

# FINAL REPORT

Archaeological Monitoring Plan in Support of Federal Aid Project No. STP-0300 (152), Freeway Management System Phase 3, Unit 1, at Ke'ehi Interchange and Middle Street in Kahauiki and Kalihi Ahupua'a, Honolulu District, O'ahu Island, State of Hawai'i

Adjacent TMKs: (1) 1-1-003:003, 1-1-006:001, 003, 013; 1-1-008:001, 002; 1-2-013:022, 023; 1-2-016:006, 007, 029; 1-2-018:003, 009-011, 014, 015

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On Behalf of the

*State of Hawai'i Department of Transportation*

August 2021

PACIFIC CONSULTING SERVICES, INCORPORATED

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## INTRODUCTION

Under contract to Austin, Tsutsumi & Associates (ATA), Pacific Consulting Services, Inc. (PCSI) has prepared this Archaeological Monitoring Plan (AMP) in support of Federal Aid Project No. STP-0300 (152), Freeway Management System Phase 3, Unit 1, on O‘ahu Island, Hawai‘i. This AMP addresses proposed work at Ke‘ehi Interchange and Middle Street in Kahauiki and Kalihi Ahupua‘a, Honolulu (Kona) District (Figure 1).

This project has been determined to be a Federal undertaking due to the use of Federal funds and thus is subject to Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. Project proponents include the Federal Highway Administration (FHWA) and the Hawaii Department of Transportation (HDOT). The archaeological work completed for this project, has been done in accordance with the Secretary of Interior’s Standards and Guidelines for Archaeology and Historic Preservation, as well as in accordance with Hawaii Revised Statutes (HRS), Chapter 6E, and the following chapters of Title 13 of the Hawaii Administrative Rules (HAR), Subtitle 13 (State Historic Preservation Division Rules):

- Chapter 275: Rules Governing Procedures for Historic Preservation Review for Governmental Projects Covered Under Sections 6E-8; and
- Chapter 279: Rules Governing Standards for Archaeological Monitoring Studies and Reports

## AREA OF POTENTIAL EFFECT DESCRIPTION AND LOCATION

The FMS Unit 1 project includes three separate APEs on the leeward side of O‘ahu Island; these are designated as Areas 1, 2, and 3 (Figure 1). The FHWA and HDOT determined and the SHPD concurred (SHPD Doc #s 2005SH03 and 2004SH12) that archaeological monitoring was only required in Area 1, the subject of this AMP. However, SHPD requested that the Area 2 and Area 3 APEs be included in the current AMP in the event that archaeological monitoring is necessary in these areas due to inadvertent discoveries. While the general field methodologies and reporting requirements outlined in this AMP are appropriate for all the FMS Unit 1 APEs, the reader is referred to Appendix A for background information for Areas 2 and 3.

For the Area 1 portion of the FMS Unit 1 project covered in this AMP, the Area of Potential Effect (APE) is defined by the extent of proposed ground disturbance. The APE is entirely within the City/State ROW (Right of Way). Adjacent Tax Maps Keys (TMKs) include (1) 1-1-003:003, 1-1-006:001, 003, 013; 1-1-008:001, 002; 1-2-013:022, 023; 1-2-016:006, 007, 029; and 1-2-018:003, 009–011, 014, and 015. Plat maps showing the APE are provided in Appendix B.

The APE for Area 1 totals 39.34 acres (ac) (15.92 hectares [ha]) and includes the Ke‘ehi IC and Middle Street to its intersection with the H-1 Freeway and North King Street (Figure 2; Figure 2 also shows Areas 2 and 3 for reference). Proposed work includes trenching 2.0 to 3.0 feet (ft) (0.6 to 0.91 meters [m]) wide and 4.0 to 8.0 ft (1.21 to 2.44 m) deep for installation of conduits and pull box cabinets. Selected project site plans are provided in Appendix B.

## ENVIRONMENTAL SETTING

The APE is located in an urban environment in Kahauiki and Kalihi Ahupua‘a. These *ahupua‘a* (traditional Hawaiian land division) are situated on the leeward side of O‘ahu. A portion of the APE is on filled land and is beyond the traditional *ahupua‘a* boundaries.

Kahauiki Ahupua‘a is roughly triangular-shaped and rises to where the Kahauiki Stream originates, at approximately 540 m above mean sea level (amsl), which is below the ridge line of

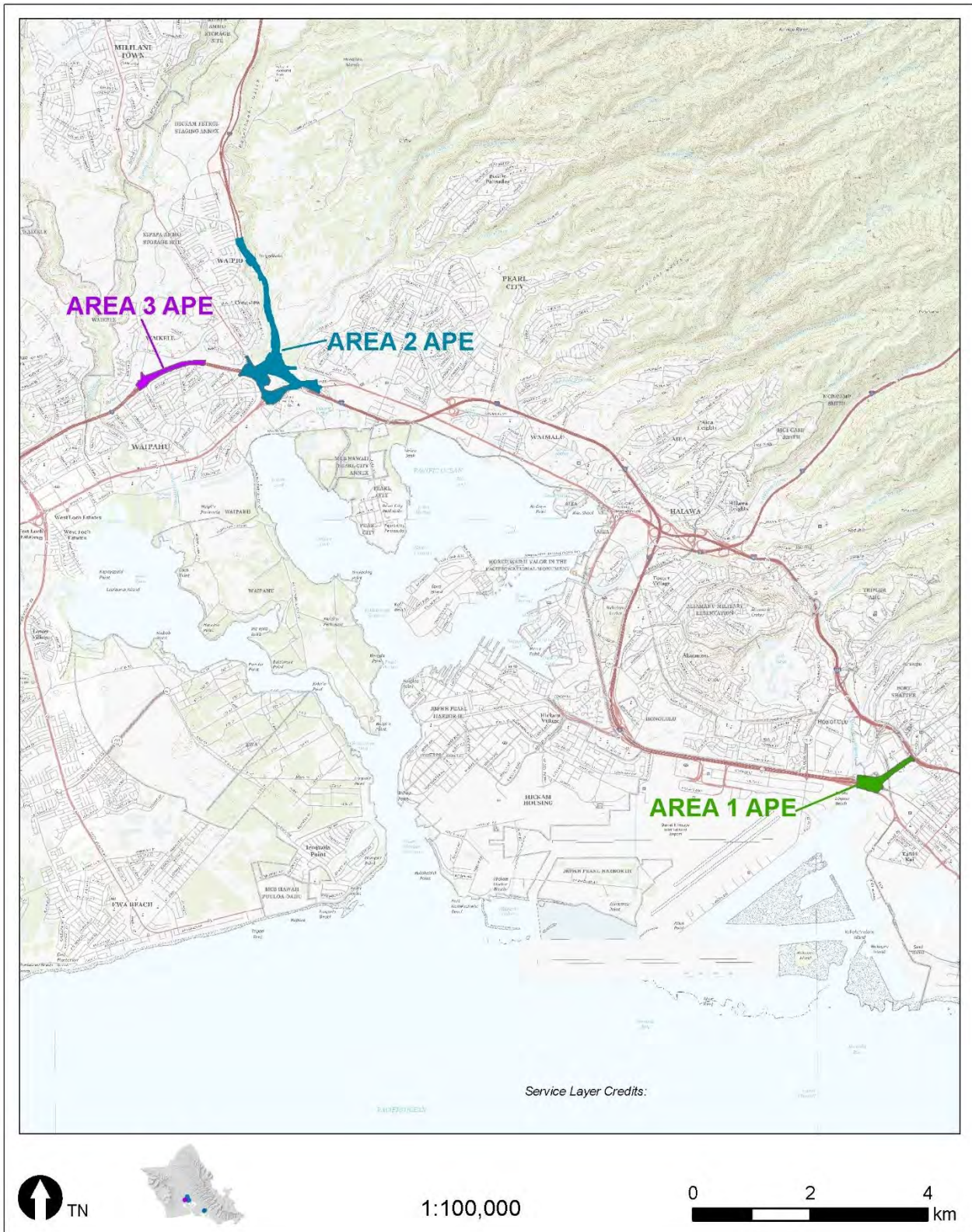


Figure 1. Location of Three Areas of Potential Effect for FMS Phase 3, Unit 1 (USGS 2017a,b).



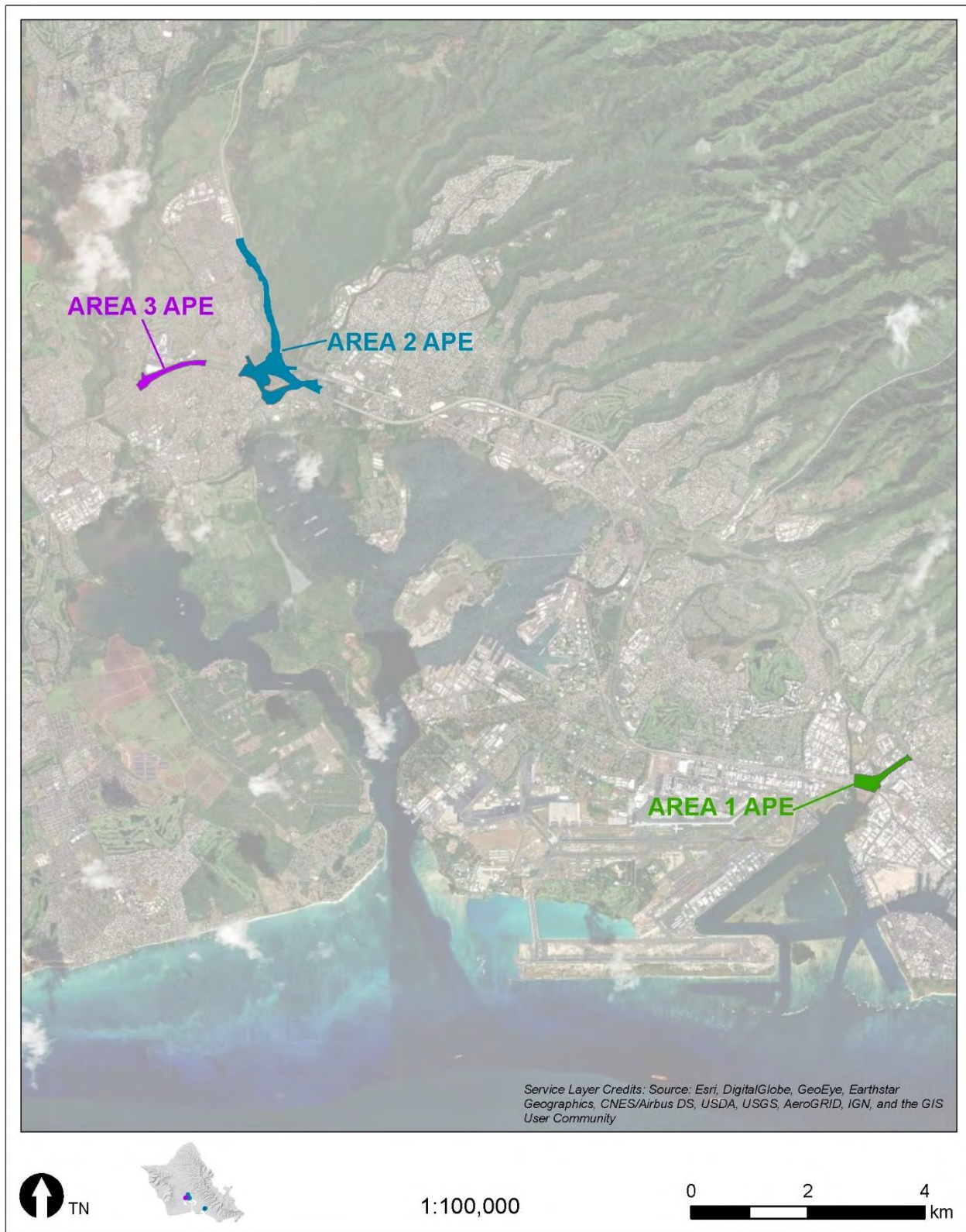


Figure 2. Aerial Image of the Location of Three Areas of Potential Effect for FMS Phase 3, Unit 1 (Esri et al. 2019).

the Ko'olau Mountains. The southern boundary prior to land filling was the shoreline that existed north, or inland, of today's H-1 Freeway. With the exception of the southern border, the *ahupua'a* boundary corresponds to that of the Fort Shafter Military Reservation.

The west side of Kalihi Ahupua'a borders Kahauiki. Kalihi also shares a western border with Moanalua Ahupua'a because both *ahupua'a* extend to the Ko'olau ridge line beyond the northern reach of Kahauiki Ahupua'a. Kalihi Ahupua'a consists of an amphitheater-headed valley with Kalihi Stream feeding into Honolulu Harbor. The valley floor has been filled with lava flows of the geologically recent Honolulu Volcanic Series (Macdonald et al. 1983; Stine et al. 2011:4). Kalihi Stream has two tributaries, Kamanaiiki Stream and Ka'ewai Stream.

The APE is situated on moderately sloping to level land approximately 1.0 to 13.0 m (1.28 to 42.65 ft) amsl. Rainfall averages 764.3 to 896.1 mm (30.09 to 35.28 in) annually with a majority of the precipitation occurring from November to March. (Giambelluca et al. 2013).

Soils consist of Honouliuli clay with 0–2 percent slopes (HxA) and mixed fill land (FL) (Figure 3). The Honouliuli series (HxA) consist of deep, well drained soils that formed in alluvium weathered from basic igneous rock (Soil Survey Staff 2019). Located on lowlands, these soils have been used for growing irrigated sugarcane, truck crops, orchards, and pasture. The natural vegetation includes *kiawe*, *koa haole*, fingergrass, bristly foxtail (*Setaria verticillata*), and Bermuda grass (*Cynodon dactylon*).

Mixed fill land (FL) is a product of historical and modern land reclamation efforts. It is described as deposits dredged from the ocean or hauled from nearby areas, garbage land-fills, and general material from other sources (Foote et al. 1972:31).

## HISTORICAL BACKGROUND

This section presents the ethno-historical and archaeological background information for the APE. Data from background research were compiled to create an overview of traditional Hawaiian and historic period land use and subsistence practices. Previous archaeological research is reviewed and anticipated archaeological findings are discussed.

### TRADITIONAL HISTORY

The Hawaiian cultural landscape can be described through significant Hawaiian place names, or *wahi pana*, and *mo'olelo*. *Mo'olelo* may be myths, legends, proverbs, and events surrounding well-known individuals in Hawaiian history (Pukui and Elbert 1986:254). The following is a discussion of the mythological and traditional accounts in and around the APE.

Kalihi translates as “outside edge,” or boundary valley (Lyons 1917:178; Pukui et al. 1974). The APE is in the *makai*, or seaward, portion of Kalihi, which is historically known as Kalihi-kai. Many of the *mo'olelo* of Kalihi concern Kalihi-Uka, or the *mauka* (toward the mountains) portion of Kalihi to the northeast. The goddess Haumea, who is thought of as the progenitor of the Hawaiian people (Malo 1951:5), is a sister of the gods Kāne and Kanaloa, and the mother of the Hawaiian goddess Pele and her sisters and brothers. She was known for her regeneration abilities and is often considered the goddess of childbirth (Beckwith 1970:283). Papa, the human form of the goddess Haumea, first resided in Kalihi Valley when living on O'ahu (Beckwith 1970:276).

In her human body as Papa, Haumea lives on Oahu as the wife of Wakea; in her spirit body as Haumea she returns to the divine land of the gods in Nu'umealani [a legendary place] and changes her form from age to youth and returns to marry with her children and grandchildren. Some place these transformations on Oahu at the *heiau* of Ka-ieie (the pandanus vine) built for her worship in Kalihi valley [Beckwith 1970:278].

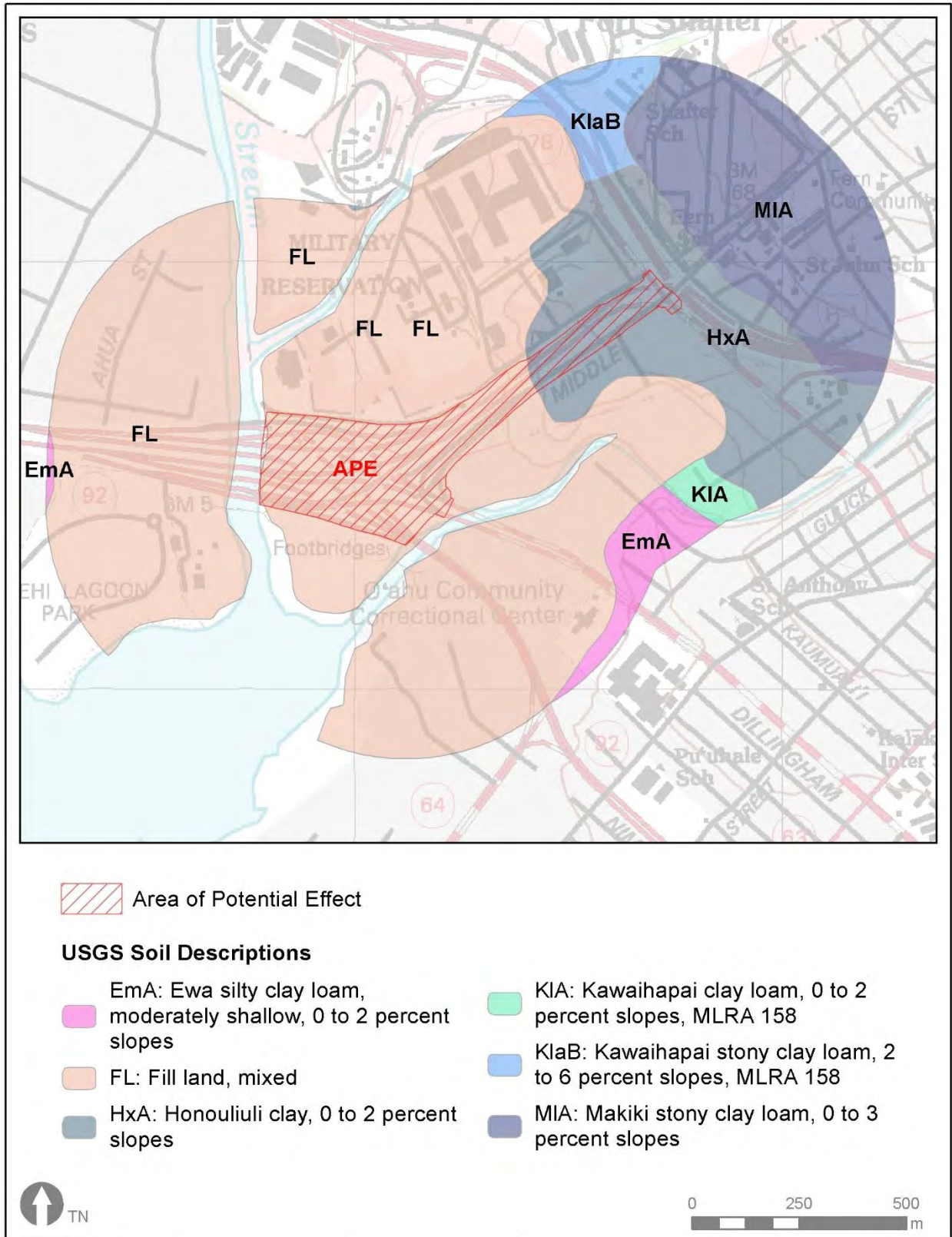


Figure 3. Soil Units Near Area 1 (Soil Survey Staff 2019; USGS 2017).

The *heiau* (traditional Hawaiian ritual structure) where Papa transformed into Haumea was Ka'ie'ie Heiau in Kalihi-Uka (Beckwith (1970:278). She lived there with one of her sons, Ki'o, who was "named for the deposits (*ki'o*) of gum on the *kukui* tree above Kalihi" (Kamakau 1991:134).

In a *mo'olelo* of Kalihi-Kai, there is a shark guardian named Makali'i. He was known to visit the waters of Kalihi-Kai, often near Kahaka'aulana, an islet off Sand Island where he had a cave (Oppenheimer 1976:15). In the 1970s, *kānaka maoli* (Native Hawaiians) of Mokauea 'Ili in Kalihi recalled that during Makali'i's residence in his cave at Kahaka'aulana, the sand patterns changed above his cave and fishing was good for the *akule* (bigeye scad, *Trachurops crumenophthalmus*) (Oppenheimer 1976:15).

Kahauiki translates as "the small hau tree" (Pukui et al. 1974:63). It is the name of both the *ahupua'a* and the stream that once watered taro *lo'i* in the area. There are several *mo'olelo* associated with the land. One source, J.K Mokumaia, wrote of a burial ground: "The military reservation (Fort Shafter) was a burial ground extending as far as Pohaha and up inland to the home of one of the sons of the Honorable S.M. Damon, that is on Puukapu where the evil chiefs carried on their mischievous work" (Mokumaia 1922 in Sterling and Summers 1978:327).

The apparition Poki, a mythical dog, was also known to live on Kahauiki ridge. According to J. F. G. Stokes:

Kahauiki ridge is, according to one of my informants, a favorite spot of Poki's. If a person is traveling mauka (towards the mountains) and Poki is observed in the same direction all is well. But if Poki is met, or seen lying across the road, one had better take the warning and return home or disaster will be met with [Stokes N.D. in Sterling and Summers 1978:328].

Finally, there are two *mo'olelo* concerning a stone called Kawaluna, which was located on a road in Kahauiki. The first is from the Legend of Puhuhuluana:

When Haumea saw her grandchild was taken (from Lelepua by Kula-uka) she gathered her various flying objects together, but none were capable of distant flight. She therefore leaped and entered the dark-shiny-way of Kane, and nearly overtook them, when the birdman (Kula-uka) released a stone, When Haumea saw the falling of the stone, she mistook it for the grandchild and turned below in search thereof, When about to catch it, the thundering noise from below occurred; it was the Kawa-luna stone [Thrum 1925:92].

The second *mo'olelo* where the stone appears is in the writings of Hawaiian historian Samuel Kamakau concerning Puakea and Pinao of Wailua, O'ahu. The two men are pursued by warriors from Maui when they meet in battle in Kahauiki near the Kawaluna stone:

As they came up toward Lapakea and passed the lower side of the house they called out, "Greetings to you all! Kalai-koa's victims are here, but Manono's return to Ko'olau." The guards, eighty in number, heard them and came outside with their spears. They had scarcely reached Kahauiki when the trouble began. "You are rebels! you are rebels!" shouted the guards, and spears, clubs, and darts began to fall about them. They were surrounded and had a hard time to struggle through. At the stone called Ka-papa-i-kawaluna that stood on the upper road of Kahauiki, Pinao turned and stabbed two men, Pua-kea stabbed two, and the men who obstructed the way scattered. This side of Kahauiki they encountered a host of warriors, and the dead fell about them like water in a bath. Pinao killed five men, and Puakea slew the same number [Kamakau 1992:139].

