Section 3 Background Research

3.1 Traditional and Historical Background

Niumalu Ahupua‘a is located in the ancient *moku* or district of Puna and is probably best known in a traditional sense for the Menehune Fishpond.

Fornander (1880) relates that

> The earliest mention of the [Niumalu] area is legendary dating to 1785. After Kahekili defeated Oahu a number of chiefesses of highest rank were killed. Kekelaokalani made her escape to Kaua‘i bringing with her some Oahu soil, part of which she deposited at Hulaia [Huleia]. [Fornander 1880:227 in Ching et al. 1973]

3.1.1 Mythological and Traditional Accounts

Wichman (1998:57) relates that Niumalu translates as “shaded coconut trees.” The name is derived from the following legend.

Kemamo had the ability to shoot a rock from his sling 5 miles, and never missed a shot. He is said to have resided on the Kona/Puna Districts boundary. During Kapūnohu’s travels through the islands he was warned about Kemamo and his challenges to travelers. Upon their meeting, Kapūnohu agreed to a contest with Kemamo, each betting his most prized possession; Kapūnohu bet his spear and Kemamo his sling. Kalalea peak was the target and visible from their location. Kemamo slung a rock that failed to reach Kalalea and fell near Anahola. Kapūnohu’s spear shaded the coconut trees, which led to the naming of Niumalu, “dipped into the Wailua River, hence the name Waiehu, and finally pierces the mountain at Kalalea leaving a large hole that was visible until just a few years ago” (Wichman 1998:57).

Līhu‘e, a traditional song speaks of Niumalu.

Aloha ‘ia no au Līhu‘e	Beloved is Līhu‘e
I ka ne‘e mai a ka ua Paupili	When the Paupili rain comes.
Ua pili no au me ku‘u aloha	I cling to my beloved
Me ke kau nehe mai au Niumalu. [Clark 1990:2]	Under the soft rustling [leaves] of Niumalu

‘Alekoko Fishpond in Niumalu was named after Chief ‘Alekoko and is called Menehune Fishpond today as its wall is believed to have been built in one night by *menehune*. Chief ‘Alekoko and his sister Chiefess Ka-lālā-lehua requested the construction of the fishpond across the Hulē‘ia River. The *menehune* agreed to construct the 825 m dirt stone-faced dam, but only if Chief ‘Alekoko and his sister promised to stay in their home and not watch the *menehune* at work. The two agreed. The *menehune* formed two lines stretching from the Wahiawa Plains to the Hulē‘ia River and passed stone blocks through the night. Before morning Chief ‘Alekoko could no longer just listen to the *menehune* at work and the shifting of the stone. He made a small hole in the house’s grass thatch and peeked through. The *menehune* dropped their stones, washed their hands, and left the fishpond incomplete as a reminder that promises are not to be broken. The *menehune*’s

hands bled from passing the rough stone that they did not have time to polish, leading to the fishpond's and the chief's name, ‘Ale-koko, "rippling blood" (Wichman 1998:57–58). The pond was later completed by Chinese (Rice 1923:37).

Handy (1940) relates that

> Niumalu is a tiny ahupua‘a, a mere wedge between Nawiliwili and Ha‘ikū, but it was, and is, one of the most important fishing localities on Kauai, and contained a fairly large area of terraces along the lower mile of Puali Stream. There were a few terraces at the lower end of Halehaka Stream where it joins the Puali about 1.5 miles inland. [Handy 1940:67]

Handy and Handy (1972) additionally note

> . . . southward of the Huleia River and harbor [Niumalu] . . . had fairly large *lo‘i* [terraced pond] areas at the seaward ends of its two streams, Puali and Halehaka. Niumalu was noted in the past, as it is today, for being one of the most important fishing localities on Kauai. [Handy and Handy 1972:427]

The terraces and fishing area are south of the project area. Based on the concentration of *lo‘i* within the vicinity of the coast and the importance of fishing, the coastal area contained a majority of the population of the *ahupua‘a* of Niumalu.

3.1.2 Early Historic Period

Western homesteading and commerce were established on the lands above Nāwiliwili Bay. This area would evolve into Līhu‘e Town within a few years after the establishment of the missionary and business activities at Kōloa (approximately 11 km southwest of the current project area) in the mid-1830s. Accounts of nineteenth century travelers on the trail between Kōloa and Līhu‘e present the first record of the lands surrounding Līhu‘e and therefore also Niumalu. William DeWitt Alexander, son of the former Waioli missionary William P. Alexander, described a return visit to Kaua‘i in 1849, six years after his family had left the island. Traveling on horseback from Kōloa to Wailua, Alexander noted in his diary:

> We then rode through a gap in the hills, leading out from Kōloa. The scenery was very fine, and worthy of Kaua‘i. Mauna Kāhili was close on the left, & on the right a beautiful range of hills extending towards the northeast, and terminating in an abrupt peak which goes by the name of ‘Hoary Head’ [Hā‘upu]. We rode on over a beautiful undulating table land, dotted with groves of lauhala and kukui. After riding about five miles, we crossed a stream fitly called Stoney Brook. We afterwards crossed many other streams on our way. Five miles further we passed Dr. Lafon's former residence. Here we began to descend towards the sea. [Alexander 1991:122]

Apparently, Alexander observed no conspicuous Hawaiian settlements between the Gap and Dr. Lafon's residence in the Līhu‘e area. It may be, however, that substantial settlement down in the Hulē‘ia Stream valley was largely obscured from his view.

3.1.3 The Māhele and the 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 Hawaii, the *ali‘i* (chiefs), and the common people, which introduced the concept of private property into Hawaiian society. In 1848, Kamehameha III divided the land into four categories: 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 habitation and agricultural plots claimed by the common people called *kuleana* (Chinen 1958:8–15).

Victoria Kamāmalu was awarded LCA 7713, which included the *ahupua‘a* of Niumalu (see full testimony in Appendix B). She was the daughter of Kīna‘u, and thus the granddaughter of Kamehameha I, and her brothers were Kamehameha IV and Kamehameha V. Following her death in 1866, her father, Mataio Kekūanaoa inherited her lands. Stauder (1973:26) relates that following Victoria Kamāmalu’s father’s death, Niumalu Ahupua‘a was inherited by Kamehameha V, and then by “her stepsister Ruth, who sold Niumalu to Paul P. Kanoa in 1883 (Bishop Trust 1930:4).” Paul P. Kanoa resided in Niumalu, and was Governor of Kaua‘i. He also served as *konohiki* of Kamāmalu’s lands (Stauder 1973:31–34). No *kuleana* LCAs were awarded within the project area or its vicinity.

Catherine Stauder (in Ching et al. 1973) summarized the following information from Land Commission documents. Niumalu had at least 24 Land Commission Awards with at least 80 separate *lo‘i*. Dozens of separate *‘ili* (a smaller land division) are named and claimants describe *loko* or Kiowai, translated by Stauder as “pond” (cf. LCA 3634 at Ha‘ikū). Pukui and Elbert (1986) define *ki‘o wai* as a “water hole.” Niumalu had seven other ponds in the vicinity of the well-known Alekoko (Menehune) Loko. Survey notes (Ching et al. 1973:105) for Niumalu Ahupua‘a state “[t]he fishing priviledge [*sic*] of Huleia River belongs to the Ahupua‘a of Niumalu from its mouth to the Road crossing it to Kīpū Kai.” The data also shows that *lo‘i* and *kula* lands are described as being in the same *‘āpana* (lot or parcel), a pattern that appears common to Puna Moku, Kaua‘i, but is not common elsewhere in Hawai‘i. Perhaps *maka‘āinana* were creating “kula” (drier) lands by piling up soil adjacent to wet lands. Throughout most of the Hawaiian Islands, *kula* lands refer specifically to dry sloping lands between the mountains and the sea. At Puna Moku, in contrast, *maka‘āinana* were referring to lands in valley bottoms as *kula.* Some claimants also describe their lands as being trampled by cattle.

3.1.4 Mid- to Late 1800s

Lihue Plantation, situated adjacent to the project area, began as a partnership between Henry Augustus Pierce, Judge William Little Lee, and Charles R. Bishop in 1849. The company obtained up to 3,000 acres of land and by 1851 a water-driven sugar mill was constructed (on the site of the Līhu‘e sugar mill). Hawaiians made up the labor force and many built their homes on the land surrounding the mill. Planting began in 1850 and the first crop was ground in 1853 (Joesting 1984:173). From 1854 to 1862, under the management of William Harrison Rice a former American Board of Commissioners for Foreign Missions (ABCFM) teacher, the plantation invested heavily in irrigation ditch infrastructure known initially as “Rice’s Folly” (Krauss and Alexander 1984:67).

George Norton Wilcox, son of the ABCFM teacher Abner Wilcox, was raised on Kaua‘i and observed Rice’s successful utilization of irrigation. Wilcox attended Yale and studied engineering and surveying, earning a certificate in 1862. Upon returning to Kaua‘i in 1863 he soon began work as a surveyor for Judge Herman Widemann, owner of the Grove Farm Plantation.

Warren Goodale established Grove Farm (named after an old stand of *kukui* trees) in 1850. Goodale sold the property the same year to James F.B. Marshall for $3,000. In 1856, the plantation was sold to Judge Widemann for $8,000. 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. The following year, Wilcox leased Grove Farm Plantation from Widemann and rapidly expanded development of the irrigation infrastructure.

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 mountains to the canefields below. Owls (pueo) 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” excavated in 1864 and “2nd Ditch” which was completed in 1865. Prior to the completion of 1st Ditch, Wilcox

> drove an ox cart to the beach and around the bay to a Hawaiian settlement called Niumalu where the natives grew sugar cane, as a supplementary food crop, on the earthen dams that separated their taro patches, George carefully chose stands of healthy cane, making sure that they were original plantings and not rations. [Krauss and Alexander 1984:133]

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 whereby Willie Rice also received Kīpū and Kīpū Kai for a total price of $27,500—money that Princess Ruth used to build her palace that rivaled Kalākaua’s palace, also completed the following year.

An 1878 Government Survey map (Figure 6) shows little development within the project area vicinity and sugar plantations have not expanded to their later extent; Grove Farm fields are to the southeast, and Lihue Plantation is to the east. Kaumuali‘i Highway appears to be an unimproved or dirt road.

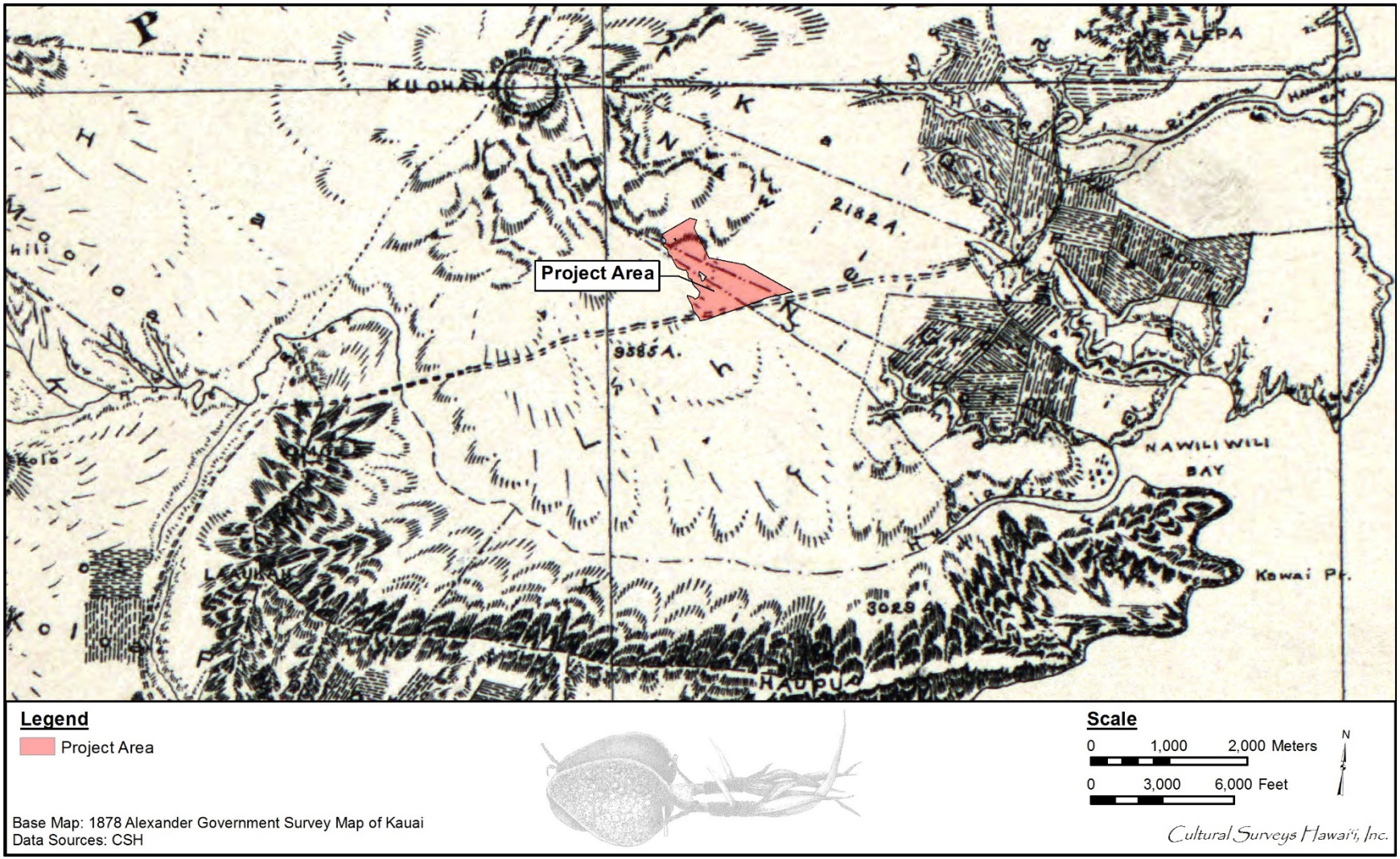


Figure 6. Portion of 1878 Government Survey map by W.D. Alexander, showing location of project area

3.1.5 1900s

In the early 1900s, there was a major increase in plantation farming and the associated infrastructure such as ditches, reservoirs, cane haul roads, railways, and plantation camps (Figure 7 through Figure 9). At the beginning of the twentieth century, Grove Farm developed agreements to secure sufficient water and also to sell any surplus. A right-of-way with Koloa Plantation was secured in 1906 that provided water from Kuia Stream. Grove Farm's "Upper Ditch" was constructed between 1914 and 1917 and by the 1920s "Grove Farm had 16 miles of ditches delivering 26 mgd" (Wilcox 1998:74).

