
Draft

**Cultural Assessment Report for the
AES Lawai Solar and Storage Project,
Lāwa‘i and Kōloa Ahupua‘a, Kōloa District, Kaua‘i
TMK: [4] 2-6-003:001**

**Prepared for
CH2M Hill**

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(Job Code: LAWAI 12)**

June 2017

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Management Summary

Reference	Cultural Assessment Report for the AES Lawai Solar and Storage Project, Lāwa'i and Kōloa Ahupua'a, Kōloa District, Kaua'i, TMK: [4] 2-6-003:001 (Wildey et al. 2017)
Date	June 2017
Project Number(s)	Cultural Surveys Hawai'i, Inc. (CSH) Job Code: LAWAI 12
Agencies	Kaua'i County Planning Commission and the State Land Use Commission (LUC)
Land Jurisdiction	Private
Project Location	The study area is located within Lāwa'i and Kōloa Ahupua'a. The northern portion of the project area is bounded by Kōloa Road. To the west is Aka Road. To the southeast of the project area is Aepoeka Reservoir. The southwestern portion of the project area is comprised of former sugar cane field with some areas now used for cattle ranching. The proposed project area would exclude two existing reservoirs located within the project boundaries: Aeolua and Aepoekolu.
Project Description	<p>In late 2016 and early 2017 respectively, KIUC awarded a Power Purchase Agreement (PPA) and Interconnection Agreement to AES Distributed Energy, Inc. (AES DE) after a competitive bid process in which KIUC sought proposals for a solar PV and energy storage solution to serve the island of Kauai. AES DE and its affiliate AES Lawa'i Solar, LLC's proposed project involves construction and operation of a 20 megawatt (MW) AC power plant comprised of 28 MW DC of integrated solar PV and a 20 MW – 5-hour (100 MWh) battery energy storage system (BESS). The project would be located on former sugar cane land owned by Alexander & Baldwin (A&B) in Lawai, approximately 13 miles southwest of Lihue. A&B and AES Lawa'i Solar, LLC have fully executed a grant of easement agreement for the use of a portion of an approximately 1,062-acre parcel. The proposed project area would exclude two existing reservoirs located within the boundaries. Access would be via Koloa Road (to the north) and Halewili Road (to the southwest) and a network of existing onsite access roads.</p> <p>The proposed project would provide dispatchable renewable electricity through a combination of direct PV generation, simultaneous PV and battery output, and battery discharge. It would be based on a storage-integrated ("PV Peaker") design, which efficiently allows for energy from the PV modules to be either stored in the batteries or sent directly to the grid at KIUC's discretion. The PV modules would be mounted on single-axis trackers to optimize use of the land and maximize energy</p>

	<p>yield. The average height of the modules would be approximately 7.5 feet above grade, with a maximum height of 13 feet above grade (which is expected to occur approximately one hour per day, when the panel rotates on its axis to track the sun). The BESS containers would be mounted on concrete pads, and would be approximately 9.5 feet tall, 8 feet wide and 40 feet long. The PV modules and BESS containers would connect to a series of inverters and transformers which would convert the output to transmission voltage, allowing for interconnection to the KIUC grid. The point of interconnection would be at a KIUC substation, which would be located adjacent to an existing transmission line that traverses the project site. The project site would be enclosed by a perimeter fence for safety and security purposes. Following project installation, the project site would also be used to host sheep, thus promoting dual use (agricultural and energy production) of the land. Sheep pasturage and solar systems are considered to be highly compatible, with sheep grazing serving to manage onsite vegetation which helps to maximize electricity production.</p> <p>AES Lawa'i Solar, LLC and KIUC signed the PPA for the project in December 2016. The project will require approval from the Public Utility Commission (PUC), which is expected to be obtained in Fall 2017. Other required permits and approvals include a Special Use Permit, Use Permit, Zoning Permit, and building permits including a National Pollutant Discharge Elimination System (NPDES) permit, noise permit, and grading/grubbing/stockpiling permits.</p>
Project Acreage	Total project acreage is approximately 221 acres.
Document Purpose	<p>This cultural assessment (CA) was prepared to:</p> <ul style="list-style-type: none"> • Provide information pertinent to the assessment of the proposed project's impacts to cultural beliefs, practices, and resources. • Assess impacts to cultural resources for consideration in the State of Hawai'i Land Use Commission's Special Permit process. • Support the HRS 6E process.
Results of Background Research	<p>Background for this project yielded the following results (presented in approximately chronological order):</p> <ol style="list-style-type: none"> 1. The <i>ahupua'a</i> (land division extending from the mountains to the sea) of Lāwa'i is bounded by the <i>ahupua'a</i> of Kalāheo to the west; Kōloa to the east; the Pacific Ocean to the south; and the Līhu'e-Kōloa Forest Reserve to the north. The main geographic feature of the <i>ahupua'a</i> is the deeply dissected Lāwa'i Valley along Lāwa'i Stream. The most notable place on the coast is

	<p>Puki Kai o Lāwa‘i, also known as Spouting Horn, which is a natural blowhole.</p> <ol style="list-style-type: none"> 2. The name Kōloa has several derivations. Kōloa is the name for the large, soft Hawaiian sugarcane once grown by Hawaiians; it is also the name of a steep rock called Paliokōloa located on the banks of Waikomo Stream. The bank of the river was called Kōloa after the native duck (Kikuchi 1963:46; Pukui et al. 1974:116). 3. Three <i>heiau</i> (pre-Christian place of worship) are listed for the <i>ahupua‘a</i> of Lāwa‘i including Niukapukapu Heiau (Bennett Site 72) located on Niukapukapu Hill; Kalohiokapua Heiau (Bennett Site 69) in Lāwa‘i Valley (destroyed); and Māmalu Heiau (Bennett Site 70) near the mouth of Lāwa‘i Valley (destroyed). 4. Kōloa Ahupua‘a has five <i>heiau</i> including Hō‘ai (Bennett Site 75) at Kūhiō Park on the west bank of Waikomo Stream; Kānehaule (Bennett Site 92) on the east branch of ‘Ōma‘o Stream (destroyed); Kāneiolouma (Bennett Site 81) on the shore near Kihouna Heiau (Bennett Site 80); and Kūhāhāpō at Lae o Kahala. 5. Radiocarbon dating suggests settlement occurred in Kōloa Moku between AD 750 to AD 1000 (Rieth and Cochrane 2015). Hawaiian traditions indicate the Hawaiian Islands were first settled by chief Punanuikaianaaina who came from Puna Moku on Kaua‘i via Marquesas in approximately AD 1000 to 1100 (Fornander 1996:45–46). 6. The earliest documentation of Kōloa’s population appears in the 1850s when missionaries began to create a census. The total population for Kōloa during this time was 1,296 (Schmitt 1977:12). The majority of the population was concentrated in the lower flood plains and delta plains of rivers where <i>kalo</i> (taro; <i>Colcasia esculenta</i>) is generally cultivated. By 1872, the population decreased dramatically to 833 then began to increase over time (Schmitt 1977:13). 7. Captains Cook and Vancouver both wrote about Kaua‘i’s extensive agricultural systems noting the continuous use of the land spanning from <i>mauka</i> to <i>makai</i>. Handy and Handy (1972:152) noted that from Waimea to Wailua, the area was known for its extensive plantations of breadfruit, bananas, sweet potatoes, yams, and <i>kalo</i>. The favored area for coconuts were in Kōloa and Lāwa‘i (Handy 1940:193). 8. According to LCA documentation, although there were no claims within the project area, there were several claims in the vicinity of the project area. The land was used for <i>lo‘i kalo</i>
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	<p>(irrigated terrace for taro), <i>kula</i> (plain), pig enclosures, a fishpond, and house lots.</p> <ol style="list-style-type: none"> 9. After Liholiho's (Kamehameha IV) death in 1863, Queen Emma built a residence for herself in Lāwa'i Ahupua'a on a bluff east of Lāwa'i Kai. 10. Kōloa was the home of three large sugar companies: Koloa Sugar Company (the first sugar plantation company on Kaua'i); McBryde Sugar Company; and Grove Farm. 11. Previous archaeological reports indicate Lāwa'i Ahupua'a was a well populated and used area. Within the project area is Site 73, a stone work site (Bennett 1931); and State Inventory of Historic Properties (SIHP) # - 1051, a McBryde Sugar Company irrigation infrastructure (Hammatt and Shideler 2007). Other sites found in the vicinity of the project area includes <i>heiau</i> (pre-Christian place of worship), coastal shelters, agricultural complexes, habitation complexes, <i>iwi kupuna</i> (ancestral remains), platforms, <i>'auwai</i> (irrigated ditch), historic irrigation ditches, stone walls, and cemeteries. 12. Previous oral histories conducted by the University of Hawai'i at Mānoa Center for Oral History (UHCOH) reflect the diverse multi-cultural history of Hawai'i's sugar industry.
<p>Impacts and Recommendations</p>	<p>Based on information gathered from the cultural and historic background, no impacts were identified. However, in the event that any <i>iwi kupuna</i> and/or cultural finds are encountered, CSH recommends the following:</p> <ol style="list-style-type: none"> 1. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that <i>iwi kūpuna</i> are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD, coroner, and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended. 2. In the event that <i>iwi kūpuna</i> and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

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Section 1 Introduction

1.1 Project Background

At the request of CH2M Hill, Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this cultural assessment (CA) report for the AES Lawai Solar and Storage project, Lāwa‘i and Kōloa Ahupua‘a, Kōloa District, Kaua‘i, TMK: [4] 2-6-003:001. The study area is depicted on a portion of the 1996 U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2), and a 2013 aerial photograph (Figure 3). The study area includes approximately 221 acres.

In late 2016 and early 2017 respectively, KIUC awarded a Power Purchase Agreement (PPA) and Interconnection Agreement to AES Distributed Energy, Inc. (AES DE) after a competitive bid process in which KIUC sought proposals for a solar PV and energy storage solution to serve the island of Kauai. AES DE and its affiliate AES Lawa‘i Solar, LLC’s proposed project involves construction and operation of a 20 megawatt (MW) AC power plant comprised of 28 MW DC of integrated solar PV and a 20 MW – 5-hour (100 MWh) battery energy storage system (BESS). The project would be located on former sugar cane land owned by Alexander & Baldwin (A&B) in Lawai, approximately 13 miles southwest of Lihue. The proposed project area would exclude two existing reservoirs located within the boundaries. Access would be via Koloa Road (to the north) and Halewili Road (to the southwest) and a network of existing onsite access roads.

The proposed project would provide dispatchable renewable electricity through a combination of direct PV generation, simultaneous PV and battery output, and battery discharge. It would be based on a storage-integrated (“PV Peaker”) design, which efficiently allows for energy from the PV modules to be either stored in the batteries or sent directly to the grid at KIUC’s discretion. The PV modules would be mounted on single-axis trackers to optimize use of the land and maximize energy yield. The average height of the modules would be approximately 7.5 feet above grade, with a maximum height of 13 feet above grade (which is expected to occur approximately one hour per day, when the panel rotates on its axis to track the sun). The BESS containers would be mounted on concrete pads, and would be approximately 9.5 feet tall, 8 feet wide and 40 feet long. The PV modules and BESS containers would connect to a series of inverters and transformers which would convert the output to transmission voltage, allowing for interconnection to the KIUC grid. The point of interconnection would be at a KIUC substation, which would be located adjacent to an existing transmission line that traverses the project site. The project site would be enclosed by a perimeter fence for safety and security purposes. Following project installation, the project site would also be used to host sheep, thus promoting dual use (agricultural and energy production) of the land. Sheep pasturage and solar systems are considered to be highly compatible, with sheep grazing serving to manage onsite vegetation which helps to maximize electricity production.

AES Lawa‘i Solar, LLC and KIUC signed the PPA for the project in December 2016. The project will require approval from the Public Utility Commission (PUC), which is expected to be obtained in Fall 2017. Other required permits and approvals include a Special Use Permit, Use Permit, Zoning Permit, and building permits including a National Pollutant Discharge Elimination System (NPDES) permit, noise permit, and grading/grubbing/stockpiling permits.

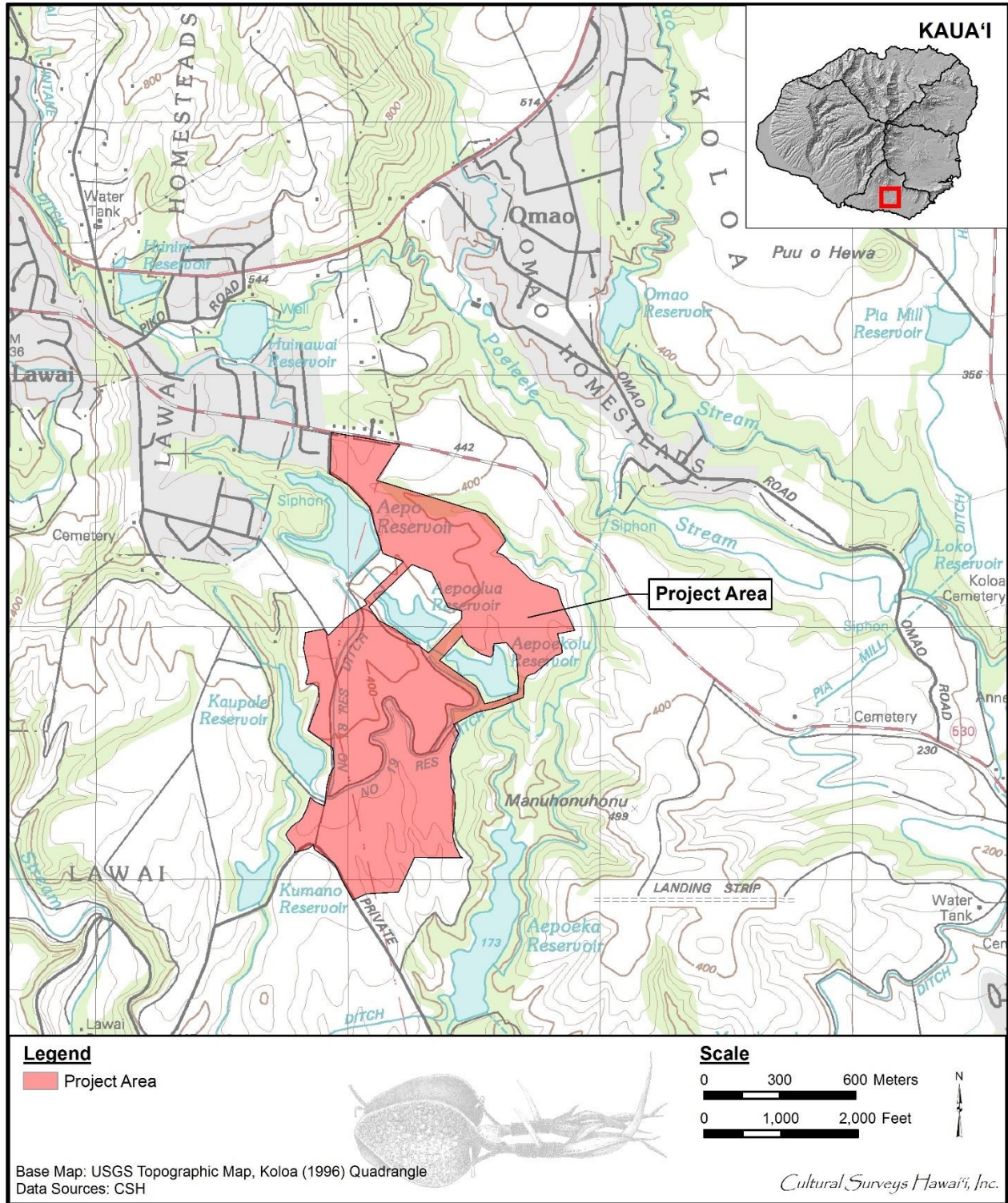


Figure 1. Portion of the 1996 Koloa USGS 7.5-minute topographic quadrangle showing the location of the project area

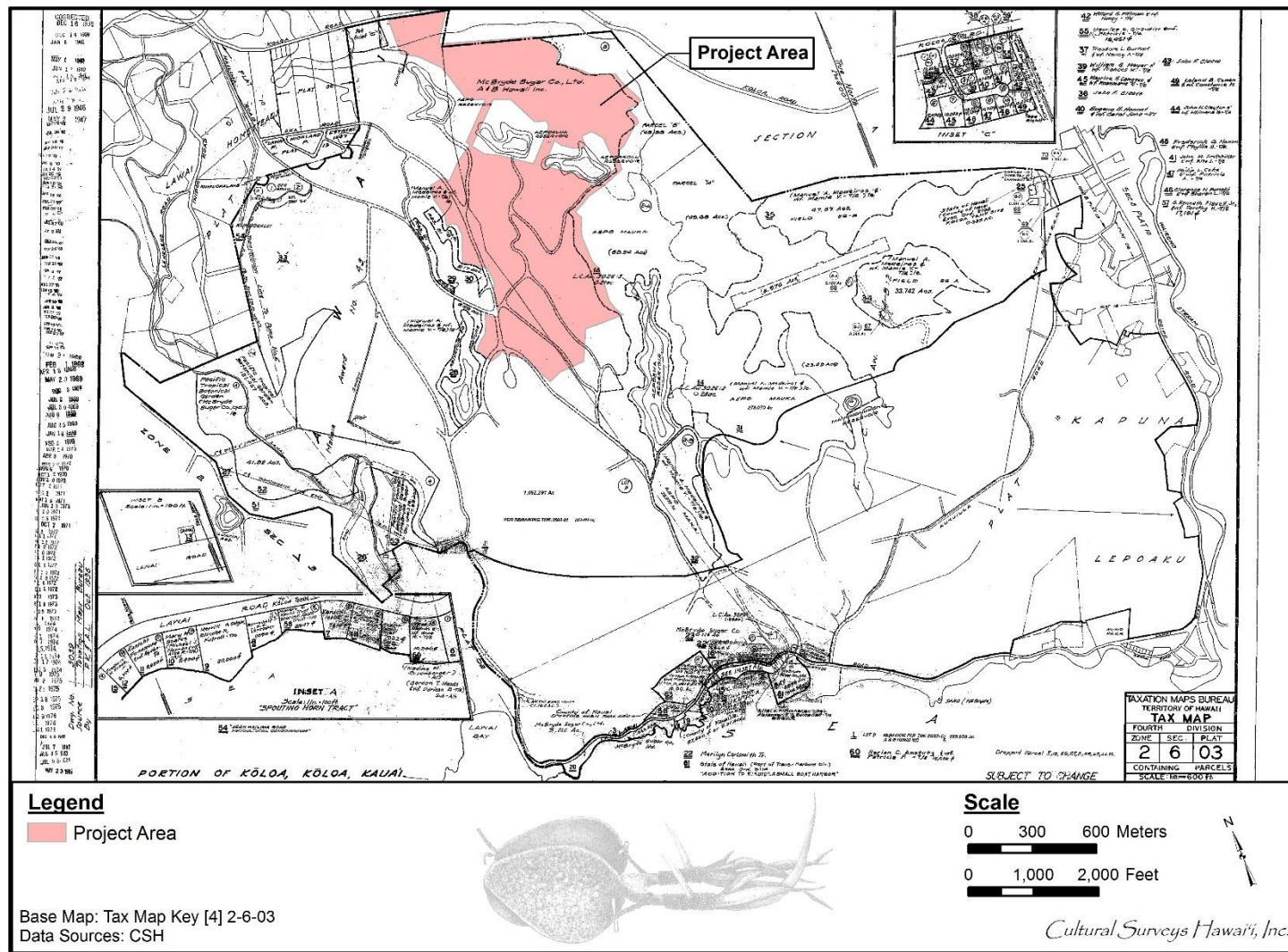


Figure 2. Tax Map Key (TMK) [4] 2-6-003 showing the project area (Hawai'i TMK Service 2014)

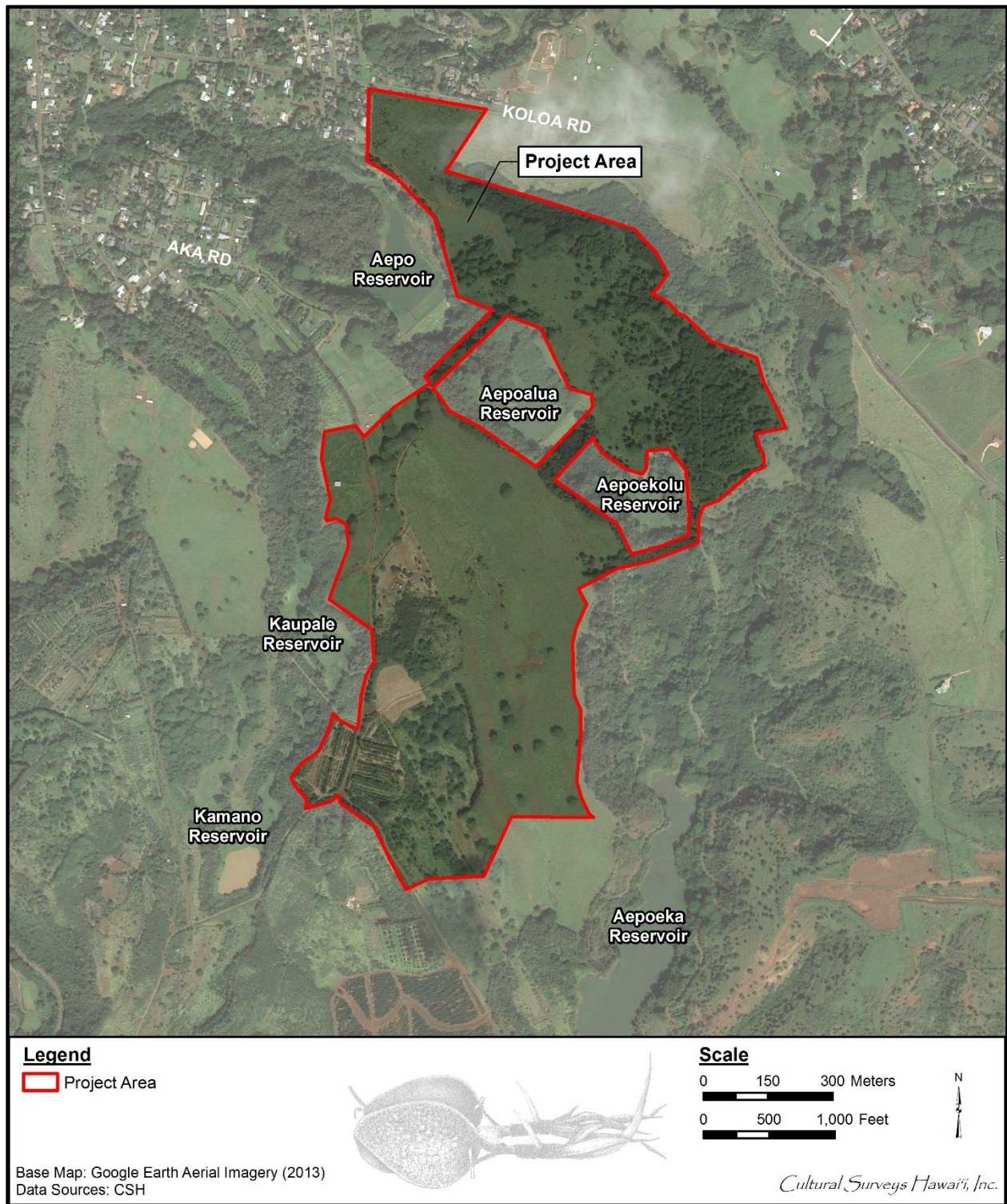


Figure 3. Aerial photograph of the project area (Google Earth 2013)

1.2 Document Purpose

This cultural assessment (CA) was prepared to:

- Provide information pertinent to the assessment of the proposed project's impacts to cultural beliefs, practices, and resources.
- Assess impacts to cultural resources for consideration in the State of Hawai'i Land Use Commission's Special Permit process.
- Support the HRS 6E process.

1.3 Scope of Work

The scope of work for this CA includes the following:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

1.4 Environmental Setting

1.4.1 Natural Environment

The *ahupua'a* (land division usually extending from the uplands to the sea) of Lāwa'i extends as a large land segment from Kalualea to the sea. It is bordered by Kalaheo Ahupua'a to the west and Kōloa Ahupua'a to the east. Handy and Handy mention Lāwa'i:

Lawai is the *ahupua'a* next westward from Koloa with a more sizable stream. There were *lo'i* [irrigated terrace] on flats above the sea and along Lawai Stream for a mile or more inland, and beyond this were small *lo'i* in the narrow valley. In upper Lawai Valley there is no evidence of terracing. [Handy and Handy 1972:428]

The *ahupua'a* of Kōloa extends as a large land segment from Mt. Kāhili to the sea. It is bordered by Lāwa'i Ahupua'a to the west and Weliweli Ahupua'a to the east. Handy and Handy mention Kōloa:

Koloa had a stream which at its seaward end was called Waikomo (Hidden-water), suggesting that the stream must have gone underground. Three streams in upper Koloa may have watered some taro terraces, since they flow through relatively flat land, although a *kama'aina* [native born] told us he knew of none. However, there were a few terraced areas, whose names we obtained, in localities now dry because the water is diverted upstream for sugar-cane irrigation. There were extensive terraces on land now planted with sugar cane near what is now Kuhio Park, seaward from Koloa Valley. There were fresh-water ponds in both Weliweli and Koloa.

Possibly this was why Koloa was so named, for *koloa* means duck, and duck were attracted to fresh water. [Handy and Handy 1972:428]

1.4.1.1 *Āina* (Soil Surveys)

According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), the project area's soils consist of Puhi silty clam loam, Rough broken land, Water, and Lihue silty clay (Figure 4). Puhi Series soils are described as follows:

This series consists of well-drained soils on uplands on the island of Kauai. These soils developed in material derived from basic igneous rock. They are nearly level to steep. Elevations range from 175 to 500 feet. The annual rainfall amounts to 60 to 80 inches. The mean annual soil temperature is 73° F. Puhi soils are geographically associated with Lihue and Kapaa soils.

These soils are used for sugarcane, pineapple, truck crops, orchards, pasture, woodland, wildlife habitat, water supply, and homesites. The natural vegetation consists of guava, Java plum, pangolagrass, kikuyugrass, elephantopus, joe, yellow foxtail, and rhodomyrtus. [Foote et al. 1972:115]

Rough Broken Land is described as follows:

Rough broken land [rRR] consists of very steep land broken by numerous intermittent drainage channels. In most places it is not stony. It occurs in gulches and on mountainsides on all the islands except Oahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000 feet. The local relief is generally between 25 to 500 feet. Runoff is rapid, and geologic erosion is active. The annual rainfall amounts to 25 to more than 200 inches... This land type is used primarily for watershed and wildlife habitat. In places it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, lantana, Natal redbud, bermudagrass, koa haole, and molassesgrass. Ohia, kukui, koa, and ferns are dominant in the wetter areas. Puakeawe, aalii, and sweet vernalgrass are common at the higher elevations. [Foote et al. 1972:119]

The Lihue Series is described as below:

This series consists of well-drained soils on uplands on the island of Kauai. These soils developed in material weathered from basic igneous rock. They are gently sloping to steep. Elevations range from nearly sea level to 800 feet. The annual rainfall amounts to 40 to 60 inches. The mean annual soil temperature is 73° F. Lihue soils are geographically associated with Ioleau and Puhi soils.

These soils are used for irrigated sugarcane, pineapple, pasture, truck crops, orchards, wildlife habitat, woodland, and homesites. The natural vegetation consists of lantana, guava, koa haole, joe, kikuyugrass, molassesgrass, guineagrass, bermudagrass, and Java plum. [Foote et al. 1972:82]

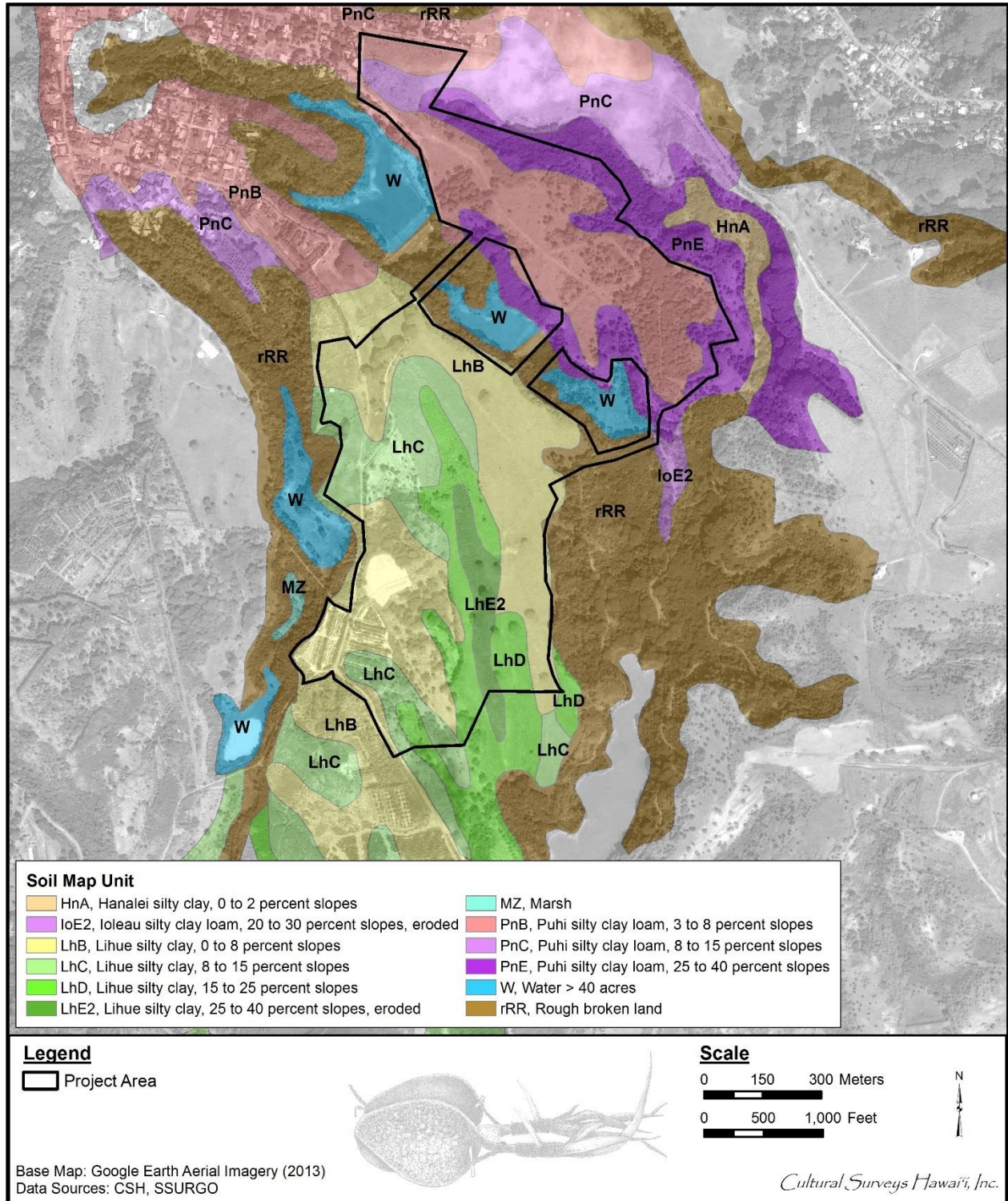


Figure 4. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [USDA SSURGO] 2001)

1.4.1.2 *Makani* (Prevailing Winds)

Northeasterly trade winds prevail throughout the year, although their frequency varies from 80 to 95% of the time during the summer months, when high-pressure systems tend to be located north and east of the Hawaiian Islands. During the winter months, the high-pressure systems are located farther to the south, decreasing the occurrence of the trade winds to about 50 to 80% of the time (WRCC 2010).

