
Final
Archaeological Monitoring Report for the
Queen Ka‘ahumanu Highway Widening
Phase 2 Project,
Kalaoa, Kalaoa-‘O‘oma, ‘O‘oma 2, Kohanaiki, Kaloko,
Honokōhau 1-2 and Kealakehe Ahupua‘a,
North Kona District, Hawai‘i Island
TMKs: [3] 7-3-009, 010, 043, 049, 051, 058; 7-4-008, 020

Prepared for
Goodfellow Bros., Inc.
and the
Hawai‘i State Department of Transportation

Prepared by
Olivier Bautista, B.A.,
Sarah Wilkinson, B.A.,
William Folk, B.A.,
and
Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: KALAOA 21B)

February 2020

O‘ahu Office
P.O. Box 1114
Kailua, Hawai‘i 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Hawai‘i Office
399 Hualani St. Ste. 124
Hilo, Hawai‘i 96720
Ph.: (808) 965-6478
Fax: (808) 965-6582

Management Summary

Reference	Archaeological Monitoring Report for the Queen Ka'ahumanu Highway Widening Phase 2 Project, Kalaoa, Kalaoa-'O'oma, 'O'oma 2, Kohanaiki, Kaloko, Honokōhau 1-2 and Kealakehe Ahupua'a, North Kona District, Hawai'i Island, TMKs: [3] 7-3-009, 010, 043, 049, 051, 058; 7-4-008, 020 (Bautista et al. 2020)
Date	February 2020
Project Number(s)	Federal Aid Project No. NH-019-1(38)R Cultural Surveys Hawai'i, Inc. (CSH) Job Code: KALAOA 21B
Investigation Permit Number	CSH completed the archaeological monitoring fieldwork under archaeological fieldwork permit numbers 15-03, 16-26, 17-08, and 18-04 for calendar years 2015, 2016, 2017, and 2018, respectively, issued by the Hawai'i State Historic Preservation Division (SHPD) per Hawai'i Administrative Rules (HAR) §13-282.
Agencies	Federal Highway Administration (FHWA), U.S. Department of Transportation; State of Hawai'i, Highways Division, Department of Transportation (HDOT); SHPD, Department of Land and Natural Resources
Land Jurisdiction	State of Hawai'i, County of Hawai'i, Private (Appendix A); additionally, the area of potential effect (APE) overlaps Federal U.S. National Park Service (NPS) lands at the Koloko-Honokōhau National Historical Park, though no project work occurs within the NPS park Boundary. ¹
Project Funding	FHWA, HDOT
Project Location	The project is situated between approximately 0.5 and 1.5 miles back from the coastline in the northern outskirts of Kailua-Kona town, in the <i>ahupua'a</i> (land divisions) of Kalaoa, Kalaoa-'O'oma, 'O'oma 2, Kohanaiki, Kaloko, Honokōhau 1-2 and Kealakehe, North Kona District, Hawai'i Island. The project area and Area of Potential Effect (APE) are depicted on a portion of the 1996 Keahole Point U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
Project Description	The Queen Ka'ahumanu Highway Widening project (Phase 2) involved widening the highway from the existing two lanes into a four-lane divided highway between Kealakehe Parkway and the Keāhole Airport Access Road. The project included the construction, installation, and/or relocation of new pavements and pavement markings, drainage systems,

¹ The Honokōhau Settlement National Historic Landmark (SIHP # 50-10-27-04138) is located within the Koloko-Honokōhau National Historical Park, and therefore is also included in the project APE as specified in the project's 2015 Memorandum of Agreement (MOA), but no project work occurred within the landmark's or park's boundary

	sidewalks, traffic signal systems and traffic signs, guardrails, highway lighting, utilities, and landscape plantings.
Project-Related Ground Disturbance	Ground disturbing activities included grubbing, grading and filling portions of the right-of-way (ROW); excavations for utility and sewer lines, signage, and signal lights; and installation of permanent protective barriers around historic properties, guardrails, and landscaping. Most of the major ground disturbance occurred along the <i>makai</i> (seaward) side of the existing highway. Excavated materials were reused on site.
Area of Potential Effect (APE) and Project Area (PA)	<p>The original project area (PA) identified in the Monahan et al. (2012a) archaeological inventory survey (AIS) consisted of a portion of the Queen Ka'ahumanu Highway ROW, beginning (in the south) approximately 350 m (1,150 feet [ft]) south of Kealakehe Parkway and ending (in the north) at approximately 518 m (1,700 ft) north of Keāhole Airport Road. It was approximately 5.2 miles long and 300 ft wide, comprising approximately 190 acres (76.9 hectares).</p> <p>The project APE described in Monahan et al. (2012a) and the 2015 Memorandum of Agreement (MOA) comprised the project area described above plus areas potentially affected by the proposed undertaking including, but not limited to, the Kaloko-Honokōhau National Historical Park and the Honokōhau Settlement National Historic Landmark (State Inventory of Historic Places [SIHP] # 50-10-27-04138), which are immediately adjacent to the project area in Honokōhau and Kaloko Ahupua'a. This APE comprised approximately 1,356.5 acres (549.2 hectares).</p> <p>HDOT in December 2016 expanded the project area and APE by approximately 23 acres to include additional improvement areas, bringing the project area to approximately 212.82 acres (86.13 hectares).</p> <p>The expanded project area resulted in a revised APE acreage of approximately 1,379 acres (558 hectares), comprising Queen Ka'ahumanu Highway ROW, portions of intersecting streets, construction offices, base yards and storage areas, and the Koloko-Honokōhau National Historical Park and Honokōhau Settlement National Historic Landmark.</p>
Project Acreage	212.82 acres (86.13 hectares)
Historic Preservation Regulatory Context	This archaeological monitoring report (AMR) was designed to comply with both federal and Hawai'i State environmental and historic preservation review legislation. Due to Federal Highway Administration (FHWA) funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and Section 4(f) of the Department of Transportation Act. As an HDOT project within a state ROW and private lands, the project is

	<p>also subject to Hawai'i State historic preservation review legislation (Hawai'i Revised Statutes [HRS] §6E-8 and HAR §13-275, respectively).</p> <p>In consultation with the SHPD, this AMR was prepared in consideration of the <i>Secretary of the Interior's Standards for Archaeology and Historic Preservation</i> and fulfills the requirements of HAR §13-279-5. The archaeological monitoring program was carried out per the provisions of the project's archaeological monitoring plan (AMP) (Monahan et al. 2012b), and this AMR was prepared to document all monitoring results.</p>
Fieldwork Effort	<p>CSH archaeologists by Olivier M. Bautista, B.A., Layne Krause, B.A., Nate Garcia, B.A., Samantha Sund, B.A., Lisa Manirath, B.A., Amanda Lawson, B.A., Johnny Dudoit, B.A., McKenzie Wildey, B.A., Raimana Nifae David Hunkin, B.A., Laura Vollert, B.A., Fredrick LaChance, B.A., Tim Zapor, B.A., Jonas Madeus, B.A., Mary Tardona, B.A., Brittany Enanoria, B.A., Avalon Cooley, B.A., Nancine Kamai, B.A., Emily Menzies, B.A., Angus Raff -Tierney, M.A., Thomas Martel, B.A., Gina Farley, B.A., Jesse Davis, B.A., Ryan Harismendy, B.A., Andrew Soltz, B.A., Leah Westley, B.A., David Doig, B.A., Kira Mullen, M.A., Si-Si Hensley, B.A., Robin Kapoi-Kelii, B.A., Abigail Langham, B.A., Sherilyn Wheeler, B.S., Matthew Rice, B.A., Jessica Burden, B.A., Phoenix Pu'u, B.A., Zachariah Royalty, B.A., and Jay Rapoza, B.A., conducted fieldwork between 2 September 2015 and 26 November 2018 under the general supervision of Hallett H. Hammatt, Ph.D (principal investigator), William H. Folk, B.A. (project manager) and Sarah Wilkinson, B.A. (project director). This work required approximately 1,847 person-days to complete.</p>
Historic Properties Identified	<p>No previously unrecorded historic properties were identified.</p>
Monitoring Results	<p>Protective retaining walls were constructed at SIHP #s 50-10-27-10154, -15324, -18099, -22418, -28783, and -29272. All related construction work was monitored. These sites were not impacted by construction, though SIHP # -10154 required temporary stabilization using sandbags during construction of Retaining Wall F.</p> <p>Four lava tubes were breached during excavation activities, including one near SIHP # -28809. In all instances the breached lava tubes were found to be culturally sterile within the project boundaries and construction was allowed to proceed.</p> <p>Interim protective fencing was breached only once during project construction, when a public vehicle crashed through the fence after construction hours. The incident was located between SIHP #s -10714</p>

	<p>Feature A and -29344. These historic properties were not damaged by the accident.</p> <p>The Area of Potential Effect (APE) identified in the project archaeological reports were determined to be incorrect. The APE shown was contained with the 300 foot right of way and did not include the project's connections to the side roads. HDOT Highways Division Planning Office coordinated the APE modification with the State Historic Preservation Division.</p> <p>Communication and coordination issues resulted in incorrect information being used to identify and locate three historic sites that needed to be protected. The communication and coordination issues, combined with the existing poor condition of some sections of the historic trails, resulted in three incidents.</p> <p>Three historic properties were affected by inadvertent impact during the project. The historic properties are identified by their State Inventory of Historic Site (SIHP) numbers and the impacts were as follows:</p> <ul style="list-style-type: none"> • At SIHP # 50-10-27-10714 (<i>mauka-makai</i> [mountains-sea] trail system), an approximately 5-m segment of the Feature A trail and approximately 7-m segment of the Feature C trail were impacted by grading activities. The impacted portions of the Feature A and Feature C trails appear to have been erroneously located outside interim preservation fencing on engineering drawings and were therefore exposed to project impact. The placement of interim fencing across the Feature A and Feature C trail segments was based on the SHPD accepted archaeological data recovery and preservation plan (DRPP) (Shideler et al. 2012) and the archaeological preservation and mitigation plan (APMP) (Hammatt and Shideler 2014); it was expected that the grading limit was intended to cross the Feature A and Feature C trails, leaving segments of these trails protected outside the grading limits and segments to be impacted inside of the grading limits. • At SIHP # 50-10-27-19954 (<i>mauka-makai</i> trail), cultural monitors deconstructed a section of the stepping stone trail that they mistakenly believed was within project grading limits. Per the archaeological data recovery and preservation plan (DRPP) (Shideler et al. 2012) this section of the trail was slated for destruction, but under the subsequent project re-design and archaeological preservation and mitigation plan (APMP) (Hammatt and Shideler 2014) the site was completely outside the grading limits. The step stones of the trail were replaced by the cultural monitors. The historic property was not impacted by highway construction.
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	<ul style="list-style-type: none">• At SIHP # 50-10-27-00002 (Māmalahoa Trail) an approximately 3.5-m section of the trail adjacent to the southern Kealakehe Parkway shoulder was impacted when a heavy, tracked vehicle drove perpendicularly across the trail during stockpiling of pre-cast concrete blocks atop the road shoulder. SIHP # -00002 was not protected by interim preservation fencing in this location as this work occurred outside the project area and APE described in the SHPD-accepted AIS (Monhan et al. 2012a) and subsequent preservation plans (Shideler et al. 2012; Hammatt and Shideler 2014). <p>The stratigraphy observed during the monitoring program was as expected given the geology known to characterize the project area and prior construction-related disturbance. Stratigraphy within the project area consists of basalt gravel-to-boulder construction fills and/or natural layers of crushed 'a'ā lava overlying both deteriorating and consolidated basalt bedrock. No cultural deposits or burials were exposed during project excavations.</p> <p>Aside from the inadvertent impacts to the three historic properties addressed here, the results of the monitoring were as expected.</p>
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Section 1 Introduction

1.1 Project Background

At the request of Goodfellow Bros., Inc., (GBI) and on behalf of the Hawai‘i State Department of Transportation (HDOT), Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this archaeological monitoring report (AMR) for the Queen Ka‘ahumanu Highway Widening Phase 2 project, Kalaoa, Kalaoa-‘O‘oma, ‘O‘oma 2, Kohanaiki, Kaloko, Honokōhau 1–2, and Kealakehe, North Kona District, Island of Hawai‘i, TMKs: [3] 7-3-009, 010, 043, 049, 051, 058; 7-4-008, 020. The project area and Area of Potential Effect (APE) are depicted on a portion of the 1996 Keahole Point U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), tax map plats (Figure 2 through Figure 4), and a 2013 aerial photograph (Figure 5).

The Queen Ka‘ahumanu Highway Widening project (Phase 2) involved widening the highway from the existing two lanes into a four-lane divided highway within the right-of-way (ROW) between Kealakehe Parkway and the Keāhole Airport Access Road. The project included the construction, installation, and/or relocation of new pavements and pavement markings, drainage systems, sidewalks, traffic signal systems and traffic signs, guardrails, highway lighting, and utilities, as well as landscape plantings. Ground disturbing activities included grubbing, grading, and filling portions of the ROW; excavations for utility and sewer lines, signage, and signal lights; and installation of permanent protective barriers around historic properties, guardrails, and landscaping. Most of the major ground disturbance occurred along the *makai* (seaward) side of the existing highway. Excavated materials were reused on site.

The project area addressed in the *Archaeological Inventory Survey [AIS] for the Proposed Queen Ka‘ahumanu Highway Widening Phase 2 Project, Kalaoa, Kalaoa-‘O‘oma, ‘O‘oma 2, Kohanaiki, Kaloko, Honokōhau 1-2 and Kealakehe, North Kona District, Hawai‘i Island TMK: (3) 7-4-008, 7-3-009 & 7-3-043* (Monahan et al. 2012a) consisted of an approximately 300-foot (ft) wide corridor along the Queen Ka‘ahumanu Highway ROW, beginning (in the south) approximately 350 m (1,150 ft) south of Kealakehe Parkway (approximate Station 1110+00) and ending (in the north) at approximately 518 m (1,700 ft) north of Keāhole Airport Road (304.8 m [1,000 ft] + taper length; approximate Station 252+00). This project area comprised 190 acres (76.9 hectares). The project APE described in Monahan et al. (2012a) and the 2015 Memorandum of Agreement (MOA) included the highway ROW plus areas potentially affected by the proposed undertaking including, but not limited to, the Kaloko-Honokōhau National Historical Park and the Honokōhau Settlement National Historic Landmark (State Inventory of Historic Places [SIHP] # 50-10-27-04138), which are immediately adjacent to the project area in Honokōhau and Kaloko Ahupua‘a. This APE comprised approximately 1,356.5 acres (549.2 hectares).

HDOT in December 2016 expanded the project area and APE by approximately 23 acres to include additional improvement areas, bringing the project area to approximately 212.82 acres (86.13 hectares) and the APE to approximately 1,379 acres (558 hectares). The revised APE included the Queen Ka‘ahumanu Highway ROW, portions of intersecting streets, construction offices, base yards, and storage areas, and the Koloko-Honokōhau National Historical Park and Honokōhau Settlement National Historic Landmark. The additional acreage was surveyed during a supplemental AIS (Wilkinson et al. 2017). Appendix A lists all landowners for parcels within the project area and APE.

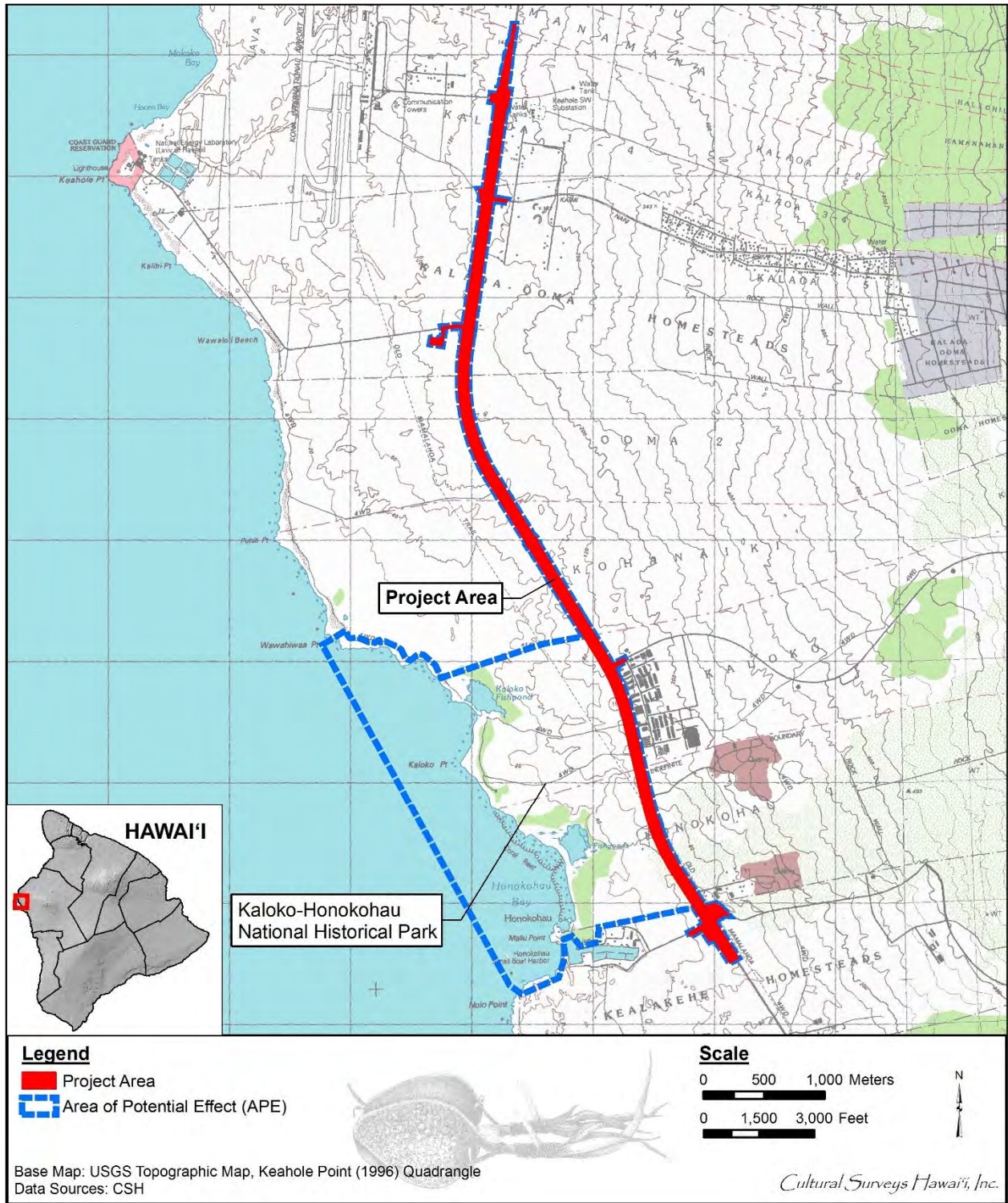


Figure 1. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing the Queen Ka'ahumanu Highway Widening Phase 2 project area (in red) and APE (in blue)

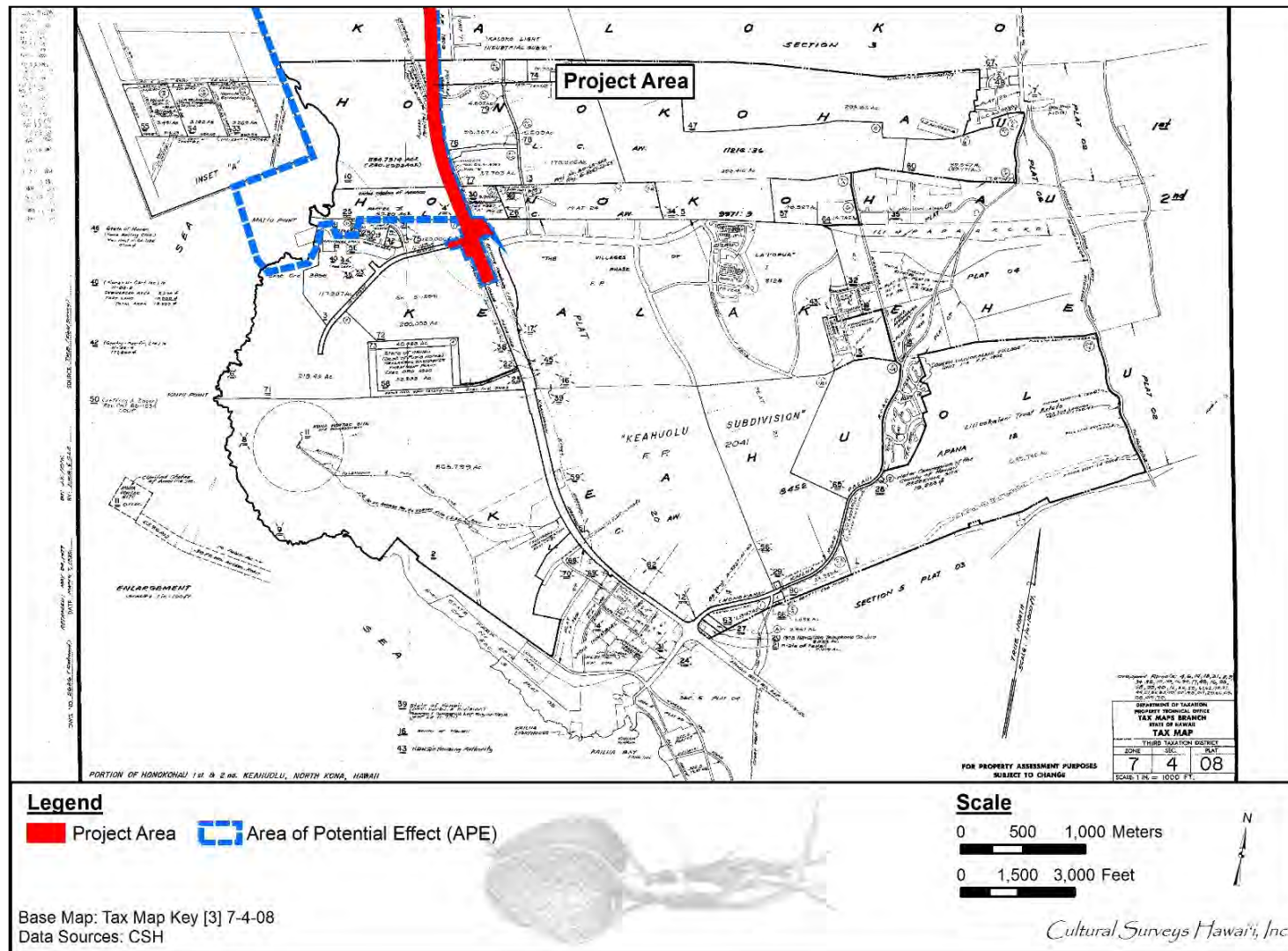


Figure 2. Tax Map Key (TMK) [3] 7-4-008, showing the Queen Ka‘ahumanu Highway Phase 2 project area and APE (Hawai‘i TMK Service 2014)

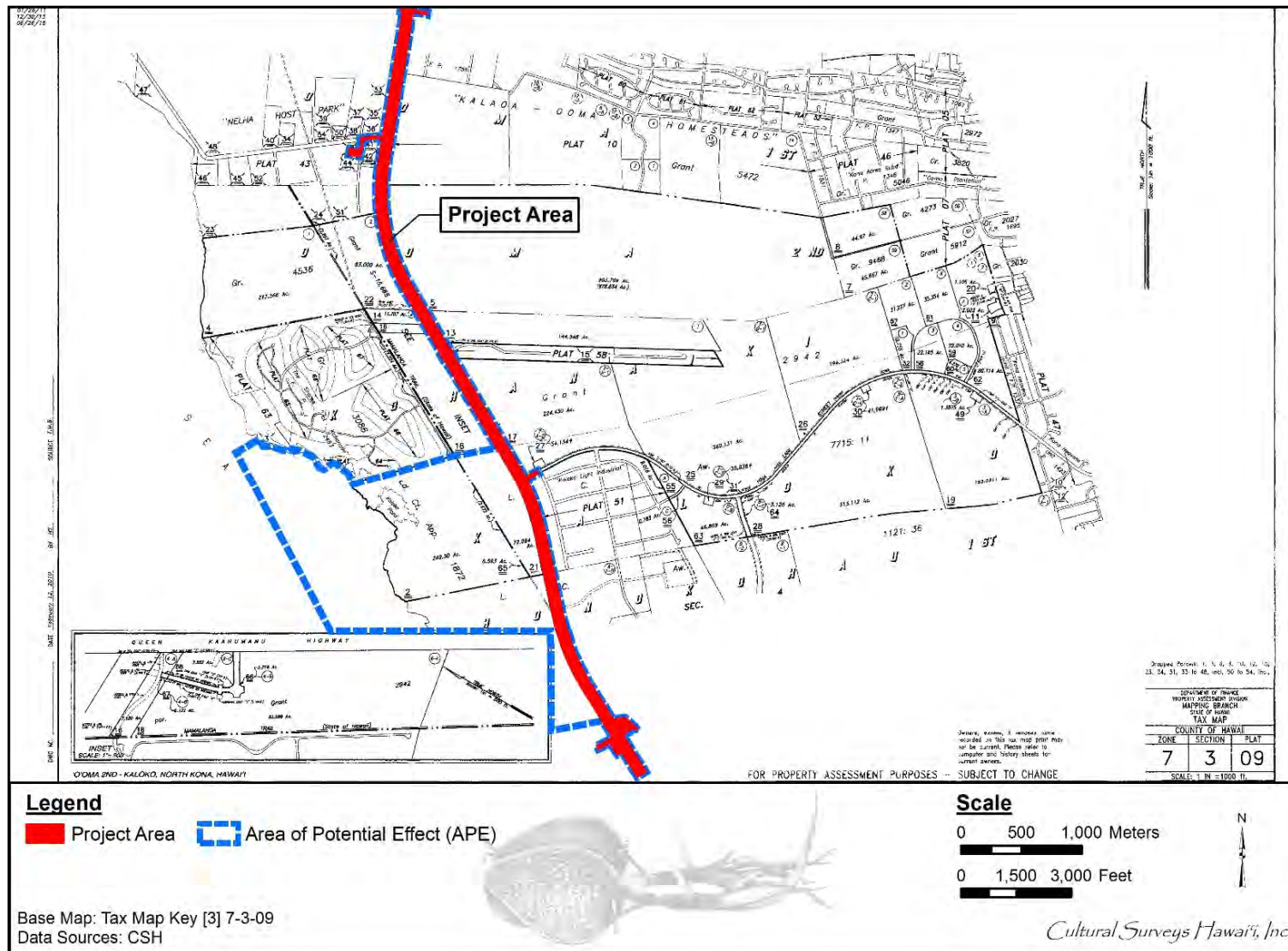


Figure 3. TMK: [3] 7-3-009, showing the Queen Ka'ahumanu Highway Phase 2 project area and APE (Hawai'i TMK Service 2014)

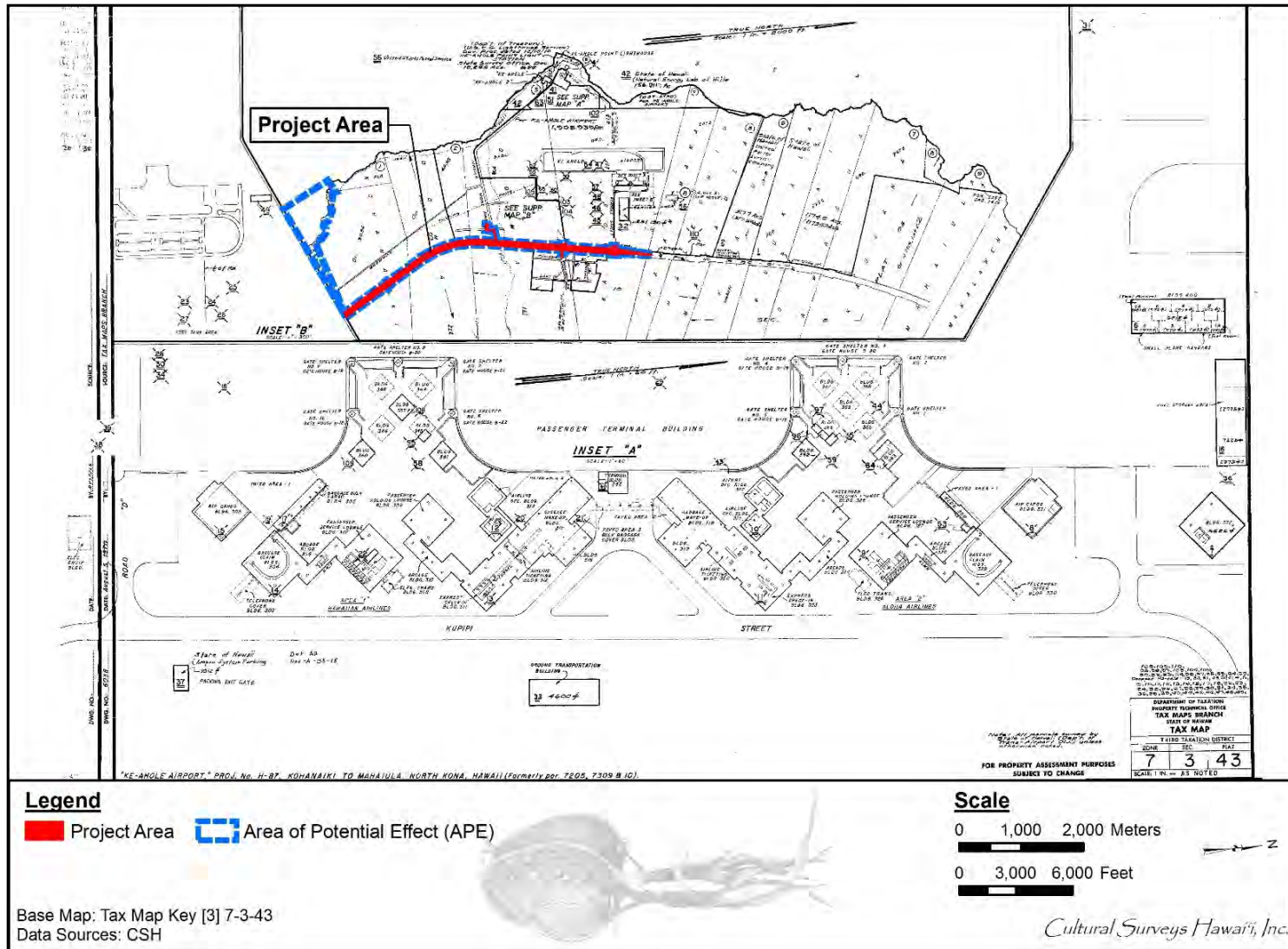


Figure 4. TMK: [3] 7-3-043, showing the Queen Ka'ahumanu Highway Phase 2 project area and APE (Hawai'i TMK Service 2014)



Figure 5. Aerial photograph of the project area (Google Earth 2013)

1.2 Project Historic Preservation Regulatory Context and Document Purpose

This archaeological monitoring report (AMR) was designed to comply with both federal and Hawai'i State environmental and historic preservation review legislation. Due to Federal Highway Administration (FHWA) funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA), and Section 4(f) of the Department of Transportation Act. As an HDOT project within a state ROW and private lands, the project is also subject to Hawai'i State historic preservation review legislation (Hawai'i Revised Statutes [HRS] §6E-8 and Hawai'i Administrative Rules [HAR] §13-275, respectively).

This AMR was prepared in consideration of the *Secretary of the Interior's Standards for Archaeology and Historic Preservation* and fulfills the requirements of HAR §13-279-5. The archaeological monitoring program was carried out per the provisions of the project's archaeological monitoring plan (AMP) (Monahan et al. 2012b), and this AMR was prepared to document all monitoring results.

1.2.1 Project Historic Preservation Regulatory Background

In 1995, CSH conducted an archaeological inventory survey for the proposed Queen Ka'ahumanu Highway Widening project (Walsh and Hammatt 1995), identifying 17 historic properties within the project area (as it was known at that time). The survey report was reviewed and accepted by the SHPD (LOG NO.: 15956, DOC NO.: 9511PM28) on 22 November 1995.

In 1996, the FHWA and HDOT produced a Final Environmental Assessment (FEA), issued a Finding of No Significant Impact (FONSI), and determined the proposed project "will not have any significant impact on the human environment."

In 1999, a Final Archaeological Treatment Plan (FATP) and MOA were completed to memorialize mitigation and protection measures for 12 historic properties identified by CSH (Walsh and Hammatt 1995).

Subsequently, staff working for the National Park Service (NPS), including the Honokōhau Settlement National Historic Landmark, the Kaloko-Honokōhau National Historical Park, and the Ala Kahakai National Historic Trail, raised concerns about archaeological features or sites they believed were overlooked during the 1995 surveys. These NPS concerns were raised directly to HDOT and FHWA.

In response to NPS concerns, CSH was re-contracted in 2010 to conduct a thorough supplemental archaeological inventory survey of the project area, the results of which were reported in an AIS report (Monahan et al. 2012a). The objective of the study by Monahan et al. (2012a) was to conduct a complete re-survey of the entire Phase 2 project area. The resulting AIS documented 75 historic properties, of which 55 were newly identified. The Monahan et al. (2012a) AIS was accepted by the SHPD in a letter (LOG NO.: 2011.1140, DOC NO.: 1104TD12) dated 27 April 2011, under the condition that other consulting parties, in particular the NPS and NHOs, were satisfied with the report.

In 2011, an archaeological data recovery plan (ADRP) was accepted by the SHPD in a letter (LOG NO.: 2011.2598, DOC. NO.: 1110TD01) dated 5 October 2011. Data recovery was then initiated following the 2011 ADRP (Altizer and Monahan 2011); however, due to a revision of the project scope, data recovery was halted during this fieldwork effort. After halting fieldwork, consultation with interested parties continued. When it became clear, through continuing consultation, that the other consulting parties were not satisfied with the report, CSH undertook two supplemental studies of the project area (Monahan and Wilkinson 2012; Monahan and Yucha 2012). These studies, which included a limited amount of fieldwork investigation with the NPS and NHOs, yielded additional historic properties that were added to the AIS report, which is an integration of information from three main documents: the original AIS by Monahan et al. (2012a) and the two supplemental survey reports cited above. The AIS recommended preparation of an AMP, archaeological data recovery and preservation plan (DRPP), and burial treatment plan (BTP). This AIS was accepted by SHPD in a letter dated 21 August 2012 (LOG NO.: 2012.1443, DOC NO.: 1208MV01; Appendix B)

An AMP (Monahan et al. 2012b) for this project was accepted by the SHPD in a letter dated 1 October 2012 (LOG NO.: 2012.2544, DOC. NO.: 1209MV11; see Appendix B).

A DRPP (Shideler et al. 2012) for this project was reviewed and accepted by the SHPD in a letter dated 25 October 2012 (LOG NO: 2012.3052, DOC NO: 1210MV25; see Appendix B). Subsequently, to secure Advisory Council on Historic Preservation (ACHP) support, it was decided to minimize impact to certain historic properties by effectively moving the seaward edge of the proposed highway widening corridor inland. A SHPD §6E-8 and National Historic Preservation Act Section 106 Review dated 23 July 2013 (LOG NO: 2013.4167, DOC NO: 1307MV17; see Appendix B) specifies the need for an amended DRPP. An amended plan was produced to address that SHPD directive of 23 July 2013. The SHPD directive of 28 October 2013 (LOG NO.: 2013.4267, DOC NO.: 1310MV12) recommended that “the amended [2013] data recovery and preservation plan be abandoned, and instead, an independent preservation/mitigation plan be prepared only for the sites whose mitigation commitments will change as a result of the redesign.” In response to this directive, an archaeological preservation and mitigation plan (APMP) was prepared addressing 23 applicable historic properties (Hammatt and Shideler 2014). The APMP was and accepted by the SHPD in a letter dated 9 April 2014 (LOG NO.: 2014.1379, DOC. NO.: 1404MV06; see Appendix B).

An updated project MOA was finalized on 6 April 2015 addressing the historic properties documented since the initial 1995 AIS. In May 2015, an updated Section 4(f) evaluation was finalized addressing SIHP # -00002 (Mamālahoa Trail).

Subsequent to SHPD acceptances of the AIS, AMP, and DRPP in 2012; APMP in 2014; and completion of the data recovery fieldwork in 2016, the project APE was expanded. In consultation with the FHWA, SHPD, and HDOT, a supplemental AIS (SAIS) was conducted addressing 13 areas of the revised APE that were not included in the Monahan et al. (2012) AIS. This SAIS (Wilkinson et al. 2017) was accepted by the SHPD in a letter dated 9 March 2017 (Log No.: 2017.00322, Doc. No.: 1703SL06; see Appendix B).

1.3 Environmental Setting

1.3.1 Natural Environment

The project area lies between approximately 0.5 and 1.5 miles from the coastline, at elevations between 50 ft above mean sea level (AMSL) and 160 ft AMSL at the north end. Rainfall in the project area averages between 20 and 30 inches per year, and temperatures range from an average minimum of 62–68° F to an average maximum of 78–82° F (Armstrong 1973:57–58).

The land surface is composed predominately of undissected ‘a‘ā and *pāhoehoe* lava flows. The *Soil Survey of the Island of Hawaii* describes ‘a‘ā lava terrain as having “practically no soil covering and . . . bare of vegetation, except for mosses, lichens, ferns, and a few small *ohia* trees . . . This lava is rough and broken. It is a mass of clinkers, hard, glassy sharp pieces piled in tumbled heaps” (Sato et al. 1973:34). The same study describes *pāhoehoe* lavas as “a billowy, glassy surface that is relatively smooth. In some areas however, the surface is rough and broken and there are hummocks and pressure domes” (Sato et al. 1973:34). Figure 6 depicts the main soil types in the project area. Besides the ‘a‘ā flows (rLV) and *pāhoehoe* flows (rLW), the highway also crosses a few areas of Punaluu Extremely Rocky Peat, 6-20% slopes (rPYD). This soil series consists of very shallow, well drained organic soils, which formed in organic material mixed with minor amounts of basic volcanic ash over *pāhoehoe* lava.

Vegetation in the project area is identified as “Fountain Grass Grassland” in *The Botanical Survey of West Hawai‘i Boundary Review* (Char & Char Associates 1992 in Head and Rosendahl 1993:2). This vegetation type typically consists of low tufts of grass with scattered shrubs and a few trees. Plants commonly observed within the project area include *pili* grass (*Heteropogon contortus*), Guinea grass (*Panicum maximum*), fountain grass (*Pennisetum setaceum*), *wilelaiki* or Christmas berry (*Schinus terebinthifolius*), *klu* (*Acacia farnesiana*), *koa haole* (*Leucaena leucocephala*), *kiawe* (*Prosopis pallida*), and lantana (*Lantana camara*). In areas of Punaluu Stony Peat, common vegetation includes *koa haole* and Guinea grass.

1.3.2 Built Environment

The Queen Ka‘ahumanu Highway extends through bare *pāhoehoe* and ‘a‘ā lava flows. There are three commercially developed areas adjacent to the *mauka* (inland) side of the highway: in Honokōhau for a gas station and quarry, in Kaloko for the Kaloko Industrial Park, and in Kohanaiki for the Kohanaiki Industrial Park. On the *makai* (seaward) side of the project area, there are several adjacent, developed areas and associated access roads including (from south to north) Honokōhau Harbor, Kaloko-Honokōhau National Historical Park, Shores at Kohanaiki, the Nature Energy Laboratory of Hawai‘i Authority (NELHA), and the Kona International Airport. Approximately 50% of the project area consists of the existing highway and previously disturbed land along both the *mauka* and *makai* highway shoulders. Previous disturbance in the project area appears to be primarily a result of the original highway construction (both sides of the existing highway) and utility pole installation (*mauka* side).

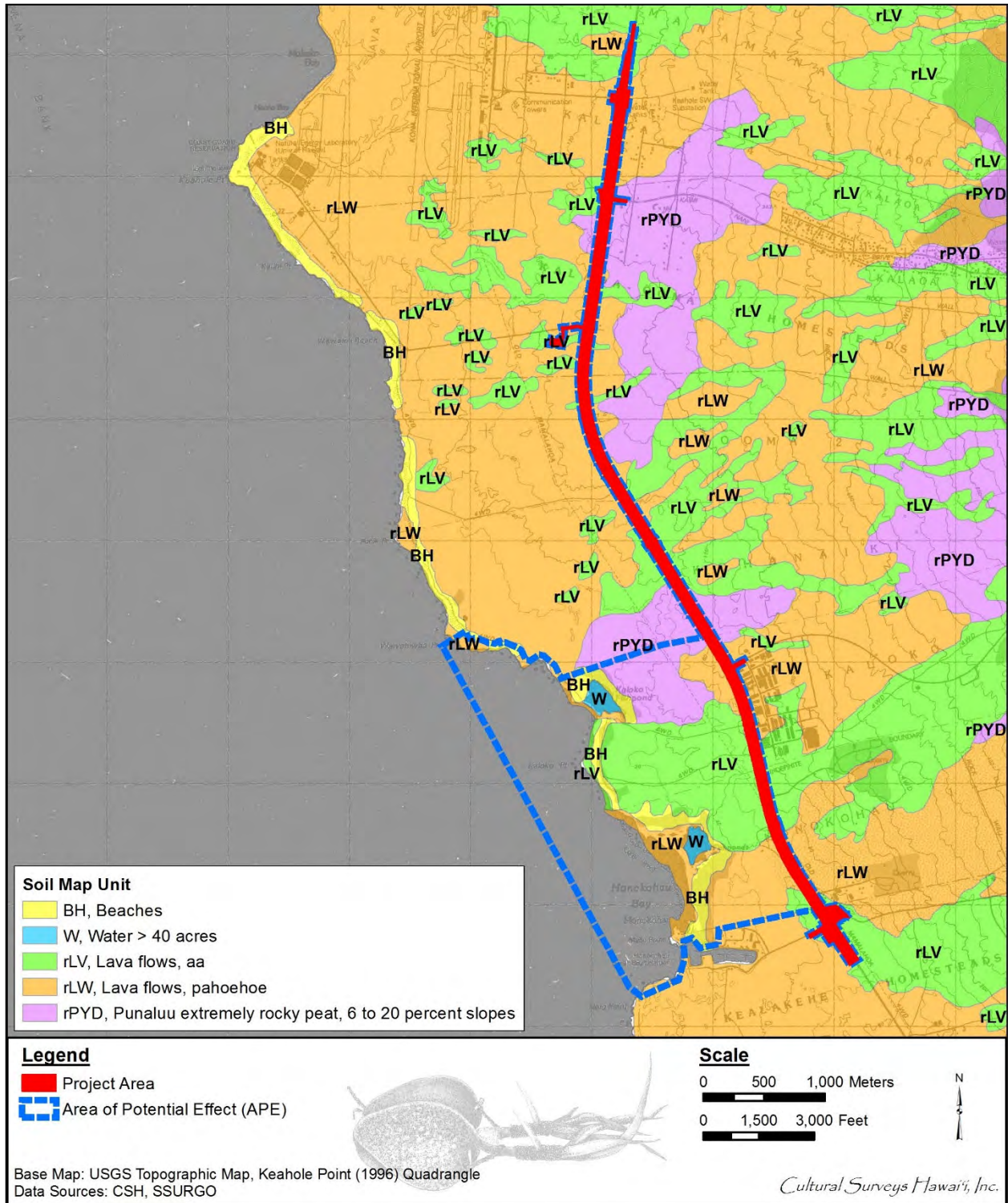


Figure 6. Overlay of *Soil Survey of the State of Hawaii* (Sato et al. 1973), indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [USDA SSURGO] 2001)

Section 2 Methods

2.1 Field Methods

CSH completed archaeological monitoring fieldwork under archaeological permit numbers 15-03, 16-26, 17-08, and 18-15 issued by the SHPD pursuant to HAR §13-282. CSH archaeologists Olivier M. Bautista, B.A., Layne Krause, B.A., Nate Garcia, B.A., Samantha Sund, B.A., Lisa Manirath, B.A., Amanda Lawson, B.A., Johnny Dudoit, B.A., McKenzie Wildey, B.A., Raimana Nifae David Hunkin, B.A., Laura Vollert, B.A., Fredrick LaChance, B.A., Tim Zapor, B.A., Jonas Madeus, B.A., Mary Tardona, B.A., Brittany Enanoria, B.A., Avalon Cooley, B.A., Nancine Kamai, B.A., Emily Menzies, B.A., Angus Raff -Tierney, M.A., Thomas Martel, B.A., Gina Farley, B.A., Jesse Davis, B.A., Ryan Harismendy, B.A., Andrew Soltz, B.A., Leah Westley, B.A., David Doig, B.A., Kira Mullen, M.A., Si-Si Hensley, B.A., Robin Kapoi-Kelii, B.A., Abigail Langham, B.A., Sherilyn Wheeler, B.S., Matthew Rice, B.A., Jessica Burden, B.A., Phoenix Pu'u, B.A., Zachariah Royalty, B.A., and Jay Rapoza, B.A., conducted fieldwork between 2 September 2015 and 26 November 2018 under the general supervision of Hallett H. Hammatt, Ph.D. This work required approximately 1,847 person-days to complete.

CSH archaeological monitors employed by GBI worked in coordination with cultural monitors employed by RMT for the duration of the project.

Standard archaeological monitoring practices were employed. An archaeologist was present for all ground disturbing activities. Following discovery of inadvertent impacts to sections of some historic properties during construction (see Section 5.4), a monitoring Action Plan was developed in coordination with HDOT and GBI (Appendix C). This Action Plan, finalized 15 November 2016, clarified the monitors' role and responsibilities in the project construction, coordination protocols, protocols for working around archaeological preserves, and reporting requirements. In addition to the standard on-site monitoring of ground disturbing activities described in the AMP, the Action Plan called for archaeological monitoring of *all* work activity within "proximity" (typically defined as 100 ft or 30 m) of the outer edge of an archaeological preserve. Because of this stipulation, many days of monitoring were conducted despite a lack of ground disturbing activity.

During ground disturbing activities, the archaeologist watched as the machine excavated at a normal pace and inspected excavated material as it was removed from the ground and dumped into an adjacent backfill pile or truck. All excavation activity, particularly through natural sediment, was closely monitored. Locations of subsurface excavation were documented in daily monitoring records.

Stratigraphic profiles of representative excavations were drawn and photographed. The observed sediments were described using standard USDA soil description observations/terminology. Sediment descriptions included Munsell color; texture; consistence; structure; plasticity; cementation; origin of sediments; descriptions of any inclusions such as cultural material and/or roots; lower boundary distinctiveness and topography; and other general observations. Were stratigraphic anomalies or potential cultural deposits exposed, these would have been carefully represented on excavation profile maps; however, no such anomalies were observed during the project monitoring.

2.2 Research Methods

Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library of the University of Hawai'i, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Bishop Museum Archives; study of historic photographs at the Hawai'i State Archives and the Bishop Museum Archives; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona 'Aina database (Waihona 'Aina 2000). This research provided the environmental, cultural, historic, and archaeological background for the project area.

2.3 Laboratory Methods

No materials were collected during monitoring therefore laboratory analyses were not conducted.

2.4 Disposition of Materials

No materials were collected from the field. All data generated during the course of the archaeological monitoring program are stored at the CSH offices in Hilo and Waimānalo.

Section 3 Background Research

This section summarizes aspects of the traditional and historical importance of the project area, including descriptions of place names and *wahi pana* (legendary places), *'ōlelo no'eau* (poetical sayings), and significant historical events and persons.

3.1 Traditional Background

3.1.1 *Wahi Pana* (Place Names)

Wahi pana (“legendary place” Pukui and Elbert 1986:376) or “place names” are an integral part of Hawaiian culture. “In Hawaiian culture, if a particular spot is given a name, it is because an event occurred there which has meaning for the people of that time” (McGuire and Hammatt 2000:23). The *wahi pana* are then passed on through language and oral tradition, thus preserving the unique significance of the place. Hawaiians have named a wide variety of objects and places, including points of interest that may have gone unnoticed by persons of other cultural backgrounds.

The primary compilation source for place names in this section is the online database of Lloyd Soehren’s (2010) *Hawaiian Place Names*. Soehren has compiled all names from mid-nineteenth century land documents, such as Land Commission Awards (LCAs) and Boundary Commission Testimony (BCT) reports. The BCT lists boundary points for many (but not all) of the *ahupua'a* (land division usually extending from the uplands to the sea). The names of *'ili 'āina* (land units within an *ahupua'a*) and *'ili kū* (land units rewarded separately from a specific *ahupua'a*) are compiled from the testimony in Māhele LCAs, from both awards successfully claimed and from those rejected. Place names found by the authors on USGS maps and Hawai'i Survey Registered Maps (RM) have been added to the Soehren database.

The Soehren database includes place name meanings from the definitive book on Hawaiian place names, *Place Names of Hawaii* (Pukui et al. 1974). Where Pukui et al. (1974) do not provide a translation, Soehren often suggests a meaning for simple names from the *Hawaiian Dictionary* (Pukui and Elbert 1986). Thomas Thrum (1922) also compiled a list of place names in the 1922 edition of Lorrin Andrews’s *A Dictionary of the Hawaiian Language*, although these meanings are considered to be less reliable than those in *Place Names of Hawaii*.

Many of these place names are shown on historic maps (Figure 7 through Figure 10). In many cases, the exact locations of place names are not known, only their general location between two other points along an *ahupua'a* boundary. These cannot be placed accurately on any maps, so their position is only noted in the following place name tables. Abbreviations used in the Soehren database are presented in Table 1.

3.1.1.1 Kealakehe Place Names

Kealakehe was assigned as Government Land during the Māhele, but there were 23 Land Commission claims with information on *'ili* names. Although there is no specific Boundary Commission survey for Kealakehe, Keahuolū, the *ahupua'a* to the south, was surveyed with the result that the boundary points along the southern boundary of Kealakehe are in the boundary commission testimony (BCT). The exact locations of most of the places are not known, but the general order of the names, from the *makai* boundary point at the coast to the *mauka* point of the

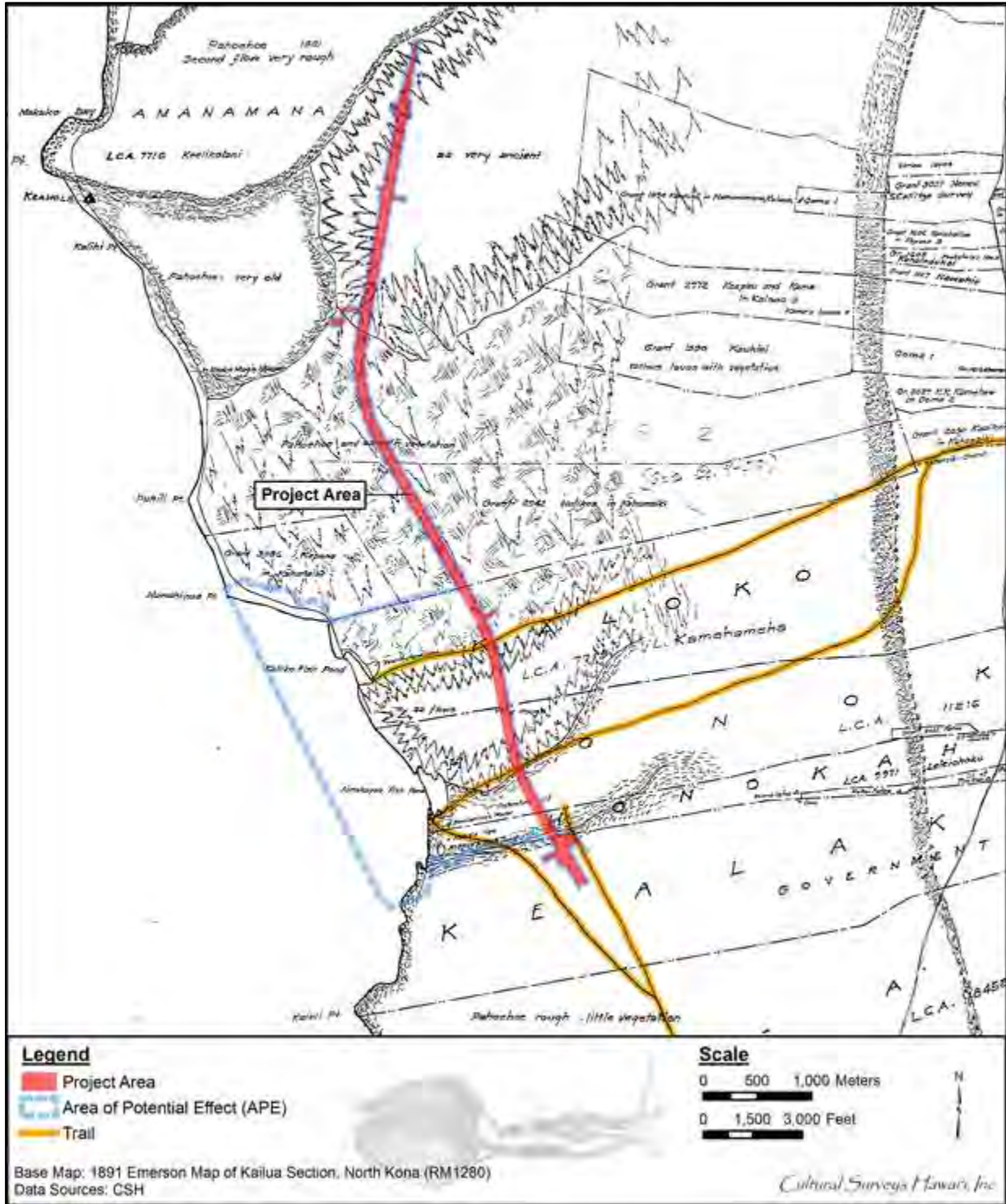


Figure 9. 1891 map (portion), Kailua section of North Kona (Hamanamana to Puapua‘a) by J.S. Emerson; note *mauka-makai* trails in Kaloko (SIHP # -10714, “Road to the Sea”) and Honokōhau I (SIHP # -18099, “Trail to Honokōhau”)

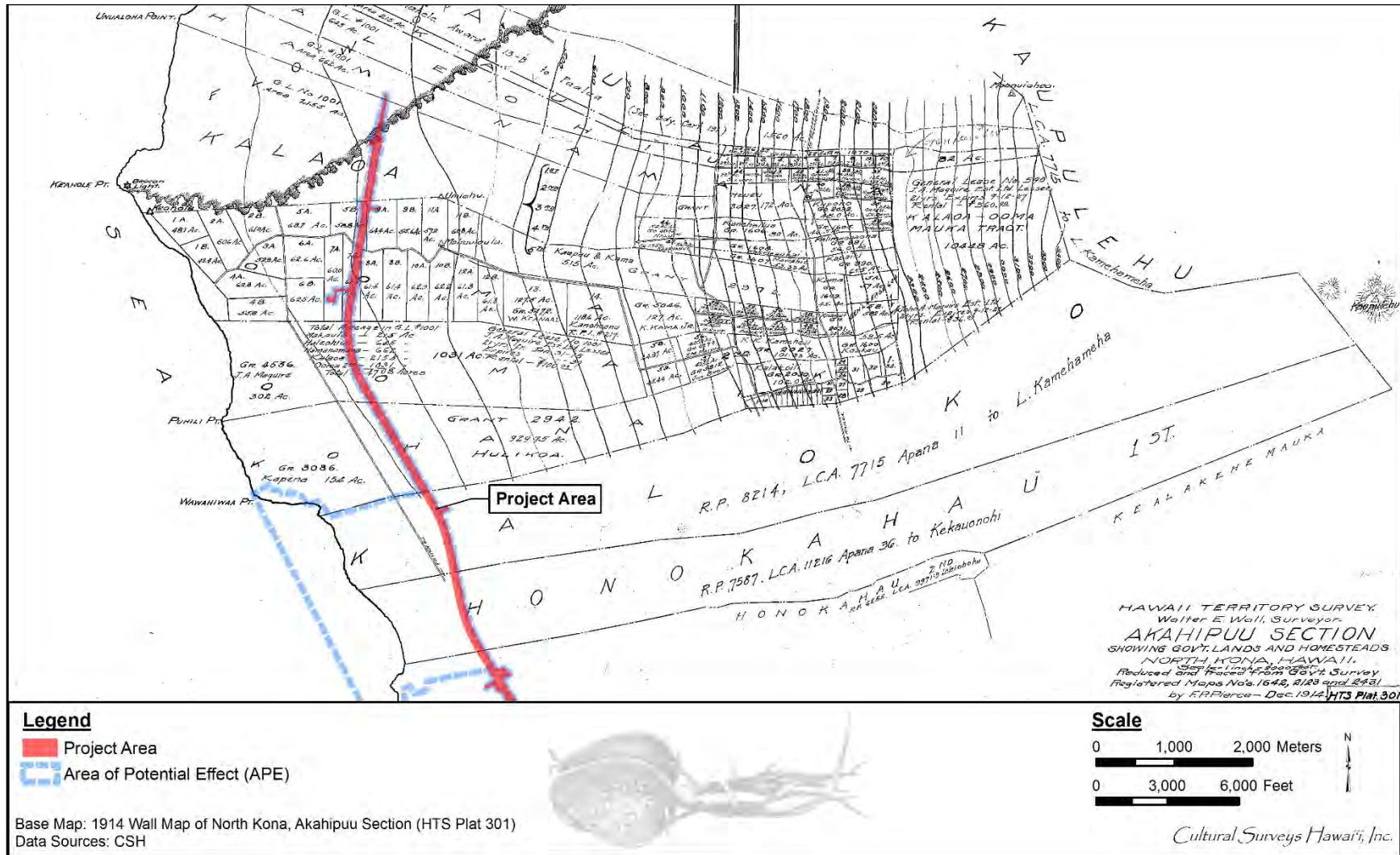


Figure 10. 1914 map of Akahipu'u Section of Kailua-Kona by W.E. Wall, depicting the numerous Government Lands and land grants in 'O'oma and Kalaoa

Table 1. Abbreviations used in Lloyd Soehren's (2010) *Hawaiian Place Names*

Abbreviation	Full Name
BC	Boundary Certificate Number
BCT	Boundary Commission Testimony
FB	Field Book Register
FR	Land Commission, Foreign Register
FT	Land Commission, Foreign Testimony
NR	Land Commission, Native Register
NT	Land Commission, Native Testimony
RM	Registered Map
RPG	Royal Patent Grant
TM	Tax Map
USGS	U.S. Geological Survey

ahupua'a, can be determined. In Table 2, these boundary points are numbered one through 12, from the shore to the *mauka* point. In the Boundary Commission, several witnesses recorded their memories of the boundary points, which resulted in different sequences, as some place names appeared in only one of the testimonies. For instance, one sequence listed the following:

Pu'u Nāhāhā, Pu'u Hulihuli, and Ka'e'ku

Another sequence lists the following:

Pu'u Nāhāhā, Ka'ena'ena, and Ka'e'ku

Thus, it is not possible to determine if Pu'u Huliuli or Ka'ena'ena is *mauka* of the other, or even if they are variant names for the same place. In this case, the names are listed with a sub-number (e.g., Boundary Point 5a and 5b). The boundary points between Kealakehe and Honokōhau are presented in the following section on Honokōhau place names.

3.1.1.2 Honokōhau Place Names

Honokōhau was awarded to two high *ali'i* (chief) in the Māhele, and 32 commoner LCAs were claimed. The lands (Honokōhau 1 and Honokōhau 2) were surveyed, and the testimony for the boundary points is recorded in the Boundary Commission Books. This resulted in a great deal of information on place names for Honokōhau. Table 3 lists the place names and their meanings. Table 4 presents additional information on boundary points—including their numbered order—for the Honokōhau Ahupua'a/Kealakehe Boundary. Table 5 presents the boundary points for the border between Honokōhau 1 and 2.

Few of the boundary points between the *ahupua'a* of Honokōhau and Kealakehe or between Honokōhau 1 and Honokōhau 2 are known exactly. The tables present the general location information from the BCTs in order of occurrence as one would walk from the shore to the *mauka* point of the *ahupua'a*. Estimates of the elevation along this boundary line are from USGS maps, registered maps, and from estimates by Lloyd Soehren (2010). For points along the Honokōhau/Kaloko Ahupua'a boundary, see the next section in this report.

3.1.1.3 Kaloko Place Names

Place names of Kaloko Ahupua'a, as well as boundary points along the Honokōhau/Kaloko Ahupua'a boundary, are presented in Table 6.

3.1.1.4 Kohanaiki Place Names

The entire *ahupua'a* of Kohanaiki was classified as Government Lands (Indices of Awards 1929) in the Māhele. Two LCA claims were made, but neither was awarded, and so there are few sources for *'ili* names. The boundary of the *ahupua'a* was not surveyed, so there are no Boundary Commission sources for place names. Some land was later sold by the government as land grants, and place names are occasionally mentioned in these documents. J.S. Emerson mapped a portion of Kohanaiki on his Kona Coast Registered Map (RM 2035) and listed the names of several triangulation stations, which he had named. RM 2035 is a compilation that in part includes data from Emerson's 1888c map of Akahipu'u (RM 1446; see Figure 8). Thus, we have little information on traditional place names in Kohanaiki, except for those presented in Table 7.

Table 2. Kealakehe place names (compiled by Lloyd Soehren, with additions)

Place Name	Type	Comments	Name Meaning
Kealakehe	<i>Ahupua'a</i>	Māhele Book	The bend of a road (Thrum 1922)
Haleoloni	<i>'Ili 'āina</i>	LCA 8608 testimony	House of Lono (Pukui et al. 1974)
'Iliiloa	<i>'Ili 'āina</i>	LCA 8608 testimony	Long <i>'ili</i> (Pukui and Elbert 1986)
Ka'ōhia	<i>'Ili 'āina</i>	LCA 7483, 8608, 10950 testimony	The <i>'ōhi'a</i> tree
Kalihi	<i>'Ili 'āina</i>	LCA 8608 testimony	The edge (Pukui et al. 1974)
Kani'ohale	<i>'Ili 'āina</i>	LCA 9252, 10070, 10306, 10671 testimony	The house doorway (Pukui and Elbert 1986)
Kukui'ōmino	<i>'Ili 'āina</i>	LCA 8608, 7897, 10597, and 10671 testimony	Stunted <i>kukui</i> tree (Pukui and Elbert 1986)
Makakiloi'a	<i>'Ili 'āina</i>	LAC 8608 testimony	Fish-observing point (Pukui et al. 1974)
Pū'ohe	<i>'Ili 'āina</i>	LCA 8608 testimony	–
Hale o Mono (or Mano)	<i>Heiau</i>	1982 USGS	–
Haleokane	<i>Heiau</i>	Site 33: Reinecke called this simple platform <i>heiau</i> “Hale o Lono”; called “Hale of Kane” by surveyors in 1883 (Reinecke ms [1] 9: FB 294:135; FB 493:94)	–
Haleoloni	<i>Heiau</i>	1959 USGS	Likely Makaopio Heiau
Kalualapauila	<i>Heiau</i>	The Kealakehe/ Keahuolū boundary passes “a few fathoms on the north side of a heiau called Kalualapauila” (BCT 1:355); also called Luapauwila; see BC 45 (3:44); FB 294:610-62	–
Luapauwila (Kalualapauila)	<i>Heiau</i>	Said to be a walled structure on the 'Emakule homestead, RPG 3765, 3.5 miles from sea (Stokes 1991:40)	–

Place Name	Type	Comments	Name Meaning
Maka'ōpio	<i>Heiau</i>	Called "Hale o Lono Heiau" on USGS 1959, a generic name for temples dedicated to Lono; Reinecke Site 35; Emory and Soehren Site D11-7 (Emory and Soehren 1971:9; Reinecke ms [1]:10)	A variety of taro (Pukui and Elbert 1986)
'Ālula	Canoe landing	Site 34 (Reinecke ms [1]:10): A small sandy cove south of Honokōhau small boat harbor; here Punia tricked the shark king, Kaialeale, into coming ashore where he was killed	Possibly named for the endemic lobelia, ' <i>alula</i> (Pukui and Elbert 1986)
Ka'omalō	Canoe landing	Canoe landing near or the same as Alula (FB 243:191)	Perhaps, dry desert (Pukui and Elbert 1986)
Makauhele-hele	Canoe landing	(FB 306:136)	—
Kalokoloa	Inlet	A narrow inlet at the shore, probably a collapsed <i>pāhoehoe</i> lava tube, between Kaluakauaka and Noio Point (FB 306:135)	The long pond (Pukui and Elbert 1986)
Kaluakauaka	Inlet	Between Kaiwi Point and Kalokoloa (FB 243:191–192)	The pit [where] lightning flashes
Noio	Coastal point	(USGS 1982)	Tern (Pukui and Elbert 1986)
'Ōpilopilo	Stream	"[T]urn north to kahawai Opilopilo, the <i>mauka</i> corner of Kealakehe"	—
Keomano	<i>Pōhaku</i>	A rock outside Alula, below Hale on Kane Heiau (FB 294:135–136; FB 493:94)	—
Kaiwi Point	Boundary Point 1 (at coast)	Kealakehe/Keahuolū boundary at shore (USGS 1998)	The bone (Pukui et al. 1974)

Place Name	Type	Comments	Name Meaning
Pu'u o Kāloa	Boundary Point 2	Kealakehe/Keahuolū boundary. Kamakau: "The spot where [Kealii-o-kaloa] was killed was called Puu-o-Kaloa, situated between Kailua and Honokōhau." 'Ī'ī places it along the trail from Kamakahonu to Kiholo. An <i>oioina</i> (resting place), on Kealakehe/Keahuolū boundary (BCT 1:355; Kamakau 1961:35; 'Ī'ī 1959:120)	Hill of Kāloa (Pukui and Elbert 1986)
Pu'u 'Ula'ula	Boundary Point 3	Kealakehe/Keahuolū boundary; "hill between Puu o Kaloa & Puu Nahaha" (BCT 1:356)	Red hill (Pukui and Elbert 1986)
Pu'u Nāhāhā	Boundary Point 4	Kealakehe/Keahuolū boundary, "a hill of aa called Puu Nahaha" between Puu Ulaula and Puu o Hulihuli (BCT 1:355, 356)	Shattered hill (Pukui et al. 1974)
Pu'u Hulihuli (Puohuliuliu)	Boundary Point 5a	Kealakehe/Keahuolū boundary between Puu Nahaha and Kalualapauwila, about 220 ft elev (BC 45 [3:44]; BCT 1:356; FB 294:61–62; USGS 1924)	Hill of Hulihuli (Pukui and Elbert 1986)
Ka'ena'ena	Boundary Point 5b	Kealakehe/Keahuolū boundary—hill between Pu'u Nahaha and Kae'eku (BCT 1:356, 358)	—
Ka'e'ku	Boundary Point 6	Kealakehe/Keahuolū boundary, hill between Kaenaena and Kalualapauila (BCT 1:356, 358)	—
Kaluapau-wila	Boundary Point 7	Kealakehe/Keahuolū boundary passes "a few fathoms on the north side of a heiau called Kalualapauila" (BCT 1:355)	—
Lae Niau (Kalaeoniau)	Boundary Point 8	Kealakehe/Keahuolū boundary, an <i>ahu pohaku</i> at the Government road (1:355); "a puu makai of said road" [Old Upper Govt. road on TM]; between Kalualapauila and Keahupuaa (BCT 1:355, 1:366, 358)	—

Place Name	Type	Comments	Name Meaning
Keahupua'a	Boundary Point 9	Kealakehe/Keahuolū boundary “and ahua pohaku at the mauka [Old Upper] Government road”; between lae Niau and Kahihi'ie (BCT 1:357)	The pig altar (Pukui and Elbert 1986)
Kahuaa-ka'ūlei	Boundary Point 10	Kealakehe/Keahuolū boundary between Keahuuaa and Ohiawela (BCT 1:358)	The fruit of the 'lei shrub (Pukui and Elbert 1986)
'Ōhi'awela	Boundary Point 11	Kealakehe/Keahuolū boundary; “I have not been there, but have heard that there is a spring there”; Between Kahuaakaulei and Kahihiia (BCT a:358)	—
Kahihi'ie	Boundary Point 12a (mauka)	Kealakehe/Keahuolū boundary at the corner of the lands of Kealakehe, Keahuolū, and Lanihauiki (BC 45 [3:44]; BCT:1:358, 364, 365)	—
Kaohiamoekanaka (Ohiakaukanaka)	Boundary Point 12b (mauka)	Kealakehe/Keahuolū, “corner of Keahuolū is an Ahua called Kaohiamoekanaka, thence makai along Kealakehe” (BCT 1:356)	—

Table 3. Honokōhau place names (compiled by Lloyd Soehren 2010, with additions)

Place Name	Location	Type	Source	Meaning
'Ai'ōpio	Honokōhau 2	Fishpond	—	Youth eating (Pukui et al. 1974)
'Aimakapā	Honokōhau	Hishpond	—	—
Ahupua'a	Honokōhau 2	<i>Pu'u</i> , boundary point	—	Pig altar
'Elepaio	Honokōhau 2	<i>'Ili kū</i>	LCA 10319 testimony b	Pukui et al. 1974: flycatcher (a Hawaiian bird, <i>Chasiempis sandwichensis</i>); Pukui and Elbert 1986: a variety of taro
Hale o Mano (sometimes written as Mono)	Honokōhau	<i>Heiau</i>	—	—

Place Name	Location	Type	Source	Meaning
Haleamahuka	Honokōhau 1	<i>'Ili 'āina</i>	LCA 10521 testimony	Fugitive house (Pukui and Elbert 1986)
Halekū'ō	Honokōhau 1	<i>Heiau</i>	–	–
Haleolono	Honokōhau	<i>'Ili 'āina</i>	LCA 10319 testimony	House of Lono (Pukui et al. 1974)
Hanapouli	Honokōhau	<i>'Ili 'āina</i>	LCA 7890, LCA 10319, and 10949 testimony	–
Honokōhau	Honokōhau 1, 2	<i>Ahupua'a</i>	USGS 1982	Bay drawing dew (Pukui et al. 1974)
Honokōhau	Honokōhau 1, 2	Village	–	Bay drawing dew (Pukui et al. 1974)
Honokōhau	Honokōhau	Bay	–	Bay drawing dew (Pukui et al. 1974)
Hulipia	Honokōhau 2	<i>'Ili 'āina</i>	LCA 9231 testimony	–
Hulipia	Honokōhau 2	Boundary point	–	–
Iakahale	Honokōhau 3	Boundary point	–	–
Ikuana	Honokōhau 1	Residence	–	–
Iiala	Honokōhau 2	Boundary point	–	–
Kaaiakuli	Honokōhau 2	Boundary point	–	–
Kaero	Honokōhau 1	<i>'Ili 'āina</i>	LCA 9236 testimony	Winner (Thrum 1922)
Kahawaiaina	Honokōhau 2	Boundary point	–	–
Kāne'ōpua	Honokōhau 2	Boundary point	–	–
Kapiopio	Honokōhau 1	Boundary point	–	–
Kauakahihale	Honokōhau 1	<i>'Ili 'āina</i>	LCA 9114 testimony	–
Keanakāhuapua'a	Honokōhau 1	Boundary point	–	The cave [for] baking pig (Pukui and Elbert 1986)
Kuakahela	Honokōhau 1	Boundary point	–	–
Kuanawai	Honokōhau 1	Coastal point	–	–
Kūkāno'ono'o	Honokōhau 2	Residence	–	–

Place Name	Location	Type	Source	Meaning
Kukuioahulani	Honokōhau 2	Boundary point	–	–
Kukuipulua	Honokōhau 2	Boundary point	–	–
Kumumāmaki	Honokōhau 1	Boundary point	–	Trunk of <i>māmaki</i> tree (Pukui and Elbert 1986)
Mākūiki	Honokōhau 1	<i>'Ili 'āina</i>	LCA 10699 testimony	Small hibiscus (Pukui and Elbert 1986)
Malai'ula	Honokōhau 1	Boundary point	–	Variant of <i>palai'ula</i> , a fern (Pukui and Elbert 1986)
Maliu	Honokōhau 2	Coastal point	–	Look upon (Pukui et al. 1974)
Maluhia	Honokōhau 3	Boundary point	–	Peace, quiet, security (Pukui and Elbert 1986)
Mī'ala	Honokōhau 2	Boundary point	–	Same as <i>miki'aala</i> : alert, prompt (Pukui and Elbert 1986)
Mumuku	Honokōhau 1	Boundary point	–	–
Nāunu	Honokōhau 1	Boundary point	–	–
Nu'uhiwa	Honokōhau 2	<i>'Ili 'āina</i>	LCA 10559 testimony	A variety of banana (Pukui and Elbert 1986)
'Ōhi'akaumai'a	Honokōhau 1	Boundary point	–	–
'Ōhi'awela	Honokōhau 1	Boundary point	–	–
'Ōnea	Honokōhau 1	<i>'Ili 'āina</i>	LCA 7490 and LCA 9158 testimony	Desolate (Pukui and Elbert 1986)
Paehala	Honokōhau	<i>'Ili 'āina</i>	LCA 9158 testimony	Cluster of <i>pandanus</i> trees (Pukui and Elbert 1986)
Pāhoehoea	Honokōhau 2	Boundary point	–	–
Papa'akoko	Honokōhau 2	<i>'Ili kū</i>	RPG 3456 testimony	Secured blood (Pukui et al. 1974)
Pōhakuha'ikū	Honokōhau 1	Boundary point	–	–

Place Name	Location	Type	Source	Meaning
Pu'u Kou	Honokōhau	<i>'Ili 'āina</i>	LCA 7396 testimony	–
Pu'u Mau	Honokōhau 1	Boundary point	–	–
Pu'u Noho	Honokōhau 2	Boundary point	–	–
Pu'u Oina	Honokōhau 2	<i>Heiau</i>	–	–
Pukaalani	Honokōhau 2	Boundary point	–	–
Pūnāwai	Honokōhau 1	Boundary point	–	Water spring (Pukui and Elbert 1986)
'Ulukūkahi	Honokōhau 1	Boundary point	–	Breadfruit tree standing alone (Pukui and Elbert 1986)
Waihā	Honokōhau 2	<i>'Ili 'āina</i>	LCA 9161 testimony	Trough water (Pukui and Elbert 1986)
Waihā	Honokōhau 2	Boundary point	–	Trough water (Pukui and Elbert 1986)
Waiopapa	Honokōhau 2	Boundary point	–	–
Waipi'o	Honokōhau 2	<i>'Ili 'āina</i>	LCA 7870 testimony	Curved water (Pukui et al. 1974)

Table 4. Honokōhau 1 / Honokōhau 2 boundary points (in order from the coast to the *mauka* point; compiled by Lloyd Soehren 2010, with additions)

Boundary Point	Order	Elev. (ft)	Description
Maliu	Boundary Point 1 (at coast)	0	Variously described as a <i>lae</i> (point), a <i>pōhaku</i> (stone), a point of rocks (USGS 1982; BCT 1:364,365; BC 27; BCT 1:366)
Halekū'ō	Boundary Point 2	–	“. . . a heiau named Halekuo . . .” is above Maliu Point, but the same witness earlier placed Halekuo, “a wall above the School house” (BCT 1:365)
Malihia	Boundary Point 3	–	“. . . a kula mahiai, ahua, and iwi aina . . . [dryland field, mound, wall]” between Maliu and Kahawaiaina (BCT 1:365)
Pāhoehoea	Boundary Point 4	–	On <i>pāhoehoe</i> near shore, between Maliu Point and Puu Noho (BCT 1:364)
Pu'u Noho	Boundary Point 5	–	“. . . on the <i>pāhoehoe</i> , said place is an Ahua . . .” between Pāhoehoea and (BCT 1:364)

Boundary Point	Order	Elev. (ft)	Description
Kahawaiaina	Boundary Point 6	–	“... a mahina ai [cultivated patch] in aa ...” (p.364); “... an ahua pohaku ... [stone mound]” (p.365); between Puu Noho and Kukuipuloo (BCT 1:364, 365)
Kukuioahulani	Boundary Point 7a	200	“... at a place called Kukuioahulani ...” between Maliu Point and Iiala (BC 27, 1:366)
Iiala	Boundary Point 7b	430	“... to Iiala a point 23 ft. southwest of a tree ...” between Kukuioahulani and Hulipia (BC 27; 1:366)
Hulipia	Boundary Point 7c	660	“... a place called Hulipia ...” about 690 ft elev, between Iiala and Kukuipuloo at lower end of Papa‘akoko (BC 27 (1:367); NT 4:542)
Keanalehu	Boundary Point 8	720	RM 1280—shown as the <i>makai</i> corner of the ‘ili of Papa‘akoko near a marked cave
Kukuipuloo	Boundary Point 9	790	“... an ahua pohaku (resting place) ... in the kula mahiai and goat ground” (p.364); “... an old resting place, under a kukui tree ...” (p.365); between Hulipia and Kukanonoo, at the north end of Kealakaa Street (BC 27 [1:367]; BCT 1:364, 365)
Pu‘u Kou	Boundary Point 10	1,040	RM 1280 shown as peak just below the lower government road
Kūkāno‘ono‘o	Boundary Point 11	–	“... an old kulana kauhale ... [house complex]” between Kukuipuloo and Kaneopua
Kāne‘ōpua	Boundary Point 12	–	“... an oiaina [resting place] on the boundary, below the Government road ...” between Kukanonoo and Waiopapa (BCT 1:364)
Papa‘akoko	Boundary Point 13	1,400	Above the upper govt road (RM 1280)
Waiopapa	Boundary Point 14	1,760	“... a punawai [spring] and Ahua above the Government road, where you can look out to sea ...” between Ahupuaa and Waiha (BCT 1:364)
Waihā	Boundary Point 15	2,000	“... along Kealakehe to Waiha a punawai at the old kulana kauhale, below the woods ...” (p.364) Between Waiopapa and Malaiula (BCT 1:364,365; NT 8:652)
Miala	Boundary Point 16	–	Between Kukanonoo and Ahupuaa (BCT 1:365)

Boundary Point	Order	Elev. (ft)	Description
Ahupua'a	Boundary Point 17	–	“. . . a place called Ahupuaa a puu pohaku at the Government road at the makai corner of my land [LCAw.7870] . . .”; probably a Makahiki altar at the land boundary (Malo 1951:146; BCT 1:354)
Kaaiakuli	Boundary Point 18	–	“. . . passing to the south side of Kaaiakuli and the mauka corner of my land [LCA 7870]”; between Waiha and Malaiula (BCT 1:365)
Malai'ula	Point 19	2,130	“. . . a banana grove, in the edge of the ohia woods where Honokōhau Nui & Kealakehe unite, thereby cutting Honokōhau Iki off” (BCT 1:364, 365; BC 27 [1:367])
Nāunu	Point 20	2,200	“The lands of Kealakehe & Honokōhaunui meet at a place called Naunu, an ahu makai of the koa”; this point at end of Honokōhauiki is called Kumumamaki elsewhere (BCT 1:369, 372)
‘Ōhi‘awela	Point 21	5,800	“[A] pali [cliff] on Honokōhaunui where olona grows” (p.369); “Honokōhaunui ends at Ohiawela, a pali” (p.371); “on the road through the woods . . . above Honokōhaunui” (BCT 1:369, 371)

Table 5. Honokōhau 1 / Honokōhau 2 boundary points (in order from the coast to the *mauka* point; compiled by Lloyd Soehren 2010, with additions)

Boundary Point	Order	Elev. (ft)	Description
Kuanawai [Punawai]	Boundary Point 1	0	“. . . a place called Kuanawai, said place is in the water . . .” (1:363) “. . . a lae pohaku named Kuanawai, on the North side of the point . . .” (1:365) “ledge of rocks at shore . . . called Punawai or Kuanawai . . .” (BCT 1:368; BCT 1:363, 365; BC 27 [1:368])
Pōhaku ha'ikū	Boundary Point 2	20	“. . . up the sand beach to a place called Pohakuhaiku a heiau on the pāhoehoe” (Bishop Museum site HA-D12-14?) (1:363, Hoohia testifying); between Kuanawai and Puu Mau (BCT 1:363, 365)
Pu'u Mau	Boundary Point 3	–	“. . . an oiaina or Ahua, an old resting place, where a koa tree used to stand . . .” (1:363) “. . . a puu pohaku above the makai government road . . .” (1:365) between Pohakuhaiku and Keanakaluapuaa (BCT 1:363, 365)
Keanakāluapua'a	Boundary Point 4	–	“. . . a cave” between Puu Mau NS Ulukukahi (BCT 1:363, 365)

Boundary Point	Order	Elev. (ft)	Description
'Ulukūkahi	Boundary Point 5	620	"... a breadfruit tree ... " (1:363) "... a lae kukui" (1:365); between Keanakaluapuaa and Pukaalani
Puka'alani	Boundary Point 6	800	grove of <i>puhala</i> [pandanus] tree (BCT 1:365)
'Ōhi'akaumai'a	Boundary Point 7	–	"... ohia fruit trees ['ōhi'a ai, mountain apple] ... " (1:365); between Ulukukahi and Kuakahela (BCT 1:363, 365)
Kuakahela	Boundary Point 8	1,100	"... a lae ohia fruit trees ['ōhi'a ai, mountain apple] ... " (1:364) "... a place called Kuakahela ... "; between Pukaalani and Mumuku (BCT 1:364,365; BC 27, 1:367)
Mumuku	Boundary Point 9	1,260	"... to a Bread fruit tree ... at place called Mumuku ... " (BCT 1:367); between Palani Rd AND Māmalahoa Hwy; between Kuakahaela and Iakahale (BCT 1:364,365; BC 27 [1:367])
Ikuana	Boundary Point 10	1,400	between Mumuku and Kapiopio, above Māmalahoa Hwy (BCT 1:364, 365)
Iakahale	Boundary Point 11	1,610	"... to Iakahale kihapai [cultivated patch], the boundary passing on the North side and crossing the road ... "; between Mumuku AND Ikuana, near Māmalahoa Hwy (BCT 1:365)
Kapiopio	Boundary Point 12	2,060	"... a punawai [spring or well] in the fern [<i>ama'u</i>] ... " between Ikuana AND Kumumamaki (BCT 1:364, 365; BC 27, 1:367)
Kumumāmaki	Boundary Point 13	2,160	"... a water hole and bathing place ... on the edge of the woods. The water hole is above here ... " (BCT 1:364, 365; BC 27 [1:367]); "Honokōhauiki [Honokōhau 2] is cut off at Kumumamaki by Honokohanui [Honokōhau 1] and Kealakehe" (BCT 1:365)

Table 6. Kaloko place names (compiled by Lloyd Soehren 2010, with additions)

Place Name	Type	Comments (Source)	Place Name Meaning
Kaloko	<i>Ahupua'a</i>	MB 13; IN 64; BCT 1:371; USGS 1982	The pond (Pukui et al. 1974)

Place Name	Type	Comments (Source)	Place Name Meaning
Hale'ape	<i>'Ili 'āina</i>	LCA 10327 testimony	House of 'ape [a taro like plant]
Haleolono	<i>'Ili 'āina</i>	LCA 9243 testimony	House of Lono (Pukui et al. 1974)
Kanaio	<i>'Ili 'āina</i>	LCA 9160 testimony	The false sandalwood tree (Pukui et al. 1974)
Kealaehu	<i>'Ili 'āina</i>	LCA 10951, 10346, 10693, and 9243 testimony	The dusty road (Pukui and Elbert 1986)
Ki'iki'i	<i>'Ili 'āina</i>	LCA7797, 10951, 10346, and 9242 testimony	—
Kikahala	<i>'Ili 'āina</i>	LCA 10694 testimony	—
Kukuiha'a	<i>'Ili 'āina</i>	LCA 9238 and 9241 testimony	Low candlenut tree (Pukui and Elbert 1986)
Luahine'eku	<i>'Ili 'āina</i>	LCA 9241 and 9243 testimony	—
Makaawe	<i>'Ili 'āina</i>	LCA 7909 testimony	—
Oloupe	<i>'Ili 'āina</i>	LCA 9237 testimony	—
Pāpua'a	<i>'Ili 'āina</i>	LCA 9238 testimony	Pig fence or enclosure (Pukui and Elbert 1986)
Ulawini	<i>'Ili 'āina</i>	LCA 7797 testimony	—
Ulukukahi	<i>'Ili 'āina</i>	LCA 9060 testimony	—
Waimea	<i>'Ili 'āina</i>	LCA 10693 testimony	Reddish water (Pukui et al. 1974)
Kaloko	Coastal point	USGS 1982	The pond (Pukui et al. 1974)
Pu'u Iki	<i>Pu'u</i>	Kaloko/Honokōhau boundary Course 1, 6,864 ft from shore; elev. about 260 ft (BC 138, 3:348)	Small hill (Pukui et al. 1974)
Kaloko	Fishpond	USGS 1983	—
Kaukahokū	Survey station	A survey station located near the Kohanaiki/Kaloko boundary, TMK 7324:16; elev. about 1,900 ft (RM 2035)	The star appears (Pukui et al. 1974)

Place Name	Type	Comments (Source)	Place Name Meaning
Pālahalaha	Water hole	Near the Kaupulehū boundary, about 4,200 ft elev. (BC 160 4:55)	Broad, spread out, flattened (Pukui and Elbert 1986)
Okuhi	Boundary Point 1 (at shore)	Kaloko/Honokōhau boundary at shore; “. . . an awaawa [gulch, ravine] in the sea with a point on each side of it” (BCT 1:371)	Probably ‘ <i>okuhe</i> , a variety of ‘ <i>ō‘opu</i> fish (Pukui and Elbert 1986)
Kaewewai	Boundary Point 2	Kaloko/Honokōhau boundary near shore road “. . . an awaawa with water . . .” between Okuhi and Kaohe (BCT 1:371)	—
Kaohe	Boundary Point 3	“. . . a grove of trees . . .” above the <i>a‘a</i> , between Kaewewai and Kiikii [Kīkī] (BCT 1:371)	—
Ki‘iki‘i	Boundary Point 4	Kaloko/Honokōhau boundary, between Kaohe and Kapokalani (BCT 1:371)	Possibly to fetch, summon, procure (Pukui and Elbert 1986)
Kapokalani	Boundary point 5 (SE corner)	Kaloko-Honokōhau boundary—SE corner; “. . . along an iwi aina [field wall] to Kapokalani at the Govt. road [Old Upper Road on TM 7301]” (BCT 1:371)	—

Table 7. Kohanaiki place names (compiled by Lloyd Soehren 2010, with additions)

Place Name	Type	Comments (Source)	Name Meaning
Hālau	Triangulation station	SW corner of RPG 3086, on Kohanaiki/Kaloko boundary about 250 ft from shore; elev. <20 ft (RM 2035)	Canoe shed; meeting house (Pukui and Elbert 1986)
Haleolono	<i>‘Ili ‘āina</i>	LCA 7987 testimony	House of Lono (Pukui et al. 1974)
Ho‘okēkē	Place	“Area in upper Kohanaiki, Kona, Hawai‘i. See Mai‘a-loa”	Crowded (Pukui et al. 1974:51)
Kananaka	Triangulation station	SE corner of RPG 3086 on Kohanaiki/Kaloko boundary at the Lower Gov. road; elev. about 40 ft; named by surveyor (RM 2035)	—

Place Name	Type	Comments (Source)	Name Meaning
Kānoa	Place, boundary point	“. . . in scrub trees above the woods where Kaloko is cut off by Kaupulehu. It is on the <i>makai</i> side of an ahua called Kapulehu [Pulehu on TM 7301]” (BCT 1:370)	Bowl (Pukui et al. 1974)
Kapa	Triangulation station	SE corner of RPG 2942, on the Kohanaiki/Kaloko boundary between Nawahiahu and the upper GovT. road; named by surveyor (RM 2035)	–
Kohanaiki	<i>Ahupua'a</i>	–	Small barrenness (Pukui et al. 1974)
Kumu'ohē	Triangulation station	Located on RPG 2942, on the Kohanaiki/Kaloko boundary between Kananaka and Nawahiahu; elev. about 320 ft; named by surveyor (RM 2035)	Trunk of 'ohē tree (<i>Reynoldsia sandwicensis</i>)
Kumua	<i>Pu'u</i> , triangulation station	Located on RPG 4787, about 200 ft <i>mauka</i> of the upper GovT. road; elev. about 1,750 ft	First Kū, or to stand forward
Mai'aloa	Pit	“Pit at Ho'ō-kēkē in upper Kohanaiki, Kona, Hawai'i”; Fictitious place in tale of Kamiki, “the sacred plantation of the chief Pohakuokane [in which] was grown the 'awa of Pohakuokane . . . in a small crater or hollow-like area . . .”	Long banana (Pukui et al. 1974)
Nalowale	<i>Heiau</i>	A <i>heiau</i> whose name is lost (<i>nalowale</i>) USGS 1959	Lost, forgotten (Pukui and Elbert 1986)
Nāwahiahu	Triangulation station	RPG 2942, TMK 7309:17, on Kohanaiki/Kaloko boundary between Kumuohe and Kapa; elev. about 500 ft; named by surveyor (RM 2035)	–
Wāwahiwa'a	Coastal point	USGS 1982	Wreck canoe (Pukui and Elbert 1986)

3.1.1.5 'O'oma Place Names

Similar to Kohanaiki, 'O'oma became Government Land; thus, there is no BCT for 'O'oma. Only three LCAs were granted, all in the same *'ili*. J.S. Emerson included 'O'oma in his Kona Coast map (RM 2035) and recorded several triangulation stations, which he had named. Table 8 presents the scant information on place names in the *ahupua'a* of 'O'oma.