In the 1920s, Grove Farm began a building program at Puhi, along the route of the present Kaumuali‘i Highway and just south of the project area. The continuing lack of development in the area prior to this is evident on the 1910 U.S. Geological Survey map (Figure 10).

> About 1920 George Wilcox began construction of a completely modern camp at Puhi in the heart of the expanding plantation. Instead of building houses haphazardly as new families moved in, a complete village was laid out with streets, a playground, room for gardens, and lawns. The houses had proper kitchens equipped with running water and enough bedrooms for each family depending upon the number of children. [Krauss and Alexander 1984:310]

Puhi Camp also extended into the current project area, adjacent to Kaumuali‘i Highway. The plantation camp consisted of some 600 homes occupied by up to 1,200 workers and their families (Figure 11). Puhi Camp also contained a movie hall, three stores, a Chinese laundry, a slaughterhouse, and an area for social events (Chang 2007).

A series of photographs from Puhi Camp depicts varying construction styles of the camp houses. The earliest houses, as depicted in photographs from 1928, appear to have been constructed of milled wood and posts with corrugated metal roofs (Figure 12 and Figure 13). Shade trees and fruit trees, hibiscus hedges, and wood fences bordered each property. The camp roads appear to have been unimproved dirt roads. Open 55-gallon drums are positioned at the entrance of each home, which may have been for household trash collection or possibly trash burning. A 1936 photograph of Puhi camp depicts houses constructed using cane fiber (Canec) and corrugated metal roofs (Figure 14). A 1937-1938 photograph depicts yet another construction style, using hollow tile to construct a Puhi Camp house (Figure 15).

Newspaper articles from the early years at Puhi Camp offer insight into the plantation life. The earliest mention of Puhi Camp within *The Garden Island* newspaper comes from a 25 September 1917 article entitled "Failed to Make Good" (*Garden Island* 1917). The article describes the threat of suicide of a Japanese laborer by hanging himself from a telephone pole at the camp and the mixed emotions of the gathering crowd that came to watch (Appendix C).

The minutes from an 7 August 1918 Board of Supervisors of the County of Kaua‘i meeting describe the request from Grove Farm to excavate a 1-ft-wide ditch across the Belt Road (Kaumuali‘i Highway) to connect water pipes from Puhi Camp to newly constructed stores (*Garden Island* 1918; Appendix C)

A 20 September 1921 article entitled "Entertains at Puhi" describes a Saturday evening program at Puhi Hall that included children's plays and songs accompanied by an orchestra

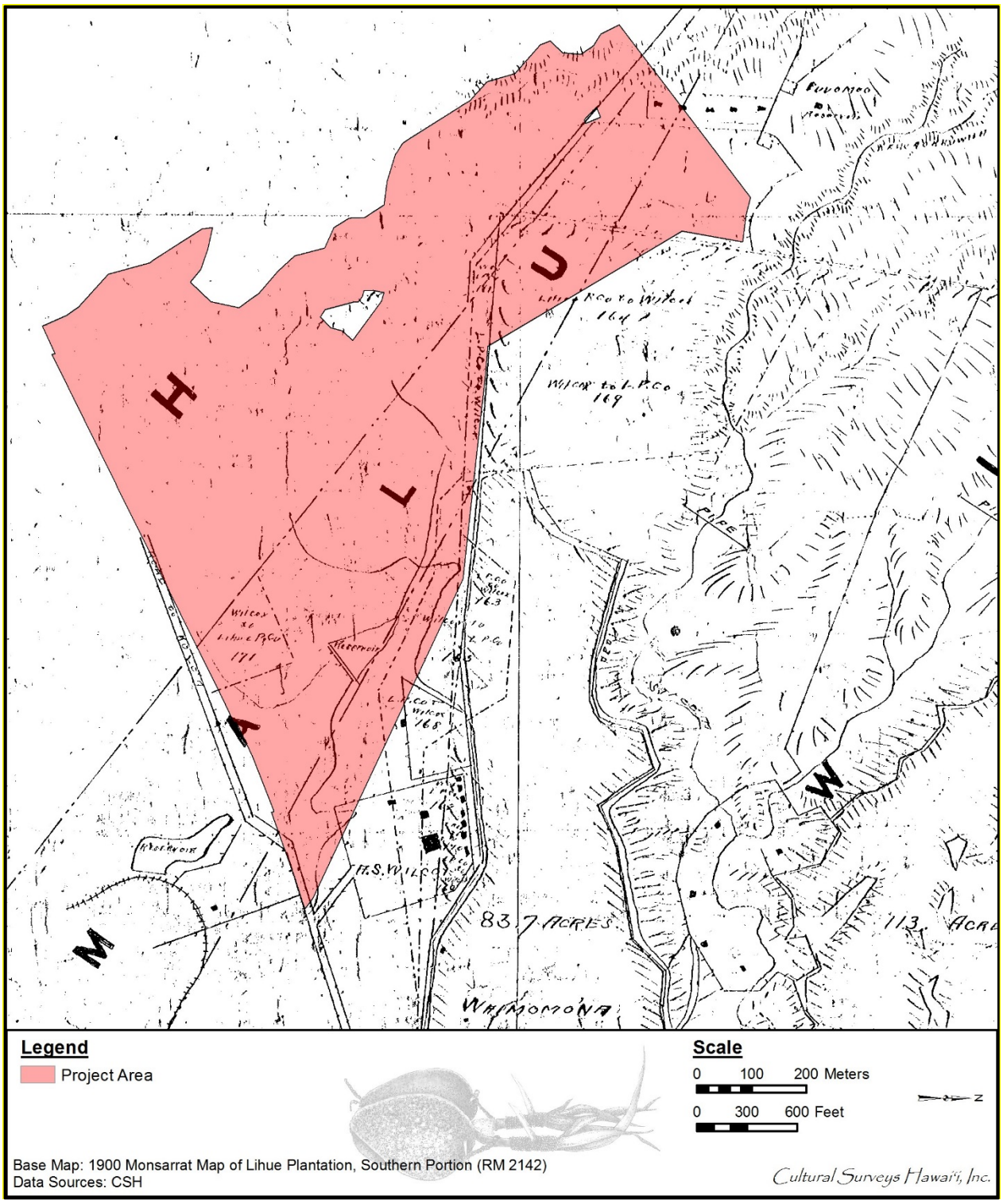


Figure 7. Portion of the 1900 Monsarrat map of Lihue Plantation showing the location of the project area

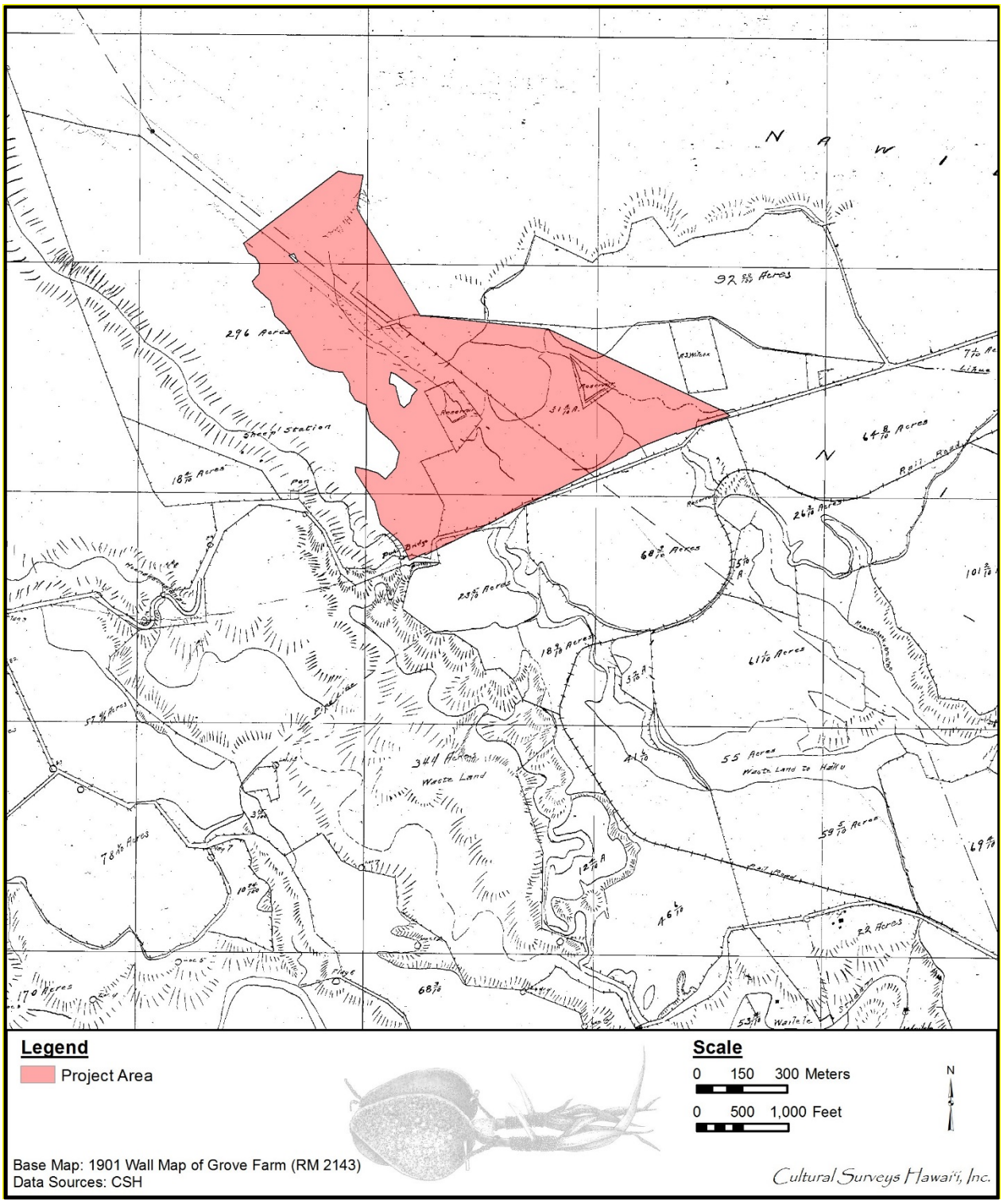


Figure 8. Portion of the 1901 map of Grove Farm showing the location of the project area

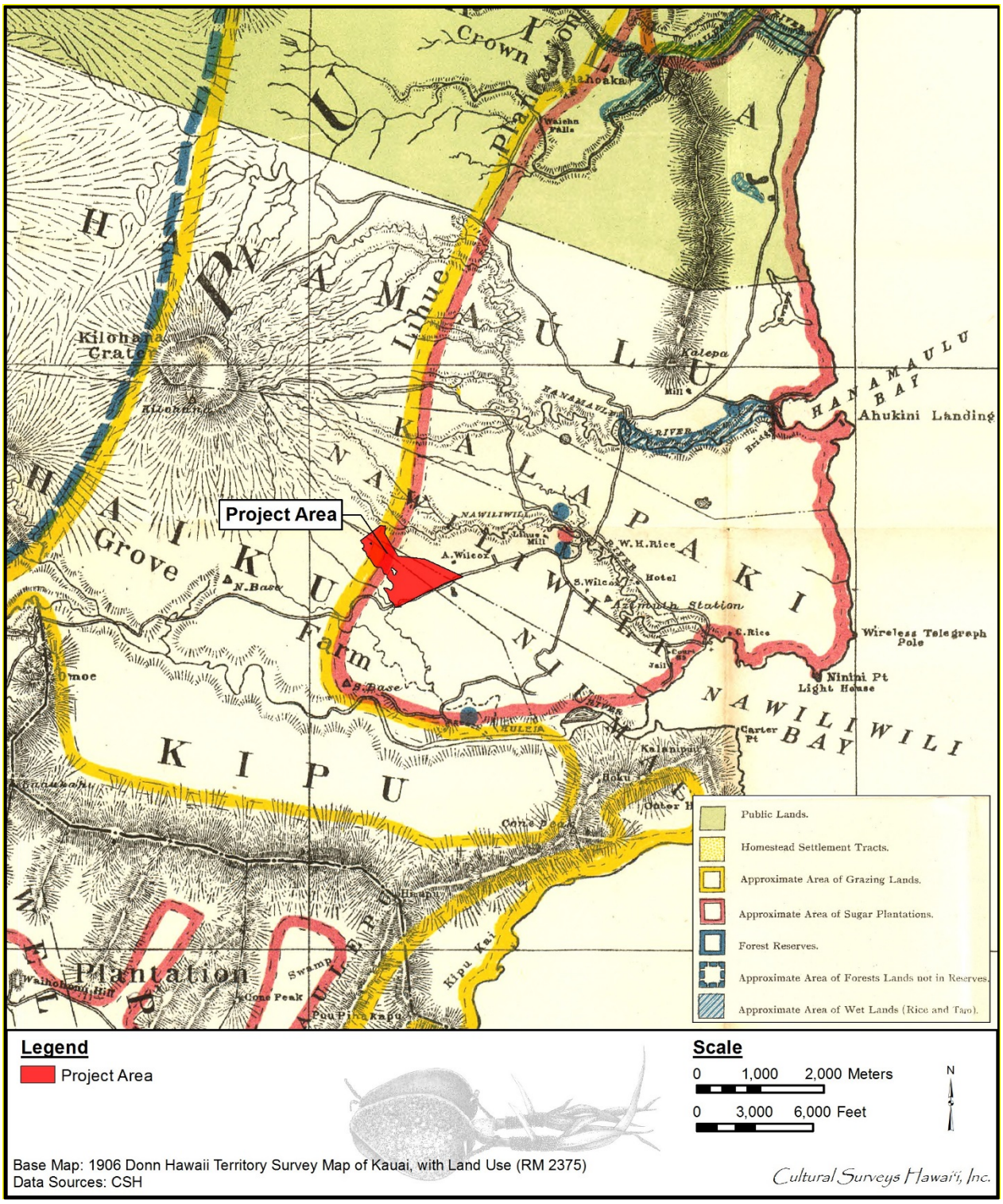


Figure 9. Portion of the 1906 Donn Hawaii Territory Survey map of Kauai showing the location of the project area and historical land use

