Section 2 Background Research

2.1 Traditional and Historical Background

2.1.1 Mythological and Traditional Accounts

The project area is located within the *ahupua‘a* of Mākaha, which extends from the leeward Wai‘anae Range to the coastline. Wai‘anae Ahupua‘a is present to the southeast and Kea‘au Ahupua‘a is present to the northwest.

Although there are many traditional accounts detailing the pre-contact period of other portions of the Wai‘anae District, few exist for Mākaha. Mary Kawena Pukui (1974) gives the meaning of Mākaha as “fierce” and Roger C. Green (1980) suggests that this translation refers to “fierce or savage people” once inhabiting the valley. Green (1980:5) also refers to “…the ‘Ōlohe people, skilled wrestlers and bone-breakers, by various accounts [who] lived in Mākaha, Mākua, and Kea‘au, where they often engaged in robbery of passing travelers.”

Legend: How Mākaha Got Its Name

The shores fronting the beautiful Mākaha Valley were known for their abundant marine resources. Edward Iopa Kealanahele’s (1975) legend of how Mākaha got its name gives light to the great ocean resources:

> Long ago, there lived in this valley a handsome young chief named Makaha. His skill as a fisherman gained island-wide attention, which eventually reached the ears of Ke Anuenue [the rainbow], the goddess of rain, who lived in upper Manoa Valley.
>
> She was so intrigued that she sent her trusted winged friend, Elepaio, to investigate Makaha. Elepaio returned with exciting stories of Mākaha’s daring and skills.
>
> The next morning, Ke Anuenue created an awe-inspiring double rainbow which arched from Manoa Valley to this valley, from where she and her retinue could watch Makaha perform his daring feats at the ocean.
>
> The people of the Wai‘anae Valley were petrified by that magnificent rainbow that ended in this unnamed valley where Makaha lived.
>
> Knowing that Ke Anuenue was watching, they prayed that she would bring them the much needed gentle rains and not the harsh storms she could create when displeased.
>
> Makaha, aware of her presence, scaled Mauna Lahilahi and called loudly to his aumakua [his ancestral spirit] Mano ai Kanaka, the most vicious of man-eating sharks. As Mano ai Kanaka glided in from the ocean, Makaha dived from the rocky pinnacle, emerged on Mano ai Kanaka’s back and rode with regal grandeur.
>
> As the two disappeared into the depths, the sea became calm. Suddenly Makaha seemed to be everywhere along the rocky coast gracefully tempting death. Then, just

> as suddenly, Makaha seemed to skim the ocean as Mano ai Kanaka carried him to shore.
>
> Makaha then carried his entire catch to the rainbows end deep in the valley and offered it to Ke Anuenue. Deeply touched, she sent gentle rains to the parched earth of the great Wai‘anae Valley. She was impressed by the selection of seafood that was offered her but was disappointed by the quality of the poi, mai‘a [banana] and uala [sweet potato] which were dry and stringy. She demanded to know why since she was so accustomed to good quality fruits. She was told that it was because of the lack of rainfall in the valley.
>
> Ke Anuenue became enamored with Makaha and from then on her double rainbow would appear in Mākaha's kuleana [land area] and gentle rains would fall on Wai‘anae so the people could enjoy lush bananas and an abundance of taro.
>
> The people built a heiau in honor of Ke Anuenue and Makaha but Ke Anuenue refused the honor and named the entire valley, Makaha, by which it is now known.

Stories of Malolokai

In the *ahupua‘a* of Mākaha there are accounts of a talking stone on the hill of Malolokai, and two small pits on the *makai* side of the road at Kepuhi Point:

> We rode to the plain of Kumanomano,… and it is said of the place, the teeth of the sun is sharp at Kumanomano. Mākaha rose above like a rain cloud. We passed in front of a famous hill Malolokai. We saw the talking stone standing there [Kuokoa, August 11, 1899 In Sterling and Summers 1978:79].

A brief account of the location of Malolokai cave is given by Kuokoa, July 12, 1923 in Sterling and Summers (1978:79): "…Malolokai lies below [beyond] the hill of Maunalahilahi close to a cliff. Below, in the level land of Waihokaea are the bones of the travelers who were killed by skilled *lua* fighters."

Lua literally means hand-to-hand fighting that includes bone-breaking (Pukui and Elbert 1986). It is often referred to as the *art of lua*, or the Hawaiian martial art. Starting in the 1750s, the art of *lua* was only taught to the *ali‘i* and their guards. It was a long time familial secret and could only be passed down through family. Later, in the early1920s, the *kapu* was broken and the Hawaiian martial art of *lua* was taught to other people outside of the bloodline.

Lua had an array of weapons that were used in combat made of different types of hardwood found throughout the Hawaiian islands such as *kauwila* and *kawa‘u*. Marine resources were also used to make weapons, such as shark teeth, used to make the *leiomano*, a shark tooth weapon used as a knife and the marlin (swordfish) bill.

Some legends say that they were cannibals and not *lua* fighters:

> The late Harry George Poe, born in Makua Valley in 1882, wrote in his diary that the robbers threw their victims into a pit that went underground to the ocean. Poe explained, 'the reason is, they wants a man's legs without no hair on to make [an] aku

> [tuna] fishhook. They believe in those days that the human leg is best, lucky hook for aku.' One legend says a group of hairless men from Kauai finally wiped out the entire colony of robbers. Since that time, Malolokai has been safe for travelers (McGrath et al. 1973:11).

The following is a story told by an unknown Hawaiian. Kepuhi Point is at the base of the ridge that divides Mākaha and Kea‘au Valleys. McAllister recorded it in 1933 (SIHP # -175):

> Long ago there lived here a group of people who are said to have been very fond of human flesh. At a high altitude on each side of the ridge, guards were stationed to watch for people crossing this narrow stretch of land between the mountains and the sea. On the Mākaha side, they watched from a prominent stone known as Pohaku o Kane; on the Kea‘au side, from a stone known as Pohaku o Kaneloa. The individual who passed here was in constant danger of death, for on each side of the trail men lay in wait for the signal of the watcher. If a group of persons approached, too many to be overcome by these cannibalistic peoples, the guards called out to the men hidden below, "Moanakai" [high tide]; but if, as frequently happened, only two or three people were approaching, the watchers called, "Mololokai" [low tide]. The individuals were then attacked and the bodies taken to two small caves on the sea side of the road. Here the flesh is said to have been removed and the bones, skin and blood left in the holes, which, at high tide, were washed clean by the sea.
>
> For many years these people prayed upon the traveler until at one time men from Kauai, hairless men [Olohe] came to this beach. They were attacked by these cannibals but defeated them, killing the entire colony. Since then the region has been safe for traveling (McAllister 1933:121-122).

In Hi‘iaka's "Address to Cape Kaena," she mentioned Mākaha as she travelled along the sunny coast. As she stood at the top of the Pōhākea Pass looking back, she sang the following song (Emerson 1965:157):

Kaena's profile fleets through the calm,	Kunihi Kaena, Holo i ka Malie;
With flanks ablaze in the sunlight-	Wela i ka La ke alo o ka pali;
A furnace-heat like Kilauea;	Auamo mai i ka La o Kilauea;
Ke-awa-ula swelters in heat;	Ikiiki i ka La na Ke-awa-ula
Kohola‘-lele revives in the breeze	Ola i ka makani Kai-a-ula Kohola‘ lele-
That breath from the sea, Kai-a-ulu.	He makani ia no lalo.
Fierce glows the sun of Makua;	Haoa ka Loa i na Makua;
How it quivers at Ohiki-lele-	Lili ka La i Ohiki-lolo
'Tis the Sun-god's dance o‘er the plain,	Ha‘a-hula le‘a ke La i ke kula,
A roit of dance at Makaha.	Ka Ha‘a ana o ka La i Makaha;
The sun-tooth is sharp at Kumano;	Oi ka niho o ka La i Ku-manomano;

Life comes again to Maile ridge,	Ola Ka-maile i ka huna na niho
When the Sun-god ensheaths his fang.	Mo‘a wela ke kula o Walio;
The Plain Walio‘ is sunburned and scorched;	Ola Kua-iwa i ka malama po
Kua-iwa revives with the nightfall;	Ola Waianae i ka makani Kai-a-ulu
Waianae is consoled by the breeze	Ke hoa aku la i ka lau o ka niu
Kai-a-ulu and waves its coco fronds;	Uwe’ o Kane-pu-niu i ka wela o ka La;
Kane-pu-niu’s fearful of sunstroke’(*e)*	Alaila ku‘u ka luhi, ka malo‘elo‘e,
A truce, now, to toil and fatigue:	Auau aku i ka wai i Lua-lua-lei
We plunge in the Lua-lei water	Aheahe Kona, Aheahe Koolau wahine,
And feel the kind breeze of Kona,	Ahe no i ka lau o ka ilima.
The cooling breath of the goddess,	Wela, wela i ka La ka pili i ka umauma,
As it stirs the leaves of ilima.	I Pu‘u-li‘ili‘i, i Kalawalawa, i Pahe-lona,
The radiant heat scorches the breast	A ka pi‘i‘na i Wai-ko-ne-ne’-ne;
While I sidle and slip and climb	Hoomaha aku i Ka-moa-ula;
Up one steep hill then another;	A ka luna i Poha-kea
Thus gain I at last Moa-ula,	Ku au, nana i kai o Hilo:
The summit of Poha-kea.	
There stand I and gaze oversea	
To Hilo, where lie my dewy-cold	
Forest preserves of lehua	
That reach to the sea in Puna-	
My lehuas that enroof Kuki‘i.	

Menehune in Mākaha are mentioned in Hawaiian Folk Tales by Thomas G. Thrum (1907) in the story of Kekupua’s Canoe. The *menehune* constructed a canoe for Chief Kakae, who lived in Wahiawa, for his wife to travel to Tahiti. Kekupua was the Chief’s main man who went to Mākaha to pull the canoe down to the ocean.

2.1.2 Early Historic Period

Wai‘anae District

The origin of the name Wai‘anae is thought to be connected to the richness of the waters off Wai‘anae’s coast: *wai* - water and *‘anae* - large mullet (Sterling and Summers 1978). Several accounts attest to the abundance of fish from Wai‘anae waters (Wilkes 1845; Pukui et al. 1974). In 1840, Wilkes makes the following comment: “The natives are much occupied in catching and drying fish, which is made a profitable business, by taking them to Oahu, where they command a ready sale” (Wilkes 1845:81-82).