The Wind Gourd of La'amaomao tells the story of Pāka'a and his son Kuāpāka'a, descendants of the wind goddess La'amaomao, who are given control over the winds of Hawai'i which are contained in a gourd. Each wind could be called forth by chanting their names (Nakuina 1992). Pāka'a's chant traces the winds of Kaua'i found in the *ahupua'a* of Lāwa'i and Kōloa. *Makani* is the general Hawaiian word for wind.

The A'e is the trade wind named for Lāwa'i. There are at least two different Hawaiian names for the winds found in the Kōloa Ahupua'a: Malanai, a gentle breeze, the trade wind of Kōloa (Nakuina 1990:149), and "Holomālani wind" (Ho'oulumāhiehie 2008:16). For an expanded version of the winds, see Section 3.2.1.

1.4.1.3 *Nahale* (Vegetation) and Native Ecosystems

Before human settlement, the native ecosystem for the Lāwa'i Solar project area consisted of lowland dry and mesic forest, woodlands, shrubland, and some sandy beaches (Juvik and Juvik 1998:122).

Vegetation observed within the study area includes *hau* (beach hibiscus; *Hibiscus tiliaceus*) and guineagrass.

1.4.1.4 *Ua* (Precipitation)

Precipitation is a major component of the water cycle, and is responsible for depositing *wai* (fresh water) on local flora. Pre-Contact *kānaka* (Native Hawaiians) recognized two distinct annual seasons. The first, known as *kau* (period of time, especially summer) lasts typically from May to October and is a season marked by a high-sun period corresponding to warmer temperatures and steady trade winds. The second season, *ho'oilo* (winter, rainy season) continues through the end of the year from November to April and is a much cooler period when trade winds are less frequent, and widespread storms and rainfall become more common (Giambelluca et al. 1986:17). Typically the maximum rainfall occurs in January and the minimum in June (Giambelluca et al. 1986:17).

The rainfall pattern on Kaua'i is characterized by Wai'ale'ale near the island's highest point (Kawaikini, 1 598 m [5,243 ft]) and the minimum at Kekaha, which is located along the western coast of the island. The rain gauge at Mount Wai'ale'ale receives more rainfall than any other gauge in the world with an annual median of 11,415 mm (449 inches), it is one of the wettest locations on earth. Southwest of Wai'ale'ale, the Kekaha annual minimum is less than 500 mm (19.7 inches) (Giambelluca et al. 1986:17). There is at least one named *ua* of Kōloa, the cold Noe rain (Akana 2015:154).

1.4.2 Built Environment

The project area consists of mostly uninhabited former sugar plantation lands. A northern portion of the project area is bounded by Kōloa Road. To the west of the project area is Aka Road.

Within the project area boundaries are several reservoirs including Aeopalu and Aeopokolu, but are not part of the project area. To the west of the project area includes Aeopu, Kaupale, and Kamana reservoirs. To the southeast of the project area is Aeopoka Reservoir. A network of dirt roads can be found in the southwest portion of the project area.

Section 2 Methods

2.1 Archival Research

Research centers on Hawaiian activities including *ka 'ao* (legends), *wahi pana* (storied places), *'ōlelo no 'eau* (proverbs), *oli* (chants), *mele* (songs), traditional *mo 'olelo* (stories), traditional subsistence and gathering methods, ritual and ceremonial practices, and more. Background research focuses on land transformation, development, and population changes beginning with the early post-Contact era to the present day.

Cultural documents, primary and secondary cultural and historical sources, historic maps, and photographs were reviewed for information pertaining to the study area. Research was primarily conducted at the CSH library. Other archives and libraries including the Hawai'i State Archives, the Bishop Museum Archives, the University of Hawai'i at Mānoa's Hamilton Library, Ulukau, the Hawaiian Electronic Library (Ulukau.org 2014), the State Historic Preservation Division (SHPD) Library, the State of Hawai'i Land Survey Division, the Hawaiian Historical Society, and the Hawaiian Mission Houses Historic Site and Archives are also repositories where CSH cultural researchers gather information. Information on Land Commission Awards (LCAs) were accessed via Waihona 'Aina Corporation's Māhele database (Waihona 'Aina 2000), the Office of Hawaiian Affairs (OHA) Papakilo Database (Office of Hawaiian Affairs 2015), and the Ava Konohiki Ancestral Visions of 'Āina website (Ava Konohiki 2015).

Section 3 *Ka‘ao and Mo‘olelo (Legends and Stories)*

Traditionally, the island of Kaua‘i was divided into five *moku* (districts): Halele‘a, Kona, Ko‘olau, Nāpali, and Puna. However, after the battle of Wahiawa in 1824, the land of Kaua‘i was redistributed and district boundaries changed. The new district names became Hanalei, Kawaihau, Līhu‘e, Kōloa, and Waimea. The Kōloa District consisted of seven of the 14 *ahupua‘a* formerly within Kona Moku. ‘Ele‘ele was also added to the Kōloa District. Traditionally, ‘Ele‘ele was an *‘ili* (smaller land division) of Hanapēpē Ahupua‘a in Kona Moku, but it was separated during the redistribution. ‘Ele‘ele subsequently became an *ahupua‘a* of the Kōloa District, and Hanapēpē became an *ahupua‘a* of the Waimea District. Thus, currently the eight Kōloa *ahupua‘a* are ‘Ele‘ele, Wahiawa, Kalāheo, Lāwa‘i, Kōloa, Weliweli, Pā‘ā, and Māhā‘ulepū, from west to east.

This section provides in-depth background of the two *ahupua‘a* in which the Lāwa‘i Solar project area is located in Lāwa‘i and Kōloa (Figure 5). Figure 6 depicts locations where *ka‘ao* and *mo‘olelo* took place in Lāwa‘i and Kōloa Ahupua‘a.

3.1 Traditional Legends

3.1.1 Lāwa‘i *Ka‘ao* and *Mo‘olelo*

3.1.1.1 Kapunohu

A legend is told of a warrior named Kapunohu:

The Hawaiian hero Kapunohu had a mighty spear called Kanikawi with which he used in battle, defeating many enemies as he traveled around the islands. Eventually he came to Kaua‘i, landing at Waimea, but then traveling to Wahiawa and to Lāwa‘i. In the area was a giant warrior named Kemamo who threw slingstones and terrorized the neighborhood, so that people were afraid to travel between Kōloa and Nāwiliwili. When Kapunohu was ready to leave Lāwa‘i, the people warned him about this warrior. When he met the warrior, he challenged him to a duel, to see which could be thrown farther, Kapunohu’s spear or Kemamo’s slingstone. Kemamo threw his stone only as far as Anahola in the Kawaihau district. Kapunohu’s spear pierced the ridge at Anahola and flew all the way to Hanalei. Kemamo forfeited his life and Kapunohu became the king of Kawai‘i. [Fornander 1918:5:222–224]

3.1.1.1 Lāwa‘i Stream

A story is told about a large boulder, the outline of which can be seen in the center of a stream in Lāwa‘i (presumably, Lāwa‘i Stream). One account tells of the body of Hina, who, after being “ardently pursued,” jumped into the water and was immediately turned into stone. According to this legend, the rock was sacred to women only, and the women of the district would stand on the stone to have their “romantic desires” granted (Forbes 1970:2).

Another tale appeared in the 1997 *Honolulu Advertiser*. Mrs. Betty Snowden, whose family had lived in Lāwa‘i Kai for over 200 years, recounts the story of the *menehune* (legendary race of small people who worked at night, building fish ponds, roads, temples):

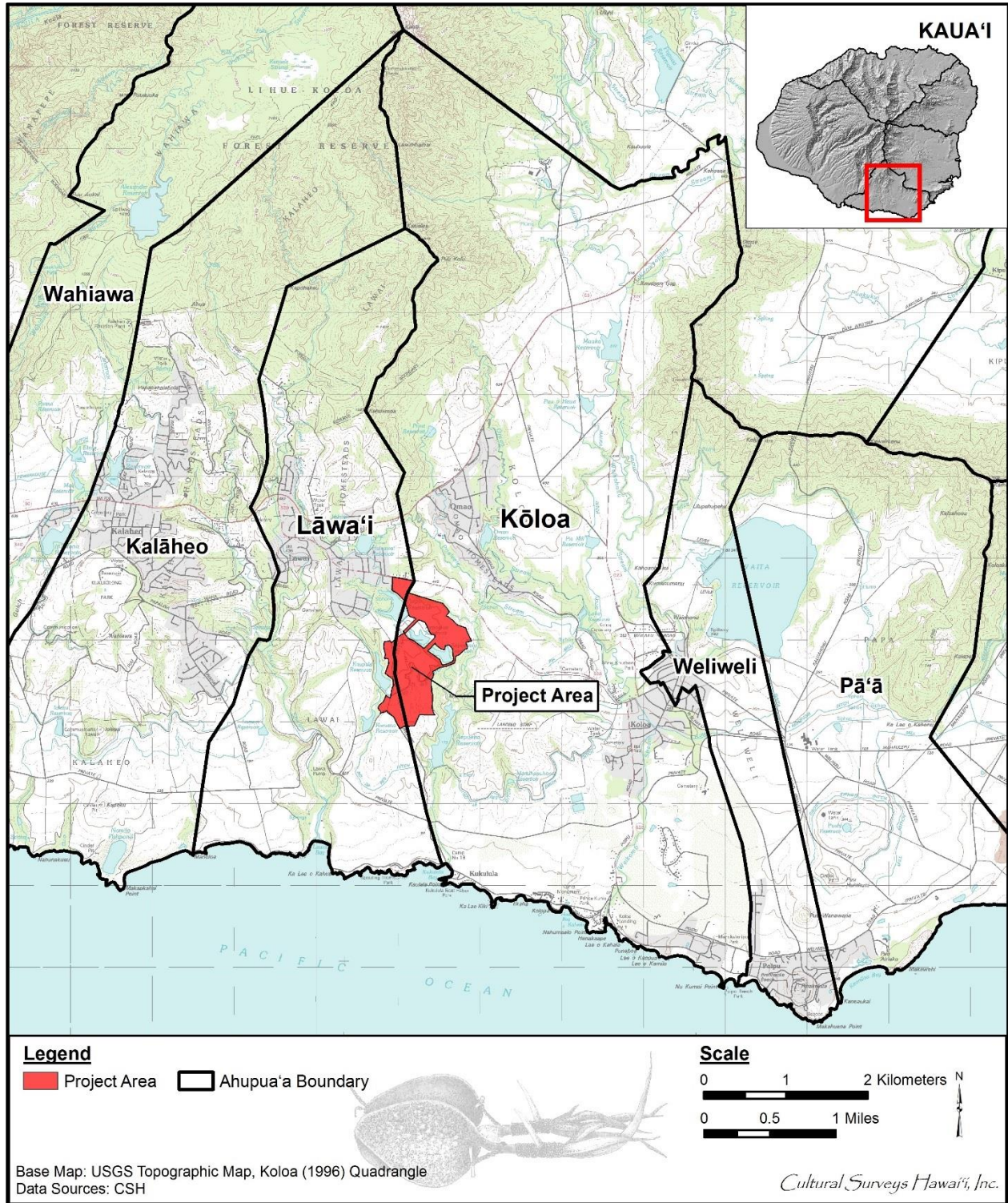


Figure 5. Portion of 1996 Koloa USGS topographic quadrangle, showing the Lāwa'i Solar project area within Lāwa'i and Kōloa Ahupua'a

One night, as he sat on the hill watching the people in the valley, the chief of the Menehune overheard Manu and his father discussing the need to build a wall in the stream. Manu's father wanted him to spend the next few days helping with the project.

But Manu and his friends had planned a fishing trip to Ni'ihau and he wasn't happy about the thought of being left behind. Yet, he certainly couldn't ignore his father's request to help. Maybe if he began right away, starting a rock pile . . .

Manu threw himself into the task. He was so busy that he didn't see the Chief of the Menehune until the Chief came right behind him and tugged at his clothing. The Chief made an offer that would benefit them both.

For two pu'olo, or bundles of shrimp the size of two large coconuts, the Menehune would build a wall for Manu and his family.

Manu agreed. For the next two days he surfed, fished and swam with his friends. On the second day he watched the sun setting in the west before he realized that he needed to catch opae [general name for shrimp]. He rushed over to the stream and tried to catch as many shrimp as he could before it got too dark to see but he only collected one bundle full.

That's OK, he thought. It's a large bundle and so that should be enough. He placed the shrimp at the promised location.

That night, the moon rose full and the Menehune crept down the valley. They worked most of the night to build the stone wall in the stream.

When Manu and his family awoke the next morning they found half a wall standing. The Menehune had built only half a stone wall because they had received only half the promised opae. [Snowden 1997:B1]

Betty Snowden concludes her article with the comment that one can still see the neat, perfectly made half-wall built by the *menehune* of Lāwa'i Kai at the edge of the stream in Lāwa'i Valley.

3.1.1.2 Spouting Horn

A Hawaiian fisherman recounted the following tale to Eric Knudsen near Spouting Horn. A giant *mo'o* (lizard, water spirit) named Lehu, accompanied by two sisters, swam from Tahiti. The two sister *mo'o* were tired out by the time they reached Ni'ihau and went to sleep on the beach there and became stones. Lehu continued on to Kaua'i and landed at Lāwa'i Beach. After recovering his strength he went over to Kōloa, and his favorite spot was the junction of the Pō'ele'ele and 'Ōma'o rivers. Years later he swam over to Ni'ihau to visit his two sisters but found they were dead, so he swam back to Kaua'i. As he swam along the shore he became fascinated by the fountains of the Spouting Horn. As he explored the lava tube he got caught and could not back out. Supposedly now every time a wave rushes in and wets him all over, he growls and hisses. The Hawaiian fisherman said the lava was too hard for the Hawaiians of long ago to allow them to free him and now using dynamite would only kill him, so he's doomed to stay there forever (Knudsen and Noble 1945:210–211).

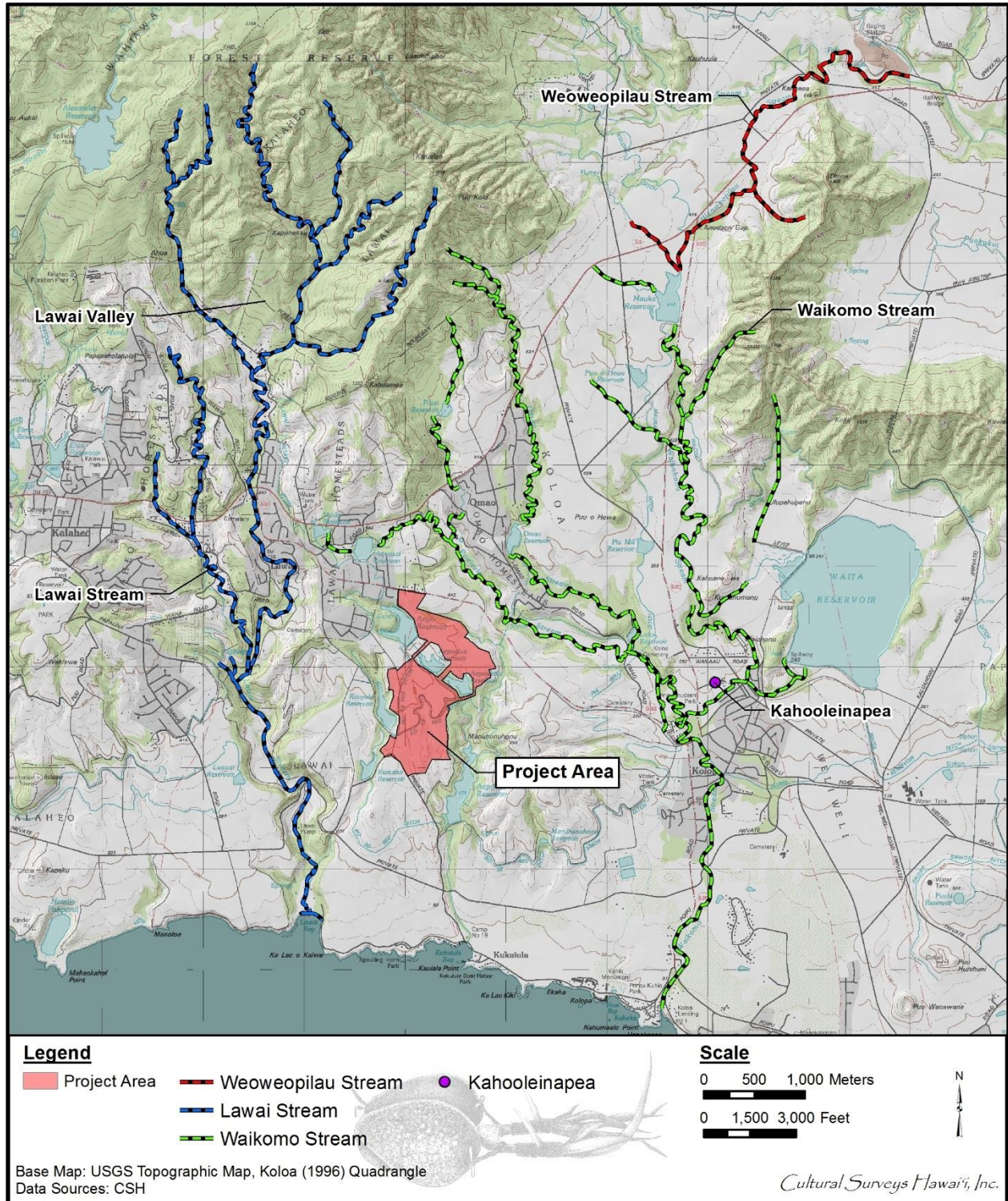


Figure 6. 1996 USGS Topographic Map, Koloa Quadrangle with project area in red and locations of ka'ao and mo'olelo

3.1.2 Kōloa *Ka'ao* and *Mo'olelo*

3.1.2.1 Kawelo

The early life of the hero Kawelo is also associated with Kōloa. Kawelo grew up in Wailua with two friends, Kauahoa of Hanalei and 'Aikanaka, the son of the king of Kaua'i. The three were fiercely competitive, and when his grandparents gave Kawelo a canoe, Kauahoa became jealous and so made himself a kite. As soon as he saw the kite, Kawelo wanted one for himself and he asked his grandparents to make him one. He flew the kite next to Kauahoa and the two entangled, which caused Kauahoa's to break away and fall to the earth in Kōloa, at a place named Kaho'oleināpe'a ("the flying of the kites"), after this event (Fornander 1918:5:3–4).

3.1.2.2 Ke Kōloa o Kaikapū

Kaikapū was a *mo'ō* who guarded the Kōloa shoreline keeping residents and visitors away from swimming holes and food sources on the reef and offshore (Wichman 1991:88). Her favorite trick was to hide herself in the rocks near the mouth of Waikomo Stream, listening for sounds of people. When she heard voices, she would swim furiously around the point and grab the fishermen from the rocks or a swimmer near the shore. The residents of Kōloa feared Kaikapū and soon no one came close to the ocean. As a result of Kaikapū's antics, no one ate any fish; gathered the *līpoa* (bladeliike, branched brown seaweed; *Dictyopteris plagiogramma*) used to flavor their food; or worked at the salt pans along the shoreline (Wichman 1991:88).

Liko and his grandmother stared at the Kōloa shoreline hopeless and angry. Liko's grandmother sighed:

'I would like a taste of i'a ho'omelu,' she said. 'I dream of the delicious pieces of raw hīnālea [wrasse; *Labridae*] fish mixed with red salt, roasted kukui [candlenut; *Aleurites moluccana*] nuts and brown līpoa seaweed.' Even though some people thought this fermented relish had an offensive smell, Liko's grandmother loved to spice her poi [Hawaiian staff of life made with cooked taro corms] with it. [Wichman 1991:88]

Liko decided his grandmother would have what she wanted and headed to the shore. Liko stared at Kaikapū and watched her movements. When it reached low tide and the waves became flat, he looked along the coastline remembering where he once gathered *līpoa* and caught *hīnalea* (wrasse; *Labridae*) (Wichman 1991:89). Kaikapū dove under the water and hid, while Liko stood on a bluff and observed that the *mo'ō* did not come up.

'Lizard or no lizard,' he muttered, 'I'm going to catch a hīnālea and gather some līpoa.'

Below him a wave surged up through the hole in the rocks. The water poured back into the hole and Liko smiled. He had an idea.

He ran home and got his sport spear made of heavy kauila wood, sharp at both ends and very strong. He picked up his funnel-mouthed hīnālea trap wove from 'inalua vine. He returned to the edge of the rocks, grasped his spear and fish trap and dove into the water, kicking hard to reach some rocks where he anchored the fish trap. His lungs grew tight, hurting from the lack of air, and he surfaced. [Wichman 1991:89]

Liko resurfaced and heard a snort. It was Kaikapū, smiling, and opening her jaws to swallow Liko. He yelled and hit the water vigorously. Kaikapū was surprised at how defiant Liko was but did not hesitate to try and eat him. Opening her jaws to swallow Liko, she instead felt a sharp pain as the *kaui* (native tree in the buckthorn family; *Alphitonia ponderosa*) spear pierced her mouth. Screaming, Kaikapū tossed her head to rid herself of the spear.

Liko's grandmother stood on the shoreline and watched:

‘Kaikapū!’ she called, ‘Here I am. Take me instead!’

‘No!’ Liko yelled. ‘Grandmother, go back!’ [Wichman 1991:89]

Kaikapū was enraged and could only think of Liko who was still in the water. Liko dove down to find the opening in the lava tube that led to the rocky shoreline. He struggled to find the opening. Kaikapū saw his feet fluttering as he slipped into the narrow lava tube. Never considering her own size, Kaikapū chased Liko into the lava tube. At that moment, a surge of water pushed through the lava tube and Liko managed to pull himself onto the rocks where his grandmother met him. Just then another wave surged and a roar resonated through the lava tube. It was Kaikapū. She was stuck in the lava tube. From that day on, the seashore was free for everyone to use.

3.1.2.3 Louma Heiau

Kapueomakawalu built the *heiau* (a pre-Christian place of worship) of Louma, which stood on the mountain side of Ho‘oleina-ka-pua‘a, “place to throw in the pig.” This was beside a small pond *mauka* (inland) of Maulili. Louma was a small *heiau* in which hogs, red fishes, and other sacrifices were offered. It was dedicated to Lono-i-ka-ou-ali‘i, the god who had come to Kaua‘i with La‘a-mai-kahiki in the twelfth century. The stones for this *heiau* were brought from O‘ahu. It is said that the *menehune* did the actual building (Wichman 1998:41).

3.1.2.4 Maulili Heiau

Maulili (meaning “constant jealousy”) is the name of Kōloa’s most important *heiau*. It was first built by Ka-pueo-maka-walu, the son of Kapu-lau-kī. He had his house on the eastern side of this *heiau*. It was a place of human sacrifice, but once Kapueomakawalu died, it was no longer used and its location was lost (Wichman 1998:41). Many years later, when ‘Aikanaka had defeated his cousin Kawelo in the battle of stones on the plains of Wahiawa, ‘Aikanaka wanted a place to sacrifice the body. No one was sure of it, but a deaf mute led ‘Aikanaka to the place. The place was rebuilt and in the morning ‘Aikanaka went to sacrifice the body. He found Kawelo was healed from his wounds and it was ‘Aikanaka instead who was sacrificed (Wichman 1998:41).

3.1.2.5 Maulili Pool

Maulili Pool has legendary associations. The Maulili Pool in Waikomo Stream was a sacred place once located in the present Kōloa Town, in the middle of the *ahupua‘a*.

One tale is of the gods Kāne and Kanaloa who slept on the eastern bank of Maulili Pool and left the impressions of their forms on the ‘*āpapa* (coral flat). “The *āpapa* in this vicinity is called an ‘Unu.’ and a ‘Heiau,’ but was never walled in, it is said. [This *heiau* may be the Maulili Heiau]. On the nights of Kāne the drums are heard to beat there, also at the sacred rocks, or unu’s, of Opuokahaku and Kānemilohae, near the beach of Po‘ipū . . .” (Farley 1907:93). Just below the

resting places of Kāne and Kanaloa is the “Pali o Kōloa” or “Cliff of Kōloa,” of which the district was possibly named after.

Wai-hānau, meaning “birth pool,” is a rock on the eastern bank of the pool. There is a *mele* (song or chant) about Waihānau:

*Aloha wale ka Pali o Koloa,
Ke Ala huli i Waihanau e, hanau.* [Farley 1907:93]

Below Wai-hānau was a rock shaped like a human tongue called “Ka-‘ōlelo-o-Hawai‘i,” “language of Hawai‘i.” It is said that Kaweloleimakua, who lived at the end of the 1600s, brought this rock to Kaua‘i from the island of Hawai‘i. According to Wichman (1998), “Kiha-wahine, the fearsome *mo‘o* goddess, lived in this pool. When she was in residence, the water turned red and no one dared to swim there” (Wichman 1998:40). “At the southern end of the Maulili pool started two large ‘auwais [ditch, canal] that watered the land east and west of Kōloa” (Farley 1907:93).

3.1.2.6 Palila

Palila was the son of Ka-lua-o-pālena and Maihi-iki (Wichman 2003:45). He was taken from his mother since birth and raised by his grandmother, Hina, in the temple of Alana-pō where he trained to be a warrior. He only ate bananas from two patches grown for him. One patch was located along a bank in Wailua, while the other was located in the *mauka* section of Makaleha. Palila trained hard and demonstrated his skills to his grandmother who replied, “Yes, you are halfway through your learning . . . You only use your right arm. Now learn to use your left arm,” (Wichman 2003:45). His teachers were astounded but Palila continue to train. On the day he completed his training, he heard a battle echoing over the ridge that divided the plains of Puna from Kōloa. Curious about the commotion, he wanted to ask his grandmother, but she was nowhere to be found. Hina was in the battlefield to warn Ka-lua-o-pālena that his son Palila would be coming to assist:

Hina said to Ka-lua-o-pālena, ‘Be on your guard. Three warriors will come before you today. The first will be Ka-kohu-koko from Moloa‘a. He claims it takes forty men to carry his war club. Do not choose him. The second will be Lupe-a-ka-wai-o-Wainiha. He will claim it takes 120 men to carry his war club. Do not choose him. Then will come a third warrior, twirling his war club in his right hand, then in his left hand. He will be the warrior by whose help you will conquer all of Kaua‘i.’ [Wichman 2003:45]

Ka-hoku-koko and Lupe-a-ka-wai-o-Wainiha both showed up and Ka-lua-o-pālena denied both of them. Both warriors were shamed and returned to their homes. However, Palila did not present himself and Hina’s words were not fulfilled. Ka-lua-o-pālena drew up his army and prepared for battle.

Palila continued to follow the noises of the battle over the ridge. He looked down on Kōloa, Weliweli, and Pā‘ā and saw two armies facing each other. One army was led by his father, Ka-lua-o-pālena, while the other was led by the Kona chief, Ka-maka-o-ka-lani. Palila stood on a point called Ke-komo-o-ke-anu (“coming of the cold”) where he was seen by both armies. From Palila’s vantage point, he could see his father had a standard war formation while Ka-maka-o-ka-lani’s was thin. The remainder of the Kona chief’s men were hidden in the surrounding forests and ready to ambush Ka-la-o-pālena. Outraged, Palila went to the edge of the forest and with a blow of his

club, knocked down a tree which began a domino effect until the entire forest had fallen. Ka-maka-o-ka-lani’s hidden army was then killed. Palila walked into the battlefield to face the Kona chief, challenging him to a one-on-one combat. Palila held his club in his right hand and a dagger in the left. Ka-maka-o-ka-lani did not notice the dagger and died (Wichman 2003:46).

Ka-lua-o-pālena approached his son and stretched out on the ground offering himself as a sacrifice. Palila raised his club, lowered it, rested it on the ground, and leaned on it. The club sank into the ground and as Palila pulled it up, a spring emerged. Hina crossed the field and welcomed Palila. Ka-lua-o-pālena and his army rose, welcoming and thanking Palila. The army turned to the fallen forest where the spring now created a lake, which is still in Kōloa (Wichman 2003:47). Within days a messenger came from the ruling chief of O‘ahu who requested Palila’s help. Palila had many adventures on O‘ahu and Hawai‘i, eventually becoming the ruling chief of Hilo. Hina predicted Palila would eventually reign Hilo, thus naming him after the honeycreeper only found on Hawai‘i island.