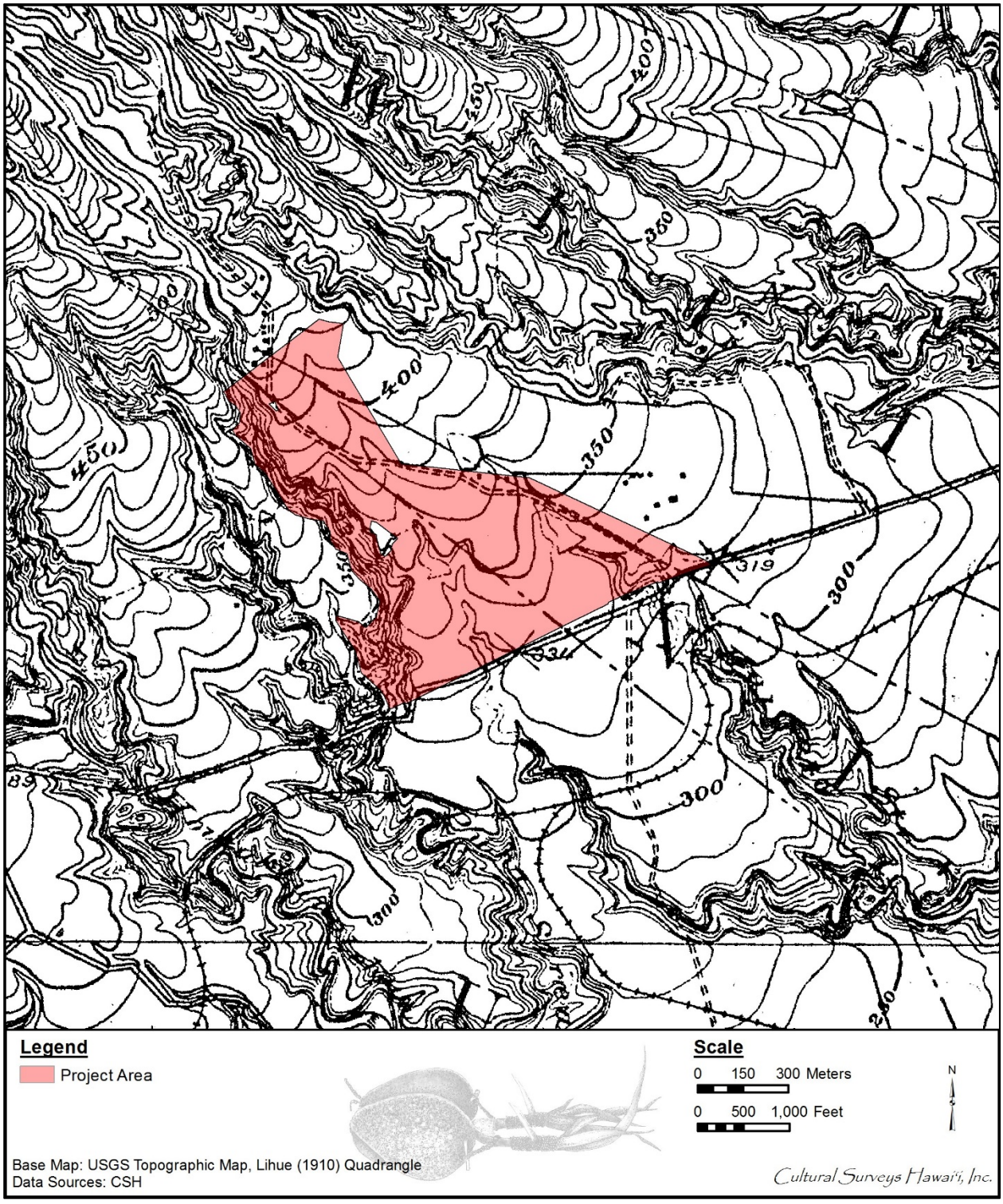


Figure 10. Portion of 1910 Lihue USGS topographic quadrangle, showing the project area

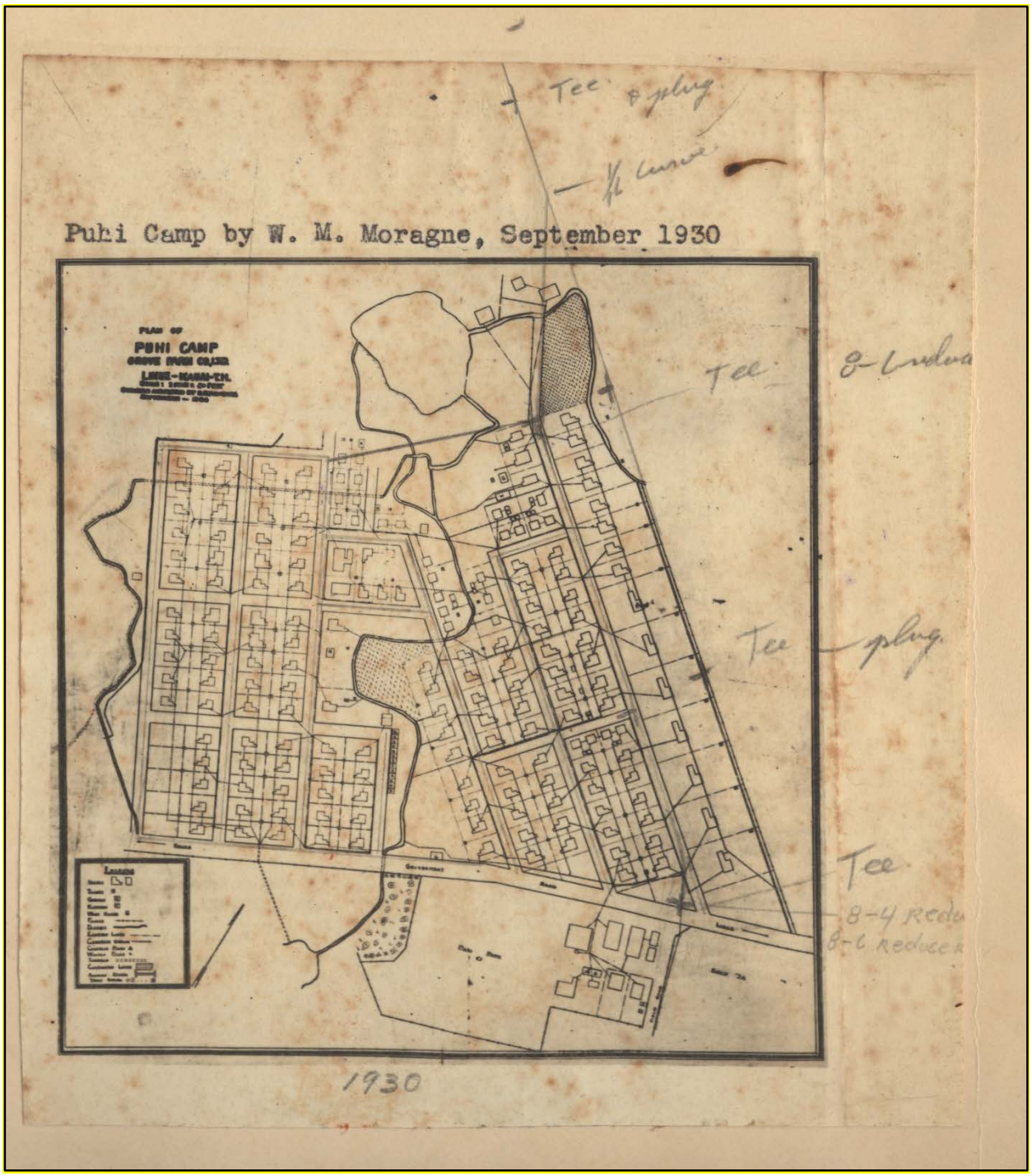
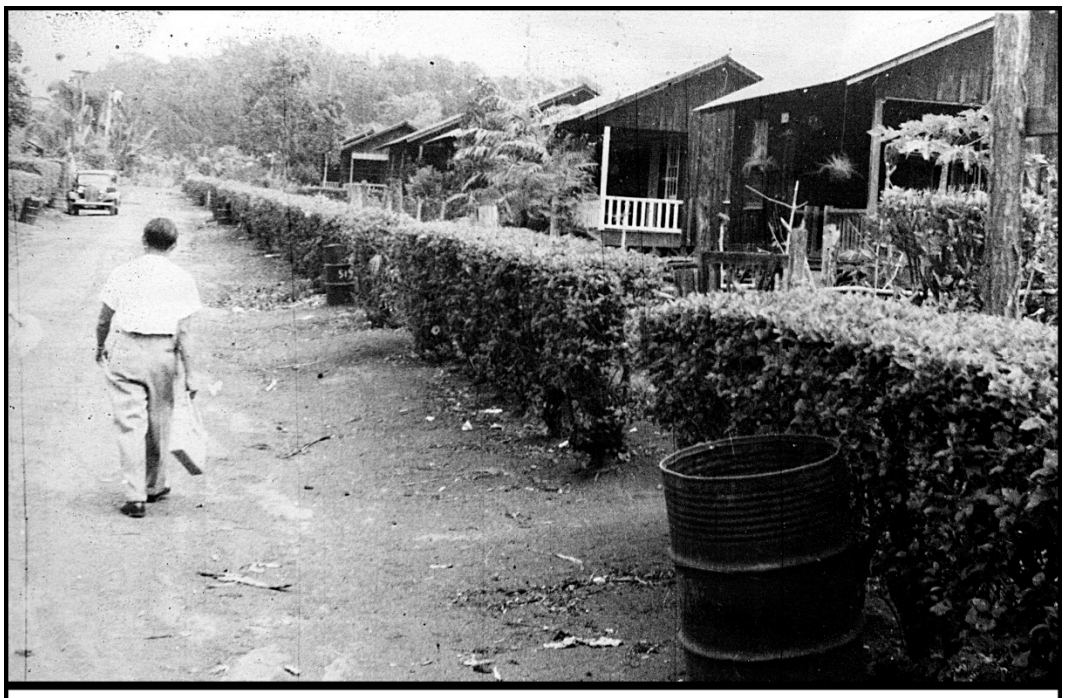
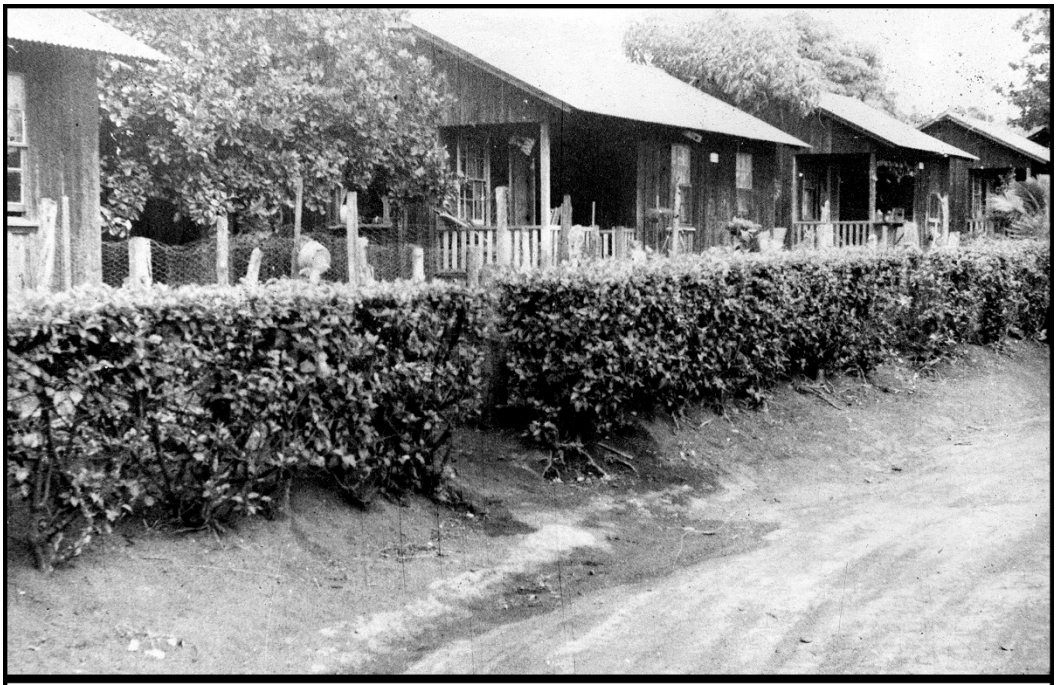


Figure 11. Plan map of Puhi Camp by W.M. Moragne, illustrated in September 1930, showing the general layout of Puhi Camp and the various ditches, reservoirs, and infrastructure in the area



Grove Farm Company - Puhi Camp 1928 -

Figure 12. Puhi Camp in 1928 (courtesy of Grove Farm Company)

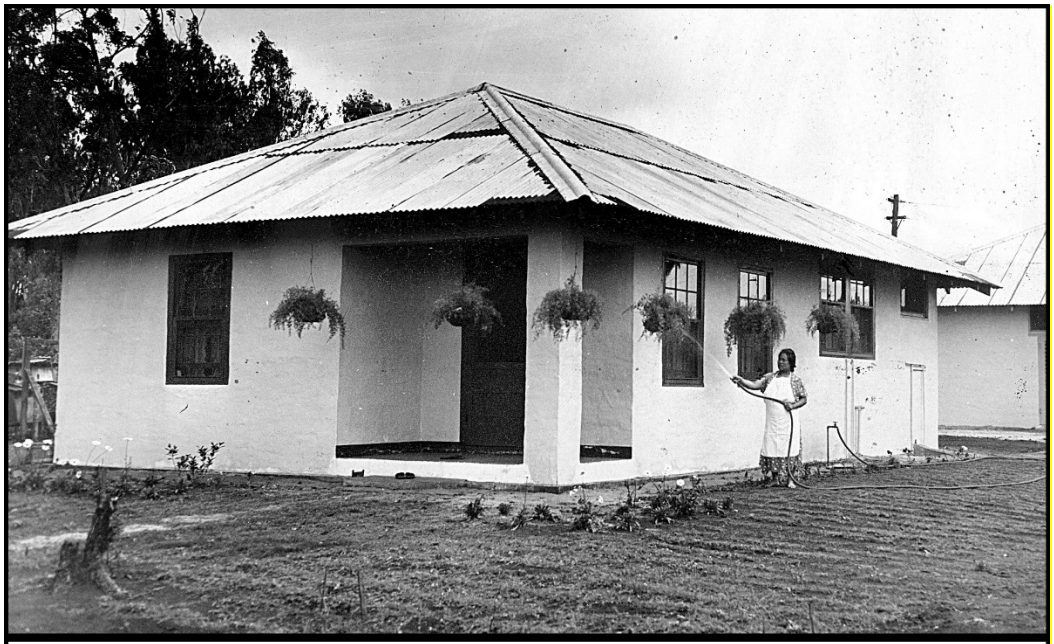


Grove Farm Company Puhi Camp House - 1928

Figure 13. Puhi Camp in 1928 (courtesy of Grove Farm Company)

Puhi Houses built in 1936 using cane fiber (Canec)exterior and interior walls. Designed by W.M. Moragne and built by Grove Farm Carpenters.