Traditional accounts of Wai‘anae portray a land of dual personality: a refuge for the dispossessed and an area inhabited by the rebellious and outlaws. Certain landmarks in Wai‘anae attest to this dichotomy. Kawiwi, a mountain between Wai‘anae and Mākaha Ahupua‘a, was dedicated as a refuge by priests during times of war (McAllister 1933; Kamakau 1961). Pōka‘ī Bay was used as a school administered by the exiled high-class priests and *kahuna* who took refuge in Wai‘anae after Kamehameha Nui gained control of O‘ahu (Sterling and Summers 1978:68). It was also near Pōka‘ī Bay, at a place named Pu‘u Kāhea, that the eighteenth century prophet and *kahuna nui* of O‘ahu, Ka‘opulupulu, made his last famous prophecy before he was killed in Po‘olua (Sterling and Summers 1978:71). In contrast, other places in Wai‘anae were famed for their inhospitality.

Certainly, the environmental conditions along the Wai‘anae Coast played a part in shaping Wai‘anae people. Vancouver, the first explorer to describe this coast in 1793, describes the Wai‘anae Coast as "…composed of one barren rocky waste, nearly destitute of verdure, cultivation or inhabitants..." (Vancouver 1798:217).

The *‘ōku‘u* epidemic of 1804 (thought to be cholera) undoubtedly had a major effect on the native population, not only in Wai‘anae, but throughout the rest of the islands as well. John Papa ‘Ī‘ī relates that the *‘ōku‘u* "broke out, decimating the armies of Kamehameha I" [on O‘ahu] (1959:16). Other diseases also took their toll. The combined census for the Wai‘anae and ‘Ewa Districts in 1831-1832 was 5,883 (Schmitt 1977:12). Twenty years later, the combined census for the two districts was 2,451.

Another early historic period foreign influence, which greatly impacted Hawaiian culture and the traditional lifestyle, was the sandalwood trade. In an effort to acquire western goods including ships, guns, and ammunition, the chiefs acquired massive debts to the American merchants (‘Ī‘ī 1959:155). These debts were paid off in shiploads of sandalwood. When Kamehameha found out how valuable the sandalwood trees were, he ordered the people not to let the felled trees fall on the young saplings, to ensure their protection for future trade (Kamakau 1992:209-210).

Mākaha Ahupua‘a

Earliest accounts specific to Mākaha describe a good sized inland settlement and a smaller coastal settlement (Green 1980). These accounts correlate well with a sketch drawn by Bingham in 1826, which depicts only six houses along the Mākaha coastline (Figure 5). Green (1980:20-21) describes Mākaha's coastal settlement as, "…restricted to a hamlet in a small grove of coconut trees on the Kea‘au side of the valley, some other scattered houses, a few coconut trees along the beach, and a brackish water pool that served as a fish pond, at the mouth of the Mākaha Stream." This stream supported traditional wetland agriculture, including taro, in pre-contact and early historic periods, and sugarcane in the more recent past. Mākaha Stream, although it has likely changed course in its lower reaches, favors the northwest side of the valley leaving most of the flat, or gently sloping, alluvial plain on the southeast side of the valley. Rainfall is less than 20 inches annually along the Wai‘anae Coast and increases to approximately 60 inches along the 4000-foot high cliffs at the back and sides of the valley (Hammatt et al. 1985). Seasonal dry land cultivation in early times would have been possible, and remnants of dry land fields (*kula*) have been found in the valley in previous surveys (Green 1980).

The ancient, small (130-square meter) stepped stone *heiau* called Laukīnui, is so old that tradition claims it was built by the *menehune*. In areas watered by the stream there were *lo‘i* lands, but along

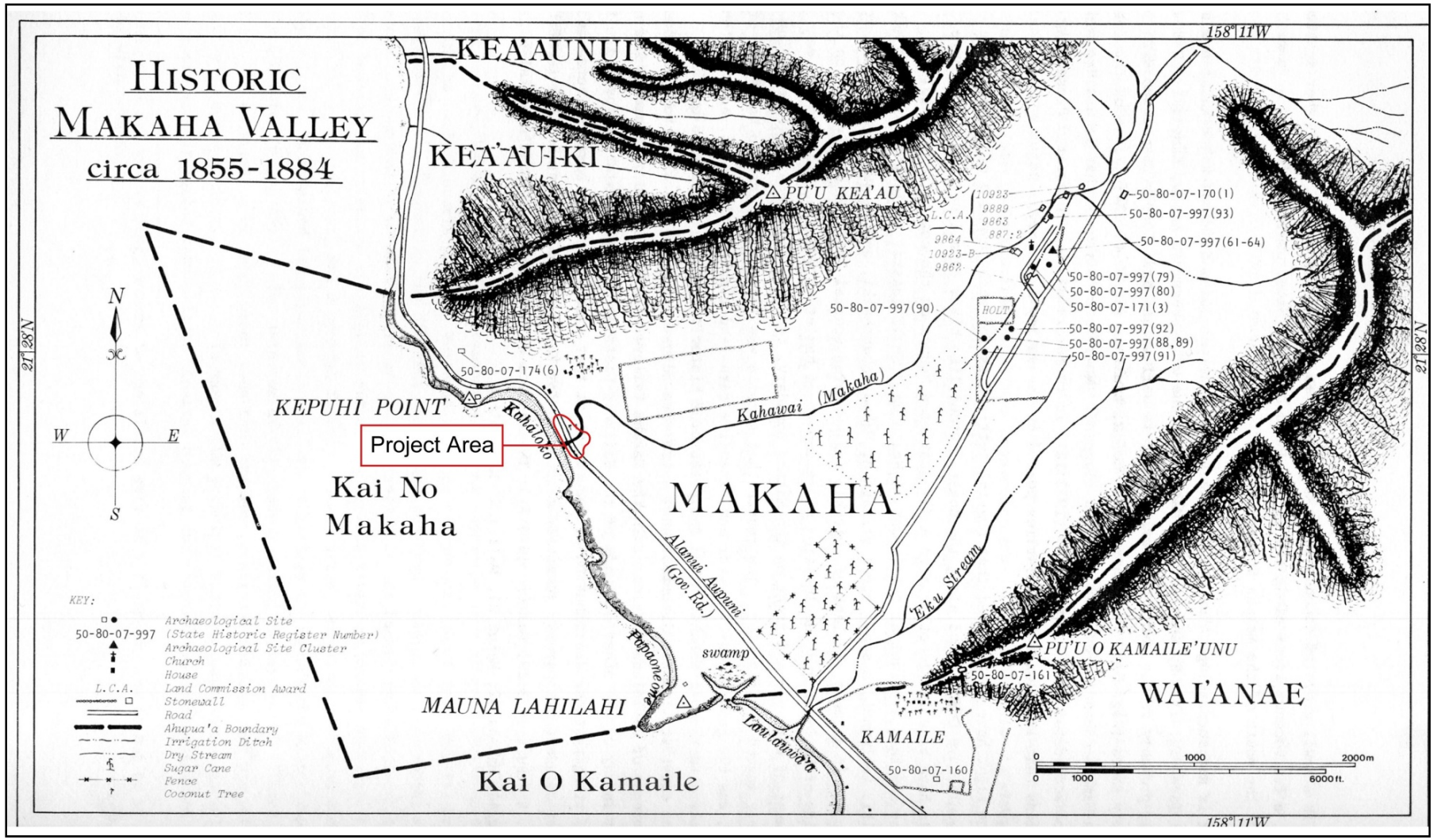

Figure 5. 1855-1884 Map (Green 1980) of Mākaha Valley showing location of project area and surrounding LCAs

this arid coast there was plenty of land where there was not enough water for taro, and typically here sweet potatoes and other dry land crops would have flourished. The Bishop Museum study undertaken by Green (1980) identified several field shelters with firepits associated with this dry land field system. Their settlement model indicates, during this early period, the field shelters were used as rest and overnight habitations by people living permanently on the coast who temporarily moved inland to plant, tend, and harvest their crops during the wet season (Green 1980: 74).

At the boundary between Mākaha and Wai‘anae Ahupua‘a lies Mauna Lahilahi, a striking pinnacle jutting out of the water. Vancouver describes Mauna Lahilahi as “a high rock, remarkable for its projecting from a sandy beach.” He also describes a village located south of Mauna Lahilahi situated in a grove of coconuts (Vancouver 1798:219). This village is Kamaile, which Green (1980:8) likens to a miniature *ahupua‘a* “with the beach and fishery in front and the well watered taro lands just behind.” A fresh water spring, Keko‘o, gave life to this land and supported one of the largest populations on the Wai‘anae Coast. The present project area is north of this coastal settlement, within a relatively low site density shoreline environment.

2.1.3 Māhele and LCA Documentation

The Organic Acts of 1845 and 1846 initiated the process of the *Māhele* - the division of Hawaiian lands, which introduced private property into Hawaiian society. In 1848, the crown and the *ali‘i* (royalty) received their land titles. *Kuleana* awards for individual parcels within the *ahupua‘a* were subsequently granted in 1850. Mākaha Ahupua‘a had 13 claims of which seven were awarded (Table 1). Of these seven, six Mākaha LCAs were located inland attesting to the importance of the inland settlement (see Figure 5). The seventh Mākaha LCA claims a *muliwai* as its western boundary. According to Pukui and Elbert (1986: 236) a *muliwai* refers to a “river, river mouth; pool near mouth of a stream, as behind a sand bar, enlarged by ocean water left there by high tide; estuary.” The reference to it as a boundary indicates this LCA was likely situated near the coast. There were two unawarded claims which also mention the *muliwai* as their boundary. Based on this information, it is possible that these claims were for Mākaha lands within the current project area, or at least in the immediate vicinity.

Land use information for the Mākaha LCAs is sparse. *Lo‘i* lands and *kula* lands were an important part of sustenance. In addition to these general land specifications, there is also mention of *noni*, ponds, and land for raising *mao*. The *noni* ponds are recorded in association with the *‘ili* of Kamaile indicating the claimant was claiming land in neighboring Wai‘anae Ahupua‘a in addition to the Mākaha claim. *Mao* refers to an introduced species of “cotton” (*Gossypium barbadense* or *Gossypium hirsutum*), which was commercially grown in Hawai‘i beginning in the early part of the nineteenth century, although it never became an important industry (Wagner et al. 1990: 876). *Ma‘o* generally does well in hot, arid environments and Mākaha would have been a suitable climate for such an industry.