3.1.2.7 Weoweopilau Stream

The following is a *mo‘olelo* about the small stream called Weoweopilau, “rotten bigeye fish,” which is on the plains of Kamo‘oioa:

It seems an upland farmer heard that the bigeye fish were running at the beach, so he went down and caught a great number of them. On his way home, an old woman asked him for a few fish but he refused to give her any, saying she could go to the shore and get as many as she wanted. As he continued home, his load of fish became heavier and heavier, the path dustier and dustier, and the sun blazed with heat. When he reached the stream, he put down his fish and plunged in to cool off. When he came out, he smelled that his fish were completely rotten. He then realized that the old lady had been Pele, the volcano goddess, testing his generosity and hospitality. He had been found wanting and was punished. [Wichman 1998:40]

3.2 *Wahi Pana* (Storied Places)

Wahi pana translations presented in this subsection are from *Place Names of Hawaii* (Pukui et al. 1974), unless indicated otherwise. Lloyd Soehren (2013) has lately compiled all the place names from mid-nineteenth century land documents into an online database. He presents spelling and meanings of names from the Pukui et al. book (1974). When no meaning from this book is given, Soehren often suggests meanings for simple names based on meanings from Pukui and Elbert’s (1986) *Hawaiian Dictionary*.

3.2.1 *Makani* (Winds)

Each *ahupua‘a* on Kaua‘i has an associated wind. In the *Legend of Kūapāka‘a*, the hero who controls the wind gourd of La‘amaomao chants the winds of Kaua‘i. For the area, the winds are the following:

The naulu is of Wahiawa.	<i>He naulu ko Wahiawa,</i>
The kuuuanu is of Kalaleo [Kalāheo],	<i>He kuuuanu ko Kalāheo,</i>
The ae is of Lawa‘i,	<i>He ae ko Lawa‘i,</i>
The malanai is of Koloa,	<i>He malanai ko Koloa,</i>
The kuiamanini is of Weliweli,	<i>He kuiamanini o Weliweli,</i>

The makahuena is of Kapea,
 The one-hali is of Manenene,
 The koomakani is of Mahaulepu
 [Fornander 1918:5:96–97]

*He makahuena o Kapea,
 He one-hali ko Manenene,
 He koomakani ko Mahaulepu,*

When the Hawaiian goddess, Pele, traveled to Kaua‘i, she recited the winds of Kaua‘i to her lover Lohi‘au and his people.

Wahiawa has an Unulau wind . . .
 Kalāheo has a Kiuanu wind
 Lāwa‘i has an ‘Aoa wind. . .
 Kōloa has a Holomālani wind. . .
 Hanaka‘ape has an Ulumano wind

*He Unulau ko Wahiawa. . .
 He Kiuanu ko Kalāheo
 He ‘Aoa ko Lāwa‘i. . .
 He Holomālani ko Kōloa. . .
 He Ulumano ko Hanaka‘ape*

The wind of Makahū‘ena [on Ni‘ihau]
 flies, the ocean is white with froth.
 Weliweli has a Kuimanihi wind. . .
 The battling wind is a Kiu,
 surging along the steeps
 The paddle of the fisherman flashes,
 it is stormy
 Pā‘ā has a Makahū‘ena wind
 Māhā‘ulepū has a Pū‘ōkū wind
 [Ho‘oulumāhie 2008a:16–17; Ho‘oulumāhie 2008b:16–17]

*Lele ka makani o Makahū‘ena,
 kuakea ka moana.
 He Kuimanihi ko Weliweli. . .
 He Kiu ka makani paio,
 lele i ka lapa
 ‘Ōlapa ka hoe a ka Lawa‘i‘a,
 he ‘ino
 He Makahū‘ena ko Pā‘ā
 He Pū‘ōkū ko Māhā‘ulepū*

The ‘*Ae* is the northeast tradewind, the *Kiu* is a strong wind breaking across the mountains, *Ku‘anu* (“releasing coldness”) is a strong wind, the *Malanai* is the gently blowing northeast tradewind, *Nāulu* is a sea breeze with heavy mist, *Onehali* was a “sand carrying” sea breeze, and *Ulumano* is a strong wind that blows from the south (Kent 1986:437–443; Pukui and Elbert 1986:289; Wichman 1998:33).

3.2.2 Lāwa‘i *Wahi Pana*

According to Kikuchi (1963:39), the name “*lāwa‘i*” means “the day to end the fishing tapu.” Others believe the name Lāwa‘i comes from “*lawa a‘i*” which means “plenty to eat” or “valley of plenty”. Pukui et al. (1974) do not give a meaning for the name.

The *ahupua‘a* of Lāwa‘i is bounded by the *ahupua‘a* of Kalāheo to the west, Kōloa to the east, the Pacific Ocean to the south, and the Līhu‘e-Kōloa Forest Reserve to the north. The *ahupua‘a* has as its main geographic feature the deeply dissected Lāwa‘i Valley along Lāwa‘i Stream. The west side of the valley is framed by high cliffs, as is the river flood plain. The eastern boundary between Lāwa‘i and Kōloa is across gently sloping terrain with no natural landscape boundary. Most of the Lāwa‘i shoreline is high cliff, except for Lāwa‘i Kai beach at the mouth of Lāwa‘i Valley. Lāwa‘i is separated from Kalāheo on the *mauka* side by the peak Kapōhākau (“placed rock”; Wichman 1998:36) and at the shore by the western end of Halulu Bay (“to roar, thunder,” or named for a legendary man-eating bird; Soehren 2013) at Puehu Point. It then extends along the coast to Lāwa‘i Harbor, which is bound on the east side by the coastal point Kalaeoka‘īwa (“the point of the frigate bird”; Soehren 2013). The next notable place on the coast is Puki Kai o Lāwa‘i, a natural blowhole now called Spouting Horn. The *ahupua‘a* ends on the eastern shore of Kukuiula

Bay near the mouth of Aepo Stream, which is within Kōloa. The boundary with Kōloa extends inland to Palikea (“white cliff”) peak, Pu‘u Kolo, and Kalualea peak.

3.2.2.1 *‘Ili* of Lāwa‘i

Mid-nineteenth century land documents mention ten *‘ili* (smaller land divisions within an *ahupua‘a*) of Lāwa‘i: Haia, Hapaiehu, Ka‘ohe (“the bamboo”), Ke‘eke‘e (“zigzag, angular”; Soehren 2013), Kihakii, Kukuimōkoi, Kuliloli, Mo‘o‘awalu (“*mo‘o* number eight”; Soehren 2013), Papakea, and Pe‘ape‘akuakui.

3.2.2.2 *Heiau* of Lāwa‘i

Three *heiau* are listed for the *ahupua‘a*: Niukapukapu Heiau (Site 72; Bennett 1931:116) on top of Niukapukapu hill, Kalohiokapua Heiau (Site 69; Bennett 1931:116) in Lāwa‘i Valley, destroyed before Bennett’s survey, and Māmālu Heiau (Site 70; Bennett 1931:116) near the mouth of Lāwa‘i Valley, destroyed before the 1930s.

3.2.3 Kōloa *Wahi Pana*

The name Kōloa has several derivations. Kōloa is the name for the large, soft Hawaiian sugarcane (*Saccharum officinarum*) once grown by the Hawaiians; Kōloa is also the name of a steep rock, called Paliokōloa, on the banks of Waikomo Stream, from where the *ahupua‘a* got its name. This bank of the river was called Kōloa, after the native Hawaiian duck (*Anas wyvilliana*) (Kikuchi 1963:46; Pukui et al. 1974:116).

The Kōloa Ahupua‘a is “well watered by constantly flowing streams. Two of these streams, the ‘Ōma‘o, “green,” and Pō-‘ele‘ele, “dark night,” feed the Pīwai (a variety of wild duck) in the area. Where they join, the stream becomes Wai-komo, “entering water,” which flows down the center of the land, bringing life to the drier regions toward the seashore. It is so named because from time to time “the stream disappears for a bit before reappearing farther down the slope” (Wichman 1998:40). The *ahupua‘a* is watered by several other streams: the Aepo, Waihohonu (“deep water;” named for a hole formed when Palila felled a forest of trees with one stroke; Pukui et al. 1974:222), Weliweli, and the Weoweopilau.

Kōloa is bordered by Lāwa‘i Ahupua‘a to the west and Weliweli Ahupua‘a to the east. The boundary with Lāwa‘i ends on the eastern shore of Kukui‘ula Bay near the mouth of Aepo Stream and extends inland to the peaks Pu‘u Kolo and Kāhili, where it extends along the boundary of Hā‘iku Ahupua‘a on the *mauka* side. The northeast corner of the *ahupua‘a* is at Lā‘aukahi (“lone tree”). At the shore, it is separated from Weliweli at a place called Poapoko.

3.2.3.1 *‘Ili* of Kōloa

Sixty-six *‘ili* are listed in mid-nineteenth century land documents, emphasizing the importance of this well-watered *ahupua‘a* and the dense population that it could support. The *‘ili* are Aea, ‘Awikiwiki, Hālāli‘i, Halehinahina, Kaakaupuawa, Ka‘auwailalo (“the lower ditch”; Soehren 2013), Kaauwailuna (“the upper ditch”; Soehren 2013), Kahoai, Kahoana (“the whetstone”), Kahoiwai, Ka‘ili‘ili (“the pebble”), Kalehuaoka‘ele, Kalua‘alamihi, Kamaemae, Kamaloula (“the red loincloth”; Soehren 2013), Kamanomano, Ka‘ōhi‘a (“the ‘ōhi‘a tree”; Soehren 2013), Kāpala‘alaea (“daub of ocher”; Soehren 2013), Kapalakea (a variety of taro; Soehren 2013), Kapalau, Kapo‘o, Kapuna (“the spring”), Kaukahōkū (“the star appears”), Kaulia (“hung, suspended”; Soehren 2013), Kauluolona, Kaunuolono (“the altar of Lono”; Soehren 2013),

Kawailehua, Keaku, Keanakaha'ia, Kekui, Kihinui, Kīkīaola (“container acquired by Ola”), Kioea (“bristle-thighed curlew”; Soehren 2013), Kiona (“Zion, or dung heap, privy”; Soehren 2013), Kōloa Hikina (“east Kōloa”; Soehren 2013), Kōloa Komohana (“west Kōloa”; Soehren 2013), Kualu, Kuunameheala, Lapapōhaku (“stone ridge”; Soehren 2013), Lauuluhaa, Lepoakua, Makapala (“sore beginning to heal”), Mākea (“fallow land, or a variety of *kalo* or *awa*”; Soehren 2013), Malaula, Maneneha'aha'a (“low plantain”), Manini, Ma'uliuli, Mauna Pōhaku, Milohai, 'Ōma'o (“green”), Opuohaku, Palaulalo, Paoa, Pipipi'eu'eu (“lively mollusk, *Theodoxus neglectus*”; Soehren 2013), Poahonu, Pō'ele'ele (“black night”), Pōhakuomakali'i (“stone of Makali'i”; Soehren 2013), Puahehu, Puhaku, Punahelu, Puokahaku, Pu'u Holo, Pu'u o Haku (“Haku hill”; Soehren 2013), Waikomo (“entering water”; Soehren 2013), Wailā'au (sap of plants, or a liquid medicine; Soehren 2013), and Waiohai.

3.2.3.2 Heiau of Kōloa

Five *heiau* are listed in Kōloa: Hō'ai (probably “to feed”; Soehren 2013) (Site 75; Bennett 1931:117) at Kūhiō Park on the west bank of Waikomo Stream, Kānehaule (Site 92; Bennett 1931:122) on the east branch of 'Ōma'o Stream, destroyed before Bennett's 1930s publication, Kāneiolouma (Site 81; Bennett 1931:118) on the shore near Kihouna Heiau (site 80; Bennett 1931:118-119), and Kūhāhāpō (“Kū feeling at night”) at Lae o Kahala.

3.2.3.2.1 Kānehaule Heiau

Located in Kaunuieie, Kōloa, the site occupies the *mauka* portions of the *ahupua'a*, along a small tributary of Omao Stream (Bennett 1931:122). Thrum described the *heiau* as: “A paved walled enclosure of large size, destroyed some time ago: a heiau where the rites of circumcision were performed” (Thrum 1906:36).

3.2.3.2.2 Kāneiolouma Heiau

The *heiau* was first surveyed by Thomas G. Thrum and later published in *The Hawaiian Almanac and Annual* (1907), which documented *heiau* throughout the Hawaiian Islands. Wendell Clark Bennett also surveyed *heiau* on Kaua'i between 1928 and 1929, later documenting and publishing his finds for Bishop Museum (Bennett 1931:3). Kāneiolouma Heiau is located along the shores of Po'ipū near Kihouna Heiau (see Section 3.2.3.2.3). Kāneiolouma, being the larger structure of the two, consists of three large sections and four rooms with limestone slabs in the middle section (Bennett 1931:119). Mary Kawena Pukui offers *mo'olelo* on the structure below:

O Olouma kekahi haiau, aia no i Koloa, Kauai, mauka ae o Hooleina-ka-puaa, he loko mauka o na hale, a o ka haiau iho e pili pu ana, o Kiha no ke alii nona ia haiau. He unu hai puua i-a ula a pela aku. O lonoikaoualii ke alii, o Wakea ke kahuna, mai Oahu mai ka pohaku i hana ia ai o ka haiau na ka menehune i hana.

Louma was another heiau, which also stood in southern Koloa on the mountainward side of Ho'oleina-ka-puaa (Place-to-throw-in-the-pig), a pond on the mountainward side of the houses. The heiau was close by. Kiha was the chief to whom it belonged. It was a heiau in which hogs, red fishes etc. were offered. Lonoikaouali'i was the chief and Wakea was the priest who brought the stones from Oahu. The menehune built the heiau. [Pukui 1936]

3.2.3.2.3 *Kihouna Heiau*

This *heiau* sits near Kāneiolouma Heiau also located on the shores of Po'ipū. The single walled enclosed *heiau* consists of walls measuring 4 to 6 ft in height (Bennett 1931:118–119).

Kihouna Heiau, which is also spelled Kihahouna, is 100 feet by 125 feet and is believed to have been dedicated to fishing and agricultural deities. The walled structure had virtually disappeared until it was reconstructed in 1984. [Friends of the Koloa Community 1985:22]

3.2.3.2.4 *Maulili Heiau*

Evidence of a rich history within Kōloa is offered in a Lahainaluna document. This document appears to be based on an oral historical project. On 7 September 1885 a student from Lahainaluna Schools (HMS 43 #17) interviewed Makea—"a native who is well acquainted with Koloa"—and recorded "what she said about the well-known places in the olden times." More than 64 years after the abolition of the *kapu* (taboo, prohibition) system and almost as many years of contact with westerners, Makea could describe in detail 14 *heiau* within the Kōloa area, for example:

Maulili was the first *heiau* of south Kōloa. Kapulauki was the first chief of Kōloa, Kiha came next. That is the chief I know of. He was a ruling chief of Kaua'i in the olden days, when the *heiau* was standing there. It had already been built and men had been sacrificed on its altars. This Kiha was called Kiha-of-the-luxuriant-hair. Another name for him was Kakae and another was Ka-pueo-maka-walu (Right-eyed-owl).

This *heiau* was also famous for this reason—it was the first *heiau* to which Kawelo was carried after he had swooned in Wahiawa, in the battle where stones were used as missiles.

The location of this *heiau* was not known, but a deaf mute knew and it was he who pointed it out to the chiefs, and that is how it was rediscovered in the olden days. Kiha lived on the eastern side of the *heiau* and 'Aikanaka lived on the northeastern side. Aikanaka, was the one with whom Kawelo fought and he was the owner of this *heiau* at that time. [Lahainaluna School 1885:165]

3.3 'Ōlelo No'eau (Hawaiian Proverbs)

Mary Kawena Pukui is known as one of the greatest contributors to the preservation of the Hawaiian language, a scholar, and ethnographer. Hawaiian knowledge was shared by way of oral history and many often competed in poetic battles of wit to see who could ascribe the most *kaona* (layered hidden meaning) to the simplest phrase. The following section draws from Pukui's knowledge of Hawaiian folk tales, proverbs, and sayings to describe the 'āina (land) in the project area. The 'ōlelo no'eau is first described, followed by the Hawaiian phrase and English translation.

3.3.1 'Ōlelo No'eau #47

The proverb uses a play on words to express the feeling of drunkenness.

Aia i Kōloa.

Is at Kōloa.

A play on *kō* (drawn) and *loa* (long)—drawn a long way under. Drunk. [Pukui 1983:8]

Section 4 Traditional and Historical Accounts

4.1 Pre-Contact and Early Historic Period

4.1.1 Pre-Contact

Chronological analysis from Kōloa and the two neighboring *ahupua‘a*, Pā‘ā and Weliweli, suggests an early initial occupation within the Kōloa District of ca. AD 535 (Walker and Rosendahl 1990:131). Initial occupation probably was characterized by temporary and/or recurrent occupation. From AD 600-1400, settlements in the Kōloa area were still limited to the coast. By AD 1040, lava tubes were used for burial and temporary habitation in the inland areas of Kōloa (Hammatt et al. 1999:7).

However, it should be noted that recent analysis of radiocarbon dates in Hawai‘i suggest more consensus for colonization of the Hawaiian Archipelago between AD 750 and AD 1000 (Rieth and Cochrane 2015). Also, “Paleoenvironmental sequences from O‘ahu and Kaua‘i have recorded vegetation change and increases in microscopic charcoal consistent with human activities between ~1050 and 850 cal. B.P. [~AD 900 and 1100]” (Rieth and Cochrane 2015:9). (All dates from the individual analyses as cited have not been independently verified or validated during the background research process and should be understood as provisory.)

One Hawaiian tradition says the islands of Hawai‘i were first settled by the chief Punanuikaianaina, who came to the Puna District of Kaua‘i from the Marquesas around AD 1000 to 1100 (Fornander 1996:45–46). The early settlers of the Hawaiian archipelago would have been especially attracted to the windward side of Kaua‘i, which boasted large river valleys supporting a vast inland region of irrigated pondfields for *kalo* (taro; *Colocasia esculenta*) cultivation that became the agricultural core of Kaua‘i. The greatest of these river valleys were around Wailua and Hanamā‘ulu streams. This area was richly endowed with agricultural wealth and was a major residential and religious center for the nobility (Kirch 2010:171). A number of prominent *heiau* and a sacred birthing site were located in the central Wailua area (Bennett 1931:125–128). In approximately AD 1450 (a time estimate based on an average length of generational intervals in chiefly genealogies), the Kaua‘i *ali‘i* (chief) Manokalanipō is credited “for the energy and wisdom with which he encouraged agriculture and industry, executed long and difficult works of irrigation, and thus brought fields of wilderness under cultivation” (Fornander 1996:93).

On the island of O‘ahu in approximately AD 1490, the *‘aha ali‘i* (council of chiefs) chose Mā‘ilikūhahi, an *ali‘i kapu* (sacred chief) who was born at the sacred site of Kūkaniloko in the uplands of Waialua, to be the new *ali‘i nui* (paramount chief) of O‘ahu. After his paramountship was installed at the *heiau* of Kapukapuākea in central Waialua, Mā‘ilikūhahi instituted an explicit land division and administration structure (Kirch 2010:84–90). Although Kaua‘i remained politically independent during this time period, a hierarchical land system was imposed.

4.1.2 Early Historic Period

The first written accounts of Kaua‘i are from travelers, missionaries, and surveying expeditions. Missionary accounts of the first half of the nineteenth century provide the majority of the early written records for this particular part of Kaua‘i. The earliest explorers, like Cook and Vancouver, used Waimea for anchorage and victualing, with no mention made of Kōloa or Lāwa‘i.

However, their descriptions of well maintained, watered agricultural systems on this dry leeward coast are echoed in the early descriptions of Kōloa. Cook notes, “What we saw of their agriculture, furnished sufficient proofs that they are not novices in that art. The vale ground has already been mentioned as one continuous plantation of taro, and a few other things, which all have the appearance of being well tended to” (Cook 1784:244). Vancouver’s description records “the low country which stretches from the foot of the mountains toward the sea, occupied principally with the taro plant . . . interspersed with some sugar-cane of luxuriant growth and some sweet potatoes” (Vancouver 1798: 170).

Damon (1931:401) wrote about Bingham’s 1824 observations from his memoir, *A Residence of Twenty-One Years in the Sandwich Islands*, published in 1847. Damon relates Rev. Hiram Bingham’s accounts after travelling east from Hanapēpē, taking in a fertile land he described as “mostly open, unoccupied and covered with grass, sprinkled with trees, and watered with lively streams that descend from the forest-covered mountains and wind their way along ravines to the sea,—a much finer country than the western part of the island.”

The earliest documentation of Kōloa district population appears in the 1850s when missionary censuses recorded a total population of 1,296 (Schmitt 1977:12). A population distribution map by Coulter (1931) (Figure 7) indicates the population of Kaua’i ca. 1853 “was concentrated chiefly on the lower flood plains and delta plains of rivers where wet land taro was raised on the rich alluvial soil” (Coulter 1931:14).

The area about Koloa in the southeast was also well populated. Koloa was a port of call for whaling vessels ‘to recruit for the Polar Seas.’ There ‘calabashes of poi, raw fish, bunches of bananas, and bundles of sugar cane . . . [were] offered for sale to the foreigner.’ There was a sugar cane plantation of 2,000 acres in this district, the proprietor of which ‘was realizing at least one ton per acre of capital sugar.’ Tidal flats in this vicinity were used for, evaporating sea water to obtain salt. [Coulter 1931:15–16]

By 1872, the population of Kōloa bottomed out at 833, and then began steadily increasing to 1,500 in 1884, 1,835 in 1896 and 4,564 by 1900 (Schmitt 1977:13).

Handy and Handy (1972:152) note that in the early post-Contact period (post-1778), the leeward coast from Waimea to Wailua (including Kōloa) was noted for the inland plantations of breadfruit, bananas grown along the gulches, sweet potatoes and yams grown in the uplands and valleys, and extensive taro terraces throughout the *ahupua’a*. On Kaua’i, the favored places for coconuts were Kōloa and Lāwa’i (Handy 1940:193). Handy (1940) states:

Upland kula [plain] lands that were famous for their sweet potatoes were Kukuiolono above Lāwa’i (the present park covering the McBride [*sic*] estate) and the elevated kula lands east of Wahiawa Stream. I was unable to obtain any information as to the uplands of Kalihi and Kilauea, but this and much of the kula land from here to Kealia is the same type of terrain and presumably was once used to some extent for growing sweet potatoes by taro planters in these districts. A kamaaina [native born] of Wahiawa says that inland of the cliff named Kawaikapuluna, the people used to have taro patches in the gulch, while their houses and potato patches were on the kula land above, bordering the gulch on either side. I was told this arrangement was typical also of Nawiliwili, and

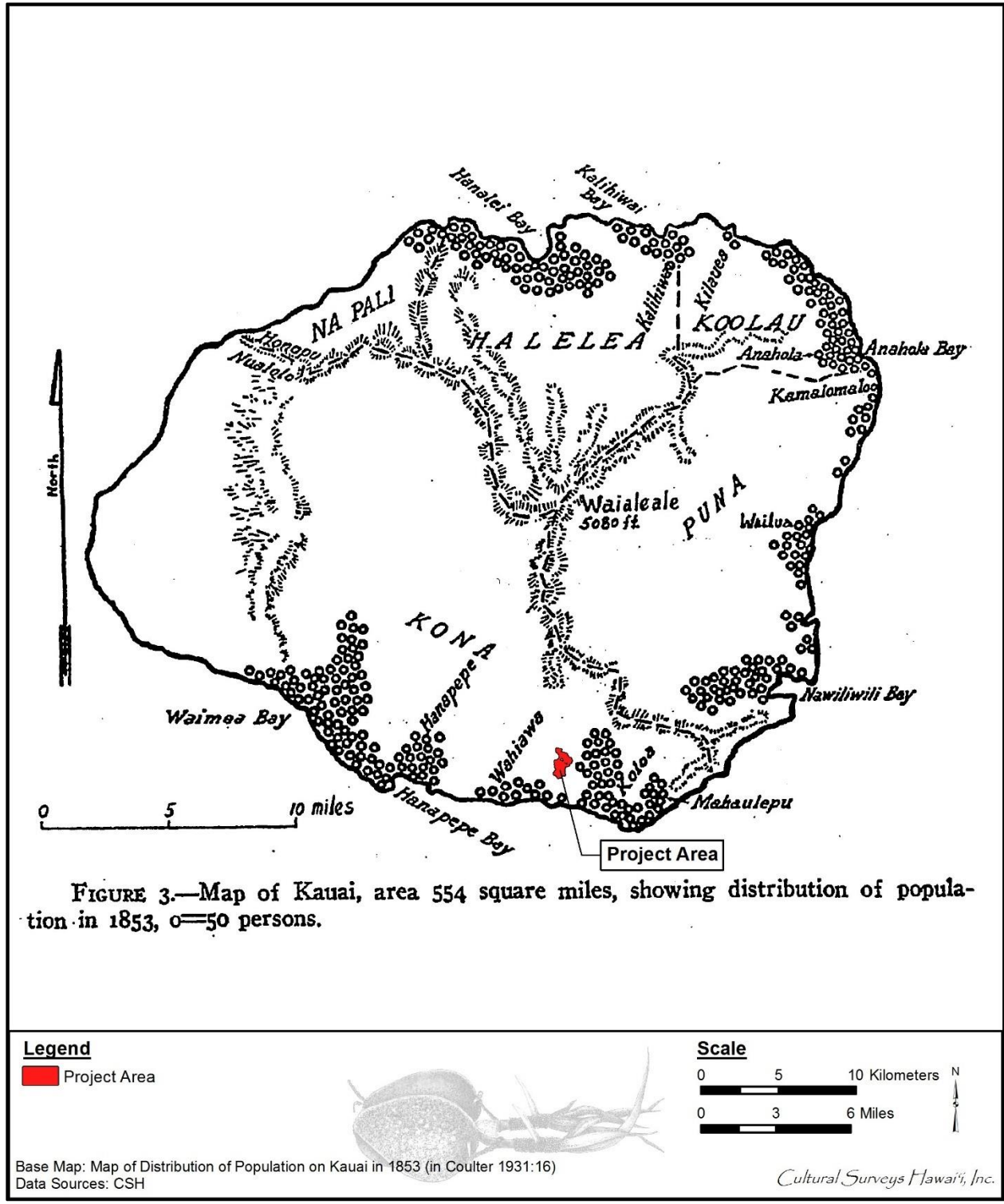


Figure 7. Map showing population estimate for Kaua'i in 1853 (in Coulter 1931:16)

presumably also of Hanamaulu, Hanapēpē, Makaweli, and Waimea in the lower sections of their canyons [Handy 1940:154]

4.1.2.1 Lāwa‘i

In Handy’s survey of agricultural remnants in Lāwa‘i, he found a few taro patches on flats near the sea, and also abandoned *lo‘i* (irrigated terrace) on terraces along lower Lāwa‘i Stream (Handy 1940:66), suggesting dryland agriculture along the coast and irrigated taro cultivation along the lower slopes of the Lāwa‘i Stream. He could not find any terraces along the upper reaches of the stream, even though there was flat land that could have been utilized (Handy 1940:65).

4.1.2.2 Kōloa

In the pre- and early post-Contact periods, Kōloa had a field system that covered much of the coastal plain, fed by its many streams and a complex of terraces and ditches (Handy 1940:65).

A dispute over the northern boundary of Kōloa Ahupua‘a in 1874 led to a hearing before Duncan McBryde, the Commissioner of Boundaries for Kaua‘i. One native witness, Nao (who describes himself as born in Kōloa but presently living in Ha‘ikū), in order to show that Hoaea (the area in dispute) was indeed at the northern boundary of Kōloa, testifies: “At Hoaea tea [*sic*] leaves were hung up to show that there were battles going on” (Boundary Commission, Kaua‘i, 1874:1:124). That there was a traditional “warning system”—well-known to all natives—suggests that Kōloa, throughout its history, may well have been the scene of some serious conflicts—serious enough and perhaps often enough to warrant devising such a system.

Bernice Judd, writing in 1935, summarized most of what was known of the traditional Hawaiian life of Kōloa before the advent of large-scale sugar cultivation:

In the old days two large ‘auwai or ditches left the southern end of the Maulili pool to supply the taro patches to the east and west. On the kuāunas [embankments] the natives grew bananas and sugar cane for convenience in irrigating. Along the coast they had fish ponds and salt pans, ruins of which are still to be seen. Their dry land farming was done on the kula (dry land), where they raised sweet potatoes, of which both the tubers and the leaves were good to eat. The Hawaiians planted pia (arrowroot) as well as wauke (paper mulberry) in patches in the hills wherever they would grow naturally with but little cultivation. In the uplands they also gathered the leaves of the hala (screwpine) for mats and the nuts of the *kukui* (candlenut) for light. [Judd 1935:53]

By the early 1800s, Kōloa Landing had become the principal port of Kaua‘i. Shipments of North American furs and pelts to Asia depended on the provisioning of ships at Kōloa Landing, as well as other Hawaiian ports. As the fur trade grew, markets in China became aware of sandalwood grown in the Hawaiian Islands. The shipment of most of Kaua‘i’s sandalwood to Asia took place at Kōloa Landing, until the supply of the fragrant wood was exhausted around 1830 (Donohugh 2001:63–64).

Accounts by visitors and settlers at Kōloa focused on the early westerners’ own concerns—religious and commercial—as these issues appeared within the historical record of Kōloa in the 1800s. However, scattered throughout the accounts are occasional references to the Hawaiians of Kōloa that may give some insight into their lives.

The American Board of Commissioners for Foreign Missions (ABCFM) missionary Samuel Whitney, in an article in the *Missionary Herald* (June 1827:12), described a visit to Kōloa with Kaikio'ewa, the governor of Kaua'i, in 1826:

The people of this place were collected in front of the house where the old chief lodged in order to hear his instructions. After a ceremony of shaking hands with men, women, and children they retired . . .

Our company consisted of more than a hundred persons of all ranks. The wife of the chief, with her train of female attendants, went before. The governor, seated on a large white mule with a Spaniard to lead him, and myself by his side, followed next. A large company of aipupu ['ā'īpu'upu'u; stewards], cooks, attendants came on in the rear. [*Missionary Herald* 1827:12]

Whitney's account suggests something of the esteem by which the local populations held the *ali'i* and the scale at which the *ali'i* carried out their functions. An even grander view of that esteem was provided in an account of a later visit by an *ali'i* to Kōloa. John Townsend, a naturalist staying in Kōloa in 1834, described a visit by Kamehameha III (Palama and Stauder 1973):

In the afternoon, the natives from all parts of the island began to flock to the king's temporary residence. The petty chiefs, and head men of the villages, were mounted upon all sorts of horses from the high-headed and high-mettled California steed, to the shaggy and diminutive poney [*sic*] raised on their natives hills; men, women, and children were running on foot, laden with pigs, calabashes of *Poe* [*sic*], and every production of the soil; and though last certainly not least, in the evening there came the troops of the island, with fife and drum, and 'tinkling cymbal' to form a body guard for his majesty, the king. Little houses were put up all around the vicinity, and thatched in an incredibly short space of time, and when Mr. Nuttall, and myself visited the royal mansion, after nightfall, we found the whole neighborhood metamorphosed; a beautiful little village had sprung up as by magic, and the retired studio of the naturalists had been transformed into a royal banquet hall. [Palama and Stauder 1973:18]

In 1835, Thomas Nuttall and John K. Townsend, two American naturalists, visited the Kōloa area. They noted "fields of taro, yam, and maize (possibly sugarcane), irrigation networks and sweet potato patches in the dryer areas" (Townsend 1839:206).