Figure 14. Puhi Camp houses in 1936 built using cane fiber (courtesy of Grove Farm)



Puhi, Hollow Tile House built in 1937-38. Designed By W.M. Moragne and Built by Grove Farm Carpenters. Hollow tile was made by Grove Farm - Picture shows Mrs. Abenes.

Figure 15. Puhi Camp houses in 1937-38 built using hollow tile (courtesy of Grove Farm)

followed by dancing (*Garden Island* 1921; Appendix C). Several performers at the camp are mentioned by name and accredited for their grace and charm.

An article entitled “A Household Tragedy” which appeared in the 9 May 1922 edition of *The Garden Island* described the death of an entire family at Puhi Camp by botulism (*Garden Island* 1922; Appendix C). The source of botulism was determined to be salmon eggs, which may have been improperly stored prior to consumption.

During the 1930s, Federal funds became available to assist the Territory of Hawaii’s highway construction program. Between 1933 and 1937 the “construction or reconstruction” of the Belt Road, the present Kaumuali‘i Highway, was completed incrementally (Figure 16 through Figure 18). Hoomana Overpass (Hoomana Road Bridge) was constructed in 1928, Waihohonu Bridge was built in 1934, the Lihue Mill Bridge was constructed in 1936, and the Weoweopilau Bridge was built in 1937.

At the same time that the Belt Road construction program was underway, during the mid-1930s, Grove Farm was further expanding into Puhi with its new headquarters and the construction of a new office building, shop, and stables. Figure 19 shows the 1941 location of Grove Farm in relation to Lihue Plantation Company. At that time, Grove Farm was still dependent on Lihue Plantation’s mill for processing its sugar.

Like O‘ahu, Kaua‘i became the focus for defense of the U.S. military following the Japanese attack on Pearl Harbor. It was thought that Kaua‘i and O‘ahu would be the most likely targets for a ground assault. An entire battalion of military personnel were deployed to Kaua‘i in May 1941 (Bennett 2003). These enlisted men were assisted by the Kauai Volunteers.

> The island was also guarded by the Kauai Volunteers, three battalions of some 2,200 citizens under Paul Townsley, a Lihue Plantation official. The paramilitary volunteers’ Springfield rifles and other munitions were supplied by the army. This home guard was formed on March 8, 1942, and drilled under army instructors on Sunday mornings. In May 1942, a defense plan called for the volunteers (mostly Filipino sugar-laborers) to man the 150 pillboxes around the island’s coastline for beach defense; their marksmanship and devotion to duty greatly impressed army officials. [Bennett 2003:67]

The project area is located approximately 4.5 km northeast and *makai* of Nawiliwi Harbor where, on the night of 15 December 1941, a Japanese submarine surfaced and shelled the shoreline with no reported damage. The submarine struck again on 30-31 December, also causing little damage to the harbor. The submarine escaped the Hawaiian Islands and was later sunk off Guadalcanal on 9 December 1942 (Bennett 2003:70)

The Grove Farm (2010) website relates that during World War II, “large acreages . . . previously used for sugar [were dedicated] to grow food for the local population and the military.” Portions of Grove Farm were also designated as the Grove Farm Artillery Impact Area that bordered one of several jungle training areas on the island of Kaua‘i. Additional information on the Grove Farm Artillery Impact Area or military use of the project area could not be located.

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 1948/49 a cane haul truck tunnel (the Wilcox Tunnel) was

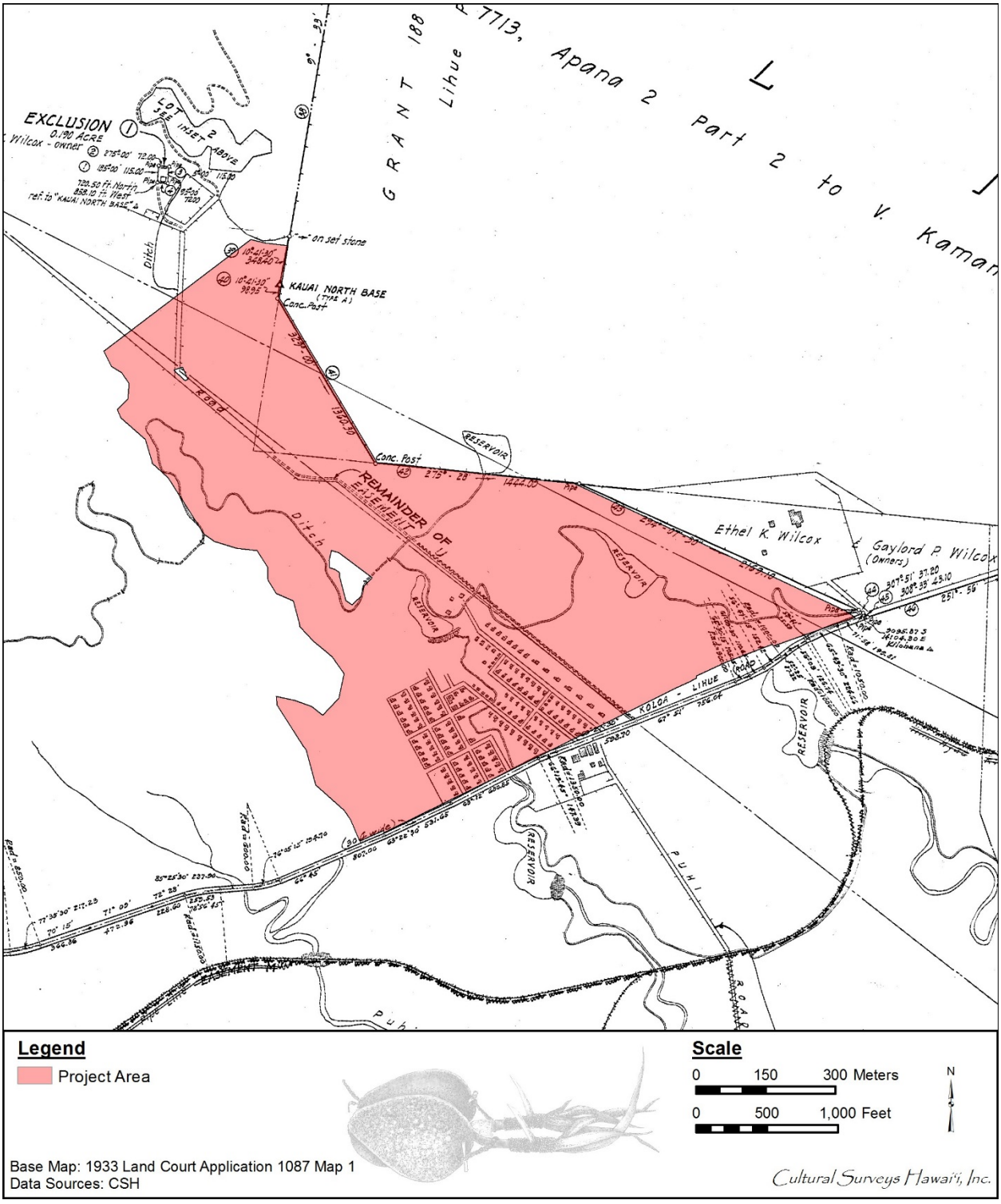


Figure 16. Portion of the 1933 Land Court Application 1087 Map 1 showing the development of additional plantation infrastructure, including Puhi Camp illustrated in the south portion of the project area

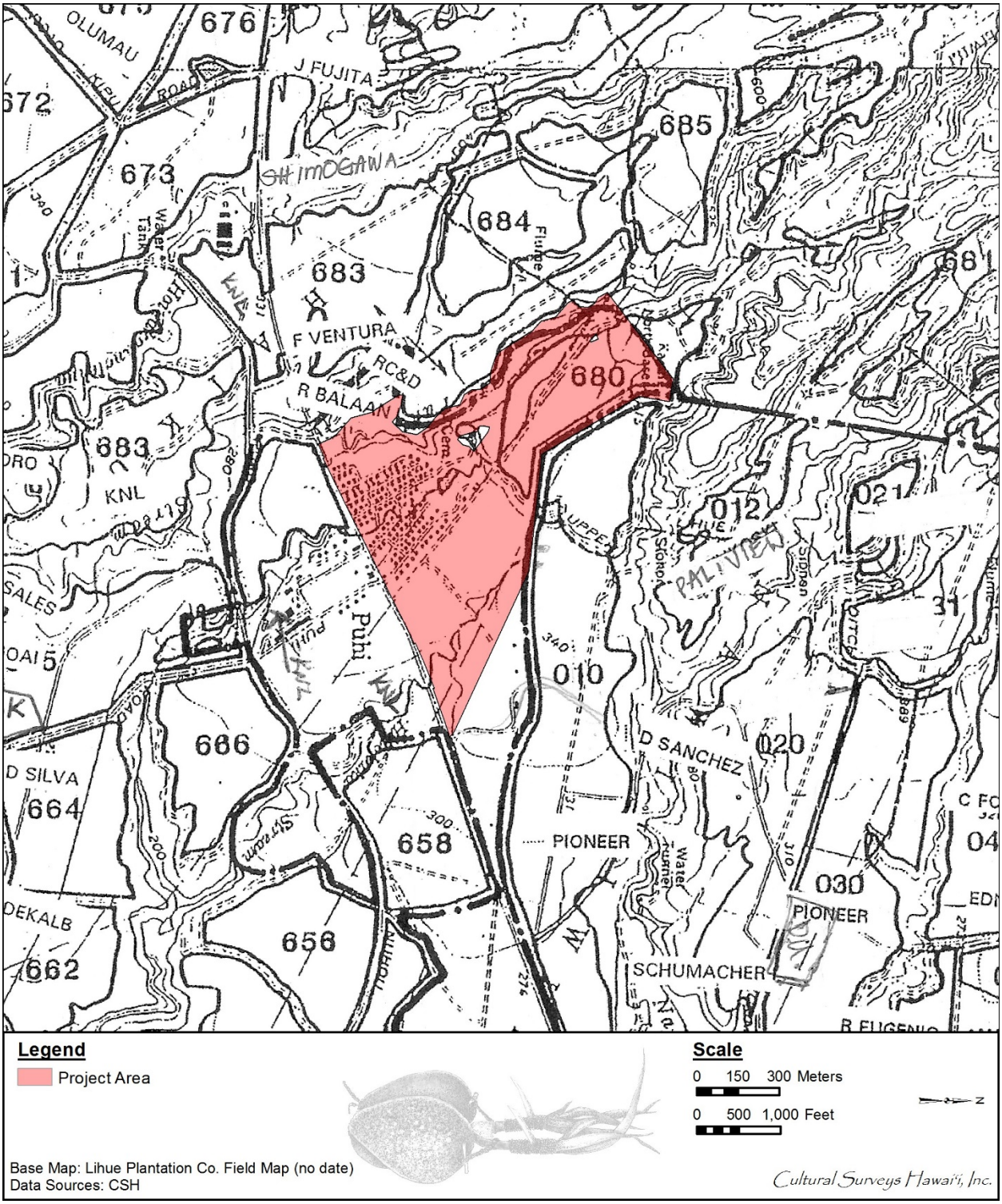


Figure 17. Portion of an undated field map of the Lihue Plantation Company showing the development of additional plantation infrastructure, including Puhi Camp illustrated in the south portion of the project area