Kuho‘oheihei (Abner) Pākī, father of Bernice Pauahi, was given the entire *ahupua’a* of Mākaha by Liliha after her husband, Boki, disappeared in 1829 (Green 1980). Although several individuals are recorded as having charge over Mākaha including Aua, Kanepaiki “chief of the Pearl River”, and the present “King”, Pākī felt entitled to the entire *ahupua‘a* of Mākaha. It is uncertain how much of his claim was granted. Whatever the case, it is suggested Chief Pākī was able to wield a certain amount of control over the residents of Mākaha during the *Māhele*

resulting in the limited number of LCA applications. Taxpaying adult males in 1855 numbered 39, indicating there were more families living and working the Mākaha lands (Barrere 1970: 7) than was reflected in *Māhele* awards.

Based on the *Māhele* documents, Mākaha's primary settlement was inland where waters from Mākaha Stream could support *lo‘i* and *kula* cultivation. Although there is evidence for settlement along the shore, for the most part, this was limited to scattered, isolated residents. The only "cluster" of habitation structures was concentrated near Mākaha Beach, near the Kea‘au side of Mākaha where there is also reference to a fishpond. There is tentative, but inconclusive evidence for land claims within the vicinity of the current project area.

Table 1.LCAs in Mākaha Ahupua‘a

Land Claim #	Claimant	‘Ili	Land Use	Landscape Feature	Awarded
877	Kaana/Kuaana for Poomano, wife	Kapuaa		Surrounded by lands of Alapai	1 ap.; 1.587 Acs (also Hotel St. & Waianae awards)
8228	Inaole (no name)	Laukini	House	stream on 2 sides	No
8763	Kanakaa	Hoaole	‘ili		No
9689	Nahina	Kekio	16 *lo‘i,* house lot	kahawai, muliwai on west	1 ap. .957 Ac.
9859	Napoe	Aheakai/ Laukini Mooiki	17 *lo‘i* (*mo‘o*) & kula house	*pali* on N. Kalua ma on N., kula & stream on E, stream on S. *muliwai* on west.	No
9860	Kalua	Luulauwaa (Laulauwaa)	House	in *kahawai* (stream valley) of Mākaha, hau, *muliwai* on west	No
9861	Nahina, see above	Kekio			No
9862	Kanehaku	Kekio Mooiki			
9863	Kala	Waikani Kahueiki Kapuaa		stream on S. *pali*(s) & stream land of Alapai	1 ap.; (Kalihi) 1.346 Acs
9864	Kapea	Laukini	19 lo‘i kula	pali	1 ap.; 1.217 Acs
10613	Pākī, Abner	Ahupua‘a			Apana 5: 4,933 Acres
10923	Uniu	Mākaha		stream on E.land of Kalua on S, *pali on W.*	1 ap.; .522 Ac. 1 ap.; .576 Ac.

Land Claim #	Claimant	‘Ili	Land Use	Landscape Feature	Awarded
10923B	Alapai	Kapuaa	2 lo‘i & kula	pali on E. kahawai on W.	1 ap.; .52 Ac.

2.1.4 1850 to 1900

By ancient custom the sea, for a mile off the shores, belonged to the *ahupua‘a* as part of its resources. The ruling chief could prohibit the taking of a certain fish or he could prohibit all fishing at specific times. Chief Pākī filed two such prohibitions, one in 1852, for the taking of *he‘e* or octopus (*Polypus* sp.) and the other in 1854 for the taking of *‘ōpelu* (*Decaqpterus pinnulatus*) (Barrere in Green 1980:7)

In 1855, Chief Pākī died, and the administrators of his estate sold his Mākaha lands to James Robinson and Co. In 1862, one of the partners, Owen Jones Holt, bought out the shares of the others (Ladd and Yen 1972). The Holt family dominated the economic, land-use, and social scene in Mākaha from this time until the end of the nineteenth century. During the height of the Holt family dynasty, from about 1887 to 1899, the Holt Ranch raised horses, cattle, pigs, goats and peacocks (Ladd and Yen 1972:4). Mākaha Coffee Company also made its way into the valley, buying up land for coffee cultivation, although they never became a prosperous industry. Upon Holt’s death in 1862, the lands went into trust for his children.

2.1.5 1900 to Present

The Holt Ranch began selling off its land in the early 1900s (Ladd and Yen 1972). In 1907, the Wai‘anae Sugar Company moved into Mākaha and, by 1923, virtually all of lower Mākaha Valley was under sugar cane cultivation. The plantation utilized large tracks of Lualualei, Wai‘anae, and Mākaha Valleys. The manager’s report for 1900 describes the plantation as having some 400 acres of newly cleared land fenced and planted, two miles of railroad, and nearly three miles of flumes laid to said lands (Condé and Best 1973:357). For a half century, Mākaha was predominantly sugarcane fields; however, by 1946 the manager’s report announced plans to liquidate the property because an additional increase in wage rates made operations no longer profitable (Condé and Best 1973:358).

The lack of water resources played a role in Wai‘anae Sugar Company’s low profitability. In the 1930s, Wai‘anae Plantation sold out to American Factors Ltd. (Amfac, Inc.). American Factors Ltd. initiated a geologic study of the ground water in the mountain ridges in the back of Mākaha and Wai‘anae Valleys. The study indicated that tunneling for water would be successful, but before tunneling could commence, World War II came about and plans were put on hold (Green 1980). In 1945, American Factors Ltd. contracted the firm of James W. Glover, Ltd. to tunnel into a ridge in the back of Mākaha Valley. The completed tunnel (Glover Tunnel) was 4200 feet long and, upon completion, had a daily water capacity of 700,000 gallons. The water made available was predominantly used for sugarcane irrigation. In 1946, Wai‘anae Plantation announced in the *Honolulu Advertiser* (Friday, Oct 18, 1946 cited in McGrath et al. 1973:145) that it planned to liquidate its nearly 10,000 acres of land. The day before, news of the impending sale was circulated among the investors at the Honolulu Stock Exchange. One of the investors was Chinn Ho.

> The unorthodox Ho had started his Capital Investment Company only the year before with a bankroll of less than $200,000, much of it the life savings of plantation workers. He was known as a friend of the little man, an eager disciple of economic growth, and an upstart (McGrath et al. 1973:145).

Chinn Ho managed to broker the deal the following day by 2 pm, when the Wai‘anae Plantation sold the Mākaha lands to the Capital Investment Corporation, which still maintains ownership of much of Mākaha Valley. There was an attempt to convert sugar lands back to ranching, but the perennial problem of water continued. Parts of the property were sold off as beach lots, shopping centers, and house lots, and many of the former plantation workers bought house lots. Chinn Ho also put his personal investment into Mākaha and initiated resort development including a luxury hotel. In 1969, the Mākaha Valley Golf Club, an 18-hole course with tennis courts, restaurant and other golf facilities opened for local and tourist use (McGrath et al. 1973:146-163). Numerous other small-scale agricultural interests were pursued during this time period including coffee, rice, and watermelons (Ladd and Yen 1972). Water from Glover Tunnel was then used to water Mākaha Valley farms, the lush grounds of the Mākaha Inn and Country Club, and its associated golf course.

2.1.6 Alterations to the Wai‘anae Coastline (1880 –1930)

Prior to the 1880s, the Wai‘anae coastline may not have undergone much alteration. The old coastal trail likely followed the natural contours of the local topography. With the introduction of horses, cattle, and wagons in the nineteenth century, many of the coastal trails were widened and graded to accommodate these new introductions. However, the changes probably consisted of superficial alterations to existing trails and did not entail major realignments. Kuykendall (1953:26) describes mid-nineteenth century road work: “Road making as practiced in Hawai‘i in the middle of the nineteenth century was a very superficial operation, in most places consisting of little more than clearing a right of way, doing a little rough grading, and supplying bridges of a sort where they could not be dispensed with.”

The first real alteration to the Wai‘anae coastline likely resulted from growth of the Wai‘anae Sugar Company. The company cultivated sugarcane in Mākaha, Wai‘anae, and Lualualei Valleys,and to more easily transport their cane to the dock and to the mill at Wai‘anae Kai, a railroad was constructed in 1880. Additional alteration to the Wai‘anae coastline occurred in the late nineteenth century with the extension of Dillingham’s OR&L rail line into the Leeward Coast. Construction of the railroad would have had an impact on the natural landscape, such as the sand dunes, as well as human-made features, particularly the fishponds and saltponds maintained in the coastal zone. One reporter writes a glowing story of the railroad trip to Wai‘anae at its opening on July 4, 1895:

> For nine miles the road runs within a stone’s throw of the ocean and under the shadow of the Wai‘anae Range. With the surf breaking now on the sand beach and now dashing high on the rocks on one side, and with the sharp craigs and the mountains interspersed with valleys on the other, patrons of the road are treated to some of the most magnificent scenery the country affords (McGrath et al. 1973:56).

This report indicates the railroad hugged the ocean during a good portion of the trip. The railway's grade requirements demanded considerable alteration to natural landscapes in order to make them feasible for transport, including curve and slope reduction. An 1884 map illustrates the alignment of the old Government Road (Jackson 1884; Figure 6 and Figure 7), which was likely a modified version of the original coastal trail. After the Belt Road was completed, further roadwork was carried out in the 1930s on what was called the "Wai‘anae Road", later named Farrington Highway. Kili Drive was built ca. 1970s to provide additional access into Mākaha Valley. Additional access was necessary due to increased population related to residential, golf resort, and condominium development in the valley.

Mākaha Bridges 3 and 3A and Improvements to Farrington Highway

The Mākaha bridges were built in 1937. Hawai‘i was still a territory, and W. D. Bartel was the Chief Engineer for the Territorial Highway Department. At the time, the bridges, along with associated improvements to the existing "Wai‘anae Road," later renamed Farrington Highway, were important components of the Territorial Highway System. Based on photographs, (McGrath et al. 1973:138-139, 144, 149; Figure 7, Figure 8, and Figure 9), Farrington Highway was first paved as a result of 1930s Territorial Highway System construction. The expansion of the belt road system was an important improvement that further facilitated transportation to and from the more remote portions of Wai‘anae, beyond Mākaha.

2.2 Previous Archaeological Research

2.2.1 Previous Archaeological Studies in Mākaha Ahupua‘a

A number of archaeological studies have been carried out in Mākaha Ahupua‘a (Table 2, Figure 10), beginning with McAllister's (1933) island-wide survey in which he describes seven sites in Mākaha Ahupua‘a:

SIHP # 50-80-07-169 is a complex of rock-faced terraces for irrigated taro cultivation located "two-thirds the way up the valley." It is shown on McAllister's O‘ahu site map, on the northwest side of the valley, approximately 800 m northwest of Kāne‘ākī Heiau.