On 31 December 1834, Peter Gulick and his family arrived in Kōloa. Apparently the first foreigners to settle in the *ahupua'a*, they initiated the process of rapid change that reshaped the life of Kōloa in the nineteenth century. In 1835, a 30 by 60 ft grass house was erected as a meeting-house and school near the Maulili Pond. Mr. Gulick cultivated sugarcane and collected a cattle herd for the Protestant Mission. In 1837, a 45 by 90 ft adobe church was built where Kōloa Church stands today, and the first mission doctor, Thomas Lafon, arrived to assist Mr. Gulick (Damon 1931:179, 187). The Kōloa mission station apparently flourished immediately. Navy Lieutenant Charles Wilkes, a member of the U.S. Exploring Expedition, during his visit to Kōloa in 1840 recorded the following:

The population in 1840, was one thousand three hundred and forty-eight. There is a church with one hundred and twenty-six members, but no schools. The teachers

set apart for this service were employed by the chiefs, who frequently make use of them to keep their accounts, gather in their taxes &c. The population is here again increasing partly by immigration, whence it was difficult to ascertain its ratio. [Wilkes 1845:64]

Other sources, however, give different population figures for Kōloa during the first half of the nineteenth century. In 1834, according to a report by missionaries on Kaua'i, the inhabitants of the *ahupua'a* numbered 2,166. An article in the *Pacific Commercial Advertiser* 21 December 1867 estimated the population in 1838 was about 3,000 (though, by 1867, it had been reduced to a third of that number). James Jackson Jarves, who visited Kōloa and Kaua'i for nine months during the early 1840s, recorded the following:

Kōloa is now a flourishing village. A number of neat cottages, prettily situated amid shrubbery have sprung up, within two years past. The population of the place, also, has been constantly increasing, by emigration from other parts of the island. Its numbers, now, about two thousand people, including many foreigners, among whom are stationed a missionary preacher, and physician, with their families. [Jarves 1844:100]

Kōloa Village and Kōloa Landing, at the mouth of the Waikomo Stream, became flourishing commercial centers as trade with Americans and Europeans grew. An estimate in 1857 stated that "10,000 barrels of sweet potatoes were grown each year at Koloa, and that the crop furnished nearly all the potatoes sent to California from Hawaii" (Judd 1935:326). Sugar and molasses were also chief articles of export. Whalers used the Kōloa "Roadstead" from 1830 to 1870, and took on provisions of squashes (pumpkins), salt beef, pigs, and cattle (Damon 1931:176). Hawaiians grew the pumpkins on the rocky land north of the landing. There were also numerous salt pans along the shore near the landing used to make salt (Palama and Stauder 1973:20).

Another major area of commercial enterprise was associated with the whaling industry at Kōloa Landing. Accounts of visitors suggest the inhabitants of Kōloa took advantage of their nearness to the landing to participate in the booming trade of the port. An article in the *Pacific Commercial Advertiser* 19 February 1857 described the salient characteristics of the port at mid-century and mentions the following:

The anchorage is an open roadstead, the tradewind blowing along and a little off shore. During the prevalence of trade it is safe for ships to anchor, but they rarely do so, preferring to procure their supplies 'lying off and on'. The anchorage for schooners is close to shore, in four to six fathoms of water, where it is somewhat sheltered from the wind by a bluff. Owing to the force of the swell and the suddenness which the south wind sweeps around the head lands of the island, and the want of proper buoys, a number of coasting vessels have been wrecked of late years in this port. For the trade of the port there is a small rude pier constructed which might be improved at no greater outlay of labor. From the landing there is a good carriage road to the town, distant about two miles. Large quantities of firewood, bullocks and sweet potatoes are furnished to whalers in this port, and these chattels can no where be procured cheaper or better. It is estimated that 10,000 barrels of sweet potatoes are cultivated annually here, which are thought to be the best on the islands. Nearly all the potatoes furnished for the California market are

produced here . . . Sweet potatoes, sugar and molasses constitute the chief trade of the port. [*Pacific Commercial Advertiser* 19 February 1857]

Kōloa became the official port of entry for Kaua'i in the 1850s and participated in the profitable whaling industry trade whose peak years ran from the 1830s to the 1860s.

4.2 The Māhele and Kuleana Act

In 1845, the Board of Commissioners to Quiet Land Titles, also called the Land Commission, was established “for the investigation and final ascertainment or rejection of all claims of private individuals, whether natives or foreigners, to any landed property” (Chinen 1958:8). This led to the Māhele, the division of lands among the king of Hawai'i, the *ali'i*, and the common people, which introduced the concept of private property into Hawaiian society. In 1848, Kamehameha III divided the land into four divisions: Crown Lands reserved for himself and the royal house; Government Lands set aside to generate revenue for the government; Konohiki Lands claimed by *ali'i* and their *konohiki* (supervisors); and *kuleana* (native land rights), habitation and agricultural plots claimed by the common people (Chinen 1958:8–15).

Upon the confirmation of a land claim, the *ali'i* were required to pay a commutation fee to the government. This commutation (meaning a substitution of one form of payment or charge for another) could be satisfied with a cash payment or the return of land of equal value. This payment was usually one-third of the value of the unimproved land at the date of the award (Chinen 1958:9–12). The *ali'i* usually retained some of the land they were awarded and then returned some of the land to pay the commutation fee. The returned land usually became Government Land. In 1851, Government Lands became available for purchase “in lots of from one to fifty acres in fee simple, to residents only, at a minimum price of fifty cents per acre” (Interior Department 1882:23). These costs did not include the survey fee, which was to be paid by the interested buyer.

Under the Kuleana Act of 1850, the *maka'āinana* (commoners) were required to file their claims with the Land Commission within a specified time period in order to apply for fee-simple title to their lands. The claim could only be filed after the claimant arranged and paid for a survey, and two witnesses testified that they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land since 1839, and knew that no one had challenged the claim. Then, the *maka'āinana* could present their claims to the Land Commission to receive their Land Commission Award (LCA) (Kame'elehiwa 1992).

Not everyone who was eligible to apply for *kuleana* lands did so and not all of the claims were awarded. Some claimants failed to follow through and come before the Land Commission, some did not produce two witnesses, and some did not get their land surveyed. In addition, some *maka'āinana* may have been reluctant to claim *'āina* that had been traditionally controlled by their *ali'i*, some may have not been familiar with the concept of private land ownership, and some may have not known about the Māhele, the process of making claims (which required a survey), or the strict deadline for making claims. Further, the Land Commission was comprised largely of foreign missionaries, so the small number of claimants and awards may reflect only those *maka'āinana* who were in good standing with the church. Significantly, the surveying of land was not standardized (Kame'elehiwa 1992:296–297).

A total of 14,195 claims were filed and 8,421 awards were approved to about 29% of the 29,220 adult Native Hawaiian males living at the time of the Māhele, averaging 3 acres each

(Kame‘eleihiwa 1992:295). Out of the potential 2,500,000 acres of Crown and Government lands, 28,658 acres of land were awarded to the *maka‘āinana*, less than 1% of the total acreage of Hawai‘i (Kame‘eleihiwa 1992:295). The small number of *kuleana* awards and their small size prevented the *maka‘āinana* from maintaining their independent subsistence, often forcing them to abandon their newly acquired property (Chinen 1958:32).

Although many Hawaiians did not submit or follow through on claims for their lands, the distribution and written testimonies of LCAs provides insight into patterns of residence and agriculture. Many of these patterns probably had existed for centuries. By examining the patterns of *kuleana* LCA parcels, insight can be gained into the likely intensity and nature of Hawaiian activity in the area at the time.

4.2.1 Lāwa‘i LCAs

In the period of the Māhele and *kuleana* claims (1848-1853), the *ahupua‘a* of Lāwa‘i was granted to James Young Kanehoa in a Māhele Award (M.A. 43) (Table 1). Kanehoa was born ca. 1798, the son of John Olohana Young (the seaman who had settled on Hawai‘i Island under the protection of Kamehameha I and who became the first foreign advisor to King Kamehameha I) and his first wife, Nāmokuelua. When Kanehoa died in 1851 he bequeathed his land of Lāwa‘i to “my married wife Hikoni,” and in a second will written a week later he bequeathed to his niece, Emma (daughter of his half-sister Fanny Kekelaokalani Young), one-third of Lāwa‘i and two-thirds of Lāwa‘i to George Davis (Junior, son of George Hueu Davis). The court refused both wills and John Young Jr. was appointed administrator of the estate (Barrère 1994:245–247). John Young’s widow Hikoni received the land, and later deeded the entire *ahupua‘a* to Queen Emma.

In 1876, Queen Emma leased the land of Lāwa‘i to Duncan McBryde for 15 years, though she reserved a house lot and several acres of taro patch land. McBryde developed roads and other infrastructure. In 1886, after the Queen’s death, Mrs. Elizabeth McBryde bought the entire *ahupua‘a* for \$50,000. The upper lands were planted in sugarcane, and the valley was leased to Chinese rice growers and taro planters (Donohugh 2001:99–100).

Five *kuleana* Land Commission Awards were recorded in Lāwa‘i Ahupua‘a (Figure 8). None of the parcels associated with these LCAs are located within the Lāwa‘i Solar project area. All five of the awarded *kuleana* claims were along Lāwa‘i Stream. In the lower valley, two of the five awards (LCAs 3414 and 3417) had house lots at the shore.

4.2.2 Kōloa LCAs

In the early post-Contact period, the *ahupua‘a* of Kōloa was controlled by the ruling chief of Kaua‘i and was administered by lesser chiefs appointed by him. When Ka-umu-ali-i, last of the ruling chiefs of the island, died in 1824, his lands (Kaua‘i and Ni‘ihau) were given to the lineal descendants of Kamehameha. Queen Ka‘ahumanu redistributed the lands among chiefs of other islands who had been loyal to the bloodline of Kamehameha. Kōloa Ahupua‘a, totaling 8,620 acres, was awarded to Moses Kekūāiwa (LCA 7714-B), the brother of Alexander Liholiho (Kamehameha IV), Lot Kapuāiwa (Kamehameha V), and Victoria Kamāmalu. The awarding of the *ahupua‘a* to Kekūāiwa was an outcome of an event 25 years in the past: the crushing—by forces loyal to Kamehameha II—of the 1824 revolt on Kaua‘i, when Kaua‘i lands were divided up among the chiefs of the other islands. The next largest award in the *ahupua‘a* went to the Protestant Mission (ABCFM) (LCA 387) and consisted of approximately 825 acres. The majority of the

Table 1. List of LCAs in the vicinity of the Lāwa'i Solar project

LCA #	Claimant	'Ili	Ahupua'a	Land Use	Description
8518-B (Royal Patent: 4512, Māhele Award: 43)	James Young Kanehoa		Lāwa'i	Lāwai Kai consisted of <i>lo'i</i> and a fishpond; a house located on the upper lands (Kanahele 1999:245–246)	Entire <i>ahupua'a</i> ; divided into three areas: the seashore area, the valley feed by Lāwa'i Stream, and the upper lands or bluffs (Kanahele 1999:245)
3414 (Royal Patent: 6143)	Levi	Pakekea	Lāwa'i	House lot, two <i>lo'i</i>	Two ' <i>āpana</i> (lot); 0.75 acres; 24 rods
3417 (Royal Patent: 3412)	Pahuiki	Papakea	Lāwa'i	House lot, three <i>lo'i</i>	Two ' <i>āpana</i> ; 0.90 acres
3612	Kahookahi	Kaohe	Lāwa'i	Twelve <i>lo'i</i> and <i>kula</i>	One ' <i>āpana</i> ; 4 acres, one rood
8054	Ehu	Haia	Lāwa'i	<i>Kula</i> , 12 <i>lo'i</i>	One ' <i>āpana</i> ; 1 acre; 3 rods
9188 (Land Patent 8111)	Kamakahookai	Papkea	Lāwa'i	House lot, <i>kula</i> (pig enclosure), and six <i>lo'i</i>	One ' <i>āpana</i> ; 21.5 acres, 17 rods; two ' <i>āpana</i> ; 1 rood, 33 rods
387 (Royal Patents: 1936, 1938, 1942, 1958, 1600)	American Board of Missions (ABCFM)	Kamalaula	Kōloa	Not available	Fourteen ' <i>āpana</i> ; 825.35 acres
7714-B (Royal Patent: 6714)	Moses Kekuaiwa		Kōloa	Not available	Approx. 8,620 acres awarded to Kekuaiwa
3026	Elemakule II	Pua	Kōloa	House lot, four <i>lo'i</i>	Two ' <i>āpana</i> ; 1 rood; 39 rods
6570	Awahua	Peapeakuakua	Kalāheo	<i>Kula</i> , 20 <i>lo'i</i> , house lot	One ' <i>āpana</i> ; 4 acres; 1 rood; 20 rods

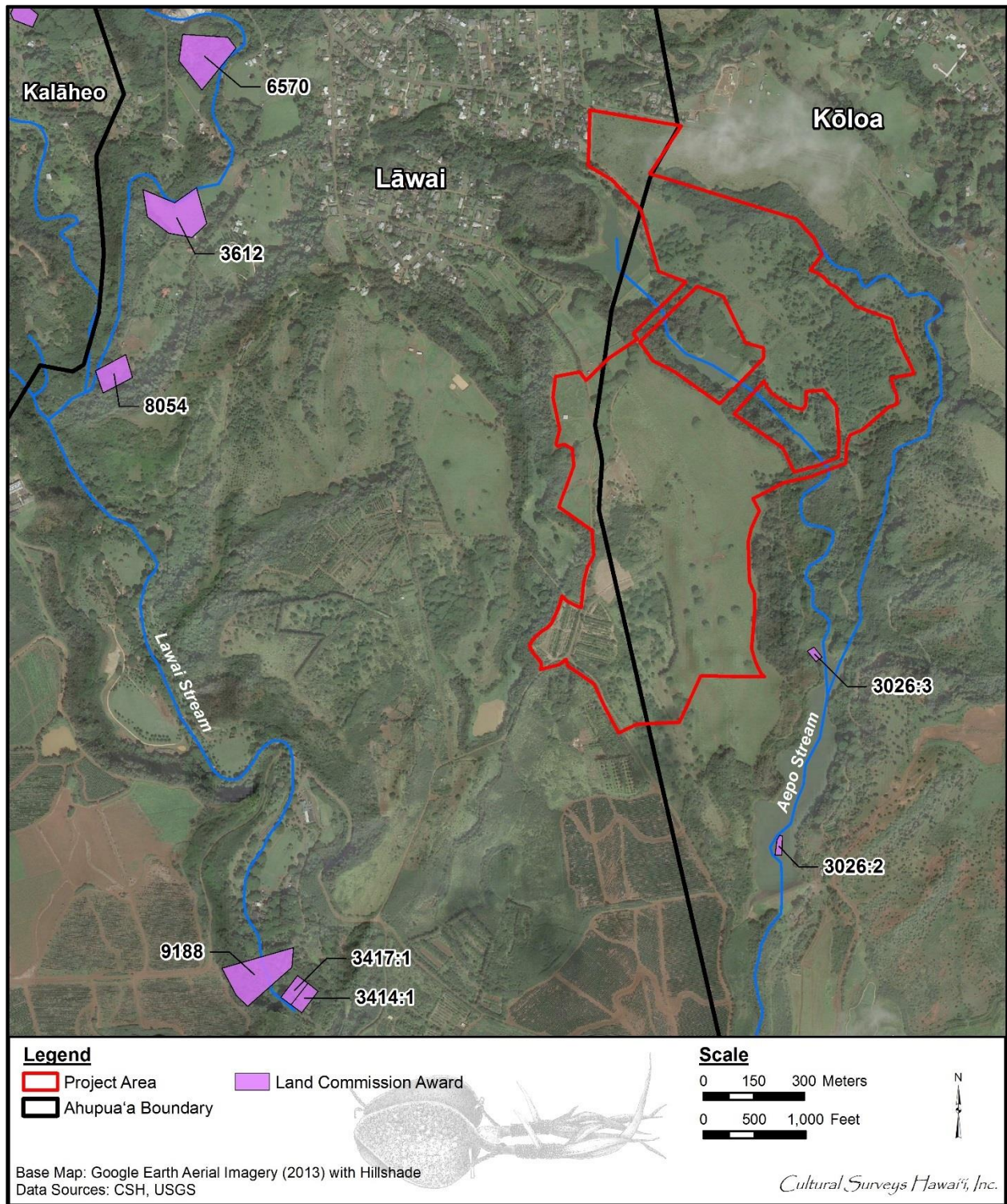


Figure 8. 2013 Google Earth aerial photograph, showing LCAs in the vicinity of the Lāwa'i Solar project area

mission lands were located in the vicinity of Kōloa Town, where the parsonage was located. Large parcels just *mauka* of Kōloa Town were utilized for sugarcane cultivation and cattle pasture.

Eighty-nine *kuleana* awards were given to individuals within Kōloa Ahupua‘a. The majority of these LCAs were located in and around Kōloa Town itself. This concentration of awards around the town area may reflect both the traditional land settlement pattern, a focus on the resources of Maulili Pool and Waikomo Stream (a permanent stream), and a more recent movement of the populace to the plantation and missionary centers.

Testimonies provided to the Land Commission by applicants of LCAs 3584, 6309, and 6667 were generally limited to stating the boundaries of their claimed lands as well as land use. All three LCAs are indicated as being enclosed by stone walls and note the presence of additional house lots and *lo‘i* of other claimants in the vicinity. Of particular interest are the stated boundaries of LCA 6309, which indicated the presence of pasture lands immediately *puna* (east) of the LCA. This may explain the presence of numerous stone walls described in the land claims. These walls are likely cattle barriers used to keep cattle out of house lots and agricultural plots.

A review of LCA records indicates land usage and activity by the mid-nineteenth century included habitation, cattle ranching, and agriculture, including the cultivation of taro, sugar, potatoes, and yams. This may reflect the continuation of traditional Hawaiian land use.

No parcels associated with LCAs are located within the Lāwa‘i Solar project area. The locations of the LCA 3026 parcels near the Lāwa‘i Solar project area are shown on a 2013 Google Earth aerial photograph (see Figure 8). Table 1 presents information on the LCA awards of Lāwa‘i and Kōloa Ahupua‘a, sourced from LCA documents.

4.3 Mid- to Late 1800s

4.3.1 Historic Documents

4.3.1.1 Lāwa‘i

The combined map of 1896 Lāwa‘i and 1891 Kōloa shows landscape features in the Lāwa‘i Solar project area during the 1890s (Figure 9). Within the Lāwa‘i Ahupua‘a portion of the project area, the only identified features are Queen Emma’s residence, “Maunakilohana,” and the road running from Lāwa‘i Kai to Kōloa (Figure 10).

4.3.1.1.1 *Queen Emma*

The *ahupua‘a* of Lāwa‘i was granted to James Young Kanehoa at the mid-nineteenth century Māhele. Following Kanehoa’s death in 1851, the *ahupua‘a* was inherited by his widow, Hikoni. Kanehoa was the uncle of Queen Emma, wife of Alexander Liholiho, King Kamehameha IV. In 1856, the king and queen arrived in Kōloa and stayed for three days during a royal tour of the Hawaiian Kingdom. The royal party visited Spouting Horn on the eastern shore of Lāwa‘i Ahupua‘a. They may have traveled through or *makai* (toward the sea) of the Kukui‘ula Community Development area to get to Spouting Horn from Kōloa Town (Figure 11).

There is no record of any further visits to Kōloa by the king or queen during Liholiho’s reign. However, in 1870, following Liholiho’s death in 1863, the Dowager Queen Emma had a residence built for herself in Lāwa‘i Ahupua‘a, on a bluff east of Lāwa‘i Kai. The 1896 map by Monsarrat indicates the residence was located within the western, Lāwa‘i Ahupua‘a portion of the Kukui‘ula Community Development area. The queen and her party arrived at Kōloa landing on 21 December

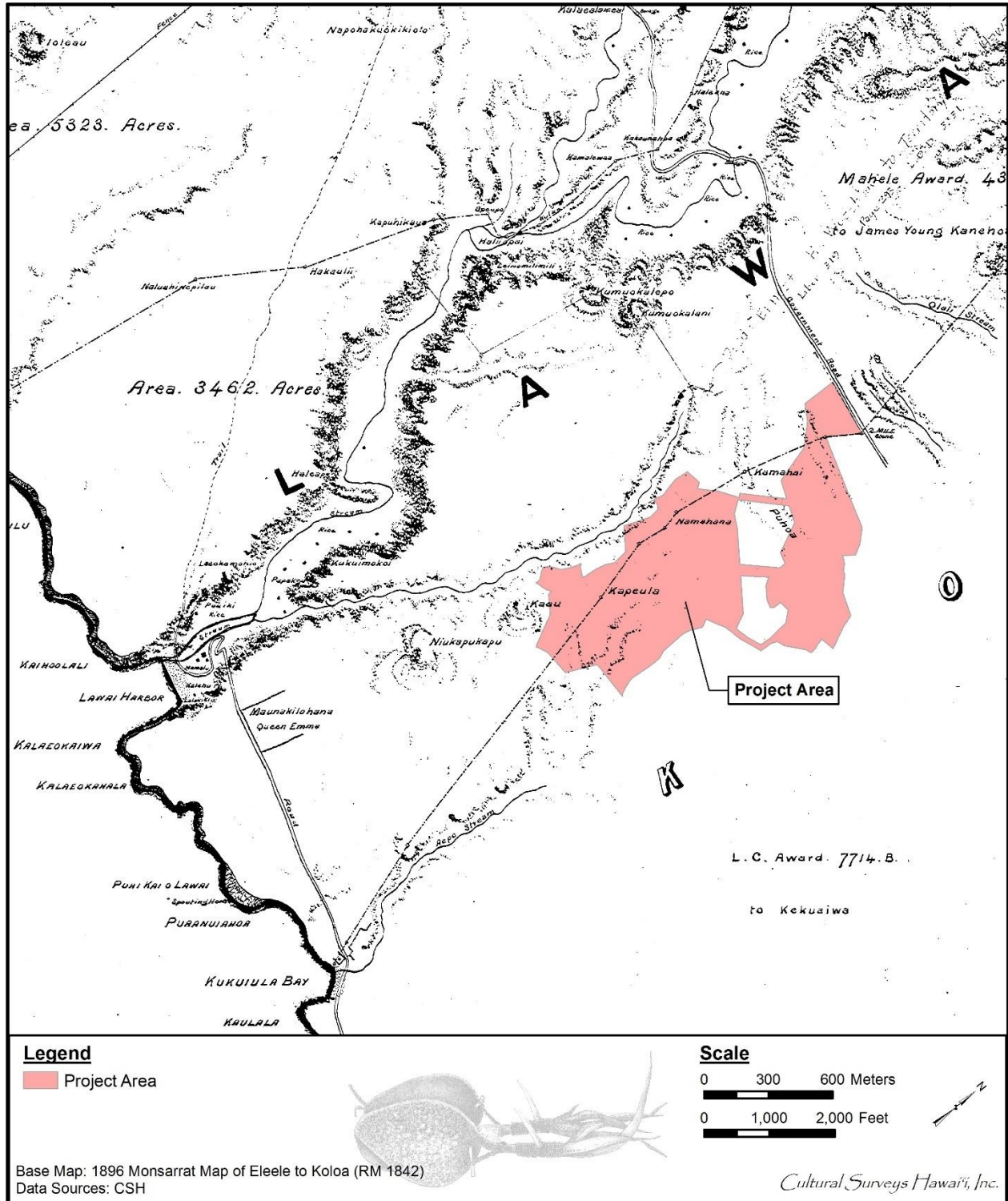


Figure 9. 1896 Monsarrat map of 'Ele'ele to Kōloa with project area in red

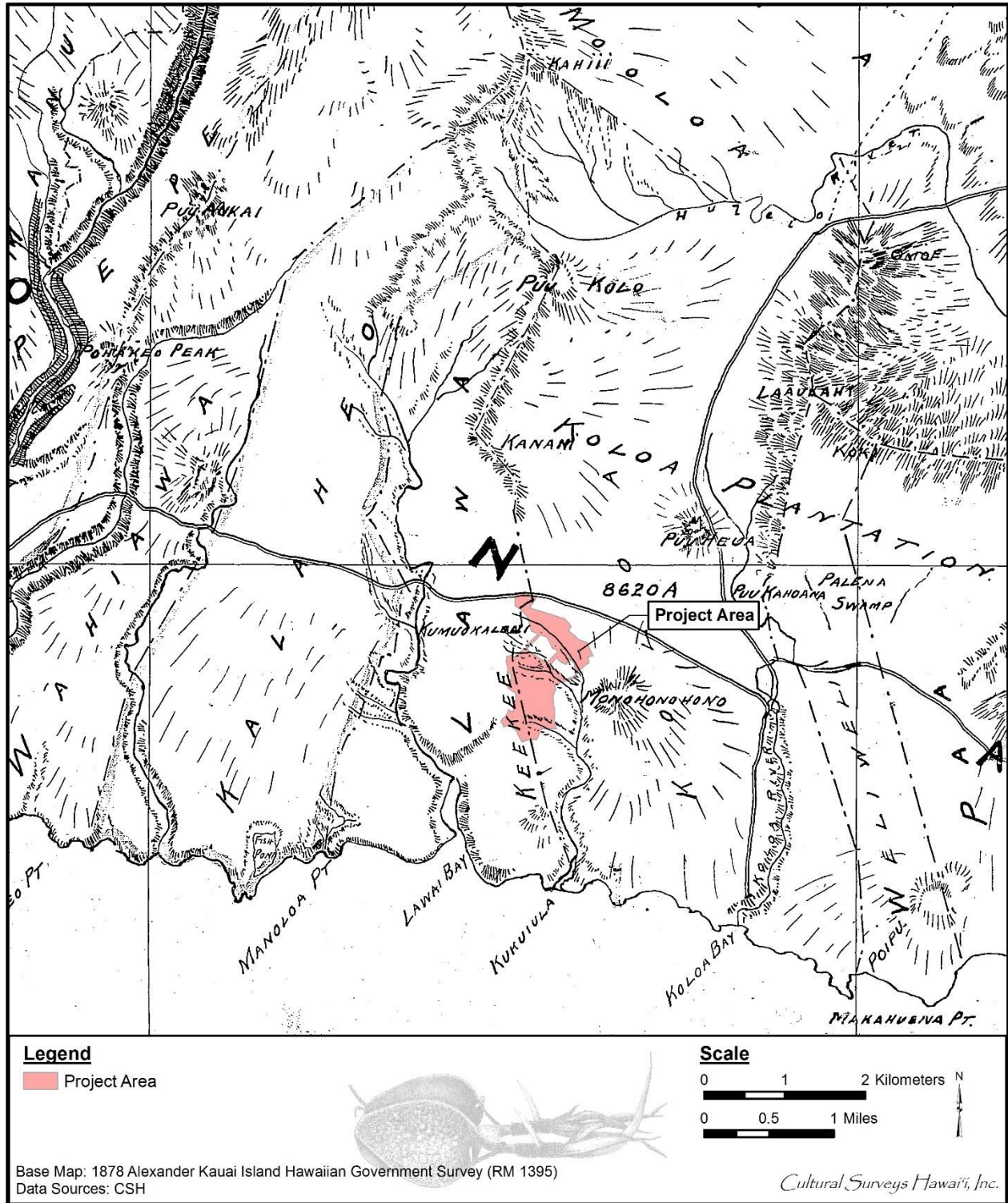


Figure 10. 1878 Alexander Kauai Island Hawaiian Government Survey with project area

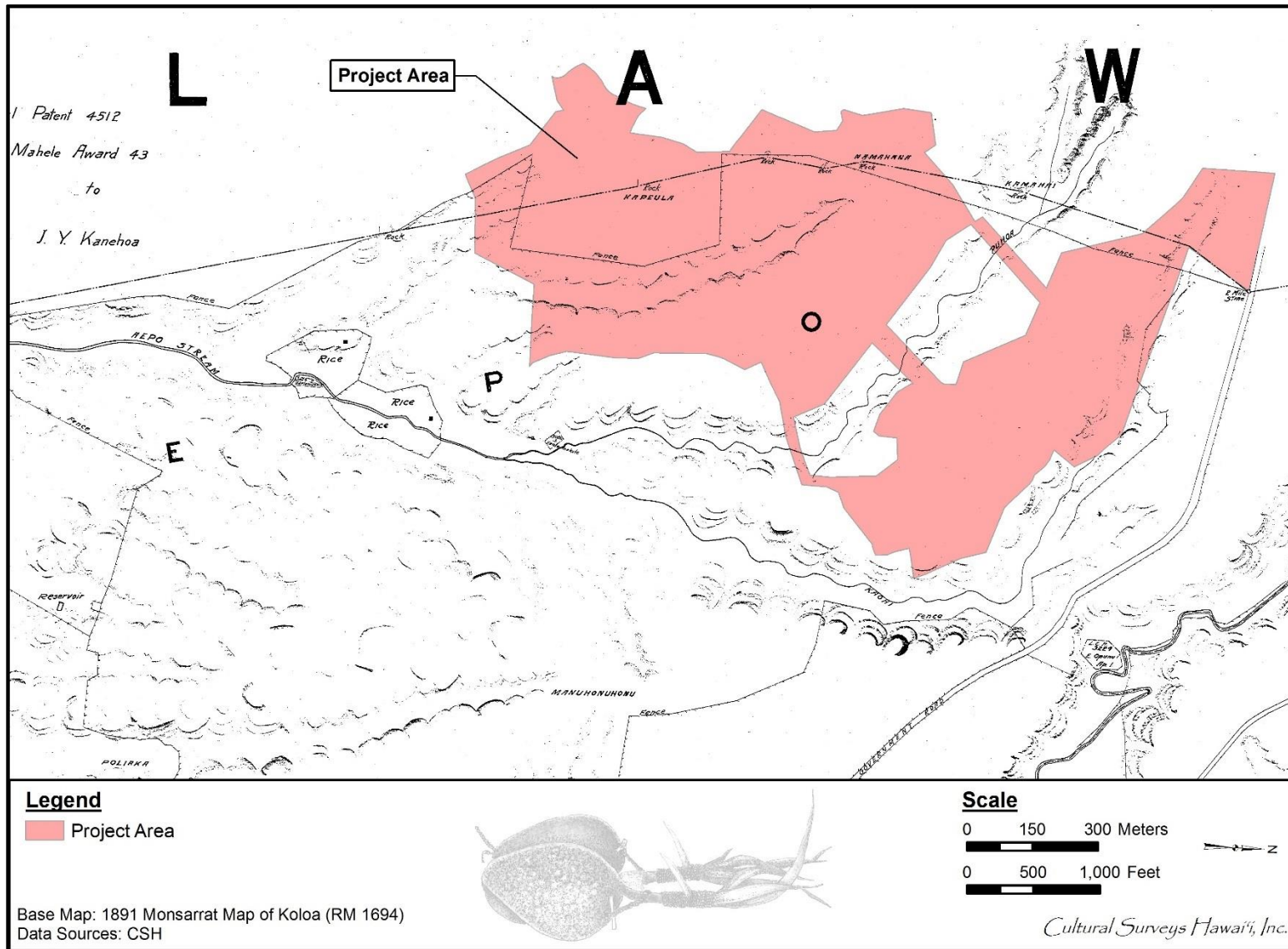


Figure 11. 1891 Monsarrat map of Kōloa with project area

CA for the Lāwa'i Solar Project, Lāwa'i and Kōloa, Kōloa, Kaua'i

TMK: [4] 2-6-003:001

1870, intending to reside at her Lāwa'i house until the spring of 1871. The queen described her arrival at Kōloa and the journey to her residence in a letter of December 31 to King Kamehameha V:

We arrived late in the afternoon last Thursday & had to ride over two miles before we reached this place. The schooner left that same evening & even if I had the time, there is nothing to tell you about but your Majesty will I am sure understand how much I am gratefull [*sic*] for your kindness in sending me free of expense down here.

