Tevita Ka'ili, Rebekah Walker, 7 BYUH students, 40+ community members | 5           |
| 4/19/2014            | Community Day           | tour, vegetation clearing   | Community members   | 4           |
| <b>TOTAL</b>         |                         |   |   | <b>22.5</b> |

## ARCHAEOLOGICAL FIELDWORK RESULTS

### SURFACE SURVEY AND FEATURE DOCUMENTATION

In order to locate existing archaeological features within TMK: [1] 5-4-05:010 a full survey of the land parcel was conducted. The survey was completed with assistance of UH-Mānoa anthropology students and local archaeologists. A hand-held GPS was used to mark potential feature locations. The feature locations were prioritized, with highest priority given to Maunawila Heiau and a grouping of features near Hau'ula Homestead Road. These two areas were mapped (Figure 23). The documented features were grouped into two main areas, the Makai Zone and the Central Zone. GPS points were taken of additional potential features found in the Mauka Zone and Central Zone, however due to time constraints detailed documentation of these sites was outside the scope of this project.

#### MAKAI ZONE

At the beginning of the project, the landowner provided a tour of the *makai* portion of the parcel. Three features were pointed out including the documented burial mound denoted on the TMK (Feature A), a nicely constructed low rectangular mound (Feature B) located adjacent to Punaiki Stream, and a large pit or depression (Feature F). The function of the low mound (Feature B) was unknown, but it was speculated by the landowner to be another historic infant burial. The function of the large pit was unknown however several interpretations were suggested. Various community members speculated it may have been a drowning pond or a cleansing pond, similar to Kaluakauwā, described by McAllister (1933) and Sterling and Summers (1978). References to Kaluakauwā state that the pond was located near the coastline, north of the current location of Hau'ula Elementary School so we are confident the depression is not Kaluakauwā. The landowner related another possibility includes a cesspool function associated with the family's former home. To the landowners knowledge no other features were known to exist in the *makai* portion of the parcel.

#### DOCUMENTATION AND MAPPING OF MAKAI ZONE

Archaeological investigation of the Makai Zone included surface survey, tape and compass mapping, documentation of surface features, and analysis of a sample of historic artifacts found on the ground surface. Very little native vegetation was documented in the Makai Zone of the parcel. Native plants include one *noni* tree (*Morinda citrifolia*) and a small *pōpolo* (*Solanum americanum*) plant. Archaeological survey of the parcel encountered the historic burial mound (Feature A), the low rectangular mound adjacent to Punaiki Stream (Feature B), two conically-shaped mounds (Feature C and Feature D), boulder alignments (Feature E), the large pit or depression (Feature F), a potential house foundation (Feature G), a low ovular shaped mound (Feature H), a large grinding stone (Feature I), and a historically bulldozed terrace (Feature J) (Figure 24). It is possible additional features may exist just inland from these features, as these features are bound by thick *hau* trees on the *mauka* side creating a difficult barrier and poor ground visibility.

Abundant historic material was documented alongside the *mauka* side of Hau'ula Homestead Road. Debris alongside the roadway includes modern materials and items that eroded down the eastward sloping hillside from the location of the potential historic house site (Feature G). The majority of artifacts documented from this area include fragments of glass bottles as well as ceramics, metal objects, brick, glass marbles, and faunal materials (including chicken, pig bone, and oyster shells).

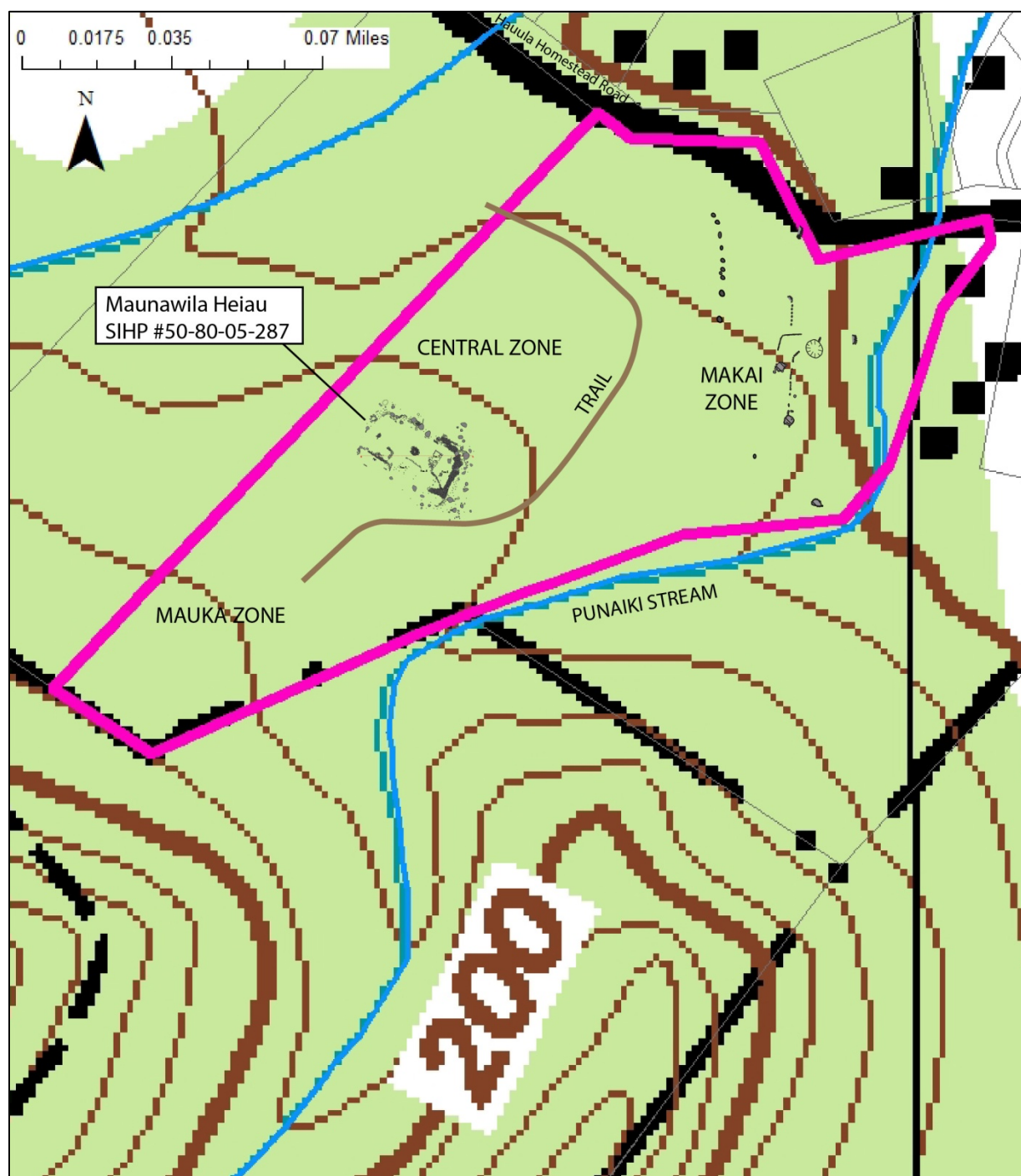


FIGURE 23. PORTION OF 1992 HAU'ULA USGS 7.5 MINUTE TOPOGRAPHIC MAP WITH A PLAN VIEW MAP OF TMK: [1] 5-4-05:010

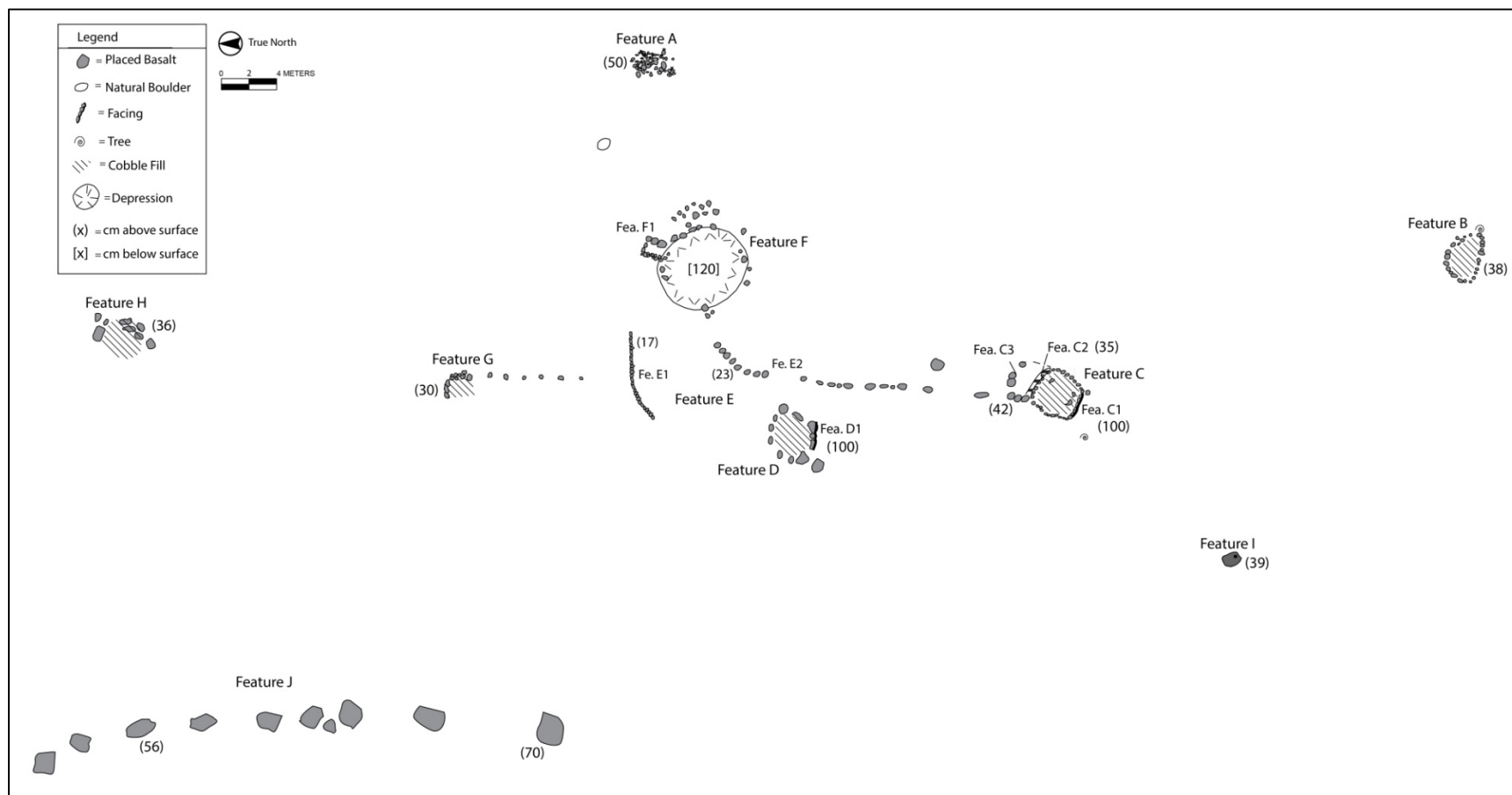


FIGURE 24. PLAN VIEW MAP OF THE MAKAI ZONE, SHOWING DOCUMENTED FEATURES (FEATURE A THROUGH FEATURE J)



Field documentation and mapping of features in the Makai Zone included completing feature forms, photo logs, taking pictures, measurements, and drawing plan maps of each feature or group of features. Volunteer mappers included Douglas Thurman, B.A., Eric Mendez, B.A., and Kealaulaokamamo Leota, B.A. Plan maps were drawn of exposed portions of the features.

Three student days focused on vegetation clearing within the Makai Zone of the parcel. Clearing efforts focused on creating a pathway so features could be easily viewed and removal of tree branches, vines, and *hau* bush from on top of and surrounding features. Figure 25 shows clearing work conducted in the Makai Zone.

TABLE 13. TABLE LISTING FEATURES DOCUMENTED IN THE MAKAI ZONE OF THE PARCEL

| FEA               | TYPE/ FUNCTION                       | MEASUREMENTS  |
|-------------------|--------------------------------------|---|
| <b>MAKAI ZONE</b> |                                      |   |
| A                 | Historic Burial Mound                | 3 m N/S x 2 m E/W, ranging from 7 cm to 50 cm in height                             |
| B                 | Burial Mound                         | 3 m N/S x 3 m E/W, ranging from 13 cm to 38 cm in height                            |
| C                 | Burial Mound                         | 2.7 m N/S x 3 m E/W, ranging from 90 cm to 100 cm in height                         |
| D                 | Burial Mound                         | 3.3 m N/S x 3.3 m E/W, ranging from 60 cm to 100 cm in height                       |
| E                 | Stone Alignments                     | Two alignments, E1: 16 m E/W, E2: 12 m NE/SW, ranging from 10 cm to 50 cm in height |
| F                 | Large Circular Pit                   | 4.8 m N/S x 5.3 m E/W, approximately 1.2 m deep                                     |
| G                 | Historic House Foundation            | 12 m N/S x 7 m E/W, ranging from 3 cm to 30 cm in height                            |
| H                 | Low Mound                            | 3 m N/S x 2.4 m E/W, ranging from 20 cm to 36 cm in height                          |
| I                 | Large Grinding Stone                 | 1.2 m N/S x 1.15 m E/W, ranging from 25 cm to 39 cm in height                       |
| J                 | Historic to Modern Bulldozed Terrace | 20 m N/S ranging from approximately 20 cm to 70 cm in height                        |



FIGURE 25. PHOTO SHOWING STUDENT CLEARING EFFORTS IN THE MAKAI ZONE, VIEW TO EAST

## FEATURE A

|                             |  |
|-----------------------------|--|
| <b>FEATURE TYPE</b>         | Low Mound  |
| <b>FUNCTION</b>             | Infant Burial  |
| <b>ORIENTATION</b>          | N/S  |
| <b>FEATURE DIMENSIONS</b>   | 3 m N/S x 2 m E/W, ranging from 7 cm to 50 cm in height  |
| <b>CONSTRUCTION METHOD</b>  | Dry stacked basalt boulders built one to two courses high with basalt cobbles scattered in a loose alignment with basalt cobbles to pebble sized stones concentrated in the center and east portion of the feature. Cobbles and pebbles extend down the eastern sloping hillside.                                  |
| <b>TIME PERIOD</b>          | Historic; based on McGregor family history   |
| <b>TOPOGRAPHY</b>           | Located on a relatively level to eastward tending, gently sloping hillside   |
| <b>VEGETATION</b>           | Large mango trees and thick <i>hau</i> bush  |
| <b>CONDITION</b>            | Poor   |
| <b>DISTURBANCE</b>          | Natural erosion (rain and soil loss), likely additional modification caused by animals and/or humans   |
| <b>ASSOCIATED ARTIFACTS</b> | Historic and modern glass, metal, and plastic debris scattered in vicinity   |
| <b>INTERPRETATION</b>       | According to discussions with the landowners, this mound could contain one or two infants. The burial mound location was surveyed by a licensed surveyor, a ten foot buffer was established around the site, and the mound and buffer have been made an encumbrance on the TMK for perpetuity (refer to Figure 5). |

## FEATURE B

|                             |   |
|-----------------------------|---|
| <b>FEATURE TYPE</b>         | Low Mound   |
| <b>FUNCTION</b>             | Possible Burial   |
| <b>ORIENTATION</b>          | N/S   |
| <b>FEATURE DIMENSIONS</b>   | 3 m N/S x 3 m E/W, ranging from 13 cm to 38 cm in height  |
| <b>CONSTRUCTION METHOD</b>  | Dry stacked basalt boulders built one course high around the feature perimeter with a basalt cobble and pebble filled center creating a consistently level structural surface   |
| <b>TIME PERIOD</b>          | Likely Post Contact; based on existing condition and construction style   |
| <b>TOPOGRAPHY</b>           | Relatively level ground surface, located approximately 10 m from Punaiki Stream down a southward sloping steep embankment   |
| <b>VEGETATION</b>           | Large mango trees, thick hau bush, <i>pōpolo</i> ( <i>Solanum americanum</i> )  |
| <b>CONDITION</b>            | Good  |
| <b>DISTURBANCE</b>          | None  |
| <b>ASSOCIATED ARTIFACTS</b> | Metal fragments observed on the <i>makai</i> side of feature  |
| <b>INTERPRETATION</b>       | The condition of the feature and distinction in the landscape suggests it is post-contact rather than pre-contact. Pre-contact burials do not typically draw attention due to the <i>mana</i> inherent in bone, which was sought to make tools and fishhooks (Buck 1957:569). On the <i>makai</i> (east) side of the feature is a small, low terrace which could be an offering area. The position of the feature along Punaiki Stream (the southern boundary of Hau'ula Ahupua'a), relatively flat surface, and terracing on the feature could also indicate an <i>ahu</i> (altar or shrine) function for offerings. |



FIGURE 26. PHOTO OF FEATURE A (INFANT BURIAL), VIEW TO WEST (NOTICE A 2 METER LONG PHOTO SCALE)



FIGURE 27. PHOTO OF FEATURE B (MOUND), VIEW TO SOUTHEAST

## FEATURE C

|                             |  |
|-----------------------------|--|
| <b>FEATURE TYPE</b>         | Conical Mound  |
| <b>FUNCTION</b>             | Possible Burial  |
| <b>ORIENTATION</b>          | N/S  |
| <b>FEATURE DIMENSIONS</b>   | 2.7 m N/S x 3 m E/W, ranging from 90 cm to 100 cm in height  |
| <b>CONSTRUCTION METHOD</b>  | Dry stacked basalt boulders built three to four courses high around the feature perimeter with basalt cobble and pebble filled center creating a conical structural surface. The south wall is faced (aligned vertically) with four courses of stone, approximately 1 meter tall (Fea. C1). A low terrace of basalt cobbles and pebbles is adjacent to the east side of the mound (Fea. C2). A rectangular area aligned with boulders and cobbles (Fea. C3) also extends off the east ( <i>makai</i> ) side of the mound, encompassing Feature C2. |
| <b>TIME PERIOD</b>          | Likely Post Contact; based on existing condition and construction style  |
| <b>TOPOGRAPHY</b>           | Slightly sloping ground surface toward the east  |
| <b>VEGETATION</b>           | Thick <i>hau</i> bush  |
| <b>CONDITION</b>            | Good   |
| <b>DISTURBANCE</b>          | None   |
| <b>ASSOCIATED ARTIFACTS</b> | No artifacts observed near or on the feature   |
| <b>INTERPRETATION</b>       | This mound is constructed similarly to Feature B however it is larger, taller, and contains facing (Fea. C1) on the south side. The surface of this mound is more conical than Feature B. The function is determined to likely be a burial mound. A small, low terrace (Fea. C2) and rectangular stone alignment (Fea. C3) on the <i>makai</i> side of the feature suggests this mound could have also been an <i>ahu</i> .  |





FIGURE 28. PHOTO OF FEATURE C (MOUND) SHOWING VERTICAL FACING (FEA. C1, ON LEFT) AND A RECTANGULAR ALIGNMENT (FEA. C3, ON RIGHT) EXTENDED FROM THE MOUND, VIEW TO NORTH



FIGURE 29. PHOTO OF FEATURE C (MOUND) SHOWING A SMALL TERRACE (FEA. C2) ADJACENT TO THE MOUND, VIEW TO SOUTHWEST



## FEATURE D

|                             |   |
|-----------------------------|---|
| <b>FEATURE TYPE</b>         | Conical Mound   |
| <b>FUNCTION</b>             | Possible Burial   |
| <b>ORIENTATION</b>          | N/S   |
| <b>FEATURE DIMENSIONS</b>   | 3.3 m N/S x 3.3 m E/W, ranging from 60 cm to 100 cm in height   |
| <b>CONSTRUCTION METHOD</b>  | Dry stacked basalt boulders built three to four courses high around the feature perimeter with basalt cobble and pebble fill in center creating a conical structural surface. The south wall is faced (aligned vertically) with four courses of stone and is approximately one meter tall (Fea. D1).  |
| <b>TIME PERIOD</b>          | Likely Post Contact; based on existing condition and construction style   |
| <b>TOPOGRAPHY</b>           | Located at the base of a southeast sloping hillside with gradual slope continuing to the south  |
| <b>VEGETATION</b>           | Thick <i>hau</i> bush   |
| <b>CONDITION</b>            | Good  |
| <b>DISTURBANCE</b>          | Hau tree slightly disturbed surface of structure  |
| <b>ASSOCIATED ARTIFACTS</b> | No artifacts observed on or within the near vicinity of the feature   |
| <b>INTERPRETATION</b>       | This mound is constructed very similarly to Feature C, including a facing of stones on the south side (Fea. D1). Therefore, the facings of Features C and D are viewed due north. In contrast to Features B and C, no delineation of stones on the <i>makai</i> side was observed in association with Feature D. This feature is interpreted as a burial mound. |



FIGURE 30. PHOTO OF FEATURE D (MOUND), VIEW TO WEST



FIGURE 31. PHOTO OF FEATURE D (MOUND) SHOWING , VIEW TO NORTH

## FEATURE E

|   |   |
|---|---|
| <b>FEATURE TYPE</b>                       | Stone Alignments  |
| <b>FUNCTION</b>                           | Demarcation   |
| <b>FEATURE DIMENSIONS and ORIENTATION</b> | Two alignments, E1: 16 m E/W, E2: 12 m NE/SW, ranging from 10 cm to 50 cm in height   |
| <b>CONSTRUCTION METHOD</b>                | Two alignments, E1: Basalt cobbles to small boulders aligned in a single stone alignment, runs from Feature F (pit) inland along the base of the hillside; E2: Basalt boulders aligned in a single stone alignment, runs from Feature C (mound) towards Feature F (pit)                                       |
| <b>TIME PERIOD</b>                        | Likely Post Contact; based on existing condition, construction style, and association with surrounding features   |
| <b>TOPOGRAPHY</b>                         | Located at base of east/southeast sloping hillsides on relatively level land, gentle slope to northeast   |
| <b>VEGETATION</b>                         | Large mango trees, thick <i>hau</i> bush  |
| <b>CONDITION</b>                          | Good  |
| <b>DISTURBANCE</b>                        | None  |
| <b>ASSOCIATED ARTIFACTS</b>               | Historic to modern glass scattered in <i>makai</i> -most areas  |
| <b>INTERPRETATION</b>                     | Stone alignment E1 separates a relatively flat, low hillside from a lower relatively flat area. Feature E1 curves along the contour of the hillside. Feature E2 divides a relatively flat area vertically, creating a separation between mound Features C and D. The alignments are well set into the ground. |





FIGURE 32. PHOTO OF FEATURE E (ALIGNMENT) SHOWING E1, VIEW TO WEST



FIGURE 33. PHOTO OF FEATURE E (ALIGNMENT) SHOWING E2, VIEW TO NORTH

## FEATURE F

|                             |  |
|-----------------------------|--|
| <b>FEATURE TYPE</b>         | Large Pit  |
| <b>FUNCTION</b>             | Undetermined   |
| <b>ORIENTATION</b>          | N/S  |
| <b>FEATURE DIMENSIONS</b>   | 4.8 m N/S x 5.3 m E/W, approximately 1.2 m deep  |
| <b>CONSTRUCTION METHOD</b>  | Excavated pit with earthen sides. A ramped access way with short parallel alignments (Fea. F1) of basalt boulders and cobbles is on the north side, approximately 2 m long N/S. A metal bolt protrudes from within the ramped access way.  |
| <b>TIME PERIOD</b>          | Possibly Post Contact with Historic Use, based on association with surrounding features and community interpretation; OR Possible Historic Cesspool, related to previous homestead   |
| <b>TOPOGRAPHY</b>           | Relatively level ground surface  |
| <b>VEGETATION</b>           | Large mango tree, thick <i>hau</i> bush, <i>noni</i> tree  |
| <b>CONDITION</b>            | Good   |
| <b>DISTURBANCE</b>          | None   |
| <b>ASSOCIATED ARTIFACTS</b> | Historic artifacts including glass soda water bottle fragments and whiteware ceramics, metal bolt found within a rock near a sloping access point into the feature   |
| <b>INTERPRETATION</b>       | The function of the large pit is unknown however several interpretations have been suggested, including use as a pond associated with cleansing/ purification or sacrifice, or as an animal pen, cistern, or cesspool. As part of the homestead requirements, a water source was necessary and this feature could reflect an old well or pit that was low to ground water for water storage purposes. However the association with surrounding features, including the alignments which run from Features C and D towards Feature F, suggests the site has a ceremonial function. It is believed that Maunawila Heiau is a healing or medicinal <i>heiau</i> rather than sacrificial <i>heiau</i> , therefore, it is thought the pit may have held water and been used for cleansing and purification. |





FIGURE 34. PHOTO SHOWING FEATURE K (LARGE PIT/DEPRESSION), VIEW TO SOUTHEAST



FIGURE 35. PHOTO OF FEATURE F (LARGE PIT/DEPRESSION) SHOWING FEATURE F1 ON THE FAR SIDE, VIEW TO NORTH



## FEATURE G

|                             |   |
|-----------------------------|---|
| <b>FEATURE TYPE</b>         | Possible House Site   |
| <b>FUNCTION</b>             | Habitation  |
| <b>ORIENTATION</b>          | N/S   |
| <b>FEATURE DIMENSIONS</b>   | 12 m N/S x 7 m E/W, ranging from 3 cm to 30 cm in height  |
| <b>CONSTRUCTION METHOD</b>  | Northeast corner contains a dry stacked basalt boulder and cobble L-shape alignment with a roughly paved basalt cobble surface. The alignment extends to the south and west, with relatively evenly spaced basalt boulders.   |
| <b>TIME PERIOD</b>          | Historic, based on concentration of historic debris, burned glass, and family history indicating a wooden house burned down   |
| <b>TOPOGRAPHY</b>           | Relatively level land located on top of a rolling hillside, hillside gently slopes to the south and moderately slopes to the east   |
| <b>VEGETATION</b>           | Large mango trees and thick <i>hau</i> bush   |
| <b>CONDITION</b>            | Documented portion is in good condition   |
| <b>DISTURBANCE</b>          | None  |
| <b>ASSOCIATED ARTIFACTS</b> | Historic and modern debris is scattered on the feature and in the vicinity including glass, melted glass, metal, plastic, marbles, clothing, a futon mattress, plastic bags, clothing, shoes  |
| <b>INTERPRETATION</b>       | Feature G is found on the highest point of a hillside. Only one corner of the potential house site is prominent. This corner area is covered in glass, ceramics, and melted glass. As we know that the historic home burned down, the melted glass and household items observed on and in the vicinity of this feature suggest the house was built on this location. Because the other features in the Makai Area (Feature B through Feature E) were constructed prior to utilization of the land as a homestead, it is possible that the stone alignment and potential house site may be remnants of an earlier traditional cultural feature. Future excavation is recommended for this feature. |



FIGURE 36. PHOTO OF FEATURE G (HOUSE SITE), VIEW TO SOUTH



FIGURE 37. PHOTO OF THE SURFACE OF FEATURE G (HOUSE SITE) SHOWING HISTORIC MATERIALS (BURNED GLASS, CERAMICS)

## FEATURE H

|                             |  |
|-----------------------------|--|
| <b>FEATURE TYPE</b>         | Low Mound  |
| <b>FUNCTION</b>             | Potential Burial or <i>Ahu</i>   |
| <b>ORIENTATION</b>          | E/W  |
| <b>FEATURE DIMENSIONS</b>   | 3 m N/S x 2.4 m E/W, ranging from 20 cm to 36 cm in height   |
| <b>CONSTRUCTION METHOD</b>  | Constructed of basalt cobbles and pebbles, with basalt boulders aligned along the northeast and southeast edges  |
| <b>TIME PERIOD</b>          | Undetermined; Possibly Post Contact based on association with surrounding features   |
| <b>TOPOGRAPHY</b>           | Relatively level land with gradual slope to northeast  |
| <b>VEGETATION</b>           | Thick <i>hau</i> bush  |
| <b>CONDITION</b>            | Fair   |
| <b>DISTURBANCE</b>          | <i>Hau</i> vegetation and erosion appear to have moderately disturbed the feature  |
| <b>ASSOCIATED ARTIFACTS</b> | Modern to historic materials are scattered on and in the vicinity of the feature, including glass soda bottle fragments  |
| <b>INTERPRETATION</b>       | Feature H is a very low mound and is loose in construction, more similar to Feature A (infant burial) than Features B through D. It is possible the feature is a historic infant burial, an early post contact burial, or a small <i>ahu</i> . |

## FEATURE I

|                             |   |
|-----------------------------|---|
| <b>FEATURE TYPE</b>         | Grinding Stone or Whetstone   |
| <b>FUNCTION</b>             | Organic Preparation   |
| <b>FEATURE DIMENSIONS</b>   | 1.2 m N/S x 1.15 m E/W, ranging from 25 cm to 39 cm in height   |
| <b>CONSTRUCTION METHOD</b>  | Large basalt boulder with polishing on north and northwest portions, circular indentation measuring 20 cm in diameter and approximately 3 cm deep in the center of the northwest polished area  |
| <b>TIME PERIOD</b>          | Undetermined; Likely Post-Contact, based on association with surrounding features; or Pre-Contact based on early use of the land parcel associated with Maunawila Heiau   |
| <b>TOPOGRAPHY</b>           | Relatively level land with gentle slope to east   |
| <b>VEGETATION</b>           | Thick <i>hau</i> bush   |
| <b>CONDITION</b>            | Good  |
| <b>DISTURBANCE</b>          | None  |
| <b>ASSOCIATED ARTIFACTS</b> | No artifacts were observed near the feature   |
| <b>INTERPRETATION</b>       | It is possible the stone was used to pound <i>kava</i> root, <i>taro</i> , or process other plants (Buck 1957). The stone could also be a whetstone for grinding stone to sharpen tools or create objects such as stone balls, polishing stones, files, sinkers, club heads, <i>poi</i> pounders, oil lamps, <i>ulu maika</i> , etc. (Brigham 1974) |





FIGURE 38. PHOTO SHOWING FEATURE H (LOW MOUND) AFTER VEGETATION CLEARING, VIEW TO NORTH



FIGURE 39. PHOTO SHOWING FEATURE I (LARGE GRINDING STONE), VIEW TO NORTHWEST

## FEATURE J

|                             |   |
|-----------------------------|---|
| <b>FEATURE TYPE</b>         | Bulldozed Terrace   |
| <b>FUNCTION</b>             | Land Clearing   |
| <b>FEATURE DIMENSIONS</b>   | 20 m N/S ranging from approximately 20 cm to 70 cm in height  |
| <b>CONSTRUCTION METHOD</b>  | Basalt boulders and cobbles mechanically pushed into a long alignment, bulldozer scaring present on boulders  |
| <b>TIME PERIOD</b>          | Historic, based on method of construction   |
| <b>TOPOGRAPHY</b>           | Relatively level land, covered by thick <i>hau</i> , feature extends southward beyond portion mapped  |
| <b>VEGETATION</b>           | Thick <i>hau</i> bush and <i>ti</i> trees   |
| <b>CONDITION</b>            | Good  |
| <b>DISTURBANCE</b>          | Thick <i>hau</i> grows over the feature, disturbance is likely  |
| <b>ASSOCIATED ARTIFACTS</b> | No artifacts were observed on or in the near vicinity of the feature  |
| <b>INTERPRETATION</b>       | <p>This feature was created within the historic to modern time period, as evidenced by bulldozer scaring on several boulders. Therefore, this feature has no temporal association with any of the other features in the Makai Area, other than perhaps Feature F (possible house site). It is possible the terracing may have been created during development of the property for the homestead however, as large boulders in the Central Zone of the parcel have similar bulldozing scaring which is thought to have occurred rather recently, it is possible this bulldozed terrace is associated with more recent activity on the parcel by squatters. The feature extends further southward than has been mapped due to extremely thick <i>hau</i>.</p> |



## CENTRAL ZONE (MAUNAWILA HEIAU, SIHP # 50-80-05-287)

At the beginning of the project Maunawila Heiau was completely obscured by thick vegetation. The landowner provided a tour of the *heiau* and pointed out the prominent eastern border of the lower platform terrace (Feature 1) which was only minimally visible through the weeds (Figure 40, top row). The surface of the terrace was examined and found to be paved and in good condition. The other portion of the *heiau* which was pointed out by the landowners was a stacking of basalt boulders which marked the western edge of the upper platform terrace (Feature 2). Vegetation was too thick to discern any other features.

### VEGETATION CLEARING

Phase I fieldwork included identification of invasive vegetation on the parcel. Plant identification was assisted by Ena Sroat, B.A. Very little native vegetation was documented. Native plants included limited amounts of *ti*, *ʻūlei*, and *noni* (*Morinda citrifolia*). Native plants were tagged with a metal identification label and flagging tape. These plants were pointed out prior to vegetation clearing as an intentional effort to avoid their removal. All invasive species and potentially destructive vegetation such as trees growing out of archaeological features and sprawling *hau* bush were considered for removal.

More than twenty community and student days, consisting of vegetation clearing and educational tours, were conducted at Maunawila Heiau during this project. Safety precautions and methods of site maintenance were expressed prior to vegetation removal by community and student groups. Groups were asked not to drag brush along the surface of the *heiau*, walk over the top of discrete features, dislodge any stones, or cut down tree limbs which would fall directly onto archaeological features. Sites were mapped as they were cleared and became observable. Modern additions to Maunawila Heiau were photographed and placed onto the site plan map prior to their removal. Modern additions included a barb-wire and metal post fenceline and a wooden shack with corrugated metal roofing covering a cast-iron tub which sat on a flat layer of concrete bricks (Figure 42).

Herbicide was not spread over the site, rather RoundUp was injected into tree stumps only. To stall constant growth of vegetation on the *heiau*, thick black plastic was used to cover the surface. The plastic served to smother the vegetation. During community and student days the tarps would be removed and vegetation cleared. This method worked well to expose the surface of the *heiau* and suppress vegetation growth.

A large pile of cut vegetation exists approximately twenty feet from Maunawila Heiau. In accordance with the Management Plan for the site, created by the Hauʻula Community Association and Maunawila Heiau Steering Committee, a wood chipper will be rented to rid the brush pile(s). The chippings will be used for trail systems around the *heiau* and other sites on the property to provide obvious pathways to act as a buffer and discourage improper trampling over features.

### DOCUMENTATION AND MAPPING OF MAUNAWILA HEIAU

Archaeological investigation of the Central Zone of the parcel included survey, Total Station Mapping, tape and compass mapping, Trimble GPS, documentation of surface features, limited excavation, and analysis of collected materials. Survey of the area was hindered by very limited ground visibility. Therefore, features were mapped and plotted using GPS as vegetation was removed. Mapping efforts were assisted by a UH-Mānoa Geography class taught by Evert Wingert. The class took topographic points along the northeast, east and south sides of the *heiau*, creating a contour map (Figure 43). The contour map indicates the *heiau* is situated on a natural spur of the hillside and shows a gradual slope in elevation to the east and northeast.



**FIGURE 40. PHOTOS OF VEGETATION PRIOR TO CLEARING (TOP ROW), SQUATTERS SHACK (MIDDLE, LEFT) AND PHOTO OF MODERN FENCELINE RUNNING THROUGH THE CENTER OF THE HEIAU (MIDDLE, RIGHT), AND USE OF BLACK TARPS TO COMBAT VEGETATION (BOTTOM ROW, PHOTO ON LEFT IS WITH THE TARP, PHOTO ON RIGHT SHOWS VEGETATION UNDER TARP AFTER ONE MONTH)**



Vegetation clearing and mapping uncovered the lower platform terrace (Feature 1), an upper platform terrace (Feature 2), a low platform terrace on the surface of Feature 1 (Feature 3), low terraces (Features 4 and 5), an altar stone (Feature 6), an L-shaped alignment (Feature 7), a small mound (Feature 8), a circular alignment (Feature 9), a central rock concentration (Feature 10), pits and depressions (Feature 11), and large basalt boulders (Feature 12) (Figure 44 and Figure 46). Modern debris including plastic planting pots, aluminum window frames, concrete blocks, glass, and metal fragments were found on the northwest portion of the *heiau*. This debris is associated with the shack remnant and fence line which were removed during vegetation clearing. The presence of modern debris corresponds with Jan Becket's account that in 1993 squatters had built a house just north of the *heiau* and incorporated portions of the *heiau* into their landscaping (Ishihara and Hammatt 2011:59).

Survey and documentation of the Central Zone was assisted by UH-Mānoa students in the Anthropology Department, Applied Archaeology Program, and local archaeologists. A surface survey of the area was conducted using hand-held GPS devices and by running transects roughly N/S across the parcel. During surface survey each volunteer was given a hand compass for orientation purposes and to aid in traversing straight lines. Volunteer surveyors included Douglas Thurman, B.A., Brian Lane, M.A., Tuyen Quang, M.A., and Robert DiNapoli, M.A. Field documentation and mapping of features in the Central Zone included completing feature forms, photo logs, taking photographs, measurements, and drawing plan maps of each feature or group of features. Volunteer mappers included Douglas Thurman, B.A. and Scott Belluomini, M.A. Excavation was assisted by Quy Tran, M.A., Douglas Thurman, B.A., and Mandy Lawson, B.A.