SIHP # 50-80-07-170 is Kāne‘ākī Heiau which has been preserved and reconstructed.

SIHP # 50-80-07-171 is another set of extensive, once irrigated taro terraces with some rock facings, approximately 6 ft. in height, and is reported as, "half-way up Mākaha Valley and on the Honolulu side of the stream" and is shown on McAllister's O‘ahu site map as approximately 400 m south of Kāne‘ākī Heiau. Green (1980) reported that this site was not relocated and had been destroyed; however Neller (1984) relocated and described the site as damaged.

SIHP # 50-80-07-172 is described as a stone platform, interpreted as a possible shrine, and is shown on McAllister's O‘ahu site map as approximately 600 m south of Kāne‘ākī Heiau. Green (1980) reported that this site was not relocated and had been destroyed; however, Neller (1984) relocated and described the site as damaged.

SIHP# 50-80-07-173 is described as the "probable location" of a large rock reported in 1839 by E. O. Hall as "two or three miles distance" past the settlement at Pukahea (Pu‘u Kahea) that was once an object of worship. This sacrificial stone was reported by Hall as "in no peculiar sense striking" and "as undignified as any other hump or inanimate matter along the road."

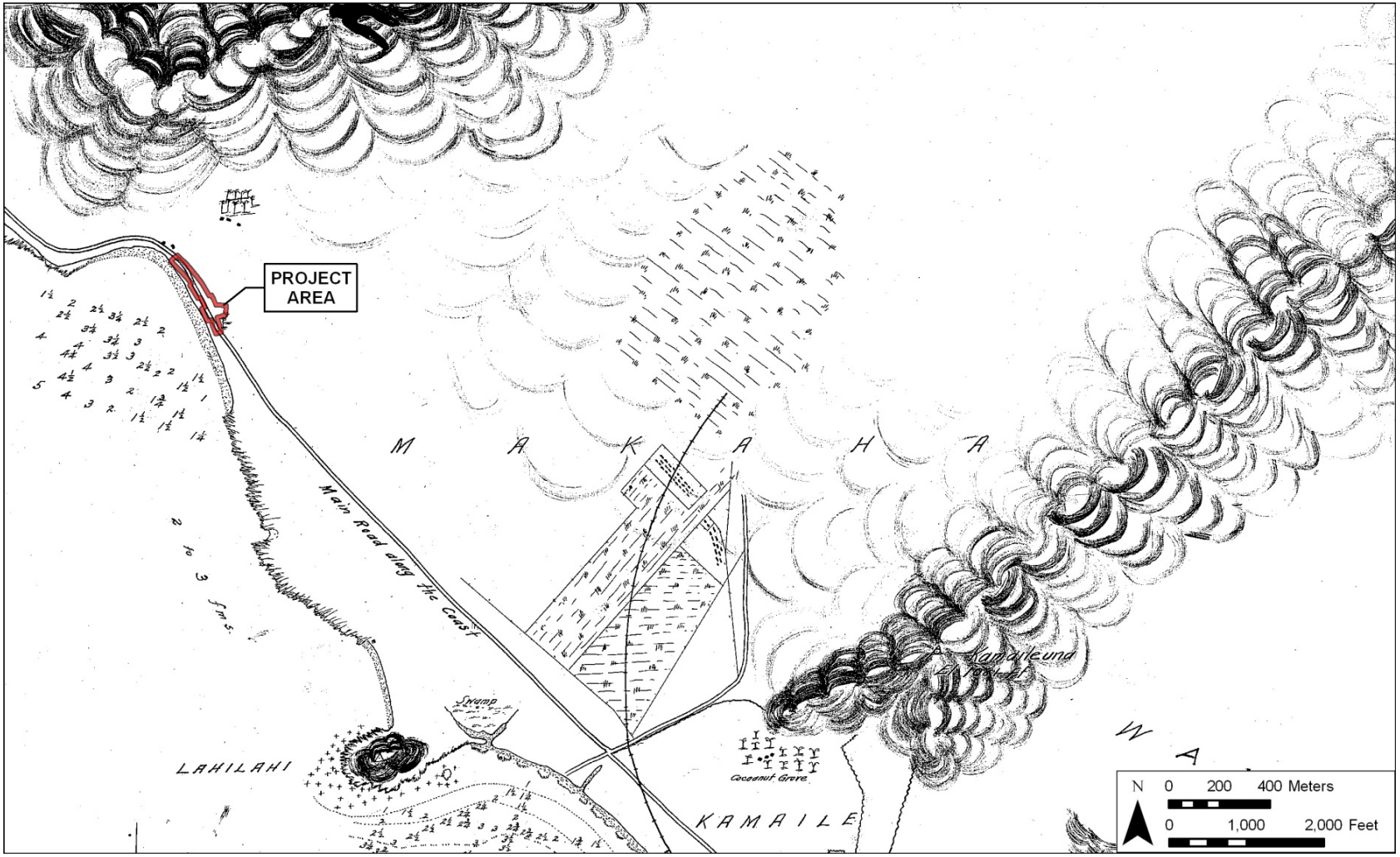

Figure 6. An 1884 Government Survey map showing the alignment of the Old Government Road along the Wai‘anae Coast and through the current project area (Jackson 1884).

Figure 7. Photograph of the old Waianae Road (McGrath et al. 1973:51)

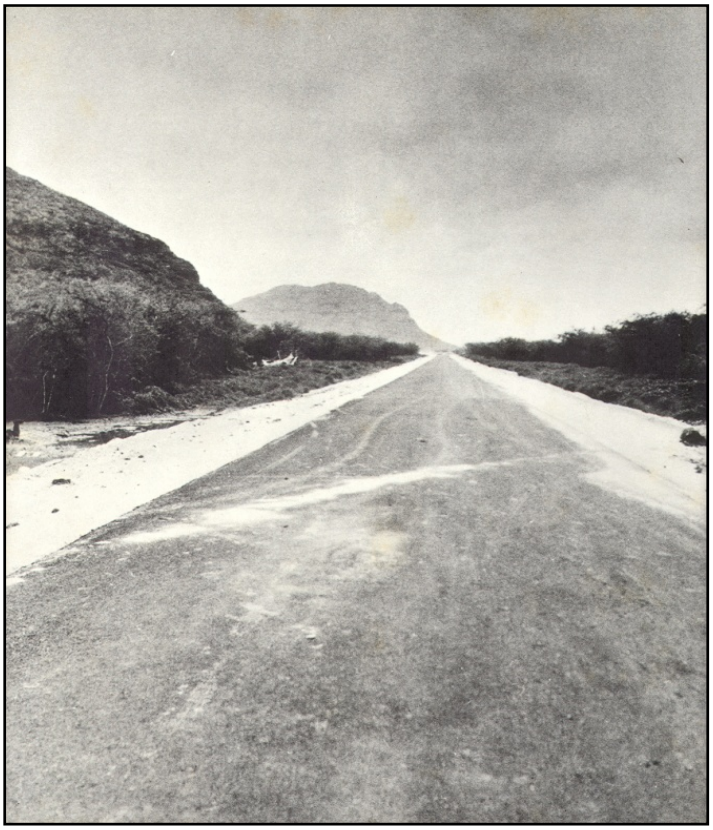

Figure 8. Photograph of Farrington Highway, late 1940s (McGrath et al. 1973:144)

Figure 9. Photograph of Farrington Highway, 1947 (McGrath et al. 1973:149), the current project area is in the distance, near the beach at the base of the ridgeline, on the far side of the shallow peninsula

Table 2. Previous Archaeological Studies in Mākaha Ahupua‘a

Study	Location	Type of Study	Findings
McAllister 1933	Island-wide	Island-wide survey	Describes seven sites within Mākaha Ahupua‘a
Green 1969	Large expanse of the central valley	Mākaha Valley Historical Project Report 1	Presents historical documentation and analysis of remains
Green 1970	Large expanse of central Mākaha Valley	Mākaha Valley Historical Project Report 2	Presents results of excavations including 16 carbon dates going back to circa AD 1200.
Ladd andYen 1972	Large expanse of central Mākaha Valley	Mākaha Valley Historical Project Report 3	Presents results of excavations
Ladd 1973	Large expanse of central Mākaha Valley	Mākaha Valley Historical Project Report 4	Presents results of excavations
Green 1980	Large expanse of central Mākaha Valley	Mākaha Valley Historical Project Report 5 - Summary	Summary of archaeological data and cultural history
Bordner 1981	Corridor in Mākaha Valley floor *mauka* of Kāne‘ākī Heiau	Surface Survey	Notes numerous agricultural sites
Bordner 1983	Corridor in Mākaha Valley floor *mauka* of Kāne‘ākī Heiau	Surface Survey	Notes numerous agricultural sites
Kennedy 1983	Elevation of 1072 feet in the Mākaha Valley floor, 2 km *mauka* of Kāne‘ākī Heiau	Well Monitoring Report	No historic properties observed
Neller 1984	Central Mākaha Valley (SIHP # -997)	Archaeological Reconnaissance Survey	Identifies unreported sites, and re-analysis of several sites
Hammatt et al. 1985	West side of Mākaha Valley (SIHP # -776)	Archaeological Reconnaissance Survey	Identifies numerous modified natural terraces associated with dry land agriculture
Barrera Jr. 1986	West-central side of Mākaha Valley	Archaeological Survey	Identified four sites including four stone platforms, a U-shape habitation enclosure, a

Study	Location	Type of Study	Findings
			terrace, and a wall. Approximately 17 test pits were excavated
Kennedy 1986	Mauna Lahilahi	Archaeological Investigations	Identifies five archaeological sites
Ahlo et al. 1986	Mauna Lahilahi	Affidavits of brief oral histories	Accounts note the general sacredness of Mauna Lahilahi and the good fishing
Komori 1987	Mauna Lahilahi	Archaeological Survey and Testing	Relocates Kennedy's five sites and describes eleven more. Reports eight carbon dates
Bordner and Cox 1988	Upper Mākaha Valley floor	Mapping Project	Relocates previously identified sites with focus on sites -764 and -77; emphasis on dry land agriculture.
Donham 1990	Two areas on southeast side of Mākaha Valley	Archaeological Inventory Survey	Identified a terrace associated with dry land agriculture and/or habitation
Kawachi 1990	Mauna Lahilahi	Burial report	Describes remains of at least two individuals, artifacts and sites
Hammatt and Robins 1991	Water Street/ Kili Drive Area	Archaeological Inventory Survey	Identified a linear earthen berm understood as associated with commercial sugar cane cultivation
Kawachi 1992	84-325 Makau St., Kepuhi Point	Burial Report	Documentation of burial eroded by waves associated with Hurricane ‘Iniki
Moore and Kennedy 1994	Northwest side of Mākaha Valley, 242-foot elevation	Archaeological Investigations	No historic properties were observed
Cleghorn 1997	*Mauka* of Farrington Hwy and north of Kili Drive	Archaeological Inventory Survey	A cultural layer, a pond/wetland area ,remains of structures associated with the OR&L Railroad, and a bridge foundation were documented
Pagliaro 1999	Kāne‘ākī Heiau	*Heiau* Restoration Report	Presents background, a restoration plan and an