The house we are in is one by itself for a couple of miles around, rather lonesome I fear for some. [Forbes 1970:4]

David Forbes describes the Lāwa'i lands (i.e., the lands to the south of the Lāwa'i Solar project area) surrounding the queen's residence:

. . . lonesome indeed it must have appeared to many of her party. The house that they were getting settled in stood on the bluff above Lawai-Kai. A large square frame house with a thatch roof, and with several outbuildings enclosed by a stone wall, with only a few struggling trees for shade, the house must have indeed seemed desolate to those accustomed to Honolulu. The surrounding area was an arid, stony pasture, suitable only for grazing. [Forbes 1970:4]

An historic photograph of Queen Emma's house (land south of the Lāwa'i Solar project area) confirms that in the late nineteenth century and before the introduction of sugarcane the area was indeed an arid, stony pasture (Figure 12).

4.3.1.1.2 Prince Jonah Kūhiō Kalaniana'ole

On Lāwa'i Beach Road, the Prince Kūhiō Memorial Park marks the birthplace on 26 March 1871 of Jonah Kūhiō Kalaniana'ole, great grandson of Kaumuali'i, the last high chief of Kaua'i, and son of a sister of Queen Kapi'olani. Prince Kūhiō's career of public service included ten terms as Hawai'i's delegate to the U.S. Congress, where he helped create the Hawaiian Home Lands Act, from 1903 until his death in 1922. In 1902, the prince founded the Royal Order of Kamehameha I. Prince Kūhiō Memorial Park is owned and maintained by members of the Royal Order of Kamehameha I, Kaumuali'i Chapter No. 3. The prince's birthplace and memorial park, above Ho'ai Bay, are at "Kaho'ai, a prominent Hawaiian fishing village in pre-Contact times, and chiefs of Kaua'i would often stay there" (Donohugh 2001:261).

4.3.1.2 Kōloa

Judge Henry Kawahinehelelani Blake of Kōloa (1874-1948) drew a colored map of "Koloa Village"—most likely in the 1938—depicting what the area looked like in 1888 when he was a boy of 14 (Figure 13). The map depicts the land east of the Lāwa'i Solar project area and shows the Kōloa Village filled with *lo'i* and houses, including the "Governor's House, Mauna Kapu." The *lo'i* appear to be fed primarily by an *auwai* extending west from Waikomo Stream. Only one pond field east of the road to Kōloa Landing is identified as growing "rice and taro." Based on the map's legend, all the other ponds on the map are "taro lands"—indicating taro continued to be grown in the vicinity of the Lāwa'i Solar Project area in the last quarter of the nineteenth century.

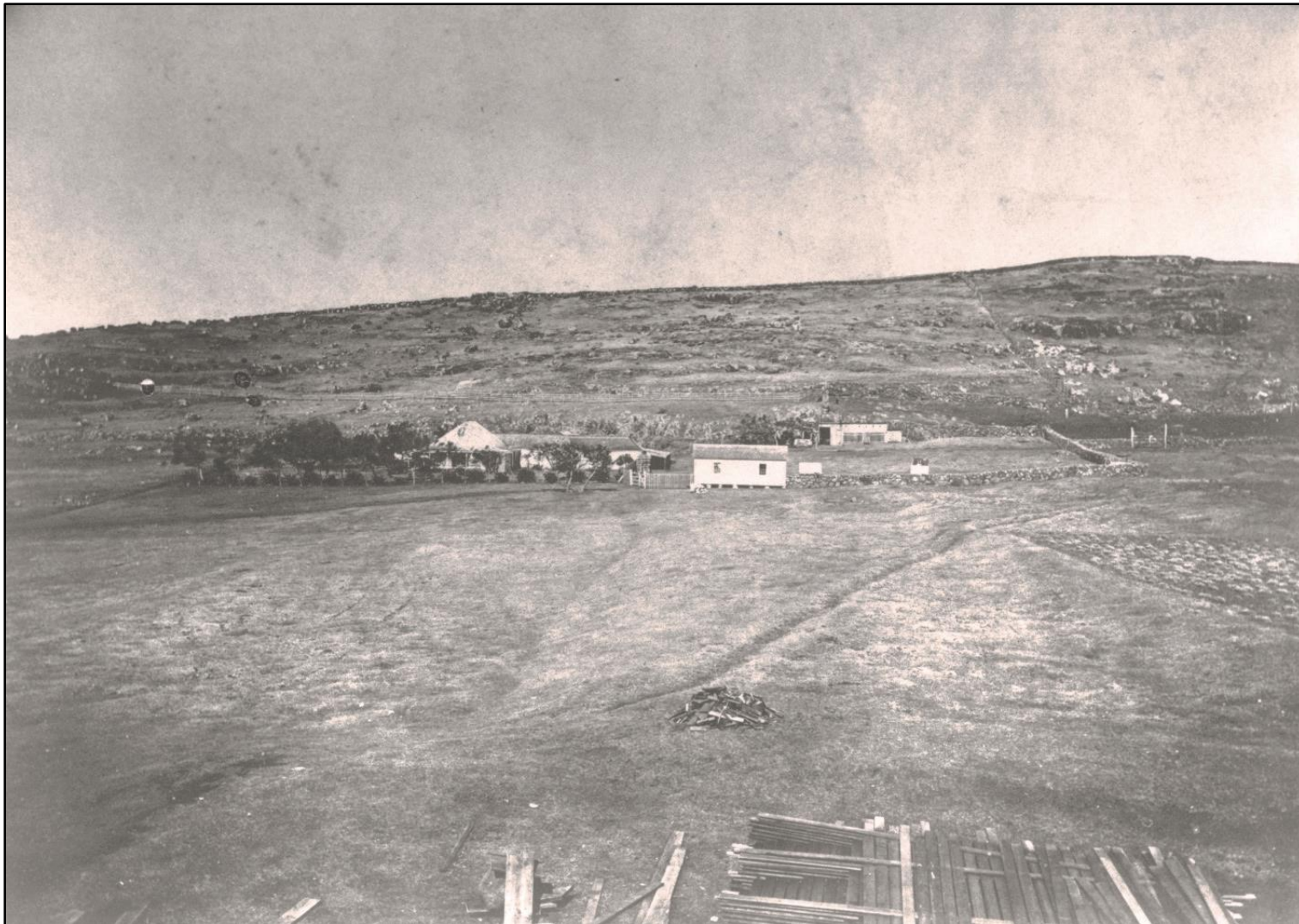


Figure 12. Photo of Queen Emma's home at Lāwa'i, ca. late nineteenth century (Bishop Museum Archives)

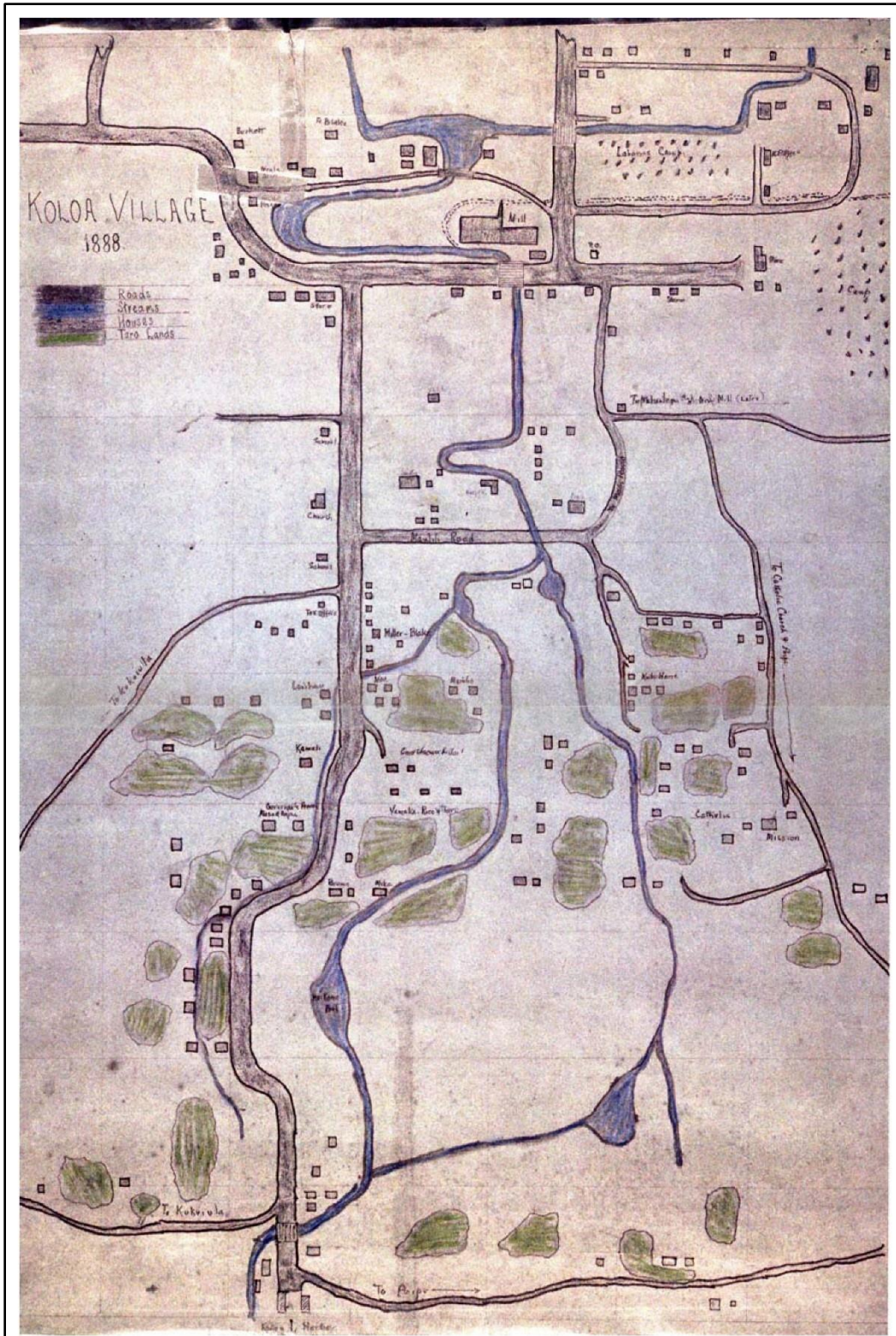


Figure 13. Hand-drawn map of Kōloa Village, 1888, by Judge Henry K. Blake (1874-1948) (courtesy of the Kaua'i Historical Society)

The map was likely drawn in 1938 along with the map of the village in 1888 (see Figure 13) to record a “then and now” portrait of Kōloa. A second map drawn by Judge Henry Kawahinehelelani Blake of Kōloa (1874-1948) shows “Koloa Village” in 1938 (Figure 14). Judge Blake’s map reveals there are no longer any *lo’i*, *auwai*, or houses in Kōloa Village. They have all been supplanted by “cane lands” and “pasture lands.” In addition, “pineapple lands” are shown *mauka* of the cane lands. Commercial pineapple growing was also pursued by Kauai Pineapple Company within a *mauka* portion of Kōloa Village.

4.4 Sugar Industry

The story of nineteenth century development in the Kōloa District is the story of three large sugar companies: the Koloa Sugar Company, the first plantation sugar company on Kaua’i, which eventually owned lands in eastern Kōloa, Weliweli, Pā’a, and Māhā’ulepū Ahupua’a; the McBryde Sugar Company, which stretched from ‘Ele’ele Ahupua’a through Wahiawa, Kalāheo, Lāwa’i, and western Kōloa Ahupua’a; and, to a lesser extent, Grove Farm, which had upland lands from Kōloa to Līhu’e. Grove Farm is mentioned in this report because of its contribution to the historic and modern eras of Kōloa.

4.4.1 Koloa Sugar Company

Koloa Sugar Company was the first plantation-organized industry in Hawai’i (Damon 1931:176, 198). It began in 1835 as Ladd and Company. About 1,000 acres of land for silk and sugar culture were leased from the king and local chiefs, mainly in Weliweli Ahupua’a, for 50 years at \$300 a year. The lease “allowed the use of the waterfall and an adjoining mill site at Maulili pool, not far from the thousand acres, together with the right to build roads, the privilege of unrestricted buying and selling, and freedom from local harbor dues.” In subsequent years, they would buy or rent land in upland Pā’ā (1841), in Māhā’ulepū (1878), and in Kōloa Ahupua’a, the section east of Kōloa Stream (1881) (Alexander 1937: frontpiece).

Judd (1935:57) noted the following:

The company was permitted to hire natives to work on the plantation provided they paid Kauikeaouli, the king, and Kaikioewa, the governor of Kauai, a tax for each man employed and paid the men satisfactory wages. The workers were to be exempt from all taxation except the tax paid by their employers. [Judd 1935:57]

Judd further described the revolutionary implication of this arrangement: “The significance of Ladd and Company’s lease lay in the fact that it was the first public admission by the Hawaiian chiefs that their subjects had rights of personal property backed with a guaranty of protection to that property” (Judd 1935:58). Local chiefs, fearful of a usurpation of their power, resisted the company’s first efforts to recruit workers, forcing the king’s intervention.

The commercial activity initiated by the Ladd and Company plantation had widespread ramifications. Kōloa Town and the landing at the mouth of Waikomo Stream became major commercial centers. The landing—or “roadstead” as it was called—was a busy port during the mid-1800s. “An estimate in 1857 stated that 10,000 barrels of sweet potatoes were grown each year at Koloa, and that the crop furnished nearly all the potatoes sent to California from Hawai’i. Sugar and molasses were also chief articles of export” (Judd 1935:326). Whalers also used the Kōloa roadstead during this period (1830-1870) and took on provisions of squashes, salt, salt

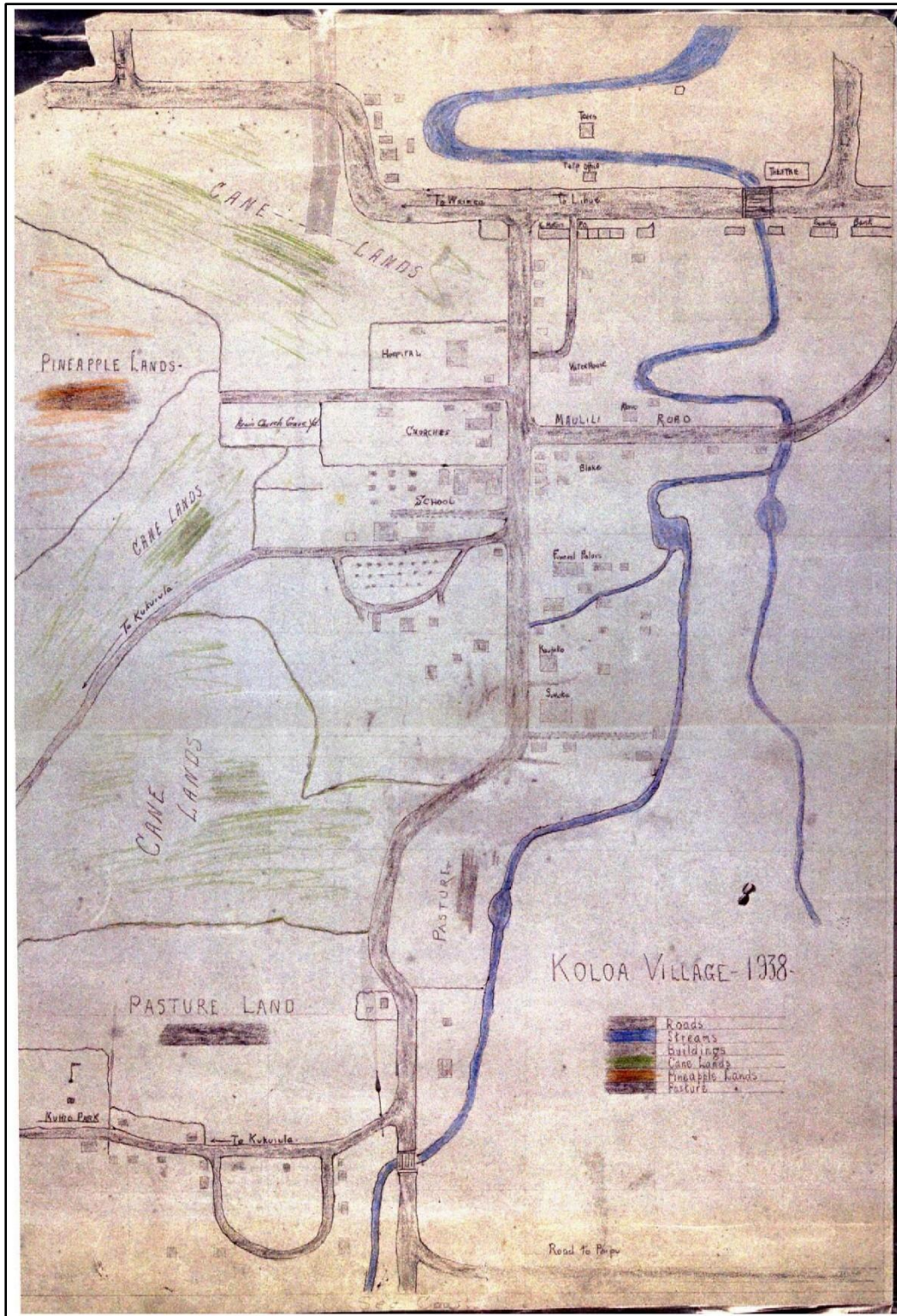


Figure 14. Hand-drawn map of Kōloa Village, 1938, by Judge Henry K. Blake (1874-1948) (courtesy of the Kaua'i Historical Society)

beef, pigs, and cattle. Hawaiians grew the squashes (pumpkins) on the rocky lands north of the landing, and numerous salt pans were located along the shore near the landing (Figure 15).

Ladd and Company ceased operating in 1845. Then, following a succession of individual and partnered ownerships, a new enterprise, Koloa Sugar Company, was established in 1880. In 1882, the Koloa Sugar Company announced it had ordered all the components for a plantation railroad. Per the *Planter's Monthly*, 1882 Vol. 1, "It (the railroad) will consist of four miles of 30-inch gauge track, forty cars 5 x 10 feet, and one locomotive . . ." (Condé 1993:28). According to Arthur C. Alexander (1937), "Cut cane was hauled to the mill by oxcart until 1882. In that year, 3½ miles of 30-inch gauge, 18 pound railroad track and 50 cars were purchased" (Condé 1993:28).

By 1885, the railway extended to Kōloa Landing where steamers transported the bags of sugar to the mainland. A motorized derrick winched the bagged sugar from the railroad cars to the warehouse on the west side of the landing. From there, bagged sugar was loaded onto small lighters, which would row the sugar out to waiting ships in the harbor. By 1895, the railroad had extended a spur line through the coastal lands of Kōloa into Weliweli to aid in the harvest around Pā'ā. Remnants of this spur line are seen today throughout lower Po'ipū (Donohugh 2001:106).

The Koloa Sugar Company had previously purchased the *ahupua'a* of Pā'ā southeast of Kōloa town, and a large parcel, a swamp that the company drained and tried to use for sugar, was unproductive. A new and much larger mill was built there in 1912 about a mile from Kōloa (Figure 16). New railroad track was laid, and an asphalt road was built to connect the new mill with Kōloa Landing. World War I caused a huge demand for sugar. By the end of hostilities in 1918, the Koloa Sugar Company was producing 9,000 tons of sugar each year and adding additional acreage (Donohugh 2001:105).

Kōloa Landing was phased out around 1925 when McBryde Sugar Company and the Koloa Sugar Company began shipping their product out of Port Allen Harbor at Hanapēpē in Waimea District. The McBryde Plantation had been improving the facilities at 'Ele'ele Landing since the turn of the century, and a private company, the Kauai Terminal Limited Railway, had developed a modern bridge crossing the Hanapēpē River. Soon after this, the Koloa Sugar Company ceased using the *makai* Kōloa fields, and much of the area was converted into cattle-grazing pasture by the Knudsen family. Most of the *mauka* areas of Kōloa remained under sugarcane cultivation as late as the 1970s, when these cane lands were converted into pasture (Donohugh 2001:101).

According to Wilcox's (1996) account of the Koloa Sugar Company, following the merger of the plantation lands of the Koloa Sugar Company and the Grove Farm Company in 1948, the combined lands under cultivation required new sources of irrigation water. In 1965, Grove Farm built a tunnel to bring water from Ku'ia directly into the Waitā (Kōloa) Reservoir. Grove Farm leased these cane lands to McBryde Sugar Company when it terminated sugar operations in 1974 (Wilcox 1996). The mill in Pā'ā was finally closed in 1996, and remains a landmark.

4.4.2 McBryde Sugar Company, Ltd.

Duncan McBryde moved to Wahiawa from his estate in Wailua ca. 1860 (Damon 1931). He acquired a lease for lands at Wahiawa from Victoria Kamāmalu, sister of Moses Kekuaiwa. Kamāmalu inherited the unclaimed lands at Wahiawa following the untimely death of Kekuaiwa in 1848. McBryde drove his herd of cattle across the island and began the development of the extensive Wahiawa Ranch. The McBryde family estate, known as Brydeswood, was built in the

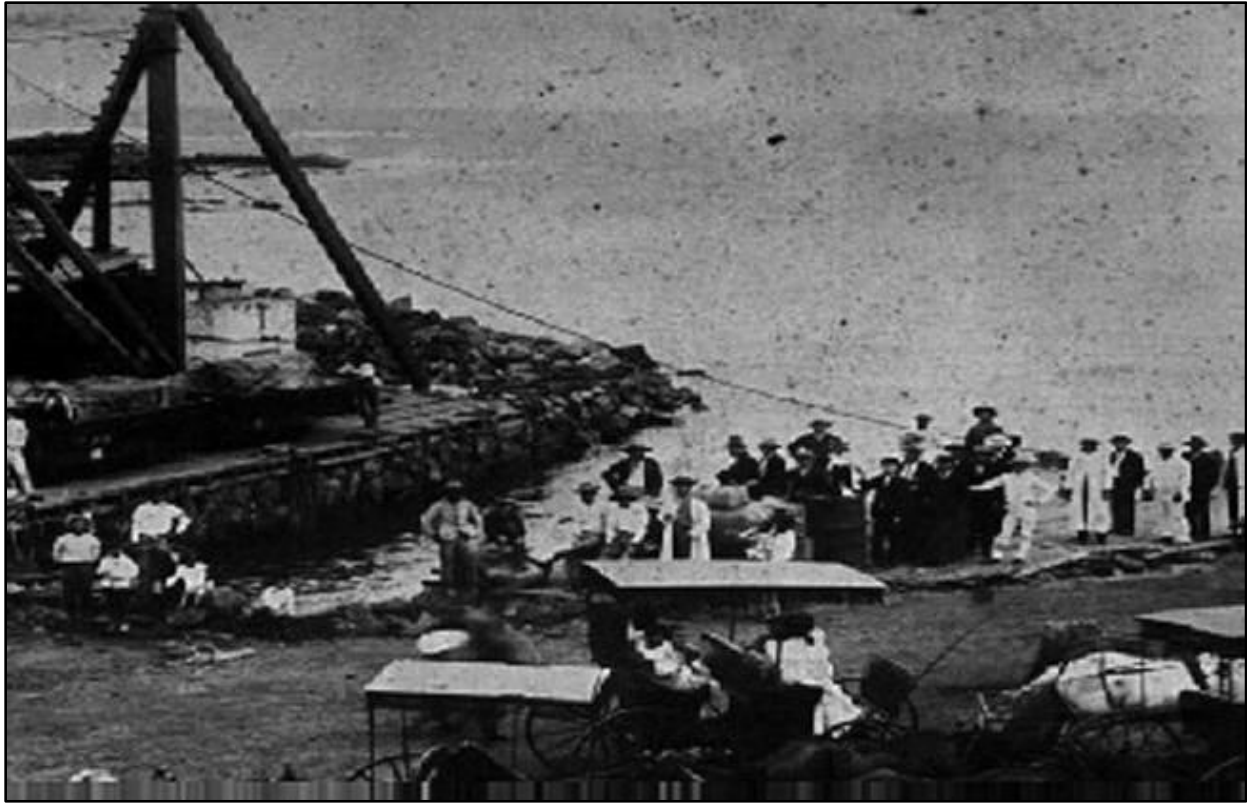


Figure 15. Photograph of Kōloa Landing, ca. 1880 (Post Office in Paradise 2015)

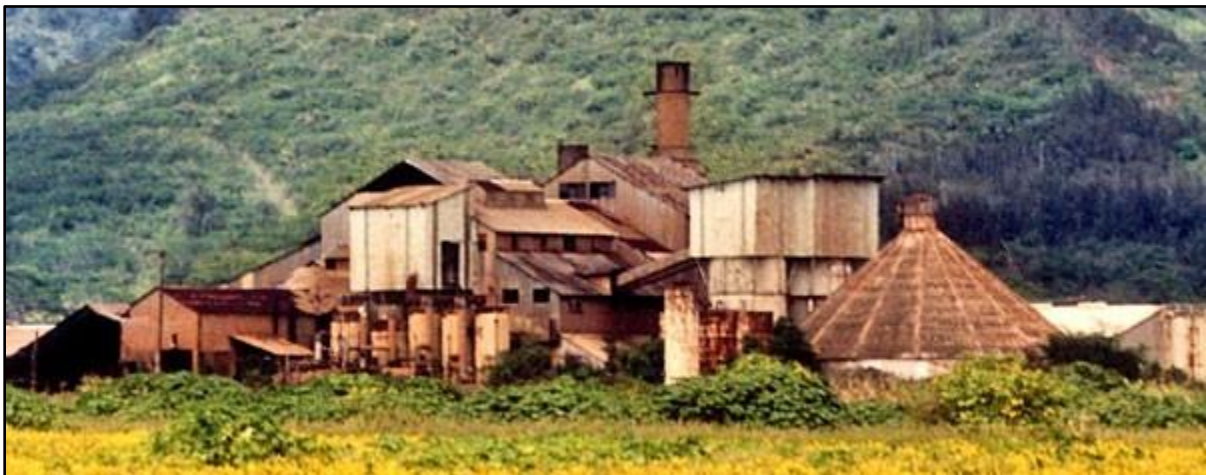


Figure 16. Photograph of Kōloa Mill, built in 1912 (Kōloa Plantation Days 2015)

uplands of Wahiawa, *mauka* of the government road. McBryde acquired land in Wahiawa, later owned in fee simple, and leased land in Kalāheo from the Crown. Eventually, the plantation covered most of the land of western Kōloa District, including Wahiawa, Kalāheo, Lāwa'i, and the western section of Kōloa Ahupua'a, west of Kōloa Stream (Figure 17).

By 1870, in addition to ranching, McBryde ventured into sugarcane cultivation. The plantation primarily consisted of land already owned by the McBryde Estate, including the Wahiawa Ranch and lands in neighboring Kālaheo and Lāwa'i. In 1899, Walter D. McBryde, son of Duncan McBryde, and W.A. Kinney founded the McBryde Sugar Company, formed by combining the lands of the Eleele Plantation in Hanapēpē Ahupua'a, the lands owned by McBryde in Wahiawa, Kalāheo, and Lāwa'i, and the lands owned by the Koloa Agricultural Company (separate entity from the Koloa Sugar Company), which had lands in Kōloa Ahupua'a owned by the Knudsen family, west of Kōloa Stream (McBryde Sugar Company n.d.:3).

To irrigate the mid-sized plantation (approximately 4,700 planted acres), between 1900 and 1907 the McBryde Sugar Company constructed 30 large and small reservoirs, as well as an extensive system of ditches to collect water from the uplands (Yamanaka and Fuji 2001). In addition to collecting surface water, which became insufficient for the growing plantation, McBryde Sugar Company constructed a series of wells and pumps to collect groundwater (Wilcox 1996). These plantation ditches, pumps, and reservoirs are indicated on a 1900 map of the McBryde Sugar Company lands (see Figure 17).