3.1.1.6 Kalaoa Place Names

Kalaoa was designated as Government Land in the Māhele, and only two LCAs were claimed. Thus, there were few early surveys of the land, and many of the traditional place names were lost. J.S. Emerson completed a survey of Kalaoa government lands, in which he gave new names to many triangulation stations and boundary points at the corners of land grants. The few traditional boundary point names that are known are presented in Table 9.

3.1.2 'Ōlelo (Poetical Sayings) and Mo'olelo (Stories)

The project area is located within the Kekaha region of North Kona District. Based on a recent translation of the "Legend of Ka-Miki" by Kepā Maly (cited in Henry et al. 1993) the region or *'okana* of Kekaha extends from Keahuolū northward to the Kona/Kohala boundary. The Kekaha region is also called *Kekaha wai'ole*, or "waterless place," a name that reflects its dry and barren appearance. Despite its desolate appearance, legends and other traditional accounts indicate Kekaha was once a populous and productive region.

The character of Kekaha, as it had been established in the Hawaiian consciousness, is represented in a traditional saying recorded by Mary Kawena Pukui and in a brief description by John Papa 'Ī'ī. The saying, "*Kekaha wai'ole na Kona*," translates to "waterless Kekaha of the Kona district." Pukui states that "Kekaha in Kona, Hawai'i, is known for its scarcity of water but is dearly loved by its inhabitants" (Pukui 1983:184). However, water could come in the form of early morning mists and rains, as shown in this account of a hill, located in either Kealakehe, or the adjacent Keahuolū, as recounted in the Legend of Kamiki:

Ka-noenoe (The mist, fogginess) The mound-hill called Pu'u-o-Kalaoa sits upon the plain of Kanoenoe which is associated with both Keahuolu and Kealakehe. The settling of mists upon Pu'u-o-Kalaoa was a sign of pending rains; thus the traditional farmers of this area would prepare their fields. This plain was Honokōhau. The inheritance lands included everything from the uplands of Hikuhia above Nāpu'u and the lands of the waterless Kekaha, which spanned from the rocky plain of Kanikū (Keahualono) to the plain of Kanoenoe at Pu'ukalaoa. [*Ka Hoku o Hawai'i* 25 October 1917, translated by Maly 1994:A-4]

Another legendary account discusses the hill called Pu'u-o-kalaoa:

Pu'u-o-kalaoa is a mound-hill site in the lands of Keahuolu-Kealakehe, not far from the shore of Kaiwi and Hi-iakanoholae. During periods of dry weather (*Ka lā malo'o*) when planted crops, from the grassy plains to the 'ama'uma'u (fern forest zone), and even the ponds (*ki'o wai*) were dry, people would watch this hill for signs of coming rains. When the *līhau* (light dew mists) sat atop the hill of Pu'u-o-kalaoa, rains were on the way. Planters of the districts agricultural fields

Table 8. 'O'oma place names (compiled by Lloyd Soehren 2010, with additions)

Place name	Type	Location (Source)	Name Meaning
'O'oma 1, 2	<i>Ahupua'a</i>	–	Concave (Pukui et al. 1974)
Puhili	Coastal point	'O'oma 2, the boundary between 'O'oma and Kohanaiki at the shore is at Puhili point; "Said to be named for a priest of the same name . . ." (Pukui et al. 1974; TM 7300; RM 2035)	To thwart (Pukui et al. 1974)
Anakauao-kahokukahi	Cave	'O'oma 1, "the vertical entrance of a famous 'ana kaua' [cave] which extends for a long distance to the east and to the west" is located about 500 ft north of Kahokukahi trig. Station; a refuge cave during time of war; elev. about 400 ft (RM 2035; FB 291:197)	War cave of Kahokukahi (Pukui and Elbert 1986)
Hālawa	Triangulation station	Located between Kekee and Kalamanamana on 'O'oma 2/Kohanaiki boundary, at NW corner of RPG 2030, TMK 7307:36; elev. about 1100 ft; named by surveyor (RM 2035)	Curve (Pukui et al. 1974)
Kahōkūkahi	Triangulation station	Located on the 'O'oma 1/'O'oma 2 boundary at the NE corner of Lot 29C, SW corner of TMK 7310:4x; elev. about 360 ft; named by surveyor (RM 2035)	The first star (Pukui and Elbert 1986)
Kalamanamana	Triangulation station	Located at NE corner of RPG 2030, TMK 7307:50, on 'O'oma 2/Kohanaiki boundary; elev. about 1,740 ft; named by surveyor (RM 2035)	–
Kaualoku	Triangulation station	'O'oma 2, located on <i>mauka</i> boundary of RPG 2027 at Gov. road, TMK 7336:10; elev. about 1,720 ft; named by surveyor (RM 2035)	The pouring rain (Pukui and Elbert 1986)
Keke'e	Triangulation station	Located between Puhili trig. station and Halawa on 'O'oma 2/Kohanaiki boundary at Lower Govt. road, the NE corner of RPG 3086, TMK 7309:3; elev. about 70 ft; also written "Keekee" on TM 7309; named by surveyor (RM 2035)	Crooked, twisted; same as <i>ke'eke'e</i> (Pukui and Elbert 1986)

Place name	Type	Location (Source)	Name Meaning
Kekuaio	Triangulation station	'O'oma 1, located on Lot 29B, TMK 7310:6x.; elev. about 280 ft; coordinates estimated; named by surveyor (RM 2035)	The border or bank between cultivated fields (Pukui and Elbert 1986)
Kuhiaka	Triangulation station	Located at the NE corner of RPG 1600 on the 'O'oma 1/'O'oma 2 boundary, TMK 7306:22.; elev. about 2,100 ft; named by surveyor (RM 2035)	—
Pihapono	Triangulation station	'O'oma 2, located near center of RPG 1600, TMK 7306:20; elev. about 1,860 ft; named by surveyor (RM 2035)	Completely full (Pukui et al. 1974)
Pu'u Kou	Triangulation station	'O'oma 2; located on the <i>makai</i> side of RPG 2027, TMK 7397:37; elev. about 1,125 ft; named by surveyor (RM 2035)	—

Table 9. Kalaoa place names (compiled by Lloyd Soehren 2010, with additions)

Place Name	Type	Location (Source)	Name Meaning
Kalaoa	<i>Ahupua'a</i>	Māhele Book	The eel gorge, choker (Pukui et al. 1974)
Kahuku	<i>'Ili 'āina</i>	LCA 7937 testimony	The projection (Pukui and Elbert 1986)
Kaweo	<i>'Ili 'āina</i>	LCA 7899 testimony	—
Ahupua'a	<i>Ahu</i> (mound)	At the Govt. road on the Hamanamana/Kalaoa boundary; probably a Makahiki altar at the land boundary (Malo 1951:146; BCT 2:265)	Pig altar (Pukui and Elbert 1986)
Kanakamake	Place	On the Hamanamana/Kalaoa boundary; "There used to be an old trail from [Kapulehu] along this boundary to a place called Kanakamake" (BCT 2:263)	Dead man (Pukui and Elbert 1986)
Unualoha [Unuhoaloha]	Boundary Point 1a (at coast)	Kalaoa/Hamananmana coastal boundary point (USGS 1982; RM 2035)	—

Place Name	Type	Location (Source)	Name Meaning
Kahua	Boundary Point 1b (at coast)	Kalaoa/Hamananmana coastal boundary point “. . . a lae at the shore . . .” (BCT 2:263,264; RM 2035; USGS 1924)	—
Kelehua	Boundary Point 2	Kalaoa/Hamananmana “. . . an ahua and kipuka the boundary running through the kipuka” (BCT 2:264); “. . . ohia trees growing on the aa . . .” (BCT 2:265); between Kahua and Laeakailio (BCT 2:264, 265)	—
Laeaka‘ilio [Kalaeka‘ilio]	Boundary Point 3	Kalaoa/Hamananmana boundary “. . . on the Kona side of the aa” at 395 ft elev. below Gr. 3027. “Laeokailio” (RM 2035); between Kelehua and Kaiwiholehole (BCT 2:264, 265; RM 2035; USGS 1924)	Point of the dog (Pukui and Elbert 1986)
Kaiwiholehole	Boundary Point 4	Kalaoa/Hamananmana boundary, “a lauhala grove” between Govt. road and Kalaeakailio; Claim 10523 by Nawahie is for “kekahi pauku o keia ili o Kaiwiholehole, o Kaloaloa ka inoa o ka pauku” (BCT 2:264; NR 8:597; RM 2035; USGS 1924)	—
Ho‘ona	Coastal bay	A place on shore and a small bay north of Keāhole Point	To relieve pain, soothe, comfort; to end, as a taboo; settle a claim (Pukui and Elbert 1986)
Makako	Coastal bay	USGS 1982	—
Kalihi	Coastal point	USGS 1982	The edge (Pukui et al. 1974)
Keāhole	Coastal point	USGS 1959; Kamakau 1961:185,193; Reinecke ms (1):17	The <i>āhole</i> fish
Kapeke	Triangulation station	SE corner of RPG 3750, TMK 7310:29 on Kalaoa 4/Kalaoa 5 boundary; elev. about 1,040 ft; named by surveyor (RM 2035)	The dwarf (Pukui and Elbert 1986)

Place Name	Type	Location (Source)	Name Meaning
Pāhinahina	Triangulation station	SE corner of Lot 16, TMK 7310:32 (dropped), on Kalaoa 1/Kalaoa 2 boundary (Kona Highlands subdivision); elev. 1,160 ft; named by surveyor (RM 2035)	—
Kuanalua	Triangulation station	“This station was named after Kuanalua, a warrior chieftain of Kamehameha I, whose house once stood among the trees back of the station”; located on <i>mauka</i> side of Govt. road in Kalaoa 1, TMK 7302:12; elev. about 1,780 ft (RM 2035; FB 291:49)	—
Ipuu	Triangulation station	Kalaoa 4, at south side center of RPG 990, TMK 7304:14, almost on Kalaoa 4/Kalaoa 5 Boundary; elev. 200 ft; named by surveyor (RM 2035)	—
Kaaipuaa	Triangulation station	Kalaoa 3, located near SW corner of RPG 3764, TMK 7302:25; elev. about 2,100 ft; named by surveyor (RM 2035)	—
Kaeu	Triangulation station	Kalaoa 2, boundary point “. . . in the iwi aina north side of the ‘kihapai koele’ Kaeu, formerly cultivated with taro”; TMK 7302:10; elev. 1,880 ft (RM 2035; FB 291:53)	—
Kahouhale	Triangulation station	Kalaoa 2, boundary point “. . . in the iwi aina north side of the ‘kihapai koele’ Kaeu, formerly cultivated with taro”; TMK 7302:10; elev. about 1,880 ft (RM 2035; FB 291:53)	—
Kalaehumuhumu	Triangulation station	NW corner of RPG 1606, at SE corner of TMK 7301:31, on Kalaoa 2/Kalaoa 3 boundary; elev. about 1,020 ft; named by surveyor (RM 2035)	The <i>humuhumu</i> (fish) point (Pukui and Elbert 1986)
Keanalele	Triangulation station	Kalaoa 2, near NE corner of RPG 2032 [erroneously printed 3032 on RM 2035], TMK 7302:9; elev. about 2,060 ft; named by surveyor; coordinates estimated (Cf. Analele 394.21.001; RM 2035)	The flying cave (Pukui and Elbert 1986)

Place Name	Type	Location (Source)	Name Meaning
Kumumamane	Triangulation station	SW corner of RPG 3027, TMK 7310:31, on Kalaoa 2/Kalaoa 3 boundary; elev. about 850 ft; named by surveyor (RM 2035)	<i>Māmane</i> tree (<i>Sophora chrysophylla</i>) trunk (Pukui and Elbert 1986)
Makaulaula	Triangulation station	Kalaoa 5, located near SW corner of RPG 2972, TMK 7310:25x in Kalaoa 5; named by surveyor; elev. about 280 ft; coordinates estimated (RM 2035)	Pinkeye; inflamed or bloodshot eye (Pukui and Elbert 1986)
Pu'u Oina (Puoina)	Triangulation station	Kalaoa 3, located "on hill over cave, in woods" N side center of RPG 3764, TMK 7302:25; elev. about 2,160 ft; named by surveyor, perhaps after the <i>heiau</i> at the shore; coordinates estimated; Cf Puu Oina, the preferred spelling (RM 2035; FB 291:55)	—
'Umiahu	Triangulation station	Located on Kalaoa 2/Kalaoa 5 boundary, at NW corner of RPG 2972, TMK 7310:33; named by surveyor; elev. 280 ft (RM 2035)	Cairn of 'Umi (Pukui and Elbert 1986)

watched for omens at Pu‘uokaloa, and it was from keen observation and diligent work that people prospered on the land. If a native of the land was hungry and came asking for food, the person would be asked:

Ua ka ua i Pu‘ukaloa, ihea ‘oe?

When rains fell at Pu‘ukaloa, where were you? (If the answer was...)

I Kona nei no!

In Kona (there would be no sweet potatoes for this person)

But if the answer was:

I Kohala nei no!

In Kohala! (The person would be given food to eat for they had been away, thus unable to accomplish the planting). [*Ka Hōkū o Hawai‘i* 19 March 1914, translated by Maly 1994:A-5]

These legendary accounts emphasize the importance of rainfall in this relatively dry region for farmers who were cultivating sweet potatoes and other crops on the plains of Kekaha.

‘Ī‘ī describes the winds of Kekaha:

. . . a cold wind from Kekaha, the Hoolua. Because of the calm of that land, people often slept outside of [*sic*] the tapa drying sites at night. It is said to be a land that grows cold with a dew-laden breeze, but perhaps not so cold as in Hilo when the Alahonua blows. [‘Ī‘ī 1959:122]

These passages suggest Kekaha was firmly identified with its austere physical environment. A legend told in Maguire (1966:28–32) reveals the importance of water resources in this general area (see also Wolforth et al. 2005:8–9). The story takes place at the Cave of Mākālei, located outside the current project area near ‘Akahipu‘u (a nearby mountain). The story focuses on a man named Ko‘amokumokuohe‘eia, who moved to this area and was told by the current residents that water was very scarce. Water, he was told, could be obtained in “celebrated” caves, but these caves were *kapu* (forbidden), and if caught, trespassers would be killed by the owner of the cave. However, Ko‘amokumokuohe‘eia discovered a very small cave entrance no else knew about. The cave had water dripping from its roof (Maguire 1966:30). Ko‘amokumokuohe‘eia and his father used carved ‘ōhi‘a (*Metrosideros polymorpha*) and wiliwili (*Erythrina sandwicensis*) trees to capture the dripping water, and his family was thus able to survive during dry spells. This legend clearly demonstrates the importance of water as a resource that is difficult to procure and highlights the importance of water collection caves.

John Ka‘elemakule Sr., a Kekaha native, wrote newspaper articles between 1928 and 1930 that provide details about life and customs in the last half of the nineteenth century. Kepā Maly (Maly and Maly 2003) translated these serial accounts that appeared in *Ka Hoku o Hawai‘i*. The two following excerpts provide additional details related to water collection:

. . . There were not many water holes, and the water that accumulated from rain dried up quickly. Also there would be weeks in which no rain fell . . . The water which the people who lived in the uplands of Kekaha drank, was found in caves.

There are many caves from which the people of the uplands got water . . . (September 17, 1929:3). [Maly and Maly 2003:42]

. . . The *kūpuna* had very strict *kapu* (restrictions) on these water caves. A woman who had her menstrual cycle could not enter the caves. The ancient people kept this as a sacred *kapu* from past generations. If a woman did not know that her time was coming and she entered the water cave, the water would die, that is, it would dry up. The water would stop dripping. This was a sign that the *kapu* of Kāne-of-the-water-of-life (Kaneikawaiola) had been desecrated. Through this, we learn that the ancient people of Kekaha believed that Kāne was the one who made the water drip from within the earth, even the water that entered the sea from the caves. This is what the ancient people of Kekaha wai 'ole believed, and there were people who were *kia'i* (guardians) who watched over and cleaned the caves, the house of Kāne . . . (September 24, 1929:3). [Maly and Maly 2003:42]

The nineteenth century Hawaiian historian Samuel M. Kamakau relates that in the fifteenth century, High Chief 'Umi-a-Liloa fished for *aku* (skipjack tuna; *Katsuwonus pelamis*) along the Kekaha coast, and around 1810, Kamehameha I also fished the shores of Kekaha (Kamakau 1961:20, 203). Pukui (1983) also relates the importance of fishing in the following:

Ola aku la ka aina kaha, ua pua ka lehua i kai.

Life has come to the kaha lands for the lehua blooms are seen at sea. [Pukui 1983:271]

Pukui (1983:271) further explains this saying: “Kaha lands refers to Kekaha. When the season for deep-sea fishing arrived, expert fishermen and their canoes headed for the ocean.”

However, Kekaha was “valued by ruling chiefs, inhabited by attendant chiefs, and upon occasion abused by warring chiefs” (Kamakau 1979:31). Kamakau (1961) reports that during the war between Alapa'inui of Hawai'i and Kekaulike of Maui, Kekaulike “abused the country people of Kekaha” by destroying all the coconut groves and slaughtering “the country people.” The destruction of these valuable trees was devastating.

Describing the apportioning of land by the *ali'i* (royalty) before the ascendancy of Kamehameha, Kamakau records this information about the lands of Kekaha:

Waimea [in this case Waimea, O'ahu] was given to the Pa'ao kahuna class in perpetuity and was held by them up to the time of Kamehameha III when titles had to be obtained. But there was one land title held by the kahuna class for many years and that was Puuepa in Kohala. In the same way the land of Kekaha was held by the kahuna [priests] class of Ka-uahi and Nahulu. [Kamakau 1961:231]

Kamakau further records that during the 1770s, “Kekaha and the lands of that section” were held by descendants of the Nahulu line, the Ka-me'e-ia-moku and Ka-manawa, the twin half brothers of Ke'e-au-moku, the Hawai'i island chief (Kamakau 1961:310). The Great Seal of the State of Hawai'i depicts Kame'eiamoku and Kamanawa (Springer 1989:23).

A great deal of primary research on legendary references and place names of Kekaha has been undertaken by Kepā Maly and Lehua Kalima. The results of some of this research can be found in “The Historical Documentary Research by Kepa Maly and Lehua Kalima” presented in Paul

H.Rosendahl Inc.'s (PHRI) Report No. 1275-071493: *Archaeological Assessment Study, Kailua to Keāhole Region State Lands LUC Project* (Henry et al. 1993).

3.1.2.1 The Story of Ka-Miki

Kepā Maly (1993) translated the “Kao Hooniua Puuwai no Ka-Miki” (The Heart stirring Story of Ka-Miki) that appeared in the newspaper *Ka Hoku o Hawai'i* between 1914 and 1917. The legend provides details about life and the environment of Kekaha, as well as the entire island of Hawai'i. Ka-Miki, the quick or adept one, and his brother Maka'iole (“rat or squinting eyes”), traveled around the island to participate in competitions ca. the thirteenth century, when Pili-a-Ka'aiea was the chief of Kona. The boy's parents were Pōhaku-o-Kāne (male) and Kapa'ihilani (female), the *ali'i* of Kaloko and Kohanaiki. The legend relates that the supernatural brothers

Were empowered by their ancestress Ka-uluhe-nui-hihi-kolo-i-uka (the great entangled growth of *uluhe* fern which spreads across the uplands), a reincarnate form of the earth-mother goddess, creative force of nature Haumea (also called Papa) who dwelt at Kalama'ula on Hualālai, in the uplands of Kohana-iki, Kona. [Maly 1993:21–22]

The twins were raised by Ka-uluhe, who taught them how to use their supernatural powers.

Portions of the legend that are relevant to the current study follow. The following excerpt, dated 21 May 1914, discusses the division of property within Ka-loko (the pond):

The wood carved for the makaha (fish pond gates) came from 'Iwa'awa'a (near a halau ali'i [royal compound] and kahua [contest arena] of the chief Pohaku-o-Kane, on the plains of Kohana-iki next to Kaloko [1/15/1914]). The lands of Kaloko and Kohana-iki were jointly governed by Pohaku-o-Kane, though the ponds were under guardianship of other god-chiefs and chiefesses . . . [Maly 1993:23]

Several of the stories identify *heiau* of Kaloko and Kohanaiki. The first appeared between 16 and 30 April 1914:

The ocean at 'Ohiki was named Kauahia or Kai o Kauahia. After an 'awa ceremony with Ka-uluhe ma, Ka-Miki went to the shore of 'Ohiki to fish, in the pond waters of the chief Ahauhale. 'Ohiki was the name given for several places, including: a heiau; a cove; and an 'ili of Kaloko. The 'ili land parcel came to be known as Ki'ikahala after the punishment of the dual formed priest-shark Kalua'olapauila.

On the night of Kāne the priests, chiefs, and people were observing the kapu of silence and all was being made ready to dedicate the royal compound of Ka'aipu'a at Kohanaiki. Ka-Miki and Maka'iole descended to the coastal region of Kaloko and Kohanaiki from Kalama'ula and beat the drums in the heiau of Pohakea, 'Ohiki, Kaukeano, 'O'unui, Honu'iwa, Pu'uho'olelelupe, Kauki'eki'e, and Hale-o-Lono. The sound of the pahu heiau (temple drums) greatly startled the people, and caused the priests and chiefs of Kaloko to grumble amongst themselves. The sequence of events which followed, led to the naming of Hi'iakanoholae.

A spring in the land parcel was also named 'Ohiki. The ocean of this area was named Kauahia before 'Ohiki came about, and following the death of the shark-

priest Kalua'olapauila, the land section and temple of 'Ohiki came to be called Ki'ikahala. [Maly 1993:24]

The following appeared between 8 and 15 January 1914 and describes Hale-o-Lono, or house of Lono, a *heiau* in Kohanaiki where prayers for rain and abundant growth were offered:

Hale-o-Lono was the husband of Pipipi'apo'o, a daughter of the deified beings Kumua and Ka-uluhe. Hale-o-Lono excelled at farming, and had the plain of Nanawale, Kohaha-iki well cultivated. His plantation was marked by Nahiahu, also called Nawahiahu (the alignment of cairns) on the makai side of this feature. [Maly 1993:25]

Additional information about Na'wahi'ahu was published between 8 and 29 January 1914:

Na-wahi-ahu (the place [of] cairns) [or] Mahiahu is identified as a line of cairns which marked the agricultural fields of Hale-o-Lono, and the sacred plantation of Ka'aipu'a at Kohana-iki. Before Hale-o-Lono established his fields in this area this portion of Kohanaiki was called Nanawale (to look about—because of the extensive fields). [Maly 1993:28]

Details about why this area of Kohanaiki became important appeared between 8 January and 28 May 1914, as well as 6 December 1917:

Ka-uluhe-nui-hihi-kolo-i-uka a reincarnate form of Haumea (also called Papa) lived at Kalama'ula in the uplands of Kohana-iki, below Hainoa. Ka-uluhe was the wife of Kumua, and the hill site at which Kumua dwelt is also called Kumua; it is below Kalama'ula, a little above the hidden spring of Kapa'ihi. The reason that Kumua lived at this hill was because it allowed him clear view of the coastal lands of Kohana-iki, which is where his children and grand children lived. One of the children of Kumua ma was Pipipi'apo'o and she was married to Hale-o-Lono (an agriculturalist and temple type, coastal Kohana-iki) who was an exceptional farmer. Hale-o-Lono excelled in his trade, and the place upon which he farmed was called Nanawale, and because he marked the area with many cairns, it came to be called Nahiahu, also called Nawaiahu, the place of cairns. [Maly 1993:28]

“Nawahi ahu” appears on Emerson's RM 1449 and RM 1512, dating to 1888 and 1889, respectively.

A more recent translation of the legend of Ka-Miki in Maly and Maly (2003) includes the following additional information about Nāwahiahu:

Pipipi'apo'o was another daughter of Kūmua and Ka-uluhe-nui-hihi-kolo-i-uka. She married Haleolono, one who cultivated sweet potatoes upon the *'ilima* covered flat lands of Nānāwale, also called Nāhiahu (Nāwahiahu), as it has been called from before and up to the present time. Cultivating the land was the skill of this youth Haleolono, and because he was so good at it, he was able to marry the beauty, Pipipi'apo'o. Pipipi'apo'o skill was that of weaving pandanus mats, and there grow there many pandanus trees to this day. The grove of pandanus trees and a nearby cave, is called Pipipi'apo'o . . . [Maly and Maly 2003:15]

Maly (1993:28) notes Hale-o-Lono, Ki'ikahala, and 'Ohiki are associated with sites and/or place names shared by Kaloko and Kohanaiki.

In 'O'oma and Kalaoa, the priests of the different *ahupua'a* are named in excerpts dating to 23 and 30 April 1914:

'Elepaio was the high priest of Honokōhau. The place where he dwelt bears the name 'Elepaio [an *'ili* in Honokōhau]. It is in the great grove of *'ulu* (*kaulu'ulu*) on the boundary between Honokōhau-nui and Honokōhau-iki [Honokōhau I and II] . . .

Puhili was the high priest of 'O'oma and Kohanaiki, the place where he lived is on the plain of Kohanaiki, at the shore, and bears his name to this day. It is on the boundary between Kohanaiki and 'O'oma.

Kalua'ōlapa was the high priest of Hale'ōhi'u and Kamāhoe, that is the waterless land of Kalaoa (*Kalaoa wai 'ole*). The place where he lived was in the uplands of Maulukua on the plain covered with *'ilima* growth. This place bears his name to this day.

Kalua-ōlapa-uwila was the high priest of Kealakehe and Ke'ohu'olu (Keahuolu), and it was he who built the heiau named Kalua'ōlapa-uwila, which is there along the shore of Kealakehe, next to the road that goes to Kailua. The nature of this priest was that of a shark and a man. The shark form was named Kaiwi, and there is a stone form of the shark that can be seen near the *heiau* to this day . . . [Maly in Rechtman 2008:18]

Ka-Miki completed his journey around the Big Island and, according to excerpts dated 26 July and 18 October 1917,

. . . became the foremost champion of Pili . . . It was at this time that Ka-Miki learned about the sacred palama chiefess Paehala of Honokōhau; lands also called Na-Hono-i-na-Hau-'Elua (the bays of the two dewes). Pili gave Ka-Miki permission to wed Paehala if she and her family agreed, and Paehala was the foremost beauty of Kona.

When the chiefess agreed to marry Ka-Miki, Pili told Ka-Miki, that he would also, 'oversee the chiefs' sacred fishponds [at Kaloko and Pa'aiea]; the schools of kala, uhu, and palani; and all the lands of Kekaha from Hikuhia which is above Napu'u u (also called Napu'upo'alu); and lands between Keahualono at Kaniku to the plain of Kanoenoe, marked by the hill of Pu'uokalua at Keahuolu' . . . [Maly 1993:22]

The following passage is from Kihe and appeared in *Ka Hoku o Hawai'i* between 31 January and 10 April 1928. It relates the variety of agricultural crops that grew in Kohanaiki and Kaloko:

Departing from O'ahu, Makalie and his family landed at Hale 'uki, Ka'upulehu and were greeted by Ke'awalena a chief and overseer of the Kekaha region. Ka'upulehu and all Kekaha were extensively cultivated at this time. Dependent on seasons, the uplands were used for residences and farming, and the coastal lands for residence and fishing. Pao wai (dug out water catchments) on the pāhoehoe and in upland

fields were a means of water catchment. Crops grown here included: taro, sweet potatoes, sugar canes, bananas, and 'awa . . . [Maly 1993:25]

Maly (1993:29) explains that traditional accounts of Kaloko and Kohanaiki describe a lush environment that differs from its current state due to several factors. The Hualālai lava flow in 1801 covered the former agricultural and forested lands, residential areas, and fishponds. The loss of forests began the decrease in rainfall exacerbated by the introduction of livestock and ranching. Goats and cattle stripped the vegetation from the lands, causing water resources to dry up. Thus, over the last 150 years, the environment has been significantly altered.

3.1.2.2 Honokōhau and the Spy

Kamakau mentions Honokōhau in an account of an extraordinary day's reconnaissance of the west coast of Hawai'i Island by the spy Ka-uhi-o-ka-lani, sent to the island by Kama-lala-walu, chief of Maui. Having reached Kawaihae by canoe at night, Ka-uhi-o-ka-lani "ran about that same evening [reaching as far south as Ka'awaloa] and returned before the canoes were dismantled . . ." Ka-uhi-o-ka-lani, recounting his journey and the landmarks he had observed, mentions, "I went on to the long stretch of sand, to the small bay with a point on that side and one on this side. There are large inland ponds." He is told that the "sandy stretch is 'Ohiki, and the walled-in ponds are Kaloko and Honokōhau" (Kamakau 1961:56).

Kamakau also includes Honokōhau in a litany of lands inquired about following the division of Hawai'i Island *ahupua'a* among the *ali'i* after the death of Kalaniopu'u in 1782. Keoua Kuahu'ula asks Kiwala'o:

'Are Ola'a and Kea'au ours?' The chief answered, 'They have been given away; they are not ours.' 'How about Waiakea and Ponahawai?' 'They have been given away; they are not ours.' . . . 'The two Napu'u and the two Honokahau are ours?' 'They have been given away; they are not ours.' [Kamakau 1961:120]

3.1.2.3 Kaloko Fishpond

There are numerous versions of *mo'olelo* about the famous fishpond along the seashore at Kaloko Ahupua'a, including some suggesting the remains of Kamehameha I may have been buried there. In his chapter recounting the death of Hawai'i's greatest leader, Kamakau states,

After the kahuna had performed his office [ritual duties], Ulu-maheihei prepared to carry out the command of Kamehameha given before his death . . . to secret his bones in a place where they could not be found . . . to put them in a place which could never be pointed out to anyone. At midnight, therefore, when black darkness had fallen and no one was likely to be on the road and the rough lava plains of Pu'uokaloa lay hushed, Hoa-pili sent his man, Ho'olulu, to bring the container of wicker work in which the bones of Kamehameha were kept to Kaloko in Kekaha [the coast of North Kona] . . . The next morning Hoa-pili and Ke-opu-o-lani took care to Kaloko where Hoa-pili met the man who had charge of the secret cave and together they placed the bones there. 'The morning star alone knows where Kamehameha's bones are guarded.' [Kamakau 1961:215]

3.1.2.4 Kahinihini'ula

Kahinihini'ula is the name of a bathing pool along the boundary between Kaloko Ahupua'a and Honokōhau I Ahupua'a, west and *makai* of the project area.

According to Maly's extensive research (Maly 2000; Maly and Maly 2002) translating Hawaiian language documents and interviewing *kūpuna* (elders), this bathing pool is associated with *mo'o* (supernatural water spirits), who ensured the water stayed clean and free from pollutants. Kama'āina Kihe, born in the area in the middle nineteenth century, had this to say about Kahinihini'ula:

This is a bathing pool of the chiefs of days gone by. It is a beautiful pond, with cool water that causes the skin of the sweetheart that bathes there to tingle. The pool is on the shore in the middle of a lava flow, entirely surrounded by stone. It is there on the boundary of the ahupua'a of Kaloko and Honokōhau-Nui. It is there that one will find this famous swimming pond of the chiefs of days gone by. Here is the tradition of this pond—

In ancient times, the chiefs would regularly live along the shore, that is, the chiefs of Kaloko and Honokōhau. At the place called Ahauhale, is where the chiefs of Kaloko lived. The place called Waihalulu, is where the chiefs of Honokōhau lived.

In the times when all was still and the sun glistened above the aa and the sands, that is when they would go swim in this cool pond (kiowai), Kahinihini'ula, which caused the skin to tingle. When they were finished bathing, they would go to the enclosure (pa) that was near the pond. Then the one who had been bathing would say, 'What is it about the pond of Kahinihini'ula? It is cold and pinches the skin, like a sweetheart one holds close to the breast.'

The pond is still there to this day, at the place of the chiefs of past time. They have returned to the earth, but the pond is still there today. This pond is an unforgettable monument for those ancient people who have gone. Those works of old and the pond may be seen by travelers of this generation. [J.W.H.I. Kihe in "Na Hoonanea o ka Manawa," *Ka Hoku o Hawai'i*, 13 September 1923; translated by Maly 2000]

3.1.2.5 'Ōhiki and Kaiwi

Pukui et al. (1974:70) described Kaiwi, a coastal point in Kealakehe, as "[l]and points near Kai-lua, Kona, Hawai'i, and farther north in the same district." This entry summarizes *mo'olelo* originally documented by Fornander about the sandy beach area between Kaloko and Honokōhau known as 'Ōhiki:

At one of the points [along this coast] is a rock believed to be a petrified shark, the shark form of a priest (Ka-lua-lapa-uila). When the priest was about to be burned at 'Ōhiki, a legendary hero, Ka-miki, prayed to Pele and a terrible storm arose. The priest's shark-form was turned to stone as it tried to enter the heiau to save the human form of the priest. One of Pele's sisters, Hi'iaka-noho-lae (Hi'iaka living [at the] point), came to live here, making the place sacred and forbidden to Pele. [Pukui et al. 1974:70]

3.1.2.6 Punia

Pukui et al. (1974:70) also note Kaiwi Point in Kealakehe is related to the shark Punia: “In the story of Punia, the shark Kai‘ale‘ale, who had swallowed Punia, came here and was cut open by the people; Punia came out alive but was bald.” This refers to a story about a shark named Punia, who was born in Kohala (Fornander 1959:9–17). He wished to trap lobsters for his mother, but the cave pool with the lobsters was guarded by a school of sharks led by the shark Kai‘ale‘ale. Punia killed all of the other sharks and tricked Kai‘ale‘ale into swallowing him whole:

Once inside Kai‘ale‘ale, Punia rubbed two sticks together to make a fire to cook the sweet potatoes he had brought with him. He also scraped the insides of Kai‘ale‘ale, causing great pain to the shark. In his weakened state, Kai‘ale‘ale swam along the coast of Kekaha, and finally beached himself at Alula, near the point of Maliu in the land of Kealakehe. The people of Alula, cut open the shark and Punia was released. [Fornander 1959:10]

All the Hawaiians along the Kekaha coast lived at Alula at this time, since the rest of the area was inhabited by ghosts. Punia again used his skill of trickery to convince the ghosts to follow him into the ocean. When they dove below the surface, he caught them in his nets and killed them, until only one was left. “The ghost fled and Kekaha became safe for human habitation” (Fornander 1959:17).

3.1.2.7 Kona Legends Concerning ‘O‘oma

There are only a few listings for the *ahupua‘a* of Kealakehe, Honokōhau, Kaloko, Kohanaiki, ‘O‘oma, and Kalaoa in the definitive bibliographic source on Hawaiian *mo‘olelo*, the *Hawaiian Legends Index* (Gotanda 1989). However, several of the stories written about the Ka-Miki tale in Hawaiian language newspapers were used as the basis for Eliza Maguire’s *Kona Legends*. One of these concerns the Pond of Wāwāloli on the ‘O‘oma shore:

This little pool of water is situated near the seashore between ‘O‘oma and Kaloko. The story of this pool has been handed down from generations past to the present day, and is related thus:

Wāwāloli was the name of a certain *loli* (a sea slug). He was a kupua (wizard). He had two bodies, a limpsy fish body and the body of a man.

There lived in the uplands covered with ‘ilima, a man by the name of Kalua‘ōpala and his wife, and their beautiful and charming daughter, Malumaluiki. [Maguire 1966:21]

Malumaluiki traveled to the shore to collect *limu* (seaweed) and *‘opihi* (limpets). When she bent down to get a drink from the pool, a handsome man arose. He was the charmer Wāwāloli, and the girl fell in love with him. Each day she returned to the pool, crying out a chant, and her lover would join her. However, the girl could not eat or sleep, and one day her father followed her. Seeing the form of her lover, he vowed to trap him. He memorized the chant and disguised his voice to make the *loli* appear, then caught him in a net. He gave the captured *loli* to a priest, Pāpa‘apa‘o, baked the *loli* in an *imu* (underground oven), and saved the life of Malumaluiki (Maguire 1966:21–32).

Wawāloli is also mentioned in the legend of the fishpond of Pā‘aiea, which was destroyed by the Hualālai lava flow of 1801:

This was a very large fishpond extending from *Ka'elehuluhulu* [in Kaulana Ahupua'a], adjoining the little fishing hamlet of *Mahai'ūla* [Mahai'ula Ahupua'a] and as far as *Wawālohi* on the boundary of 'O'oma [Kalaoa/'O'oma boundary]. This pond was not far from *Ka-Lae-O-Keāhole*, (Fisherman's Point) which is the extreme western point, or cape on the island of Hawai'i, and on which there is a lighthouse. . . .

The Fish-Pond of *Pā'aiea* was three miles long, and a mile and a half wide. The fishermen going to *Kailua* and further south, often took a short cut by taking their canoes into the pond and going across, thus saving time and the hard labor of paddling against the 'eka [strong southern breeze] and also against the strong current from *Keāhole*. [Maguire 1966:13]

Pele came to visit the pond in her guise as an old woman and asked the *konohiki* (overseer) of the pond for some fish or shrimp. The *konohiki* refused, and that night the lava flowed down to the shore, completely destroying and filling the fishpond in revenge for the stinginess of the fishpond manager (Maguire 1966:13–17).

3.2 Early to Mid-Nineteenth Century

3.2.1 Early Explorers and Visitors

Archibald Menzies, the first foreigner to record his visit to Kekaha, accompanied Captain Vancouver in 1792. He described the land as “barren and rugged with volcanic dregs and fragments of black lava . . . in consequence of which the inhabitants were obliged to have recourse to fishing for their sustenance” (Menzies 1920:99). On 17 January 1792, Menzies hiked to the top of Hualālai, and observed the following:

We commenced our march with a slow pace, exposed to the scorching heat of the meridian sun, over a dreary barren track of a gradual ascent, consisting of little else than rugged porous lava and volcanic dregs, for about three miles, when we entered the bread fruit plantations whose spreading trees with beautiful foliage were scattered about that distance from the shore along the side of the mountain as far as we could see on both sides. Here the country began to assume a pleasant and fertile appearance through which we continued our ascent for about two miles further, surrounded by plantations of the esculent roots and vegetables of the country, industriously cultivated . . . From this place we had a delightful view of the scattered villages and shore underneath us, and of the luxuriant plantations around us . . .

January 18th . . . We observed here and there on the path little maraes [shrines] pointed out by taboo sticks in the ground round a bush or under a tree. In passing these places the natives always muttered a prayer or hymn, and made some offering as they said, to their akua, by leaving them a little piece of fruit, vegetable or something or other at these consecrated spots. Even in this distant solitary hut, we found a corner of it consecrated by one of these taboo sticks which the natives earnestly requested us not to remove when we took possession of it, and we very strictly obeyed their injunction, conceiving that religious forms whatever they are, ought to be equally inviolable everywhere. [Menzies 1920:151–160]

Vancouver, referring to the North Kona coast in 1794, noted

the adjacent shores . . . chiefly composed of volcanic matter, and producing only a few detached groves of cocoa nut trees, with the appearance of little cultivation, and very few inhabitants . . . [Vancouver 1798:III:62 in Cordy 1985:34]

In 1823, William Ellis referred to the 1801 Huehue lava flow from Hualālai, which covered parts of Kekaha just to the north of the project area, as having “inundated several villages, destroyed a number of plantations and extensive fish ponds, filled up a deep bay twenty miles in length and formed the present coast . . . stone walls, trees and houses all gave way before it” (Ellis 1963:30–31).

In 1840, Captain Charles Wilkes of the American Exploring Team observed

. . . a considerable trade is kept up between the north and south end of this district. The inhabitants of the barren portion of the latter are principally occupied in fishing and the manufacture of salt, which articles are bartered with those who live in the more fertile regions of the south, for food and clothes. [Wilkes 1845:91]

3.2.1.1 Descriptions of Cultivation Practices

The project area is in the central portion of the North Kona District at the boundary of two distinct ecological zones. Lands to the south of Lanihau, known as *Kona kai 'opua* (Kona of the distant horizon clouds above the ocean), between Kailua Bay and Keauhou Bay, are generally recognized as the fertile agricultural district and population center of North Kona (Kirch 1985:166; Kelly 1983). The relatively dry *Kekaha-wai-'ole* (the waterless place) area of North Kona to the northwest, which includes the six project area *ahupua'a*, is characterized by coastal fishponds and relatively barren lava inlands.

Despite descriptions of the lava-covered terrain, various crops were traditionally cultivated within Kekaha, and sweet potato is likely to have been the most abundantly grown crop because of its adaptability to stony, dry environments. It was commonly planted in mounds and in *pāhoehoe* excavations. Henry J. Lyman, son of missionaries who first arrived in Hilo in 1831, describes features in Puna similar to *pāhoehoe* clearings in the project area that were cultivated with sweet potatoes:

Wherever the lava could be pounded into scoria, a plantation of sweet potatoes was laboriously formed by digging among the stones and filling in the holes with dried grass brought from the mountainside. Placed in the nest, the tuberous buds were covered with gravel, and there grew with astonishing luxuriance, yielding the largest and finest potatoes on the island. [Lyman in Frierson 1991:167]

During the mid-1800s, Captain Wilkes commented on the agricultural use of *pāhoehoe* excavations (similar to the modification of *pāhoehoe* outcrops in the project area) that he observed specifically in the Kona region:

Cultivation is carried on in many places where it would be deemed almost impracticable in any other country. The natives, during the rainy season, also plant, in excavations among the lava rocks, sweet potatoes, melons, and pine-apples, all of which produce a crop. [Wilkes 1845:91]

Sweet potatoes were also cultivated within walled fields or depressions in the walls themselves. E.S. Craighill Handy and Elizabeth Green Handy discuss this method in an account that appeared in the Hawaiian newspaper *Ka Nupepa Ku'oko'a* (24 March 1922):

Rocky lands in the olden days were walled up all around with the big and small stones of the patch until there was a wall (*kuaiwi*) about 2 feet high and in the enclosure were put weeds of every kind, 'ama'u tree ferns and so on, and then topped well with soil taken from the patch itself, to enrich ti, or in other words to rot the rubbish and weeds to make soil.

After several months, the rotted weeds were converted into soil of the best grade. The farmer waited for the time when he knew that the rains would fall, then he made the patch ready for planting. If for sweet potatoes, he made mounds for them and for taro too, on some places on Hawai'i. [Handy and Handy 1972:131]

3.2.2 Population and Settlement in Kekaha

Early missionary residents made the first recorded estimates of the population of the Kona District. Asa Thurston in 1824 “reported a population of not less than 20,000 inhabitants along a 30-mile stretch of the Kona coast”—these residents were clustered on the coast, but some families also lived in a habitation belt about 2 miles inland (Kelly 1983:14). An 1831-32 census recorded 12,400 people in the district of Kona, including 6,649 persons specifically in North Kona (Schmitt 1973:9). By 1835, the North Kona number had declined to 5,957 (of which 1,244 or 21% were Kekaha residents). By 1853, the North Kona number had dropped to 2,210 (Schmitt 1973:21, 29, 31). During his visit to the Kona area in 1822, Ellis (1979:32) described deserted villages and abandoned fields “everywhere to be met with.”

Several factors influenced changes in population and settlement patterns throughout Kona in the nineteenth century. Newly introduced disease had a devastating impact on the native population. Another major factor was outmigration. “As early as 1788, Hawaiians began enlisting as seamen on the foreign ships that stopped at Island ports, and their number increased rapidly with the growth of whaling in the Pacific” (Schmitt 1973:16). As harbor facilities were developed at Kailua and Kealahou during the early 1800s, these burgeoning ports became centers of a population drawn from increasingly isolated (economically and socially) areas like Kekaha. The effect of inter-island migration on the population of Kona was specifically noted by missionaries in 1832:

We have been sensible for some time that the number of inhabitants in this island is on the decrease. There is an almost constant moving of the people to the leeward islands, especially since the removal of the governor (Kuakini) to Oahu. Some leave by order of the chiefs, and others go on their own responsibility. [Schmitt 1973:16]

The movement of people from Hawai'i Island to O'ahu and Kaua'i, in particular, was also related to economic opportunities to own land or work for money in the so-called “leeward islands.”

Coulter's (1931) population density estimates for 1853 (Figure 11) show that a few hundred people lived in the vicinity of the project area during the mid-1800s. However, many sources of information—including archaeological survey data, historical documentation, and oral-historical information—suggest the main areas of settlement up to that time were likely along the coast and

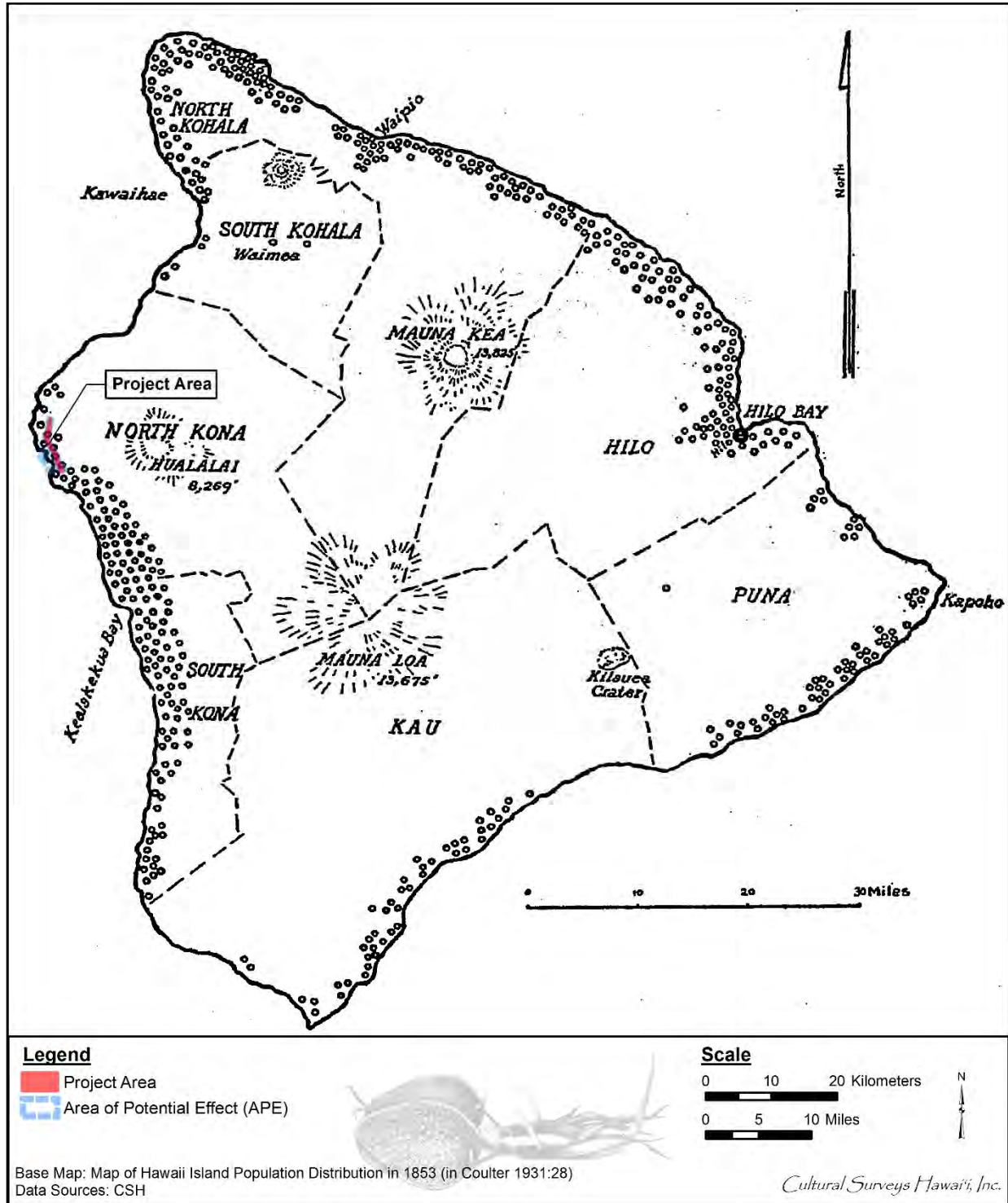


Figure 11. Coulter's (1931) population estimates for 1853 in and around the project area; each symbol represents 50 people

upcountry above the project area. It is likely the project area was never a location of dense permanent settlement. The land between the coastal and upland settlements was used for cattle, donkey, and goat pasturage. *Mauka-makai* trails through Kohanaiki, Kaloko, Kalaoa, and Honokōhau were utilized by upland families to access the coast to fish and gather water during upland droughts (see Section 3.5).

Regarding coastal settlement in the mid-nineteenth century, Cordy et al. (1991) note the following about Kaloko:

The historical documents suggest that by the 1840s-1850s, the Coastal Zone had been abandoned as a residential area, except probably for a house used by the fishpond's caretaker. This pattern would have been a stunning change from prehistoric and early historic times, when many coastal residences were present. [Cordy et al. 1991:288]

This pattern likely also held for other *ahupua'a* in the Kekaha area.

3.2.3 Inception of Ranching

Ranching has its roots in this early historic period, with the introduction of goats, cattle, and horses by sea captains who sought to develop these resources to replenish their ship holds during long journeys. Captain George Vancouver gave Ke'eumoku, an *ali'i*, a pair of goats in 1792, and the following year, he brought Ke'eumoku four sheep. Vancouver also brought the first cattle, California longhorns, to Kamehameha I in 1793. Kamehameha issued a *kapu* (in this case, a prohibition) that carried the death penalty to anyone harming cows or cattle, thus ensuring that the first herds would proliferate. The *kapu* was enforced for ten years. Due to the *kapu*, families constructed walls to protect their sweet potato and taro lands from the cattle. Kamehameha ordered the construction of a wall *mauka* of the project area that ran from north to south Kona, to prevent cattle from destroying populated areas (Bergin 2004:22–23). Historical research suggests both goat and cattle grazing took place within the project area.

Horses were introduced in 1803. They also ran free, although no *kapu* protected them. Horses had difficulties acclimating to local grasses, and herds of feral horses were rare until the 1830s. At that time, Kamehameha III had California *vaqueros*, cowboys of Native Californian, Spanish, and Mexican descent, brought to Hawai'i to herd the cattle and teach Hawaiians to ride horses and tend the cattle. The *paniolo*, as they were called, were expert horsemen and able to chase down the wild cattle on horseback and capture them with a lasso. The hide and tallow trade proved to be successful, and cattle were shipped from Kailua Bay to slaughterhouses on O'ahu. In 1851, it was estimated that Hawai'i Island had 8,000 head of tame cattle and 12,000 head of wild cattle (Kelly 1983:79; Bergin 2004:23, 97).

The development of cattle ranching, as with sugarcane plantations, was most changed by the Māhele (1848), which introduced private land ownership in Hawai'i and allowed for the ownership of land by foreigners. Fences and corrals were built in the vast tracts of formerly open *kula* lands (pasture, drylands) to contain the captured cattle, and then foreign stock was brought in for breeding. Once the fences and corrals were built, they needed to be maintained; this was one of the many regular tasks of the Hawaiian *paniolo*, in addition to the more occasional cattle round-ups and shipping to slaughter houses (Strazar 1987:xiv–xv).

3.3 1848–1852 Māhele Data

In the mid-nineteenth century, during the time of Kamehameha III, a series of legal and legislative changes were brought about in the name of “land reform” (see the works of Jon Chinen 1958, 1961 for a thorough and well-written explanation). Prior to the Māhele, all land belonged to the *akua* (god), held in trust for them by the paramount chief and managed by subordinate chiefs.

Following the enactment of a series of new laws from the mid-1840s to mid-1850s, Kamehameha III divided the land into four categories: Crown Lands reserved for himself and the royal house; Government Lands set aside for the government; Konohiki Lands claimed by *ali'i* and their *konohiki*; and *kuleana*, small plots claimed by the *maka'āinana* (commoners) (Chinen 1958:8–15). These claims are described in LCA testimony from the claimant and witnesses. A Royal Patent (R.P.), which quit-claimed the government's interest in the land, was issued on most LCAs (Chinen 1958:14). In some cases, more than one R.P. number was issued for an LCA, especially in cases where there were several widely separated *'āpana* (lots), such as an award with agricultural land in one *ahupua'a* and a house lot in Kailua town.

The chiefs and *konohiki* were required to pay a commutation fee for their lands, usually about one-third of the value any unimproved lands. To pay the fee, the awardees usually “returned” a portion of the lands awarded to pay the commutation fee for the lands they decided to retain. The returned lands usually became Government Lands (Chinen 1958:13).

In 1848, four resolutions were passed to protect the rights of the *kama'āina*, the native tenants. The resolutions authorized the Land Commission to award fee simple title to native tenants for habitation and agricultural lands that were part of Crown Lands, Government Lands, or Konohiki Lands. The lands for the common people became known as *kuleana* (tenant) awards (Chinen 1958, 1961). The Kuleana Act of 1850 allowed *maka'āinana*, in principle, to own land parcels at which they were currently and actively cultivating and/or residing. In theory, this set aside hundreds of thousands of acres as potential *kuleana* parcels; however, this ultimately led to about 10,000 claimants obtaining approximately 30,000 acres, while 252 chiefs, for example, divided up about a million acres. Many or most Hawaiians were simply disenfranchised by these acts.

In Kekaha, land claim testimonies indicate there were relatively few native tenants who made land claims, and the majority of lands became the property of the government. Of the few land claims made, it appears the cultivation of traditional crops within the upper elevations (the Upland Zone), including taro and sweet potatoes, was the predominant land use activity. Only one claimant indicated the cultivation of a commercial crop (coffee). Besides a claim made for “salt lands” at Keahuolū and several other claims made for rights to fishpond resources, there is very little indication of land use throughout the intermediate and lower elevations, including an absence of claims made for house lots on the coast.

The Māhele data from each of the subject *ahupua'a* support what Cordy found in his study of land claims made at Kaloko, namely that by the time of the Māhele, “the coast was virtually abandoned [and] the economic focus in this area had shifted to the uplands, which may have been a non-traditional pattern in this area” (Cordy et al. 1991:421). The following are excerpts from previous studies that provide brief summaries of the Māhele data for each of the subject *ahupua'a*. The excerpts are direct quotes compiled from the referenced reports.

3.3.1 Kealakehe – Government Land

Kealakehe was awarded to Kekuapanio, a *hulumanu*, one of a group of young nobles that were the favorites of Kauikeaouli, Kamehameha II. He returned the land to the government. Twenty-three *kuleana* claims were made for Kealakehe, and 11 were awarded. Table 10 gives the LCA number, awardees, the name of the *'ili* in which the award was located (if known), the Royal Patent (R.P.) number, and the acreage. Six *'ili* are mentioned in Māhele testimony, of which all had claims awarded. From the 11 testimonies, it was determined that claimants listed numerous cultivated parcels (*kīhāpai*) planted in taro and sweet potatoes. At least ten houses and a fair sized banana patch were situated in the uplands (Donham 1990b:B-4).

3.3.2 Honokōhau 1-2 – Konohiki Land

Honokōhau 1, composed of 2,653 acres, was awarded to Miriam Kekau'ōnohi (LCA 11216). Honokōhau 2, composed of 480 acres, was awarded to William Pitt Leleiōhoku (LCA 9971). Both of these awards were kept by the claimants. The *'ili* of Papa'akoko and Elepai were also awarded as a *konohiki* award to William Charles Lunalilo (LCA 8559-B), who later became the sixth Hawaiian monarch but ruled for only a year, until his death in 1874. He returned the land to the government in lieu of commutation.

In addition to the two *konohiki* awards, Hawaiian commoners made an additional 32 claims on Honokōhau lands; 12 were awarded (Table 11). Lands were claimed in 16 *'ili* but awarded in only nine. These awards—ranging in size from 0.97 to 6.75 acres—are located between 800 and 1,680 ft in elevation. Only two of the testimonies recorded for these awards mentions specific crops grown in the awarded parcels; these include taro and potato *kīhāpai*. A house lot was claimed by only one individual (Robins et al. 1995:25).

3.3.3 Kaloko – Konohiki Land

Kaloko was awarded and kept by Lot Kamehameha (LCA 7715), who later ruled Hawai'i as Kamehameha V. A total of 21 additional claims were made in Kaloko, and 12 were awarded (Table 12). Fifteen *'ili* names are mentioned in Māhele testimony, but lands were awarded in only 12. Kelly (1971) noted all 12 *kuleana* awards were located within the Upland Zone between 1,200 and 1,700 ft elevation. Specific crops grown in the fields are mentioned in only six claims. Taro predominated, although two sweet potato plots and eight mixed taro plots were also claimed. House lots were claimed in only two of the 18 cases, which is extremely unusual. In summary, housing data is extremely poor for this period (Cordy et al. 1991:411, 415).

3.3.4 Kohanaiki – Government Land

Kohanaiki was awarded to Asa Ka'eo, the uncle of Kekau'ōnohi, a granddaughter of Kamehameha I and one of the wives of Kamehameha II. He returned the land to the government. Commoners claimed two LCA parcels in Kohanaiki, but neither was awarded. The entire *ahupua'a* of Kohanaiki was classified as Government Lands (Indices of Awards 1929). Because of this, no testimony can be found on this land by any of the natives wishing to testify for *kuleana* lands. Instead, parcels of the land were later sold by the government to raise money (Lehua Kalima in O'Hare and Goodfellow 1992:A-12).

Table 10. Land Commission Awards in Kealakehe

LCA	Awardee	<i>ʻIli</i>	R.P.	Acreage
7483	Kulua	Kaʻōhia, Makakiloīʻa	4040	2.6
7897	Kahuenui 2	Kukuiʻōmino	4002	4.9
8608	Kaahui	Kaʻōhia, Kalihi, Pūʻohe, Kukuiʻōmino, ʻIliiloa	5228	3.9
9252	Kauhai	Pūʻohe, Kaʻōhia, Kaniʻohale	4005	5.78
10070	Mioi	ʻIliiloa, Kaniʻohale, Kukuiʻōmino	4003	4.4
10306	Nuole	Kaniʻohale	4006	5.25
10322	Nuhi	Makakiloīʻa	8054	4.75
10597	Puou	Kukuiʻōmino-nui, Kukuiʻōmino-iki	6235	4.12
10671	Pepe	ʻIliiloa, Haleolono, Kukuiʻōmino, Kaniʻohale	4007	4.96
10692	Paai	Pūʻohu, ʻIliiloa, Kaʻōhia	4004	2.8
10950	Waiwaiole	Kaʻōhia, Pūʻohe	5123	2.0

Table 11. Land Commission Awards in Honokōhau 1-2

LCA	Awardee	<i>Ahupuaʻa</i>	<i>ʻIli</i>	R.P.	Acreage
6026	Lanai, Ikaaka	Honokōhau 2	Hanapouli	6787	1.0
7396	Kekipi	Honokōhau 2	Puʻu Kou	5231	3.9
7490	Polapola, Solomona	Honokōhau 1, Honokōhau 2	ʻOnea, Waipiʻo, Pukalani	5247	2.0
7870, 7867	Kamohai	Honokōhau 2	Waipiʻo	–	1.0
7890	Kukona	Honokōhau 2	Hanapouli	7766	2.3
8218	Ikiiki	Honokōhau 2	Waipiʻo	–	2.3
9061	Kanae	Honokōhau 2	Pukalani	5049	4.8
9236	Kahaulewahine	Honokōhau 1	Kaeo	–	3.2
10319	Nahina	Honokōhau 2	Haleolono	4896	3.5
10521-B	Puhiale	Honokōhau 1	Haleamahuka	7785	6.8
10762	Ahu	Honokōhau 2	Nuʻuhiwa	3743	2.2
11064	Apuni	Honokōhau 1		5326	2.5
11216:36	Kekauonohi, Mikahela	Honokōhau 1	<i>Ahupuaʻa</i> award	7587	26.5
9971	Leleiohoku, William P.	Honokōhau 2	<i>Ahupuaʻa</i> award	6855	480.0

Table 12. Land Commission Awards in Kaloko

LCA	Awardee	<i>ʻIi</i>	Royal Patent	Acreage
7797	Kamohoalii	Kikahala, Ulaiui	3972	5.3
7909	Kamaole	Makaawe, Haleʻape	5377	7.0
9060	Kioku	Ulukukahi	4012	4.0
9160	Kanu	Kanaio	6938	2.5
9237	Kahiona	Oloupe	–	2.8
9238	Kahoohanohano	Pāpuaʻa	3316	1.8
9241	Kaiama	Kealaehu, Luahineʻeku, Haleolono	3772	4.3
9242	Keaweahokina	Kikahala, Kealaehu	3744	2.8
9243	Kaleiko	Kealaehu, Luahineʻeku, Haleolono	3786	1.8
10327	Nahuina	Haleʻape	3891	3.5
10694	Puhi	Kiki	3763	3.5
10951	Wahahee	Kealaehu, Kikahala	5095	2.0
7715	Kapuawaiwa, Lota	<i>Ahupuaʻa</i> award	8214	4320.0

3.3.5 ʻOʻoma 1-2 – Government Land

Kauikeaouli, the future King Kamehameha III, was born and lived in his early childhood at ʻOʻoma. He originally claimed the land of ʻOʻoma as his own land, but returned it to the government for further claims. Kamakau (1961) notes the following:

Ka-iki-o-ʻewa became the boy's guardian and took him to rear in an out-of-the-way place at ʻOʻoma, Kekaha . . . Here at ʻOʻoma he was brought up until his fifth year, chiefly occupied with his toy boats rigged like warships and with little brass cannon loaded with real powder mounted on [their] decks. [Kamakau 1961:264]

In the Māhele, ʻOʻoma 1 was awarded as a *kono* award to Moses Kekūāiwa, while ʻOʻoma 2 was awarded to an *aliʻi* named Kekaha. Moses Kekūāiwa was the brother of the future Kamehameha IV and Kamehameha V; he died of the measles at the age of 19. Both Kekūāiwa and Kekaha returned these awards to the government to pay the commutation fee for lands they decided to keep. Commoners claimed five *kuleana* awards in ʻOʻoma, but only three were awarded (Table 13).

3.3.6 Kalaoa 1-5 – Government Land

Kalaoa was divided into five sections, with Kalaoa 1 awarded to Emilia Keaweamahi, Kalaoa 2 awarded to Kinimaka, Kalaoa 3 awarded to Hapakuka Hewahewa, Kalaoa 4 awarded to William Pitt Leleiōhoku, and Kalaoa 5 designated as Government Land. Emilia Keaweamahi was the wife of Kaikioʻewa, an early supporter of Kamehameha I. He became governor of Kauaʻi in 1825 and was succeeded at that post by his wife after his death in 1839. Kinimaka was a high *aliʻi*, who became the *makua hānai* (adopted father) of the future King Kalākaua (Barrère 1994:367).

Hewahewa was the last high priest of the Hawaiian *kapu* system and had been the *kahuna* of Kamehameha I and Ka'ahumanu before becoming an early Christian convert. Leleiōhoku was the brother of two Hawaiian monarchs, King Kalākaua and Queen Lili'uokalani. The awardees of Kalaoa 1–4 all returned their lands to the government as commutation fees.

Twelve Hawaiians claimed *kuleana* lots in Kalaoa, but only two were awarded, both in Kalaoa 5 (Table 14). A series of grants were issued in the *ahupua'a* between 1852 and 1864, evidently representing commoners acquiring lands. All the awards were in the upland forest zone from 800–2,200 ft elevations; they appear to be agricultural parcels (Cordy 1985:35).

Table 13. Land Commission Awards in 'O'oma

LCA	Awardee	'Ili	Royal Patent	Acreage
8245-B	Kiekie	'O'omakaa	–	3.2
8059	Naiwi	'O'omakaa	3950	4.4
11004	Waa	'O'omakaa	5433	4.8

Table 14. Land Commission Awards in Kalaoa

LCA	Awardee	'Ili	Royal Patent	Acreage
7899	Kiekie	Kalaoa 5	–	4.9
7937	Kupuoe	Kalaoa 5	–	5.8

3.4 Late Nineteenth and Early Twentieth Centuries

Despite the major changes in population, settlement patterns, and land tenure during the early to mid-nineteenth century, people did continue to live in the area, as indicated by the following extended testimony of J.W.H.I. Kihe, who was born at Honokōhau in 1854. Writing in 1924, Kihe described population in the area around 1870:

Now [1924] the majority of those people are all dead. Of those things remembered and thought of by the people who yet remain from that time in 1870; those who are here 53 years later, we cannot forget the many families who lived in the various ('āpana) land sections of Kekaha. From the lands of Honokōhau, Kaloko, Kohanaiki, the lands of 'O'oma, Kalaoa, Haleohiu, Makaula, Kau, Puukala-Ohiki, Awalua, the lands of Kaulana, Mahaiula, Makalawena, Awakee, the lands of Kukio, Kaupulehu, Kiholo, Keawaiki, Kapalaoa, Puuanahulu, and Puuwaawaa. These many lands were filled with people in those days.

There were men, women, and children, the houses were filled with large families. Truly there were many people [in Kekaha]. I would travel around with the young men and women in those days, and we would stay together, travel together, eat together, and spend the nights in homes filled with aloha. The lands of Honokōhau were filled with people in those days, there were many women and children with whom I traveled with joy in the days of my youth. Those families are all gone, and

the land is quiet. There are no people, only the rocks remain, and a few scattered trees growing, and only occasionally does one meet with a man today (1924). One man and his children are all that remain.

Kaloko was the same in those days, but now, it is a land without people. The men, the women, and the children are all gone, they have passed away. Only one man, J.W. Haau, remains. He is the only native child (keiki kupa) besides this author, who remains. Now the land is desolate, there are no people, the houses are quiet. Only the houses remain standing, places simply to be counted. [Maly and Maly 2002:341–342]

Another native familiar with the area, J.P. Pu'uokupa, wrote a letter to the Hawaiian language newspaper *Ku Okoa* in 1875. Pu'uokupa was reacting to, and disagreeing with, an earlier letter describing supposed famine-like conditions in the area:

. . . The people who live in the area around Kailua are not bothered by the famine. They all have food. There are sweet potatoes and taro. These are the foods of these lands. There are at this time, breadfruit bearing fruit at Honokōhau on the side of Kailua, and at Kaloko, Kohanaiki, 'O'oma and the Kalaoas where lives J.P. [the author]. All of these lands are cultivated. There is land on which coffee is cultivated, where taro and sweet potatoes are cultivated, and land livestock is raised. All of us living from Kailua to Kalaoa are not in a famine, there is nothing we lack for the well being of our bodies.

Mokuola (a poetic reference to a place of life and well-being) is seen clearly upon the ocean, like the featherless back of the ukeke (shore bird). So it is in the uplands where one may wander gathering what is needed, as far as Kiholo which opens like the mouth of a long house into the wind. It is there that the bow of the boats may safely land upon the shore. The livelihood of the people there is fishing and the raising of livestock. The people in the uplands of Napuu are farmers, and as is the custom of those people of the backlands, they all eat in the morning and then go to work. So it is with all of the native people of these lands, they are a people that are well off . . .

As was said earlier, coffee is the plant of value on this land, and so, is the raising of livestock. From the payments for those products, the people are well off and they have built wooden houses. If you come here you shall see that it is true. Fish are also something which benefits the people. The people who make the pai ai on Maui bring it to Kona and trade it. Some people also trade their poi for the coffee of the natives here . . . [J.P. Puuokupa, in *Ku Okoa*, 27 November 1875; translated by Maly, in Maly and Maly 2002:339]

As noted in Pu'uokupa's letter, coffee and animal husbandry were becoming the major economic drivers in nineteenth-century Kona. During the latter part of the nineteenth century ranching established the North Kona region as a source of market resources (e.g., beef and dairy products) for Honolulu and beyond.

To encourage more native tenants to buy or lease lands, the Hawaiian Kingdom established the Homestead Act in 1884. Government lands from Kohanaiki north to Kūki'o were set aside for

these homesteads, and 20-acre lots were leased, mainly adjacent to Māmalahoa Highway in the uplands. King Kalākaua gave up his lands in Kekaha in 1889 to increase the amount of land available for homesteads. Besides the smaller lots, large tracts were also leased for cattle ranches, such as the Huehue Ranch in Kealakehe.

The following discussions of the project area *ahupua'a* provide additional information about ranching and other key events in this time period.

3.4.1 Kealakehe

As Government Lands, portions of Kealakehe Ahupua'a were subdivided as the Kealakehe Homesteads for purchase by homesteaders for residential development. Following the passage of the Hawaiian Homes Commission Act in 1921, portions of Kealakehe were designated Hawaiian Homelands "for the benefit and use of native Hawaiians, upon which they may live, farm, ranch, and otherwise engage in commercial or industrial or any other activities."

3.4.2 Honokōhau

Following the Māhele (ca. 1850s), the Intermediate and Upland Zones of the Honokōhau area were ultimately abandoned, as suggested by Boundary Commission and LCA records. Subsequently, the vacant lands were acquired for cattle ranching, and portions were leased for commercial cultivation of coffee and fruit by Japanese immigrants. Early twentieth century maps and photographs show a village along the coast of Honokōhau comprising frame houses, a chapel, and a schoolhouse. No records were uncovered documenting dates of construction for these structures. By the 1920s the village appears to have been abandoned. Most Hawaiians had moved to the uplands, where another schoolhouse had been established by at least 1888 (Emerson 1888b).

The *mauka* portions of Honokōhau 1 and 2 during the last quarter of the nineteenth century and throughout the twentieth century focused on the activities of the Greenwell family. Henry Nicholas Greenwell, an Englishman, had arrived on Hawai'i Island during the 1850s and soon began purchasing and leasing land. After starting out growing oranges, Greenwell expanded his commercial interests to coffee as well as sheep and cattle raising. The lands of Honokōhau apparently became a part of Greenwell's holdings sometime between the 1870s and his death in 1891. During the twentieth century, the Greenwell Ranch lands of Kona were divided into three units, with the Honokōhau holdings becoming the Frank Greenwell Ranch, named for a son of Henry N. Greenwell who had managed that section. A 1929 publication described the Frank Greenwell Ranch as follows:

This . . . is also known as Honokōhau Ranch and Hualalai Ranch. The total area is about 20,000 acres, one-half of which is suitable for grazing; it stretches from the sea to an elevation of 5400 feet. Four thousand acres of this area are fee simple, the remainder is leased land.

The herd on this ranch is approximately 1500 head. Between 300-350 cattle averaging three to four years of age with an average weight of 525 pounds are marketed annually in Honolulu. In addition ninety head are annually slaughtered locally. The cattle for Honolulu are loaded at Napoopoo. The ranch is well fenced into fifteen paddocks by 20 miles of stone wall and 12 miles of wire fencing.

The ranch now carries 9 Hereford and 3 Shorthorn bulls. Cattle are bred from June to February. From November to April only about one-half of the paddocks are used, the others being too dry over these months. September is perhaps the wettest month in Kona. Only enough horses for use on the ranch are raised. [Henke 1929:26–27]

The Frank Greenwell Ranch subsequently became the Palani Ranch Company. According to information provided by the company, Palani Ranch in modern times has carried over 3,000 head of Angus and Hereford cattle per year.

James M. Greenwell, grandson of H.N. Greenwell and son of Frank Greenwell, provided details of his family's life in Kona and more specifically at Honokōhau (personal communication, 14 September 1992). Mr. Greenwell recalled that dairy cattle ranching on Henry N. Greenwell's Kona lands began in the 1870s, at the time when the first Portuguese immigrants arrived in Hawai'i. Henry N. Greenwell formed partnerships with Portuguese families in which the families would live on Greenwell's land and turn out dairy products. Mr. Greenwell remembered that his father, Frank, planted mango and other introduced trees on portions of the Honokōhau ranch property. Some of these trees were protected by individual surrounding walls.

Mr. Greenwell also noted that, sometime early in this century, a paddock of the ranch below Palani Road within the northeast portion of the present project area was leased to the Kuni and Isomoto families for growing coffee. (During the present interview, Mr. Greenwell pointed out the house sites of these two families and referred to the area as "Kuni paddock"). After the collapse of the coffee market, the families grew avocado and citrus fruit trees. Mr. Greenwell recalled that the families would build protective walls around these trees to protect them from animals.

3.4.3 Kaloko

By the 1870s and 1880s, housing seems to have become focused in the Upland Zone at the Kohanaiki Homesteads, with some scattered houses across Kaloko along the Road to Kailua and the upper Government Road. A Catholic Church is shown along the upper road on the 1888c Emerson map (see Figure 8), which would have drawn families to settle nearby. Cultivation may have been shifting to cash crops (e.g., coffee), and small-scale livestock raising may have been taking place.

During the twentieth century Kaloko experienced continuing commercial use of the fishpond. Ranching steadily increased with the development of the *ahupua'a* uplands into the Hu'ehu'e Ranch. Maly and Maly (2003) discussed the acquisition of these lands and the types of ranching that were common:

In 1899, John A. Maguire, founder of Huehue Ranch applied for a Patent Grant on . . . lots in 'O'oma 2nd, but he only secured Grant No. 4536 . . . Maguire's Huehue Ranch did secure General Lease No.'s 1001 and 590 for grazing purposes on the remaining government lands in the Kohanaiki and 'O'oma vicinity. Thus, by the turn of the century, Huehue Ranch, utilized both the upper forest lands and lower kula lands to the shore for ranching purposes. Oral history interviews with elder former ranch hands record that this use extended across the Kapena and Huliko'a grant lands of Kohanaiki, from the fee and leasehold lands of Kaloko and 'O'oma. Nineteenth century goat drives, gave way to formalized cattle drives and round ups on these lands. [Maly and Maly 2003:78]

Until the construction of the Queen Ka'ahumanu Highway in the 1970s, access to the “kula kai (shoreward plains)” was limited to local residents (Maly and Maly 2003:101). The 1924 USGS map shows “the road to the sea” (SIHP # -10714) connecting the Kohanaiki Homesteads with the Kaloko Fishpond. In the first half of the twentieth century, the primary method of travel was “by foot or on horse or donkey, and those who traveled the land were almost always native residents of Kalaoa, ‘O‘oma, Kohanaiki, Kaloko and Honokōhau” (Maly and Maly 2003:99). Huehue Ranch bulldozed a Jeep road to the shore around 1955, during the construction of the Kailua pier; the road was used primarily by the ranch employees for duties or for fishing along the coast.

The Kaloko Fishpond—leased from the Huehue Ranch—continued as a commercial fishing operation until the 1950s. During the 1970s, the pond was incorporated into the newly established Kaloko-Honokōhau National Historical Park.

3.4.4 Kohanaiki, ‘O‘oma, and Kalaoa

Kohanaiki, ‘O‘oma, and Kalaoa were all designated as Government Lands during the Māhele, but the government began to sell this land to native tenants as early as 1852. The 1888 Emerson map (see Figure 8) shows the dense concentration of land grants purchased near the upper Belt Road (Māmalahoa Highway) in the Kona region. One of these clusters was in Kohanaiki, where a small settlement grew up around a Protestant church built in the 1870s (Kelly 1971:14).

Historic documents related to the Government Homestead Program of the late 1880s indicate officials deemed goats the only animals adept at grazing within arid, rocky Kaloko and Kohanaiki (Maly and Maly 2003:76, 79). Goats were present in the area prior to the late 1880s as well. Limited cattle ranching was practiced at the same time, although by 1900 cattle ranching had, for the most part, replaced the goats (Maly and Maly 2003:75).

3.5 Trails

The first improved cross-*ahupua‘a* trails through Kekaha (inland of the coastal trail) were the *alaloa* and the *alahahele*. The *alaloa* was modified in the 1840s and called the *Alanui Aupuni* (Government Road), the King’s Highway, or the Māmalahoa Trail. Cordy et al. (1991:403) believe the curb-lined Māmalahoa Trail was built between 1836 and 1855. Portions of this trail are aligned with the current Queen Ka'ahumanu Highway. The *alahahele*, or Kealaehe (“path of Ehu”), extended from Kailua to the uplands of Kekaha; the current Belt Highway, or Māmalahoa Highway, is aligned with portions of this old trail. Each *ahupua‘a* also had a *mauka-makai* trail that led from the coast to the uplands. Sometimes these were mere footpaths, marked by cairns across the bare *pāhoehoe* or ‘*a‘ā* lava (Clark and Rechtman 2006a:61).

Many of these trails were improved in the mid-nineteenth century for horse or carriage traffic. The government paid for the work or used prisoners working off penalties to construct the roads, which became straighter, back from the coast, and sometimes paved and lined with stones. As the population shifted to the agricultural zone along the inland trail, the Māmalahoa trail on the lower barren shore was abandoned. By the time of Emerson’s survey of homestead lands in Kekaha in 1888, the trail was noted as “Lower Govt. Road – little used” (Cordy et al. 1991:405).

The main means of transport before 1947 were by foot and on horses and donkeys. Jeeps became available for purchase after the end of World War II, and many old *mauka-makai* trails were improved. Not all trails shown on post-1950s maps are old; for instance, the Huehue Ranch

in Kealakehe blazed a new Jeep trail to the Kaloko shore sometime between 1924 and the 1950s. In 1973, the Queen Ka'ahumanu Highway opened, allowing vehicles to cross Kekaha Ahupua'a at the lower elevations once again (Clark and Rechtman 2006a:66).

The Hawaii Territorial Survey and USGS maps (Figure 12 and Figure 13) depict early trails along the Kekaha Coast. On an 1886 map (see Figure 7), only the inland cross-*ahupua'a* Belt Road (now the Māmalahoa Highway) that extends from Kailua to Waimea in Kohala, is depicted. Emerson depicts a coastal trail immediately adjacent to the beach on an 1891 map (see Figure 9) and a *mauka-makai* trail (SIHP # -10714) from Kaloko Fishpond to the early upper settlements at Kohanaiki near the Belt Road. The same map also depicts two other *mauka-makai* trails: one (SIHP # -18099) within the project area in Honokōhau and another (SIHP # -21588) originating in Honokōhau on the south side of 'Aimakapā Fishpond and connecting with the Māmalahoa Trail in Kealakehe.

During Emerson's survey of the Kekaha Region of North Kona from ca. 1881–1891, his assistant J. Perryman prepared detailed sketches of the landscape. A sketch dated 4 June 1882 (Figure 14) depicts the view looking *mauka* toward Hualalai from Keāhole. Two *mauka-makai* trails are depicted in the sketch converging at "Kohanaiki Village" on the Upper Government Road and running downslope. These trails are labeled "trail to Honokohau" (SIHP # -18099) and "trail to coast" (SIHP # -10714). The two trails end before reaching a final coastal destination, probably due to the sketch being "unfinished on account of bad weather." Segments of SIHP #s -18099 and -10714 are within the project area.

A sketch dated August 1882 (Figure 15) depicts the view looking *makai* from Kealakehe on the slope of Hualalai. Four trails are visible on this map: the cross-*ahupua'a* coastal foot trail and three *mauka-makai* trails. The *mauka-makai* trails (SIHP #s -21588, -18099, and -10714) are depicted extending from the "Average edge of forest and Conture Line of Mountain Slope," where presumably the forest cover obscures them, to (from left to right) the Kealakehe shore, the 'Aimakapā Fishpond at Honokōhau, and the Kaloko Fishpond in Kaloko.

The trail from 'Aimakapā Fishpond at Honokōhau is better known as the "Trail to Honokohau" (SIHP # -18099). It is a paved, curbed-lined trail that begins at the south side of 'Aimakapā Fishpond, intersects the Māmalahoa Trail (SIHP # -00002), and then runs parallel to a trodden 'a'ā trail (Robins et al. 2000:23). It extends mauka of the Māmalahoa Trail for approximately 10,120 ft (nearly 2 miles) reaching 810 ft AMSL.