Study	Location	Type of Study	Findings
			account of restoration work
Magnuson 1997	Upper Mākaha Valley	Archaeological Review	Presents an overview and summary of previous studies
Maly 1999	Central Mākaha Valley	Limited Consultation Study	Presents historical background and consultation with knowledgeable parties
Elmore et al. 2000	South side of Kili Drive (Site area - 776)	Archaeological Inventory Survey	Identified three features poss. assoc. with dry-land ag. and/or habitation
Moore and Kennedy 2000	North side of Kili Drive (SIHP # - 776)	Archaeological Inventory Survey	Identified two features possibly associated with dry land agriculture
Kailihiwa and Cleghorn 2003	Lower Mākaha	Archaeological Monitoring Report	Identified three sites
Tulchin and Hammatt 2003	Kili Drive and Farrington Hyw.	Archaeological Inventory Survey	No historic properties observed
Perzinski and Hammatt 2004	Mauna Lahilahi Beach Park	Archaeological Inventory Survey	A multi-component cultural layer, 2 burials, the OR&L Railroad, and a historic wall alignment were identified and documented.
Hazlett and Hammatt 2007	Mākaha Bridge 3, Farrington Highway, Mākaha	Archaeological Monitoring Report for emergency repairs	No cultural resources identified
Hammatt and Yucha 2008	An approximately 61-Acre Parcel Mākaha Ahupua‘a, TMK: [1] 8-4-002: 043, 044, 048 and 063	Archaeological Literature Review and Field Inspection	Identified seven sites, recommended AIS
McDermott and Tulchin 2006	Mākaha Bridges 3 and 3A	Archaeological Inventory Survey	Identified five sites
Jones and Hammatt 2009	Mauna Lahilahi Beach Park	Archaeological Monitoring Report	Identified two burials

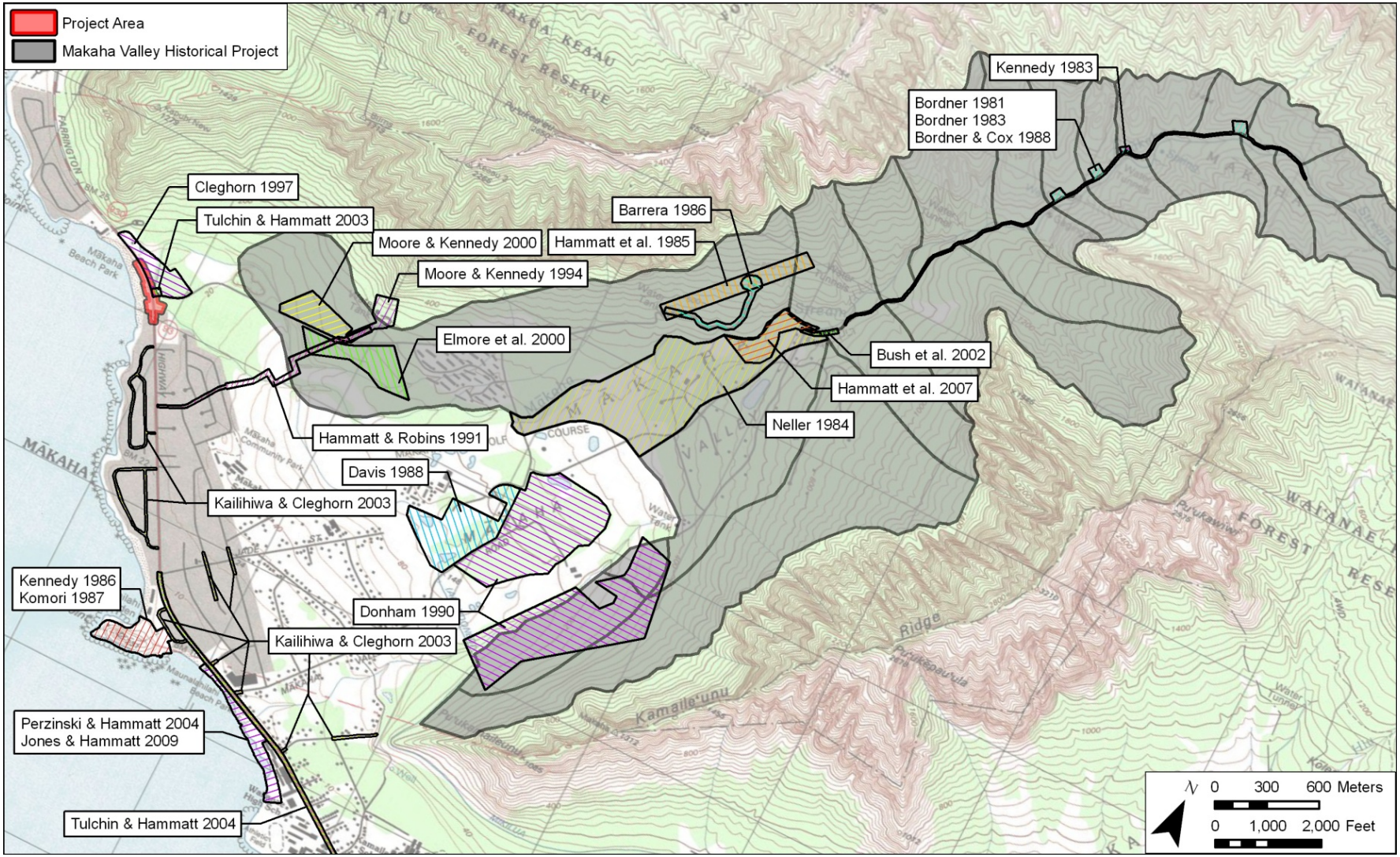

Figure 10. 1998 Wai‘anae U.S. Geological Survey topographic quadrangle showing previous archaeological investigations in Mākaha Ahupua‘a

It is unclear whether McAllister actually saw this stone, which Hall describes as “lying at the foot of a frightful precipice several hundred feet in height” but McAllister’s map appears to locate it in the flats of the central-seaward portion of the valley.

SIHP# 50-80-07-174, Laukinui Heiau, was described as “the important one [*heiau*] in Mākaha Valley”, and said to be so old as to have been built by the *menehune*. McAllister places this site in the vicinity of Kepuhi Point and his description of the *heiau* incorporating a “coral outcrop” and “an amazing amount of coral” fits that locale.

SIHP # 50-80-07-175, known as Mololokai, is located at the base of the ridge between Kea‘au and Mākaha on the *makai* side of the road. This site was described as two pits where early cannibals had come to wash the de-fleshed bodies of their victims at high tide. Associated with this site were said to be two prominent stones, a Pōhaku O Kāne on the Mākaha side and a Pōhaku O Kanaloa on the Kea‘au side.

The Mākaha Valley Historical Project (Green 1969, 1970, 1980; Ladd and Yen 1972; and Ladd 1973), involving fieldwork conducted between 1968 and 1970, studied most all of Mākaha Valley. However, as Neller (1984:1) noted, sites were lumped into large geographical districts and most of the valley was only surveyed at the reconnaissance level. The Mākaha Valley Historical Project research was unique in that it was funded by private enterprise without legal compulsion and the investigations covered parts of the valley beyond those due for development. More than 600 archaeological features were recorded in the upper valley and 1,131 features were recorded in the lower valley.

The coastal strip and the central lower valley were not included because of previous development. Excavations were conducted at 30 separate structural features including 10 field shelters, four stone mounds, three stepped-stone platforms, three house enclosures, two storage pits, a clearing, a site thought to be a shrine, a *heiau*, a pond field terrace system, a habitation feature, two historic house platforms, and a modern curbed foundation. Carbon dating indicated settlement as early as the 13th century. Settlement was focused on the primary water source, Mākaha Stream. Subsequently, with increased population, expansion into *kula* lands occurred. By the 16th century, expansion occurred in the upper valley with changes in subsistence to irrigated taro system (i.e. *lo‘i*) (Green 1980:75).

Green’s (1980) archival research, as part of the Mākaha Valley Historical Project, identifies a number of small residences, thought to correspond to late pre-contact and early historic habitation, in the vicinity of the current project area. This area, and presumably the associated settlement, is termed Kahaloko, based on information provided by Clark (1977:91). This Kahaloko area (see Figure 5) few houses and coconut trees, is depicted on Green’s reconstructed map of Mākaha Valley settlement and land use for the period between 1855 and 1884 (Green 1980:22-23). This settlement was, at least generally, geographically associated with a fishpond:

> It is highly probable that there was a brackish-water fishpond in the low area behind the beach where Mākaha Stream would have constantly been imponded… A pond appears in this position on the preliminary field map for the O‘ahu Railway and Land Company (Dillingham Files, n.d.). The use of the name Kahaloko (place of the fishpond) for Mākaha Beach strongly suggests its

> presence, and Clark (1977:92) gives Mākāhā [sluice gate of a traditional Hawaiian fishpond] as the name of a large fishpond here (Green 1980:20).

Richard Bordner (1981) carried out a survey of a linear project area in the middle of the valley floor, inland of Kāne‘ākī Heiau, in support of road widening and well placement projects. This corridor ran through several site areas documented during the Mākaha Valley Historical Project. Descriptions of sites are by proximity to site mapping points. Bordner (1981: D-22) concluded, “the entire Mākaha Valley was utilized for agricultural production in the most intensive way, such that all areas capable of it were undoubtedly utilized for crop production.” This study accessioned two reviews by Roger C. Green and Matthew Spriggs resulting in Bordner's preparing “Mākaha Valley Well III - V Re-Survey” (1983) and writing “Appendix B: Response to M. Spriggs Review of Mākaha Wells” (n. d.).

Kennedy (1983) produced an archaeological monitoring report on work at a 100 m long strip near “Well IV” at an elevation of 1,072 feet in the valley floor, approximately 2 km inland from Kāne‘ākī Heiau. He saw no evidence of buried features or artifacts.