Plantation development consisted of extensive sugarcane cultivation, with associated irrigation ditches, on the upper plateau areas outside Wahiawa Valley. It is also noted that in addition to the Eleele Ditch, several other ditches were constructed in order to take water from Wahiawa Stream to the McBryde Sugar Company cane lands. A railroad line was also constructed *mauka*, running from the McBryde Plantation Mill in the east, through Wahiawa Valley, and on to 'Ele'ele Landing in the west. Extensive development of plantation camps was made to house the large numbers of plantation laborers. The structures were concentrated in the vicinity of the rail line crossing, located both within Wahiawa Valley, as well as along the upper edge of the valley. Additional plantation camp structures were located in the *makai* portion of Wahiawa Valley (Yamanaka and Fuji 2001).

Following the expansion of sugar cultivation by McBryde Sugar Company, a "New Mill" (Numila) was constructed in Wahiawa to replace the mill at 'Ele'ele (Figure 18 and Figure 19). Additional plantation development included the construction of a reservoir, the Kapa Reservoir. A cemetery was also located near the coast, between Wahiawa Bay and 'Ele'ele Harbor. The cemetery was likely established for the interment of McBryde Sugar Company plantation workers (Yamanaka and Fuji 2001).

In 1933, McBryde took over 7,200 acres of the Grove Farm Plantation (Dorrance and Morgan 2000:30). In 1985, the McBryde Sugar Company ranked as Hawai'i's eighth largest sugar plantation. However, sugar plantations soon became unprofitable in the Islands, bringing an end to McBryde's sugar production in 1996. Much of the former McBryde sugar lands were converted into coffee production, with the Kaua'i Coffee Company replacing the McBryde Sugar Company. Much of the former Wahiawa and 'Ele'ele cane lands are presently planted in coffee (Yamanaka and Fuji 2001).

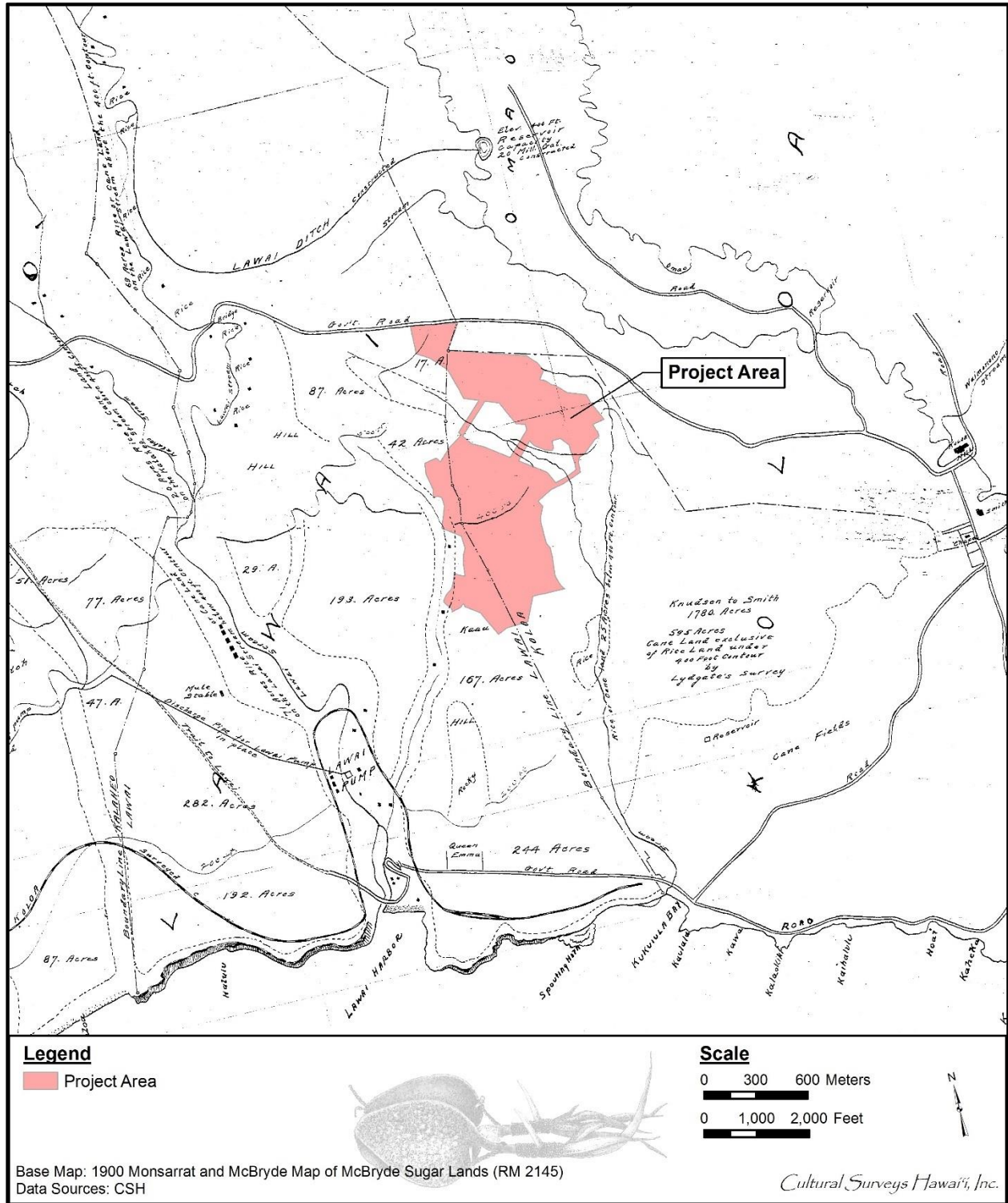


Figure 17. Combined portions of 1900 Hawaii Territory Survey Map of Kōloa, M.D. Monsarrat and McBryde Sugar Company Lands map, showing the Lāwai Solar project area



Figure 18. Photograph of sugar mill in 'Ele'ele, ca. 1885 (Post Office in Paradise 2015)

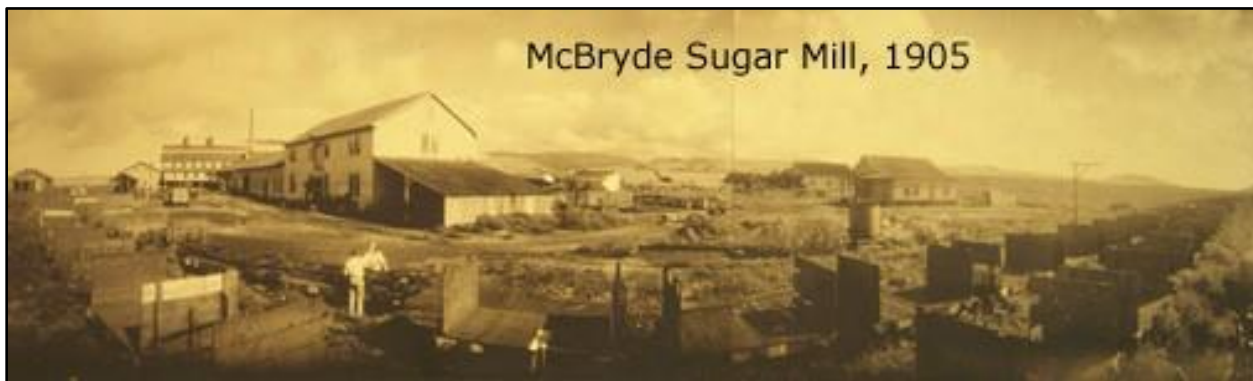


Figure 19. Sepia photograph of McBryde Sugar Mill, 1905 (Post Office in Paradise 2015)

4.4.3 Grove Farm

Grove Farm was started by Warren Goodale in 1850, sold the same year to James F.B. Marshall for \$3,000, and sold again in 1856 to Mr. Widemann for \$8,000 (Krauss and Alexander 1984:152). At the end of 1863, Judge Widemann asked George Wilcox to undertake the supervision of the cutting of a water lead or irrigation ditch for the Grove Farm Plantation using Hawaiian labor (Krauss and Alexander 1984:107–109). The ditch (“1st Ditch”) was completed in July 1863, but failed to bring water to the fields (Krauss and Alexander 1984:110–111). Wilcox leased Grove Farm Plantation from H.A. Widemann at the end of 1864 and rapidly developed the irrigation infrastructure further (Krauss and Alexander 1984:114–116). Western commerce between Kōloa and Līhu‘e took off during the second half of the nineteenth century. A visitor to Kaua‘i in 1865, William T. Brigham, described the route between Līhu‘e and Kōloa:

From Līhu‘e the road led over the plain with the mountains on the left. A ditch crossed and recrossed the road as it wound along the hills from the fountains to the canefields below. Owls were very abundant. The Pass over the mountains was very good and not at all steep, and all the way which was some twelve miles, the road was very good, in fact a carriage road. Two hours riding brought me to Dr. Smith’s [in Kōloa] at eight. [Lydgate 1991:143]

The “ditch” Brigham described probably included “1st Ditch,” which was excavated in 1864 and “2 ml Ditch,” which was completed in 1865. “3rd Ditch,” which traverses the Kokolau Tunnels area was developed in 1866-1867. The Kokolau Tunnel was excavated under portions of the 3rd Ditch. The ditches were excavated by Hawaiian labor at 25 cents per man per day, but Chinese labor was used to excavate short tunnel sections. Almost all of the ditch construction was by shovel with one man capable of digging 5 linear ft in one day. Black powder blasting was used on occasional hard rock outcrops (Krauss and Alexander 1984:123–131). 3rd Ditch is annotated on a map of Grove Farm as starting at the “Halenanaho” (properly “Halenanahu”) Reservoir, *mauka* of the highway, then heading south, crossing the highway alignment and then running roughly parallel with the Hule‘ia River toward the core Grove Farm fields.

In 1870, Wilcox bought Grove Farm from Widemann for \$12,000, three-quarters of which was borrowed. Four years later he had 200 acres under cultivation. The cane was milled at the Lihue Mill and exported from Nāwiliwili. In 1874, Wilcox renewed a lease for 25 years for a 10,000-acre tract of Ha‘ikū Ahupua‘a from Princess Ruth Ke‘elikōlani (Krauss and Alexander 1984:179). On 1 April 1881, George Wilcox bought 10,500 acres of Ha‘ikū Ahupua‘a from Princess Ruth, increasing the acreage of Grove Farm nearly ten-fold (Krauss and Alexander 1984:206). The sale was part of a package deal in which Willie Rice also received Kīpū and Kīpū Kai for a total price of \$27,500—money that Princess Ruth used to build her palace which rivaled Kalākaua’s palace and was completed the following year.

In 1948, Grove Farm purchased Koloa Plantation. This doubled the size of Grove Farm, gave Grove Farm its own sugar mill for the first time, and eliminated duplication in manpower, equipment, and administrative costs. In 1948/1949 a cane haul truck tunnel (the Wilcox Tunnel) was excavated under the Hoary Head Range connecting the sugarcane fields of Ha‘ikū to the Kōloa Mill (Krauss and Alexander 1984:366–368).

In the mid-1960s, Sam Wilcox of Grove Farm donated 200 acres of former sugar land to the State for Kaua‘i Community College (Kamins and Potter 1998:275). Grove Farm ended its sugar

business in 1974, setting aside lands for development and also for the continuation of sugar cultivation by leasing its Līhu'e lands to Lihue Plantation and its Kōloa lands to McBryde Sugar Company (Wilcox 1996:76).

4.5 The 1900s

The 1923 McBryde Sugar Company field map (Figure 20) shows the pervasive presence of sugarcane and cattle pasture in the vicinity of the Lāwa'i Solar project area within the first decades of the twentieth century. Further evidence is provided in aerial photographs taken in 1924 of views *mauka* from Lāwa'i Bay and Kukui'ula Harbor (Figure 21 and Figure 22). The photographs show expanses of cane fields in the western two-thirds of the project area and cattle pasture land in the eastern third.

A 1910 USGS map (Figure 23) indicates the low density of urbanization in the Kōloa District. The district had few improved roads, and areas worthy of labels included only the mills for the McBryde Plantation in Wahiawa and associated upland camps, Kōloa Landing, and inland Kōloa Town. As shown on a 1963 USGS map (Figure 24) and a 1978 aerial photograph (Figure 25), in the mid- to late twentieth century, there are numerous highways, reservoirs, and town centers in Numila (former McBryde mill area) in Wahiawa, an expanding Kōloa Town, a cluster around Kōloa Mill in Pā'ā, and numerous small beach villages.

4.5.1 Modern Land Use

By the late 1960s, the main town of Kōloa experienced a type of reverse migration back to the shoreline. Although the town had established a Civic Center in 1977, the pace of tourist-driven development at the shoreline had been drawing construction and service jobs away from the town center. In 1962, the Wai'ohai Resort opened, with the Sheraton Kaua'i Resort following in 1965. The Kīāhuna Plantation Resort opened in 1967, followed by the construction of various condominiums throughout the 1970s and 1980s. Finally, the Hyatt Regency Resort, with its expansive golf course, opened in 1991.

By the early 1990s, the tourist industry had successfully attached the name "Po'ipū Beach" to the entire coastline beginning at Kōloa Landing and continuing east to Makahū'ena Ledge (Donohugh 2001). With the development of the Po'ipū Bay Resort Golf Course and the Hyatt Regency Kaua'i Resort Hotel, the Po'ipū Beach name became synonymous with all 2 miles of coastline fronting the Wai'ohai, Kīāhuna, and Sheraton developments, ending at Po'ipū Beach Park (Donohugh 2001:244).

Future plans within the Kōloa District will place more demands on beachfront properties along the coastline. Over 1,000 acres of former sugar plantation lands are slated for hotel and condominium development surrounding both Lāwa'i and Po'ipū coastal resort areas (Donohugh 2001). Future development plans for the upland areas involve both large tracts of lands, as well as regional redevelopment within Kōloa Town itself.

4.5.2 Conservation and Agricultural Lands

Mauka portions of Kōloa Ahupua'a are zoned as conservation and agricultural lands. Lands currently zoned for conservation are those owned by A&B – Hawaii Inc., and the State of Hawai'i. Lands currently zoned for agriculture include those owned by the Eric A. Knudsen Trust, Green Energy Team, LLC, Anuheha Properties, LLC, and Kahi Na Wai Pu'ili LLC. Regarding

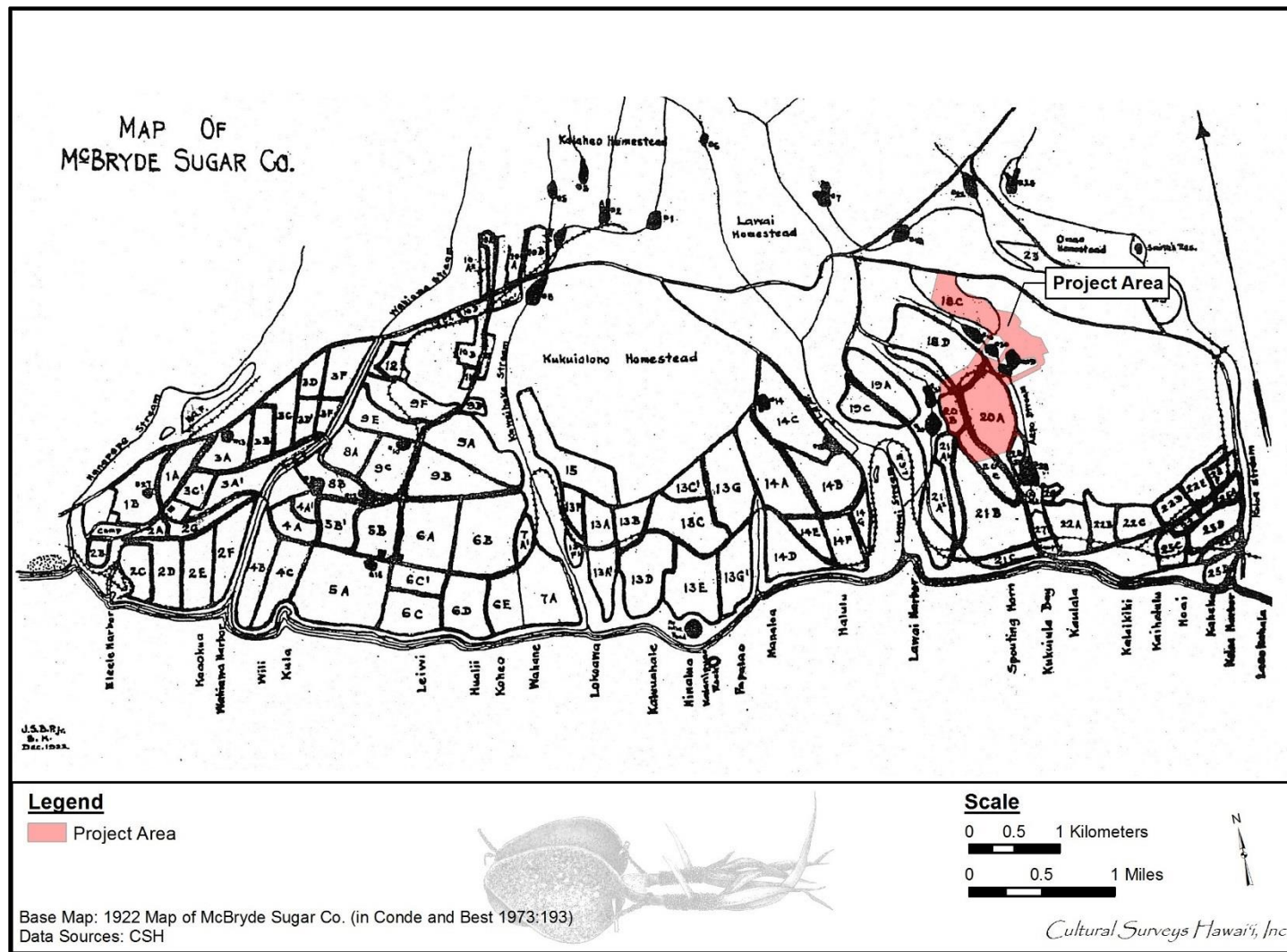


Figure 20. 1923 McBryde Sugar Company field map (Condé and Best 1973:193)



Figure 21. Aerial photograph of Lāwa'i Bay (ca. 1924) (Bishop Museum Archives)



Figure 22. Aerial photograph of Kukui'ula Harbor (ca. 1924) (Hawai'i State Archives)

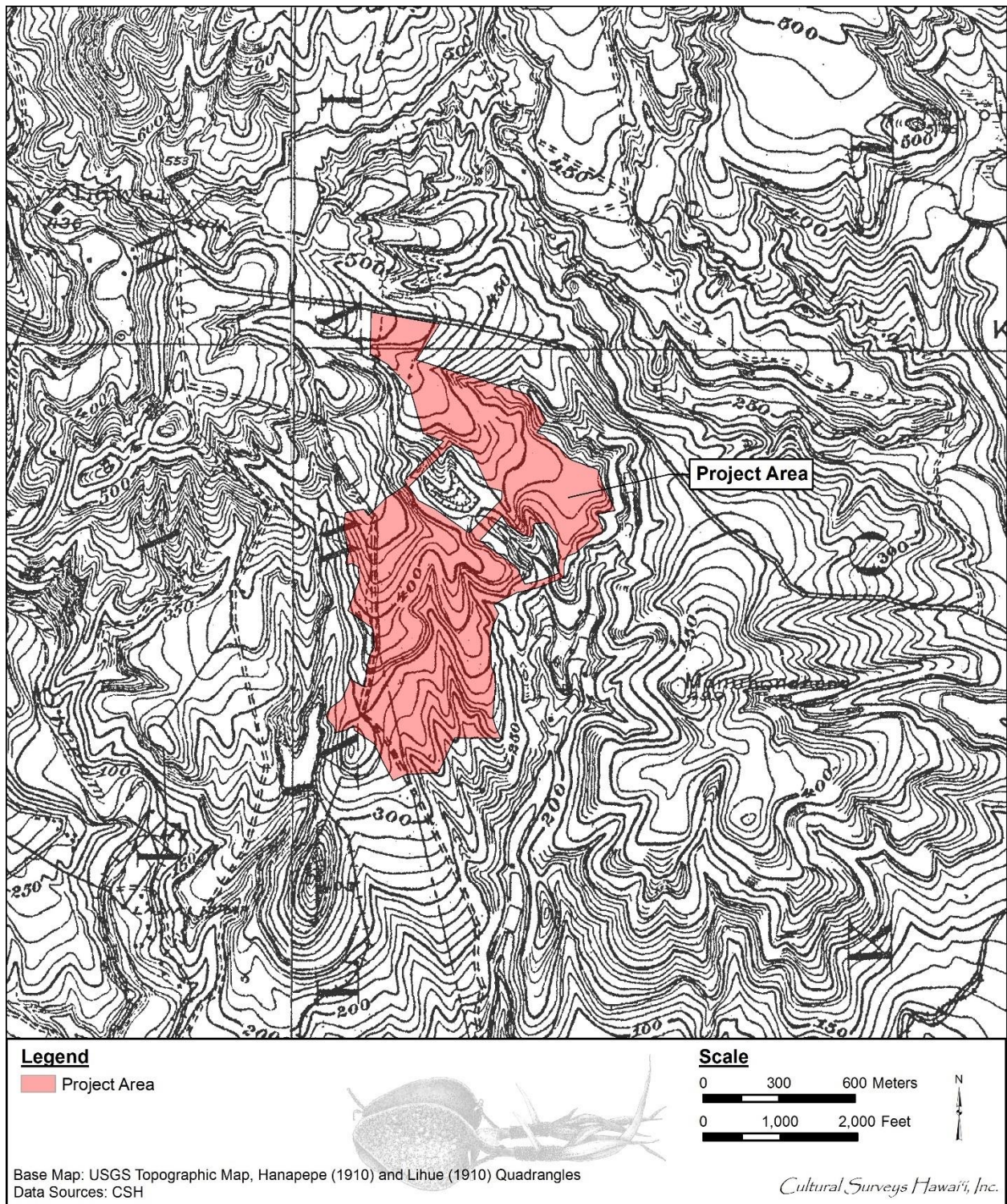


Figure 23. 1910 Hanapepe and Lihue USGS topographic quadrangles, showing limited development in the vicinity of the Lāwa'i Solar project area

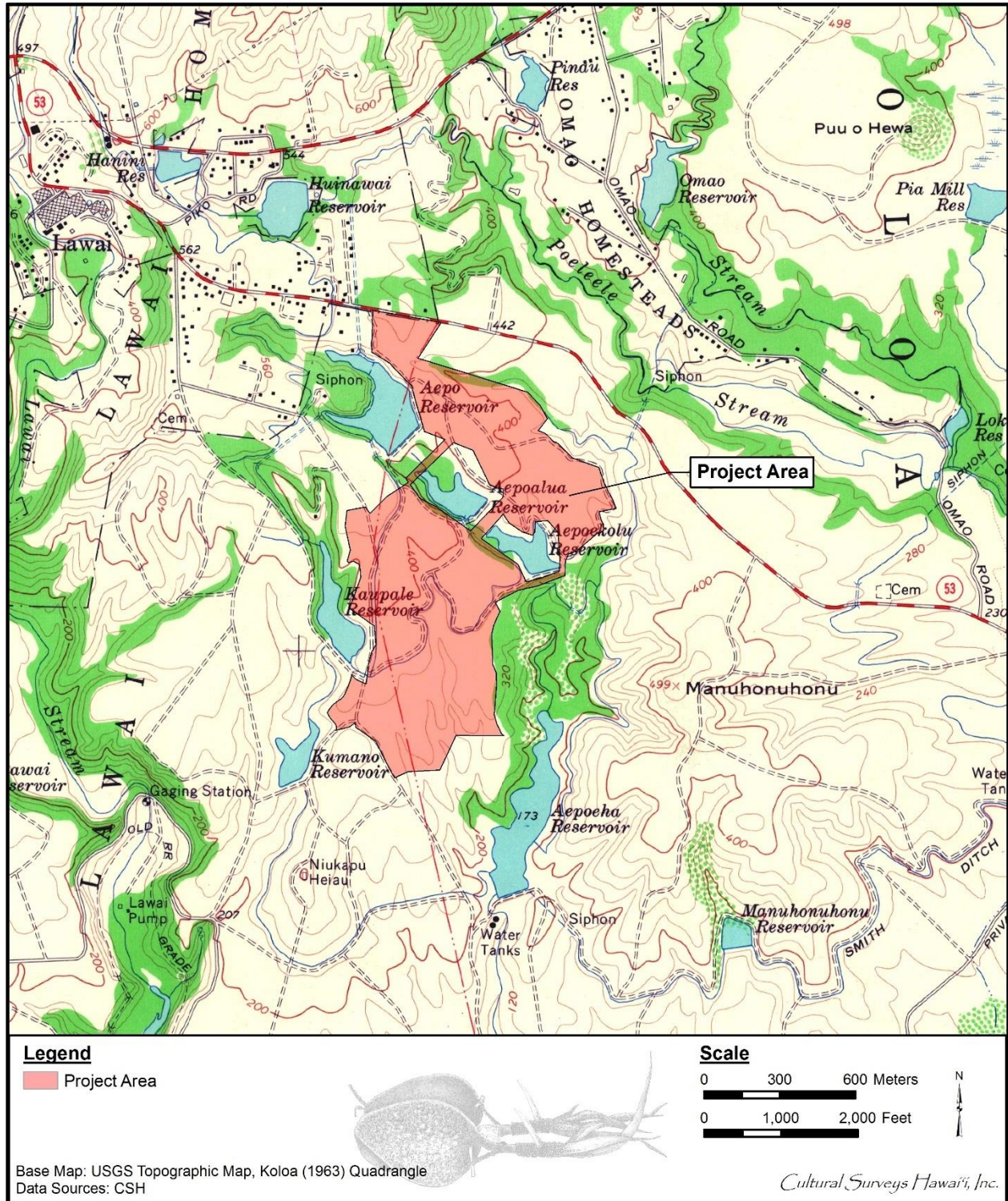


Figure 24. 1963 Koloa USGS topographic quadrangle, showing increasing development in the vicinity of the Lāwa'i Solar project area

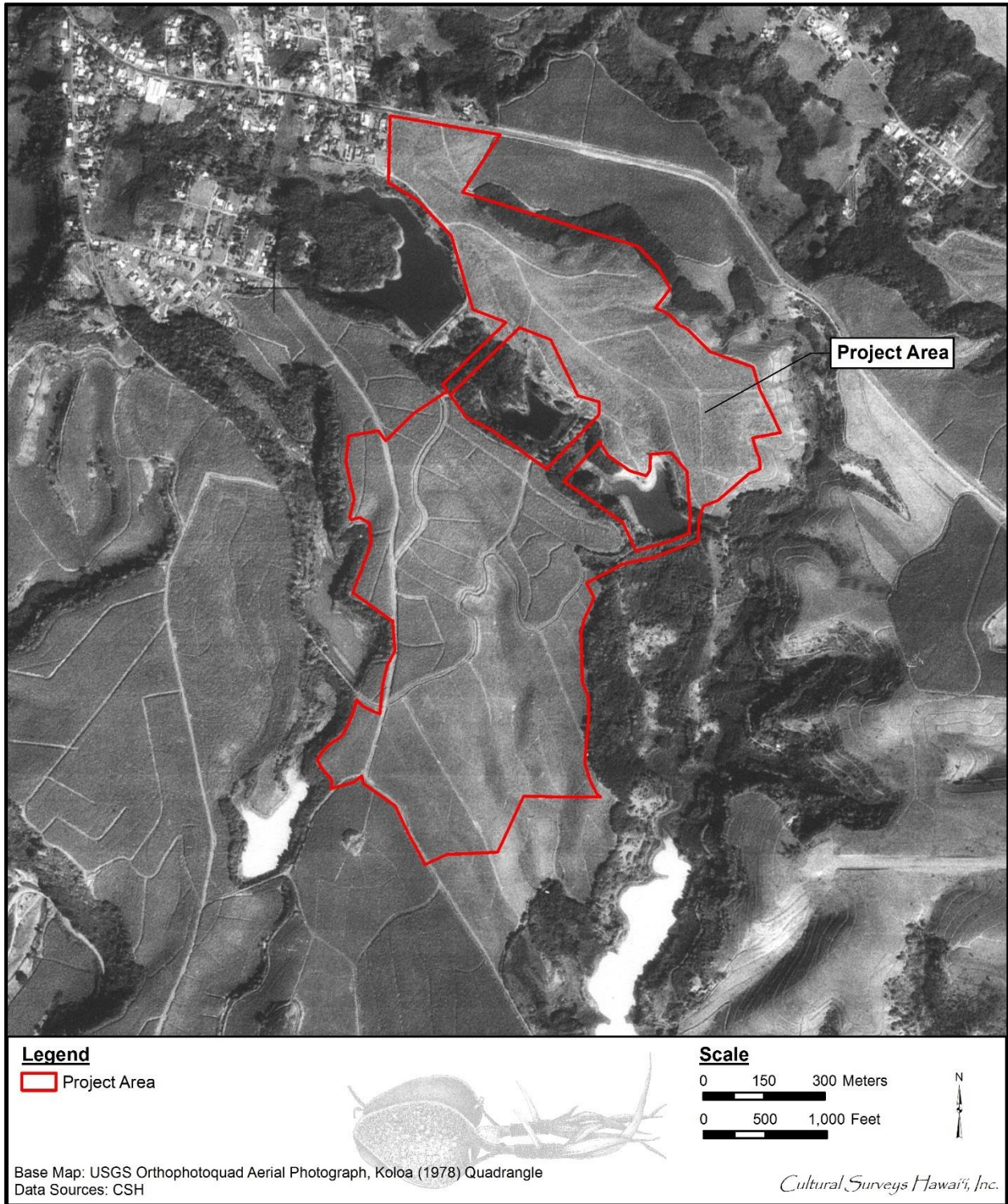


Figure 25. 1978 Koloa USGS Orthophotoquad aerial photograph, showing cane cultivated areas

conservation lands, the department, defined as the Department of Land and Natural Resources per HRS §183C-2,

shall adopt rules governing the use of land within the boundaries of the conservation district that are consistent with the conservation of necessary forest growth, the conservation and development of land and natural resources adequate for present and future needs, and the conservation and preservation of open space areas for public use and enjoyment. [HRS §183C-4(b)]

Accordingly, the “department shall establish zones within the conservation district, which shall be restricted to certain uses” (HRS §183C-4[d]). Specifically:

The department, by rules, may specify the land uses permitted therein which may include, but are not limited to, farming, flower gardening, operation of nurseries or orchards, growth of commercial timber, grazing, recreational or hunting pursuits, or residential use. The rules may control the extent, manner, and times of the uses, and may specifically prohibit unlimited cutting of forest growth, soil mining, or other activities detrimental to good conservation practices. [HRS §183C-4(d)]

According to *The Garden Island*, the “conservation of necessary forest growth,” and the “development of land and natural resources” (HRS §183C-4[b]) is increasingly threatened by feral pigs (Lyte 2015). The newspaper states, “Ubiquitous, menacing and ruinous to crops and native plantings, Kauai’s feral pigs are a problem. They are widespread, found everywhere except isolated parts of the Napali Coast. And they’re capable of year-round breeding” (Lyte 2015).