## TRADITIONAL LAND USE

When European explorers first began arriving to O'ahu, Kalihi Valley supported a large population with agricultural developments across the floodplain (Kotzebue 1821:339–341).

According to ethnologist and anthropologist E.S. Craighill Handy (1940), in the neighboring *ahupua'a* of Kahauiki it would have been possible for Kahauiki Stream to irrigate “a moderate-sized area of terraces for about half a mile” (1940:79). Early accounts of the area document *heiau*, trails connecting with various population centers on the island, and numerous *loko i'a* (traditional Hawaiian fishpond). Handy and Handy (1972) offer a description of Kahili's former resource potential:

Kalihi had a shallow seaside area, now the shore of Kalihi Basin, that was, like that of Moanalua, ideal for the building of fishponds, of which there were six. On the flat land below the valley there were extensive terraces on both sides of the stream, while along the stream in the lower valley there were numerous areas with small terraces. The interior valley was rough and narrow and not suitable for lo'i, but it would have been good for sweet potatoes, yams, wauke, and bananas, which probably were planted there [Handy and Handy 1972:475].

*Kai pa'akai*, or salt beds, were present at the shoreline in Kalihi, which are shown on a historical map in Figure 4. Land Commission Award 1257 mentions salt beds in the *'ili* of Kahalekai at Kalihi, along with *pu'uone*, or dune-bank ponds (Kikuchi 1973:228). Salt beds at

Kalihi were operating into the early twentieth century immediately south of the APE, at which time harvesting was carried out by Chinese workers:

In the western part of Honolulu, on the uplands which rise from the harbor stand the fine buildings of the Kamehameha Schools. Almost directly south of the school grounds lie the salt beds. The native name for the land district is Kalihi. The salt beds are in the part of the district known as Kalihi ma kai or Kalihi by the sea [Westervelt 1906:43].

Within Kahauiki Ahupua'a, there was one large *loko a'i* called Weli (State Inventory of Historic Places [SIHP] Site 50-80-14-00075). The meaning of the name Weli is mentioned in Titcomb (1972:86): “The killing of the ghosts was said to be the cause of the occasional phosphorescent glow (*weli*) on the water and the strong odour of the *kala* and *palani*.” Fishponds were symbols of chiefly status and power and use was reserved only for chiefs and priests (Kikuchi 1976:296, 299).

*Loko Weli* fell within the northwest portion of the APE (see Figure 4), and bordered the former island of Mokumoa, a former islet across from the mouth of Kalihi Stream belonging to Moanalua Ahupua'a. Weli was a *loko pu'uone*, (DHM Planners and Applied Research Group 1989:III-10), which Kikuchi (1973:228) defined as “[a]n isolated shore fishpond usually formed by the development of barrier beaches building a single, elongated sand ridge parallel to the coast and containing one or more ditches and sluice gates.” These ponds were usually filled with *awa* (milkfish, *Chanos chanos*) or *'ama'ama* (mullet, *Mugil cephalis*). A description of Weli can be found in McAllister (1933): “Said to be 30 acres in area. The greater part of its walls appear to be earth embankments, mostly natural. It is now separated from Kaikikapu Pond by a roadway. Kaikikapu is 20 acres in area with a wall from Mokumoa Island to Moanalua 900 feet long” (McAllister 1933:91). Archaeological investigations have dated the pond to AD 1650 (Athens and Ward 1996).

An early historical account and map by Otto von Kotzebue, a navigator for the Imperial Russian Navy, describes the *makai* (towards the sea) portion of Kalihi circa 1817 (Kotzebue 1817, 1921). A portion of this map is shown in Figure 5. Along Kalihi Stream there were vast *lo'i* (irrigated taro plot), with a network of *loko i'a* at the mouth, which are labeled on the map in Cyrillic as *Рыбныя Пруды*.

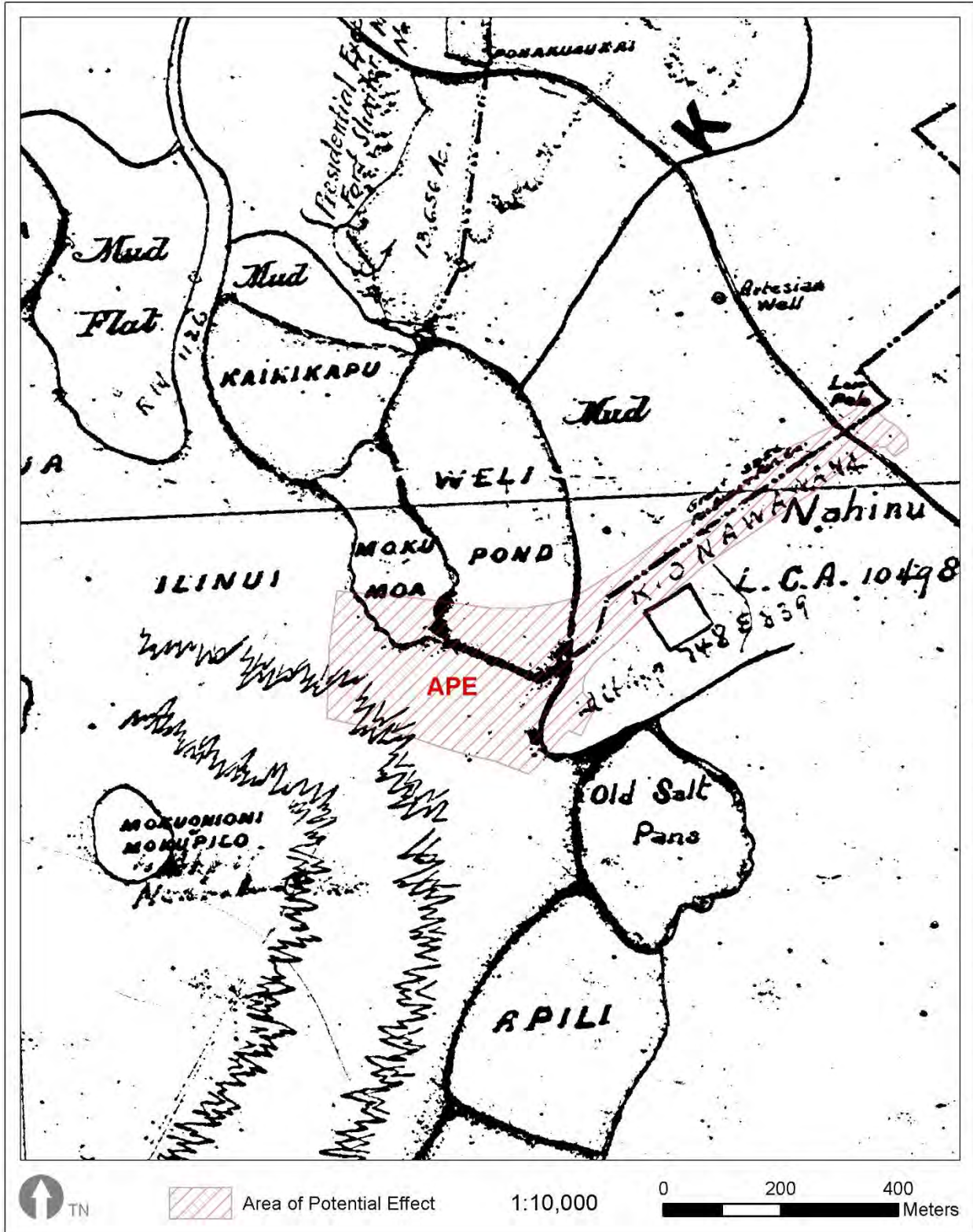


Figure 4. Portion of Circa 1880 Map of Moanalua and Kahauiki Showing the APE in Relation to Loko A'i, Mud Flats, Salt Pans, and Mokumoa Island (Lyons and Monsarrat Ca 1880).

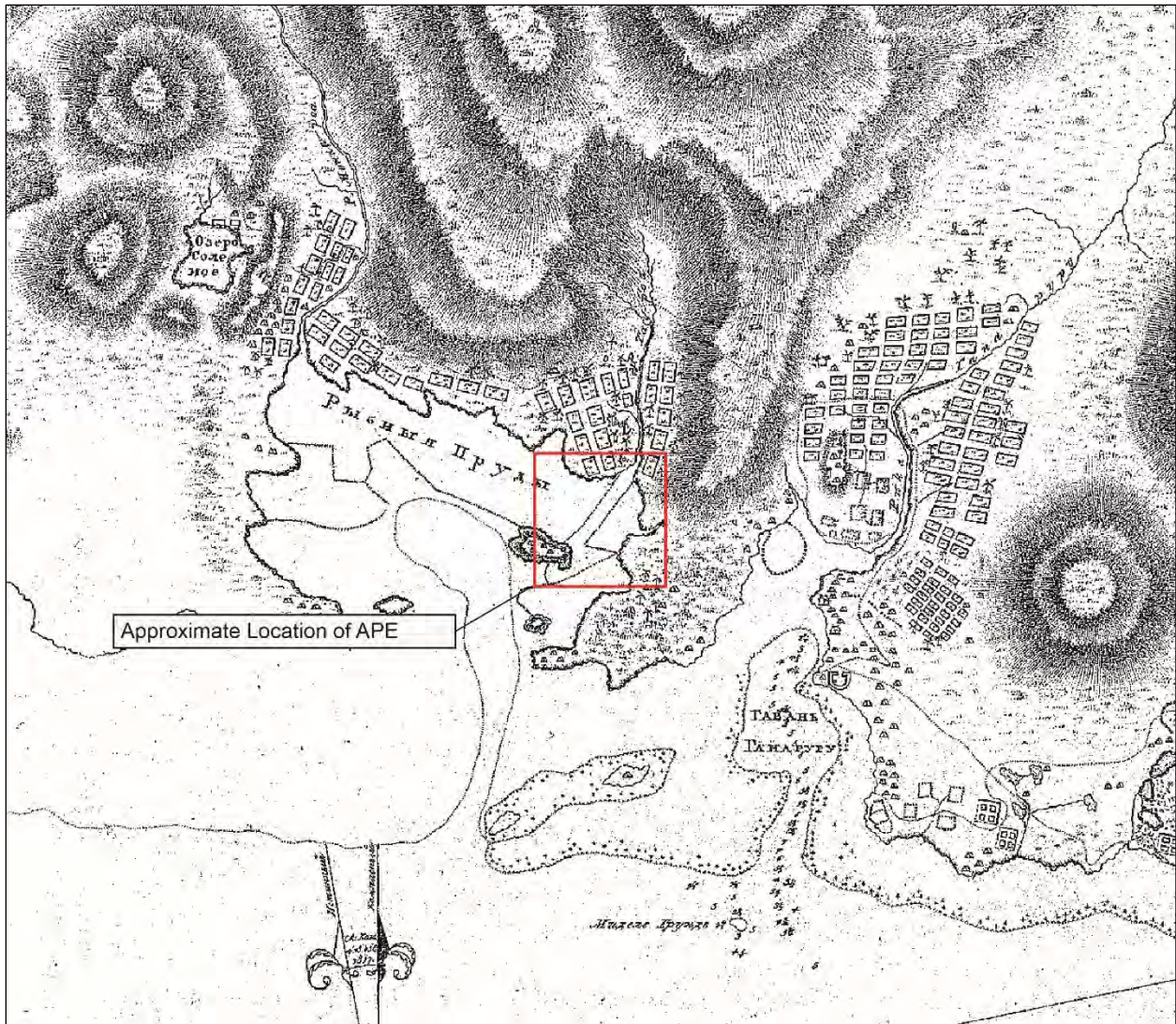


Figure 5. Portion of 1817 Map of South O'ahu Showing the Approximate Location of the APE (Kotzebue 1817).

Kotzebue did not document any residences near the *lo'i* at the mouth of Kalihi Stream, but four huts were present on Mokumoa. The following excerpt documents Kotzebue's travel by sea to Pearl Harbor and onward to the mouth of Nu'uaniu Stream:

The way now lies to the west, through a beautifully cultivated valley, which is bounded towards the north by romantic scenery of woody mountains, and on the south by the sea. The artificial taro fields, which may justly be called taro lakes, excited my attention. Each of them forms a regular square of 160 feet, and is enclosed with stone all round like our basins. This field, or rather this pond . . . contains two feet of water. In the spaces between the fields, which are from three to six feet broad, there are very pleasant shady avenues, and on both sides bananas and sugarcane are planted. . . . [T]he fish which are caught in distant streams thrive admirable when put into them. In the same manner as they here keep river-fish, they manage in the sea with sea-fish, where they sometimes take advantage of the outward coral reefs, and draw from them to the shore a wall of coral stone. Such a reservoir costs much labor, but not so much skill as the taro fields, where both are united, I have seen whole mountains covered with such fields, through which the water gradually flowed; each sluice formed a small cascade, which ran through avenues of sugarcane, or banana into the next pond, and afforded an extremely picturesque prospect. Sugar plantations and taro fields alternately varied our way, with scattered habitations, and we had gone unawares five miles to the large village of Mouna Roa [Moana-lua] [Kotzebue 1821:339–341].

1834: An account of Kalihi Valley and the floodplain was written by Frederick Debell Bennett in

The valley of Kalihi succeeds to that of Anuuana [Nu'uaniu], but is less bold and diversified in its scenery. Human dwellings and cultivated lands are here very few, or scattered thinly over a great extent of, probably, the finest soil in the world. The commencement of the valley is a broad pasture-plain, the tall grass waving on every side, and intersected by a foot-path, reminding one forcibly of the rural scenes which precede the hay-harvest in England. Kalihi has a pass to the vale of Kolau similar to the pari [pali] of Anuuana, though more precipitous, and only employed by a few of the islanders who convey fish from Kolau to Honoruru [Bennett 1840:202].

The largest *loko i'a* of Kalihi were Ananoho, Auiki, Pahouiki, Pahounui, and Apili. In a newspaper article from 1872 there is an advertisement for the lease of four fish ponds at Kaliawa (or Kaliheawa) in Kalihi. The five-year lease was for Maakakukuhi (or Makaakukuhi), Punaula, Waikulu, Panahaha, "and more" all owned by the Estate of William Beckley under Royal Patent 4544 (Hawaiian Gazette 1872). These ponds were *loko wai*, which are inland freshwater fishponds connected to a river, stream, or the sea by ditches and contained sluice grates (Kikuchi 1973:228). The location of Panahaha and Waikulu are shown in Figure 6. William Beckley (1815–1871) was the son of George Beckley (1787–1826), a foreign advisor to Kamehameha I, who was made a high chief.

Kahauiki is mentioned by the Hawaiian historian John Papa 'Ī'ī in his writings from the 1860s. He describes a trail from Nu'uaniu to Moanalua. In this description, the presence of *lo'i* corresponds to Kotzebue's (1817, 1821) records:

When the trail reached a certain bridge, it began going along the banks of taro patches, up to the other side of Kapālama, to the plain of Kaiwiula on to the taro patches of Kalihi; down to the stream and up to the other side; down into Kahauiki and up to the other side; turned right to the houses of the Portuguese people [Ī'ī 1959:95].



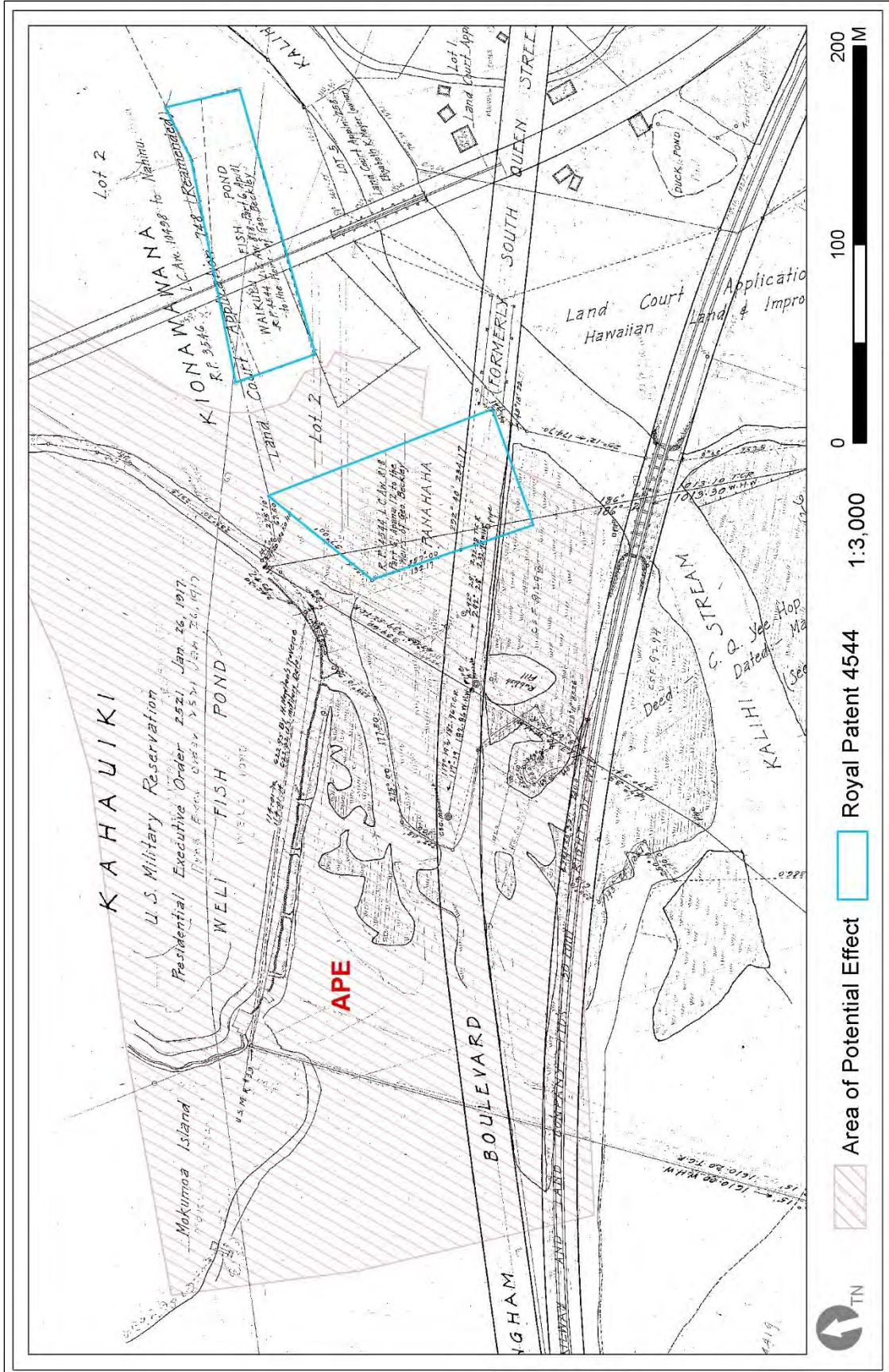


Figure 6. Portion of a 1930 Map Showing the Northern Portion of the Kaliwa Fishery and the APE (King 1930).

## HISTORICAL LAND USE

Traditional land divisions of the fifteenth and sixteenth centuries persisted until the 1848 Mahele, which introduced private property into Hawaiian society (Kamakau 1991:54). During the Mahele, the Land Commission required the Hawaiian chiefs and *konohiki* (land agent for the *ali'i*) to present their claims to the Land Commission. In return they were granted Land Commission Awards (LCAs) for the land quit-claimed to them by Kamehameha III. Land was divided into Crown Lands, Government Lands, and Konohiki Lands. The remaining unclaimed land was then sold publicly, “subject to the rights of the native tenants” (Chinen 1958:29).

In the case of land claims made for Konohiki lands, approval by the Land Commissioners was required before the award was made. If approved, then the awardee obtained a Royal Patent (RP) from the Minister of the Interior, which indicated that the government’s interest in the land had been settled with a commutation fee. This fee was typically no more than one-third of the value of the unimproved land. The fee was paid either with cash, or, more commonly, the return of one-third of the awardee’s lands (or total value of the lands awarded) (Hammatt 2013:A-3).

The Kuleana Act of 1850 allowed *hoa’āina* (common people of the land, native tenants) to make claims to the Land Commission. The new western system of ownership resulted in many losing their land. Often claims would be made for discontinuous cultivated plots with varying crops, but only one parcel would be awarded.

The Crown Lands became Government Lands when the Hawaiian Government was overthrown in 1895, making them public domain for sale by fee simple (Hammatt 2013:A-5). Patents were the certificates issued for the sale of such lands. Beginning in 1900, when Hawai’i became a U.S. territory, the certificates were called Land Patents, or Land Patent Grants (Hammatt 2013:A-5).

Kamehameha III retained Kahauiki Ahupua’a during the Mahele, which included Loko Weli. The *ahupua’a* subsequently became Government Land. In 1899, the *ahupua’a* was set aside for what would be Fort Shafter Military Reservation; construction of Fort Shafter began in 1905 (Thrum 1905:178).

In Kalihi, many *lo’i* were claimed along the Kalihi and Niuhelewai streams. In the APE, three awards were made: LCA 818:6:11 and 12, 7715:2, and 10948. These awards are shown in Figure 7 and summarized in Table 1.