Earl Neller (1984) of SHPD went back into the area designated as Site Area 997 “to clear up various deficiencies in the published reports and unpublished site data” and to re-examine various “puzzling inconsistencies.” He relocated sites previously reported as destroyed (McAllister sites 171 and 172), identified unreported sites, and re-analyzed several sites studied during the Mākaha Valley Historical Project.

Hammatt, Shideler and Borthwick (1985) carried out an archaeological reconnaissance survey of a 3,000-ft long corridor on the west side of central Mākaha Valley in the -776 site area, documenting numerous modifications of natural terraces for dry land agriculture. A total of 10 archeological sites including 1 wall, 2 habitation sites, and 7 agricultural sites were recorded.

Barrera, Jr. (1986) carried out an archaeological survey of a mid-valley well site on the west-central side of the valley. The project area included a corridor approximately 600 m long and 30 m wide, and a proposed reservoir site 90 m in diameter. He identified four sites, including four stone platforms (Site -1465), a U-shape habitation enclosure (Site -1466), a terrace (Site -1467) and a wall (Site -1468). At least 17 test pits were excavated, however no artifacts were recovered.

Kennedy (1986) carried out archaeological investigations focused on the north (Mākaha) side of Mauna Lahilahi, and identified five sites including a possible shrine, a *koa*, a linear pile, and an enclosure.

Komori (1987) carried out archaeological survey and testing at Mauna Lahilahi, relocating Kennedy's (1986) five sites. An additional 11 sites, including petroglyphs, enclosures, terraces, rock shelters, midden, and lithic scatters were identified. He reports eight radiocarbon dates within the AD 1300-1650 period.

Bordner and Cox (1988) carried out a mapping project on the upper valley floor, inland of Kāne‘ākī Heiau. While much of the focus of this study was more accurately locating sites previously identified during the Mākaha Valley Historical Project, their findings indicate that the relative importance of dry land, non-irrigated agriculture had previously been underestimated.

Donham (1990) carried out an archaeological inventory survey of two discrete but adjacent parcels encompassing approximately 130 acres in the south-central portion of the valley. Donham identified a terrace associated with dry land agriculture and/or habitation.

Hammatt and Robins (1991) carried out an archaeological inventory survey of an approximately 4,600-ft long route of a proposed 20-in water main extending northeast from Farrington Highway, up Water Street, and then continuing northeast across Kili Drive. They documented a single historic property SIHP # 50–80-07-4363. Site -4363 was described as "a linear earthen berm ... buttressed along its stream side with cobbles and boulders" (Hammatt and Robins 1991). The berm was interpreted as, "associated with the historic sugarcane cultivation" (Hammatt and Robins 1991). Based on historic maps, the berm likely represents an old ditch alignment, which was likely altered during construction of the adjacent golf courses. It presently functions as a flood control structure, protecting housing down-slope. Subsurface testing within the corridor encountered nothing of archaeological significance.

Carol Kawachi (1992) documented a burial(s) eroding out of the sand at 84-325 Makau Street. This was a pit burial, approximately 50 cm below the surface, extending 1.5 m long, in a sand bank exposed by Hurricane ‘Iniki. The burial included staghorn coral at major joints and a possible shell, *niho palaoa*.

Moore and Kennedy (1994) carried out archaeological investigations on the northwest side of Mākaha Valley for a proposed reservoir at 242-foot elevation. The access corridor and reservoir site covered approximately eleven acres. No historic properties were observed.

Fields Masonry documented stabilization and restoration of Kāne‘ākī Heiau carried out in 1996 (Pagliaro 1999). Prior restoration efforts had been carried out in 1970.

Magnuson (1997) conducted a preliminary archaeological review of upper Mākaha Valley for a proposed water line replacement project. This was primarily an archaeological literature review providing an overview of sites.

In 1997, Cleghorn conducted test excavations associated with an archaeological inventory survey conducted for the new Mākaha Beach Park comfort station and parking area, located *mauka* of Farrington Highway. Cleghorn identified a cultural layer present in an area approximately 80 m *mauka* of Farrington Highway near its intersection with Kili Drive. Radiocarbon analysis indicated an age range of AD 1440-1690. The deposit contained, "evidence of a small encampment near the coast" (Cleghorn 1997:32). Clegorn also indicates the possible importance of a pond/wetland area just *mauka* of the Highway at Mākaha Beach Park: "This pond and wetland may have offered rich resources for the Hawaiians of the area, and the pond may have been used as an inland fishpond during the prehistoric and early historic eras" (Cleghorn 1997:33). This pond/wetland area is likely the area Green (1980) identified as "Kahaloko." Also present in the area are remains of infrastructure associated with the OR&L Railroad (SIHP # 50-80-12-9714). Cleghorn indicates the presence of a bridge foundation located in an unnamed stream just north of Kili Drive, *makai* of the highway, and within the current Mākaha Bridges project area (Cleghorn 1997:11).

Maly (1999) conducted a "Limited Consultation Study with Members of the Hawaiian Community in Wai‘anae" in support of the Mauna ‘Olu Water System. Several interviewees deferred to Mr. Landis Ornellas (a co-founder of the organization *Hui Mālama o Kāne‘ākī*

Heiau) as a cultural expert for mid-valley Mākaha. Concerns for continuing community consultation were expressed.

Elmore (et al. 2000) conducted an archaeological inventory survey of an approximately 19.6 acre parcel located on the south side of Kili Drive, and just west of the condominiums in a portion of previously identified SIHP # 50-80-07-776. A total of eight features were identified. Of these, five were determined modern disturbances while the other three were thought to be possible traditional Hawaiian dry land agricultural and/or habitation features.

Moore and Kennedy (2000) conducted an archaeological inventory survey of an approximately 20-acre parcel located on the north side of Kili Drive in a portion of previously identified SIHP # 50-80-07-776. A total of 12 features were identified; 10 of these were determined modern disturbances while the other two were thought to be possible traditional Hawaiian dry land agricultural features.

Kailihiwa and Cleghorn (2003) monitored Mākaha Water System Improvements Phase II for 10 streets in the *ahupua‘a* of Mākaha and Wai‘anae. A total of three sites were documented, which consisted of five features including a pit, a concrete flume, two thermal features, and a charcoal deposit. No cultural material was found in any of the deposits.

Tulchin and Hammatt (2003) conducted an archaeological inventory survey, located at the corner of Kili Drive and Farrington Highway, associated with a proposed fiber optic cable facility. No historic properties were observed.

Perzinski and Hammatt (2004) conducted an archaeological inventory survey of Mauna Lahilahi Beach Park. A total of 3 sites were identified as a result of pedestrian survey and subsurface testing. These include the remnants of the OR&L Railroad (SIHP # 50-80-12-9714), the remnants of a historic wall alignment (SIHP # 50-80-07-6635), two burials (SIHP # 50-80-07-4064), and a multi-component subsurface cultural layer containing concentrations of midden charcoal, and artifacts. Radio carbon dating results indicate initial settlement of the shoreline in the 1400s with 400 to 500 years of continuous use, into the 20th century.

In 2007, CSH conducted a literature review and field inspection for a 61-Acre parcel *mauka* of the Mākaha Town Center and *makai* of Mākaha Golf Course (Hammatt and Yucha 2008). Evidence of historic agriculture had been previously found within the project area (see Hammatt and Robins 1991 above). During the field check, additional evidence of agriculture was observed including rock mounds (CSH 1, CSH 5 and CSH 6); retaining walls associated with berms CSH 2 and CSH 3); and a rock alignment that may have been used as a water control dam (CSH 4). CSH 3 and CSH 6 appear to be associated with SIHP # 50-80-07-4363, a linear earthen berm associated with historic sugarcane cultivation attributable to the Wai‘anae Sugar Plantation. An inventory survey was recommended because of evidence of historic and possible pre-contact agriculture.

Recently CSH monitored improvements to Mauna Lahilahi Beach Park. As a result, two additional burials were documented (Jones and Hammatt 2009).

2.2.2 Previously Recorded Sites in the Vicinity of the Project Area

Table 3 summarizes previously recorded archaeological sites in the vicinity of the project area; Figure 11 shows the locations of these sites.

Table 3. Previously Identified Archaeological Sites in Coastal Mākaha Ahupua‘a

State Site #	Description
50-80-07-173	Probable location of rock discussed by Hall and documented by McAllister (1933:121): “called ...Pukahea...an object of worship, and to which sacrifices were offered in former times. (3 miles from Pukahea) a large rock...in no particular sense striking”
50-80-07-174	Laukīnui Heiau (McAlllister 1933:121) “Low walls inclose, on three sides, what appear to be two low stone-paved platforms...Just to the south of the inclosure a coral outcrop forms a natural platform which was undoubtedly part of the heiau...The heiau is so old as to be accredited to the *menehunes* and said to have been the important one in Mākaha Valley, though not nearly so pretentious or well-preserved as that of Kaneaki.”
50-80-07-175	Mololokai (McAllister 1933:121) Two small pits on the *makai* side of the old road that were said to have been used by a group of cannibals who would place the de-fleshed bodies of their victims in the pits for cleaning by the high tide. Located at the foot of the ridge between Keaau and Mākaha Valleys. Now buried/destroyed.
50-80-07-776	Mākaha Valley Historic Project Site Area -776 Various pre-contact and historic sites including field shelters, stone mounds, stone platforms, habitation enclosures, storage pits, habitation features, and dry land agricultural features.
50-80-07-3704	Mauna Lahilahi (Kennedy 1986; Komori 1987; Kawachi 1990) A natural promontory at the southern end of Mākaha Valley. Subsurface cultural deposits, evidence of marine and religious activities, stone tool production, petroglyphs, and crevice burials; all included under one site designation.
50-80-07-4363	Historic sugarcane-related berm (Hammatt and Robins 1991)
50-80-07-4527	Burial at 84-325 Makau St.(Kawachi 1992) Pit burial, approximately 50 cm below the surface, extending 1.5 m long. Exposed from sand bank by Hurricane 'Iniki. Included staghorn coral at major joints and a possible shell, *niho palaoa*.
50-80-12-9714	Remnants of the OR&L Railroad, present along the *makai* side of Farrington Highway. A portion of the railroad is listed on the National Register of Historic Places**.**
50-80-07-6634	Multi-component cultural layer in Mauna Lahilahi Beach Park containing midden, charcoal, and artifacts (Perzinski and Hammatt 2004).
50-80-07-6635	Rectangular wall alignment constructed of basalt cobbles and boulders. Located in Mauna Lahilahi Beach Park (Perzinski and Hammatt 2004).
50-80-07-4064	Two burials at Mauna Lahilahi Beach Park (Perzinski and Hammatt 2004).
50-80-07-6704	Burial at Mauna Lahilahi Beach Park (Jones and Hammatt 2009).
50-80-07-6705	Burial at Mauna Lahilahi Beach Park (Jones and Hammatt 2009).