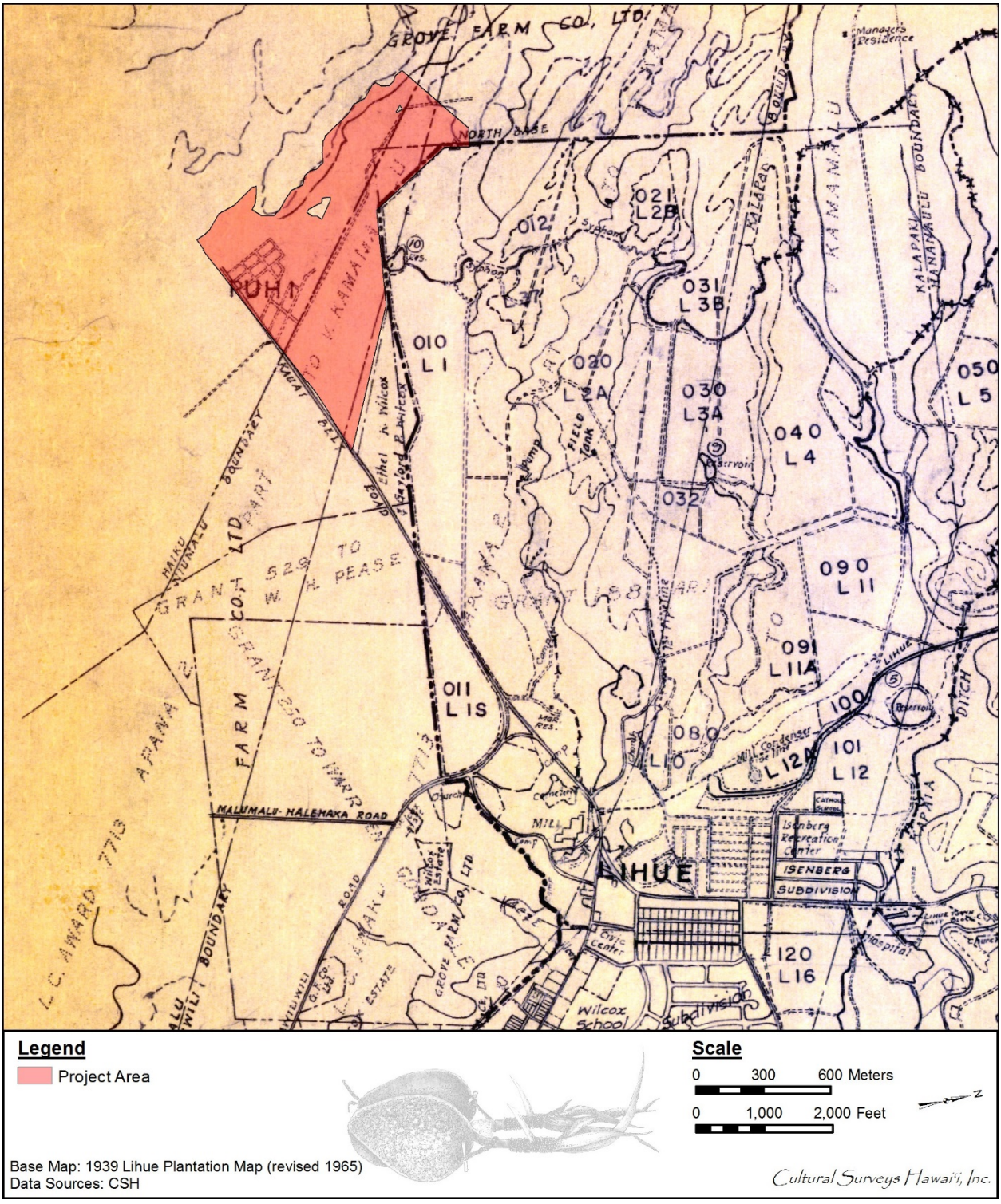


Figure 18. Portion of 1939 Lihue Plantation map showing plantation infrastructure, including Puhi Camp illustrated in the south portion of the project area; North Base is also observed in the north corner of the project area

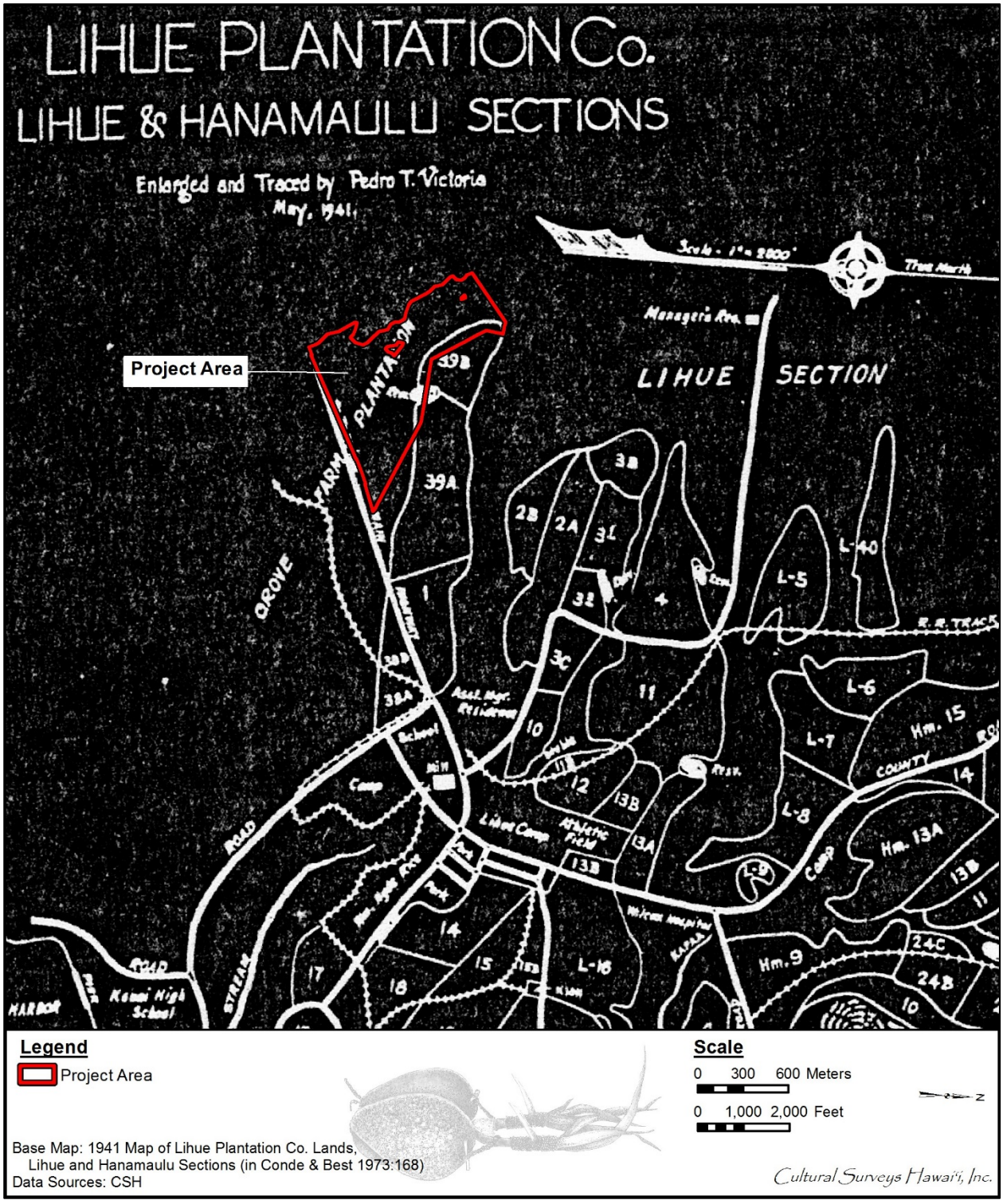


Figure 19. Portion of 1941 Lihue Plantation Company map showing the location of the project area adjacent to the plantation and within Grove Farm

excavated under the Hoary Head Range connecting the sugar cane fields of Ha‘ikū to the Koloa Mill (Krauss and Alexander 1984:366–368). Figure 20 shows Grove Farm, identifying the plantation’s original areas and subsequent acquisitions. The graphic also shows “Mauka Ditch” extending north to south through the center of the project area.

In 1954, an airstrip was developed at Ha‘ikū for aerial spraying of fertilizer and herbicides. In the early 1960s, the nearly 1-mile long Kuia-Waita Tunnel was completed bringing Ha‘ikū water to the drier Kōloa side. Development within the project area and its vicinity can be seen on the 1963 USGS map (Figure 21). The symbols for buildings adjacent to Kaumuali‘i Highway on Figure 21 are the homes within Puhi Camp.

Wilcox (1998:76) reports that despite almost 100 years of irrigation ditch construction, “Grove Farm’s ditch system was a modest one not known for any outstanding technical or physical achievements. This may reflect the limited watershed available to Grove Farm, the small size of the plantation’s acreage, or G.N.’s [Wilcox] personal sense of scale.”

3.1.6 Modern Land Use

Aerial photographs (Figure 22 through Figure 24) show the extent of sugar cane cultivation within the project area and vicinity prior to the construction of KCC. In the mid-1960s, Sam Wilcox of Grove Farm donated 200 acres of former sugar land to the state for KCC (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 Līhue lands to Lihue Plantation, and its Koloa lands to McBryde Sugar (Wilcox 1998:76). A 1978 aerial (Figure 25) shows the new college campus and development within its vicinity although the northern and westernmost portions of the approximately 200-acre campus still appear to be undeveloped.

Most of the Puhi Camp housing was removed in the 1970s prior to the construction of KCC. In the 1980s, the last homes in Puhi Camp were dismantled (Chang 2007).

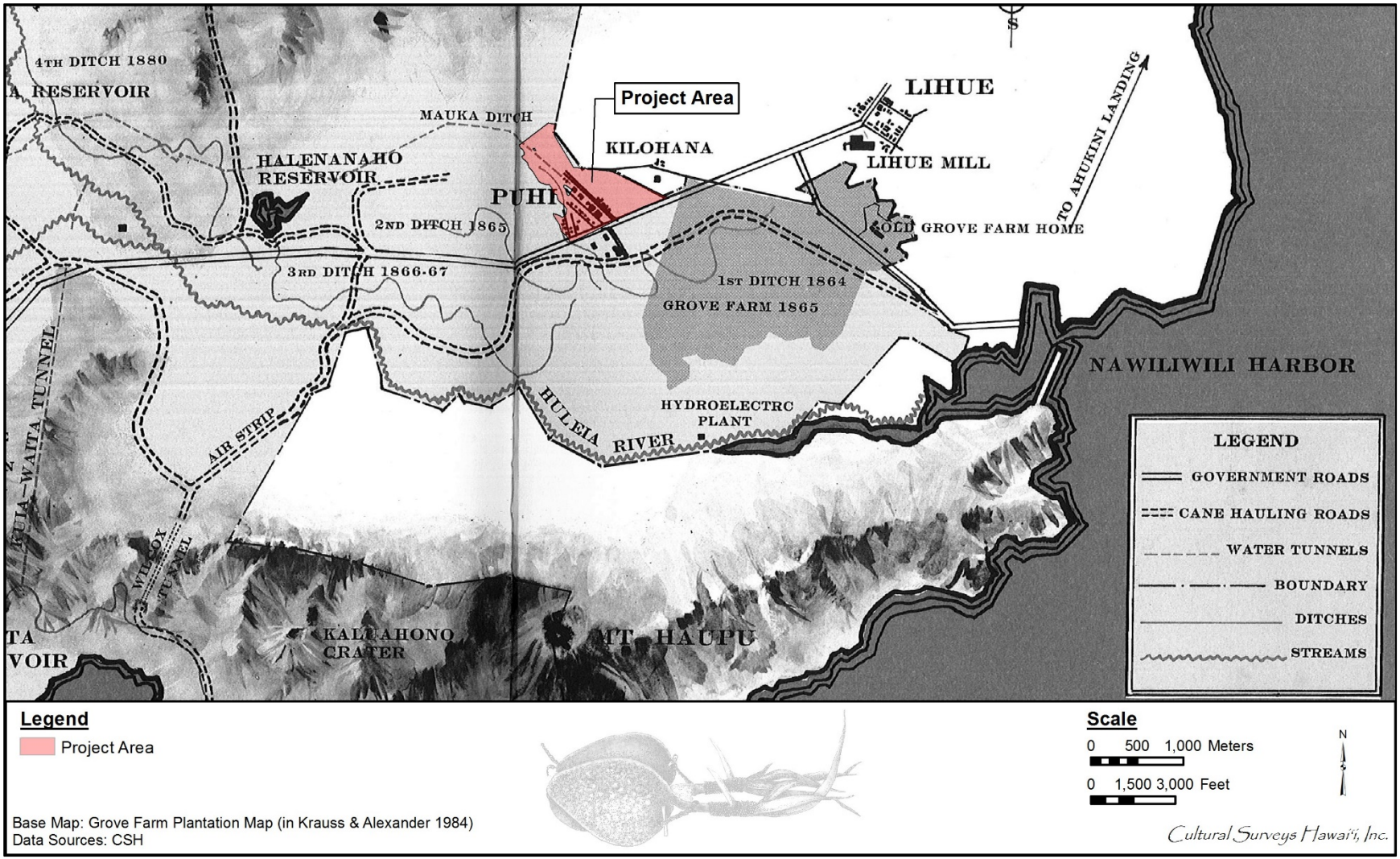


Figure 20. Grove Farm showing the location of the project area within the plantation (adapted from Krauss and Alexander 1984)

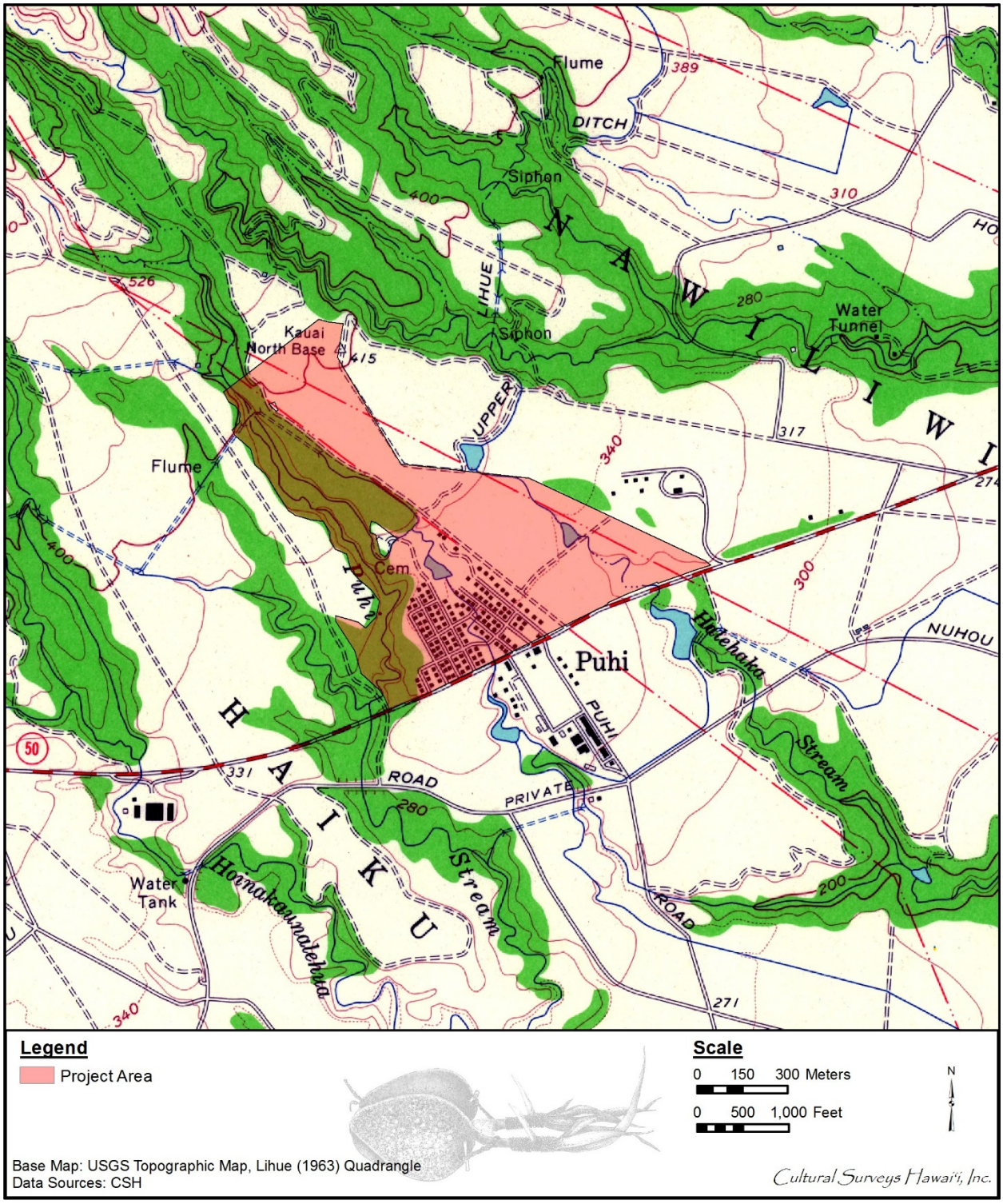


Figure 21. Portion of 1963 Lihue USGS 7.5-minute series topographic quadrangle, showing the project area