**Table 1. Land Commission Awards (LCAs) in the APE.**

LCA No.	AHUPUA’A	’ILI	AWARDEE	AWARD
818:6:11 and 12	Kalihi	Kaliawa and Kekualiiili	George Beckley	One farm with the fishing grounds called Kalihawa (Hammatt 2013:B-26)
7715:2	Moanalua	-	Lot Kamehameha	Moanalua Fishery
10948	Kalihi	Kionawawana	Nahinu	Six <i>pō’alima</i> (land worked for the <i>ali’i</i> ) <i>lo’i</i> and one pasture

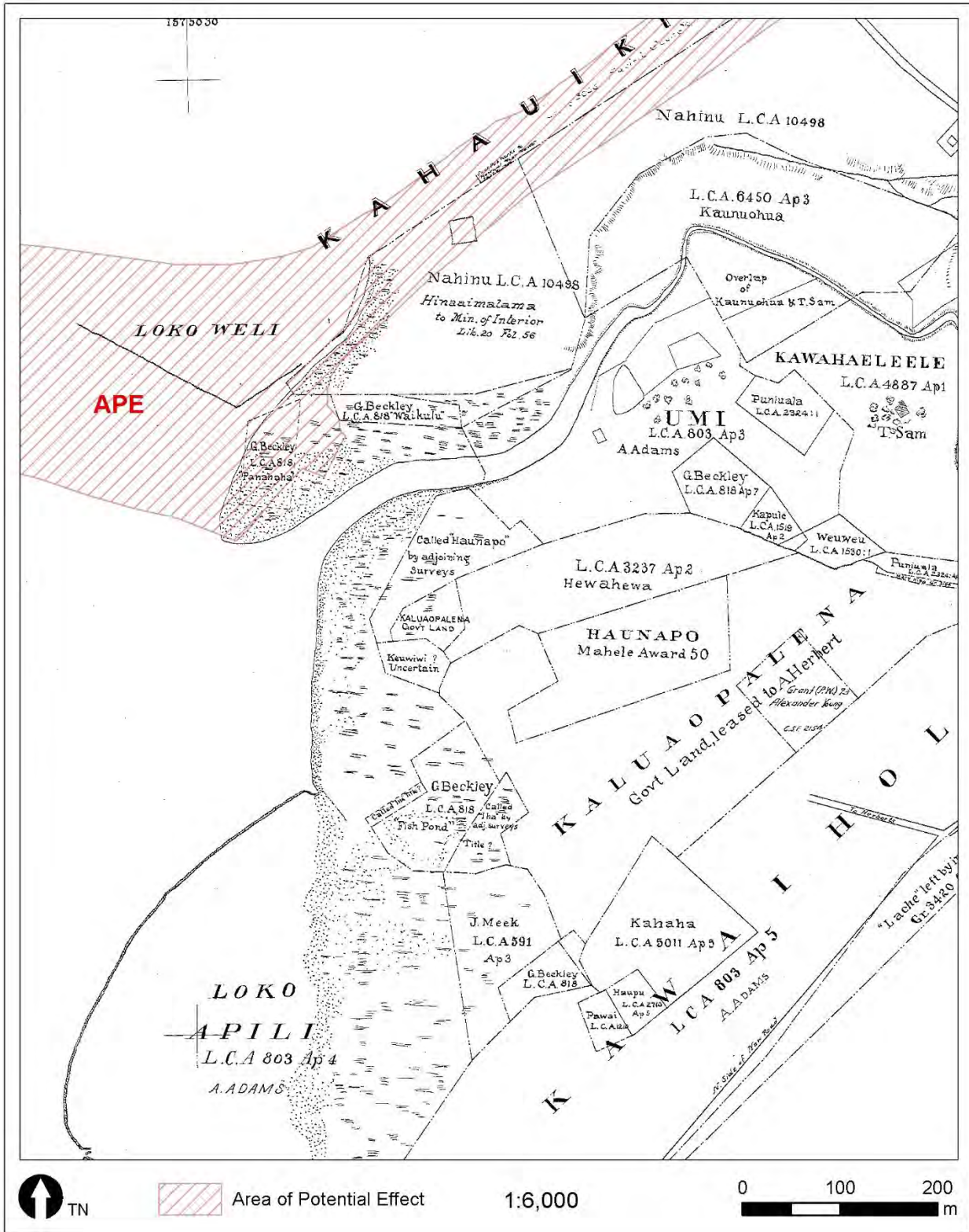


Figure 7. Portion of Map of Kalihi and Kapālama, *Makai* Sections Dated 1883, Showing the APE (Brown 1883).

LCA 818 (Royal Patent 4544) was granted to the heirs of George Beckley. It included inland fishponds, likely *pu'uone*, and fishing grounds, the latter of which were outside of the APE. This land and fishing ground had been given to Beckley by Keopuolani, a wife of Kamehameha I.

LCA 10498 in Kionawawana 'Ili was granted to Nahinu and consisted of six *pō'alima* (land worked for the *ali'i*) *lo'i* and one pasture (Hammatt 2013:B-26) (see Figure 7). Nahinu was a *kahuna* (priest; expert) and served as a *konohiki* for Kalihi Kai (Landrum and Klieger 1991:22–23 in Hammatt 2013:39). His name is mentioned by Kamakau as a contemporary of the high chief Boki:

Boki returned and lived at his place at Beretania and devoted himself to medicine, in which he was proficient, and all those joined him who were skilled in placing pebbles, such as Kaa, Kuauau, Kinopu, Kahiole, Nahinu, Kekaha, Hewahewa, and their followers and other kahunas besides [Kamakau 1992:291].

Also within the APE was the Moanalua Fishery, which belonged to LCA 7715:2 awarded to Lot Kamehameha (Kamehameha V). This award consisted of the entire *ahupua'a* of Moanalua. After Kamehameha V's death 1872, the fishery and land went to Princess Ruth Ke'elikōlani. Upon her death in 1883, the land transferred to Princess Bernice Pauahi Bishop, who willed Moanalua to Samuel M. Damon, son of the missionary Samuel Chenery Damon (Hammatt et al. 2017:19).

In the first half of the nineteenth century, Hansen's disease spread through the Hawaiian Islands. In 1865, the Legislative Assembly of the Hawaiian Islands passed "An Act to Prevent the Spread of Leprosy," which was approved by Kamehameha V. Near the shore in Kalihi, a hospital was built on a twelve-acre lot for light cases of the disease and as a temporary detention station for severe cases (Greene 1985:13). The location of the facility is shown in Figure 8. The facility was named the Kalihi Hospital and Detention Station. The hospital operated for 10 years, then closed in 1875. The detention station was located northeast of the hospital on King Street and remained open until 1881. In 1881 a new facility site was open in Kaka'ako; however, this site became inoperable due to inundation from high tide, so the operation returned to the old Kalihi site in 1889. When this location was rezoned as industrial in the twentieth century, the conditions became unhealthy and all patients were relocated. The detention station facility closed in 1949.

In 1884, the Metropolitan Meat Market (later the Metropolitan Meat Company and the Hawaii Meat Company) was opened within LCA 10498, which included associated stockyards and a slaughterhouse (Tomonari-Tuggle and Tuggle 1996:12). This business, along with Wagner's Slaughterhouse within LCA 818 and Pacific Guano and Fertilizer Company to the northeast, are shown in Figure 9. These businesses also appear on Land Court Application Map 748, which is shown in Figure 10, for the transfer of the land to C.Q Yee Hop and Company, Ltd. At this time, the former Wagner's Slaughterhouse comprised numerous buildings, including pig pens, a reduction plant, and a boiler house. Chun Quan (C.Q) Yee Hop had arrived in Honolulu in 1884 and became a highly successful business man. With the partnership of a friend, Lum Hop, he operated a meat business from 1887 until 1900, when the Chinatown fire occurred. In 1907 they opened in a new building in Chinatown (Honolulu Star Bulletin 1927). It can be speculated that the men acquired the slaughterhouse property adjacent to Kalihi Stream to expand their business in the early twentieth century. Today the company still owns a building east of the APE, on the property between Kalihi Stream and the Kalihi Transit Center.

In 1889, Benjamin Dillingham organized the Oahu Railway and Land (OR&L) Company, which operated from Honolulu to Waianae (Kuykendall 1967:100). The railway can be seen passing through the southwest corner and across Middle Street in the APE on Figure 11. By the late 1940s, OR&L operations were shut down completely due to the collapsed freight business and rise of personal vehicle use (Chiddix and Simpson 2004:256).

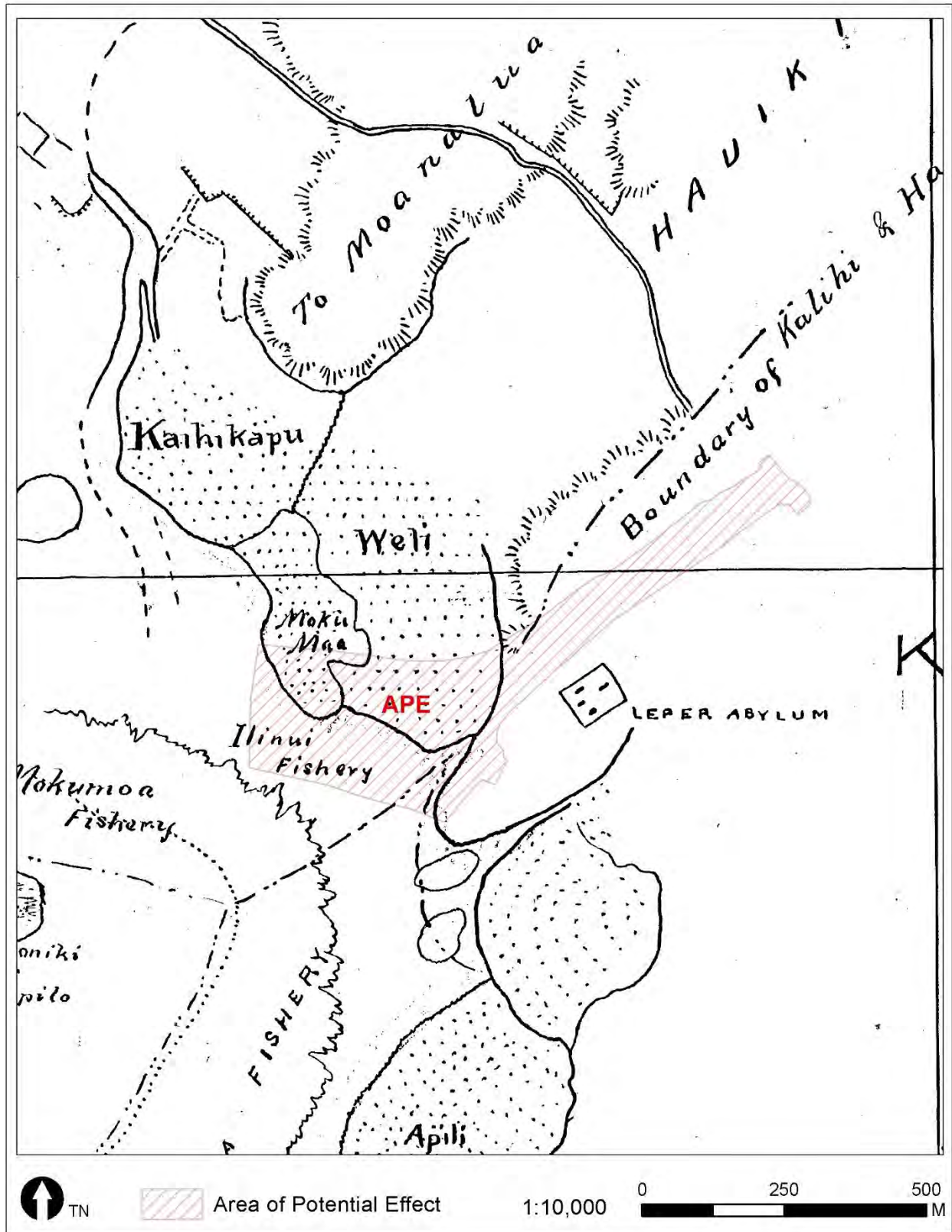


Figure 8. Portion of a Map of Reef Titles of Kalihi Showing the APE (Lyons 1886).

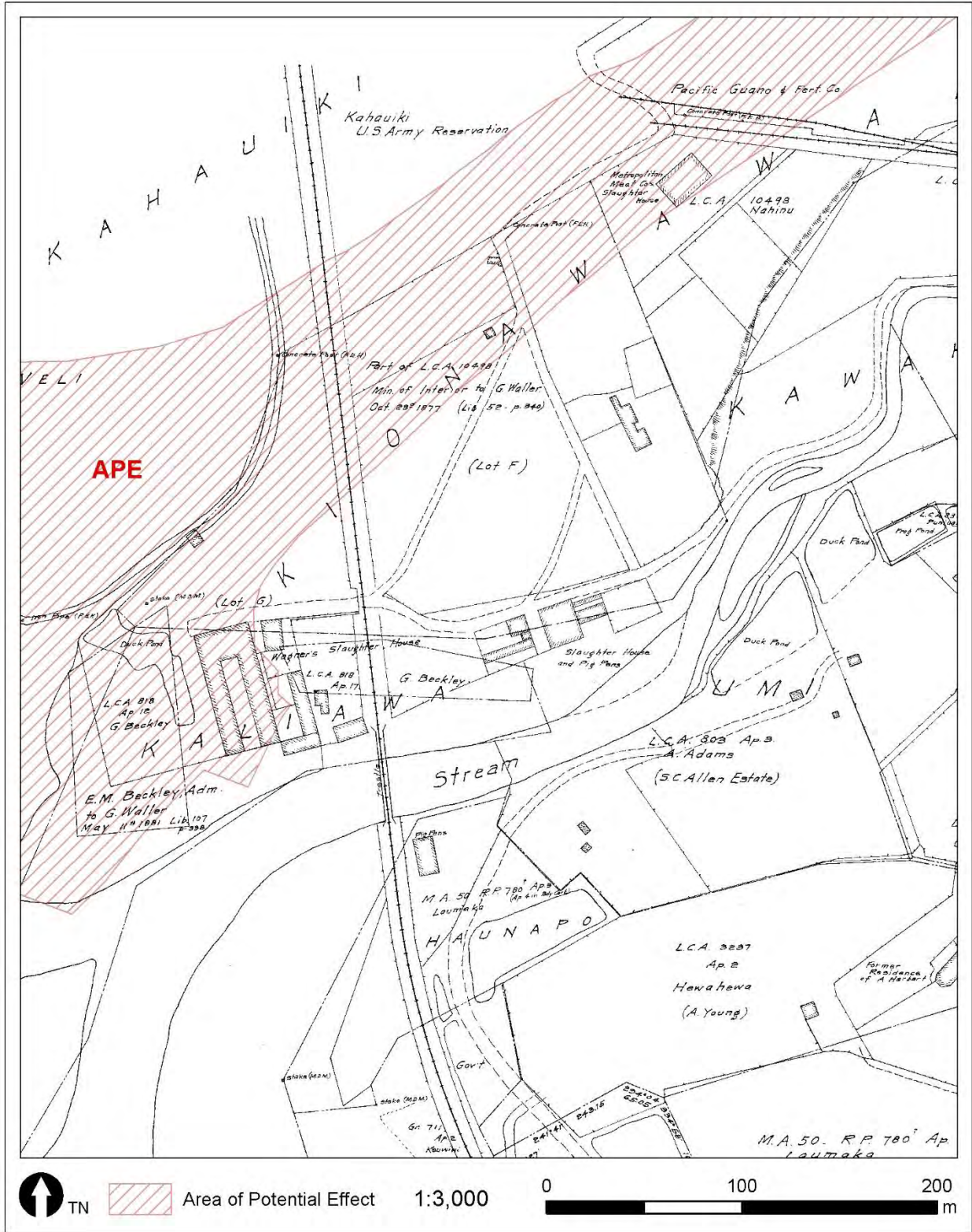


Figure 9. Portion of a 1904 Map Showing Slaughterhouses within the APE (Alexander 1904).

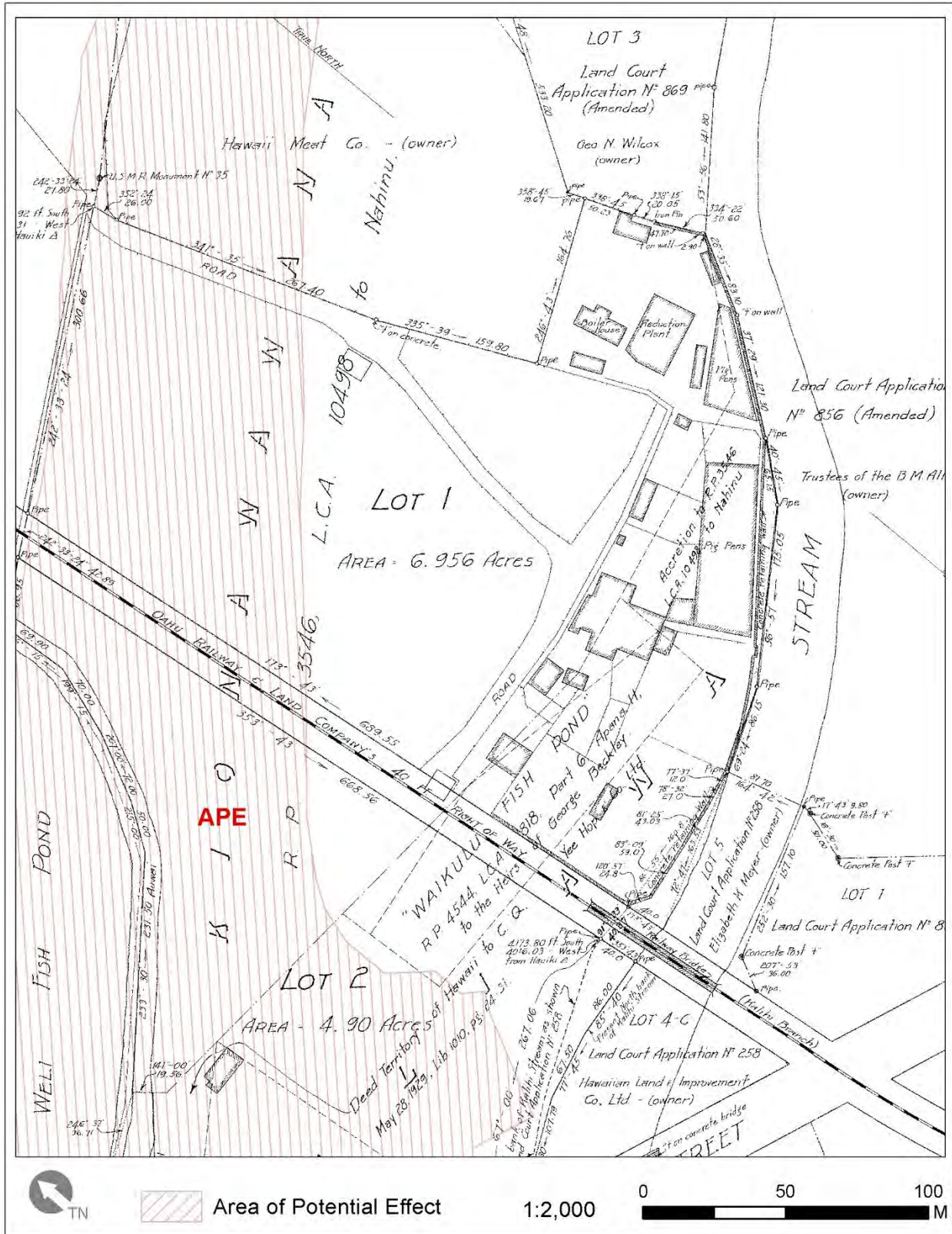


Figure 10. Portion of Land Court Application Map 748 Showing the APE (Wright, Harvey, and Wright 1929)

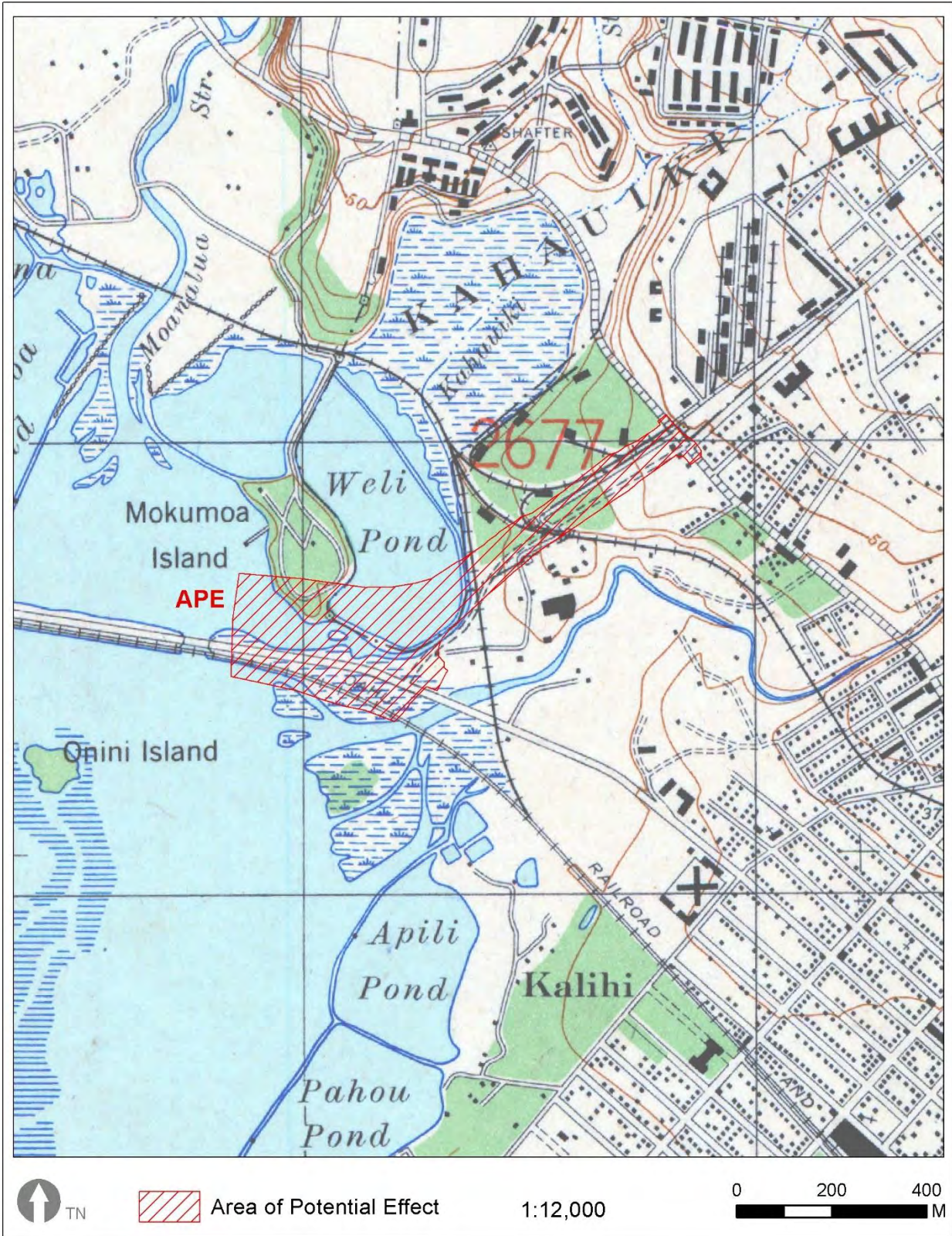


Figure 11. Portion of a 1933 Honolulu Topographical Quadrangle Showing the Location of the APE (USACOE et al. 1933).



In late nineteenth century, Kalihi fishponds, along with all other fishponds in the vicinity, were under commercial operation (Cobb 1905:748). Loko Weli continued to be used into the 1930s, when Ke'ehi Lagoon was dredged for a seaplane runway and the pond was filled, as shown in Figure 12.

Today the APE is located within an industrial zone. Construction for the H-1 Freeway through the APE began in 1960. Prior to 1960, the H-1 Freeway was named the Lunalilo Freeway. It was at this time that federal money was used for the freeway system in Hawai'i (Stine et al. 2011:30).

## **PREVIOUS ARCHAEOLOGICAL RESEARCH**

Numerous archaeological investigations have been conducted in the vicinity of the APE. These studies are shown in Figure 13 and summarized in Table 2. Previous work has included archaeological literature review and field inspection, archaeological inventory survey, archaeological subsurface testing, and archaeological monitoring. Only one instance of the inadvertent discovery human remains also occurred within 500 meters of the APE. Archaeological sites nearby are associated with traditional Hawaiian aquaculture and cooking and historic period industry. The locations of these sites are shown in Figure 14. All site numbers below follow Statewide Inventory of Historic Places (SIHP) Site 50-80-14-.