The trail from the Kaloko fishpond in Kaloko is known as the "Road to the Sea Trail" (SIHP # -10714). The trail originates in the vicinity of Kohanaiki Village and is also known by other names such as "Trail to Sea Coast" and "Kohanaiki Road." The trail has been documented *mauka* of the project area by Wolforth et al. (2005) and more recently by CSH (Bell et al. 2009). This extensive trail system is represented by at least three trail segments identified by CSH, located immediately north of Hina Lani Street (a full discussion is in Volume III of the project DRR [LaChance et al. 2017]). The Road to the Sea Trail (SIHP # -10714) can also be seen on a survey station map by J.S. Emerson of the Akahipu'u section of North Kona in 1888 (Emerson 1888b), as well as on Emerson's 1891 map of the Kailua Section of Kona (see Figure 8). The *mauka-makai* trail generally follows the border of Kohanaiki and Kaloko and is depicted between Nawahiahu and Kumuohe stations. Cordy et al. (1991) noted the following:

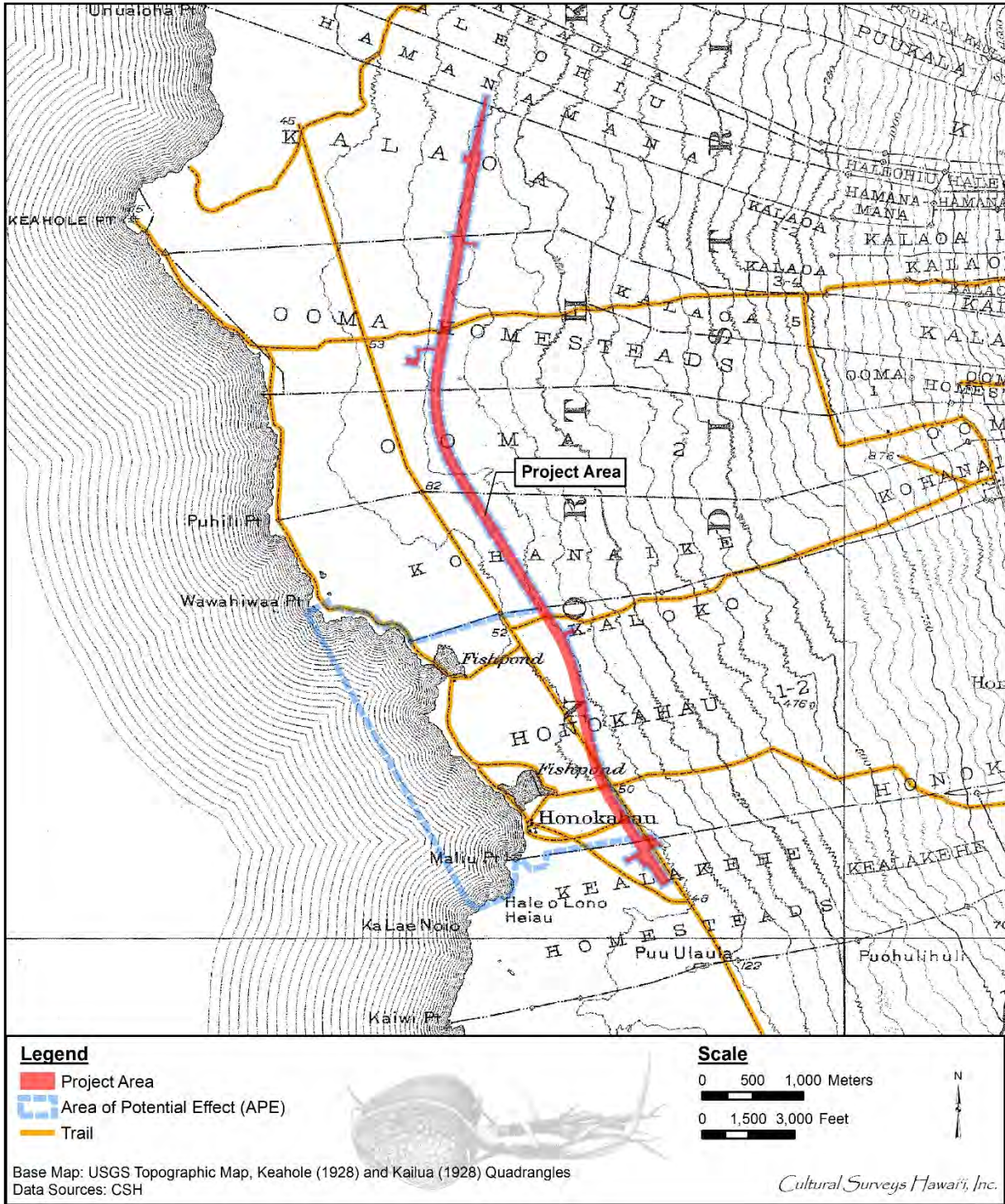


Figure 12. 1928 Keahole and Kailua USGS topographic quadrangles, depicting the project area; note dotted line Māmalahoa Trail (SIHP # -00002) crossing project area in Honokōhau, the Road to the Sea Trail (SIHP # -10714) connecting Māmalahoa Trail with Kaloko Fishpond, and SIHP# -29272 running *mauka-makai* through Ooma Homesteads

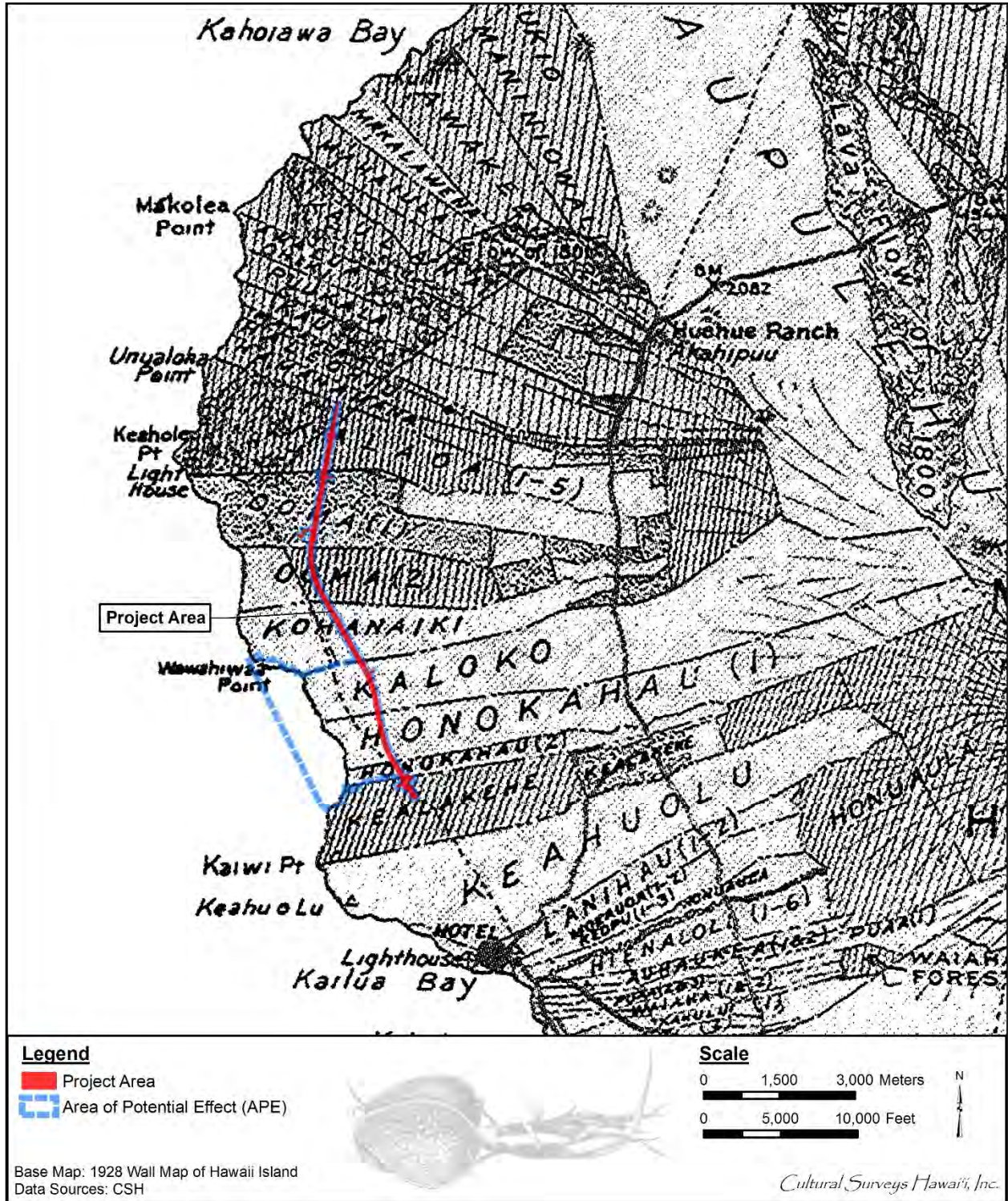


Figure 13. 1928 Hawaii Territorial Survey map of Hawaii (W.E. Wall, surveyor) depicting the approximate boundaries of the project area; note dotted Māmalahoa Trail (SIHP # -00002) adjacent to, and *makai* of, the highway

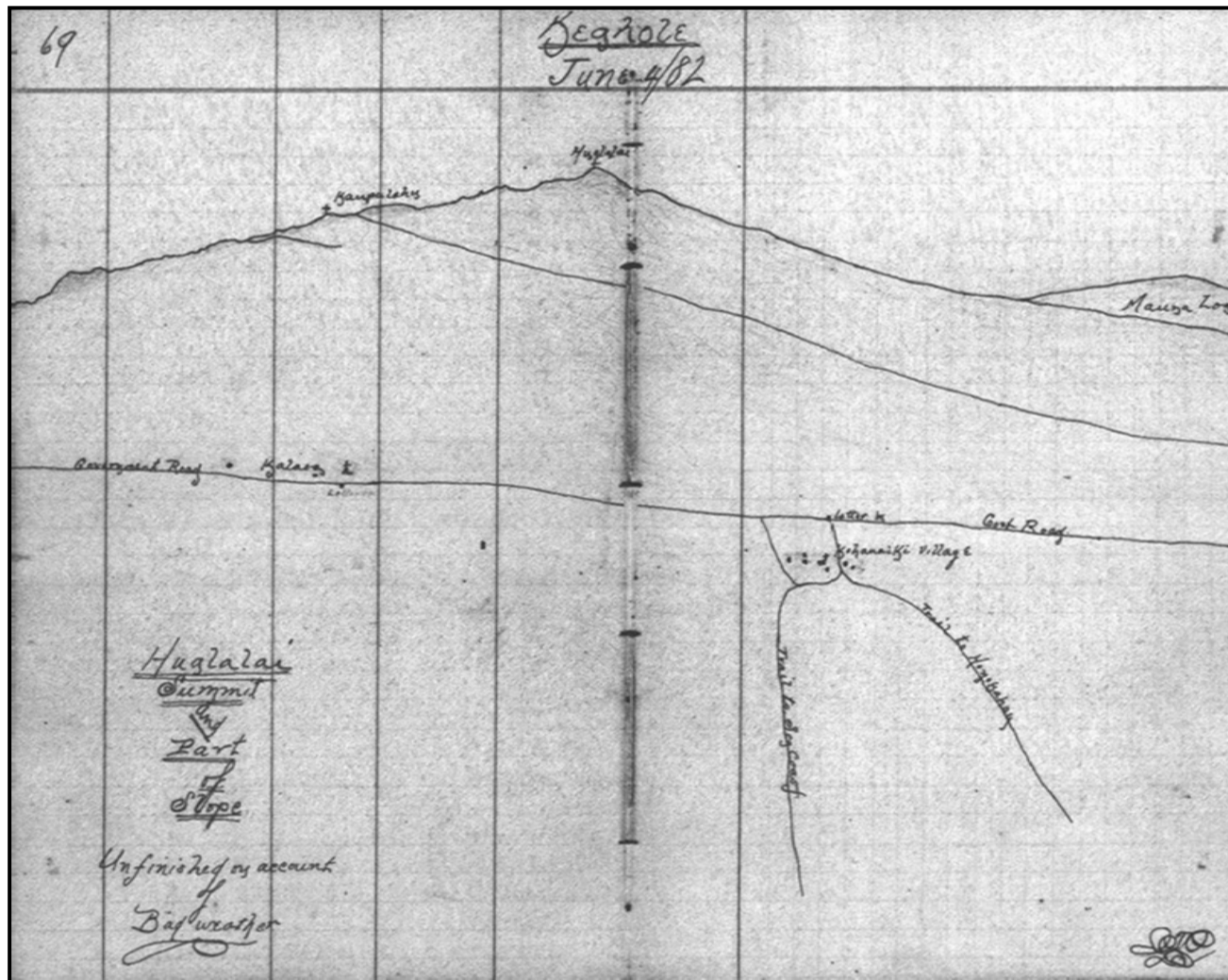


Figure 14. J.S. Emerson Field Notebook Map, Book 253:69, 1882 (Hawai'i Land Survey Division), Kona Coast, view upslope to Hualālai; note *mauka-makai* trails labeled “trail to Honokohau” and “trail to coast” (SIHP #s -18099 and -10714)

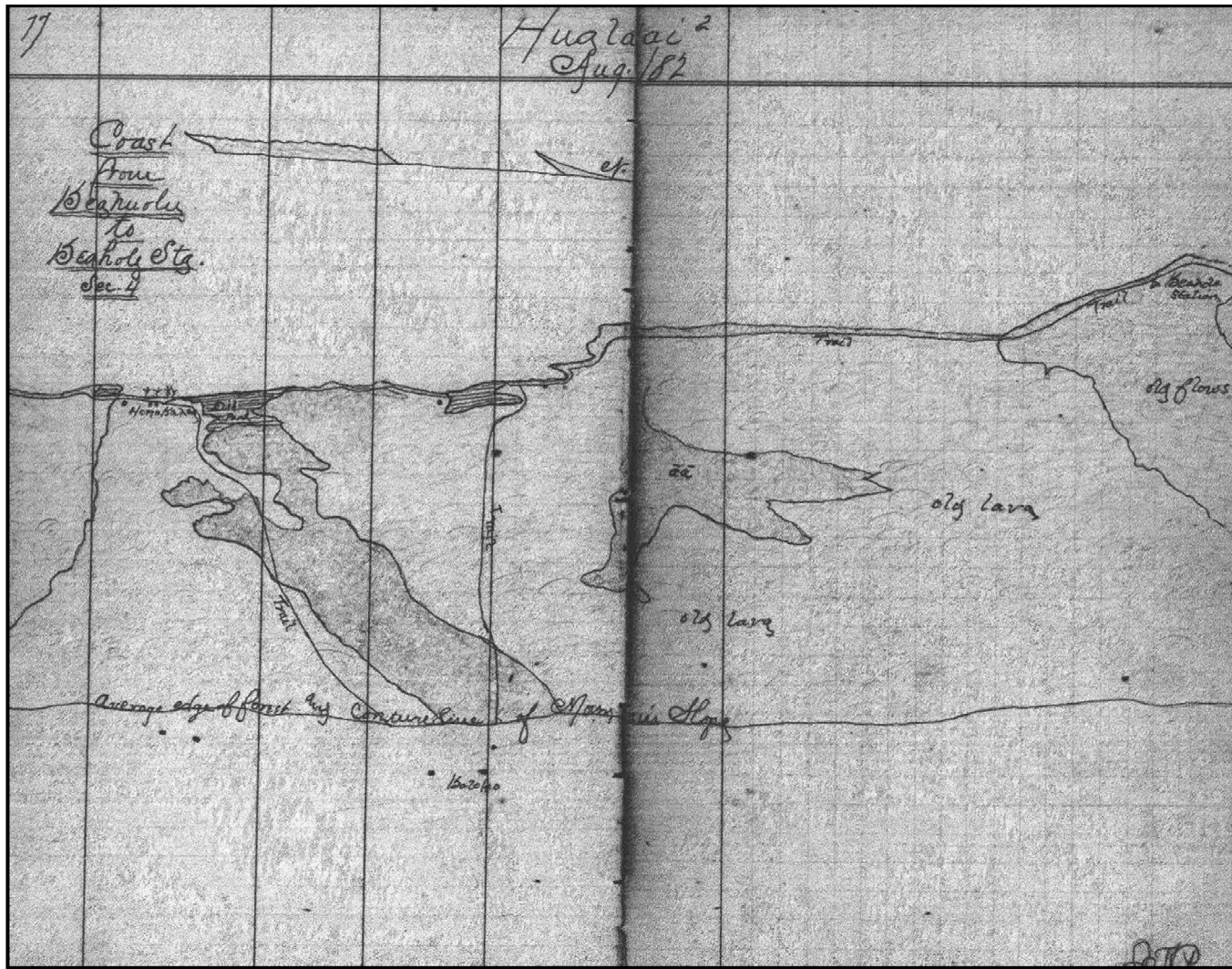


Figure 15. J.S. Emerson Field Notebook Map, Book 254:77, 1882 (Hawai'i Land Survey Division), looking *makai* from Kealahou (left) to 'Aimakapā Fishpond at Honokōhau Ahupua'a to Kaloko Fishpond (center) and to Keāhole Point (right)

Emerson's next inland station was called 'Kumuohe,' at 325 elevation (Emerson 1888a:75-78; 1888b). This station was a cairn (ahu) on an 'a'a flow. A mark (+) and cairn were placed here by Emerson (Emerson 1881:75-78). Additionally, a trail, 'road,' was located just south of this station within Kaloko (Emerson 1888b). 'This irregular path is a continuation of the road, located from Na wahi ahu [the next inland station]' (Emerson 1888a:76-78). Emerson's map of the entire Kaloko-Kohanaiki area shows this road leading from the Kohanaiki Homestead, inland at 1,100-1,200 feet and within Kohanaiki ahupuaa, down to Na Wahi Ahu (Nawahiahu), and then into Kaloko by the Kumuohe station and down to Kealiihelepo's house at Kaloko Fishpond in the d13-12 area (Emerson 1888b). [Cordy et al. 1991:404]

It should be noted that a portion of the Road to the Sea trail system (SIHP # - 10714) that is not shown on the 1928 USGS map (see Figure 12) is actually present and recognizable on the ground within the project area. CSH has designated this portion as Feature A of SIHP # -10714. The only cross-*ahupua'a* trail shown on the map is the Māmalahoa Trail (SIHP # -00002). Within the project area, this trail is *mauka* of, and adjacent to, the present Queen Ka'ahumanu Highway alignment in Kealakehe and in the southern third of Honokōhau, at which point it crosses the highway alignment in Honokōhau, continuing on the highway's *makai* side. The Māmalahoa Trail extends approximately 500 m *makai* of, and parallel to, the alignment in Kaloko, Kohanaiki, and 'O'oma. By Kalaoa, they are no longer parallel, as the highway diverges to the northeast. The relationship of these two alignments is also shown on a 1928 Hawaii Territorial Survey map (see Figure 13).

The 1928 USGS map also shows an additional *mauka-makai* trail north of the three previously mentioned running through Kalaoa 5 Ahupua'a and Ooma Homesteads (see Figure 12). This trail was identified as SIHP # -29272 during the current project's AIS. A more formal section of this trail had been identified by another firm in an adjacent project area to the west (see Rechtman and Clark 2013). At that portion of the trail, Rechtman and Clark (2013:67) identified "a cleared, widened (up to 3.7 meters) and in places cobble paved thoroughfare; low kerbing in spots; and a constructed (10.3 meters long x 3.7 meters wide bridge." Given the effort put into improving the trail, they concluded it was a primary *mauka-makai* transportation route in historic times, and the heavily worn central footpath points to its use in pre-Contact times as well.

On the 1959 USGS map (Figure 16), portions of three *mauka-makai* trails that cross the Queen Ka'ahumanu Highway alignment are shown: a trail (SIHP # -18099) from 'Aimakapā Fishpond in Honokōhau that extends *mauka* to the Māmalahoa Trail; a "jeep trail" (SIHP # -10714) that extends from Kaloko Fishpond to the *mauka* Kohanaiki settlements near the Belt Road; and a "jeep trail" (SIHP # -29272) extending from Wawāloli Beach east to the Kalaoa-Ooma Homesteads in the uplands near the Belt Road. The "jeep trail" in Kaloko refers to a *makai* portion of the current access road to Kaloko Fishpond, a bulldozed connection to Māmalahoa Trail and Huehue Ranch Road found within Kaloko-Honokōhau National Historical Park, and Huehue Ranch Road extending *mauka*.

In Kalaoa, the *mauka-makai* trail was the Alanui Kauhini, or *ka'uhini* (meaning "grasshopper"), which predated the division of the Kalaoa lands into Government Grants in 1852 (Walker and Rosendahl 1990:A-2). After World War II, a Jeep road was bulldozed from Māmalahoa Highway to Keāhole Point along the alignment of the Alanui Kauhini. This Jeep road was abandoned when

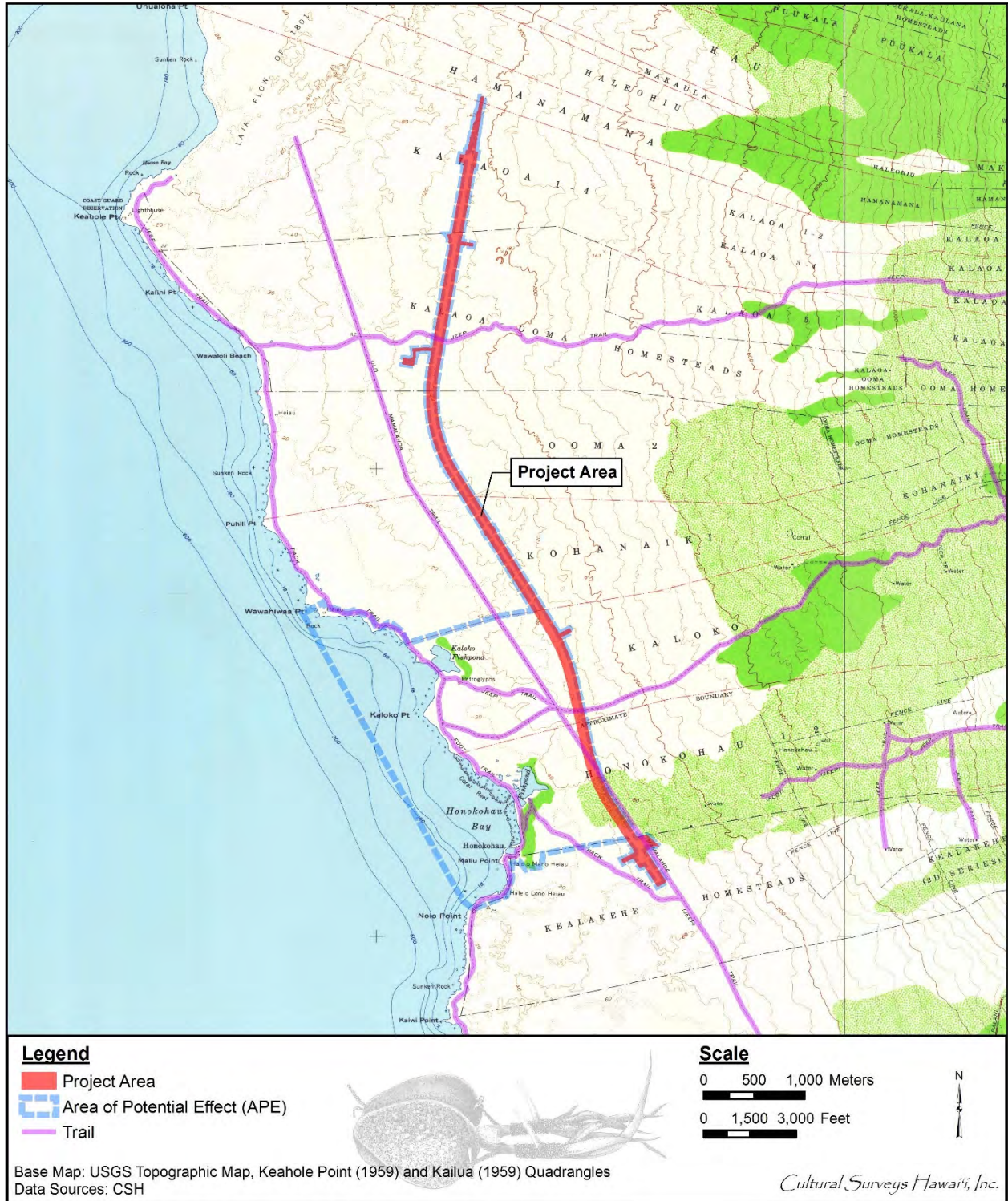


Figure 16. 1959 Keahole and Kailua USGS topographic quadrangles, depicting the approximate boundaries of the project area; note Mamalahoa Trail (SIHP # -00002) and “jeep trail” (SIHP # -29272) crossing it at Kalaoa-Ooma Homesteads

access to the coastal lands became easier with the 1973 construction of the Queen Ka'ahumanu Highway (Walker and Rosendahl 1990:A-3). Faint traces of these trails can be seen as thin white lines on a 1977 aerial photograph (Figure 17) of the Kona Coast. This photo also shows the limited development of the project area, with the improvements to the Honokōhau Small Boat Harbor, the construction of an industrial complex on the *mauka* side of the road in Honokōhau, and the development of the Keāhole Airport in Kalaoa.

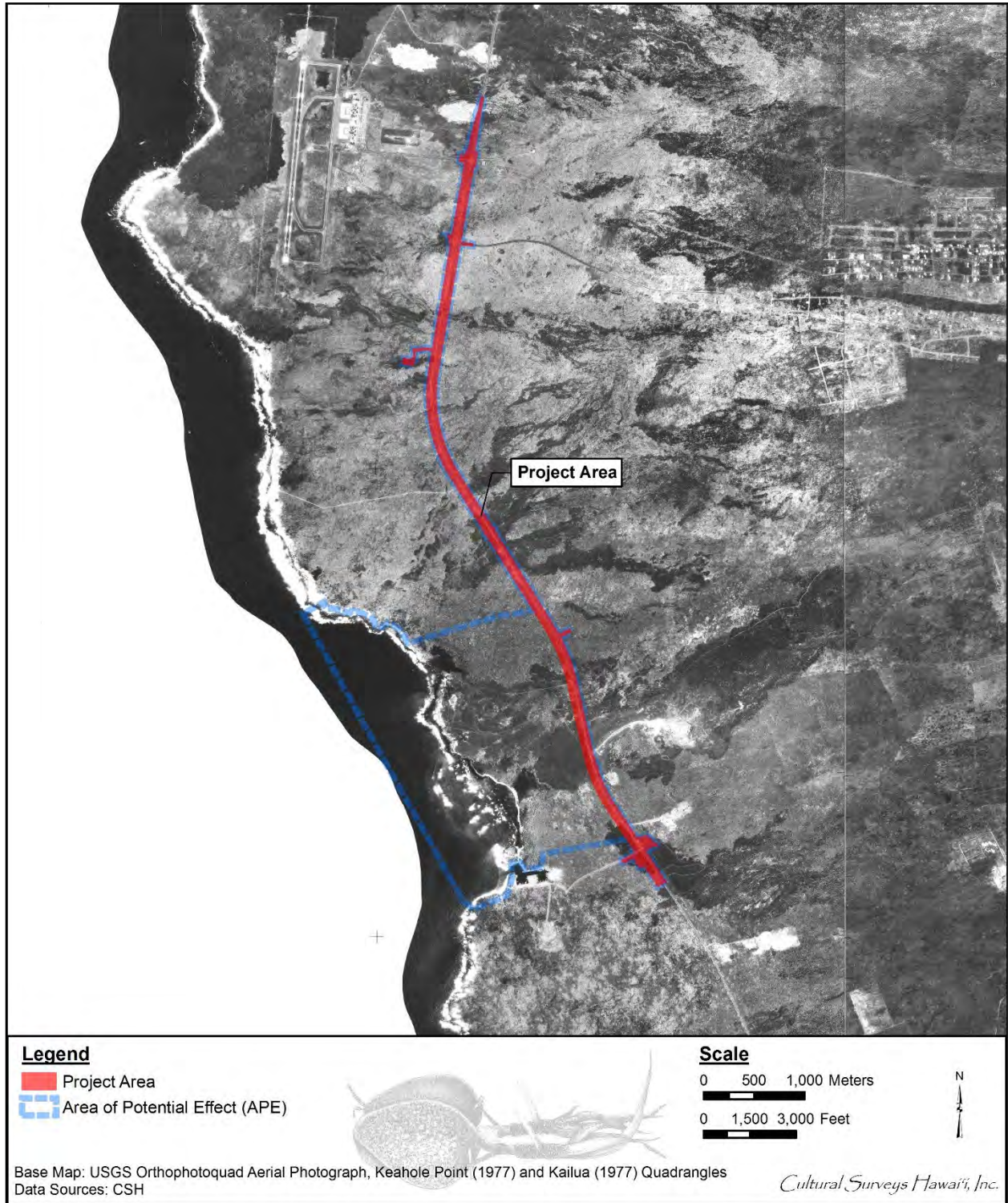


Figure 17. 1977 aerial photograph of the Keāhole Point area (USGS Orthophoto), depicting the approximate boundaries of the project area

Section 4 Previous Archaeological Research

Section 4 addresses the previous archaeological background for the vicinity of the Queen Ka'ahumanu Highway Widening Phase 2 project. While the majority of this section comes from prior research conducted for the project AIS (Monahan et al. 2012a) and DRR (LaChance et al. 2017), it has been updated to include studies added to the SHPD library since 2017.

Section 4.1 outlines previous archaeological studies in the vicinity of the project area; this section is broken out by *ahupua'a* from Kealakehe northward to Kalaoa 1–4 and followed by a separate discussion of other relevant archaeological studies in Section 4.1.6. Section 4.2 is a summary of the current project-related AIS investigations and their findings.

Because of the extensive record of past archaeological study in the region, Figure 18 through Figure 21 depict only larger survey or data recovery areas; small projects within these large areas are not shown. CSH's studies related to the Queen Ka'ahumanu Highway Widening project are depicted in Figure 21. As described in Section 1.2.1, these investigations began with a 1995 AIS conducted an AIS in portions of the current project area (Walsh and Hammatt 1995). The background research for that study focused on identifying historic properties previously identified within approximately 91 m (300 ft) of both sides of the present highway; 23 historic properties were recorded within this 600-ft-wide corridor along the highway (Table 15 and Table 16). The Walsh and Hammatt (1995) survey documented 17 historic properties, including some of those previously identified (Figure 22).

4.1 Previous Archaeological Studies in the Project Ahupua'a

4.1.1 Kealakehe

Figure 18 and Table 17 present a representative sample of previous archaeological projects conducted in Kealakehe. Select projects adjacent to the Queen Ka'ahumanu Highway in Kealakehe are discussed below.

4.1.1.1 Reinecke 1930

In 1930, John Reinecke conducted a survey of Hawaiian sites along the Kona coast. Reinecke (1930) noted the presence of numerous habitation platforms and petroglyphs. Emory (1970:37) indicated Reinecke's Sites 25 through 31 are in Kealakehe, including the Kealakehe settlement ruins, and consist of "13 house platforms, 11 burials, two corrals, one pen, and two *heiau*, Heiau-o-Kāne and Heiau Maka'opio."

4.1.1.2 Sinoto 1977

This reconnaissance survey was conducted on the eastern, or *mauka*, side of the highway. Four historic properties were identified, only one of which (SIHP # 50-10-27-5011) was within 300 ft of Queen Ka'ahumanu Highway: SIHP # -05011 comprises the *mauka-makai* oriented Kealakehe/Keauhuolū boundary wall, south of the current project area.

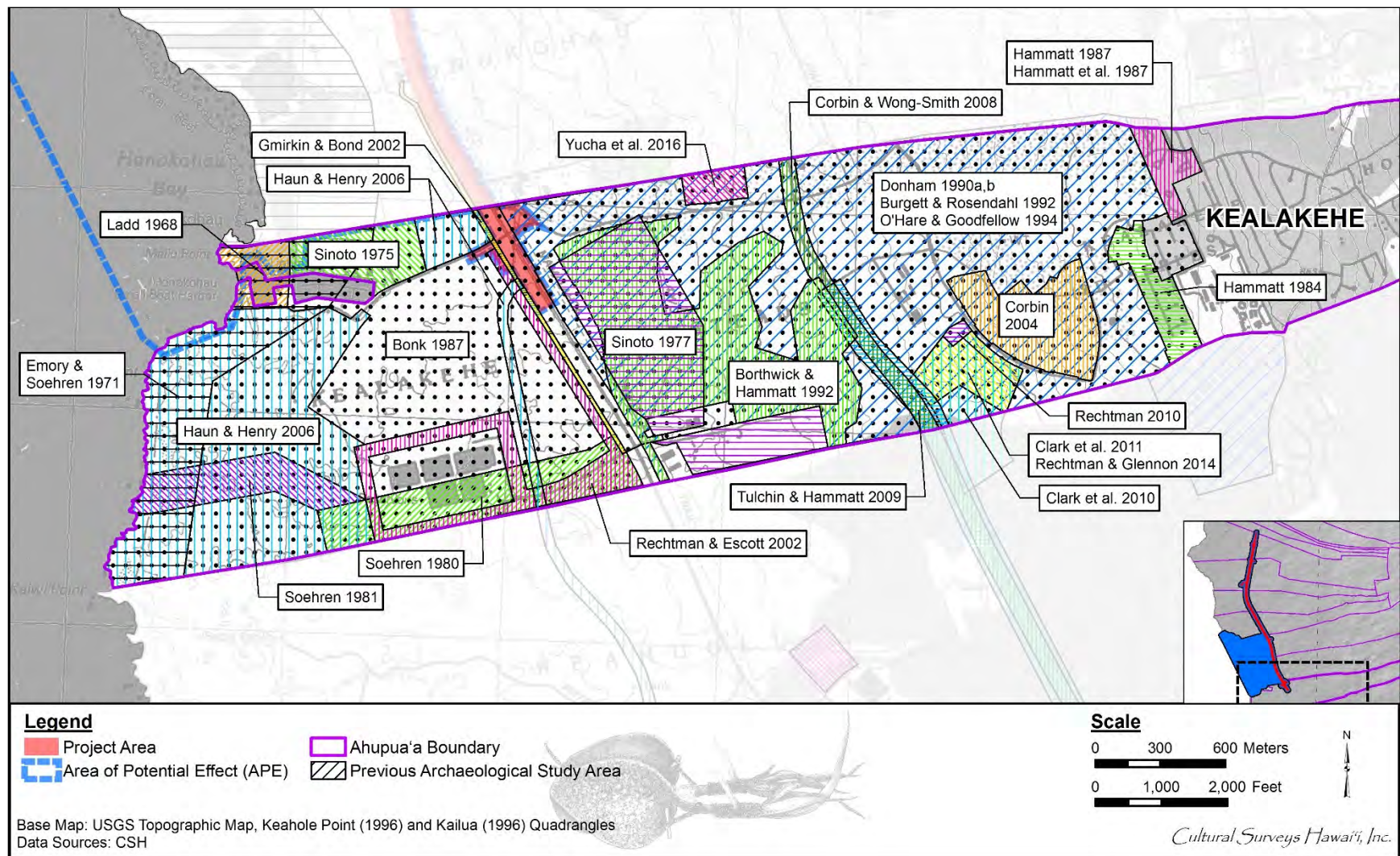


Figure 18. Selected previous archaeological studies in Kealakehe Ahupua'a (base map: 1996 Keahole Point and Kailua USGS topographic quadrangles)

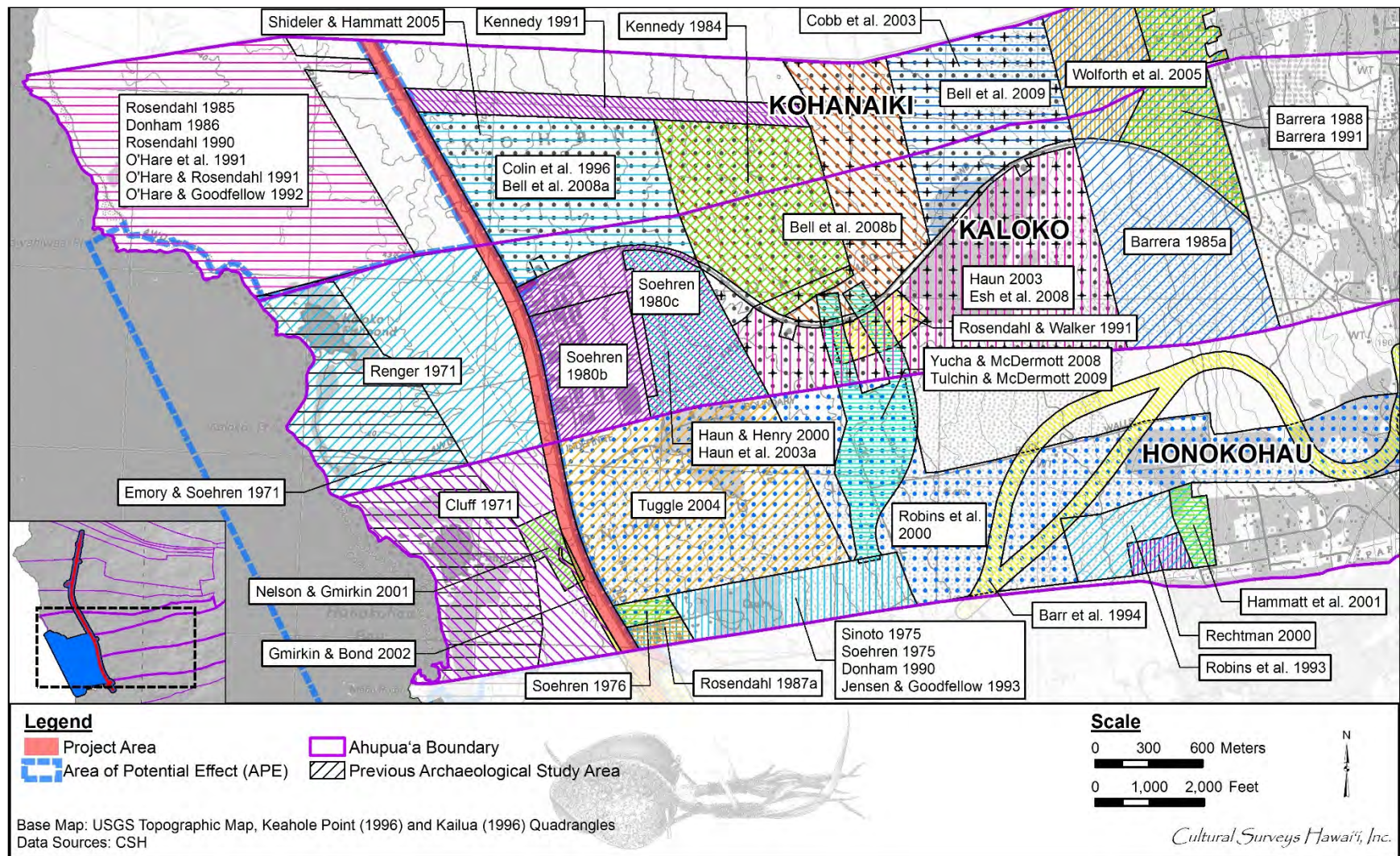


Figure 19. Selected previous archaeological studies in Kohanaiki, Kaloko, and Honokōhau Ahupua‘a (base map: 1996 Keahole Point and Kailua USGS topographic quadrangles)

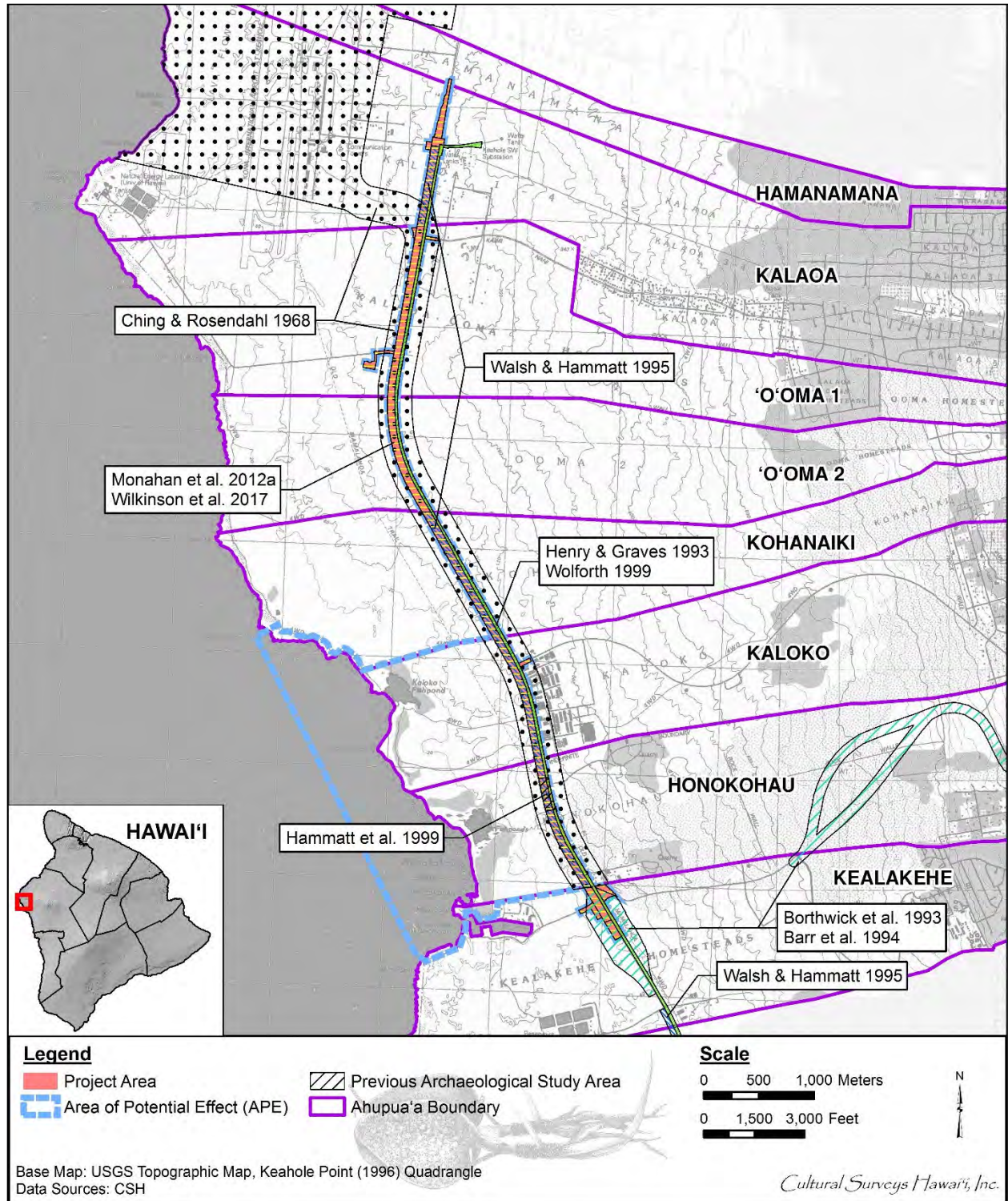


Figure 21. Selected previous archaeological studies along the Queen Ka'ahumanu Highway (base map: 1996 Keahole Point USGS topographic quadrangle)

Table 15. Previously identified historic properties within 300 ft of the Queen Ka'ahumanu Highway (listed by *ahupua'a* from south to north) (adapted from Walsh and Hammatt 1995:30)

SIHP # 50-10-27	Site Type	<i>Ahupua'a</i>	Level	References	Mitigation	Status
-00002*	Māmalahoa Trail	Kealakehe, Honokōhau, Kalaoa	S, AIS	Bonk 1987 and various others	FDC, PID, P, I	M, P, K
-05011	Boundary wall	Kealakehe, Keahuolu	AIS	Sinoto 1977; Donham 1990b	NFW	M
-13194	Trail	Kealakehe	AIS, DR	Donham 1990b+	P, I	P
-13195	<i>Ahu</i>	Kealakehe	AIS	Burgett and Rosendahl 1991	NFW	M
-18081	Petroglyphs	Honokōhau	AIS	Robins et al. 2000	P	K
-18083	Modified outcrop	Honokōhau	AIS	Robins et al. 2000	DR	K
-18084	Rock shelter	Honokōhau	AIS	Robins et al. 2000	DR	K
-18085	Lava tube	Honokōhau	AIS	Robins et al. 2000	DR	K
-18086	Pāhoehoe basin	Honokōhau	AIS	Robins et al. 2000	NFR	K
-18091	Petroglyph	Honokōhau	AIS	Robins et al. 2000	NFR	K
-18099*	Trail	Honokōhau	AIS	Nelson and Gmirkin 2001; Gmirkin and Bond 2002	—	—
-18186	Wall segment	Honokōhau	AIS	Robins et al. 2000	NFR	K
-19953*	Trail	Honokōhau	DR	Hammatt et al. 1999	NFW	P
-22418	Trail	Honokōhau	AIS	Nelson and Gmirkin 2001; Gmirkin and Bond 2002	—	—
-22507*	Trail	Honokōhau	AIS	Nelson and Gmirkin 2001; Gmirkin and Bond 2002	—	—
-02199	Trail	Kaloko	S	Cordy et al. 1991	None	K
BPM 90	Trail	Kaloko	S	Cordy et al. 1991	None	K

SIHP # 50-10-27	Site Type	Ahupua'a	Level	References	Mitigation	Status
-02238	Wall with midden	Kaloko	S	Cordy et al. 1991	None	K
-02233	Trail	Kaloko	S	Cordy et al. 1991	None	K
-02240	Trail	Kaloko	S	Cordy et al. 1991	None	K
-06432	Boundary wall	Kalaoa, 'O'oma	S	Davis 1977	None	K
-10154*	Habitation structure	'O'oma 2	R, DR	Barrera 1985b, 1989	Additional recording only	M
-18524	Pāhoehoe excavation	Kalaoa	R	Henry et al. 1993	FDC	K

Table 16. Abbreviations for Table 15

Abbreviation	Definition
+	Indicates associated addendum reports or revision letters
AIS	Archaeological inventory survey
DR	Data recovery
S	Survey (conducted prior to establishment of current AIS standards)
NFW	No further work
NFR	No further research
FDC	Further data collection
PID	Preservation with interpretive development
PI	Preservation with interpretation
P	Preserved—included in a preservation plan
M	Mitigated—historic property adequately recorded
K	Known—historic property has been identified, but findings and recommended treatment have not been made and/or have not yet been approved by SHPD
*	Historic property included in the current project's AIS (Monahan et al. 2012a)

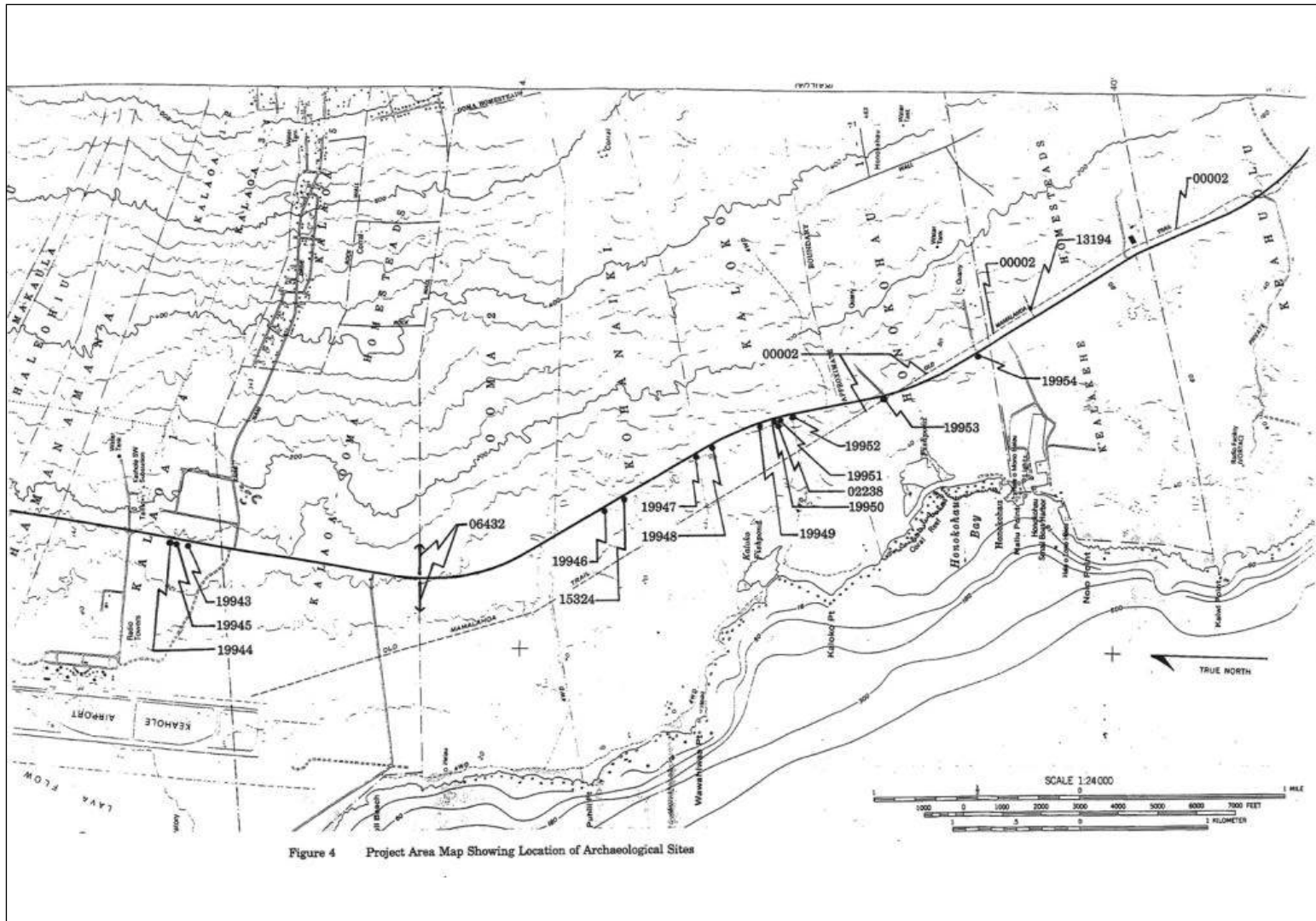


Figure 22. Previously identified historic properties from Keahuolu to Kalaoa within 300 ft of the Queen Ka'ahumanu Highway ROW (figure from Walsh and Hammatt 1995:4)

Table 17. Selected previous archaeological studies in Kealakehe Ahupua'a

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Stokes and Dye 1991	Island of Hawai'i	Survey	Identified two <i>heiau</i> , Kawaluna Heiau and Palihiolo Heiau, and two <i>ko'a</i> (fishing shrines), Halepa'u Ko'a and Maka'eo Ko'a
Reinecke 1930	West Hawai'i	Survey	Identified seven historic properties: Sites 24 through 35, including house platforms, small complexes encompassing enclosures and platforms, petroglyphs, and a possible fishing <i>heiau</i>
Sekido 1968	A shelter cave Kealakehe D11-1a	Archaeological excavation report (Anthropology 371 UH Hilo paper)	Description of shelter cave
Emory and Soehren 1971	Ka'u and Kona Districts and 'Anaeho'omalua	Inventory of sites	Confirmed many of Reinecke's (1930) sites, found 27 historic properties in Kealakehe, four in current project area, two <i>heiau</i> , one <i>ko'a</i> , and a cluster of petroglyphs
Sinoto 1975a	A proposed access road corridor at Keahuolu	Archaeological reconnaissance survey	Identified seven historic properties, comprising walls and enclosures
Sinoto 1975b	Honokohau Small Boat Harbor, Kealakehe	Archaeological reconnaissance survey	Documented no new historic properties but discussed three previously identified
Sinoto 1977	<i>Mauka</i> of hwy	Archaeological Reconnaissance Survey	One historic property within project area
Soehren 1980	Kealakehe Wastewater Site, <i>makai</i> of Queen Ka'ahumanu Hwy, TMK: [3] 7-4-008:003	Archaeological reconnaissance survey	Documented trail (SIHP # -7704), which connected Ainapapa Pond in Honokohau with a settlement at Pawai Bay in Keahuolu
Soehren 1981	Kealakehe, TMK: [3] 3-7	Archaeological reconnaissance survey	Three previously recorded sites (SIHP #s -1888 through -1890) confirmed

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Sinoto 1983	Kona Public Safety Bldg	Field inspection	No historic properties identified
Hammatt 1984	Kealakehe House lots, TMK: [3] 7-4-008:017	Archaeological reconnaissance survey	No historic properties identified
Schilt 1984	Kuakini Hwy Realignment project, 26 <i>ahupua'a</i> in Kona	Archaeological study	134 historic properties identified in road corridor; two, a cairn and a modified outcrop, identified in Keahuolū
Bonk 1987	Lower Kealakehe	Archaeological walk-through survey	Noted historic properties in a 1,000-ft wide coastal strip and between 620 ft and 730 ft elevation
Hammatt 1987	15-acre parcel at Kealakehe, TMK: [3] 7-4-017:030, at 700 ft elevation	Archaeological reconnaissance survey	Identified 18 historic properties, including mounds, terraces, overhang shelters, agricultural complexes, and cattle walls
Hammatt et al. 1987	15-acre parcel at Kealakehe, TMK: [3] 7-4-017:030, at 700 ft elevation	Archaeological inventory survey and data recovery	Excavations at 17 historic properties previously identified by Hammatt 1987
Walker and Haun 1987	Kealakehe Reservoir, TMK: [3] 7-4-009:072	Archaeological reconnaissance survey	Recorded one agricultural/habitation complex at an elevation of 900 ft
Donham 1990a, b	Kealakehe Planned Community, TMKs: [3] 7-4-008:012, 017	Archaeological inventory survey	82 historic properties recorded, mainly agricultural and temporary habitation, but also burial features and ranching features
Borthwick and Hammatt 1992	Proposed Kealakehe Golf Center, TMK: [3] 7-1-008:017 (por.)	Archaeological field inspection and interim preservation plan	Identified two additional historic properties (SIHP #s -15537, a cave, and -15538, a terrace)
Borthwick et al. 1993	Proposed Kealakehe Parkway Extension	Archaeological reconnaissance survey	43 newly identified historic properties; preliminary assessments of significance and future treatment made

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Burgett and Rosendahl 1992	Kealakehe Planned Community, TMKs: [3] 7-4-008:012 and 017, <i>mauka</i> of Queen Ka'ahumanu Hwy	Archaeological inventory survey	44 new historic properties with 225 features identified in Donham (1990 a, b) area; 103 new features at previously identified historic properties; most common features modified outcrops, rock mounds, terraces, and 'a'ā excavations
Thompson and Rosendahl 1992a, b	Keāhole Transmission Lines	Archaeological inventory survey (recorded as an archaeological assessment)	Confirmed previously identified historic properties
Barr et al. 1994	Kealakehe Parkway Extension, TMKs: [3] 7-4-008:003, 005, 017, and 034	Archaeological inventory survey	83 historic properties identified; 50 previously recorded; included traditional Hawaiian habitation, huistoric ranching, and Japanese homesteading
Borthwick et al. 1994	Kealakehe Parkway Extension, TMK: [3] 7-4-008:005	Archaeological inventory survey	Additional information for Barr et al. 1994
O'Hare and Goodfellow 1994	Kealakehe Planned Community, TMKs: [3] 7-4-008:012 and 017	Data recovery	Data recovery at selected historic properties previously identified by Donham 1990a, b and Burgett and Rosendahl 1991
Walsh and Hammatt 1995	New Queen Ka'ahumanu ROW	Archaeological inventory survey	Seventeen historic properties identified, with one (Māmalahoa Trail, SIHP # -00002) recorded in Keahuolū Ahupua'a
Wolforth 1999	Māmalahoa Trail, TMKs: [3] 7-3-009, 019, 049, and 051; 7-4-008	Archaeological monitoring	Monitoring to prevent historic property destruction
Haun and Henry 2001	Kealakehe DHHL, TMK: [3] 7-4-008:003, 200 acres	Archaeological inventory survey	Recorded 123 features at 56 historic properties, including two trails, SIHP # -13194, and one recorded by Borthwick et al. (1994a)

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Rechtman et al. 2001	Kealakehe, TMK: [3] 7-4-003:007, 21.81 acres	Archaeological inventory survey	Identified six historic properties, comprising four historic walls and two traditional Hawaiian agricultural complexes (SIHP #s 50-10-28-22429, 22430, -22431, -22432, -22433, and -22434)
Rechtman and Dougherty 2002	Kealakehe, TMK: [3] 7-4-03:005, 16 acres	Archaeological reconnaissance survey	One historic property with 79 features identified, historic residence complex (SIHP # 50-10-28-23274)
Rechtman and Escott 2002	Kealakehe Waste Water Treatment, TMK: [3] 7-4-008:003	Archaeological inventory survey	<i>Makai</i> edge of Queen Ka'ahumanu Hwy; recorded five features, including three trail segments
Corbin 2004	Villages of La'i'ōpua Village 4 project, TMK: [3] 7-4-021:012	Data recovery and associated letter report	Data recovery at SIHP # 50-10-28-13209 deemed it a temporary, rather than permanent, habitation
Haun and Henry 2006	Kona Kai Ola project, Kealakehe and Keahuolū Ahupua'a, 370.5 acres	Archaeological inventory survey	127 historic properties comprising 432 features; most common feature type (n=170) was <i>pāhoehoe</i> excavation
Corbin and Wong-Smith 2008	Ane Keohokālōle Hwy Corridor, Kealakehe and Keahuolū Ahupua'a	Archaeological survey and cultural impact assessment	Nine previously identified historic properties reidentified; a new feature of a previously identified historic property (SIHP # -6302, Kuakini Wall) also identified
Tulchin and Hammatt 2009	2.3-km long portion of proposed Ane Keohokālōle Hwy	Archaeological inventory survey	Identified 12 historic properties, including a wall, lava tubes and blisters, burial caves, terraces, and a trail
Clark et al. 2010	TMKs: [3] 7-4-021:003 and 023	Archaeological inventory survey	Seven historic properties identified within Kealakehe Ahupua'a

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Rechtman 2010	TMK: [3] 7-4-21:002	Archaeological inventory survey (recorded as an archaeological assessment)	No significant historic properties identified
Clark et al. 2011	TMK: [3] 7-4-021:003	Data recovery	Data recovery at SIHP # -13207 (habitation site) suggests it was inhabited on a temporary recurrent or seasonal basis during the late 17th and early 18th centuries
Rechtman and Glennon 2014	La'i'ōpua 2020 West Hawai'i Community Health Center	Archaeological monitoring	No new historic properties identified
Yucha et al. 2016	Kona Judiciary Complex Candidate Sites C and F, Kealakehe and Keahuolū Ahupua'a	Archaeological inventory survey	Identified ten historic properties, seven newly identified; these included cairns, modified outcrops, excavated pits, and a terrace

4.1.1.3 Sinoto 1983

This reconnaissance survey of roughly 7 acres is also on the eastern side of the highway. No historic properties were identified. The project areas of the two Sinoto reports (1977 [see Section 4.1.1.2 above] and 1983) were subsequently subjected to inventory level survey (Donham 1990b; see Section 4.1.1.5 below).

4.1.1.4 Bonk 1987

This report concerns a walk-through survey over the width of the *ahupua'a*, between the coast and roughly 640 ft AMSL. One historic property, the Māmalahoa Trail (SIHP # -00002), was identified in close proximity to the highway, and another trail, a stepping stone trail previously identified by Soehren (1975; see Section 4.1.2 below), was mentioned as being just *mauka* of the highway near the northern boundary of the *ahupua'a*.

4.1.1.5 Donham 1990a, 1990b

In 1990, Paul H. Rosendahl, Inc. (PHRI) completed an AIS for the Kealakehe Planned Community (Donham 1990b). The approximately 950-acre study area consisted of lands *mauka* of the Queen Ka'ahumanu Highway, including the Kealakehe portion of the current survey area. A total of 840 features were located within the study area. The most common feature types were rock mounds and *pāhoehoe* excavations. Other common features included modified outcrops, terraces, enclosures, and low mounded walls. The author noted the predominance of such features indicates "relatively intensive use of the area for agricultural purposes" (Donham 1990b:ii).

4.1.1.6 Burgett and Rosendahl 1992

This addendum report (for Donham 1990a, b) documents the inventory survey of an approximately 950-acre project area situated on the east side of the highway. Four historic properties were identified within roughly 91 m (300 ft) of the highway, including the Māmalahoa Trail (SIHP # -00002), a stepping stone trail (SIHP # -13194), a complex of several *ahu* or cairns (SIHP # -13195), and the *ahupua'a* boundary wall (SIHP # -05011). The stepping stone trail (SIHP # -13253) identified by Soehren (1975) and mentioned again by Bonk (1987) is identified in this survey as being roughly 122 m (400 ft) from the highway, and thus is considered to be outside the current project area.

4.1.1.7 Borthwick and Hammatt 1992b

This study was within the Kealakehe Planned Community project area previously surveyed by O'Hare and Goodfellow 1994 (described above), in an area planned for a golf course. No newly identified historic properties were located within 91 m (300 ft) of the highway. Recommended treatment for the three previously identified historic properties (SIHP #s -00002, -13194, and -13195) was the same as cited in the O'Hare and Goodfellow 1994 discussion above.

4.1.1.8 Borthwick et al. 1993

CSH performed an archaeological reconnaissance survey for the proposed Kealakehe Parkway extension. Forty-three new historic properties were identified. They included habitation sites, burials, lava tubes, and possible *heiau*. Preliminary assessments of significance and future treatment were made.

4.1.1.9 Barr et al. 1994

A reconnaissance and inventory level survey was conducted of two parcels, one of which is an interchange area of the highway that includes 46 m (150 ft) on either side of an approximately 762-m (2,500-ft) section of the highway. This project area adjoins and partially overlaps with the Kealakehe Planned Community project area previously surveyed (see O'Hare and Goodfellow 1994 and Borthwick and Hammatt 1992b above). The three historic properties identified in prior surveys (SIHP #s -00002, -13194, and -13195) were reidentified in this survey, but no additional historic properties were found within 91 m (300 ft) of the highway; this included virtually the entire length of the highway through Kealakehe, except for a roughly 700-ft section on the *makai* side of the Queen Ka'ahumanu Highway at the southern end of the *ahupua'a*.

4.1.1.10 O'Hare and Goodfellow 1994

This report is on the data recovery work undertaken within the Kealakehe Planned Community project area. This report includes any final data collection on SIHP #s -00002 (Māmalahoa Trail) and -13194 (stepping stone trail).

4.1.1.11 Summary of Previous Archaeological Studies in Kealakehe Ahupua'a

The highway extends approximately 1,494 m (4,900 ft) through Kealakehe. The entire *mauka* side of the highway has been subjected to inventory survey and/or data recovery work. Four historic properties have been identified within 91 m (300 ft) of the present highway at Kealakehe. Two of these, SIHP #s -13195 (*ahu*) and -05011 (wall), have been subjected to data recovery and/or inventory level work, and no further work was recommended (Donham 1990b). Portions of the other two sites, SIHP #s -00002 (Māmalahoa Trail) and -13194 (stepping stone trail), have been included in preservation plans approved by SHPD.

4.1.2 Honokōhau

Figure 19 and Table 18 present a representative sample of previous archaeological projects conducted in Honokōhau. Select projects adjacent to the Queen Ka'ahumanu Highway in Honokōhau are discussed below.

4.1.2.1 Cluff 1971

Cluff (1971) conducted a surface survey of the *ahupua'a* west of the highway to the coast. No historic properties were identified within 91 m (300 ft) of the highway.

4.1.2.2 Soehren 1975, 1976

These reports describe two reconnaissance surveys conducted on adjoining parcels situated within TMK: [3] 7-4-008:026 (por.) on the east side of the highway, along the southern end of the *ahupua'a*. Two historic properties were identified within roughly 91 m (300 ft) of the highway, the Māmalahoa Trail (SIHP # -00002) and a stepping stone trail (SIHP # -13253, also mentioned by Bonk [1987] in his walk-through survey of Kealakehe, as this trail extends into that *ahupua'a*). The northernmost of these two parcels was subsequently included in the inventory survey by Robins et al. (2000); see Section 4.1.2.4 below.

Table 18. Selected previous archaeological studies in Honokōhau Ahupua'a

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Stokes and Dye 1991	Island of Hawai'i	Survey	Identified two <i>heiau</i> , Kawaluna Heiau and Palihiolo Heiau, and two <i>ko'a</i> , Halepa'u Ko'a and Maka'eo Ko'a
Reinecke 1930	West Hawaii	Survey	Sites 38 through 42 are within Honokōhau I and II, including Pu'uoina Heiau, Makaopi'o Heiau, and a <i>hōlua</i> (slide)
Ching and Rosendahl 1968	Kailua-Kawaihae Rd (Honokōhau-Keāhole Point) and Keāhole Airport	Archaeological surface survey	Two historic properties recorded in the Honokōhau portion; a terrace and a platform and trail
Ladd 1968	Lanihau Corporation Lands, TMK: [3] 7-4-008:010	Data recovery	Excavation at historic properties identified by Emory and Soehren 1971
Cluff 1971	Seaward portion of Honokōhau 1 and 2, TMKs: [3] 7-4-008:010, 025	Archaeological reconnaissance survey	Recorded 61 historic properties, many clustered around 'Aimakapā Fishpond
Emory and Soehren 1971	Honokōhau Area, TMK: [3] 7-3, 7-4	Archaeological reconnaissance survey	Recorded 27 historic properties, including traditional Hawaiian habitation complexes, especially around 'Aimakapā Fishpond at the coast
Sinoto 1975c	Honokōhau 2 Quarry, TMK: [3] 7-4-005	Archaeological reconnaissance survey	Identified 19 historic properties, including portions of a foot trail, the Māmalahoa Trail (SIHP # -00002), and several platforms thought to be burials
Soehren 1975, 1976	Honokōhau 2, TMK: [3] 7-4-008:026 (por.)	Archaeological reconnaissance surveys	Recorded three historic properties: the Māmalahoa trail (SIHP # -00002), a mound, and a stone wall
Rosendahl 1987a	Honokōhau Industrial Park, TMK: [3] 7-4-008:033	Archaeological reconnaissance survey	Recorded two historic properties: a terrace complex (SIHP # -10642) and a single terrace (SIHP # -10643)
Donham 1990c	Honokōhau Industrial Park, TMKs: [3] 7-4-008:026, 049	Archaeological inventory survey	<i>Mauka</i> of the Queen Ka'ahumanu Hwy; six historic properties identified, mainly agricultural and temporary habitation

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Johnson and Somers 1991	Kaloko-Honokōhau Park, TMKs: [3] 7-3; 7-4	Data recovery	Pu'uoina Heiau stabilization
Rosendahl and Walker 1991	Honokōhau Industrial Park, TMKs: [3] 7-4-008:026, 049	Archaeological inventory survey	Identified a trail with two cairns
Fager and Rosendahl 1992	Honokōhau Industrial Park, TMK: [3] 7-3-051:001	Data recovery	Data recovery work for Rosendahl and Walker 1991
Thompson and Rosendahl 1992a, b	Keāhole Transmission Lines	Archaeological inventory survey (recorded as an archaeological assessment)	Confirmed previously identified historic properties
Jensen and Goodfellow 1993	Honokōhau Industrial Park, TMKs: [3] 7-4-008:026, 049	Data recovery	Excavations carried out at 36 historic properties previously identified during Donham 1990c project
Robins et al. 1993	Honokōhau 2, TMK: [3] 7-4-008:034, 82 acres	Archaeological inventory survey	Identified 39 historic properties, mainly dryland agricultural features, temporary habitations, and ranching features
Walsh and Hammatt 1995	Queen Ka'ahumanu Hwy	Archaeological inventory survey	Identified 17 historic properties
Hammatt et al. 1999	Honokōhau, TMKs: [3] 7-3, 7-4, 13 acres, 800-ft elevation area	Data recovery	Historic materials, including a Spanish and a Russian coin, recovered from one rock shelter (SIHP # -18343); indigenous artifacts, including a <i>poi</i> pounder, found at a second rock shelter (SIHP # -18345)
Wolforth 1999	Māmalahoa Trail, TMKs: [3] 7-3-009:019, 049, and 051; 7-4-008	Archaeological monitoring	Monitoring of Māmalahoa Trail (SIHP # -00002)
Rechtman 2000	Honokōhau 2, TMK: [3] 7-4-008:064	Data recovery	Data recovery at a permanent habitation site (SIHP # -18326) and a habitation platform (SIHP # -18327), first identified during the Robins et al. 1993 study

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Robins et al. 2000	Honokōhau 1 and 2, TMKs: [3] 7-4-008:005, 013, 030, and 036, 803 acres	Archaeological inventory survey	Identified 284 historic properties, mainly features for dryland agriculture and temporary habitation; a refuge cave and a <i>heiau</i> also identified
Hammatt et al. 2001	Honokōhau 2, TMK: [3] 7-4-008:034, 9.9 acres	Data recovery	Data recovery at historic properties identified in Robins et al. 1993
Nelson and Gmirkin 2001	Area fronting (<i>mauka</i> side) the National Park	Archaeological inventory survey	In current project area: SIHP #s -21245, -22417, -22418, -18099 and -22507
Gmirkin and Bond 2002	Area fronting (<i>mauka</i> side) the National Park	Addendum to archaeological inventory survey	In current project area: SIHP #s -21245, -22417, -22418, -18099 and -22507
Tuggle 2004	337 acre-parcel, extending inland from Queen Ka'ahumanu Hwy, TMKs: [3] 7-4-009:103, 030	Archaeological data recovery	Data recovery at historic properties first recorded by Robins et al. 2000
Haun and Henry 2005	Honokōhau 1, TMK: [3] 7-4-008:47, 277 acres	Archaeological inventory survey	Identified 167 historic properties with 7,894 component features; 31 historic properties previously identified by Barr et al. 1994, mainly agricultural and temporary habitation
Yucha and McDermott 2008	Keohokālōle Hwy (Henry St Extension), Kaloko and Honokōhau Ahupua'a	Archaeological inventory survey	Identified 33 historic properties comprising 179 features
Tulchin and McDermott 2009	Keohokālōle Hwy (Henry St Extension), Kaloko and Honokōhau Ahupua'a	Addendum archaeological inventory survey	One historic property, SIHP # -18115), historic cattle walls

4.1.2.3 Jensen and Goodfellow 1993

In 1993, PHRI completed data recovery for the Honokōhau Industrial Park. Research objectives consisted of the following (Jensen and Goodfellow 1993:9–10):

1. Further evaluating the age, duration, and intensity of occupation at individual historic properties and features;
2. Further evaluating and characterizing individual historic properties and features for portable artifact content and assemblages;
3. Further evaluating and characterizing individual historic properties and features for ecofactual content;
4. Refining existing assessments, thus far based on inventory-level survey data, of the variety of cultural activities conducted at various historic properties during different pre-Contact time periods;
5. Further evaluating existing interpretations of specific architectural features and presumed associated activities.

Jensen and Goodfellow's (1993:40) investigations confirmed the study area "represented a pattern of recurrent/temporary use of small subsurface and surface habitation features, with subsistence focused on the exploitation of locally available marine resources and limited agriculture." Radiocarbon analysis indicated the area was occupied from as early as AD 980 and continued uninterrupted into the early twentieth century. Artifacts observed during excavations consisted of bone fishhooks and awls, lithic debitage, and coral and basalt abraders. The artifact assemblage indicated a broad range of pre-Contact activities were conducted within the study areas; these activities include fishing gear manufacture, stone tool manufacture, food processing, and domestic activity. Ecofactual analysis of midden indicated the primary source for resources was the ocean.

4.1.2.4 Robins et al. 2000

This project area is situated on the east side of the highway, between the two parcels surveyed by Soehren (1975, 1976; see Section 4.1.2.2 above) and the northern *ahupua'a* boundary. Eight historic properties were identified within roughly 91 m (300 ft) of the highway. From south to north, these include SIHP #s -18085, -18086, -18091, -18084, -18186, -18083, -18081, and -00002. Recommended treatment included preservation of SIHP #s -00002 (Māmalahoa Trail) and -18081 (petroglyphs); data recovery for SIHP #s -18083 (modified outcrop), -18084 (rock shelter), and -18085 (lava tube); and no further work for SIHP #s -18086 (*pāhoehoe* basin), -18186 (wall segment), and -18091 (historic-era petroglyph).

4.1.2.5 National Park Service 1975

This document is a report on the cultural and historical resources within Kaloko-Honokōhau National Historical Park. One historic property, SIHP # -00002 (the Māmalahoa Trail), is within 91 m (300 ft) of the highway. The present highway crosses the Māmalahoa Trail in Honokōhau, and therefore the trail is present on both sides of the highway.

Information on additional historic properties located within 91 m (300 ft) of the highway was provided by NPS archaeologist Laura Schuster. In addition to the Māmalahoa Trail, archaeological

surveys conducted by NPS archaeologists have identified two *mauka-makai* trails near the highway. Within the park (but not necessarily within the present project area), human burials have been found beneath accretion boulders within the 'a'ā lava flows. The accretion boulders are formed "when a fragment of solidified lava . . . is rolled along and wrapped up in the viscous liquid and range in size up to 10 feet" (MacDonald and Abbott 1970:25–26). These burials had no associated archaeological surface features.

4.1.2.6 Johnson and Somers 1991

This project included maintenance work at two historic properties within Kaloko-Honokōhau National Historical Park and at the Māmalahoa Trail (SIHP # -00002). A portion of the trail was cleared and restored, but this portion does not lie within 91 m (300 ft) of the highway.

4.1.2.7 Hammatt et al. 1999

In 1999, CSH completed data recovery for portions of the Māmalahoa Trail (SIHP # -00002) and an intersecting, unnamed *mauka-makai* trail, SIHP # -19953, in the *ahupua'a* of Honokōhau 2. The goal of the data recovery was to gather information from the portions of the two trails that would be destroyed by highway widening. The research focused on recording additional information on the two trails through archival quality photographs and test excavations to expose trail cross-sections to document trail construction techniques.

Trail construction at the Māmalahoa Trail involved either the filling or removal of 'a'ā pebbles and cobbles relative to surface topography; low areas were filled and high areas involved removal. Trail construction at SIHP # -19953 involved placing 'a'ā slab boulders atop clinker 'a'ā, with 'a'ā cobbles filling gaps, thus creating a stepping stone trail across an otherwise difficult terrain. SIHP #s -00002 and -19953 are also addressed in the current data recovery report (see Volume III of the DRR [LaChance et al. 2017]).

4.1.2.8 Rechtman 2000

In 2000, PHRI completed data recovery at two permanent habitation sites (SIHP # -18326, platforms and terrace, and SIHP # -18327, a platform) in the *ahupua'a* of Honokōhau 2. Six radiocarbon dates were obtained from charcoal samples collected during excavation, with three samples from each historic property. Samples from both historic properties indicated they were occupied by the mid-1400s. Due to similar construction styles and the relative distance between individual features, it was suggested that SIHP #s -18326 and -18327 composed a single permanent habitation complex (Rechtman 2000:23). Additionally, the limited midden diversity and lack of a developed cultural deposit indicated they were occupied for a relatively short duration, likely for a single generation (Rechtman 2000:22).

4.1.2.9 Hammatt et al. 2001

In 1999, CSH completed data recovery for an approximately 13-acre parcel in the *ahupua'a* of Honokōhau 2. Data recovery was conducted at two permanent habitation sites (SIHP # -18340, an enclosure and terrace, and SIHP # -18349, an enclosure). Research objectives consisted of the following (Hammatt et al. 1999:6):

1. To confirm or disprove the existence of specific activity areas within selected permanent habitation sites;

2. To obtain chronological data (e.g., radiocarbon dates, temporally distinct artifacts) to build a chronology of occupation of permanent habitation sites.

Excavations at SIHP # -18340 yielded both pre- and post-Contact artifacts. Pre-Contact artifacts included abraders, volcanic glass flakes, a hammerstone, a grindstone fragment, and a basalt adze. Post-Contact artifacts included a 1782 Spanish *reale*, an 1858 Russian *kopek*, buttons, beads, and equestrian materials. Distribution maps, utilizing point plotting of artifact proveniences, were created in order to identify specific activity areas within the excavated feature. Identified pre-Contact activity areas consisted of a refuse area, a storage area, and a tool manufacture area. A post-Contact writing area was also identified, based on a concentration of slate pencils. Charcoal samples collected from SIHP # -18340 yielded a radiocarbon date range of AD 1635–1950, reflecting the pre- to post-Contact utilization of this site as indicated by the artifact assemblage collected during excavation.

Excavations at SIHP # -18349 yielded pre-Contact artifacts including a broken poi pounder, a hammerstone, and volcanic glass flakes. Due to previous bulldozer disturbance in this area, distribution maps were not generated, since the original positions of many of the documented artifacts were likely disturbed. Charcoal samples collected from SIHP # -18349 yielded radiocarbon date ranges of AD 1305-1645 and AD 1405-1650, reflecting the traditional Hawaiian utilization of this area as indicated by the artifacts.

4.1.2.10 Nelson and Gmirkin 2001; Gmirkin and Bond 2002

These two studies reported on an AIS of two parcels totaling approximately 17.9 acres along the *mauka* boundary of the Kaloko-Honokōhau National Historical Park. Several historic properties in the current project area, including SIHP #s -22418, -18099, and -22507, were identified.

4.1.2.11 Yucha and McDermott 2008

In 2008, CSH performed an AIS of the northernmost third of the proposed Ane Keohokālolo Highway. Most of the project area had been surveyed previously (see Bell et al. 2008b, Esh et al. 2008, and Robins et al. 2000). The most prevalent types of features observed were mounds (n=66), modified outcrops (n=37), pavements (n=11), enclosures (n=10), platforms (n=10), terraces (n=9), and lava blisters (n=7). Less common feature types included lava tubes, modified depressions, alignments, cleared areas, walls, cairns, trails, petroglyphs/pecking, a *papamū*, a rockshelter, and a cattle trough. The eight functional categories assigned to these features were agriculture, habitation, burial, marker, commemorative, transportation, animal husbandry, and recreation.

4.1.2.12 Honokōhau Summary

The highway extends approximately 1,280 m (4,200 ft) through Honokōhau Ahupua'a. On the *mauka* side of the road, approximately 1,158 m (3,800 ft) have been subjected to inventory level archaeological survey, while the remaining 122 m (400 ft) have undergone reconnaissance level survey only. The *makai* side of the road has been subjected to reconnaissance level survey only, including that portion of the AIS project area that lay within the Kaloko-Honokōhau National Historical Park.

Thirteen historic properties have been identified within 91 m (300 ft) of the highway, including two sections of the Māmalahoa Trail (SIHP # -00002) on both sides of the highway in Honokōhau.

Two additional historic properties, *mauka-makai* oriented trails, have also been noted near the highway, although they have yet to be fully documented (L. Schuster, NPS, personal communication).

4.1.3 Kaloko and Kohanaiki

Figure 19 and Table 19 present a representative sample of previous archaeological projects conducted in Kaloko and Kohanaiki (discussed here together, given a history of projects overlapping both ahupua'a). Select projects adjacent to the Queen Ka'ahumanu Highway in Kaloko and Kohanaiki are discussed below.

4.1.3.1 Early Archaeological Surveys

During the mapping of the North Kona area in 1888, Emerson noted two historic properties in Kohanaiki, the cross-*ahupua'a* Māmalahoa Trail (SIHP # -00002), probably built between AD1836 and 1855, and a *mauka-makai* trail that extended from the Kohanaiki Homesteads near Māmalahoa Highway toward the coast at Kaloko (Cordy et al. 1991:404; Reinecke 1888:76–78).

During the 1930s, John Reinecke surveyed the coastal areas of North and South Kona for the Bishop Museum. He recorded eight historic properties (later merged into three) in Kohanaiki, which were recorded as SIHP #s 50-10-27-01902, -01905, and -01909 during a Statewide Inventory of Historic Places study in 1971 and 1972. SIHP #s -01902 and -01905 were "residential" features, while SIHP # -01909 was a possible fishing shrine at Wawahiwaa Point (Reinecke n.d.).

4.1.3.2 Archaeological Studies for the Y-O/Kaloko Heights Projects (1980–2005)

Hammatt (1980) conducted a reconnaissance survey of a 410-acre parcel in upland Kohanaiki and Kaloko, recording two historic properties: a walled complex and a habitation cave. In 1985, a full reconnaissance survey was conducted on a portion of the project area (the Y-O project); in this survey (Barrera 1985a), 55 historic properties were recorded within Kohanaiki. Data recovery consisting of limited excavation took place in the Barrera project area in 1987 (Barrera 1988). Barrera (1991) subsequently led a crew for an inventory survey with limited testing in 1991. Most of the features were found in the Kohanaiki section, as the Kaloko area had been extensively bulldozed. Eighty-nine features were identified as agricultural features associated with the Kona Field System. Sixty-one features were associated with the Kohanaiki Homesteads, a late 1800s historic settlement adjacent to the Māmalahoa Highway. In 2005, the project area, now called Kaloko Heights, was surveyed again by Scientific Consultant Services (Wolforth et al. 2005). Eighty-nine historic properties were identified; the most common were cave shelters (n=37).

4.1.3.3 Cordy 1985

Ross Cordy surveyed a portion of the Kohanaiki coast from 0.25 to 0.5 miles inland in 1975. He recorded 12 historic properties and conducted limited excavations at 11 of them.

4.1.3.4 Donham 1986

A Phase I reconnaissance survey was carried out for the proposed Kohanaiki Development project in 1986. The project area covered the coastal area from 'O'oma Ahupua'a on the north to Kaloko Ahupua'a on the south and extended inland approximately 0.5 miles to the Māmalahoa Trail (SIHP # -00002). A total of 105 historic properties were recorded; these consisted of

Table 19. Previous archaeological studies in Kaloko and Kohanaiki Ahupua'a

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Reinecke 1930	Kona coastal survey	Cursory survey	Briefly notes numerous historic properties
Emory and Soehren 1971	Kona coastal survey	Cursory survey	Briefly notes numerous historic properties
Kelly 1971	Kaloko and Kuki'o Ahupua'a	Historical survey and background	Background study
Renger 1971	Kaloko, Coastal, TMKs: [3] 7-3-004:005; 7-3-009:002	"Field Notes" of "mauka excavations"	"Field Notes" describe several historic properties
Soehren 1979	Kaloko Access Road corridor (Hina Lani St) TMK: [3] 7-3-009:001	Letter report reconnaissance survey	No finds
Hammatt 1980	Kaloko YO, TMK: [3] 7-3-009:019, 410 acres	Archaeological reconnaissance	Identified two historic properties
Soehren 1980b	Kaloko lowlands	Letter report reconnaissance survey	No finds
Soehren 1980c	Kaloko Access Road corridor	Letter report reconnaissance survey	Discusses three stepping stone trails, two cairns, and a lava tube complex
Barrera 1983	Kaloko, TMK: [3] 7-3-9:019	Archaeological reconnaissance	No finds
Kennedy 1983	Kaloko Golf Course, TMK: [3] 7-3-009:001	Archaeological reconnaissance	Identified 39 historic properties
Kennedy 1984	Kaloko Golf Course, TMK: [3] 7-3-009:001	Intensive archaeological survey	Results of investigations of 39 historic properties
Barrera 1985a	Kaloko and Kohanaiki YO, TMK: [3] 7-3-009:019, 409 acres	Archaeological survey	Identified 58 historic properties

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Rosendahl 1985	Kohanaiki Development project, TMKs: [3] 7-3-009:003, 014	Preliminary archaeological reconnaissance survey	Identified 18 historic properties/feature complexes
Donham 1986	Kohanaiki Development project, TMKs: [3] 7-3-009:003, 014	Archaeological reconnaissance survey	Identified 105 historic properties
Rosendahl 1987a	Kaloko and Kohanaiki 3, TMKs: [3] 7-3-009:001, 017, 1-acre parcels	Archaeological reconnaissance survey	One historic property identified
Rosendahl 1987b	Kohanaiki Māmalahoa Trail, TMKs: [3] 7-3-009:003, 016	Field inspection	Inspection of Māmalahoa Trail (SIHP # -00002) in Kohanaiki
Barrera 1988	Kaloko and Kohanaiki YO, TMK: [3] 7-3-009:019, 409 acres	Archaeological excavations	Identified 60 historic properties
Rosendahl 1989a	Kaloko Mauka Parcel 1, TMK: [3] 7-3-024:007	Field inspection	Four historic properties identified
Rosendahl 1989b	Kaloko Mauka Parcel 2, TMK: [3] 7-3-024:008	Field inspection	No finds
Rosendahl 1990	Kohanaiki Resort, TMK: [3] 7-3-009:003	Archaeological inventory survey	Testing of burial features
Rosendahl and Walker 1990	Kaloko Water Tank, TMK: [3] 7-3-010:017	Archaeological inventory survey	One historic property identified
Barrera 1991	Kaloko and Kohanaiki YO, TMK: [3] 7-3-009:019, 409 acres	Archaeological inventory survey and data recovery report	Recorded 140 historic properties, mainly in the Kohanaiki Homestead section; the Kaloko area had been bulldozed

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Cordy et al. 1991	Kaloko-Honokōhau National Park	Ahupua'a Study on the 1971 archaeological work at Kaloko	Identified 94 historic properties
Johnson and Somers 1991	Kaloko-Honokōhau National Park, TMKs: [3] 7-3; 3-7-4	Data recovery	Pu'uoina Heiau stabilization
Kennedy 1991	Kohanaiki Industrial Development, TMK: [3] 7-3-009:015	Surface reconnaissance	No significant finds
O'Hare and Rosendahl 1991	Kohanaiki Resort, TMKs: [3] 7-3-009:003, 014	Data recovery	Seven historic properties comprising 15 features recorded in detail; these included petroglyphs, alignments, filled depressions, burials, caves, cairns, and enclosures
O'Hare et al. 1991	Kohanaiki Resort, TMKs: [3] 7-3-009:003, 014	Burial report	Five features from five historic properties contained burials
Rosendahl and Walker 1991	Industrial crusher site; two adjacent 10-acre parcels within present project area	Archaeological field inspection	Identified a trail with two cairns
O'Hare and Goodfellow 1992	Kohanaiki Resort, TMKs: [3] 7-3-009:003, 014	Data recovery	Data recovery at historic properties identified during Donham (1986)
Barrera 1993a	5.7 acres; 1,450 to 1,630 ft elevation	Archaeological inventory survey	Identified 40 features of Kona Field System
Fager and Graves 1993	Kaloko Industrial Park parcel	Archaeological inventory survey	Identified 17 historic properties with 60 component features
Henry et al. 1993	Transmission line project on <i>mauka</i> side of Queen Ka'ahumanu Hwy	Archaeological inventory survey	Identified 42 historic properties in project area; four historic properties in present project area

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Rosendahl 1993	Kaloko Mauka, TMK: [3] 7-3-024:005	Field inspection	Four historic properties discussed
Nees and Williams 1995	Kaloko Mauka Subdivision, TMKs: [3] 7-3-024:010; 7-3-025:016, 110 acres, 2,100 to 2,900 ft elevation	Archaeological investigations	Identified enclosure, lava tube, terrace, wall, and mounds
R.M. Towill 1995	Kaloko-Kohanaiki Trail	Historic property description	Brief historical references to trails
Walsh and Hammatt 1995	Queen Ka'ahumanu Hwy ROW	Archaeological inventory survey	Identified nine historic properties adjacent to <i>makai</i> side of highway in Kohanaiki and Kaloko
Colin et al. 1996	Kaloko and Kohanaiki, TMK: [3] 7-3-009:002, 017, 2,243 acres	Inventory survey and data recovery	Identified 55 historic properties
Rechtman 1998	Kaloko, TMK: [3] 7-3-025:015, 22 acres, 2,400 to 2,500 ft elevation	Archaeological field inspection	No finds
Rechtman and Henry 1999	Kaloko, Morrisson property, TMK: [3] 7-3-008:017, 1,450 to 1,620 ft elevation	Archaeological inventory survey	Identified 15 historic properties
Wolforth 1999	HELCO Keāhole-Kailua transmission line corridor	Archaeological monitoring	Describes one historic property, SIHP # -21258
Haun and Henry 2000a	Kaloko Industrial Park, TMK: [3] 7-3-051:060, 102 acres	Archaeological inventory survey	Identified 45 historic properties with 81 features
Rosendahl and Gothar 2000	Kaloko Mauka, TMK: [3] 7-3-025:013, 2,435 to 2,730 ft elevation	Archaeological inventory survey (recorded as an archaeological assessment)	No finds

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Clark and Rechtman 2002	Kohanaiki, 52 acres, TMK: [3] 7-3-007:027, 1,200 to 1,600 ft elevation	Archaeological inventory survey	Identified five historic properties in area cleared for coffee cultivation
Rechtman and Rivera 2002	Kaloko Mauka, TMK: [3] 7-3-026:004	Archaeological inventory survey (recorded as an archaeological assessment)	No finds
Cobb et al. 2003	Kaloko and Kohanaiki, TMKs: [3] 7-3-09:025, 026 and 028, 400 acres	Archaeological inventory survey (recorded as an archaeological assessment)	Briefly identifies 154 features
Haun 2003	400-acre portion of TMK: [3] 7-3-009:028	Letter report	Re: archaeological assessment
Haun and Henry 2003a	Kaloko, TMK: [3] 7-3-009:028, 400 acres	Archaeological inventory survey (recorded as an archaeological assessment)	Identifies only eight historic properties (63 features), all in 'a'ā
Haun et al. 2003a	Kaloko Industrial Park, TMK: [3] 7-3-051:060, 102 acres	Data recovery report	Data recovery report addresses eight historic properties
Moore and Kennedy 2003	Roadway corridor	Archaeological inventory survey	Identified one historic property, SIHP # -23973 (two mounds)
Puette and Dye 2003	22 acres, 2,100 to 2,400 ft elevation	Archaeological inventory survey	No finds
Rechtman 2003	Kaloko Mauka, TMK: [3] 7-3-026:005, 3,100 ft elevation	Archaeological inventory survey (recorded as an archaeological assessment)	No finds
Shideler and Hammatt 2005	1,200+ acres in Kaloko and Kohanaiki	Archaeological field inspection and literature review	Numerous pre-Contact historic properties, including habitations, agricultural features, petroglyphs, boundary walls, and burials

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Wolforth et al. 2005	TMK: (3) 7-3-09: 032	Archaeological inventory survey	Identified 89 historic properties, consisting of burials, permanent habitations, temporary habitations, religious sites, trails, boundary walls, and agricultural sites
Nelson et al. 2006	TMK: (3) 7-3-009:007	Archaeological inventory survey	Re-recorded SIHP # -16103, which extends into current project area
Bell et al. 2008a	TMK: [3] 7-3-009:017, 224.43 acres	Archaeological inventory survey	Identified 59 historic properties
Bell et al. 2008b	TMK: [3] 7-3-009:025, 360.131 acres	Archaeological inventory survey	Identified 121 historic properties
Esh et al. 2008	TMK: [3] 7-3-009:028, 363.106 acres	Archaeological inventory survey	Identified 41 historic properties
Bell et al. 2009	TMK: [3] 7-3-009:026, 194.324 acres	Archaeological inventory survey	Identified 120 historic properties

habitation sites (>50%), roads, trails, boundary markers, animal pens, petroglyphs, shrines, and brackish water wells/pools. Three additional historic properties were found in 1987, and in 1990, features identified as possible burials were tested. Only one burial was found (Rosendahl 1990).