The introduction of European swine by westerners coupled with the introduction of alien species such as earthworms, mango, and guava resulted in the unchecked explosion of feral pig populations in *kula* and *mauka* lands. In time, the effects of feral animal populations upon the forested uplands were observed. Delicate native flora and streams were ravaged, resulting in the watershed crisis of the late nineteenth century (Maly et al. n.d.:3). In response, *kama‘āina* across all islands initiated mitigation measures in the form of fencing, feral animal control, and reforestation; King Kalākaua himself aided in these measures in 1878, leading a reforestation effort in Nu‘uanu Valley, O‘ahu (Maly et al. n.d.:3). Currently on Kaua‘i, it appears the feral pig population is growing (Lyte 2015). The growing population has spurred the development of a feral pig eradication program, focused on removing feral populations known to decimate *mauka* native forests.

Hunting aids in the management of *mauka* lands in Kōloa Ahupua‘a. Initially, western-style hunting was adopted as a means of resource management; additionally, the skills learned by *kama‘āina* to manage feral animal populations have been passed down from one family generation to the next for nearly 150 years (Maly et al. n.d.:4). Pig hunting, “a cherished modern practice” (Maly et al. n.d.:4), represents an aspect of modern land use in Kōloa Ahupua‘a. Kaua‘i hunters also acknowledge that hunting is not only a component of resource management, but also an important subsistence practice: “Even though we eradicate and we call it eradication, we don’t truly want to eradicate because that’s what we use for food and for sport” (Lyte 2015). Currently, portions of conservation land in the *mauka* portion of Kōloa Ahupua‘a and comprising a part of the Lihue-Kōloa Forest Reserve are designated as a public hunting area per HAR §13-123-15(4).

Section 5 Previous Archaeological Surveys and Research

Numerous archaeological studies have been conducted in the vicinity of the Lāwa'i Solar project area. Table 2 summarizes these previous archaeological studies, and their locations (when applicable) are depicted on Figure 26. The locations of historic properties are depicted on Figure 27. A brief description of each archaeological study is also included in this section.

5.1 Previous Archaeological Research

5.1.1 Kikuchi 1963

Kikuchi (1963) conducted an archaeological survey of the Kona District of Kaua'i. Information from Thrum (1906), Bennett (1931), a Lahainaluna School manuscript (1885), and other sources were instrumental in helping to locate major archaeological sites during the field survey. Kikuchi's survey was selective, as it was not designed to be a complete inventory, and focused on generally larger or more coastal sites.

Kikuchi identified 70 sites in the Kōloa District: eight sites in Lāwa'i Ahupua'a: Site 52 (Bennett Site 70), Site 55 (Bennett Site 72), and State Inventory of Historic Places (SIHP) #s 50-30-10-3067 through -3072, and seven sites in Kōloa Ahupua'a: SIHP #s -3073 through -3076 and -3086 through -3088.

5.1.2 Hammatt et al. 1988

In 1988, CSH completed an archaeological inventory survey (AIS) of the proposed 1,000-acre Kukui'ula Bay Planned Community, in Kōloa Ahupua'a (Hammatt et al. 1988). The project area stretched from Po'ipū Road on the east side to the edge of Lāwa'i Valley on the west side.

Fifty-eight archaeological sites comprising 150 individual features were located, mapped, and described (no SIHP designations). A majority of the sites were located in the non-cultivated lands in the eastern and southeastern portions of the project area. Both pre-Contact and historic sites were identified. The prehistoric sites are remnants of the former extensive late pre-Contact (early historic) irrigated agricultural complex that stretched eastward from Lāwa'i Valley to Weliweli. This complex includes *'auwai*, fields, house sites, shelters, modified lava tubes, burials, and two *heiau*. Historic-era sites included cattle walls, abandoned cane fields, a house site, and remnants of a railroad berm. Many of the archaeological sites were in remnant condition due to modern land disturbance.

5.1.3 Kikuchi and Remoaldo 1992

Kikuchi and Remoaldo (1992) conducted a study to locate, map, and inventory burial places on Kaua'i. Their study focused on cemeteries, graveyards, and family plots post 1800; traditional Hawaiian burials were not discussed.

St. Raphael's Church Cemetery in Kōloa Ahupua'a was mapped and inventoried in February 1986. Of the 224 documented grave sites, seven are marked as "unknown." St. Raphael's Church Cemetery is listed as SIHP # -B005. The Lāwa'i Public Cemetery in Lāwa'i Ahupua'a was not surveyed, but is listed as SIHP # -B003.

Table 2. Previous archaeological studies and historic properties within and in the vicinity of the Lāwa'i Solar project area (organized by date)

Study	Location	Nature of Study	Description (SIHP # 50-30-10)
Bennett 1931	Island-wide	Site survey	Site 71 (Petroglyphs), Site 72 (Niukapukapu Heiau), Site 73 (Stone Work), and Site 91 (Holua Slide)
Kikuchi 1963	Kōloa District	Archaeological surface survey and test excavations	Site 56 and 57 (SIHP #s -3071 and -3072 respectively), coastal shelter caves near Spouting Horn
Hammatt et al. 1988	1,000 acres of Kukui'ula Bay Community	Archaeological inventory survey	Recorded pre-Contact and historic-era archaeological sites (including some previously identified): SIHP #s -1912, -1922, -1924, -1934, -1936, -1941, and -1945 (agricultural complex); SIHP #s -1803, -1930, -1937, and -1948 (habitation complex); SIHP #s -1906, -1907, -1921, -1925, -1928, -1929, -1938, -1942, -1946, -1947, -1949, -1950, -1951 (habitation/agricultural complex); SIHP # -1927 (habitation/agricultural complex and human remains); SIHP #s -1913, -1917, -1918, -1919, -1932, -1940, -1905, -1931, and -1944 (platforms); SIHP #s -1909 and -1925 (platform and 'auwai); SIHP #s -1901, -1902 ('auwai); SIHP # -1910 (wall and 'auwai); SIHP # -1952 (wall and platform); SIHP # -1926 (wall); SIHP #s -1904 and -1943 (site remnant); SIHP # -1935 (enclosure); SIHP # -1914 (habitation cave); SIHP #s -1920 and -1923 (modified outcrop); SIHP # -1916 (mound); SIHP # -1911 (historic house site); SIHP # -1933 (historic railroad berm); SIHP # -1908 (historic structure foundations); and SIHP # -1903 (possible heiau remnant)

Study	Location	Nature of Study	Description (SIHP # 50-30-10)
Kikuchi and Remoaldo 1992	Kaua'i Island	Island-wide cemetery inventory	Burial sites in the vicinity of the project area: SIHP # -B003 (Lāwa'i Public Cemetery); SIHP # -B005 (St. Raphael's Church)
Jones et al. 2002	'Ōma'ō, Kōloa Ahupua'a	Archaeological inventory survey	Identified SIHP # -2072 (terraces) and SIHP # -2073 (irrigation ditch for sugar cane)
Van Ryzin et al. 2004	Aepo water line, 'Ōma'ō, Kōloa Ahupua'a	Archaeological inventory survey	Identified SIHP # -392 (irrigation ditch) and SIHP # -1901 (' <i>auwai</i>) previously identified by Hammatt et al. (1988)
Tulchin and Hammatt 2005	Pu'u Manuhonuhonu, Kōloa Ahupua'a	Archaeological inventory survey (recorded as an archaeological assessment)	No historic properties identified
Hammatt and Shideler 2007	KIUC Electrical Substation, Lāwa'i Ahupua'a, TMK: [4] 2-6-003:001	Archaeological inventory survey	SIHP # -01051 (irrigation infrastructure)
Hoerman and Spear 2009	Allerton Gardens, Lāwa'i Ahupua'a	Archaeological reconnaissance survey, archaeological inventory survey	Identified SIHP # -893 (agricultural terraces); SIHP # -894 (habitation site); SIHP # -895 (two terraces); SIHP # -896 (<i>lo'i</i> complex); SIHP # -897 (habitation terrace); SIHP # -898 (Allerton Gardens wall); SIHP # -3069 (stone wall) previously identified by Kikuchi (1963); and SIHP # -3067 Feature C (<i>lo'i</i> terraces) previously identified by Kikuchi (1963)
Raff-Tierney and Hammatt 2016	Manuhonuhonu Borrow Site Phase 3, TMK: [4] 2-6-003:001	Archaeological inventory survey (recorded as an archaeological assessment)	No historic properties identified

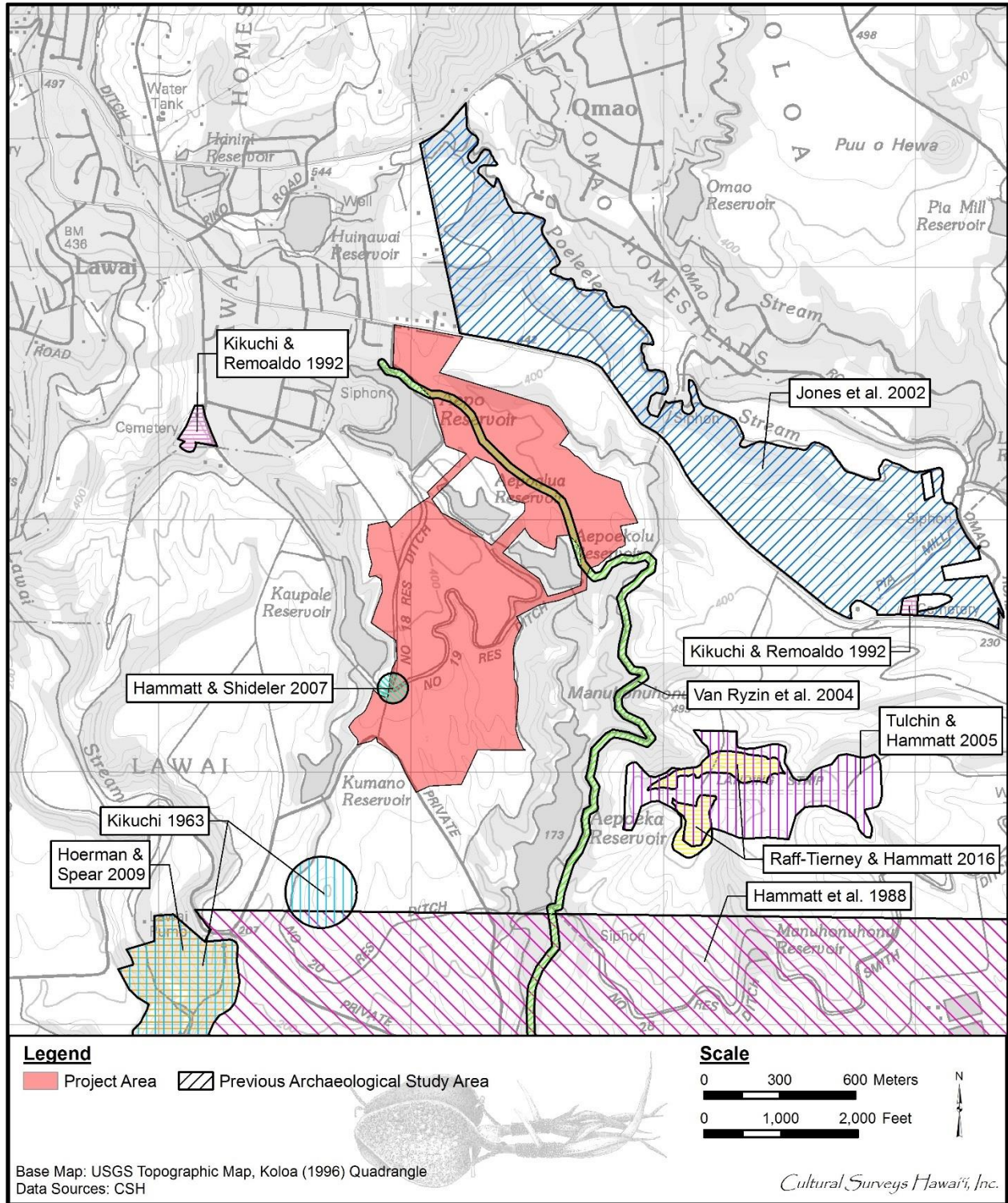


Figure 26. Portion of 1996 Koloa USGS topographic quadrangle, showing previous archaeological studies in the immediate vicinity of the project area

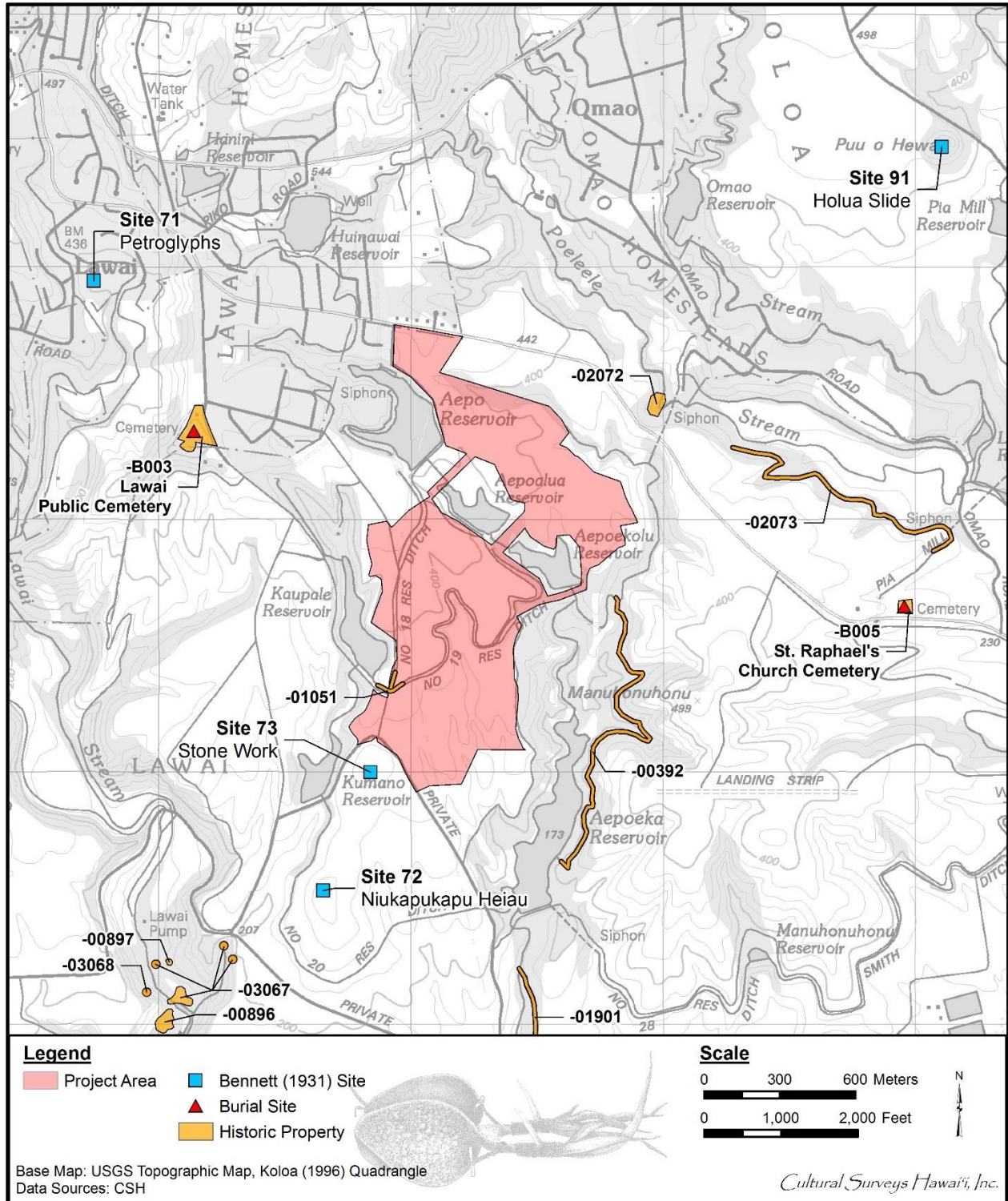


Figure 27. Portion of 1996 Koloa USGS topographic quadrangle, showing archaeological sites identified during previous archaeological studies

5.1.4 Jones et al. 2002

In 2002, CSH conducted an AIS with subsurface testing for the Moir Family Limited Partnership. The project area was an approximately 260-acre parcel at 'Ōma'ō, in the Kōloa Ahupua'a. Two sites were identified: SIHP # -2072 and SIHP # -2073. SIHP # -2072 is associated with the LCA 3229 awarded to Eke 'Opunui for the cultivation of taro and sugarcane. Partly eroded terraces were identified, as well as late-historic modern artifacts. SIHP # -2073 was identified as an irrigation ditch (now filled with colluvium) once associated with sugar plantation structures.

5.1.5 Van Ryzin et al. 2004

In 2004, an AIS was conducted for the Aepo Water Line project extending from the northwest corner of Parcel A toward Aepoeka Reservoir, terminating at Aepo Reservoir. SIHP # -392, a historic irrigation ditch, was observed near Aepoeka Reservoir. The previously identified 'auwai SIHP # -1901 was also identified and further documented.

5.1.6 Tulchin and Hammatt 2005

In 2005, CSH conducted an AIS (negative results recorded as an archaeological assessment) of an approximately 65-acre parcel in the Kōloa Ahupua'a at the request of the Kukui'ula Development Company, LLC. The project area, located along the southern slopes of Pu'u Manuhonuhonu, was proposed for development as a borrow pit. No historic properties were located within the project area's Area of Potential Effect, as the project area was completely cultivated in pineapple by the Kauai Pineapple Company until 1964. No mitigation commitments were recommended.

5.1.7 Hammatt and Shideler 2007

In 2007, CSH conducted an AIS in the *ahupua'a* of Lāwa'i for the Kukui'ula Development Company, LLC. The approximately 1.0-acre project area was proposed for a Kaua'i Island Utility Cooperative electrical substation. The 2007 AIS project area is located within the central, western portion of the 2017 Lāwa'i Solar project area.

One site, SIHP # -01051, was identified as McBryde Sugar Company irrigation infrastructure. The site has two features: No. 18 Reservoir Ditch and No. 19 Reservoir Ditch. Both features are earthen ditches and were likely constructed between 1904 and 1912. The site was determined to be significant under Criteria d for information content only and no further archaeological documentation work was recommended.

5.1.8 Hoerman and Spear 2009

Scientific Consultant Services, Inc. (SCS), conducted an archaeological reconnaissance survey and an AIS in 2009 at the request of the National Tropical Botanical Garden. The approximately 90-acre project area is located in the Lāwa'i Ahupua'a (Hoerman and Spear 2009), at Allerton Gardens.

During the survey, six sites were newly identified. The six sites comprise agricultural terraces, habitation sites, and habitation terraces. One site and one feature previously identified by Kikuchi (1963) (a stone wall and a series of *lo'i* terraces) were confirmed and documented (Hoerman and Spear 2009). All seven sites and one feature were found to be significant under Criterion d,

information content (Hoerman and Spear 2009). SCS recommended the entire project area be preserved under its use as a portion of the existing Allerton Gardens (Hoerman and Spear 2009).

5.1.9 Raff-Tierney and Hammatt 2016

In 2016, CSH conducted an AIS (negative results recorded as an archaeological assessment) for the Manuhonuhonu Borrow Site Phase 3 project in the uplands north of the Kukui'ula Community Development area. A pedestrian inspection was conducted and identified no significant historic properties. No further historic preservation work was recommended.

5.2 Current Archaeological Research

5.2.1 Wildey et al. 2017

CSH conducted an AIS for the current project, the Lāwa'i Solar and Storage Project (Wildey et al. 2017). During the AIS, two historic properties were re-identified and seven historic properties were newly identified. SIHP # 50-30-10-1051 Features A and B, were previously identified elements of the McBryde Sugar Company Irrigation Infrastructure. New historic properties identified include CSH 1, a plantation inter-field road system; CSH 2, low earthen berms; CSH 3, concrete slab; CSH 4, plantation fieldstone mound; CSH 5, two-tiered concrete platform; CSH 6, ditch remnant; and CSH 7, a steel pipe are all part of McBryde Sugar Company's irrigation and transportation system infrastructure.

A reduction in the project area resulted in Bennett Site 73, CSH 4, CSH 6, and CSH 7, being outside of the final project area. It is recommended that the new historic properties in the project area are included as features of SIHP # -1051. They are all evaluated as significant pursuant to HAR §13-275-6, under Criterion "d" (have yielded, or is likely to yield, information important for research on prehistory or history).

Section 6 Previous Oral History Research

This section draws from previous oral history research conducted by the University of Hawai'i's Center for Oral History (UHCOH) in 1988 to highlight the voices of several people who had deep knowledge of the culture and history of the *moku* of Kōloa. Their *mo'olelo* color the cultural, historical, and archaeological background with depth and nuanced recollections. Summaries and excerpts from this collection of oral histories are presented below.

6.1.1 Andres Labrador

The UHCOH documented the autobiography of Andres Labrador on 14 July 1987, in Kōloa, Kaua'i. Andres was born in the Philippines in 1901, the youngest of five children. Andres' mother taught at a Catholic school and his father was a fisherman. Andres and his wife, Baldomera, came to Kaua'i in 1922 and Andres soon started his first job for the Koloa Plantation. He held multiple different positions for the Koloa Plantation until his retirement in 1966. Andres shared his recollections of sugarcane processing around 1948:

Oh, for grab the cane. For load the cane in the cane car. Yeah. But first time, the people, they [still] stay cutting cane, they pile, and then [the machine] grab 'em, put 'em on the ruck. They put the cable over there, and then they hook 'em, put on the cane car. Yeah. And the second [machine, i.e., canegrabber], no more men [were required to cut the cane]. Only the machine. Yeah. They push [i.e., bulldoze] the cane, and they grab 'em, put 'em in the cane [truck]. Somebody wreck over there, the behind. So, no more men already.

Yeah, that '48, yeah, about, they start that. They pile the cane. Somebody cut the cane and they pile, and then the grab. They put chains under, they grab 'em and put on the cane car. And then, they find some other kind style, too. They bulldoze the cane and just grab 'em. [UHCOH 1988:1080-1081]

Andres also describes his work at the plantation stable, earlier, in 1926:

In Sunday about one o'clock, half past one like that, they [the horses] ready for come inside. They come insides and ready the food over there already. And that's the one hard time because some, he know what place he stay living. But most, he don't know already because Saturday—one whole night, no more food, he stay in the pasture. They rush over there, and go ahead, grab the food over there in the feed box. That's why, you got to catch that one, one by one, grab the neck and put rope. Bring 'em the regular place they got where [they] stay. 'Cause no can mix up that to the other one because not friend, eh? You got to make 'em partner-partner. Yeah, that's the one, that's the one I have a hard time in Sunday. And to pass that horse and mule, I got to pass behind [them] so I can grab the neck and bring 'em outside, put. Yeah, that's the hardest time when danger, because some, they fighting no put that [rope]. And you must know [each horse] from the feet until the body to the eye, everything. Because if you don't know—about the horse, same the mule. Because if he stay here with somebody already, they start fight already. "What the hell you come with me. You not my partner." [UHCOH 1988:1065-1066]

6.1.2 Rosalina Labrador Wagner

The UHCOH documented the autobiography of Rosalina Labrador Wagner on 5 August 1987, in Honolulu, O'ahu. Rosalina was born in Kōloa in 1924, the second of six children, to Andres and Baldomera Labrador. Rosalina spent her childhood in Kōloa doing chores, baby-sitting, and selling homemade baked goods and beer. She attended Kōloa School until the eighth grade, married in 1941, and then moved to Honolulu and raised two children. Rosalina shared her recollections of her chores picking vegetables and fruit as a child in Kōloa:

They were so in abundance, they were wild. Like those Filipino beans. And the pumpkin and the squash, they almost grew wild. And the tomatoes. And then, too, we would pick up fruits. They had wild guavas and those plums. As far as I can recall, the sugarcane, we ate a lot.

I think the laborers, I'm sure, they were the one that planted those vegetables. At that time, they did not have poison that killed the grass like they do now, the weeds. That gave us an outlet, too, I'm sure.

And we were picking up a lot of pig grass. They come like a succulent family, they crawl. They have that in Mexico, they make salads. But we took gunny sacks and we went to pick. The little kids tried, but the older ones, that's the one that did the pulling or the cutting. And we would drag that as much as we can because we had lots of pigs. I think, between four or six, to be sold and for our livelihood.

And we had lots of chickens. In fact, it was amazing when I can remember. They were living up in our ironwood tree. We were surrounded with ironwood trees, and they lived up there. We had a small area for the chicken coops where they would sleep. And our job was to clean that, you know, the chicken manure. And the pigs, we gave them baths.

So we were kept very busy. Then we had to make our own hot water, so we constantly had to pick up firewood, all kind of dead branches. What you find out in the country, it was a completely different world. I don't think I knew what happiness was. I felt secure with my parents, but I know what the difference today. I will never go and live like that again, that's for sure. [UHCOH 1988:1090-1091]

6.1.3 Florence Waterhouse Brandt

The UHCOH documented the autobiography of Florence Waterhouse Brandt on 1 December 1987, in Līhu'e, Kaua'i. Florence was born in Kōloa in 1911, the second of three children, to Dr. Alfred Herbert Waterhouse and Mabel Palmer Waterhouse. Her father, Dr. Waterhouse, was the physician for Koloa Plantation for many years. Florence attended school in Līhu'e up until the eighth grade. She then attended Kaua'i High for a year before moving to the mainland to finish her education. She married in 1931 and eventually moved back to Kaua'i. Florence shared her recollections of Fourth of July celebrations held by her father, Dr. Waterhouse:

Well, that was their [wedding] anniversary. And Dad, he'd get from the plantation the use of the train and the cane cars, empty train cars. And so, he'd get the people, anybody that wanted to go down to Po'ipu would all pile on the train. Oh, that was fun. You couldn't get clear to Po'ipu, but it was a walk after that. You walked quite

a ways, but not terribly long. And then when they went to go back, I remember, the train would whistle, and then everybody'd start walking back up to go back on the train.

He'd furnish the drink. He'd buy a big jug of syrup or something and mix it, and then he'd have ice. And then, he had a great big round barrel, I guess it was like that, all full of juice. That, and a big tin can of, or several of them, of senbei. And he'd have juice and senbei. And then they'd bring their own lunches. Packed lunches, the people that came. [UHCOH 1988:1200]

Florence also mentioned horse races held among the different plantations:

Over in Waipouli, there was a regular racecourse over there. And you know when the plantation had their races, the plantations would race against each other, and they'd always have the finals over there. But in just practicing for it, why, I didn't want to run them [the horses] on macadam, so we ran them in the dirt roads leading into the cane field, and so I would take 'em down that, beyond the stables. The stables were in Wahiawa. And then I kept Ipo there. We had Lehua there, too. Then Bill sold Lehua, then we could see her, though, from a distance. And there was a camp – see, when you're going from Kōloa to 'Ele'ele, before you get to the [Kaua'i Pineapple Company] cannery [in Lāwa'i], there was a road back in there, I would run Ipo on that, too. [UHCOH 1988:1208]

6.1.4 Rita Cataluna Jacintho

The UHCOH documented the autobiography of Rita Cataluna Jacintho on 18 March 1987 in Kōloa, Kaua'i. Rita was born in 1906 in Lisbon, Portugal, one of seven children. Rita and her family arrived in Kōloa in 1911. Her father worked for the Kōloa Plantation and the family lived in the Spanish Camp. Rita attended St. Raphael's Catholic School and then later married in 1924. She and her husband raised five children in Kōloa, and Rita remained in Kōloa as well. She shared her recollections of life in the Spanish Camp during her childhood:

Where the bank is was one small store like. But was the small store, plantation store, Kōloa. Right next was the small little Chinese restaurant. And the track, the train came right in between. We remember the track, yet. So, anyway, got to Spanish Camp. Each one choose the home they wanted. Had three lanes of homes. Each lane had one brick oven. So, baked bread. We were in the front, the top one. In the house was two beds, one table with two benches, one each side. There was a sink. And then, outside, we had just the roof, washhouse. No bathtub. So in the big tin pan, we used to bathe, one by one, in the kitchen. Make hot water outside in the big can. (Chuckles) That, I remember. Going to [St. Raphael's] Catholic School and all that, I remember. [UHCOH 1988:1218]

Rita also mentions how her mother and family made bread in the Portuguese oven:

They used to make all bread. Those days, they no buy in the store. That was plenty bread. We helped her carry to the oven. There, they burn lot of wood. And then, you know, always had, by the door, get something like a flume. When everything, the top is all white, then they start taking that ashes all out. And then, sweep 'em all nice and clean, and then they put flour. If it burns fast, it's too hot. So they have

a mop, and then with cold water. They try again. Little bit brown, then put the bread inside. Some, they used to put upside down. You know, come nice, crust. Now, they use banana leaves so come not dusty, you know. And ho, the smell go all over the place. And those days, no more butter. They broke by pieces, they put some of that oil. They eat like that right there by the oven. Was good, I remember that. I baked lot of that in the Kōloa Camp too, before.

They used to put signs. Put sign on the top so two of them . . . Well, if only one need, well, get three ovens. They can go to different lane, anyway. But they put signs so you know somebody's going to make. Cannot knead 'em same time because it cannot go in the same time. That was fun, you know, with that. We used to roll sweet potatoes on that ashes. 'Cause a big pile, eh? Then, I remember all that.