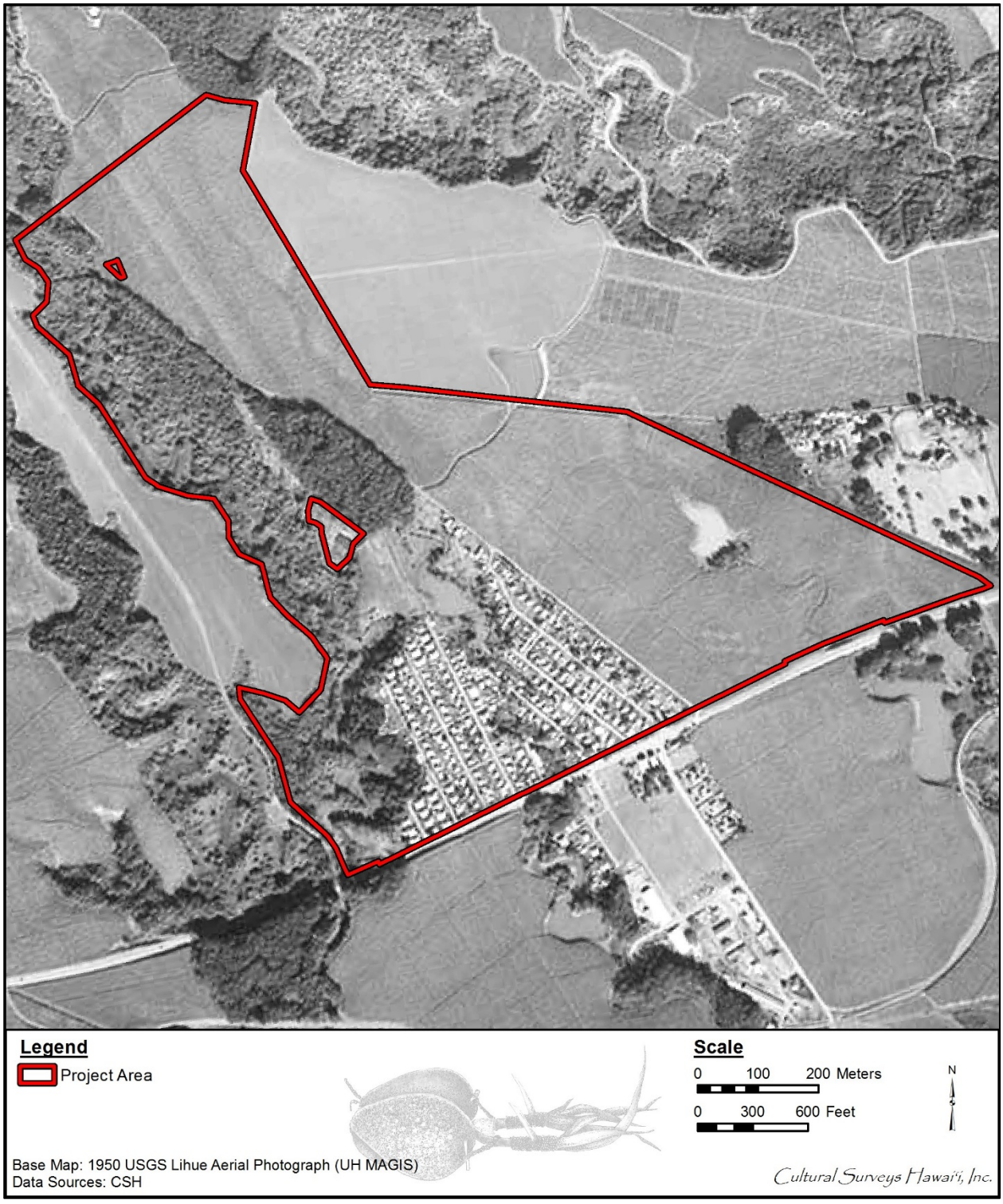


Figure 22. 1950 USGS aerial photograph showing the extent of sugar cane cultivation within the project area and its vicinity

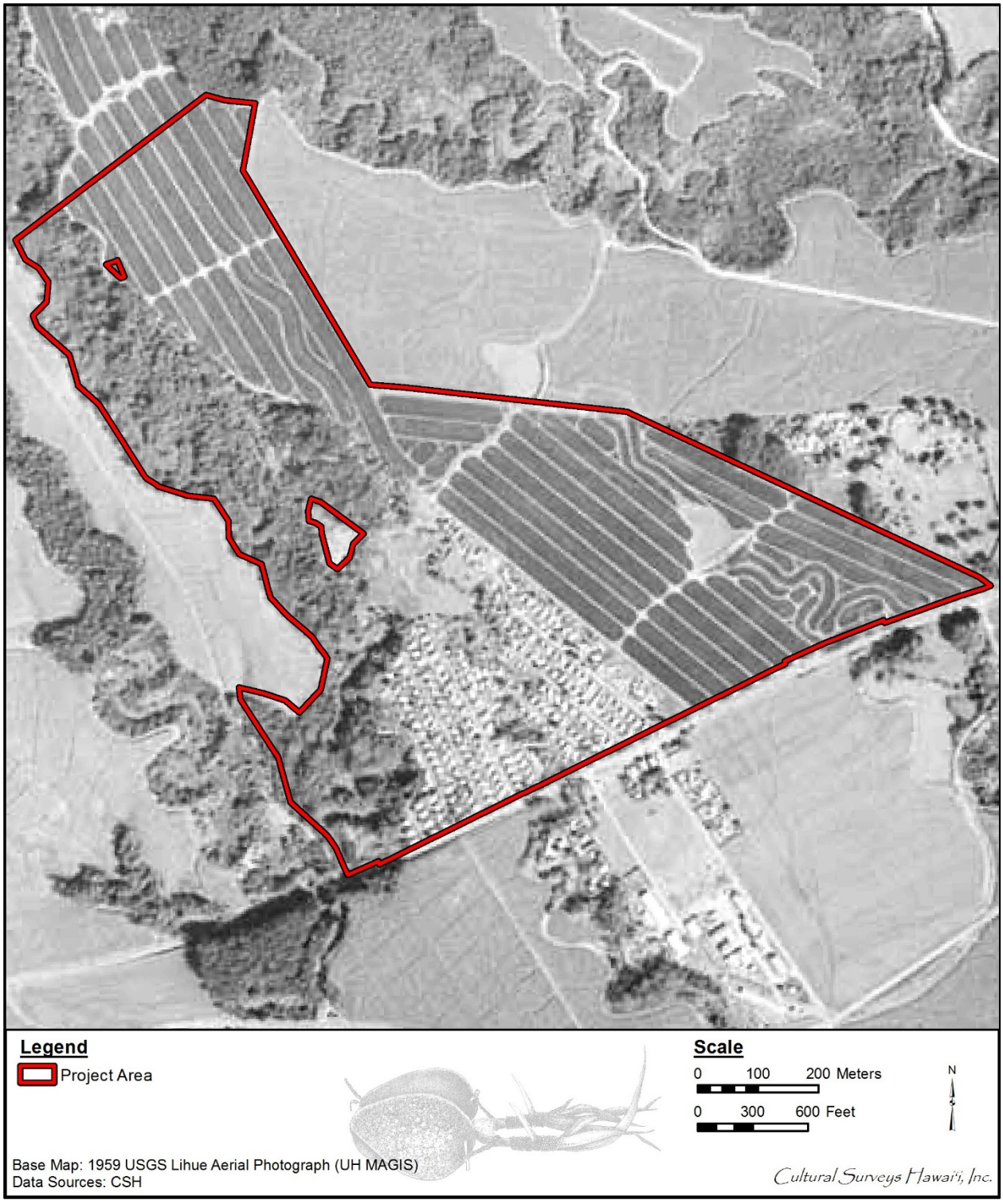


Figure 23. 1959 USGS aerial photograph showing the extent of sugar cane cultivation within the project area and its vicinity

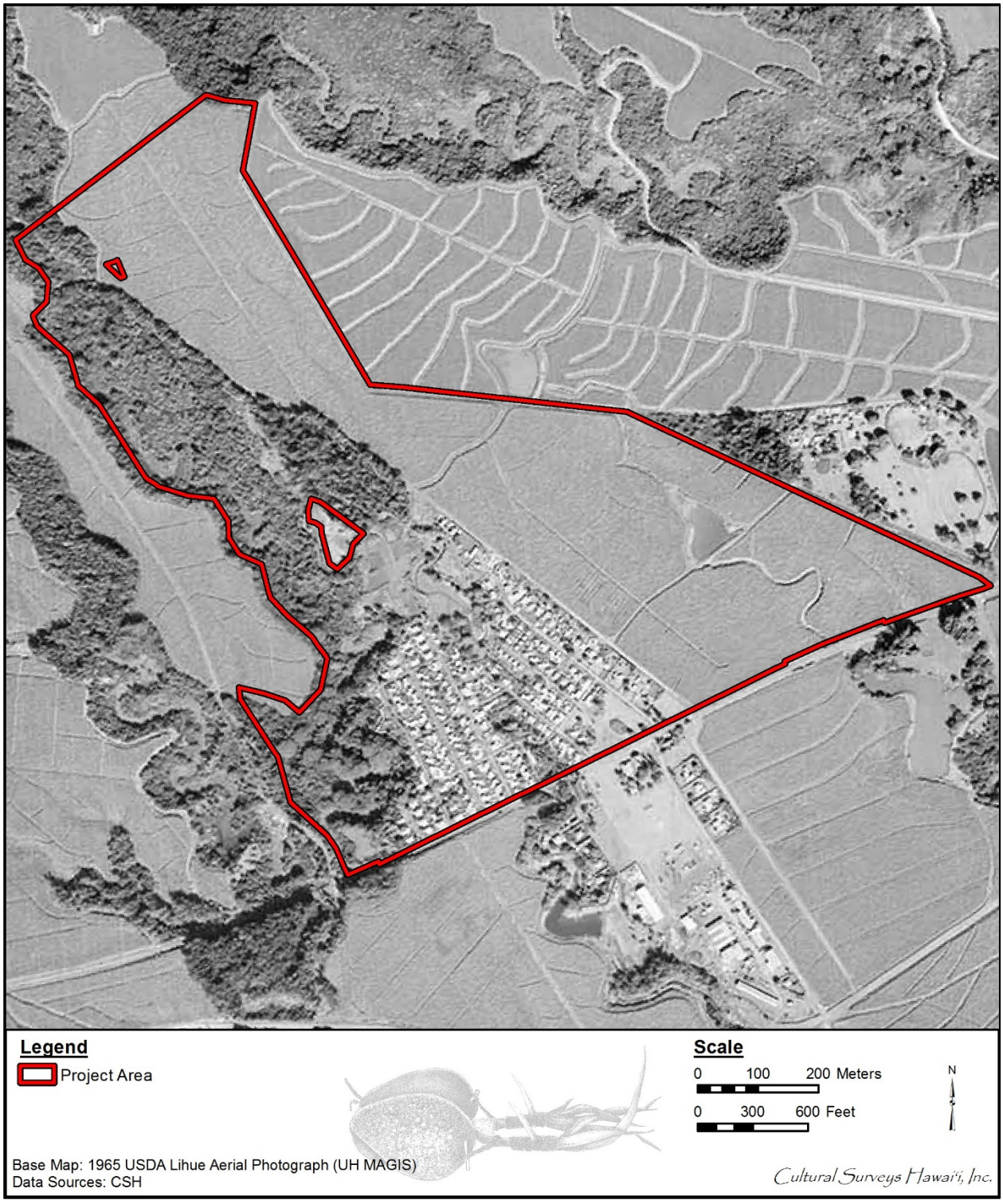


Figure 24. 1965 USGS aerial photograph showing the extent of sugar cane cultivation within the project area and its vicinity