4.1.3.5 Cordy et al. 1991

Cordy et al.'s (1991) study of Kaloko constructs a generalized model for social structure and environmental adaptation for pre-Contact Kaloko. In 1971, Cordy et al. (1991) attempted to construct a model of how Hawaiians in the Kaloko area were organized socially before western contact (AD 1778), and how this social organization reflected adaptations to the natural and social environments and to internal pressures. A combination of pedestrian survey and subsurface testing was undertaken throughout the Kaloko area in order to collect data for analysis.

Due to a general lack of chronological data, Cordy et al. (1991) were unable to build a picture of local social organization and its adaptation to the environmental field at any single time period, nor could they make any major statements on changes in organization and adaptation. As a result, Cordy et al. (1991) attempted to present a generalized model for social structure and environmental adaptation for the entire pre-Contact period of Kaloko. Cordy et al. (1991) speculated that Kaloko was initially settled between AD 1000 and 1500, and that it may have been an outlier of another community. By historic times, the Kaloko community consisted of four residential groups totaling 60 to 100 individuals. Political power and religious authority were focused in a chief, who apparently before and after AD 1490 to AD 1610 did not reside at Kaloko (Cordy et al. 1991). According to Cordy et al. (1991), adaptation to the natural environment consisted of agriculture, water usage, the collection of raw materials for tool manufacture and dwelling construction, marine resource procurement, and the raising of livestock. Agriculture was determined to be focused within the upland zone (300–490 m elevation) and the lower upland-forest zone (490–550 m elevation). Agricultural structures utilized in this agricultural zone consisted of terraces and low walls for water and soil control, as well as stone piles resulting from the clearing of soil areas for planting. Also noted were enclosures of varying shape, utilized as temporary habitations.

As water was scarce in Kaloko, potable water was thought to have been predominantly acquired at brackish pools near the coastal-middle zone interface. Cultural modification observed at these pools consisted of small, cleared areas or large lava slabs tilted over them for shade. Several short trails leading to the pools were also noted. The middle and upland-forest zones were believed to have been the primary areas for the collection of raw materials such as thatching, wood, and vines for the manufacture of dwellings, weapons, agricultural tools (e.g., digging sticks), fishing gear (e.g., nets and lines), and canoes. Further data and analysis were deemed necessary in order to determine if distinct coastal areas were utilized and partitioned per each residential group, or if Kaloko Fishpond was always reserved for chiefly use. Additionally, further data is necessary to shed light on the extent and nature of animal husbandry in pre-Contact Kaloko.

This report documents the archaeological survey and testing work undertaken in the *makai* portion of Kaloko (i.e., *makai* of the highway) in 1971. Based on the map of the seaward portion of Kaloko included in this study, five historic properties are located within 91 m (300 ft) of the highway; from south to north these include SIHP # -2199 (BPM 46), a *mauka-makai* trail; BPM 90 (no SIHP number assigned), a *mauka-makai* trail; SIHP # -2238 (BPM 86), a wall with midden; SIHP # -2233 (BPM 81), a *mauka-makai* trail; and SIHP # -2240 (BPM 89A–B), a *mauka-makai* trail. Survey work was also performed on the eastern side of the highway, but the information on

the locations and descriptions of specific historic properties is missing; therefore, it is unknown if any historic properties were identified within 91 m (300 ft) of the highway.

4.1.3.6 Kennedy 1991

Joseph Kennedy conducted a reconnaissance survey of a 152-m (500-ft) wide strip extending east (*mauka*) from the Queen Ka'ahumanu Highway for 2,213 m (7,260 ft). No historic properties or features were observed; seven caves "were examined to term and were determined to be devoid of cultural materials" (Kennedy 1991:C-1).

4.1.3.7 O'Hare and Goodfellow 1992

Based on the recommendations in the Donham (1986) report, data recovery was conducted at 31 of the previously recorded historic properties; this work consisted of relocation and additional documentation. In addition, 15 newly identified historic properties were recorded during the project. A total of 109 test units were excavated at 21 of the 46 historic properties for the data recovery project. Most of the project area is 457 m (1,500 ft) west of the Queen Ka'ahumanu Highway, but an access road extends to the highway. No historic properties were identified within 91 m (300 ft) of the highway or within the access road portion of the project area.

4.1.3.8 Colin et al. 1996

In 1996, a 224-acre parcel in Kohanaiki and Kaloko adjacent to the *mauka* side of the Queen Ka'ahumanu Highway was surveyed by CSH. Fifty-five historic properties were recorded during the project. Thirteen were within Kohanaiki or on the Kaloko-Kohanaiki boundary; these consisted of one cairn, one C-shape, one enclosure, one terrace, two modified excavations, two lava tubes, and portions of five trails.

4.1.3.9 Haun et al. 2003a

In 2003, Haun and Associates completed data recovery for eight historic properties located in the *ahupua'a* of Kaloko. All eight consisted of temporary habitations in the form of caves and surface midden scatters. Research objectives consisted of the following (Haun et al. 2003a:i):

1. To establish the age of the site/feature
2. To determine the type and variety of activities conducted at each site/feature

Charcoal samples from five of the eight were submitted for radiocarbon analysis (with the remaining three already dated during the inventory survey phase). Three of the historic properties (SIHP #s -21999, -22016, and -22018) were potentially utilized by the mid-1400s. SIHP # -22023 was determined to have multiple occupations spanning from AD 1500–1700. SIHP #s -22014 and -22017 were occupied during the late pre-Contact period into the early post-Contact period.

Observed artifact and midden assemblages, as well as structural modifications, indicated a variety of activities conducted at the temporary habitation features. Activities determined to have been practiced at the data recovery sites included animal husbandry, water collection, fire construction, food preparation and consumption, and stone and bone tool manufacture.

4.1.3.10 Bell et al. 2008a

This AIS of a 224-acre parcel resulted in the documentation of 59 historic properties, 53 of which were previously identified by Colin et al (1996; see Section 4.1.3.8 above). The most

prevalent types of historic properties observed were modified tumuli (n=26), trails (n=21), enclosures (n=9), terraces (n=7), and lava tubes and blisters (n=11). Based on historic background and previous archaeological studies, the types, functions, and distribution of historic properties matched the anticipated finds for this “intermediate zone” of the Kekaha region.

4.1.3.11 Summary of Previous Archaeological Studies in Kaloko Ahupua‘a

The highway extends for approximately 1,158 m (3,800 ft) through Kaloko. Both sides of the highway have been subjected to some degree of archaeological investigation, but it is likely the archaeological work undertaken within these areas would not be considered adequate as an inventory level survey. Five historic properties were identified within 91 m (300 ft) of the highway: four *mauka-makai* trails (BPM 90 and SIHP #s -02199, -02233, and -02240) and one historic property described as a wall with midden (SIHP # -02238). The survey in which these historic properties were identified was conducted in 1971, and the survey data was made available in 1991 (see Cordy et al. 1991, Section 0). The survey report does not include significance assessments or recommendations for future treatment.

4.1.3.12 Summary of Previous Archaeological Studies in Kohanaiki Ahupua‘a

The highway extends approximately 1,311 m (4,300 ft) through Kohanaiki Ahupua‘a. One 152-m (500-ft) wide section on the *mauka* side of the highway has been subjected to inventory level archaeological survey, and one approximately 61-m (200-ft) wide section on the *makai* side of the highway has been included in both an inventory level survey and data recovery phase archaeological study. No historic properties were identified in either of these two portions of the present project area within Kohanaiki.

4.1.4 ‘O‘oma

Figure 20 and Table 20 present a representative sample of previous archaeological projects conducted in ‘O‘oma. Select projects adjacent to the Queen Ka‘ahumanu Highway in ‘O‘oma are discussed below.

4.1.4.1 Rosendahl, M. 1989

PHRI conducted an inventory survey of a 61-m (200-ft) wide corridor along the ‘O‘oma-Kohanaiki border extending east from the highway. No historic properties were identified within 91 m (300 ft) of the highway.

4.1.4.2 Henry et al. 1993

This is an archaeological assessment of a 1,260-acre parcel on the west side of the highway. Within ‘O‘oma 2, no historic properties were identified within 91 m (300 ft) of the highway.

4.1.4.3 Barrera 1985b

This is a reconnaissance survey of a 450-acre project area on the west side of the highway in ‘O‘oma 2 and Kalaoa-‘O‘oma (referred to as ‘O‘oma 1). One historic property (SIHP # -10154, a “habitation structure”) was identified within 91 m (300 ft) of the highway.

4.1.4.4 Barrera 1989

Varying levels of data recovery work were conducted on historic properties identified within a 450-acre project area on the west side of the highway within ‘O‘oma 2 and Kalaoa-‘O‘oma

Table 20. Previous archaeological studies in 'O'oma Ahupua'a

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Reinecke 1930	Coastal survey	Cursory survey	Briefly notes numerous historic properties, Sites 66 through 78 are within 'O'oma, mainly habitation sites
Ching et al. 1968–1969	Kailua-Kawaihae Rd corridor extension and parcel near Keāhole Airport	Archaeological reconnaissance survey and excavations	343 historic properties recorded, 216 features in the coastal portion and 117 in the inland portion from 800 ft to 3 miles from the coast
Ching and Rosendahl 1968	Kailua-Kawaihae Rd corridor, South Kohala to North Kona	Archaeological reconnaissance survey	Identified 665 archaeological features, including three trails (SIHP #s -0500, -0603, and -0630)
Davis 1977	Keāhole Agricultural Park, Kalaoa 1–5 and 'O'oma 1; from Queen Ka'ahumanu Hwy to 400 ft elevation	Archaeological reconnaissance survey	Identified 22 agricultural and habitation historic properties; minimal recording
Rogers-Jourdane 1978	Keāhole Point, NELH, 22.5 acres	Archaeological reconnaissance survey	Identified 11 historic properties
Hammatt and Folk 1980	Keāhole Agricultural Park and 370-acre parcel north of park	Subsurface excavations, reconnaissance survey	Tested 12 site complexes first identified by Davis (1977); 18 new historic properties recorded in 370-acre parcel
Rosendahl 1980	NELH, Keāhole Point, TMK: [3] 7-3-010:036	Inventory survey and data recovery	Follow-up on work of Rogers-Jourdane 1978
Soehren 1980d	'O'oma 1, TMKs: [3] 7-3-007:040, 041	Archaeological reconnaissance survey	Four-page report; no historic property map
Barrera 1985b	'O'oma 2 Resort, 314-acre coastal parcel, TMK: [3] 7-3-009:004	Archaeological reconnaissance survey	Identified 40 historic properties
Cordy 1985	'O'oma and Kalaoa, TMK: [3] 7-3	Historic property inventory	Inventory of previously identified historic properties

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Cordy 1986a	'O'oma 2 Resort, TMK: [3] 7-3-009:004	Field inspection	Re-evaluation of Barrera's survey (Barrera 1985b)
Donham 1987	'O'oma 2 Resort, TMK: [3] 7-3-009:004	Data recovery	Identified 27 new historic properties with 130 features, and 54 features recorded at previously identified historic properties
Barrera 1989	NELH and Host Park, TMKs: [3] 7-3-043:003, 042	Data recovery	Excavation of sites identified by Barrera 1985b
Rosendahl, M. 1989	Kohana-iki Resort Water Development project area, 'O'oma 2, TMK: [3] 7-3-009:005	Archaeological inventory survey	Four historic properties identified along corridor; features included a wall, terraces, a cave, and a <i>papamū</i> (playing) board
Walker and Rosendahl 1990	'O'oma 2 Water System Development project area	Archaeological reconnaissance survey	Identified 13 historic properties with 27 features; majority were agricultural mounds
Drolet and Schilz 1991	'O'oma 2, TMKs: [3] 7-3-007:038; 7-3-009:005, 008	Archaeological inventory survey	Identified 29 historic properties with 41 features identified; majority were agricultural mounds
Yent 1991	Upland 'O'oma, at elevations of 2,600 to 3,200 ft	Archaeological reconnaissance survey	Ten sites found at 2,280 ft elevation; walls and mounds of agricultural fields, probably for sweet potato cultivation
Barrera 1992	'O'oma, TMK: [3] 7-3	Data recovery	Excavations at three historic properties
Dowden and Graves 1992	HELCO Keāhole parcel, Kalaoa 1-4, 15-acre parcel	Archaeological inventory survey	Four historic properties with <i>pāhoehoe</i> excavations recorded
Thompson and Rosendahl 1992a, b	Keāhole transmission lines, TMKs: [3] 6-; 7-; 8-	Archaeological inventory survey (recorded as an archaeological assessment)	Confirmed previously identified historic properties

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Henry et al. 1993	Makaula to Kalaoa to 'O'oma Ahupua'a	Archaeological inventory survey (recorded as an archaeological assessment)	Assessment of a 1,260-acre parcel
Walsh and Hammatt 1995	Queen Ka'ahumanu Hwy, TMKs: [3] 7-, 4-	Archaeological inventory survey	Identified 17 cultural resources
Corbin 2000	NELH, 'O'oma 2, TMK: [3] 7-3-009:004	Data recovery	SIHP #s -1916 and -18028
Haun and Henry 2000b	'O'oma 1, 50-acre parcel, TMK: [3] 7-3-10:03	Archaeological inventory survey	Identified 186 features at 17 historic properties, including a habitation cave and a basalt rock quarry
Haun and Henry 2002	'O'oma, TMK: [3] 7-3-005:004	Data recovery	Data recovery excavation at three caves, SIHP #s -22740, -22741, and -22749
Haun and Henry 2003b	'O'oma, 41-acre parcel, TMK: [3] 7-3-007:040	Archaeological inventory survey	Identified 21 historic properties with 2,046 features, including six habitation caves
Clark and Rechtman 2005	'O'oma 1 and 2, TMKs: [3] 7-3-007:039 and 7-3-046:105	Archaeological inventory survey	Three historic properties previously identified (see Drolet and Schilz 1991) and 12 new historic properties identified, including habitation occupied as late as 1939
Clark and Rechtman 2006a	Holoholo St extension, TMK: [3] 7-3-009:008	Archaeological inventory survey	Four historic properties recorded; two walls, an agricultural complex, and a pre-Contact habitation site
Clark and Rechtman 2006b	'O'oma 2, TMK: [3] 7-3-007:038	Archaeological inventory survey	Identified 18 historic properties, mainly historic walls
Haun et al. 2006	TMKs: [3] 7-3-007:040, 041	Data recovery	SIHP #s -23825, -23831, -23832, -23835, -23836, and -23839; 18 features tested
Nelson et al. 2006	'O'oma 2, 45-acre parcel, TMK: [3] 7-3-009:007	Archaeological inventory survey	Identified 11 historic properties, mainly historic homestead features

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Rechtman 2008	'O'oma Beachside Village project area, TMK: [3] 7-3-009:004 and 022	Archaeological inventory survey	Reassessed 15 previously identified historic properties, and identified two new historic properties (SIHP #s -25932 and -26678, both lava tubes with human remains)
Rechtman et al. 2008	TMK: [3] 7-3-010:003	Data recovery	Data recovery at five historic properties identified by Haun and Henry (2000b)
Rechtman and Clark 2013	'O'oma 1 and 2, TMKs: [3] 7-3-043:073, 080, 083, 089, and 091 (por.)	Archaeological inventory survey and update	One previously identified wall, SIHP # -6432, and one recorded trail segment, SIHP # -29272

(referred to as 'O'oma 1). SIHP # -10154, which is also part of the current data recovery study, is one of the historic properties that "required additional recording only." It is depicted on the project area map and briefly described as a well-constructed shelter with an adjacent short wall section of unknown age and function.

4.1.4.5 Rechtman and Clark 2013

This AIS updated prior inventory work, and overlapped lands in both 'O'oma and Kalaoa. In the 'O'oma portion of the project area, Rechtman and Clark (2013) encountered the previously identified 'O'oma 1-2 *ahupua'a* boundary wall (SIHP # -06432) and recorded a newly identified *mauka-makai* trail (SIHP # -29272). The trail was interpreted originally as a pre-Contact foot path that was later improved in both the early and late historic period. A segment of SIHP # -29272 within the current project area is addressed in Volume III of the DRR (LaChance et al. 2017).

4.1.4.6 Summary of Previous Archaeological Studies in 'O'oma 2 Ahupua'a

The highway extends through 'O'oma 2 for approximately 1,158 m (3,800 ft). The *mauka* side of the highway has been subjected to reconnaissance level study. The *makai* side of the road has apparently been adequately surveyed, and data recovery work was carried out on selected historic properties. One historic property has been identified within 300 ft of the highway in 'O'oma 2: SIHP # -10154. This historic property is also addressed in the current DRR (LaChance et al. 2017).

4.1.5 Kalaoa

Figure 20 and Table 21 present a representative sample of previous archaeological projects conducted in Kalaoa. Select projects adjacent to the Queen Ka'ahumanu Highway in Kalaoa are discussed below.

4.1.5.1 Davis 1977; Hammatt and Folk 1980

These two reports record the survey and salvage excavations within the proposed Keāhole Agricultural Park on the east side of the highway. One historic property was identified within 300 ft of the highway: SIHP # -06432, an *ahupua'a* boundary wall. This is described as a historic-era wall that forms the boundary between Kalaoa-'O'oma and 'O'oma 2. Survey and salvage excavations within the proposed Keāhole Agricultural Park also extended into Kalaoa 1–5. No historic properties were identified within 300 ft of the highway there.

4.1.5.2 Barrera 1985c, 1989

These reports summarize reconnaissance survey and subsequent data recovery work (see Barrera 1989 discussion in Section 4.1.4.4 above). No historic properties were identified within 300 ft of the highway at Kalaoa-'O'oma.

4.1.5.3 Barrera 1987a, b; 1990

These reports record the survey and data recovery work at five areas within Kalaoa 1–5 in the vicinity of the Keāhole Airport. It appears this project area did not include the area within 300 ft of the highway; therefore, no historic properties were identified within 300 ft of the highway.

4.1.5.4 Barrera 1993b

This document reports on archaeological data recovery efforts along a portion of the Māmalahoa Trail (SIHP # -00002) in Kalaoa 1–4.

Table 21. Previous archaeological studies in Kalaoa Ahupua'a

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Stokes and Dye 1991	Island of Hawai'i	Survey	Identified two <i>heiau</i> , Kawaluna Heiau and Palihilo Heiau, and two <i>ko'a</i> , Halepa'u Ko'a and Maka'eo Ko'a
Rosendahl and Kirch 1975	Natural Energy Laboratory Hawai'i (NELH), Keāhole Pt	Reconnaissance survey	Recorded 14 historic properties, all previously identified
Davis 1977	Keāhole Agricultural Park, TMK: [3] 7-3-010:033	Archaeological reconnaissance survey	Identified 22 site complexes in a narrow corridor study
Barrera 1979	Keāhole Airport emergency service roads, TMK: [3] 7-3-043:003	Archaeological reconnaissance survey	Two walled shelters, SIHP #s -06961 and -06962
Bonk 1979	Keāhole Airport, TMK: [3] 7-3-010	Archaeological survey addendum	Borrow pits area, SIHP # -500
Barrera 1980	Keāhole Airport, TMK: [3] 7-3-043:003	Archaeological reconnaissance survey	SIHP # -06987; dismantled two C-shaped structure
Hammatt and Folk 1980	Keāhole Agricultural Park, TMK: [3] 7-3-010:033	Archaeological excavations	Data recovery at 12 historic properties, and identification of 18 historic properties in larger parcel north of park
Rosendahl 1980	NELH, Keāhole Point, TMK: [3] 7-3-010:036	Inventory survey and data recovery	No findings
Soehren 1982	Kalaoa 4, TMK: [3] 7-3-005:013	Archaeological reconnaissance survey	Recorded a house platform and a square enclosure, SIHP #s -10214 and -07266
Clark 1984	NELH, Keāhole Pt, TMK: [3] 7-3-010:036	Archaeological reconnaissance survey	SIHP #s -00185, -00246, -01920, -05601, -10191, -10192, and -10194 through -10201
Barrera 1985c	Keāhole Point, 450-acre parcel, TMK: [3] 7-3	Archaeological reconnaissance survey	Identified 42 historic properties
Cordy 1985	Kalaoa and 'O'oma	Archaeological reconnaissance survey	Settlement pattern study

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Soehren 1985	Alanui Kauhini, Kalaoa 4, TMK: [3] 7-3-010:033	Archaeological survey	Coastal foot trail, SIHP # -21186
Cordy 1986b	NELH, Keāhole Point, TMK: [3] 7-3-010	Field check	SIHP #s -01920 and -10205 through -10214
Barrera 1987a	Keāhole Airport	Archaeological survey	Six historic properties recorded
Barrera 1987b	Keāhole Airport, south ramp and ground transportation expansion, Kalaoa, TMK: [3] 7-3-043:043	Archaeological survey	SIHP #s -00002 and -10306
Cordy 1987	Kalaoa 3 Uplands, TMK: [3] 7-3-028:005	Field inspection	Recorded one platform/terrace
Telea and Rosendahl 1987	Kona Palisades Subdivision, Kalaoa 4, TMK: [3] 7-3-005:086, 6.6 acres	Archaeological reconnaissance survey	Identified 14 features at six historic properties
Walker and Haun 1988	Kona Palisades Subdivision, Kalaoa 4, TMK: [3] 7-3-005:087, 5.6 acres	Limited data recovery	Identified 17 features, including two agricultural complexes part of Kona Field System
Barrera 1989	NELH and Host Park, TMKs: [3] 7-3-043:003, 042	Data recovery	Excavations of historic property identified by Barrera 1985c
Walker and Rosendahl 1989	Pu'uhonua Subdivision, Kalaoa 5, TMK: [3] 7-3-010:027	Archaeological inventory survey	Recorded 34 historic properties with 84 features, composed of SIHP #s -05745 through -05778
Barrera 1990	Keāhole Airport expansion	Archaeological data recovery	Excavations at two caves
Walker and Rosendahl 1990a	Kona Palisades, TMK: [3] 7-3-005:012	Archaeological inventory survey	Identified 12 historic properties, including a refuge cave

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Walker and Rosendahl 1990b	Kona Palisades, TMK: [3] 7-3-005:086	Archaeological inventory survey	Identified 18 additional features, in addition to 14 features found during reconnaissance survey (Telea and Rosendahl 1987)
Dowden and Graves 1992	HELCO Keāhole parcel project area, Kalaoa 1-4, TMK: [3] 7-3-049:036	Archaeological inventory survey	Four quarry sites identified: SIHP #s -18076 through -18079
Thompson and Goodfellow 1992	Kona Palisades Development parcel, Kalaoa 4, TMK: [3] 7-3-005:086	Interim report: background, summary of findings, and recommendations; archaeological data recovery – Phase II	Additional recording at four historic properties (SIHP #s 50-10-28-14135 through -14137 and -14565); 24 test units excavated
Barrera 1993b	Kalaoa, TMK: [3] 7-3-005:088, 5 acres	Data recovery	Further recording of Māmalahoa Trail (SIHP # -00002)
Head and Rosendahl 1993	LUC project, 500-acre university site	Archaeological inventory survey	Identified 43 historic properties, 16 previously identified; included midden deposits, modified outcrops, terraces, enclosures, mounds, walls, <i>pāhoehoe</i> excavations, alignments, petroglyphs, trails, platforms, pavements, modified lava tubes, and cairns
Henry and Graves 1993	Keāhole-Kailua 69kV transmission line project	Archaeological inventory survey	Identified 25 historic properties with 60 component features; two trails, SIHP #s -15324 and -00002, also part of current data recovery
Henry et al. 1993	LUC Project, TMKs: [3] 7-3-009:001; 7-3-010:001	Archaeological inventory survey (recorded as an archaeological assessment)	Identified 25 historic properties
Barrera 1995	Kalaoa Mauka, TMK: [3] 7-3-005:098	Archaeological inventory survey	SIHP #s 50-10-28-19823 through -19831

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Masterson and Hammatt 1997	Kalaoa Reservoir, TMK: [3] 7-3-010:033	Archaeological reconnaissance survey	Upland historic properties
Bonk 1998	Kalaoa, TMK: [3] 7-3-005:112, 5.9 acres	Archaeological survey: papers in ethnic and cultural studies 98-1	Cultural study
Cleghorn 1998	Proposed University Center at West Hawai'i, TMK: [3] 7-3-010:033	Archaeological investigations	SIHP #s 50-10-28-06418, -15263 through -15265, -15268, -15281 through -15288, -15300, and -21361
Moore et al. 1999	Keāhole Point, Kalaoa 4, TMK: [3] 7-3-010:034	Archaeological inventory survey	One significant historic property, SIHP # -21350 (lighthouse)
Wolforth 1999	HELCO Keāhole-Kailua 69kV transmission line, Kalaoa 1-4	Archaeological monitoring	Monitoring of Māmalahoa Trail (SIHP # -00002)
McGerty and Spear 2000	Kalaoa Mauka, TMK: [3] 7-3-05:98, 5.9 acres	Final addendum to archaeological inventory survey	SIHP #s 50-10-28-19823 through -19832, -19839, and -21812
Roberts and Roberts 2001	NELH, Kalaoa 5, TMK: [3] 7-3-043:003	Data recovery	SIHP #s -10211 through -10213
Haun and Henry 2003c	Kalaoa 4, TMK: [3] 7-3-010:029	Archaeological inventory survey	SIHP #s 50-10-28-11271, -21886 and -23640 through -23643
Haun and Henry 2003d	Kalaoa 3, TMK: [3] 7-3-023:088	Archaeological inventory survey	SIHP # 50-10-28-23789
Haun et al. 2003b	Pu'uhonua Subdivision, Kalaoa 5, TMK: [3] 7-3-010:027	Data recovery	SIHP #s -5748, -5749, -5750, -5753, -5755, -5756, -5761, -5762, -5764, -5771, -5773, and -5774; excavation at four historic properties; charred sweet potato found in one feature
Rasmussen 2004	Kona Internatioanl Airport, TMK: [3] 7-3-010	Archaeological inventory survey (recorded as an archaeological assessment)	Nine historic properties documented included cairns, a trail, a <i>pāhoehoe</i> excavation, and petroglyphs

Reference	Project Location	Report Type	Results (SIHP # 50-10-27 unless otherwise noted)
Rosendahl 2004	HELCO Station, Kalaoa 1–4, TMKs: [3] 7-3-049:036, 037	Archaeological inventory survey (recorded as an archaeological assessment)	Four historic properties recorded, all <i>pāhoehoe</i> excavations
McIntosh and Cleghorn 2005	UH Center, Main St Rd, TMKs: [3] 7-3-010:006, 033, 044, and 045	Archaeological inventory survey (recorded as an archaeological assessment)	Confirmed ten historic properties from a previous study and recommended all should be avoided during construction
Reeve 2009	UH Center, Main St Rd, TMK: [3] 7-3-010:033	Data recovery	Excavation of a portion of a roof fall feature within a lava tube yielded no cultural deposit; therefore, preservation not recommended
Rechtman and Clark 2013	Kalaoa 5, TMKs: [3] 7-3-043:073, 080, 083, 089, and 091 (por.)	Archaeological inventory survey	One recorded trail segment, SIHP # -29273, and cairns recorded as SIHP # -29274
Rechtman 2017	Kalaoa 5, TKM: [3] 7-3-043:111	Archaeological Field Inspection	Relocated SIHP # -01920, an enclosure complex

4.1.5.5 Henry et al. 1993

This project area included the western side of the highway at 'O'oma 2 (see discussion in Section 4.1.4.2 above). One historic property was identified as being within approximately 91 m (300 ft) of the highway: SIHP # -18524, identified as a "pāhoehoe excavation." Recommended treatment was "further data collection." This project continues through Kalaoa 1–4, but no historic properties were identified within 300 ft of the highway there.

4.1.5.6 Summary of Previous Archaeological Studies in Kalaoa-'O'oma Ahupua'a

The highway extends approximately 1,585 m (5,200 ft) through Kalaoa-'O'oma. The *mauka* side of the road through the length of the *ahupua'a* has been subjected to varying degrees of archaeological survey, including salvage excavations in some areas. The length of the *ahupua'a* along the *makai* side of the road was included in the reconnaissance and data recovery work conducted by Barrera (1987a, b; 1990). Two historic properties have been identified within 300 ft of the highway: SIHP # -18524, *pāhoehoe* excavation, and SIHP # -06432, boundary wall.

4.1.5.7 Summary of Previous Archaeological Studies in Kalaoa 1–5 Ahupua'a

The portion of the highway within the present project area extends 732 m (2,400 ft) into Kalaoa 1–5, between the southern boundary of the *ahupua'a* and the Keāhole Airport entrance road. Along the *mauka* side of this section of the highway, the area has been subjected to both an archaeological survey and salvage excavations. On the *makai* side of the road, survey and data recovery work has been undertaken in the vicinity of the airport, but apparently not within 300 ft of the highway.

4.1.6 Other Relevant Archaeological Studies

This section addresses other relevant previous archaeological studies associated with early proposed highway alignments, cross-*ahupua'a* transmission line alignments, and the Māmalaha Trail. Some of these do not appear on the maps showing previous archaeological studies in relation to the current project area.

4.1.6.1 Ching et al. 1968–1969

This report, entitled *Preliminary Report of Archaeological Surface Survey and Salvage Operations at Keāhole, North Kona, Hawai'i Island: Section II Keāhole Point Airport Kailua Kawaihae Road* is incomplete and missing the section called "Kailua-Kawaihae Road Section II Survey and Salvage" (pp 38–89). The report contains a map of the Keāhole region with historic property locations (SIHP #s -00118 through -00355) but does not provide historic property descriptions.

4.1.6.2 Ching and Rosendahl 1968

This report records a surface survey of Section II of the highway (likely the same report that was to have been included in Ching et al. 1968-69) (see Figure 21). The map accompanying this report identifies a small number of historic properties within roughly 300 ft of the (proposed) highway: two historic properties in Honokōhau (T2 and T3), one in 'O'oma 2 (T1), one in Kalaoa-'O'oma (T1), and one in Kalaoa 1–4 (T1). Minimal descriptions of these historic properties are provided, but the use of this data is highly problematic; see explanation by Cordy (1985:11–12).

4.1.6.3 Helber et al. 1987

This is a Environmental Assessment study related to the request for an easement across a portion of the Māmalahoa Trail (SIHP # -00002) in Kohanaiki. Although this report documents the Māmalahoa Trail, it is not considered an acceptable archaeological data recovery report.

4.1.6.4 Thompson and Rosendahl 1992a, b

These studies assessed archaeological sensitivity for two proposed transmission line routes (Keāhole-Kailua and Keāhole-Keamuku). The locations of select existing historic properties along the routes were identified. The historic properties marked on the map were limited to “sites or features considered to be culturally significant or possibly significant” (Thompson 1992a:4). One of the routes is essentially the same project area as the present highway widening.

4.1.6.5 Henry and Graves 1993

This was an AIS for the Keahole-Kailua 69kV transmission line project crossing several of the project *ahupua'a* (see Figure 21). Twenty-five historic properties with 60 component features were identified. These included *ahu*, filled crevices, lava tubes, modified blisters, modified outcrops, mounds, *pāhoehoe* excavations, terraces, trails, and walls. Two of the trails, SIHP #s -15324 and -00002, were investigated under the current data recovery efforts (LaChance et al. 2017).

4.1.6.6 Wolforth 1999

PHRI conducted archaeological monitoring for the Keahole-Kailua 69kV Transmission Line installation (see Figure 21). The monitoring involved inspection of 31 previously documented sites (including those documented by Henry and Graves 1993 in proximity to the current project area) and documentation of eight newly recorded sites: SIHP #s -21252 (filled lava blister), -21253 through -21255 (modified outcrops), -21256 (cupboards and modified lava tube), -21257 and -21258 (trails), and -21756 (boundary wall). Portions of the approximately 3.3-km section of SIHP # -00002 within the transmission line project area were mapped and described in detail—possibly including parts of the site within the current project area. Wolforth (1999:ii) concluded that “The relationship of the Mamalahoa Trail to other sites and trails suggests that Mamalahoa Trail was built over, and incorporates parts of a prehistoric trail.”

4.2 Summary of Queen Ka‘ahumanu Highway Widening Phase 2 AIS Results and Recommendations

The Walsh and Hammatt (1995) survey documented 17 historic properties. This AIS was later replaced by the Monahan et al. (2012a) study, which recorded 75 historic properties within a revised project area. The project’s supplemental AIS (Wilkinson et al. 2017) documented portions of the previously identified Māmalahoa Trail (SIHP # -00002), but did not encounter any previously undocumented historic properties.

4.2.1 Historic Properties Identified and Significance/Eligibility Criteria

Table 22 summarizes the 75 historic properties identified in the final AIS report for this project (Monahan et al. 2012a). Table 22 also includes “significance assessments” made in the AIS (in this case, the term is erroneously conflated with evaluation of eligibility for inclusion on the State and/or National Registers of Historic Places). Figure 23 through Figure 36 depict the locations of the 75 historic properties, including the additional components of SIHP # -00002, which were

Table 22. Significance evaluations for historic properties in the project area (arranged south to north) from Monahan et al. (2012a:398–402)

SIHP # ¹	Formal Type	No. of Features	Age	Function	Significance Criteria ²
19954	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
29332	Mound/paved area within naturally formed <i>pāhoehoe</i> depression	2	Indeterminate	Indeterminate, possible burial	D and E
29334	Rock mound within a naturally formed <i>pāhoehoe</i> depression	0	Indeterminate	Indeterminate, possible burial	D and E
28774	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
22507	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
29335	Rock wall segment	0	Indeterminate	Indeterminate	D and E
18099	Trail (<i>mauka-makai</i>)	0	Indeterminate, possibly historic	Transportation	A, C, D, and E
22418	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
22417	Modified lava blister	0	Pre-Contact	Agriculture / planting pit	D and E
28778	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Agriculture / planting pit	D and E
22415	Platform	0	Pre-Contact	Burial	D and E
29336	Rock terrace	0	Indeterminate	Indeterminate, possible burial	D and E
29337	Excavated pit	0	Indeterminate	Indeterminate, possible quarry or sweet potato planter	D and E

SIHP # ¹	Formal Type	No. of Features	Age	Function	Significance Criteria ²
29339	Rock wall segment	0	Indeterminate	Indeterminate	D and E
29338	Excavated pit	0	Indeterminate	Indeterminate, possible quarry or sweet potato planter	D and E
29340	Rock mound	0	Indeterminate	Indeterminate, possible burial	D and E
29341	Excavated pits	2	Indeterminate	Indeterminate, possible quarry or sweet potato planter	D and E
29342	Excavated pit	0	Indeterminate	Indeterminate, possible quarry for cinder rock to repair nearby Māmalahoa Trail	D and E
00002	Māmalahoa Trail (cross slope, <i>ala loa</i> type)	0	Historic	Transportation	A, B, C, D, and E
19953	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
29343	Excavated pit	0	Indeterminate	Indeterminate, possible quarry or sweet potato planter	D and E
28780	'A 'ā excavation	0	Indeterminate	Indeterminate, possible burial	D and E
28781	Paved / leveled area	0	Indeterminate	Indeterminate, possible agricultural clearing	D and E
28782	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
28783	Complex	6	Pre-Contact	Agriculture	D and E

SIHP # ¹	Formal Type	No. of Features	Age	Function	Significance Criteria ²
28784	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
28785	Enclosure	0	Pre-Contact	Agriculture	D and E
29333	Rock stacking (possible <i>ahu</i>)	0	Indeterminate	Indeterminate	D and E
28786	Modified depression	0	Pre-Contact	Agriculture	D and E
28787	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
19952	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
28788	Modified outcrop complex	2	Pre-Contact	Agriculture	D and E
19951	Wall	0	Historic	Ranching / boundary	D and E
28789	Complex	6	Pre-Contact	Agriculture	D and E
19950	Modified outcrop complex	5	Pre-Contact	Agriculture	D and E
28790	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	D and E
19949	Enclosure	0	Indeterminate, historic or possibly modern	Indeterminate, possible windbreak / temporary shelter	D and E
28791	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
28792	Petroglyph	0	Pre-Contact	Symbolic expression	D and E
29344	Excavated pit	0	Indeterminate, possibly pre-Contact	Indeterminate, possible quarry, sweet potato planter, or bird pit	D and E
10714	Trail system (<i>mauka-makai</i>), part of the "Road to the Sea Trail"	3	Pre- to Post-Contact	Transportation	A, C, D, and E

SIHP # ¹	Formal Type	No. of Features	Age	Function	Significance Criteria ²
28794	Filled crevice	0	Indeterminate	Indeterminate, possible agricultural clearing feature	D and E
28797	Mound complex	2	Pre-Contact	Agriculture	D and E
19948	Complex	8	Pre-Contact	Agriculture and quarrying	D and E
28799	Excavated pit complex	3	Pre-Contact	Agriculture	D and E
28800	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	D and E
28801	Modified outcrop complex	2	Pre-Contact	Agriculture	D and E
19947	Stacked rocks	3	Pre-Contact	<i>Ahupua'a</i> boundary markers	D and E
28802	Complex	3	Pre-Contact	Temporary habitation	D and E
28803	Complex	2	Indeterminate	Indeterminate, possible agricultural clearing feature	D and E
28804	Filled crevice	0	Indeterminate	Indeterminate, possible agricultural clearing feature	D and E
28805	Modified outcrop	0	Pre-Contact	Agriculture / clearing	D and E
15324	Trail (<i>mauka-makai</i>)	2	Indeterminate	Transportation	C, D, and E
19946	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	C, D, and E
28806	Mound	0	Indeterminate	Possible marker	D and E
28807	Filled crevice	0	Indeterminate	Indeterminate	D and E
29345	Coral-filled <i>pāhoehoe</i> crevice	3	Indeterminate	Indeterminate	D and E
28808	Mound complex	5	Indeterminate	Markers	D and E

SIHP # ¹	Formal Type	No. of Features	Age	Function	Significance Criteria ²
28809	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	D and E
28810	Lava tube	0	Pre-Contact	Indeterminate, possible water catchment	D and E
29346	Rock mound	0	Indeterminate	Indeterminate, possible marker or quarrying	D and E
10154	Walled enclosure	0	Historic	Indeterminate, possible habitation	D and E
06432	Core-filled stone wall	0	Historic	<i>Ahupua'a</i> boundary	D and E
29347	Rock mound	0	Indeterminate	Possible marker or quarrying	D and E
29272	Level area in 'a'ā with trail (<i>mauka/makai</i>)	2	Indeterminate	Possible temporary resting spot / work area and transportation	C, D, and E
28811	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	D and E
28812	Possible filled crevice	0	Indeterminate	Indeterminate	D and E
28813	Modified lava blisters	5	Pre-Contact	Agriculture	D and E
28814	Lava tube	0	Pre-Contact	Indeterminate, possible water catchment	D and E
28815	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	D and E
19943	Lava tube	4	Pre-Contact	Temporary habitation	D and E
19945	Petroglyphs (n=2) and bashed/pecked <i>pāhoehoe</i> (n=7)	9	Pre-Contact	Symbolic expression and prospecting for voids in lava flow	D and E
29348	Boulder (<i>pāhoehoe</i> basher) in excavated pit	0	Pre-Contact	Prospecting for voids in lava flow	D and E

SIHP # ¹	Formal Type	No. of Features	Age	Function	Significance Criteria ²
29349	Boulder (<i>pāhoehoe</i> basher) and associated excavated pit	2	Pre-Contact	Prospecting for voids in lava flow	D and E

¹These State Inventory of Historic Places (SIHP) numbers are prefixed "50-10-27-."

²These "Significance Criteria" listed in Monahan et al. (2012a) are erroneously conflated with criteria for evaluation of eligibility for inclusion on the National and Hawai'i Registers of Historic Places; see Section 8 for corrected assessments of significance under HAR §13-275-6 and evaluations of eligibility to the National and State Registers under 36 CFR 60.4 and HAR 13-198-8, respectively.

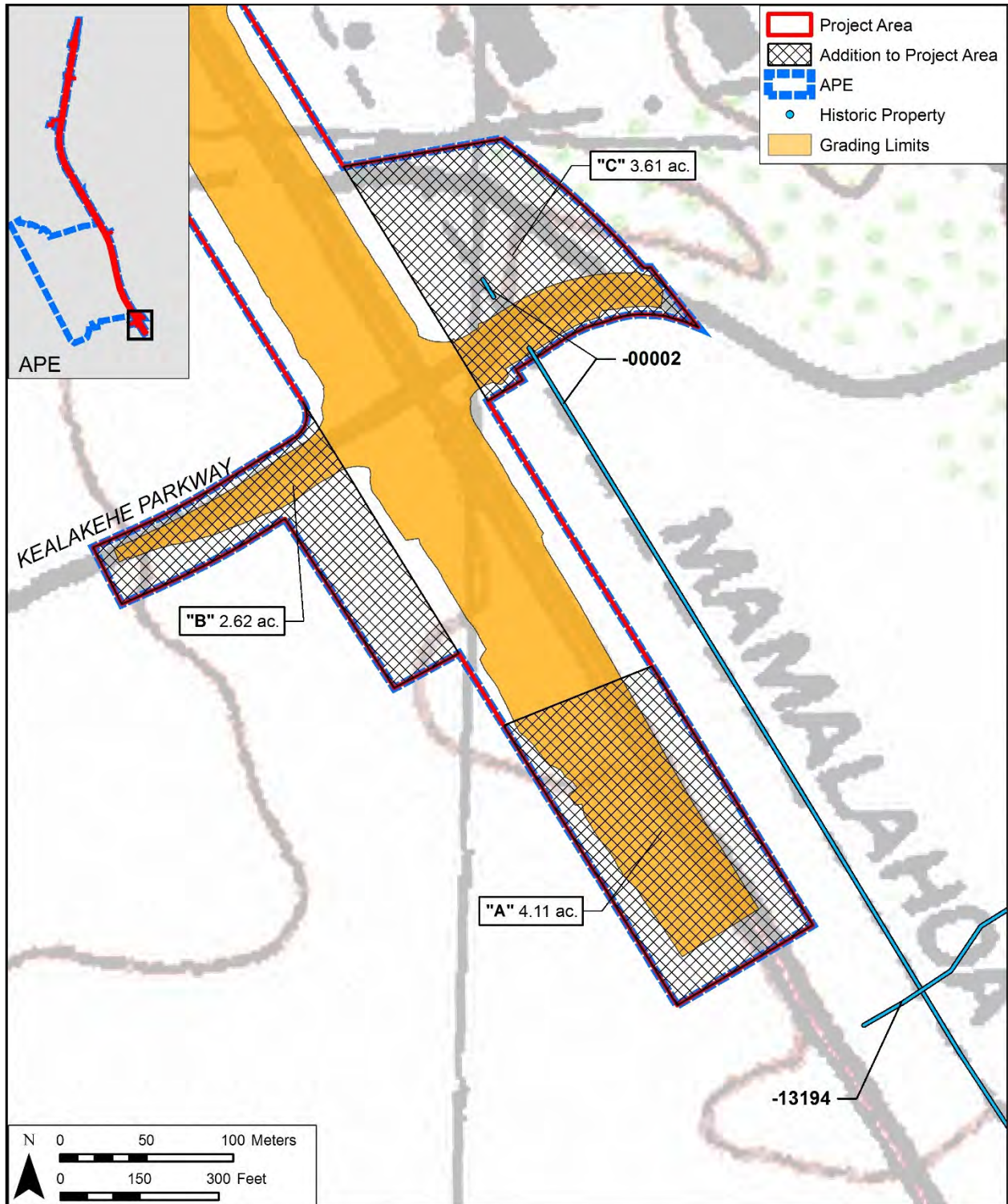


Figure 23. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

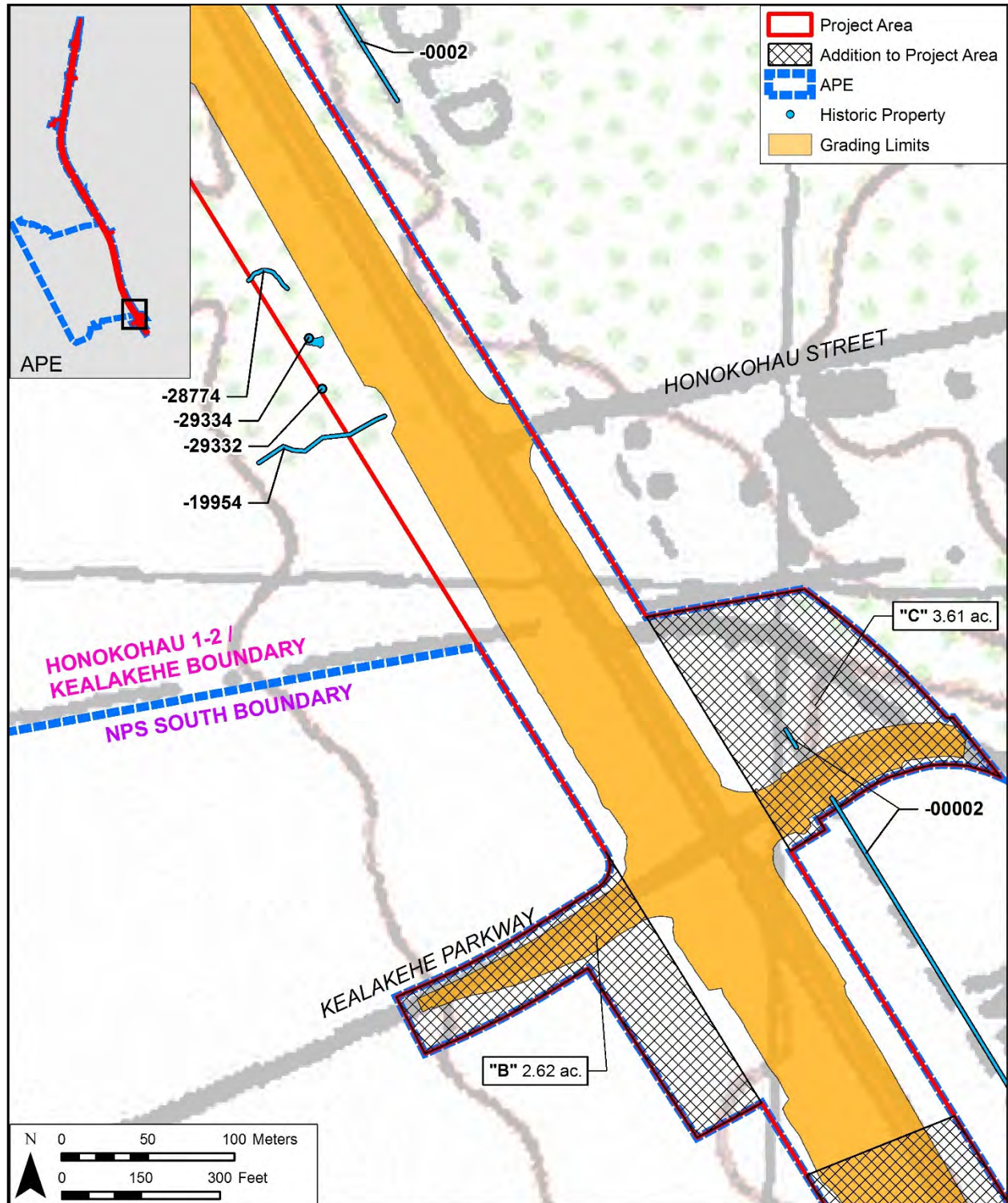


Figure 24. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

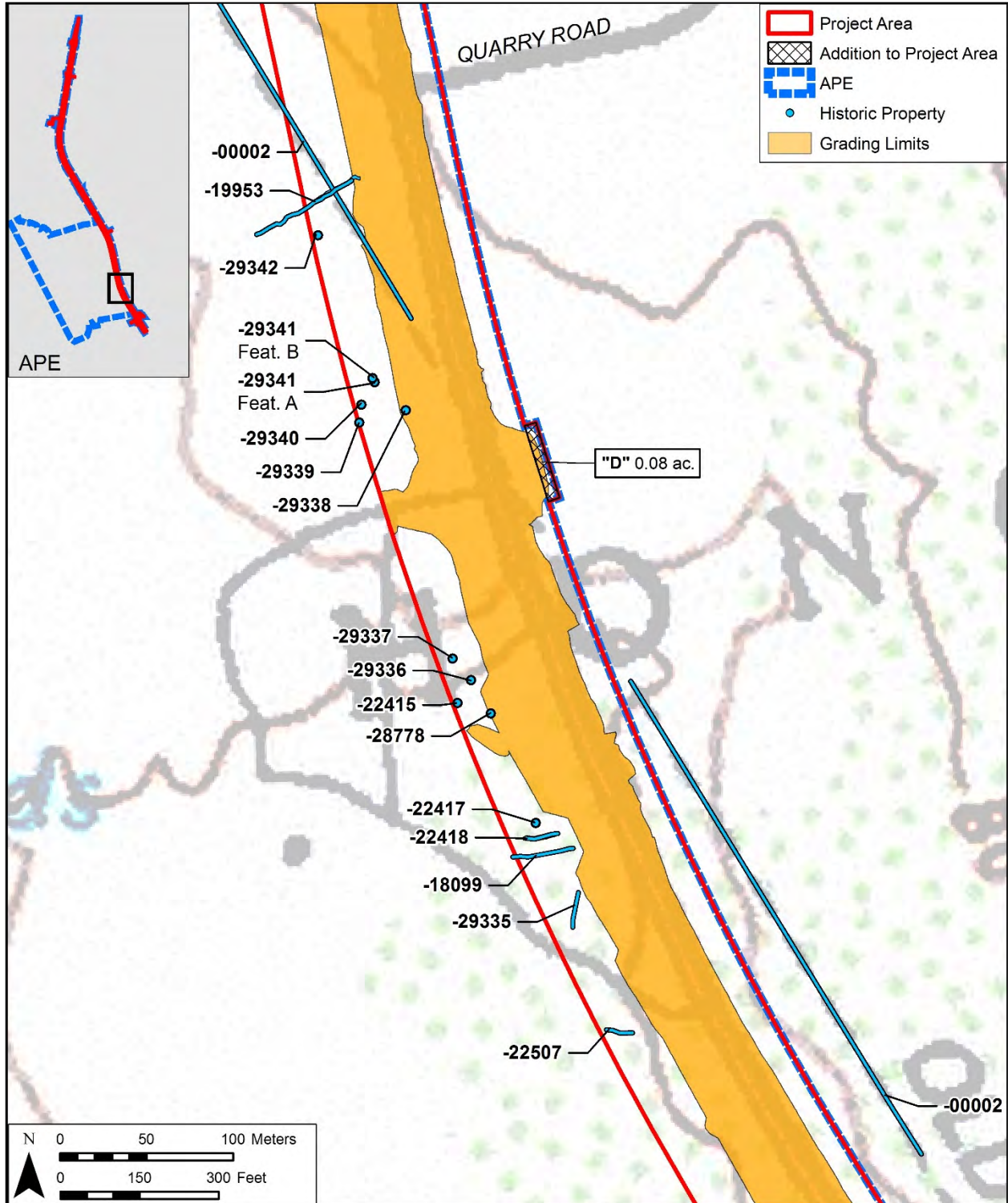


Figure 25. Portion of 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

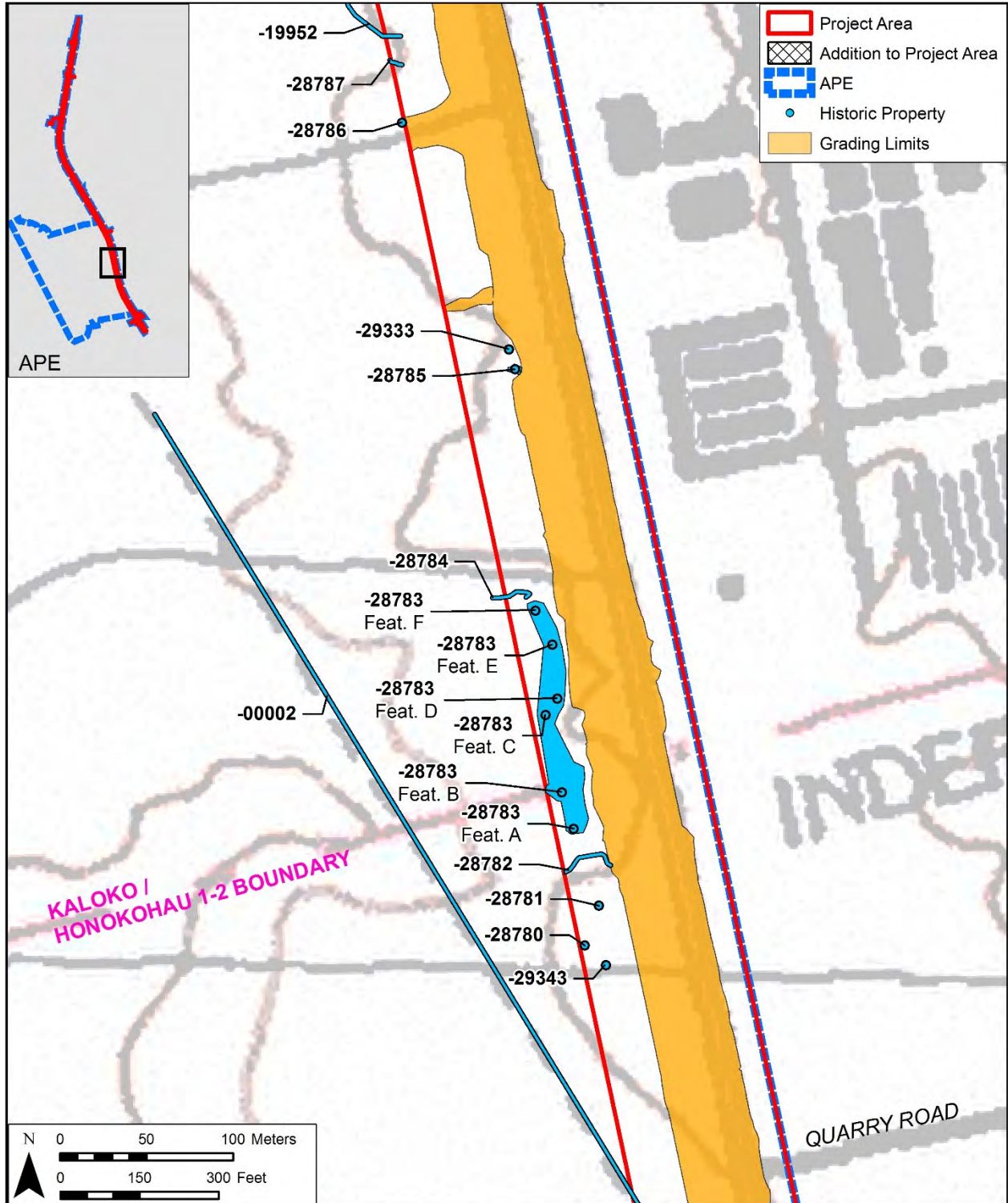


Figure 26. Portion of 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

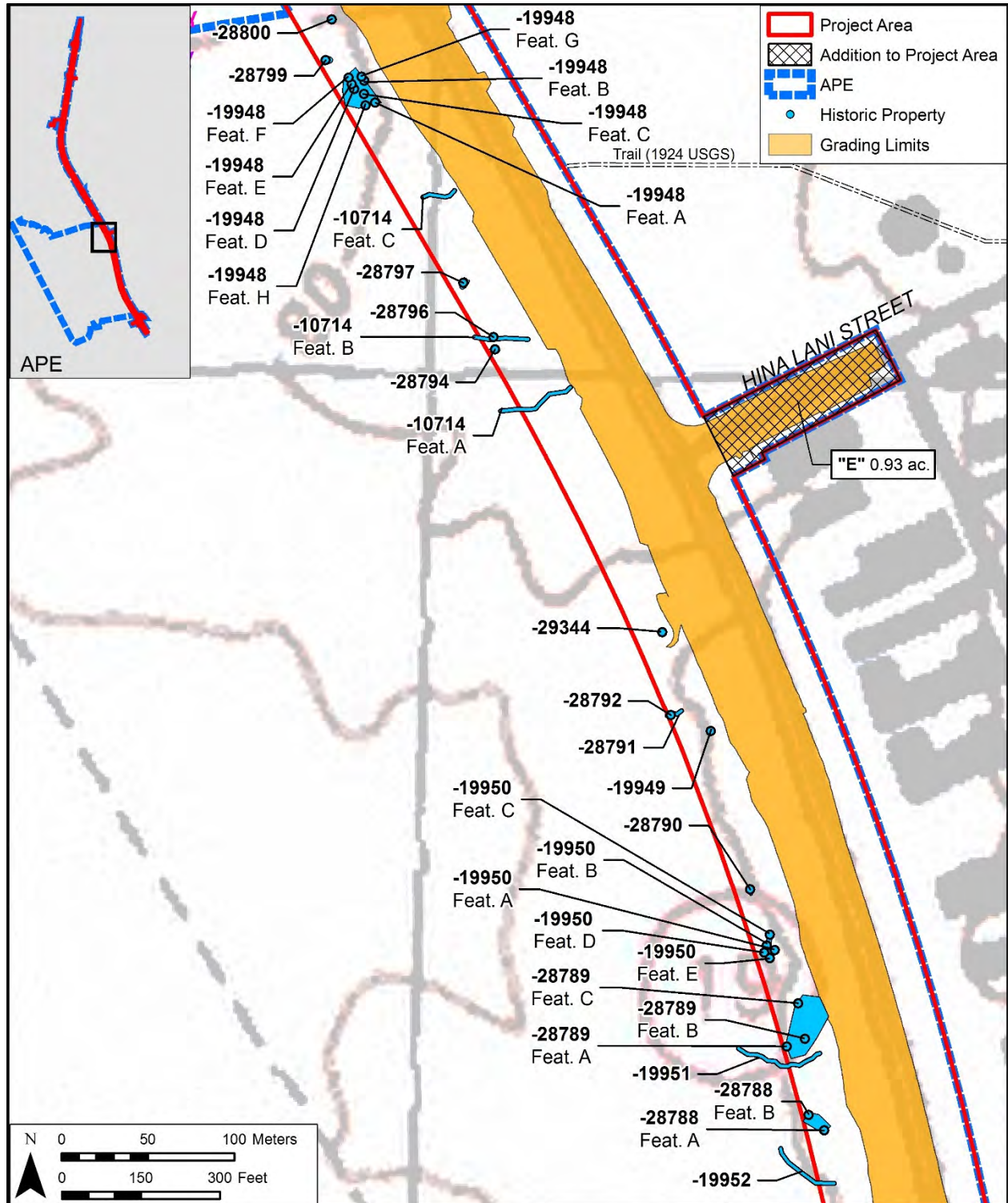


Figure 27. Portion of 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

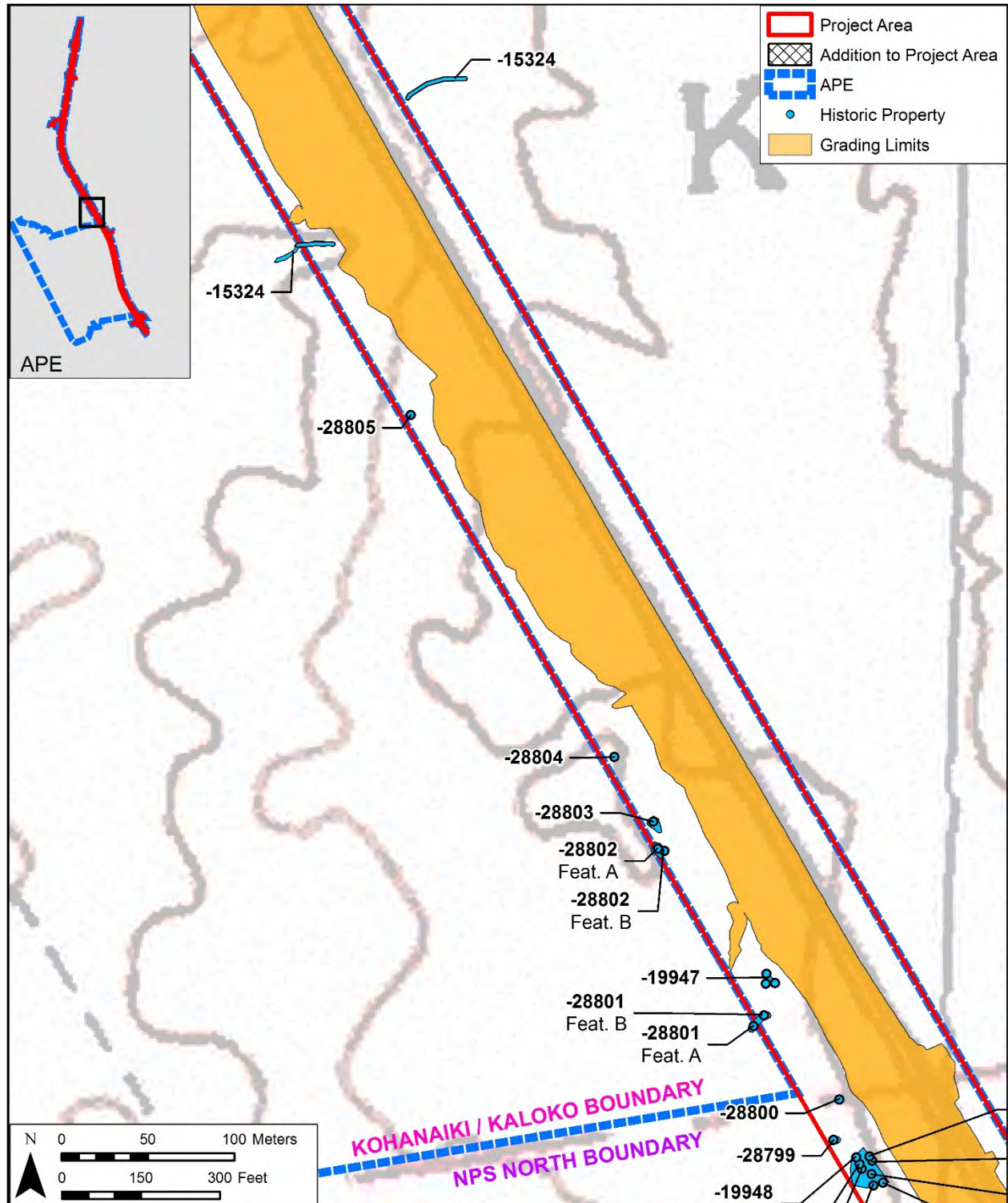


Figure 28. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

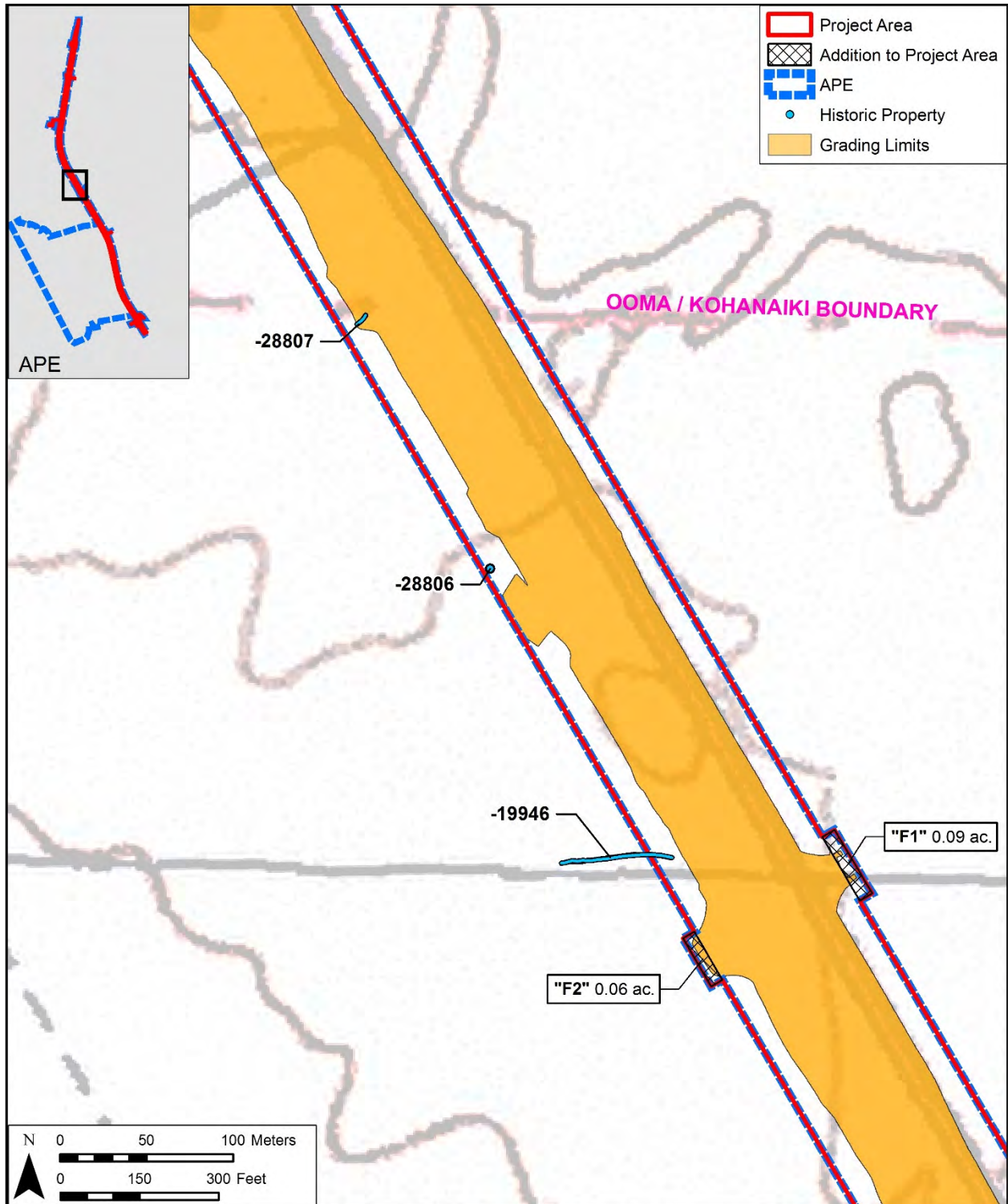


Figure 29. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

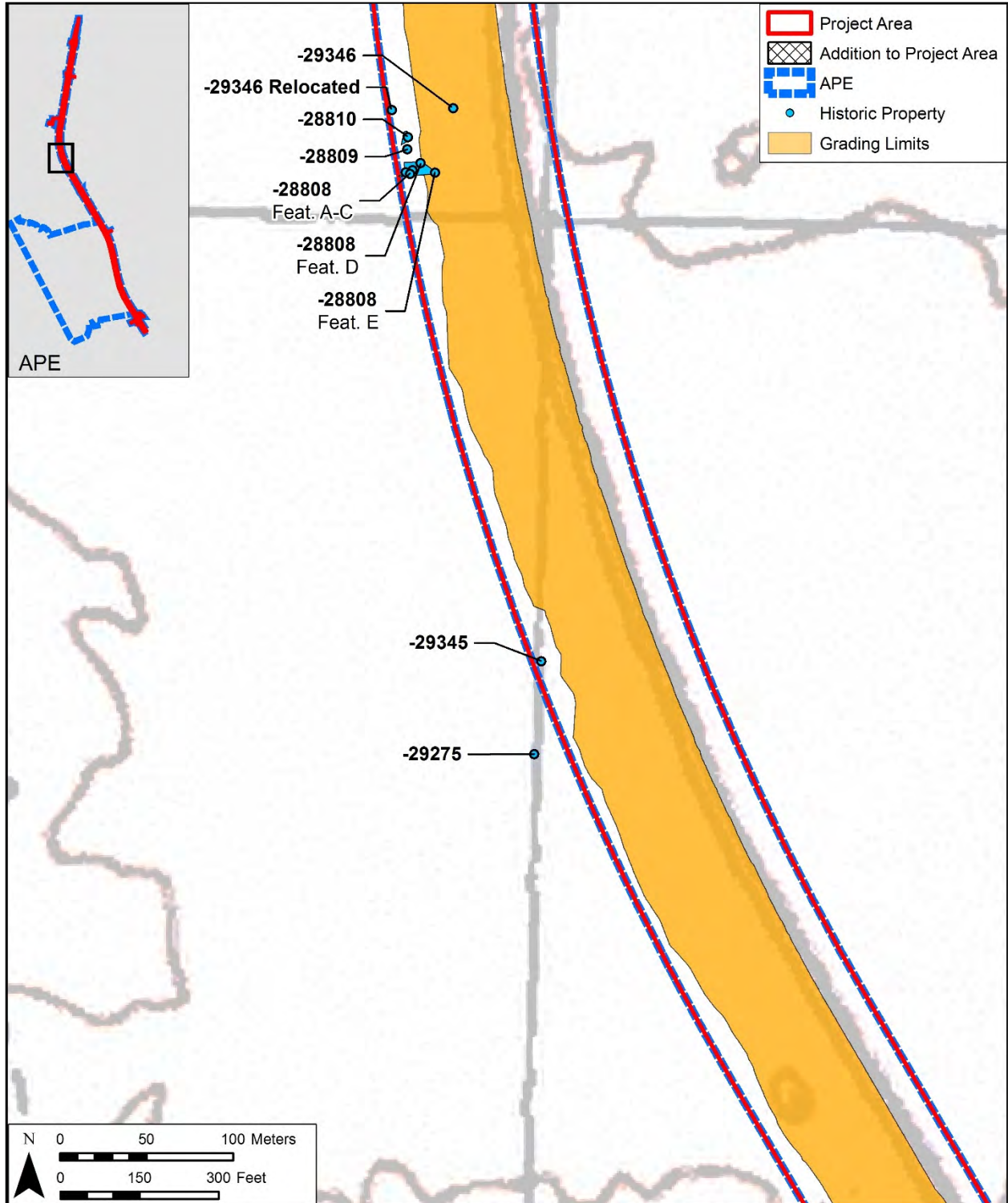


Figure 30. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

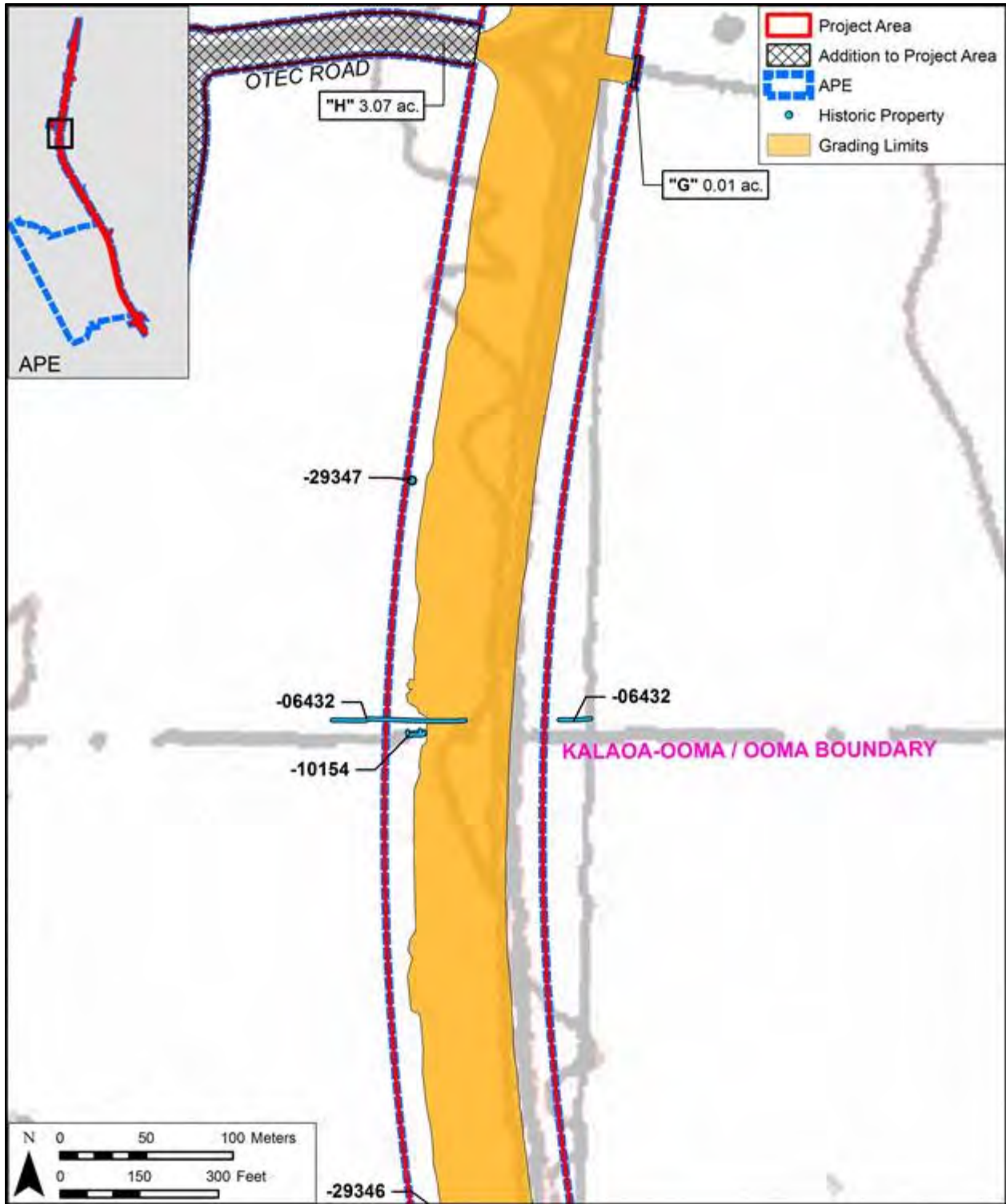


Figure 31. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

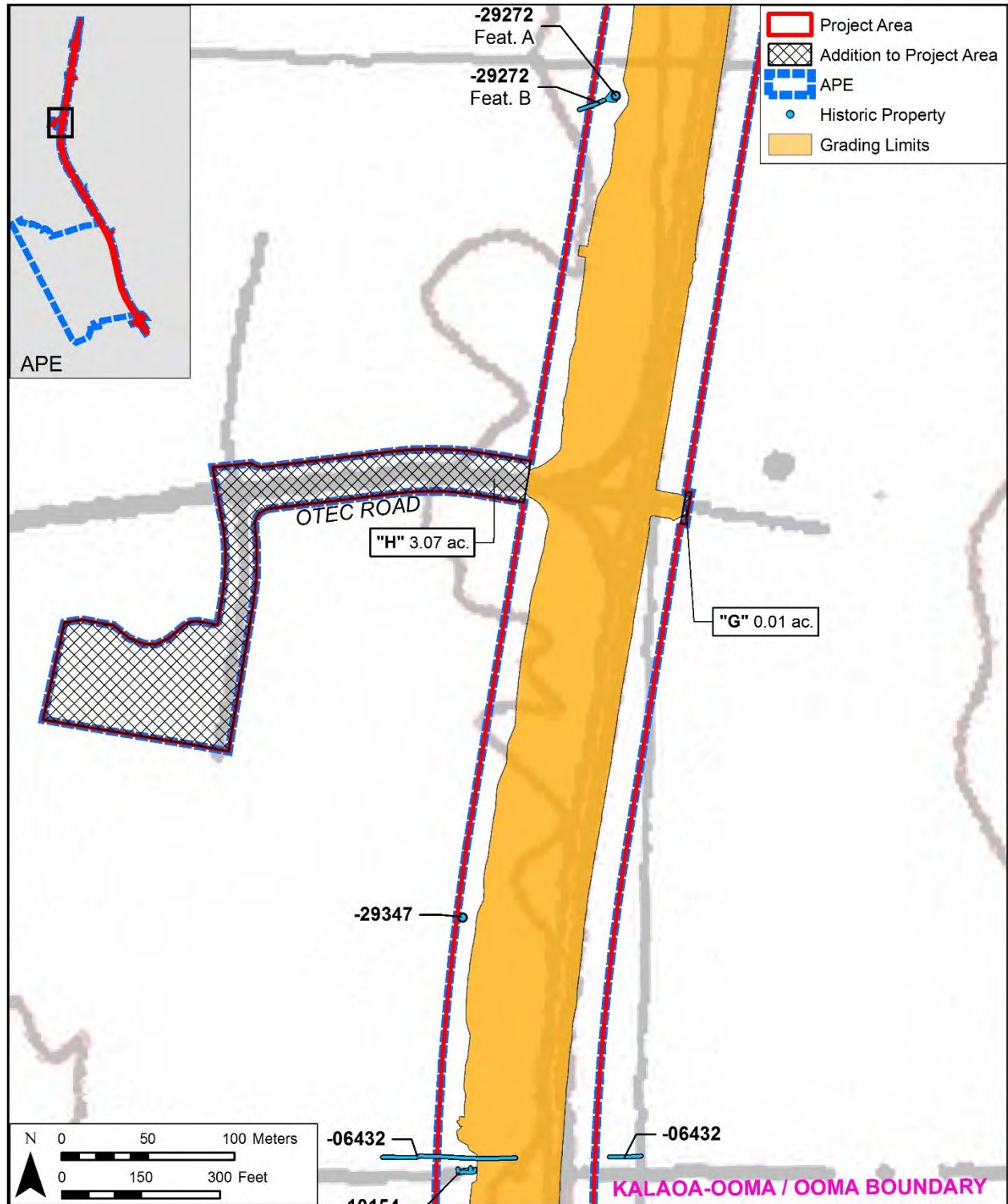


Figure 32. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

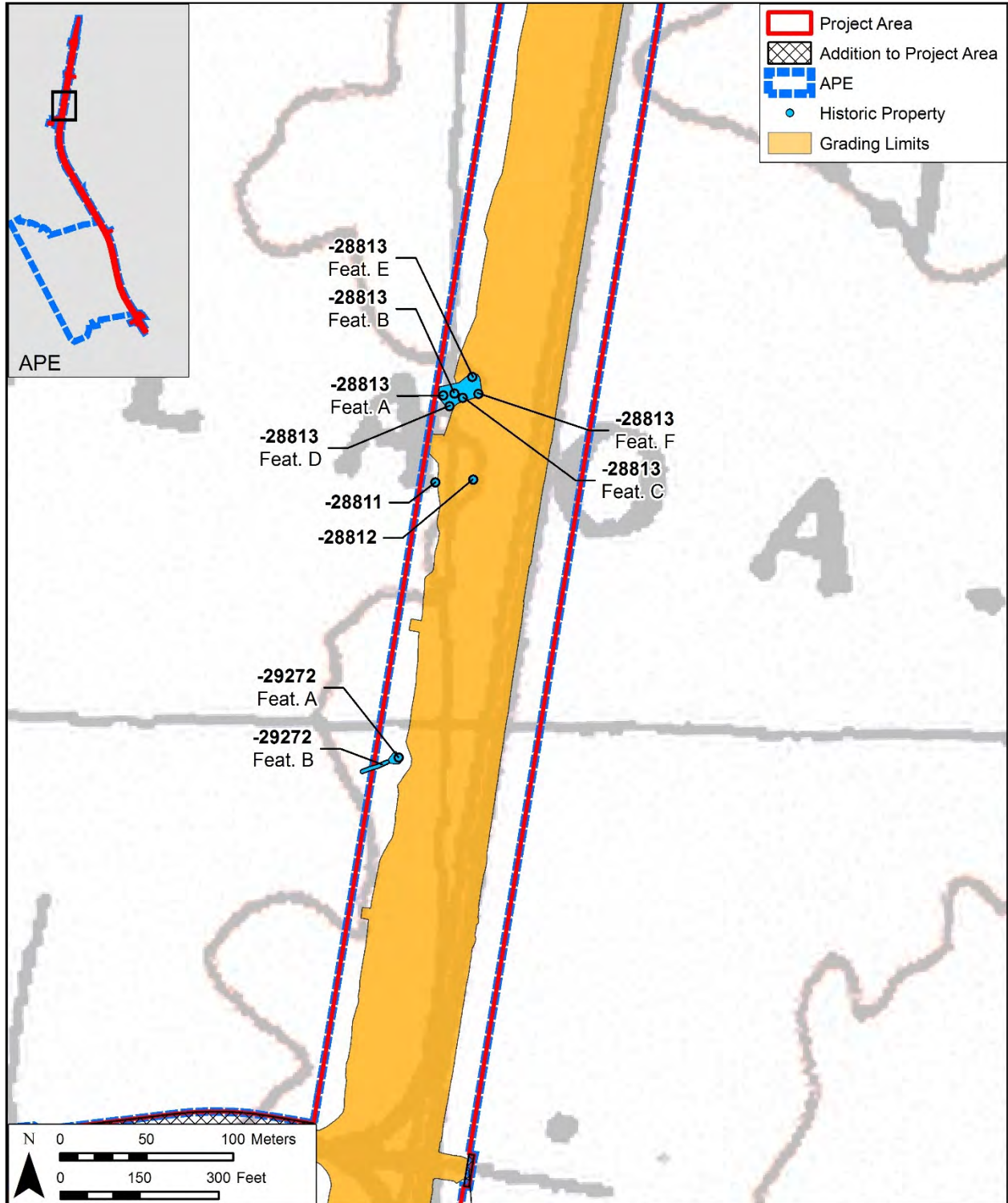


Figure 33. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

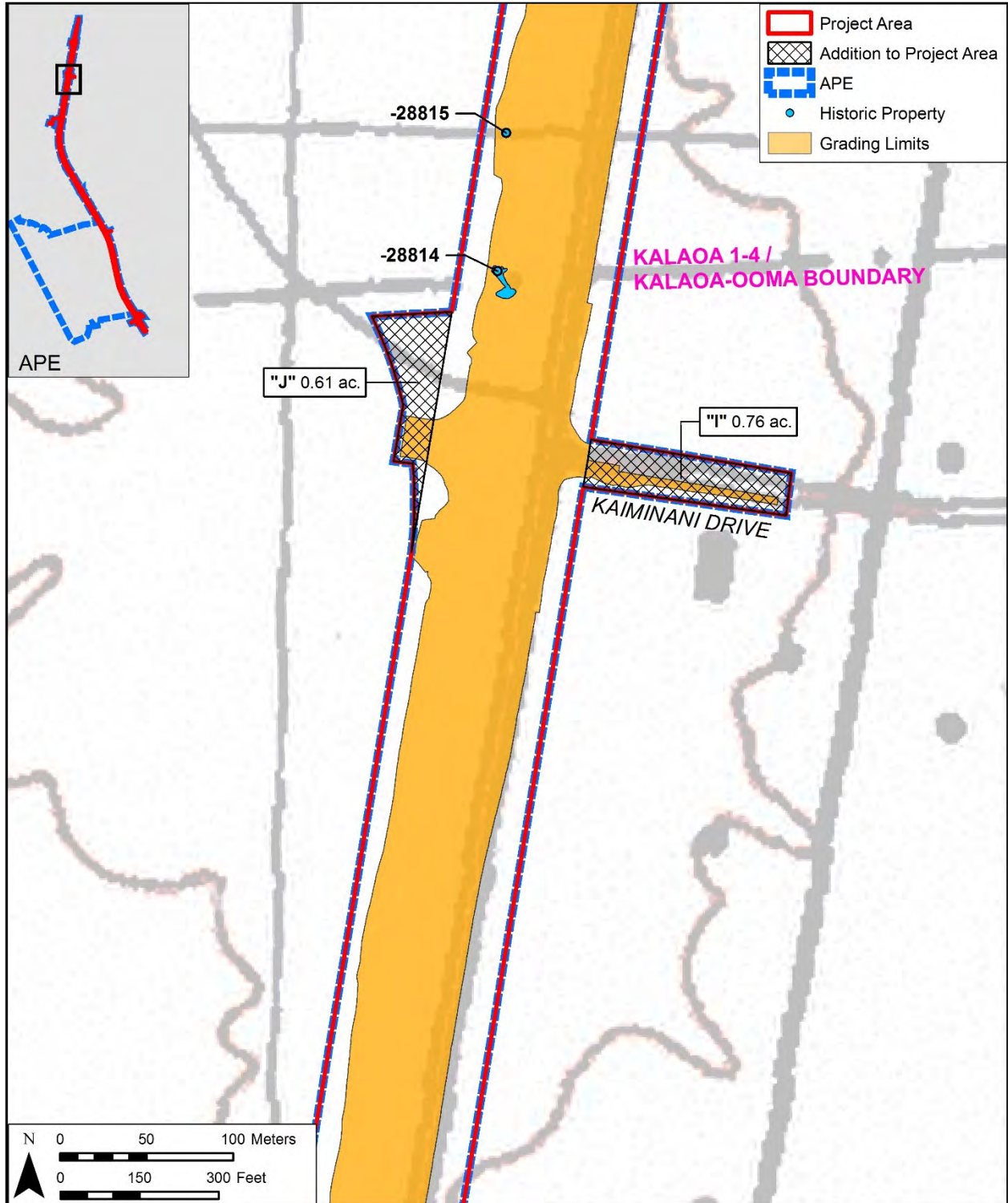


Figure 34. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

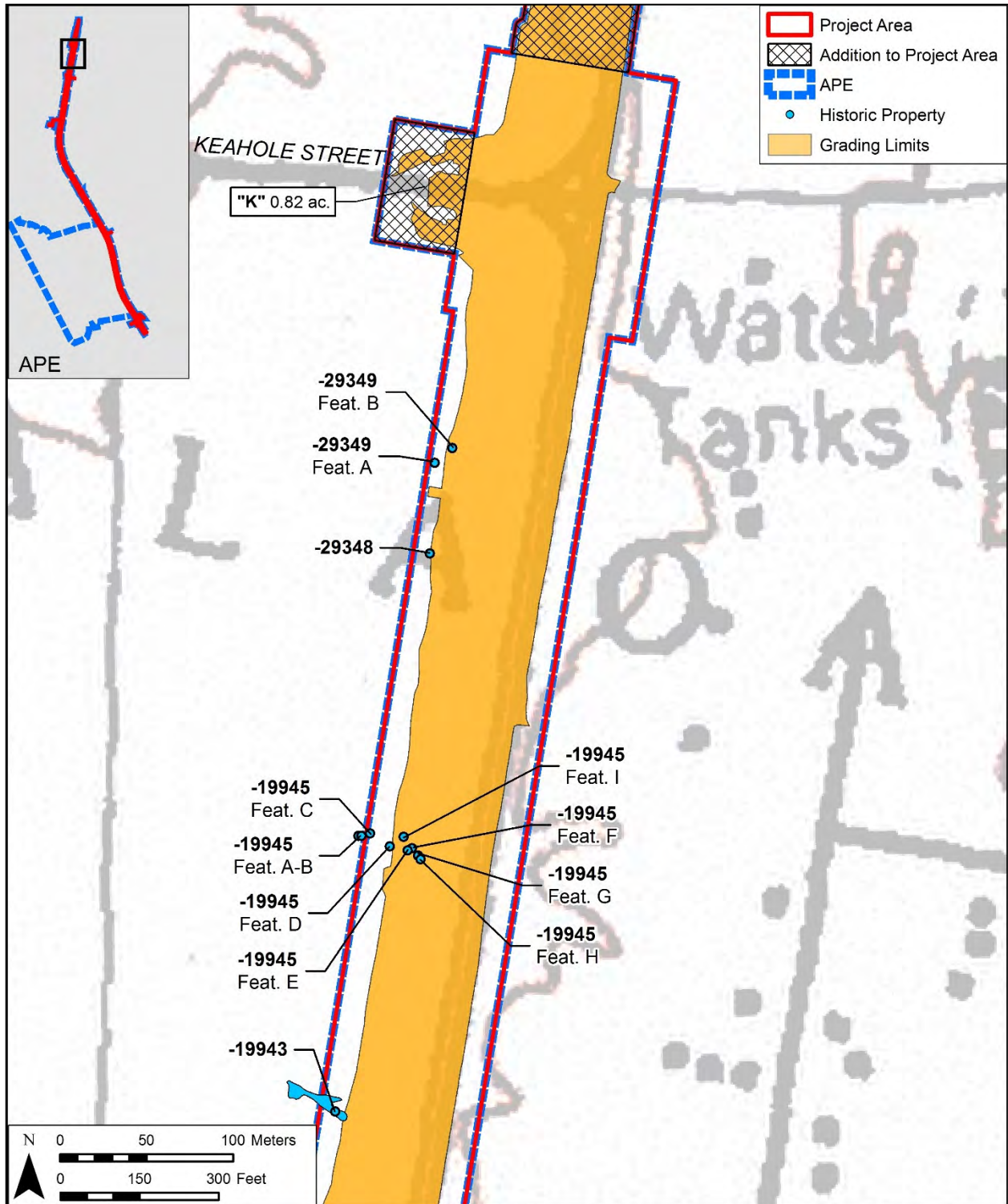


Figure 35. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

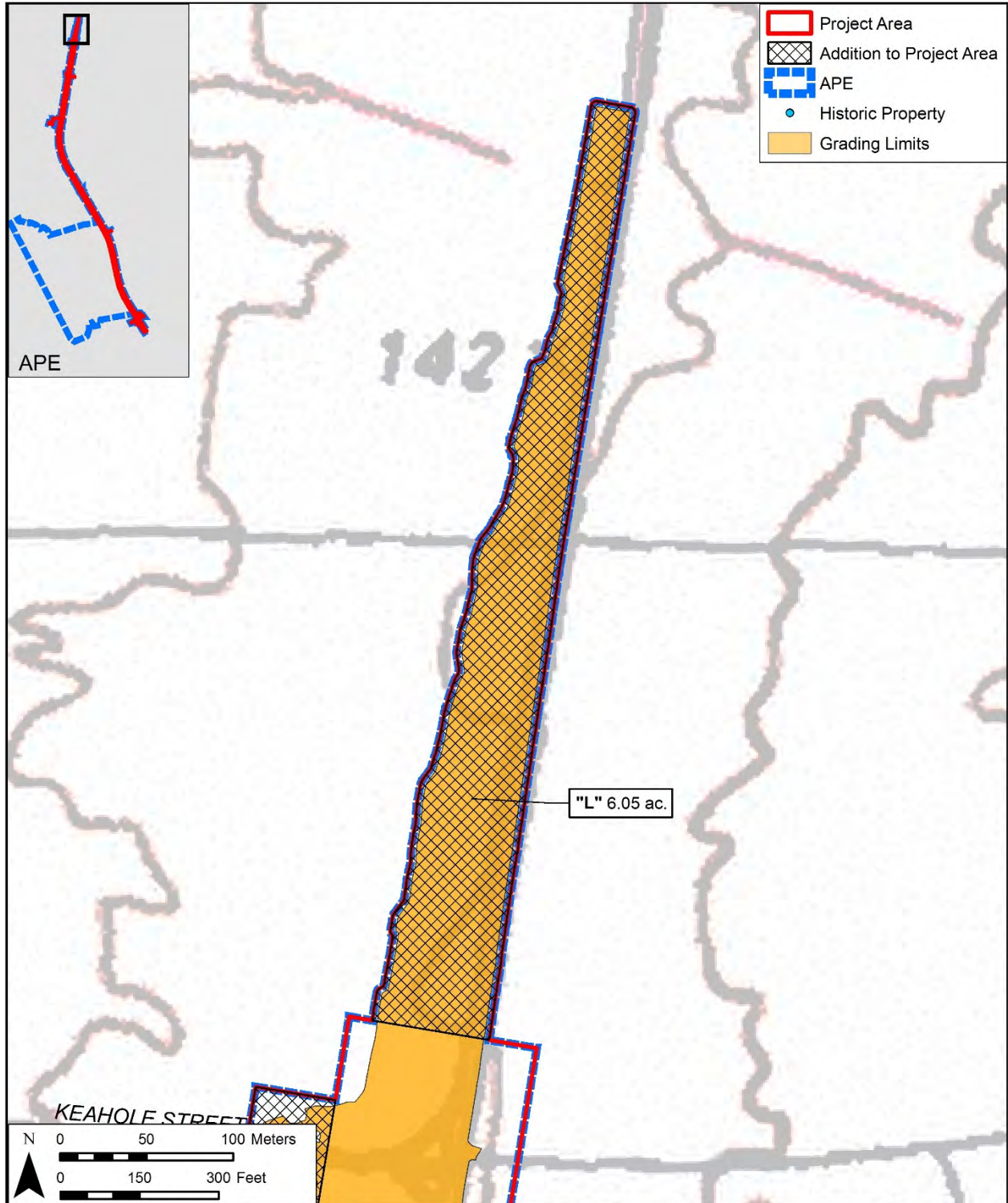


Figure 36. Portion of the 1996 Keahole Point USGS 7.5-minute topographic quadrangle showing historic properties identified within the project area and APE

documented during the supplemental AIS (Wilkinson et al. 2017). It is important to note that, in addition to historic properties in the ROW, the NPS has determined all historic properties within Kaloko-Honokōhau National Historical Park and Honokōhau Settlement National Historic Landmark are also eligible for inclusion on the National Register of Historic Places.