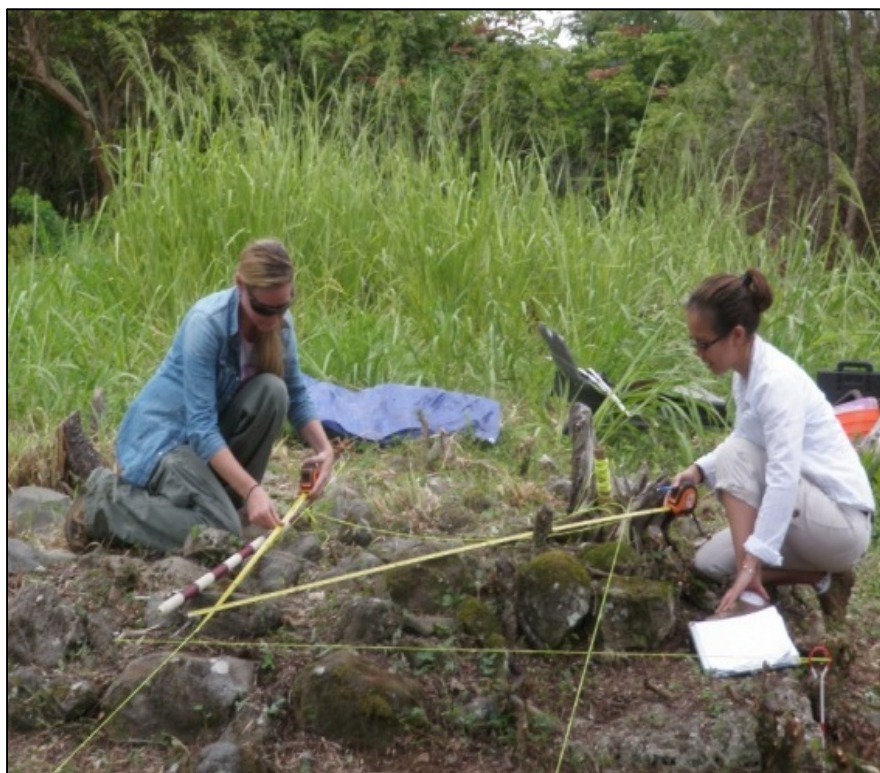


FIGURE 41. PHOTO SHOWING THE SETTING UP OF A TEST UNIT GRID SYSTEM IN PREPARATION FOR EXCAVATION, VIEW TO NORTHWEST



FIGURE 42. DRAFTED PLAN MAP OF MAUNAWILA HEIAU SHOWING A FENCELINE AND A SHACK FOUND AT THE BEGINNING OF THE PROJECT

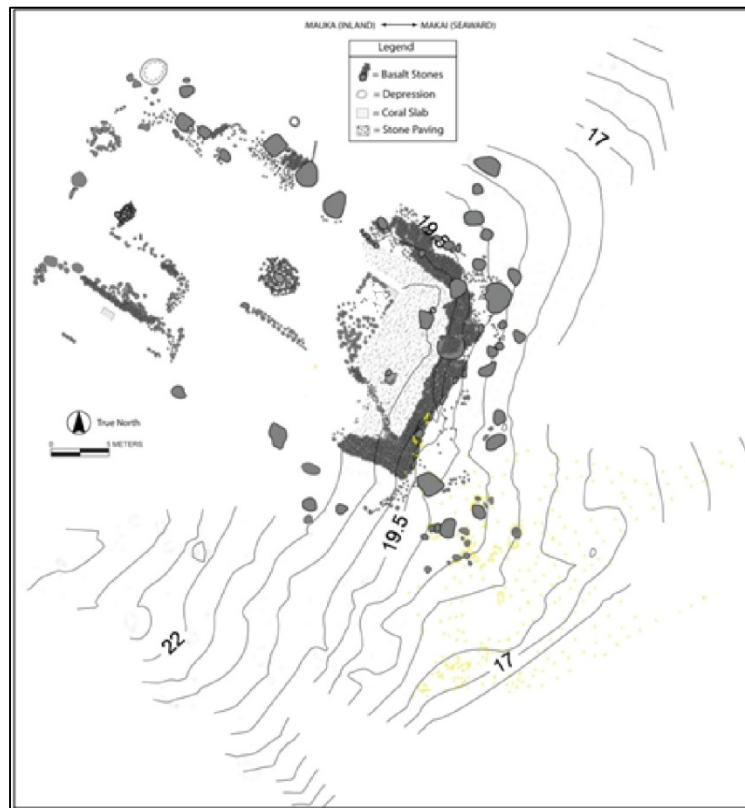


FIGURE 43. DRAFTED PLAN MAP WITH TOPOGRAPHIC CONTOUR DATA PRODUCED FROM TOTAL STATION MAPPING

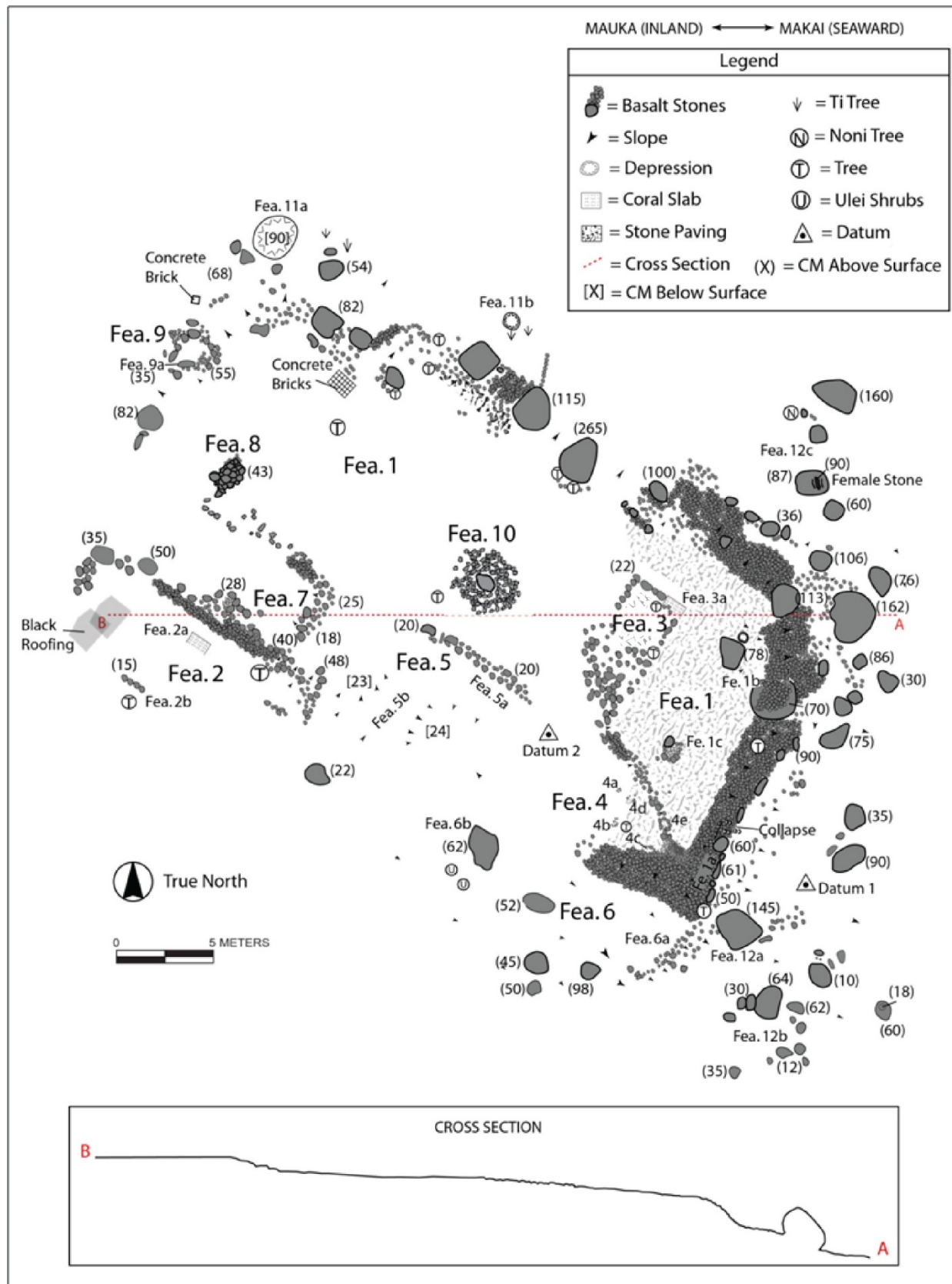


FIGURE 44. PLAN VIEW MAP OF MAUNAWILA HEIAU, SIHP # 50-80-05-287



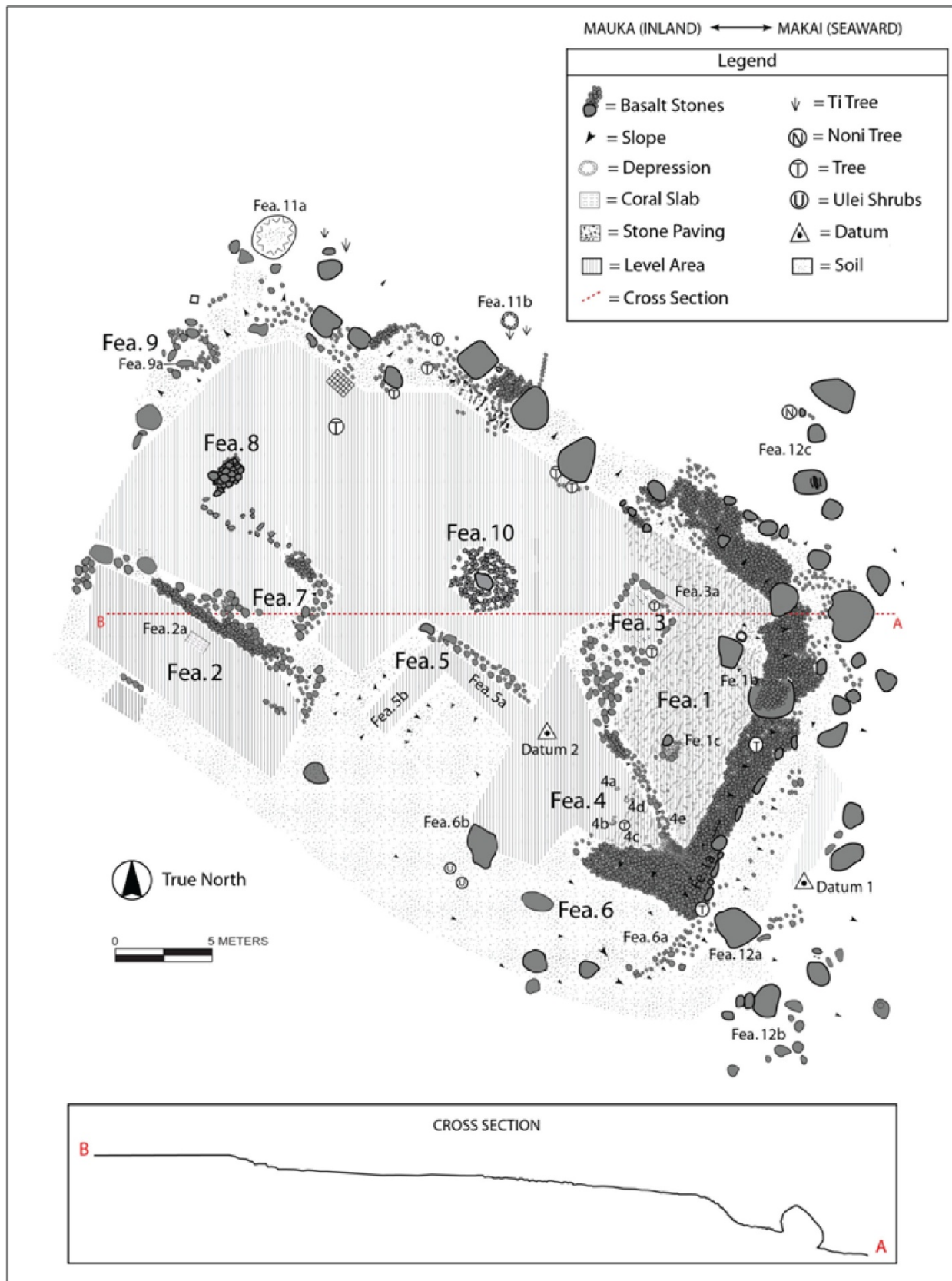


FIGURE 45. PLAN MAP OF MAUNAWILA HEIAU, SIHP # 50-80-05-287, SHOWING LEVEL AREAS

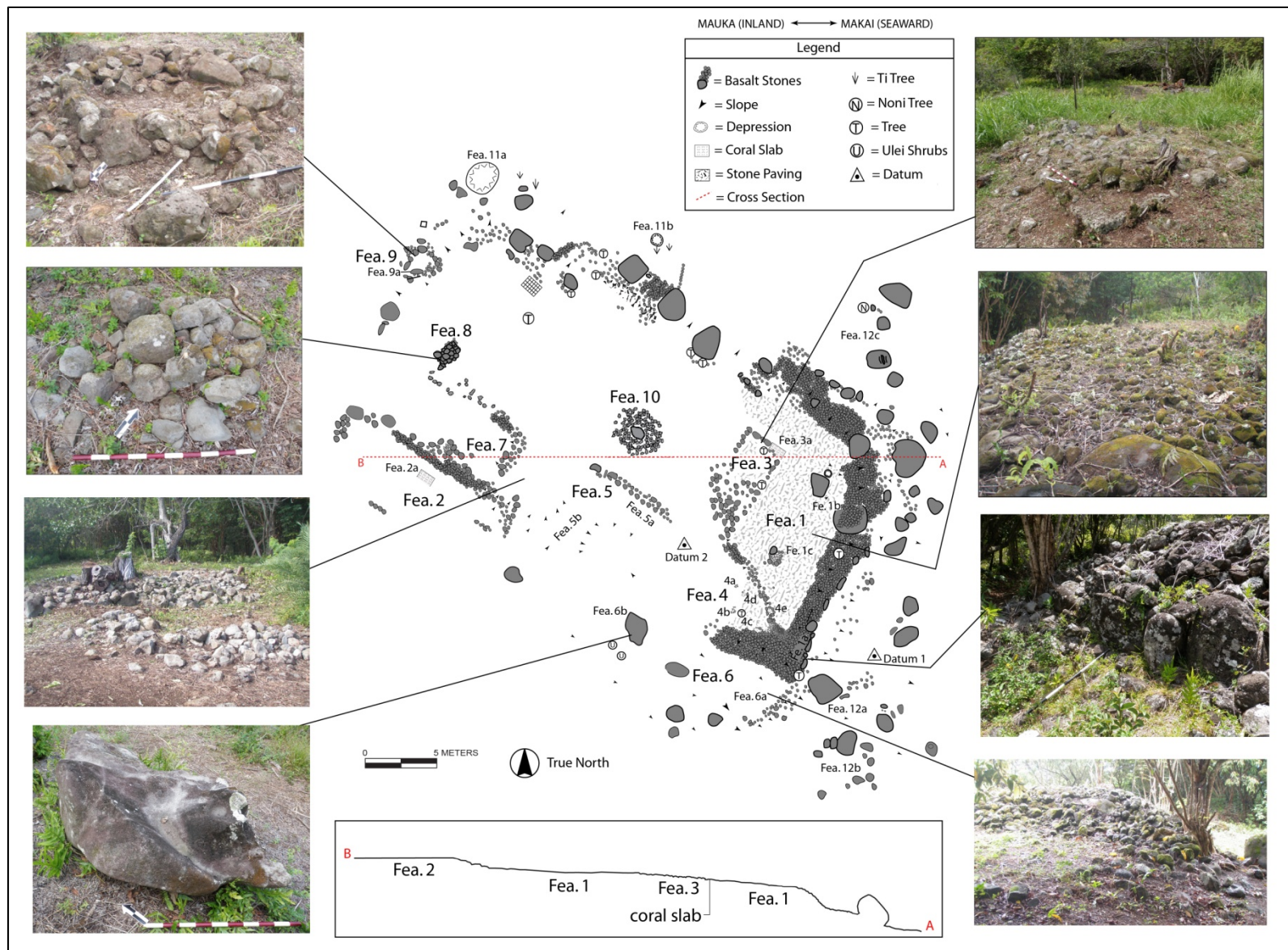


FIGURE 46. PLAN MAP OF MAUNAWILA HEIAU WITH INSET PHOTOS OF SELECT AREAS (2013)

TABLE 14. TABLE LISTING FEATURES DOCUMENTED IN THE MAUKA ZONE OF THE PARCEL

| FEATURE             | TYPE/ FUNCTION                            | MEASUREMENTS   |
|---------------------|---|--|
| <b>CENTRAL ZONE</b> |   |  |
| 1                   | Lower Terrace Platform                    | 40 m E/SE to W/NW by 25 m N/NE to S/SW and approximately 0.7 m to 2.6 m in height along the perimeter; surface is 33 m E/SE to W/NW by approximately 15 m N/NE to S/SW |
| 2                   | Upper Terrace Platform                    | 14 m SE/NW by 6.5 m NE/SW, ranging from 28 cm to approximately 75 cm in height; surface is 11.5 m SE/NW by 4 m NE/SW   |
| 3                   | Low Platform                              | 7 m NE/SW by 3.5 m NW/SE and ranging from approximately 20 cm to 35 cm in height   |
| 4                   | Paved Terrace                             | 6.5 m NW/SE by 3.5 m SW/NE and ranging approximately 20 cm to 40 cm in height  |
| 5                   | Low Terrace                               | 7 m NW/SE by 6 m NE/SW and ranging from 2 cm to 24 cm in height  |
| 6                   | Terrace/ Entrance Area                    | 12 m NW/SE by 5 m NE/SW  |
| 7                   | L-Shape Alignment                         | 8 m NW/SE by 5 m NE/SW and ranging from 13 cm to 26 cm in height   |
| 8                   | Mound                                     | 1.3 m N/S by 1.5 m E/W by 43 cm in height  |
| 9                   | Circular Alignment                        | 2.3 m N/S by 2.8 m E/W and ranging from 8 cm to 74 cm in height  |
| 10                  | Central Stone Concentration               | 3.6 m N/S by 4 m E/W and 23 cm in height   |
| 11                  | Pits/Depressions                          | Two pits, ranging in size from 120 cm N/S by 90 cm E/W and 45 cm deep to 2.2 m N/S by 3 m E/W and 80 cm deep   |
| 12                  | Large Basalt Boulders in Surrounding Area | Multiple Boulders ranging from 1.5 m N/S by 1.75 m E/W and 90 cm tall to 3.6 m N/S by 4 m E/W and 1.8 m in height  |

## FEATURE 1

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | Platform Terrace   |
| <b>FUNCTION</b>               | Ceremonial Activity Area   |
| <b>ORIENTATION</b>            | E/SE x W/NW  |
| <b>FEATURE DIMENSIONS</b>     | 40 m E/SE to W/NW by 25 m N/NE to S/SW, approximately 0.7 m to 2.6 m in height   |
| <b>SURFACE DIMENSION</b>      | 33 m E/SE to W/NW by approximately 15 m N/NE to S/SW   |
| <b>CONSTRUCTION TECHNIQUE</b> | Dry stacked basalt boulders and cobbles built five to six courses high, approximately 45 degree angle slope on east border. East surface is relatively level and paved with angular basalt cobbles, western surface is earthen. Large boulders are incorporated along the perimeter. Four flat upright stones line the southeast border (Fea. 1a), a large concave circular boulder filled with cobbles (Fea. 1b) along the east border, and a filled-in rock lined pit in the east paved surface (Fea. 1c). |
| <b>TIME PERIOD</b>            | Pre-contact; based on traditional Hawaiian function, design, charcoal analysis, and radiocarbon dates  |
| <b>TOPOGRAPHY</b>             | Built on a gently to moderately sloping hillside at 100 feet above sea level. The east face of the <i>heiau</i> follows the natural terrain contour. The hillside slopes from the south toward the north, west, and east.  |
| <b>VEGETATION</b>             | <i>Hau</i> , Christmas berry, octopus tree, strawberry guava, California grass, <i>luae'a</i> fern, Jamaican jurvine, autograph tree, <i>koa haole</i> , Spanish clover, <i>ti</i> , one <i>noni</i> tree, <i>ūlei</i>   |
| <b>CONDITION</b>              | Surface: Good, Perimeter: Good to Fair   |
| <b>DISTURBANCE</b>            | Perimeter has indications of natural rock fall as well as rock removal and modern disturbance caused by squatter use, construction of small buildings, and a fenceline running roughly N/S through center of Fea. 1.   |
| <b>ASSOCIATED ARTIFACTS</b>   | Modern debris including black plastic planting pots, aluminum window frames, concrete blocks, glass, and metal fragments were found on the northwest and west limits of the <i>heiau</i> . No traditional artifacts were collected on the surface of the <i>heiau</i> however a small adze was found on the trail leading to the <i>heiau</i> . Multiple stone tools and coral manuports were found during excavation.   |
| <b>INTERPRETATION</b>         | This feature defines the boundary of the <i>heiau</i> structure and represents the final expansion of the <i>heiau</i> before activity at the site was discontinued. Fea. 1a may indicate a focal point connected to procession towards the temple. Fea. 1b is possibly a <i>kīpapa</i> altar. Fea. 1c may have held a large wooden idol (Fea. 1c).  |





FIGURE 47. AERIAL PHOTO OF MAUNAWILA HEIAU SHOWING A COMMUNITY TOUR, VIEW TO WEST (PHOTO TAKEN MARCH 2014)





FIGURE 48. PHOTO SHOWING THE EAST WALL OF MAUNAWILA HEIAU (FEATURE 1), VIEW TO NORTH



FIGURE 49. PHOTO SHOWING THE EAST WALL OF MAUNAWILA HEIAU (FEATURE 1), VIEW TO THE SOUTHWEST





FIGURE 50. PHOTO SHOWING UPRIGHT BOULDERS ON THE SOUTHEAST END OF MAUNAWILA HEIAU (FEA. 1A), VIEW TO SOUTHWEST



FIGURE 51. PHOTO SHOWING A LARGE BOULDER WITH COBBLE FILL IN THE EAST WALL (FEA. 1B), VIEW TO NORTH (POSSIBLE KIPAPA)





FIGURE 52. PHOTO SHOWING THE EASTERN PAVED SURFACE OF MAUNAWILA HEIAU, VIEW TO SOUTHWEST



FIGURE 53. PHOTO SHOWING THE WESTERN EARTHEN SURFACE OF MAUNAWILA HEIAU, VIEW TO NORTH

## FEATURE 2

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | Platform Terrace, Potential Site of <i>Hale Mana</i>   |
| <b>FUNCTION</b>               | Ceremonial Activity Area   |
| <b>ORIENTATION</b>            | NE/SW  |
| <b>FEATURE DIMENSIONS</b>     | 14 m SE/NW by 6.5 m NE/SW, ranging from 28 cm to approximately 75 cm in height   |
| <b>SURFACE DIMENSION</b>      | 11.5 m SE/NW by 4 m NE/SW  |
| <b>CONSTRUCTION TECHNIQUE</b> | Basalt boulders and cobbles built two to four courses high creating well defined boundaries on the northeast, southeast, and northwest edges. Earthen surface. Coralline conglomerate slab (Fea. 2a) set into center of the northern surface. Short alignment of stones on southwest surface (Fea. 2b).  |
| <b>TIME PERIOD</b>            | Pre-contact; based on construction technique and association with the remainder of the <i>heiau</i>  |
| <b>TOPOGRAPHY</b>             | Built on relatively level land at base of moderate to steeply sloping hillside, southwest feature boundary grades into hillside, land slopes to northeast  |
| <b>VEGETATION</b>             | <i>Luae'a</i> fern, California grass, <i>hau</i> , Christmas berry, octopus tree, autograph trees  |
| <b>CONDITION</b>              | Fair   |
| <b>DISTURBANCE</b>            | Edges show indications of rock fall likely due to natural erosion and/or human and animal traffic.   |
| <b>ASSOCIATED ARTIFACTS</b>   | A large slab of coralline conglomerate (Fea. 2a) is built into the level surface of the feature. The slab contains an exposed corner which appears to be dressed and angled roughly 90°. Modern black roofing material left from a former squatter residence is embedded into the surface of the feature.  |
| <b>INTERPRETATION</b>         | The location and height of Fea. 2 being above the lower terrace (Fea. 1) likely reflects stratification and suggests the terrace was of high rank. It is possible a <i>hale mana</i> may have been built on top of Fea. 2 to hold temple items. Bennett (1930) states the <i>hale mana</i> was commonly built at the opposite end of the <i>heiau</i> from the oracle tower and <i>lele</i> altar. |





FIGURE 54. PHOTO SHOWING FEATURE 2 (PLATFORM TERRACE), VIEW TO WEST



FIGURE 55. PHOTO SHOWING FEATURE 2 (PLATFORM TERRACE), VIEW TO WEST





FIGURE 56. PHOTO SHOWING THE SURFACE OF FEATURE 2 (UPPER PLATFORM TERRACE), VIEW TO NORTHWEST



FIGURE 57. PHOTO OF FEATURE 2 (UPPER PLATFORM TERRACE) CORALLINE CONGLOMERATE SLAB (FEA. 2A) FOUND ON THE SURFACE, VIEW TO SOUTHWEST

## FEATURE 3

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | Low Platform   |
| <b>FUNCTION</b>               | Ceremonial Activity Area   |
| <b>ORIENTATION</b>            | NE/SW  |
| <b>FEATURE DIMENSIONS</b>     | 7 m NE/SW by 3.5 m NW/SE and ranging from approximately 20 cm to 35 cm in height   |
| <b>CONSTRUCTION TECHNIQUE</b> | Dry stacked basalt boulder and cobble elongated platform. Edges are lined with relatively flat sided boulders along northeast and southeast sides. A large, cut, and dressed coralline conglomerate slab (Fea. 3a) marks the northeast corner of the feature. The surface of Fea. 3 is paved and relatively level.   |
| <b>TIME PERIOD</b>            | Pre-contact; based on construction technique, association with the <i>heiau</i> , and excavation findings; dates to sometime after the late 16 <sup>th</sup> century AD  |
| <b>TOPOGRAPHY</b>             | The feature is built atop the relatively level Feature 1 (lower main terrace)  |
| <b>VEGETATION</b>             | <i>Hau</i> , California grass, <i>koa haole</i> , octopus trees, <i>luae'a</i> fern, Spanish clover  |
| <b>CONDITION</b>              | Good   |
| <b>DISTURBANCE</b>            | At one time the feature may have extended to the southwest and connected with Features 4 and 5 (low terraces) to create a long T-shaped low platform terrace. Currently between Feature 3 and Features 4 and 5 is a pile of basalt cobbles and boulders which have been previously disturbed. A modern fenceline was found running along the southwest side of the disturbed area. It appears the disturbed stones are a dismantled portion of Feature 3 that have been secondarily placed in a loose pile.      |
| <b>ASSOCIATED ARTIFACTS</b>   | A large slab of coralline conglomerate (Fea. 3a) is built into the northeast corner of the feature. The slab appears to be cut and dressed with corners at nearly a 90° angle. Stone tools and coral manuports were found during excavation of Test Units 2 and 3 adjacent to the northeast side of the feature. Excavation work suggests the coralline slab is original to the site.  |
| <b>INTERPRETATION</b>         | The feature creates a prominent space on the lower terrace of the <i>heiau</i> and was therefore a focal point of ritual activity. The distinct edges and raised construction indicate a defined space of high importance, separate from the paved portion of Feature 1 found on the east and north sides and the earthen surface of Feature 1 to the west. Feature 3 overlooks the northeast portion of the <i>heiau</i> and surrounding perimeter, which infers a possible public zone of ritualized activity. |





FIGURE 58. PHOTO OF FEATURE 3 (LOW PLATFORM), VIEW TO WEST



FIGURE 59. PHOTO OF FEATURE 3 (LOW PLATFORM), VIEW TO WEST (NOTICE FEA. 3A IN FOREGROUND AND FEATURE 2 IN BACKGROUND)

## FEATURE 4

|                               |   |
|-------------------------------|---|
| <b>FEATURE TYPE</b>           | Low Terrace, Potential Site of <i>Anu'u</i> or Oracle Tower   |
| <b>FUNCTION</b>               | Ceremonial Activity Area  |
| <b>ORIENTATION</b>            | NW/SE   |
| <b>FEATURE DIMENSIONS</b>     | 6.5 m NW/SE by 3.5 m SW/NE and ranging approximately 20 cm to 40 cm in height   |
| <b>CONSTRUCTION TECHNIQUE</b> | Feature consists of basalt cobble and pebble paving built approximately 20- 40 cm higher than the paved eastern portion of Feature 1. The northeast boundary is two to three courses high and slopes steeply towards the northeast. The southeast boundary is tightly paved with basalt pebbles to the precipice of the southeast corner of the <i>heiau</i> , overlooking Fea. 1a (flat upright boulders). The southern boundary of the feature borders the steeply sloping edge of the <i>heiau</i> . The western boundary contains an earthen surface that connects to Feature 5. The surface of Feature 4 contains five potential stone lined post holes which create small circular sunken depressions (Fea. 4a-4e). |
| <b>TIME PERIOD</b>            | Pre-contact; based on construction technique and association with other features  |
| <b>TOPOGRAPHY</b>             | Relatively level surface  |
| <b>VEGETATION</b>             | <i>Luae'a</i> fern, Christmas berry, California grass   |
| <b>CONDITION</b>              | Good  |
| <b>DISTURBANCE</b>            | None observed   |
| <b>ASSOCIATED ARTIFACTS</b>   | Small coral manuports are scattered on the surface. The remains of a sun bleached sub-adult pig are on the surface. The pig remains are in good condition and appear to be fairly recent in origin.   |
| <b>INTERPRETATION</b>         | This feature is built higher than the surface of the lower terrace (Feature 1) indicating a defined space of significance. The feature overlooks the southeast side of the <i>heiau</i> , just above four upright stones (Fea. 1a) built into the eastern edge of the lower terrace. It is possible the feature overlooks the path which visitors to the <i>heiau</i> would approach, as evidenced by the prominent east side of the <i>heiau</i> . The circular depressions in the surface of the feature suggest this was the location of a ritual tower, such as an oracle tower.  |





FIGURE 60. PHOTO OF FEATURE 4 (LOW TERRACE) FROM THE LOWER PLATFORM TERRACE (FEATURE 1), VIEW TO SOUTH



FIGURE 61. PHOTO SHOWING THE SURFACE OF FEATURE 4, VIEW TO SOUTHEAST





FIGURE 62. PHOTOS SHOWING CIRCULAR PITS LIKELY REPRESENTING POST HOLES (FROM TOP TO BOTTOM, FEA. 4A, 4B, 4C)

## FEATURE 5

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | Low Terrace  |
| <b>FUNCTION</b>               | Ceremonial Activity Area   |
| <b>ORIENTATION</b>            | Feature 5a: NW/SE, Feature 5b: NE/SW   |
| <b>FEATURE DIMENSIONS</b>     | 7 m NW/SE by 6 m NE/SW and ranging from 2 cm to 24 cm in height  |
| <b>CONSTRUCTION TECHNIQUE</b> | Basalt boulders and cobbles built one course high with relatively flat sides forming an alignment running northwest/southeast (Fea. 5a). The feature surface along the south side of the stone alignment is earthen and intersects with a possible earthen ramp (Fea. 5b) extending NE/SW towards Feature 2 (upper platform terrace). The potential earthen ramp is approximately two meters wide and is defined by edges which slope steeply to the southeast and northwest . |
| <b>TIME PERIOD</b>            | Pre-contact; based on construction technique and association with other features   |
| <b>TOPOGRAPHY</b>             | Fea. 5a: Relatively level surface, Fea. 5b: moderate slope to northeast  |
| <b>VEGETATION</b>             | <i>Hau</i> , Christmas berry, octopus tree, <i>luae'a</i> fern, California grass, <i>koa haole</i>   |
| <b>CONDITION</b>              | Good   |
| <b>DISTURBANCE</b>            | None   |
| <b>ASSOCIATED ARTIFACTS</b>   | Only modern trash observed, including black plastic planting pots and a decomposing blue tarp  |
| <b>INTERPRETATION</b>         | This feature is built slightly higher than the lower platform terrace (Feature 1), forming an elevated earthen pathway. The natural procession of the feature suggests it may be a pathway leading to the upper platform terrace (Feature 2).  |





FIGURE 63. PHOTO OF FEATURE 5A (LOW TERRACE), VIEW TO WEST (NOTICE FEATURE 2 IN THE BACK LEFT)



FIGURE 64. PHOTO SHOWING FEATURE 5A (FOREGROUND) AND POSSIBLE RAMP (FEATURE 5B, IN CENTER) WITH FEATURE 2 IN THE BACKGROUND, VIEW TO NORTHWEST

## FEATURE 6

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | Terrace with Altar Stone   |
| <b>FUNCTION</b>               | Possible Entrance Area and Ceremonial Rites  |
| <b>FEATURE DIMENSIONS</b>     | 2.5 m N/S by 1.4 m E/W and ranging from 57 cm to 62 cm in height   |
| <b>CONSTRUCTION TECHNIQUE</b> | Feature 6a: basalt cobbles in an alignment, loosely stacked one to three sloping courses; Feature 6b: large basalt boulder with several circular depressions indicative of grinding, smooth wavy contour running from NW to SE   |
| <b>TIME PERIOD</b>            | Pre-contact; based on association with other <i>heiau</i> features   |
| <b>TOPOGRAPHY</b>             | Gentle slope near Feature 6b to steep slope near Feature 6a, land slopes to east   |
| <b>VEGETATION</b>             | Strawberry guava, <i>luae'a</i> fern, <i>'ūlei</i> , California grass  |
| <b>CONDITION</b>              | Good   |
| <b>DISTURBANCE</b>            | None   |
| <b>ASSOCIATED ARTIFACTS</b>   | No artifacts were observed in the near vicinity  |
| <b>INTERPRETATION</b>         | Due to the ease in accessing the <i>heiau</i> from this location and proximity to the upright stones of Feature 1 (Fea. 1a), it is thought Feature 6 represents an entrance area. This is the entrance currently used as the main access onto the <i>heiau</i> . Feature 6b (large boulder) is interpreted as being utilized in the production of medicines or for <i>kava</i> also called <i>'awa</i> ( <i>Piper methysticum</i> ). Feature 6b contains smooth grooves which extend from the highest elevation on the north side of the stone to the lowest point on the south side which makes a sort of shelf where a container could easily set underneath to collect fluid. Circular depressions on the east surface of the stone suggest intentional grinding activity. The interpreted function of this stone as an altar stone is due to it's placement near the entrance of the <i>heiau</i> , prominent shape, and interpretation by cultural practitioners and community members. |





FIGURE 65. PHOTO OF FEATURE 6A (ENTRANCE AREA), VIEW TO NORTHEAST



FIGURE 66. PHOTO OF FEATURE 6 (ALTAR STONE), VIEW TO NORTHEAST

## FEATURE 7

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | L-shape Alignment  |
| <b>FUNCTION</b>               | Ceremonial Activity Area   |
| <b>FEATURE DIMENSIONS</b>     | 8 m NW/SE by 5 m NE/SW and ranging from 13 cm to 26 cm in height   |
| <b>CONSTRUCTION TECHNIQUE</b> | Built of roughly stacked basalt boulders and cobbles of one to two courses in height with a distinct corner on the southeast. A low alignment of basalt boulders are inset into the surface of <i>heiau</i> extending from the southeast corner to the northwest. This alignment then turns sharply to the northeast, connecting to Feature 8. |
| <b>TIME PERIOD</b>            | Pre-contact; based on early documentation of the feature by McAllister (1933) and the stones are inset into the surface of the <i>heiau</i> indicating some antiquity.   |
| <b>TOPOGRAPHY</b>             | Built on the relatively level surface of Feature 1 (lower main terrace), there is a slight depression in southeast interior corner of the feature.   |
| <b>VEGETATION</b>             | Hau, <i>laua'e</i> fern, California grass, Christmas berry, Spanish clover   |
| <b>CONDITION</b>              | Poor   |
| <b>DISTURBANCE</b>            | Edges show indications of rock fall likely due to natural erosion and/or human and animal traffic, with a possibility of rock removal  |
| <b>ASSOCIATED ARTIFACTS</b>   | Black plastic planting pots observed   |
| <b>INTERPRETATION</b>         | The feature is built between the upper and lower platform terraces (Features 1 and 2) and is delineated by a defined L-shape alignment of stones indicating a separated space. The L-shape may have been a low wall at one time, creating a sort of enclosure. The function of the feature is unknown.   |





FIGURE 67. PHOTO SHOWING FEATURE 7 (L-SHAPED ALIGNMENT, IN FOREGROUND) AND FEATURE 3 (UPPER TERRACE, IN BACKGROUND), VIEW TO WEST



FIGURE 68. PHOTO SHOWING FEATURE 7 (L-SHAPE ALIGNMENT) EXTENDING WEST TOWARDS FEATURE 8 (MOUND), VIEW TO WEST

## FEATURE 8

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | Small Mound  |
| <b>FUNCTION</b>               | Possible Ahu   |
| <b>FEATURE DIMENSIONS</b>     | 1.3 m N/S by 1.5 m E/W by 43 cm in height  |
| <b>CONSTRUCTION TECHNIQUE</b> | Dry stacked basalt cobbles, relatively loosely stacked, built two to four courses high, no smaller cobble or pebble fill observed  |
| <b>TIME PERIOD</b>            | Pre-contact or Post-Contact; due to its placement on top of the surface of the <i>heiau</i> and construction technique   |
| <b>TOPOGRAPHY</b>             | Constructed on relatively level surface of Feature 1 (lower central terrace)   |
| <b>VEGETATION</b>             | <i>Hau</i> , octopus tree, California grass, <i>koa haole</i>  |
| <b>CONDITION</b>              | Good   |
| <b>DISTURBANCE</b>            | Stacking is somewhat loose and <i>'ili'ili</i> fill is not apparent which indicates a potential for historic modification or construction                                      |
| <b>ASSOCIATED ARTIFACTS</b>   | One coralline conglomerate cobble built into the base of the feature   |
| <b>INTERPRETATION</b>         | The shape of the feature suggests a potential <i>ahu</i> function. As Feature 7 and 8 are connected by an alignment of stone, the two features may have an associated purpose. |





FIGURE 69. PHOTO SHOWING FEATURE 8 (MOUND), VIEW TO SOUTHWEST (NOTICE AN ALIGNMENT OF STONES FROM FEATURE 7 CONNECTING TO FEATURE 8)



FIGURE 70. PHOTO OF FEATURE 8, VIEW TO NORTHWEST (NOTICE A CORAL COBBLE COVERED IN MOSS ON THE LOWER RIGHT)

## FEATURE 9

|                               |   |
|-------------------------------|---|
| <b>FEATURE TYPE</b>           | Circular Alignment  |
| <b>FUNCTION</b>               | Modern: Planting Area; Original: Ceremonial Activity Area   |
| <b>FEATURE DIMENSIONS</b>     | 2.3 m N/S by 2.8 m E/W and ranging from 8 cm to 74 cm in height   |
| <b>CONSTRUCTION TECHNIQUE</b> | Basalt boulders and cobbles stacked one to four courses high, placed in a circular alignment  |
| <b>TIME PERIOD</b>            | The surface configuration of stones is of modern construction. Excavation in this feature found that beneath the surface sediments was a loose paving over top of a pre-contact deposit dating from AD 1669-1780 (highest probability).   |
| <b>TOPOGRAPHY</b>             | Constructed on the western edge of the <i>heiau</i> , the southern extent of the feature is 50 cm higher than the central portion and 70 cm higher than the northern extent, therefore the land slopes steeply to the northeast.  |
| <b>CONDITION</b>              | Good  |
| <b>DISTURBANCE</b>            | Used in modern times, evidenced by presence of metal, glass, and plastic within upper layers of sediment, modern rubbish scattered in the near vicinity included black plastic planting pots suggesting use as a modern planting area   |
| <b>ASSOCIATED ARTIFACTS</b>   | Modern debris was observed in the vicinity, including black plastic planting pots, aluminum window frames, concrete blocks, glass, and metal fragments. During excavation of Test Unit 1 several stone artifacts and coral manuports were recovered.  |
| <b>INTERPRETATION</b>         | Evidence suggests this feature was originally a small shrine or place for offerings that was converted to a historic planting area. The current placement of stones in Feature 9 has been slightly modified from the original design for use as a modern planting area. Use of the feature for a modern planting area is supported by the eye witness account of Jan Becket stating that portions of the <i>heiau</i> were incorporated into landscaping associated with a squatters residence (Ishihara and Hammatt 2011:59). This is further supported by findings in Test Unit 1 which found several of the feature's stones on top of a layer of sediment containing modern rubbish. A long phallic-shaped stone (Fea. 9a), referred to as a <i>kū</i> stone or <i>pōhaku o Kāne</i> , is currently lying on its side along the south edge of the feature. It is likely that the stone was originally upright, suggesting the feature was a shrine or former place of offering. Additionally, a coral concentration (likely offering) was found during excavation of the feature. |





FIGURE 71. PHOTO OF FEATURE 9 (CIRCULAR ALIGNMENT), VIEW TO EAST



FIGURE 72. PHOTO OF FEATURE 9 (CIRCULAR ALIGNMENT) SHOWING THE KŪ STONE (FEA. 9A) ALONG THE SOUTH INTERIOR EDGE, VIEW TO SOUTHEAST

## FEATURE 10

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | Central Rock Concentration, Potential Site of <i>Hale Waiea</i>  |
| <b>FUNCTION</b>               | Ceremonial Activity Area   |
| <b>FEATURE DIMENSIONS</b>     | 3.6 m N/S by 4 m E/W and 23 cm in height   |
| <b>CONSTRUCTION TECHNIQUE</b> | One large smooth boulder surrounded by a circular scattering of basalt cobbles   |
| <b>TIME PERIOD</b>            | Pre-contact, due to construction technique and inset position within the <i>heiau</i>  |
| <b>TOPOGRAPHY</b>             | Built into the relatively level surface of Feature 1 (lower platform terrace), gentle slope to east  |
| <b>TIME PERIOD</b>            | Pre-contact; based on construction technique and association with the remainder of the <i>heiau</i>  |
| <b>VEGETATION</b>             | California grass, Christmas berry, <i>hau</i>  |
| <b>CONDITION</b>              | Good   |
| <b>DISTURBANCE</b>            | None observed, a large pile of wood was covering the top of the feature, after removal of brush and the wood pile the feature was exposed  |
| <b>ASSOCIATED ARTIFACTS</b>   | No artifacts were found on or in the near vicinity of the feature  |
| <b>INTERPRETATION</b>         | <p>The feature appears quite unique in form. The focal point of the feature is the large rounded boulder set in the center with only a portion of the boulder protruding from the surface of the lower platform terrace (Fea. 1). The basalt cobbles surrounding the boulder delineate a distinct feature surrounding this stone. The central boulder is located in the center of the <i>heiau</i>, potentially representing the <i>piko</i> of the <i>heiau</i>. The <i>piko</i> is translated as the navel or the connecting line such as an umbilical cord or the node connecting a leaf to a stem (Ulukau 2003). Therefore, this feature likely shares a connection between the land and the gods. It is suggested that the feature may be associated with a <i>hale waiea</i>, which held the <i>'aha</i> cord. <i>'Aha</i> is translated as a gathering as well as a cord for measuring equal distances (Ulukau 2004). Since the feature is in the center of the <i>heiau</i>, the meaning is quite fitting.</p> |





FIGURE 73. PHOTO SHOWING FEATURE 10 (CENTRAL BOULDER CONCENTRATION), VIEW TO NORTHEAST



FIGURE 74. PHOTO SHOWING FEATURE 10 (CENTRAL BOULDER CONCENTRATION), VIEW TO NORTH

## FEATURE 11

|                               |  |
|-------------------------------|--|
| <b>FEATURE TYPE</b>           | Pits/ Depressions  |
| <b>FUNCTION</b>               | Ceremonial Activity  |
| <b>FEATURE DIMENSIONS</b>     | Two pits, Fea. 11a: 2.2 m N/S by 3 m E/W and 80 cm deep; Fea. 11b: 50 cm N/S by 43 cm E/W and 30 cm deep   |
| <b>CONSTRUCTION TECHNIQUE</b> | Excavated pits with steep earthen sides  |
| <b>TIME PERIOD</b>            | Pre-contact, based on construction technique and common function associated with <i>heiau</i>  |
| <b>TOPOGRAPHY</b>             | relatively level areas   |
| <b>VEGETATION</b>             | <i>Ti</i> , Christmas berry, <i>hau</i> , octopus tree, <i>haole koa</i> , Spanish clover  |
| <b>CONDITION</b>              | Good   |
| <b>DISTURBANCE</b>            | None observed  |
| <b>ASSOCIATED ARTIFACTS</b>   | None observed  |
| <b>INTERPRETATION</b>         | Pits are common features at <i>heiau</i> sites. They typically function as waste disposal for wicker work, wooden idols or <i>ki'i</i> , and other organic materials utilized during religious ceremony and ritually disposed. |





FIGURE 75. PHOTO SHOWING A LARGE PIT AT THE NORTHWEST CORNER OF MAUNAWILA HEIAU (FEATURE 11A), VIEW TO SOUTHWEST

## FEATURE 12

|                               |   |
|-------------------------------|---|
| <b>FEATURE TYPE</b>           | Large Basalt Boulders   |
| <b>FUNCTION</b>               | Association with Ceremonial Area  |
| <b>FEATURE DIMENSIONS</b>     | Multiple Boulders ranging from 1.5 m N/S by 1.75 m E/W and 90 cm tall to 3.6 m N/S by 4 m E/W and 1.8 m in height   |
| <b>CONSTRUCTION TECHNIQUE</b> | Naturally occurring large boulders in the vicinity of Maunawila Heiau   |
| <b>TIME PERIOD</b>            | Pre-contact significance  |
| <b>TOPOGRAPHY</b>             | Located on gentle to moderately sloped terrain  |
| <b>VEGETATION</b>             | <i>Ti, noni</i> , California grass, Christmas berry, octopus tree, <i>haole koa</i> , Spanish clover  |
| <b>CONDITION</b>              | Good  |
| <b>DISTURBANCE</b>            | None  |
| <b>ASSOCIATION ARTIFACTS</b>  | Bottle glass found on one boulder, boulders along the trail have <i>Conus</i> sp. marine shell eroding from surrounding soil and coral manuports  |
| <b>INTERPRETATION</b>         | <p>Many boulders are found nearby the <i>heiau</i>, situated within the <i>heiau</i>, and along the modern trail leading to the <i>heiau</i>. The boulders were possibly trail makers, <i>ahu</i>, and guardian stones. A large boulder with a smooth flat face (Fea. 12a) stands at the possible entrance to the <i>heiau</i>. A circular grouping of boulders is just southeast of the <i>heiau</i> (Fea. 12b). A boulder at the northeast corner of the <i>heiau</i> is shaped similarly to female genitalia (Fea. 12c), potentially representing goddess Hina. A large boulder on the south side of the <i>heiau</i> near Punaiki Stream has an anthropomorphic form in the shape of a large human head (Fea. 12d), the face of which contains a brow ridge, circular eye, prominent nose, lips and chin. Based on interpretations from cultural practitioners, this “face stone” is a guardian of the site. Other large boulders exist along the current trail leading to the <i>heiau</i>. This study concurs with McAllister (1933) which stated that the large stones in and around the <i>heiau</i> were potentially significant features of the site.</p> |





FIGURE 76. PHOTO SHOWING A LARGE BOULDER (FEA. 12A) AT THE SOUTHEAST CORNER OF MAUNAWILA HEIAU, NEAR THE POSSIBLE ENTRANCE (FEA. 6) , VIEW TO NORTH



FIGURE 77. PHOTO OF A GROUPING OF BOULDERS (FEA. 12B) JUST SOUTHEAST OF MAUNAWILA HEIAU (NEAR ENTRANCE), VIEW TO SOUTHEAST





FIGURE 78. PHOTO OF LARGE BOULDERS JUST NORTHEAST OF MAUNAWILA HEIAU (FEA. 12C), VIEW TO NORTH (NOTICE THE STONE IN THE FOREGROUND WITH FEMALE ATTRIBUTES)



FIGURE 79. PHOTO OF A LARGE ANTHROPOMORPHIC BOULDER (FACE ROCK) (FEA. 12D) SOUTHWEST OF MAUNAWILA HEIAU, VIEW TO WEST

## SUB-SURFACE TESTING

### RESEARCH GOALS

Research goals for the excavation component of this project (Phase II) was conducted in accordance with a “Research Goals and Sampling Strategy” letter report (Runyon and Tran 2012). The report was reviewed and approved by Dr. James Bayman, Cultural Surveys Hawai‘i supervisor David Shideler, M.A., and Dr. Pua Aiu with the State Historic Preservation Division (SHPD). The Research Goals and Sampling Strategy was presented at a Hau‘ula Community Association (HCA) meeting and was provided electronically to the McGregor ‘ohana (through Dr. Davianna McGregor and Lurline McGregor) and the HCA president (Dotty Kelly). With concurrence of the plan, the following research goals were targeted:

- 1.) Recover suitable materials (charcoal, organics, diagnostic historics, etc.) to provide chronological information for indicating when the structure was built and utilized.
- 2.) Recover artifactual materials to indicate the potential function of different activity areas.
- 3.) Examine the relationships between structural components in order to gain insight on building episodes and continued use, maintenance, and modification of the *heiau*.
- 4.) Catalogue, photograph, and properly curate recovered artifacts and cultural material.

The sampling strategy planned for the placement and excavation of six test units, with the possibility of up to 9 units. The sampling strategy proved to be more ambitious than the actual field time allowed. The location, size and rationale for each test unit was presented as follows:

Test Unit 1 (west limit of main structure, within a circular alignment of stones [Fea. 9]) (approx. 1 m x 1 m)  
Purpose: Looking for dateable materials, function/use, and evidence of early structural components and later historic modifications

Test Unit 2 (SE corner of the *heiau* [Fea. 1], adjacent to upright boulders [Fea. 1a]) (approx. 1 m x 1 m)  
Purpose: Looking for dateable materials associated with construction of the lower terrace

Test Unit 3 & 4 (low platform on the bottom terrace [Fea. 3], adjacent to a coral slab [Fea. 3a]) (1 m x 2 m)  
Purpose: Looking for dateable materials, function/use, and evidence of early structural components, later historic modifications, and correlations with the coral slab

Test Unit 5 & 6 (central portion of bottom terrace [Fea. 1]) (approx. 1 m x 2 m)  
Purpose: Looking for dateable materials, indications of use activities, and evidence of earlier structural components

Additional Test Unit Locations, Time Permitting:

Test Unit 7 & 8 (top of upper terrace platform [Fea. 2], adjacent to coral slab [Fea. 2a]) (approx. 1 m x 2 m)

Test Unit 9 (just southeast of main structure, within circular rock alignment [Fea. 12b]) (1 m x 1 m)

The location of Test Unit 1 was excavated in the location described for Test Unit 1 in the Research Goals and Sampling Strategy (Runyon and Tran 2012). Sufficient materials and data were collected to provide supporting evidence for answering research questions and to satisfy the purpose of the Test Unit 1 excavation. The location of Test Unit 2, as outlined in Runyon and Tran (2012), was abandoned due to the potential of creating an unstable condition to several large boulders which face the southeast side of the *heiau*. Therefore, it was decided to place the second test unit adjacent to the low platform (Fea. 3) containing a large coral slab (Feat. 3a), directly on top of the lower terrace (Feature 1). Two test units (Test Units 2 & 3) were placed within this location, corresponding to Test Units 3 & 4 in Runyon and Tran 2012. These two test units contained multiple layers of stone pavings and

proved to require much time and detail. Coupled with regular community events at the site, it was only possible to finish a total of three excavations within Maunawila Heiau.

## EXCAVATION RESULTS

Phase II and Phase III fieldwork included the excavation of three test units on Maunawila Heiau (Figure 80). All test units encountered structural components of the *heiau*. These structural components consisted of discrete layers of paving, or stone laid surfaces. A possible post mold feature was also documented. These sub-surface deposits were designated alphanumerically as sub-features of Maunawila Heiau. In general, excavations encountered historic and pre-contact artifacts and abundant charcoal. Obtained radiocarbon dates indicate the earliest possible time period (*terminus post quem*) for when excavated portions of the *heiau* were built.