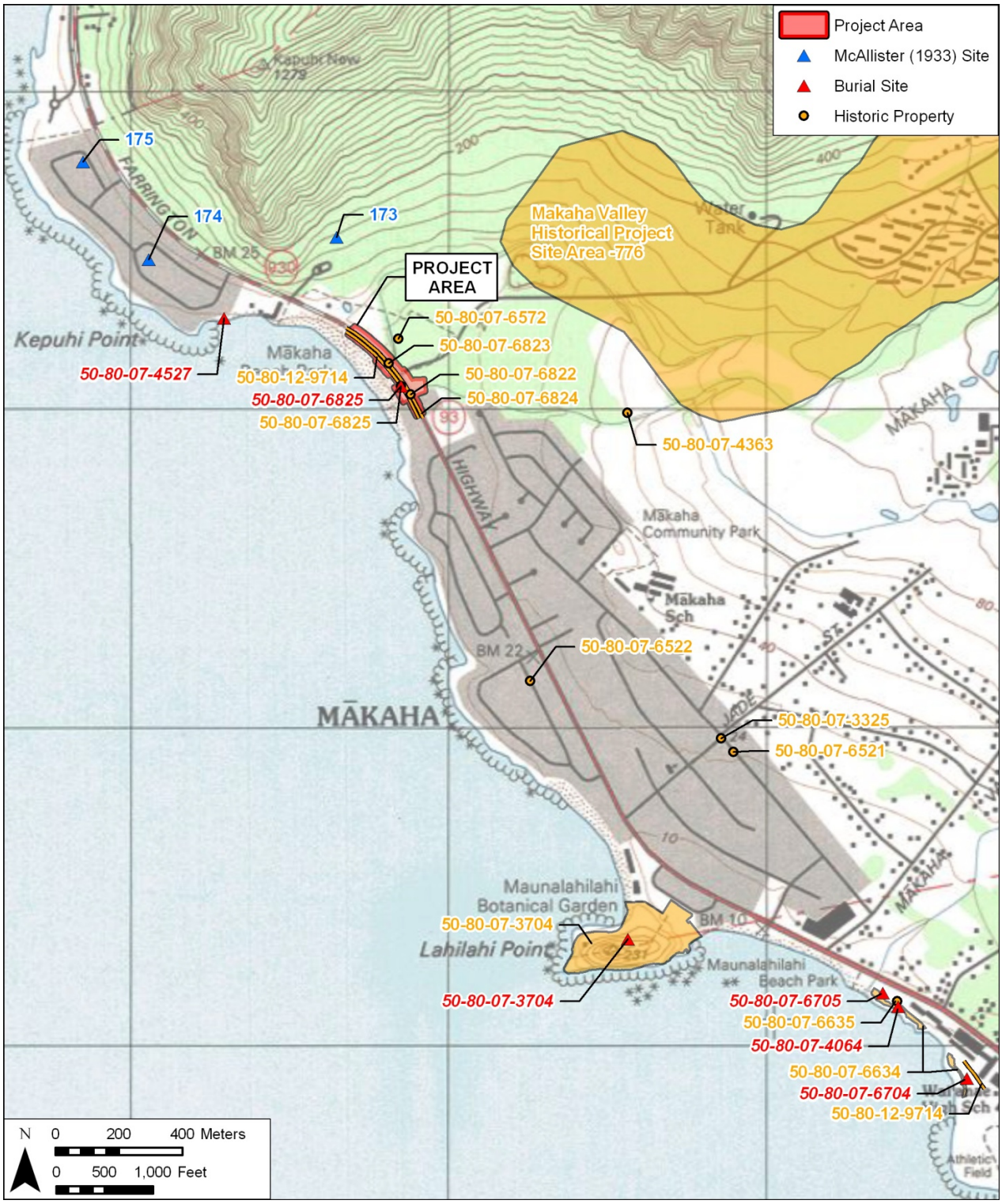

Figure 11. Previously recorded sites in the vicinity of the project area.

2.3 Inventory Survey Summary

In compliance with, and to fulfill applicable Hawai‘i state and federal historic preservation legislation, CSH completed an archaeological inventory survey investigation for the proposed Mākaha Bridges project (McDermott and Tulchin 2006).

As part of its inventory survey field effort, carried out on August 30 and 31, 2005, CSH conducted a systematic pedestrian inspection of the project area. CSH also excavated eight trenches to prospect for subsurface cultural deposits. Approximately half of the roughly 3.7-acre project area consists of paved roadways and active stream drainages that were not suitable for subsurface testing.

Based on fieldwork results, five cultural resources were documented within the project area (Figure 12; Appendix A):

- SIHP # 50-80-7-6822, Makaha Bridge 3, constructed in 1937
- SIHP # 50-80-7-6823, Makaha Bridge 3a, constructed in 1937
- SIHP # 50-80-7-6824, Farrington Highway, originally constructed in the 1930s as part of the Territorial Highway System
- SIHP # 50-80-7-6825, buried, culturally enriched A-horizon, activity area dating to the pre-contact and historic period, contains a probable Native Hawaiian burial (disarticulated human remains—previously [prior to the current project] disturbed).
- SIHP # 50-80-12-9714, the former OR&L Railroad alignment--constructed in the 1890s

These findings are largely in keeping with expectations, based on background research. During the pre-contact and historic periods, and continuing today, the project area was/is an important transportation and/or communications corridor. Prehistorically, the project area likely included the primary coastal trail that circled the island of O‘ahu. In the 1800s this trail was improved to convey horse and wagon traffic, eventually becoming the “Old Waianae Road,” Farrington Highway’s predecessor (McGrath et al. 1973). By the turn of the 20th century, the OR&L Railroad passed through the project area, likely with associated electric and/or telegraph lines. In the first part of the 20th century, in response to demands of advancing automotive technology, a portion of the Territorial Highway System was constructed through the project area. With its associated Bridges 3 and 3A within the project area, this roadway became known as Farrington Highway. Throughout the 20th century, Farrington Highway has developed as an important communications corridor; most recently, at the turn of the 21st century, with the installation of fiber optic communication lines within the roadway’s right-of-way. Of the five cultural resources documented within the project area, four are components of this long established transportation and communication corridor.

The fifth cultural resource (SIHP # 50-80-7-6825) documented within the project area is a relatively rare remnant of a pre-contact and historic activity area. Based on available information, this subsurface cultural deposit may yield additional important archaeological

Figure 12. Locations of the five cultural resources identified and documented within the project area

information regarding prehistoric and historic coastal land use along the Mākaha Coast. This archaeological record may extend from the historic period, prior to the construction of the OR&L Railroad, back into Mākaha's prehistory, to as early as the fourteenth century (AD 1300-1430 based on radiocarbon dating results). This type of specific archaeological information regarding coastal habitation and land use within Māhaka is currently lacking.

Additionally, this subsurface cultural layer contains probable Native Hawaiian skeletal remains. These skeletal remains are important cultural resources in their own right, and their treatment and protection is clearly outlined in Hawai‘i state burial law (HRS Chapter 6E-43 and HAR Chapter 13-300). As a previously identified, most likely Native Hawaiian burial site, the treatment of these human remains falls under the jurisdiction of the O‘ahu Island Burial Council.

All of these recorded cultural resources were documented within the *makai* portions of the project area. *Mauka* of Farrington Highway, the project area appears to have been disturbed by grading or other land alteration, likely associated with commercial agriculture. Evidence for this past land disturbance includes a large amount of rusted metal, PVC pipe, and plastic, which was observed in trench profiles between one and two meters below the current land surface. In Trench 4, approximately 3 m below the current land surface, a sedimentary layer interpreted as the remnants of a former "*muliwai*," or backshore marshy pond, was documented. This deposit is perhaps of paleoenvironmental interest, but, based on radiocarbon dating results, it was deposited well before human colonization of the Hawaiian Islands (2890–2570 BC) (refer to Appendix A for complete historic property descriptions).

2.4 Background Summary and Anticipated Finds

2.4.1 Background Summary

Cordy (1998) provides a synthesis of the settlement patterns and prehistory of the Wai‘anae District. This study places the settlement of Wai`anae into the wider context of O‘ahu settlement as a whole. The proximity of expansive forest resources and well-watered agricultural lands to abundant marine resources made the Windward side of O‘ahu most appealing to early O‘ahu settlers and their descendants. Foraging trips to the dryer areas of the island would have occurred and were most likely associated with recurrent, temporary habitation during resource procurement. The rich marine resources of the Wai‘anae District, and particularly the fishing grounds off shore, were likely a strong draw for early O‘ahu inhabitants. As population in the Windward areas increased, permanent settlement began to spill over into the well-watered regions of O‘ahu's leeward side. Eventually, with further population expansion, permanent settlement spread to the less watered regions of the leeward side, which included much of the Wai‘anae District and all of the current project area (Cordy 1998:1-6). Settlement most likely began as temporary habitation along the coast in association with marine resource procurement. Later, permanent settlement would have developed in response to expanding populations in previously settled, better watered areas.

Available radiocarbon dates indicate that, by A.D. 600-800, there was at least temporary coastal habitation on the Wai‘anae coast. This dated sample comes from the area fronting Pōka‘i Bay, one of the only areas along the Wai‘anae Coast to have a perennial stream reach the coast, and undoubtedly one of the more attractive areas for early temporary and, later, permanent settlement (Cordy 1998:6). The current project area is more arid than the area of Pōka‘i Bay;

however marine resources were likely equally abundant in the both areas. Accordingly, it is likely that the first temporary habitation of the current project area was later than the A. D. 600-800 time frame for Pōka‘i Bay, but perhaps not significantly so because, after Wai‘anae Ahupua‘a, Mākaha has the next most abundant fresh water resources of the Wai‘anae District (Cordy 1998:39).