All 75 historic properties were evaluated as eligible (the AIS states “assessed as significant”) for inclusion on the National and Hawai'i Registers under Criterion D, meaning that each historic property has “yielded, or is likely to yield, information important for research on prehistory or history.”

All 75 historic properties were also “assessed as significant under Criterion E” in recognition of their “important value to the native Hawaiian people . . . due to associations with cultural practices once carried out, or still carried out, at the property,” as well as their “associations with traditional beliefs, events or oral history accounts.” This assessment of “significance” is understood to be made under HAR §13-275-6 (“Criterion e”) as a “Criterion E” does not exist for National and Hawai'i Register eligibility criteria under 36 CFR 60.4 and HAR §13-198-8, respectively. This criteria was assigned in consultation with NHOs for this project.

All historic trail properties have also been evaluated as “significant”/eligible for inclusion on the National and Hawai'i Registers under Criterion C, in recognition of the fact that the short portions of these trails identified within the project area are components of much larger networks of trails extending down to the seashore and up the mountain slopes. In addition, two of these trails, SIHP # -10714 (the “Road to the Sea Trail”) and SIHP # -18099 (the “Trail to Honokōhau”), are also assessed as “significant”/eligible for inclusion on the National and Hawai'i Registers under Criterion A for their association with events that have made contributions to broad patterns of history in Hawai'i. The Māmalahoa Trail (SIHP # -00002) is a special case, as it has previously been evaluated in the project area by Walsh and Hammatt (1995) as “significant”/eligible under Criteria A, C, D, and E. However, it should also be considered eligible under Criterion B, in recognition of its association with Kuakini (Governor of Hawai'i from 1819-1844), who initiated a program of road building that included the Māmalahoa Trail (Kirch 1996).

Finally, it is important to state that some NHOs consulted during this project believe all 75 historic properties should be considered eligible under Criterion B due to associations “with the lives of persons significant in our past.” Citing Cordy et al.'s (1991) classic historical and archaeological study of Kaloko-Honokōhau, these NHOs highlighted the project area's associations with certain historically significant Hawaiian *ali'i* including Laeanuikaumanamana, Liloa, Kame'eiamoku, Kamehameha I, Kamehameha V (a grandson of Kamehameha I, also known as Kapuāiwa or Lot Kapuāiwa), and others. CSH believes these associations highlight the overall historical significance of the entire North Kona district, or the traditional region known as Kekaha; however, specific associations between the historic properties and these historical persons in the project area are lacking (with the exception of the Māmalahoa Trail).

4.2.2 Project Effect and Mitigation Recommendations

This discussion is based on the final AIS report by Monahan et al. (2012a), CSH's communication with agents for the project proponents regarding the project's potential impacts to the identified historic properties, and consultation with the HDOT, FHWA, SHPD, NPS, OHA, and other NHOs.

4.2.2.1 Project Effect

The AIS investigations identified 74 historic properties within the project area, and one historic property (SIHP # -29275, a burial cave) in the vicinity of, but outside, the project area. The burial cave is described in more detail in an appendix to the AIS report (see Monahan et al. 2012a: Appendix C). Under Hawai'i State historic preservation review legislation, the project-specific effect recommendation was "effect, with proposed mitigation commitments." Under federal historic preservation review legislation, a project effect recommendation of "adverse effect" was warranted, with the understanding that the proposed mitigation measures (described below) are carried out to mitigate the undertaking's potential effect on Hawai'i and National Register-eligible historic properties.

Table 23 provides a summary of the mitigation recommendations for these 75 historic properties, as described in the DRPP by Shideler et al. (2012).

4.2.2.2 Mitigation Recommendations

The subsequent APMP by Hammatt and Shideler (2014) addresses 23 historic properties previously proposed to be directly impacted by construction, but which will now be avoided as a result of the project redesign. Ten of the historic properties (SIHP #s -15324, -18099, -19946, -19953, -19954, -22418, -22507, -28774, -28782, and -29272) are trails previously proposed to be partially destroyed, with mitigation in the form of archival research and preservation of the undisturbed portion of the trail. The other 13 were previously proposed to be totally or partially destroyed, with data recovery excavation for 12 historic properties (SIHP #s -19948, -19949, -22417, -28783, -28800, -28811, -29333, -29334, -29336, -29339, -29340, and -29344) and relocation for one (SIHP # -19947). Table 24 provides a revised summary of the mitigation recommendations for the 75 historic properties, as described in the APMP by Hammatt and Shideler (2014).

In addition to the mitigation recommendations listed in Table 24, CSH also recommended archaeological and cultural monitoring of all original ground disturbing activities in the project area (ROW). The archaeological and cultural monitoring is ongoing and is performed whenever disturbance of original (previously undisturbed) ground is conducted in the project area. The archaeological monitoring is conducted in accordance with an archaeological monitoring plan (AMP; Monahan et al. 2012b) prepared in accordance with HAR §13-279.

Table 23. Summary of proposed mitigation (adapted from Shideler et al. 2012:20)

Item	Action (SIHP # 50-10-27)	No. Historic Properties
1	Burial treatment plan —preservation in place (-22415, -29275 [contingent upon consent of the landowner])	2
2	Preservation (-10154, -19943, -19950, -19951, -28780, -28781, -28788 through -28790, -28792, -28797, -28799, -28802, -28806, -28810)	15
3	Preservation and no further work (19945—two petroglyphs will be preserved; no further work for remaining features)	1

Item	Action (SIHP # 50-10-27)	No. Historic Properties
4	Avoidance during construction (-28794, -28801, -28803 through -28805, -28809, -29337, -29341 through -29343, -29347)	11
5	No further work (-06432, -29338; note damage to -06432 will be minimized through archaeological and cultural monitoring)	2
6	Relocation (-19447, -29346)	2
7	Relocation and preservation (-28808; relocation of two features, preservation of three features)	1
8	Data recovery (excavation/dismantling) (-19949, -22417, -28778, -28785, -28786, -28800, -28807, -28811, -28812, -28814, -28815, -29332 through -29336, -29339, -29340, -29344, -29345)	20
9	Data recovery (archival research) and partial preservation (-00002, -10714, -15324, -18099, -19946, -19952 through -19954, -22507, -28774, -28782, -28784, -28787, -28791)	14
10	Data recovery (archival research) and partial preservation (-29272 Feature B) and data recovery (excavation) (-29272 Feature A)	1
11	Data recovery (archival research) (-22418)	1
12	Data recovery (collection and curation of portable artifacts) (-29348, -29349)	2
13	Data recovery (excavation) and preservation (-19948, -28783, -28813)	3
	Total	75

Table 24. Revised summary of proposed mitigation (adapted from Hammatt and Shideler 2014:20)

Item	Action (SIHP # 50-10-27)	No. Historic Properties
1	Burial treatment plan —preservation in place (-22415, -29275 [contingent upon consent of the landowner])	2
2	Preservation (-10154, -19943, -19950, -19951, -28780, -28781, -28788, -28789, -28790, -28792, -28797, -28799, -28802, -28806, -28810)	15
3	Preservation and no further work (-19945—two petroglyphs will be preserved; no further work for remaining features)	1
4	Avoidance during construction (-28794, -28801, -28803, -28804, -28805, -28809, -29337, -29341, -29342, -29343, -29347)	11
5	No further work (-06432; note damage to -06432 will be minimized through archaeological and cultural monitoring; -29338)	2
6	Relocation (-29346)	1
7	Relocation and preservation (-28808; relocation of two features, preservation of three features)	1
8	Interim preservation and commitment to mitigation (relocation) prior to any future land disturbance (-19947)	1
9	Data recovery (excavation/dismantling) (-28778, -28785, -28786, -28807, -28812, -28814, -28815, -29332, -29335, -29345)	10
10	Data recovery (archival research) and preservation (-00002, -10714, -15324, -18099, -19946, -19952, -19953, -19954, -22418, -22507, -28774, -28782, -28784, -28787, -28791)	15
11	Data recovery (collection and curation of portable artifacts) (-29348, -29349)	2
12	Data recovery (excavation) and preservation (-28813)	1
13	Interim preservation and commitment to mitigation (data recovery) prior to any future land disturbance (-19948, -19949, -22417, -28783, -28800, -28811, -29333, -29334, -29336, -29339, -29340, -29344)	12
14	Data recovery (archival research) and preservation (-29272 Feature B) and interim preservation and commitment to mitigation (data recovery) prior to any future land disturbance (-29272 Feature A)	1
	Total	75

Section 5 Monitoring Results

5.1 Overview

Monitoring for the Queen Ka'ahumanu Highway Widening Phase 2 project took place between 2 September 2015 and 26 November 2018 requiring a total of 1,847 person-days. Archaeological monitoring was conducted following the provisions of the AMP and, as of November 2016, the additional provisions of the Action Plan (see Section 2.1 and Appendix C).

The majority of ground disturbing work occurred during the first several months of the project, when mass excavation and grading occurred throughout the project area. During this time, a daily crew of 4–6 archaeologists monitored construction activities occurring simultaneously throughout the project area. The number of archaeological monitors present fluctuated over time as ground disturbance slowed and work was concentrated into fewer areas. Appendix D provides monthly summaries of construction and monitoring activities for the duration of the project.

The construction work was preceded by the installation of temporary protective barriers at archaeological preservation sites and along the NPS boundary (Section 5.2). While the long-term preservation buffers for the majority of the archaeological preserves are not demarcated on the ground, concrete barriers were constructed during the project at six historic properties to afford long-term protection (see Section 5.2.2).

No previously unrecorded cultural features, deposits, or burials were identified during monitoring of this project. These results were largely expected based on the natural setting, background research, and results of the AIS. One isolated find (common 1960s soda bottle fragment) was made during the project (Section 5.3). Four lava tubes were exposed by excavation, but these tubes were found to be culturally sterile. (Small blisters were also periodically exposed by project excavations and found to be culturally sterile; these were not documented beyond being mentioned in the daily monitoring notes.) These lava tube breaches are described along with other incidents in Section 5.4. The incidents that occurred during project construction were inadvertent impacts to portions of three historic properties (see Section 5.4.3).

Stratigraphy in the project area typically consists of deteriorating and/or consolidated basalt bedrock overlain by natural crushed 'a'ā lava and/or previous construction fill layers; representative profiles are included in Section 5.5.

5.2 Protective Barriers

In accordance with the project's DRPP (October 2012), APMP (April 2014), and Final Section 4(f) Evaluation (May 2015), both interim ("short-term") and long-term protective measures were put in place for preservation and avoidance during construction (ADC) sites within the project area. Aside from portions of the Mamalāhoa Trail (SIHP # -00002) adjacent to Kealakehe Parkway, all the preservation/ADC sites were located along the *makai* side of the highway (the segment of SIHP # -15324 located *mauka* of the highway is well outside the project area).

5.2.1 Interim Protective Buffers

Interim ("short-term") protective buffers were developed in the DRPP/APMP and typically provided an additional 2+ m buffer around the long-term preservation buffers, except where a site

location was constrained by construction and/or grading limits. (See DRPP/APMP for graphic illustrations of each archaeological preserve.) These interim buffers were demarcated by 4-ft orange construction fencing attached to rebar stakes installed along the outer edge of the interim buffer zone facing the highway; in some areas the fences were erected outside/beyond the buffer zone to facilitate installation. Fencing extended at least 25 ft north and south of each preservation and ADC site along the construction limits line. In the southern portion of the project area, a 2.43-km (1.51-mile) long continuous buffer fence was erected along construction limits adjacent to the NPS boundary; sites located *makai* of this boundary on NPS property were not fenced. The construction fencing provided a temporary barrier for all preservation and ADC sites during construction activities. The fencing installation was conducted in May and June 2015 by GBI personnel and monitored by CSH (Figure 37 and Figure 38).

During the interim fencing installation, a metal tag bearing the applicable SIHP number and mitigation status (i.e., "Preserve" or "ADC") was placed at each site. Following the impacts to certain historic properties (see Section 5.4.3) and development of the Action Plan in late 2016, each individual archaeological preserve was also marked with a wooden lath and pink flagging bearing the applicable SIHP number affixed to the southeast corner of the preserve fencing. This was to facilitate ease of site identification during monitoring activities.

Interim fencing was maintained throughout the project, aside from a single breach to a fence located *makai* of the Hualani Street intersection caused by a public vehicle accident (see Section 5.4.2). The archaeological monitor was responsible for inspecting the condition of the interim fencing on a regular basis and reporting any disrepair to RMTTC and GBI. The interim fencing was removed in November 2018 following completion of project construction; removal activities were also monitored.

5.2.2 Long-term Protective Buffers

Long-term (permanent) buffer zones were established under the DRPP/APMP around the preservation and ACD sites to facilitate passive long-term preservation. Wherever possible, a 5-m long-term buffer was afforded, as measured from the outer edge of the preservation/ADC site boundary. The long-term buffers were typically smaller than the interim buffers, except where a site location was constrained by construction and/or grading limits. For trail sites, the long-term buffer zone comprises the line represented by the construction limits, on the *mauka*/east side, and the ROW on the *makai*/west side. (See DRPP/APMP for graphic illustrations for each archaeological preserve.)

The DRPP/APMP noted that these long-term buffers would not be demarcated on the ground but established and recorded as encumbrances on the applicable properties. It was determined in subsequent project design that concrete retaining walls (Walls A, A1, E, F, and G) were needed to provide long-term protection to six historic properties (SIHP #s -18099, -22418, -28783, -15324, -10154, and -29272, respectively) (Figure 39). These walls were constructed as part of the widening project and, given their proximity to archaeological preserves, all retaining wall construction from footing excavations to removal of concrete forms was monitored. No historic properties were impacted by the wall construction, though work at Wall F did require stabilization of SIHP # -10154 during construction (see Section 5.2.2.1). The walls are large, 3-part concrete structures with chain-link fence running along the top.



Figure 37. Photo of GBI crew installing fencing at SIHP # -19950 on 1 June 2015; view to north

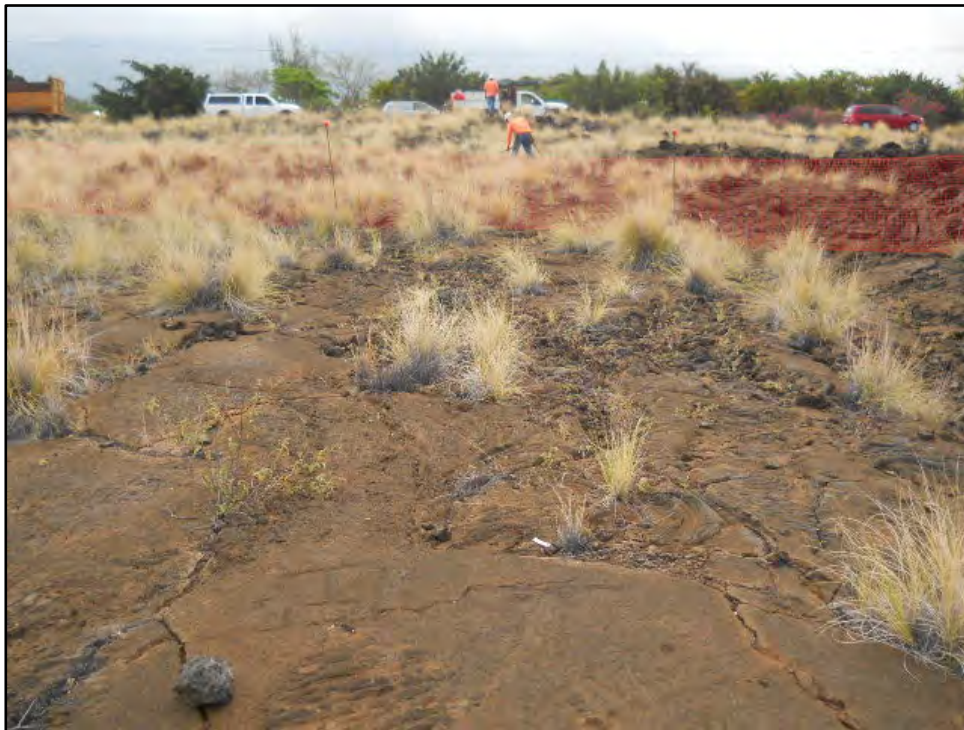


Figure 38. Photo of interim fencing installed at SIHP # -19945 on 26 May 2015; view to northeast

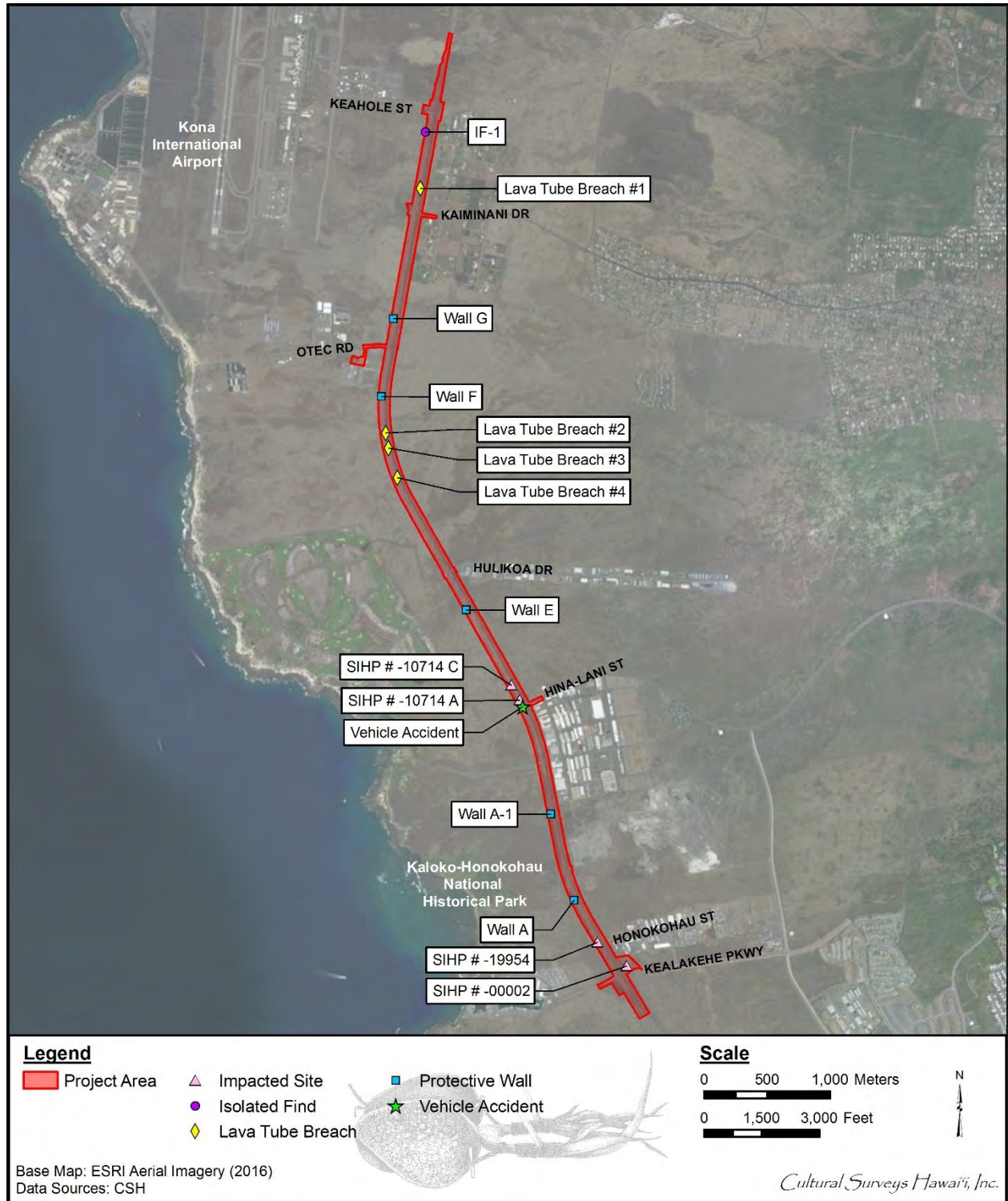


Figure 39. Aerial photo (ESRI 2016) showing the locations of protective retaining walls, Isolated Find 1 (IF-1), lava tube breaches, historic properties inadvertently impacted by construction (SIHP -10714 A, -10714 C and -00002), and a vehicle accident that impacted intermin protective fencing

Table 25 provides relevant information for each wall including location (using project station numbers), applicable historic property number(s), photo references (Figure 40 through Figure 49), and updated site description location (Section heading number) in this report.

5.2.2.1 Temporary Stabilization of Retaining Wall F

On 7 September 2016 GBI commenced construction of Retaining Wall F at SIHP # -10154 (adjacent to No-Further-Work site SIHP # -06432). Due to the proximity of SIHP # -10154 to the grading limits (no more than 1 m apart), it was determined the SIHP # -10154 walls should be supported using sandbags to protect the site during construction of the retaining wall (Figure 50 and Figure 51). The terminus of the SIHP # -06432 wall was also stabilized using sandbags, in support of the AIS recommendation to minimize disturbance to the site through monitoring (see Table 24). During construction the workers were limited to a very confined work space in order not to disturb SIHP # -10154 (Figure 52 and Figure 53). Once the wall construction was complete the sandbags were carefully removed. No impact occurred at SIHP # -10154 as a result of the Retaining Wall F installation.

Table 25. Protective retaining walls

Retaining Wall	Location (Station #s)	Applicable SIHP #(s)	Photo reference	SIHP Description(s) (Section #)
A	STA 18+45–19+75	-18099 and -22418	Figure 40 and Figure 41	6.2.1 and 6.2.2
A-1	STA 40+25–42+13	-28783	Figure 42 and Figure 43	6.2.3
E	STA 99+25–99+95	-15324	Figure 44 and Figure 45	6.2.4
F	STA 159+48–160+11	-10154	Figure 46 and Figure 47	6.2.5
G	STA 179+95–180+45	-29272	Figure 48 and Figure 49	6.2.6



Figure 40. Photo showing northern portion of Retaining Wall A; view to northwest



Figure 41. Photo of southern portion of Retaining Wall A with SIHP # -28783 visible in background; view to southwest



Figure 42. Photo showing southern portion of Retaining Wall A-1; view to southwest



Figure 43. Photo of Retaining Wall A-1; view to northeast



Figure 44. Photo showing northern portion of Retaining Wall E; view to northwest



Figure 45. Panoramic photo of Retaining Wall E; view to west



Figure 46. Photo of southern portion of Retaining Wall F; view to northwest

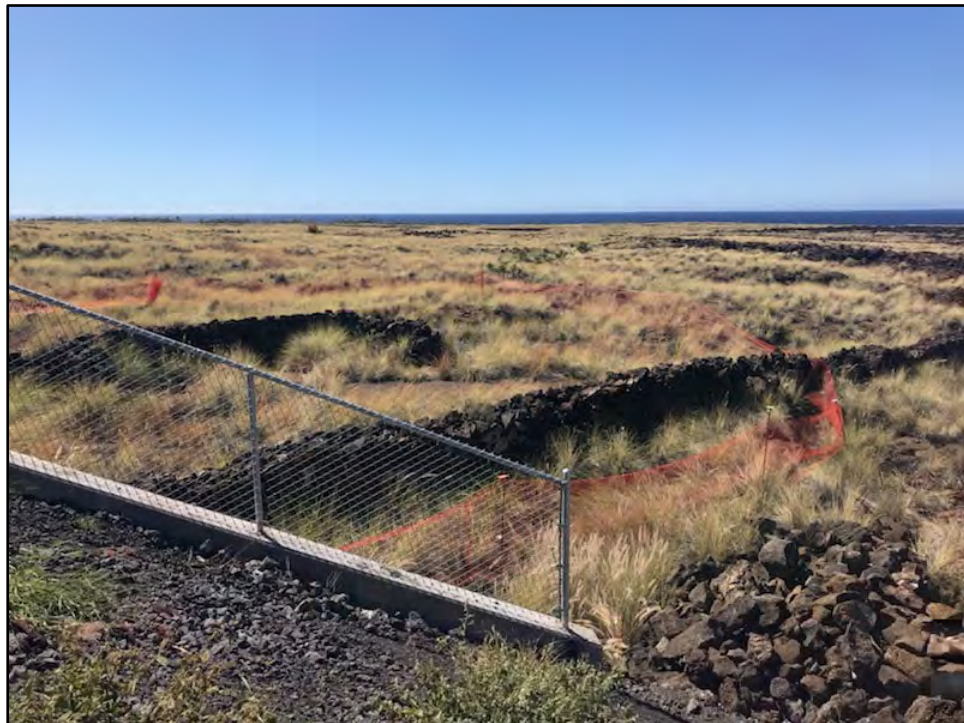


Figure 47. Photo of northern end of Retaining Wall F, note SIHP # -06432 in center and SIHP # -10154 in background; view to southwest



Figure 48. Photo of the northern section of Retaining Wall G; view to north



Figure 49. Photo of the southern section of Retaining Wall G; view to southwest



Figure 50. Photo of SIHP # -10154 with protective sandbags in place; view to west



Figure 51. Photo of SIHP #s -10154 and -06432 with supportive sandbags in place; view to southwest



Figure 52. Photo showing construction of concrete forms for Retaining Wall F; view to north



Figure 53. Photo of workers constructing the wooden concrete form for Retaining Wall F; view to north

5.3 Isolated Find

An isolated find (IF) is characterized as an artifact identified on the ground surface and not associated with an archaeological site. On 8 September 2015, during the monitoring of mass excavations along the *makai* portion Queen Kaahumanu Highway between Stations 218 and 235 (see Figure 39), a single, clear glass historic soda bottle fragment was identified in the northern portion of the project area and designated IF-1. The 7-ounce “HAWAII BEVERAGES” bottle is embossed “COCA-COLA BOTTLING CO. OF HILO” on the reverse panel. This bottle dates to the 1960s and is common. The bottle fragment was photographed but not collected (Figure 54).



Figure 54. Photograph of IF-1, historic soda bottle, front (left) and reverse (right)

5.4 Incidents

Over the three-year span of project construction some incidents did occur. Section 5.4.1 addresses breaches to four lava tubes, all found to be culturally sterile. Section 5.4.2 describes a public vehicle accident that impacted a section of interim preserve fencing. Section 5.4.3 provides an account of construction-related impacts to sections of three historic properties. The general locations of these incidents are all illustrated on Figure 39.

5.4.1 Breached Lava Tubes

5.4.1.1 Lava Tube Breach #1

On 23 September 2015 an entrance to a lava tube was breached at 0825 hours during excavation at STA 214+50 (see Figure 39). While monitoring hoe ramming for a utility trench that runs along the highway between intersections with Keahole Airport Road and Kaiminani Drive, the archaeologist noticed a small opening in the northern wall of the trench. The archaeologist stopped construction and discovered that the opening extended into a larger lava tube. Construction was halted in the area and the excavator moved farther north to continue excavating the trench while CSH archaeologists inspected the lava tube. The tube, designated Lava Tube #1, was described by the monitor as follows:

The opening of the tube was uncovered at station 214+50, approximately 20 meters west of the western margin of Queen Kaahumanu Highway, near the edge of the project area grading zone. The lava tube entrance extends underneath the bedrock surface from the northern wall of the trench. The bottom of the opening is situated approximately 2 meters below the graded bedrock surface, on the floor of the trench, measuring approximately 1 meter wide, by 80 centimeters tall. From this point the lava tube widens and extends northeast underneath the graded bedrock surface. The cavern is mitten shaped, forking in the middle with a smaller void extending northwest and a larger void extending northeast off of the central cavern. The "Palm" of the mitten retains the height of the initial opening throughout, measuring approximately 80 centimeters floor to ceiling, but begins to pinch out as it extends into each lobe. The northeast lobe (the larger of the two) extends an additional 10 meters at 35 degrees true north out from the palm, dropping in height from 80 centimeters where it adjoins with the main cavern, gradually pinching out to nothing and terminating at the 10m mark. The northwestern lobe is similar, only shorter. The lobe extends northwest an additional 3 meters, at about 18 degrees true north from the palm, gradually pinching out at its terminus. The palm itself is more or less circular in shape, with a diameter of approximately 4 meters, with either lobe extending off of its north end.

No cultural materials were identified within the lava tube. A plan view map of the lava tube interior was drawn (Figure 55) and photographs of the location of the breached tube were taken (Figure 56). When this documentation was completed, work resumed in the area. The lava tube was collapsed and filled to meet the engineering standards of the highway construction (Figure 57).

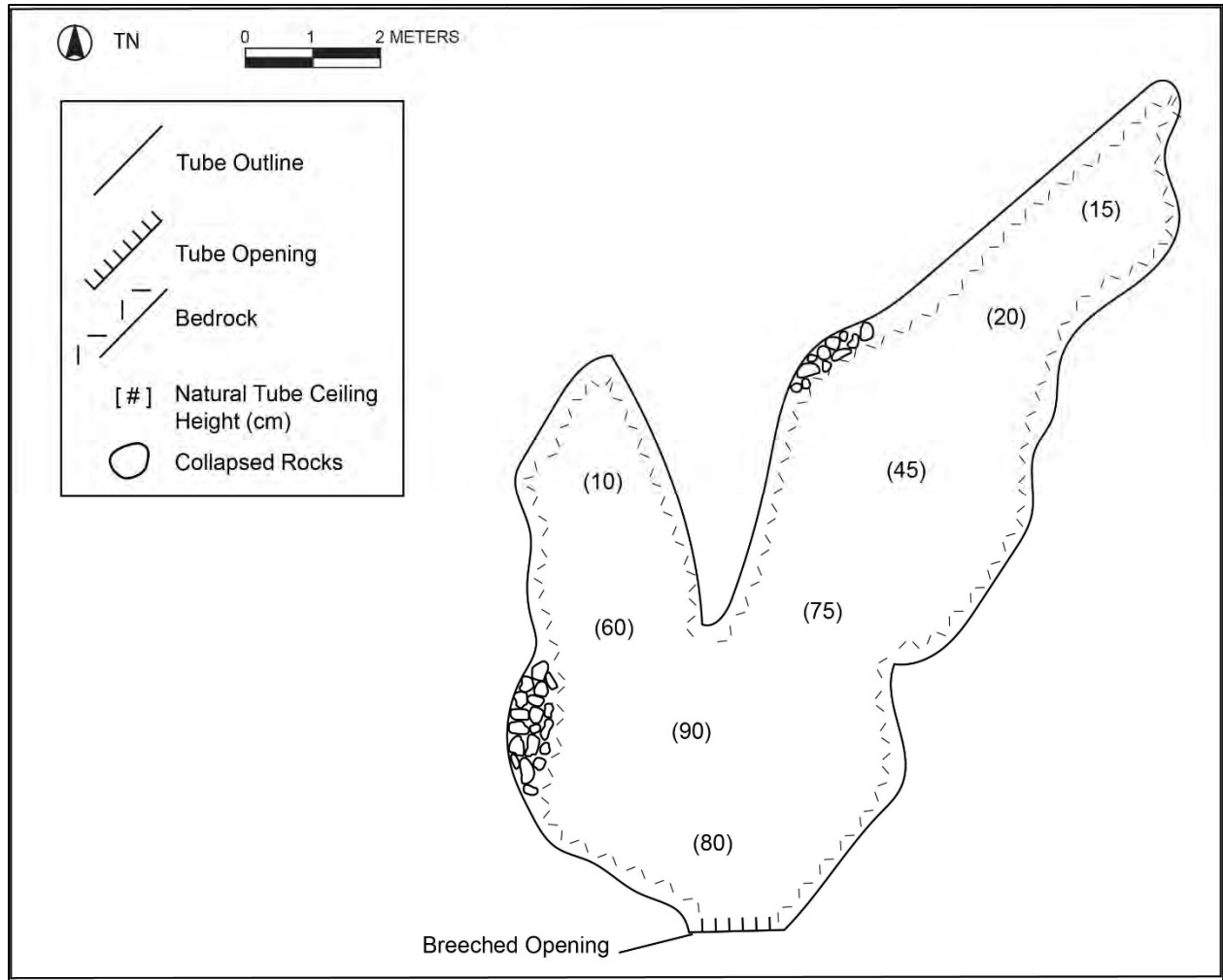


Figure 55. Plan view map of Lava Tube #1, showing the breach opening location



Figure 56. Photo showing the location of Lava Tube Breach #1; view to southwest



Figure 57. Photo of Lava Tube Breach #1 being collapsed by an excavator; view to northwest

5.4.1.2 Lava Tube Breach #2

Later on 23 September 2015, at 1630 hours, another lava tube was breached during project ground disturbance near STA 150 (see Figure 39). The breach occurred approximately 6.9 m east of the intermin fencing around SIHP # -28809 (a *pāhoehoe* excavation; see site description in Section 6.1.4). The exposed lava tube was designated as Lava Tube #2. Construction was halted and SHPD was informed, given the proximity of the tube to a historic property. The lava tube was inspected by Morgan Davis from SHPD, as well as HDOT, RMT, GBI, Cynthia Nazara (Lead Cultural Monitor), and CSH staff. An undated letter written to CSH Project Supervisor Oli Bautista by Cynthia Nazara about this incident is included in Appendix E.

The tube, designated Lava Tube #2, was described by the lead monitor as follows:

The breach or opening at Lava Tube 2 measures approximately 320 cm by 210 cm. The opening accesses an irregularly shaped cavern and an offshoot tunnel. The main cavern is oriented northeast-southwest at roughly 265 degrees, and is approximately 15 m long on its east-west axis and 10 m wide on its north-south axis. The ceiling height of the main cavern varies between 60 and 150 cm in the central area, and pinches out along its periphery, eventually meeting the floor.

The offshoot tunnel extends approximately 4 m south from the main cavern. The opening to the offshoot tunnel is approximately 40 cm high by 100 cm wide. This tunnel extends from the main cavern at a southwest bearing of 215 degrees for a distance of about 20 m, at which point it pinches out and terminates.

After investigating the interior and exterior of the cave, CSH archaeologists confirmed that Lava Tube 2 extends underneath the protective fencing around SIHP # -28809, and that SIHP # -28809 overlies the southwestern corner of the Lava Tube 2 main cavern. However, despite this close proximity, the excavation and lava tube are entirely separate features and in no way impact one another. Additionally, the tube was revealed to contain no cultural material or evidence of cultural use.

A small natural opening to Lava Tube 2 is in very close proximity to SIHP # -28809. This opening was investigated during the AIS [Monahan et al. 2012a]. As this opening was too small to enter, the portion of the tube visible from the opening was visually inspected at that time.

In summary, Lava Tube 2 is an unmodified lava tube that underlies SIHP # -28809 (a *pāhoehoe* excavation), a preservation site. Lava Tube 2 bears no physical connection with SIHP # -28809, and is culturally sterile. The collapsing of the portion of Lava Tube 2 within the project grading zone will not impact SIHP # -28809 in any way. For these reasons CSH does not recommend preservation of the portion of Lava Tube 2 that extends into the project grading zone.

Lava Tube #2 was mapped and photographs were taken (Figure 58, Figure 59, and Figure 60). When this documentation was completed, work resumed in the area. The portions of the lava tube within the project grading limits were collapsed and filled to meet the engineering standards of the highway construction.

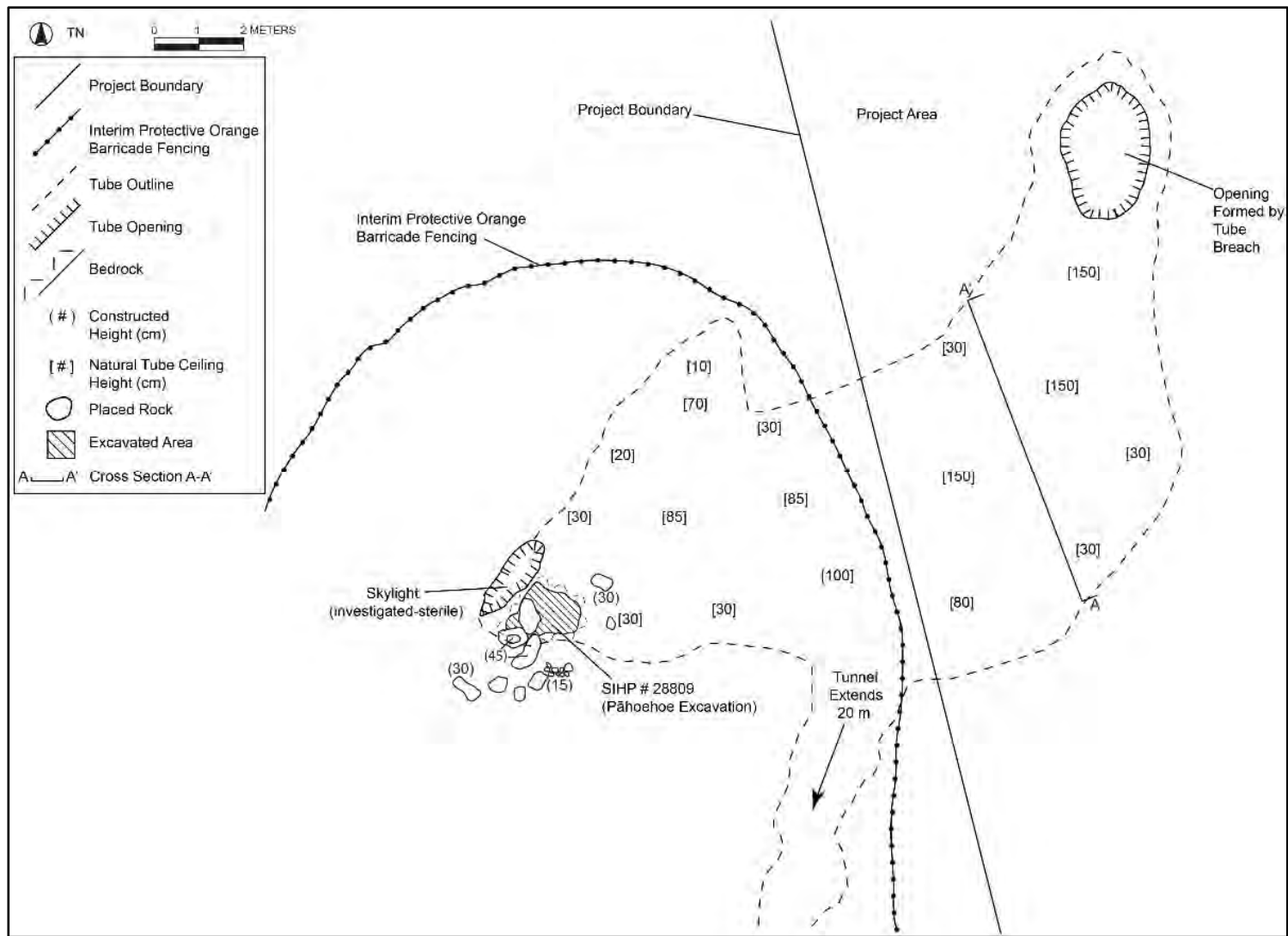


Figure 58. Plan view map of Lava Tube #2, showing the breach opening location



Figure 59. Photo showing Lava Tube Breach #2; view to west



Figure 60. Photo of the lava tube interior at Lava Tube Breach #2; view to west

5.4.1.3 Lava Tube Breach #3

On 25 September 2015 at 0930 hrs, a lava tube was breached by a D10 bulldozer that was reducing a *pāhoehoe* outcrop approximately 35 m west of Queen Ka'ahumanu Highway at STA 146 (see Figure 39). The exposed lava tube was designated as Lava Tube #3. Construction was halted in the area while CSH archaeologists inspected the lava tube. The opening measured approximately 250 cm by 200 cm and gave way to the lava tube floor which was visible approximately 190 cm below. Lava Tube #3 was described by the lead monitor as follows:

Lava tube 3 is a large, irregularly shaped lava tube. The entrance, which was uncovered by dozer excavation, is situated at the tubes north end. From the entrance the tube splits off into two lobes, the eastern lobe, and western lobe. The eastern lobe is considerably smaller than the western lobe, measuring about 15 by 20 meters. The western lobe is irregular in shape, but follows a general orientation of 82 degrees true north from the excavated opening. The northeastern corner of this lobe splits off into two small caverns which eventually pinch out into solid bedrock towards the northeast. Another offshoot cavern exists in the southeastern corner of this lobe. Like the others this offshoot eventually pinches out into solid bedrock. The floor to ceiling height of this lobe varies from approximately 2 meters in the central area to approximately 45cm down into the offshoot tunnels, until they close out. The western lobe of lava tube 3 is much larger, measuring about 100 meters in length, with widths varying between 15 to 25 meters. From the excavated opening, the western lobe meanders to the southwest, following a general orientation of 220 degrees true north. Following this heading into the tunnel, the lava tube opens into a large cavern with a ceiling height of approximately 145 centimeters. The ceiling is arch-shaped and pinches out into solid bedrock on either side. Continuing down the tunnel, approximately 45 meters southwest from the excavated opening, the tunnel narrows and the ceiling drops to about 90 cm before opening up into a spacious chamber. The floor to ceiling height of this chamber is approximately 3 meters at its center. It is a dome shaped ceiling, as such the ceiling is considerably lower at its periphery. Just beyond this chamber are a series of ledges, which climb up toward the ceiling, but drop off again to the east. This drop off leads to a small offshoot tunnel measuring 60 cm or so in height, which snakes back to the northeast before terminating into bedrock. Just beyond this series of ledges the tube turns to the west following a bearing of 240 degrees. Here the tunnel begins to close in, the ceiling height dropping to 30 cm on the edges of the tunnel and varying between 110 cm and 80 cm at the ceiling peak. Shortly after this change in direction the lava tube terminates into a small natural exit and a pile of rubble. The exit is not man made, but rather appears to have been the result of a series of collapses, presumably due to seismic activity, which exposed the southern end of the tunnel. The natural exit is located approximately 100 meters southwest of the excavated opening at a bearing of about 210 degrees true north.

No cultural materials were identified within Lava Tube #3, which was mapped and photographed (Figure 61, Figure 62, and Figure 63). When this documentation was completed, work resumed in the area. The portions of the lava tube within the project grading limits were collapsed and filled to meet the engineering standards of the highway construction.

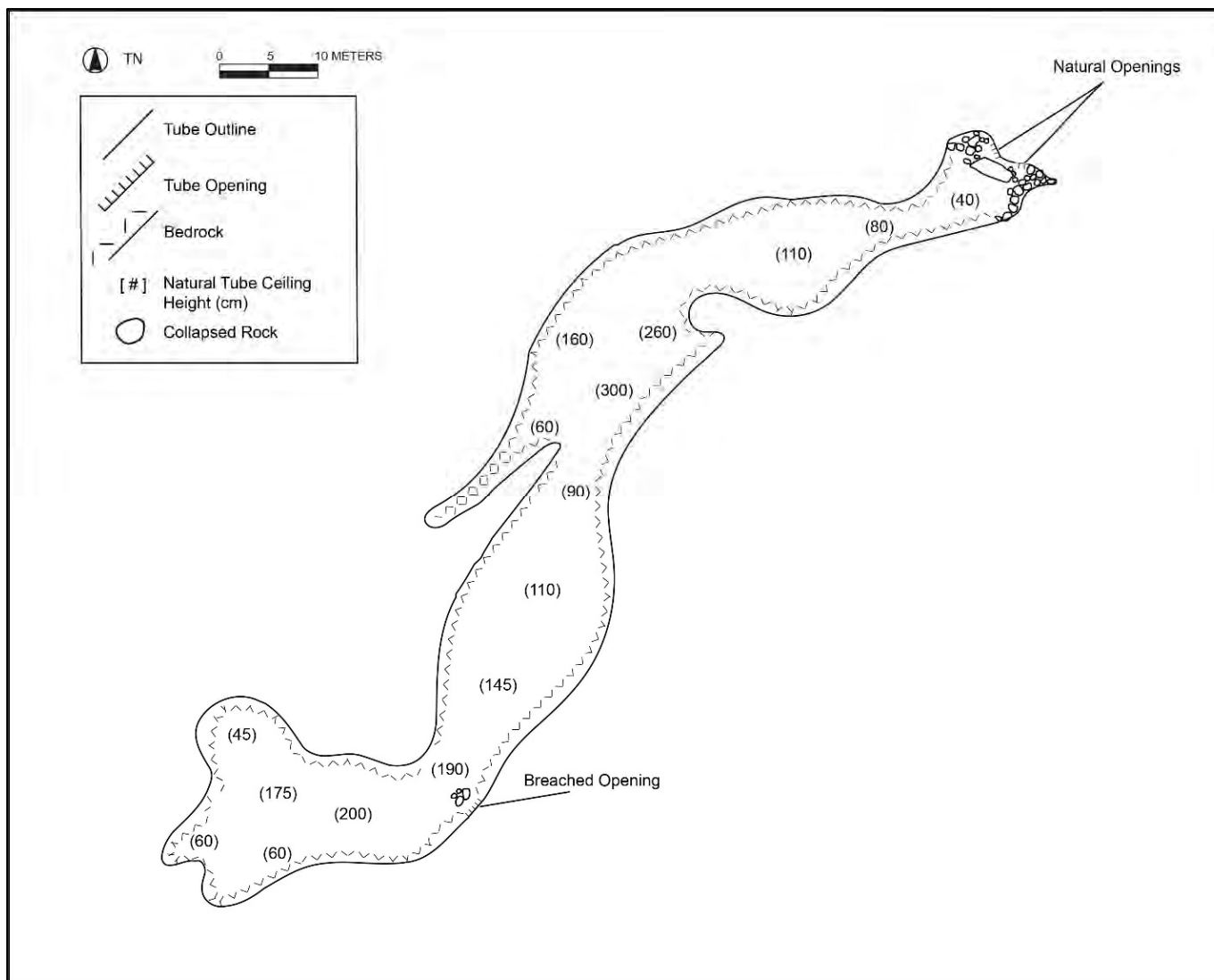


Figure 61. Plan view map of Lava Tube #3, showing the breach opening location



Figure 62. Photo of Lava Tube Breach #3; view to north



Figure 63. Photo of interior of Lava Tube #3; view to north

5.4.1.4 Lava Tube Breach #4

On 1 October 2015 at approximately 0900 hrs a D10 bulldozer breached a lava tube during grading near STA 138 (see Figure 39). The exposed lava tube was designated as Lava Tube #4. Construction was halted in the area while CSH archaeologists inspected the lava tube. Lava Tube #3 was described by the lead monitor as follows:

The entrance to the tube was uncovered approximately 25 meters west of the current shoulder of queen k highway, along station post 138. The d10 dozer cut across the easternmost portion of the tube, exposing two entrances. Entrance 1 opens to the north, exposing a small section of the tube which extends to the north approximately 4 meters before immediately pinching out into solid bedrock. Entrance 1 measures approximately 1.5 meters wide, by 1.9 meters tall, declining in height and width along all axis until it terminates. Entrance 2 is approximately 4 meters south of entrance, and opens into the main body of lava tube 4. Lava tube 4 is irregularly shaped, approximately 80 meters long running in a general northwest / southeast direction at a compass heading of approximately 272 degrees. Just beyond entrance two, the tube opens into a large cavern which measures approximately 10 meters by 10 meters. The floor of this cavern is dome shaped, sloping in all directions. A small offshoot tunnel extends off of the cavern at its southwestern corner. Here the tube narrows considerably before turning sharply to the northwest. This corridor widens slightly as it extends approximately 15 meters to the northwest. The ceiling of this corridor is triangular, reaching a height of about 2 meters at its peak. A secondary opening was discovered on the northern margin of this corridor. This side entrance measured approximately 2 meters by 60 centimeters, and runs parallel to the corridor, opening to the surface. The corridor extends another 15 meters or so to the northwest before opening into a large 20 by 20m cavern. The ceiling height of this cavern is about 290 centimeters at its highest. Large boulders and rubble are piled in the center of the cavern, clearly the result of partial cave collapses, probably due to seismic activity. A small skylight is visible above the collapsed rubble, confirming this. The large cavern extends to the northwest, diminishing gradually until it pinches into a small tunnel, which measures between 90 and 60 centimeters high, and about 3 meters wide. This small offshoot extends another 30 meters or so to the northwest before pinching out into solid bedrock.

No cultural materials were identified within Lava Tube #4, which was mapped and photographed (Figure 64, Figure 65, and Figure 66). When this documentation was completed, work resumed in the area. The portions of the lava tube within the project grading limits were collapsed and filled to meet the engineering standards of the highway construction.

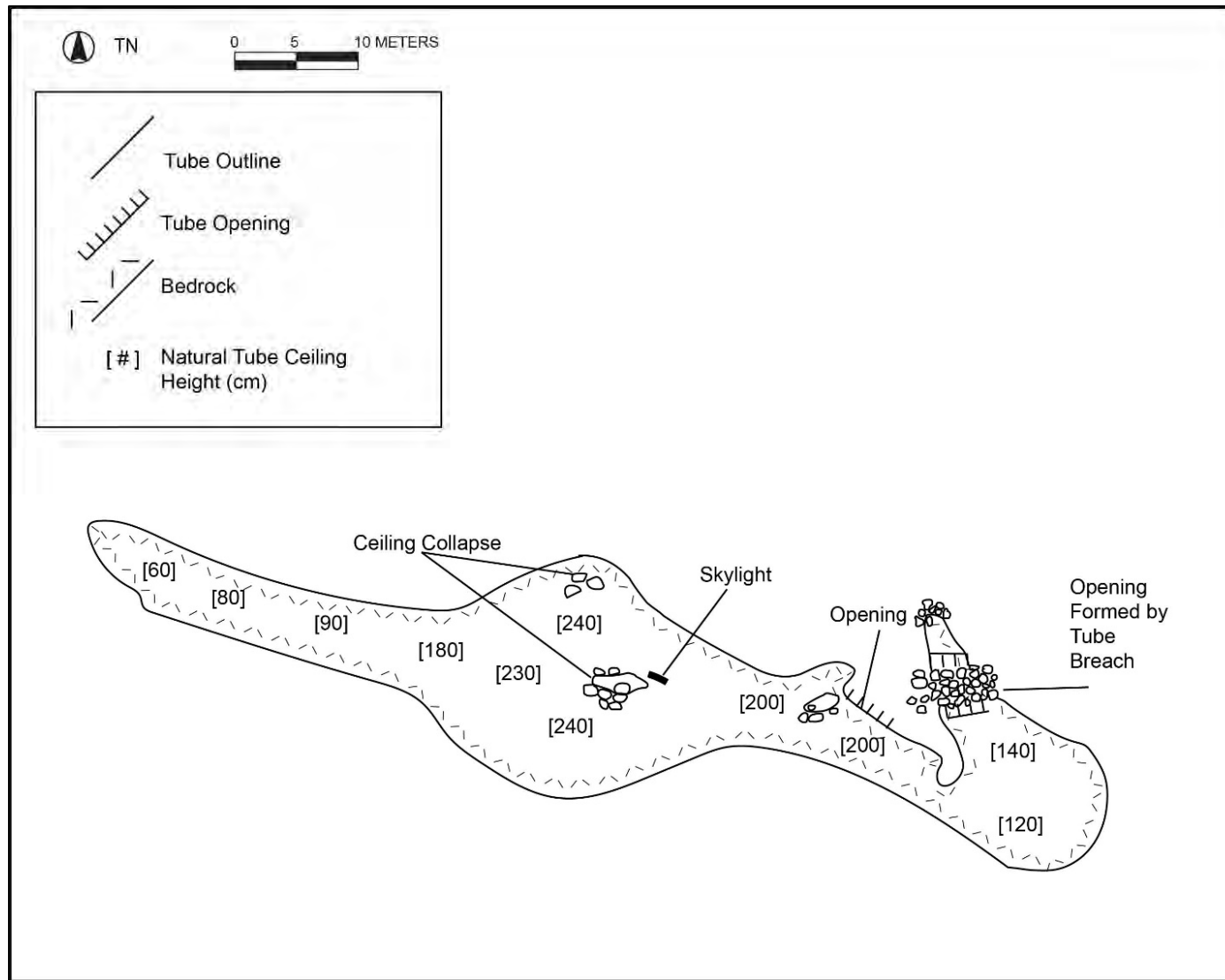


Figure 64. Plan view map of Lava Tube #4, showing the breach opening location



Figure 65. Photo of Lava Tube Breach #4; view to southwest



Figure 66. Photo showing the interior of Lava Tube Breach #4; view to southwest

5.4.2 Vehicle Accident

On 9 January 2018 at approximately 0300 hours a pickup truck lost control heading west (*makai*) on Hina Lani Street. The truck traveled through the highway intersection between a temporary utility pole and the streetlight near STA 70+00, coming to a stop approximately 25 m west of the highway atop an elevated *pāhoehoe* flat (see Figure 39). No historic properties were damaged as a result of the accident. The preservation sites nearest to the accident were SIHP # -10714 Feature A (Trail), situated approximately 35 m to the north, and SIHP # -29344 situated approximately 50 m to the south. Neither were impacted. A 20-m section of the orange protective fence at the location of the accident was damaged (Figure 67) and repaired later that day. The accident site was littered with vehicle debris and personal items (Figure 68).

5.4.3 Impacts to Historic Properties

There were inadvertent impacts to three historic properties during construction of the Queen Ka'ahumanu Highway Widening Phase 2 project. Immediately upon discovery of these impacts, construction was halted, and a meeting was held on 13 September 2016 with HDOT, SSFM, GBI, and CSH to discuss how these impacts occurred and how to move the project forward. As a result of this meeting, a monitoring Action Plan was developed by CSH in coordination with HDOT and GBI (see Section 2.1).

Upon the discovery of inadvertent impacts to historic properties, historic property location data and changes related to the re-design in the engineering plans were reassessed. A certified land survey of the historic properties and preservation boundaries was conducted (Appendix F), and the re-design changes to historic property preservation and mitigation was disseminated via the Final 4(f) Evaluation report.

5.4.3.1 SIHP # 50-10-27-10714

In November 2015, portions of SIHP # -10714 Feature A and Feature C trail segments were impacted by the Queen Ka'ahumanu Highway Widening Phase 2 project grading activities. An updated description of SIHP # -10714 is provided in Section 6.1.2.

In 2012 the SHPD accepted the DRPP (Shideler et al. 2012) for the historic properties in the project area. The preservation plan was revised in the APMP (Hammatt and Shideler 2014) for 23 specific historic properties due to engineering re-design of the highway widening plans and associated grading and construction limits. The preservation plans for trail segments comprising SIHP # -10714 Feature A and Feature C in Shideler et al. (2012) were not changed in the revised Hammatt and Shideler (2014) plan. The Hammatt and Shideler (2014) plan included preservation of only a portion of SIHP # 10714 Feature A and Feature C, and destruction of portions of Feature A and Feature C.

On 9 April 2014 the Hammatt and Shideler (2014) plan was accepted by SHPD (LOG NO. 2014.1379; DOC. NO. 1404MV06; see Appendix B). The acceptance letter speaks directly to the FHWA initiating "a redesign of the Phase 2 widening project in order to minimize the effects of this undertaking on historic properties." It notes 21 sites previously proposed to be impacted would now be avoided, and that nine of these sites are trails. It then lists the nine SIHP trail numbers. The list does not include SIHP # -10714.



Figure 67. Photo showing the location of the vehicle accident on the *makai* side of the Hina Lani Street and Queen Ka'ahumanu Highway intersection; note the breached interim construction fencing; view to west



Figure 68. Photo depicting the extent of damage caused by the vehicle accident at the Hinalani intersection; view to east

On 18 April 2015, in a letter signed by the Hawai'i State Historic Preservation Officer (SHPO) Dr. Alan Downer (LOG NO.: 2015.00806; DOC. NO.: 1504MV02) addressed to Meesa Otani of the FHWA, the SHPO accepted the Draft Section 4(f) Evaluation Report.

On 15 May 2015 the draft Section 4(f) Evaluation document, accepted by the SHPO on 18 April 2015, became the Queen Ka'ahumanu Highway Widening, Phase 2 Kealakehe Parkway to Keahole Airport Access Road Kailua-Kona, Big Island, Hawai'i FINAL SECTION 4(f) EVALUATION. This document contained a change in the preservation measures for SIHP # -10714 as summarized in Table 2 of the Final Section 4(f) Evaluation. Communication and coordination issues resulted in incorrect information being used to identify and locate the historic sites that needed to be protected. Placement of the barricade fencing in May and June 2015 relied on the 2014 grading limit (Hammatt and Shideler, 2014) and the SHPD acceptance letter for that report [LOG NO.:2014.1379; DOC. NO.:1404MV06]) The re-designed grading limits and vertical wall features included in the Final Section 4[f] Evaluation were unknown to the GBI and CSH personnel laying out the barricade fencing.

The highway re-design, to change the project effect to SIHP # -10714 from partial impact and "Data Recovery (Archival Research) & Partial Preservation" (Hammatt and Shideler 2014:20, Table 2), to "Avoidance via median reduction" (Federal Aid Project Number: NH-019-1[38]R, HDOT – Highways Division 2015), influenced the uncertainty in the inaccurate placement of barricade fencing across the Feature A and Feature C trail segments. It was expected that the grading limit was intended to cross the Feature A and Feature C trails, leaving segments of these trails outside the grading limits and segments inside, in accord with Hammatt and Shideler (2014). The inaccurate placement of interim fencing across the Feature A and Feature C trail segments occurred due to multiple items, including differing reports and information.

Figure 69 illustrates the SIHP # -10714 Feature A trail segment (in blue) and, from left (*makai*) to right (*mauka*), the 2012 Short and Long Term Preserve Buffer at the highway ROW boundary line, the revised 2014 Grading Limits and 2016 Interim [installed, preserve] Fence, and the Grading Limits from the Final Section 4(f) Evaluation report.

Figure 70 illustrates the SIHP # -10714 Feature C trail segment (in blue) and, from left (*makai*) to right (*mauka*), the 2012 Short and Long Term Preserve Buffer at the highway ROW boundary line, the revised 2014 Grading Limits and 2016 Interim [installed, preserve] Fence, and the Grading Limits from the Final Section 4(f) Evaluation report.

The impact to SIHP # -10714 Feature A was destruction of about 5 m of the east or *mauka* end of the trail that occurred during grubbing and grading for the highway widening. Initial preservation plans (Shideler et al. 2012) allowed for approximately 19 m of SIHP # -10714 Feature A to be impacted for the highway widening.

The impact to SIHP # -10714 Feature C involved approximately 7 m of the east or *mauka* end of the trail that occurred during grubbing and grading for the highway widening. Initial preservation plans (Shideler et al. 2012) allowed for approximately 23 m of SIHP # -10714 Feature C to be impacted for the highway widening.

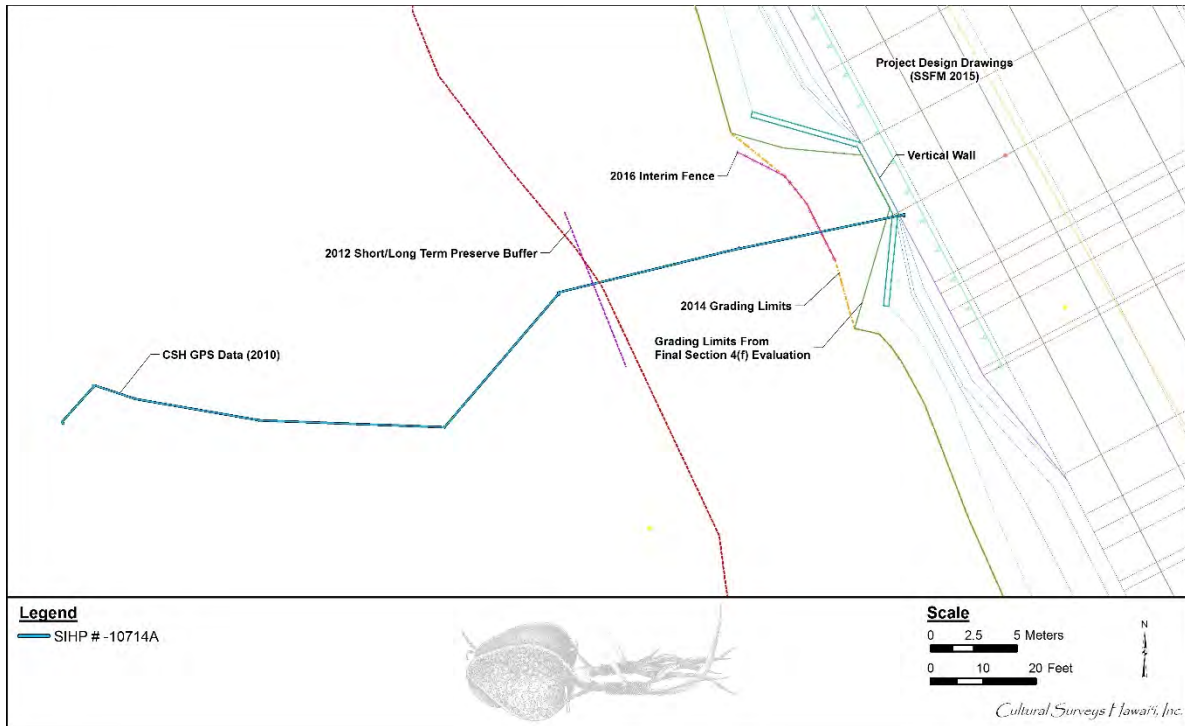


Figure 69. SIHP # -10714 Feature A showing 2014 highway design boundaries relative to the historic property location and other data

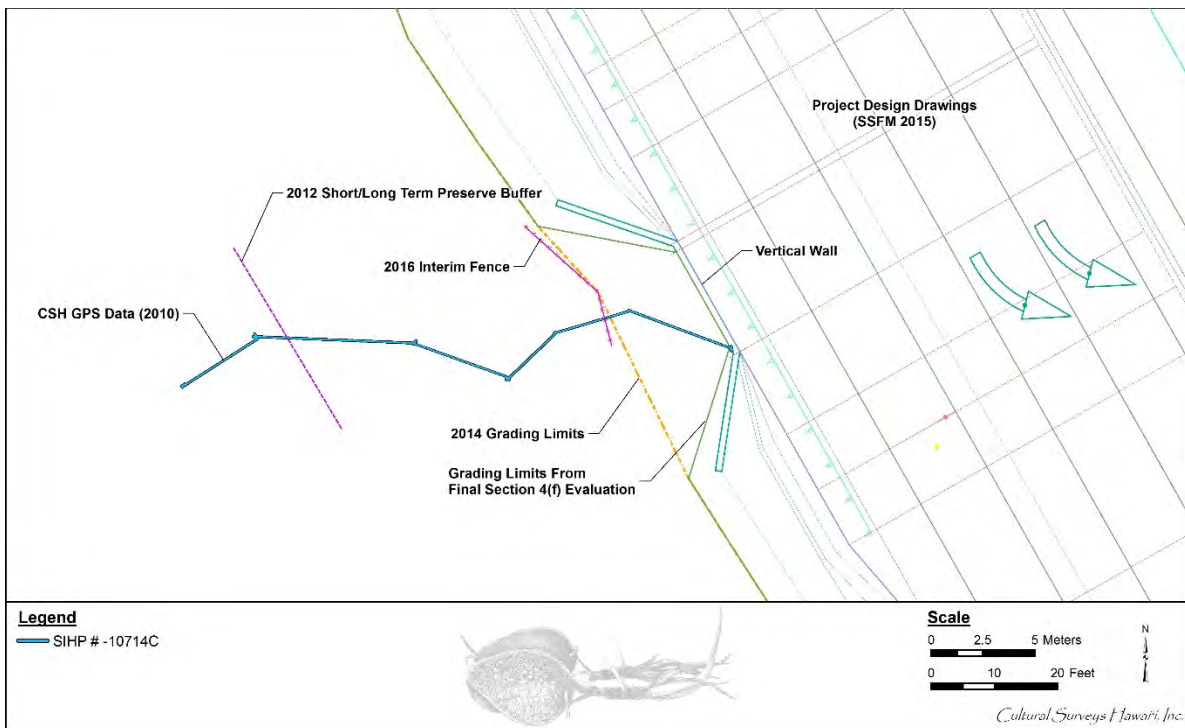


Figure 70. SIHP # -10714 Feature C showing 2014 highway design boundaries relative to the historic property location and other data

5.4.3.2 SIHP # 50-10-27-19954

On 15 April 2016 cultural monitors under contract with R.M. Towill Corporation dismantled that portion of the SIHP # -19954 stepping stone trail that appeared as if it would be impacted. The historic property-protective fencing was incorrectly placed, being positioned based on engineering drawings of the construction limits prior to the Highway redesign between 2012 and 2014. The cultural monitors constructed a cairn, makai of the 2012 construction and grading limits, with the collected step stones (flat *pāhoehoe* slabs) (Figure 71 through Figure 74). In addition to dismantling a portion of the trail, they collected marine shell associated with the site and deposited it into the cairn. This activity was monitored by CSH archaeological monitors. Once the error of the historic property-protective fencing was discovered, the cultural monitors reconstructed the trail using photographs taken prior to its dismantling. This reconstruction was not monitored by CSH archaeologists, but the site was inspected after the fact by a CSH supervisor. CSH monitors and the cultural monitors agreed the reconstruction was satisfactory.

The Lead CSH Monitor at the time made the following entry in his weekly report regarding the dismantling of SIHP # -19954:

At 8am or so a crew of two cultural monitors conducted a ceremony to preserve the portion of SIHP 19954, stepping stone trail, that was slated for demolition within the project grading limits. This entailed a short chant, and the excavation of the stone slabs that comprised this portion of the trail. The stones were removed and stacked in an ahu outside of the western grading limits of the project area. The new ahu was photographed and a gps point of its location was taken. The ahu measures approximately 60 cm across and 70 cm tall. The stones were stacked by Walter and Nicole which were arranged so that stones that were adjacent in-situ while still components of the trail, remained adjacent in the ahu configuration. Photographs of the process and of the finished ahu were taken. The ahu is stacked just north of the portion of the stepping stone trail that remains in preservation. [Layne Krause Doforms Weekly report 4/15/16]

See Section 6.1.3 for an updated description of SIHP # -19954.



Figure 71. Photo of cultural monitors Walter Wong and Nicole Lui dismantling SIHP # -19954 while being observed by CSH archaeological monitor Johnny Dudoit (center); view to north



Figure 72. Photo of cultural monitors Walter Wong and Nicole Lui constructing a cairn with stepping stones from SIHP # -19954; view to north



Figure 73. Photo of cultural monitors Walter Wong and Nicole Lui constructing a cairn with stepping stones from SIHP # -19954; view to east



Figure 74. Photo of completed cairn; view to northwest

5.4.3.3 SIHP # 50-10-27-00002; Māmalahoa Trail

A portion of SIHP # -00002 (Māmalahoa Trail) was impacted during construction activities. A 3.5-m section of the trail south of Kealakehe Parkway was disturbed by a tracked machine driven in a perpendicular direction across the trail segment terminus along the southern side of Kealakehe Parkway (Figure 75). Pre-cast concrete blocks are present adjacent to and slightly atop the disturbed northeast corner of this segment (see Figure 76). A plan view map illustrating the disturbed portion of SIHP # -00002 is presented in Figure 77. The impact to this site was documented in December 2016 as part of the SAIS (Wilkinson et al. 2017); in that report this section of the trail is discussed as Segment #1 within SAIS Area C. The SAIS (Wilkinson et al. 2017) was accepted by the SHPD in a letter dated 9 March 2017 (Log No.: 2017.00322, Doc. No.: 1703SL06; see Appendix B). An updated description of SIHP # -00002 is provided in Section 6.1.1.

The MOA of 1999 acknowledged that the project would affect SIHP # -00002 (Māmalahoa Trail), and provided that the HDOT shall not cumulatively affect more than 200 lineal ft of the SIHP # -00002 and that the HDOT shall develop and implement an archaeological treatment plan that includes a data recovery plan and an interim protection plan. A later 2015 MOA defers to the 1999 MOA for the treatment of SIHP # -00002, the Māmalahoa Trail. This concern for impact to the trail derived from the fact that the trail was crossed (and a section destroyed) by the original construction of Queen Ka'ahumanu Highway; the widening of the highway required destruction of an additional section of the trail.

The SHPD-accepted AIS (Monahan et al. 2012a) reported, in concurrence with the HDOT scope of work, that the project area was the approximately 300-ft-wide Queen Ka'ahumanu Highway ROW, a project area and area of potential effect that did not include the highway intersection with Kealakehe Parkway to the east or *mauka* (or the other intersecting streets to the north of the parkway). This oversight appears to have remained undetected until 2016.

The discovery prompted the HDOT to contract CSH for a supplemental survey of all the intersecting roads where construction was to occur to connect these intersecting roads with the expanded highway (Wilkinson et al. 2017). It was during this supplemental survey that an impact to approximately 3.5 m of the Māmalahoa Trail (SIHP # -00002) was identified and recorded on the south side of Kealakehe Parkway. The adverse effect consisted of a heavy, tracked vehicle driving perpendicularly across the northernmost end of the SIHP # -00002 up on the top of the backslope retaining wall. The heavy equipment was driving on the top of this backslope wall to stockpile pre-cast concrete boxes on the embankment. SIHP # -00002 in this location was not protected by interim preservation fencing, as fencing was not called for at that location in the DRPP (Shideler et al. 2012) or subsequent APMP (Hammatt and Shideler 2014), because this section of Kealakehe Parkway was not within the 300-ft-wide ROW that constituted the project area prior to the realization that the intersecting roads would need to be included in the project area and APE.

The impact to SIHP # -00002 is partial destruction of approximately 3.5 m of the northern end of the trail segment terminus along the southern side of Kealakehe Parkway, that occurred during stockpiling of pre-cast concrete boxes for the Queen Ka'ahumanu Highway widening project. The MOA addressing impacts to SIHP # -00002 allowed for destruction of up to 200 ft of the trail, but that was not intended for this section of trail at the parkway location.



Figure 75. Photo of SIHP # -00002, Māmalahoa Trail, overlooking the area of impact; Kealakehe Parkway is visible in background; view to east



Figure 76. Photo of SIHP # -00002, Māmalahoa Trail, showing the area of impact; Queen Ka'ahumanu Highway visible in background; view to west

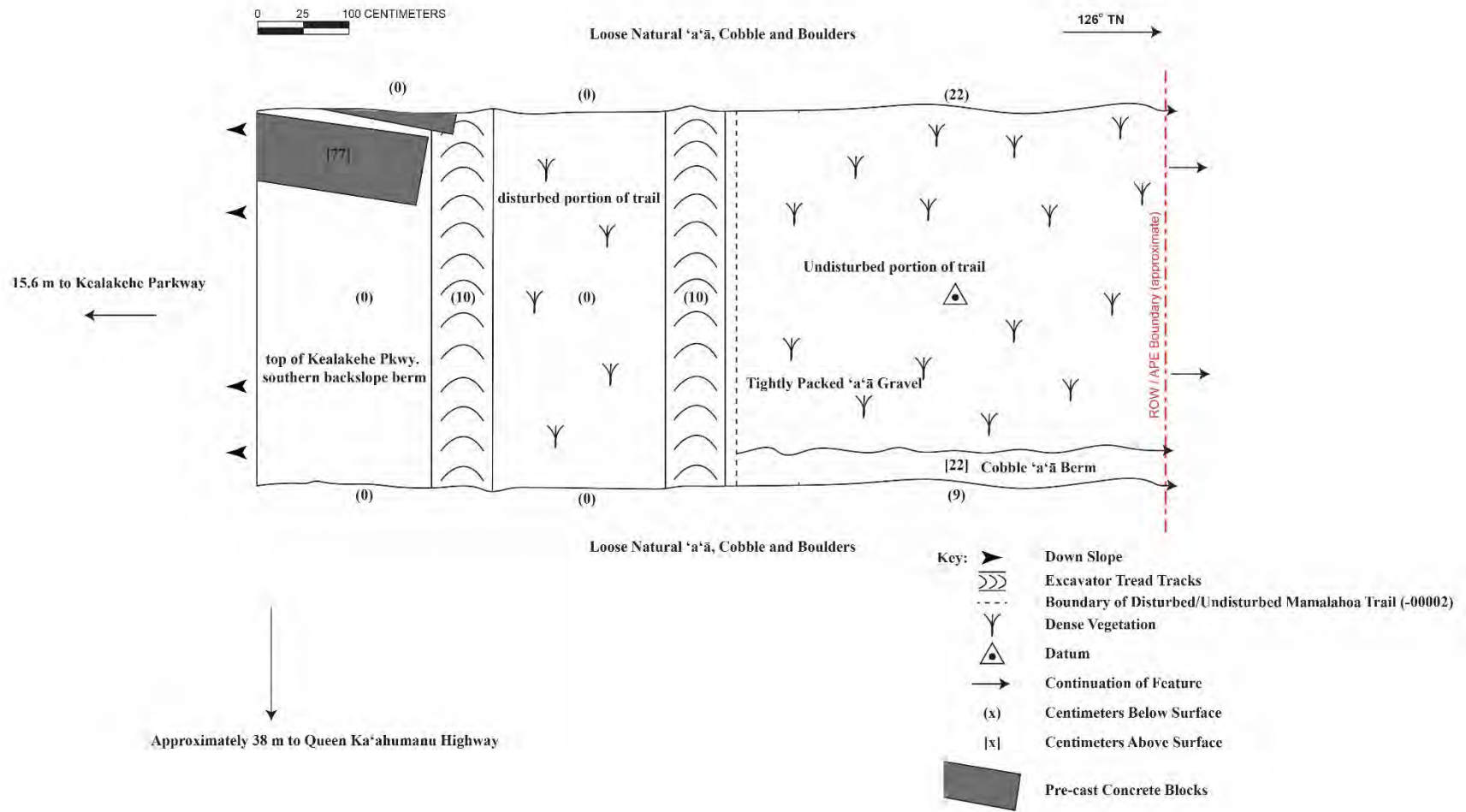


Figure 77. Plan view map of SIHP # -00002, showing the area of impact to Segment #1 within SAIS (Wilkinson et al. 2017) Area C

Immediately upon discovery of the impact at SIHP # -00002 work in the area was stopped and GBI and HDOT were notified. The area of impact and a portion of the trail to the south were cordoned off with orange barricade fencing. Approximately 3.5 m of the trail was impacted. Removal of the pre-cast concrete box was done with heavy equipment staged on the Kealakehe Parkway shoulder at the bottom of the backslope wall with an archaeological monitor present during that work.

5.5 Stratigraphy

A total of 231 profile drawings were completed by the archaeological monitors over the course of the project following the methods described in Section 2.1. The majority of profiles were recorded within the first several months of the project when new ground disturbance was occurring regularly throughout the project area. As no cultural deposits or other types of subsurface features were exposed by project excavations, 24 select profiles (approximately 10.4% of all recorded profiles) are included herein as representative of stratigraphy throughout the project area (Figure 78).

The stratigraphy observed during the monitoring program was as expected given the geology known to characterize the project area (see Figure 6) and prior construction-related disturbance. Stratigraphy within the project area consists of basalt gravel-to-boulder construction fills and/or natural layers of crushed 'a'ā lava overlying both deteriorating and consolidated basalt bedrock.

5.5.1 Profile 1

Excavation for a culvert extension located at STA 1112 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 250 cm below surface (cmbs). The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the southeastern sidewall (Figure 80 and Figure 81) is provided in Table 26. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.