TABLE 15. TABLE LISTING SUB-SURFACE FEATURES DOCUMENTED DURING EXCAVATION

| FEATURE          | TYPE/ FUNCTION                | TEST UNIT | PROVENIENCE AND MEASUREMENTS   |
|------------------|-------------------------------|-----------|--|
| <b>Feature 9</b> | <b>Circular Alignment</b>     | 1         |  |
| Sub-Feature A1   | Stone Paving                  | 1         | Stratum III, 55-85 cmbd; approximately 55 cm N/S x 1 m E/W                                 |
| Sub-Feature A2   | Possible Post Mold            | 1         | Stratum III, 89-99 cmbd; 31 cm E/W by 16 cm N/S  |
| <b>Feature 1</b> | <b>Lower Terrace Platform</b> | 2         |  |
| Sub-Feature B    | Stone Alignment               | 2         | Stratum III, 33-64 cmbd; 1.2 m NE/SW x 30 cm to 40 cm NW/SE, only exposed portion measured |
| Sub-Feature C    | Stone Pavings                 | 2         | Stratum III, 58-71 cmbd; 2 m NE/SW x 1 m NW/SE   |
| Sub-Feature D    | Stone Pavings                 | 2         | Stratum III, 71-78 cmbd; 2 m NE/SW x 1 m NW/SE   |
| Sub-Feature E    | Buried Heiau Structure        | 2         | Stratum V, 92-125 cmbd; 2 m NE/SW x 1 m NW/SE  |

## TEST UNIT 1

Test Unit 1 was placed within Feature 9 (circular alignment on west edge of Maunawila Heiau) to assess the function of the feature and its association with the lower platform terrace (Feature 1). This feature was targeted for excavation based on the research goal of collecting dateable samples (charcoal) in order to provide a chronology for the site and to assess modern and historic modifications. It was presumed that the feature was modified and used recently as a planting area. However, many large boulders creating the feature were well set and appeared to be previously undisturbed, suggested the feature may have originally had a similar design as the current circular alignment. The shape of the feature and location relative to prevailing winds coming from the northeast provided some rationale the feature could contain a fire pit.

Test Unit 1 was excavated during September 14 to September 29, 2012, requiring approximately 46.5 hours for two to three archaeologists to complete. The vicinity around Test Unit 1 was covered in *laua'e* fern and contained signs of modern activity, such as several black plastic flower pots, aluminum window frames and a concrete block.

Feature 9 was mapped in detail, vegetation was removed, a feature documentation form was completed, and photos were taken (Figure 84). A datum was established at the highest point of the feature. Due to the slope of the feature, the surface of the test unit within the center of Fea. 3 ranged from approximately 57 cm to 73 cm below the datum. Unfortunately two line levels utilized for measuring elevations proved to give inconsistent results and elevations were re-measured with a higher quality line level after the first two days of excavation. Subsequently,



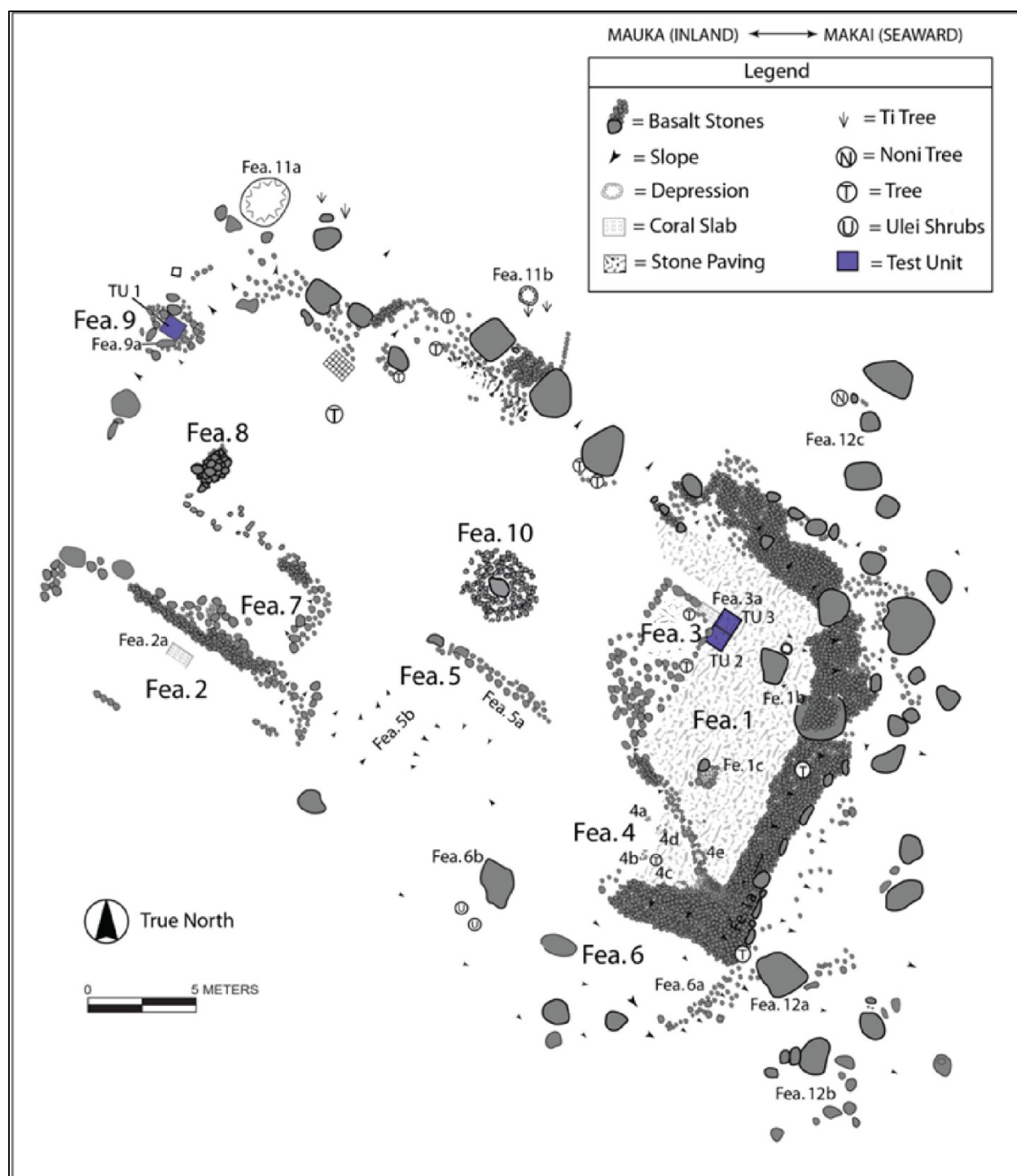


FIGURE 80. PLAN OF MAUNAWILA HEIAU SHOWING LOCATIONS OF EXCAVATED TEST UNITS

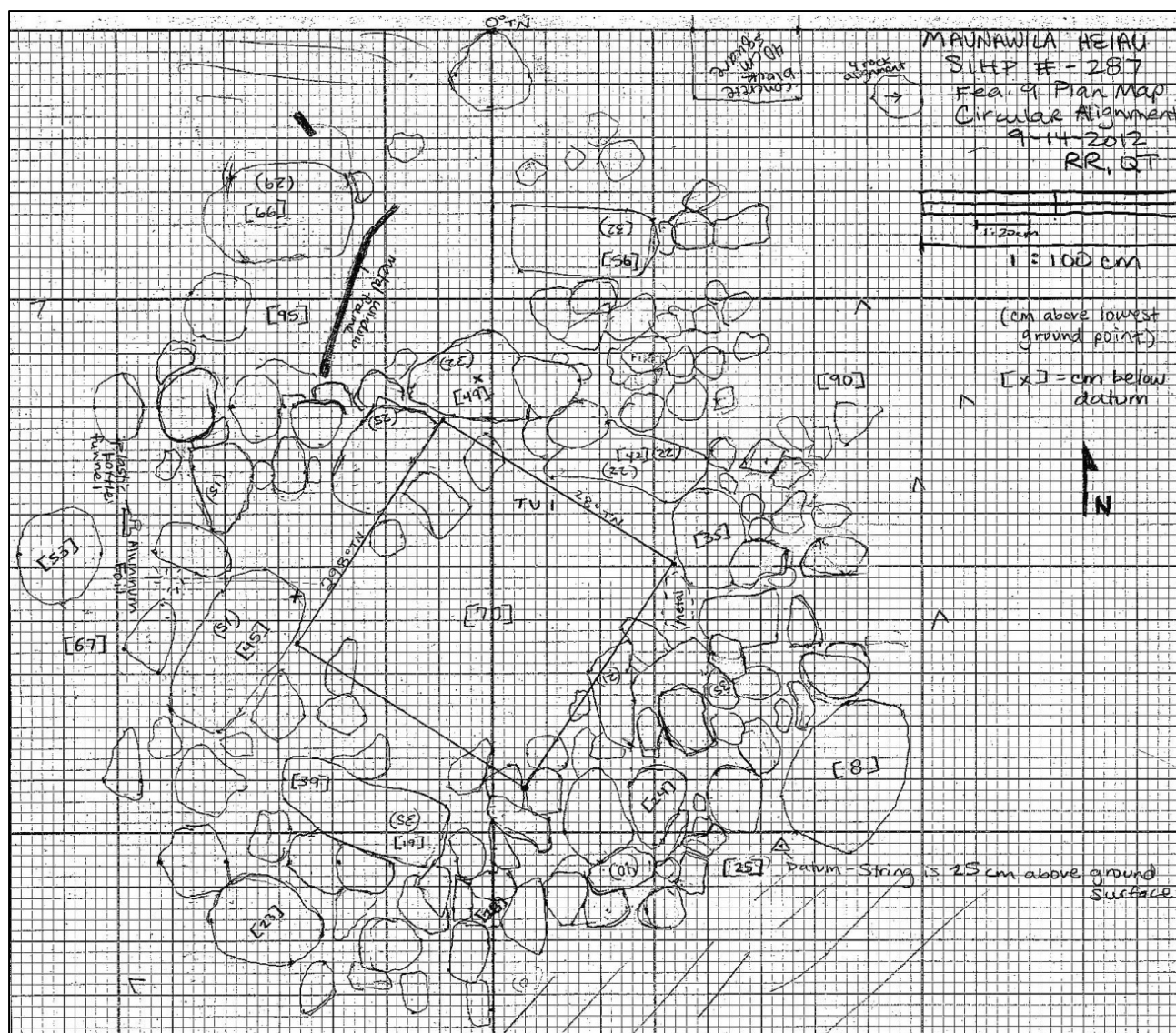


FIGURE 81. PLAN VIEW OF FEATURE 9 OF MAUNAWILA HEIAU (SIHP # -287) SHOWING THE PLACEMENT OF TEST UNIT 1

elevations of collected materials from the first two days (Stratum I and II) were re-labeled to incorporate a range in elevation, rather than a specific elevation.

The earthen surface of Test Unit 1 had a few scattered basalt cobbles with dense basalt cobbles and boulders around the periphery. A circular depression containing modern rubbish was documented in the southwest portion of the unit, approximately 35 cm in diameter and from two to five cm deeper than the surrounding surface of the test unit (Figure 82). The depression observed on the surface of Test Unit 1 extended into the upper limit of Stratum III and contained fragments of modern material (glass and plastic). The shallow depression was noted as a modern disturbance and was not designated as a significant feature.

Observed and documented stratigraphy of Test Unit 1 consisted of four discrete layers or strata (Stratum I through Stratum IV). Strata designations were identified by a change in soil texture, consistency, and coloration. Stratum I consisted of a thin layer of modern soil accumulation and *luae'a* fern roots, creating a dense root mat. Some areas contained moss covering and modern debris (a plastic bag, an aluminum soda can, white plastic dental floss container fragments, metal fragments, and glass shards) (Figure 83 and Figure 83). Stratum II consisted of silty clay sediment containing sparse charcoal, natural landsnails, modern materials (plastic utensil handle, metal fragments, flathead nails, glass shards, and faunal animal bone), and traditional artifacts including coral pieces and basalt debitage (Figure 84). Stratum III consisted of silty clay sediment containing a sparse amount of modern materials in the upper boundary, a basalt paving (Feature A1), coral (including a coral concentration), and frequent charcoal. Stratum IV consisted of sterile clay sediment.

Natural sterile sediment (Stratum IV) was first observed within the southwest corner at approximately 80 cmbd. This is 10-25 cm higher in elevation than was observed in the other quadrants of the test unit, indicating the natural hillside sloped steeply towards the northeast. The base of Test Unit 1 was probed an additional 30 cm to verify only sterile soil lied directly underneath.

Two features were designated within Test Unit 1 (Features A1 and A2) (Figure 85 and Figure 86). A loosely spaced stone paving, Feature A1, separated Stratum II and Stratum III within Test Unit 1 and was found throughout the northern and eastern portions of the unit. Feature A1 was not found within the southwest portion of the unit where a shallow modern disturbance was documented, suggesting potential rock removal. The paving consisted of one to two courses of cobbles and small boulders ranging from 55-85 cm below datum (cmbd). Feature A1 is shown in Figure 85, the Test Unit 1 profile (Figure 87), and in photographs of test unit sidewalls (Figure 88 through Figure 91).

Feature A2 is a small pit feature, measuring approximately 31 cm E/W by 16 cm N/S. The pit feature was found under basalt cobbles of Feature A1 and likely represents the location of a former wooden post (post mold). Feature A2 extended from the base of Stratum III into sterile Stratum IV sediments, ranging from 89-99 cmbd. The feature contained abundant charcoal pieces. Three charcoal samples from Test Unit 1 were analyzed for plant taxa identification. Charcoal samples included carbonized material found: 1.) directly below a decomposing basalt cobble (of bright orange color) from Feature A1 (Sample A) (see Figure 85); 2.) in the northwest profile wall below Feature A1 (Sample B) (see Figure 87); and 3.) within the pit feature (Feature A2) at the base of Test Unit 1 (Sample C) (see Figure 86). The charcoalized specimens were identified as endemic, native, and Polynesian introduced shrubs and trees. Charcoal from Feature A2 was radiocarbon dated, indicating the west boundary of Maunawila Heiau was not constructed until after the latter part of the seventeenth century AD.





FIGURE 82. OVERVIEW PHOTOS OF TEST UNIT 1 PRIOR TO EXCAVATION SHOWING THE SURFACE LEVEL, VIEW TO SOUTHWEST

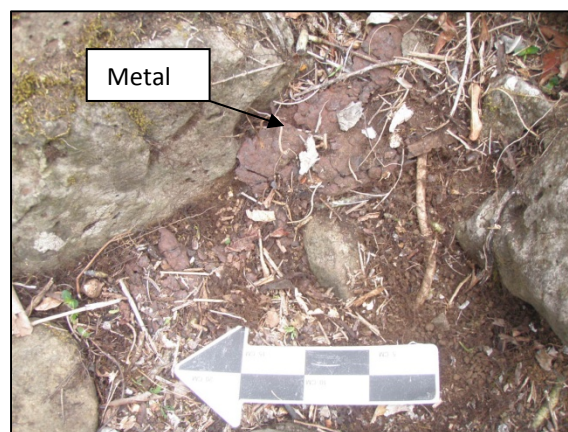
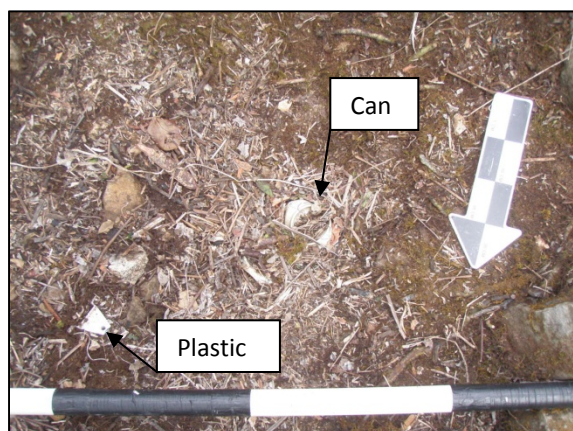


FIGURE 83. PHOTOS SHOWING MODERN RUBBISH ON THE SURFACE OF TEST UNIT 1 (STRATUM I), ARROW POINTS TO NORTH

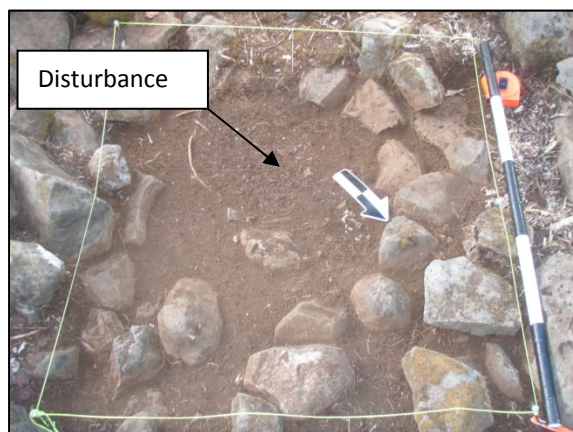


FIGURE 84. PHOTOS SHOWING TEST UNIT 1 IN MID-EXCAVATION, THE LEFT PHOTO SHOWS A MODERN DISTURBANCE (STRATUM II, 74 CMBD) AND THE RIGHT PHOTO SHOWS AN EXPOSED PORTION OF A CORAL CONCENTRATION (STRATUM II, 74 CMBD), ARROW POINTS TO NORTH





FIGURE 85. PHOTO OF TEST UNIT 1, FEATURE A1, PAVING (TOP OF STRATUM III, 79 CMBD), VIEW TO NORTHEAST (NOTICE THE ORANGE COBBLE IN THE LOWER LEFT)



FIGURE 86. PHOTO OF TEST UNIT 1 SHOWING FEATURE A2 (POSS. POST MOLD) POST-EXCAVATION JUST ABOVE A 20 CM LONG PHOTO SCALE, VIEW TO SOUTHEAST

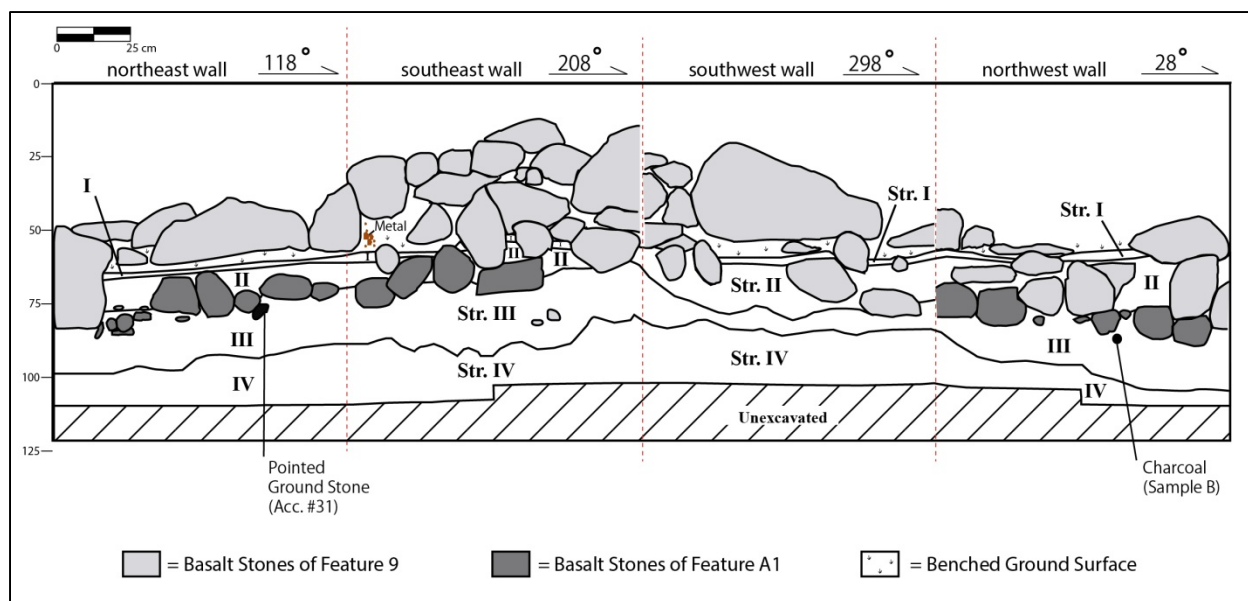


FIGURE 87. PROFILE OF TEST UNIT 1

TABLE 16. TABLE DESCRIBING STRATIGRAPHY OBSERVED WITHIN TEST UNIT 1

| Stratum   | Depth (cmbd) | Sediment Description   |
|---|--------------|--|
| Datum located at 25 cm above surface of lower terrace (Fea. 1)                  |              |  |
| Surface of Test Unit 1 ranged from approximately 57 cm to 73 cm below the datum |              |  |
| Stratum I   | 57-75        | Modern A Horizon, root mat with silt texture; 10 YR 3/2 (very dark grayish brown); moist, very friable consistency; non-plastic; terrigenous sediment; abrupt, smooth lower boundary; many very fine to medium roots and rootlets; contains aluminum, plastic, and metal fragments   |
| Stratum II  | 58-82        | Modern fill (likely containing disturbed on-site sediments), silty clay texture; 10 YR 3/3 (dark brown); strong, medium to coarse, crumb structure; moist, very friable consistency; non-plastic; terrigenous sediment; clear, smooth lower boundary; many fine to coarse roots and rootlets; contains glass, metal, plastic, nails, coral, basalt, and charcoal   |
| Stratum III   | 64-105       | Cultural Deposit, silty clay texture; 10 YR 4/3 (brown) grading to 7.5 YR 4/3 (brown); moderate, medium, crumb structure; moist, friable to firm consistency; slightly plastic; terrigenous sediment; clear to abrupt, wavy lower boundary; common medium to coarse roots; upper limit contains glass and plastic, stratum contains coral, water rounded and angular basalt cobbles, decomposing basalt, and charcoal pieces; grades to a higher clay content with an increase in natural decomposing basalt; capped by stone paving (Fea. A1) |
| Stratum IV  | 80-110       | Sterile natural hillside, clay texture; 7.5 YR 4/4 (brown) with frequent medium sized mottles of 10YR 6/6 (brownish yellow); weak, fine, blocky structure; moist, firm consistency; very plastic; terrigenous sediment; lower boundary was not observed; few, very fine to medium roots and rootlets; contained frequent, small to medium mottles of decomposing basalt, no cultural material within stratum; one pit feature (Fea. A2) extended into this stratum   |





FIGURE 88. PHOTO SHOWING THE NORTHEAST WALL OF TEST UNIT 1, VIEW TO NORTHEAST



FIGURE 89. PHOTO SHOWING THE SOUTHEAST WALL OF TEST UNIT 1, VIEW TO SOUTHEAST





FIGURE 90. PHOTO SHOWING THE NORTHWEST WALL OF TEST UNIT 1, VIEW TO NORTHWEST



FIGURE 91. PHOTO SHOWING THE SOUTHWEST WALL OF TEST UNIT 1, VIEW TO SOUTHWEST



## TEST UNIT 2

Test Unit 2 was placed within the lower terrace (Feature 1) of Maunawila Heiau. The test unit was located adjacent to a low platform terrace (Feature 3) and the southeast edge of a cut and dressed slab of coralline conglomerate (Feature 3a). This feature was targeted for excavation based on the research goals of collecting dateable samples (charcoal) in order to provide a chronology for the site, identifying additions and/or construction phases of the *heiau*, and attempting to indicate function and past activities.

Test Unit 2 was excavated between October 5 and December 22, 2012, requiring approximately 98.5 hours for two to three archaeologists to complete. The vicinity around Test Unit 1 was covered in *luae'a* fern, *koa haole*, Spanish clover, and California grass. Modern to historic disturbance in the form of rock displacement was noted just southwest of Test Unit 2 (separating Features 3, 4, and 5). However the portion of Feature 3 in which Test Unit 2 was positioned adjacent to was in good condition and did not show any signs of recent modification or use.

Prior to excavation vegetation was removed, Feature 3 was mapped, feature documentation forms were completed, and photos were taken (Figure 92). A datum was established at the highest point of Feature 3. The surface of the test unit ranged from approximately 41-57 cmbd, with a slight slope towards the east. The surface of Test Unit 2 included the eastern edge of Feature 3, which ranged from 8 to 19 cm higher in elevation than the rest of the unit surface. Observed and documented stratigraphy of Test Unit 2 consisted of five discrete layers or strata (Stratum I through Stratum V). Strata designations were identified by a change in soil texture, consistency, cultural content, and coloration.

Stratum I consisted of a thin layer of silt and detritus (bark, decomposing leaves, seeds, limbs, and root matter) with land snails and a scattering of basalt cobbles. Stratum II consisted of silty clay sediment containing infrequent coral pebbles and charcoal. Stratum III consisted of silty clay with basalt paving layers, coral pebbles, and infrequent charcoal. Stratum IV consisted of silty clay and contained coral pebbles, basalt artifacts, decomposing basalt, and abundant small to large pieces of charcoal. The loose consistency of Stratum IV indicated it was secondarily placed or previously disturbed sediment. The cultural content and sporadic stones found throughout Stratum IV suggested the sediment was taken from a cultural site and was re-deposited as fill material to construct the *heiau*. Stratum V is a cultural deposit or cultural layer found directly under a buried stone feature and consisting of silty clay with infrequent charcoal. Stratum VI consisted of sterile clay sediment. The base of Test Unit 2 was probed an additional 15 cm to verify only sterile soil was directly underneath.

Four distinct stone features were designated within Test Unit 2, Stratum III (Feature B through Feature E). Feature B was documented as an alignment of basalt boulders and cobbles. The feature was one course high and 30-40 cm wide, running roughly northeast/southwest through the center of Test Unit 2. Only the top of a few stones were observable from the ground surface. Elevations on the stones ranged from 33-64 cmbd. It is possible Feature B was a step created to access Feature 3 or could be a curb or perimeter boundary for the paved surface of Feature 1.

Feature C through E were sub-surface stone pavings. Each layer of paving was separated by at least one centimeter of soil. Feature C was a stone paving of *'ili'ili* (basalt pebbles) located directly underneath Feature B. Feature C was most densely found throughout the eastern half of the test unit and was located from approximately 58-65 cmbd. Feature C contained water rounded pebbles, coral pebbles, and charcoal. Approximately 1-2 cm below Feature C was a second layer of paving (Feature C-2). Feature C-2 contained water rounded and angular pebbles and cobbles, coral, and charcoal. Feature C-2 was found from 63-71 cmbd within the east portion of the test unit. Silty clay sediment collected and screened from below Feature C to the top of

Feature C-2 contained two pieces of volcanic glass and a .22 caliber bullet. The presence of a bullet suggests Feature C-2 was exposed during the post-contact time period. Further suggesting the most recent paving layer, Feature C, and the overlying stone alignment, Feature B, were added sometime within the post-contact period. Maintenance or re-paving of the *heiau* and additions would theoretically have been performed prior to the abolishment of the Hawaiian *kapu* system in 1819.

Feature D was a stone paving ranging from around 71-73 cmbd. Feature D contained water rounded pebbles and cobbles, coral pebbles, and charcoal. A second similar paving, Feature D-2, was found from 72-78 cmbd and consisted of two courses of water rounded pebbles and cobbles and coral pebbles and cobbles. Within these pavings were found volcanic glass, basalt debitage, a pig molar, and a basalt scraper tool. These paving layers were only separated by one to two centimeters of soil, suggesting the layers are either separate maintenance events or the construction technique used to pave the site involved the placement of stones followed by a thin layer of soil, and then another layer of stones.

Feature E was a compacted stone paving found just below Stratum IV. Feature E represents the surface or facing edge of a buried structure, interpreted as a buried *heiau*. Feature E was constructed of angular pebbles and cobbles. Feature E contained coral, basalt flakes, a basalt abrader, and charcoal. The buried *heiau* was found from approximately 92-108 cmbd in the west portion of the unit and from 102-125 in the east portion, indicating the feature sloped steeply downward towards the east. Stratigraphy indicated Feature E was erected along the face of the naturally sloped hillside.

Nine charcoal samples from Test Unit 2 were analyzed for plant taxa identification. Charcoal samples were collected from Features C, D, and E, as well as from specific strata. The charcoalized specimens were identified as endemic, native, and Polynesian introduced shrubs and trees. Two identified charcoal samples collected from the base of Feature E, a buried *heiau* structure, dated from AD 1421- 1601 (using highest probability date ranges).



FIGURE 92. PHOTOS SHOWING FEATURE 3 (LEFT) AND THE SURFACE OF TEST UNIT 2, VIEW TO WEST



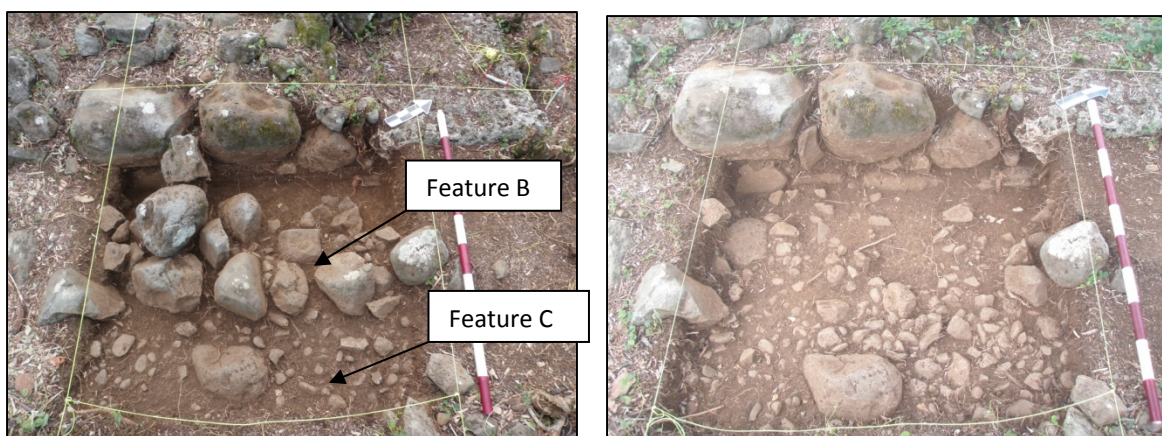


FIGURE 93. PHOTOS SHOWING FEATURES OF TEST UNIT 2, FEATURE B AND C (LEFT) AND FEATURE C (RIGHT), VIEW TO NORTHWEST



FIGURE 94. PHOTOS SHOWING AN OVERVIEW OF FEATURE C (LEFT) AND A PHOTO OF FEATURE D (RIGHT), ARROW POINTS TO NORTH



FIGURE 95. PHOTOS OF TEST UNIT 2 JUST UNDER FEATURE D (LEFT) AND PHOTO OF FEATURE E (RIGHT), VIEW TO SOUTHWEST

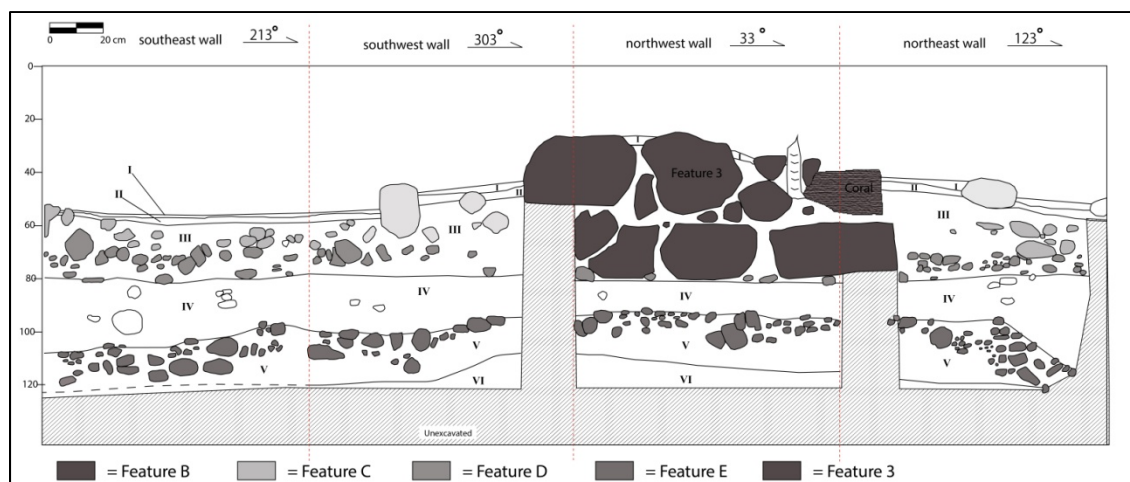


FIGURE 96. PROFILE OF TEST UNIT 2

TABLE 17. TABLE DESCRIBING STRATIGRAPHY OBSERVED WITHIN TEST UNIT 2

| Stratum   | Depth (cmbd) | Sediment Description   |
|---|--------------|--|
| Datum located at 22 cm above surface of low platform terrace (Fea. 3)                               |              |  |
| Surface of Test Unit 2 ranged from approximately 41 cm (coral slab) to 57 cm (soil) below the datum |              |  |
| Stratum I   | 41-57        | Modern A Horizon, silt and detritus (bark, decomposing leaves, seeds, limbs, root matter); 10 YR 3/2 (very dark grayish brown); moist, very friable consistency; non-plastic; terrigenous sediment; clear, smooth lower boundary; many very fine to medium roots and rootlets; contains landsnails and scattered basalt cobbles  |
| Stratum II  | 42-60        | Fill (likely containing disturbed on-site sediments), silty clay texture; 10 YR 3/3 (dark brown) with infrequent, small mottles of 5YR 5/8 (yellowish red); moderate, medium, crumb structure; moist, very friable to friable consistency; slightly plastic; terrigenous sediment; clear, smooth lower boundary; common fine to medium roots and rootlets; contains coral pebbles and charcoal   |
| Stratum III   | 46-80        | Fill (likely containing disturbed on-site sediments), silty clay texture; 7.5 YR 3/2 (dark brown) with few, small mottles of 7.5 YR 7/8 (reddish yellow); moderate, medium, crumb structure; moist, friable consistency; slightly plastic; terrigenous sediment; clear to abrupt, smooth lower boundary; few fine to medium roots and rootlets; contains basalt paving layers (Features C, C-2, D, D-2), coral, volcanic glass, and basalt artifacts; contemporary with <i>heiau</i> maintenance/utilization |
| Stratum IV  | 76-102       | Fill (likely containing disturbed on-site sediments), silty clay texture; 7.5 YR 3/2 (dark brown) with few, small mottles of 7.5 YR 7/8 (reddish yellow); strong, medium to coarse, crumb structure; moist, very friable consistency; plastic; terrigenous sediment; very abrupt, smooth lower boundary; few medium roots; contains very frequent charcoal, coral pebbles, and basalt artifacts; soil from previously utilized site  |
| Stratum V   | 98-125       | Cultural Deposit, silty clay texture; 7.5 YR 3/3 (dark brown); moderate, medium, crumb structure; moist, very friable consistency; plastic; terrigenous sediment; abrupt, wavy lower boundary; few, fine to medium roots and rootlets; capped by a structural paving (Feature E); contains charcoal, basalt artifacts, and infrequent coral  |
| Stratum VI  | 105-143      | Sterile natural hillside, clay texture; 5 YR 3/4 (dark reddish brown) with frequent, small to medium sized mottles of 10 YR 5/8 (yellowish brown); structureless, massive structure; moist, firm consistency; very plastic; terrigenous sediment; lower boundary was not observed; few, medium roots; contained frequent, small to medium mottles of decomposing basalt, no cultural material within stratum   |





FIGURE 97. PHOTO OF TEST UNIT 2 NORTHEAST PROFILE WALL (ADJACENT TU 3 HAS FEATURE C EXPOSED), VIEW TO NORTHEAST



FIGURE 98. PHOTO OF TEST UNIT 2 SOUTHEAST PROFILE WALL, VIEW TO SOUTHEAST



FIGURE 99. PHOTO OF TEST UNIT 2 SOUTHWEST PROFILE WALL, VIEW TO SOUTHWEST



FIGURE 100. PHOTO OF TEST UNIT 2 SOUTHWEST PROFILE WALL (ADJACENT TO FEATURE 3), VIEW TO SOUTHWEST



### TEST UNIT 3

Test Unit 3 was placed adjacent to the north side of Test Unit 2, within the lower terrace of Maunawila Heiau (Feature 1). The test unit was also adjacent to the low platform terrace (Feature 3) and a slab of coralline conglomerate (Feature 3a). This location was targeted for excavation based on the research goals of collecting dateable samples (charcoal) in order to provide a chronology for the site, identifying additions and/or construction phases of the *heiau*, and attempting to indicate function and past activities.

Test Unit 3 was excavated from December 12, 2012 to June 9, 2013, requiring approximately 80 hours for two to three archaeologists to complete. The datum established for Test Unit 2 was also used for Test Unit 3. Similar conditions and vegetation noted for Test Unit 2 also apply to Test Unit 3. No previous disturbance in the near vicinity was noted. The surface of the test unit ranged from approximately 48-61 cmbd, due to a slope towards the northeast (Figure 101). Observed and documented stratigraphy of Test Unit 2 consisted of six discrete layers or strata (Stratum I through Stratum VI) (Table 18). Strata designations were identified by a change in soil texture, consistency, cultural content, coloration, and known stratigraphy documented in the adjacent Test Unit 2.

Documented sediments were consistent with Test Unit 2. Stratum I consisted of a thin layer of silt and detritus (bark, decomposing leaves, seeds, limbs, and root matter) with land snails and a scattering of basalt cobbles. Stratum II consisted of silty clay sediment containing infrequent coral pebbles and charcoal. Stratum III consisted of silty clay with basalt paving layers, coral pebbles, and infrequent charcoal. Stratum IV consisted of silty clay and contained coral pebbles, basalt artifacts, decomposing basalt, and abundant small to large pieces of charcoal. Stratum V consisted of silty clay and contained infrequent charcoal. Stratum VI consisted of sterile clay sediment.

Four features were documented within Test Unit 3 (Features B-E), corresponding with features found in Test Unit 2. Only a few stones which could be attributed to the Feature B stone alignment were documented within Test Unit 3. The stones ranged in elevation from 48-59 cmbd. Feature C (paving) was mainly found within the north and east portions of Test Unit 3, ranging from 57-64 cmbd (Figure 102). Feature C was made of water rounded and angular cobbles and coral pebbles. Feature C-2 was documented as containing water rounded and angular pebbles and cobbles and coral pebbles ranging from 63-65 cmbd (see Figure 102). Feature C-2 contained more water rounded pebbles and cobbles than Feature C. Another layer of paving, designated Feature C-3, with similar characteristics as Feature C-2 was documented ranging from 64-70 cmbd (Figure 103). Feature C-3 contained more coral than Feature C or C-2.

Feature D was documented ranging from 70-73 cmbd. Feature D was constructed of water rounded and angular pebbles and cobbles found in the eastern half of the unit (Figure 104). Feature D-2 was found ranging from 70-73 and was made of water rounded and angular pebbles and cobbles and coral pebbles (Figure 104). Another layer of paving, Feature D-3, was found throughout the base of the unit from 71-77 cmbd (Figure 105). Feature D-3 was made mainly of water rounded pebbles and cobbles with few angular pebbles and cobbles. Feature D-3 gently sloped from west to east. Basalt flakes and volcanic glass were found within Feature D-3. Another layer of paving, Feature D-4, was also documented (Figure 106). Feature D-4 was made of water rounded and angular pebbles and cobbles ranging from 72-77 cmbd.