In the 1930s, J. Gilbert McAllister (1933) identified several traditional Hawaiian fishponds near the APE. These included Apili, Pāhouiki, and Pāhounui (Site 00074), Weli (Site 00075), Mapunapuna (Site 00078), and Kaikikapu (Site 05365). Modern investigations by Athens and Ward (1996) dated Loko Weli to AD 1650. Paleoenvironmental coring at both Weli and Kaikikapu indicated that fishpond deposits are present under urban developments in the area. Results from testing at the site of Pāhounui and Apili Fishponds (Site 00074) in Kalihi Kai were inconclusive and it was speculated that fishpond sediments form thin layers (Moore et al. 2004).

Survey was conducted in the 1970s for the U.S. Army Support Command, Hawai'i (USASCH), which included Fort Shafter Military Reservation (Rosendahl 1977). The survey did not yield any historic properties within 500 meters of the APE. A majority of the sites identified in subsequent studies within Fort Shafter (Erkelens and Tomonari-Tuggle 2000; Tomonari-Tuggle et al. 2000; Williams and Anderson 1997) are well over 500 meters from the APE. However, in 2000, archaeological monitoring in the southern portion of Fort Shafter for the Outside Cable Rehabilitation (OSCAR) project (Roberts et al. 2002) did determine that a "roadway" to Mokumoa Island was built upon the fishpond wall that divided Loko Kaikikapu (Site 05365) and Loko Weli (Site 00075). Fishpond deposits associated with Loko Weli were documented at 280–290 cmbs but were disturbed (Roberts et al. 2002:23). Loko Weli is considered eligible for listing in the National Register of Historic Places. Additionally, a disturbed, historic period artifact deposit associated with the Tripler Hospital Facility (previously the deposit was designated Site 05849) and decomposed railroad ties from a segment of the Oahu Railways & Land Co. (previously designated Site 50-80-12-09714) were identified; neither the track section nor the artifact deposit are considered eligible for listing in the National Register of Historic Places.

In the 1990s, archaeological work was carried out for the Kalihi-Pālama Bus Facility project (Folk and Hammatt 1993; Folk et al. 1993; Hammatt and Folk 1992; Landrum and Klieger 1991). During archaeological inventory survey, 19 backhoe trenches were excavated, which encountered three human burials (two coffin burials and one burial without a coffin) and an associated subsurface cultural layer (Site 04525). Historical literature research indicated that the area was intensively used for agriculture and habitation from the pre-Contact period through the 1800s. The site is in the vicinity of the former Kalihi Hospital and Detention Station. The burials may have been associated with the facility, as suggested by Dega and Davis (2005). No further

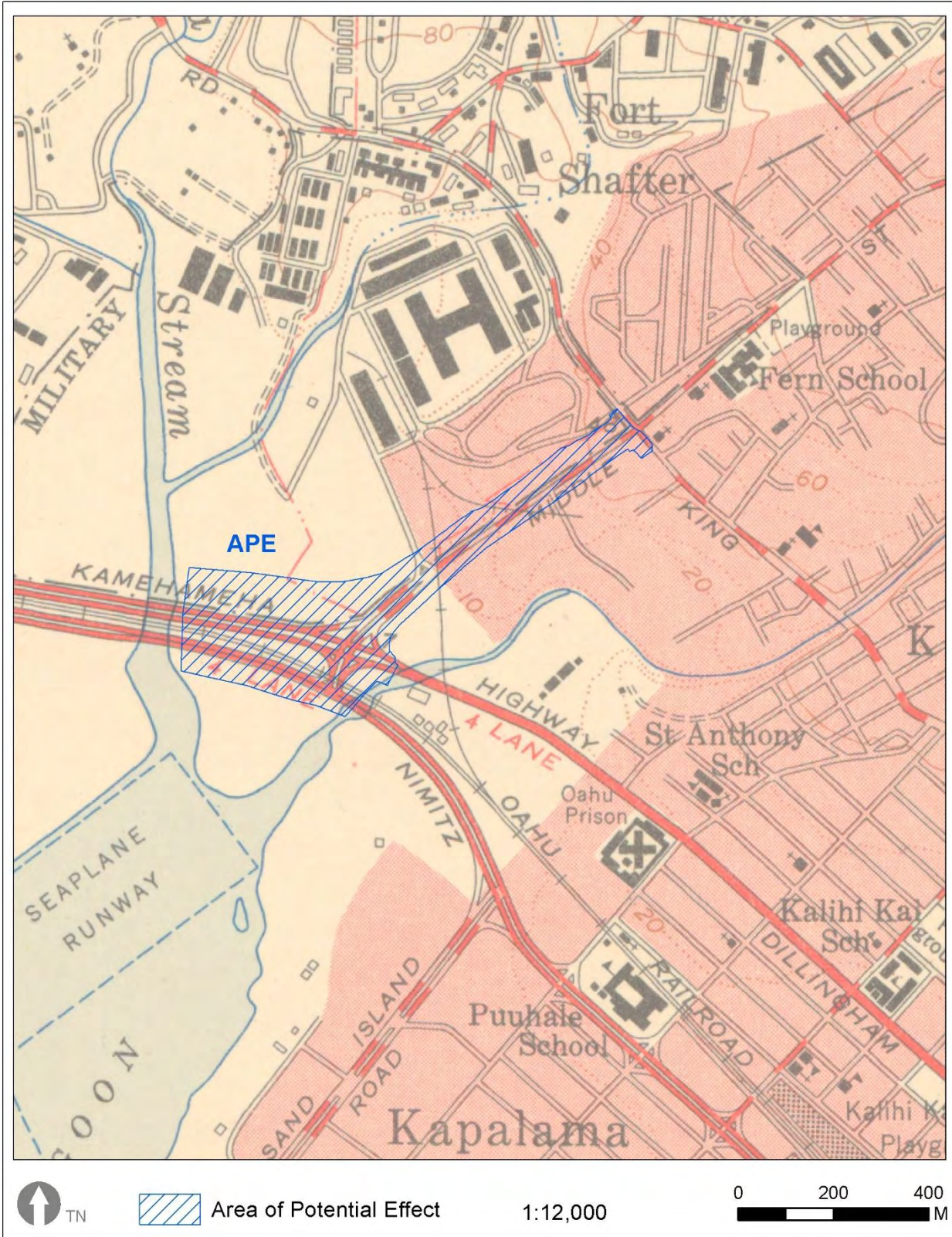


Figure 12. Portion of the 1953 Honolulu Topographical Quadrangle Showing the Location of the APE (USGS 1953).

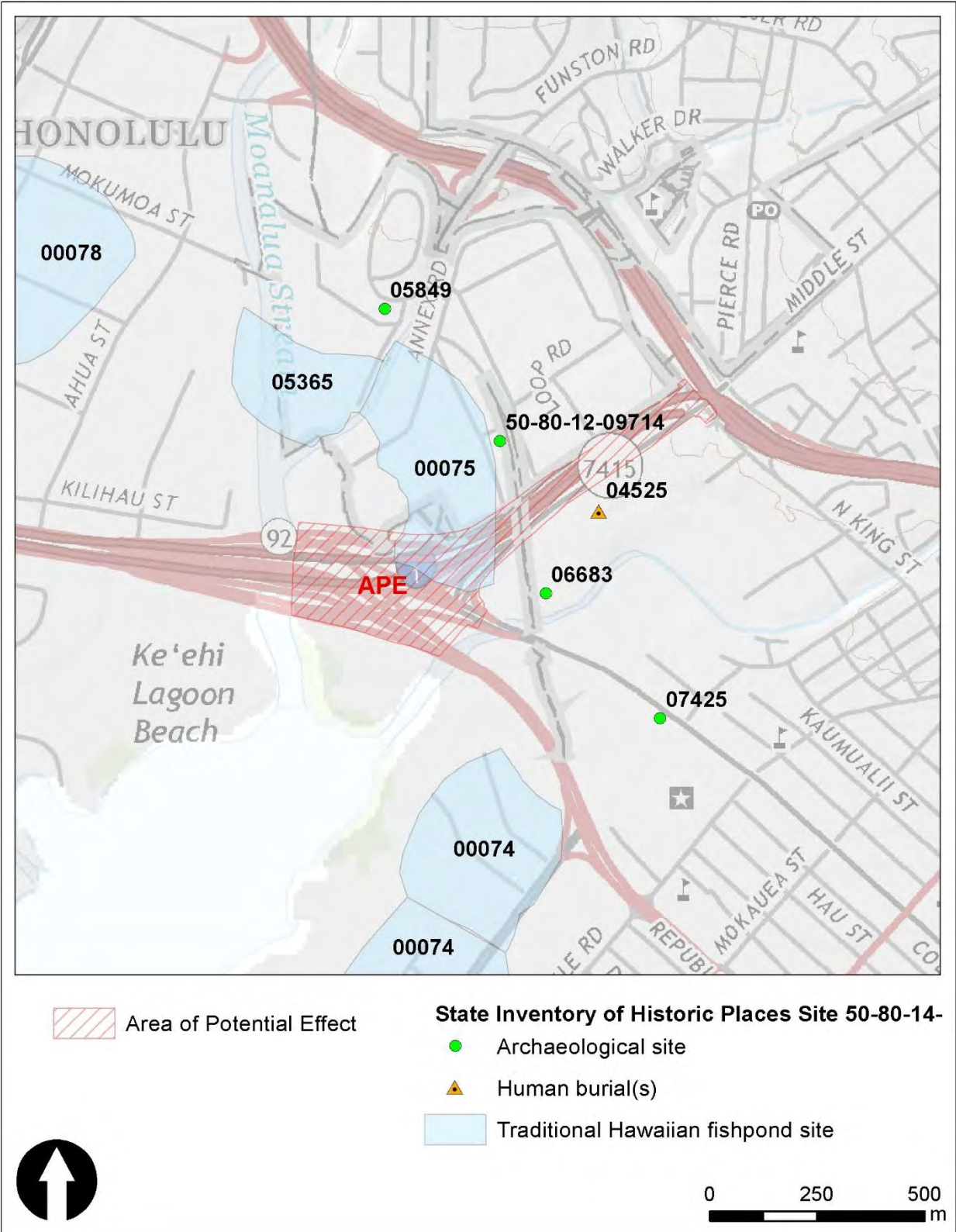


Figure 13. Previous Archaeological Investigations near the APE (USGS 2017).

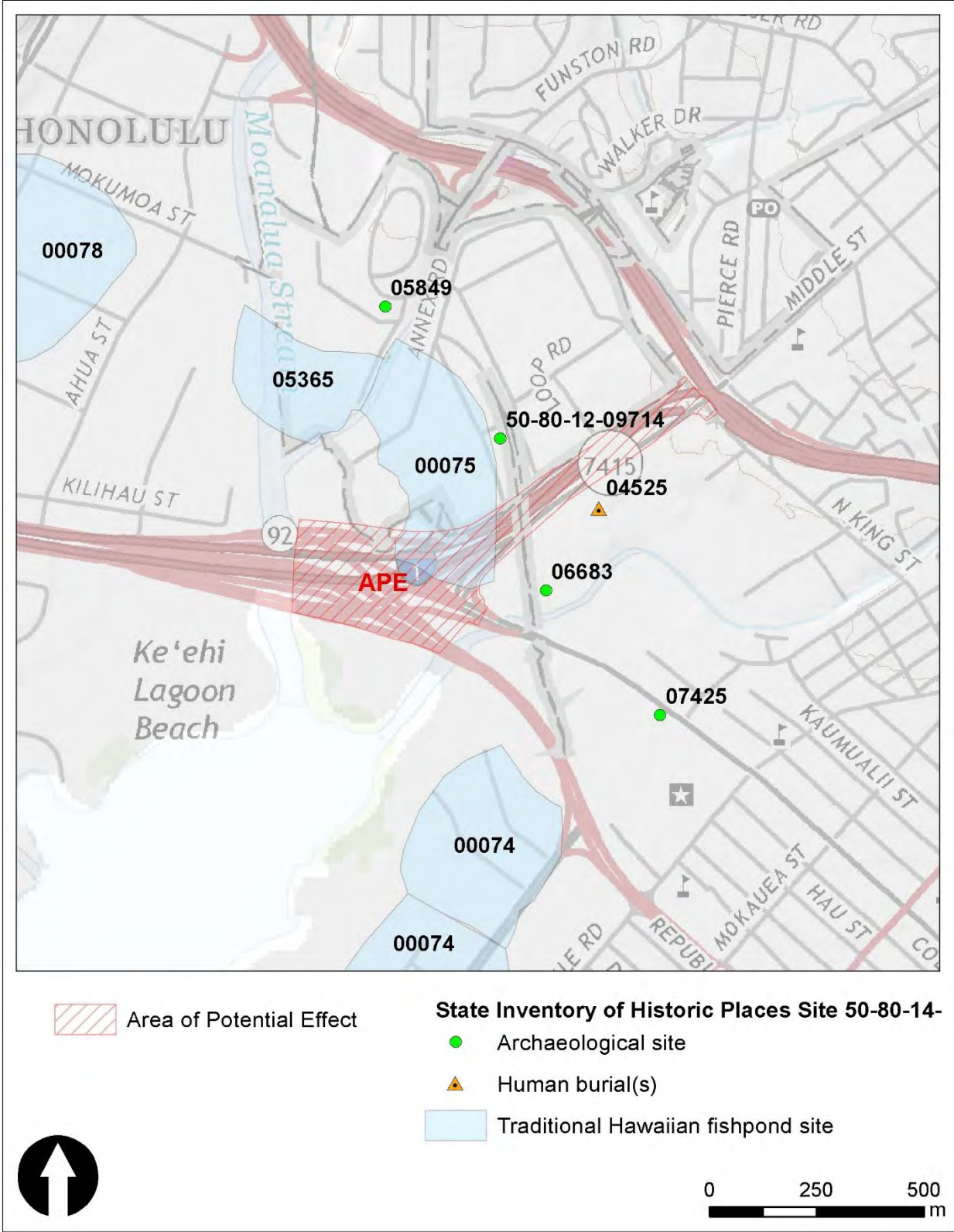


Figure 14. Archaeological Sites and Human Burials near the APE (USGS 2017).

**Table 2. List of Previous Archaeological Studies and Burial Finds near the APE.**

<b>AUTHOR YEAR</b>	<b>TMK(S)</b>	<b>NATURE OF STUDY</b>	<b>SIHP* SITE NO. 50-80- 14-</b>	<b>SITE DESCRIPTION</b>
McAllister 1933	Island-wide	Reconnaissance Survey	00074	Apili, Pāhouiki, and Pāhounui Fishponds
			00075	Weli Fishpond
			00078	Mapunapuna Fishpond
			05365	Kaikikapu Fishpond
Rosendahl 1977	1-1/ U.S. Army Support Command, Hawaii (USASCH) Installations	Archaeological Inventory Survey	-	No historic properties identified near the APE
Landrum and Klieger 1991	1-2-016:007/ City Bus Repair Facility	Historical Literature Review	-	Project area determined to be area of pre-Contact and early post-Contact agricultural complex
Hammatt and Folk 1992	1-2-016:007/ City Bus Repair Facility	Burial Treatment Plan	04525	Human burials
Folk and Hammatt 1993	1-2-016:007/ City Bus Repair Facility	Mitigation Plan	04525	Human Burials
Folk et al. 1993	1-2-016:007/ City Bus Repair Facility	Archaeological Inventory Survey	04525	Post-Contact cultural layer and three human burials
Athens and Ward 1996	1-1/ Fishponds of Fort Shafter Military Reservation	Paleoenvironmental Study	00075	Weli Fishpond
			05365	Kaikikapu Fishpond
Williams and Anderson 1997	1-1-035:002/ Fort Shafter Flats	Archaeological Monitoring and Sampling	-	No historic properties identified near the APE

**Table 2. List of Previous Archaeological Studies and Burial Finds near the APE.**

<b>AUTHOR YEAR</b>	<b>TMK(S)</b>	<b>NATURE OF STUDY</b>	<b>SIHP* SITE NO. 50-80- 14-</b>	<b>SITE DESCRIPTION</b>
Erkelens and Tomonari-Tuggle 2000	1-1-008:001/ Fort Shafter Flats	Archaeological Subsurface Testing	-	No historic properties identified near the APE
Tomonari-Tuggle et al. 2000	1-1/ Fort Shafter Military Reservation	Archaeological Inventory of Historic Properties	-	No historic properties identified near the APE
Hammat and Shideler 2002	1-2-018:001–003 and 008–010/ Proposed Middle St Transit Center	Archaeological Assessment	-	No historic properties identified
			00075	Weli Fishpond
			05365	Kaikikapu Fishpond
Roberts et al. 2002	1-1/ Fort Shafter Military Reservation	Archaeological Monitoring	05849	Historic period artifact deposit
			50-80-12-9714	Oahu Railway & Land Co. (OR&L) track
Moore et al. 2004	1 -2-021:013/ Property near Ke'ehi Lagoon	Archaeological Inventory Survey	00074	Pāhounui and Apili fishponds
Dega and Davis 2005	1-2-18:001, 002, 009, and 010/ Proposed Middle St Intermodal Center	Archaeological Inventory Survey	06683	Historic refuse pit and material remains associated with a slaughterhouse; Loko Waikulu.
Barnes et al. 2007	1-3-009:029/ Combs Estate	Archaeological Literature Review and Field Inspection	-	No significant finds
Cleghorn and Kahahane 2008	1-2-13:02/ Oahu Community Correctional Center	Archaeological Assessment	-	No significant finds

**Table 2. List of Previous Archaeological Studies and Burial Finds near the APE.**

<b>AUTHOR YEAR</b>	<b>TMK(S)</b>	<b>NATURE OF STUDY</b>	<b>SIHP* SITE NO. 50-80- 14-</b>	<b>SITE DESCRIPTION</b>
Dey and Hammatt 2009	1-1-008/ Middle St and H-1	Archaeological monitoring	-	No significant finds
Prestana and Spear 2009	1-2-015 and 016; 3-1-001/ Near H-1 and Middle St.	Archaeological Monitoring	-	No significant finds
Hammatt and Shideler 2011	1-3, 1-6/ Ola Lane Overpass to Vineyard Boulevard	Archaeological Assessment	-	Potential historic properties noted
Hunkin et al. 2012	(58 streets)	Archaeological Monitoring	-	No historic properties identified near the APE
Hammatt 2013	1-2, 1-5, 1-7, 2-1, 2-3/ City Center (Section 4) of the Honolulu High-Capacity Transit Corridor	Archaeological Inventory Survey	07425	Subsurface <i>imu</i> feature
Hammatt et al. 2017	1-1-003:239 por.; 1-2-021:035 por. and 036 por./ South of North Nimitz Highway near Ke'ehi Lagoon	Archaeological Literature Review and Field Inspection	-	Potential historic properties noted
Vernon 2019	1-1, 1-2/	Archaeological Literature Review	00075 06683	Loko Weli Loko Waikulu

\*SIHP = State Inventory of Historic Places

work was recommended at the location because no archaeological material was encountered beyond the burial area.

Two investigations were conducted for the Middle Street Transit Center Station project, adjacent to the Bus Repair Shop Facility: an archaeological assessment (Hammatt and Shideler 2002) and an archaeological inventory survey with subsurface testing (Dega and Davis 2005). The archaeological assessment resulted in no findings. During the archaeological inventory survey, subsurface testing encountered evidence of historic era industrial activity, which included a historic refuse pit and material remains associated with a slaughterhouse. The site was designated Site 06683 (Dega and Davis 2005:42). There was also an effort to locate evidence of Loko Waikulu (see Figure 6), which was designated as Site 06683.

Pollen analysis suggested that taro may have been planted along the edge of the fishpond. Sediments encountered were consistent with a fishpond environment, but inconclusive, and no evidence of a fishpond wall or associated habitation deposits were observed.

An archaeological literature review and field inspection was conducted at Coombs Lane and Hiu Street in Kalihi (Barnes et al. 2007). A Catholic Church appears on the parcel as early as 1897 according to historical maps. The associated cemetery was in use until at least 1927. Research and a field inspection indicated that the church lot and cemetery boundary are identical as those that exist today. In 2008, an archaeological assessment was conducted for the work at the Oahu Correctional Facility. It was determined there was a low potential for subsurface historic properties and no further work was recommended (Cleghorn and Kahahane 2008).

In 2009, archaeological monitoring was conducted for the installation of a traffic pole and electrical connections at Middle Street and the H-1 Freeway (Dey and Hammatt 2009). Subsurface layers consisted of landscaping and imported gravel fill over naturally-deposited clay sediment and bedrock. No significant cultural resources were identified.

Archaeological monitoring was conducted along residential streets in Kalihi for the final phase of the Board of Water Supply's Kalihi Water System Improvement project (Pestana and Spear 2009). Isolated deposits of historic artifacts were observed in disturbed subsurface contexts; no significant historic properties were identified.

In 2011, an archaeological literature review and field inspection was conducted for the H-1 Highway Widening project between the Ola Lane Overpass and the Vineyard Boulevard off-ramp in Kalihi and Kapālama (Hammatt and Shideler 2011). Results indicated potential impact to the H-1 freeway (a possible historic property), the Kalihi and Kapālama Stream channelization walls (possible historic properties), and the original ground surface below fill layers at bridge footings, piers, and stream retaining walls (O'Hare et al. 2013:72 in Hammatt and Shideler 2011).

Extensive monitoring was conducted for the Kalihi-Nu'uuanu Sewer Project (Hunkin et al. 2012). The project covered 58 streets between Middle Street in Kalihi and Pi'ikoi Street in Makiki. One isolated human femur fragment was recovered from fill material in one of the western Punchbowl slope areas. No cultural deposits were identified.

Archaeological inventory survey for Section 4 (City Center) of the Honolulu High-Capacity Transit Corridor Project (HHCTCP) (Hammatt 2013) traversed the south portion of the APE. One historic property, Site 07425, was recorded near the APE. This site consists of a subsurface fire feature remnant, which was interpreted as the remains of a single *imu*, or earth oven (Hammatt 2013:545).

To the southeast and southwest of the APE, two parcels were subject to Archaeological Literature Review and Field Inspection for the Kamehameha Highway Force Main Project (Hammatt et al. 2017). Two potential historic properties were identified. The first consists of



“distinctive appurtenances” outside the tennis courts at Ke‘ehi Lagoon Beach Park. The second is a concrete slab also at the beach park. No archaeological inventory survey or archaeological monitoring program was recommended; however, it was noted that consultation with an architectural historian may be warranted regarding the beach park.