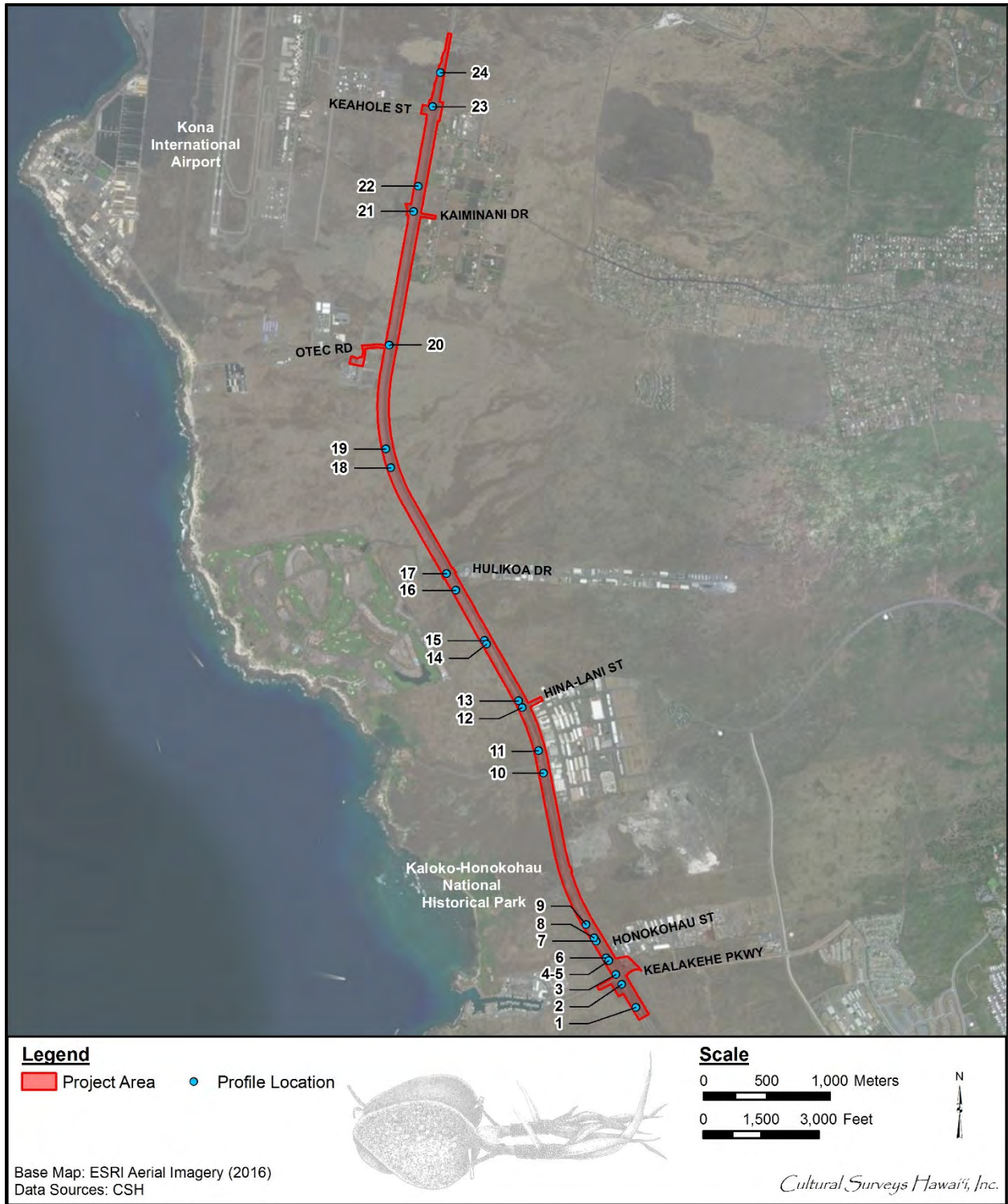


Figure 78. Aerial photo (ESRI 2016) showing the locations of 24 representative profiles throughout the project area



Figure 79. Photo of Profile 1; view to southeast

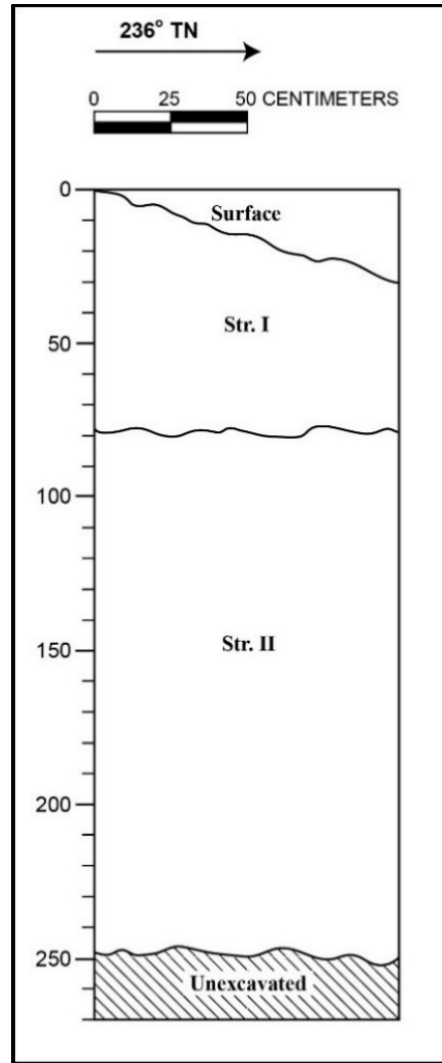


Figure 80. Drawing of Profile 1

Table 26. Stratigraphy of Profile 1

Stratum	Depth (cmbs*)	Description
I	0–80	2.5YR 5/2, grayish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; many fine roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	80–250	10YR 6/1; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

*cmbs = centimeters below surface

5.5.2 Profile 2

Excavation for a reclaimed water line located at STA 1120 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 230 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill overlying deteriorating and consolidated basalt bedrock. The stratigraphic sequence of the northeastern sidewall (Figure 81 and Figure 82) is provided in Table 27. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 81. Photo of Profile 2; view to northeast

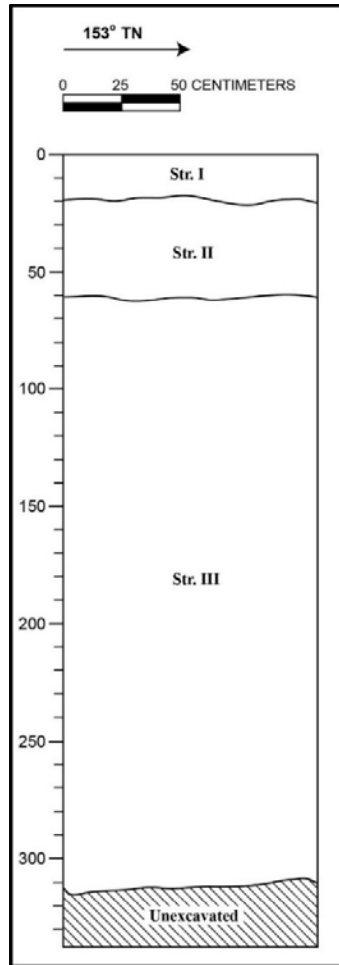


Figure 82. Drawing of Profile 2

Table 27. Stratigraphy of Profile 2

Stratum	Depth (cmbs)	Description
I	0–20	10YR 4/6, dark yellowish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; few fine roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	20–60	10YR 4/1, dark gray; extremely gravely silty loam; dry, hard consistence; moderate cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; natural matrix of deteriorating bedrock and aeolian silts
III	60–230	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.3 Profile 3

Excavation for a reclaimed waterline located at STA 1122 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 270 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill overlying crushed 'a'ā lava rock and consolidated basalt bedrock. The stratigraphic sequence of the southeastern sidewall (Figure 83 and Figure 84) is provided in Table 28. No subsurface cultural deposits and/or human remains (i.e., historic properties) were observed during monitoring at this location.



Figure 83. Photo of Profile 3; view to southeast

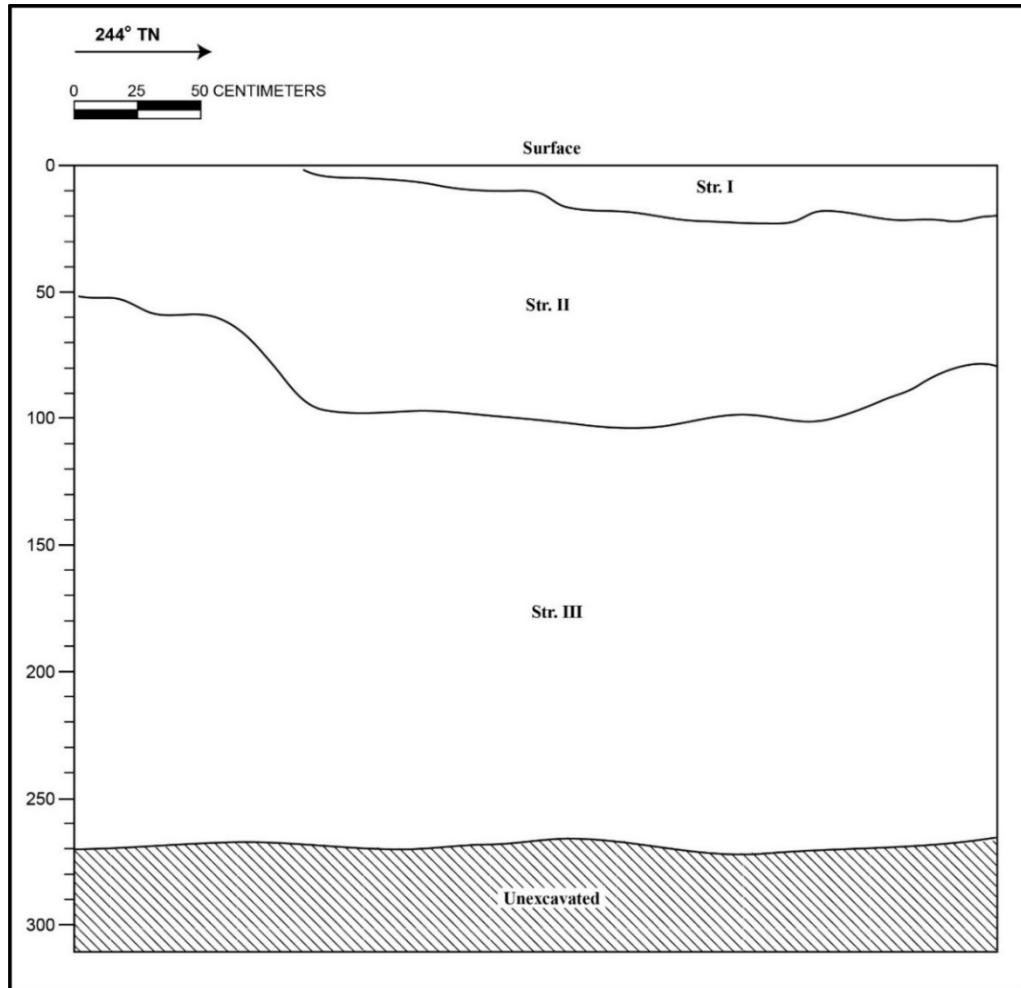


Figure 84. Drawing of Profile 3

Table 28. Stratigraphy of Profile 3

Stratum	Depth (cmbs)	Description
I	0–20	2.5 Y 6/3, light yellowish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; few fine roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	0–50	2.5Y 5/2, grayish brown; silty crushed 'a 'ā lava rock; dry, hard consistence; moderate cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present
III	50–270	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.4 Profile 4

Excavation for a sewer line located at STA 1126 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 330 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by crushed 'a 'ā lava and consolidated basalt bedrock. The stratigraphic sequence of the northeastern sidewall (Figure 85 and Figure 86) is provided in Table 29. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 85. Photo of Profile 4; view to northeast

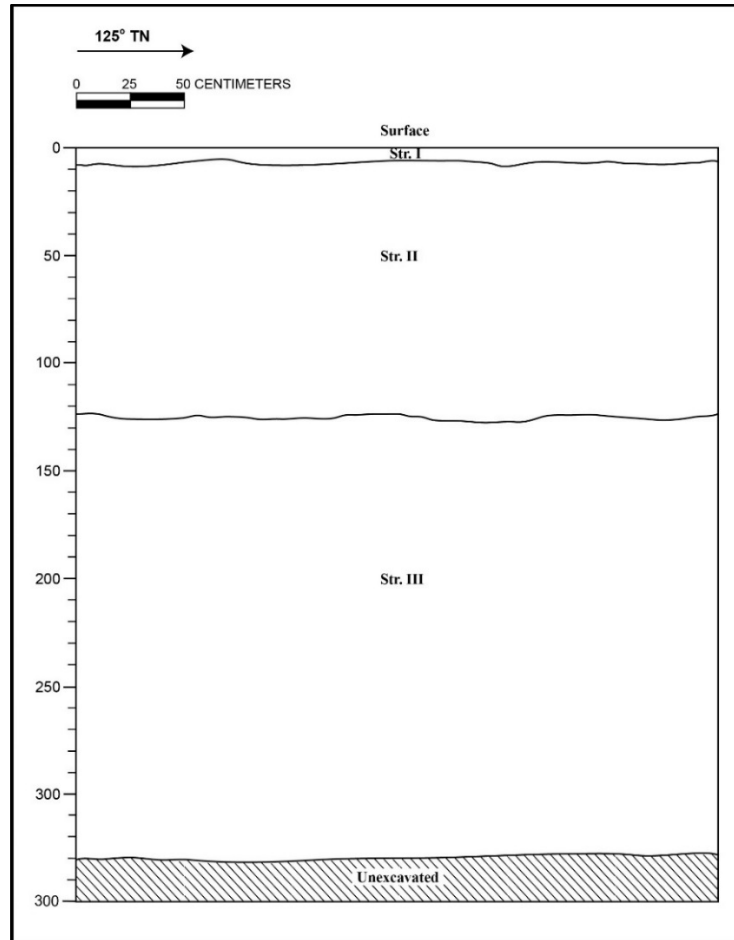


Figure 86. Drawing of Profile 4

Table 29. Stratigraphy of Profile 4

Stratum	Depth (cmbs)	Description
I	0–10	2.5 Y 6/3, light yellowish brown; extremely gravelly silt; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; few fine roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	10–125	10YR 6/1, gray; silty crushed 'a'ā lava rock; dry, hard consistence; moderate cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present
III	125–330	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.5 Profile 5

Excavation for a sewer line located at STA 1126 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 300 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel/sand fill underlain by natural crushed 'a'a lava and consolidated basalt bedrock. The stratigraphic sequence of the southwestern sidewall (Figure 87 and Figure 88) is provided in Table 30. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 87. Photo of Profile 5; view to west

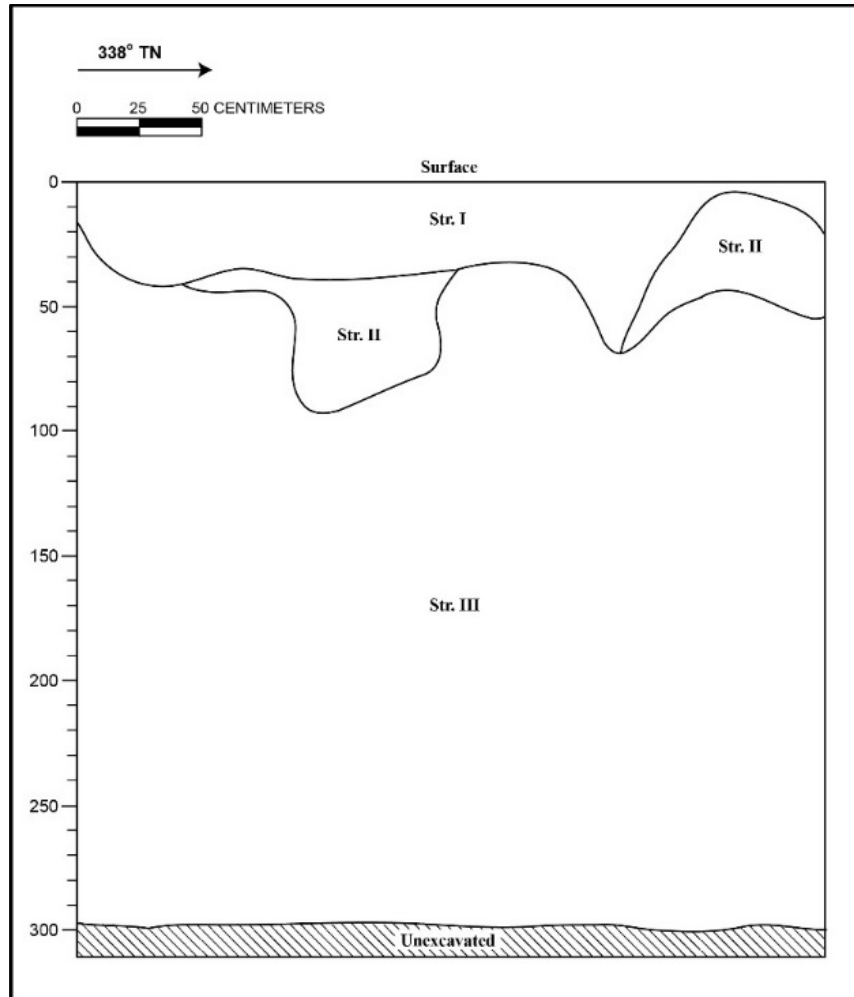


Figure 88. Drawing of Profile 5

Table 30. Stratigraphy of Profile 5

Stratum	Depth (cmbs)	Description
I	0-75	5YR 5/1, gray; extremely gravelly silty sand; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; diffuse to clear, wavy lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	10-90	5YR 3/2, dark reddish brown; silty crushed 'a'ā lava rock; dry, hard consistence; no cementation; non-plastic; terrigenous; broken, clear lower boundary; no roots; no cultural materials present
III	40-300	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.6 Profile 6

Excavation for a sewer line located at STA 1 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 320 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced basalt fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the western sidewall (Figure 89 and Figure 90) is provided in Table 31. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 89. Photo of Profile 6; view to west

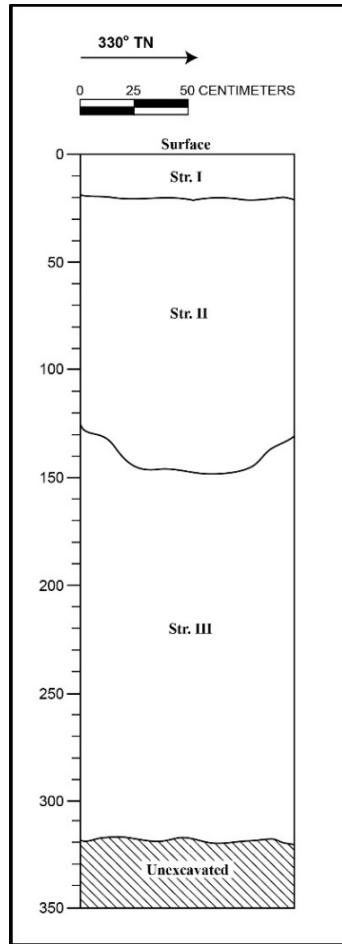


Figure 90. Drawing of Profile 6

Table 31. Stratigraphy of Profile 6

Stratum	Depth (cmbs)	Description
I	0–20	2.5YR 5/2, grayish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
II	20–125	10YR 6/1, gray; silty gravel, cobbles and boulders; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
III	125–320	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.7 Profile 7

Excavation for a sewer line located at STA 6 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 310 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the eastern sidewall (Figure 91 and Figure 92) is provided in Table 32. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 91. Photo of Profile 7; view to east

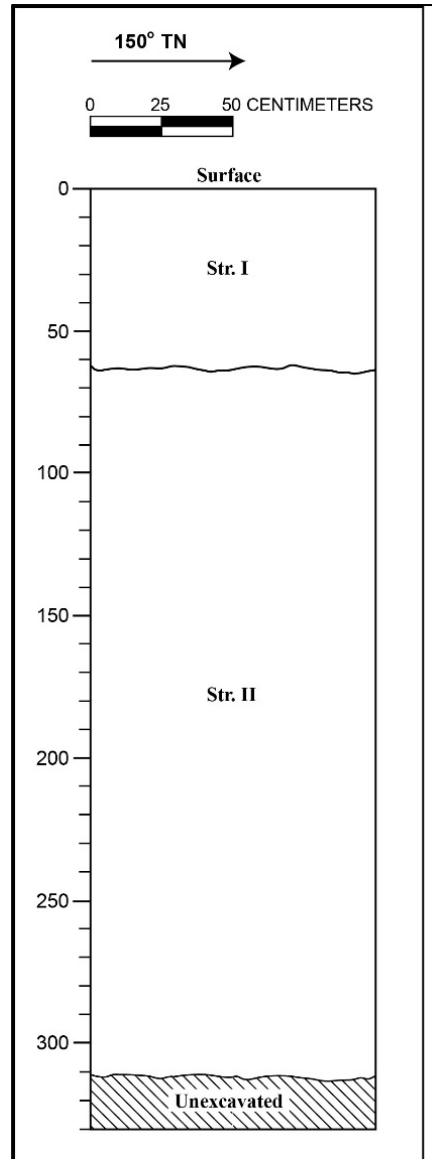


Figure 92. Drawing of Profile 7

Table 32. Stratigraphy of Profile 7

Stratum	Depth (cmbs)	Description
I	0–60	2.5YR 5/2, grayish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, abrupt lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
II	60–310	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.8 Profile 8

Excavation for a reclaimed water line located at STA 7 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 220 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the western sidewall (Figure 93 and Figure 94) is provided in Table 33. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 93. Photo of Profile 8; view to west

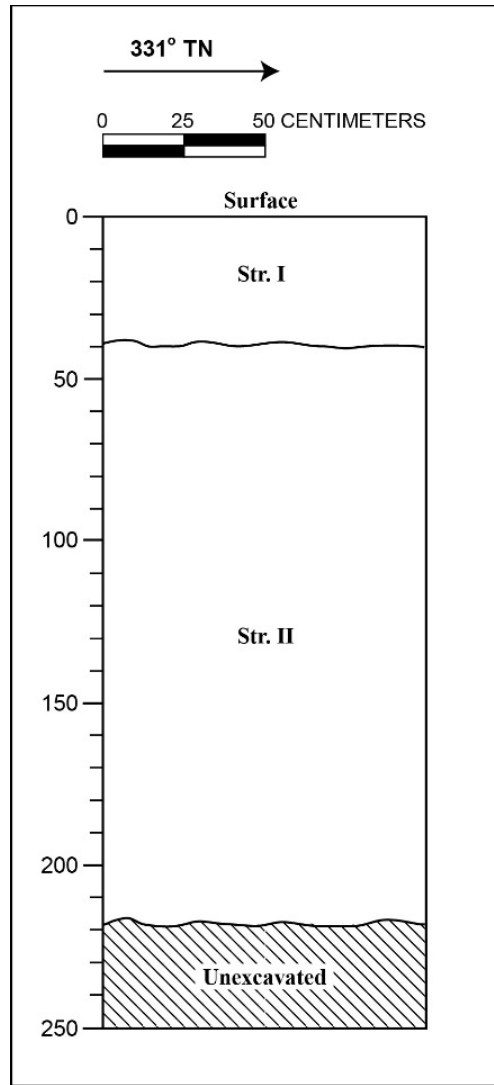


Figure 94. Drawing of Profile 8

Table 33. Stratigraphy of Profile 8

Stratum	Depth (cmbs)	Description
I	0–40	2.5YR 5/2, grayish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, abrupt lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	40–220	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.9 Profile 9

Excavation for a sewer line located at STA 11 along the *makai* highway shoulder in the southern portion of the project area (see Figure 78) exposed sediments up to 250 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel and cobble-boulder fills underlain by deteriorating and consolidated basalt bedrock. The stratigraphic sequence of the southwestern sidewall (Figure 95 and Figure 96) is provided in Table 34. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 95. Photo of Profile 9, view to southwest

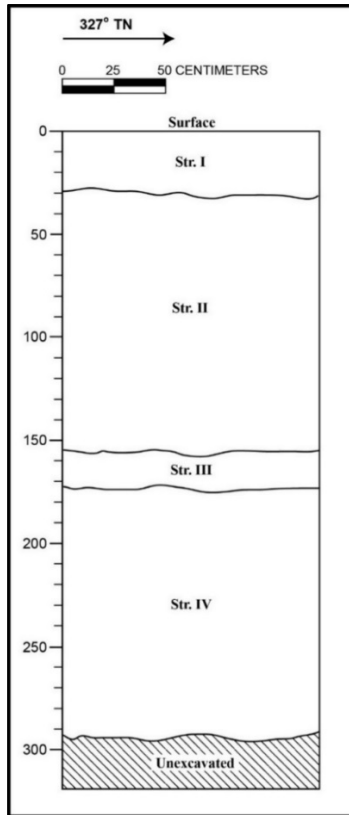


Figure 96. Drawing of Profile 9

Table 34. Stratigraphy of Profile 9

Stratum	Depth (cmbs)	Description
I	0–25	10YR 3/2, very dark grayish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
II	25–135	10YR 6/1, gray; silty cobbles and boulders; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, abrupt lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
III	135–150	2.5 YR 3/6, dark red; silty deteriorating basalt bedrock; dry, hard consistence; moderate cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; layer is source of red staining observed in Stratum IV
IV	150–250	2.5 YR 3/2, very dark gray; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.10 Profile 10

Excavation for a sewer line located at STA 52 along the *makai* highway shoulder in the southern-central portion of the project area (see Figure 78) exposed sediments up to 200 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by deteriorating and consolidated basalt bedrock. The stratigraphic sequence of the northeastern sidewall (Figure 97 and Figure 98) is provided in Table 35. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 97. Photo of Profile 10; view to northeast

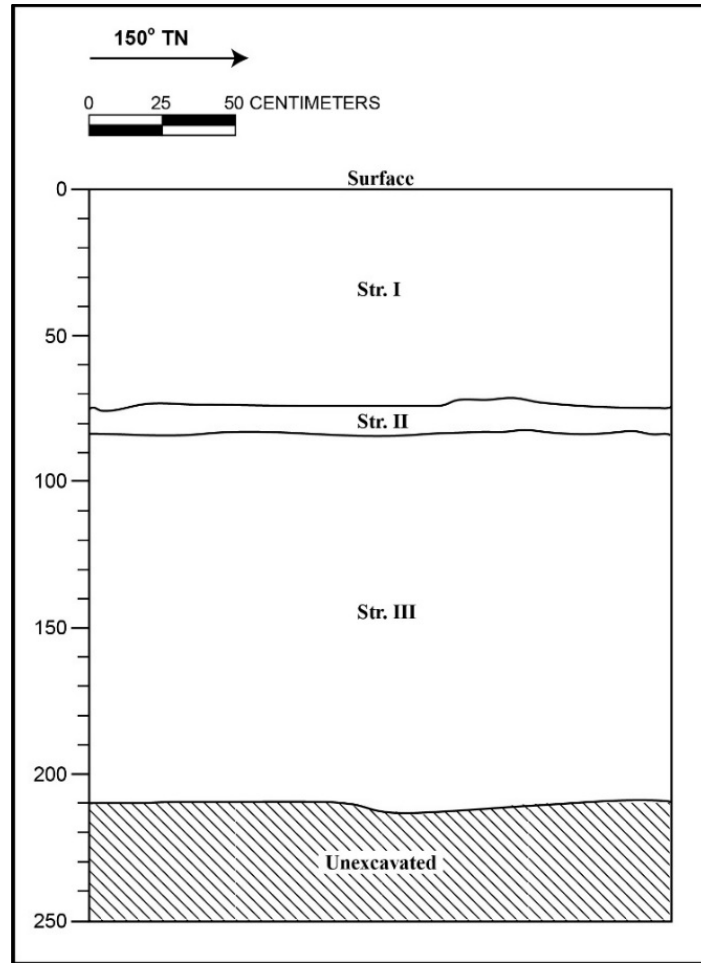


Figure 98. Drawing of Profile 10

Table 35. Stratigraphy of Profile 10

Stratum	Depth (cmbs)	Description
I	0–75	10YR 3/2, very dark grayish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
II	75–85	10YR 4/2, dark grayish brown; silty deteriorating bedrock; dry, hard consistence; no cementation; non-plastic; terrigenous; broken, clear lower boundary; no roots; no cultural materials present
III	85–210	10YR 3/2, very dark grayish brown; silty deteriorating bedrock; dry, hard consistence; no cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.11 Profile 11

Excavation for a dry wall at STA 58 along the *makai* highway shoulder in the southern-central portion of the project area (see Figure 78) exposed sediments up to 200 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the northwestern sidewall (Figure 99 and Figure 100) is provided in Table 36. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 99. Photo of Profile 11; view to northwest

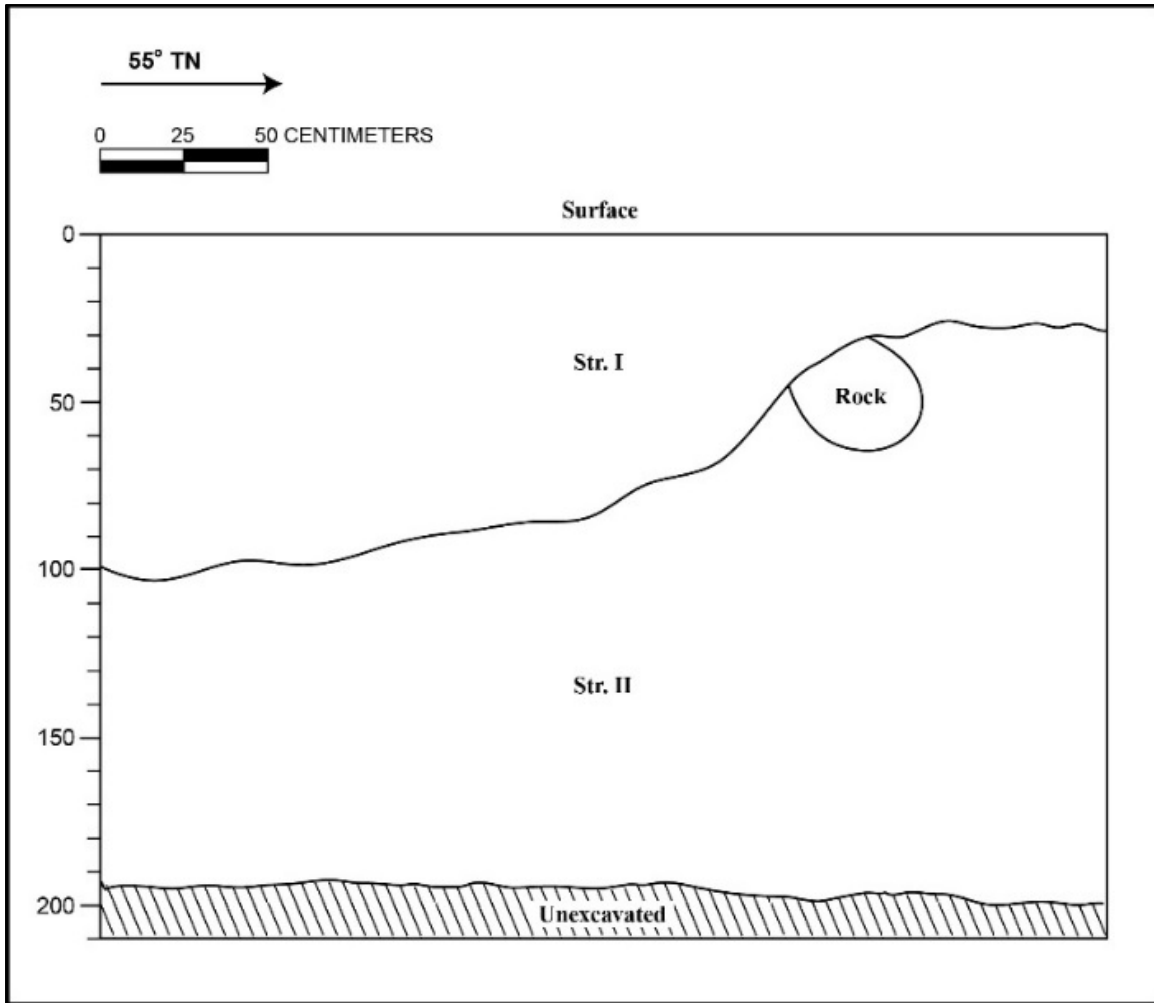


Figure 100. Drawing of Profile 11

Table 36. Stratigraphy of Profile 11

Stratum	Depth (cmbs)	Description
I	0–100	10YR 3/2, very dark brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; wavy, clear lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	30–200	10YR 3/1, very dark gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.12 Profile 12

Excavation for a water line located at STA 70 along the *makai* highway shoulder in the southern-central portion of the project area (see Figure 78) exposed sediments up to 270 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by natural deteriorating and consolidated basalt bedrock. The stratigraphic sequence of the northeastern sidewall (Figure 101 and Figure 102) is provided in Table 37. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 101. Photo of Profile 12; view to northeast

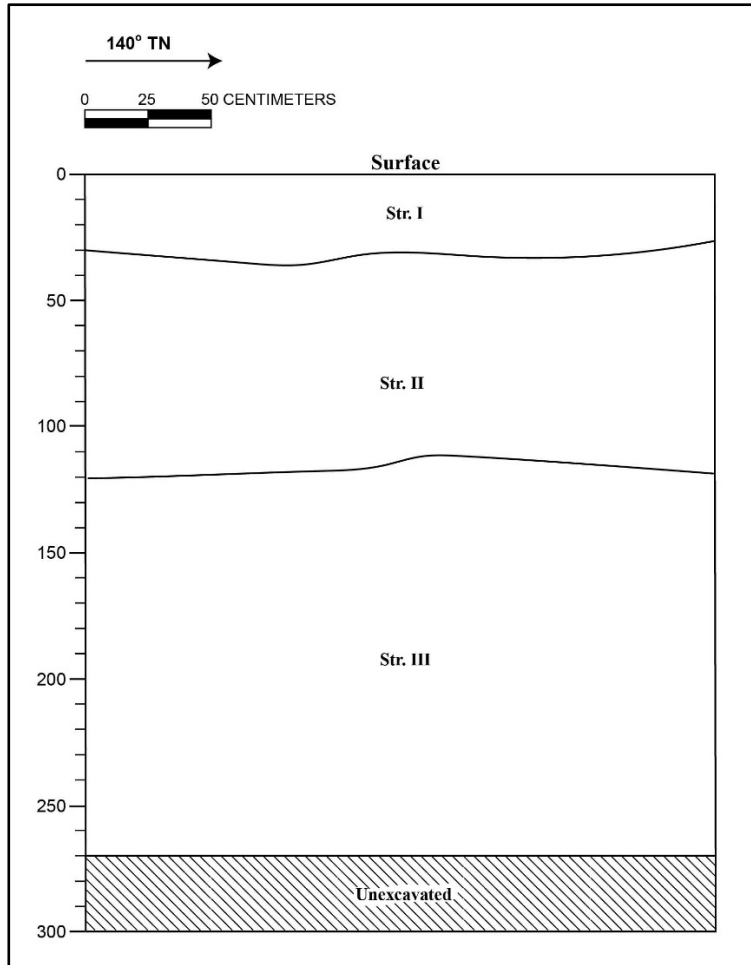


Figure 102. Drawing of Profile 12

Table 37. Stratigraphy of Profile 12

Stratum	Depth (cmbs)	Description
I	0–30	10YR 3/2, very dark brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, diffuse lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	30–120	10YR 3/2, very dark grayish brown; extremely stony silty loam; dry, hard consistence; moderate cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; natural matrix of deteriorating bedrock and aeolian silts
III	120–270	10YR 3/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.13 Profile 13

Excavation for a water line located at STA 72 along the *makai* highway shoulder in the southern-central portion of the project area (see Figure 78) exposed sediments up to 200 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the southwestern sidewall (Figure 103 and Figure 104) is provided in Table 38. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 103. Photo of Profile 13; view to southwest

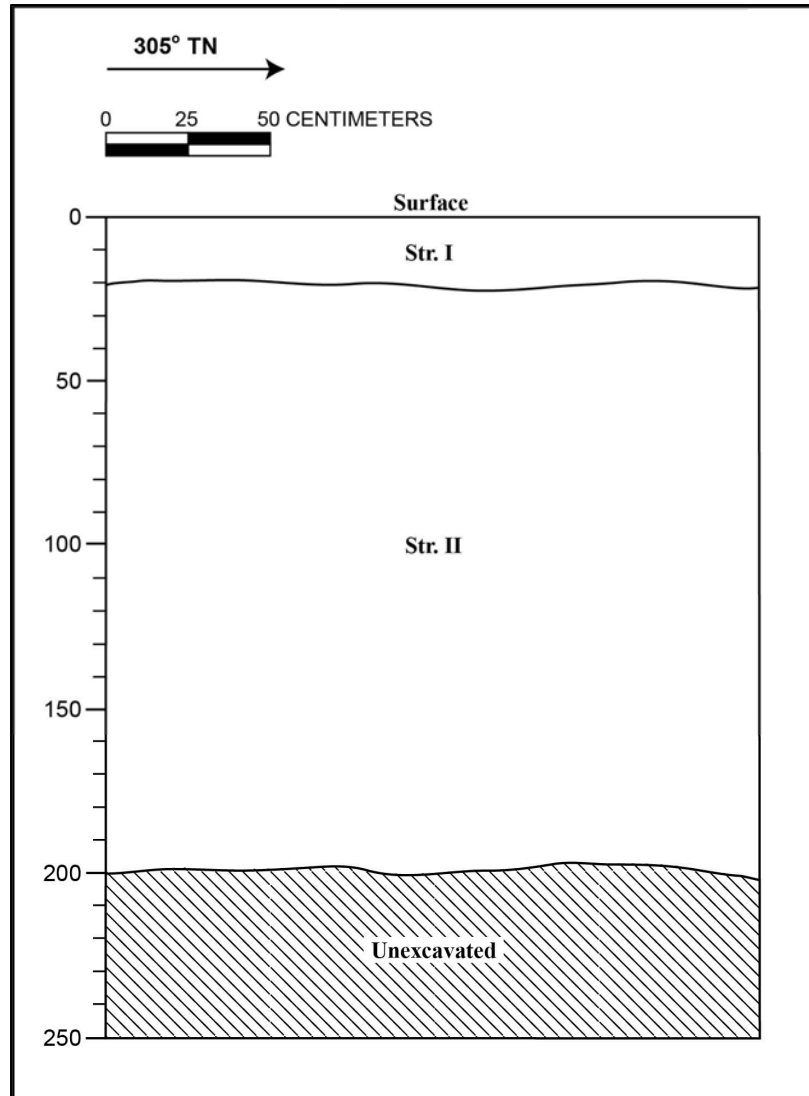


Figure 104. Drawing of Profile 13

Table 38. Stratigraphy of Profile 13

Stratum	Depth (cmbs)	Description
I	0–20	10YR 3/2, very dark brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	20–200	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.14 Profile 14

Excavation for a utility line located at STA 89 along the *makai* highway shoulder in the central portion of the project area (see Figure 78) exposed sediments up to 110 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the southeastern sidewall (Figure 105 and Figure 106) is provided in Table 39. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 105. Photo of Profile 14; view to northwest

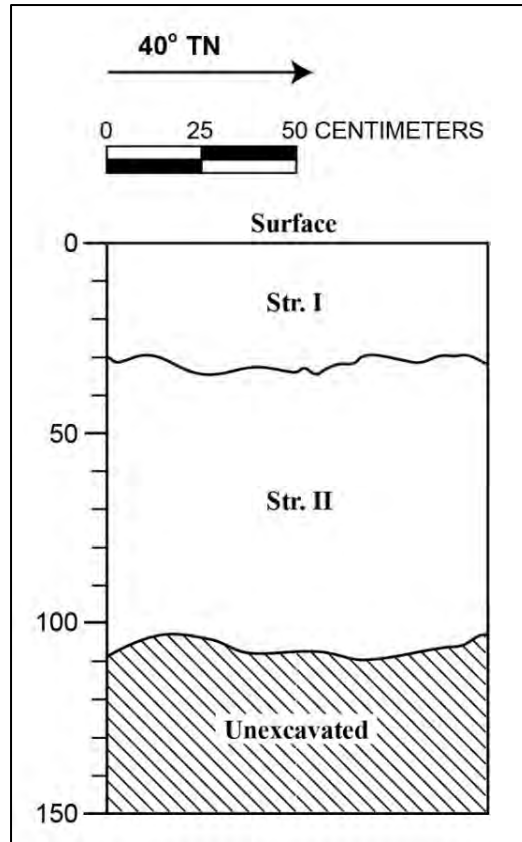


Figure 106. Drawing of Profile 14

Table 39. Stratigraphy of Profile 14

Stratum	Depth (cmbs)	Description
I	0–30	10YR 3/2, very dark brown; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	30–110	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.15 Profile 15

Excavation for a utility line located at STA 90 along the *makai* highway shoulder in the central portion of the project area (see Figure 78) exposed sediments up to 150 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the northeastern sidewall (Figure 107 and Figure 108) is provided in Table 40. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 107. Photo of Profile 15; view to northeast

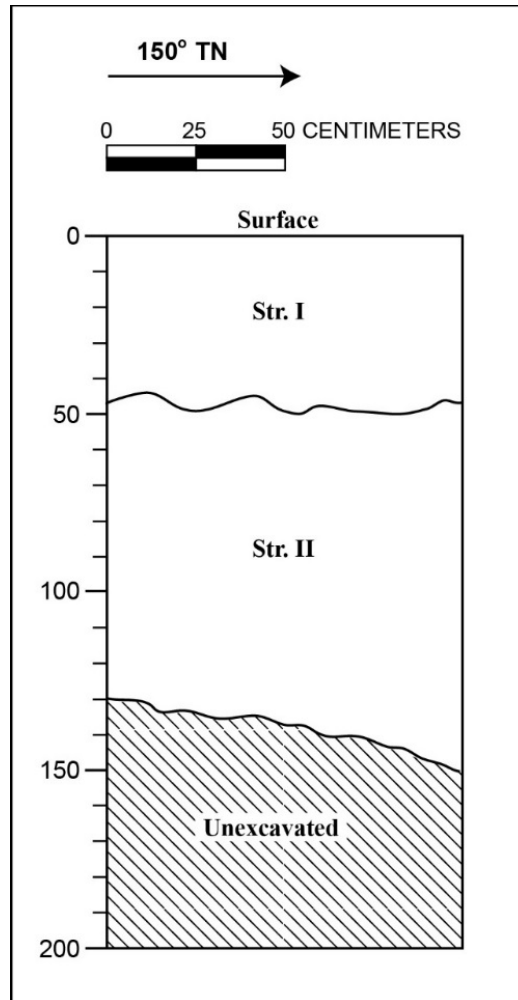


Figure 108. Drawing of Profile 15

Table 40. Stratigraphy of Profile 15

Stratum	Depth (cmbs)	Description
I	0–45	Fill 10YR 3/2, very dark brown; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	45–150	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.16 Profile 16

Excavation for a utility line located at STA 105 along the *makai* highway shoulder in the central portion of the project area (see Figure 78) exposed sediments up to 80 cmbs. The stratigraphic sequence of this area is characterized by a single layer of locally sourced gravel and cobble fill. The stratigraphic sequence of the northeastern sidewall (Figure 109 and Figure 110) is provided in Table 41. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 109. Photo of Profile 16; view to east

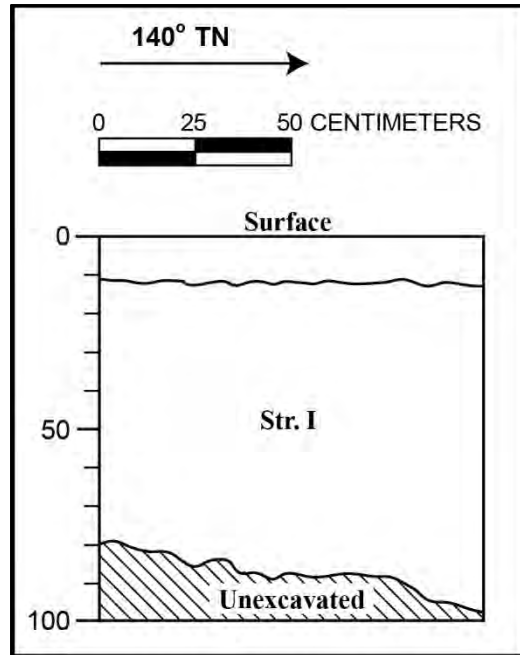


Figure 110. Drawing of Profile 16

Table 41. Stratigraphy of Profile 16

Stratum	Depth (cmbs)	Description
I	0-80	Fill 10YR 3/2, very dark brown; silty gravel and cobbles; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt

5.5.17 Profile 17

Excavation for a streetlight foundation located at STA 110 along the *mauka* highway shoulder in the central portion of the project area (see Figure 78) exposed sediments up to 150 cmbs. The stratigraphic sequence of this area is characterized by a layer of locally sourced gravel and cobble fill overlying consolidated basalt bedrock. The stratigraphic sequence of the northwestern sidewall (Figure 111 and Figure 112) is provided in Table 42. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 111. Photo of Profile 17; view to northwest

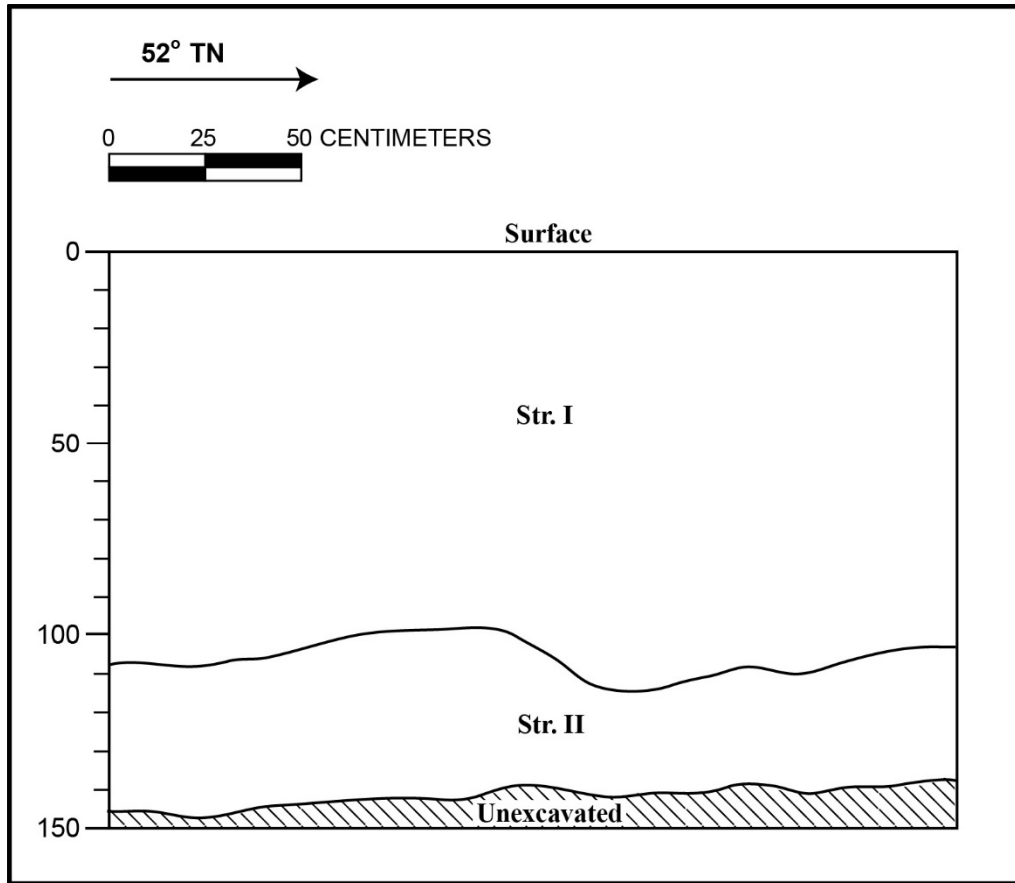


Figure 112. Drawing of Profile 17

Table 42. Stratigraphy of Profile 17

Stratum	Depth (cmbs)	Description
I	0–120	10YR 3/1, very dark brown; silty gravel and cobbles; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; matrix of fill associated with prior highway construction and aeolian silt
II	120–150	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.18 Profile 18

Excavation for a culvert extension located at STA 141 along the *makai* highway shoulder in the central portion of the project area (see Figure 78) exposed sediments up to 125 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the western sidewall (Figure 113 and Figure 114) is provided in Table 43. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 113. Photo of Profile 18; view to west

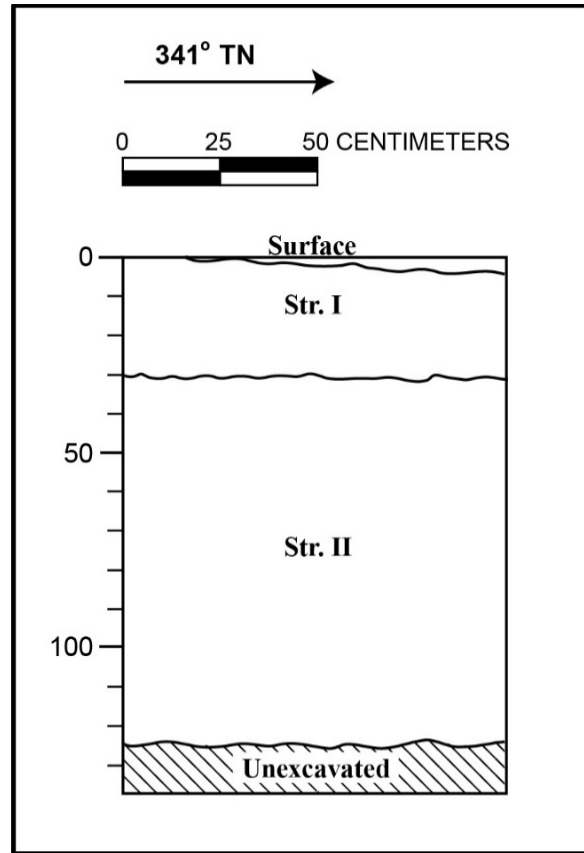


Figure 114. Drawing of Profile 18

Table 43. Stratigraphy of Profile 18

Stratum	Depth (cmbs)	Description
I	0–32	10YR 3/2, very dark brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
II	32–125	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.19 Profile 19

Excavation for a culvert extension located at STA 146 along the *makai* highway shoulder in the central portion of the project area (see Figure 78) exposed sediments up to 140 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the western sidewall (Figure 115 and Figure 116) is provided in Table 44. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 115. Photo of Profile 19; view to west

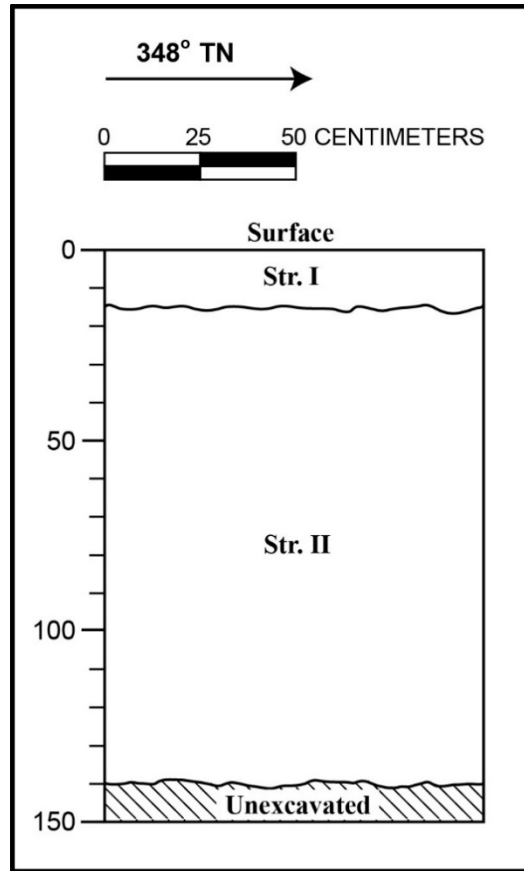


Figure 116. Drawing of Profile 19

Table 44. Stratigraphy of Profile 19

Stratum	Depth (cmbs)	Description
I	0–15	10YR 3/2, very dark brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
II	15–140	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.20 Profile 20

Excavation for a trench located at STA 173 along the *mauka* highway shoulder in the northern-central portion of the project area (see Figure 78) exposed sediments up to 140 cmbs. The stratigraphic sequence of this area is characterized by asphalt and a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the southeastern sidewall (Figure 117 and Figure 118) is provided in Table 45. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 117. Photo of Profile 20; view to southeast

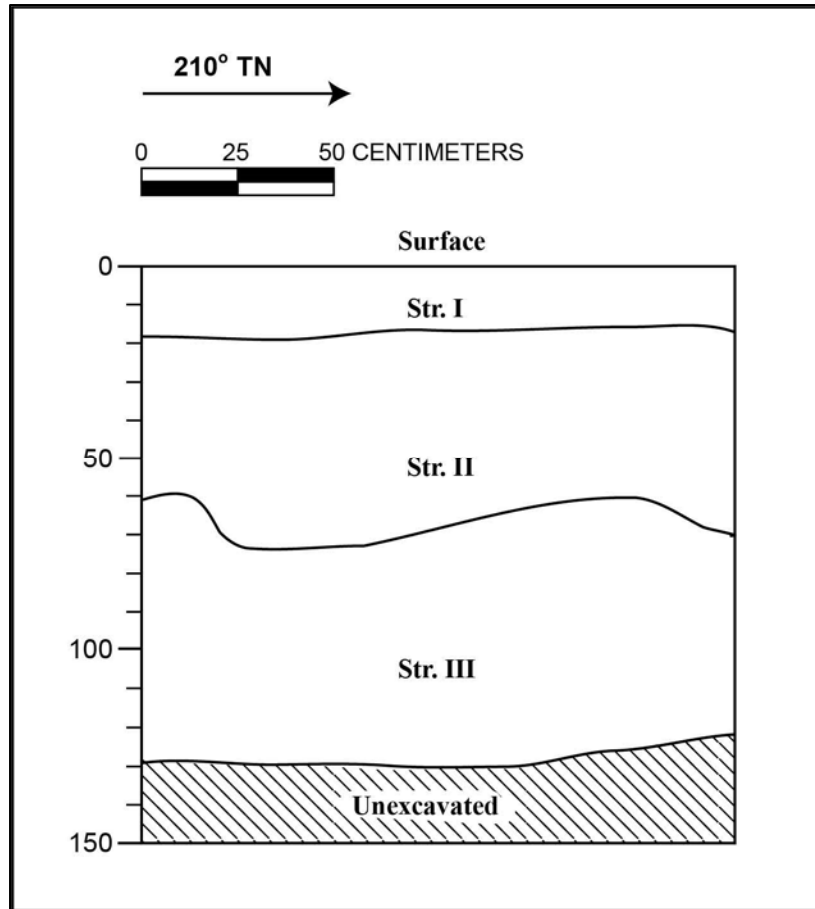


Figure 118. Drawing of Profile 20

Table 45. Stratigraphy of Profile 20

Stratum	Depth (cmbs)	Description
I	0–20	Asphalt concrete
II	20–70	10YR 3/2, very dark brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
III	70–140	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.21 Profile 21

Excavation for a trench located at STA 209 along the *makai* highway shoulder in the northern portion of the project area (see Figure 78) exposed sediments up to 230 cmbs. The stratigraphic sequence of this area is characterized by consolidated basalt bedrock exhibiting a 2.0-m-wide, culturally sterile blister or void at approximately 30-50 cmbs. The stratigraphic sequence of the southern sidewall (Figure 119 and Figure 120) is provided in Table 46. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 119. Photo of Profile 21; view to south

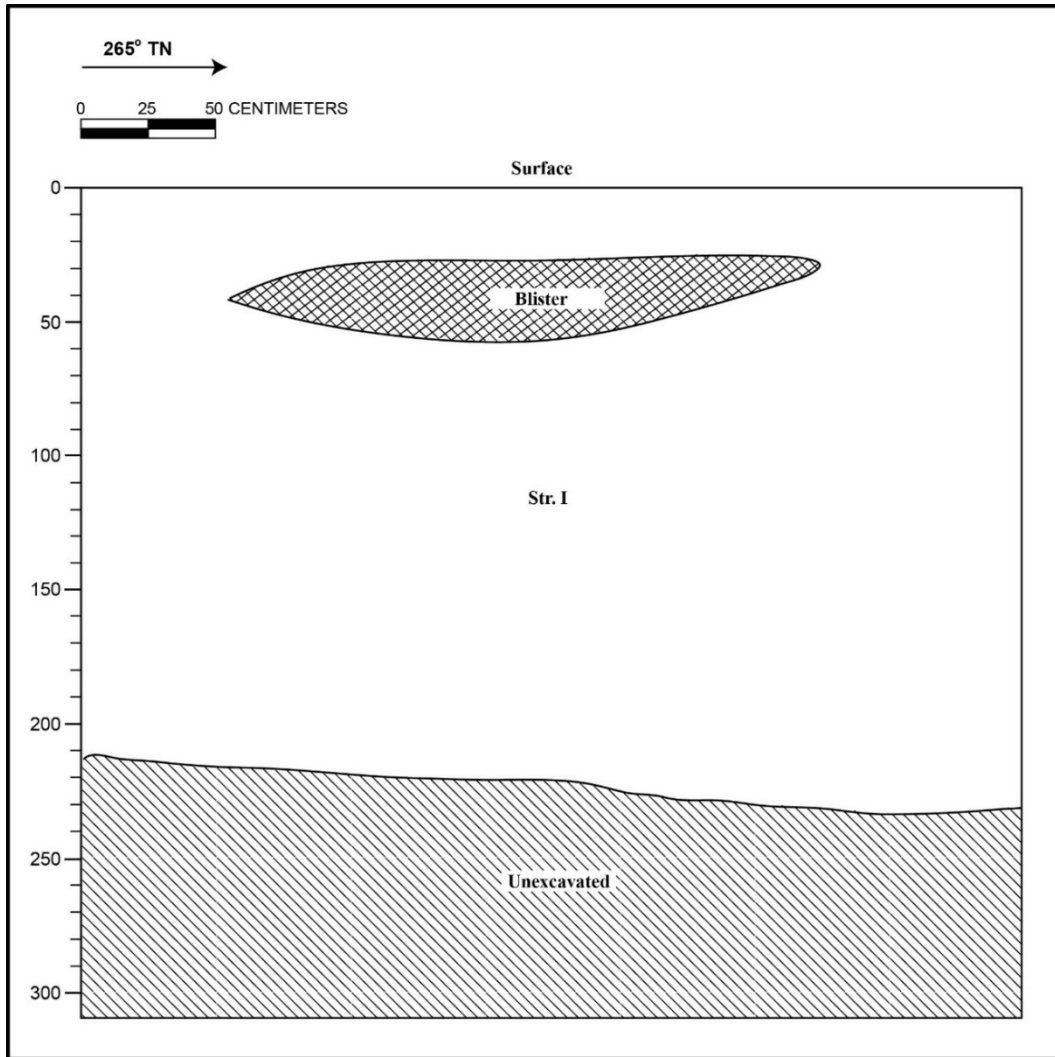


Figure 120. Drawing of Profile 21

Table 46. Stratigraphy of Profile 21

Stratum	Depth (cmbs)	Description
I	0–230	10YR 6/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present; culturally sterile void located at 30-50 cmbs

5.5.22 Profile 22

Grading activities at STA 215 along the *makai* highway shoulder in the northern portion of the project area (see Figure 78) exposed sediments up to 200 cmbs. The stratigraphic sequence of this area is characterized by consolidated basalt bedrock. The stratigraphic sequence of the western sidewall (Figure 120 and Figure 121) is provided in Table 47. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 121. Photo of Profile 22; view to west

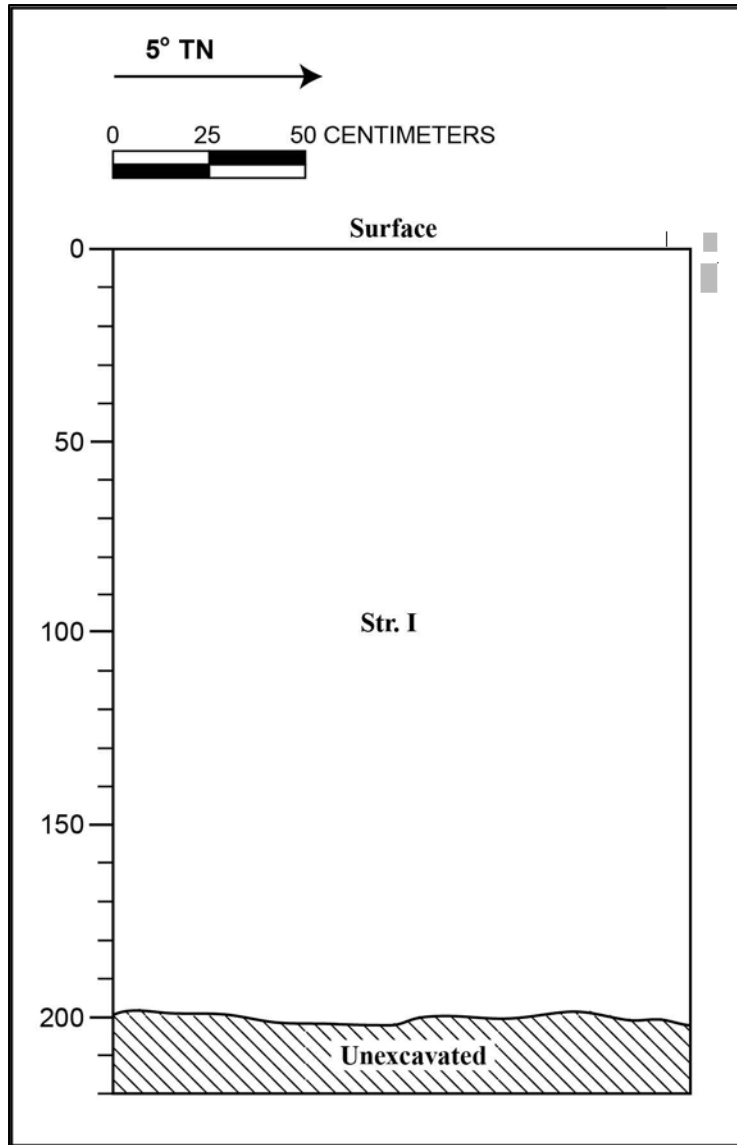


Figure 122. Drawing of Profile 22

Table 47. Stratigraphy of Profile 22

Stratum	Depth (cmbs)	Description
I	0–200	10YR 3/1, very dark gray; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.23 Profile 23

Excavation for a utility relocation located at STA 236 along the *mauka* highway shoulder in the northern portion of the project area (see Figure 78) exposed sediments up to 260 cmbs. The stratigraphic sequence of this area is characterized by a locally sourced gravel fill underlain by consolidated basalt bedrock. The stratigraphic sequence of the southern sidewall (Figure 123 and Figure 124) is provided in Table 48. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 123. Photo of Profile 23; view to south

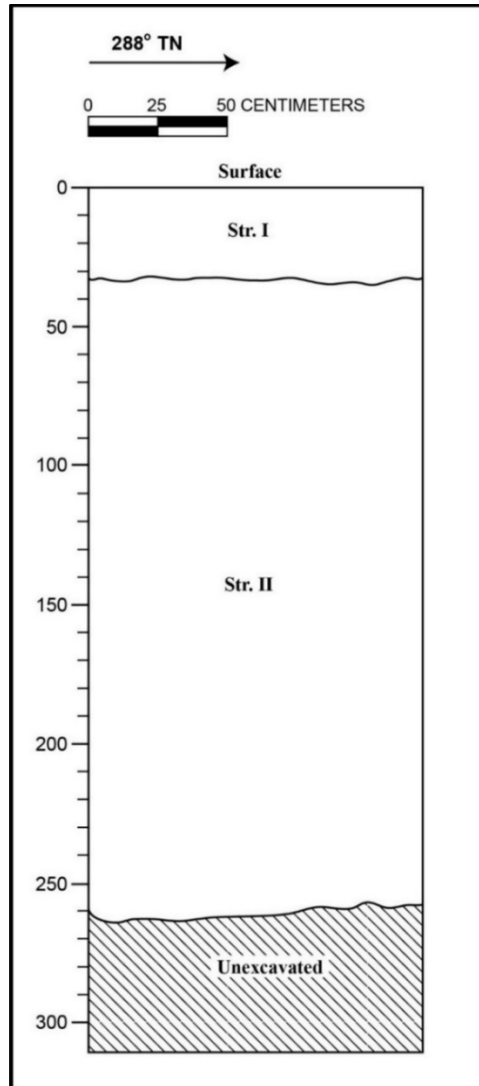


Figure 124. Drawing of Profile 23

Table 48. Stratigraphy of Profile 23

Stratum	Depth (cmbs)	Description
I	0-30	2.5YR 5/2, grayish brown; silty gravel; weak, coarse, subangular blocky structure; dry, loose consistence; weak cementation; non-plastic; terrigenous; smooth, clear lower boundary; no roots; no cultural materials present; fill layer associated with prior highway construction
II	30-260	10YR 3/1, gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

5.5.24 Profile 24

Grading activities at STA 245 along the *makai* highway shoulder in the northern portion of the project area (see Figure 78) exposed sediments up to 140 cmbs. The stratigraphic sequence of this area is characterized by consolidated basalt bedrock. The stratigraphic sequence of the western sidewall (Figure 125 and Figure 126) is provided in Table 49. No subsurface cultural deposits and/or human remains (i.e., historic properties) were identified during monitoring at this location.



Figure 125. Photo of Profile 24; view to west

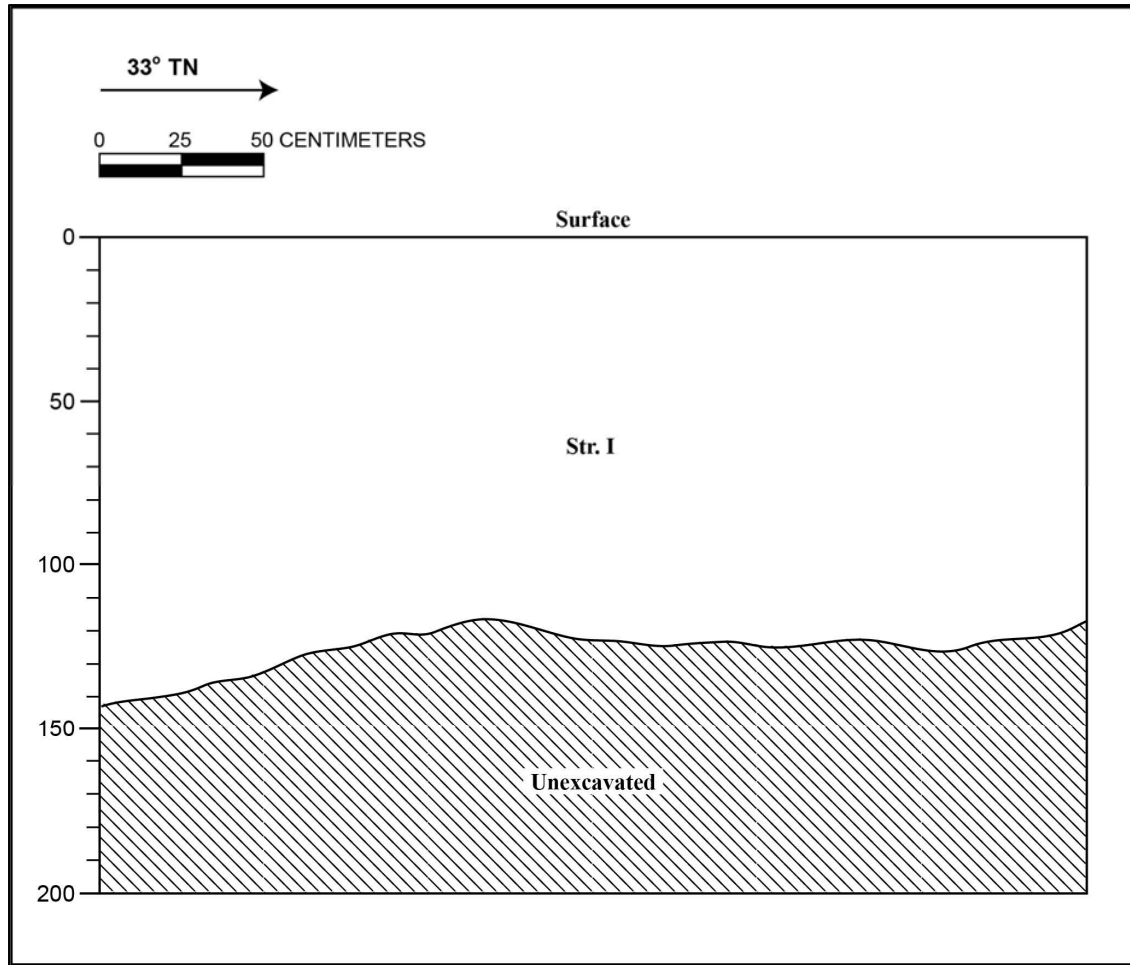


Figure 126. Drawing of Profile 24

Table 49. Stratigraphy of Profile 24

Stratum	Depth (cmbs)	Description
I	0–140	10YR 3/1, very dark gray; basalt bedrock; massive; dry, extremely hard consistence; indurated cementation; non-plastic; terrigenous; lower boundary not visible; no roots; no cultural materials present

Section 6 Site Descriptions

No new historic properties were identified during project monitoring. This section updates existing descriptions for the historic properties in the project area. Table 50 provides a descriptive summary of all 75 historic properties in the project area identified during the project AIS, including present status following completion of the project.

Per the recommendations of the SHPD-accepted project DRPP (Shideler et al. 2012) and APMP (Hammatt and Shideler 2014) (see Section 4.2 and Table 23), most all of the historic properties in the project area were either preserved in place without incident or destroyed by construction as planned. Full site descriptions for these historic properties are not included herein; for detailed descriptions and background information for each of these individual sites refer to the AIS (Monahan et al. 2012a), DRPP (Shideler et al. 2012), or APMP (Hammatt and Shideler 2014). Certain historic properties were subject to inadvertent project impacts, adjacent retaining wall construction, or other significant events (see Section 5.2 and Section 5.4); written descriptions for these historic properties follow, taken verbatim from the most recent applicable document (Monahan et al. 2012a, Shideler et al. 2012, Hammatt and Shideler 2014, Wilkinson et al. 2017) and updated as applicable based on the results of project monitoring. Plan view and cross-section maps are also included; for site photos see the relevant past report. Section 6.1 provides descriptions for historic properties at which incidents occurred. Section 6.2 provides descriptions for the historic properties where protective barriers were constructed.

6.1 Historic Properties with Incidents

6.1.1 SIHP # 50-10-27-00002 (Māmalahoa Trail) (Inadvertent Impact)

Wilkinson et al. (2017:19–24) most recently describe SIHP # -00002 as follows. This description accounts for project-related impacts to the site described in Section 5.4.3.3; the remainder of the trail in/adjacent to the project area was protected without incident.

FORMAL TYPE:	Trail (Māmalahoa Trail)
FUNCTION:	Transportation
NUMBER OF FEATURES:	2
AGE:	Historic (constructed 1836-1855)
OVERALL DIMENSIONS:	Two segments of the trail are within supplemental Area “C”: Segment #1 is approximately 3 m (9.84 ft) wide and 7 m (22.97 ft) long on the south side of Kealakehe Parkway, and Segment #2 is approximately 2.5 m (8.2 ft) wide and 9 m (29.53 ft) long on the north side. The entire trail is many miles long outside the PA.
TOPOGRAPHY:	Gently undulating ‘a‘ā (clinker lava) terrain in Area “C”
ELEVATION:	57-60 ft (17-18 m) AMSL (in the project area)
PREVIOUS DOCUMENTATION:	Walsh and Hammatt (1995); Hammatt et al. (1999); Monahan et al. (2012a)

Table 50. Current status of 75 historic properties in the project area following completion of project construction

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-19954	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	Portion of stepping stone trail dismantled and reassembled by cultural monitors (see Section 5.4.3.2)
-29332	Mound/paved area within naturally formed <i>pāhoehoe</i> depression	Indeterminate, possible burial	No impact to site	Data recovery (as per SHPD letter of 9 July 2012)	No impact to site
-29334	Rock mound within naturally formed <i>pāhoehoe</i> depression	Indeterminate	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28774	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-22507	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-29335	Rock wall segment	Indeterminate	Destruction of entire site	Data recovery (excavation)	Entire site destroyed per the plan
-18099	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-22418	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-22417	Modified lava blister	Agriculture/ planting pit	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28778	<i>Pāhoehoe</i> excavation	Agriculture/ planting pit	Destruction of entire site	Data recovery (excavation)	Entire site destroyed per the plan
-22415	Platform	Burial	No impact to site	Burial treatment plan (preservation)	No impact to site
-29336	Rock terrace	Indeterminate	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-29337	Excavated pit	Indeterminate- possible quarry or sweet potato planter	No impact to site	Avoidance during construction	No impact to site
-29339	Rock wall segment	Indeterminate	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-29338	Excavated pit	Indeterminate- possible quarry or sweet potato planter	Destruction of entire site	No further work	Entire site destroyed per the plan
-29340	Rock mound	Indeterminate, possible burial	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-29341	Excavated pits	Indeterminate-possible quarry or sweet potato planter	No impact to site	Avoidance during construction	No impact to site
-29342	Excavated pit	Indeterminate-possible quarry for rock to repair nearby Māmalahoa Trail	No impact to site	Avoidance during construction	No impact to site
-00002	Māmalahoa trail	Transportation	Destruction of a portion of site	Data recovery (archival research) and preservation	3.5 m section of trail south of Kealakehe impacted by machine tracks (see Section 5.4.3.3)
-19953	Trail (<i>mauka-makai</i>)	Transportation	Destruction of a portion of site	Data recovery (archival research) and preservation	Portion of site within grading limits destroyed per the plan
-29343	Excavated pit	Indeterminate-possible quarry or sweet potato planter	No impact to site	Avoidance during construction	No impact to site
-28780	'A 'ā excavation	Indeterminate, possible burial	No impact to site	Preservation	No impact to site

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-28781	Paved/leveled area	Indeterminate- possible agricultural clearing	No impact to site	Preservation	No impact to site
-28782	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-28783	Complex	Agriculture	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28784	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-28785	Enclosure	Agriculture	Destruction of entire site	Data recovery (excavation)	Entire site destroyed per the plan
-29333	Rock stacking (possible <i>ahu</i>)	Indeterminate	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28786	Modified depression	Agriculture	Destruction of entire site	Data recovery (excavation)	Entire site destroyed per the plan
-28787	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-19952	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-28788	Modified outcrop complex	Agriculture	No impact to site	Preservation	No impact to site
-19951	Wall	Ranching/ boundary	No impact to site	Preservation	No impact to site

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-28789	Mound complex	Agriculture	No impact to site	Preservation	No impact to site
-19950	Modified outcrop complex	Agriculture	No impact to site	Preservation	No impact to site
-28790	<i>Pāhoehoe</i> excavation	Quarrying	No impact to site	Preservation	No impact to site
-19949	Enclosure	Indeterminate- possible windbreak/ temporary shelter	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28791	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-28792	Petroglyph	Symbolic expression	No impact to site	Preservation	No impact to site
-29344	Excavated pit	Indeterminate- possible quarry or sweet potato planter or bird pit	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-10714	Trail system (<i>mauka-makai</i>), interpreted as part of “Road to the Sea Trail” (three features)	Transportation	Portions of all three features (Features A, B, and C) will be destroyed by construction; portions of all three features (Features A, B, and C) will not be physically impacted by construction	Data recovery (archival research) and preservation	5 m of Feature A and 7 m of Feature C inadvertently impacted during grubbing and grading (see Section 5.4.3.1)

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-28794	Filled crevice	Indeterminate-possible agricultural clearing	No impact to site	Avoidance during construction	No impact to site
-28797	Mound complex	Agriculture	No impact to site	Preservation	No impact to site
-19948	Complex	Agriculture and quarrying	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28799	Excavated pit complex	Agriculture	No impact to site	Preservation	No impact to site
-28800	<i>Pāhoehoe</i> excavation	Quarrying	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28801	Modified outcrop complex	Agriculture	No impact to site	Avoidance during construction	No impact to site
-19947	Stacked rocks	<i>Ahupua'a</i> boundary markers	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28802	Complex	Temporary habitation	No impact to site	Preservation	No impact to site
-28803	Complex	Indeterminate-possible agricultural clearing	No impact to site	Avoidance during construction	No impact to site

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-28804	Filled crevice	Indeterminate- possible agricultural clearing	No impact to site	Avoidance during construction	No impact to site
-28805	Modified outcrop	Agriculture/ clearing	No impact to site	Avoidance during construction	No impact to site
-15324	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-19946	Trail (<i>mauka-makai</i>)	Transportation	No impact to site	Data recovery (archival research) and preservation	No impact to site
-28806	Mound	Possible marker	No impact to site	Preservation	No impact to site
-28807	Filled crevice	Indeterminate	East end of site will be destroyed by construction; entire site is within construction limits	Data recovery (excavation/removal of coral)	Portion of site within grading limits destroyed per the plan
-29345	Coral-filled <i>pāhoehoe</i> crevice	Indeterminate	No impact to site	Data recovery (excavation/removal of coral)	No impact to site
-28808	Mound complex	Markers	Three (of total five) features (A, B, and C) will not be physically impacted by construction; Features D and E will be physically impacted by construction	Features A–C: preservation Features D and E: relocation (to the west within ROW)	No impact to site (including relocated features)

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-28809	<i>Pāhoehoe</i> excavation	Quarrying	No impact to site	Avoidance during construction	No impact to site
-28810	Lava tube	Indeterminate/ possible water catchment	No impact to site	Preservation	No impact to site
-29346	Mound	Indeterminate– possible marker or quarrying	Destruction of entire site	Relocation to the west (within ROW)	No impact to relocated site
-10154	Walled enclosure	Indeterminate- possible habitation	No impact to site	Preservation	Sandbags used to stabilize site during construction of Retaining Wall F (see Section 5.2.2.1); no impact to site
-06432	Core-filled stone wall	<i>Ahupua'a</i> boundary	Destruction of a small portion of site	No further work; minimize destruction through archaeological and cultural monitoring	Portion of site within grading limits destroyed per the plan; remaining section stabilized using sandbags during construction of Retaining Wall F (see Section 5.2.2.1)
-29347	Mound	Possible marker or quarrying	No impact to site	Avoidance during construction	No impact to site

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-29272	Level area in 'a'ā with trail (<i>mauka/makai</i>)	Possible temporary resting spot/work area and transportation	No impact to site	Feature A: Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity Feature B: data recovery (archival research) and preservation	No impact to site
-28811	<i>Pāhoehoe</i> excavation	Quarrying	No impact to site	Interim preservation and commitment to mitigation prior to any future land disturbance in the vicinity	No impact to site
-28812	Possible filled crevice	Indeterminate	Destruction of entire site	Data recovery (excavation/removal of rock)	Entire site destroyed per the plan
-28813	Modified lava blisters	Agriculture	Feature A will not be physically impacted by construction Features B–E will be destroyed during construction	Feature A: preservation Features B–E: data recovery (excavation)	Features B–E destroyed per the plan
-28814	Lava tube	Indeterminate/ possible water catchment	Destruction of entire site	Data recovery (excavation)	Entire site destroyed per the plan
-28815	<i>Pāhoehoe</i> excavation	Quarrying	Destruction of entire site	Data recovery (excavation)	Entire site destroyed per the plan
-19943	Lava tube	Temporary habitation	No impact to site	Preservation	No impact to site

SIHP # (50-10-27)	Site Type	Function	Anticipated Project Effects ¹	Most Recent Recommended Mitigation ²	Status Following Construction
-19945	Petroglyphs (n=2) and bashed/pecked <i>pāhoehoe</i> (n=7)	Symbolic expression and prospecting for voids in lava flow	Features A and B (Petroglyphs) will not be physically impacted by construction Features C–I (pecking marks) most will be destroyed by construction	Features A and B: preservation (petroglyphs); Features C-I (pecking marks on lava): no further work	Features C–I mostly destroyed per the plan
-29348	Boulder (<i>pāhoehoe</i> basher) in excavated pit	Prospecting for voids in lava flow	Entire site is immediately adjacent to grading limits	Collection and curation of portable artifact (boulder); no further work for the excavated pit	Portable artifact collected; site destroyed per the plan
-29349	Boulder (<i>pāhoehoe</i> basher) and associated excavated pit	Prospecting for voids in lava flow	Feature A (boulder) will not be physically impacted by construction Feature B (excavated pit) will be destroyed by construction	Collection and curation of the portable artifact (Boulder, Feature A); no further work for excavated pit (Feature B)	Feature A collected; Feature B destroyed per the plan
-29275*	Lava tube	Burial, contemporary habitation	No impact to site; site located outside project area/APE	Preservation (burial treatment plan in progress)	No impact to site

¹ Recommended project effects from Monahan et al. (2012a) based on construction limits provided to CSH by SSFM April 2012; updated as applicable with revised recommendations in Hammatt and Shideler (2014) following project redesign

² Most recent mitigation recommendation as applicable from Shideler et al. (2012) or Hammatt and Shideler 2014

Monahan et al. (2012a) described SIHP # -00002 (the Māmalahoa Trail) as follows:

SIHP # 50-10-27-00002, the well-known Māmalahoa Trail or Road, extends for miles outside of, and north and south of, the project area [see Figure 3 and Figure 4—dashed line labeled “Old Mamalahoa Trail”]. In its 1995 report, CSH (Walsh and Hammatt 1995) describe this site in general and project-specific terms:

Site 00002 is an historic cross-*ahupua'a* road commonly referred to as the Mamalahoa Trail. The construction of the road is dated to 1836-1855. It is considered to have been the major seaward road through the region between its construction and 1888, when use of the road became infrequent (Cordy 1991:403, 406). The road, in general, is described as a remarkably straight curb-lined path – typically 2.0 to 3.0 m. wide. In some areas the road surface is raised, with low points in the terrain filled in and leveled with stone.

The trail has been used sporadically in late historic and modern times and some parts of the road show evidence of vehicular use. The road has been breached in numerous places between Kailua-Kona and the Keahole Airport in modern times. As a result, the trail exists as a series of discontinuous segments in varying conditions. (Walsh and Hammatt 1995:30)

The portion currently located within the project area was described by CSH in 1995 as follows:

At Honokohau, Queen Kaahumanu Highway breaches the Mamalahoa Trail and two sections lie within the present project area. On the eastern side of the highway, one 30-40 foot (10 m.) section remains within the project area. It consists of a short ramp section below the present power line. The area surrounding this section has been cleared, presumably during the construction of the present highway. On the western side of the highway, an approximately 490 foot (149 m.) sections lies within the project area . . . This section begins 30 feet (9 m.) west of the present highway pavement edge and extends through the project area at 147 degrees T.N. [true north]. The road continues at the angle beyond the project area boundary and into the Kaloko-Honokohau National Park. This section does not appear to have been previously recorded. (Walsh and Hammatt 1995:32)

The site was revisited during the current [2012] archaeological inventory survey and found to be in the same general physical condition . . .; however, in its current configuration, the Māmalahoa Trail is no longer within the project area on the east, or *mauka*, side.

This trail is subject to protection and preservation under the Highways Act of 1892 (HRS Chapter 264-1(b)) (Na Ala Hele 2008). [Monahan et al. 2012:185–186]

As noted by Walsh and Hammatt (1995), the historic trail (SIHP # -00002) was constructed in the mid-nineteenth century under Hawai'i Island's Governor Kuakini. The trail exists today as a series of remnant segments in varying conditions cut by modern developments between Kailua-Kona and the Kona International Airport.

SIHP # -00002 is oriented north-south and runs roughly parallel with Queen Ka'ahumanu Highway within the east or *mauka* side at Area C. This historic property is segmented by the existing Kealakehe Parkway, which runs east to west or *mauka-makai*. Two sections of the historic property are present in Area C.

Segment #1 of SIHP # -00002 in Area C is on the south side of the Parkway, entering the project area from the south across an 'a'ā flow, oriented parallel to Queen Ka'ahumanu Highway and perpendicular to Kealakehe Parkway [see Figure 23, Figure 77, and Figure 127]. There is approximately 7 m (23 ft) of the trail segment within Area C of the project area. It is approximately 3.0 m wide. The trail is cut off approximately 2 m (3.2 ft) south of the top of the graded embankment on Kealakehe Parkway's south shoulder; i.e., SIHP # -00002 has been destroyed from this point to Segment #2 to the north by the creation of the Kealakehe Parkway. A 3.5 m (11.48 ft) section of the trail south of the embankment and within Area C has been disturbed by a tracked machine driven in a perpendicular direction across the trail segment [see Figure 77]. Pre-cast concrete blocks are present adjacent to and slightly atop the disturbed northeast corner of this segment [see Figure 77]. The trail has a low cobble and small boulder berm on the *makai* side [see Figure 127]. No cultural materials were found within Segment #1.

Segment #2 of SIHP # -00002 in Area C is north of the Kealakehe Parkway's graded shoulder in 'a'ā lava, between the road shoulder and the graded construction base yard at the northeast corner of the Kealakehe Parkway and Queen Ka'ahumanu Highway intersection [see Figure 23]. This is a short remnant section of SIHP # -00002, approximately 9 m (29.93 ft) long and 2.5 m (8 ft) wide between the two construction areas, and is bounded by bulldozer push piles at either end [Figure 128 and Figure 129]. Directly north of Segment #2, SIHP # -00002 has been demolished by pre-project grading within the construction base yard and other development further north. Directly south of Segment #2, SIHP # -00002 is cut by Kealakehe Parkway. The surface of Segment #2 is raised about 30 cm above the surrounding 'a'ā ground surface on the *mauka* side and is lined with a low cobble and small boulder edging on the *makai* side [see Figure 128 and Figure 129]. A horse shoe fragment (not collected) was observed at the north end of the Māmalahoa Trail Segment #2....