Feature E was constructed of angular cobbles and pebbles with a few water rounded cobbles (Figure 107 to Figure 109). Feature E contained two to five courses of stone, with two courses in the southwest portion, three courses in the northwest corner, and five courses in the southeast wall. The elevations of Feature E, documented



FIGURE 101. PHOTOS SHOWING THE LOCATION OF TEST UNIT 3, OVERVIEW (ON LEFT, VIEW SOUTH) AND SURFACE (ON RIGHT, VIEW WEST)



FIGURE 102. PHOTOS OF TEST UNITS 2 AND 3 SHOWING FEATURE C (LEFT) AND FEATURE C2 (RIGHT), ARROW POINTS TO NORTH



FIGURE 103. PHOTOS SHOWING THE TEST UNIT 3 SIDWALL WITH FEATURE C-3 ON SURFACE (RIGHT) AND A CLOSE-UP OF FEATURE C-3 (LEFT, NOTICE CORAL MANUPOINTS IN THE PAVING STONES)





FIGURE 104. PHOTOS SHOWING FEATURE D (LEFT) AND FEATURE D-2 IN TEST UNIT 3, ARROW POINTS TO NORTH



FIGURE 105. PHOTOS SHOWING TEST UNIT SIDEWALL WITH FEATURE D-3 ON THE SURFACE (LEFT) AND FEATURE D-3 (RIGHT)



FIGURE 106. PHOTO SHOWING TEST UNITS 2 AND 3 WITH FEATURE D-4 ON THE SURFACE OF TEST UNIT 3 (LEFT) AND A CLOSE-UP OF FEATURE D-4 (RIGHT), ARROW POINTS TO NORTH





FIGURE 107. PHOTO SHOWING TEST UNITS 2 AND 3 WITH FEATURE E ON THE SURFACE OF TEST UNIT 3 (LEFT) AND FEATURE E (RIGHT)



FIGURE 108. PHOTOS SHOWING THE PROFILE WALL WITH FEATURE E ON THE SURFACE (LEFT) AND MID-EXCAVATION OF FEATURE E (RIGHT)



FIGURE 109. PHOTOS SHOWING TEST UNITS 2 AND 3 IN MID-EXCAVATION OF FEATURE E (LEFT, VIEW SOUTHEAST) AND TEST UNITS 2 AND 3 POST-EXCAVATION OF FEATURE E (RIGHT, VIEW SOUTHWEST)



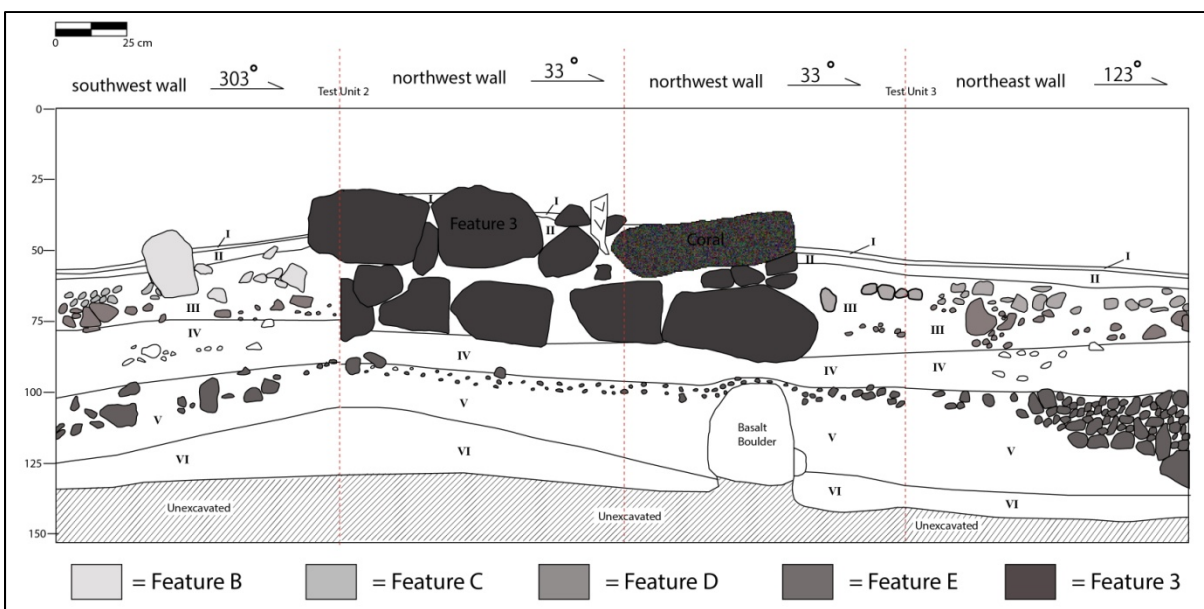


FIGURE 110. PROFILE OF TEST UNIT 2 AND 3, SHOWING THE NORTHWEST, SOUTHWEST, AND NORTHEAST PROFILE WALLS

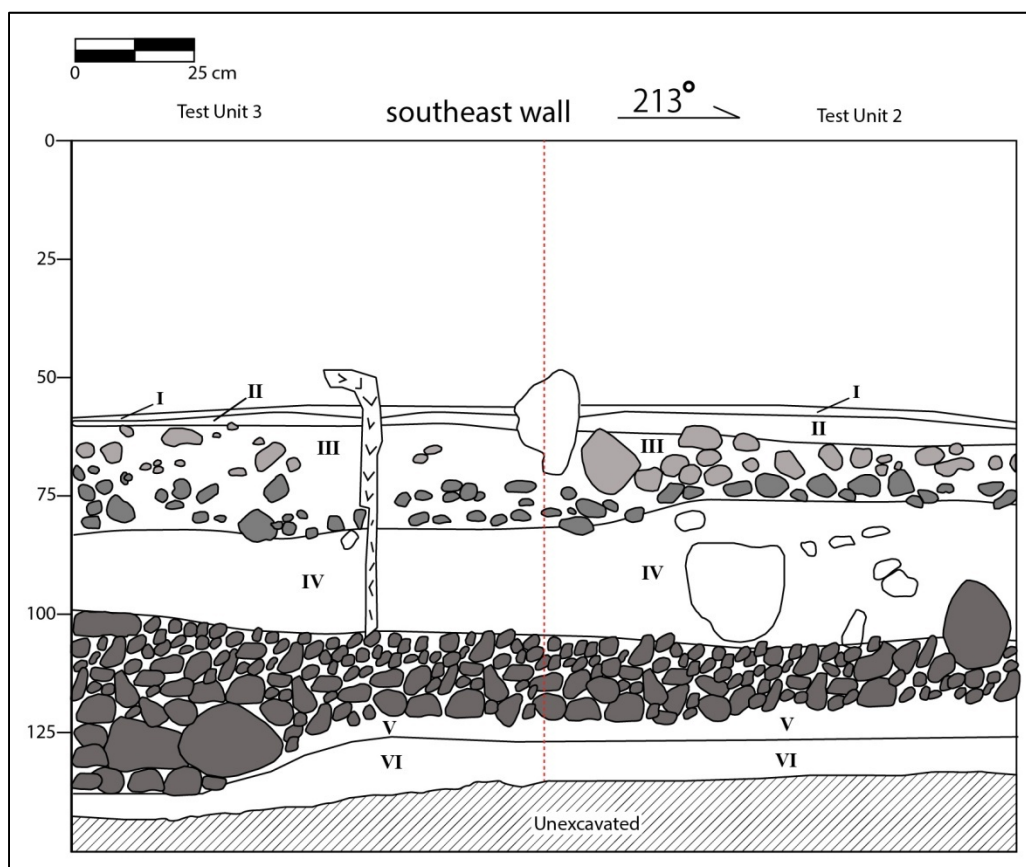


FIGURE 111. PROFILE OF TEST UNIT 2 AND 3, SHOWING THE SOUTHEAST PROFILE WALL

TABLE 18. TABLE DESCRIBING SEDIMENTS WITHIN TEST UNIT 3

| Stratum  | Depth (cmbd) | Sediment Description   |
|--|--------------|--|
| Datum located at 22 cm above surface of low platform terrace (Fea. 3)                                      |              |  |
| Surface of Test Unit 3 ranged from approximately 41 cm (top of coral slab) to 61 cm below the datum (soil) |              |  |
| Stratum I  | 48-61        | Modern A Horizon, silt and detritus (bark, decomposing leaves, seeds, limbs, root matter); 10 YR 3/2 (very dark grayish brown); moist, very friable consistency; non-plastic; terrigenous sediment; clear, smooth lower boundary; many very fine to medium roots and rootlets; contains landsnails and scattered basalt cobbles  |
| Stratum II   | 48-63        | Fill (likely containing disturbed on-site sediments), silty clay texture; 10 YR 3/3 (dark brown) with infrequent, small mottles of 5YR 5/8 (yellowish red); moderate, medium, crumb structure; moist, very friable to friable consistency; slightly plastic; terrigenous sediment; clear, smooth lower boundary; common fine to medium roots and rootlets; contains coral pebbles and charcoal   |
| Stratum III  | 56-82        | Fill (likely containing disturbed on-site sediments), silty clay texture; 7.5 YR 3/2 (dark brown) with few, small mottles of 7.5 YR 7/8 (reddish yellow); moderate, medium, crumb structure; moist, friable consistency; slightly plastic; terrigenous sediment; clear to abrupt, smooth lower boundary; few fine to medium roots and rootlets; contains basalt paving layers (Features C, C-2, D, D-2), coral, volcanic glass, and basalt artifacts; contemporary with <i>heiau</i> maintenance/utilization |
| Stratum IV   | 76-101       | Fill (likely containing disturbed on-site sediments), silty clay texture; 7.5 YR 3/2 (dark brown) with few, small mottles of 7.5 YR 7/8 (reddish yellow); strong, medium to coarse, crumb structure; moist, very friable consistency; plastic; terrigenous sediment; very abrupt, smooth lower boundary; few medium roots; contains very frequent charcoal, coral pebbles, and basalt artifacts; soil from previously utilized site  |
| Stratum V  | 93-132       | Cultural Deposit (likely containing disturbed on-site sediments), silty clay texture; 7.5 YR 3/3 (dark brown); moderate, medium, crumb structure; moist, very friable consistency; plastic; terrigenous sediment; abrupt, wavy lower boundary; few, fine to medium roots and rootlets; capped by a structural paving (Feature E); contains charcoal, basalt artifacts, and infrequent coral  |
| Stratum VI   | 105-135      | Sterile natural hillside, clay texture; 5 YR 3/4 (dark reddish brown) with frequent, small to medium sized mottles of 10 YR 5/8 (yellowish brown); structureless, massive structure; moist, firm consistency; very plastic; terrigenous sediment; lower boundary was not observed; few, medium roots; contained frequent, small to medium mottles of decomposing basalt, no cultural material within stratum   |

profiles, and stratigraphy indicates the portion of the feature exposed was built on top of a steep southwest to northeast tending slope. The stone stacking indicates Test Units 2 and 3 were situated on the top and edge of a buried *heiau* structure, containing the east/ northeast sloping corner.

One bulk charcoal sample from Test Unit 3 was analyzed for plant taxa identification. The sample was collected from Feature D. The sample contained endemic, native, and Polynesian introduced shrubs and trees. One identified species was radiocarbon dated to AD 1270-1316 (using the highest probability date range). Because this date is inverted, or much earlier than other dates obtained from deposits deeper in the structure, this date does not indicate when the temple paving was constructed. Rather, this date indicates that sediments from an earlier cultural site were used as fill to build the structure. Other items in the same fill sediment include coral, basalt debitage, and a stone scraper or chopping tool.





FIGURE 112. PHOTO OF THE WEST PROFILE WALL OF TEST UNITS 2 AND 3, VIEW TO NORTHWEST



FIGURE 113. PHOTO OF THE NORTH PROFILE WALL OF TEST UNITS 2 AND 3, VIEW TO NORTHEAST





FIGURE 114. PHOTO OF THE EAST PROFILE WALL OF TEST UNITS 2 AND 3, VIEW TO SOUTH



FIGURE 115. PHOTO OF THE SOUTH PROFILE WALL OF TEST UNITS 2 AND 3, VIEW TO SOUTHWEST

## ADDITIONAL FEATURES IN THE TMK PARCEL

### MAUKA ZONE

During Phase I survey of the parcel, modification of the upper slopes above Maunawila Heiau was noted (Figure 117). This Mauka Zone of the parcel includes a naturally terraced hillside which has evidence of human modification in some areas. Modifications include leveled surfaces of soil between basalt boulder alignments, potential cupboards, and a small patch of basalt cobble paving. This area was likely utilized for dryland agriculture. The Mauka Zone is currently covered in thick vegetation including strawberry guava and ironwood trees. The area was not cleared of vegetation, mapped, or documented in detail during this study.

Additionally, a potential fertility stone has been identified between the terraced hillside and Maunawila Heiau (Figure 116). The stone was pointed out by the neighbor, Ben Lasery. Ben recounts that a Kamehameha Schools representative showed him the stone and told him of its function. The stone is located within the ironwood forest and the site can be easily accessed from the existing trail. Additional features likely exist near the stone. The vicinity of the stone was not documented in detail during this study. Background research compiled thus far has not uncovered any mention of a fertility stone in the area.

### CENTRAL ZONE

During survey of the parcel, a low terrace was found alongside the main access trail in the Central Zone of the parcel. The context of the site has been compromised by modern disturbance. Large basalt boulders with bulldozer scaring have been secondarily placed on top of the terrace. This disturbance is likely associated with original construction of the access trail. The low terrace is relatively flat and lined with basalt cobbles along the north edge (Figure 118). The terrace site is unique and highly significant in that there are three coralline conglomerate slabs on the surface (Figure 119). Based on input from cultural practitioners, historic research, and descriptions of *heiau* design and supporting architecture, it is possible that this terrace feature could be the location of a *hale o Papa* (separate female *heiau*), priests house, or other structure. This terrace has not been cleared of vegetation or documented in detail.





FIGURE 116. PHOTO OF A FERTILITY STONE IN THE MAUKA ZONE, VIEW TO EAST



FIGURE 117. PHOTO OF HILLSIDE TERRACES IN THE MAUKA ZONE OF THE PARCEL, VIEW TO NORTHWEST





FIGURE 118. PHOTO SHOWING AN UNMAPPED TERRACE IN THE CENTRAL ZONE, VIEW TO WEST (ACCESS TRAIL IN BACKGROUND)



FIGURE 119. PHOTO SHOWING THREE SLABS OF CORALINE CONGLOMERATE ON THE UNMAPPED TERRACE IN CENTRAL ZONE, VIEW TO WEST

## LABORATORY RESULTS

### ARTIFACT ANALYSIS

Artifacts documented during this study include historic debris found within the Makai Zone and materials associated with Maunawila Heiau (SIHP # -287) found within the Central Zone of the parcel. Historic debris in the Makai Zone was documented to assess if it was associated with the McGregor Homestead. Materials documented from Maunawila Heiau were collected during survey and excavation.

### MAKAI ZONE

Abundant modern and historic debris was observed throughout the Makai Zone and along the adjacent Hau'ula Homestead Road. The materials consist of modern bottle fragments likely thrown into the ditch and historic materials which presumably eroded down slope from the previous homestead location. The majority of all historic materials include glass soda water and beer bottles with infrequent jars and medicine bottle fragments. Soda water bottles include 7UP and Coca-Cola varieties. A small amount of ceramics, including stoneware and whiteware fragments were also observed. Additional materials include glass marbles, portions of decorative picture frames, corroded metal can parts, melted glass, infrequent red brick fragments, and chunks of concrete. A sample of the observed historic materials was researched using identifiable manufacturer marks. The materials ranged in date from 1915 to 1992, with an overlapping common date range from the 1950s to 1960s (Figure 120). These dates indicate continuous trash disposal on the parcel from the time period associated with the McGregor Homestead (circa 1906-1920) until much later. The amount of beverage bottles suggests land use by squatters and for loitering. However, it is interesting that a portion of the observed and dated artifacts were of household function, even after use of the parcel by the McGregor family. This may indicate squatters were residing on the land, particularly during the 1950s through 1970s.



FIGURE 120. CHART PLOTTING THE DISTRIBUTION OF MANUFACTURE DATES FROM DIAGNOSTIC MATERIALS DOCUMENTED ALONG HAU'ULA HOMESTEAD ROAD

Materials which were successfully researched to provide chronological use of the land parcel also indicate what conveniences were purchased and consumed by the former residents. A bottle manufactured by the Obear-Nester Glass Company, based in East St. Louis, Illinois was found with a maker's mark dating between 1915 and 1978 (Toulouse 1971, Whitten 2013). The Obear-Nester Glass Company made similar bottle types for various chemicals, oils, medicines, food, beverages, and other household products (Whitten 2013). A bottle manufactured by the Alexander H. Kerr & Company, based in Los Angeles, California was found with a maker's mark dating between 1944 and 1992 (Toulouse 1971, Whitten 2013). This company began with manufacturing of fruit jars and by 1944 additional food packing jars were added to the line. A green 7UP bottle fragment with a partial applied color label (ACL) was observed. The label design indicates the bottle was manufactured between 1953 and 1969 (Lockhart 2010).

Three bottles, containing two different maker's marks, were made by the Owens Illinois Glass Company. The company used one mark from 1929 to around 1954 (a diamond superimposed over an "I" and an oval), and then simplified their company's mark (an "I" inside an oval) (Toulouse 1971, Lockhart 2004, Whitten 2013). The company used an informative dating code on the base of their bottles. Flanking the companies mark, a two digit number on the left represents which company made the bottle, a one to two digit number on the right represents the date in which the bottle was made, and a number below the maker's mark indicates the mold style (Toulouse 1971). One bottle contained the older maker's mark and indicates it was made in Oakland, California in 1952. This bottle also contains script reading "Duraglas" which was used on bottles in the 1940s and 1950s (Lindsey 2013). The script, amber color, and base stippling on the bottle indicates it is likely a beer bottle (Lockhart 2004). A food jar fragment contained the simplified maker's mark and had script indicating it was made in Oakland, California in 1954. A third glass bottle, representing either food or beverage, contained markings indicating it was made in Los Angeles, California in 1967. As these three bottles are associated with consumption, they were likely deposited shortly after they were utilized. Thus, these bottles were likely deposited throughout the mid- 1950s through the late 1970s.

While artifacts which were easily dated indicate a much later time period than could be associated with the McGregor Homestead, artifacts which were not as easily dated may still be associated with the historic site. For instance, on Feature G (potential house site) and in the vicinity of the feature, were shards of high quality cut glass and melted glass. Cut glass is expensive and indicates permanent residence. Melted glass can be assumed to correspond with the McGregor home which burned down. There is a high potential for finding more information on the Homestead through additional research on materials in the Makai Area.

TABLE 19. TABLE LISTING DIAGNOSTIC ARTIFACTS DOCUMENTED ADJACENT TO HAU'ULA HOMESTEAD ROAD

| Material        | Type        | Function                     | Manufacture Info/Decoration   | Company                                       | Date      | Reference                   |
|-----------------|-------------|------------------------------|---|---|-----------|-----------------------------|
| Amber glass     | Bottle base | Household Product            | base with no stippling, embossed "26 N (inside square)"   | Obear-Nester Glass Co., East St. Louis, IL    | 1915-1978 | Toulouse 1971, Whitten 2013 |
| Amber glass     | Beer bottle | Beverage consumption         | stippled base perimeter, embossed "20 I (in diamond and oval) 52, 4F, Duraglas, 1-Way, 2766-GB"           | Owens Illinois Glass Co., Oakland, California | 1952      | Toulouse 1971, Lindsey 2004 |
| Colorless glass | Jar         | Food consumption             | heel has a band of stippled diamonds, base embossed "20 I (in oval) 4"                                    | Owens Illinois Glass Co., Oakland, California | 1954      | Toulouse 1971, Lindsey 2004 |
| Colorless glass | Bottle base | Food or beverage consumption | dot stippling around perimeter, embossed "23 I (in oval) 67, 18365-6 28"                                  | Owens Illinois Glass Co., Toledo, Ohio        | 1967      | Toulouse 1971, Lindsey 2004 |
| Colorless glass | Bottle base | Food consumption             | stippled base perimeter, embossed "AHK, 13 73, 4000-12"   | Alexander H. Kerr & Co., Los Angeles, CA      | 1944-1992 | Toulouse 1971, Whitten 2013 |
| 7UP-green glass | Soda bottle | Beverage consumption         | Applied Color Label fragment reading "Like It", next to a black bar between two white bars, and "7" above | Owens-Illinois Glass Co.                      | 1953-1969 | Lockhart 2010               |





FIGURE 121. PHOTO SHOWING THE *MAUKA* SIDE OF HAULULA HOMESTEAD ROAD WHERE MODERN TRASH AND HISTORIC DEBRIS WAS OBSERVED, VIEW TO SOUTH



FIGURE 122. PHOTO SHOWING A SAMPLE OF ARTIFACTS FOUND IN THE MAKAI AREA (NOTICE MELTED AND CUT GLASS)

## CENTRAL ZONE, MAUNAWILA HEIAU (SIHP # -287)

## TEST UNIT 1, WITHIN FEATURE 9 OF MAUNAWILA HEIAU (SIHP # -287)

A total of 31 materials were tabulated and given accession numbers from Test Unit 1 (Acc. #'s 1-31). Additionally, seeds, *kukui* nut shell and abundant charcoal were collected. Of the accessioned materials, fifteen were modern, six were coral manuports, seven were basalt artifacts, and three were faunal. Collected modern materials include corroded metal fragments, a soda can, a plastic "Long's Drugs" dental floss container, glass fragments, black tar roofing material, plastic, and a stoneware fragment (Acc. #'s 1-13 and 23-24). Modern materials were found within Stratum I, Stratum II, and the upper portion of Stratum III. These materials correspond with known use of the area by squatters and indicate shallow disturbance into the west edge of Maunawila Heiau.

Traditional Hawaiian artifacts were found within Stratum II and Stratum III of Test Unit 1. Twenty-nine pieces of coral (Acc. #14) were collected from Stratum II, as well as a piece of basalt debitage (Acc. #18) indicative of traditional tool production. Stratum III contained basalt manuports for construction purposes (Acc. #'s 20, 30), coral manuports (Acc. #'s 21-22, 26-27, 29), and two stone hand tools (Acc. #'s 28 and 31). Eighty-three pieces of coral were collected from Stratum III, sixty-six (79.5%) of which were found in one concentration (Acc. #21) on the surface of a stone paving (Feature A1). This concentration likely represents an in situ religious offering.

Faunal materials collected from Test Unit 1 included landsnails and a chicken long bone fragment found in Stratum II. The landsnails (Acc. #15-16) are considered to be naturally occurring. The chicken bone (Acc. #17) is interpreted as modern food rubbish associated with squatters. No cut marks were observed on the chicken bone.

## TEST UNIT 2, WITHIN FEATURE 1 OF MAUNAWILA HEIAU (SIHP # -287)

A total of 52 materials were tabulated and given accession numbers from Test Unit 2 (Acc. #'s 32-83). Additionally, seeds, *kukui* nut shell, wood fragments, and charcoal were collected. Of the accessioned materials, one was historic, twenty-four were coral, seventeen were basalt, three were volcanic glass, and six were faunal. The historic artifact consisted of a .22 caliber bullet (Acc. #44) found between Feature C and C-2. The presence of the bullet indicates overlying Feature C and Feature B were constructed during the pos-contact time period.

Traditional Hawaiian artifacts were found within Strata II, III, and IV within Test Unit 2. Fifteen pieces of coral (Acc. #33) were collected from Stratum II. Stratum III contained coral (Acc. #'s 38-41, 43, 46-49, 51-52, 60-61, 70-74, 76, 80), a stone scraper or chopping tool (Acc. #56), basalt debitage (Acc. #'s 42, 50, 53, 75, 79), volcanic glass (Acc. #45, 54), and other transported materials such as a dikestone (Acc. #55) and water rounded stones (Acc. #36). Stratum IV contained coral (Acc. #'s 57, 64, 66), basalt flakes (Acc. #'s 63, 69), basalt debitage (Acc. #62, 68), volcanic glass (Acc. #59), and fine grained basalt (Acc. #81).

Faunal materials collected from Test Unit 2 included landsnails, marine shell, and animal bone. Landsnails were collected from Stratum I (Acc. #32), Stratum II (Acc. #34), and Stratum V (Acc. #83). Collected marine shell included one *Hipponix* sp. shell found in Stratum II (Acc. #35) and one *Hipponix* sp. shell found in Stratum IV (Acc. #67). A pig molar tooth fragment (Acc. #77) was found within Stratum III. No human modifications were observed on collected faunal materials.

### TEST UNIT 3, WITHIN FEATURE 1 OF MAUNAWILA HEIAU (SIHP # -287)

A total of 56 materials were tabulated and given accession numbers from Test Unit 3 (Acc. #'s 84-133 and 137-142). Additionally, seeds, charcoal, and wood fragments were also found. Of the accessioned materials twenty-nine were coral, twenty-two were basalt, one was volcanic glass, and four were faunal.

Traditional Hawaiian artifacts were found in Strata II, III, IV, and V within Test Unit 3. Stratum II contained coral manuports (Acc. #'s 85) and water rounded stones for paving construction (Acc. #84). Stratum III contained coral (Acc. #'s 87, 88, 91-104, 112, 114, 115, 119, 121), basalt flakes (Acc. #'s 90, 105, 106, 108, 110), basalt debitage (Acc. #'s 111, 117), volcanic glass (Acc. #89), a possible basalt core (Acc. #113), and water rounded stones for paving constructions (Acc. #107, 109, 116, 120). Stratum IV contained coral (Acc. #'s 122-124, 127, 128, 130), a coffee-bean net sinker (Acc. #125), basalt flakes (Acc. #129), a basalt abrader (Acc. #139), a basalt tool fragment (Acc. #140), and basalt debitage (Acc. #126). Stratum V contained coral (Acc. #132), basalt flakes (Acc. #131, 133, 142) and water rounded cobbles (Acc. #138).

Faunal materials collected from Test Unit 3 included landsnails, marine shell, and animal bone. Landsnails were collected from Stratum II (Acc. #86) and Stratum IV (Acc. #137, 141). A pig molar tooth fragment was found within Stratum III (Acc. #118).

## TRADITIONAL HAWAIIAN ARTIFACTS

Traditional Hawaiian artifacts collected during this study include coral manuports and lithic materials such as basalt hand tools, flakes and debitage, and volcanic glass.

### LITHIC ARTIFACTS

Collected lithics show evidence of multiple manufacturing techniques, including percussion flaking, abrasion, pecking, and grinding. Flaking is typically conducted using a nodule of fine-grained stone and a hammerstone for striking to produce cutting implements with sharp edges or points (Buck 1957:23, Kowta 1980:3). Direct percussion creates characteristic fracture patterns including evidence of a striking surface or platform, conchoidal fracture patterns including a bulb of percussion, and flake scarring. These characteristics were used to identify stone tools within the Maunawila Heiau artifact assemblage.

Several stone tools were found during excavations within Maunawila Heiau. The stone artifacts appear to be almost naturally weathered rather than intentionally modified. This is due to the manufacturing technique utilized. Many of the tools appear to have utilized pecking and grinding as the reduction technique. Stones used for abrasion, pecking, and grinding tend to be of larger-grained stone material (i.e. vesicular basalt) that is relatively soft and easier to shape, groove, and manipulate than fine-grained basalts (Buck 1957:343). Stones selected for this technique are typically either flaked to size or selected for their size and then are pecked to shape, grinded on an abrasive stone, and then polished to remove striations (Kowta 1980:10). Collected stone tools which were shaped using this technique include a pointed grinding stone, a scraping or chopping tool, a fishing weight, and a micro-adze. One stone with abrasion marks was also documented.

Two stone artifacts found very near to one another loosely infer a potential mortar and pestle function (Figure 123). A pointed grinding stone (Acc. #31) and an ovular water-rounded cobble with a small depression on one end (Acc. #28) were found within Feature A1 (stone paving) of Test Unit 1 (Figure 123). The cobble (Acc. #28) has a smooth top and base and fits snugly into the palm of the hand. The depression includes a trace of potential use wear, in the form of a concentric interior groove. The depression was not fully cleaned out for the potential reason of future residue analyses. Upon removing adhering sediments, the artifact can be further analyzed under a

microscope to more concretely determine whether it was used as a mortar stone. The combination of these artifacts, potentially indicate use for grinding organic materials, cracking nuts and seeds, crushing materials to make dye, or processing other organic materials. Krauss (1993) explains the use of specialized mortar and pestles, particularly for medicinal purposes. "Plant material was pounded in special stone mortars with stone pestals made for this purpose only" (101). Small mortar and pestles are made in various forms and have multiple uses. The "amount of shaping on the outside [of the mortar] is variable from none to extensive. Size is also variable- from small medicine or pigment mortars to large ones up to two feet in diameter" (Kowta 1980:20). Shorter pestles, easily held in the hand, were used as mullers to pulverize charcoal, ochres, berries, and stems for paints (Brigham 1974:30). Dyes prepared from bark were "probably pounded in a stone mortar with a stone pestle before water was added" (Buck 1957:187).

Buck (1957) documented an artifact very similar to Acc. #31 (smooth pointed stone) which was termed a "breadfruit splitter" (24) (Figure 124). However, he notes a lack of stone breadfruit splitters in Hawai'i and states that the "authenticity of their function requires further proof" (Buck 1957:24). Under a high powered magnifying glass the pointed stone (Acc. #31) is much smoother and has more wear on the body near the pointed tip. This further supports the assumption that it was used to grind materials within a small depression.

A stone scraper or chopping tool (Acc. #56) was found within Test Unit 2 (refer to Figure 125). The tool was possibly used for processing plants for cordage and weaving (plaiting) and light to medium force chopping. The thickness of the cutting edge indicates the tool would have been used for rough shaping rather than intricate craftwork or slicing. Plaiting of matting for clothing, flooring, and various uses was a common activity. Matting was made using strips of *lauhala*, sedge, or other plants which were passed over a smudge fire and then scraped smooth (Kāne 1997:56). *Kapa* cloth was made by repeated efforts at soaking strips of tree fibers, beating the material over a stone with wooden anvils, soaking, fermenting, working it into thin paper sheets, and drying it in the sun (Mitchell 1982:215, Kāne 1997:90). The tool could have been used for these and/or other activities.

A small basalt fishing weight (Acc. #125) was found within Test Unit 3, Stratum IV. Weights or sinkers are typically "pebbles that are minimally modified with pecked notches or grooves for tying on lines" (Kowta 1980:19). Stone weights were used with nets, fishing lures, and squid lures (Buck 1957:342). There are several common shapes of traditional Hawaiian weights, including breadloaf, plummet, and coffee-bean. Acc. #125 is in the form of a coffee-bean sinker. The shape, size, and longitudinal groove suggest it was crafted for use on a fishing line. Buck (1957) states that sinkers with a longitudinal groove were used for fishing lines, whereas sinkers with a transverse groove were used with nets. "Many of the longitudinally grooved sinkers are slightly wider and thicker at one end, which was probably the lower end in fishing line sinkers" (Buck 1957:342). This description corresponds very closely with Acc. # 125.

A small basalt adze (*ko'i*) was found on the surface of the modern trail used to access Maunawila Heiau (Figure 127). The adze is of small size for precision craftwork and woodworking, terming the artifact a micro-adze. Typically adze material is obtained from a quarry location and shaped into a rough form (blank) which could later be worked into a tool (Kikuchi 1964:2). A hammerstone was typically used to remove flakes from both sides or faces of the material. The adze was then grinded against a wet slab of fine-grained stone with abrasives to smooth the surfaces of the tool and was hafted or lashed to a wooden handle. Hawaiian adzes have a distinct tanged shoulder for ease in hafting. Acc. #134 is tanged and has a quadrangular cross-section, typical of the Hawaiian adze form (Emory 1961:60).





FIGURE 123. PHOTO SHOWING TWO STONES FOUND NEAR EACHOTHER IN TEST UNIT 1, POSSIBLE MORTAR AND PESTLE (LEFT TO RIGHT ACC. #'S 31 AND 28)



FIGURE 124. PHOTOS OF POINTED STONE ACC. #31 (TWO PHOTOS ON LEFT) AND A BREADFRUIT SPLITTER DESCRIBED BY BUCK (1964:24)



FIGURE 125. PHOTOS OF A SCRAPER OR CHOPPING TOOL (ACC. #56) (OVERHEAD, PROFILE, AND SIDE VIEWS)



FIGURE 126. PHOTO OF A COFFEE-BEAN SINKER (ACC. #125), STONE ABRAIDER (ACC. # 139), AND DIKESTONE (ACC # 55)



FIGURE 127. PHOTOS OF A MICRO-ADZE (ACC. # 134), TOP AND BOTTOM VIEWS

A basalt cobble with multiple scraping marks on one end (Acc. #139) was found in Test Unit 3, Stratum IV (Figure 126). The scraping marks are characteristic of sharpening another implement which was not as hard as the scraper itself. Abraders were typically used for sharpening shell, bone, or wood (Kowta 1980:21).

Some of the collected stone artifacts are not intentionally modified, rather they are transported stones called manuports. Manuports refer to objects which were obtained from a location different from where they were found. Water-rounded stones, which originated in nearby streams, were carried to the site to construct the *heiau*. The intentionality of procuring the stones from the stream for use in the *heiau* defines these stones as artifacts. Only a sample of water-rounded stones were collected and a few were analyzed using EDXRF in order for comparison with other stone artifacts found at the site.

Another collected manuport is a dikestone (Acc. #55) (see Figure 126). Dike stone is created within the cooled cracks or fissures in which lava traveled during an eruption (Lawrence 1961:41). Dikes appear as vertical lines of plate-like blueish-colored rock. The stone was found within Stratum III of Test Unit 2 and was used as fill material within the construction of the *heiau*.

#### VOLCANIC GLASS

Flakes made of volcanic glass were found within Test Units 2 and 3, Strata III and IV (Figure 128). Volcanic glass is a very fine-grained lithic material. The drop-shaped pellets of volcanic glass are referred to as Pele's tears (Mitchell 1982:22).

Fragments of molten rock falling from a lava fountain may congeal in the air, forming solid drops of volcanic glass, broad at one end and tapering at the other. Hawaiians call the beautiful black fragments waimaka-o-Pele, or Pele's tears (in reference to the volcano goddess). Fountaining may also produce glass filaments as long as three feet, gold in color and as fine as human hair, either spun out from the tear-shaped ends of these drops or forming on their own. The delicate strands [are referred to as] lauoho-o-Pele, or Pele's hair. (Gray 2013)

Volcanic glass also commonly forms on the edges of volcanic flows and dikes (Reith et al. 2013:120). The material is typically only found in small amounts, usually "much less than 1 cm (0.4 inches) thick" (Ziegler 2002:49). The volcanic glass flakes were used as cutting implements. When flaked, the glassy material creates very sharp edges.



FIGURE 128. PHOTO OF VOLCANIC GLASS FOUND DURING EXCAVATIONS (LEFT TO RIGHT ACC. #'S 45 (TWO PEICES), 54, 59, 89)

## EDXRF ANALYSIS

Samples of basalt and volcanic glass materials were sent to Dr. Peter Mills at the University of Hawai'i-Hilo for EDXRF analysis. EDXRF analysis is a non-destructive technique that measures elemental composition. The composition of a material can be compared to data collected from known quarry locations to provide potential source location of material procurement from Hawai'i as well as other areas of the Pacific. Results of the EDXRF analysis are presented below in Table 20 and Figure 129. The EDXRF graph plots the Strontium (Sr) and Zirconium (Zr) levels within each analyzed sample. The levels are then compared on the graph by proximity and whether a sample falls within the same range as other analyzed samples with known nearby source locations, including Wai'āhole Valley and Chinaman's Hat (Mokoli'i Island). Chinaman's Hat is a sea stack which eroded from the shore (Hazlett and Hyndman 1996:230-231). The island is connected to the shore by a submerged peninsula of basalt bedrock (Hazlett and Hyndman 1996: 232).

Results indicate that some of the Maunawila Heiau basalt is similar to Wai'āhole basalts and volcanic glass is similar to Chinaman's Hat (Mokoli'i Island). Other materials are dissimilar to known O'ahu quarry locations but still similar to the Ko'olau Range signature. This indicates multiple source locations were utilized for tool production, including local and non-local materials.

Only a few of the artifacts sent for EDXRF analysis were able to be sourced to a specific location or were found to be quite similar to a specific source location. One lithic artifact, a piece of basalt debitage (EDXRF\_6, Acc. #69), was found to have the same chemical signature as Wai'āhole quarry basalts. A dike stone (EDXRF\_7, Acc. #55), a basalt flake (EDXRF\_10a, Acc. #110), and an adze (EDXRF\_12, Acc. #134) share a relatively similar chemical signature with Wai'āhole Valley basalts. Additionally, a piece of volcanic glass (EDXRF\_3.2, Acc. #45) has a similar chemical signature to Chinaman's Hat volcanic glass.

Plotted EDXRF results show a distinct cluster of four artifacts that are dissimilar to Wai'āhole basalts. This grouping indicates a shared similarity in material type and may represent a previously undocumented source location. These four artifacts include a piece of volcanic glass (EDXRF\_3.1, Acc. #45), basalt flakes (EDXRF\_8, Acc. #63 and EDXRF\_10b, Acc. #110), and water rounded stones (EDXRF\_9, Acc. #109).

Some lithics were found to be quite dissimilar to the other analyzed artifacts. Two basalt tools (EDXRF\_1, Acc. #31; EDXRF\_2, Acc. #56), volcanic glass (EDXRF\_4, Acc. #54; EDXRF\_5, Acc. #59), and water rounded stones (EDXRF\_11, Acc. #138) were found to be outliers and did not match other samples. These materials could have been procured from any number of locations throughout the Ko'olau Range, locally and/or non-locally.

Lithic analysis can be a valuable tool for better understanding exchange and redistribution in Hawai'i (Bayman 2001, Mills et al. 2011, Reith et al. 2013) as well as throughout the greater Pacific (Rolett 2002, Collerson and Weisler 2007). As the layout of each *ahupua'a* is designed to incorporate both mountain and ocean resources, procurement from other *ahupua'a* could potentially indicate specialized trade (Earle 1987). However, trade in lithic materials on O'ahu is currently not believed to have been heavily controlled. Valued materials from outside of an *ahupua'a* were commonly procured through the establishment of temporary residences near the source (McGregor 1996:7). Therefore, movement between *ahupua'a* was likely common and performed as needed.

The distribution of lithic varieties has not been compiled for the island of O'ahu. However, data on the Big Island of Hawai'i has been able to re-create distribution patterns of raw material types (Withrow 1990, Mills et al. 2011, Reith et al. 2013). Studies on the Big Island have found that a variety of raw materials were available in certain locals over time. Therefore, Hawaiians were directly procuring or exchanging lithic materials rather than there being a centralized redistribution system which would likely have distributed a preferred type of material.



TABLE 20. TABLE LISTING EDXRF RESULTS

| SAMPLE   | ACC. # | TEST UNIT | FEA./ SUB-FEA. | STRAT | DEPTH   | TYPE                 | RESULTS  |
|----------|--------|-----------|----------------|-------|---------|----------------------|--|
| EDXRF_1  | 31     | 1         | AA             | III   | 80      | Basalt tool          | Outlier, no known source   |
| EDXRF_2  | 56     | 2         | D-2            | III   | 72      | Basalt tool          | Outlier, no known source   |
| EDXRF_3  | 45     | 2         | C/C-2          | III   | 60-64   | volcanic glass       | 1.) Clustered with EDXRF 8, 9, 10b, and a Wai'āhole outlier, 2.) Similar to Chinaman's Hat |
| EDXRF_4  | 54     | 2         | Below Fea. D   | III   | 75      | volcanic glass       | Outlier, no known source   |
| EDXRF_5  | 59     | 2         | 1              | IV    | 85      | volcanic glass       | Outlier, no known source   |
| EDXRF_6  | 69     | 2         | E              | IV    | 98      | basalt debitage      | 1.) Falls within Wai'āhole cluster, 2.) similar to Wai'āhole                               |
| EDXRF_7  | 55     | 2         | 1              | III   | 66-71   | dike stone           | Similar to Wai'āhole   |
| EDXRF_8  | 63     | 2         | 1              | IV    | 97      | basalt flake         | Clustered with EDXRF 3.1 and 10b   |
| EDXRF_9  | 109    | 3         | 1/ FEA C-C2    | III   | 60-65   | water rounded stones | Similar to EDXRF 10b   |
| EDXRF_10 | 110    | 3         | 1/ FEA C-C2    | III   | 60-65   | basalt flake         | A.) Similar to Wai'āhole, B.) Clustered with EDXRF 3.1, 8, 9                               |
| EDXRF_11 | 138    | 3         | FEA E          | V     | 106-118 | water rounded stone  | Outlier, no known source   |
| EDXRF_12 | 134    | TRAIL     |                | I     | surface | micro-adze           | Similar to Wai'āhole outliers  |

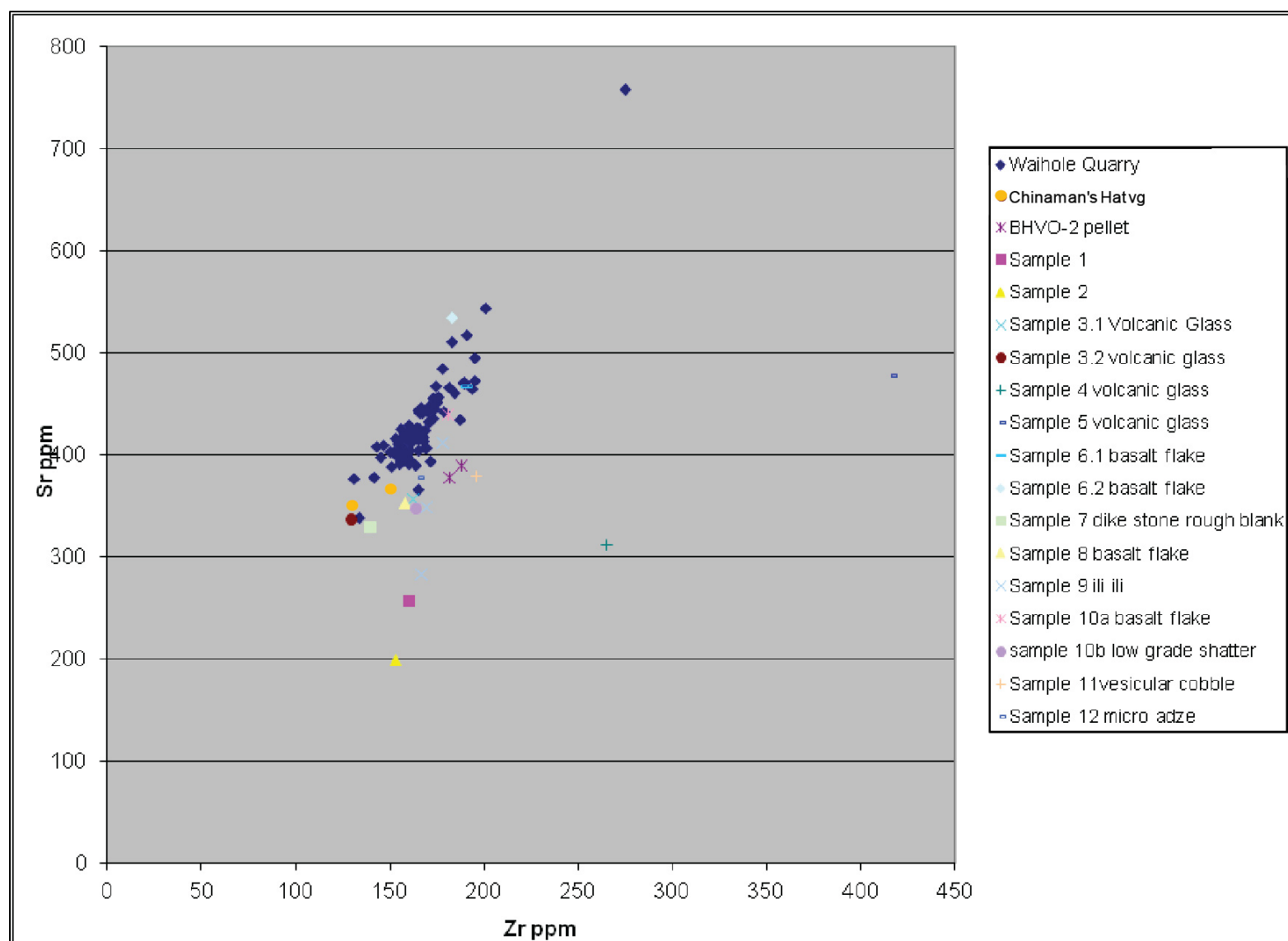


FIGURE 129. DISTRIBUTION CHART SHOWING EDXRF RESULTS

Evidence does however suggest that Inter-island exchange and certain social settings may have affected the quality of stone being distributed and utilized. Kirch et al. (2011) found a correlation between religious sites and non-local high-quality basalt tools. In his study of 328 basalt tool specimens, including fine-grained basalt and volcanic glass, he found that “In residential contexts local sources on average comprise 76% of the basalt artifacts, in ritual contexts local sources comprise only 56%, with extra-local sources making up the other 44%” (Kirch et al. 2011:5). Therefore, there may have been an element of controlled distribution in certain contexts. However, it should be noted that high quality offerings would be expected at ritual sites.

## CORAL

A large amount of coral pebbles and small cobbles were collected from stone pavings and construction fills within Maunawila Heiau (Figure 130). Coral was typically brought to religious sites as offerings. Most typically coral was placed at fishing shrines (*kū'ula*) (Mitchell 1982:151). However, coral is also common within stone pavings of *heiau*. Coral was typically “collected live from underwater coral colonies rather than collected as weathered coral after it washed up dead on the shore. Live coral was a more potent offering because it contained more spiritual force (*mana*) than dead coral” (Kolb 1999:79). Two coral pieces (Acc. #'s 93 and 94) are termed “ornamental coral” due to their shapes and the placement of natural perforations (Figure 131). Acc. #93 contains a longitudinal bore which could have easily been slid onto a stick or cordage. Acc. #94 contains a transverse bore hole on one end which could have easily suspended the artifact. Although these coral pieces are ornamental in form and contain natural perforations which provide ease in their use, no obvious wear was observed in the perforations from cordage or on the body of the artifacts.

Modern dating techniques include a method of dating certain species of coral using  $^{230}\text{Th}/\text{U}$  dating (Kirch and Sharp 2005, Weisler et al. 2006, Sharp et al. 2010, Burley et al. 2012). AMS radiocarbon dates provide a wide chronological range (often of a hundred years or more), whereas  $^{230}\text{Th}/\text{U}$  dating produces precise dates ( $\pm 5$  years) which allow more efficient interpretation of the past (Cobb 2003).  $^{230}\text{Th}/\text{U}$  dating results have been used to support claims of sociopolitical and economic historic events through archaeological investigations of centralized ritual sites in the Pacific (Kirch and Sharp 2005, Sharp et al. 2010). This method was not pursued in this study due to a lack of funding and no contact that can identify proper coral specimens for this analysis. Coral specimens must be of proper species, contain cortex in good condition, and indicate characteristics of direct procurement followed by purposeful placement at a site (McCoy et al. 2009:453). These requirements ensure that the obtained date would target the exact time when the coral was taken from the ocean and deposited at the site.

Two coralline slabs were built into Maunawila Heiau (Feature 2a and Feature 3a). Slabs of coralline conglomerate were incorporated into temples throughout Polynesia, including throughout the Society Islands and Tonga (Buck 1938, Kirch 1990, Sharp et al. 2010). Sharp et al. (2010) found that “all of the *morae* (temples) incorporating coral in their structures fall within a period of just 140 y (ca. AD 1620-1760)” (13238). The study also found a progression of architectural development beginning with simple *ahu* with coral veneers, then progressing to platform *ahu* with cut and dressed coral blocks and basalt dikestones, and ending with stepped *ahu* containing pecked basalt cobbles (2010:13238). Coral blocks however, are not commonly utilized in temple construction in the Hawaiian Islands.

Coral limestone is of considerable importance throughout the Pacific region and is often crystalline, hard and compact without much indication of its original structure; in this condition it is used for pestles, poi-pounders, dishes, weights, etc. Calcareous limestone is found compacted of the sand and debris of the reefs blown ashore and cemented by Aeolian influences, but it generally is not hard enough for making tools, although sometimes good as building stone. The coral reef rock was once used largely by foreigners for building purposes as it can be cut from the reef at low tide with an axe and on continued exposure to the air it hardens. The first church in

Honolulu is entirely constructed of this material, but I do not know that the old natives made any extensive use of it in the construction of temple walls or even the walls of fish ponds. (Brigham 1974:11)

Due to geological submergence and emergence of Hawaiian coastlines during glacial and interglacial periods of earth's history, broad coral reefs formed along O'ahu's coastline. Fluctuations in the sea level have exposed areas of beach rock, calcified sandstone or coralline conglomerate, or "caprock" specifically along portions of the windward coast of O'ahu. Extensive plains of coral limestone exist in 'Ewa, Waimānalo, Kahuku, and Lā'ie (Mitchell 1982:23). <sup>230</sup>Th/U dating of this type of material would provide the date of when water level fluctuations exposed the coral reef rather than when it was utilized. Because the beachrock formed well before Polynesian habitation of the Hawaiian Islands dating the coralline slabs found within Maunawila Heiau would not be of benefit.