As part of the current project, PCSI prepared an archaeological literature review and conducted a reconnaissance survey of the APE (Vernon 2019). The purpose of the survey was to ensure that no historical or pre-Contact archaeological materials or features were present on the surface. No surface traditional Hawaiian or post-Contact historic properties were observed within the APE during the archaeological reconnaissance survey. Background research from the ALR is presented in this report.

### **ANTICIPATED ARCHAEOLOGICAL FINDS**

Previous archaeological investigations and historical records indicate that traditional Hawaiian settlement and intensive agriculture in Kalihi and Kahauiki Ahupua‘a occurred along the well-watered streams dissecting the coastal floodplain, while various types of *loko i‘a* were present near the shoreline. Previous studies of settlement patterns on O‘ahu suggest that “[t]he greatest percentages of each community’s agricultural lands on O‘ahu were generally on coastal plains and in lower valleys (Cordy 2002:46). Kuleana land claims in the vicinity of the APE were clustered adjacent to streams. These mainly consisted of *lo‘i* and *loko i‘a*.

Within 500 meters of the APE, human burials (two coffin burials and one burial without a coffin) and an associated subsurface cultural layer were documented on the south side of Middle Street. This site is designated Site 04525 and is possibly associated with the former Kalihi Hospital and Detention Station.

In the APE, impacts from urbanization have included the construction of the H-1 Freeway and Middle Street and the filling of wetlands and traditional Hawaiian fishponds. A majority of the APE is underlain by filled land that covers the former Weli Pond (Site 00075), Mokumoa Island, and lands of LCAs 818 and 10498, which included *lo‘i* and *loko a‘i*. During the early 20<sup>th</sup> century, the APE was the location of Slaughterhouse Road, where there were two slaughterhouses and associated facilities, along with a fertilizer company. Previous archaeological investigations adjacent to the APE have documented historic properties associated with a slaughterhouse (Site 06683; see Dega and Davis 2005).

The APE traverses the former boundary of Loko Weli (Site 00075), LCA 818 and its fishpond Panahana, and LCA 10498. Additionally, a portion of Loko Waikulu (Site 06683) of LCA 818 might be within the APE. Evidence of historic period industrial activities may also be present within the APE, or cultural deposits associated with the Kalihi Hospital and Detention Station, which was immediately east of the APE.

### **ARCHAEOLOGICAL MONITORING METHODS**

This section details the extent of monitoring and the methods and procedures to be employed during field and laboratory work. All archaeological monitoring activities will be conducted in compliance with Chapter 6E, HRS, HAR Chapter 13-279 (*Rules Governing Standards for Archaeological Monitoring Studies and Reports*) and in accordance with the Secretary of Interior’s Standards and Guidelines for Archaeology and Historic Preservation.

### **PROJECT PERSONNEL**

A senior archaeologist, qualified under Hawai‘i Administrative Rules (HAR) § 13-281, will serve as principal investigator (PI) for the project. The PI will be responsible for overall project

organization and quality assurance for field and laboratory work and report content. The archaeological monitor will have satisfactory fieldwork experience in Hawai'i or have completed adequate college-level coursework in Anthropology and Hawaiian Archaeology.

### EXTENT OF ARCHAEOLOGICAL MONITORING

The archaeologist(s) will conduct on-site monitoring of all ground-disturbing activities that penetrate existing base course and below. Activities to be monitored are listed in Table 3 and include trenching 2.0 to 3.0 feet (ft) (0.6 to 0.91 meters (m) wide and 4.0 to 8.0 ft (1.21 to 2.44 m) deep for installation of conduits and pull box cabinets.

**Table 3. List of Ground-Disturbing Activities Requiring Archaeological Monitoring.**

PROPOSED GROUND-DISTURBING ACTIVITY	ESTIMATED EXCAVATION DEPTH	ON-CALL/ON-SITE MONITORING NECESSARY
Conduit Trenching	4.0 to 8.0 ft (1.21 to 2.44 m)	Yes; On-site
Splice Cabinet Installation	4.0 to 8.0 ft (1.21 to 2.44 m)	Yes; On-site

### PRE-CONSTRUCTION CONFERENCE

Before ground-disturbing work begins in the APE, the on-site archaeologist will explain to the entire construction crew what materials may be encountered and the procedures to follow if archaeological materials are found, as well as the role of the archaeological monitor. All appropriate construction personnel, as determined by the construction supervisor and monitoring archaeologist, are required to attend the construction briefing. Prior to the project starting, the monitoring archaeologist, in consultation with the construction supervisor, will identify the appropriate contacts to stay informed about the work schedule for ground disturbing activities. At this time, it will be made clear that the archaeological monitor must be on-site for all ground-disturbing activities (see Table 3) and that the archaeologist has the authority to stop work *immediately*, if necessary.

### HALTING OF EXCAVATION ACTIVITY

The monitoring archaeologist has the authority to halt construction in the vicinity of any find so that the provisions of this AMP can be carried out. The consulting archaeological firm will make it clear to the construction personnel that the archaeologist has the authority to halt work when it is deemed appropriate.

### MONITORING METHODS

The archaeological monitor will closely observe all ground disturbing activities (e.g., grading and trenching). Following monitoring of soil removal, trench faces will be cleaned and examined for cultural material and subsurface features. If any archaeological materials are encountered during the monitoring of ground-disturbing activities, work will be stopped immediately in that area and the monitoring archaeologist will investigate the nature of the discovery. Photographs of excavations (with north arrows and scales), characteristic stratigraphic sequences (cleaned prior to photography), and GPS locations will document (in accordance with site health and safety regulations) the monitoring project and be included in the archaeological monitoring report even if no historically significant sites are documented during the field work.

The archaeological monitor will compile daily monitoring logs. These logs will minimally include a description of daily activities, sites or features recorded, personnel on-site, and problems encountered and corrective action taken. Monthly reports will be filed with the SHPD detailing any new sites or features identified, if necessary and appropriate.

#### **TREATMENT OF HISTORIC SITES AND DEPOSITS**

Should subsurface deposits be encountered, the SHPD will be consulted regarding the identification, appropriate documentation, and assessment of the site significance prior to work continuing in the area. The monitoring archaeologist or archaeological firm will document all attempts to consult/communicate with the SHPD via email, phone, or other means.

If an intact cultural layer, living surface, structural components (e.g., foundations), archaeological subsurface features (e.g., hearths, pits, postholes, etc.), artifacts, charcoal or midden deposits or trash pits are encountered, then the following actions will be taken:

- Subsurface finds, deposits, and other spatially locatable data will be recorded on project site plans and located with sub-meter capable GPS unit;
- Selected, sorted charcoal samples will be collected for the possibility of radiocarbon analysis (particularly if the charcoal appears in a prehistoric context). Charcoal samples will be subject to taxa identification prior to submittal for radiocarbon analysis.
- In situ cultural layers and pit features will be sampled and matrix will be screened through 1/4- or 1/8-inch wire mesh.
- Bulk samples of midden (faunal/floral material) if present will be collected. Bulk samples should be excavated to collect a minimum of 2-3 liter samples, or the entire feature if possible. If the sample is a good candidate for floatation, the sample shall not be screened, but rather bagged appropriately to prevent mold.
- All prehistoric artifacts will be collected.
- All historic artifacts will be collected unless large trash or refuse pits are encountered, in which case a sampling strategy focusing on temporally and functionally diagnostic artifacts will be developed in consultation with the project historic archaeologist and SHPD
- All historic artifacts not collected will be documented in the field with photographs containing scales and will be quantified and described
- Standard documentation will be carried out, including to-scale maps, profiles, photographs, detailed soil descriptions (including Munsell color determinations and USDA soil characterizations), provenience descriptions, and interpretation.

#### **TREATMENT OF HUMAN REMAINS**

If human remains are identified, work will immediately stop in that locale, and the SHPD/Department of Land and Natural Resources (DLNR) will be notified immediately of the find. No further work will take place in that locale—including screening of back dirt, cleaning and/or excavation of the burial area, or exploratory work of any kind—unless explicitly requested by the SHPD. Skeletal remains will be secured in-place to protect them from imminent harm, in consultation with SHPD.

Any human skeletal remains identified during monitoring shall be treated as an inadvertent discovery and be dealt with in accordance with Chapter 6E-43 of the Hawaii Revised Statutes (HRS) and HAR § 13-300-40.

#### **LABORATORY WORK**

Laboratory work will be conducted in accordance with HAR Chapter 13-279 (*Rules Governing Standards for Archaeological Monitoring Studies and Reports*). Artifacts will be catalogued and analyzed, along with any samples of midden materials that have been collected. Charcoal and other datable materials will be submitted for dating analysis, provided samples were collected in situ from prehistoric contexts that show no signs of intermixing with historic materials; e.g., charcoal obtained from distinct fire features in solely pre-Contact deposits. Charcoal from undisturbed traditional contexts may be submitted to a specialist for identification to taxon and then, if the material is short-lived and native, submitted to a specialized laboratory for dating analysis.

#### **REPORT PREPARATION**

Following completion of fieldwork, a draft Archaeological Monitoring Report (AMR) compliant with HAR Chapter 13-279 will be prepared and submitted to the SHPD/DLNR for review. The consulting archaeological firm will submit a final report after receiving any comments on the draft report. Should burials and/or human remains be identified, other letters, memos, and/or reports may be requested by the SHPD, and will be provided in accordance with applicable statutes and regulations.

#### **DISPOSITION OF MATERIALS**

All field records, maps, photographs, and related documents and archaeological materials will be temporarily curated at the consulting archaeologist's firm. Final disposition of these records and related materials will be determined in consultation with the land owner and the SHPD.

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**APPENDIX A: BACKGROUND SECTIONS FOR AREAS 2 AND 3 FROM VERNON AND  
COLLINS (2020)**

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## AREA 2: H-2–WAIAWA INTERCHANGE TO WAIPIO

Area 2 totals 113.09 ac (45.77 ha) and includes the Waiawa IC and the H-2 Freeway to Waipi'o Gentry. Figure 17 shows the location of Area 2 on the 2017 USGS Waipahu Quadrangle Map. Figure 18 presents an aerial image of Area 2. Proposed work, listed in Table 5, includes trenching 2.0 to 3.0 ft (0.6 to 0.91 m) wide and 4.0 to 8.0 ft (1.21 to 2.44 m) deep for conduits and splice cabinets, and excavations 4.0 ft (1.21 m) wide and 15.0 to 25.0 ft (4.57 to 7.62 m) deep for installation of three (3) traffic camera poles. Specifically, two new CCTV are proposed on the H-2 between Waipio Gentry and Waiawa IC, a single new CCTV camera is proposed near H-1/Kamehameha Highway overpass in the Waiawa IC, and various conduit routing is proposed in the Waiawa IC.

**Table 5. List of Proposed Project Activities in Area 2.**

PROPOSED ACTIVITY	ANTICIPATED DEPTH OF GROUND DISTURBANCE
Conduit trenching	4.0 to 8.0 ft (1.21 to 2.44 m)
Splice cabinet installation	4.0 to 8.0 ft (1.21 to 2.44 m)
Installation of three traffic camera poles and CCTV	15 to 25 ft (4.57 to 7.62 m)

### ENVIRONMENTAL SETTING

Waipi'o and Waiawa Ahupua'a are situated on the leeward side of O'ahu and extend from the Ko'olau mountain range through the coastal plain to the shoreline at Pearl Harbor. Area 2 is situated on the border of the two *ahupua'a* and extends north along the H-2, immediately east of the Waipi'o neighborhood. The southern reach of Area 2 is 500 meters north of Middle Loch at Pearl Harbor.

Annual rainfall in this part of leeward O'ahu averages about 63.5–78.5 mm (25.0–30.90 in) per year, with most rain falling in the winter months between November and March (Giambelluca et al. 2013). Area 2 is situated on a moderately sloping to level area approximately 28.0 to 115.0 m amsl.

Various soil types are found throughout Area 2, which are summarized in Table 6 and displayed in Figures 19 and 20. The modern built-environment includes the H-1 Freeway bordered by commercial and residential developments.

### HISTORICAL BACKGROUND

This section presents the ethno-historical and archaeological background information of Area 2. Data from the background research were compiled to create an overview of traditional Hawaiian and historic-era land use and subsistence practices. Previous archaeological research is reviewed and anticipated archaeological findings are discussed

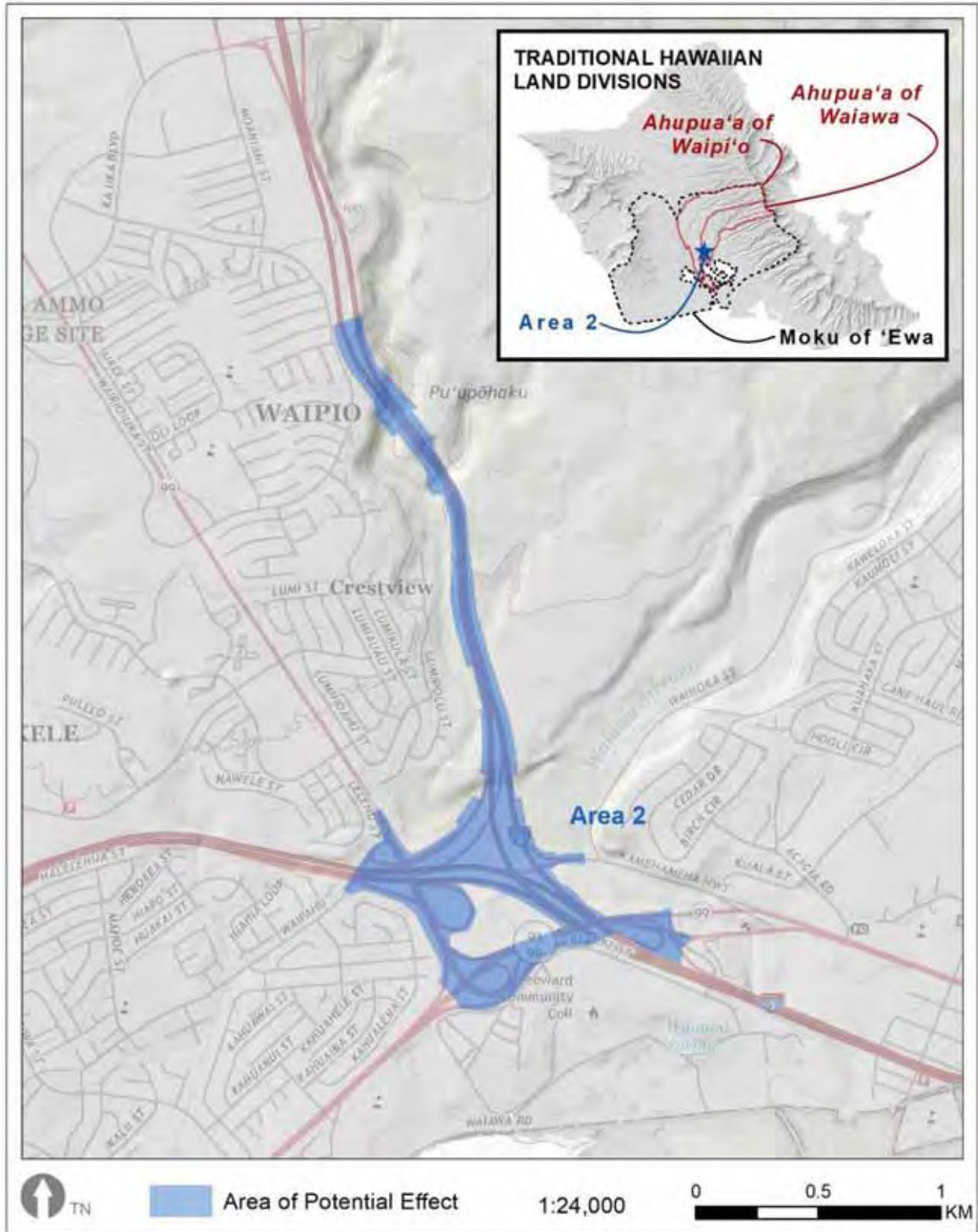


Figure 17. Location of the Area 2 APE on a 7.5-Minute Series USGS Waipahu Topographical Quadrangle (USGS 2017b), FMS Phase 3, Unit 1, H-2 Freeway from the Waiawa Interchange to Waipi'o Gentry.



Figure 18. Location of the Area 2 APE on an Aerial Image (Esri et al. 2019), FMS Phase 3, Unit 1, H-2 Freeway from the Waiawa Interchange to Waipi'o Gentry.

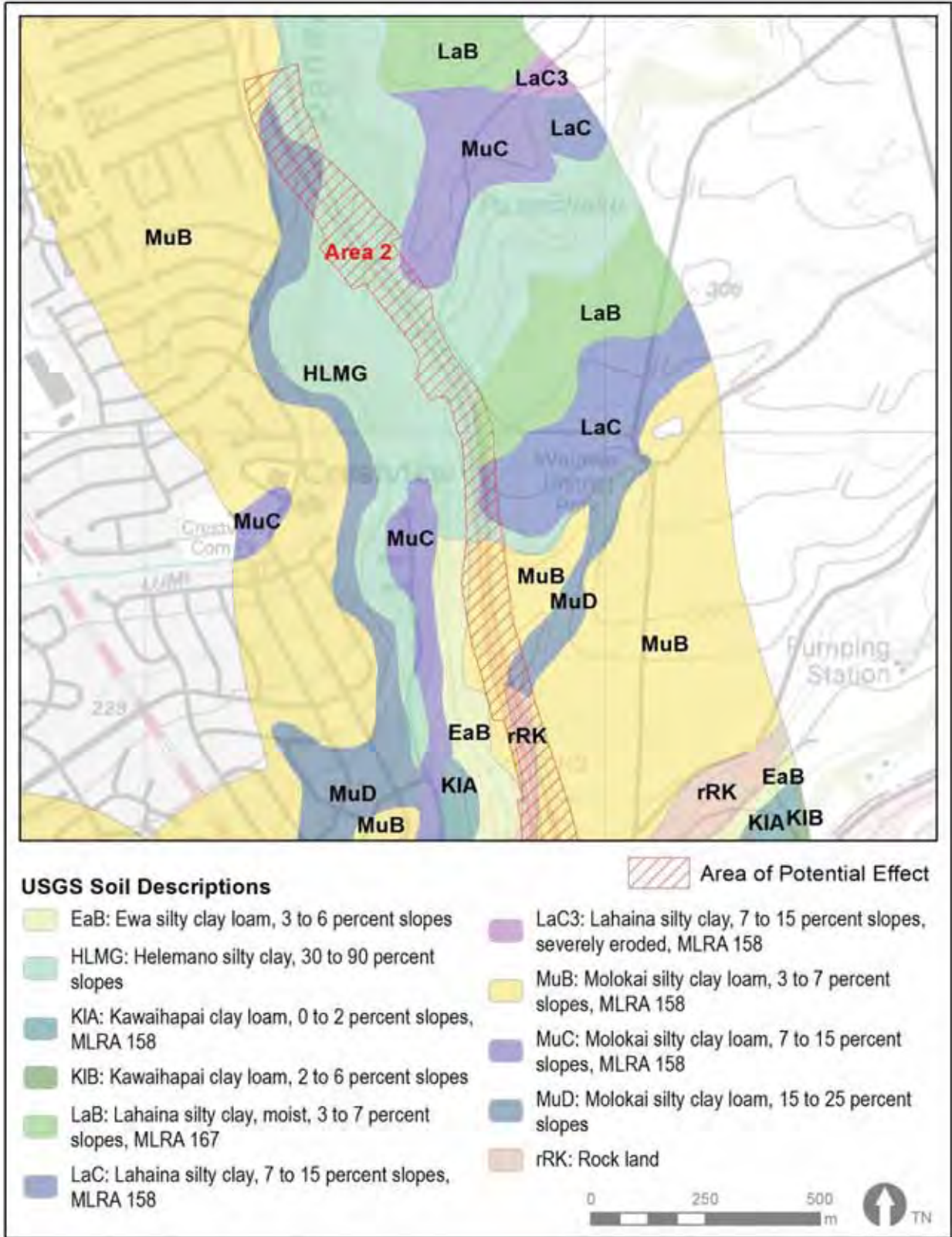


Figure 19. Soil Units within the Northern Portion of the Area 2 APE (Soil Survey Staff 2019; USGS 2017b).



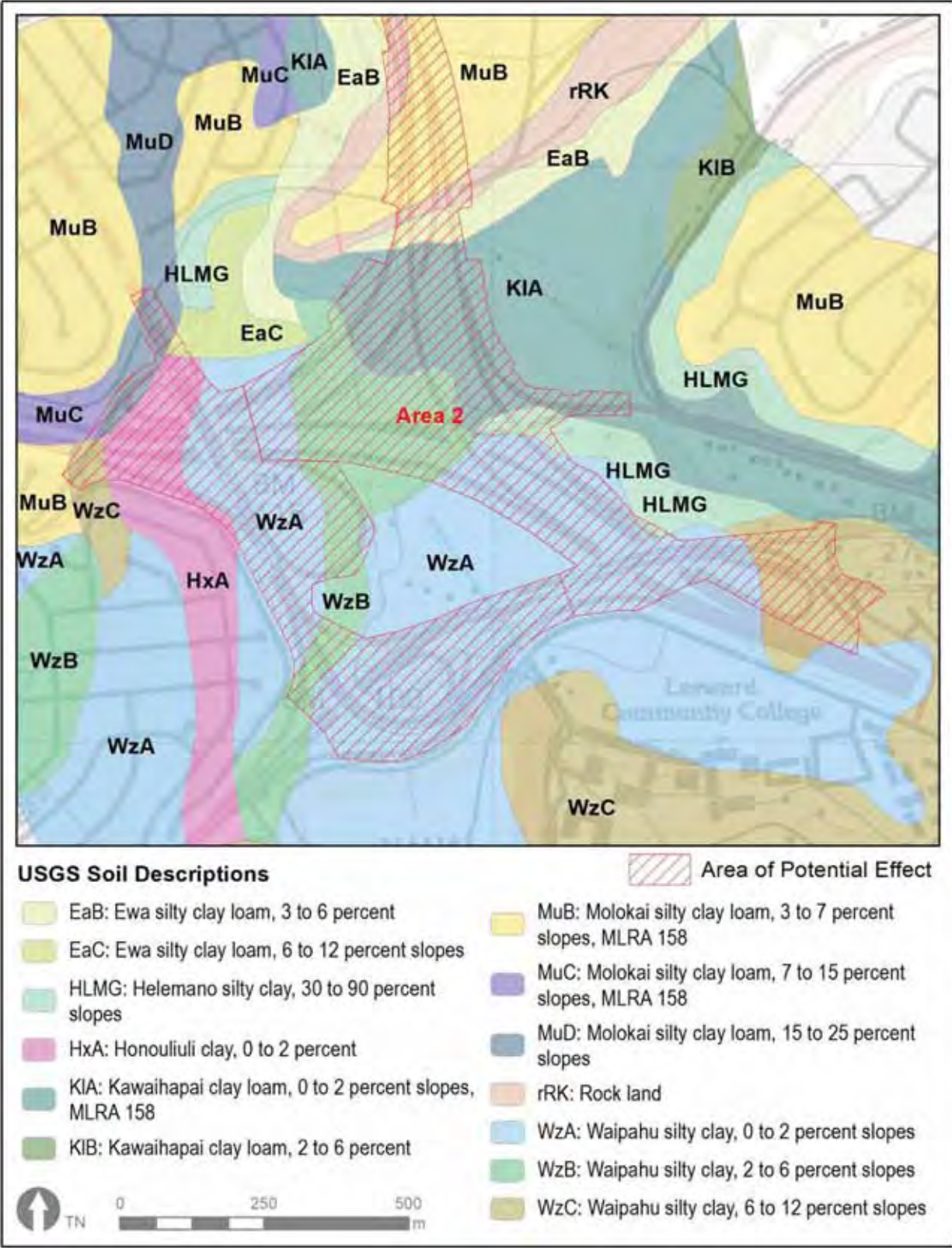


Figure 20. Soil Units within and near the Southern Portion of the Area 2 APE (Soil Survey Staff 2019; USGS 2017b).