We used to go up the hill, play, and slide down. You know, we had to go get grass there for make mattress because before days they never buy mattress in the store. Every other week or so, you have to change because get all dusty, eh? That was something. [UHCOH 1988:1223-1224]

6.1.5 Masako Hanzawa Sugawa

The UHCOH documented the autobiography of Masako Hanzawa Sugawa on 8 April 1987, in Kōloa, Kaua'i. Masako was born in Halehaka, Kaua'i in 1911, the eldest of three children. Her parents immigrated from Japan and Masako's father was a rice farmer in Halehaka. Her mother died in 1919, at age 33, when Masako was eight years old. At age 18, Masako married and moved to Lāwa'i. Eventually Masako and her husband and young son moved to Kōloa, where Masako and her husband were employed by the local telephone company. She retired in 1966. Masako shared her recollections of life in Lāwa'i:

Well, the kitchen and the house was built separately. And of course, it used to be like a plantation home. But the plantation homes have the kitchen and everything together on one building, these ones, I think they made themselves because the kitchen was separate and the living room and the bedrooms were on another building. But not like other plantation house because they made it themselves. So, they had floors, you know, all.

And then, my father-in-law, I think, and my mother-in-law, they are old people from Japan so they made the home with shoji, you know. Of course, the floor was goza. And then, the bed, they used to sleep regularly like Japanese with the futon laid out. But they had shoji. At night, they close it. And in the morning, they open it into a living room. We used to have small little rooms on the side. Of course, those were made into American sort of home with the bed and things like that.

When I first got married, they had a big artesian well with a roof over it. And then, they have two buckets hanging on a chain, one on each end. We had to carry all that. Get the water from that artesian well for o-furo, and washing laundry, and cooking, and all.

Then, we didn't have electricity either. It was all kerosene lamps until several years later, they changed to those gas lamps. So even the iron was the old-fashioned one with charcoal.

Before we moved, for a couple of years before that, this Nawiliwili Transportation [Company], they were in with this road buildings. And they started to go around to get rocks, blue rocks, for crushings to make the roads. And we had quite a bit on our land, you see. So my husband sold the rocks to them. And then, they made a road coming into our lot. And then, they start taking all the rocks out. Mr. Hashizume was one of them that got these men. Contracting with about twenty men there. And they made a barracks right little above so they could stay there and then work on it. [UHCOH 1988:1276-1277]

Masako described the work available in Lāwa'i around 1930:

All, I think even the ladies and menfolks were all involved in the Lāwa'i cannery [Kaua'i Pineapple Company] job. Because as far as I know, after I got married, they were all working. And if the wives weren't working, the husbands were working either the pineapple field or in the cannery. They had so many job at that time. [UHCOH 1988:1278]

She also mentions activities for the Japanese community of Lāwa'i:

Because I was telling about the Daijingu they had up the valley. Of course, I don't think there's any building up there anymore, but, oh, they used to have a big affair, I was told. I've never been there, though. But my husband used to say, oh, they used to have sumo and all those things, no? And I think they used to have those things, although I've never been to one. [UHCOH 1988:1280]

Section 7 Traditional Cultural Practices

7.1 Migration Patterns

Radiocarbon dating suggests settlement occurring between AD 750 to AD 1000 (Rieth and Cochrane 2015). Hawaiian traditions indicate the Hawaiian Islands were first settled by chief Punanuikaianaaina, who came from Puna Moku on Kaua'i via Marquesas in approximately AD 1000 to 1100 (Fornander 1996:45-46). Early settlers would have been attracted to the windward side of Kaua'i, which boasted large river valleys that could support *kalo* cultivation. The most notable areas for this type of cultivation would be Wailua, Hanamā'ulu, and Hanalei.

The earliest documentation of Kōloa's population appears in the 1850s when missionary censuses recorded a total population of 1,296 (Schmitt 1977:12). The majority of Kōloa's population was concentrated in the lower flood plains and delta plains of rivers where *kalo* is usually cultivated. By 1872, the population decreased to 833 and then began to increase over time (Schmitt 1977:13).

7.2 Cultivation and Gathering of Plant Resources

The first written accounts of Kaua'i are from foreigners who described the general landscape of areas noting the extensive agricultural systems. Captains Cook and Vancouver both anchored off of Waimea Ahupua'a. Cook described Kōloa as "what we saw of their agriculture, furnished sufficient proofs that they are not novices in that art. The vale ground has already been mentioned as one continuous plantation of taro, and a few other things, which all have the appearance of being well tended to" (Cook 1784:244). Vancouver's description indicates the land was used *mauka* to *makai*: "the low country which stretches from the foot of the mountains towards the sea, occupied principally with the taro plant...interspersed with some sugar-cane of luxuriant growth and some sweet potatoes" (Vancouver 1798:170). Handy and Handy noted from Waimea to Wailua was known for its extensive plantations of breadfruit, bananas, sweet potatoes, yams, and *kalo* (Handy and Handy 1972:152). The favored areas for coconuts were Kōloa and Lāwa'i (Handy 1940:193).

According to LCA documentation, although there were no claims within the project area, there were several claims in the vicinity of the project area. The land was used for *lo'i kalo*, *kula*, pig enclosures, a fishpond, and house lots.

Previous archaeological reports also indicate Lāwa'i Ahupua'a was a well populated and used area. Within the project area is SIHP # -1051, a McBryde Sugar Company irrigation infrastructure (Hammatt and Shideler 2007). Other sites found in the vicinity of the project area includes *heiau*, coastal shelters, agricultural complexes, habitation complexes, *iwi kūpuna* (ancestral remains), platforms, *'auwai*, historic irrigation ditches, stone walls, and cemeteries.

Previous oral histories conducted by UHCOH reflect the diverse multi-cultural history of Hawai'i's sugar industry. Rosalina Labrador Wagner was the daughter of Andres Labrador, a worker at Koloa Plantation until his retirement in 1966. Rosalina's recollections of Kōloa include doing chores, babysitting, and selling homemade baked goods and beer. She recalls picking fruits and vegetables as a child in Kōloa:

They were so in abundance, they were wild. Like those Filipino beans. And the pumpkin and the squash, they almost grew wild. And the tomatoes. And then, too,

we would pick up fruits. They had wild guavas and those plums. As far as I can recall, the sugarcane, we ate a lot.

Rosalina would also pick pig grass, a crawling succulent plant that is popular in Mexican and used to make salads.

7.3 *Mo'olelo and Ka'ao*

Lāwa'i Stream, which is east of the project area, is a *wahi pana* or storied place. In the center of Lāwa'i Stream is a large boulder. One account relays how the goddess Hina was being actively pursued. Hina jumped into the stream and immediately turned into stone. According to this legend, the stone was sacred to women only. Women of the area would stand on the stone to have their "romantic desires" granted (Forbes 1970:2). In 1997, Betty Snowden, whose family had lived in Lāwa'i Kai for over 200 years, recounts the story of the *menehune* (*Honolulu Advertiser* 1997). Manu and his father discussed building a wall in the stream, however, Manu and his friends had planned a fishing trip to Ni'ihau and he did not want to miss out. Not wanting to ignore his father's request either, Manu began the task. Unaware that the *menehune* chief was behind him, the chief tugged at Manu's clothing and made him an offer that would benefit the both of them. For two *pū'olo* (bundle) of shrimp, the *menehune* would build a wall for Manu and his *'ohana* (family). Manu agreed. For the next few days, Manu surfed, fished, and swam with his friends until he realized at sunset that he need to collect *'ōpae* to fulfill his promise to the *menehune* chief. He began collecting as much *'ōpae* as possible before it was dark but was only able to gather one *pū'olo*. He placed the bundle at the agreed upon location. The *menehune* eventually crept down the valley and constructed the wall. When Manu and his family awoke the next morning, only half the wall was completed because they had received only half of their request. Today a half built wall can still be found at the end of Lāwa'i Stream in the valley.

7.4 Burials

Previous archaeological research indicates several burials were found in the vicinity of the project area. In 1988, CSH conducted an AIS of 1,000-acres for the proposed Kukui'ula Bay Planned Community (Hammatt et al. 1988). A total of 58 archaeological sites with 150 individuals features were located, mapped, and described (no SIHP designations). Both pre-Contact and post-Contact sites were found stretching from Lāwa'i Valley to Weliweli Ahupua'a. Pre-Contact sites included *'auwai*, fields, house sites, shelters, modified lava tubes, burials, and two *heiau*. Historic sites included cattle walls, abandoned cane fields, a house site, and remnants of a railroad berm.

In 1992, Kikuchi and Remoaldo conducted a study to locate, map, and inventory burial places on Kaua'i. Their study focused on cemeteries, graveyards, and family plots post 1800. This study did not include traditional Hawaiian burials. St. Raphael's Church Cemetary in Kōloa Ahupua'a was mapped and inventoried in February 1986. A total of 224 grave sites were documented while seven were marked as "unknown." St. Raphael's Church Cemetery was given SIHP # -B005. The Lāwa'i Public Cemetery was not surveyed but listed as SIHP # -B003.

An AIS was conducted for the current project, Lāwa'i Solar and Storage Project (Wildey et al. 2017). It should be noted that during the AIS, there were no burials found.

Section 8 Summary and Recommendations

CSH undertook this CA at the request of CH2MHILL. The research broadly covered the entire *ahupua'a* of Lāwa'i and Kōloa, which includes the project area.

8.1 Results of Background Research

Background research for this study yielded the following results:

1. The *ahupua'a* of Lāwa'i is bounded by the *ahupua'a* of Kalāheo to the west; Kōloa to the east; the Pacific Ocean to the south; and the Līhu'e-Kōloa Forest Reserve to the north. The main geographic feature of the *ahupua'a* is the deeply dissected Lāwa'i Valley along Lāwa'i Stream. The most notable place on the coast is Puki Kai o Lāwa'i, also known as Spouting Horn, which is a natural blowhole.
2. The name Kōloa has several derivations. Kōloa is the name for the large, soft Hawaiian sugarcane once grown by Hawaiians; it is also the name of a steep rock called Paliokōloa located on the banks of Waikomo Stream. The bank of the river was called Kōloa after the native duck (Kikuchi 1963:46; Pukui et al. 1974:116).
3. Three *heiau* are listed for the *ahupua'a* of Lāwa'i including Niukapukapu Heiau (Bennett Site 72) located on Niukapukapu Hill; Kalohiokapua Heiau (Bennett Site 69) in Lāwa'i Valley (destroyed); and Māmalu Heiau (Bennett Site 70) near the mouth of Lāwa'i Valley (destroyed).
4. Kōloa Ahupua'a has five *heiau* including Hō'ai (Bennett Site 75) at Kūhiō Park on the west bank of Waikomo Stream; Kānehaule (Bennett Site 92) on the east branch of 'Ōma'o Stream (destroyed); Kāneioulouma (Bennett Site 81) on the shore near Kihouna Heiau (Bennett Site 80); and Kūhāhāpō at Lae o Kahala.
5. Radiocarbon dating suggests settlement occurred in Kōloa Moku between AD 750 to AD 1000 (Rieth and Cochrane 2015). Hawaiian traditions indicate the Hawaiian Islands were first settled by chief Punanuikaianaaina who came from Puna Moku on Kaua'i via Marquesas in approximately AD 1000 to 1100 (Fornander 1996:45-46).
6. The earliest documentation of Kōloa's population appears in the 1850s when missionaries began to create a census. The total population for Kōloa during this time was 1,296 (Schmitt 1977:12). The majority of the population was concentrated in the lower flood plains and delta plains of rivers where *kalo* is generally cultivated. By 1872, the population decreased dramatically to 833 then began to increase over time (Schmitt 1977:13).
7. Captains Cook and Vancouver both wrote about Kaua'i's extensive agricultural systems noting the continuous use of the land spanning from *mauka* to *makai*. Handy and Handy (1972:152) noted that from Waimea to Wailua, the area was known for its extensive plantations of breadfruit, bananas, sweet potatoes, yams, and *kalo*. The favored area for coconuts were in Kōloa and Lāwa'i (Handy 1940:193).
8. According to LCA documentation, although there were no claims within the project area, there were several claims in the vicinity of the project area. The land was used for *lo'i kalo*, *kula*, pig enclosures, a fishpond, and house lots.
9. After Liholiho's (Kamehameha IV) death in 1863, Queen Emma built a residence for herself in Lāwa'i Ahupua'a on a bluff east of Lāwa'i Kai.

10. Kōloa was the home of three large sugar companies: Koloa Sugar Company (the first sugar plantation company on Kaua'i); McBryde Sugar Company; and Grove Farm.
11. Previous archaeological reports indicated Lāwa'i Ahupua'a was a well populated and used area. Within the project area is SIHP # -1051, a McBryde Sugar Company irrigation infrastructure (Hammatt and Shideler 2007). Other sites found in the vicinity of the project area includes *heiau*, coastal shelters, agricultural complexes, habitation complexes, *iwi kupuna* (ancestral bones), platforms, *'auwai*, historic irrigation ditches, stone walls, and cemeteries.

8.2 Impacts and Recommendations

Based on information gathered from the cultural and historic background, no impacts were identified. However, in the event that any *iwi kūpuna* and/or cultural finds are encountered, CSH recommends the following:

1. Project construction workers and all other personnel involved in the construction and related activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. In the event that any potential historic properties are identified during construction activities, all activities will cease and the SHPD will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD, coroner, and Police Department will be notified pursuant to HAR §13-300-40. In addition, in the event of an inadvertent discovery of human remains, the completion of a burial treatment plan, in compliance with HAR §13-300 and HRS §6E-43, is recommended.
2. In the event that *iwi kūpuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment plan and cultural preservation plan for proper cultural protocol, curation, and long-term maintenance.

Section 9 References Cited

Akana, Collette Leimomi with Kiele Gonzales

2015 *Hānau Ka Ua, Hawaiian Rain Names*. Kamehameha Publishing, Honolulu.

Alexander, Arthur C.

1937 Koloa Plantation 1835-1935, A History of the Oldest Hawaiian Sugar Plantation. *Star Bulletin*.

Alexander, A.C.

1878 Map of Kauai. Registered Map 1395. Hawai'i Land Survey Division, Department of Accounting and General Services, Honolulu.

Ava Konohiki

2015 Ancestral Visions of 'Āina website. Available online at <http://www.avakonohiki.org/>.

Barrère, Dorothy

1994 *The King's Mahele: The Awardess and Their Lands. Compiled by Dorothy B. Barrère*. Ms. on file, State Historic Preservation Division Library, Kapolei, Hawai'i.

Bennett, Wendell C.

1931 *The Archaeology of Kaua'i*. Bishop Museum Bulletin 80. Bernice Pauahi Bishop Museum, Honolulu.

Bingham, Hiram

1847 *A Residence of Twenty-One Years in the Sandwich Islands*. Convers, New York.

Bishop Museum Archives

Late 1800s Photograph of Queen Emma's hom at Lāwa'i. Bishop Museum Archives, Honolulu.

1924 Aerial photo of Lāwa'i Bay. Bishop Museum Archives, Honolulu.

Blake, Henry K.

1888, 1938 Hand-drawn map of Kōloa Village. Kaua'i Historical Society, Līhu'e, Kaua'i, Hawai'i.

Boundary Commission, Kauai

1874 Commission on Boundaries. Hawaii (Kingdom, Republic, Territory). On file at Hawai'i State Archives, Honolulu.

Chinen, Jon J.

1958 *The Great Mahele, Hawaii's Land Division of 1848*. University of Hawaii Press, Honolulu.

Cook, James P.

1784 *A Voyage to the Pacific Ocean 1776, 1777, 1779, and 1780*. Vol. 2 and 3. G. Nichol and T. Cadell, London.

Condé, Jesse C. and Gerald M. Best

1973 *Sugar Trains*. Glenwood Publishers, Felton, California.

Coulter, John Wesley

1931 *Population and Utilization of Land and Sea in Hawaii. 1853*. Bishop Museum Bulletin 88. Bernice Pauahi Bishop Museum, Honolulu.

Damon, Ethel M.

1931 *Koamalu*. 2 vols. Privately printed by the Honolulu Star-Bulletin Press, Honolulu.

Donohugh, Donald

2001 *The Story of Koloa: A Kaua'i Plantation*. Mutual Publishing, Honolulu.

Dorrance, William H. and Francis S. Morgan

2000 *Sugar Islands: The 165-Year Story of Sugar in Hawai'i*. Mutual Publishing, Honolulu.

Farley, J.K.

1907 1907 Notes on Maulili Pool, Kōloa. In *Hawaiian Almanac and Annual for 1908*, Thos. G. Thrum, Honolulu.

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens

1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*. U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawai'i Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C.

Forbes, David

1970 Research notes (1967-1971). 12 vols. On file at Hawaiian Mission Children's Society Library, Honolulu.

Fornander, Abraham

1918 *Fornander Collection of Hawaiian Antiquities and Folk-Lore*. Bishop Museum Press, Honolulu.

1996 *Fornander's Ancient History of the Hawaiian People*. Mutual Publishing, Honolulu.

Friends of the Koloa Community

1985 *Historic Koloa: A guide*. Martha Hoverson, editor. Friends of the Koloa Community, Kōloa, Kaua'i.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte

2013 Online Rainfall Atlas of Hawai'i. *Bulletin of the American Meteorological Society volume 94, pp. 313-316, doi: 10.1175/BAMS-D-11-00228.1*. Electronic document, <http://rainfall.geography.hawaii.edu> (accessed 10 April 2014).

Google Earth

2013 Aerial photographs of Hawai'i. Google Inc., Mountain View, California. Available online at www.google.com/earth.html.

Hammatt, Hallett H. and David W. Shideler

2007 *Preservation and Reconstruction Plan for Site 50-30-10-0947, a Railroad Berm in Kōloa Ahupua'a, Kona District, Kaua'i TMK: [4] 2-8-015:082*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Hammatt, Hallett H., Douglas F. Borthwick, David W. Shideler, and Mark Stride

1988 *Archaeological Inventory Survey of the Proposed Kukuiula Bay Planned Community, Kōloa, Kaua'i*. Cultural Surveys Hawai'i, Kailua, Hawai'i.

Hammatt, Hallett H., Kristina W. Bushnell, Gerald K. Ida, Rodney Chiogioji, Victoria S. Creed, David W. Shideler

1999 *Archaeological Data Recovery for Kukui'ula Bay Planned Community, Phase II Development Area, Kukui'ula, Kōloa, Kaua'i, (TMK 2-6-03: Por. 1 and 2-6-04:Por. 33, 38, 40)*. Cultural Surveys Hawai'i, Kailua, Hawai'i.

Handy, E.S. Craighill

1940 *The Hawaiian Planter*. Bishop Museum Bulletin Volume 1, No. 161. Bernice Pauahi Bishop Museum, Honolulu.

Handy, E.S. Craighill and Elizabeth G. Handy

1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Bishop Museum Bulletin 233. Bishop Museum Press, Honolulu.

Hawai'i State Archives

ca. 1924 Aerial photo of Kukui'ula Harbor. Hawai'i State Archives, Honolulu.

Hawai'i TMK Service

2014 Tax Map Key [4] 2-6-003. Hawai'i TMK Service, Honolulu.

Hoerman, Rachel and Robert L. Spear

2009 *Archaeological Inventory Survey of an Approximately 90 Acre Parcel Lawa'i Ahupua'a, Koloa District, Kaua'i Island, Hawai'i [TMK: (4) 2-6-002: 001, 004 to 006]*. Scientific Consultant Services, Inc., Honolulu.

Ho'oulumāhie

2008a *Ka Mo'olelo O Hi'ikaikapoliopole*. Awaiaulu Press, Honolulu.

2008b *The Epic Tale Of Hi'ikaikapoliopole*. Puakea Nogelmeier, translator. Awaiaulu Press, Honolulu.

Interior Department

1882 *Appendix 1 to Surveyor General's Report. A Brief History of Land Titles in the Hawaiian Kingdom*. P.C. Advertiser Co., Honolulu.

Jarves, James J.

1844 *Scenes & Scenery in the Sandwich Islands . . . during the Years 1837-1842*. James Munroe and Company, Boston

Jones, C. Kulani, Anthony R. Bush, William H. Folk, Rodney Chiogioji, David W. Shideler, and Hallett H. Hammatt

2002 *Archaeological Inventory Survey of an Approximately 260-Acre Parcel at 'Ōma'ō, Kōloa, Kaua'i (TMK: 2-7-03:5)*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Judd, Bernice

1935 Koloa, A Sketch of Its Development. In *Kauai Historical Society Papers*, Vol. II. Kauai Historical Society, Līhu'e, Kaua'i, Hawai'i.

Juvik, Sonia P. and James O. Juvik (editors)

1998 *Atlas of Hawai'i*. Third edition. University of Hawai'i Press, Honolulu.

Kame'eleihiwa, Lilikala

1992 *Native Land and Foreign Desires. Pehea La E Pono Ai?* Bishop Museum Press, Honolulu.

Kamins, Robert M. and Robert E. Potter

1998 *Mālamalama, A History of the University of Hawai'i*. University of Hawai'i Press, Honolulu.

Kanahele, George S.

1999 *Emma: Hawai'i's Remarkable Queen*. University of Hawai'i Press, Honolulu, Hawaii.

Kent, Harold Winfield

1986 *Treasury of Hawaiian Words in One Hundred and One Categories*. Masonic Public Library of Hawai'i, Honolulu.

Kikuchi, William K.

1963 *Archaeological Survey and excavations on the Island of Kaua'i, Kona District, Hawaiian Islands*. Honolulu.

Kikuchi, William and Susan Remoaldo

1992 *Cemeteries of Kaua'i*. Kaua'i Community College and University of Hawai'i. Committee for the Preservation of Hawaiian Language, Art and Culture, Puhī, Kaua'i.

Kirch, Patrick Vinton

2010 *How Chiefs Became Kings: Divine Kingship and the Rise of Archaic States in Ancient Hawai'i*. University of California Press, Oakland, California.

Koloa Plantation Days

2015 Photo of Koloa Mill, built 1912. Accessed online, <http://www.koloaplantationdays.com/>

Knudsen, Eric A. and Gurre P. Noble

1945 *Kanuka of Kauai*. Tongg Publishing Company, Honolulu.

Krauss, Bob, and William P. Alexander

1984 *Grove Farm Plantation: The Biography of a Hawaiian Sugar Plantation*. Pacific Books, Palto Alto, California.

Lahainaluna School

1885 *Heiaus and Fishing Grounds [of Koloa, Kauai]* [translation]. HMS 43, #17. Bishop Museum Archives, Honolulu.

Lydgate, John M.

1991 William E. Rowell's Reminiscences of Waimea. In *The Kauai Papers*. Kauai Historical Society, Līhu'e, Hawai'i.

Lyte, Brittany

2015 In Hunt of Feral Pigs. *Garden Island*. Electronic document, http://thegardenisland.com/news/local/in-hunt-of-feral-pigs/article_ebc14189-ffb4-59cf-a39c-31a8c365f67b.html (accessed 17 May 2016).

Maly, Kepā, Benton Keali'i Pang, and Charles Pe'ape'a Makawalu Burrows

n.d. *Pigs in Hawai'i, from Traditional to Modern*. Electronic document, available online at <http://www.eastmauiwatershed.org/wp-content/uploads/2013/01/Puaa-cultural-fact-sheet-04.03.pdf> (accessed 17 May 2016)

McBryde Sugar Company

n.d. *The Story of McBryde Sugar Co., Ltd. 1899-1949*. n.p., n.p.

Missionary Herald June

1827 Article by Samuel Whitney. *Missionary Herald* June:12.

Monsarrat, M.D.

1891 Map: Hawaii Territorial Survey, Koloa. Traced from M.D. Monsarrat ca. 1891 Government Survey Map 1694 by T.B. Butch and E.J. Grube, September 1918. Hawai'i Land Survey Division, Department of Accounting and General Services, Honolulu.

1896 Map of Eleele to Koloa. Registered Map 1842. Hawai'i Land Survey Division, Department of Accounting and General Services, Honolulu.

Monsarrat and McBryde

1900 Map of McBryde sugar lands. Registered Map 2145. Hawai'i Land Survey Division, Department of Accounting and General Services, Honolulu.

Nakuina, Moses K.

1990 *The Wind Gourd of La'amaomao*. First edition. Esther T. Mookini and Sarah Nākoa, translators. Kalamakū Press, Honolulu.

1992 *The Wind Gourd of La'amaomao*. Second edition. Esther T. Mookini and Sarah Nākoa, translators. Kalamakū Press, Honolulu.

Office of Hawaiian Affairs

2015 *Papakilo Database*. Office of Hawaiian Affairs cultural and historical database. Electronic document, <http://papakilodatabase.com/main/index.php>.

Pacific Commerical Advertiser

1857 Article. *Pacific Commercial Advertiser* 19 February.

1867 Article. *Pacific Commercial Advertiser* 21 December.

Palama, Stephen L. and Catherine Stauder

1973 *The Archaeology of Kona, Kaua'i from the Ahupua'a of Kōloa to the Ahupua'a of Weliweli. Archaeological Reconnaissance of the Proposed Cane Haul Road to the Koloa Mill for McBryde Sugar Co., Ltd.* Archaeological Research Associates, Honolulu.

Post Office in Paradise

2015 1905 photo of McBryde Sugar Mill. Available online at www.hawaiianstamps.com.

2015 ca. 1885 photo of sugar mill in 'Ele'ele. Available online at www.hawaiianstamps.com.

2015 ca. 1880 photo of Koloa Landing. Available online at www.hawaiianstamps.com.

Pukui, Mary K.

1936 Manuscript. Bernice Pauahi Bishop Museum, Honolulu.

1983 *Ōlelo No'eau: Hawaiian Proverbs and Poetical Sayings*. Bishop Museum Special Publication No.71. Bishop Museum Press, Honolulu.

Pukui, Mary K. and Samuel H. Elbert

1986 *Hawaiian Dictionary*. Second edition. University of Hawaii Press, Honolulu.

Pukui, Mary K., Samuel H. Elbert, and Esther Mookini

1974 *Place Names of Hawaii*. University of Hawaii Press, Honolulu.

Raff-Tierney, Angus and Hallett H. Hammatt

- 2016 *Archaeological Assessment Report for the Kukui'ula Manuhonuhonu Borrow Site Phase 3, Kōloa Ahupua'a, Kōloa District, Kaua'i TMK: [4] 2-6-003:001 por.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Rieth, Timothy and Ethan E. Cochrane

- 2015 *Chronology of Colonization in Remote Oceania (The); the Oxford Handbook of Prehistoric Oceanic* (forthcoming). Oxford Handbooks Online.

Schmitt, Robert C.

- 1977 *Historical Statistics of Hawaii.* University of Hawaii Press, Honolulu.

Snowden, Betty

- 1997 You get half of what you half pay for. *Honolulu Advertiser* 15 March, B1.

Soehren, Lloyd

- 2013 *Hawaiian Place Names.* Electronic database, ulukau.org/cgi-bin/hpn?l=haw.

Thrum, Thomas G.

- 1906 *Hawaiian Almanac and Annual for 1907.* Thomas G. Thrum, Honolulu.
1907 *Hawaiian Almanac and Annual for 1908.* Thomas G. Thrum, Honolulu.

Townsend, John

- 1839 *Narrative of a Journey Across the Rocky Mountains....and a Visit to the Sandwich Islands and Chile... H.* Perkins and Marvin, Boston.

Tulchin, Jon and Hallett H. Hammatt

- 2005 *Archaeological Literature Review and Field Inspection for a 8.5-Acre Knudsen Trust Parcel, Kōloa Ahupua'a, Kona District, Island of Kaua'i TMK: 2-18-14: por. 01.* Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

UHCOH (UH Center for Oral History)

- 1988 Oral Histories. Electronic document, <http://www.oralhistory.hawaii.edu/pages/community/koloa.html>

Ulukau

- 2014 *Māhele Database.* Hawaiian Electronic Library, <http://ulukau.org/cgi-bin/vicki?l=en..>

U.S. Department of Agriculture

- 2001 Soil Survey Geographic (SSURGO) database. U.S. Department of Agriculture, Natural Resources Conservation Service. Fort Worth, Texas. <http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/> (accessed March 2005).

U.S. Geological Survey

- 1910 Koloa USGS Survey 7.5-Minute Series Topographic Quadrangle. USGS Information Services, Denver, Colorado.
1963 Koloa USGS Survey 7.5-Minute Series Topographic Quadrangle. USGS Information Services, Denver, Colorado.
1978 Koloa USGS Orthophotoquad aerial photograph. USGS Information Services, Denver, Colorado.
1996 Koloa USGS Survey 7.5-Minute Series Topographic Quadrangle. USGS Information Services, Denver, Colorado.

Vancouver, George

1798 *A Voyage of Discovery to the North Pacific Ocean and Round the World Performed in the Years 1790-95*, 3 Volumes. G.G. and J. Robinson and J. Edwards, London, England.

Van Ryzin, Karl, David W. Shideler, and Hallett H. Hammatt

2004 *Archaeological Inventory Survey for the Proposed Aepo Waterline Project, 'Ōma'o, Kōloa, Kaua'i Island, TMK: 2-6-03:31, 32*. Cultural Surveys Hawai'i, Inc., Kailua, Hawai'i.

Waihona 'Aina

2000 *The Māhele Database*. Electronic document, <http://waihona.com> (accessed 10 April 2014).

Walker, Alan T. and Paul H. Rosendahl

1990 *Archaeological Inventory Survey, Hyatt Regency Kaua'i Proposed Golf Course Project Area, Land of Pā'a, Kōloa District Island of Kaua'i (TMK: 4-2-9-01: por.1)*. Paul H. Rosendahl, inc., Hilo, Hawai'i

Wichman, Frederick B.

1991 *Polihale and other Kaua'i Legends*. Bamboo Ridge Press, Honolulu.

1998 *Kaua'i. Ancient Place-Names and Their Stories*. University of Hawai'i Press, Honolulu.

2003 *Nā Pu'a Ali'i O Kaua'i: Ruling Chiefs of Kaua'i*. University of Hawai'i Press, Honolulu.

Wilcox, Carol

1996 *Sugar Water: Hawaii's Plantation Ditches*. University of Hawai'i Press, Honolulu.

Wilkes, Charles

1845 *Narrative of the United States Exploring Expedition, During the Years 1838, 1839, 1840, 1841, 1842*, 5 vols. Lea and Blanchard, Philadelphia, Pennsylvania.

WRCC (Western Regional Climate Center)

2010 1961-1990 Monthly Climate Summary for Kawaihoa. Available online at <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?hi3754>

Yamanaka, William K. and Takeo Fuji

2001 *History of McBryde Plantation 1899-1996*. Electronic document, <http://members.aol.com/kauaihistory/bk1.htm>.