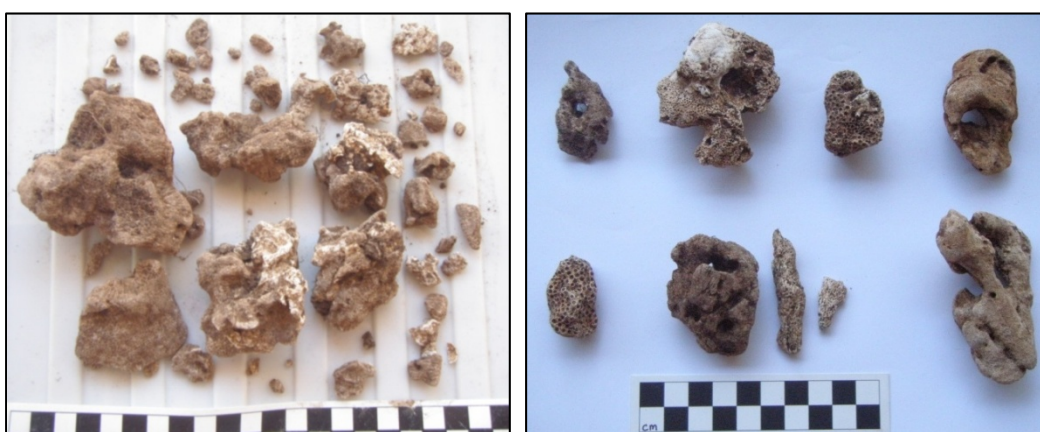


FIGURE 130. PHOTO OF A CORAL CONCENTRATION FOUND IN TEST UNIT 1 (ON LEFT, ACC. #21) AND A PHOTO OF REPRESENTATIVE CORAL MANUPOINTS FOUND DURING EXCAVATIONS (LEFT TO RIGHT, TOP ROW ACC. #'S 14, 71, 73, 74; BOTTOM ROW ACC. #'S 88, 101 [3], 103)



FIGURE 131. PHOTOS OF ORNAMENTAL CORAL PIECES (LEFT TO RIGHT, ACC #'S 93 AND 94)



## FAUNAL ANALYSIS

### ANIMAL BONE

Three animal bones were found during excavation within Maunawila Heiau (SIHP # -287) (Table 21). A chicken bone (Acc. #17) was found within Stratum II of Test Unit 1 which contained several modern artifacts. The chicken bone is associated with modern food consumption associated with squatters known to have resided on the property.

Two pig molar fragments were found in layers of stone paving within Maunawila Heiau. The molars are shown in Figure 132. Acc. #77 appears to be a deciduous molar of a sub-adult pig and Acc. #118 is a permanent molar with little to no wear on the grinding surfaces. The size and small amount of wear indicates both teeth are likely from sub-adult animals (Rolett and Chiu 1994). The presence of these teeth does not directly indicate intentional predation or human consumption. Pigs (*pua'a*) were raised in great numbers and roamed freely throughout unfenced areas (Mitchell 1982:121). Pigs fed on scraps of root vegetables and found natural food sources in upland zones such as *kukui* nuts and mountain apples.

TABLE 21. TABLE LISTING ANIMAL BONE FOUND WITHIN SIHP # -287

| ACC # | TU | STRAT | DEPTH (cmbd) | SIHP -287<br>FEA/ SUB<br>FEA | TYPE/ SKELETAL ELEMENT  |
|-------|----|-------|--------------|------------------------------|-------------------------|
| 17    | 1  | II    | 75-77        | 9                            | CHICKEN LONG BONE SHAFT |
| 77    | 2  | III   | 74-78        | D-2                          | PIG MOLAR FRAGMENT      |
| 118   | 3  | III   | 60-65        | C-C2                         | PIG MOLAR FRAGMENT      |



FIGURE 132. PHOTOS OF ANIMAL BONE FOUND DURING EXCAVATIONS (FRONT AND BACK) (LEFT TO RIGHT, ACC #'S 17, 77, AND 118)

## MARINE SHELL

Two small marine shells were found during this project (Table 22). Both shells are *Hipponix* species. This species of gastropod attaches to rocks and other shells and are common along windward shorelines of the Hawaiian Islands (Kay 1979:176). The two shells are not considered to be evidence of food consumption, rather they likely were attached to water rounded stones used for *heiau* construction. It is also possible that Acc. #35, found within Stratum II, had fallen off the coralline slab within Feature 3 (low platform terrace) which was adjacent to Test Unit 2.

TABLE 22. TABLE LISTING MARINE SHELL FOUND WITHIN SIHP # -287

| ACC # | TU | STRAT | DEPTH<br>(cmbd) | SIHP -287<br>FEA/ SUB<br>FEA | SPECIES             |
|-------|----|-------|-----------------|------------------------------|---------------------|
| 35    | 2  | II    | 42-59           | 1                            | <i>Hipponix</i> sp. |
| 67    | 2  | IV    | 92-98           | 1                            | <i>Hipponix</i> sp. |



FIGURE 133. PHOTO OF MARINE SHELL FOUND DURING EXCAVATIONS (ACC. #35 ON LEFT, ACC. #67 ON RIGHT)

## LANDSNAIL ANALYSIS

Six samples of landsnails were analyzed by molocologist Dr. Carl Christensen with the Bishop Museum. Identified landsnails are presented within Table 23, Figure 134, and Figure 135. Hawai'i had a wide variety of endemic landsnails brought to the islands by birds prior to Polynesian contact. During the post-contact period new species of landsnails were introduced. Landsnails typically live on leaves or bark of trees throughout mountains and valley systems.

Landsnails from Test Units 1, 2, and 3 were sent for analysis. All analyzed landsnails were found to be historic introductions. This data corresponds with Stratum II in Test Unit 1 which contained modern debris (metal, glass, and plastic) and Strata I and II within Test Units 2 and 3 which contained naturally accumulated wind-blown sediments and detritus. The presence of historically-introduced landsnails within Strata I and II within Test Unit 2 and 3 is not unexpected.

A discrepancy exists with the identification of one landsnail fragment collected from Stratum V of Test Unit 2 (Acc. #83). The fragment most closely represents a historically introduced species. The presence of this species within Stratum V does not correlate with other lines of evidence associated with the stratum. Only native and Polynesian-introduced charcoaled plant species and pre-contact radiocarbon dates were obtained from Stratum V. Therefore, the landsnail must represent contamination. It is very likely the landsnail fragment fell into the test unit from upper strata in the side wall of the excavation. As landsnails are very light, the fragment could also have blown in during excavation. This raises an important concern when using landsnails to relatively date a cultural deposit. Multiple lines of supporting data are needed to build factual interpretations.

One landsnail (*Opeas beckianum*) of the faunal assemblage is rather rare (Acc. #34). Therefore, the specimen is being curated in the Bishop Museum's Molocology Department. Photos and descriptions of collected landsnails are provided below.

TABLE 23. TABLE LISTING LANDSNAILS COLLECTED FROM SIHP # -287

| ACC # | TU | STRAT | DEPTH (cmbd) | FEA | IDENTIFICATION   | DATE INTRODUCED | ORIGIN (Cowrie 1997)                |
|-------|----|-------|--------------|-----|--|-----------------|-------------------------------------|
| 15    | 1  | II    | 75-77        | 9   | <i>Achatina fulica</i>   | Post 1936       | Africa                              |
| 16    | 1  | II    | 75-77        | 9   | <i>Paropea achatinaceum</i> ,<br><i>Achatina fulica</i>              | Post 1936       | Borneo,<br>Sumatra, Java;<br>Africa |
| 32    | 2  | I     | 41           | 1   | <i>Euglandina vosea</i>  | Post 1955       | SE North<br>America                 |
| 34    | 2  | II    | 42-59        | 1   | <i>Opeas beckianum</i>   | Post 1914       | Central and<br>South America        |
| 83    | 2  | V     | 109-<br>120  | 1   | possibly either <i>Achatina fulica</i><br>or <i>Euglandina vosea</i> |                 |                                     |
| 86    | 3  | II    | 50           | 1   | <i>Paropea achatinaceum</i>  | Post 1936       | Borneo,<br>Sumatra, Java            |



FIGURE 134. PHOTO OF ANALYZED LANDSNAILS (ACC. #'S 15, 16, 32, 83, AND 86)



FIGURE 135. PHOTO OF ANALYZED LANDSNAILS ACC. #34; CURATED AT BISHOP MUSEUM



## FLORAL ANALYSIS

### SEED IDENTIFICATION

Seeds found within field samples were hand delivered to Dr. Chris Lao and Dr. Becky Azama at the Department of Agriculture in Honolulu. Comparative samples and reference books (Wagner et al. 1999, Little and Skolmen 2003) were consulted in order to identify seed species. Identified seed varieties are presented in Table 24 and Figure 136.

Four plant species were identified. Seeds from *Makole*, *Haole koa*, Spanish clover (*ka'imi* or tick clover), and *Curcubitaceae* species were identified. *Makole*, found within Stratum III of Test Unit 1, was the only native plant species identified. This corresponds with identified native and Polynesian-introduced charcoaled plants found within the same stratum of Test Unit 1. A *Curcubitaceae* sp. seed was found within Stratum IV of Test Unit 2. The seed appeared to be burnt and was fragmented into mendable pieces. Due to the condition, the exact species was not discernible. *Curcubitaceae* sp. includes gourds as well as other food producing plants including pumpkins, squash, cucumber, and watermelon (Deyo and O'Malley 2008). The charring on the seed and context suggests the seed has some antiquity and is therefore likely a Polynesian-introduced gourd seed rather than a modern seed species.

Two species of seeds which are modern introductions to Hawai'i were found within various strata of Test Unit 2 and 3. The presence of modern seeds within deep cultural deposits are contradictory to other more reliable forms of analysis including charcoal identification, which found only native and Polynesian-introduced species and pre-contact radiocarbon dates. The presence of these modern seed species is likely due to upper strata soils falling into the excavation or the frequent winds and close proximity of these growing plant species. This study has attempted to gather multiple lines of evidence to provide a thorough examination of exposed land surfaces. In doing this, this study found that two forms of relative dating methods, seed and landsnail analyses, produced discrepancies due to hard to avoid contamination factors. Contamination likely occurred as a result of common heavy winds, regular examination of the units for educational purposes, and quickly growing vegetation surrounding Test Units 2 and 3. This highlights the necessity of keeping vegetation cut back from excavations, keeping excavations covered while not in use, brushing off sidewalls, and removing any naturally accumulated (windblown, collapse, etc.) dirt prior to controlled excavation. Although these methods were employed during this study the seeds were still present, indicating analysis of seeds in a windy environment may be counter-productive.



FIGURE 136. PHOTO OF REPRESENTATIVE SEEDS FOUND DURING EXCAVATIONS (LEFT TO RIGHT, SEED\_1 [2], SEED 2 [6], SEED 6 [3], SEED 10 [2])

TABLE 24. TABLE LISTING SEEDS COLLECTED DURING THIS STUDY

| SAMPLE  | TEST UNIT | FEA/<br>SUB-<br>FEA | STRAT | DEPTH<br>(cmbd) | SPECIES  | INTRO.<br>DATE | PLACE OF ORIGIN  |
|---------|-----------|---------------------|-------|-----------------|--|----------------|--|
| Seed_1  | 1         | 9                   | III   | 74              | <i>Makole (C. granactensis)</i>  | N/A            | Hawaiian native  |
| Seed_2  | 2         | 1/<br>FEA.<br>C/C-2 | III   | 60-64           | <i>Haole koa (Leucaena glauca)</i>   | Post 1864      | SE Mexico (Little and Skolmen 2003)                        |
| Seed_3  | 2         | C-2                 | III   | 68-71           | <i>Haole koa (Leucaena glauca)</i> , Spanish clover ( <i>Desmodium incanum</i> ) | Post 1931      |  |
| Seed_4  | 2         | D-2                 | III   | 74-78           | <i>Haole koa (Leucaena glauca)</i>   | Post 1864      | SE Mexico (Little and Skolmen 2003)                        |
| Seed_5  | 2         | 1                   | IV    | 78-84           | <i>Haole koa (Leucaena glauca)</i>   | Post 1864      | SE Mexico (Little and Skolmen 2003)                        |
| Seed_6  | 2         | 1                   | IV    | 98-102          | <i>Curcubitaceae</i> sp.   |                | Endemic and foreign varieties (Wagner et al. 1999)         |
| Seed_7  | 3         | Above E             | IV    | 97-101          | Spanish clover ( <i>Desmodium incanum</i> )                                      | Post 1931      | SE Asia, Tropical & Subtropic America (Wagner et al. 1999) |
| Seed_8  | 3         | E                   | V     | 106-118         | <i>Haole koa (Leucaena glauca)</i>   | Post 1864      | SE Mexico (Little and Skolmen 2003)                        |
| Seed_9  | 3         | E                   | V     | 106-118         | Spanish clover ( <i>Desmodium incanum</i> )                                      | Post 1931      | SE Asia, Tropical & Subtropic America (Wagner et al. 1999) |
| Seed_10 | 2         | 1                   | V     | 109-120         | Spanish clover ( <i>Desmodium incanum</i> )                                      | Post 1931      | SE Asia, Tropical & Subtropic America (Wagner et al. 1999) |

## CHARCOAL IDENTIFICATION

Samples of charred material were delivered to Dr. Gail Murakami with the International Archaeological Research Institute, Inc. (IARII) for species identification (SAMPLE A-M, Table 25). Identified charcoal samples represent only a representative sample of the charred material collected. Charcoal samples chosen for analysis were selected from discrete stratigraphic layers and depths which were spatially representative of specific target events. Samples from each excavated test unit and from distinct construction episodes were analyzed.

Identification of charcoaled plant species provides a detailed list of what types of plants were being used. The presence of only endemic or native species within one stratigraphic layer indicates a time period prior to the spread of invasive foreign species, which currently covers the landscape. The presence of only endemic (native) and Polynesian introduced crops identifies traditional Hawaiian cultural activities. All carbonized plant species identified during this study were endemic or Polynesian introduced. All identified plants were common in the pre-contact landscape. Plants such as 'ilima and mountain apples ('ōhia 'ai) tend to be hardy and do not need special care (Mitchell 1989). Identified plants 'ākia, 'ūlei, and 'akoko also grow wild and tend to thrive in the same communities as one another (Wagner et al. 1999:71).

Polynesian introduced plants include mountain apple ('ōhi'a ai) (*Syzygium* sp.), kukui (*Aleurites moluccana*), and gourd (ipu) (*Lagenaria siceraria*). Native and endemic food sources included lama (*Diospyros* sp.) and 'ūlei (*Osteomeles anthyllidifolia*) which contained edible fruits and berries, as well kukui in which the nuts were used to make a relish (Mitchell 1989). Plants used for medicinal purposes included kukui, which was used for various ailments, 'ākia (*Wikstroemia* spp.) used as a narcotic to stupefy fish or as relaxing medicine, and 'ūlei which was brewed like a tea and used for general sicknesses (Abbott 1992, Krauss 1993, Stone and Pratt 1994). Two types of hard wood were identified, 'ōhi'a lehua and lama. These species were typically used for rafters in construction of hale (Malo 1951, Abbott 1992).

Plants most commonly identified in the charcoal samples were 'akoko and lama. The frequency of these species was followed by 'ūlei, pilo, and 'ōhia lehua, and then kukui and mountain apple. Species represented by only one sample include ala'a, alahe'e, 'ilima, 'ākia, kōpiko, and ipu. The stratum with the most variety of species was from Test Unit 2, Feature E, Stratum V, which contained eight of the thirteen species identified in this study. The diversification of plant species within the lower stratum compared to upper strata is great because most samples were collected from one specific target location while charcoal collected from throughout Stratum V was submitted for analysis, resulting in more identifications. Only endemic and native plant species were found within the samples and radiocarbon dates correlate quite specifically to the pre-contact era of Hawaiian occupation.

Identified plant species were researched in order to interpret activities which may have occurred at the heiau. Each identified species is discussed below, including associated use and activities. The species are ordered by the most commonly identified species in this assemblage to the lowest frequency or alphabetically when numerically equal.

TABLE 25. IDENTIFIED CHARCOAL SAMPLES FROM MAUNAWILA HEIAU

| SAMPLE DESIGNATION | TU | SIHP -287<br>FEA/ SUB<br>FEA | STRAT  | DEPTH<br>(cmbd) | Description  | Results   |
|--------------------|----|------------------------------|--------|-----------------|--|---|
| SAMPLE TU 1_A      | 1  | 9                            | III    | 81              | below orange stone within Fea. A1 (sample 2 of 81 cmbd)      | <i>'ūlei</i>  |
| SAMPLE TU 1_B      | 1  | 9                            | III    | 87              | found in NW profile wall                                     | <i>'akoko</i>   |
| SAMPLE TU 1_C      | 1  | 9/ FEA A2                    | III-IV | 90-99           | subsample of charcoal  | <i>'akoko, 'ūlei, kukui, pilo</i>                             |
| SAMPLE_D           | 2  | 1/ FEA. C-<br>C2             | III    | 65              | just above Fea. C-2  | <i>lama</i>   |
| SAMPLE_E           | 2  | 1/ FEA. C2                   | III    | 69              | within Fea. C-2  | <i>'akoko</i>   |
| SAMPLE_F           | 2  | 1/ FEA. D2                   | III    | 73              | large chunk under cobble of Fea. D-2                         | <i>'akoko</i>   |
| SAMPLE_G           | 2  | 1/ FEA. 3                    | IV     | 79              | below Fea. 3   | <i>unknown</i>  |
| SAMPLE_H           | 2  | 1                            | IV     | 81              | large organic (Bag 1)  | <i>'ōhi'a lehua</i>   |
| SAMPLE_I           | 2  | 1/ FEA. E                    | V      | 98-104          | contemporaneous with Fea. E                                  | <i>'ōhi'a lehua, 'ōhi'a ai, 'akoko, lama, alahe'e, 'ilima</i> |
| SAMPLE_J           | 2  | 1/ FEA. E                    | V      | 104             | just below Fea. E  | <i>pilo, 'ōhi'a lehua, ipu, 'akoko, lama</i>                  |
| SAMPLE_K           | 2  | 1                            | V      | 113             | large charcoal concentration/<br>root (Bag 1 of 2)           | <i>'āla'a</i>   |
| SAMPLE_L           | 2  | 1                            | V      | 109-120         | charcoal from Str. V under Fea. E and above sterile sediment | <i>'ākia, 'akoko, lama, 'āla'a, kukui</i>                     |
| SAMPLE_M           | 3  | 1/ FEA.<br>D2-D4             | III    | 70-75           | below D-2 & D-3  | <i>'ūlei, 'ōhi'a ai, kōpiko, 'ōhi'a lehua, pilo</i>           |



'Akoko (*Chamaecyze* spp.)

'Akoko (*Chamaecyze* spp.) is an endemic shrub or small tree found in coastal areas and forest zones throughout Hawai'i (Krauss 1993:138). 'Akoko has shiny dark green leaves and green, red, or pink buds. The plant was once valued for firewood (Hillebrand 1981:396 cited in Murakami 2012), the milky sap was used as paint or stain (Krauss 1993:50), and the plant may have been a possible source for rubber (Rock 1974:261 cited in Murakami 2012).

Lama (*Diospyros sandwicensis*)

Lama (*Diospyros sandwicensis*) is an endemic tree found in dry to wet shrublands and forests on windward foothills throughout Hawai'i (Wagner et al. 1999:47,73). The fruit produced is a relative of the persimmon and was eaten when ripe (Mitchell 1982:129). The hard wood was used by Hawaiians for house rafters (Malo 1951:20, Abbott 1992:68), enclosures for certain idols (Malo 1951:21), chisel handles (Buck 1957:38), and fish traps (Abbott 1992:41). Lama was used medicinally within a mixture of kukui nut, breadfruit sap, and makaloa (*Cyperaceae* sp.) fibers as a compress to treat open sores (Krauss 1993:103). Lama and 'ōhi'a are co-dominants and typically occur within the same environmental communities (Wagner et al. 1999:73). Furthermore, lama wood is connected to the goddess Laka.

Inside a hālau hula was an altar (*kuahu*), on which lay a block of wood of the endemic lama (*Diospyros sandwicensis*), a tree whose name translates as "light" or "lamp" and carried the figurative meaning of "enlightenment". Swathed in yellow kapa and scented with 'ōlena, this piece of wood represented Laka, goddess of hula, sister and wife of Lono. (Abbott 1992:117)

'Ūlei (*Osteomeles anthyllidifolia*)

'Ūlei (*Osteomeles anthyllidifolia*) is an indigenous vine to sprawling shrub with white flowers and white berries. The plant grows from the lowlands to mid-elevation woodlands (Stone and Pratt 1994:100, Wagner et al. 1999:47). The hard wood was used to make digging sticks ('ō'ō), fishing spears, carrying poles ('auamo), and musical bow ('ukeke) (Buck 1957:12, 357, 14, 388), as well as for handles of farming tools such as adzes and chisels (Krauss 1993:25). The flexible smaller branches were bent into hoops for fishnets, baskets, and in making lei (Krauss 1993:77, Abbott 1992:127, Stone and Pratt 1994:101). The leaf buds and seeds were eaten during times of famine and used medicinally to treat throat infections ('ea) and childhood ailments (pa'ao'ao) (Krauss 1993:16; Bishop Museum 2013). The bark, leaves, and salt were mixed and applied to open cuts or injuries (kahi 'eha) (Chun 1994:250–251 cited in Bishop Museum 2013).

Pilo (*Coprosma* spp.)

Pilo (*Coprosma* spp.) is an endemic plant and can grow as a shrub or a small tree within diverse environments (Wagner et al. 1990:1125-1129). Pilo grows under the canopy of taller trees such as 'ōhi'a lehua. The berries of pilo were used as a laxative (Degener 1930:282 cited in Bishop Museum 2013). No additional information on traditional use of pilo was found.

'Ōhi'a lehua (*Metrosideros polymorpha*)

'Ōhi'a lehua (*Metrosideros polymorpha*) is an endemic shrub to tall tree species with bright pom-pom shaped red and yellow flowers. The plant is found in dry lowland, mid-elevation, woodlands, and uplands on all of the main Hawaiian Islands (Stone and Pratt 1994:11, Wagner et al. 1999:47). The hard wood was used for making spears, bowls, mallets, temple idols, offering stands, posts and rafters for houses, canoes, and enclosures around

temples (Abbott 1992:68, 114; Buck 1957:87; Krauss 1993:118-119; Malo 1951:20; Merlin 1986:63). The tree was believed to represent Kāne and Kū (Mitchell 1982:79, Abbott 1992:114). The wood was extremely hard and resisted weathering. The flowers were used in *lei* making (Emerson 1909:56, Abbott 1992:127). The flowers were also used medicinally to aid in childbirth (Merlin 1980:43, Chun 1998:43 cited in Bishop Museum 2013). Native insects and birds, including the red ‘*apapane*, ‘*amakihi*, and ‘*i‘iwi*, feed on the *lehua* blossom’s nectar (Merlin 1986:63, Stone and Pratt 1994:11).

#### Kukui (*Aleurites moluccana*)

*Kukui* (*Aleurites moluccana*), also referred to as the candlenut tree, is a Polynesian introduced tree with long green leaves, small white flowers, and hard nuts. The plant grows on low forested mountain slopes throughout the Hawaiian Islands (Wagner et al. 1999:47). The wood was used to make net floats and dugout canoes (Buck 1957:297). The juice of the nut was used as a grey to black dye for tattoos and *tapa* (Abbott 1992:54, Buck 1957:187), was burned for light (Abbott 1992:77, Buck 1957:107), and used to seal canoes to make them water tight (Abbott 1992:81) among other uses. The nuts were also baked and eaten as a relish or spicy condiment mixed with salt (Buck 1964a:73). The flowers, nuts, and bark were used medicinally as a laxative, for childhood ailments (*pa‘ao‘ao*), and throat infections (‘*ea*), and mixtures using *kukui* were made into salve for infected wounds (Abbott 1992:100, Chun 1994-170-174 cited in Bishop Museum 2013,). The flowers and nuts were also used in *lei* (Abbott 1992:125,127; Krauss 1993:79).

#### ‘Ōhi‘a ‘ai (*Syzygium* sp.)

‘*Ōhi‘a ‘ai* (*Syzygium* sp.) or mountain apple, is a Polynesian introduced tree species found in shaded valleys and wet forests. The wood from ‘*ōhi‘a ‘ai* was used for posts, house rafters and temple enclosures (Wagner et al. 1990:976), as well for temple idols (Rock 1913:321 cited in Bishop Museum 2013), and offerings on *hula* altars (*kuahu*) (Emerson 1909:19). The juicy fruit was eaten raw and dried (Krauss 1993:16). Juices from the bark were used for sore throat and for open wounds, and leaves were crushed and eaten for bronchitis (Abbott 1992:101, Krauss 1933:102). The plant is a secondary ingredient in a number of other medicines (Bishop Museum 2013). A brown dye for clothing was extracted from the bark (Buck 1957:187, Krauss 1993:66).

#### ‘Ākia (*Wikstroemia* spp.)

‘*Ākia* (*Wikstroemia* spp.) is an endemic shrub to small tree found in lowlands and dry shrublands on windward slopes (Wagner et al. 1999:47, 71). The plant has yellow flowers and orange fruit and grows in similar plant communities as *lama* and ‘*ūlei*. The bark of ‘*ākia* was used for ropes and braids (Abbott 1992:63). The fruit or berries were used to make *lei* (Abbott 1992:125, Krauss 1993:77). The plant is toxic and was used as poison and to capture fish (Abbott 1992:86, Stone and Pratt 1994:135).

#### ‘Ala‘a (*Pouteria sandwicensis*)

‘*Ala‘a* (*Pouteria sandwicensis*) is an endemic shrub to tree species found in diverse mesic forests. The wood was used to make spears, digging sticks (‘*ō‘ō*), and canoe gunwales (Krauss 1993:50). The sticky sap was used to trap birds (Pukui and Elbert 1986:16 cited in Murakami 2012). The plant was added to ‘*ōlona* root (*Cucurma longa*) and salt as an ointment and for child ailments (Chun 1994:30 cited in Bishop Museum 2013).

Alahe'e (*Canthium odoratum*)

*Alahe'e* (*Canthium odoratum*) is an indigenous shrub to small tree found in dry regions across Hawai'i. Its hard wood was once used for making digging sticks (*o'o'o*) (Handy and Handy 1972:117), light weight spears, and handles for hand tools (Abbott 1992:12; Krauss 1993:25,45). *Alahe'e* leaves were used to make black dye (Krauss 1993:65).

'Ilima (*Sida fallax*)

*'Ilima* (*sida fallax*) is an indigenous shrub that is found in coastal to dry and mixed environments (Wagner et al. 1999:46). The plant is low-lying with trailing branches and yellow-orange flowers. Various portions of the plant held great use. The flowers were used for royal *lei* making and ornament (Abbott 1992:127, Emerson 1909:56, Krauss 1993:77). Stems were used to frame sleeping houses, create rough basketry, and for use under sleeping mats (Handy and Handy 1972:228). The roots and flowers were used medicinally. The plant was mixed with other medicinals for general debility, womb disorders, childhood ailments (*pa'ao'ao*), and throat infections (*'ea*) (Neal 1965:553 cited in Murakami 2013, Merlin 1980:4, Chun 1994:106-110 cited in Bishop Museum 2013).

Ipu (*Lagenaria siceraria*)

The *ipu* (*Lagenaria siceraria*) or bottle gourd, is a Polynesian introduced vine. The *ipu* grows only under cultivation and was carefully tended (Mitchell 1982:118). Gourds were used as receptacles for food and water, rattles for dances, whistles, drums, and storage containers (Buck 1964b:391, 405; Abbott 1992:89,90,96,120; Pukui and Elbert 1986:103). The gourd is associated with god Lono (Abbott 1992:16,116).

Kōpiko (*Psychotria sp.*)

*Kōpiko* (*Psychotria sp.*) is a small to medium sized endemic tree with white flowers and yellow to orange fruit. The trees are found in wet forest environments (Merlin 1980:48). Its wood was used as firewood and to make *kapa* anvil logs (Malo 1951:21 cited in Bishop Museum 2013). No further traditional uses for *kōpiko* were found.

## DISCUSSION REGARDING CHARCOALIZED MATERIALS

Excavations encountered a large amount of charcoalized plant material. Charcoal ranged from fleckings to large pieces. In order to identify the range of plant material present at the site, large and small pieces of charcoal were identified to species. Small pieces of charcoal were targeted in an attempt to identify short-lived species. Due to the common frequency of large charcoal pieces found during excavations charcoal analysis also included a broad approach of assessing the array of charcoal within the site. A large piece of charcoal was found in the upper limits of Stratum IV in Test Unit 2 (Figure 137). The chunk of charcoal was identified as *'ōhi'a lehua* wood (Sample H). Another large piece of charcoal was found within Test Unit 2, Stratum V sediments and extended into Test Unit 3, Stratum V (Figure 137 and Figure 138). This chunk of charcoal was identified as *'ala'a*. Multiple other large pieces of charcoal and charcoal with unique characteristics were found within Strata III through V of Test Units 2 and 3 (Figure 139). Charcoal with unique characteristics included potential notches, mendability, and tapering. It is possible these charcoal fragments represent burnt offerings (*mohai kuni*) (Kamakau 1976:138). Due to the fair preservation of charcoal at the site, it is possible that through additional testing remnants of burnt offerings, images, wooden posts, and other organic items may be similarly preserved within the structure.



FIGURE 137. PHOTOS SHOWING A LARGE PIECE OF CHARCOAL FOUND IN TEST UNIT 2, STRATUM IV (SAMPLE H)



FIGURE 138. PHOTOT SHOWING A LARGE PIECE OF CHARCOAL FOUND IN TEST UNIT 2, STRATUM V (SAMPLE K)



FIGURE 139. PHOTO OF SELECT CHARCOAL PIECES FOUND IN TEST UNITS 2 AND 3, STRATUM III THROUGH STRATUM V (ON LEFT, LEFT TO RIGHT, BAG #'S 52 [2 PCS, MENDABLE, 71 CMBD], 59 [3 PCS, MENDABLE, 81 CMBD], 75 [TAPERS, 76-84 CMBD], 82 [TAPERS TO A POINT, 113-122 CMBD], 61 [3 PCS, MENDABLE, 108 CMBD]; ON RIGHT, BAG 67, 112 CMBD)



## RADIOCARBON DATING

Four samples of charcoal collected from excavations at Maunawila Heiau (SIHP # -287) were sent to Beta Analytic, Inc. for AMS radiocarbon dating. The selected samples were of identified short-lived plant species and were collected from stratigraphic deposits which represented specific periods of human activity and *heiau* construction. Of the identified plant species collected from Test Units 1-3 (Sample A-M), four samples were selected for radiocarbon dating (Samples C, I, J and M). Presented radiocarbon dates provide 95.4% probability of when the plant species was utilized, followed by the highest percentage of probability within that date range. Table 26 and Figure 140 through Figure 142 show all obtained radiocarbon dates for this project, including the highest probabilities of when the material was carbonized. These dates range from AD 1270-1780, indicating continuous human activity in this area for a span of more than 500 years.

One carbonized sample from Test Unit 1 (Sample C), identified as '*akoko* (*Chamaecyze* spp.), was selected for radiocarbon dating. This sample was collected from within a discrete pit feature (SIHP # -287, Feature A2) documented at the base of Test Unit 1. The feature extended from a cultural layer (Stratum III) containing only native and Polynesian introduced plant species. Feature A2 was capped by a layer of stone paving (Feature A1). The charcoal sample was dated to AD 1669-1945 (95.4% probability), with the highest probability date range between AD 1669-1780 (43.1%). This date is interpreted as representing the latest expansion of Maunawila Heiau found during this project.

Two carbonized samples from Test Unit 2 (Samples I and J), identified as '*ilima* (*Sida fallax*) and *ipu* rind (*Lagenaria siceraria*) were radiocarbon dated. The two samples were collected from within the deepest and therefore the oldest construction event found within Maunawila Heiau (SIHP # -287, Feature E). Two specific date ranges were identified from the samples. Sample I dated from AD 1421-1616 (95.4%), with the highest probability date range between AD 1421-1499 (90.7%) Sample J dated from AD 1498-1795 (95.4%), with the highest probability date range between AD 1513-1601 (54.3%). These two dates indicate that sediments and charcoal from the 15<sup>th</sup> and 16<sup>th</sup> centuries AD were incorporated into the construction of Feature E. The more recent of the two dates provides evidence that Feature E of Maunawila Heiau was not constructed until the 16<sup>th</sup> century.

One carbonized sample from Test Unit 3 (Sample M), identified as '*ūlei* (*Osteomeles anthyllidifolia*), was radiocarbon dated. The sample was collected between multiple layers of stone pavings (Features D2-D4) within the surface of Maunawila Heiau. Sample M dated from AD 1270-1390, with the highest probability date range between AD 1270-1316 (60.4%). Features D2-D4 are stratigraphically located between the current modern surface of Maunawila Heiau and Feature E dating to the 16<sup>th</sup> century. Therefore, the Features D2-D4 should theoretically date to a more recent time period than the deeper Feature E found below. The inversion of dates indicates a re-use of older culturally-enriched sediments to build onto the *heiau* structure. It could be argued that the early date may not even represent human activity because the dated plant is an endemic shrub to Hawai'i and could have been burned during a natural forest fire. However, within the same sediments from which the charcoal was collected were pieces of coral, basalt debitage, and a basalt scrapper or chopping tool suggesting a pre-contact associated context. Therefore, it is most likely this early date indicates early cultural activity in the near vicinity.

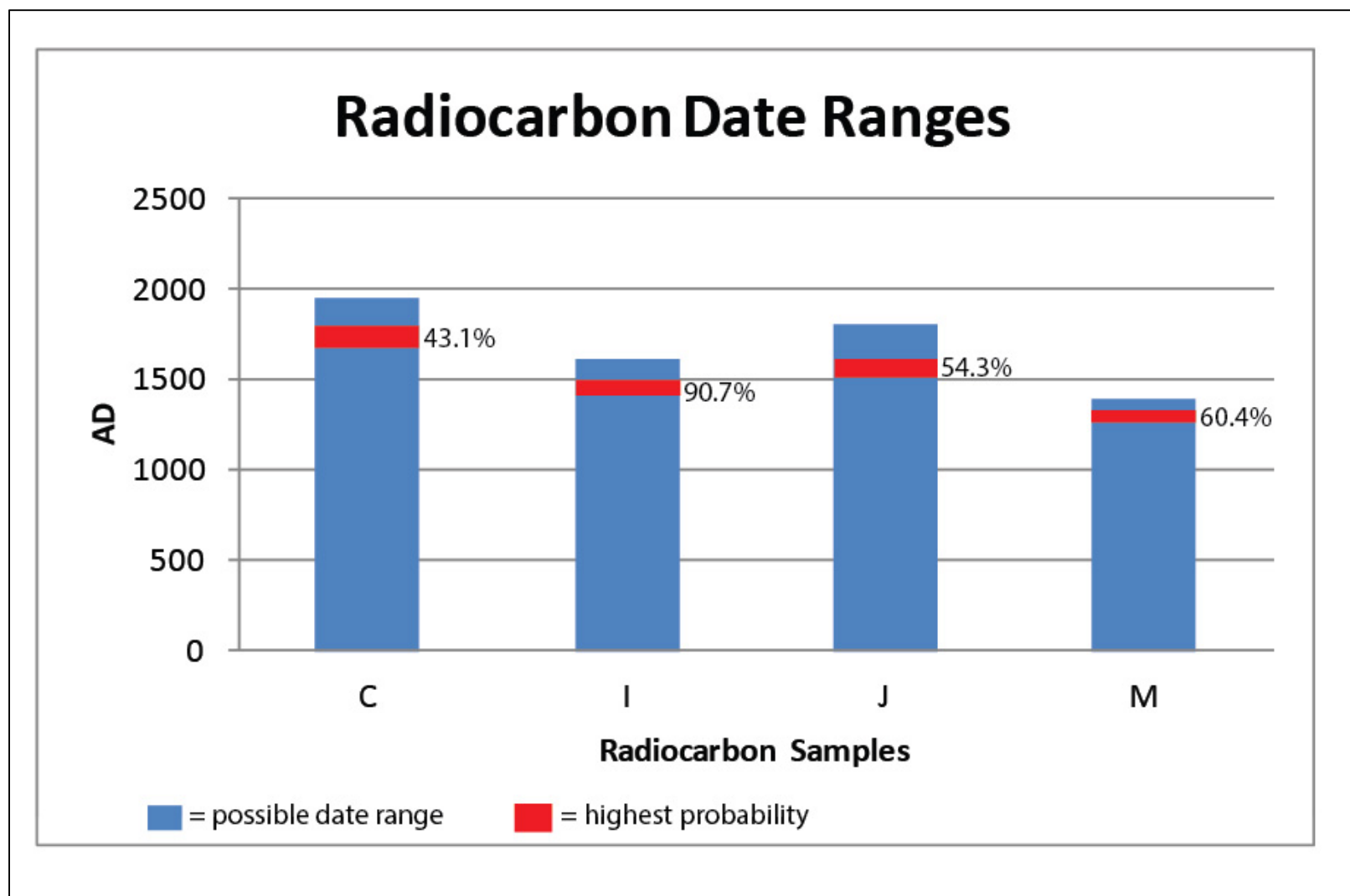


FIGURE 140. CHART SHOWING RADIOCARBON DATE RANGES AND HIGHEST PROBABILITY DATES

TABLE 26. TABLE LISTING RADIOCARBON SAMPLES AND DATING RESULTS

| SAMPLE | TEST UNIT | FEA. / SUB-FEA | STRAT  | IDENTIFIED MATERIAL           | BETA SAMPLE | MEA. AGE          | 13C/12C    | CONV. AGE     | 2 SIGMA CALIBRATION (Beta Analytic. Inc.)  | Calibrated Age Range (OxCal 4.2)                                       |
|--------|-----------|----------------|--------|-------------------------------|-------------|-------------------|------------|---------------|--|--|
| C      | 1         | 9/ FEA A2      | III-IV | WIDL 1221-3: <i>akoko</i>     | 333069      | 101.1 +/- 0.4 pMC | -10.9 o/oo | 140 +/- 30 BP | Cal AD 1670 to 1780 (Cal BP 280 to 170)/Cal AD 1800 to 1890 (Cal BP 150 to 60)/Cal AD 1900 to 1950 (Cal BP 50 to 0)/Cal AD 1950 to post 1950 (Cal BP 0 to post 1950) | 1669-1780 (43.1%), 1798-1891 (36.8 %), 1909-1945 (15.5%)               |
| I      | 2         | 1/ FEA. E      | V      | WIDL 1221-21: <i>ilima</i>    | 345657      |                   |            | 430 +/- 30    | Cal AD 1430 to 1480 (Cal BP 520 to 470)  | 1421-1499 (90.7%), 1507-1511 (0.6 %), 1601-1616 (4.1%)                 |
| J      | 2         | 1/ FEA. E      | V      | WIDL 1221-24: <i>ipu rind</i> | 345656      | 240 +/- 30 BP     | -22.8 o/oo | 280 +/- 30 BP | Cal AD 1520 to 1590 (Cal BP 430 to 360)/Cal AD 1620 to 1660 (Cal BP 330 to 290)  | 1498-1504 (0.8%), 1513-1601 (54.3), 1616-1666 (38.2%), 1784-1795 (2.1) |
| M      | 3         | 1/ FEA. D2-D4  | III    | WIDL 1221-36: <i>'ūlei</i>    | 345655      | 700 +/- 30 BP     | -26.0 o/oo | 680 +/- 30 BP | Cal AD 1270 to 1310 (Cal BP 680 to 640)/Cal AD 1360 to 1390 (Cal BP 590 to 560)  | 1270-1316 (60.4%), 1355-1390 (35%)                                     |

| Sample Data  | Measured Radiocarbon Age | $^{13}\text{C}/^{12}\text{C}$ Ratio | Conventional Radiocarbon Age(*) |
|--|--------------------------|-------------------------------------|---------------------------------|
| Beta - 333069<br>SAMPLE : Maunawila_TU1<br>ANALYSIS : AMS-Standard delivery<br>MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid<br>2 SIGMA CALIBRATION : Cal AD 1670 to 1780 (Cal BP 280 to 170) AND Cal AD 1800 to 1890 (Cal BP 150 to 60)<br>Cal AD 1900 to 1950 (Cal BP 50 to 0) AND Cal AD 1950 to post 1950 (Cal BP 0 to post 1950)   | 101.1 +/- 0.4 pMC        | -10.9 o/oo                          | 140 +/- 30 BP                   |
| Beta - 345655<br>SAMPLE : MAUNAWILA_SAMPLE I<br>ANALYSIS : AMS-Micro-sample Analysis; PRIORITY delivery<br>MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid<br>2 SIGMA CALIBRATION : Cal AD 1430 to 1480 (Cal BP 520 to 470)<br>COMMENT: The original sample was too small to provide a $^{13}\text{C}/^{12}\text{C}$ ratio on the original material. However, a ratio including both natural and laboratory effects was measured during the $^{14}\text{C}$ detection to calculate the true Conventional Radiocarbon Age. | NA                       | NA                                  | 430 +/- 30 BP                   |
| Beta - 345656<br>SAMPLE : MAUNAWILA_SAMPLE J<br>ANALYSIS : AMS-PRIORITY delivery<br>MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid<br>2 SIGMA CALIBRATION : Cal AD 1520 to 1590 (Cal BP 430 to 360) AND Cal AD 1620 to 1660 (Cal BP 330 to 290)  | 240 +/- 30 BP            | -22.8 o/oo                          | 280 +/- 30 BP                   |
| Beta - 345657<br>SAMPLE : MAUNAWILA_SAMPLE M<br>ANALYSIS : AMS-PRIORITY delivery<br>MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid<br>2 SIGMA CALIBRATION : Cal AD 1270 to 1310 (Cal BP 680 to 640) AND Cal AD 1360 to 1390 (Cal BP 590 to 560)  | 700 +/- 30 BP            | -26.0 o/oo                          | 680 +/- 30 BP                   |

FIGURE 141. RADIOCARBON DATING RESULTS (BETA ANALYTIC, INC.)

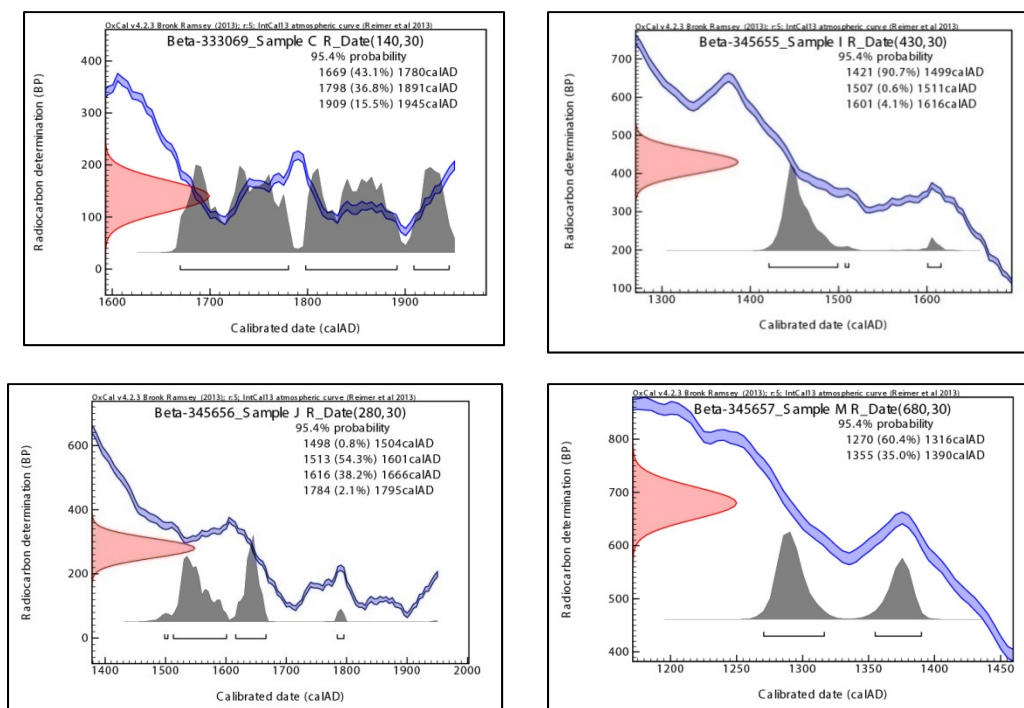


FIGURE 142. GRAPHS SHOWING RADIOCARBON DATING RESULTS (OXCAL 4.2 2013)



## SUMMARY AND INTERPRETATION

### BACKGROUND RESEARCH

Hau'ula has a rich cultural history exhibited in mythology, traditional accounts, and archaeological resources. A reoccurring theme found within traditional place names and mythological accounts of Hau'ula and Kaluanui include a connection to Kahiki, the Hawaiian homeland. Place names associated with Makuakaumana, including Kālaipāloa Point, and myths including the Two Fish From Tahiti, provide evidence of an early connection between this part of O'ahu and Kahiki and place Hau'ula within a wider Polynesian context. A study by Abad (2000) uses mythology and historic accounts to form a relative chronological genealogy for Hawai'i. According to Abad (2000) Pā'ao, Makuakaumana, and Pilika'ai'ea were associated with Generation 2. Using an average duration of chiefly reign length between fifteen to twenty five years, Generation 2 likely occurred between AD 1225-1435 (Abad 2000:225). The study also placed the reign of 'Olopana and the exploits of Kamapua'a within Generation 5, around AD 1300-1480.