Archaeological data indicate that a significant and rather substantial pre-contact population once occupied Mākaha Valley. Green, in his summary Report No. 5, of the Mākaha Valley Historical Project (1980), proposed that the earliest Hawaiian settlement (before A.D. 1100) was likely focused along the coast at the mouth of Mākaha Stream, in the immediate vicinity of the current project area. Following this initial settlement, sometime after A.D. 1100, exploitation of the surrounding *kula* lands prompted an expansion into the surrounding lower valley. Subsequently, as the population increased in Mākaha Valley, expansion into other *kula* regions occurred. Green argues that the *kula* expansion was a rational exploitation of “More than sufficient kula land in Mākaha for the coastal population” in an area with presumably little pressure on resources (Green 1980:74).

According to Green, various events during the 15th and early 16th centuries led to population expansion into the upper valley regions. Green attributes this movement to “changes in the subsistence (irrigated wet taro system), emigration of a part of the population to an area of low population density, and development of a different means of social organization (in the form of social stratification and segmentation)” (Green 1980:75).

In 1997, Cleghorn conducted an archaeological inventory survey, which abuts the eastern boundary of the current project area. Test excavations identified a cultural layer present in an area approximately 80 meters *mauka* of Farrington Highway, near the intersection of Kili Drive. Radiocarbon analysis indicated an age range of A.D. 1440-1690. This subsurface cultural deposit may be a remnant of the Kahaloko pre-contact and early historic coastal settlement that Roger Green (1980) reported for this portion of coastal Mākaha, based on archival research.

By the mid-1800s the traditional Native Hawaiian lifestyle in Mākaha Valley was in decline. The sandalwood trade, which ended circa 1829, undoubtedly had a negative effect on the Native Hawaiian population. During this time Mākaha Valley entered its cattle ranching period. The construction of the OR&L Railroad more directly linked Honolulu to Wai‘anae in 1895. Based on the paucity of LCAs claimed within the *ahupua`a* and early population figures, it appears that the Native Hawaiian population was quite low in the latter half of the 19th century.

In 1907, the Wai‘anae Plantation moved into Mākaha and placed large portions of the valley under sugarcane production. With plantation activity, Mākaha’s population numbers slowly increased in the early 1900s. The construction of Farrington Highway in the 1930s, tied the Wai‘anae Coast, and Mākaha, more closely with the rest of O‘ahu, including Honolulu. World War II greatly affected the landscape of the Leeward Coast as the military placed bunkers, gun emplacements, and barbed wire along the waterfront. The sale of Wai‘anae Sugar Plantation in the late 1960s brought large scale resort development to the area, and spurred local population growth as parts of the plantation were sold off as beach lots, shopping centers, and house lots. Subsequent infrastructure improvements, including utilities and an improved transportation corridor, have brought further population growth to the area in recent years.

Sediments observed during the archaeological inventory survey of the current project area, conducted by CSH in 2005, were consistent with the U.S. Department of Agriculture soil survey (Foote et al. 1972, McDermott and Tulchin 2009). Observed soils include those similar to Hale‘iwa Silty Clay, 0 to 2 percent slopes through the majority of the project area. Pockets of Jaucas sand were observed in *makai* test trenches, while remnants of coral reef were observed in the inland portion of the project area, underlying fine grain sediments.

2.4.2 Anticipated Finds

Based on previous historic document and archaeological research, and the previous inventory survey in the project area, two types of cultural deposits are known in the project area. These include transportation infrastructure consisting of Mākaha Bridge 3 (SIHP# 50-80-07-6822), Mākaha Bridge 3A (SIHP# 50-80-07-6823), a portion of Farrington Highway (SIHP# 50-80-07-6824), and remnants of the OR&L Railroad (SIHP# 50-80-12-9714). Also present is a multi-component, subsurface cultural layer containing pre-contact and historic cultural material as well as the remnants of a human burial (SIHP# 50-80-07-6825). All documented historic properties will likely be impacted by the current project. Other types of cultural material that may be encountered during construction activities include additional subsurface transportation infrastructure and historic trash deposits, pre-contact shell midden, artifacts, and additional human burials.

2.4.3 Research Objectives

2.4.3.1 SIHP # 50-80-07-6825

The SIHP # 50-80-07-6825 subsurface cultural layer is the subject of a dedicated archaeological data recovery program, the plan for which (Groza et al. 2010) has been approved by SHPD. This archaeological data recovery fieldwork will be completed prior to project construction and prior to the archaeological monitoring activities outlined in this plan.

Background research indicates that SIHP # 50-80-07-6825, a buried A-horizon with cultural material from pre-contact and historic land use, and previously disturbed human skeletal remains determined to be most likely Native Hawaiian, may yield additional important archaeological information regarding coastal land use along the Mākaha Coast. The project's archaeological inventory survey has indicated that SIHP # 50-80-07-6825 may have originated as early as the fourteenth century (AD 1300–1430), based on preliminary radiocarbon dating results, and continued as a stable, culturally modified land surface through the historic period. This type of specific archaeological information regarding coastal habitation and land use within Māhaka is currently lacking.

The significance of the SIHP # 50-80-07-6825 cultural deposit is best discussed in terms of its potential to provide important archaeological information. Previous archaeological research along O‘ahu’s Wai‘anae Coast indicates a traditional-Hawaiian settlement pattern characterized by relatively early coastal occupation associated with marine resources procurement. There is fairly abundant archaeological information regarding inland settlement for Mākaha Valley, but very little information about coastal settlement (Cordy 1998). With this rarity of coastal habitation deposits, SIHP # 50-80-07-6825 has potential to provide important information that is lacking regarding Mākaha’s pre-contact and early historic archaeological record.

The SIHP # 50-80-07-6825 subsurface deposit may be comparable and homologous to the coastal subsurface cultural deposits (SIHP # 50-80-07-6634) recently documented at near-by Mauna Lahilahi Beach Park in the Ahupua‘a of Wai‘anae, immediately to the south of Mākaha (Perzinski and Hammatt 2004). SIHP # 50-80-07-6634, an intact cultural layer, was documented during subsurface testing. The cultural layer contained four distinct layers (Stratum II, IIA, IIB, and IIC) all containing varying concentrations of midden, artifacts, and charcoal. Based on laboratory analysis, radiocarbon dating, and historical research, it was determined that the upper two layers (Stratum II and IIA) represented an early post-contact to historic cultural deposit. These sub-layers were distinguished by a very dark gray color and, in most instances, historic trash was present, as well as invertebrate midden, cut bone, and a few fish hooks. Within the lower two layers (Stratum IIB and IIC) of SIHP # 50-80-07-6634 no historic midden or artifacts (modern bottle glass, rusted metal) were encountered. These layers were generally distinguishable by a slightly lighter color of a gray, a lack of historic midden and artifacts, and a higher concentration of marine and vertebrate midden. Radiocarbon analysis of charcoal collected from the cultural layer indicated that Stratum IIB was deposited no earlier than A.D. 1430. Thus it was suggested that Stratum IIB and IIC represented the pre-contact component of the site (Perzinski and Hammatt 2004).

Other potentially comparable and homologous subsurface cultural layers along the Wai‘anae Coastline include SIHP # 50-80-07-5762 and 50-80-07-5763. Both of these buried calcareous sand A-horizons were documented during archaeological inventory survey of ‘Ulehawa Beach Park in Nānākuli and Lualualei Ahupua`a, south of the current Mākaha Bridges project area. These layers contained charcoal, fishhook fragments, volcanic glass and basalt flakes, marine shell and fishbone midden deposits, and small, distinct pit features. Based on radiocarbon dating analysis, these deposits date to the late pre-contact/early historic period (McDermott and Hammatt 2000:147-148).

There are clear similarities between SIHP # 50-80-07-6825, within the current Mākaha Bridges project area, and SIHP # 50-80-07-6634, within Mauna Lahilahi Beach Park, and SIHP # 50-80-07-5762 and 50-80-07-5763, within ‘Ulehawa Beach Park. These similarities in geographic setting, stratigraphy, midden, and artifact deposits indicate that these subsurface cultural layers are the result of comparable formation processes. These subsurface deposits represent the remains of traditional Hawaiian coastal land use and likely habitation. Due to their apparent rarity, the archaeological information they contain is particularly significant.

Additional data collected from SIHP # 50-80-07-6825 may also identify relationships between this site and other sites in the near vicinity. The settlement of Kahaloko, shown on Figure 5 just *makai* of SIHP # 50-80-07-6825, consisted of a few houses and coconut trees between 1855 and 1884. This settlement was at least generally geographically associated with a fishpond and the literal translation of Kahaloko is “pond place” (Clark 1977:134). Kahaloko was “filled in when the railroad bed for the” OR&L Railroad was constructed in the late nineteenth century (Clark 1977:134).

Two Māhele land claims (9859, 9860) that were not awarded mention a *muliwai* as their boundary. It is possible that these claims were for Mākaha lands within the current project area, and may be in the immediate vicinity of SIHP # 50-80-07-6825.

Modern disturbance has truncated SIHP # 50-80-07-6825, which may run more or less north/south just *makai* of Farrington Highway, and may be discontiguous as another cultural layer has been documented within the vicinity of the project area (Cleghorn 1997). Our research objectives should provide specific archaeological information regarding coastal habitation and land use within Māhaka.

The monitoring activities described in this plan may provide the opportunity to further the research objectives for SIHP # 50-80-07-6825. These objectives include:

1. To better define the age and function of SIHP # 50-80-07-6825; and
2. To define and delimit the boundaries of SIHP # 50-80-07-6825.

Should the pre-contact cultural layer be impacted by construction activities related to the current project, it may be possible to obtain additional carbon samples for dating purposes to better quantify the date range of the cultural layer. Additional artifacts and midden recovered from the site may also help to solidify this date range and provide additional information on site function. Stratigraphic profiles of excavations that cut through this subsurface cultural layer may provide additional information regarding the layers accumulation and subsequent burial beneath more recent sedimentary layers.

2.4.3.2 SIHP # 50-80-07-6822, 6823, and -9714 (Historic Transportation Infrastructure)

Historic American Engineering Record-type recordation of the various transportation related historic properties in the project area (SIHP # 50-80-12-9714, remnants of the O. R. & L. Railroad; SIHP # 50-80-7-6822, Mākaha Bridge 3; and SIHP # 50-80-7-6823, Mākaha Bridge 3A) has already been completed by Mason Architects, and will be documented in reports that are currently under review by the National Park Service. This documentation was based on the structural elements that were visible above the current land surface at the time of inspection. During the upcoming archaeological monitoring work, it is likely that additional subsurface portions of these features will be exposed during their demolition. The on-site archaeological monitor will further document these features, as allowable by the construction environment and schedule, with sketch drawings, scale elevations and/or profiles, and photographs. This information may provide additional information regarding the techniques used in these feature’s construction.