**Table 6. Summary of Soil Units in the Area 2 APE (Foote et al. 1972; Soil Survey Staff 2019).**

<b>Series</b>	<b>Map Unit Symbol</b>	<b>Soil Unit</b>	<b>Percent slope</b>	<b>Properties</b>
Ewa: well-drained soils in basins and on alluvial fans; developed in alluvium derived from basic igneous rock	EaB	Ewa silty clay loam	3 to 6	Moderate permeability; slow runoff; slight erosion hazard
	EaC	Ewa silty clay loam	6 to 12	Slow to medium runoff; slight to moderate erosion hazard
Helemano: well-drained soils on alluvial fans and colluvial slopes on the sides of gulches; developed in alluvium and colluvium derived from basic igneous rock	HLMG	Helemano silty clay	30 to 90	Moderately rapid permeability; medium to very rapid runoff; severe to very severe erosion hazard
Honouliuli: well-drained soils on coastal plains; developed in alluvium derived from basic igneous material.	HxA	Honouliuli clay	0 to 2	Moderately slow permeability; slow runoff; no more than slight erosion hazard is.
Kawaihapai: well-drained soils in drainageways and on alluvial fans and the coastal plains; formed in alluvium derived from basic igneous rock in humid uplands	KIA	Kawaihapai clay loam, MLRA 158	0 to 2	Moderate permeability; slow runoff; no more than slight erosion hazard
Lahaina: well-drained soils on uplands; developed in material weathered from basic igneous rock	LaB	Lahaina silty clay, moist, MLRA 167	3 to 7	Moderate permeability; slow runoff; slight erosion hazard
	LaC	Lahaina silty clay, MLRA 158	7 to 15	Medium runoff; moderate erosion hazard
Molokai: well-drained soils on uplands; formed in material weathered from basic igneous rock	MuB	Molokai silty clay loam, MLRA 158	3 to 7	Slow to medium runoff; slight to moderate erosion hazard
	MuC	Molokai silty clay loam, MLRA 158	7 to 15	Medium runoff; moderate erosion hazard
	MuD	Molokai silty clay loam	15 to 25	Medium runoff; severe erosion hazard

**Table 6. Summary of Soil Units in the Area 2 APE (Foote et al. 1972; Soil Survey Staff 2019).**

Series	Map Unit Symbol	Soil Unit	Percent slope	Properties
Waipahu: well-drained soils on marine terraces; developed in old alluvium derived from basic igneous rock	WzA	Waipahu silty clay	0 to 2	Moderately slow permeability; slow or very slow runoff; none to slight erosion hazard
	WzB	Waipahu silty clay	2 to 6	Slow runoff; slight erosion hazard
	WzC	Waipahu silty clay	6 to 12	Medium runoff; moderate erosion hazard
-	rRK	Rock land	Nearly level to steep	Exposed rock covers 25 to 90 percent of the surface; contains rock outcrops (mainly basalt and andesite) and very shallow soils

### Traditional History

In Waiawa there were two *kūlu maika* playing fields called Puehulunui and Haupū'u, which were both in the vicinity of the southern portion of Area 2. 'Ī'ī wrote of a trail in 'Ewa that crossed the upper boundary of the *lo'i* that were once present nearby and mentions the playing fields. Traveling from Honolulu:

The trail went down to the stream and up again, then went above the taro patches of Waiau, up to a *maika* field, to Waimano, to Manana, and to Waiawa; then to the stream of Kukehi and up to two other *maika* fields, Pueohulunui and Haupuu. At Pueohulunui was the place where a trail branched off to go to Waialua and down to Honouliuli and on to Waianae ['Ī'ī 1959:97].

The trails near Area 2 that are mentioned by 'Ī'ī are shown on a map from 1851 in Figure 21. Stone markers along this trail, called *Nāpōhaku-luahine*, are said to be old women transformed into stones:

When you leave the bridge of Waiawa, for Honolulu, go up and then down an incline. The hill standing on the seaward side is Nuku-o-ka-manu. The next incline is Waiawa. Go up the ascent till you reach the top and above that, about two chains from the road you will find the stones. The names of these royal stones were Kahoaiai (also the name of an 'ili in Waiawa), Waiawakalea, Piliaumoa, Kahe'ekuluaiakamoku, all chiefesses. Their four servants were Nohoana, Kikaeleke, Piliamo'o, Nohoanakai. These were the guardians of the trail [Ka Loea Kalaiaina 1899 in Sterling and Summers 1978:6].

Several *wahi pana* in the area are associated with Ka'ahupahau, the shark goddess of Pearl Harbor. Kuhialoko (SIHP Site 50-80-09-00119) is named after Kuhia, "one of the butlers or purveyors to Kaahupahau the shark queen of Ewa" (Saturday Press 1884 in Sterling and Summers 1978:17). Kahi'ukā, Ka'ahupahau's brother, had a cave in Waiawa, which is said to have been located below the home of Reverend Bishop of the 'Ewa Church (Ke Au Hou 1910 in Sterling and Summers 1978:18).

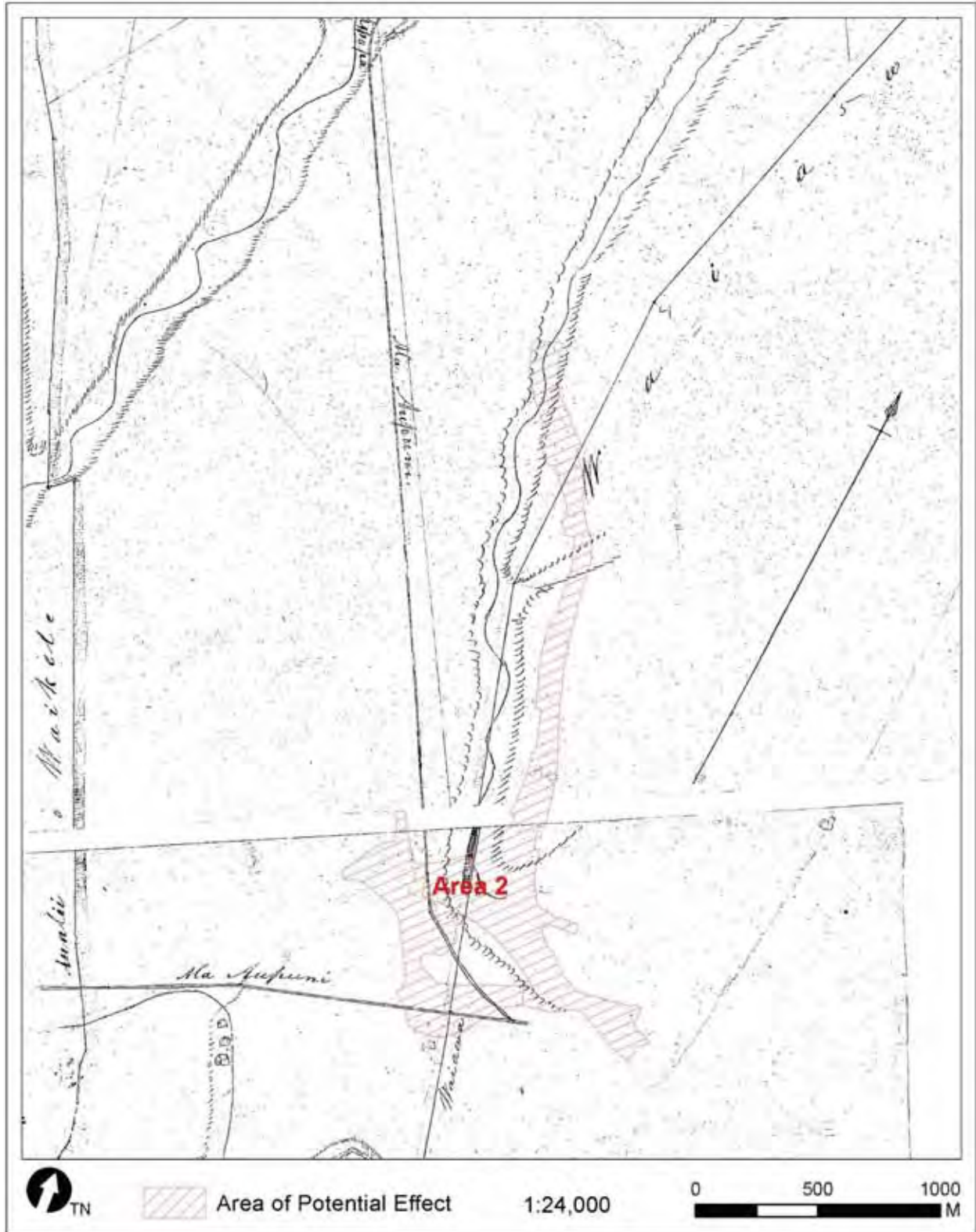


Figure 21. Portion of 1851 Map Showing Trails Crossing the Area 2 APE (Bishop 1851).

The name Waipi'o can be translated as "curved waters" (Pukui et al. 1974:227). 'Ai'ai (son of the fishing god) is said to have established a *pōhaku i'a* (fish stone) at Hanapouli and a *ku'ula*, "stone god used to attract fish" (Pukui and Elbert 1986:187), named Ahu'ena in Waipi'o. Ahu'ena Heiau, was once located between Farrington Highway and the coast. When documented by Thrum (1906:46) only the foundations remained. 'Ī'ī was once the custodian of the idols at this *heiau*. Along the coast of the *ahupua'a* there were formerly several fishponds, which included Loko 'Eo and Loko Hanaloa (Hammatt 2010:46).

A chant for the chief Kūali'i, an ancient chief of O'ahu, mentions all twelve *ahupua'a* of 'Ewa Moku (Fornander 1917:400–401). Each line of the chant is a play on words and not associated with the actual place name meaning (Hammatt and Shideler 2012:16).

Uliuli ka poi e piha nei—o Honouliuli;	Blue is the poi [pounded taro] which appeases [the hunger] of Honouliuli;
Aeae ka paakai a Kahuaiki—Hoeaeoe,	Fine the salt of Kahuaike—Hoeaeae;
Pikele ka ia e Waikele-- o Waikele;	Slippery the fish of Waikele—Waikele;
Ka hale pio i Kauamoa—o Waipio;	The arched house at Kauamoa—Waipio;
E kuu kua i ka loko awa—o Waiawa;	Let us cast the net in the awa-pond—of Waiawa;
Mai hoomanana ia oe—o Manana.	Do not stretch yourself at—Manana.
He kini kahawai,	Many are the ravines,
He lau kamano—o Waimano;	Numerous the sharks, at Waimano;
Ko ia kua e ke au o Waiiau;	We are drawn by the current of Waiiau;
Kukui malumalu kua—Waimalu;	In the kukui grove we are sheltered —in Waimalu;
E ala kua ua ao-e—o Kalauao;	Let us arise, it is daylight at Kalauao;
E kipi kua e ai-o Aiea;	Let us enter and dine-at Aiea;
Mai hoohalawa ia oe—o Halawa.	Do not pass by —Halawa.

[Fornander 1917:400–401]

In the story of the dividing of 'Ewa by the gods Kane and Kanaloa, Waiawa is mentioned as a place where *kāwa* (*Piper methysticum*) is grown, which is not to be confused with *awa*, or milkfish (*Chanos chanos*), which was mentioned in the above chant. "Maihea, a man, resided at Waimalu at a place called Punanalo. He cultivated sweet potatoes, taros and planted 'awa. The place where he planted the *kāwa* was on a hill in the upland of Waiawa. This is what he did up to the time when the gods came to earth" (Ka Loea Kalaiaina 1899 in Sterling and Summers 1978:6). As the story goes on, Maihea prays for knowledge and *mana* (power) for his family and a whale is sent by the gods. Maihea's son is taken by the whale to Kahiki to study the priesthood. The two gods then visit Maihea and reveal that they are Kane and Kanaloa. The gods travel around the land and 'Ewa is divided.

On their return after dividing the land, they came to the top of Haupuu (that is the present site of the Kahikuonalani Church at Waiawa), they turned to look at Ewa and when they saw the fish ponds at Waiawa, they said, "May the fish ponds down at Waiawa be as the stars in the sky above. May there be mullets at Kuhia-loko, fine sea weeds at Kuhia-waho, salt at Ninauele, the single fruited coconut at Hapenui, the taro greens at Mokaalika and the water of Kaaimalu, to remove the bitterness of the awa of Kalahikuola. " This was the last thing that they did before returning to Maihea's house. They drank awa again that afternoon. They spent the remainder of the day going to Puuloa. The result of this was that Maihea obtained the knowledge of the priesthood, oratory and so on. This was the first time that these arts were practiced here in Hawaii [Ka Loea Kalaiaina 1899 in Sterling and Summers 1978:6].

## Traditional Land Use

Based on *mo'Uelo* and early historical accounts, 'Ewa was a densely populated area that would have offered abundant resources. McAllister (1933) also wrote of Waipi'o as a location favored by the *ali'i* (chiefly class). "The populous dwelling place of the *ali'i* was formerly located on an east point of Waipi'o Peninsula known as Lēpau" (McAllister 1933:106). Several pre-Contact sites have been interpreted as permanent habitations and fishing shrines. Marine and estuarine resources existed along the coast, while around today's Pearl Harbor *loko i'a* were present. The irrigated lowlands would have supported *lo'i*, while the lower forest area of the mountain slopes offered other subsistence resources during famine or low rainfall (Handy 1940:211; Handy and Handy 1972:469–470). Additionally, the upper valley slopes may have been used for quarrying of basalt to manufacture stone tools (O'Hare et al. 2011:12).

In a study of resources and population of the *ahupua'a* of 'Ewa, archaeologist Ross Cordy (1996:12) posited a correlation between floodplain size, fishery size, and population size. Specific to the current study area, Waipi'o had a large floodplain, irrigated fields along Kīpapa Stream, and a large fishery, covering a majority of Pearl Harbor's Middle Loch and portions of West Loch along the Waipi'o Peninsula. Waiawa possessed smaller, but similar resources. Following this correlation, Waipi'o had a large population and Waiawa had a medium-sized population relative to the other *ahupua'a* in 'Ewa.

## Historical Land Use

Beginning in 1811, Kamehameha I commenced intensive sandalwood logging on O'ahu. The trade was strictly under the control of the *ali'i* and harvesting was conducted by the *makaikāinana* (commoners). After a famine in 1821 due partially to the intensive logging, Kamehameha reversed the order to log so that the *makaikāinana* were not overworked to the extent that farming was neglected (Cottrell 2002:10–11). He also instituted conservation measures that spared young trees. Upon Kamehameha's death in 1819, Liholiho (Kamehameha II) opened the sandalwood trade to his *ali'i*, which caused the island to revert to intensive harvesting.

The sandalwood harvesting had negative ecological consequences for the land, which were exacerbated by domesticated animals introduced to the islands. Reverend Serano Bishop spent time as a child in 'Ewa when his family moved from Kailua in 1836. His father, Artemas Bishop, was stationed at 'Ewa Church in Waiawa. He wrote, "My father's cows were the first cattle that had ever run on the Ewa uplands. Waiawa Valley above us lay knee deep with the richest of grass, where our cows rioted" (Bishop 1921:156). A map from 1877, shown in Figure 22, shows the 'Ewa Church, land owned by Bishop, and a grassy plain to the north. He recalled the dramatic changes that occurred in the first half of the nineteenth century:

Our family made repeated trips to the home of Rev. John S. Emerson at Waialua during those years. There was then no road save a foot path across the generally smooth upland. We forded the streams. Beyond Kipapa gulch the upland was dotted with occasional groves of Koa trees. On the high plains the ti plant abounded, often so high as to intercept the view. No cattle then existed to destroy its succulent foliage. According to the statements of the natives, a forest formerly covered the whole of the then nearly naked plains. It was burned off by the natives in search of sandalwood, which they detected by its odor burning [Bishop 1921:158].

Īī was born in Waipi'o Ahupua'a at the beginning of the nineteenth century. When he was ten years old he was placed in the household of Liholiho (Kamehameha II) and became Liholiho's personal attendant.

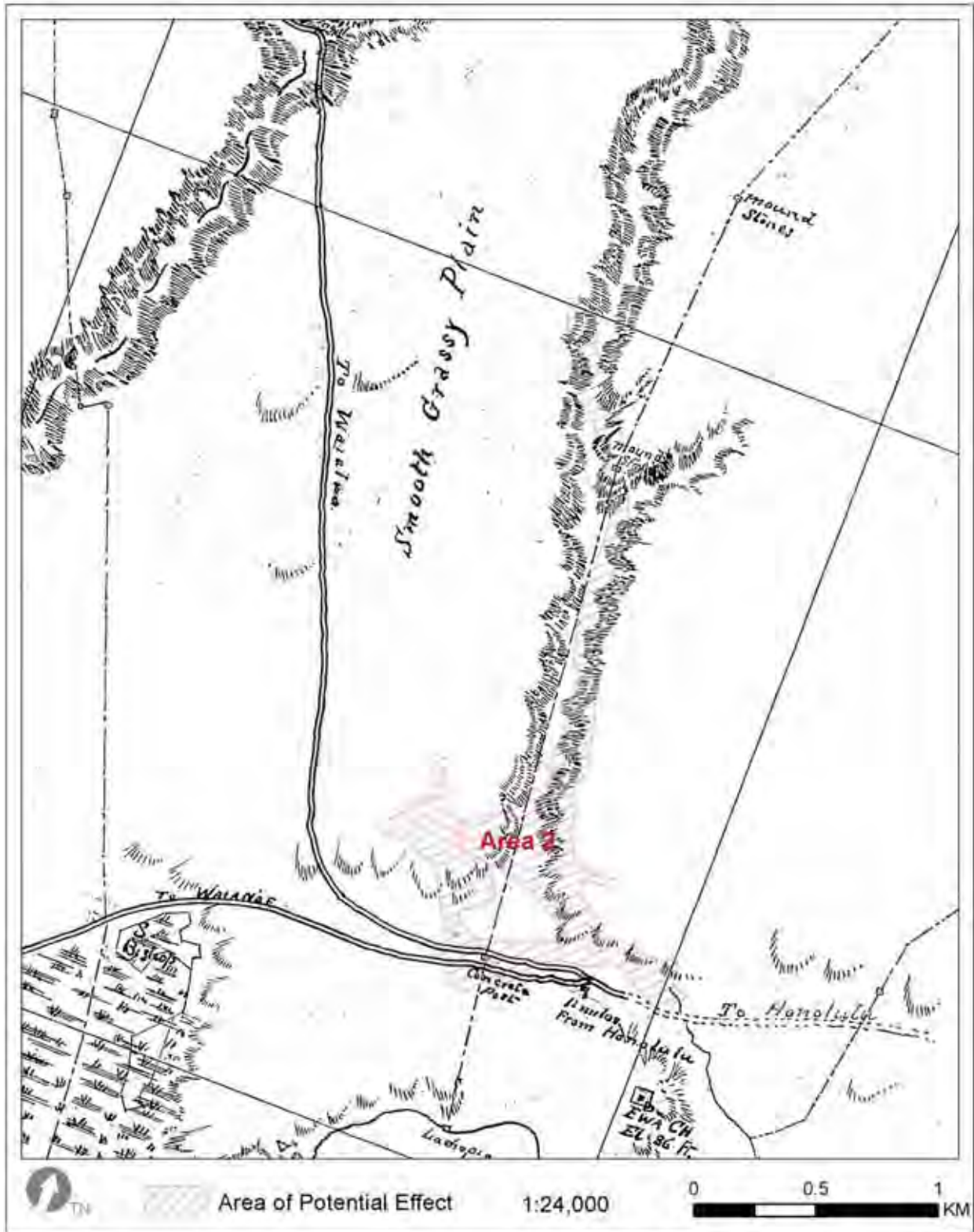


Figure 22. Portion of 1877 Map of Waipi'o Showing the Area 2 APE (Brown 1877).

John Papa Ii was born in Kumelewai, Waipio, in Ewa, Oahu, on the third day of August (Hilinehu in the Hawaiian calendar) in 1800, on the land of Papa Ii, whose namesake he was. Papa was the owner of the pond of Hanaloa and two other pieces of property, all of which he had received from Kamehameha, as did others who lived on that ahupua‘a, or land division, after the battle of Nuuanu. He gave the property to his kaikuahine, or cousin, who was the mother of the aforementioned boy. Her names were Wanaoa, Pahulemu, and Kalaikane [‘I‘I 1959:20].

In the nineteenth century, disease and famine impacted the population of the ‘Ewa district. The population was recorded at 4,015 people in the 1831–1832 census; four years later the population dropped to 3,423 (Schmitt 1973:9, 36). Regarding a famine that affected Waipi‘o Ahupua‘a, ‘I‘I wrote:

Here is a wonderful thing about the land of Waipio. After a famine had raged in that land, the removal of new crops from the taro patches and gardens was prohibited until all of the people had gathered and the farmers had joined in thanks to the gods. This prohibition was called kapu ‘ohi‘a because, while the famine was upon the land, the people had lived on mountain apples [‘ohi‘a ‘ai], ti, yams, and other upland foods. On the morning of Kane an offering of taro greens and other things was made to remove the ‘ohi‘a prohibition, after which each farmer took of his own crops for the needs of his family [‘I‘I 1959:77].

Reverend Lowell Smith, who was stationed at ‘Ewa Church and preceded Reverend Artemas Bishop, wrote of the devastation caused by disease:

The people of Ewa are a dying people. I have not been able to obtain an exact count of all the deaths & births since the last general meeting. But my impression is that there have been as many as 8 or 10 deaths to one birth. I have heard of but 4 births on Waiawa during the year, & all of these children are dead. I have attended about 20 funerals on that one land, & 16 of these were adults. [Ewa Station Report 1836 in Hammatt 2010:83]

There were no *kuleana* awards granted in Area 2. In Waiawa, there were seven *kuleana* awards along Waiawa Stream immediately north of Area 2 near the H-1 Freeway and one award to the south. These parcels can be seen on Figure 23. The awards included *pahale* (house lot), *lo‘i* and *kula* (dry agricultural) land, as described in Table 7.