According to background research, Hau'ula was a bountiful land. Pre-contact life within Hau'ula would have revolved around the fertile landscape; fishing, gathering, planting and maintaining *lo'i*, *kula* lands, and ponds, as well as common daily crafts and activities. Land Commission Awards (LCA) indicate heavy use of the lowlands behind the coast to the fringes of the Ko'olau for wetland *taro* farming, *kula* lands, and house lots. Claims also mention fishing rights and forest plots for gathering wood, cultivating dryland agricultural goods, and other forest resources.

Previous archaeological projects in Hau'ula have documented a *lo'i* field, stone agricultural features (walls and terraces), human burials, and *heiau*. Radiocarbon dates from Hau'ula span from the thirteenth through twentieth centuries. Three *heiau* have been documented in Hau'ula. Maunawila Heiau (Site # -287) is located near the southern border of Hau'ula along Punaiki Stream. Kaunihokahi Heiau (Site # -286) and an un-named *heiau* (SIHP # -3394) have been documented near the center of Hau'ula, within Ma'akua Gulch. Kaunihokahi Heiau was documented as having been considerably disturbed in historic times by dairy farm activities. The un-named *heiau* (Site #-3394) was recorded during recent archaeological studies in Ma'akua Valley and was radiocarbon dated to around AD 1440-1600 (Clark et al. 1998).

Compiled historic background research of the study parcel, TMK: [1] 5-4-05: 010, found short-lived permanent historic occupation by the McGregor family, followed by use of the land by squatters. Background and family knowledge indicates the McGregor 'ohana took ownership of the land in 1906 and lived on the parcel for around ten years, until the house burned down. Surface artifacts documented in the vicinity of the historic homestead found dateable debris from the mid 1900's. However, further archaeological documentation in the area has a high potential of uncovering more direct evidence of the homestead.

### PROJECT FIELDWORK

The parcel was divided into the Makai, Central, and Mauka Zones. Features were documented within the Makai Zone and in the near vicinity of Maunawila Heiau in the Central Zone (Table 27). This project included more than 530 hours of survey, documentation, excavation, and community outreach. The high volume of support by local and student volunteers attest to the importance and interest for this type of project in Hawai'i.

Table 27. Table Listing Features Documented Within the Study Parcel, Including The Makai Zone (Features A-J), The Central Zone (Features 1-12), and Sub-Surface Features Documented During Excavation (Features A-E)

| FEATURE  | TYPE/ FUNCTION                       | MEASUREMENTS   |
|--|--------------------------------------|--|
| <b>MAKAI ZONE</b>                                  |                                      |  |
| A  | Historic Burial Mound                | 3 m N/S x 2 m E/W, ranging from 7 cm to 50 cm in height  |
| B  | Burial Mound                         | 3 m N/S x 3 m E/W, ranging from 13 cm to 38 cm in height   |
| C  | Burial Mound                         | 2.7 m N/S x 3 m E/W, ranging from 90 cm to 100 cm in height  |
| D  | Burial Mound                         | 3.3 m N/S x 3.3 m E/W, ranging from 60 cm to 100 cm in height  |
| E  | Stone Alignments                     | Two alignments, E1: 16 m E/W, E2: 12 m NE/SW, ranging from 10 cm to 50 cm in height  |
| F  | Large Circular Pit                   | 4.8 m N/S x 5.3 m E/W, approximately 1.2 m deep  |
| G  | Historic House Foundation            | 12 m N/S x 7 m E/W, ranging from 3 cm to 30 cm in height   |
| H  | Low Mound                            | 3 m N/S x 2.4 m E/W, ranging from 20 cm to 36 cm in height   |
| I  | Large Grinding Stone                 | 1.2 m N/S x 1.15 m E/W, ranging from 25 cm to 39 cm in height  |
| J  | Historic to Modern Bulldozed Terrace | 20 m N/S ranging from approximately 20 cm to 70 cm in height   |
| FEATURE  | TYPE/ FUNCTION                       | MEASUREMENTS   |
| <b>CENTRAL ZONE, MAUNAWILA HEIAU (SIHP # -287)</b> |                                      |  |
| 1  | Lower Terrace Platform               | 40 m E/SE to W/NW by 25 m N/NE to S/SW and approximately 0.7 m to 2.6 m in height along the perimeter; surface is 33 m E/SE to W/NW by approximately 15 m N/NE to S/SW |
| Sub-Feature B                                      | Stone Alignment                      | 1.2 m NE/SW x 30 cm to 40 cm NW/SE, only exposed portion measured; Stratum III, 33-64 cmbd   |
| Sub-Feature C                                      | Stone Pavings                        | 2 m NE/SW x 1 m NW/SE, only exposed portion measured; Stratum III, 58-71 cmbd  |
| Sub-Feature D                                      | Stone Pavings                        | 2 m NE/SW x 1 m NW/SE, only exposed portion measured, Stratum III, 71-78 cmbd  |
| Sub-Feature E                                      | Buried Heiau Structure               | 2 m NE/SW x 1 m NW/SE, only exposed portion measured, Stratum V, 92-125 cmbd   |
| 2  | Upper Terrace Platform               | 14 m SE/NW by 6.5 m NE/SW, ranging from 28 cm to approximately 75 cm in height; surface is 11.5 m SE/NW by 4 m NE/SW   |

| FEATURE             | TYPE/ FUNCTION                            | MEASUREMENTS  |
|---------------------|---|---|
| <b>CENTRAL ZONE</b> |   |   |
| 3                   | Low Platform                              | 7 m NE/SW by 3.5 m NW/SE and ranging from approximately 20 cm to 35 cm in height                                  |
| 4                   | Paved Terrace                             | 6.5 m NW/SE by 3.5 m SW/NE and ranging approximately 20 cm to 40 cm in height                                     |
| 5                   | Low Terrace                               | 7 m NW/SE by 6 m NE/SW and ranging from 2 cm to 24 cm in height   |
| 6                   | Terrace/ Entrance Area                    | 12 m NW/SE by 5 m NE/SW   |
| 7                   | L-Shape Alignment                         | 8 m NW/SE by 5 m NE/SW and ranging from 13 cm to 26 cm in height  |
| 8                   | Mound                                     | 1.3 m N/S by 1.5 m E/W by 43 cm in height   |
| 9                   | Circular Alignment                        | 2.3 m N/S by 2.8 m E/W and ranging from 8 cm to 74 cm in height   |
| Sub-Feature A1      | Stone Paving                              | approximately 1 m NE/SW x 1 m NW/SE; Stratum III, 55-85 cmbd  |
| Sub-Feature A2      | Possible Post Mold                        | 31 cm E/W by 16 cm N/S ; Stratum III, 89-99 cmbd  |
| 10                  | Central Stone Concentration               | 3.6 m N/S by 4 m E/W and 23 cm in height  |
| 11                  | Pits/Depressions                          | Two pits, ranging in size from 120 cm N/S by 90 cm E/W and 45 cm deep to 2.2 m N/S by 3 m E/W and 80 cm deep      |
| 12                  | Large Basalt Boulders in Surrounding Area | Multiple Boulders ranging from 1.5 m N/S by 1.75 m E/W and 90 cm tall to 3.6 m N/S by 4 m E/W and 1.8 m in height |

## MAKAI ZONE

A total of ten features were recorded in the Makai Zone of the TMK parcel. Mound features in the Makai Zone (Features A-D and Feature H) utilize dry stone stacking and a boulder with cobble fill construction technique, indicative of traditional Hawaiian structural design. Basalt cobbles are used as alignments (Feature E), a boulder was utilized for traditional grinding activities (Feature I), and other features used natural stone boulders as structural components. Feature F is a large pit with a short boulder alignment and stepped entrance denoted with basalt cobbles. Feature G is a potential historic house location with a prominent corner of basalt cobbles and boulders in alignment. Therefore, all these features utilized natural stone elements typical of traditional Hawaiian construction. Although no radiocarbon dates have been obtained from the Makai Zone, based on structural style, condition, and interpreted function the majority of the features in this area are interpreted as being early post-contact.

## CENTRAL ZONE, MAUNAWILA HEIAU (SIHP # -287)

A total of twelve surface features were recorded in the Central Zone of the parcel. All of these features were found in relatively good condition and are associated with utilization of Maunawila Heiau. Documented features include a large platform terrace (Feature 1), a smaller upper platform terrace (Feature 2), a low platform (Feature 3), low terraces (Features 4 and 5), a possible *heiau* entrance area (Feature 6), an L-shaped alignment (Feature 7), a small mound (Feature 8), a circular alignment (Feature 9), a central rock concentration (Feature 10), earthen pits (Feature 11), and large boulders (Feature 12).

Sub-surface features documented during excavation were designated alphanumerically. Sub-surface features included a rough stone pavement (Feature A1), a small pit feature or possible post mold (Feature A2), a post-contact stone alignment (Feature B), layers of stone paving (Feature C and Feature D), and a buried *heiau* structure (Feature E). Excavation within Maunawila Heiau was conducted in order to answer specific research questions (Runyon and Tran 2012). Each research question is discussed individually below. Answers are summarized as a compilation of data developed during this study.

According to community members and Hawaiian cultural practitioners, the general consensus is that Maunawila Heiau is a place of life. The *heiau* is thought to be a medicinal or healing *heiau* (*heiau ho'ola*) or a place of fertility, agricultural and otherwise. Multiple gods were likely worshipped at Maunawila Heiau. The association of the *heiau* with Makuakaumana suggests a link to gods Kāne and Kaneloa. The association of Hau'ula and adjoining lands with Kamapua'a indicates a close tie to Lono. Due to the sites presumed function it is likely the fertility and healing gods Lono and Kāne were of eminent gods worshiped at the site. However, it is also possible other gods and/or goddesses such as Papa and Hina may have been worshiped. Maunawila Heiau is not thought to be a sacrificial temple (*luakini*).

## RESEARCH GOALS

### **1.) Recover suitable materials (charcoal, organics, diagnostic historic, etc.) to provide chronological information for indicating when Maunawila Heiau was utilized.**

Analyzed materials from Test Unit 1 found modern use of the *heiau* over the top of in situ traditional Hawaiian deposits. A stone paving (Feature A1) built along the western edge of Maunawila Heiau was constructed over a pre-contact cultural deposit. A small possible post mold feature (Feature A2) was documented extending from the Hawaiian cultural deposit into sterile soil. Identified charcoal from the buried cultural deposit consisted of native and Polynesian introduced plant species. A radiocarbon date from Feature A2 found traditional Hawaiian use of the site area in the late 1600's through late 1700's. Therefore, the western extent of Maunawila Heiau could not have been constructed until the late 1600's.



Analyzed materials from Test Units 2 and 3 found construction events dating from the pre-contact and post-contact time periods. Two construction events (Feature B and Feature C) were found to be post-contact, based on the presence of a .22 caliber bullet found within Feature C paving. Lower sub-surface features are associated with pre-contact temple construction. Lower cultural deposits utilized culturally-enriched sediments as construction fill. The deepest feature found within Test Units 2 and 3 (Feature E), representing a previous *heiau* structure, was the oldest feature found during this study. Identified charcoal from Test Units 2 and 3 consisted of native and Polynesian introduced plant species. Radiocarbon dates from Feature E indicate the *terminus post quem*, or the earliest date in which the structure may have been built, is AD 1513 (based on highest probabilities).

Secondarily placed or re-deposited sediments were identified within Stratum III and Stratum IV. The origin of these re-deposited sediments can only be assumed. However, due to the material content within these sediments, it is suggested that the soils are local to the Maunawila Heiau site area. This suggestion is due to the presence of natural spalling/ chipping, which is a frequent and rather unique characteristic of stones found within the site area, and the presence of coral within the soil matrix which indicates a religious context. Additionally, the re-deposited sediments did not contain midden materials (i.e. marine shells, food remains). Food remains are typically found within domestic habitation sites yet are non-typical at a place of purity and cleanliness such as a *heiau* (Kolb 1990 b, Valeri 1985). References to building of terraced *heiau* on slopes mention the use of soil from the upper side of the slope or base of the terrace facing to fill in the structure with soil (Bennett 1930:22-23, Kolb 1992:18). This study did not uncover evidence of soil removal from the base of the hillside, therefore it is possible the soil was procured from the upper slope. Sediments used to expand the *heiau* to its current size dated from the end of the 1200's to beginning of the 1300's AD. As there is evidence Maunawila Heiau was maintained during the post-contact period, this area was used by Hawaiians for more than 700 years.

Dates obtained from Maunawila Heiau correspond with a comprehensive study conducted on Maui where ninety dates collected from forty-one different heiau were compiled (Kolb 2006). The study found prolonged temple construction and expansion of existing structures occurred throughout AD 1200-1800 (Kolb 2006:657). Kolb (2006) was able to attribute changes in temple design with changes in Hawaiian society. Further in depth research into the social and political history of O'ahu and Ko'olauloa District could produce similar results.

According to Abad's (2000) genealogical chronology, Pā'ao, Makuakaumana, and Pilika'ai'ea, are associated with Generation 2 which dates from AD 1330-1435 (using fifteen, twenty, and twenty-five year durations for each chiefly reign) (225). The radiocarbon dates obtained from Maunawila Heiau indicate the exposed features, including the lowest construction event (Feature E) were built post AD 1500. Based on Abad's (2000) genealogical data, the dates of Maunawila Heiau place its construction between four and eleven generations later than the arrival of Pā'ao and Makuakaumana. If in fact Maunawila Heiau was built during the generation of Pā'ao and Makuakaumana (Generation 2) and the date of AD 1500 is the earliest construction event, the average chiefly reign would fall closer to twelve years (given that 250 years pass between the second and twenty-third generation).

## **2.) Recover artifactual materials to indicate the potential function of different activity areas.**

A few artifacts found in situ within Test Unit 1 provide some insight on potential function. A pointed stone and potential mortar were found on a buried stone paving (Feature A1). The uniquely shaped possible mortar and pestle suggests grinding of organics in small amounts. The artifacts could be associated with a medicinal function. A coral concentration and a large Kū or Kāne stone found within the Feature 9 circular alignment (Test Unit 1), suggest that Feature 9 was likely a location of an *ahu* or offering area.

The majority of recovered artifacts were found within secondarily placed fill sediments and were not necessarily found in their primary location. Test Units 2 and 3 found continuous re-construction and/or maintenance of the *heiau* in the form of layers of stone paving. Therefore, it is most likely that artifacts collected from Test Units 2 and 3 were transported and deposited within construction materials rather than being utilized and discarded in the location which they were found.

Several features of the *heiau* were attributed to structures historically documented as significant features of a *heiau* (Malo 1951, Kamakau 1976, Shimizu 1980). Along the eastern boundary of the main terrace of Maunawila Heiau (Feature 1) is a large circular boulder that is filled and leveled with basalt cobbles (Feature 1b). This feature is interpreted as a *kipapa*, or altar for offerings to be placed prior to their sacrifice by the *kahuna* (Figure 51). The upper platform terrace (Feature 2) is suggested as the site for a *hale mana*. A low terrace (Feature 4) with small circular pits or depressions (Feature 4a-4e) is suggested as the location of an oracle tower. A central concentration of stones (Feature 10) is suggested as a *hale waiea*, or house of the '*aha* cord. As more clearing work and additional detailed documentation continues at Maunawila Heiau, perhaps additional evidence will be found to further support these assumptions and attempt to identify additional activity areas of the *heiau*.

The possible *hale waiea* provides an intriguing connection between ritual practices established by chief Pilika'ai'ea, brought to Hawai'i by Pā'ao and Makuakaumana during the second generation of Hawaiian genealogy (Abad 2000). Pilika'ai'ea is thought to have instilled the '*aha ali'i* royal court. The '*aha ali'i* was a congregation of chiefs who enforced the right to rule and uphold chiefly rank through genealogical connections. The council determined gradations of tabu and were "bound to support each other in weal or woe at all hazards, even that of life itself" (Fornander 1880:29). The '*aha ali'i* had four main purposes described by Abad (2000):

Once fully established the '*aha ali'i* provided the following: 1.) a means for *ali'i* to be recognized as such, 2.) a venue in which the relative ranks of *ali'i* could be determined, 3.) an opportunity for *ali'i* from across the island to interact, exchange information, and to develop mutually beneficial ties, and 4.) a group decision making process that served to support, advise, or even correct the *ali'i nui* (Abad 2000:159).

This raises an additional possibility for traditional use of Maunawila Heiau by some of Hawai'i's highest ranking *ali'i*. However, this association is made through the presence of an intriguing boulder feature (Feature 10) in the center of the *heiau* that is interpreted as a potential location for a *hale waiea* and is therefore only extrapolated. High ranking temples are typically thought to be quite large. Based on Kolb's (2006) study of *heiau* of Maui Island, the size of Maunawila Heiau (1000 m<sup>2</sup>) indicates it is either a large community shrine or small politically centralized *heiau* (Kolb 2006).

### **3.) Examine the relationships between structural components in order to gain insight on building episodes and continued use, maintenance, and modification of the *heiau*.**

Results indicate that Maunawila Heiau was built in phases. A minimum of three phases can be inferred from the current study (Table 28, Figure 143, and Figure 144). Phase I consists of Feature E, which represents an original *heiau* structure. This previous structure may have been a simple platform. Only the northeast corner of Feature E was uncovered, therefore the feature likely extends northwest and southeast. Phase II includes the expansion of the temple by use of secondarily placed culturally-enriched sediments (Stratum IV in Test Units 2 and 3). Phase II also includes an overlying stone and coral paving (Feature D) and Feature 3 (low platform). The base of Feature 3 was documented as contemporaneous with the stone paving of Feature D, both of which cap Stratum IV.

During the Phase II expansion or sometime shortly thereafter, the current western boundary (location of Test Unit 1) was built. Chronologically, the link between Test Unit 1 and Test Units 2 and 3 is disconnected due to the

lack of testing within the central portion of Maunawila Heiau and the lack of precision in the obtained radiocarbon dates. The radiocarbon date obtained from the west boundary of the *heiau* provides a date range spanning over one hundred years. Additionally, the radiocarbon date obtained from Feature D did not pinpoint the targeted date of the features construction, rather it dated when the sediment had been lived on prior to its use as construction fill. What is known based on available data is that Feature 3 and the current western boundary of Maunawila Heiau are the result of a massive building episode which expanded the original *heiau* structure (Feature E). Therefore, based on information gathered during this study Phase 2 includes the western extent of Maunawila Heiau.

Phase III includes post-contact construction phases consisting of pavings or re-surfacing events (Feature B and Feature C). These paving events are considered post-contact due to the presence of a .22 caliber bullet casing found within Feature C. The extent of the re-surfacing events is extrapolated to include the entire eastern portion of Feature 1 which contains surface paving. Modern modification of the *heiau* (by squatters), documented in Feature 9, is not considered a significant construction episode.

Table 28 lists the features of Maunawila Heiau in relative chronological order. Two obtained radiocarbon dates provide evidence for the construction of Feature E dating after AD 1513 (Phase I). Following a major importation of sediments (Stratum IV, Test Unit 2 and 3) to expand the *heiau*, Feature 3 and Feature D were constructed (Phase II). Feature 9 is also associated with the Phase II expansion in this study. Based on available data, it appears large scale building events at Maunawila Heiau began after AD 1500 and continued through the late 1600's. Medium to smaller scale construction events (pavings/ re-surfacing) at the *heiau* continued through the early post-contact period of Hawaiian history. Continuous utilization of the site would likely have ended by 1819 due to the abolishment of the *kapu* system.

Due to the minimal amount of excavation conducted and relatively small number of radiocarbon dates obtained from Maunawila Heiau, interpretation of building episodes can only be considered preliminarily supported. It is largely unknown when other surface features associated with the *heiau* were incorporated. For instance it is unclear when Feature 2 (upper platform terrace) was constructed, or what phase of construction it corresponds. It is probable that the designated Phase II expansion actually occurred in several phases which were not uncovered during this study. It is also possible there may have been even an earlier building event prior to construction of Feature E. Excavations within Test Unit 2 and 3 documented a natural slight to moderate slope towards the northeast, evidenced in Stratum V and VI, in which the corner of Feature E was constructed on. It is presumed that the majority of Feature E is situated to the west and southwest, over a more level portion of the hillside. The leveled hillside could have supported an even earlier structure. The presumption of there being a structure that pre-dates Feature E is based on the early radiocarbon dates obtained from re-deposited sediments containing coral manuports and interpreted as likely originating from the site area.

The incorporation of coralline conglomerate slabs within Maunawila Heiau is a unique attribute for a Hawaiian temple. Test Units 2 and 3 were positioned adjacent to a coralline slab, Feature 3a. The coralline slab aligns perfectly with buried corner stones of Feature 3 (shown in profile). In order for the coralline slab to align so well, it must have been placed in it's current location prior to the underlying portion of Feature 3 being buried. As Feature B and C were found to cover the lower portion of Feature 3 and were found to likely be constructed during the post-contact period, it is possible the coral slab may have also been added historically. However, due to the connection of Hau'ula and Makuakaumana with Kahiki it is interesting to note archaeological studies at other Polynesian temples which incorporated coral blocks into ritual structures. Sharp et al. (2010:13238) found a common occurrence of coral being built into temples sites in central Polynesia during a period of 140 years (ca. AD 1620-1760). This time period corresponds well with dates obtained from Maunawila Heiau, particularly those associated with Phase II.

Table 28. Table Listing Features of Maunawila Heiau in Relative Chronological Order

| Construction Phase | Test Unit | Features   | Feature Type                 | Date                                   |
|--------------------|-----------|------------|------------------------------|--|
| I                  | 2 and 3   | Feature E  | early <i>heiau</i> structure | Post AD 1513                           |
| II                 | 2 and 3   | Feature 3  | low platform                 | contemporary with Feature D            |
| II                 | 2 and 3   | Feature D  | stone pavings                | contemporary with Feature 3            |
| II                 | 1         | Feature A2 | poss. post mold feature      | AD 1669-1780                           |
| II                 | 1         | Feature A1 | stone paving                 | caps pre-contact deposit (pre AD 1778) |
| III                | 2 and 3   | Feature C  | stone pavings                | post-contact (post AD 1778)            |
| III                | 2         | Feature B  | stone alignment              | post-contact (post AD 1778)            |

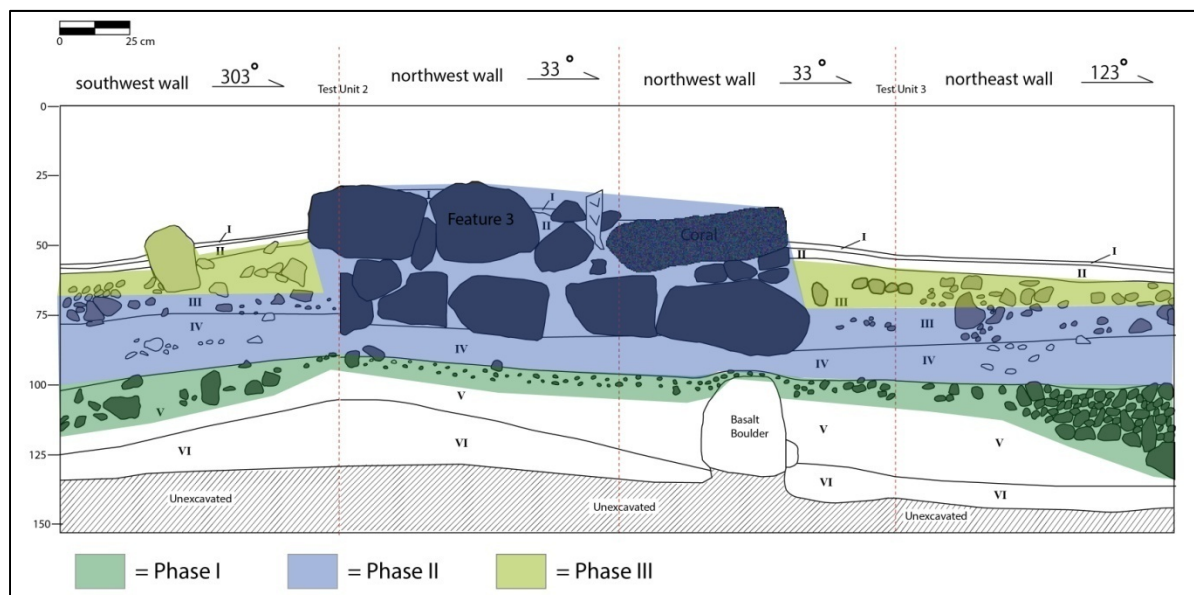


FIGURE 143. PROFILE OF TEST UNIT 2 AND 3, SHOWING THREE CONSTRUCTION PHASES



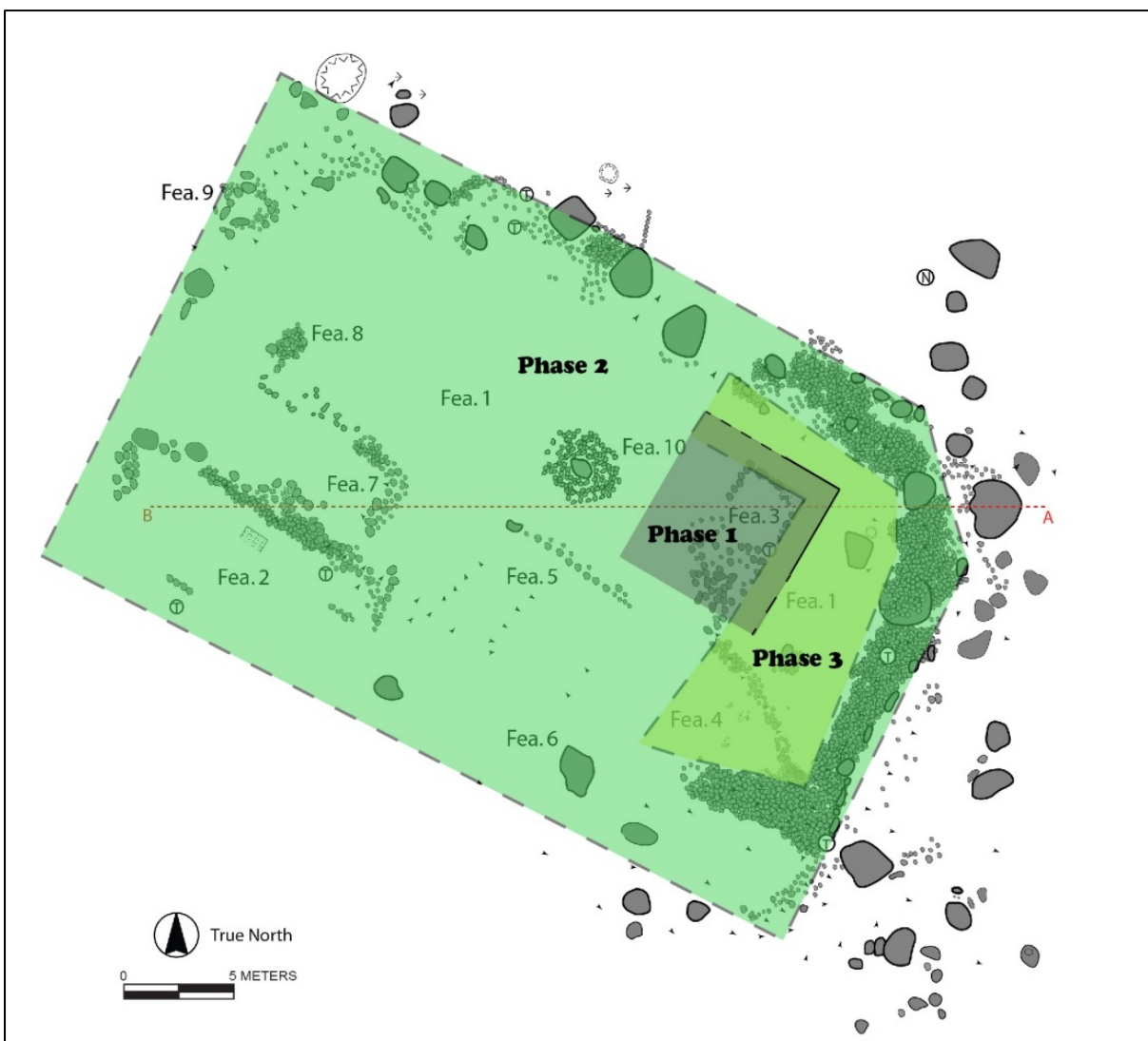


FIGURE 144. EXTRAPOLATED PHASES OF CONSTRUCTION FOR MAUNAWILA HEIAU

## SITE DESIGNATIONS

### OVERVIEW

Site designations will need to be agreed upon by the landowner and coordinated with the SHPD. Discussions can also be had regarding designation of traditional cultural properties (TCP's). By the end of this project the land will likely be owned by the Hawaiian Island Land Trust (HILT) (P.O. Box 965, Wailuku, Hawai'i 96793, 808-244-LAND, Main Contact: Christina Aiu, christina@hilt.org). Recommendations for site eligibility determinations are listed in Table 29 and Table 30.

This study recorded a large number of features which can be divided into two or three historic sites: 1.) Maunawila Heiau, 2.) the Makai Zone, and 3.) within the Makai Zone a separate site number could be designated for the historic infant burial (Feature A) (Table 29). Maunawila Heiau already has an associated State Inventory of Historic Properties (SIHP) number. However a letter report found in the SHPD library, titled *Heiau on O'ahu on the State and National Registers, O'ahu Heiau Sites Removed from Hawai'i Register in 1980* (no author) removed many *heiau* in Ko'olaupia District from the State Register, including Sites -286 (Kaunihokahi Heiau) and -287 (Maunawila Heiau). It is suggested that Maunawila Heiau be placed back onto the State and National Registers.

One to two site numbers are recommended to be obtained for the Makai Zone (see Table 29). In recommending site numbers for the Makai Zone, the separating factor between Feature A through Feature I is family knowledge of a historic burial mound, Feature A. Because Feature A is a known human burial, it could receive a separate site number (temporarily designated in this study as UH\_MH\_1). It is suggested that one site number be obtained for Feature B through Feature I (temporarily designated as UH\_MH\_2). Several potential burial mounds were documented in the Makai Zone of the parcel (Feature B through Feature D). Potential burial sites are defined by the DLNR/SHPD (2002) as "any specific unmarked location where prehistoric or historic human skeletal remains and their associated burial goods if any, are interred, and its immediate surrounding archaeological context, including any associated surface or subsurface features, deemed a unique class of historic property, and not otherwise included in [another site]" (276-2). Therefore, one site number is recommended for the grouping of features documented in the vicinity.

Feature J, a bulldozed terrace, was not found to have integrity or be of significance. However, due to the near proximity of Feature J to features of high significance, further investigation of the feature has the potential to uncover important cultural materials. Therefore, it is recommended that future archaeological work in the Makai Zone re-assess the significance of Feature J.

### SIGNIFICANCE ASSESSMENTS

The quality of significance for each historic property is based on age, integrity, and significance. Qualifying historic properties must typically be at least fifty years old (ACHP 2008, DLNR/SHPD 2002). Integrity of a historic property is based on the location, design, setting, materials, workmanship, feeling, and association (ACHP 2008).

The National Register assesses the significance of each historic property under four broad categories (Criteria A-D). The State of Hawai'i uses these same criteria and adds one additional significance criterion (Criterion E). Each historic property is assessed for:

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|             |   |
|-------------|---|
| Criterion A | Associated with events that have made a significant contribution to broad patterns of history;  |
| Criterion B | Associated with the lives of persons significant to our past;   |
| Criterion C | Embodies distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possess high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction; |
| Criterion D | Yielded or may be likely to yield information important in prehistory or history; and   |
| Criterion E | Historic property has cultural significance to an ethnic group, including, but not limited to, religious structures, burials, traditional cultural properties, cultural practices, and/or beliefs important to the groups history and cultural identity.                        |

Maunawila Heiau fulfills all State and National Register significance criteria (A through E). Maunawila Heiau embodies pre-contact traditional social, economic, and political lifeways of the Hawaiian people. Traditional cultural practices were significantly altered by the abolishment of the religious system (*kapu* system) in 1819. Therefore, Maunawila Heiau represents a former way of life which has contributed to the broad patterns of Hawaiian history (Criterion A). Maunawila Heiau is believed to be associated with the legendary prophet Makuakaumana from Kahiki (Criterion B). This association is evidenced in nearby place names and associated mythology placing Makuakaumana within Hau'ula and adjacent *ahupua'a*. Maunawila Heiau contains characteristics representative of the pre-contact time period, the site embodies work of a master, and high artistic values are found within the temple layout and architectural elements (Criterion C). The site has been found to contain important data pertaining to the history of Hawai'i and continues to yield much information (Criterion D). Lastly, Maunawila Heiau is of high cultural significance to the Hawaiian people.

Features in the Makai Zone of the study parcel are recommended significant under various criteria. The known historic burial mound (Feature A) is of high significance and is therefore recommended under Criterion E. The historic burial mound has already been surveyed and made an encumbrance on the parcel's TMK map. Potential burial mounds, Feature B through Feature D, are recommended under Criterion E as well as Criterion C due to their good condition, high craftsmanship, and artistic value. Feature H, a possible *ahu* or burial mound, is recommended under Criterion E. Several features, including stone alignments, a large pit, a house foundation, and a low mound (Feature E through Feature H), are likely to yield important information regarding the history of Hawai'i and are therefore recommended under Criterion D. The grinding stone or whetstone, Feature I, possesses characteristics of traditional Hawaiian activity and contains significant artistic value. Therefore, Feature I is recommended significant under Criterion C.

TABLE 29. TABLE LISTING FEATURES OF THE MAKAI ZONE, RECOMMENDED SITE DESIGNATION, AND SIGNIFICANCE CRITERIA

| Feature   | Type                       | Recommended Designation | Site | Significance Criterion |
|-----------|----------------------------|-------------------------|------|------------------------|
| Feature A | Historic Burial Mound      | UH_MH_1                 | E    |                        |
| Feature B | Burial Mound               | UH_MH_2                 | C, E |                        |
| Feature C | Burial Mound               | UH_MH_2                 | C, E |                        |
| Feature D | Burial Mound               | UH_MH_2                 | C, E |                        |
| Feature E | Stone Alignments           | UH_MH_2                 | D    |                        |
| Feature F | Large Pit                  | UH_MH_2                 | D    |                        |
| Feature G | House Foundation           | UH_MH_2                 | D    |                        |
| Feature H | Low Mound                  | UH_MH_2                 | E    |                        |
| Feature I | Grinding Stone/ Whetstone  | UH_MH_2                 | C    |                        |
| Feature J | Historic Bulldozer Terrace | N/A                     | N/A  |                        |

TABLE 30. FEATURES OF MAUNWILA HEIAU (SIHP # -287) AND SIGNIFICANCE CRITERIA

| Feature/ Sub-Feature  | Type   | Significance Criterion |
|---|--|------------------------|
| Feature 1<br>Feature B<br>Feature C<br>Feature D<br>Feature E | Lower Terrace/Platform<br>Basalt cobble alignment<br>Stone paving<br>Stone paving<br>Buried <i>heiau</i> structure (AD 1600)   | A, B, C, D, E          |
| Feature 2   | Upper Terrace/Platform   | A, B, C, D, E          |
| Feature 3   | Low Platform   | A, B, C, D, E          |
| Feature 4   | Paved Terrace  | A, B, C, D, E          |
| Feature 5   | Low Terrace/Alignment/Ramp   | A, B, C, D, E          |
| Feature 6   | Terrace and Altar Stone  | A, B, C, D, E          |
| Feature 7   | L-Shape Alignment  | A, B, C, D, E          |
| Feature 8   | Mound/ <i>Ahu</i>  | A, B, C, D, E          |
| Feature 9<br>Feature A1<br>Feature A2                         | Circular Alignment<br>Loose stone paving creating west edge of <i>heiau</i><br>Small post mold under Feature A1 (AD 1669-1780) | A, B, C, D, E          |
| Feature 10  | Central Stone Concentration  | A, B, C, D, E          |
| Feature 11  | Pits/Depressions   | D                      |
| Feature 12  | Large Basalt Boulders  | D                      |



## FUTURE WORK, RECOMMENDATIONS, AND CHALLENGES

### FUTURE WORK AND RECOMMENDATIONS

Planned future work in the study parcel includes mapping of additional features on the parcel, creation of a preservation plan, and mulching of large piles of cut vegetation for use in making pedestrian walking trails. The trails will provide easy-to-follow routes around the documented sites. Established trail systems will allow ample viewing opportunity of cultural features while also providing as a buffer. The trail system will be designed to discourage walking over the top of stacked stone features. This will help to keep the sites in their current good condition. Additionally, through community meetings and consultations interpretive signage will likely be developed for the parcel. Signage may include information regarding respectful behavior at sacred sites as well as cultural and archaeological background and interpretation. A Preservation Plan for documented sites will be written with community consultation. Future work at the *heiau* will be conducted in accordance with a community-produced Management Plan for Maunawila Heiau.

Further mapping and potential limited excavation work is recommended to be conducted within the study parcel. Mapping should be completed for known sites in the Central and Mauka Zones which were beyond the scope of the current study. As discussed in this report, there are additional sites which were marked with GPS and photographed however they have not been mapped in detail or cleared of vegetation. To assist with mapping the features, it is recommended to add these sites to the regular maintenance program established through community vegetation clearing days and educational site visits. Locations in the Makai Zone recommended for excavation include adjacent to Feature E (alignments), within Feature F (large pit), and within Feature G (possible historic house site).

Due to the limited excavation conducted at Maunawila Heiau, only preliminary conclusions can be drawn. Construction phases of the *heiau* presented in this report are only based on exposed stratigraphy. Through grant opportunities, additional testing and analyses of the phases of construction can continue to be developed. Results and interpretation gathered from this study should be used as hypotheses for future studies in the parcel. Locations recommended for excavation include the area between Feature 3 (platform) and Feature 10 (central boulder and stone concentration), Feature 2 (upper terrace), Feature 5 (low terrace), and Feature 7 (L-shaped alignment). Additional charcoal identification and radiocarbon analyses are recommended to further explore the development of Maunawila Heiau. Coral specimens should be analyzed by an expert to determine whether the artifact assemblage includes corals appropriate for  $^{230}\text{Th}/\text{U}$  dating, which could provide extremely precise dates to pinpoint when specific construction events occurred.

This study attempted to compile available information for Hau'ula and place Maunawila Heiau within a larger context by also incorporating history of nearby *ahupua'a*. With additional research and investigation the history of this region can be even further compiled and analyzed. As there is strong community support to uncover and disseminate local history, it is strongly recommended to continue acquiring related mythology, ethnographic accounts, historic documentation, cultural knowledge, and archaeological research for this region of windward O'ahu. Archaeological survey, field mapping and documentation of surface features, and limited testing at other sites within Hau'ula is also recommended to further piece together the cultural landscape in which Maunawila Heiau is situated.

It is recommended for further research into the development of *ahupua'a* boundaries to identify changes in territorial divisions over time and examine temporal associations of *heiau* by their spatial distribution (Mulrooney

and Ladefoged 2005). Analyzing the distribution of sites, particularly ceremonial architecture, can uncover Hawaiian territorial divisions and varying levels of political control and influence (Kolb 1994, Kolb and Snead 1997, Stevenson 2002). Incorporating genealogical data with this type of information could help develop the history of this area. There is much more to learn about in Hau'ula's backyard.

## CHALLENGES

Several challenges were encountered during this project. A major challenge has been the constant growth of vegetation, typical of windward O'ahu. This challenge was overcome with the placement of thick black plastic over large areas once they were cleared and the scheduling of regular community and student events which devote much time and energy into removing vegetation. Designation of one or more community members or a rotating community group schedule to provide regular site visits and general maintenance for the *heiau* will likely be a future necessity.

It was a challenge to complete multiple excavations within one semester (Phase II). Because excavation can be quite time consuming and requires detailed documentation, excavation work was not conducted within one semester. Rather, it took two semesters (Phase II and III) and only three test units were excavated. The proposed "Research Goals and Sampling Strategy" (Runyon and Tran 2012) written for excavation work, indicated six locations for test units with an additional three units if time permitted. This proposed strategy proved to be very ambitious and unattainable for this project. The excavation work was challenged by the frequency and depth of sub-surface features and a significant amount of time allotted for educational and community events. During Phase II, five community days, three student days, a community meeting, and two formal presentations were completed. Therefore, it was a challenge to balance archaeological fieldwork and active participation in community outreach. Archaeological work and community involvement were treated as equally important components of this study throughout this project's duration. This is likely a large reason for the project's success in maintaining strong community support and engagement. If it were not a possibility to extend the project additional semesters then the scope of fieldwork and/or amount of community involvement would have had to be drastically decreased. This project has helped to create a long-term vision for the property and I am thankful to have had the opportunity to be part of the process.