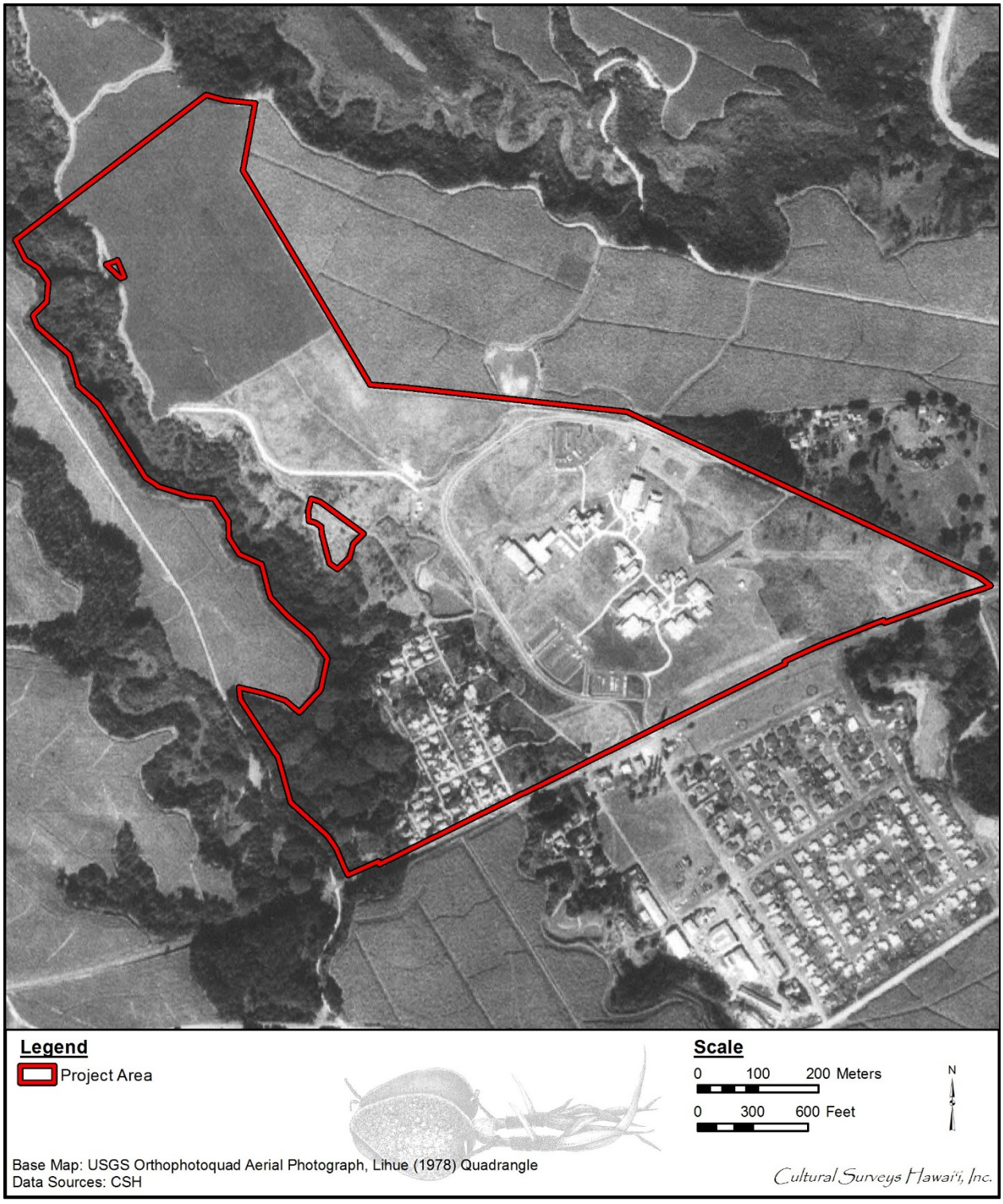


Figure 25. 1978 USGS aerial photograph of Līhu‘e and vicinity showing the project area and its vicinity

3.2 Previous Archaeological Research

3.2.1 Early Archaeological Studies

The first attempt at a comprehensive archaeological survey of Kaua‘i was undertaken by Wendell Bennett (1931) of the Bishop Museum. Bennett's survey report identifies no archaeological sites within or in the vicinity of the present project area. The "Niamalu" or "Menehune" Fishpond (Bennett Site 98) is approximately 3 km southwest of the project area.

> The Niamalu [*sic*] fish pond consists principally of a stone-faced, dirt wall that runs for over 900 yards and cuts off a large bend in the river for use as a fish pond. It is today [in the early 1930s] used both for fish and ducks. Cement walls and iron gates have obscured any old method of controlling the water or the fish. [Bennett 1931:124]

3.2.2 Recent Archaeological Studies

The major focus for more recent archaeological studies in the vicinity has been at the mouth of the Hulē‘ia River, Nāwiliwili Bay, and the associated river banks leading down to the bay. The agricultural fields within and surrounding the proposed project area have been slowly converted to other uses, particularly in the 1990s, and some archaeological work has been undertaken within the vicinity.

A discussion of the previous archaeological studies in the vicinity of the project area follows, with the work summarized in Table 1 and Figure 26. Previous identified archaeological sites in and near the project area are shown in Figure 27 and summarized in Table 2.

Table 1. Previous Archaeological Studies in the Vicinity of the Project Area

Reference	Location	Type of Study	Results (SIHP # 50-30-11)
Bennett 1931	Island-wide	Recordation of major pre-Contact sites	Identified one site in area (Site 98) (not included on Fig. 15)
Palama 1973	Kaua‘i Community College area	Reconnaissance survey	Noted portions of *‘auwai*, possible *lo‘i*, a cemetery, and a historic military complex (not included on Fig. 15)
Neller and Palama 1973	Lower portion of Hulē‘ia River	Reconnaissance survey	Identified 31 sites including one historic human burial (not included on Fig. 15)
Ching et al. 1973	Kanoa Estate, Niumalu	Reconnaissance survey	Identified and documented nine features associated with ‘Alekoko (Menehune) Fishpond (not included on Fig. 15)

Reference	Location	Type of Study	Results (SIHP # 50-30-11)
Kido 1986	Alekoko Fishpond and Hulē‘ia Estuary	Preliminary survey	Mangrove encroachment on pond wall, breaks in wall and rubbish used to fortify wall; recommends more comprehensive survey (not included on Fig. 15)
Walker and Rosendahl 1988	Grove Farm Līhu‘e/Puhi project	Surface and subsurface survey	Identified two historic properties, Japanese cemetery SIHP # -503; and historic residence SIHP # -9390 (not included on Fig. 15)
Rosendahl 1989	Eight additional areas of Grove Farm Līhu‘e/Puhi project	Archaeological inventory survey	No cultural material observed
McMahon 1990	Līhu‘e	Archaeological field check	Three previously identified historic residential sites (SIHP #s -9390, -9401, -9402)
Walker et al. 1991	Līhu‘e District	Archaeological inventory survey	Identified ten historic properties; three pre-Contact, seven historic including a concrete bridge, concrete wharf, cultural deposits, terraces, roads, walls, retaining walls, a possible agricultural area, and an historic cemetery
Henry et al. 1993	590-acre Grove Farm Līhu‘e/Puhi project site	Inventory survey with subsurface testing	Two historic properties identified including a cemetery and residence (revised report same as Walker and Rosendahl 1988)
O’Hare et al. 1993	100-acre Puakea Golf and Country Club, Līhu‘e	Inventory survey with subsurface testing	No cultural material observed
Hammatt and Chiogioji 1998	11.5-km portion of Kaumuali‘i Hwy corridor	Archaeological assessment	Four historic properties identified: Grove Farm office building in Puhi, Lihue Mill Bridge, Hoomana Overpass Bridge, and Līhu‘e Public Cemetery
Hammatt and Shideler 2004	One-Stop Center at Kaua‘i Community College	Archaeological and cultural impact evaluation	No cultural material observed and no cultural impacts anticipated

Reference	Location	Type of Study	Results (SIHP # 50-30-11)
Groza and Hammatt 2010	Kaua‘i Community College	Archaeological literature review and field inspection	Ten historic properties identified: five irrigation ditches (CSH 1, 2, 4, 6, and 9); three reservoirs (CSH 3, 5, and 7), a flume (CSH 8), and Puhi Camp Cemetery, SIHP # -B006 (CSH 10)
O’Hare et al. 2012	Kaumuali‘i Hwy/Ho‘omana Rd, TMKs: [4] 3-8-004, 005, 016	Archaeological inventory survey	Identified five historic properties: SIHP #s -2174 Fea. A-C (flume, terrace, culvert), -2175 (rock and mortar drainage ditch), -2176 (rock wall), -2177 (remnant train bridge), -2178 (sugar cane road and railroad ROW)
Groza and Hammatt 2013	Island School	Archaeological literature review and field inspection	Identified SIHP # -2179 Fea. A–D, reservoir and three associated irrigation ditches
Hunkin et al. 2014	Island School	Archaeological inventory survey	Previously identified historic property: SIHP # -2179 B (CSH 2) and SIHP # -2220, a Hawaii Territory survey marker
Kamai and Hammatt 2015	Līhu‘e Hanamā‘ulu New Mauka Rd	Archaeological literature review and field inspection	All historic properties related to plantation era (ditches, culverts, cemetery) located along portions of cane haul roads

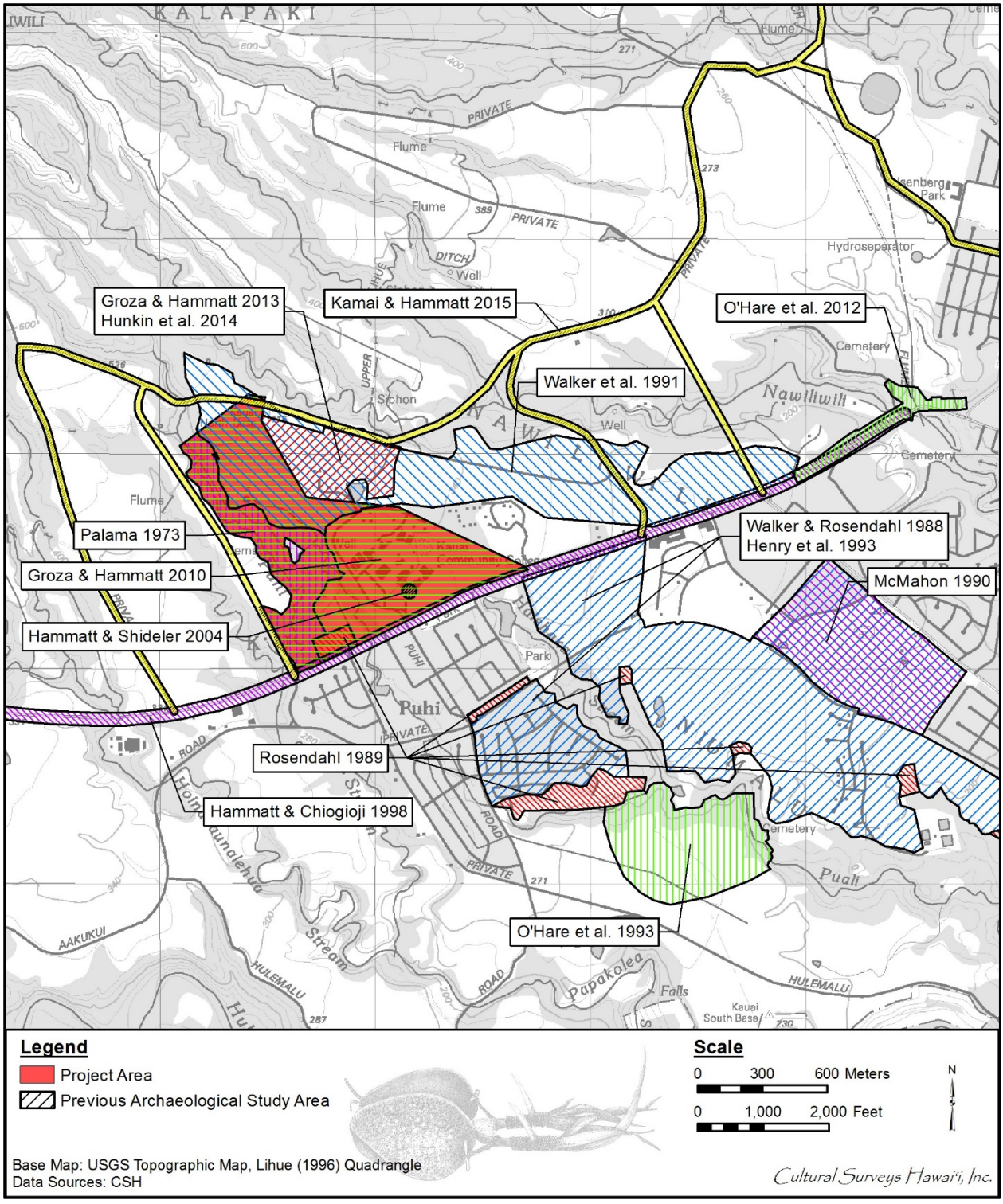


Figure 26. Portion of 1996 Lihue USGS 7.5-minute series topographic quadrangle, showing previous archaeological studies in vicinity of the project area

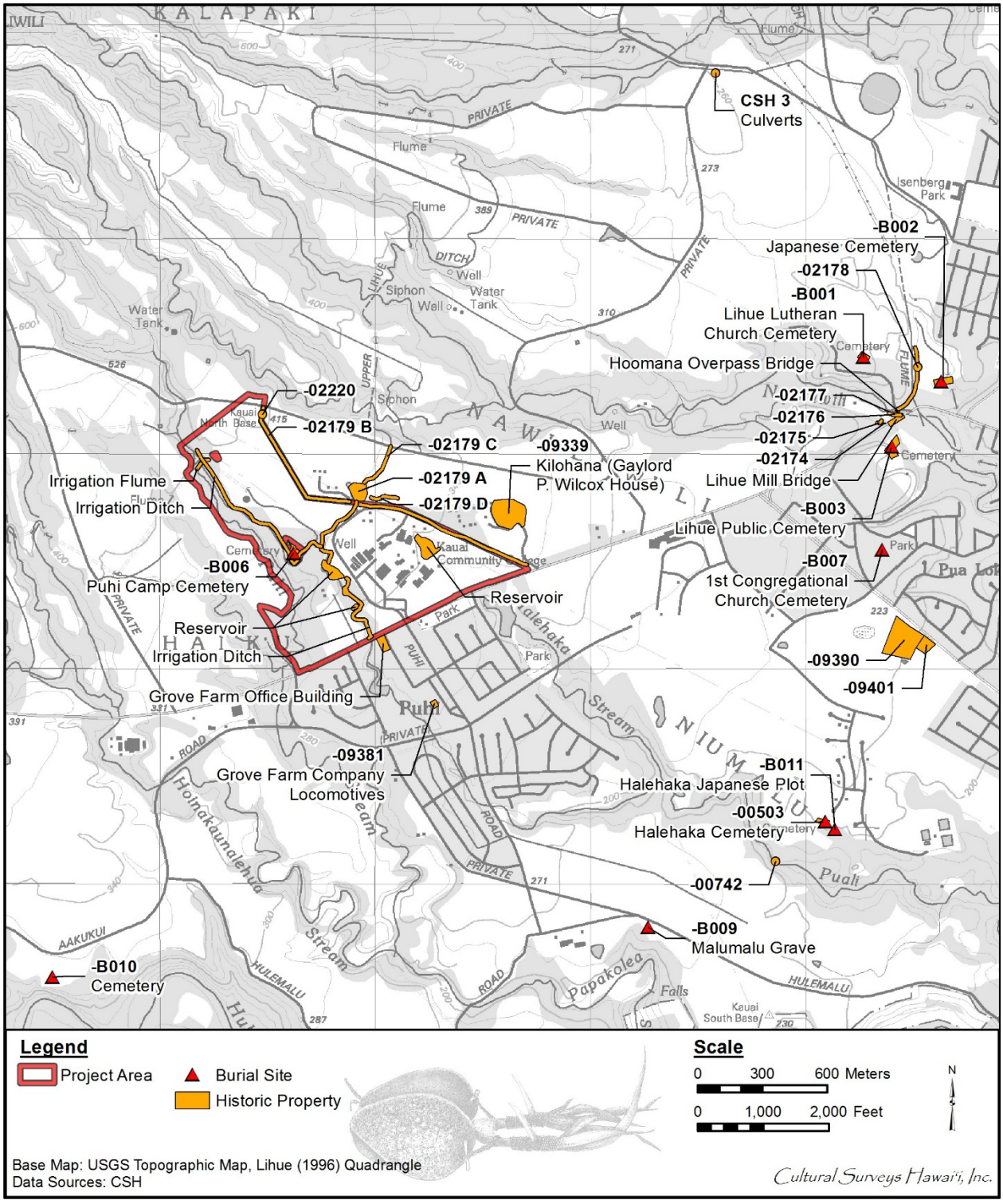


Figure 27. Portion of 1996 Lihue USGS topographic quadrangle, showing locations of previously identified historic and archaeological sites near project area