**Table 7. Land Commission Awards (LCAs) Near Area 2.**

LCA No.	KŪI	AWARDEE	AWARD
4213:1, 2	Holoipiapia	Kauhi	3 lo‘i, <i>pahale</i>
5591, 9357	Kahoaiai	Kekua	3 lo‘i called Kaihumenenui and 1 kula
10942:1, 2 3, 4	Kahoaiai	William Wallace	House lot, mo‘o <i>kāina</i> called Kalualii and Mooiki, 2 lo‘i in the mo‘o <i>kāina</i> Oopa, four lo‘i and kula in mo‘o <i>kāina</i> Oopa
904:1	Kahoaiai	Naheana	<i>Pahale</i>
9294	Piliaumoa	Kekeni	<i>Pahale</i>
904:3	Kahoaiai	Naheana	Lo‘i



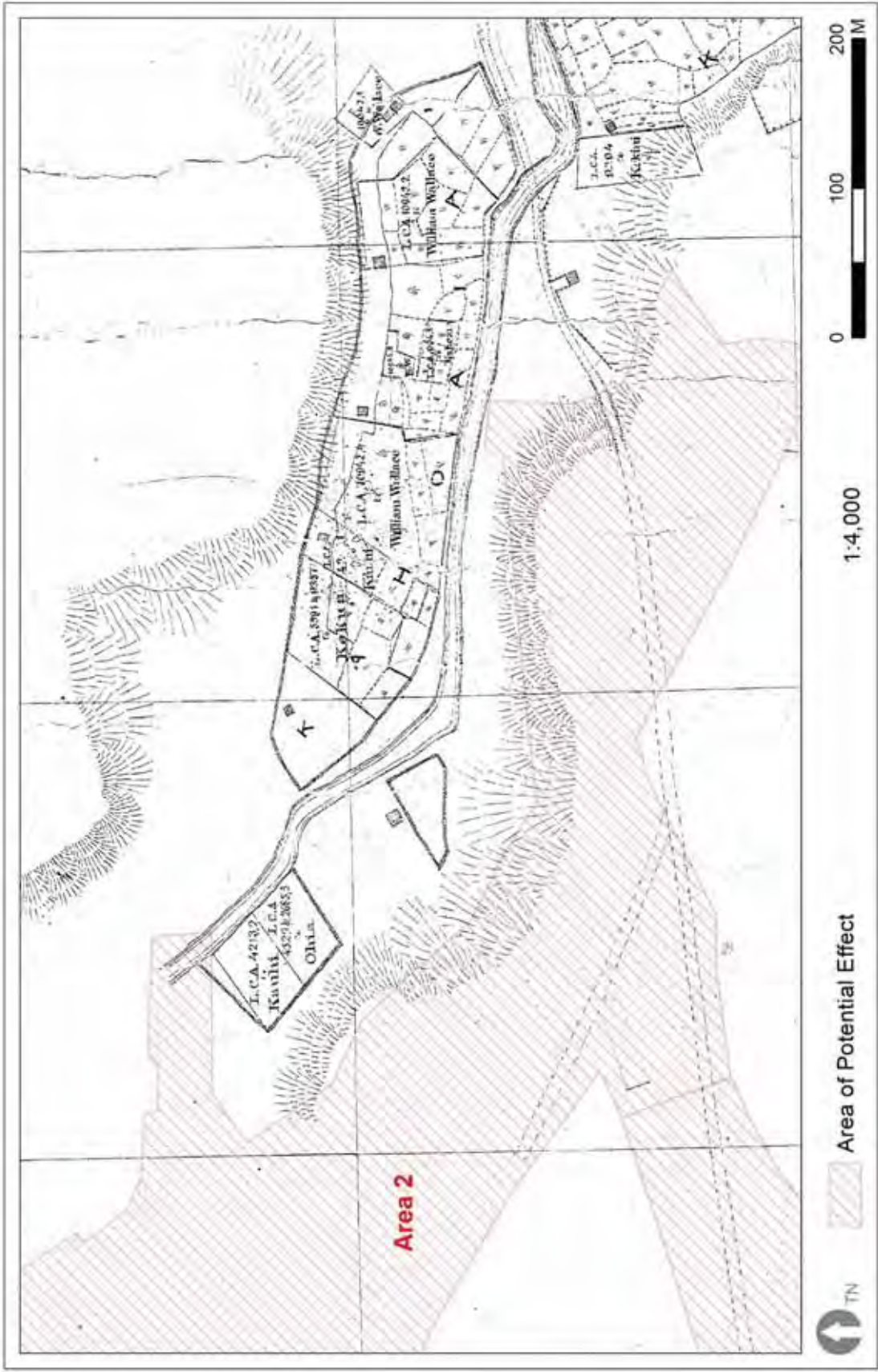


Figure 23. Portion of 1887 Map Showing Land Commission Awards near the Area 2 APE along Waiawa Stream (Bishop 1887).

The entire *ahupuaʻa* of Waiawa, less the *kuleana* land parcels, was Crown Land awarded as LCA 7713, Apana 46 to Victoria Kamāmalu, sister to King Kamehameha IV and V. After her death, the land was passed on to her father, followed by her sister; then Lot Kapuāiwa (Kamehameha V) followed by his half-sister, Ruta Keʻelikōlani; then finally Bernice Pauahi Bishop in 1883. The Bernice Pauahi Bishop Estate was left to Kamehameha Schools, who currently owns a large portion of the *ahupuaʻa* (Hammatt 2010:97).

LCA 8241 to John Papa ʻĪʻĪ, which totaled 20,540, was within the portion of Area 2 situated in Waipiʻo Ahupuaʻa. At his death in 1870, his daughter Irene Brown inherited his estate. Not long after, small parcels of the *ahupuaʻa* were sold off (Hammatt 2010:97).

At the end of the nineteenth century, the *loʻi* in the *makai* portions of Waiawa and Waipiʻo were converted to rice fields, while *mauka* lands were under cultivation for pineapple and sugar (Tulchin et al. 2009:17; Conde and Best 1973:313–317). A map from 1902, shown in Figure 24, indicates taro or rice was being cultivated (shown in blue on Figure 24) along Waiawa Stream, which likely corresponds to the LCA shown in Figure 23. This land is also demarcated as grazing land (outlined in orange on Figure 24).

Figure 25 shows that Area 2 was within the Oahu Sugar Company's land. The sugar industry had vastly expanded throughout the Hawaiian Kingdom and the need for field laborers led to contract labor laws. In 1852, Chinese workers began arriving in the islands on five-year contracts that paid \$3 a month plus room and board (Coman 1903:495; MacLennan 1997). Many of these laborers remained in the islands as merchants or rice farmers after their contracts expired (Coman 1903:35; Tulchin et al. 2009:43).

Following the change in agriculture, numerous irrigation ditches were constructed in the vicinity of Area 2. These features can be seen on a 1954 topographical map shown in Figure 26. The Oahu Sugar Company operated until the 1990s, though fields were gradually encroached on by residential developments. A photomap from 1978, presented in Figure 27, shows sugarcane fields, residential developments, and the newly constructed H-2 Freeway in the vicinity of Area 2.

## PREVIOUS ARCHAEOLOGICAL RESEARCH

Several archaeological investigations have been conducted in the immediate vicinity of Area 2. Previous work has included archaeological reconnaissance survey, archaeological and cultural assessment, and historical literature review. Two instances of the inadvertent discovery human remains have also occurred. These projects are summarized in Table 8. The following section focuses on projects conducted within approximately 500 meters of Area 2 in order to compare previous findings of land use. Figure 28 presents the locations of previous archaeological studies and Figure 29 locates historic properties in the vicinity. All site numbers follow SIHP Site 50-80-09-.

In 1985, William Barrera Jr. carried out an archaeological reconnaissance survey in Waikele (Barrera 1985). The survey covered approximately 237 ha northeast of the Waiawa IC. Findings indicated that sugarcane agriculture had removed all evidence of past land use.

Reconnaissance survey was conducted for a 37-acre wetland parcel south of Leeward Community College (Hammatt and Borthwick 1985). The parcel formerly contained the fishpond named Loko Moʻo. A portion of the parcel was planted in watercress and the remainder had been filled. No historic properties were encountered during the survey.

In 1988, human skeletal remains were encountered during demolition of a wooden shack east of Leeward Community College (Bath 1988). This secondary burial site was designated

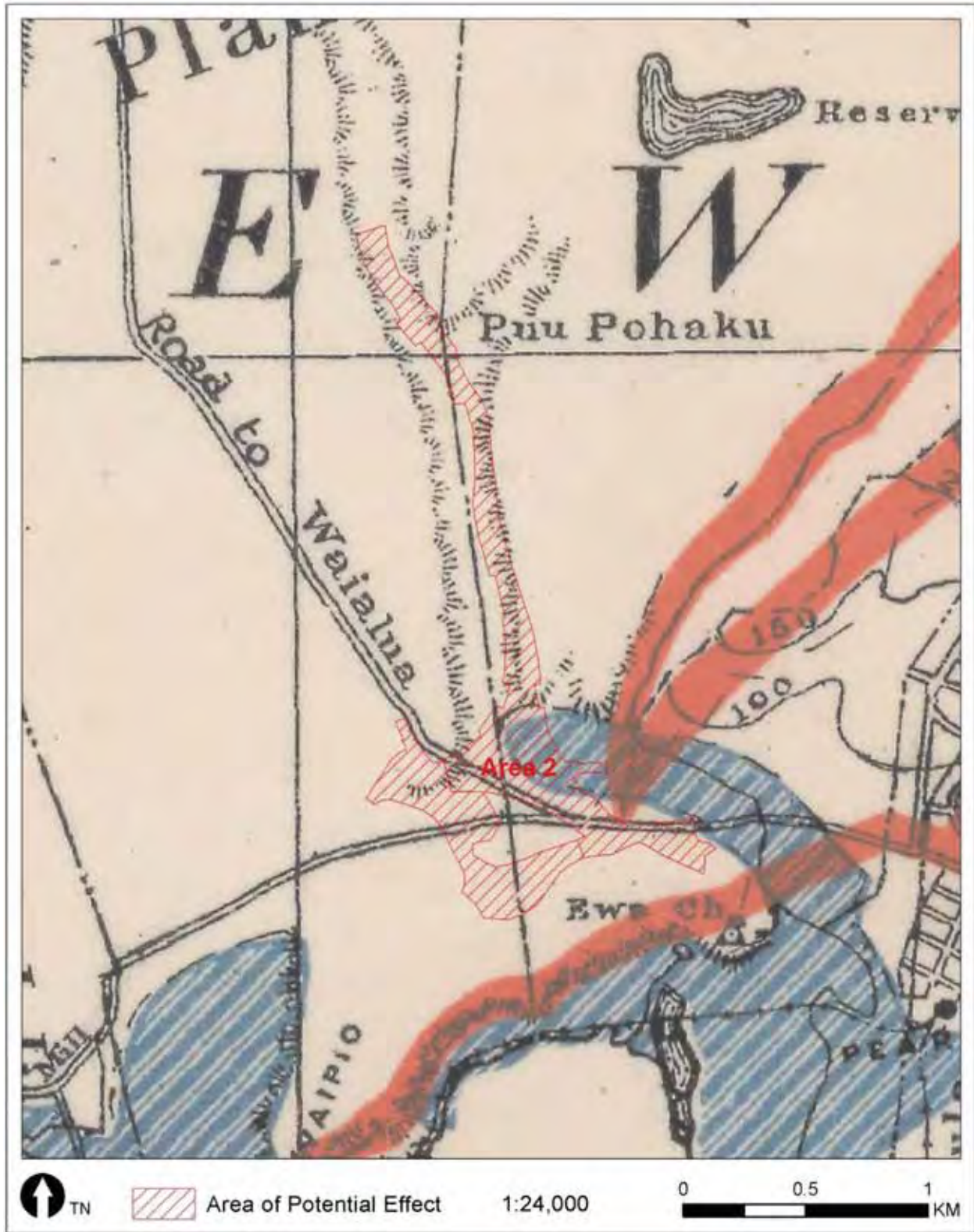


Figure 24. Portion of 1902 Map Showing the Area 2 APE within Grazing Land and in or near Rice or Taro *Lo'i* (Donn 1902).

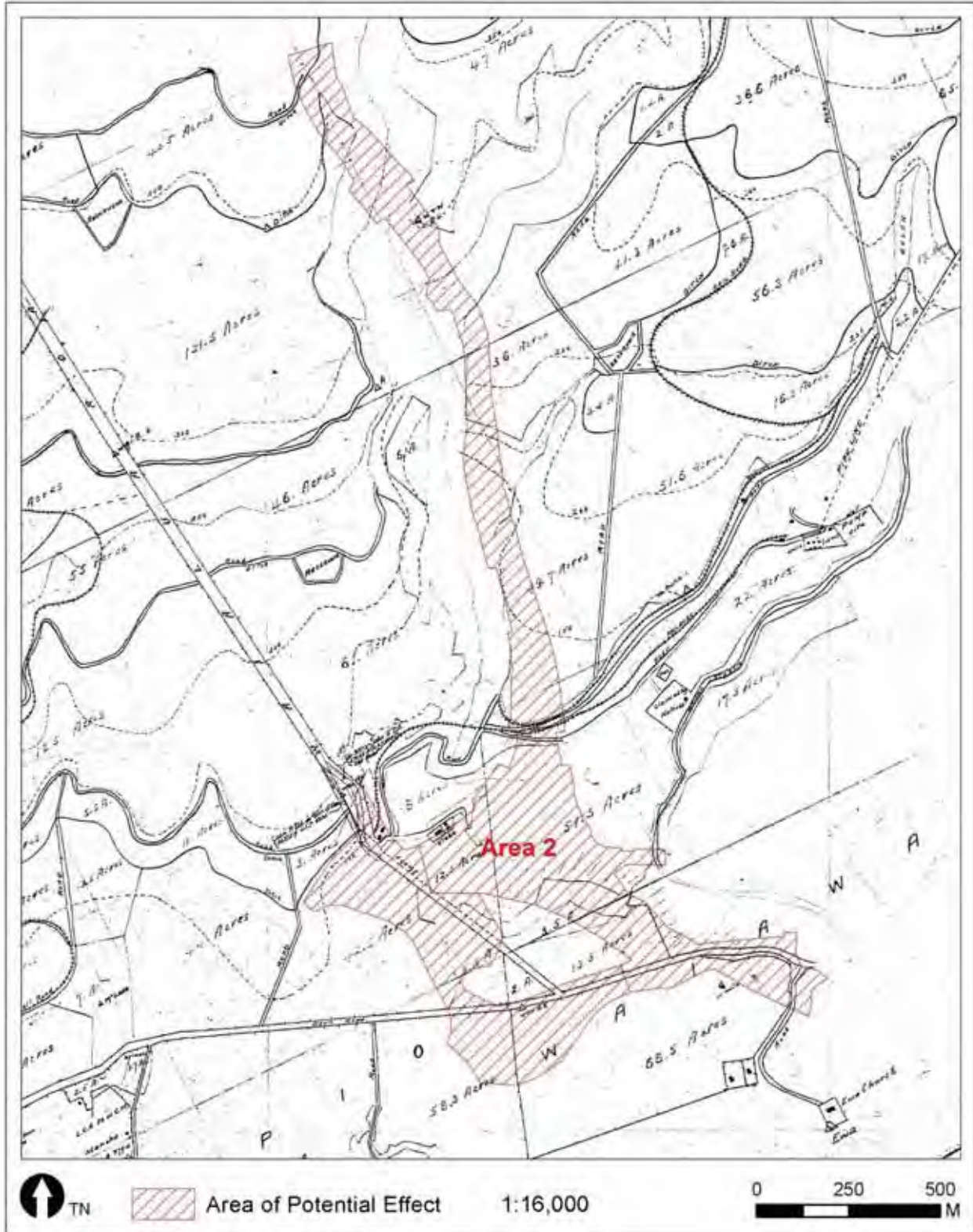


Figure 25. Portion of ca 1920 Map Showing the Area 2 APE within Oahu Sugar Company Fields (Monsarrat ca 1920).

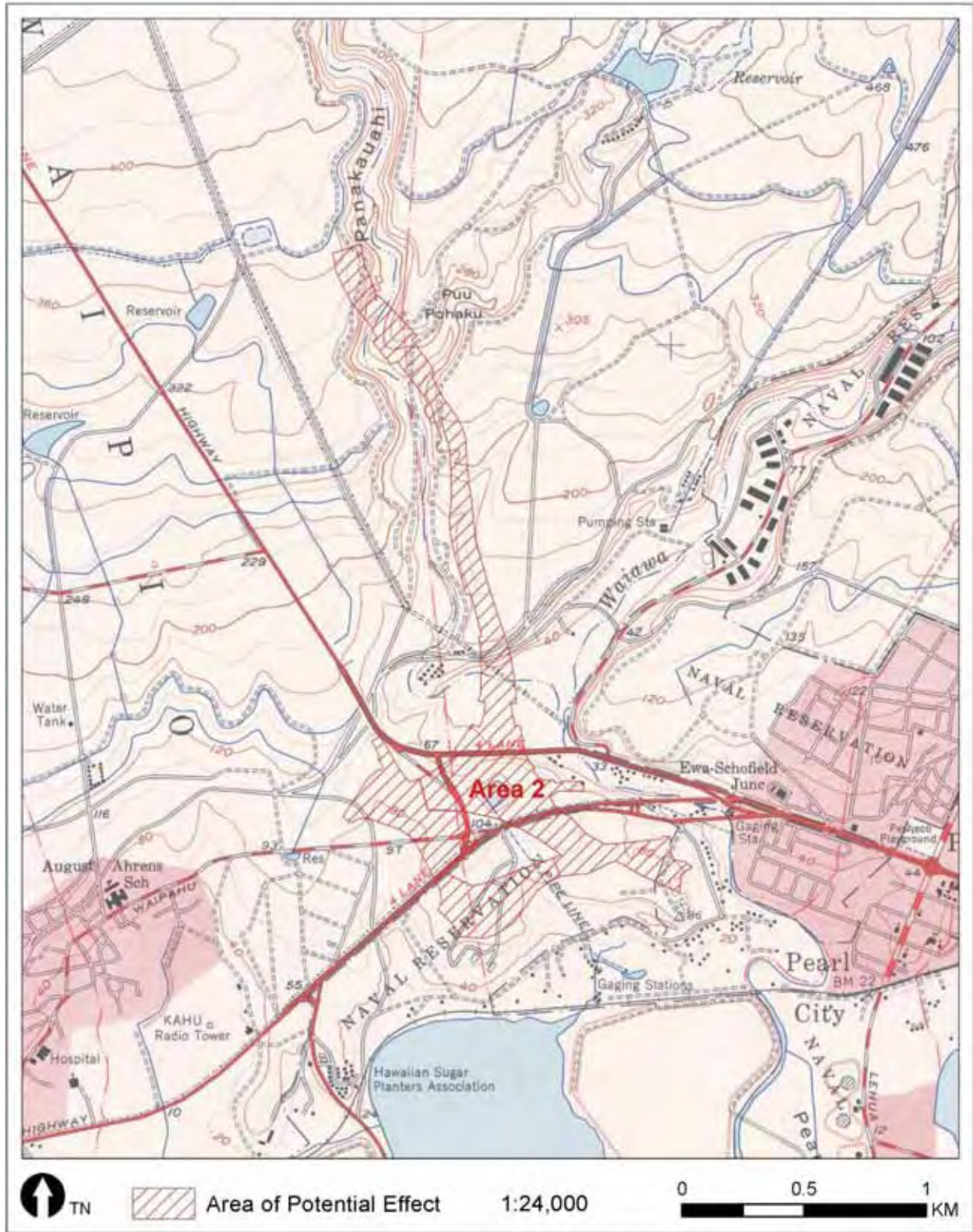


Figure 26. Portion of Topographic Map Dated 1954 Showing Irrigation Features on the Landscape (USGS 1954).



Figure 27. Portion of Aerial Photograph Dated 1978 Showing Sugarcane Fields and Residential Developments near the Area 2 APE (USGS 1978).

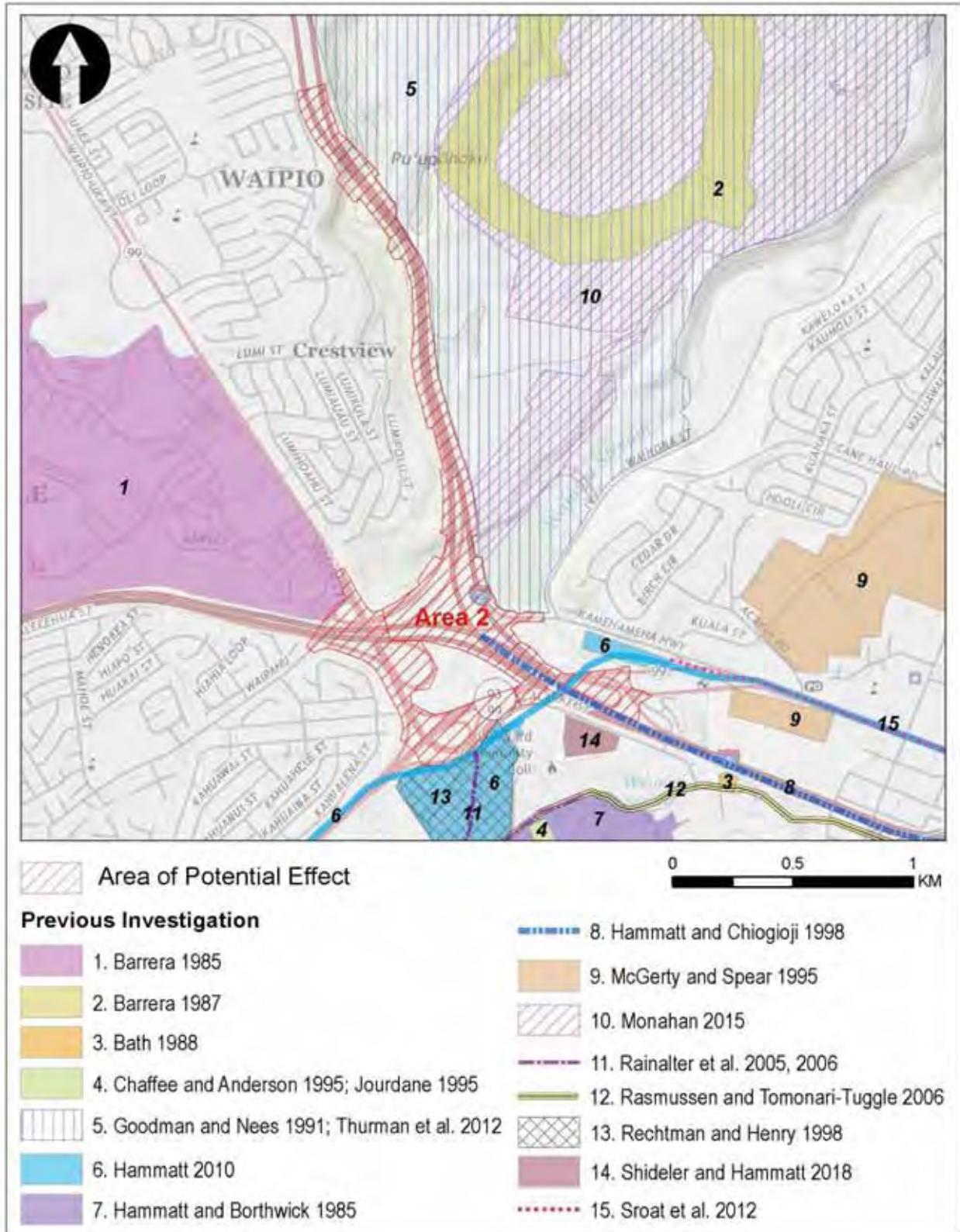


Figure 28. Previous Archaeological Investigations near and within the Area 2 APE (USGS 2017b).