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APPENDIX A ARTIFACT CATALOGUE

| ACC # | BAG # | TU | STR.   | DEPTH<br>(cmbd) | FEA/ SUB- FEATURE | MATERIAL        | COLOR/ TYPE                                     | FUNCTION                  | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION   |
|-------|-------|----|--------|-----------------|-------------------|-----------------|---|---------------------------|-------|------------|-----------------|---|
| 1     | 1     | 1  | I      | 66-75           | 9                 | METAL           | FERROUS (CORRODED)                              | UNKNOWN                   | 37    | 12.4       | 2.2 x 1.3 x 0.3 | collected from SE por of TU1, possible can parts                  |
| 2     | 2     | 1  | I      | 66-75           | 9                 | ALUMINUM        | RED, MACHINE-PRINTED, SODA CAN                  | MODERN CONSUMPTION        | 1     | 24.2       | 12 x 9 x 6      | "ALOHA Maid" brand "STRAWBERRY GUAVA" drink                       |
| 3     | 3     | 1  | I      | 66-75           | 9                 | PLASTIC         | WHITE, MACHINE- PRINTED, DENTAL FLOSS CONTAINER | MODERN PERSONAL HYGENE    | 25    | 4.1        | 4.7 x 4.4 x 1.1 | purple logo reading "LONGS" (in cursive), "DENTAL **"             |
| 4     | 3     | 1  | I      | 66-75           | 9                 | PLASTIC/ RUBBER | BLUE & BLACK, SHORT TUBING                      | MODERN PERSONAL HYGENE    | 2     | 0.5        | 1.2 x 1 x 1     | associated with Acc # 4 (dental floss container)                  |
| 5     | 3     | 1  | I      | 66-75           | 9                 | GLASS           | COLORLESS, BOTTLE NECK FRAGMENT                 | UNKNOWN                   | 2     | 0.8        | 2.5 x 1.4 x 0.7 | thin glass, suggests a personal hygiene function                  |
| 6     | 4     | 1  | II     | 66-77           | 9                 | TAR             | BLACK, ROOFING MATERIAL                         | MODERN ARCHITECTURE       | 1     | 1          | 3 x 2.1 x o.2   | thin roofing tar with green speckles on one side                  |
| 7     | 4     | 1  | II     | 66-77           | 9                 | GLASS           | COLORLESS, BOTTLE FINISH FRAGMENT               | UNKNOWN                   | 14    | 1.5        | 1.6 x 0.8 x 0.2 | one external thread   |
| 8     | 4     | 1  | II     | 66-77           | 9                 | PLASTIC         | CREAM, UTENSIL SHAFT                            | MODERN CONSUMPTION        | 1     | <0.1       | 1.5 x 0.5 x 0.2 | likely a fragmented shaft of plastic utensil (i.e. fork, spoon..) |
| 9     | 4     | 1  | II     | 66-77           | 9                 | PLASTIC         | GREEN   | UNKNOWN                   | 1     | 0.2        | 1.9 x 0.6 x 0.3 |   |
| 10    | 4     | 1  | II     | 66-77           | 9                 | PLASTIC         | BLACK & PURPLE                                  | UNKNOWN                   | 2     | <0.1       | 0.7 x 0.5 x 0.1 |   |
| 11    | 4     | 1  | II     | 66-77           | 9                 | STONEWARE       | WHITE, BODY FRAGMENT                            | CONTAINER                 | 1     | 0.3        | 0.6 x 0.7 x 0.3 | burned; possibly for food storage, flower pot, or other use       |
| 12    | 5     | 1  | II     | 66-77           | 9                 | METAL           | FERROUS   | UNKNOWN                   | 49    | 14.5       | 1.7 x 1.5 x 0.3 |   |
| 13    | 5     | 1  | II     | 66-77           | 9                 | METAL           | FERROUS, WIRE NAILS                             | MODERN ARCHITECTURE       | 2     | 8.2        | 6.6 x 0.7 x 0.5 | flat head nails   |
| 14    | 6     | 1  | II     | 66-77           | 9                 | CORAL           | MANUFPORT                                       | TRADITIONAL OFFERING      | 29    | 28.6       | 4.2 x 2.3 x 1.3 | poss. Incorporated from lower strata associated with use of heiau |
| 15    | 7     | 1  | II     | 75-77           | 9                 | LANDSNAIL       | <i>Achatina fulica</i>                          | NATURAL                   | 8     | <0.1       | 1 x 0.9 x 0.1   | modern introduction, Post 1930                                    |
| 16    | 7     | 1  | II     | 75-77           | 9                 | LANDSNAIL       | <i>Paropea achatinaceum, Achatina fulica</i>    | NATURAL                   | 3     | <0.1       | 0.6 x 0.3 x 0.3 | modern introduction, Post 1930                                    |
| 17    | 7     | 1  | II     | 75-77           | 9                 | ANIMAL BONE     | CHICKEN LONG BONE SHAFT                         | LIKELY MODERN CONSUMPTION | 1     | 0.6        | 3 x 1 x 0.5     |   |
|       | 8     | 1  | II     | 75-77           | 9                 | CHARCOAL        | UNIDENTIFIED                                    | COMBUSTION                | 5     | <0.1       |                 |   |
| 18    | 8     | 1  | II     | 75-77           | 9                 | BASALT          | DEBITAGE  | TOOL PRODUCTION           | 1     | 0.4        | 1.6 x 1 x 0.2   | interior flake with platform                                      |
| 19    | 8     | 1  | II     | 75-77           | 9                 | BASALT          | GRAY PEBBLE                                     | UNKNOWN                   | 1     | 0.1        | 0.7 x 0.4 x 0.4 |   |
| 20    | 9     | 1  | III    | 69-79           | 9/ FEA A1         | BASALT          | WATER ROUNDED STONES                            | TRADITIONAL ARCHITECTURE  | 2     | 73.5       | 5.7 x 4.3 x 1.6 | 1 medium and 1 small size, collected from Fea. A1 paving          |
|       | 10    | 1  | III    | 74              | 9                 | SEEDS           | BLACK, ROUND; MAKOLE SEED                       | NATURAL                   | 2     | 0.5        | 0.6 dia.        | SEED_1: Makole ( <i>Coprosma granadensis</i> )                    |
| 21    | 11    | 1  | II-III | 69-75           | 9                 | CORAL           | MANUPORT  | TRADITIONAL OFFERING      | 66    | 272.5      | 7.2 x 6.4 x 3.7 | coral concentration   |
| 22    | 12    | 1  | III    | 69-79           | 9                 | CORAL           | MANUPORT  | TRADITIONAL OFFERING      | 11    | 1          | 1.3 x 1 x 0.4   |   |
|       | 12    | 1  | III    | 69-79           | 9                 | KUKUI NUT       | NUT SHELL                                       | UNKNOWN                   | 1     | <0.1       | 1.3 x 1.1 x 0.4 |   |
| 23    | 13    | 1  | III    | 69-79           | 9                 | GLASS           | COLORLESS, POSS. BOTTLE                         | UNKNOWN                   | 2     | 0.7        | 1.9 x 1 x 1.2   |   |
| 24    | 13    | 1  | III    | 69-79           | 9                 | PLASTIC         | BLACK   | UNKNOWN                   | 1     | <0.1       | 1 x 1.6 x 1.1   |   |
| 25    | 13    | 1  | III    | 69-79           | 9                 | BASALT          | BLACK, PEBBLE                                   | UNKNOWN                   | 1     | 0.1        | 0.6 x 0.6 x 0.3 | rounded, shiney pebble  |
|       | 14    | 1  | III    | 79              | 9                 | CHARCOAL        | UNIDENTIFIED                                    | COMBUSTION                | 2     | <0.1       |                 | small   |
|       | 14    | 1  | III    | 79              | 9                 | CHARCOAL        | UNIDENTIFIED                                    | COMBUSTION                | 2     | <0.1       |                 | small   |
|       | 15    | 1  | III    | 79-86           | 9                 | CHARCOAL        | UNIDENTIFIED                                    | COMBUSTION                | 3     | <0.1       |                 | small to large  |
|       | 15    | 1  | III    | 80              | 9                 | CHARCOAL        | UNIDENTIFIED                                    | COMBUSTION                | 2     | 0.1        |                 | small to large  |

| ACC # | BAG # | TU | STR.   | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL           | COLOR/ TYPE                          | FUNCTION                 | # PCS | WEIGHT (g) | L x W x Th (cm)  | DESCRIPTION   |
|-------|-------|----|--------|--------------|-------------------|--------------------|--------------------------------------|--------------------------|-------|------------|------------------|---|
|       | 15    | 1  | III    | 81           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 46    | 1          |                  | under a stone, small to med   |
|       | 15    | 1  | III    | 83           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 2     | <0.1       |                  | med size  |
| 26    | 16    | 1  | III    | 77-80        | 9                 | CORAL              | MANUPORT                             | TRADITIONAL OFFERING     | 1     | 24.5       | 3.8 x 2.6 x 2.5  |   |
| 27    | 17    | 1  | III    | 81           | 9                 | CORAL              | MANUPORT                             | TRADITIONAL OFFERING     | 3     | 0.8        | 1.4 x 0.6 x 0.5  |   |
| 28    | 18    | 1  | III    | 76-82        | 9/ FEA A1         | BASALT             | OVULAR, WATER ROUNDED COBBLE         | UNKNOWN                  | 1     | 589.7      | 11.8 x 7.8 x 4.8 | circular depression (1-1.5 cm deep) on one end, shape and form suggests potential use for processing plants, nuts or dye; poss. association with Acc. #31 |
| 29    | 19    | 1  | III    | 69-79        | 9                 | CORAL              | MANUPORT                             | TRADITIONAL OFFERING     | 2     | 0.3        | 1.1 x 0.7 x 0.5  |   |
|       | 20    | 1  | III    | 76           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 1     | 0.3        |                  | large piece charcoal  |
| 30    | 21    | 1  | III    | 79-82        | 9/ FEA A1         | DECOMPOSING BASALT | BLACK & ORANGE, SMOOTH, THIN         | TRADITIONAL ARCHITECTURE | 2     | 218.1      | 8.4 x 5.9 x 1.6  | sides found facing upward are very orange, collected within Feature A1  |
|       | 22    | 1  | III    | 82           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 7     | <0.1       |                  | small to med  |
|       | 23    | 1  | III    | 86           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 1     | <0.1       |                  | med size  |
|       | 24    | 1  | III    | 87           | 9                 | CHARCOAL           | IDENTIFIED, AKOKO                    | COMBUSTION               | 2     | 0.3        |                  | collected from NW wall, CHARCOAL ID_SAMPLE_TU1_B  |
|       | 25    | 1  | III    | 80           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 6     | <0.1       |                  | small to med  |
|       | 25    | 1  | III    | 81           | 9                 | CHARCOAL           | IDENTIFIED, ULEI                     | COMBUSTION               | 1     | <0.1       |                  | below FEA A-1, CHARCOAL ID_SAMPLE TU1_A   |
|       | 25    | 1  | III    | 81           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 3     | <0.1       |                  | sample 3, small to med  |
|       | 25    | 1  | III    | 81           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 1     | <0.1       |                  | sample 4, large size  |
|       | 25    | 1  | III    | 82           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 2     | <0.1       |                  | small   |
|       | 25    | 1  | III    | 84           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 7     | <0.1       |                  | small to med  |
|       | 25    | 1  | III    | 85           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 4     | <0.1       |                  | small to med  |
|       | 25    | 1  | III    | 85           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 6     | <0.1       |                  | sample 2, small to med  |
|       | 25    | 1  | III    | 87           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 12    | 0.3        |                  | charcoal concentration, small to large size   |
|       | 25    | 1  | III    | 88           | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 25    | 1.3        |                  | small to large  |
|       | 26    | 1  | III    | 81-89        | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 68    | 2          |                  | small to large  |
|       | 27    | 1  | III    | 79-89        | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 14    | 0.3        |                  | charcoal from screened mat, small to med  |
|       | 28    | 1  | III-IV | 90-99        | 9/ FEA A2         | CHARCOAL           | IDENTIFIED; AKOKO, ULEI, KUKUI, PILO | COMBUSTION               | 16    | 0.6        |                  | collected from small pit feature (FEA. A2), CHARCOAL ID_SAMPLE TU1_C, RADIOCARBON: AD 1669-1781 (43% probability)   |
|       | 29    | 1  | III    | 79-89        | 9                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 3     | <0.1       |                  | sm-med size pieces  |
|       | 30    | 1  | III-IV | 89-99        | 9/FEA A2          | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 23    | 0.6        |                  | sm-med size pieces  |
| 31    | 1A    | 1  | III    | 80           | 9/ FEA A1         | BASALT             | POINTED GROUND STONE                 | ABRAIDER/ GRINDING TOOL  | 1     | 211.1      | 9.1 x 5.1 x 3.1  | mano; found in NE profile wall, SAMPLE EDXRF_1  |
| 32    | 31    | 2  | I      | 41           | 1                 | LANDSNAIL          | <i>Euglandina vosea</i>              | NATURAL                  | 13    | 1.5        | 3.5 x 1.4 x 1.3  | modern introduction, Post 1930  |
| 33    | 32    | 2  | II     | 42-59        | 1                 | CORAL              | MANUPORT                             | TRADITIONAL OFFERING     | 15    | 11.6       | 2.8 x 2.6 x 1.9  |   |
| 34    | 32    | 2  | II     | 42-59        | 1                 | LANDSNAIL          | <i>Opeas beckianum</i>               | NATURAL                  | 2     | <0.1       | 0.8 x 0.3 x 0.3  | modern introduction, Post 1930  |
| 35    | 33    | 2  | II     | 42-59        | 1                 | MARINE SHELL       | Hipponix sp.                         | MANUPORT                 | 1     | 0.1        | 0.8 x 0.7 x 0.4  | likely associated with Fea. 3 coral slab  |
|       | 34    | 2  | III    | 46           | 1                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 3     | <0.1       |                  |   |
|       | 34    | 2  | III    | 48           | 1                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 1     | <0.1       |                  |   |
| 36    | 35    | 2  | III    | 48           | 1                 | BASALT             | WATER ROUNDED STONE                  | MANUPORT                 | 1     | 9.1        | 2.8 x 1.8 x 1.6  |   |
|       | 36    | 2  | III    | 48-58        | 1                 | CHARCOAL           | UNIDENTIFIED                         | COMBUSTION               | 7     | <0.1       |                  |   |



| ACC # | BAG # | TU | STR. | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL       | COLOR/ TYPE                     | FUNCTION             | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION   |
|-------|-------|----|------|--------------|-------------------|----------------|---------------------------------|----------------------|-------|------------|-----------------|---|
|       | 36    | 2  | III  | 50           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 6     | <0.1       |                 |   |
|       | 36    | 2  | III  | 51           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 2     | <0.1       |                 |   |
|       | 36    | 2  | III  | 52           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 5     | <0.1       |                 | extremely small   |
|       | 36    | 2  | III  | 56           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 10    | 0.3        |                 | med to large pieces   |
|       | 37    | 2  | III  | 52           | 1                 | KUKUI NUT      | NUT SHELL, UNBURNED             | UNKNOWN              | 5     | 0.6        | 1.3 x 1 x 0.6   |   |
|       | 37    | 2  | III  | 52           | 1                 | WOOD           | BROWN, UNBURNED                 | UNKNOWN              | 7     | 0.3        | 1.3 x 0.7 x 0.4 |   |
| 37    | 38    | 2  | III  | 56           | 1                 | BASALT         | SPALLING/ CHIPPING              | NATURAL              | 3     | 2.9        | 2.2 x 1.8 x 0.3 |   |
| 38    | 39    | 2  | III  | 59-62        | 1                 | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 6     | 3.3        | 2.6 x 1.8 x 1   | 1 med size  |
| 39    | 40    | 2  | III  | 61           | 1                 | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 1     | 0.3        | 1.2 x 0.8 x 0.5 | hook-shaped, picture, broken  |
| 40    | 41    | 2  | III  | 61           | 1/ FEA C          | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 2     | 0.3        | 1.1 x 0.8 x 0.5 |   |
| 41    | 42    | 2  | III  | 62           | 1/ FEA B          | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 1     | 1.7        | 2.2 x 1.6 x 1.2 |   |
|       | 43    | 2  | III  | 56           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 2     | <0.1       |                 |   |
|       | 43    | 2  | III  | 59           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 7     | <0.1       |                 | sample 1  |
|       | 43    | 2  | III  | 59           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 3     | <0.1       |                 | sample 2  |
|       | 43    | 2  | III  | 59           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 4     | 0.1        |                 | sample 3, med size  |
|       | 43    | 2  | III  | 60           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 3     | <0.1       |                 | near coral slab, med to large pieces                                      |
|       | 43    | 2  | III  | 62           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 3     | <0.1       |                 |   |
|       | 44    | 2  | III  | 57           | 1/ FEA B          | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 2     | <0.1       |                 | under stone of FEA. B   |
|       | 44    | 2  | III  | 58           | 1/ FEA B          | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 1     | <0.1       |                 | under stone of FEA. B   |
|       | 44    | 2  | III  | 60           | 1/ FEA B          | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 2     | <0.1       |                 | under stone of FEA. B   |
|       | 44    | 2  | III  | 60-64        | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 7     | <0.1       |                 |   |
|       | 44    | 2  | III  | 62-64        | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 6     | <0.1       |                 | small to med  |
|       | 44    | 2  | III  | 63           | 1/ FEA C2         | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 1     | <0.1       |                 | thin wood   |
|       | 44    | 2  | III  | 64           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 1     | <0.1       |                 | med size  |
|       | 44    | 2  | III  | 65           | 1/ FEA C2         | CHARCOAL       | IDENTIFIED, LAMA                | COMBUSTION           | 3     | 0.1        |                 | CHARCOAL ID_ SAMPLE D   |
| 42    | 46    | 2  | III  | 62           | 1/ FEA C          | BASALT         | POSS. DEBITAGE                  | TOOL PRODUCTION      | 1     | 6          | 2.8 x 2.7 x 0.7 |   |
| 43    | 47    | 2  | III  | 62-65        | 1/ FEA C          | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 3     | 0.3        | 1.3 x 0.5 x 0.4 |   |
|       | 48    | 2  | III  | 60-64        | 1/ FEA C-C2       | SEEDS          | BROWN, OBLONG, HAOLE KOA        | NATURAL              | 6     | 0.2        | 0.7 x 0.4 x 0.2 | SEED_2: Haole koa ( <i>Leucaena glauca</i> )                              |
| 44    | 49    | 2  | III  | 60-64        | 1/ FEA C-C2       | AMMUNITION     | CUPREOUS (COPPER-BASED), BULLET | HISTORIC RECREATION  | 1     | 1.8        | 1 x 0.6 x 0.6   | conical head with copper heel, .22 caliber                                |
| 45    | 49    | 2  | III  | 60-64        | 1/ FEA C-C2       | VOLCANIC GLASS | DEBITAGE                        | TRADITIONAL CRAFT    | 2     | 0.5        | 1.1 x 0.6 x 0.4 | one piece is 90% cortex, one is debitage with 30 % cortex; SAMPLE EDXRF_3 |
|       | 50    | 2  | III  | 62-64        | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 2     | <0.1       |                 | med size  |
| 46    | 51    | 2  | III  | 65-66        | 1/FEA C2          | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 2     | 0.7        | 1.7 x 1 x 0.7   |   |
| 47    | 51    | 2  | III  | 62-64        | 1                 | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 9     | 18.8       | 2.9 x 2 x 1.2   |   |
| 48    | 51    | 2  | III  | 58-66        | 1                 | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 1     | 0.1        | 1 x 0.5 x 0.3   | water-rounded, found in north wall  |
|       | 51    | 2  | III  | 64           | 1                 | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 2     | <0.1       |                 |   |
|       | 51    | 2  | III  | 65           | 1/FEA C2          | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 1     | <0.1       |                 |   |
|       | 51    | 2  | III  | 58-66        | 1/FEA C-C2        | CHARCOAL       | UNIDENTIFIED                    | COMBUSTION           | 1     | <0.1       |                 |   |
| 49    | 52    | 2  | III  | 65-74        | 1                 | CORAL          | MANUPORT                        | TRADITIONAL OFFERING | 8     | 18.2       | 3.2 x 2.7 x 1.3 |   |

| ACC # | BAG # | TU | STR.   | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL       | COLOR/ TYPE                      | FUNCTION             | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION  |
|-------|-------|----|--------|--------------|-------------------|----------------|----------------------------------|----------------------|-------|------------|-----------------|--|
| 50    | 52    | 2  | III    | 68-71        | 1/FEA C2          | BASALT         | POSS. DEBITAGE                   | TOOL PRODUCTION      | 2     | 1.1        | 1.6 x 1.4 x 0.3 | debitage or spalling/ chipping   |
| 51    | 52    | 2  | III    | 68-71        | 1/FEA C2          | CORAL          | MANUPORT                         | TRADITIONAL OFFERING | 2     | <0.1       | 0.6 x 0.6 x 0.3 |  |
|       | 52    | 2  | III    | 68-71        | 1/FEA C2          | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 26    | 0.7        |                 |  |
|       | 52    | 2  | III    | 68-71        | 1/FEA C2          | WOOD           | UNBURNED                         | UNKNOWN              | 1     | <0.1       | 1 x 0.7 x 0.2   |  |
|       | 52    | 2  | III    | 68-71        | 1/FEA C2          | SEEDS          | BROWN, OBLONG and SEMI- CIRCULAR | UNKNOWN              | 5     | <0.1       | 0.7 x 0.4 x 0.2 | SEED_3: Haole koa ( <i>Leucaena glauca</i> ), Spanish clover (Desmodium incanum) |
| 52    | 52    | 2  | III    | 69-71        | 1/FEA C2          | CORAL          | MANUPORT                         | TRADITIONAL OFFERING | 15    | 38.8       | 3.9 x 2 x 1.3   |  |
| 53    | 52    | 2  | III    | 71-75        | 1/ FEA D          | BASALT         | DEBITAGE                         | TOOL PRODUCTION      | 1     | 0.8        | 1.4 x 1.2 x 0.4 | platform and scaring   |
|       | 52    | 2  | III    | 68           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 1     | <0.1       |                 | med size   |
|       | 52    | 2  | III    | 71-75        | 1/ FEA D          | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 9     | <0.1       |                 | small to med size  |
|       | 52    | 2  | III    | 71-75        | 1/ FEA D          | WOOD           | UNBURNED                         | UNKNOWN              | 1     | <0.1       | 1 x 0.8 x 0.3   | wood fragment or root cast   |
| 54    | 52    | 2  | III    | 75           | BELOW FEA D       | VOLCANIC GLASS | FLAKE                            | TRADITIONAL CRAFTS   | 1     | <0.1       | 0.7 x 0.5 x 0.1 | SAMPLE EDXRF_4   |
|       | 52    | 2  | III    | 68-71        | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 32    | 0.6        |                 | small to large   |
|       | 52    | 2  | III    | 69           | 1/ FEA C2         | CHARCOAL       | IDENTIFIED, AKOKO                | COMBUSTION           | 4     | 0.1        |                 | within C-2 paving, CHARCOAL ID_SAMPLE E  |
|       | 52    | 2  | III    | 70           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 3     | <0.1       |                 | small  |
|       | 52    | 2  | III    | 70           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 8     | <0.1       |                 | NUMBER 2, small to med.  |
|       | 52    | 2  | III    | 71           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 17    | 0.7        |                 | NUMBER 1, small to large   |
|       | 52    | 2  | III    | 71           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 7     | 0.2        |                 | NUMBER 2, small to large   |
|       | 52    | 2  | III    | 71           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 3     | 0.1        |                 | NUMBER 2, one large piece  |
|       | 52    | 2  | III    | 71-75        | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 17    | 0.4        |                 | small to large   |
|       | 52    | 2  | III    | 71           | 1                 | BURNED WOOD    | POSS. WORKED                     | TRADITIONAL CRAFTS   | 2     | 0.8        | 2 x 1.3 x 0.4   | large and flat, mendable, cut notch; designated Acc. #65 then de-accessioned     |
| 55    | 53    | 2  | III    | 66-71        | 1                 | BASALT         | DIKESTONE                        | TOOL PRODUCTION      | 1     | 231.4      | 9.2 x 6.5 x 2.7 | dikestone with scaring, poss. Flaking; EDXRF_7                                   |
| 56    | 53    | 2  | III    | 73           | 1/ FEA D2         | BASALT         | SCRAPER/ CHOPPING TOOL           | TRADITIONAL CRAFTS   | 1     | 176.3      | 8.1 x 7.4 x 2.2 | from east sidewall, SAMPLE EDXRF_2   |
| 57    | 53    | 2  | IV     | 78           | 1                 | CORAL          | MANUPORT                         | TRADITIONAL OFFERING | 1     | <0.1       | 0.7 x 0.4 x 0.2 |  |
| 58    | 53    | 2  | IV     | 78-84        | 1                 | BASALT         | SPALLING/ CHIPPING               | NATURAL              | 7     | 8.5        | 2.9 x 2.2 x 0.5 | natural spalling/ chipping   |
|       | 53    | 2  | IV     | 78-84        | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 140   | 4.6        |                 | small to large   |
|       | 53    | 2  | IV     | 78-84        | 1                 | SEEDS          | BROWN, OBLONG, HAOLE KOA         | UNKNOWN              | 1     | <0.1       | 0.7 x 0.4 x 0.2 | SEED_5: Haole koa ( <i>Leucaena glauca</i> )                                     |
|       | 53    | 2  | III    | 77-78        | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 12    | 0.2        |                 | med size   |
|       | 53    | 2  | IV     | 78           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 3     | 0.2        |                 | one large piece  |
|       | 53    | 2  | IV     | 78-80        | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 144   | 3.6        |                 | flecking to large  |
|       | 53    | 2  | IV     | 79           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 4     | 0.2        |                 | small to large   |
|       | 53    | 2  | IV     | 79-84        | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 58    | 2.2        |                 | number 2, flecking to large  |
|       | 53    | 2  | IV     | 79           | UNDER FEA 3       | CHARCOAL       | IDENTIFIED AS UNKNOWN            | COMBUSTION           | 1     | <0.1       |                 | CHARCOAL ID_SAMPLE G   |
|       | 53    | 2  | IV     | 81-82        | 1                 | CHARCOAL       | IDENTIFIED, OHIA LEHUA           | COMBUSTION           | 14    | 10.44      |                 | large charcoal, CHARCOAL ID_SAMPLE H   |
|       | 53    | 2  | IV     | 81           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 100   | 10.1       |                 | large charcoal, bag 2  |
|       | 53    | 2  | IV     | 81           | 1                 | CHARCOAL       | UNIDENTIFIED                     | COMBUSTION           | 18    | 0.5        |                 | near large charcoal  |
| 59    | 54    | 2  | IV     | 85           | 1                 | VOLCANIC GLASS | FLAKE                            | TRADITIONAL CRAFT    | 1     | 0.9        | 1.8 x 1.2 x 0.4 | large size, flake scaring; SAMPLE EDXRF_5  |
| 60    | 54    | 2  | III/IV | 78-80        | 1                 | CORAL          | MANUPORT                         | TRADITIONAL OFFERING | 1     | 0.2        | 1.3 x 0.9 x 0.5 |  |

| ACC # | BAG # | TU | STR.   | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL     | COLOR/ TYPE   | FUNCTION             | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION                                    |
|-------|-------|----|--------|--------------|-------------------|--------------|---|----------------------|-------|------------|-----------------|--|
| 61    | 54    | 2  | III/IV | 78-80        | 1                 | CORAL        | MANUPORT  | TRADITIONAL OFFERING | 1     | 11.7       | 5 x 2.5 x 1.7   |  |
| 62    | 54    | 2  | IV     | 89           | 1                 | BASALT       | POSS. DEBITAGE  | TOOL PRODUCTION      | 1     | 2.7        | 3 x 2.1 x 0.4   |  |
|       | 54    | 2  | IV     | 89           | 1                 | KUKUI NUT    | BLACK, HEAVILY CHARRED                                      | UNKNOWN              | 1     | 0.5        | 1.5 x 1.4 x 0.5 |  |
|       | 54    | 2  | III-IV | 61-88        | 1/FEA D           | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 3     | 0.2        |                 | med to large pieces                            |
|       | 54    | 2  | IV     | 80-88        | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 185   | 8.6        |                 | small to large                                 |
|       | 54    | 2  | IV     | 84           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 2     | 0.9        |                 | one large piece                                |
|       | 54    | 2  | IV     | 84-88        | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 5     | 0.3        |                 | small to med size                              |
|       | 54    | 2  | IV     | 85-86        | BELOW FEA 3       | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 9     | 1          |                 | med to large size                              |
|       | 54    | 2  | IV     | 88           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 1     | 0.5        |                 | one large piece                                |
|       | 54    | 2  | IV     | 88           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 1     | 0.3        |                 | NUMBER 2, one large piece                      |
|       | 54    | 2  | IV     | 88-95        | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 11    | 0.4        |                 | med to large size                              |
|       | 54    | 2  | IV     | 88-95        | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 175   | 9.6        |                 | small to large pieces                          |
|       | 54    | 2  | IV     | 73           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 68    | 2.2        |                 | found under a rock, small to med               |
| 63    | 55    | 2  | IV     | 97           | 1                 | BASALT       | FLAKE   | TOOL PRODUCTION      | 1     | 4.9        | 3 x 2.9 x 0.4   | two platforms, one bulb of percussion; EDXRF_8 |
| 64    | 55    | 2  | IV     | 96           | ABOVE FEA E       | CORAL        | MANUPORT  | TRADITIONAL OFFERING | 1     | 2.4        | 2.2 x 1.6 x 0.9 | beach rock                                     |
|       | 55    | 2  | IV     | 92-98        | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 173   | 4.3        |                 |  |
| 66    | 55    | 2  | IV     | 92-98        | 1                 | CORAL        | MANUPORT  | TRADITIONAL OFFERING | 3     | <0.1       | 0.8 x 0.4 x 0.3 |  |
| 67    | 55    | 2  | IV     | 92-98        | 1                 | MARINE SHELL | Hipponix sp.  | UNKNOWN              | 1     | <0.1       | 0.6 x 0.6 x 0.2 | poss. from off coral slab of FEA. 3            |
|       | 55    | 2  | IV     | 92-98        | 1                 | WOOD         | UNBURNED  | UNKNOWN              | 3     | <0.1       | 1.2 x 0.6 x 0.3 |  |
|       | 55    | 2  | IV     | 92           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 2     | 0.8        |                 | med and large piece                            |
|       | 55    | 2  | IV     | 92-98        | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 186   | 8.8        |                 | small to large pieces                          |
|       | 55    | 2  | IV     | 93           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 3     | 1.1        |                 | two large pieces                               |
|       | 55    | 2  | IV     | 93           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 2     | 0.5        |                 | sample 2, one large piece                      |
|       | 56    | 2  | IV     | 98-102       | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 217   | 5.1        |                 | small to large pieces                          |
|       | 56    | 2  | IV     | 98-102       | 1                 | SEED         | CHARRED, CURCUBITACEAE                                      | UNKNOWN              | 1     | <0.1       | 1 x 0.5 x 0.2   | SEED_6: CURCUBITACEAE sp.                      |
| 68    | 56    | 2  | IV     | 98-102       | 1                 | BASALT       | POSS. DEBITAGE  | TOOL PRODUCTION      | 5     | 48.4       | 5.9 x 3.7 x 1.3 |  |
| 69    | 56    | 2  | IV     | 98           | FEA E             | BASALT       | FLAKES  | TOOL PRODUCTION      | 2     | 29.8       | 4.5 x 3.6 x 0.9 | SAMPLE EDXRF_6                                 |
| 70    | 56    | 2  | III    | 71-73        | FEA D             | CORAL        | MANUPORT  | TRADITIONAL OFFERING | 1     | 4.8        | 2.7 x 1.9 x 1.8 | from NE profile wall                           |
|       | 56    | 2  | V      | 98-104       | FEA E             | CHARCOAL     | IDENTIFIED; OHIA LEHUA, OHIA AI, AKOKO, LAMA, ALAHEE, ILIMA | COMBUSTION           | 68    | 2.3        |                 | CHARCOAL ID_SAMPLE I                           |
|       | 56    | 2  | IV     | 99           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 1     | 1          |                 | one large piece                                |
|       | 56    | 2  | V      | 105-108      | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 6     | <0.1       |                 | small pieces                                   |
|       | 56    | 2  | V      | 104          | BELOW FEA E       | CHARCOAL     | IDENTIFIED; PILO, OHIA LEHUA, IPU, AKOKO, LAMA              | COMBUSTION           | 27    | 1.7        |                 | CHARCOAL ID_SAMPLE J                           |
|       | 56    | 2  | III    | 80           | 1                 | CHARCOAL     | UNIDENTIFIED  | COMBUSTION           | 37    | 1.3        |                 | from NE profile wall, small to med             |
| 71    | 57    | 2  | III    | 66-71        | 1                 | CORAL        | MANUPORT  | TRADITIONAL OFFERING | 2     | 40.6       | 6.2 x 5 x 2.8   | one large piece                                |
| 72    | 57    | 2  | III    | 67           | 1                 | CORAL        | MANUPORT  | TRADITIONAL OFFERING | 2     | 2          | 2.8 x 1.2 x 1   | med size                                       |
| 73    | 57    | 2  | III    | 71-73        | 1/ FEA D2         | CORAL        | MANUPORT  | TRADITIONAL OFFERING | 12    | 40.2       | 3.3 x 2.9 x 1.1 | small to large pieces                          |
| 74    | 57    | 2  | III    | 72-74        | 1/ FEA D2         | CORAL        | MANUPORT  | TRADITIONAL OFFERING | 1     | 16.6       | 5.2 x 3.1 x 1.9 | hole through center                            |

| ACC # | BAG # | TU | STR. | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL    | COLOR/ TYPE                                | FUNCTION             | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION                                      |
|-------|-------|----|------|--------------|-------------------|-------------|--|----------------------|-------|------------|-----------------|--|
| 75    | 57    | 2  | III  | 74-78        | 1/ FEA D2         | BASALT      | POSS. DEBITAGE                             | TOOL PRODUCTION      | 5     | 10.3       | 2.5 x 1.9 x 0.3 |  |
|       | 57    | 2  | III  | 74-78        | 1/ FEA D2         | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 123   | 4.3        |                 |  |
|       | 57    | 2  | III  | 74-78        | 1/ FEA D2         | WOOD        | BARK, UNBURNED                             | NATURAL              | 2     | 0.5        | 1.8 x 1.1 x 0.4 |  |
| 76    | 57    | 2  | III  | 74-78        | 1/ FEA D2         | CORAL       | MANUPORT                                   | TRADITIONAL OFFERING | 5     | 0.3        | 1.2 x 0.6 x 0.3 | small pieces                                     |
|       | 57    | 2  | III  | 74-78        | 1/ FEA D2         | SEEDS       | BROWN, OBLONG, HAOLE KOA                   | NATURAL              | 1     | <0.1       | 0.6 x 0.4 x 0.2 | SEED_4: Haole koa ( <i>Leucaena glauca</i> )     |
| 77    | 57    | 2  | III  | 74-78        | 1/ FEA D2         | ANIMAL BONE | PIG MOLAR FRAGMENT                         | UNKNOWN              | 1     | <0.1       | 0.9 x 0.6 x 0.5 | likely natural, likely subadult                  |
| 78    | 57    | 2  | III  | 74-78        | 1/ FEA D2         | BASALT      | HIGHLY POROUS                              | NATURAL              | 3     | 9.4        | 2.8 X 2.6 X 1.5 | 0.1 to 0.5 dia. holes on surface                 |
| 79    | 57    | 2  | III  | 74-78        | 1/ FEA D2         | BASALT      | POSS. DEBITAGE                             | TOOL PRODUCTION      | 4     | 16.6       | 5.1 x 2.9 x 0.6 | poss. platforms on all pieces                    |
|       | 57    | 2  | III  | 70-72        | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 9     | 0.1        |                 |  |
|       | 57    | 2  | III  | 71           | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 1     | <0.1       |                 |  |
|       | 57    | 2  | III  | 71           | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 7     | 13         |                 | under pebbles of FEA. D-2, small to medium sized |
|       | 57    | 2  | III  | 71-78        | 1/ FEA D2         | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 16    | 0.6        |                 | small to medium sized                            |
|       | 57    | 2  | III  | 72           | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 1     | 0.1        |                 | NW CORNER, large size                            |
|       | 57    | 2  | III  | 72           | UNDER FEA D       | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 1     | <0.1       |                 | UNDER FEA. D, med sized                          |
|       | 57    | 2  | III  | 72           | 1/ FEA D2         | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 5     | <0.1       |                 | small to medium sized                            |
|       | 57    | 2  | III  | 73           | 1/ FEA D2         | CHARCOAL    | IDENTIFIED, AKOKO                          | COMBUSTION           | 7     | 0.2        |                 | large piece under rock, CHARCOAL ID_ SAMPLE F    |
|       | 57    | 2  | III  | 74           | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 10    | 0.2        |                 | NW corner, small to medium                       |
|       | 57    | 2  | III  | 75-78        | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 96    | 5.5        |                 | small to medium sized                            |
|       | 57    | 2  | III  | 77           | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 1     | <0.1       |                 | one med size piece                               |
|       | 64    | 2  | III  | 68-71        | 1/ FEA C-D1       | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 14    | 0.2        |                 | small pieces                                     |
| 80    | 64    | 2  | III  | 68-71        | 1/ FEA C-D1       | CORAL       | MANUPORT                                   | TRADITIONAL OFFERING | 1     | <0.1       | 0.6 x 0.5 x0.2  |  |
|       | 66    | 2  | IV   | 78-84        | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 45    | 1.1        |                 |  |
|       | 67    | 2  | IV   | 84-88        | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 51    | 1.4        |                 |  |
|       | 67    | 2  | IV   | 84-88        | 1                 | WOOD        | BARK, UNBURNED                             | UNKNOWN              | 1     | <0.1       | 1.2 x 1 x 0.1   |  |
| 81    | 67    | 2  | IV   | 84-88        | 1                 | BASALT      | FINE GRAINED PEBBLE                        | TRADITIONAL CRAFT    | 1     | 1.1        | 0.7 x 0.4 x 0.4 | fine-grained basalt, possibledebitage            |
|       | 61    | 2  | V    | 108          | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 6     | 4.5        |                 | charcoal concentration, large pieces, mendable   |
|       | 61    | 2  | V    | 109-120      | 1                 | CHARCOAL    | IDENTIFIED; AKIA, AKOKO, LAMA, ALAA, KUKUI | COMBUSTION           | 22    | 1,4        |                 | CHARCOAL ID_ SAMPLE L                            |
|       | 61    | 2  | V    | 112          | UNDER FEA E       | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 65    | 4.7        |                 | 1 OF 2, small to large pieces                    |
|       | 61    | 2  | V    | 112          | UNDER FEA E       | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 80    | 1          |                 | 2 of 2, small pieces                             |
|       | 61    | 2  | V    | 113          | 1                 | CHARCOAL    | IDENTIFIED, ALAA                           | COMBUSTION           | 71    | 6.5        |                 | LARGE CHARCOAL 1 OF 2, CHARCOAL ID_ SAMPLE K     |
|       | 61    | 2  | V    | 113          | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 57    | 1.7        |                 | large charcoal, 2 OF 2, small to large           |
|       | 68    | 2  | V    | 102-108      | 1/ FEA E          | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 30    | 0.9        |                 | east portion TU2, small pieces                   |
| 82    | 68    | 2  | V    | 102-108      | 1/ FEA E          | BASALT      | ANGULAR PEBBLES AND COBBLES                | TEMPLE CONSTRUCTION  | 139   | 2993.7     | 9 x 8.2 x 4.9   | stones of FEA. E                                 |
|       | 68    | 2  | V    | 102-108      | 1/ FEA E          | WOOD        | UNBURNED                                   | UNKNOWN              | 2     | <0.1       | 1 x 0.3 x 0.1   | small pieces, poss. root fragments               |
|       | 69    | 2  | V    | 105-108      | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 24    | 0.8        |                 | west portion TU2, small pieces                   |
|       | 70    | 2  | V    | 109-120      | 1                 | CHARCOAL    | UNIDENTIFIED                               | COMBUSTION           | 8     | <0.1       |                 | small pieces                                     |



| ACC # | BAG # | TU | STR. | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL       | COLOR/ TYPE   | FUNCTION                 | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION  |
|-------|-------|----|------|--------------|-------------------|----------------|---|--------------------------|-------|------------|-----------------|--|
| 83    | 70    | 2  | V    | 109-120      | 1                 | LANDSNAIL      | possibly either <i>Achatina fulica</i> or <i>Euglandina vosea</i> | NATURAL                  | 1     | <0.1       | 0.8 x 0.7 x 0.2 | identification is not certain, suggests modern introduction, Post 1930 |
|       | 70    | 2  | V    | 109-120      | 1                 | SEEDS          | BROWN, HALF-CIRCLE, SPANISH CLOVER                                | NATURAL                  | 2     | <0.1       | 0.4 x 0.3 x 0.1 | SEED_10: Spanish clover ( <i>Desmodium incanum</i> )                   |
| 84    | 58    | 3  | II   | 48-58        | 1/ FEA. B         | BASALT         | WATER ROUNDED STONES  | TEMPLE CONSTRUCTION      | 8     | 97.9       | 3.6 x 2.6 x 1.7 | water rounded pebbles  |
| 85    | 58    | 3  | II   | 48-58        | 1                 | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 9     | 6.9        | 3.2 x 1.5 x 1.6 | small to med size  |
| 86    | 58    | 3  | II   | 50           | 1                 | LANDSNAIL      | <i>Paropea achatinaceum</i>                                       | NATURAL                  | 5     | <0.1       | 0.4 x 0.2 x 0.2 | small fragments, modern introduction, Post 1930                        |
| 87    | 60    | 3  | III  | 70-75        | 1/ FEA D2 - D3    | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 3     | 2.9        | 2.3 x 1.5 x 1.2 | small and med size   |
| 88    | 60    | 3  | III  | 71-75        | 1/ FEA D3         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 10    | 22.3       | 3.3 x 2.1 x 1.9 |  |
| 89    | 60    | 3  | III  | 73           | 1/ FEA D3         | VOLCANIC GLASS | DEBITAGE  | TRADITIONAL CRAFT        | 1     | 0.2        | 0.9 x 0.6 x 0.3 |  |
|       | 60    | 3  | III  | 70-75        | 1/ FEA D2 - D3    | CHARCOAL       | UNIDENTIFIED  | COMBUSTION               | 20    | 0.9        |                 | small to med size  |
|       | 60    | 3  | III  | 70-77        | 1/ FEA D3         | CHARCOAL       | UNIDENTIFIED  | COMBUSTION               | 30    | 1.2        |                 | small to large size  |
|       | 60    | 3  | III  | 70-77        | 1/ FEA D3-D4      | CHARCOAL       | UNIDENTIFIED  | COMBUSTION               | 7     | 0.7        |                 | med to large peices  |
|       | 60    | 3  | III  | 72-77        | 1/ FEA D4         | CHARCOAL       | UNIDENTIFIED  | COMBUSTION               | 40    | 3.5        |                 | small to large size  |
|       | 60    | 3  | III  | 72-80        | 1/ FEA D3-D4      | CHARCOAL       | UNIDENTIFIED  | COMBUSTION               | 8     | 0.6        |                 | small to med size  |
|       | 60    | 3  | III  | 74           | 1/ FEA D3         | CHARCOAL       | UNIDENTIFIED  | COMBUSTION               | 19    | 1.9        |                 | flecking to med size, dirt clods                                       |
|       | 60    | 3  | III  | 75           | 1/ FEA D4         | CHARCOAL       | UNIDENTIFIED  | COMBUSTION               | 1     | 0.2        |                 | one large piece  |
| 90    | 61    | 3  | III  | 61           | 1                 | BASALT         | FLAKE   | TOOL PRODUCTION          | 1     | 37         | 5.5 x 5.3 x 0.6 | platform and bulb of percussion  |
| 91    | 61    | 3  | III  | 56-64        | 1                 | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 6     | 2.1        | 1.6 x 1.1 x 0.8 | small pieces   |
|       | 61    | 3  | III  | 56           | 1                 | CHARCOAL       | UNIDENTIFIED  | COMBUSTION               | 2     | <0.1       |                 | small pieces   |
| 92    | 62    | 3  | III  | 64           | 1/ FEA C3         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 1     | 18.4       | 5.8 x 3 x 1.8   | ORNAMENTAL CORAL 1   |
| 93    | 62    | 3  | III  | 64           | 1/ FEA C3         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 1     | 19.9       | 5.6 x 2.4 x 2.1 | ORNAMENTAL CORAL 2, shaped similar to a lei niho palaoa                |
| 94    | 62    | 3  | III  | 58-62        | 1/ FEA C          | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 4     | 4.5        | 2.1 x 1.2 x 0.9 | surface of FEA C, 1 OF 2   |
| 95    | 62    | 3  | III  | 58-62        | 1/ FEA C          | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 8     | 34.9       | 4.6 x 3.1 x 2.1 | surface of FEA C, 2 OF 2, small to large                               |
| 96    | 62    | 3  | III  | 63           | 1                 | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 12    | 11.2       | 2.6 x 1.6 x 1.3 | from SW portion of unit, small to med sized beach rock                 |
| 97    | 62    | 3  | III  | 63           | 1/ FEA C2         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 20    | 17.3       | 2.5 x 2.4 x 0.9 | small pieces   |
| 104   | 62    | 3  | III  | 63           | 1/ FEA C2         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 1     | 1.7        | 2.4 x 2 x 0.6   | small hole through center  |
| 98    | 62    | 3  | III  | 64           | 1/ FEA C3         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 2     | 38.8       | 4.9 x 3.1 x 2.6 |  |
| 99    | 62    | 3  | III  | 64-66        | 1/ FEA C3         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 9     | 39.9       | 3.5 x 3.1 x 2.6 | small to med size  |
| 103   | 62    | 3  | III  | 68           | 1/ FEA C3         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 1     | 35         | 7 x 5 x 2.5     | hole through center  |
| 100   | 62    | 3  | III  | 69           | 1/ FEA C3         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 28    | 49.4       | 4.6 x 3.8 x 3.7 | small to large size  |
| 101   | 62    | 3  | III  | 70           | 1/ FEA D          | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 23    | 65.9       | 5.4 x 2.7 x 2.8 | weathered  |
| 102   | 62    | 3  | III  | 71-80        | 1/ FEA D2         | CORAL          | MANUPORT  | TRADITIONAL OFFERING     | 10    | 11.4       | 3.7 x 2.4 x 1.5 | small to med size  |
| 105   | 62    | 3  | III  | 63           | 1                 | BASALT         | FLAKE   | TOOL PRODUCTION          | 1     | 3.1        | 3 x 2.1 x 0.4   | platform and partial bulb of percussion                                |
| 106   | 62    | 3  | III  | 65           | 1/ FEA C2         | BASALT         | FLAKE   | TOOL PRODUCTION          | 1     | 46.8       | 7.2 x 5.7 x 0.9 |  |
| 107   | 62    | 3  | III  | 70           | 1/ FEA D          | BASALT         | WATER ROUNDED STONES  | TRADITIONAL ARCHITECTURE | 1     | 16.8       | 3.6 x 2.5 x 1.6 | water rounded pebbles of FEA. D  |
| 108   | 62    | 3  | III  | 71           | 1/ FEA D3         | BASALT         | FLAKES  | TOOL PRODUCTION          | 2     | 41.6       | 6.5 x 3.7 x 1.2 | one with platform and bulb, one with faint percussion scars            |