Both trail segments within supplemental Area C consist primarily of a bed of tightly packed and slightly rounded 'a'ā pebbles and small cobbles edged on the *makai* side with unhewn rough large cobbles and small boulders of 'a'ā.

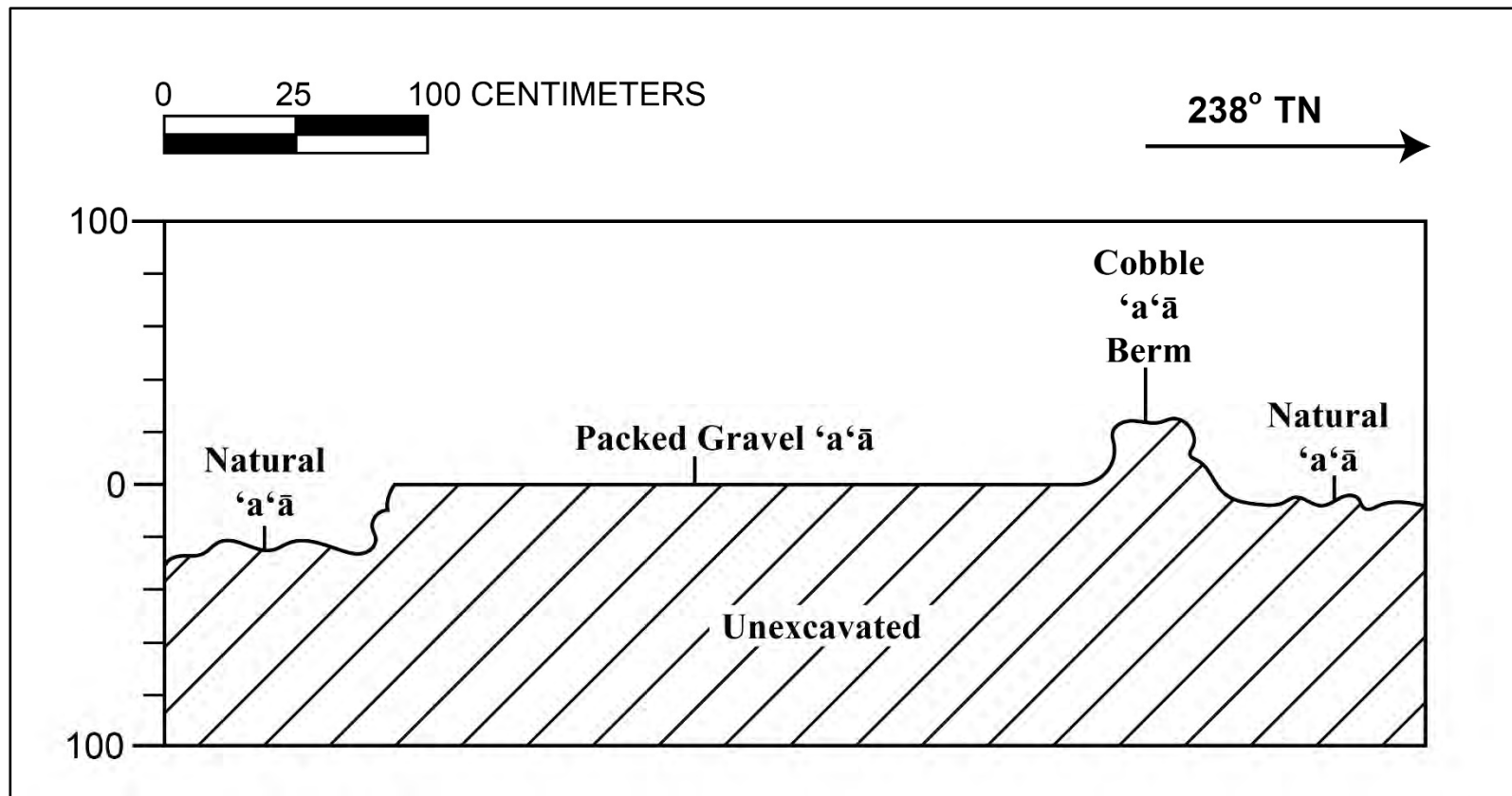


Figure 127. Cross-section A (*mauka*) – A' (*makai*) drawing of SIHP # -00002 Segment #1 within SAIS (Wilkinson et al. 2017) Area C, facing south

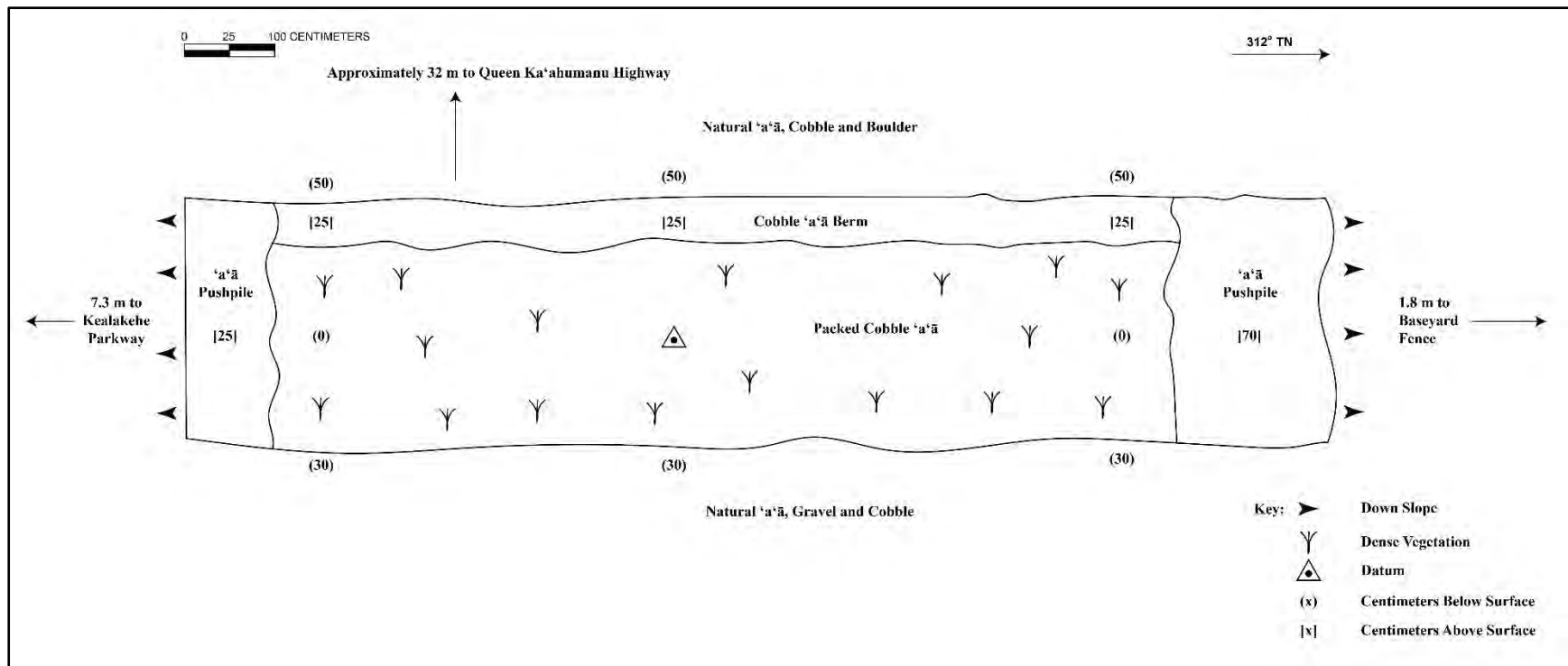


Figure 128. Plan view map of SIHP # -00002 Segment #2 within SAIS (Wilkinson et al. 2017) Area C

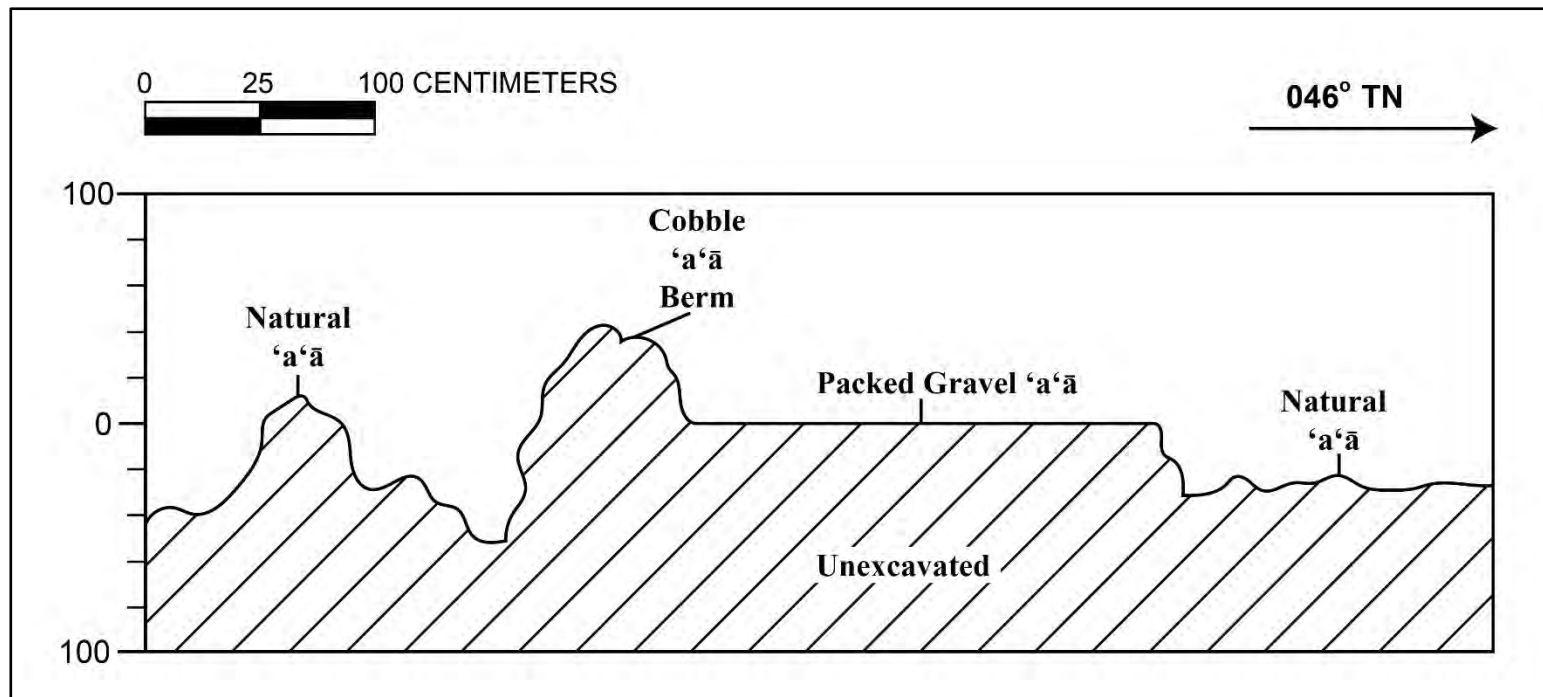


Figure 129. Profile drawing of SIHP # -00002 Segment #2 within SAIS (Wilkinson et al. 2017) Area C

6.1.2 SIHP # 50-10-27-10714 (*Mauka-Makai Trail System*) (Inadvertent Impact)

Shideler et al. (2012:49–58) most recently describe SIHP # -10714 Features A-C as follows:

SIHP # 50-10-27-10714 (Feature A)

Temp. Site No.: T-091010-4 (Monahan et al. 2012[a])

Site Type: Trail—Part of the Trail System ‘Road to the Sea’

No. of Features: 1

Functional Interpretation: Transportation

Probable Age: Pre-Contact with continued use in Historic Era

Overall Dimensions: Approximately 56.6 m long in the project area

Topography: Undulating *pāhoehoe* flow, level to slightly-sloping

Elevation: 75 ft (23 m) AMSL (in the project area)

Description:

SIHP # 50-10-27-10714 (Feature A) is a trail located approximately 88 m northwest of the intersection of Hina Lani Street and the Queen Ka‘ahumanu Highway within the portion of the project area that is adjacent to the Kaloko-Honokōhau National Historical Park. The trail is oriented roughly E/W and measures 56.6 m long within the project area. Within the project area the trail lacks any formal construction features such as stepping stones or curbing [Figure 130]. The trail can be recognized within the project area by observing subtle wear-pattern / color variation on the lava flow

Other previous archaeological studies such as Renger (1970), Cordy et al. (1991), Wolforth et al. (2005) and Bell et al. (2009), as well as consultation with trails specialists with the NPS suggest this trail portion is part of a more extensive trail complex known as the ‘Road to the Sea,’ which generally follows the Kaloko/Kohanaiki *ahupua‘a* boundary and extends from the Kohanaiki Homesteads (*mauka*) to Kaloko Fishpond (at the coast). *Mauka* of the project area, this trail has been designated SIHP # -10714 (by Wolforth et al. 2005), and the portion within the current project area is herein designated Feature A (specific to the current project).

This trail also connects within the national park with other trails segments designated SIHP # -2233 (D13-81) and SIHP # -2183.

It is important to note that CSH has identified three portions of this ‘Road to the Sea Trail’ within the project area. NPS trail specialists have suggested these three portions should all be considered part of SIHP # -10714, and CSH concurs with this recommendation. In the AIS report by Monahan et al. (2012[a]), these three trail portions are treated separately (although they are all given the same site number, with different feature numbers) in keeping with the south-to-north presentation and description of cultural resources.

This trail is subject to protection and preservation under the Highways Act of 1892 (HRS Chapter 264-1(b)) (Na Ala Hele 2008).

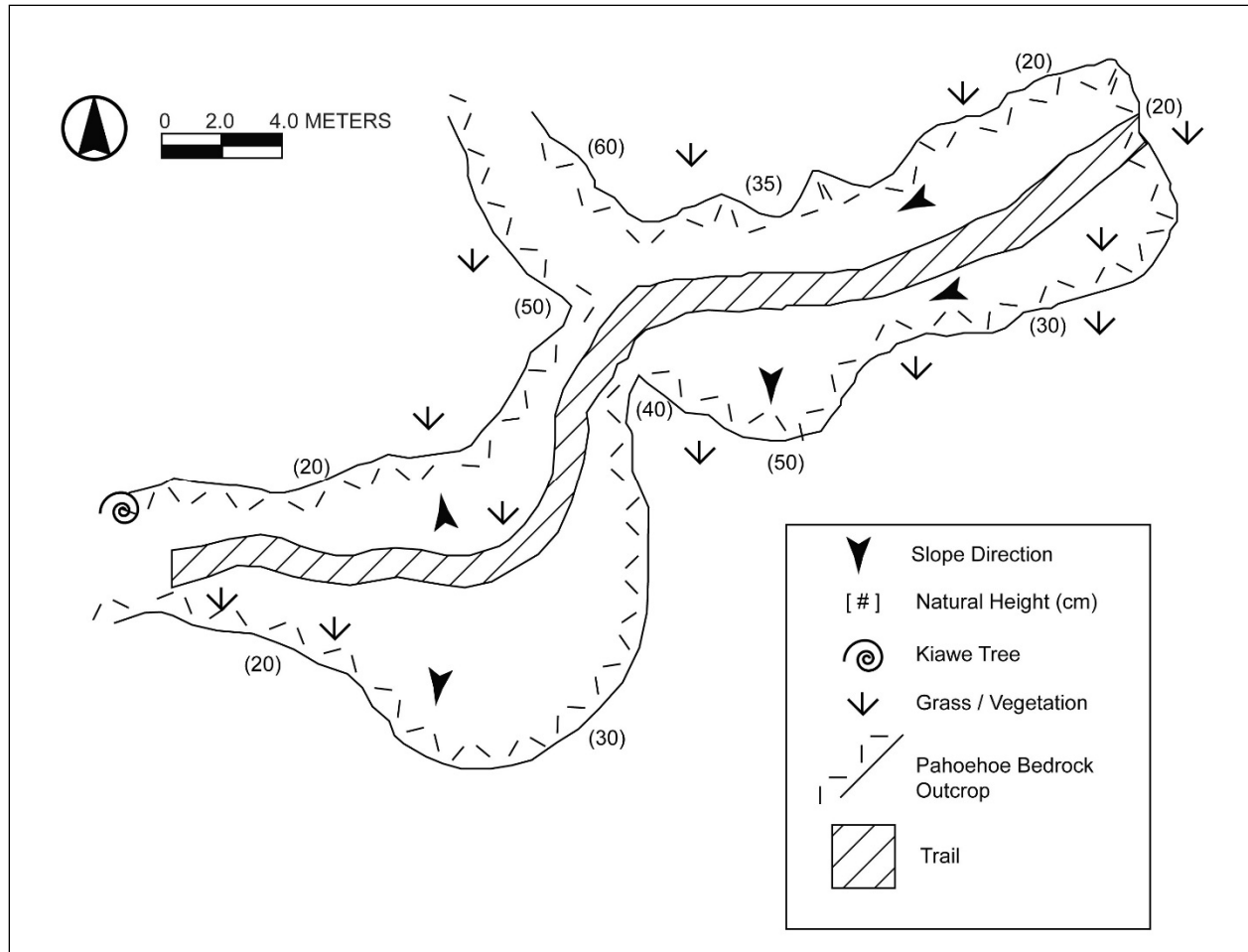


Figure 130. Plan view map of SIHP # -10714 Feature A

Previous significance evaluations for SIHP # -10714 by Wolforth et al. (2005) and Bell et al. (2009) have recommended this resource eligible for the Hawai'i Register of Historic Places under Criteria D and E.

During project construction, approximately 5 m of Feature A were inadvertently impacted during grubbing and grading (see Section 5.4.3.1).

SIHP # 50-10-27-10714 (Feature B)

Temp. Site No.: T-091010-4 (Monahan et al. 2012[a])

Site Type: Trail—Part of the Trail System 'Road to the Sea'

No. of Features: 1

Functional Interpretation: Transportation

Probable Age: Pre-Contact with continued use in Historic Era

Overall Dimensions: Approximately 35.6 m long in the project area

Topography: Undulating *pāhoehoe* flow, level to slightly-sloping

Elevation: 75 ft (23 m) AMSL (in the project area)

Description:

SIHP # 50-10-27-10714 (Feature B) is a trail approximately 130 m northwest of the intersection of Hina Lani Street and the Queen Ka'ahumanu Highway within the portion of the project area adjacent to the Kaloko-Honokōhau National Historical Park. The trail is roughly oriented E/W and measures 35.6 m long within the project area. Within the project area, the trail lacks any formal construction features such as stepping stones or curbing [Figure 131]. The trail can be recognized within the project area by observing subtle wear-pattern / color variation on the lava flow Two stacked boulders alongside (just north of) SIHP # -10714 Feature B may have served as a trail marker [see Figure 131]. The stacked *pāhoehoe* boulders are on top of a smooth, level *pāhoehoe* flow next to the trail and measure 0.4 m N/S by 0.3 m E/W with a maximum height of 0.5 m above the adjacent ground surface. A third boulder, located in the immediate vicinity, may have been displaced from the top of the mound.

Other previous archaeological studies such as Renger (1970), Cordy et al. (1991), Wolforth et al. (2005) and Bell et al. (2009), as well as consultation with trails specialists with the NPS, suggest this trail portion is part of a more extensive trail complex known as the 'Road to the Sea,' which generally follows the Kaloko/Kohanaiki *ahupua'a* boundary and extends from the Kohanaiki Homesteads (*mauka*) to Kaloko Fishpond (at the coast). *Mauka* of the project area, this trail has been designated SIHP # 10714 (by Wolforth et al. 2005), and the portion within the current project area is herein designated Feature B (specific to the current project).

This trail also connects within the national park with another trail segment designated SIHP # 2240 (D13-89).

It is important to note that CSH has identified three portions of this 'Road to the Sea Trail' within the project area. NPS trail specialists have suggested these three portions should all be considered part of SIHP # 10714, and CSH concurs with this recommendation. In the AIS report by Monahan et al. (2012[a]), these three trail portions are treated separately (although they are all given the same site number, with different feature numbers) in keeping with the south-to-north presentation and description of cultural resources.

This trail is subject to protection and preservation under the Highways Act of 1892 (HRS Chapter 264-1(b)) (Na Ala Hele 2008).

Previous significance evaluations for SIHP # -10714 by Wolforth et al. (2005) and Bell et al. (2009) have recommended this resource eligible for the Hawai'i Register of Historic Places under Criteria D and E.

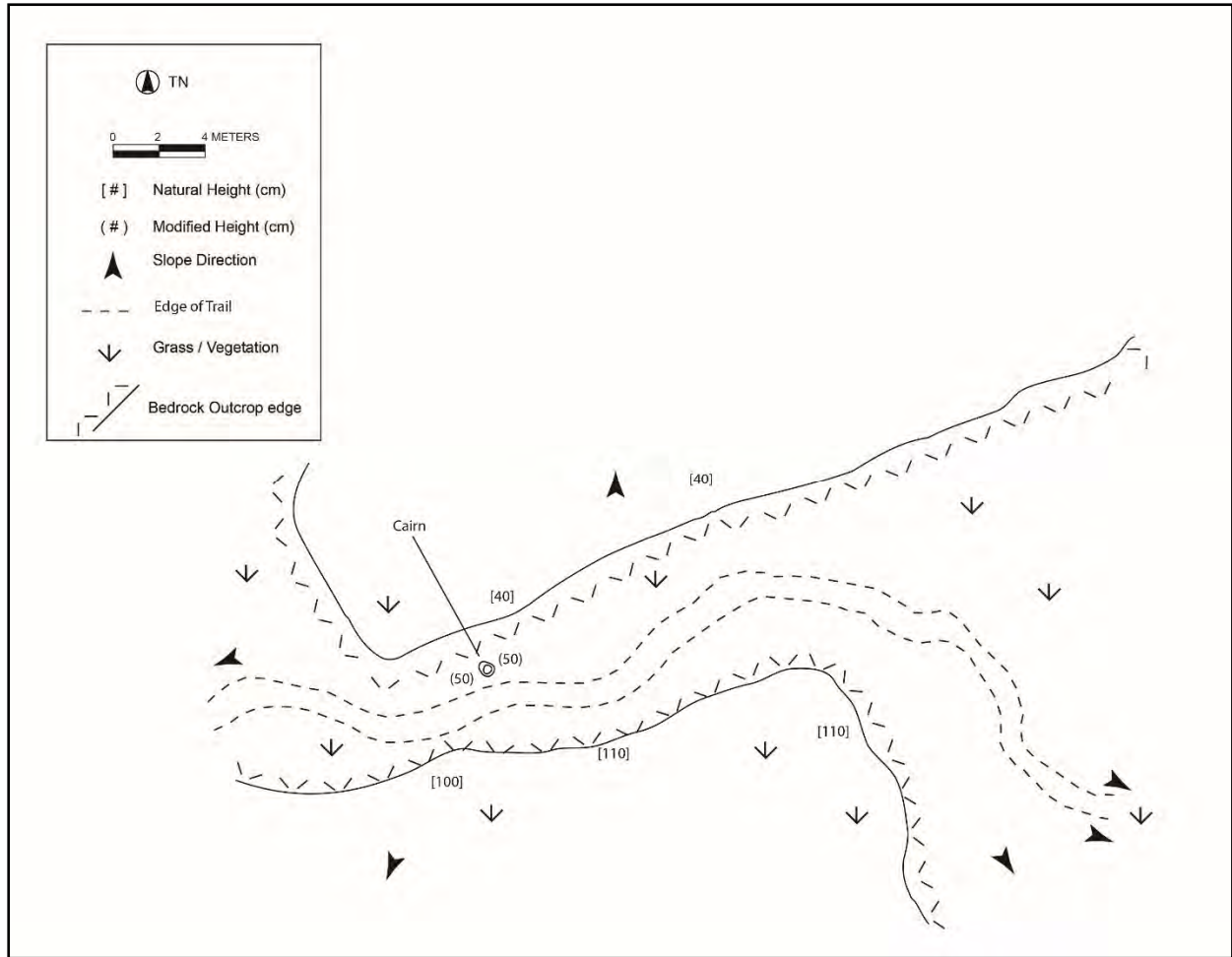


Figure 131. Plan view map of SIHP # -10714 Feature B

SIHP # 50-10-27-10714 (Feature C)**Temp. Site No.:** T-091010-4 (Monahan et al. 2012[a])**Site Type:** Trail—Part of the Trail System 'Road to the Sea'**No. of Features:** 1**Functional Interpretation:** Transportation**Probable Age:** Pre-Contact with continued use in Historic Era**Overall Dimensions:** Approximately 30.4 m long in the project area**Topography:** Undulating *pāhoehoe* flow, level to slightly-sloping**Elevation:** 89 ft (27 m) AMSL (in the project area)**Description:**

SIHP # 50-10-27-10174 (Feature C) is a trail located approximately 200 m northwest of the intersection of Hina Lani Street and the Queen Ka'ahumanu Highway within the portion of the project area that is adjacent to the Kaloko-Honokōhau National Historical Park. The trail is roughly oriented E/W and measures 30.4 m long within the project area. Within the project area, the trail lacks any formal construction features such as stepping stones or curbing [Figure 132]. The trail can be recognized within the project area by observing subtle wear-pattern / color variation on the lava flow

Other previous archaeological studies such as Renger (1970), Cordy et al. (1991), Wolforth et al. (2005) and Bell et al. (2009), as well as consultation with trails specialists with the NPS, suggest this trail portion is part of a more extensive trail complex known as the 'Road to the Sea,' which generally follows the Kaloko/Kohanaiki Ahupua'a boundary and extends from the Kohanaiki Homesteads (*mauka*) to Kaloko Fishpond (at the coast) [of note, *kūpuna* from Kaloko and Kohanaiki do not refer to this trail as "Road to the Sea"]. *Mauka* of the project area, this trail has been designated SIHP # 10714 (by Wolforth et al. 2005), and the portion within the current project area is herein designated Feature C (specific to the current project).

It is important to note that CSH has identified three portions of this 'Road to the Sea Trail' within the project area. NPS trail specialists have suggested these three portions should all be considered part of SIHP # 10714, and CSH concurs with this recommendation. In the AIS report by Monahan et al. (2012), these three trail portions are treated separately (although they are all given the same site number, with different feature numbers) in keeping with the south-to-north presentation and description of cultural resources

. . . . Previous significance evaluations for SIHP # 10714 by Wolforth et al. (2005) and Bell et al. (2009) have recommended this resource eligible for the Hawai'i Register of Historic Places under Criteria D and E.

During project construction, approximately 7 m of Feature C was inadvertently impacted during grubbing and grading (see Section 5.4.3.1).

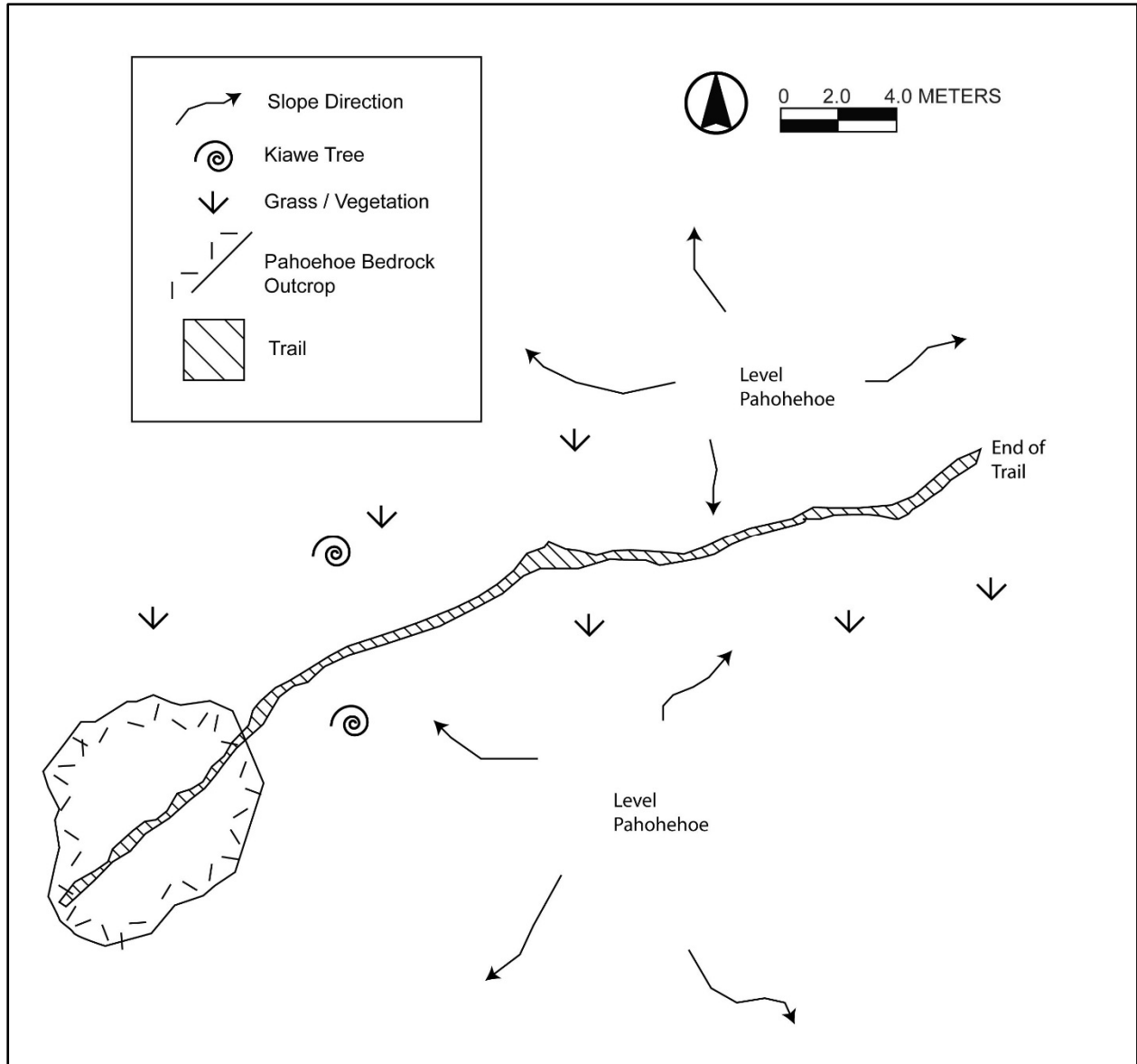


Figure 132. Plan view map of SIHP # -10741 Feature C

6.1.3 SIHP # 50-10-27-19954 (*Mauka-Makai Trail*) (Deconstruction and Reconstruction by Cultural Monitors)

Hammatt and Shideler (2014:73–77) most recently describe SIHP # -19954 as follows:

Temp. Site No.: 15 (Walsh and Hammatt 1995)

Site Type: Trail

No. of Features: 1

Functional Interpretation: Transportation

Probable Age: Indeterminate

Overall Dimensions: Approximately 30.5 m (100 ft) long (in the ROW)

Topography: Trail meanders through 'a'ā along the edge of a *pāhoehoe* flow

Elevation: 42 ft (13 m) AMSL

Description:

SIHP # 50-10-27-19954 was first formally described by CSH in 1995 (Walsh and Hammatt 1995). The site was revisited during the current archaeological inventory survey and found to be in the same physical condition [Figure 133]. The overall length of the trail, and its *mauka* terminus (i.e., starting approximately 28 m from the existing highway pavement edge), has not changed since 1995. The trail was described by Walsh and Hammatt (1995) as follows:

Site 19954 consists of a *mauka-makai* oriented trail . . . The trail begins 93 feet (28m.) from the present highway pavement edge (extent of bulldozed portion of old right-of-way) and meanders through the A'ā along the edge of a pahoehoe outcrop, then up and over an outcrop and continues *makai* beyond the project area boundary into the National Park. Some portions of the trail contain pahoehoe slabs placed as stepping stones, and it appears that the slabs were taken from the adjacent pahoehoe outcrop. The trail measures 0.4 to 0.5 m. wide. The trail is in fair to good condition and has previously been identified and flagged, probably by National Park archaeologists who, we have been informed, have done some surveying in the area and have identified several inland-heading trails. The site has not been previously recorded however, and a state site number had not been previously assigned (personal communication with National Park archaeologist Catherine Glidden 6/27/95). [Walsh and Hammatt 1995:54]

Walsh and Hammatt (1995) recommended SIHP # -19954 eligible for the National and State Registers of Historic Places under criterion D for its information relevant to prehistory and history. The site was recommended for data recovery by Walsh and Hammatt (1995); however, the final archaeological treatment plan (1999) called for 'interim protection' only with no data recovery.

Mitigation Measures

In an effort to secure ACHP support it was decided to effectively move the *makai* edge of the project *mauka*. As a result, some ten trails that were going to be impacted (including SIHP # - 19954) now will not be impacted. The mitigation for

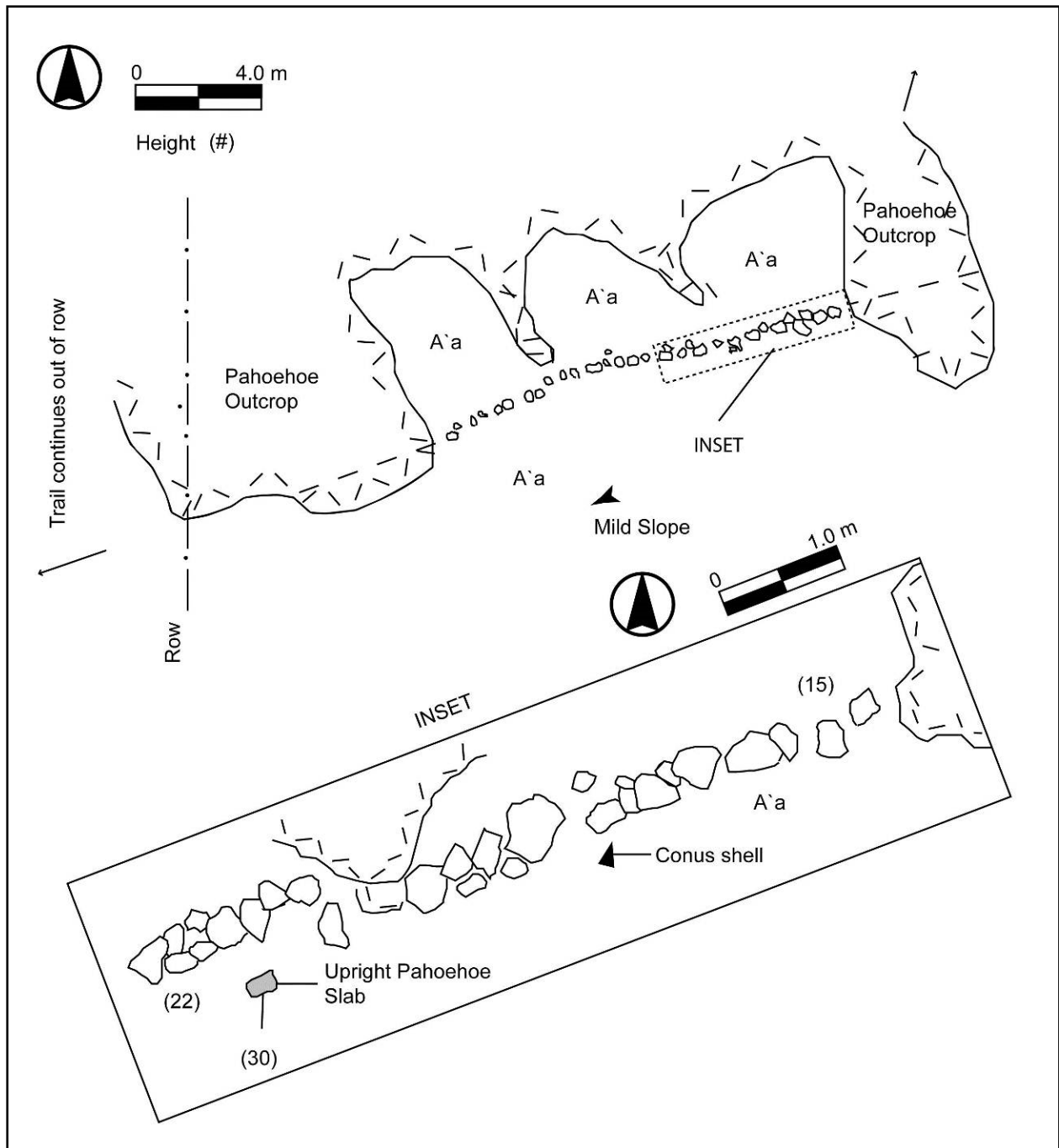


Figure 133. Plan view map of SIHP # -19954, showing trail segment within the project area and close-up inset of stepping stones

these trails will be the same data recovery 'Archival Research & Preservation' inasmuch as the archival research will be done for all trails anyway. Preservation will be through avoidance and protection (conservation). There will be a buffer zone of 5 m on all sides except the northeast side where the buffer zone will be 1.5 m.

During project construction, a portion of SIHP # -19954 was deconstructed by cultural monitors; this section of the trail was subsequently reconstructed by cultural monitors (see Section 5.4.3.2).

6.1.4 SIHP # 50-10-27-28809 (*Pāhoehoe* Excavation) (Lava Tube Breach #2)

Monahan et al. (2012a:339–341) most recently describe SIHP # -28809 as follows:

Temp. Site No.: T-092310-1 (Monahan et al. 2012)

Site Type: *Pāhoehoe* Excavation

No. of Features: 1

Functional Interpretation: Quarrying

Probable Age: Prehistoric (Pre-Contact)

Overall Dimensions: 0.9 m N/S by 1.4 m E/W

Topography: Level *pāhoehoe* flow

Elevation: 112 ft (34 m) AMSL

Description:

SIHP # 50-10-27-28809 is a *pāhoehoe* excavation approximately 700 m south of the intersection of OTEC Road and the Queen Ka'ahumanu Highway [Figure 134]. It consists of an area where an overlying, uplifted sheet of *pāhoehoe* has been quarried and removed, exposing a lower *pāhoehoe* surface. Quarry marks and scalloping were observed along the edges of the excavation. Most of the excavated material (large boulder-sized *pāhoehoe* slabs) has been placed along the southwestern side of the excavation. The interior surface of the excavation consists of scattered *pāhoehoe* pebbles on solid *pāhoehoe* bedrock. The excavated area lacks soil deposition. The *pāhoehoe* excavation measures 0.9 m N/S by 1.4 m E/W with a maximum depth of 0.4 m below the adjacent ground surface. No artifacts or midden were observed in the area.

SIHP # -28809 is interpreted as a possible raw material quarrying locality likely dating to prehistoric (pre-Contact) times. The *pāhoehoe* excavation lacks sediment accumulation that would indicate potential agricultural use.

During project construction, a lava tube (Lava Tube #2) was breached and was found to connect to an opening located outside the grading limits directly adjacent to SIHP # -28809 (see Section 5.4.1.2). The lava tube was found to be culturally sterile and construction proceeded as planned. No impact occurred to SIHP # -28809.

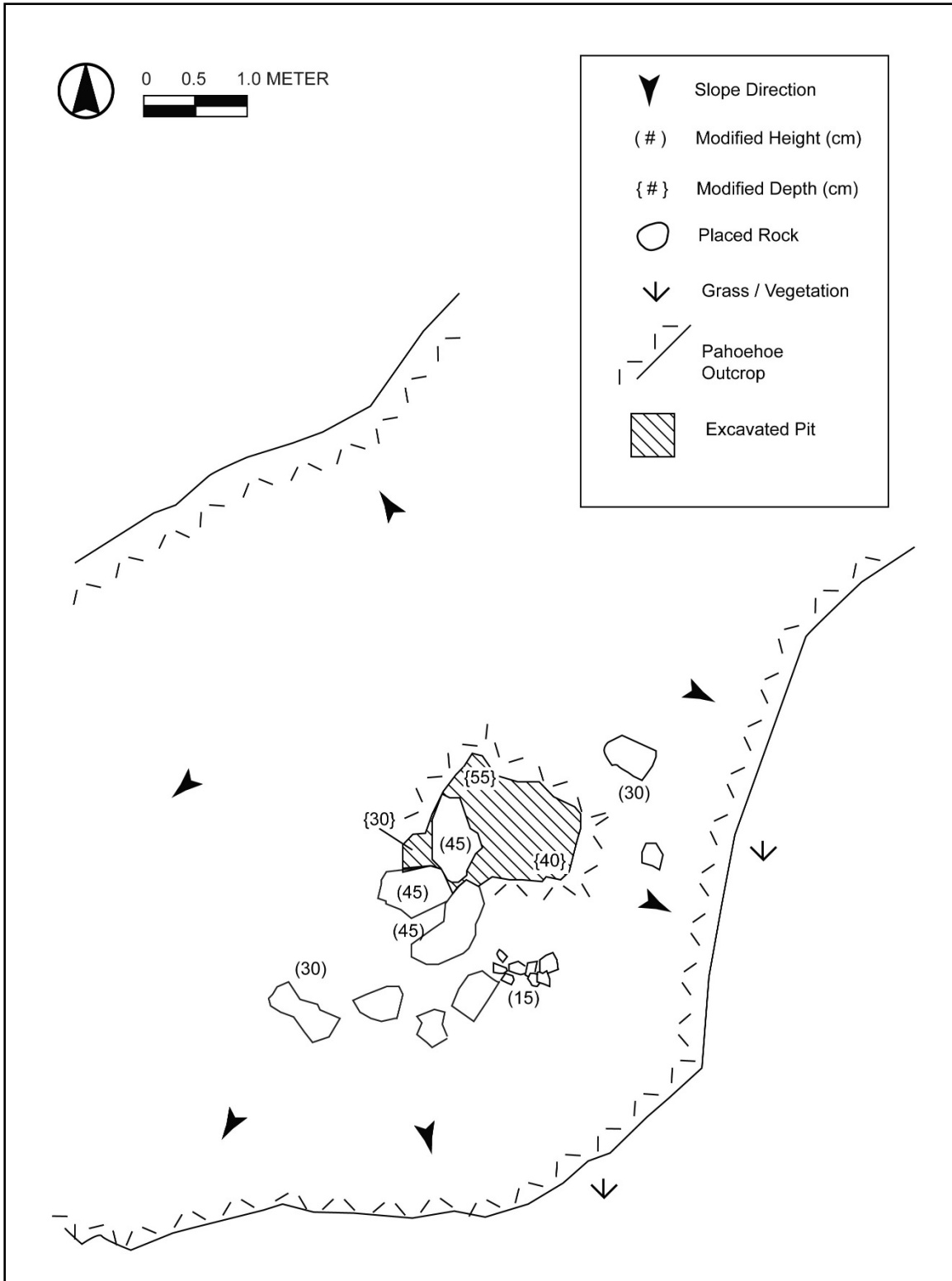


Figure 134. Plan view map of SIHP # -28809

6.2 Historic Properties at Retaining Walls

6.2.1 SIHP # 50-10-27-18099 (Trail to Honokōhau) (Retaining Wall A)

Hammatt and Shideler et al. (2014:41–45) most recently describe SIHP # -18099 as follows:

Temp. Site No.: Trail 4 (Monahan et al. 2012), 157-6 (Nelson and Gmirkin 2001)

Site Type: Trail (curbstone)

No. of Features: 1

Functional Interpretation: Transportation

Probable Age: Indeterminate-possibly historic

Overall Dimensions: Minimally 3,066 m (10,120 ft) long (1.7 m N/S by 37.6 m E/W within the current project area)

Topography: Undulating *pāhoehoe* flow, level to moderately sloping

Elevation: 45 to 810 ft (14 to 247 m) AMSL (refers to entire trail including *mauka* portion)

Description:

SIHP # 50-10-27-18099, also known as the Trail to Honokōhau, is a trail that extends roughly E/W through the project area approximately 200 m south of the Kaloko-Honokōhau National Historical Park visitor center entrance within the portion of the project area that is adjacent to the Kaloko-Honokōhau National Historical Park [Figure 135 and Figure 136]. The trail has been previously identified within Honokōhau Ahupua‘a on the *mauka* side of the existing highway during an archaeological inventory survey conducted by CSH in 1993 (Robins et al. 1993). Robins et al. (1993:23) describe SIHP # 18099 as follows:

In accordance to Russell A. Apple's classifications of Hawaiian land routes (Apple 1973), this type of curbstone trail is of the "AB" trail type. "AB" trails are generally defined as historic trails constructed for mule or horse travel over an existing prehistoric land route.

Where the trail crosses *pāhoehoe* outcrop it is usually characterized by a pebble pavement bound by parallel cobble and boulder alignments. The trail has an average width of 3.3 m and, when traversing prominent depressions, is constructed to a maximum height of 1.0 m. Along *‘a‘ā* outcrop, the trail is distinguished by a trodden surface presently obscured by a dense grass growth and inset boulder curbing.

As was identified during the survey and on aerial photos, the trail begins at the south side of Aimakapa Pond (fishpond) along the coast of Honokōhau I Ahupua‘a and extends *mauka* across the *ahupua‘a*, intersecting the Māmalahoa Trail (SIHP # 50-10-27-2), and running parallel to a trodden *‘a‘ā* trail (SIHP # 50-10-27-18122). The most *mauka* portion of the trail, beginning at approximately 690 ft. a.m.s.l., has evolved during the historic era into a road likely associated with ranching or historic agriculture activities in this region.

Midden was observed over portions of the trail. [Robins et al. 1993:23]

The portion of SIHP # -18099 that extends through the present project area consists of intermittent portions of curbstone alignments over solid *pāhoehoe* bedrock. Bulldozer track marks were observed in the vicinity of the trail. No artifacts or midden were observed in the area.

In the *ahupua'a* of Honokōhau I, SIHP # -18099 is being preserved on the *mauka* side of the existing highway by West Hawaii Business Park, LLC. This trail is subject to protection and preservation under the Highways Act of 1892 (HRS Chapter 264-1(b)) (Na Ala Hele 2008).

SIHP # -18099 has previously been recommended eligible for nomination to the State Register of Historic Places under Criteria A, C and D by CSH in two previous projects in Honokōhau I and II (Robins et al. 2000; Yucha and McDermott 2008).

Mitigation Measures

In an effort to secure ACHP support it was decided to effectively move the *makai* edge of the project *mauka*. As a result, some ten trails that were going to be impacted (including SIHP # - 18099) now will not be impacted. The mitigation for these trails will be the same data recovery “Archival Research & Preservation” inasmuch as the archival research will be done for all trails anyway. Preservation will be through avoidance and protection (conservation). There will be a buffer zone of 5 m on all sides except that on the east where the buffer zone will be approximately 0.6 m. . . . The buffer zone would not be demarcated on the ground (other than the continuous barrier on the highway side during highway construction which would be fortified with a portable construction barrier for added protection)

. . . .

Construction of Retaining Wall A did not impact SIHP # -18099 (see Section 5.2.1).

6.2.2 SIHP # 50-10-27-22418 (*Mauka-Makai* Trail) (Retaining Wall A)

Hammatt and Shideler (2014:81–84) most recently describe SIHP # -22418 as follows:

Temp. Site No.: Trail 3 (Monahan et al. 2012), 157-6A (Nelson and Gmirkin 2001)

Site Type: Trail

No. of Features: 1

Functional Interpretation: Transportation

Probable Age: Indeterminate

Overall Dimensions: Approximately 22.6 m long (in the ROW)

Topography: Undulating *pāhoehoe* flow, level to moderately sloping

Elevation: 36 ft (11 m) AMSL

Description:

SIHP # 50-10-27-22418 is a trail located approximately 200 m southeast of the Kaloko-Honokōhau National Historical Park visitor center entrance within the portion of the project area adjacent to the Kaloko-Honokōhau National Historical Park. The trail is roughly oriented east/west and measures 22.6 m long within the project area [Figure 137]. Within the project area, the trail lacks any formal

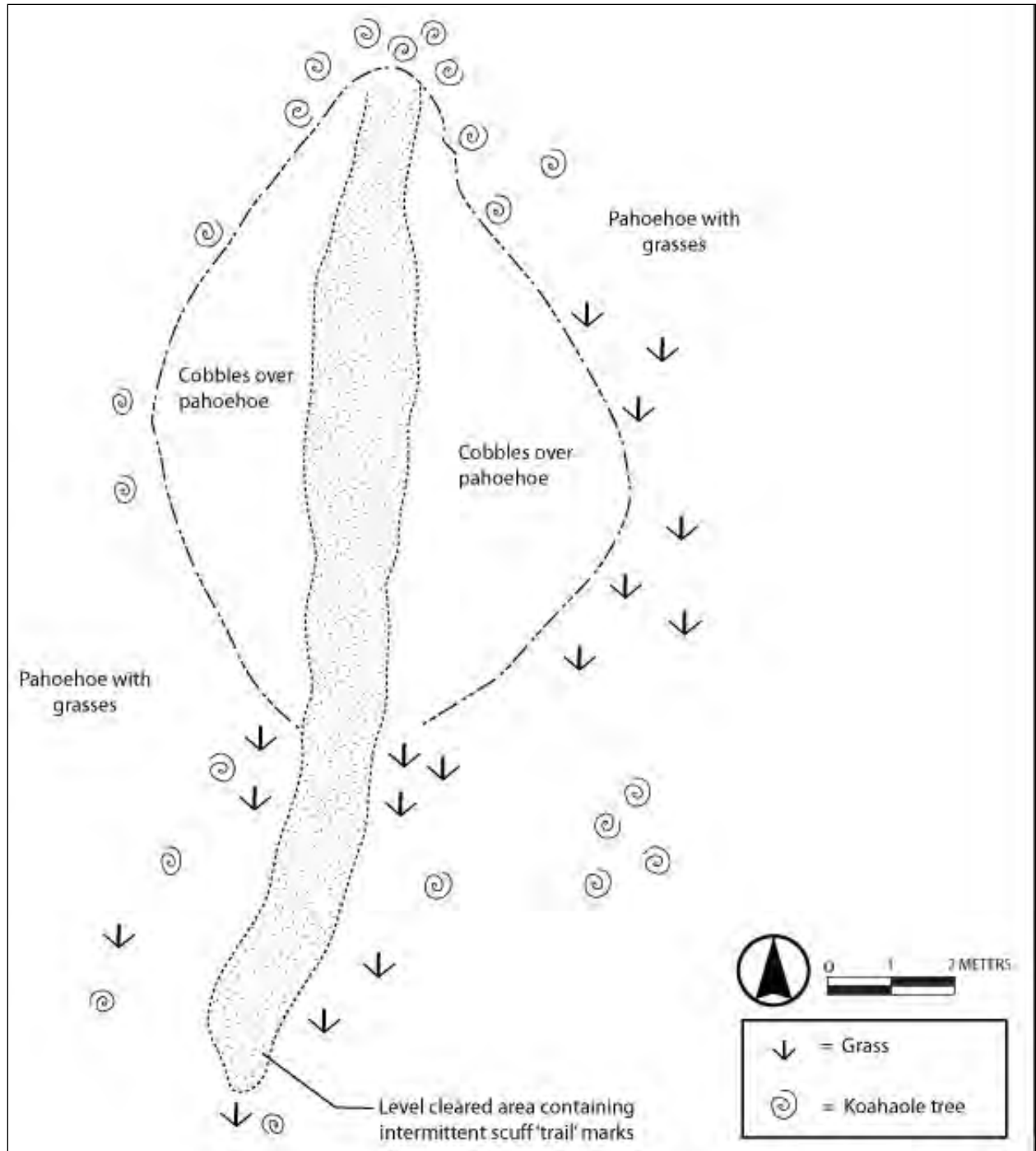


Figure 137. Plan view map of SIHP # -22418

construction features such as stepping stones or curbing. The trail can be recognized within the project area by observing subtle wear pattern/color variation on the lava flow. NPS staff have pointed out that trails such as this one, even though lacking formal attributes within the subject project area, may exhibit formal features elsewhere (i.e., outside of the project area).

Nelson and Gmirkin (2001:21) previously identified this trail, designating it SIHP # -22418, and pointed out that it parallels and crosses/merges with SIHP # -18099 outside of the current project area, in keeping with other historic trails in the region.

Mitigation Measures

In an effort to secure ACHP support it was decided to effectively move the *makai* edge of the project *mauka*. As a result, some ten trails that were going to be impacted (including SIHP # -22418) now will not be impacted. The mitigation for these trails will be the same data recovery

“Archival Research & Preservation” inasmuch as the archival research will be done for all trails anyway. Preservation will be through avoidance and protection (conservation). There will be a buffer zone of 5 m on all sides of the site. . . . The buffer zone would not be demarcated on the ground (other than the continuous barrier on the highway side during highway construction) . . .

Construction of Retaining Wall A did not impact SIHP # -22418 (see Section 5.2.1).

6.2.3 SIHP # 50-10-27-28783 (Agricultural Complex) (Retaining Wall A-1)

Hammatt and Shideler (2014:98–103) most recently describe SIHP # -28783 as follows:

SIHP # -28783 consists of six ‘*a‘ā* excavations within a low area of undulating ‘*a‘ā* In general, the interior of each excavation consists of relatively thick layers of sediment and organic debris that presently support the growth of large Christmas berry trees.

Temp. Site No.: T-080510-10 to -14a (Monahan et al. 2012)

Site Type: Excavated ‘*a‘ā* complex

No. of Features: 6

Functional Interpretation: Agriculture

Probable Age: Prehistoric (pre-Contact)

Overall Dimensions: 132.0 m N/S by 40.0 m E/W

Topography: Undulating ‘*a‘ā* flow, level to slightly sloping

Elevation: 61-76 ft (19-23 m) AMSL

Description:

SIHP # 50-10-27-28783 is a complex consisting of six features (Features A through F) located south of Huehue Road within a portion of the project area adjacent to the Kaloko-Honokōhau National Historical Park. SIHP # -28783 consists of six ‘*a‘ā* excavations within a low area of undulating ‘*a‘ā*. In general, the interior of each excavation consists of relatively thick layers of sediment and organic debris that presently support the growth of large Christmas berry trees.

Detailed documentation of Feature A and Feature B is provided below and is representative of the remainder of the features of SIHP # -28783.

Feature A is an 'a'ā excavation comprised of a low, natural depression within the 'a'ā flow that has been cleared to a level bedrock surface, which supports a thick deposit of sediment and organic debris. The excavation is oval-shaped and measures 3.2 m north/south by 5.0 m east/west with a maximum depth of 0.7 m beneath the surrounding 'a'ā flow [Figure 138]. Stacking was observed along the north and northwestern sides of the excavation, which consisted of two to three courses of small- to medium-sized 'a'ā boulders. The south and southwestern sides of the excavation consist of natural eroding bedrock. The eastern side of the excavation has been covered, and potentially impacted, by massive basalt 'blue-rock' boulders likely pushed into the site during initial construction of the Queen Ka'ahumanu Highway. A large Christmas berry tree grows from the southwestern edge of the sediment surface within the 'a'ā excavation. No artifacts or midden were observed in the area.

Feature B is an 'a'ā excavation comprised of several adjacent and partially interconnected areas that have been cleared to a level bedrock surface [Figure 139]. The cleared areas consist of a layer of sediment and organic debris of varying thickness that presently supports the growth of Christmas berry trees and grasses. The cleared areas are irregularly shaped and enclosed by a combination of unmodified 'a'ā flow and roughly stacked 'a'ā cobbles and small boulders. Modern garbage, including aluminum cans, bottles, mattresses, and food containers, is scattered throughout Feature B. The eastern side of the excavation has been covered, and potentially impacted, by massive basalt "blue-rock" boulders likely pushed into the site during initial construction of the Queen Ka'ahumanu Highway. No artifacts or midden were observed in the area.

SIHP # -28783 is interpreted as an agricultural complex likely dating from prehistoric (pre- Contact) times. The sediment surfaces within each 'a'ā excavation could have supported various dryland cultivars.

Mitigation Measures

Data recovery excavation was recommended at Feature B. A 1-sq-m excavation would be conducted in a location that appears promising. Should there be any significant quantity of midden or any artifacts other than a small quantity of basalt waste flakes, a second 1-sq-m excavation would be undertaken. CSH anticipated two to four archaeologist days to accomplish this fieldwork. In an effort to secure ACHP support it was decided to effectively move the *makai* edge of the project *mauka*. As a result, this site is recommended for interim preservation with protection behind a continuous barrier on the highway (east) side during highway widening work with a commitment to the previously agreed-to mitigation (excavation) prior to any future land disturbance in the immediate vicinity. Interim preservation will be through avoidance and protection (conservation). There will be a buffer zone of 5 m on all sides of the site except the *mauka* side where it would

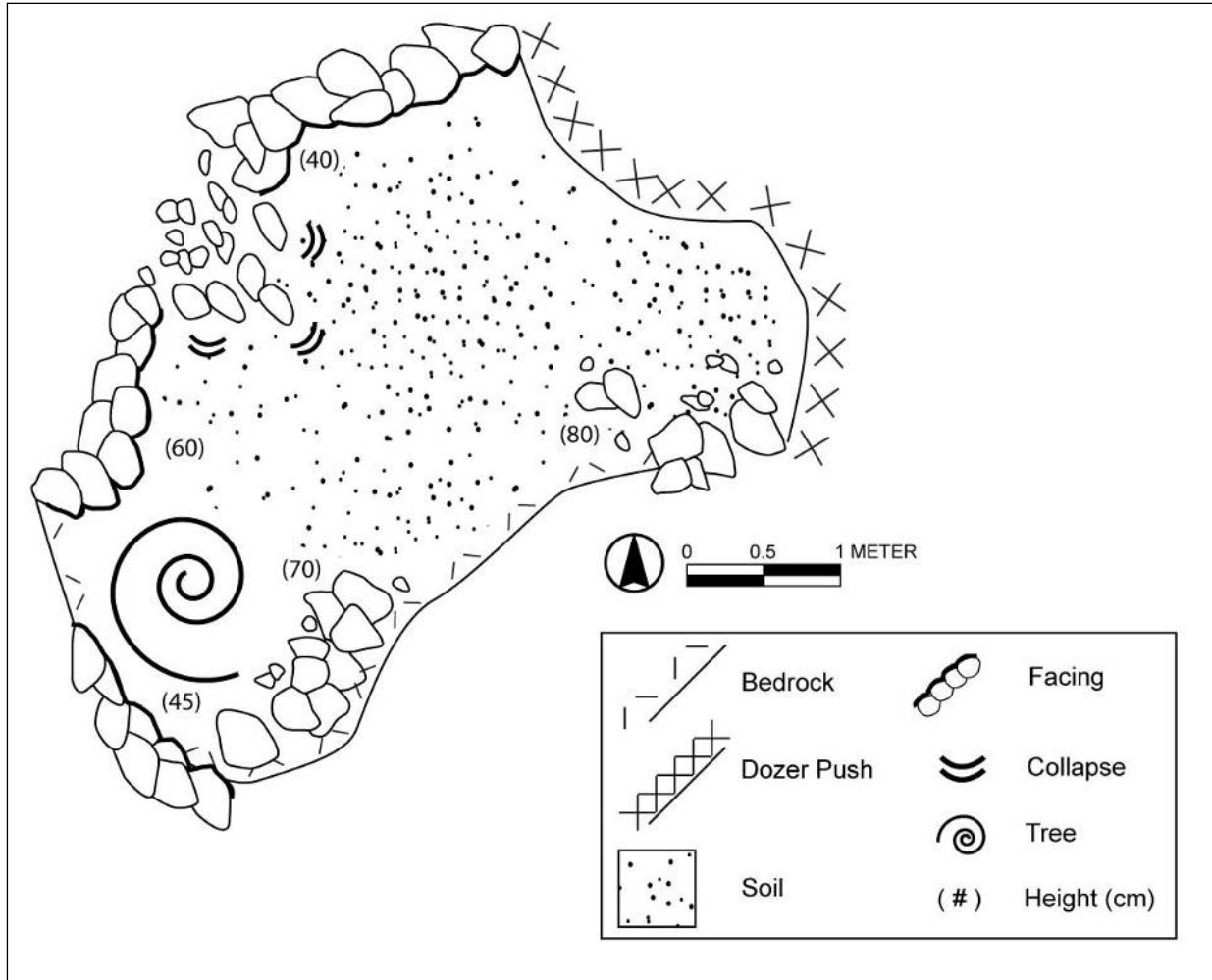


Figure 138. Plan view map of SIHP # -28783 Feature A

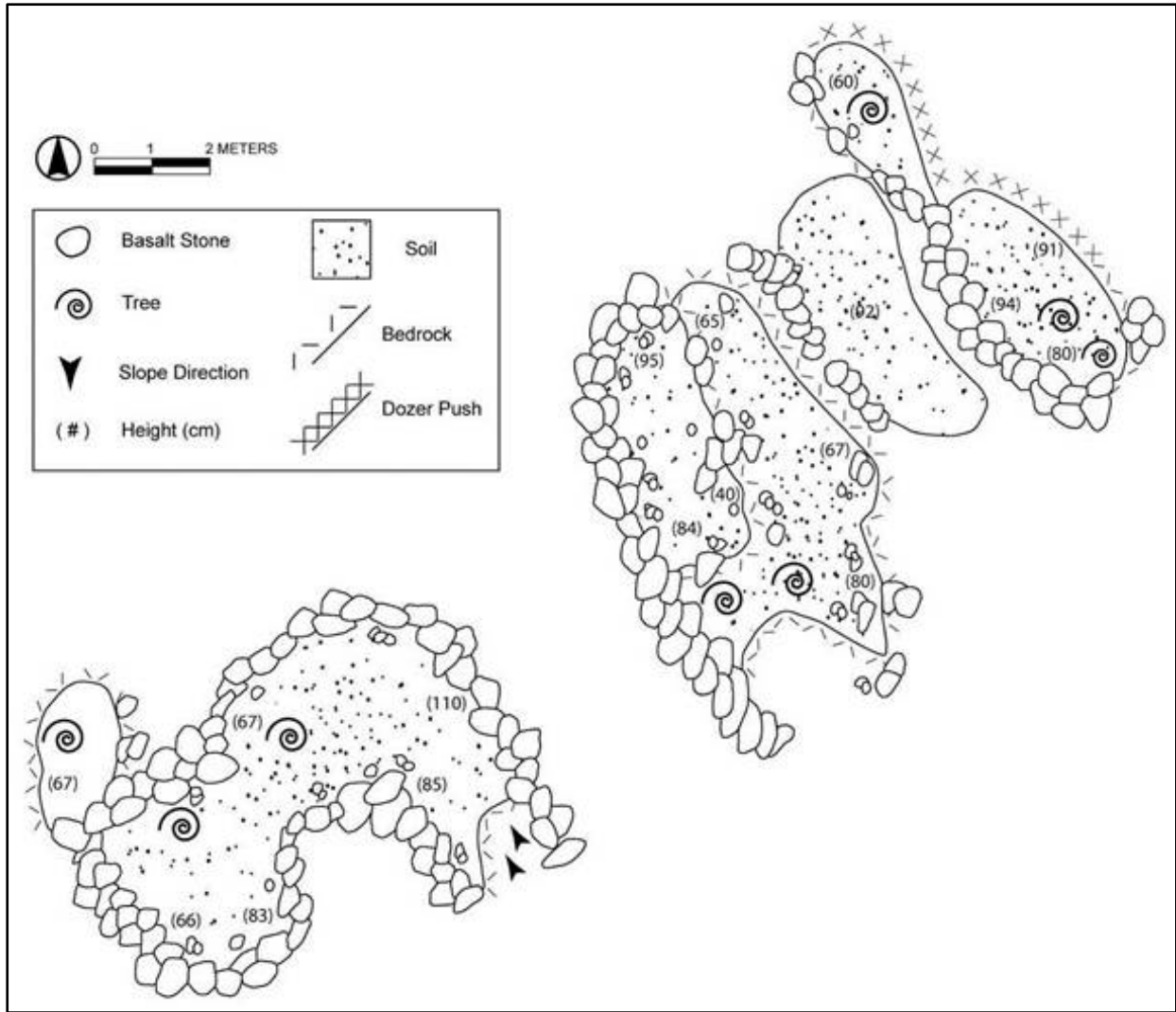


Figure 139. Plan view map of SIHP # -28783 Feature B

be 3.6 m The buffer zone would not be demarcated on the ground (other than the continuous barrier on the highway side during highway construction). . . .

Construction of Retaining Wall A did not impact SIHP # -28783 (see Section 5.2.1). The entire site was preserved; therefore data recovery was not undertaken for Feature B.

6.2.4 SIHP # 50-10-27-15324 (*Mauka-Makai Trail*) (Retaining Wall E)

Hammatt and Shideler (2014:37–40) most recently describe SIHP # -15324 as follows:

Temp. Site No.: 6 (Walsh and Hammatt 1995); 92-1118-12 (PHRI)

Site Type: Trail (*mauka-makai*)

No. of Features: 2

Functional Interpretation: Transportation

Probable Age: Indeterminate

Overall Dimensions: See description below

Topography: Both 'a 'ā and *pāhoehoe* sections

Elevation: 60-65 ft (18-20 m) AMSL (in the ROW)

Description:

SIHP # 50-10-27-15324 was first formally described by PHRI, Inc. In 1995, CSH (Walsh and Hammatt 1995) described the site and noted the presence of PHRI's site tag. The site was revisited during the current archaeological inventory survey and found to be in the same physical condition [Figure 140]. The trail was described by Walsh and Hammatt (1995) as follows:

Site 15324 consists of two converging trail segments designated Features A and B . . . Both trail segments extend in a roughly *mauka-makai* direction, but angle toward each other and converge into one trail that continues inland. The point where the two trails meet is located at the edge of the bulldozed portion of the present highway right of way, 164 feet (50 m.) from the *makai* edge of the highway pavement. Both trail segments were observed to continue over 300 feet (91 m.) *makai*. On the *mauka* side of the highway, the trail was observed at the edge of the bulldozed portion of the powerline (the new right-of-way boundary) and continuing inland at 65 degrees T.N. [true north] for at least another 100 feet (30 m.).

Both trail segments (Features A and B) average 0.6 m wide and consist of a trodden surface that meanders over *pāhoehoe* and *a'a* lava surface. A few isolated stepping stones consisting of *pāhoehoe* slabs were observed along Feature B. Both trail segments are well worn and clearly visible, especially on the *a'a* lava surfaces. The portion of Feature A within the new right-of-way is approximately 40 feet (12 m.) long, and the portion of Feature B within the new right-of-way is 50 feet (15 m.) long. [Walsh and Hammatt 1995:39]

Walsh and Hammatt (1995) recommended SIHP # -15324 eligible for the National and State Registers of Historic Places under criterion D for its information relevant to prehistory and history. The site was recommended for preservation 'to the extent possible within the proposed highway widening plans' and 'those portions of [the

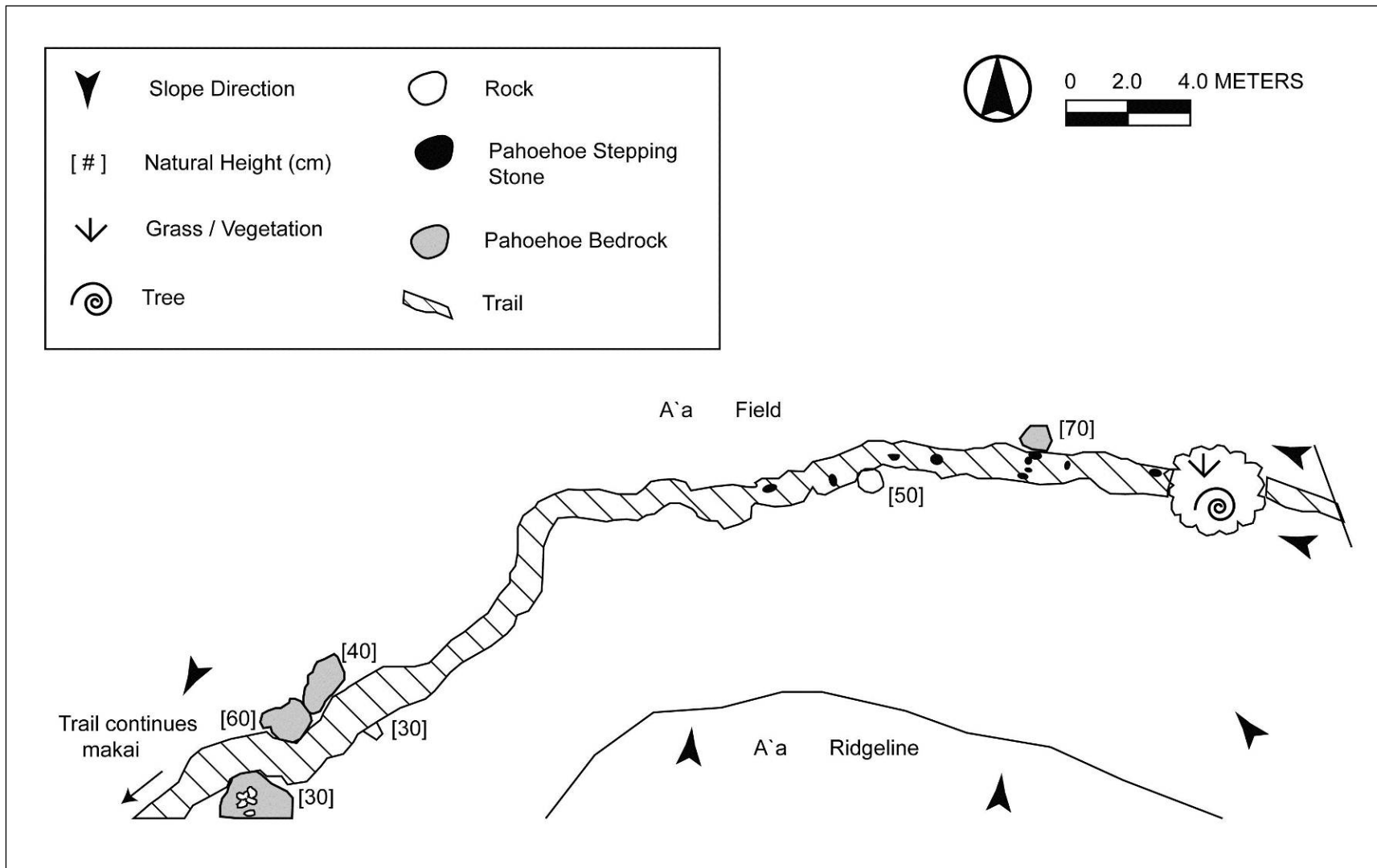


Figure 140. Plan view map of SIHP # -15324

site] that cannot be avoided [should] be included in a program of data recovery' (Walsh and Hammatt 1995:57). The final archaeological treatment plan (1999), however, called for 'interim protection' only for SIHP # -15324.

Mitigation Measures

In an effort to secure ACHP support it was decided to effectively move the *makai* edge of the project *mauka*. As a result, some ten trails that were going to be impacted (including SIHP # -15324) now will not be impacted. The mitigation for these trails will be the same data recovery 'Archival Research & Preservation' inasmuch as the archival research will be done for all trails anyway. Preservation will be through avoidance and protection (conservation). There will be a buffer zone of 5 m on all sides except that nearest the Queen Ka'ahumanu Highway where the buffer zone will be approximately 0.6 m The buffer zone would not be demarcated on the ground (other than the continuous barrier on the highway side during highway construction). . . .

Construction of Retaining Wall E did not impact SIHP # -15324 (see Section 5.2.1).

6.2.5 SIHP # 50-10-27-10154 (Retaining Wall F)

Shideler et al. (2012:45–48) most recently describe SIHP # -10154 as follows:

Temp. Site No.: T-4 (Barrera 1985)

Site Type: Walled Enclosure

No. of Features: 1

Functional Interpretation: Indeterminate-Possible Habitation

Probable Age: Historic

Overall Dimensions: 3.0 m N/S by 10.3 m E/W

Topography: Level *pāhoehoe* flow

Elevation: 105 ft (32 m) AMSL

Description:

SIHP # 50-10-27-10154 was first formally described by Barrera (1985). For unknown reasons, Walsh and Hammatt (1995) do not mention or include SIHP # 10154 in their study, although it was clearly within the limits of their project area. The site was revisited during the current archaeological inventory survey and found to be in the same physical condition as described by Barrera [Figure 141]. The site was described by Barrera (1985:11) as follows:

This is a habitation structure measuring approximately 13 meters in length and 3 meters in width, and standing to a height of about 1 meter.

Barrera (1989) provided additional detail in a data recovery effort that included SIHP # 10154:

This is a well-constructed shelter built against a bedrock ledge plus an adjacent short wall section, covering an area of 3 by 10.3 meters. The shelter measures 7.8 meters in length and 3 meters in width, and stands to a height of 1.2 meters. Its wall, which measures between 0.65 and 0.95 meters in width, encloses an area of 14.4 square meters and cover an area of 8 square

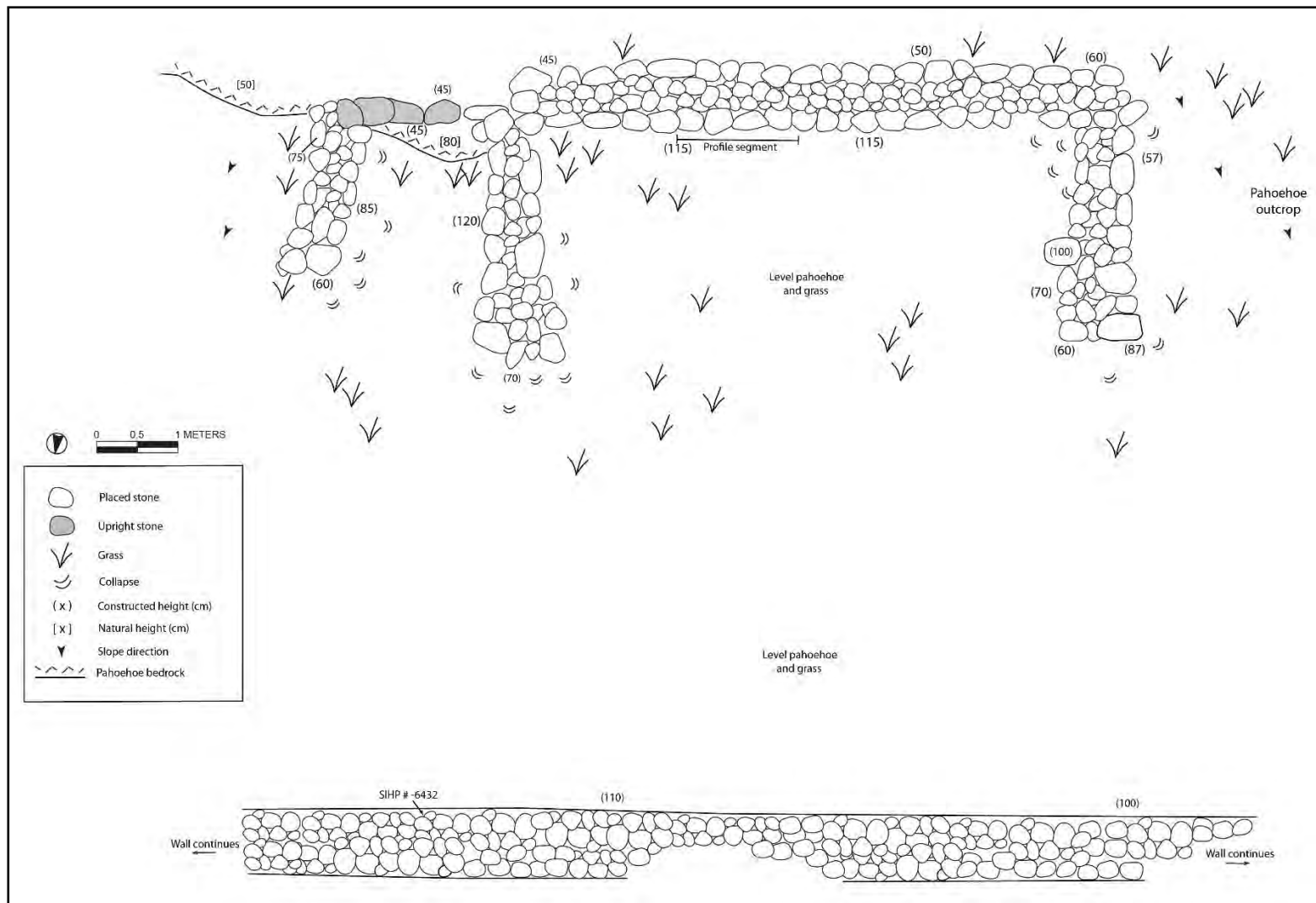


Figure 141. Plan view map of SIHP # -10154

meters. The short wall section measures 0.8 by 1.7 meters and stands to a height of one meter. Although no midden or artifacts were found at the site, its proximity and similarity in construction to the adjacent historic period boundary [SIHP # 06432] wall suggests that it is of the same age, but its function remains unknown.

Barrera's (1989) study was based on a data recovery plan developed by the Historic Sites Section of the Hawai'i Department of Land and Natural Resources (precursor to the SHPD). Based on the completion of the data recovery work, historic preservation work at SIHP # -10154 was considered complete at the time of Barrera's (1989) report. SIHP # 10154 was not included in the Final Archaeological Treatment Plan (1999), indicating concurrence with the treatment ('no further work') for this site [this recommendation was updated to "Preservation" by Monahan et al. 2012a].

Construction of Retaining Wall F was in extremely close proximity to SIHP # -10154 (and adjacent SIHP # -06432), requiring the site to be stabilized using sandbags during wall construction. SIHP # -15324 was not impacted by construction (see Section 5.2.2.1).

6.2.6 SIHP # 50-10-27-29272 (Level Area in 'A'ā with *Mauka-Makai* Trail) (Retaining Wall G)

Hammatt and Shideler (2014:112–118) most recently describe the portion of SIHP # -29272 in the project area as follows:

SIHP # 50-10-27-29272 appears to be a constructed ramp to allow for travel across uneven terrain with a primary function of transportation. It may also have been used as a small resting place. Three 1-sq-m test units were excavated here during the archaeological inventory survey. Two additional 1-sq-m test units are recommended for the data recovery work. Two archaeologist days are estimated to complete the fieldwork.

Temp. Site Designation: Coral frags (Harp 2011)

Site Type: Level area (Feature A) with *mauka/makai* trail (Feature B)

No. of Features: 2

Functional Interpretation: Possible resting place (Feature A)/transportation (Feature B)

Probable Age: Indeterminate

Overall Dimensions: 6.5 m E/W by 5.5 m N/S (level area)

Topography: Undulating *pāhoehoe* terrain sloping gently *makai*

Elevation: 114 ft (36 m) AMSL

Description:

SIHP # 50-10-27-29272 is a level area (Feature A) of rounded but 'fresh' looking basalt cobbles and small boulders with some rounded coral pieces (mostly less than 5 cm) in a low area at the edge of a *pāhoehoe* outcrop [Figure 142]. Pieces of cowrie and 'opihi shell are on the surface of the level area. Some 1970s-era bottles and beverage cans and other trash are scattered around the site area, as well as a single, rusted horseshoe. The western side of the feature has a clear but informal edge about

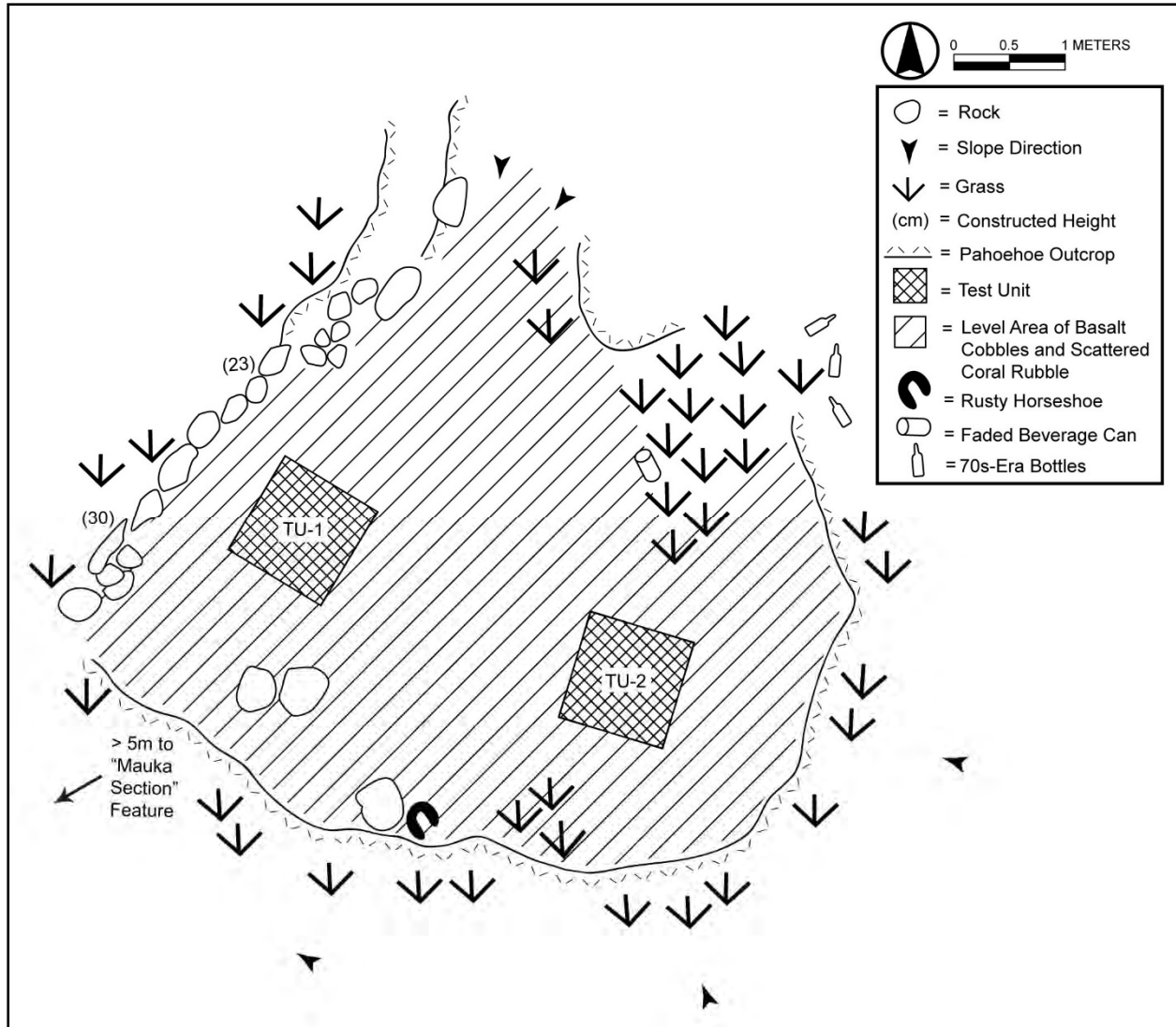


Figure 142. Plan view sketch map of SIHP # -29272 Feature A

30 cm high. Grasses surround the site. This site was pointed out to CSH by Isaac Harp, and was inspected and assessed as part of the supplemental survey of the north segment of the current project area (Monahan and Wilkinson 2012).

While working with CSH archaeologists, Isaac Harp identified a relatively faint trail oriented *mauka* to *makai* leading into the site area from the west. CSH archaeologists were skeptical about this trail, which they considered to be relatively difficult to observe in the field; nonetheless, GPS coordinates for the trail were obtained in order to map its location. It is important to note that, subsequent to CSH's fieldwork with Isaac Harp, the SHPD informed CSH that a more formal section of this trail had been identified by another firm (Dr. Robert Rechtman) in an adjacent project area to the west. The site number obtained by Rechtman for this trail has been used for the current project area, but the report is still in draft form and is not available for citation at this time [note, the Rechtman report has since been finalized; see Rechtman and Clark 2013].

In order to explore the possible function and age of the site more fully, two test units were excavated within the main level area (Feature A). Test Unit 1 (TU-1) was relatively shallow and was sterile. Test Unit 2 (TU-2) contained a small amount of midden. A third excavation, Test Unit 3 (TU-3), was placed in a nearby area of the site thought to be possibly a 'filled in' area by Isaac Harp. This test unit was sterile.

This site appears to be a constructed ramp to allow for travel across uneven terrain with a primary function of transportation. It may also have been used as a small resting place (the level area designated Feature A) associated with a *mauka/makai* trail (Feature B). The age of the site is currently indeterminate.

Mitigation Measures

In an effort to secure ACHP support it was decided to effectively move the *makai* edge of the project *mauka*. As a result, some ten trails that were going to be impacted (including SIHP # - 29272) now will not be impacted. The mitigation for these trails will be the same data recovery "Archival Research & Preservation" inasmuch as the archival research will be done for all trails anyway. There will be a buffer zone of 5 m on all sides of the site except for the *mauka* side where the buffer zone will be 0.6 m Interim preservation will be through avoidance and protection (conservation). The buffer zone would not be demarcated on the ground (other than the continuous barrier on the highway side during highway construction which would be fortified with a portable construction barrier for added protection)

. . . .

Construction of Retaining Wall G did not impact SIHP # -29272 (see Section 5.2.1).

Section 7 Significance Assessments

No previously unrecorded historic properties were identified during project monitoring. While the monitoring has resulted in no changes to the existing (conflated) significance assessments/eligibility considerations made for the 75 sites recorded in the project area under the SHPD-accepted AIS (Monahan et al. 2012a) (see Table 22 and discussion in Section 4.2.1), a clarification of site significance under HAR §13-275-6 (described in Section 7.1) and National/Hawai'i Registers eligibility pursuant to 36 CFR 60.4/HAR §13-198-8 (described in Section 7.2) is provided for each site in Table 51. This clarification of the assessments made in Monahan et al. (2012a) for SIHP # -00002 (Māmalahoa Trail) had already been made in the Wilkinson et al. (2017) SAIS.