Table 2. Previously Identified Archaeological Sites in and near the Project Area

Site #	Site Type	Reference
50-30-11-00503	Cemetery	Walker and Rosendahl 1988; Walker and Rosendahl 1991; Henry et al. 1993
50-30-11-00742	Historic bridge	O’Hare et al. 1993
50-30-11-02174	Flume (Feature A); terrace (Feature B); and culvert (Feature C)	O’Hare et al. 2012
50-30-11-02175	Drainage ditch	O’Hare et al. 2012
50-30-11-02176	Rock wall along Nāwiliwili Stream	O’Hare et al. 2012
50-30-11-02177	Train bridge	O’Hare et al. 2012
50-30-11-02178	Sugar cane road and parallel right-of-way (Feature A); and a short section of an exposed railroad track (Feature B)	O’Hare et al. 2012
50-30-11-02179	Reservoirs/ditches (Features A through D including sub-features)	Groza and Hammatt 2013; Hunkin et al. 2014
50-30-11-02220	Hawaii Territory Survey Marker and Transit Station	Hunkin et al. 2014
50-30-11-9339	Kilohana (Wilcox Homestead)	Hawaii Historic Foundation (accessed 2015)
50-30-11-9381	Grove Farm Company locomotives	Hawaii Historic Foundation (accessed 2015)
50-30-11-9390	Historic residence	Walker and Rosendahl 1988; Henry et al. 1993; Hunkin et al. 2014
50-30-11-9401	Historic residential site	McMahon 1990; Hunkin et al. 2014
50-30-11-B0001	Līhu‘e Lutheran Church Cemetery	Kikuchi and Remaoldo 1992; O’Hare et al. 2012
50-30-11-B0002	Japanese Cemetery	Kikuchi and Remaoldo 1992; O’Hare et al. 2012
50-30-11-B0003	Līhu‘e Public Cemetery	Kikuchi and Remaoldo 1992; O’Hare et al. 2012
5030-11-B0006	Puhi Camp Cemetery	Palama 1973; Kikuchi and Remoaldo 1992; Groza and Hammatt 2013
50-30-11-B0007	Līhu‘e First Congregational Church Cemetery	Kikuchi and Remaoldo 1992; O’Hare et al. 2012
50-30-11-B0009	Immaculate Conception Church II Cemetery	Kikuchi and Remaoldo 1992; Hammatt and Kamai 2013
50-30-11-B0011	Halehaka Japanese Plot	Kikuchi and Remaoldo 1992; O’Hare et al. 2012
CSH 3	Culverts	Kamai and Hammatt 2015

Neller and Palama (1973) carried out an archaeological reconnaissance of the lower portion of the Hulē‘ia River and vicinity recording a number of historic properties. The archaeological richness of that area from the "Menehune Fishpond" downstream and near the crest of the trail to Kīpū Kai is clear. They did, however, also document four historic properties upstream of the Menehune Fishpond, the nearest of which (SIHP # -3010) consists of contiguous rock wall enclosures and several other features. This historic property is described as follows:

> . . . a compound, probably belonging to a chief or other important person. Nearby there are stone-faced river terraces, irrigation ditch (auwai), and a stone bridge crossing the auwai. The area is worth restoring to its prehistoric condition. It is an impressive site. [Neller and Palama 1973:3]

SIHP # -3009, also identified by Neller and Palama, is approximately 1.6 km from the current project area, and consists of an "agricultural area along both sides of the river, including rock-walled terraces and irrigation ditches (auwai). Also includes cement covered grave of G. Kalili, died Dec. 17, 1898" (Neller and Palama 1973:11).

Ching et al. (1973) conducted detailed research on Alekoko (Menehune) Fishpond and its vicinity. Nine archaeological features and feature complexes were identified and documented, including three fishpond features (*loko kuapā* and two *loko wai*), two *‘auwai*, and four *lo‘i* complexes.

Walker and Rosendahl (1988) conducted an archaeological surface and subsurface inventory survey of 450-acre Grove Farm Līhu‘e/Puhi extending from Puhi Town, south of Kaumuali‘i Highway nearly to Nāwiliwili Bay. A total of two historic properties were identified, a historic Japanese cemetery SIHP # -503, and a historic residence SIHP # -9390. The following year, Paul Rosendahl (1989) produced an addendum report covering eight additional separate small adjacent areas. No historic properties or cultural materials were identified. Henry et al. (1993) covers the same project area and is the final archaeological inventory survey for this area.

O'Hare et al. (1993) carried out an archaeological inventory survey on a 100-acre Puakea Golf and Country Club project area located approximately 1 km southeast of Puhi Town. No historic properties or cultural materials were identified.

3.2.3 Studies within or adjacent to the Project Area

3.2.3.1 KCC Archaeological Reconnaissance (Palama 1973)

In 1973, the Archaeological Research Center Hawaii conducted an archaeological reconnaissance of approximately 57 acres of the gully portion of KCC (Palama 1973), an area north and west of the currently developed portion of KCC. During the archaeological reconnaissance an "old *‘auwai*" (conforming to Grove Farm's "Mauka Ditch," see Figure 20), an old military complex, a Japanese Cemetery, old plantation camp remains, an extant plantation camp, and possible *lo‘i* were found (Figure 28). Palama (1973:2) asked plantation camp residents whether they ever found evidence of taro cultivation or if they farmed within the gully in the westernmost portion of the current project area. Apparently only very limited farming had ever been conducted in the gully, and the plantation workers were not aware of any taro cultivation. Palama (1973:2) "recommended that no further work is warranted" for the historic features he identified and no state site numbers were assigned.

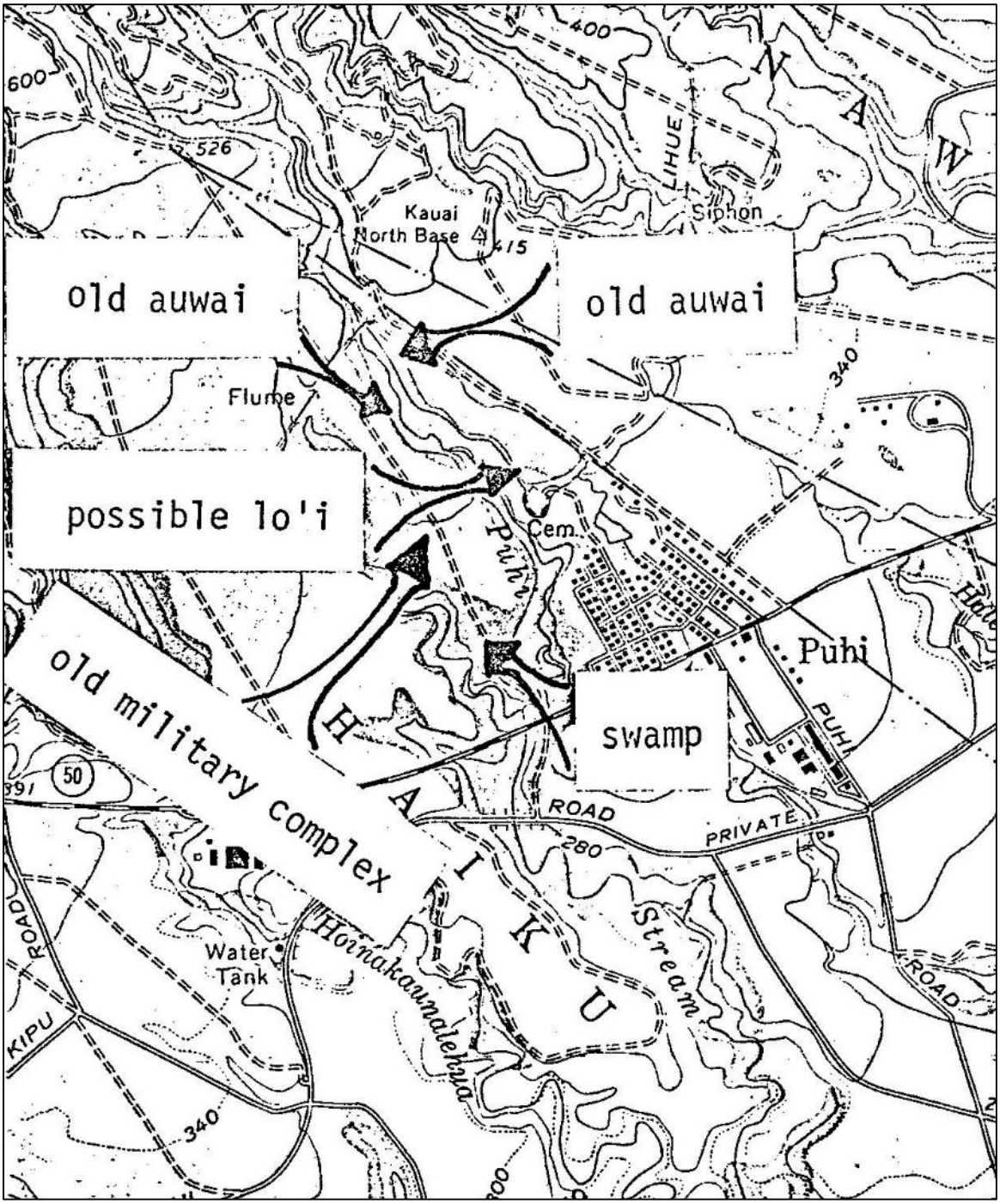


Figure 28. Locations of historic resources found within western portion of current project area during 1973 archaeological reconnaissance (adapted from Palama 1973:4)

3.2.3.2 Rosendahl (1989)/ Henry et al. (1993) AIS

One of the eight additional separate small adjacent areas surveyed by Paul Rosendahl (1989) in the addendum report described above is within the southwestern portion of the current project area and adjacent to Kaumuali‘i Highway. Designated as Area 1, it is described as consisting of “residential homesteads and yards” (Henry et al. 1993:18).

3.2.3.3 Lihue/Puhi/Hanamaulu Master Plan (Walker et al. 1991)

Approximately 220 acres within and adjacent to the project area were included in the 1,550-acre Lihue/Puhi/Hanamaulu Master Plan AIS (Walker et al. 1991). Designated as Section No. 1, this area is described as follows:

> . . . bounded on the north and east by the Nawiliwili Stream gulch, on the south by Kauai Community College and Kaumualii Highway, and on the west by the Puhi Stream gulch. This entire parcel has been modified and is presently in sugar cane (*Saccharum officinarum* L. hybrid) cultivation. [Walker et al. 1991:2]

The report states that

> areas in sugar cane were only sampled . . . [and] were not generally surveyed . . . because areas altered by sugar cane cultivation are unlikely to contain archaeological features, and because sugar cane cultivation within the present project area does not occur in low swale or alluvial flat areas that may contain buried cultural deposits. [Walker et al. 1991:7]

While Section No. 1 is listed as an area subjected to “inventory-level survey” in the Conclusion section of the report, this statement is further explained that “only very limited surface survey was done in sugar cane fields . . . [and] no subsurface testing was performed in sugar cane fields” (Walker et al. 1991:18). No additional descriptions of the project area and its vicinity are included in the report. Additionally, none of the ten historic properties (SIHP #s -1838 through -1847) identified during the Walker et al. (1991) study, including a concrete bridge, concrete wharf, cultural deposits, terraces, roads, walls, retaining walls, a possible agricultural area, and a historic cemetery, was identified in or within close proximity to the current project area.

3.2.3.4 Kaumuali‘i Highway Archaeological Assessment (Hammatt and Chiogioji 1998)

CSH (Hammatt and Chiogioji 1998) conducted an archaeological assessment of an approximately 11.5-km-long portion of the Kaumuali‘i Highway corridor, a portion of which is adjacent to the southern boundary of KCC. During the reconnaissance survey, no historic properties were found in the vicinity of the school campus. No surface traditional Hawaiian archaeological sites were observed during the entire survey although four historic properties (two bridges, a cemetery, and an office building) were noted. No state site numbers were assigned.

3.2.3.5 KCC One-Stop Center AIS and CIA (Hammatt and Shideler 2004)

In 2004, CSH conducted an archaeological and cultural impact evaluation study for the One-Stop Center at KCC (Hammatt and Shideler 2004). The proposed project involved construction of a two-story building of approximately 35,000-40,000 net sq ft (about 55,000-60,000 gross sq ft) located in the southwest (Kaumuali‘i Highway) side of the existing KCC campus. A field inspection of the vicinity of the proposed project was conducted and observed to be a graded,