| ACC # | BAG # | TU | STR. | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL    | COLOR/ TYPE   | FUNCTION                 | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION   |
|-------|-------|----|------|--------------|-------------------|-------------|---|--------------------------|-------|------------|-----------------|---|
|       | 62    | 3  | III  | 60-65        | 1/ FEA C-C2       | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 3     | <0.1       |                 |   |
|       | 62    | 3  | III  | 60-65        | 1/ FEA C-C2       | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 15    | 0.4        |                 | small to med size   |
| 109   | 62    | 3  | III  | 60-65        | 1/ FEA C-C2       | BASALT      | WATER ROUNDED STONES                                | TRADITIONAL ARCHITECTURE | 3     | 22.5       | 2.9 x 2.9 x 1.2 | retained as representative of WR pebble matrix of Fea. C and C2; EDXRF_9                  |
| 110   | 62    | 3  | III  | 60-65        | 1/ FEA C-C2       | BASALT      | FLAKES  | TOOL PRODUCTION          | 2     | 15.4       | 5.4 X 3.6 X 0.8 | both flakes contain a platform, one has a pronounced bulb; EDXRF_10                       |
| 111   | 62    | 3  | III  | 60-65        | 1/ FEA C-C2       | BASALT      | POSS. DEBITAGE                                      | TOOL PRODUCTION          | 1     | 18.9       | 4.6 x 2.9 x 1.2 | quadrangular shape, flake scaring   |
| 112   | 62    | 3  | III  | 60-65        | 1/ FEA C-C2       | CORAL       | MANUPORT  | TRADITIONAL OFFERING     | 5     | 3.5        | 2.1 X 1.6 X 1.1 |   |
|       | 62    | 3  | III  | 65-70        | 1/ FEA C3         | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 12    | 0.4        |                 | small to med size   |
| 113   | 62    | 3  | III  | 65-70        | 1/ FEA C3         | BASALT      | POSS CORE   | TOOL PRODUCTION          | 1     | 141.3      | 7 x 6 x 3.7     | somewhat triangular, rough in shape, possible flaking scars                               |
| 114   | 62    | 3  | III  | 65-70        | 1/ FEA C3         | CORAL       | MANUPORT  | TRADITIONAL OFFERING     | 8     | 0.8        | 1.1 x 0.9 x 0.4 | small pieces  |
|       | 62    | 3  | III  | 65-70        | 1/ FEA C3         | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 5     | 0.2        |                 | small to med size   |
|       | 62    | 3  | III  | 70-73        | 1/ FEA D-D2       | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 12    | 1          |                 | small to large pieces   |
| 115   | 62    | 3  | III  | 70-73        | 1/ FEA D-D2       | CORAL       | MANUPORT  | TRADITIONAL OFFERING     | 1     | <0.1       | 0.9 x 0.4 x 0.2 |   |
|       | 62    | 3  | III  | 70-75        | 1/ FEA D2-D4      | CHARCOAL    | IDENTIFIED; ULEI, OHIA AI, KOPIKO, OHIA LEHUA, PILO | COMBUSTION               | 8     | 0.4        |                 | below D2 & D3   |
|       | 62    | 3  | III  | 73           | 1/ FEA D          | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 8     | 0.2        |                 | small to med size   |
| 116   | 71    | 3  | III  | 60-65        | 1/ FEA C-C2       | BASALT      | WATER ROUNDED STONES                                | TRADITIONAL ARCHITECTURE | 17    | 87.2       | 3.1 x 2.2 x 1   | small water rounded pebbles   |
| 117   | 71    | 3  | III  | 60-65        | 1/ FEA C-C2       | BASALT      | POSS. DEBITAGE                                      | TOOL PRODUCTION          | 1     | 2.0        | 2.5 x 1 x 0.4   | poss. pivot fracture  |
| 118   | 71    | 3  | III  | 60-65        | 1/ FEA C-C2       | ANIMAL BONE | PIG MOLAR FRAGMENT                                  | UNKNOWN                  | 1     | 0.8        | 1.3 x 1 x 0.8   | 3rd molar, split vertically   |
| 119   | 72    | 3  | III  | 63-66        | 1/ FEA C2-C3      | CORAL       | MANUPORT  | TRADITIONAL OFFERING     | 1     | <0.1       | 0.5 x 0.3 x 0.3 |   |
| 120   | 72    | 3  | III  | 63-66        | 1/ FEA C2-C3      | BASALT      | WR & ANGULAR PEBBLES                                | TRADITIONAL ARCHITECTURE | 17    | 165.6      | 3.5 x 2.6 x 1.9 |   |
|       | 72    | 3  | III  | 63-66        | 1/ FEA C2-C3      | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 6     | <0.1       |                 |   |
|       | 73    | 3  | III  | 66-76        | 3                 | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 3     | <0.1       |                 | small pieces  |
| 121   | 73    | 3  | III  | 66-76        | 3                 | CORAL       | MANUPORT  | TRADITIONAL OFFERING     | 9     | 1.7        | 1.1 x 0.8 x 0.9 | small pieces  |
|       | 59    | 3  | IV   | 76-83        | 1/ FEA D-IV       | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 38    | 1.5        |                 | from base of FEA. D into Str. IV  |
|       | 59    | 3  | IV   | 76-84        | BELOW FEA D       | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 136   | 5.5        |                 |   |
| 122   | 59    | 3  | IV   | 76-84        | BELOW FEA D       | CORAL       | MANUPORT  | TRADITIONAL OFFERING     | 2     | 0.5        | 1 x 0.6 x 0.6   |   |
|       | 59    | 3  | IV   | 78           | 1                 | CHARCOAL    | UNIDENTIFIED  | COMBUSTION               | 3     | 0.8        |                 | large pieces, molded  |
| 123   | 59    | 3  | IV   | 78-80        | 1                 | CORAL       | MANUPORT  | TRADITIONAL OFFERING     | 1     | 0.5        | 1.8 x 0.6 x 0.4 | from NW baulk   |
|       | 59    | 3  | IV   | 81           | 1                 | CHARCOAL    | FLAT WOOD   | UNKNOWN                  | 3     | 0.6        | 2 x 1.2 x 0.4   | large charcoal, mendable  |
| 124   | 59    | 3  | IV   | 82           | BELOW FEA D       | CORAL       | MANUPORT  | TRADITIONAL OFFERING     | 1     | 0.5        | 1.8 x 1 x 0.7   |   |
| 125   | 59    | 3  | IV   | 80-84        | 1                 | BASALT      | COFFEE-BEAN SINKER                                  | TRADITIONAL FISHING      | 1     | 5.9        | 1.9 x 1.5 x 1.2 | WR Pebble, uneven shape, longitudinal groove around all sides, net or fishing line sinker |
| 126   | 63    | 3  | IV   | 81-91        | 1                 | BASALT      | POSS. DEBITAGE                                      | TOOL PRODUCTION          | 2     | 11.5       | 3.9 X 2 X 1.2   | platforms   |

| ACC # | BAG # | TU    | STR.    | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL | COLOR/ TYPE              | FUNCTION                 | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION   |
|-------|-------|-------|---------|--------------|-------------------|----------|--------------------------|--------------------------|-------|------------|-----------------|---|
| 127   | 63    | 3     | IV      | 81-91        | 1                 | CORAL    | MANUPORT                 | TRADITIONAL OFFERING     | 1     | 1.3        | 2.1 x 1.6 x 1.3 |   |
|       | 63    | 3     | IV      | 81-91        | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 254   | 9.6        |                 | small to medium sized   |
|       | 63    | 3     | IV      | 81-91        | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 134   | 5.5        |                 | small to large size   |
|       | 63    | 3     | IV      | 82           | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 1     | <0.1       |                 |   |
|       | 63    | 3     | IV      | 82           | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 2     | <0.1       |                 | NUMBER 2, one medium size   |
|       | 63    | 3     | IV      | 82           | BASE OF FEA 3     | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 13    | <0.1       |                 | NUMBER 3, base of FEA. 3, small                                     |
|       | 63    | 3     | IV      | 83           | BELOW FEA D       | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 1     | <0.1       |                 | below FEA. D  |
|       | 63    | 3     | IV      | 83           | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 2     | 0.4        |                 | NUMBER 2, one large piece   |
|       | 63    | 3     | IV      | 85           | BELOW FEA D3      | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 15    | 0.3        |                 | under FEA. D and FEA. 3, small to medium                            |
|       | 63    | 3     | IV      | 88           |                   | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 1     | 0.5        |                 | one large piece   |
|       | 63    | 3     | IV      | 89           | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 8     | 0.8        |                 |   |
| 128   | 63    | 3     | IV      | 89           | 1                 | CORAL    | MANUPORT                 | TRADITIONAL OFFERING     | 1     | 6.2        | 4.1 x 2.1 x 1.3 |   |
|       | 63    | 3     | IV      | 93           | ABOVE FEA E       | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 1     | 0.6        |                 | large size  |
|       | 63    | 3     | IV      | 91-97        | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 110   | 6.3        |                 |   |
|       | 63    | 3     | IV      | 91-97        | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 10    | 1.6        |                 | med to large size   |
| 129   | 63    | 3     | IV      | 91-97        | 1                 | BASALT   | FLAKE                    | TOOL PRODUCTION          | 1     | 4.5        | 3.1 x 2.9 x 0.5 | platform and bulb of percussion                                     |
| 130   | 64    | 3     | IV      | 97-101       | ABOVE FEA E       | CORAL    | MANUPORT                 | TRADITIONAL OFFERING     | 1     | <0.1       | 0.9 x 0.7 x 0.5 |   |
|       | 64    | 3     | IV      | 97-101       | ABOVE FEA E       | CHARCOAL | UNIDENTIFIED             | COMBUSTION               |       |            |                 | on top north portion of FEA. E                                      |
|       | 65    | 3     | IV      | 80-97        | 1                 | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 17    | 0.2        |                 | SE wall, med to large size  |
|       | 65    | 3     | IV      | 93-95        | ABOVE FEA E       | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 13    | <0.1       |                 | small pieces  |
|       | 66    | 3     | V       | 95-105       | FEA E             | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 30    | 1          |                 |   |
|       | 66    | 3     | V       | 95-105       | FEA E             | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 38    | 0.5        |                 | small to medium size  |
| 131   | 66    | 3     | V       | 95-105       | FEA E             | BASALT   | FLAKES                   | TOOL PRODUCTION          | 2     | 1.5        |                 | platform, bulb of percussion  |
| 132   | 66    | 3     | V       | 95-105       | FEA E             | CORAL    | MANUPORT                 | TRADITIONAL OFFERING     | 4     | <0.1       | 0.9 x 0.7 x 0.3 |   |
|       | 66    | 3     | V       | 100          | FEA E             | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 1     | <0.1       |                 |   |
|       | 66    | 3     | V       | 103          | FEA E             | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 9     | 0.5        |                 | small to medium size  |
|       | 66    | 3     | V       | 106-118      | FEA E             | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 10    | 1          |                 | small to large  |
|       | 66    | 3     | V       | 106-118      | FEA E             | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 105   | 4.8        |                 | small to large size   |
| 133   | 66    | 3     | V       | 106-118      | FEA E             | BASALT   | POSS. DEBITAGE           | TOOL PRODUCTION          | 1     | 3.5        | 3.3 x 2.5 x 0.5 | partial bulb of percussion  |
|       | 66    | 3     | V       | 106-118      | FEA E             | SEED     | BROWN, OBLONG, HAOLE KOA | NATURAL                  | 1     | <0.1       | 0.7 x 0.3 x 0.1 | SEED_8: Haole koa ( <i>Leucaena glauca</i> )                        |
| 138   | 66    | 3     | V       | 106-118      | FEA E             | BASALT   | WATER ROUNDED COBBLE     | TRADITIONAL ARCHITECTURE | 1     | 131.9      | 8.5 x 5 x 2.6   | ovular water-rounded cobble, collected from FEA. E; EDXRF_11        |
|       | 67    | 3     | V       | 111          | FEA E             | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 17    | 0.9        |                 | small to large piece  |
|       | 67    | 3     | V       | 112          | BELOW FEA E       | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 9     | 6          | 4.2 x 1.7 x 1.6 | SW corner, small to one very large piece                            |
|       | 67    | 3     | V       | 117          | BELOW FEA E       | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 1     | 0.8        |                 | below FEA. E in sidewall, one large piece                           |
|       | 67    | 3     | V       | 132          | BASE OF FEA E     | CHARCOAL | UNIDENTIFIED             | COMBUSTION               | 12    | 0.2        |                 | base of FEA. E  |
| 134   | 68    | TRAIL | Surface | 0            | N/A               | BASALT   | MICRO-ADZE               | TRADITIONAL CRAFTS       | 1     | 23         | 4.6 x 2.6 x 1.1 | slight tang, polished on four sides, chipped working edge; EDXRF_12 |
| 135   | 69    | HA    | Surface | 0            | N/A               | METAL    | ORNATE PICTURE FRAME     | HOUSEHOLD                | 1     | 22.5       | 11 x 4.5 x 0.9  | cast metal, interior reads "ITALY"                                  |

| ACC # | BAG # | TU | STR.    | DEPTH (cmbd) | FEA/ SUB- FEATURE | MATERIAL  | COLOR/ TYPE                                 | FUNCTION        | # PCS | WEIGHT (g) | L x W x Th (cm) | DESCRIPTION  |
|-------|-------|----|---------|--------------|-------------------|-----------|---|-----------------|-------|------------|-----------------|--|
| 136   | 69    | HA | Surface | 0            | N/A               | PLASTIC   | UTILITY HANDLE                              | HOUSEHOLD       | 1     | 20.7       | 10.3 x 1.8 x 1  | faux tortoise shell handle, likely a letter opener or knife handle                 |
|       | 74    | 3  | IV      | 81-91        | 1                 | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 138   | 3          |                 | small and med size   |
| 137   | 74    | 3  | IV      | 81-91        | 1                 | LANDSNAIL | UNIDENTIFIED                                | NATURAL         | 1     | <0.1       | 1 x 0.4 x 0.4   |  |
|       | 74    | 3  | IV      | 81-91        | 1                 | WOOD      | UNIDENTIFIED                                | NATURAL         | 2     | 0.1        | 1.1 x 1 x 0.4   | med size piece of poss wood and an organic shaving                                 |
|       | 75    | 3  | IV      | 76-84        | 1                 | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 59    | 1.5        |                 | small to medium size   |
|       | 75    | 3  | IV      | 76-84        | 1                 | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 1     | <0.1       | 0.8 x 0.3 x 0.3 | appears to be a small carved shaft a tapering between two projections              |
|       | 75    | 3  | IV      | 76-84        | 1                 | WOOD      | UNIDENTIFIED                                | UNKNOWN         | 1     | 0.2        | 0.6 x 0.6 x 0.4 |  |
| 139   | 76    | 3  | IV      | 97-101       | ABOVE FEA E       | BASALT    | ABRAIDER                                    | TOOL PRODUCTION | 1     | 95.9       | 6.9 x 4.2 x 2.1 | rectangular cobble with five slice marks on one end                                |
|       | 76    | 3  | IV      | 97-101       | ABOVE FEA E       | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 116   | 2.6        |                 |  |
| 140   | 76    | 3  | IV      | 97-101       | ABOVE FEA E       | BASALT    | POLISHED TOOL FRAGMENT                      | TOOL PRODUCTION | 1     | 0.4        | 0.9 x 0.7 x 0.5 | three polished sides, mico-tool fragment, high quality basalt, poss. Adze fragment |
|       | 76    | 3  | IV      | 97-101       | ABOVE FEA E       | SEEDS     | BROWN, HALF-CIRCLE, SPANISH CLOVER          | NATURAL         | 2     | <0.1       | 0.5 x 0.3 x 0.1 | SEED_7: Spanish clover (Desmodium incanum)   |
| 141   | 76    | 3  | IV      | 97-101       | ABOVE FEA E       | LANDSNAIL | UNIDENTIFIED                                | NATURAL         | 1     | <0.1       | 1 x 0.5 x 0.1   |  |
|       | 76    | 3  | IV      | 97-101       | ABOVE FEA E       | WOOD      | UNIDENTIFIED                                | NATURAL         | 1     | <0.1       | 0.6 x 0.6 x 0.3 | brown, half circle   |
|       | 77    | 3  | V       | 95-105       | FEA E             | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 52    | 1.5        |                 |  |
|       | 77    | 3  | V       | 95-105       | FEA E             | FLORAL    | UNIDENTIFIED                                | NATURAL         | 14    | <0.1       | 1.1 x 0.3 x 0.1 | white flower pedals?   |
| 142   | 77    | 3  | V       | 95-105       | FEA E             | BASALT    | FLAKE                                       | TOOL PRODUCTION | 1     | 1.6        | 3 x 1.6 x 0.5   | platform and partial bulb of percussion  |
|       | 78    | 3  | V       | 95-105       | FEA E             | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 27    | 0.7        |                 |  |
|       | 78    | 3  | V       | 95-115       | FEA E             | FLORAL    | UNIDENTIFIED                                | NATURAL         | 24    | <0.1       | 1.1 x 0.3 x 0.1 | white flower pedals?   |
|       | 79    | 3  | V       | 106-118      | FEA E             | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 20    | 0.5        |                 |  |
|       | 79    | 3  | V       | 106-118      | FEA E             | FLORAL    | UNIDENTIFIED                                | NATURAL         | 3     | <0.1       | 1.1 x 0.3 x 0.1 |  |
|       | 79    | 3  | V       | 106-118      | FEA E             | SEED      | Spanish clover ( <i>Desmodium incanum</i> ) | NATURAL         | 3     | <0.1       | 0.5 x 0.3 x 0.1 | SEED_9: Spanish clover (Desmodium incanum)   |
|       | 79    | 3  | V       | 106-118      | FEA E             | WOOD      | UNIDENTIFIED                                | NATURAL         | 1     | <0.1       | 1 x 0.5 x 0.3   |  |
|       | 80    | 3  | V       | 108-130      | FEA E             | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 30    | 1.7        |                 | small to large pieces  |
|       | 80    | 3  | V       | 108-130      | FEA E             | WOOD      | UNIDENTIFIED                                | NATURAL         | 1     | 0.1        | 1.1 x 0.5 x 0.1 |  |
|       | 81    | 3  | V       | 113-119      | FEA E & BELOW     | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 39    | 0.9        |                 | small to med size  |
|       | 82    | 3  | V       | 113-122      | FEA E & BELOW     | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 1     | 1          | 2.6 x 1.1 x 0.7 | one very large piece, curved and pointed   |
|       | 82    | 3  | V       | 117          | FEA E & BELOW     | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 13    | 1.2        |                 | beneath side of large boulder  |
|       | 85    | 3  | V       | 130-138      | BELOW FEA E       | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 40    | 1.2        |                 | small to med size  |
|       | 85    | 3  | V       | 130-138      | BELOW FEA E       | FLORAL    | UNIDENTIFIED                                | NATURAL         | 3     | 0.1        | 1.3 x 0.2 x 0.2 | root and flower parts  |
|       | 86    | 3  | VI      | 131-138      | STERILE           | CHARCOAL  | UNIDENTIFIED                                | COMBUSTION      | 1     | <0.1       |                 | small piece within sediment  |



## APPENDIX B CHARCOAL IDENTIFICATION

### RADIOCARBON SAMPLE SCREENING OF CHARCOAL SAMPLES FROM MAUNAWILA HEIAU, SITE 50-80-05-287, O'AHU ISLAND

Gail M. Murakami  
International Archaeological Research Institute, Inc.  
March 21, 2013

#### INTRODUCTION

This report presents the results of taxa identification in three charcoal samples from Maunawila Heiau in Hau'ula, island of O'ahu. Identification of charcoal found in archaeological context can give insight into the vegetation of the surrounding area at the time that the woods were burned. This information can be used to interpret the environment as well as possible cultural use of specific plants. The identification also facilitates selection of short-lived plants or plant parts for radiocarbon dating to minimize the in-built age problem.

#### METHODS

Thirteen charcoal samples, collected from Maunawila Heiau, were analyzed for taxa identification. The freshly fractured transverse and tangential facets of each charcoal piece were viewed under magnification of a dissecting microscope. Taxa identifications were made by comparing the anatomical characteristics seen during examination against those of known woods in the Pacific Islands Wood Collection at the Department of Botany, University of Hawai'i, and published descriptions.

#### RESULTS

Thirteen woody taxa were identified in the 13 samples. The summary of results is presented in Table 1. In Table 1, "cf." indicates that the charcoal resembles the taxon specified but its exact identity is uncertain at this time. A review of the identified taxa is presented below.

#### TAXA REVIEW

*Aleurites moluccana* (L.) Willd. (*Kukui*)

Once cultivated, this Polynesian introduction has escaped into the native forest, where the pale foliage of the 10 to 20 m trees (Wagner et al. 1990:598) can be seen in abundance in moist gulches and valleys. Dyes were once extracted from the bark and roots (Buck 1957:187), the oily kernel was burned for light (Buck 1957:107) or eaten as a relish after baking (Buck 1957:48), and net floats and dugout canoes were made from the soft wood (Buck 1957:297).

Table 1. Taxa Identification in Charcoal Samples from Maunawila Heiau, Site 50-80-05-287.

| WIDL No.   | Taxon                              | Common/<br>Hawaiian Name                              | Origin/Habit                                | Part         | Count/<br>Weight,<br>g |
|--|------------------------------------|---|---|--------------|------------------------|
| TU1, Feature 9, Stratum III, 81 cm bd, Bag 25                          |                                    |   |   |              |                        |
| 1221-1   | <i>Osteomeles anthyllidifolia</i>  | 'Ūlei   | Native/Shrub                                | Wood         | 1/0.01                 |
| TU1, Feature 9, Stratum III, 87 cm bd, Bag 24                          |                                    |   |   |              |                        |
| 1221-2   | <i>Chamaesyce</i> sp.              | 'Akoko  | Native/Shrub                                | Wood         | 2/0.34                 |
| TU1, Feature 9, Subfeature A, Strata III-IV, 90-99 cm bd, Bag 28       |                                    |   |   |              |                        |
| 1221-3   | <i>Chamaesyce</i> sp.              | 'Akoko  | Native/Shrub                                | Wood         | 7/0.30                 |
| 1221-4   | <i>Osteomeles anthyllidifolia</i>  | 'Ūlei   | Native/Shrub                                | Wood         | 4/0.22                 |
| 1221-5   | cf. <i>Aleurites moluccana</i>     | Kukui   | Polynesian<br>Introduction/Tree             | Wood         | 4/0.08                 |
| 1221-6   | cf. <i>Coprosma</i> sp.            | Pilo  | Native/Shrub-Tree                           | Wood         | 1/0.05                 |
| Sample D, TU2, Feature 1/Subfeature C-C2, Stratum III, 65 cmbd, Bag 44 |                                    |   |   |              |                        |
| 1221-7   | Unknown 1                          |   |   | Wood         | 2/0.10                 |
| 1221-8   | <i>Diospyros sandwicensis</i>      | Lama  | Native/Tree                                 | Wood         | 1/0.03                 |
| Sample E, TU2, Feature 1/Subfeature C2, Stratum III, 69 cmbd, Bag 52   |                                    |   |   |              |                        |
| 1221-9   | cf. <i>Chamaesyce</i> sp.          | 'Akoko  | Native/Shrub                                | Wood         | 4/0.18                 |
| Sample F, TU2, Feature 1/Subfeature D2, Stratum III, 73 cmbd, Bag 57   |                                    |   |   |              |                        |
| 1221-10  | cf. <i>Chamaesyce</i> sp.          | 'Akoko  | Native/Shrub                                | Wood         | 7/0.26                 |
| Sample G, TU2, Feature 1/Subfeature 3, Stratum IV, 79 cmbd, Bag 53     |                                    |   |   |              |                        |
| 1221-11  | Unknown 2                          |   |   | Wood         | 1/0.05                 |
| Sample H, TU2, Feature 1, Stratum IV, 81 cmbd, Bag 53                  |                                    |   |   |              |                        |
| 1221-12  | cf. <i>Metrosideros polymorpha</i> | 'Ōhi'a lehua  | Native/Tree                                 | Wood         | 14/10.44               |
| Sample I, TU2, Feature 1/Subfeature E, Stratum V, 98-104 cmbd, Bag 56  |                                    |   |   |              |                        |
| 1221-13  | cf. <i>Metrosideros polymorpha</i> | 'Ōhi'a lehua  | Native/Tree                                 | Wood         | 22/0.87                |
| 1221-14  | <i>Syzygium</i> sp.                | Mountain apple,<br>roseapple, Java<br>plum, 'ōhi'a ai | Native + Historic<br>Introductions/<br>Tree | Wood         | 9/0.55                 |
| 1221-15  | Unknown 3                          |   |   | Wood         | 5/0.11                 |
| 1221-16  | <i>Chamaesyce</i> sp.              | 'Akoko  | Native/Shrub                                | Wood         | 11/0.33                |
| 1221-17  | <i>Diospyros sandwicensis</i>      | Lama  | Native/Tree                                 | Wood         | 3/0.12                 |
| 1221-18  | Unknown 2                          |   |   | Wood         | 3/0.06                 |
| 1221-19  | Unknown 4                          |   |   | Wood         | 13/0.22                |
| 1221-20  | <i>Canthium odoratum</i>           | Alahe'e   | Native/Tree                                 | Wood         | 1/0.02                 |
| 1221-21  | <i>Sida fallax</i>                 | 'Ilima  | Native/Shrub                                | Wood         | 1/0.02                 |
| Sample J, TU2, Feature 1/Subfeature E, Stratum V, 104 cmbd, Bag 56     |                                    |   |   |              |                        |
| 1221-22  | cf. <i>Coprosma</i> sp.            | Pilo  | Native/Shrub-Tree                           | Wood         | 3/0.18                 |
| 1221-23  | cf. <i>Metrosideros polymorpha</i> | 'Ōhi'a lehua  | Native/Tree                                 | Wood         | 12/0.85                |
| 1221-24  | <i>Lagenaria siceraria</i>         | Ipu   | Polynesian<br>Introduction/Vine             | Fruit rind   | 1/0.05                 |
| 1221-25  | <i>Chamaesyce</i> sp.              | 'Akoko  | Native/Shrub                                | Wood         | 5/0.13                 |
| 1221-26  | <i>Diospyros sandwicensis</i>      | Lama  | Native/Tree                                 | Wood         | 2/0.11                 |
| 1221-27  | Unknown 5                          |   |   | Wood         | 1/0.03                 |
| 1221-28  | Not identified                     |   |   | Wood<br>burl | 3/0.36                 |

Table 1. Taxa Identification in Charcoal Samples from Maunawila Heiau, Site 50-80-05-287 (cont.)

| WIDL No.   | Taxon                              | Common/<br>Hawaiian Name                              | Origin/Habit                                | Part     | Count/<br>Weight,<br>g |
|--|------------------------------------|---|---|----------|------------------------|
| Sample K, TU2, Feature 1, Stratum V, 113 cmbd, Bag 61                      |                                    |   |   |          |                        |
| 1221-29  | cf. <i>Pouteria sandwicensis</i>   | 'Āla'a  | Native/Tree                                 | Wood     | 71/6.50                |
| Sample L, TU2, Feature 1, Stratum V, 109-120 cmbd, Bag 61                  |                                    |   |   |          |                        |
| 1229-30  | cf. <i>Wikstroemia</i> sp.         | 'Ākia   | Native/Shrub                                | Wood     | 3/0.86                 |
| 1229-31  | Unknown 5                          |   |   | Wood     | 1/0.03                 |
| 1229-32  | <i>Chamaesyce</i> sp.              | 'Akoko  | Native/Shrub                                | Wood     | 1/0.05                 |
| 1229-33  | <i>Diospyros sandwicensis</i>      | Lama  | Native/Tree                                 | Wood     | 1/0.04                 |
| 1229-34  | cf. <i>Pouteria sandwicensis</i>   | 'Āla'a  | Native/Tree                                 | Wood     | 15/0.48                |
| 1229-35  | <i>Aleurites moluccana</i>         | Kukui   | Polynesian<br>Introduction/Tree             | Nutshell | 1/0.02                 |
| Sample M, TU3, Feature 1/Subfeature D2-D4, Stratum III, 70-75 cmbd, Bag 62 |                                    |   |   |          |                        |
| 1229-36  | <i>Osteomeles anthyllidifolia</i>  | 'Ūlei   | Native/Shrub                                | Wood     | 1/<0.01                |
| 1229-37  | Unknown 6                          |   |   | Wood     | 1/0.20                 |
| 1229-38  | <i>Syzygium</i> sp.                | Mountain apple,<br>roseapple, Java<br>plum, 'ōhi'a ai | Native + Historic<br>Introductions/<br>Tree | Wood     | 2/0.09                 |
| 1229-39  | cf. <i>Psychotria</i> sp.          | Kōpiko  | Native/Shrub-Tree                           | Wood     | 1/0.02                 |
| 1229-40  | cf. <i>Metrosideros polymorpha</i> | 'Ōhi'a lehua  | Native/Tree                                 | Wood     | 1/0.04                 |
| 1229-41  | Unknown 5                          |   |   | Wood     | 1/0.05                 |
| 1229-42  | cf. <i>Coprosma</i> sp.            | Pilo  | Native/Shrub-Tree                           | Wood     | 1/0.02                 |

*Chamaesyce* spp. ('Akoko)

The distribution of the 15 endemic shrubs and small trees in this genus range from coastal environments to upper forest zones on the main Hawaiian Islands. Nine of these native species are found on O'ahu (Wagner et al. 1990:602-617; Rock 1974:243-262). 'Akoko was once valued for firewood by the Hawaiians (Hillebrand 1981:396). The milky sap was once considered a possible source for rubber (Rock 1974:261).

*Canthium odoratum* (G. Forster) Seem. (Alahe'e)

This indigenous shrub or small tree is usually 3 to 6 m tall but may be up to 15 m. It has been found in dry shrublands and dry to mesic forests at 10 to 1,160 meter elevation on all of the main islands except Ni'ihau and Kaho'olawe (Wagner et al. 1990:1119). Its hard wood was once used for making '\*\*\* digging sticks and its leaves made a black dye (Handy and Handy 1972:117; Pukui and Elbert 1986:17; Rock 1974:437).

*Coprosma* spp. (Pilo)

Thirteen endemic species are found on all the main Hawaiian Islands except Kaho'olawe and Ni'ihau (Wagner et al. 1990:1121-1131). Two three species, found on O'ahu, range in habit from scandant shrubs to trees 8 m tall and occur in mesic and wet forests (Wagner et al. 1990:1125-1129).

*Diospyros sandwicensis* (A. DC) Fosb. (Lama)

This small endemic tree, 2 to 10 m tall, is found in wet or dry regions of all the main Hawaiian Islands (Rock 1913:395; Wagner et al. 1990:587). The hard wood was once used by Hawaiians for

houses, enclosures for certain idols (Malo 1951:21), and chisel handles (Buck 1957:38). Hillebrand (1981:275) reported that the small fruits were eaten by the natives.

*Metrosideros polymorpha* Gaud. ('*Ōhi'a lehua*)

This endemic species ranges in habit from prostrate shrubs to tall trees and in distribution from sea level to 2200 m elevation in many ecological situations on all of the main Hawaiian Islands (Wagner et al. 1990:967). The hard wood was once used for making spears and mallets, idols, posts and rafters for houses, and enclosures around temples (Buck 1957:87; Malo 1951:20; Neal 1965:638).

*Lagenaria siceraria* (Molina) Standl. (*Ipu*)

The fruit of this annual spreading vine, a native of tropical Asia or Africa, was brought to the Hawaiian Islands by the early settlers (Neal 1965:810). The smaller gourds were once used as receptacles for food or water and rattles for dances while the larger gourds were made into drums or served as places to hold *kapa* bark cloth or other articles (Pukui and Elbert 1986:103).

*Osteomeles anthyllidifolia* Lindl. ('*Ūlei*)

This indigenous plant can often be found sprawling among the rocks along the coasts but may become an erect shrub up to 3 m tall in other environments. *Osteomeles* is found on all the main islands except Ni'ihau and Kaho'olawe and ranges in distribution from sea level to 2300 m in elevation (Wagner et al. 1990:1104-1105). In the past, the hard wood was used to make digging sticks ('*ō'ō*, fishing spears, carrying poles ('*auamo*), and a musical bow ('*ukeke*) (Buck 1957:12, 357, 14, 388). The flexible smaller branches were bent into hoops for fishnets (Neal 1965:387).

*Pouteria sandwicensis* (A. Gray) Baehni & Degener ('*la'a*, '*ulu*)

This endemic species is a shrub or tree up to 12 m tall which can be found in dry to mesic forest at 240 to 980 m elevations on all the main islands except Ni'ihau and Kaho'olawe (Wagner et al. 1990:1234). The wood was used to make spears and '*ō'ō* handles and the sticky sap was used to trap birds (Pukui and Elbert 1986:16).

*Psychotria* sp. (*Kōpiko*)

This large genus is distributed over tropical regions of both the New and Old Worlds. The 11 species of *Psychotria* occur in Hawai'i and are small to medium sized endemic trees which are found in the mesic to wet forests. The five species, known from O'ahu, are *P. fauriei*, *P. hathewayi*, *P. hexandra*, *P. kaduana*, and *P. mariniana*. These species range from small trees to trees up to 20 m tall and occur mainly in mesic to wet forests (Wagner et al. 1990:1160-1170). Its wood was previously used as firewood and to make *kapa* logs (Malo 1951:21).

*Sida fallax* Walp. ('*Ilima*)

This indigenous shrub was planted in the past, as it is today, near houses to provide flowers for lei making (Neal 1965:553). It has been found growing naturally along coasts, on open lava fields, in dry to mesic forests on all of the main Hawaiian Islands (Wagner et al. 1990:898). The entire plant had many uses for native Hawaiians. Erect stems were tied to the frame of the sleeping house upon which *pili* grass (*Heteropogon contortus*) was lashed. Whole '*ilima* bushes tied together were also used to secure mounds of taro plantings in swampy areas. The prostrate coastal '*ilima* was used as floor coverings under mats (Handy and Handy 1972:228). The roots and flowers were used medicinally (Neal 1965:553).

*Syzygium* sp.

Four species of these trees are found on O'ahu. *Syzygium cumini* (Java plum) and *S. jambos* (rose apple) have naturalized in the mesic forests after their introduction prior to 1871 and in 1825, respectively. The Polynesian introduction *S. malaccense* (mountain apple, '*ōhi'a 'ai*) may be found in low mesic to wet forests while the native *S. sandwicensis* ('*ōhi'a hā*) seems to be restricted to ridges and



slopes on Kaua'i, O'ahu, Moloka'i, Lāna'i and Maui (Wagner et al. 1990:975-976). The trunks from 'ōhi'a 'ai were formerly used for posts, house rafters and temple enclosures; idols were also carved from the wood. The fruit was eaten and the bark, flowers and leaves were used medicinally (Rock 1974:323). A dye for clothing was extracted from the bark (Buck 1957:187).

*Wikstroemia* spp. ('Ākia)

The endemic *Wikstroemia oahuensis*, and *W.uva-ursi* are found on O'ahu. *W. oahuensis* is a shrub or small tree found in mesic to wet forest, diverse mesic forest, bogs, and on ridges and rocky ledges, in elevations ranging from 5-1400 m, on Kaua'i, O'ahu, Moloka'i, Lāna'i, and Maui (Wagner et al. 1990:1286-1288). *W. uva-ursi* is a densely branching, prostrate or sprawling shrub scattered on dry ridges, open hillsides, ledges, windswept headlands, clay flats, aa lava, coastal, and low, dry open alien vegetation, in elevations 3-420 m on Kaua'i, O'ahu, Moloka'i, and Maui. The bark of 'ākia was a source of fibers for ropes and braids (Hillebrand 1981:384) and the juice from pounded roots, bark, and leaves were used to capture fish by narcotizing them (Neal 1965:616).

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APPENDIX C EDXRF RESULTS

TABLE 31. TABLE LISTING ELEMENTAL COMPOSITION RESULTS OF EXXRF ANALYSIS

|  | Na2O  | MgO   | Al2O3  | SiO2   | K2O   | CaO    | TiO2  | V       | MnO     | Fe     | Ni      | Cu      | Zn      | Rb     | Sr      | Y       | Zr      | Nb     | Ba      | La     | Ce     | Pb    |
|--|-------|-------|--------|--------|-------|--------|-------|---------|---------|--------|---------|---------|---------|--------|---------|---------|---------|--------|---------|--------|--------|-------|
|  | %     | %     | %      | %      | %     | %      | %     | ppm     | ppm     | %      | ppm     | ppm     | ppm     | ppm    | ppm     | ppm     | ppm     | ppm    | ppm     | ppm    | ppm    | ppm   |
| BHVO-2 3-13.1.1  | 2.221 | 7.601 | 14.126 | 48.585 | 0.589 | 10.901 | 2.692 | 340.423 | 1593.01 | 8.925  | 90.625  | 114.62  | 99.678  | 10.04  | 389.828 | 27.402  | 187.841 | 18.545 | 142.724 | 8.944  | 84.623 | 0     |
| BHVO-2 4-11 3-8-13.1   | 2.119 | 7.056 | 13.771 | 48.107 | 0.569 | 10.623 | 2.608 | 313.942 | 1545.56 | 8.408  | 88.059  | 113.574 | 109.178 | 12.17  | 378.043 | 23.8    | 181.449 | 19.696 | 155.039 | 3.312  | 57.821 | 0     |
| EDXRF 1 bag 1A TU1 Fea AA STrat III 80 cmbd basalt tool tear-drop shaped weathered stone | 1.013 | 5.562 | 9.786  | 35.557 | 0.45  | 6.502  | 3.04  | 358.724 | 1752.48 | 9.977  | 153.461 | 123.928 | 141.522 | 7.789  | 257.378 | 130.504 | 160.16  | 10.912 | 111.469 | 70.615 | 79.251 | 0     |
| EDXRF 2 bag 53 TU2 Fea D2 Strat III 72cmbd basalt tool weathered stone                   | 0.984 | 6.51  | 8.27   | 39.79  | 0.483 | 6.559  | 2.827 | 348.077 | 1823.56 | 10.958 | 126.105 | 99.435  | 146.239 | 7.022  | 199.794 | 19.966  | 152.467 | 13.671 | 119.597 | 17.151 | 14.296 | 0     |
| EDXRF 3.1 TU2 Fea C C2 Srat III 60-64cmbd vg small                                       | 2.033 | 5.913 | 10.426 | 41.256 | 0.622 | 7.724  | 2.381 | 288.393 | 1309.14 | 8.291  | 67.535  | 108.695 | 134.924 | 8.341  | 357.108 | 22.577  | 161.986 | 10.342 | 148.023 | -4.305 | 36.41  | 0     |
| EDXRF 3.2 TU2 Fea C C2 Strat III 60-60cmbd vg small                                      | 1.896 | 4.636 | 7.455  | 31.295 | 0.511 | 5.569  | 1.552 | 180.6   | 909.194 | 7.054  | 47.507  | 98.769  | 117.572 | 9.487  | 336.776 | 17.891  | 128.93  | 7.792  | 39.844  | -0.071 | 11.893 | 0.347 |
| EDXRF 4 TU2 below Fea D Strat III IV 75cmbd vg small                                     | 2.277 | 1.502 | 5.344  | 23.362 | 0.759 | 2.337  | 1.676 | 140.651 | 806.875 | 6.276  | 5.047   | 28.409  | 151.911 | 19.796 | 311.982 | 32.994  | 264.484 | 23.784 | 336.312 | 0.15   | 14.868 | 2.404 |
| EDXRF 5 bag 54 TU2 strat IV 85cmbd VG  | 3.047 | 3.083 | 12.492 | 57.148 | 1.234 | 5.801  | 3.294 | 327.586 | 1927.31 | 9.219  | 7.852   | 25.893  | 181.249 | 30.606 | 477.72  | 47.388  | 415.952 | 35.229 | 447.776 | 19.217 | 67.159 | 0.954 |
| EDXRF 6.1 bag 56 TU2 Fea E Strat IV 98 cmbd flake  | 3.263 | 3.045 | 15.955 | 49.834 | 0.767 | 8.841  | 2.677 | 314.14  | 1434.39 | 7.515  | 75.102  | 79.616  | 134.071 | 10.41  | 468.02  | 25.531  | 190.774 | 14.03  | 167.993 | 12.72  | 28.255 | 0     |
| EDXRF 6.2 bag 56 TU2 Fea E Strat IV 98 cmbd flake  | 3.491 | 3.95  | 16.49  | 50.195 | 0.82  | 9.31   | 2.833 | 318.954 | 1279.76 | 6.844  | 131.919 | 73.016  | 123.792 | 11.485 | 535.108 | 21.278  | 182.598 | 11.032 | 191.859 | 24.365 | 72.474 | 0     |
| EDXRF 7 dike stone rough blank   | 2.202 | 2.73  | 15.519 | 44.703 | 0.654 | 8.166  | 2.72  | 346.538 | 1492.44 | 6.716  | 111.989 | 77.308  | 103.37  | 9.174  | 329.596 | 19.259  | 139.14  | 10.394 | 141.067 | 35.436 | 3.848  | 0     |
| EDXRF 8 basalt flake sf platform med grain olivine                                       | 3.046 | 4.282 | 15.343 | 51.122 | 0.723 | 8.954  | 2.737 | 367.916 | 1728.03 | 7.308  | 102.64  | 114.92  | 118.386 | 8.273  | 353.437 | 23.741  | 157.47  | 10.226 | 165.202 | 12.214 | 3.848  | 0     |
| EDXRF 9a ili ili   | 2.276 | 4.265 | 16.15  | 42.297 | 0.385 | 8.457  | 2.86  | 392.716 | 1299.17 | 9.395  | 93.279  | 98.191  | 138.798 | 5.96   | 412.535 | 14.035  | 177.656 | 13.143 | 52.457  | 23.555 | 43.583 | 0     |

|   | Na2O  | MgO   | Al2O3  | SiO2   | K2O   | CaO   | TiO2  | V       | MnO     | Fe    | Ni      | Cu      | Zn      | Rb     | Sr      | Y      | Zr      | Nb     | Ba      | La     | Ce     | Pb    |
|---|-------|-------|--------|--------|-------|-------|-------|---------|---------|-------|---------|---------|---------|--------|---------|--------|---------|--------|---------|--------|--------|-------|
| EDXRF 9b ili ili                                      | 1.563 | 4.899 | 16.287 | 39.895 | 0.448 | 6.483 | 2.968 | 331.556 | 1721.21 | 8.919 | 168.593 | 48.451  | 123.484 | 4.961  | 283.445 | 19.956 | 166.307 | 7.823  | 174.37  | 17.562 | 34.451 | 0.254 |
| EDXRF 9c ili ili                                      | 2.269 | 5.298 | 15.138 | 42.313 | 0.418 | 8.103 | 2.804 | 355.564 | 1675.59 | 8.413 | 104.91  | 99.057  | 141.941 | 3.816  | 349.057 | 14.395 | 169.028 | 13.685 | 124.812 | 13.096 | 34.525 | 0     |
| EDXRF 10a<br>basalt flake mf<br>platform med<br>grain | 2.973 | 3.458 | 14.737 | 48.306 | 0.773 | 8.924 | 2.852 | 348.493 | 1426.46 | 7.076 | 74.017  | 76.523  | 131.905 | 11.486 | 440.451 | 23.08  | 180.733 | 9.836  | 198.436 | 12.371 | 36.397 | 0     |
| EDXRF 10b<br>basalt shatter<br>low grade              | 1.577 | 1.381 | 17.682 | 37.128 | 0.7   | 5.11  | 3.422 | 396.98  | 1073.78 | 9.226 | 100.709 | 103.152 | 126.898 | 12.927 | 348.288 | 17.577 | 163.43  | 11.905 | 159.55  | 13.742 | 20.904 | 0     |
| EDXRF 11<br>partially<br>vesicular cobble             | 1.624 | 4.423 | 15.608 | 44.219 | 0.537 | 7.068 | 2.903 | 362.86  | 1484.4  | 8.777 | 100.211 | 172.915 | 135.106 | 6.886  | 379.313 | 25.418 | 195.294 | 14.944 | 133.142 | 15.879 | 19.558 | 0     |
| EDXRF 12<br>microadze                                 | 2.165 | 3.967 | 14.395 | 48.705 | 0.764 | 8.517 | 2.728 | 373.377 | 2830.03 | 7.811 | 84.905  | 105.926 | 128.076 | 13.302 | 377.853 | 20.94  | 164.797 | 11.425 | 176.3   | 15.203 | 51.643 | 0     |

**APPENDIX D LETTER REGARDING LAND GRANT NO. 5703 TO LOUISE A'OE  
MCGREGOR (1912)**

*Good record*

**EXECUTIVE CHAMBER**  
Territory of Hawaii

**Rec'd JUN 1 1912**

**Office of  
SECRETARY TO THE GOVERNOR**

**Territory of Hawaii  
COMMISSION OF PUBLIC LANDS**

**HONOLULU,  
May Thirty-first,  
Nineteen Hundred and Twelve.**

*194  
31*

Dear Sir:

I beg to submit herewith, for your approval, the  
following Land Patent Grant:

No. 5703, Louise A. McGregor, Lot 1½, Hauula Koolauloa, Oahu.

Respectfully submitted,

*Joshua D. Tucker*  
Commissioner of Public Lands.

Hon. E. A. Mott-Smith,  
Acting Governor of Hawaii,  
Honolulu.

*Approved June 1, 1912*  
*(2)*

*E*  
*(1)*