7.1 Site Significance Assessments

Pursuant to HRS §6E, for a historic property to be significant under HAR §13-275-6 (applicable to government projects), the historic property should possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the following significance criteria:

- a Be associated with events that have made an important contribution to the broad patterns of our history;
- b Be associated with the lives of persons important in our past;
- c Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value;
- d Have yielded, or is likely to yield, information important for research on prehistory or history; or
- e Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

7.2 Register Eligibility

Pursuant to HRS §6E, a significant historic property is evaluated for eligibility for inclusion in the Hawai'i Register of Historic Places in accordance with HAR §13-198-8 and pursuant to 36 CFR 60.4 for inclusion in the National Register of Historic Places. To be considered eligible for inclusion on either register, a significant historic property should possess integrity of location, design, setting, materials, workmanship, feeling and/or association, and meet one or more of the following criteria:

- A That are associated with events that have made a significant contribution to the broad patterns of our history;
- B That are associated with the lives of persons significant in our past;
- C That embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;
- D That have yielded, or may be likely to yield, information important in prehistory or history.

Table 51. Clarification of site significance and register eligibility for 75 historic properties documented in AIS

SIHP # (50-10-27)	Formal Type	No. of Features	Age	Function	Significance per HAR §13-275-6	Eligibility to National Register/ Hawai'i Register
19954	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
29332	Mound/paved area within naturally formed <i>pāhoehoe</i> depression	2	Indeterminate	Indeterminate, possible burial	d, e	D
29334	Rock mound within a naturally formed <i>pāhoehoe</i> depression	0	Indeterminate	Indeterminate, possible burial	d, e	D
28774	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
22507	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
29335	Rock wall segment	0	Indeterminate	Indeterminate	d, e	D
18099	Trail (<i>mauka-makai</i>)	0	Indeterminate, possibly historic	Transportation	a, c, d, e	A, C, D
22418	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
22417	Modified lava blister	0	Pre-Contact	Agriculture / planting pit	d, e	D
28778	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Agriculture / planting pit	d, e	D
22415	Platform	0	Pre-Contact	Burial	d, e	D
29336	Rock terrace	0	Indeterminate	Indeterminate, possible burial	d, e	D

SIHP # (50-10-27)	Formal Type	No. of Features	Age	Function	Significance per HAR §13-275-6	Eligibility to National Register/ Hawai'i Register
29337	Excavated pit	0	Indeterminate	Indeterminate, possible quarry or sweet potato planter	d, e	D
29339	Rock wall segment	0	Indeterminate	Indeterminate	d, e	D
29338	Excavated pit	0	Indeterminate	Indeterminate, possible quarry or sweet potato planter	d, e	D
29340	Rock mound	0	Indeterminate	Indeterminate, possible burial	d, e	D
29341	Excavated pits	2	Indeterminate	Indeterminate, possible quarry or sweet potato planter	d, e	D
29342	Excavated pit	0	Indeterminate	Indeterminate, possible quarry for cinder rock to repair nearby Māmalahoa Trail	d, e	D
00002	Māmalahoa Trail (cross slope, <i>ala loa</i> type)	0	Historic	Transportation	a, b, c, d, e	A, B, C, D
19953	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D, E
29343	Excavated pit	0	Indeterminate	Indeterminate, possible quarry or sweet potato planter	d, e	D
28780	'A 'ā excavation	0	Indeterminate	Indeterminate, possible burial	d, e	D

SIHP # (50-10-27)	Formal Type	No. of Features	Age	Function	Significance per HAR §13-275-6	Eligibility to National Register/ Hawai'i Register
28781	Paved / leveled area	0	Indeterminate	Indeterminate, possible agricultural clearing	d, e	D
28782	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
28783	Complex	6	Pre-Contact	Agriculture	d, e	D
28784	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
28785	Enclosure	0	Pre-Contact	Agriculture	d, e	D
29333	Rock stacking (possible <i>ahu</i>)	0	Indeterminate	Indeterminate	d, e	D
28786	Modified depression	0	Pre-Contact	Agriculture	d, e	D
28787	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
19952	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
28788	Modified outcrop complex	2	Pre-Contact	Agriculture	d, e	D
19951	Wall	0	Historic	Ranching / boundary	d, e	D
28789	Complex	6	Pre-Contact	Agriculture	d, e	D
19950	Modified outcrop complex	5	Pre-Contact	Agriculture	d, e	D
28790	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	d, e	D
19949	Enclosure	0	Indeterminate, historic or possibly modern	Indeterminate, possible windbreak / temporary shelter	d, e	D
28791	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D

SIHP # (50-10-27)	Formal Type	No. of Features	Age	Function	Significance per HAR §13-275-6	Eligibility to National Register/ Hawai'i Register
28792	Petroglyph	0	Pre-Contact	Symbolic expression	d, e	D
29344	Excavated pit	0	Indeterminate, possibly pre-Contact	Indeterminate, possible quarry, sweet potato planter, or bird pit	d, e	D
10714	Trail system (<i>mauka-makai</i>), part of the "Road to the Sea Trail"	3	Pre- to Post- Contact	Transportation	a, c, d, e	A, C, D
28794	Filled crevice	0	Indeterminate	Indeterminate, possible agricultural clearing feature	d, e	D
28797	Mound complex	2	Pre-Contact	Agriculture	d, e	D
19948	Complex	8	Pre-Contact	Agriculture and quarrying	d, e	D
28799	Excavated pit complex	3	Pre-Contact	Agriculture	d, e	D
28800	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	d, e	D
28801	Modified outcrop complex	2	Pre-Contact	Agriculture	d, e	D
19947	Stacked rocks	3	Pre-Contact	<i>Ahupua'a</i> boundary markers	d, e	D
28802	Complex	3	Pre-Contact	Temporary habitation	d, e	D
28803	Complex	2	Indeterminate	Indeterminate, possible agricultural clearing feature	d, e	D
28804	Filled crevice	0	Indeterminate	Indeterminate, possible agricultural clearing feature	d, e	D

SIHP # (50-10-27)	Formal Type	No. of Features	Age	Function	Significance per HAR §13-275-6	Eligibility to National Register/ Hawai'i Register
28805	Modified outcrop	0	Pre-Contact	Agriculture / clearing	d, e	D
15324	Trail (<i>mauka-makai</i>)	2	Indeterminate	Transportation	c, d, e	C, D
19946	Trail (<i>mauka-makai</i>)	0	Indeterminate	Transportation	c, d, e	C, D
28806	Mound	0	Indeterminate	Possible marker	d, e	D
28807	Filled crevice	0	Indeterminate	Indeterminate	d, e	D
29345	Coral-filled <i>pāhoehoe</i> crevice	3	Indeterminate	Indeterminate	d, e	D
28808	Mound complex	5	Indeterminate	Markers	d, e	D
28809	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	d, e	D
28810	Lava tube	0	Pre-Contact	Indeterminate, possible water catchment	d, e	D
29346	Rock mound	0	Indeterminate	Indeterminate, possible marker or quarrying	d, e	D
10154	Walled enclosure	0	Historic	Indeterminate, possible habitation	d, e	D
06432	Core-filled stone wall	0	Historic	<i>Ahupua'a</i> boundary	d, e	D
29347	Rock mound	0	Indeterminate	Possible marker or quarrying	d, e	D
29272	Level area in 'a'ā with trail (<i>mauka/makai</i>)	2	Indeterminate	Possible temporary resting spot / work area and transportation	c, d, e	C, D
28811	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	d, e	D
28812	Possible filled crevice	0	Indeterminate	Indeterminate	d, e	D

SIHP # (50-10-27)	Formal Type	No. of Features	Age	Function	Significance per HAR §13-275-6	Eligibility to National Register/ Hawai'i Register
28813	Modified lava blisters	5	Pre-Contact	Agriculture	d, e	D
28814	Lava tube	0	Pre-Contact	Indeterminate, possible water catchment	d, e	D
28815	<i>Pāhoehoe</i> excavation	0	Pre-Contact	Quarrying	d, e	D
19943	Lava tube	4	Pre-Contact	Temporary habitation	d, e	D
19945	Petroglyphs (n=2) and bashed/pecked <i>pāhoehoe</i> (n=7)	9	Pre-Contact	Symbolic expression and prospecting for voids in lava flow	d, e	D
29348	Boulder (<i>pāhoehoe</i> basher) in excavated pit	0	Pre-Contact	Prospecting for voids in lava flow	d, e	D
29349	Boulder (<i>pāhoehoe</i> basher) and associated excavated pit	2	Pre-Contact	Prospecting for voids in lava flow	d, e	D

Section 8 Summary and Interpretation

At the request of GBI and on behalf of HDOT, CSH has completed this AMR for the Queen Ka'ahumanu Highway Widening Phase 2 project, Kalaoa, Kalaoa-'O'oma, 'O'oma 2, Kohanaiki, Kaloko, Honokōhau 1–2, and Kealakehe, North Kona District, Island of Hawai'i, TMKs: [3] 7-3-009, 010, 043, 049, 051, 058; 7-4-008, 020. Fieldwork was conducted between 2 September 2015 and 26 November 2018 and required approximately 1,847 person-days to complete.

Fieldwork consisted of archaeological monitoring for all new ground disturbing activities and, following discovery of inadvertent impacts to certain historic properties in late 2016, for any type of work occurring within proximity of an archaeological preserve. No previously unrecorded historic properties were encountered during project construction.

Protective retaining walls were constructed at SIHP #s -10154, -15324, -18099, -22418, -28783, and -29272. All related construction work was monitored. These sites were not impacted by construction; SIHP # -10154 required temporary stabilization using sandbags during construction of Retaining Wall F.

Four lava tubes were breached during excavation activities, including one near SIHP # -28809. In each instance the archaeological monitor halted work in the immediate vicinity to inspect and document each breach. In all instances the breached lava tubes were found to be culturally sterile within the project boundaries. The portions of the lava tubes within grading limits were collapsed and filled in by machine.

Interim protective fencing was breached only once during project construction, when a vehicle crashed through the fence located between SIHP #s -10714 Feature A and -29344. These historic properties were not damaged by the accident.

Three historic properties were subject to inadvertent impact during the project.

At SIHP # -10714 (*mauka-makai* trail system), an approximately 5-m segment of the Feature A trail and approximately 7-m segment of the Feature C trail were destroyed by grading activities. The impacted portions of the Feature A and Feature C trails were erroneously located outside interim preservation fencing and were therefore exposed to project impact. The inaccurate placement of interim fencing across the Feature A and Feature C trail segments occurred due to communication and coordination issues resulting in incorrect information being used to identify and locate the historic sites that needed to be protected. It was expected that the grading limit was intended to cross the Feature A and Feature C trails, leaving segments of these trails outside the grading limits and segments inside those grading limits.

- At SIHP # -19954 (*mauka-makai* trail), cultural monitors deconstructed a section of the stepping stone trail they mistakenly believed was within project grading limits. Per the DRPP (Shideler et al. 2012) this section of the trail was slated for destruction, but under the subsequent project re-design and APMP (Hammatt and Shideler 2014) the site was completely outside the grading limits.
- At SIHP # -00002 (Māmalahoa Trail) an approximately 3.5-m section of the trail adjacent to the southern Kealakehe Parkway shoulder was impacted when a heavy, tracked vehicle drove perpendicularly across the trail during stockpiling of pre-cast

concrete blocks atop of the road shoulder. SIHP # -00002 was not protected by interim preservation fencing in this location as this work occurred outside the project area and APE described in the SHPD-accepted AIS (Monhan et al. 2012a) and subsequent preservation plans (Shideler et al. 2012; Hammatt and Shideler 2014).

A total of 231 stratigraphic profiles were recorded by the archaeological monitors over the course of the project. The stratigraphy observed during the monitoring program was as expected given the geology known to characterize the project area and prior construction-related disturbance. Stratigraphy within the project area consists of basalt gravel-to-boulder construction fills and/or natural layers of crushed 'a'ā lava overlying both deteriorating and consolidated basalt bedrock. No cultural deposits or burials were exposed during project excavations.

Aside from the inadvertent impacts to certain historic properties, the results of the monitoring were as expected.

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Appendix A APE Land Jurisdiction

Entries highlighted yellow are within the Queen Ka'ahumanu Highway Widening Phase 2 project area. Entries not highlighted are outside the project area but within the greater project APE.

TMK	Owner	MajorOwner	TaxAcres
373009002	U.S.A.	Govt. Federal	249.5
373009005	STATE OF HAWAII	Govt. State	903.789
373009017	KALOKO RESIDENTIAL PARK LLC	Kaloko Residential Park	224.43
373009018	RUTTER/KW KOHANA'IKI LLC	other	82.589
373009021	U.S.A.	Govt. Federal	72.084
373009065	STATE OF HAWAII	Govt. State	8.593
373009066	COUNTY OF HAWAII	Govt. County of Hawaii	2.716
373009068	RUTTER/KW KOHANA'IKI LLC	other	7.552
373010007	STATE DEPT. OF HAWAIIAN HOME LANDS	Govt. State DHHL	200
373043003	STATE OF HAWAII /etal	Govt. State	1905.939
373043072	STATE OF HAWAII	Govt. State	7.855
373043089	STATE OF HAWAII	Govt. State	77.221
373043091	STATE OF HAWAII	Govt. State	34.454
373049001	STATE OF HAWAII	Govt. State	7.282
373049013	STATE OF HAWAII	Govt. State	4.736
373049035	STATE OF HAWAII	Govt. State	5.452
373051002	T HARA & COMPANY LTD	other	1.3663
373051058	KALOKO COMMUNITY ASSN	other	3.0407
373058001	KALANIKU LLC	other	1.262
373058002	MATSUYAMA DEVELOPMENT CO	other	5.116
373063012	COUNTY OF HAWAII	Govt. County of Hawaii	38.139
374008003	STATE OF HAWAII	Govt. State	117.987
374008010	U.S.A.	Govt. Federal	234.731
374008025	U.S.A.	Govt. Federal	59.2
374008072	STATE DEPT. OF HAWAIIAN HOME LANDS	Govt. State DHHL	200
374008076	WEST HAWAII BUSINESS PARK LLC	other	95.387
374020002	STATE DEPT. OF HAWAIIAN HOME LANDS	Govt. State DHHL	10.752

Appendix B Select SHPD Correspondence

AIS (Monahan et al. 2012a) Acceptance

<p>NEIL ABERCROMBIE GOVERNOR OF HAWAII</p>		<p>WILLIAM J. AHLA, JR. CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT</p>
	<p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES POST OFFICE BOX 621 HONOLULU, HAWAII 96809</p>	<p>PAUL J. CONRY INTERIM FIRST DEPUTY WILLIAM M. TAM DEPUTY DIRECTOR - WATER AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS PRESERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS</p>
<p>August 21, 2012</p>		
<p>Chris Monahan, Ph.D. Cultural Surveys Hawaii PO Box 1114 Kailua, Hawaii 96734</p>	<p>LOG NO: 2012.1443 DOC NO: 1208MV01</p>	
<p>Subject: Chapter 6E-8 & National Historic Preservation Act Section 106 Review - Archaeological Inventory Survey, Proposed Queen Ka'ahumanu Highway Widening, Phase 2 Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a North Kona District, Island of Hawai'i TMK: (3) 7-4-008, 7-3-009 & 7-3-043 (portion)</p>		
<p>Thank you for submitting the report titled <i>Archaeological Inventory Survey for the Proposed Queen Ka'ahumanu Highway Widening Phase 2 Project Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a, North Kona District, Island of Hawai'i TMK: (3) 7-4-008, 7-3-009 & 7-3-043</i> (C. Monahan, T. Yucha, and C. O'Hare), July 2012. This report was received by our office on July 20, 2012. The report presents the findings of multiple phases of archaeological survey work conducted along a 5.2 mile section of the proposed Queen Ka'ahumanu Highway Widening Project, Phase II. A previous draft of this archaeological inventory survey (AIS) report was reviewed by SHPD (<i>Log 2011.1140 Doc 1104TD12</i>). This previous draft was accepted under the condition that comments and concerns from other consulting parties, including the National Park Service (NPS) and native Hawaiian organizations (NHO), would be addressed. Because the concerns of the consulting parties were not adequately addressed, additional field work was undertaken in the project area and a revised draft report was submitted to our office for review. The results of all the field work in this project area to date are presented in this revised report. The survey identifies 75 historic properties in the proposed project area; twenty of the historic properties are previously described in existing archaeological reports. The remaining 55 historic properties are newly identified in this report. Of the 55 newly identified historic properties, 35 were recorded in the initial draft of this report (Monahan et al. 2011), and the remaining 20 historic properties were recorded during the supplemental fieldwork involving consulting parties (NHO's NPS, and SHPD).</p>		
<p>The changes that were made to this report are the result of the SHPD review of a previous draft (<i>Log 2012.1443, Doc. 1206MV26</i>). We believe the revisions and explanations have adequately addressed our concerns relating to inadequate levels of recording at multiple sites, the assessment of site functions, and treatment recommendations. We are pleased that the 'Big Cave' site (50-10-28-29725) has been identified and recoded in this AIS, and we are pleased that the FHWA will proceed with the proposed mitigation commitment of creating a Burial Treatment Plan to be presented to the Hawaii Island Burial Council, in consultation with the appropriate land owner.</p>		
<p>All 75 historic properties identified during this survey are assessed as significant under the National Register of Historic Places (NRHP) criterion D for their ability to yield information on historic and prehistory. As a result of consultation with Native Hawaiian organizations (NHOs), Criterion "e" of the Hawaii Register of Historic Places (HRHP) has been added to all 75 sites, because the NHOs believe these properties are of cultural value to the Native Hawaiian people. In addition, Sites 19954, 28774, 22507, 22418, 19953, 28782, 28784, 28787, 19952, 15324, 19946, 28791, and 29272 are assessed as significant under NRHP criteria C and D; and HRHP Criterion "e". Two trails, (Sites 18099 and 10714) are assessed as significant under NRHP criteria A, C, and D; and HRHP Criterion "e". Finally, the Mamalahoa Trail (Site 00002) is assessed as significant under NRHP criteria A, B, C, and D; and HRHP Criterion "e". We concur with the significance assessments presented in this report for all sites assessed as significant under NRHP criteria A, B, C, and D.</p>		

Dr. Monahan
August 21, 2012
Page 2

The application of HRHP significance Criterion "e" to all sites has been reviewed by the SHPD History and Culture Branch. The results of that review are as follows:

The History and Culture Branch concurs with the Archaeological Inventory Survey that all 75 historic properties in the project area be assessed as significant under Criterion E, as having important value to the *native Hawaiian people...due to associations with cultural practices once carried out, or still carried out, at the property*, or due to associations with traditional beliefs, events, or oral history accounts—these associations being important to the group's *history and cultural identity*. Due to changes in Hawai'i that occurred subsequent to contact with the western world (1778), the unique cultural identity of the native Hawaiian people progressively eroded. Thus with respect to that cultural identity, aside from personal DNA that each native Hawaiian possesses, all that is left today are those physical manifestations (archaeological sites and features) that identifies and defines the native Hawaiian culture. From a cultural perspective then, all sites and features are significant to the native Hawaiian.

The History and Culture Branch also concurs with the project effect and mitigation recommendations as discussed in Section 7, as well as summarized in Table 27 (Summary of Proposed Mitigation) and Table 28 (Project Effect and Mitigation Recommendations for Historic Properties in the Project Areas). The Branch would also like emphasize the importance of care and sensitivity as it relates to the proposed data recovery at those sites identified as possible burials.

This report meets the requirements of HAR §13-276 and *Secretary of the Interior's Standards for Documentation and Evaluation*, and is accepted by SHPD. Please send one hardcopy of the document, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office.

Please contact Mike Vitousek at (808) 652-1510 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,





Theresa K. Donham
Deputy State Historic Preservation Officer
Archaeology Branch Chief
Historic Preservation Division

cc: Hinano Rodrigues, Acting Branch Chief
History and Culture Branch
Historic Preservation Division

DRPP (Shideler et al. 2012) Acceptance

NEIL ABERCROMBIE
GOVERNOR OF HAWAII





STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. ATLA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONSERVANCIES
COMMISSION ON WATER RESOURCES MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAIKOLA WEIHE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

October 25, 2012

Chris Monahan, Ph.D.
Cultural Surveys Hawaii
PO Box 1114
Kailua, Hawaii 96734

LOG NO: 2012.3052
DOC NO: 1210MV25

Dear Dr. Monahan,

Subject: Chapter 6E-8 & National Historic Preservation Act Section 106 Review - Revised Archaeological Data Recovery and Preservation Plan for the Proposed Queen Ka'ahumanu Highway Widening, Phase 2 Project Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a North Kona District, Island of Hawai'i TMK: (3) 7-4-008, 7-3-009 & 7-3-043 (portion)

Thank you for submitting the revised plan titled *Archaeological Data Recovery and Preservation Plan for the Proposed Queen Ka'ahumanu Highway Widening Phase 2 Project Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a, North Kona District, Island of Hawai'i TMK: (3) 7-4-008, 7-3-009 & 7-3-043* (D. Shideler, T. Yucha, C. O'Hare and C. Monahan), August 2012. This plan was received by our office on October 9, 2012. The plan outlines the proposed site specific mitigation commitments for 75 historic properties discovered during the identification phase of this proposed undertaking. These 75 historic properties are documented in the archaeological inventory survey report for the project area (Monahan et. al. 2012) that was approved by SHPD in August 2012 (Log No 2012.1443, Doc No 1208MV01).

The site specific mitigation commitments for the 75 sites are described on page iv of the management summary and in table 3, which stretches from page 26 to page 28. According to these tables: two sites will be subjected to separate burial treatment plans (Sites 22415 and 29275); 15 sites will be preserved with no additional field work (Sites 10154, 19943, 19950, 19951, 28780, 28781, 28788, 28789, 28790, 28792, 28797, 28799, 28802, 28806, and 28810); one site will receive a combination of no further work and preservation (19945); 11 sites will be avoided during construction and therefore subject to short term protection measures (28794, 28801, 28803, 28804, 28805, 28809, 29337, 29341, 29342, 29343, and 29347); two sites will receive no further work, but impacts will be monitored by an archaeologist (6432 and 29338); two sites will be relocated (19947 and 29346); one site will receive a combination of relocation and preservation (28808); 20 sites will receive data recovery excavation with no additional mitigation (19949, 22417, 28778, 28785, 28786, 28800, 28807, 28811, 28812, 28814, 28815, 29332, 29333, 29334, 29335, 9336, 29339, 29340, 29344, and 29345); 14 sites will be subjected to a combination of archival data recovery and partial preservation (00002, 10714, 15324, 18099, 19946, 19952, 19953, 19954, 22507, 28774, 28782, 28784, 28787, and 28791); one site will be subjected to a combination of archival data recovery, data recovery excavation and partial preservation (29272); one site will be subjected to archival data recovery only (22418); two sites will have data recovery through the collection and curation of portable artifacts (29348 and 29349); and three sites will be subjected to a combination of data recovery excavation and preservation (19948, 28783, and 28813).

Changes were made to this plan in response to the SHPD review of a previous draft (Log No. 2012.2546, Doc. No. 1209MV06). We believe the revisions and explanations have adequately addressed our concerns. We believe that this mitigation plan will now serve as the overall site-specific mitigation document for the undertaking. This plan meets the requirements of HAR §13-277, HAR §13-278 and the *Secretary of the Interior's Standards*, and is accepted by SHPD. Please send one hardcopy of the document, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office.

Dr. Monahan
October 25, 2012
Page 2



Please contact Mike Vitousek at (808) 652-1510 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,



Theresa Donham
Archaeology Branch Chief and
Deputy State Historic Preservation Officer
Historic Preservation Division

AMP (Monahan et al. 2012b) Acceptance

<p>NEIL ABERCROMBIE GOVERNOR OF HAWAII</p>		<p>WILLIAM J. AILA, JR. CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT</p>
	<p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES</p>	<p>PAUL J. CONRY INTERIM FIRST DEPUTY WILLIAM M. TAM DEPUTY DIRECTOR - WATER</p>
	<p>POST OFFICE BOX 621 HONOLULU, HAWAII 96809</p>	<p>AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS</p>

October 1, 2012

Chris Monahan, Ph.D.
Cultural Surveys Hawaii
PO Box 1114
Kailua, Hawaii 96734

LOG NO: 2012.2544
DOC NO: 1209MV11


Subject: **Chapter 6E-8 & National Historic Preservation Act Section 106 Review -
Archaeological Monitoring Plan for the
Proposed Queen Ka'ahumanu Highway Widening, Phase 2 Project
Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a
North Kona District, Island of Hawai'i
TMK: (3) 7-4-008, 7-3-009 & 7-3-043 (portion)**

Thank you for submitting the plan titled *Archaeological Monitoring Plan for the Proposed Queen Ka'ahumanu Highway Widening Phase 2 Project Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a, North Kona District, Island of Hawai'i* TMK: (3) 7-4-008, 7-3-009 & 7-3-043 (C. Monahan, T. Yucha, C. O'Hare and D. Shideler), August 2012. This plan was received by our office on August 28, 2012. The plan outlines the proposed monitoring provisions for this undertaking and reiterates the mitigation commitments for the 75 historic properties discovered during the identification phase of this proposed undertaking. These 75 historic properties are recorded in the archaeological inventory survey of this project area (Monahan et. al. 2012) that was approved by SHPD (Log No 2012.1443, Doc No 1208MV01).

The archaeological monitoring provisions indicate that every piece of working machinery will be monitored by a qualified archaeologist. The archaeological monitors will be onsite to mitigate any inadvertently discovered historic properties, and to ensure the protection of the preservation sites buffers. Archaeological monitors will have the authority to halt work in the event of a discovery, and any inadvertently discovered human skeletal remains will be cared for in compliance with Hawaii Administrative Rule (HAR) 13-300. In addition, this AMP indicates that if cultural material is encountered, sufficient laboratory analysis will be conducted in order to prepare a report that meets the standards of HAR 13-279.




This plan meets the requirements of HAR 13-279-4 as well as the *Secretary of the Interior's Standards* and is therefore accepted by SHPD. Please send one hardcopy of the document, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office, attention SHPD Library. Please contact Mike Vitousek at (808) 652-1510 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,





Theresa K. Donham
Deputy State Historic Preservation Officer
Historic Preservation Division

Chapter 6E-8 and HNPA Section 106 Review Addressing Project Redesign

<p>NEIL ABERCROMBIE GOVERNOR OF HAWAII</p>		<p>WILLIAM J. AILA, JR. CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT</p>
	<p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES</p>	<p>ESTHER KIA'AINA FIRST DEPUTY</p>
	<p>POST OFFICE BOX 621 HONOLULU, HAWAII 96809</p>	<p>WILLIAM M. TAM DEPUTY DIRECTOR - WATER</p> <p>AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS</p>
<p>July 23, 2013</p>		
<p>David Shideler. Cultural Surveys Hawaii PO Box 1114 Kailua, Hawaii 96734</p>		<p>LOG NO: 2013.4167 DOC NO: 1307MV17 Archaeology</p>
<p>Subject: Chapter 6E-8 and National Historic Preservation Act Section 106 Review - Proposed Queen Ka'ahumanu Highway Widening, Phase 2 Redesign and Mitigation Revisions Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a North Kona District, Island of Hawai'i TMK: (3) 7-4-008, 7-3-009 & 7-3-043 (portion)</p>		
<p>Thank you for submitting the consultation letter that was received by our office on July 9, 2013. According to the letter, the Federal Highways Administration (FHWA) has initiated a redesign of the Phase 2 widening project in order to minimize the effects of this undertaking on historic properties. The treatment recommendations for the 55 historic properties in the project area were finalized following an archaeological inventory survey conducted by Monahan et. al. (2012) and accepted by SHPD (Log 2012.1443, Doc 1208MV01). As a result of the redesign, 20 sites that were proposed to be directly impacted will now be avoided by construction activities. Nine of these sites are trails that were previously proposed to be partially destroyed, with mitigation in the form of archival research, and the undisturbed portion of the trail preserved (SIHP Sites 20-10-27-15324, 18099, 19946, 19954, 22418, 22507, 28774, 28782, and 29272). The remaining 11 sites were previously proposed to be all or partially destroyed by the highway widening, with data recovery excavation for 10 sites (SIHP Sites 19947, 19948, 19949, 22417, 28783, 28800, 28811, 29333, 29334, 29336, and 29344); and relocation for one site (SIHP 19947). As a result of the redesign, all 20 of these sites will be avoided by this undertaking.</p>		
<p>FHWA is proposing to revise the proposed mitigation commitments for these sites in order to avoid the potential adverse effects associated with data recovery excavation. For the 9 trail sites, FHWA now proposes to preserve the entire site within the project area, and continue with the data recovery work in the form of non-invasive archival research. SHPD agrees with this recommendation. In addition, the remaining 11 sites, which were previously recommended for relocation or data recovery excavation, will retain these original treatment recommendations. These sites will be preserved during the implementation of the current undertaking through the implementation of interim protection measures. Because these sites will retain their original treatment recommendations, it is possible for these 11 sites to be impacted by future undertakings, provided the agreed upon mitigation commitments are carried out. SHPD also agrees with this recommendation, and we look forward to the opportunity to review an amended mitigation plan that will outline the preservation measures that will be carried out for these sites during this undertaking.</p>		
<p>Please contact Mike Vitousek at (808) 652-1510 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.</p>		
<p>Aloha,</p>		
		
<p>Theresa K. Donham Deputy State Historic Preservation Officer Historic Preservation Division</p>		

APMP (Hammatt and Shideler 2014) Acceptance

<p>NEIL ABERCROMBIE GOVERNOR OF HAWAII</p>		<p>WILLIAM J. AILA, JR. CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT</p> <p>JESSE K. SOUKI FIRST DEPUTY</p> <p>WILLIAM M. TAM DEPUTY DIRECTOR - WATER</p> <p>AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS</p>
	<p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES</p>	
	<p>POST OFFICE BOX 621 HONOLULU, HAWAII 96809</p>	
<p>April 9, 2014</p>		
<p>David Shideler. Cultural Surveys Hawaii PO Box 1114 Kailua, Hawaii 96734</p>		<p>LOG NO: 2014.1379 DOC NO: 1404MV06 Archaeology</p>
<p>Subject:</p>	<p>Chapter 6E-8 and National Historic Preservation Act Section 106 Review - Archaeological Preservation Plan and Mitigation Plan Addressing 23 Historic Properties Queen Ka'ahumanu Highway Widening, Phase 2 Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a North Kona District, Island of Hawai'i TMK: (3) 7-4-008, 7-3-009 & 7-3-043 (portion)</p>	
<p>Thank you for submitting the plan titled <i>An Archaeological Preservation Plan and Mitigation Plan Addressing 23 Sites for the Proposed Queen Ka'ahumanu Highway Widening, Phase 2 Project Kalaoa, O'oma, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a North Kona District, Island of Hawai'i TMK: (3) 7-4-008, 7-3-009 & 7-3-043 (portion)</i> (H. Hammatt and D. Shideler), March, 2014. This plan was received by our office on March 28, 2014. The plan outlines amended site specific preservation measures for 23 historic properties located within the Queen Ka'ahumanu Highway corridor. An archaeological inventory survey report for the project area documented a total of 76 historic properties and provided treatment recommendations (Monahan et. al. 2012). This inventory survey and treatment recommendations were approved by SHPD in August 2012 (Log No 2012.1443, Doc No 1208MV01). The mitigation commitments were as follows:</p>		
<p>Two sites will be subjected to separate burial treatment plans (Sites 22415 and 29275); 15 sites will be preserved with no additional field work (Sites 10154, 19943, 19950, 19951, 28780, 28781, 28788, 28789, 28790, 28792, 28797, 28799, 28802, 28806, and 28810); one site will receive a combination of no further work and preservation (19945); 11 sites will be avoided during construction and therefore subject to short term protection measures (28794, 28801, 28803, 28804, 28805, 28809, 29337, 29341, 29342, 29343, and 29347); two sites will receive no further work, but impacts will be monitored by an archaeologist (6432 and 29338); two sites will be relocated (19947 and 29346); one site will receive a combination of relocation and preservation (28808); 20 sites will receive data recovery excavation with no additional mitigation (19949, 22417, 28778, 28785, 28786, 28800, 28807, 28811, 28812, 28814, 28815, 29332, 29333, 29334, 29335, 9336, 29339, 29340, 29344, and 29345); 14 sites will be subjected to a combination of archival data recovery and partial preservation (00002, 10714, 15324, 18099, 19946, 19952, 19953, 19954, 22507, 28774, 28782, 28784, 28787, and 28791); one site will be subjected to a combination of archival data recovery, data recovery excavation and partial preservation (29272); one site will be subjected to archival data recovery only (22418); two sites will have data recovery through the collection and curation of portable artifacts (29348 and 29349); and three sites will be subjected to a combination of data recovery excavation and preservation (19948, 28783, and 28813).</p>		
<p>Subsequently a mitigation plan was prepared to address the recommended treatments presented in the AIS (Shideler et. al. 2012), and this plan was accepted by SHPD (Log No. 2012.3052, Doc No. 1210MV25). However, the Federal Highways Administration (FHWA) initiated a redesign of the Phase 2 widening project in order to minimize the effects of this undertaking on historic properties. As a result of the redesign, 21 sites that were previously proposed to be directly impacted will now be avoided by construction activities. Nine of these sites are trails that were proposed to be partially destroyed, with mitigation in the form of archival research, and the undisturbed portion of the trail preserved (SIHP Sites 20-10-27-15324, 18099, 19946, 19954, 22418, 22507, 28774, 28782, and 29272). Eleven (11) sites were previously proposed to be all or partially destroyed by the highway widening, with data recovery excavation for 10 sites (SIHP Sites 19947, 19948, 19949, 22417, 28783, 28800, 28811, 29333, 29334, 29336, and 29344); and relocation for one site (SIHP 19947). As a result of the redesign, all 21 of these sites will be avoided by this undertaking. In addition, two sites that were outside of the project area and previously recommended for data recovery (SIHP 29339 and 29340) are now subject to interim protection measures.</p>		

Mr. Shideler
April 9, 2014
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The agreement to avoid these sites was established via SHPD correspondence (Log No. 2013.4167, Doc No. 1307MV17). This agreement indicated that the treatment recommendations established in the Monahan et. al. (2012) AIS would be maintained, however the mitigation measures would be changed in order to preserve these 23 sites from any impact during project activities.

SHPD previously reviewed an amended preservation and data recovery plan that dealt with all 76 historic properties identified in the Monahan et. al. (2012) AIS. We requested that that the amended data recovery and preservation plan be abandoned and an addendum preservation/mitigation plan be prepared only for the sites whose mitigation commitments will change as a result of the redesign (Log No. 2013.4267, Doc No. 1310MV12). SHPD reviewed a second draft of the plan on January 21, 2014 and outlined several revisions that were needed in order to meet the standards of HAR 13-277 and the *Secretary of the Interior's Standards* for the treatment of historic properties (Log 2013.6921, Doc 1401MV05). Changes were subsequently made to this plan in response to the SHPD reviews of the previous drafts. SHPD now believes that the preservation plan will adequately protect the historic properties that it is intended to during construction. We also believe that the plan now makes reference to a reasonable and good faith effort to consult with Native Hawaiian Organizations.

This revised plan meets the standards of HAR 13-277 as well as the *Secretary of the Interior's Standards* for the treatment of historic properties and is accepted by SHPD. Please send one hardcopy of the document, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office. We look forward to the opportunity to review the revised Memorandum of Agreement for this undertaking that that incorporates the terms of the addendum preservation plan.



Please contact Mike Vitousek at (808) 652-1510 or Michael.Vitousek@Hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,



Theresa K. Donham
Deputy State Historic Preservation Officer
Historic Preservation Division

Supplemental AIS (Wilkinson et al. 2017) Acceptance

<p>DAVID Y. IGE GOVERNOR OF HAWAII</p> 	 <p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES STATE HISTORIC PRESERVATION DIVISION KAKUHIHEWA BUILDING 601 KAMOKILA BLVD, STE 555 KAPOLEI, HAWAII 96707</p>	<p>SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT</p> <p>KEKOA KALUHWHA FIRST DEPUTY</p> <p>JEFFREY T. PEARSON DEPUTY DIRECTOR - WATER</p> <p>AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONSERVATION COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS</p>
<p>March 9, 2017</p>		
<p>Pratt M. Kinimaka, Oahu District Engineer State of Hawaii, Department of Transportation Highways Division Oahu District 727 Kakoi Street Honolulu, HI 96819-2017</p>	<p>IN REPLY REFER TO: Log No. 2017.00322 Doc. No. 1703SL06 Archaeology</p>	
<p>Dear Mr. Kinimaka:</p>		
<p>SUBJECT: Chapter 6E-8 and National Historic Preservation Act (NHPA) Review – Supplemental Archaeological Inventory Survey for the Queen Kaahumanu Widening Phase 2 Project, Ref. No. HWY-OU 2.17-0187 Kalaoa, Kalaoa-'O'oma, 'O'oma 2, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe Ahupua'a, North Kona District, Island of Hawai'i TMK: (3) 7-2-005, 7-3-009, 043, 049, 051, 058; 7-3-043:091, 083; 7-4-020</p>		
<p>Thank you for the opportunity to review the revised draft report titled, <i>Supplemental Archaeological Inventory Survey Report for the Proposed Queen Kaahumanu Highway Widening Phase 2 Project, Kalaoa, Kalaoa-'O'oma, 'O'oma 2, Kohanaiki, Kaloko, Honokohau 1-2 and Kealakehe [Ahupua'a], North Kona District, Island of Hawai'i</i> TMKs: [3] 7-2-005, 7-3-009, 043, 049, 051, 058; 7-3-043:091, 083; 7-4-020 (Wilkinson et al., February 2017). The SHPD received the draft report on January 19, 2017, and requested revisions via email on February 17, 2017. The SHPD received a revised draft from the Hawaii Department of Transportation (HDOT_ on February 23, 2017.</p>		
<p>The proposed project is a federal undertaking as defined in 36 CFR 800.16(y) and subject to the National Historic Preservation Act (NHPA) Section 106 process. The project also involves highway rights-of-way (ROW) owned by the State of Hawaii and land beyond the ROW, and is subject to historic preservation review under Hawaii Revised Statutes (HRS) Chapter 6E-8.</p>		
<p>The Queen Kaahumanu Highway Widening Phase 2 project between Keahole Airport Road and Kealakehe Parkway connects to the Phase 1 section completed in March 2009. The original Area of Potential Effect (APE) totaled 190 acres, was approximately 5.2 miles long and 300 feet wide, and extended beyond the 300-ft. ROW into areas where intersection improvements are needed to connect to the widened highway. The original APE is described in the 2015 Memorandum of Agreement (MOA) as Stipulation 2, page 4. The MOA indicates the original APE includes the Kaloko-Honokohau National Historic Park; however no project work will occur within the Park boundaries.</p>		
<p>Monahan et al. (2012) completed an archaeological inventory survey (AIS) report for the original APE. The SHPD accepted the AIS on August 21, 2012 (Log No. 2012.1443, Doc. No. 1208MV01). The AIS documented 75 historic properties, all assessed as significant under Criterion d (information potential) and, as a result of consultation with Native Hawaiian Organizations (NHOs), were also assessed significant under Criterion e (cultural value). Additionally, 13 sites were assessed as significant under Criterion c, and two were assessed significant under Criteria a, c, d, and e.</p>		

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Subsequently, the SHPD reviewed and accepted an archaeological monitoring plan (Monahan et al. 2012) on October 1, 2012 (Log No. 2012.2544, Doc. No. 1209MV11), followed by a data recovery and preservation plan for the project (Shideler et al. 2012) on October 25, 2012 (Log No. 2012.3052, Doc. No. 1210MV25).

HDOT determined in August-September 2016, that construction work impacted (1) several archaeological sites that were to be preserved in place, and two trail systems at four locations; that (2) three site buffers were breached, although none of the buffer breaches involved disturbances to the sites themselves; and that (3) the Mamalahoa Trail (Site 50-10-27-00002), where it intersects with Kealakehe Parkway, was not included in the original APE. In addition, they determined that (1) descriptions and figures of the APE in archaeological project documents did not include the project work locations on side roads outside of the 300-ft. ROW, and (2) project documents (archaeological reports and plans, MOA, and 4(f) documents) include no discussion of project effect to historic grading of the Kealakehe Parkway.

Subsequent to the above findings, HDOT expanded the APE by 22.82 acres to include (1) all proposed intersection improvements, including stub-outs; (2) a 600-ft. segment of highway located approximately 1,500 ft. south of the Kealakehe Parkway intersection where the current improvements transition into the Phase 1 improvements; (3) an 1,800-ft. long transition segment north of the Keahole Airport access road intersection where the current improvements transition to the existing 2-lane roadway; and (4) all staging areas. The expanded APE totals approximately 212.82 acres.

The supplemental AIS (SAIS) was conducted by Cultural Surveys Hawai'i, Inc. (CSH) to identify, document, assess significance, and make mitigation recommendations for any historic properties present within the ~23 acres in the expanded portion of the APE. The SAIS involved 100% pedestrian survey of the following 13 discrete locations:

- Area A: extension along ROW to south of Kealakehe Parkway within Queen Ka'ahumanu Highway ROW (4.11 acres);
- Area B: contractor's staging area and additional work areas at the southwest corner of the Kealakehe Parkway and Queen Ka'ahumanu Highway intersection (2.62 acres);
- Area C: contractor's base yard on the northeast corner of the Kealakehe Parkway and Queen Ka'ahumanu Highway intersection, and a portion of the Parkway ROW (3.61 acres);
- Area D: work area outside the grading limits; east or mauka extension of future intersecting road (0.93 acres);
- Area E: Hina Lani Street and work areas outside the grading limits; east or mauka extension of intersecting road (0.93 acre);
- Area F1: Hulikoa Drive and work areas outside the grading limits; east or mauka extension of intersecting road (0.09 acre);
- Area F2: Hulikoa Drive and work areas outside the grading limits; east or mauka extension of intersecting road (0.06 acre);
- Area G: unnamed road and work areas outside the grading limits; east or mauka extension of intersecting road; across Makako Bay Drive (0.01 acre);
- Area H: contractor's field office and portions of access roads, Kahilihili Street and Makako Bay Drive, within the Natural Energy Laboratory of Hawaii Authority (NELHA) (3.07 acres);
- Area I: Kaiminani Drive and work areas outside the grading limits; east or mauka portion of intersecting road (0.76 acre);
- Area J: additional work area outside the grading limits; west or makai; across Kaiminani Drive (0.61 acre);
- Area K: Keahole Street and work areas outside the grading limits; west or makai extension of intersecting road; sign installation area (0.82 acre); and
- Area L: extension to the north of Keahole-Airport Road and Queen Ka'ahumanu Highway intersection, within the construction limits only, to the end of the Phase 2 road widening project area (6.05 acres).

The SAIS identified an approximately 30-ft. remnant of Site 50-10-27-00002 (King's Highway or Māmalahoa Trail) within Area C, on the north side of Kealakehe Parkway. The trail is assessed as retaining integrity of location, design, setting, materials, workmanship, feeling, and association. It is assessed as significant pursuant to HAR §13-

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275-6 under Criteria a through e, and eligible for the National Register of Historic Places (NRHP) under Criteria A-D.

The Monahan et al. (2012) AIS resulted in an HAR 13-275-7 effect determination of "effect, with proposed mitigation commitments" and a 36 CFR 800.5 effect determination of "adverse effect" to historic properties. A Memorandum of Agreement (MOA) was developed with stipulations to avoid and/or mitigate adverse effects. The MOA is being implemented.

The SAIS supports the previous HAR §13-275-7 and 36 CFR 800.5 effect determinations. These results also support the stipulations identified in the MOA, with the mitigation recommendations previously identified for Site 50-10-27-00002 being applicable to the two segments identified in Area C during the current SAIS.

The SAIS recommends preservation of the portions of Site 50-10-27-00002 documented in Area C. The ongoing archival research specified as a mitigation measure will also apply to these portions of the trail. Interim protection measures for the portions of Site 00002 within Area C will include establishing a minimum 10-ft. buffer around the trail segments; erecting a temporary construction mesh fence atop the buffer; and submitting to SHPD photographs verifying that the fence has been installed. These measures will be completed prior to re-initiation of project work within Area C.

Additionally, the entirety of the expanded APE (212.82 acres) will be subject to on-site archaeological monitoring of all ground disturbing activities under the existing SHPD-accepted archaeological monitoring plan (Monahan et al. 2012) (October 1, 2012; Log No. 2012.2544, Doc. No. 1209MV11).

Based on the above information, the SHPO concurs with the report's site significance assessment, eligibility evaluation, HAR §13-275-7 and 36 CFR 800.5 effect determination recommendations, and the proposed mitigation recommendations. The report meets the requirements of Hawaii Administrative Rules (HAR) §13-276-5 and the Secretary of the Interior's Standards for Archaeological Documentation. **It is accepted.** Please send two hardcopies of the document, clearly marked FINAL, along with a text-searchable PDF version to the Kapolei SHPD office, attention SHPD Library.

Please contact Susan A. Lebo, PhD, Archaeology Branch Chief, at Susan.A.Lebo@hawaii.gov or at (808) 692-8019 for any questions or concerns regarding this letter.

Aloha,



Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

Appendix C Monitoring Action Plan

This copy of the Final Action Plan has been redacted to omit sensitive information. Note: date of AMP (Monahan et al. 2012b) erroneously listed as April 2014.

FINAL ACTION PLAN

for Archaeological Monitoring at Queen Ka'ahumanu Highway Widening Phase 2 Project Cultural Surveys Hawai'i, Inc. (CSH) 11-15-16

1. CSH's Role(s) as Archaeological Monitor for Project Construction

As archaeological monitoring consultant to GBI, CSH's role is to provide archaeological monitoring for project construction. This role includes:

- a. Adherence to monitoring provisions as stated in project AMP dated April 2014. Archaeological monitors will have a copy of this document onsite and understand its contents. Monitoring provisions are as follows:
 - i. On-site monitoring of all new ground disturbing activity and monitoring of all work in the proximity of any archaeological preserve; see Section 3 below.
 - ii. Coordination meeting(s) with construction crew to orient crew to monitoring requirements. This will include the CSH lead monitors' attendance at Goodfellow Bros., Inc. (GBI) morning meetings each day for scheduling work area assessments and all other items relevant to CSH monitors
 - iii. Authority to stop work immediately in the area of any findings so that documentation can proceed and appropriate treatment can be determined OR to slow and/or suspend construction activities in order to ensure that the necessary archaeological sampling and recording can take place. This includes investigation and documentation of breached lava tubes
- b. Adherence to all short-term (interim) mitigation measures specified in related project archaeological mitigation documents. Archaeological monitors will have a copy of these documents onsite and understand their contents, Mitigation documents are identified as follows and listed in order of precedence:
 - i. Final Section 4(f) Evaluation (May 2015)
 - ii. Final Archaeological Preservation and Mitigation Plan (APMP; April 2014)
 - iii. Final Data Recovery and Preservation Plan (DRPP; October 2012)
- c. Archaeological Monitors are responsible for preserving the integrity of all archaeological preserves (comprising both Preservation and Avoidance During Construction [ADC] sites); and to ensure that their respective interim protective measures (i.e. protective temporary fencing) remain intact for the duration of the project (see Section 5.5 of the APMP [p146] and DRPP [p273])
 - i. Archaeological preserves along the National Park Service (NPS) property have been protected by continuous interim buffer fencing at project

construction limits. Additionally, each individual archaeological preserve along the NPS property has been protected by a single interim buffer fence set at the long-term buffer limits.

- ii. Archaeological preserves north of NPS property are individually fenced. Preserve fencing follows short-term buffers as delineated in DRPP/APMP. Exceptions to this stipulation include State Inventory of Historic Places (SIHP) #s -00002 and -10714, which are addressed in the Final Section 4(f) Evaluation but not the APMP.

To ensure ease of identification, each individual archaeological preserve has been marked with a wooden lath and pink flagging bearing the applicable SIHP number, affixed to the southeast corner of the preserve fencing

- iii. Interim protective fences shall not be altered at any time. Archaeological site buffer fencing, identification tags, and preserve flagging have been physically located in the field by CSH and verified by HDOT/RMTC.
- iv. The condition of the interim protective fencing will be checked by the monitoring archaeologists on a weekly basis.

If at any time a fence is found to be in disrepair, the fence shall not be touched and the Lead Archaeological Monitor shall report the finding through the chain of command immediately, beginning with the R.M. Towill Corporation (RMTC) Point-of-Contact and additionally notifying GBI as well. The archaeological monitor shall stop or prevent any work in the immediate area until the fence is corrected.

- d. Adherence to all CSH and client safety protocols

2. Coordination

- a. Execution - In order to execute the roles outlined above, effective coordination with all of our clients is of utmost importance. Coordination will be achieved in the following manner:

- i. CSH will conduct periodic on-site meetings with construction personnel, for the following reasons:
 1. Review role of archaeological monitors;
 2. Review recent changes to monitoring provisions (see Section 1.a.i. above);
 3. Review short-term protection measures at archaeological sites
 4. Meeting Minutes documenting the time, date, discussion topics, and attendees at the periodic on-site meetings shall be included in the Lead Archaeological Monitor's daily Archaeological Monitoring Form
- ii. GBI shall provide a project schedule via a copy of the Three Week Look Ahead Schedule or via verbal or written direction as to the number of

resources required. The following week's schedule will be confirmed by Wednesday of the week prior.

- iii. Daily (AM) coordination meetings between GBI Foreman, CSH Lead Archaeological Monitor, and Lead Cultural Monitor:
 - 1. Daily meeting should take place in the AM prior to beginning of construction work
 - 2. Daily meeting will facilitate assignment of monitors to work areas
 - 3. Daily meeting will provide CSH an opportunity to evaluate and report to GBI any areas of archaeological sensitivity/concern in proximity to planned work activities
 - 4. The direction provided by GBI's foreman, any subsequent changes to the daily work areas, and reason for the change will be noted on the daily Archaeological Monitoring Form(s)
- iv. Ongoing daily coordination between GBI Foreman, CSH Lead Archaeological Monitor, and Lead Cultural Monitor about movement of work crews/active work areas, to facilitate movement of monitors and reassessment of any archaeological concerns
 - 1. Ongoing daily coordination can be executed via phone or text
- v. Notifications should be made immediately of any changes to personnel within the following Chains of Command (see Section 2.b.)
 - 1. CSH is to contact both RMTC Point-of-Contact and GBI regarding changes to Lead Archaeological Monitor. Prior to any changes a meeting with CSH, RMTC, and GBI shall be held.
 - 2. Every effort will be made to provide long-term project coverage by CSH's Lead Archaeological Monitor.
- vi. All CSH personnel new to the project will be oriented on their first day prior to beginning work, provided with appropriate written material, and introduced to appropriate available staff of RMTC and GBI
- vii. Lead Archaeological Monitor or Archaeological Supervisor will be responsible for briefing all new Archaeological Monitors, and will also brief new GBI construction personnel including subcontractors as needed.

Record of this additional briefing for new personnel (time, date, names) shall be included in the Lead Archaeological Monitor's daily Archaeological Monitoring Form
- viii. New CSH Archaeological Monitors and/or GBI construction personnel including subcontractors shall undergo cultural sensitivity training administered by the Cultural Monitor Coordinator, or a Cultural Monitor approved by the Coordinator, prior to beginning any work on site.

Record of this additional briefing for new personnel (time, date, names) shall be included in the Daily Cultural Monitor Report.

- b. Chains of Command - To facilitate efficient and accurate reporting and/or follow-up, any monitoring issues large or small should be reported using the following chains of command and with the RMTC Point-of-Contact
- i. CSH chain of command (from bottom of chain up):
 1. Archaeological Monitor on ground – (variable)
 2. Lead Archaeological Monitor – (TBD)
 3. Project Supervisor (Olivier Bautista) – [REDACTED]
 4. Project Director (Sarah Wilkinson) – [REDACTED]
 5. Project Manager (William Folk) – [REDACTED]
 6. Principal Investigator (Hallett Hammatt) – [REDACTED]
 - ii. GBI chain of command (from bottom of chain up):
 1. Foreman (Clifford Cox) – [REDACTED]
 2. Project Engineer (Hudson Cowill) – [REDACTED]
 3. Project Manager (Gary Mattis) – [REDACTED]
 4. Project Manager (Jon Henning) – [REDACTED]
 - iii. Cultural Monitor chain of command:
 1. Coordinator (Cynthia Nazara) – [REDACTED]
 2. Project Coordinator (Jason Tateishi, RMT) – [REDACTED]
 - iv. RMTC Point-of-Contact:
 1. Project Coordinator (Jason Tateishi) – [REDACTED]
 - v. HDOT Point-of-Contact
 1. Construction Engineer (Julann Sonomura) – [REDACTED]

3. Protocols for Working Around Archaeological Preserves

- a. Archaeological monitor shall closely monitor all work located within proximity of an archaeological preserve. "Proximity" shall be typically defined as 100 ft (30m) to the outer edge of an archaeological preserve, through the Lead Archaeological Monitor may determine what is appropriate on a case-by-case basis
- b. Archaeological monitor shall ensure that interim protective fencing/short-term buffers are continuously maintained and not breached or damaged by construction activity
- c. Machine operators shall be aware of location of archaeological monitor and physical protective fencing at all times, proceed with extreme caution near

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archaeological sites and protective fencing, and be prepared to halt work immediately if directed to do so by the archaeological monitor

- d. Whenever possible, construction equipment equipped with GPS capability will be used when near archaeological buffer limits. If GPS capability is not available, the limits of work shall be clearly defined on the ground and operators shall be made aware of the limits by the archaeologist
- e. Additional physical barrier protection may be installed in areas where ongoing activities are near archaeological preserve locations for extended periods of time (specifically retaining wall construction) to prevent any inadvertent encroachment
 - i. GBI will discuss archaeological sites preservation during the Activity Meeting that includes prior consultation with RMTC and CSH
- f. If any question arises about work activities in the vicinity of an archaeological preserve, OR if an archaeological preserve or its buffer is breached work shall be halted and notification initiated per Sections 1.c.iii. and 2.b.


4. Reporting

- a. CSH to provide a weekly archaeological monitoring report, summarizing all of the observations and documentation collected during project monitoring and providing all of the daily reports as supporting documentation

This Action Plan for Archaeological Monitoring was developed through a collaborative effort between HDOT, Goodfellow Bros., Inc. and Cultural Surveys Hawaii, Inc. All monitoring requirements described herein will be strictly adhered to. Acknowledged and accepted by:

Hawaii Department of Transportation

Goodfellow Bros., Inc.



Scott Miller

Cultural Surveys Hawaii, Inc.

Appendix D Monthly Monitoring Summaries

Daily archaeological monitoring reports have been summarized by month and organized by year. Two significant breaks in construction activities occurred during the project: one between 21 March 2016 and 1 April 2016, and the second between 7 November 2016 and 27 January 2017.

Each monthly summary includes as applicable a description of construction activities being monitored and their locations, a summary of exposed stratigraphy, and any significant events.

D.1 Monthly Monitoring Summaries - 2015

D.1.1 September 2015

At the beginning of the current project, ground disturbing activities associated with the construction of Queen Ka'ahumanu Highway Widening Phase 2 consisted of signage installation along the *mauka* and *makai* sides of the highway. Vegetation removal and heavy grading activities followed. Disturbance occurred in natural volcanic deposits; work consisted entirely of reducing solid *pāhoehoe* and 'a'ā lava and redistributing the reduced fragments along the project area in order to make grade and deposit base course for the new road surface. Trenching for utilities also began. Three culturally sterile lava tubes were discovered over the course of the month.

On 17 September 2015, partial deconstruction of SIHP # -06432, a wall recommended for no further work, was conducted. The majority of SIHP # -06432 is protected, extending west beyond a section of interim protective fencing. However, approximately 24.5 meters of the wall extended east, outside of the protective barrier and into the project grading zone. As a result, the wall was dismantled, this work was closely monitored and documented. SIHP # -06432 was dismantled by hand and moved 3.0 west of the protective fencing, out of the project grading area. The stones are slated for pickup by various NHOs to complete their removal from the site. Five cross section photographs were taken of the inner structure of the wall during deconstruction. Deconstruction began at the easternmost portion of the wall, just west of the shoulder of the highway, and proceeded west until the entirety of the wall section was removed, right up to the protective buffer. Cross section photographs were taken every 10 feet or so during this process in order to document the inner structure of the wall. No cultural material was observed within, or underneath the wall section during removal.

D.1.2 October 2015

The majority of construction during the month of October consisted of ground disturbing activity throughout the project area. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Bedrock was ripped for the foundation of a culvert at STA 185. One culturally sterile lava tube and two culturally sterile lava blisters were discovered over the course of the month.

Construction activity and archaeological monitoring took place at STA 102, 105, 108-110, 117, 119, and 121-254. No historic or cultural material was observed.

D.1.3 November 2015

The majority of construction during the month of November consisted of ground disturbing activity. A water utility trench was excavated at STA 185-188 and 216-227. The trench was dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. A culvert tie-in was constructed near STA 117. Vegetation was grubbed prior to additional bedrock excavation. A run-off mitigation berm was also constructed. One culturally sterile lava blister was discovered over the course of the month.

Construction activity and archaeological monitoring took place at STA 26-117, 123-145, 152-154, 156-159, 185-188, and 216-227. No historic or cultural material was observed.

D.1.4 December 2015

Most construction during the month of December consisted of ground disturbing activity. A water utility trench was excavated at STA 120-121, 124-131, 136-154, and 170-171. The trench was dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Additional construction was conducted for a culvert tie-in. Vegetation was grubbed prior to further bedrock excavation. A run-off mitigation berm was also constructed. Old guard rails were removed to make way for further excavations. No geological anomalies were observed over the course of the month.

On 10 December 2015, a temporary protective barrier was erected between the construction area at STA 22-23 and SIHP # -22415 (a burial platform). An excavator erected eight cement K-bars to create a continuous buffer wall, approximately 15 m east of SIHP # -22415.

Construction activity and archaeological monitoring took place at STA 5-37, 40-51, 94-95, 120-154, 156-157, 162, 170-171. No historic or cultural material was observed.

D.2 Monthly Monitoring Summaries - 2016

D.2.1 January 2016

Most construction during the month of January consisted of ground disturbing activity. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. A water utility trench was excavated at STA 92-97, 102-11, and 119-120. The trench was dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Vegetation was grubbed prior to further bedrock excavation. Existing palm trees were dug up and replanted outside of the construction zone. No geological anomalies were observed over the course of the month.

On 1 January 2016, the location of the existing archaeological buffer fence was altered near Honokōhau Harbor. The fence line had been placed incorrectly upon setup. The lead archaeologist on duty fixed the location of the buffer fence and ensured all historic properties were being properly preserved.

On 25 January 2016, due to concern from community members, two additional concrete barriers were added to the single barrier that was previously set in place to protect SIHP # -22415 (a burial platform).

Construction activity and archaeological monitoring occurred at STA 0-22, 70, 81-97, 102-120, 1114-1121. No historic or cultural material was observed.

D.2.2 February 2016

Most construction during the month of February consisted of ground disturbing activity for utilities installations. A water utility trench was excavated at STA 15-16, 26-64, 67, 69-75, 77, and 83-110. A sewer utility trench was also excavated at STA 27-58 and 61. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Construction also took place at a culvert tie-in located at STA 21. Two culturally sterile lava blisters were discovered over the course of the month.

Construction activity and archaeological monitoring took place at STA 15-16, 21, 26-64, 67, 69-75, 77, 83-110, and 117-1114. No historic or cultural material was observed.

D.2.3 March 2016

Most construction during the month of March consisted of ground disturbing activity for utilities installations. A water utility trench was excavated at STA 4-13, 45-47, 55, 58-59, 63-64, 71-72, 76-77, and 79. A sewer utility trench was also excavated at STA 10-13, 37-47, 55, and 61. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Preparations were made for the installation of a meter box at STA 170. Electrical utility installation was also prepped at STA 234 and 236. Excavations for a dry well took place at STA 155. Excavations also took place in preparation for a culvert at STA 51. One culturally sterile lava blister was discovered over the course of the month.

Construction activity and archaeological monitoring took place at STA 4-13, 37-47, 51, 55, 58-59, 61, 63-64, 71-72, 76-77, 79, 155, 170, 234, and 236. No historic or cultural material was observed.

Construction was halted for two weeks, from 21 March 2016 through 1 April 2016.

D.2.4 April 2016

Most construction during the month of April consisted of ground disturbing activity for utilities installations. A water utility trench was excavated at STA 4, 45-55, 61-62, and 82. A sewer utility trench was also excavated at STA 3-11 and 46-52. An electrical utility trench was also excavated at STA 126, 132, 134, 138, 141, 150-151, 153, 191, 209, and 214. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Excavations for dry wells took place at STA 109 and 156. Excavations also took place in order to upgrade a culvert and to construct a berm. Vegetation was grubbed prior to further excavation and construction. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Five culturally sterile lava blisters were discovered over the course of the month.

On 15 April 2016, two cultural monitors conducted a ceremony for a portion of SIHP # -19954 (a stepping stone trail) that was slated for demolition. The portion of the trail within the project grading limits was excavated and the stone slabs were relocated and rebuilt as an *ahu* outside of

the project area. The process was photo documented and a GPS point was taken on the new *ahu* location.

Construction activity and archaeological monitoring took place at STA 3-11, 32, 45-55, 61-62, 82, 126, 132, 134, 138, 141, 150-151, 191, 209, 214, and 1112. No historic or cultural material was observed.

D.2.5 May 2016

Most construction during the month of May consisted of ground disturbing activity for utilities installations. A water utility trench was excavated at STA 1, 50, 54, and 1122-1126. A sewer utility trench was also excavated at STA 1, 2, and 1123-1126. An electrical utility trench was excavated at STA 90, 92, 96, and 220. Excavations for a dry well also took place at STA 155. Excavations for temporary light poles occurred at STA 110. These trenches and excavations were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a 'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Grading was conducted for a culvert at STA 44. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 1, 2, 44, 50, 54, 90, 92, 96, 107, 220, and 1122-1126. No historic or cultural material was observed.

D.2.6 June 2016

Ground disturbing activity was limited during the month of June. A water/reclaim water utility trench was excavated at STA 52 and 1121-1123. A sewer utility trench was also excavated at STA 1121-1123. An electrical utility trench was excavated at STA 90 and 225. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a 'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Some grading activity took place on imported fill material. Most activity was dedicated to laying the reclaim water and sewer line pipes in previously excavated trenches. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 52, 90, 109, 225, and 1121-1123. No historic or cultural material was observed.

D.2.7 July 2016

Ground disturbing activity was limited during the month of July. A water/reclaim water utility and sewer trench were excavated at STA 174 and 1121-1122. An electrical utility trench was excavated at STA 112, 209 and 1123. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a 'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Some grading activity took place on imported fill material. Some activity was dedicated to laying the reclaim water and sewer line pipes in previously excavated trenches. Base course gravel was also distributed and compacted. One culturally sterile lava blister was discovered over the course of the month.

Construction activity and archaeological monitoring took place at STA 112, 174, 209, and 1121-1123. No historic or cultural material was observed.

D.2.8 August 2016

Ground disturbing activity was limited during the month of August. A reclaim water utility and sewer trench was excavated at STA 1, 4, 7-17, and 1121-1123. A water utility trench was excavated at STA 0-9 and 1124-1125. Dry well excavations took place at STA 1, 5, 9, 35, 44, 46, 48, 51, 1122, and 1124. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Some grading activity took place on imported fill material. Some activity was dedicated to laying the reclaim water and sewer line pipes in previously excavated trenches. Base course gravel was also distributed and compacted. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 0-17, 35, 44, 46, 48, 51, and 1121-1125. No historic or cultural material was observed.

D.2.9 September 2016

During the month of September, ground disturbing activity focused on utility trench excavations. A reclaim water utility and sewer trench was excavated at STA 4, 12-15, and 1125. A water utility trench was excavated at STA 5-15. Dry well excavations took place at STA 33, 57-58, 61-62, 1120, 1121, and 1122. Electrical trenches were excavated at STA 1, 5, 110, 1121, and 1124. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Some grading activity took place on imported fill material. Some activity was dedicated to laying the reclaim water and sewer line pipes in previously excavated trenches. Base course gravel was also distributed and compacted. Some utility trenches were backfilled. A culvert was modified at STA 206. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 1, 4-15, 33, 57-58, 61-62, 206, 1120, 1121, 1122, 1124, and 1125. No historic or cultural material was observed.

D.2.10 October 2016

During the month of October, ground disturbance was limited to utility trench excavations. A sewer force main line was excavated at STA 14-15, 1115-1120, and 1125. Electrical trenches were excavated at STA 207-209, 1110-1115, and 1125. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Construction of Retaining Wall A1 (protecting SIHP # -28783) as well as Culvert B (a double culvert) took place at STA 40-41. Footing foundations were constructed and poured. Construction of Retaining Wall F (protecting SIHP # -10154 and adjacent SIHP # -06432) took place at STA 159-160. Footing foundations were constructed and poured. Bothman Construction and Simmons Steel were active at both Retaining Wall A1 and F. Additionally, some utility trenches were backfilled, an embankment was graded, and vegetation was grubbed. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 14-15, 40-41, 159-160, 207-209, 1110-1120, and 1125. No historic or cultural material was observed.

D.2.11 November 2016

Ground disturbance was extremely limited during the month of November. Most activity focused on the construction of culverts and retaining walls. Construction of Retaining Wall A1 (protecting SIHP #28783) and Culvert B (a double culvert) took place at Stations 40-41. Rebar and wooden forms were installed. Construction of Retaining Wall F (protecting SIHP #10154 and #6432) and Culvert F took place at Stations 159-160. Rebar and wooden forms were installed. Construction for a retaining wall adjacent to the National Park took place at Station 13. Bothman Construction and Simmons Steel were active at the retaining wall and culvert stations. Additionally, some backfilling and grading occurred during the construction of a berm. No geological anomalies were observed over the course of the month.

On 4 November 2016, the lead archaeologist made repairs to the buffer fence along the National Park buffer zones. The fence had fallen in a few places from natural vegetation.

Construction activity and archaeological monitoring took place at Stations 13, 40-41, and 159-160. No historic or cultural material was observed.

The project was halted from 7 November 2016 through 27 January 2017.

D.3 Monthly Monitoring Summaries - 2017

D.3.1 January 2017

Ground disturbance was extremely limited at the end of January. Electrical trenches and a sewer/reclaim water trench were excavated at STA 110. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. At STA 40-41, Bothman Construction removed the footing foundation forms from Retaining Wall A1 (protecting SIHP # -28783). No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 40-41 and 110. No historic or cultural materials were observed.

D.3.2 February 2017

For the month of February, ground disturbance was limited to retaining wall footing excavations and electrical utility trenching. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Activity at Retaining Wall A (protecting SIHP #s -18099 and -22418 at STA 18-19) included plotting excavation layouts, footing excavations, footing form construction by Bothman Construction, and sloping of side walls. Activity at Retaining Wall A1 (protecting SIHP # -28783 at STA 40-41) included ramp building, footing excavations, footing form construction by Bothman Construction, sidewall benching, base compaction, and pouring concrete footings. Additional activity included hoe-ramming loose boulders.

On 8 February 2017, the location of the existing archaeological buffer fence for SIHP #s -18099, -22417, and -22418 was altered near Retaining Wall A. The lead archaeologist on duty

fixed the location of the buffer fence and ensured all historic properties were being properly preserved.

Construction activity and archaeological monitoring took place at STA 18-20, 35-36, 40-41, and 110. No historic or cultural material was observed. No geological anomalies were observed over the course of the month.

D.3.3 March 2017

For the month of March, ground disturbance was varied. An electrical trench was excavated at STA 44-46, 51-63, and 68-70. A reclaim water/sewer trench was excavated at STA 1121. Dry well excavations took place at STA 54, 57-58, and 61-62. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Construction activity took place at Retaining Wall A (protecting SIHP #s -18099 and -22418 at STA 18-20), Retaining Wall A1 (protecting SIHP # -28783 at STA 41-43), Retaining Wall E (protecting SIHP # -15324, at STA 98-100), and Retaining Wall G (protecting SIHP # -29272 at STA 175-181). Swale construction took place at STA 60-68 and 70-80. Grading activity occurred at STA 100-101, 110-111, and 119. No geological anomalies were observed over the course of the month.

On 6 March and 10 March 2017, the lead archaeologist on duty fixed the location of the buffer fence (at STA 70 and at SIHP # -00002) and ensured all historic properties were being properly preserved.

Construction activity and archaeological monitoring took place at STA 18-20, 41-46, 51-80, 98-101, 110-111, 119, 175-181, and 1121. No historic or cultural material was observed.

D.3.4 April 2017

Ground disturbance was limited for the month of April. A force main line trench was excavated at STA 54 and 1121-1125. A sewer/utility trench was excavated at STA 27-42 and 1125-1128. An electric trench was excavated at STA 40-44 and 184. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Grading and swale construction took place at STA 50, 53-60, 64-66, 70-72, and 75.

Additional concrete wall construction occurred at Wall A (protecting SIHP # -18099 and -22418 at STA 18-20), Wall A1 (protecting SIHP # -28783 at STA 41-43), Wall E (protecting SIHP # -15324 at STA 99-100), Wall F (protecting SIHP # -10154), and Wall G (protecting SIHP # -29272 at STA 180).

No geological anomalies were observed over the course of the month. Construction activity and archaeological monitoring took place at STA 18-20, 27-44, 50, 53-60, 70-72, 75, 99-100, 180, 184, 1121-1124, and 1125-1128. No historic or cultural material was observed.

D.3.5 May 2017

Ground disturbance during the month of May was varied. A force main line trench was excavated at STA 2-6, 8-10, 54-55, 300, 400, 1120, and 1123. A reclaim water line was excavated at STA 18-25 and a water line trench was excavated at STA 16-19. An electrical trench was

excavated at STA 15, 17-21, and 28-45. Dry well excavations occurred at STA 34-42 and *mauka* of the Kaloko-Honokōhau Park entrance. Temporary light pole trenches were excavated at STA 1014 and 1114. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface.

Retaining wall excavation and construction took place at STA 97. Swale construction occurred at STA 39-54. Grading took place at STA 16-23, 25-26, and 146-186. Concrete was poured at STA 28-34. Paving occurred between Hulikoa and Kaiminani Street.

Backfilling occurred at Wall A (protecting SIHP # -18099 and 22418 at STA 18-20). At Wall A1 (protecting SIHP # -28783 at STA 34-43), concrete was poured for a foundation pad, and backfilling occurred. At Wall E (protecting SIHP # -15324 at STA 99-100), backfilling occurred, as well as form construction, form stripping, and rebar installation. At Wall F (protecting SIHP # -10154 at STA 159-160), backfilling occurred, as well as rebar installation for footing.

On 4 May 2017, CSH lead archaeologist on duty conducted buffer fence repairs at Walls A, A1, E, F, G, and at SIHP # -00002. On Friday, 5 May 2017, a walk-through site inspection occurred with RM Towell, HDOT, SHPD, Cultural Monitors, and CSH.

No geological anomalies were observed over the course of the month. Construction activity and archaeological monitoring took place at STA 2-6, 8-10, 15-26, 28-55, 97, 99-100, 146-186, 300, 400, 1014, 1114, 1120, and 1123. No historic or cultural material was observed.

D.3.6 June 2017

Ground disturbance through the month of June was varied. A force main line trench was excavated at STA 5-10 and 25-26. An electrical trench was excavated at STA 1-3, 19-28, 30-35, and 1123-1124. A water line trench was excavated adjacent to Airport Road and at STA 24-27. Dry well excavations occurred at STA 2-3, 7-9, 11-15, 30-35, and 1123. Excavations for light posts occurred at the Kealakehe Parkway intersection and at STA 99. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface.

Swale construction occurred at STA 1-5, 20-25, 32-39, 70, 72-80, and 1124. Swale box construction by GBI and Bothman Construction occurred at STA 30-75. Concrete barriers were removed at STA 22-23.

Grading and fence construction occurred at Wall A (protecting SIHP # -18099 and -22418 at STA 18-20). Fence construction occurred at Wall A1 (protecting SIHP # -28783 at STA 34-43) and Wall E (protecting SIHP # -15324 at STA 99-100).

No geological anomalies were observed over the course of the month. Construction activity and archaeological monitoring took place at STA 1-10, 11-15, 16-28, 30-80, 99-100, and 1123-1124. No historic or cultural material was observed.

D.3.7 July 2017

Ground disturbance was limited for the month of July. Most activity focused on the construction of a concrete swale at STA 47-76. Ground disturbing activity was limited to electrical trench

excavations at STA 2-3, 1121, and 1123-1124, force main line trench excavations at STA 9-10 and 31-32, and excavation for a dry well at STA 49. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 9-10, 31-32, 47-76, 1121, and 1123-1124. No historic or cultural material was observed.

D.3.8 August 2017

Ground disturbance in August was limited to utility trench excavations. A reclaim water/sewer trench was excavated at STA 1, 7-17, and 1121-1123. A waterline trench was excavated at STA 0-9 and 1124-1125. A sewer trench was excavated at STA 10, and dry well excavations took place at STA 1, 5, 9, 35, 44, 46, 48, 1122, and 1124. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 0-17, 35, 44, 46, 48, and 1121-1125. No historic or cultural material was observed.

D.3.9 September 2017

Ground disturbance for the month of September was limited to utility trench excavations. An electrical trench was excavated at STA 112-114, 171, 201-205, and 235. A water line trench was excavated at STA 171 and 235. A reclaim water/sewage trench was excavated at STA 111-113. Utility trenches were excavated at STA 42, 149-150, 201-219, 236-237, and 239-240. Dry well excavations occurred at STA 7, 77-78, and 80. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Concrete swale removal occurred at STA 65-66. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 7, 42, 65-66, 77-78, 80, 111-114, 149-150, 171, 201-219, 235-237, and 239-240. No historic or cultural material was observed. On 11 September 2017, all construction activity and archaeological monitoring was rained out. On 14 September 2017, all work was halted at 1530 due to rain.

D.3.10 October 2017

In October, most ground disturbing activity was limited to utility trench excavations. An electrical trench was excavated at STA 74-78, 119-121, and 233-234. Utility trenches were excavated at STA 70-71, 73, 77-79, 81-82, 103-111, 149-156, 171-172, 205, 209, 211, and 235. A reclaim water/sewage trench was excavated at STA 111, and dry well excavations took place at STA 51-64 and 67. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Additionally, at STA 3-14, 111-122, 158-161, and 163-164, excavators conducted grading activities/bedrock

removal to make grade. Guard rail removal also took place at STA 204. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 3-8, 51-64, 67, 70-71, 73-79, 81-82, 103-122, 149-156, 158-161, 163-164, 171-172, 204-205, 209, 211, and 233-235. No historic or cultural material was observed. No construction or archaeological monitoring took place on 13 October 2017 (due to Ironman preparations) or on 24 October 2017 (due to a rain out).

D.3.11 November 2017

For the month of November, most ground disturbing activity was limited to utility trench excavations. An electrical trench was excavated at STA 11, 70-76 and 170. A reclaim water/sewage trench was excavated at STA 70 and 72. Utility trenches were excavated at STA 26, 69-74, 110, 235, and 1118-1122. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Additionally, at STA 163-168, 216-218, and 223-233, excavators conducted grading activities/bedrock removal to make grade. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 11, 26, 69-76, 110, 163-168, 170, 216-218, 223-233, 235, and 1118-1122. No historic or cultural material was observed. No construction or monitoring took place on 10 November 2017 (due to Veteran's Day).

D.3.12 December 2017

Electrical trenches were excavated at STA 26 and 1118-1120. Drain line excavations occurred at STA 1120-1122. Dry well excavations occurred at STA 39, 40, 44, and 56. Utility trench excavations occurred at STA 26-27, 121, and 1119-1121. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Solid *pāhoehoe* bedrock and 'a'ā were hammered, ripped, crushed, and redistributed to make grade and base course for the new road surface. Additionally, grubbing and grading activity occurred at STA 26, 36-38, 40, and 58-62. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 26-27, 36-40, 44, 56, 58-62, 121, and 1118-1122. No historic or cultural material was observed.

D.4 Monthly Monitoring Summaries - 2018

D.4.1 January 2018

Water line trench excavations occurred at STA 10. A trench for sewage was excavated at STA 68 and 71-72. An electrical trench was excavated at STA 59-72 and 209. Utility trenches were excavated at STA 10 and 70. Dry well excavations occurred at STA 19, 23, 26, 30, 49, and 51. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Additionally, grading was conducted at STA 40.

A small natural lava blister formation was documented on 5 January 2018 at STA 61. The blister was found to be void of cultural material. No other geological anomalies were observed over the course of the month. Buffer fence repairs were conducted on 9 January 2018 due to a breach caused by a vehicle accident in the early morning hours.

Construction activity and archaeological monitoring occurred at STA 10, 19, 23, 26, 30, 40, 49, 51, 59-72, and 209. No historic or cultural material was observed.

D.4.2 February 2018

For the month of February, most ground disturbing activity was limited to utility trench excavations. An electrical trench was excavated at STA 27, 35, 70, and 1122. A reclaim water/sewer trench was excavated at STA 5 and 1120-1121. A water trench was excavated at STA 26-27, 71, and 1122-1123. Dry well excavations took place at STA 11, 46, and 69-70. Excavations for a swale took place at STA 13-16 and 42-50. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Additionally, grading was conducted at STA 27 and 49. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 5, 11, 26-27, 42-50, 69-71, and 1120-1123. No historic or cultural material was observed. No construction or monitoring took place on 19 February 2018 (due to President's Day).

D.4.3 March 2018

For the month of March, most ground disturbance was limited to utility trench excavations. An electrical trench was excavated at STA 38, 1120, and 1122. Trenching for utilities took place at STA 28, 209, 236, and 1122. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Additionally, grading occurred at STA 34, 48-49, 71-73, 110, and 209. At STA 68-71, guard rails were removed. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 28, 34, 38, 48-49, 68-73, 110, 209, 236, 1120, and 1122. No historic or cultural material was observed.

D.4.4 April 2018

Ground disturbance was limited during the month of April. An electrical trench was excavated at STA 40 and 1122, and excavations for dry wells took place at STA 173, 1121. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Additionally, grading was conducted at STA 40 and 95-209. Asphalt was removed at STA 70 and 1122-1123. Vegetation was grubbed at STA 40. A few light poles were removed, and concrete for dry wells was poured. GBI began paving throughout the central portion of the project area. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 40, 70, 95-209, and 1121-1123. No historic or cultural material was observed.

D.4.5 May 2018

Ground disturbance was limited during the month of May. A utility trench was excavated at STA 171 and 1122. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Additionally, a concrete swale was poured near the Kaloko-Honokōhau National Park entrance. GBI began preparations for paving in the southern portion of the project area. Paving occurred throughout the project area, and lines were painted on the newly paved highway. Backfilling for a culvert occurred at STA 40, and backfill for a swale occurred at STA 40-50 and 55-65. Asphalt was removed at STA 40-50, 70, and 1121-1122. Grading was

conducted at STA 70, 100-110, 173, and 1118. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 40-50, 70, 100-110, 171, 173, 1118, and 1121-1122. No historic or cultural material was observed.

D.4.6 June 2018

Ground disturbance was limited during the month of June. Excavations took place at STA 236, and dry well excavations occurred at STA 26-29. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Temporary pavement was removed at STA 25, 35, and 1116-1121. Backfilling on the highway shoulders occurred at STA 1120-1122, and excess material was removed from STA 26-28. Additional grading, grubbing, and backfilling occurred at STA 30-45. Paving occurred from STA 120-170. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 25-45, 236, and 1116-1122. The lead archaeologist on duty performed upkeep on the protective buffer fence from STA 26 through 200. No historic or cultural material was observed. No construction or monitoring occurred on 11 June 2018 due to the Kamehameha Day Holiday.

D.4.7 July 2018

Ground disturbance was limited during the month of July. Dry well excavation, installation, and backfilling occurred at STA 28-36. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Temporary pavement removal occurred at STA 8-14, 67-71, 75, 80-90, and 200-235. Grading occurred at STA 8-14, 64-70, 75, 80-90, and 172. Paving was monitored at STA 71. No geological anomalies were observed over the course of the month.

Construction activity and archaeological monitoring took place at STA 8-14, 28-36, 64-71, 75, 80-90, 172, and 200-235. No historic or cultural material was observed.

D.4.8 August 2018

Ground disturbance was limited during the month of August. Dry well excavation, installation, and backfilling occurred at STA 125-135. These trenches were dug in an imported fill layer and, in some cases, in previously undisturbed bedrock. Removal of temporary traffic poles took place at STA 1122, 71, 105, 209 and 235, at the intersections. Grading occurred at STA 1121-8. Renat was spread on the shoulders and along the median at STA 1121-8. Removal of silt fencing took place at STA 209-236.

Construction activity and archaeological monitoring took place at STA 1121-8, 71, 105, 125+135, and 209-236. No historic or cultural material was observed.

D.4.9 September 2018

Ground disturbance was limited during the month of September. Grubbing took place at STA 80. Renat was spread on the highway shoulders at STA 1121-1122 and 30. Electrical work was completed at STA 1121, 71 and 110. AC Removal of silt fencing took place at STA 180-240.

Construction activity and archaeological monitoring took place at STA 1121-1122, 30, 71 and 180-240. No historic or cultural material was observed.

D.4.10 October 2018

Ground disturbance was limited during the month of October. Electrical work was conducted at STA 1121-26, 70-175 and 209. Excavation for sign post took place at STA 5. Renat was spread at STA 1121 and 26-28. Landscaping work took place at STA 235 and 174.

Construction activity and archaeological monitoring took place at STA 1121-28, 70-175, 209 and 235. No historic or cultural material was observed.

D.4.11 November 2018

Ground disturbance was very limited during the month of November.

Finishing of construction activity and archaeological monitoring took place along the entire project area. All site protective fencing was removed along the highway. No historic or cultural material was observed.

Appendix E Letter from Cultural Monitor Cynthia Nazara Regarding Lava Tube Breach #2

Aloha Ollie,

This a letter for your information regarding site # 28809, which is a pahoehoe excavation.

Upon inspection with State Archeologist Morgan Davis from SHPD, this opening has no cultural significance and is found to be sterile of any cultural matter.

Present at site, Jason Tateishi- R.M Towill, Layne Karase-CSH, Simon Poole-GBI, Sterling Chow-HDOT, Cynthia Nazara-CMC and Morgan Davis-SHPD.

Thank you

Cynthia Nazara

Cultural Monitor Coordinator



Appendix F Report for January 2017 ControlPoint Surveying, Inc. Survey

CULTURAL SURVEYS HAWAI'I

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL DOCUMENTATION SERVICES — SINCE 1982

24 April 2019

Robyn Ito
SSFM International, Inc.
99 Aupuni Street, Suite 202
Hilo, HI 96720
rito@ssfm.com

CSH Job Code---- KALAOA 21A

Subject: Monitoring Report for ControlPoint Surveying, Inc. Survey at Queen Ka'ahumanu Highway Widening Phase 2 Project

Aloha Ms. Ito,

This letter is to report on archaeological monitoring by Cultural Surveys Hawai'i (CSH) during the certified land survey of historic properties undertaken by ControlPoint Surveying, Inc. (ControlPoint) in January 2017 for the Queen Ka'ahumanu Highway Widening Phase 2 project in North Kona, Hawai'i. CSH was contracted by SSFM International, Inc. to assist in identifying the historic properties and to monitor survey work.

Inconsistencies in GPS data for the geographic location of historic properties on the project construction plans resulted in inadvertent impacts to two of the historic properties in late 2016. To rectify the data inconsistencies the historic properties were surveyed by ControlPoint with a CSH archaeologist assisting in relocating the historic properties, and their preservation buffers boundaries, present near the project area.

ControlPoint conducted the survey fieldwork from 16 January through 22 January 2017, assisted by CSH archaeologist Nate Garcia in locating the extant historic properties within the project area (Figure 1 and Figure 2). The CSH Archaeologist used a Trimble ProXR GPS (sub-meter horizontal accuracy) loaded with the existing site and buffer location data to aid in the site relocation. All applicable historic properties and their preservation buffers were relocated and flagged by CSH archaeologists Sarah Wilkinson, B.A., and Olivier Bautista, B.A. prior to the ControlPoint survey to facilitate relocation during the survey.



WWW.CULTURALSURVEYS.COM - INFO@CULTURALSURVEYS.COM

O'ahu Island
P.O. Box 1114
Kailua, HI 96734
Ph: (808) 262-9972
Fax: (808) 262-4950

Maui Island
1860 Main Street
Wailuku, HI 96793
Ph: (808) 242-9882
Fax: (808) 244-1994

Hawai'i Island
399 Hualani St.
Suite 124
Hilo, HI 96720
Ph: (866) 956-6478

Kaua'i Island
2970 Kele St.
Suite 114
Lihue, HI 96766
Ph: (808) 245-9374

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ControlPoint recorded each historic property and protective buffer location. Multi-feature historic properties were recorded as polygons following the boundaries depicted on site plan maps in the applicable archaeological reports; each component feature within multi-feature historic properties was individually marked. The segments of trail sites within the project area were marked at each hinge point. Portions of historic properties (including trails) located *makai* of and outside of the project limits were not surveyed.

During the survey, the CSH archaeologist also marked the applicable historic property plan view map with the data point locations recorded by ControlPoint.

No historic properties were impacted during the survey, and no new historic properties or cultural materials were encountered.

Thank you,



William Folk
Project Manager
Cultural Surveys Hawaii, Inc.
wfolk@culturalsurveys.com

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Date: 24 April 2019



Figure 1. Photo of CSH monitor attending the ControlPoint crew during survey work on 19 January 2017



Figure 2. Photo of ControlPoint crew conducting survey work on 21 January 2017