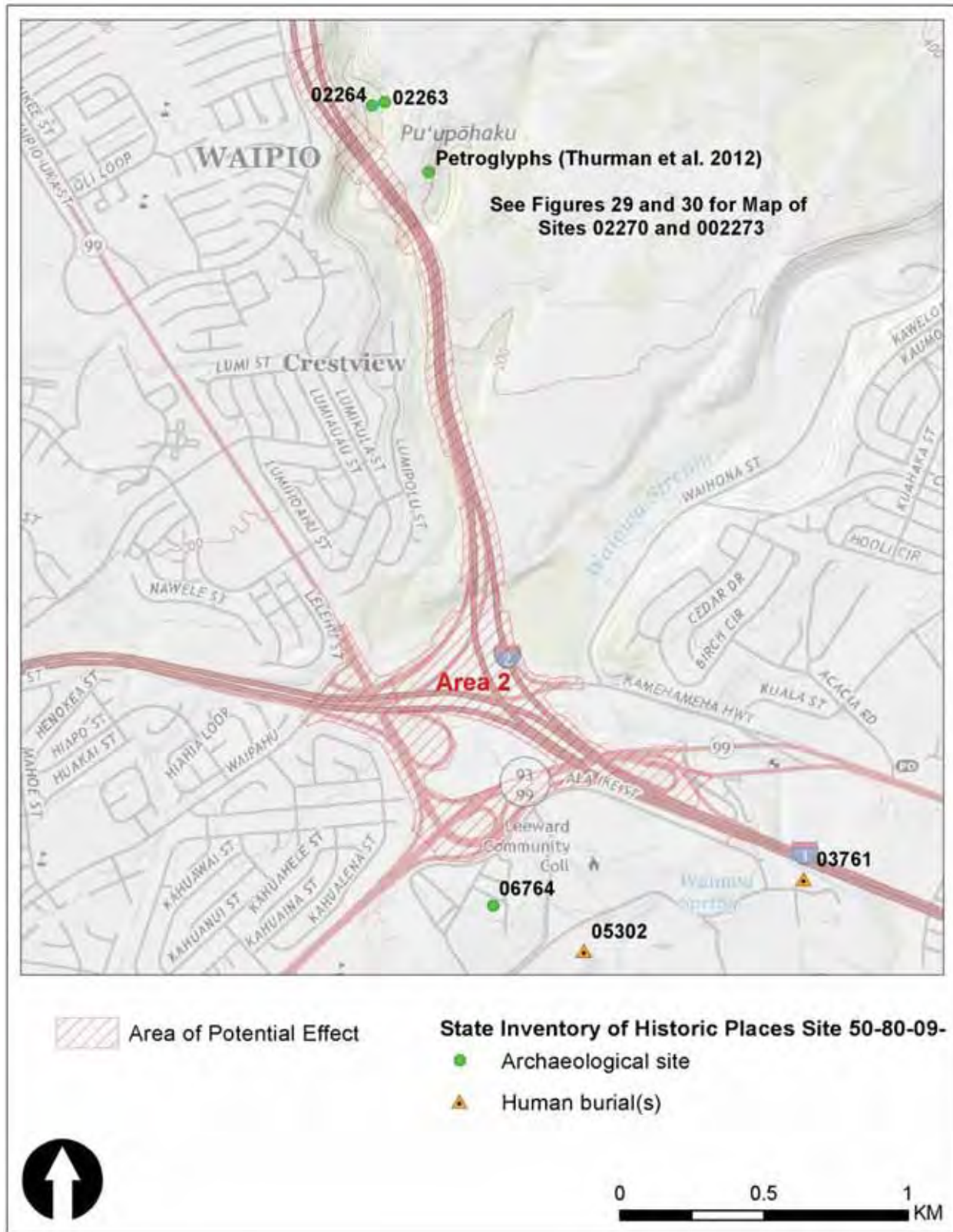


Figure 29. Archaeological Sites and Human Burial Finds near the Area 2 APE (USGS 2017b).



**Table 8. List of Previous Archaeological Studies and Burial Finds Near Area 2.**

<b>Author &amp; Year</b>	<b>TMK (1)</b>	<b>Nature of Study</b>	<b>SIHP* No. 50-80-09-</b>	<b>Site Description</b>
Barrera 1985	9-4-007 and 9-4-014/ Waikele north of H-1 Fwy	Archaeological Reconnaissance Survey	-	No significant finds
Hammatt and Borthwick 1985	9-6-003:025–028/ South of Leeward Community College	Archaeological Reconnaissance Survey	-	No significant finds
Barrera 1987	9-6-004/ Waiawa Ridge	Archaeological Reconnaissance Survey	-	No sites near Area 2
Bath 1988	9-6-002:033 and 034/ Waiawa Rd	Inadvertent Burial Discovery	03761	Secondary Burial
Pietrusewsky and Mahoney 1988	9-6-002:033 and 034/ Waiawa Rd	Osteological Analysis	03761	Secondary Burial
Goodman and Nees 1991	9-4-006:011, 026; 9-6-004:001, 004, 016; 9-6-005:001–009, 013, 014/ 3,600 Acres east of H-2 Fwy	Archaeological Reconnaissance and Inventory Survey	02263 02264 02270 02273	Rock-shelter complex Traditional Hawaiian trail Road/Railway system Irrigation complex
Chaffee and Anderson 1995	9-6-003:005/ 96-035 Waiawa Road	Archaeological Excavations of Inadvertent Burial Discovery	05302	Coffin burial and tumble pit burial
Jourdane 1995	9-6-003:005/ 96-035 Waiawa Road	Inadvertent Burial Discovery	05302	Coffin burial and tumble pit burial
McGerty and Spear 1995	9-7-023-001 and 9-7-024:006/ 138.5 acres in Pearl City	Archaeological Assessment	-	No historic properties identified.

Hammatt and Chiogioji 1998	9-8-026: var. parcels, 9-8:027:002, 9-8-060:015/ H-1 Hwy from Halawa to the Waiawa IC	Archaeological Assessment	-	No significant finds
Rechtman and Henry 1998	9-4-008:010/ 'Ewa Junction Drum Filling and Fuel Storage Area	Archaeological Reconnaissance Survey	-	No significant finds
Rainalter and Tomonari-Tuggle 2006	9-4-008:010, 023, 025, 9-6-003/ Leeward Community College access road	Archaeological Field Inspection and Literature Search	05302 06764	Coffin and pit burials 'Ewa Junction Drum Filling and Fuel Storage Area
Rasmussen and Tomonari-Tuggle 2006	9-4/ Waiau Fuel Pipeline corridor	Archaeological Monitoring	03761 05302	Secondary Burial Coffin and pit burials
Hammatt 2010	9-1, 9-4, 9-6, 9-7/ Honolulu High-Capacity Transit Corridor	Archaeological Inventory Survey	-	No sites near Area 2
Sroat et al. 2012	9-1, 9-4, 9-6, 9-7/ Honolulu High-Capacity Transit Corridor	Archaeological Inventory Survey	-	No sites near Area 2
Thurman et al. 2012 <sup>1</sup>	9-4-006:011, 026; 9-6-004:001, 004, 016; 9-6-005:001-009, 013, 014/ 3,600 Acres east of H-2 Fwy	Archaeological Inventory Survey	-	Petroglyphs
Monahan 2015	9-6-004:024	Archaeological Preservation Plan	02273	Irrigation complex
Shideler and Hammatt 2018	9-6-003:048/ Leeward Community College	Archaeological Field Inspection and Literature Search	-	No significant finds

\*SIHP (Statewide Inventory of Historic Places)

Site 03761. The human remains were covered in rice sacking filled with pillow stuffing. It was speculated that the individuals were Asian based on a skull being wrapped in red fabric (Bath 1988:1). A clear glass disc, possibly from a lantern was also present. The following is a summary from the osteological report by Pietrusewsky and Mahoney (1988):

An unusual assortment of human bones including three adult crania, four adult sacra, ilia of a child and an infant, wrist and ankle bones, first cervical vertebra and upper sternums are described.

Minimally, six individuals are represented, four are adult and two are subadult. The maximum number of individuals may be much higher (N = 18). None of the infracranial remains can be associated with any of the crania. Measurements and non-metric features were recorded in these remains. Morphological characteristics of the cranium and the association of red cloth and a clear glass disk suggest east Asian (possibly Chinese) ancestry [Pietrusewsky and Mahoney 1988:5].

In 1995, two human burials were inadvertently discovered during excavation of a sewer line at the Leeward Community College (Jourdan 1995). The burial site was designated Site 05302. Materials present with the burials included historic period glass bottles, nails, and metal pieces. The first burial consisted of a coffin burial representing one individual, and the second burial represented a minimum of five individuals in a tumbled pit burial. Based on the presence of a Buffalo Nickel dated 1917, the coffin burial post-dates the coin's age. The individuals in the pit burial possibly predated the coffin burial; the coffin may have caused their displacement when it was interred (Chaffee and Spear 1995:8–9). Ethnicity was not determined.

In 1991, an archaeological reconnaissance and inventory survey was conducted on 3,600 acres in Waiawa and Waipi'o Ahupua'a by the Bishop Museum (Goodman and Nees 1991). A portion of this project area was previously surveyed by Barrera (1987), which had identified four sites associated with Oahu Sugar Company. These sites, Sites 01469, 01470, 01471, and 01472, are all over 500 meters from Area 2. The survey by Goodman and Nees (1991) relocated the four sites, and in total identified seventeen historic properties: Sites 01469 to 01472, and 02261 to 02273. Four pre-Contact sites were identified by Goodman and Nees (1991), which included a rockshelter complex, a mound complex, a trail, and a lithic scatter. The remaining 13 sites were associated with historic period plantation and WWII military infrastructure. Four of the sites identified by Goodman and Nees (1991) are located within 500 meters of Area 2.

Two pre-Contact sites are located 60 to 100 meters east of the Area 2 APE (see Figure 29). Site 02263 is a rockshelter complex that comprises three rockshelters, petroglyph panels, and seven terraces. Site 02264 is a traditional Hawaiian trail. Site 02263 and 02264 were recommended for in situ preservation.

Site 02270 is an irrigation complex comprising 35 features. A portion of the site map from the archaeological report is shown in Figure 30. Of the 35 features, Features 3 (Metal Siphon 10), 11 (reservoir), and 18 through 24 (straight ditches) are within 500 meters of Area 2. No further work was recommended for Site 02270.

Site 02273 is a road/railway system comprising 44 features. A portion of the site map from the archaeological report is shown in Figure 31. Of these 44 features, Feature 5.1, an abandoned roadbed, and Features 30, 31, 34, and 36, paved and unpaved roads, are within 500 meters of Area 2. No further work was recommended for Site 02273.

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<sup>1</sup> Report not available. Report not submitted to the SHPD. Cited in Kamehameha Schools 2019; citation not listed in reference section of *'Āina Inventory*.

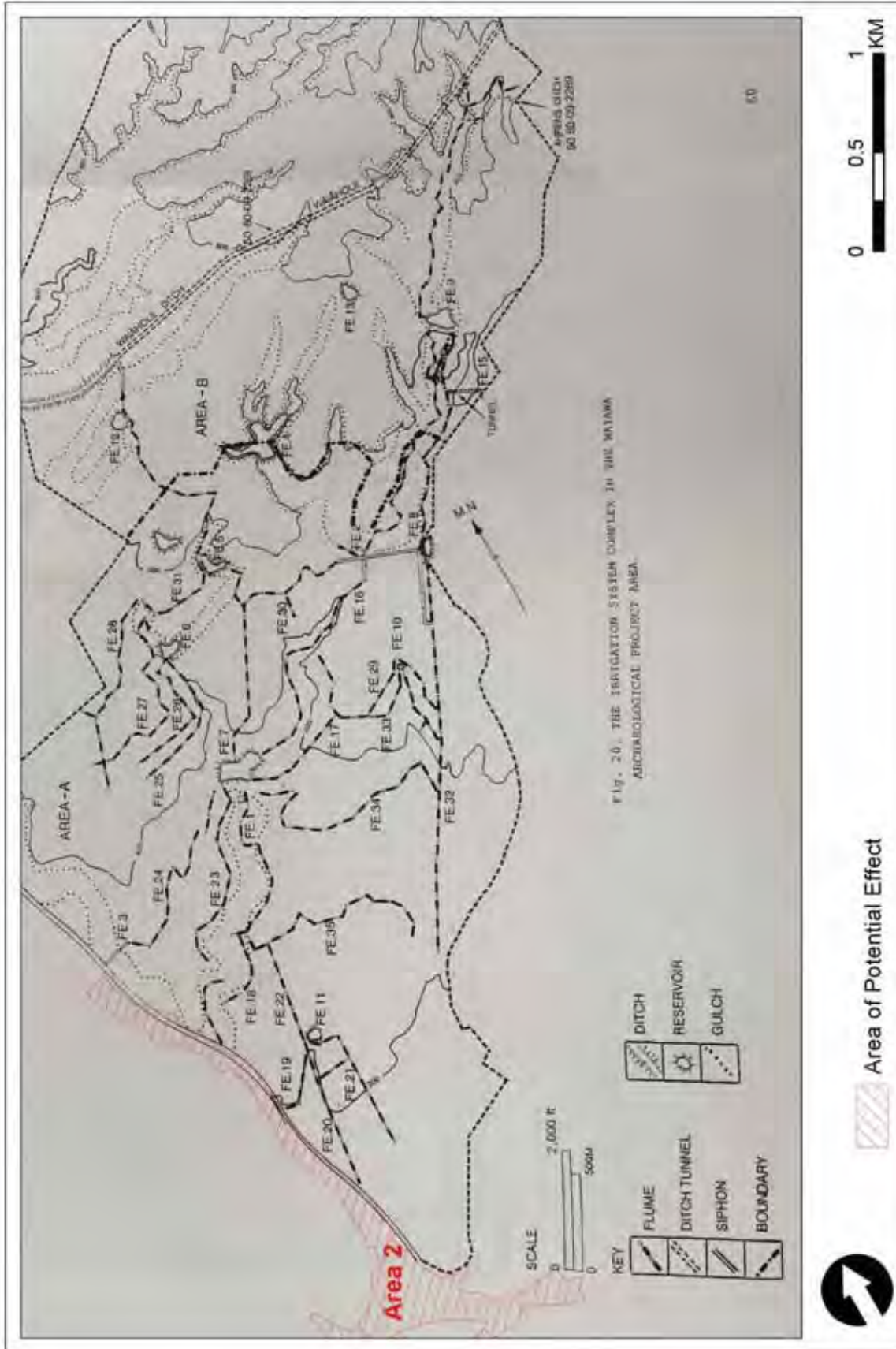


Figure 30. Location of Site 50-80-09-02270 near the Area 2 APE (Goodman and Nees 1991: Figure 20).

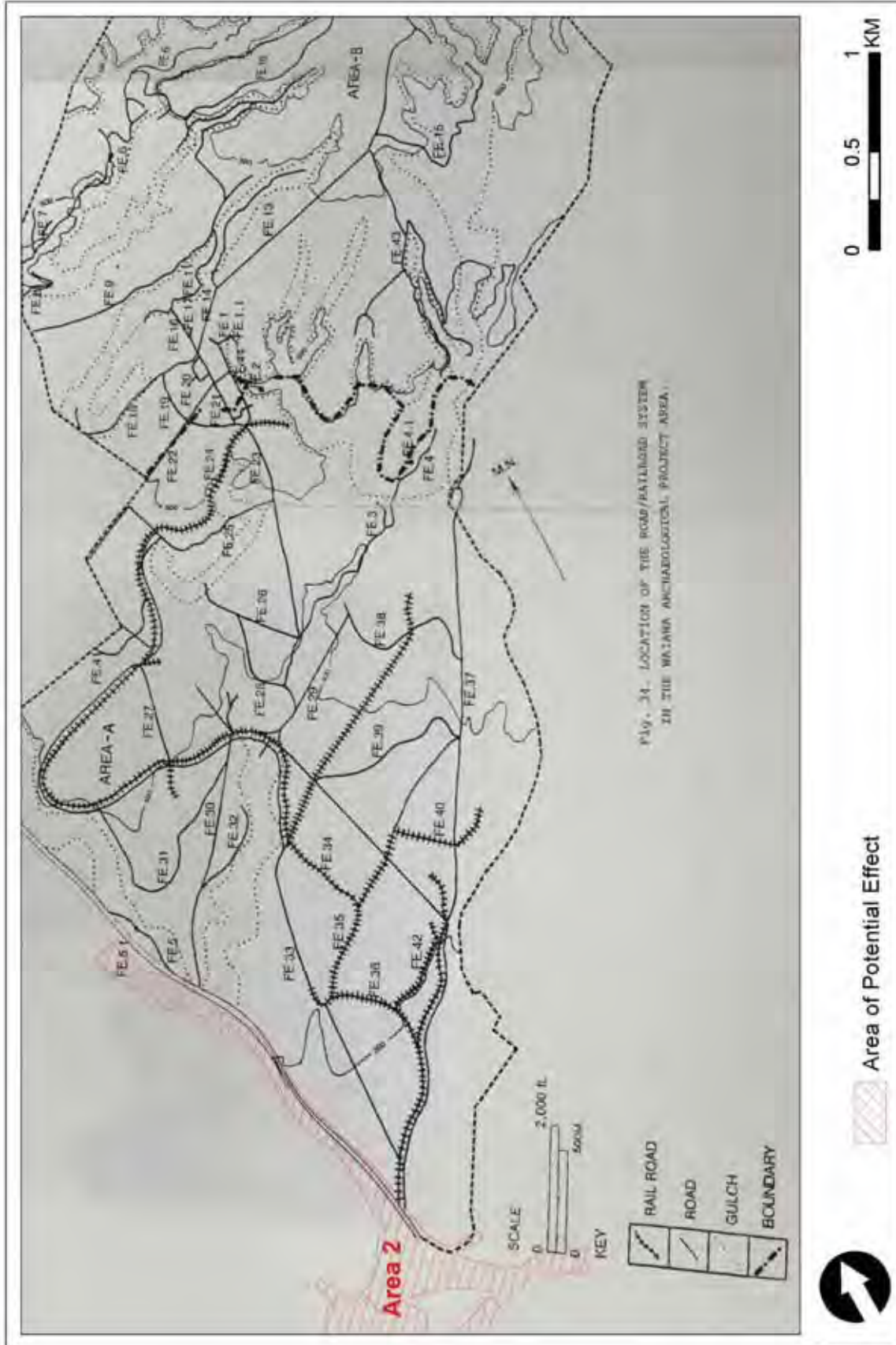


Figure 31. Location of Site 50-80-09-02273 near the Area 2 APE (Goodman and Nees 1991:Figure 34).

Additional survey has been conducted within the Goodman and Nee's (1991) project area within the last decade. Cultural Surveys Hawai'i (Thurman et al. 2012<sup>2</sup>) resurveyed a 1,680 acre-portion of the previously investigated parcel for Kamehameha Schools. One new pre-Contact site was identified. The site comprises three small petroglyphs on rock outcrops in a dry gulch and is located approximately 90 meters east of Area 2 (Kamehameha Schools 2019:172). No SIHP site number has been assigned. In addition to the new survey, a preservation plan was prepared for four features of Site 02273, a road/railroad system (Monahan 2015).

An archaeological assessment was conducted for approximately 138.5 acres to the east of Waiawa IC (McGerty and Spear 1995). It was determined that although there was pre- and post-Contact land use, as well as military activities in the area, no significant historic sites were present.

In 1998, an archaeological assessment was conducted for the Ewa Drum and Fuel Storage Area (Rechtman and Henry 1998). No historic properties were identified. However, a subsequent archaeological field inspection and literature search (Rainalter et al. 2006) and an archaeological inventory survey (Rainalter et al. 2005) for the construction of a proposed second access road for Leeward Community College identified the facility as a historic property. It was designated Site 06764, and after Navy consultation it was concluded that the site was likely eligible for listing on the National Register of Historic Places.

An archaeological assessment was conducted for the corridor along H-1 from Halawa to the Waiawa IC (Hammatt and Chiogioji 1998). No surface archaeological sites were observed. Several historic buildings, including wood-frame houses, the Pearl City Fire Station, and the Pearl City Hongwanji Buddhist temple were identified, but no historic properties were identified in vicinity of Area 2.

Archaeological monitoring was conducted in 2004 along the Waiawa Fuel Pipeline corridor from the HECO Barbers Point Tank Farm to the Waiawa Generating Station (Rasmussen and Tomonari-Tuggle 2006). The corridor mostly ran parallel to the O.R. & L. right-of-way and was in the vicinity of Sites 03761 (Secondary Burial) and 05302 (Coffin and pit burials). No previously unidentified historic properties were encountered.

An archeological inventory survey was conducted for Construction Phase I (Hammatt 2010) and II (Sroat et al. 2012) of the Honolulu High-Capacity Transit Corridor Project (HHCTCP). The project traversed Waiawa, Manana, Waimano, Waiawa, Waimalu, Kalauao, 'Aiea, and Halawa Ahupua'a. No new historic properties were identified near Area 2.

Archaeological literature review and field inspection was carried out for work at a 5.6-acre parking area on the north side of the Leeward Community College (Shideler and Hammatt 2018). It was determined that the project area was not a location of pre- and post-Contact activities. No further work was recommended.

## **AREA 2 RECONNAISSANCE SURVEY**

PCSI archaeologists Keola Nakamura and Katie Shiroma, conducted an archaeological reconnaissance of the Area 2 APE on May 28, 2019. The purpose of the survey was to ensure that no historical or pre-Contact archaeological materials or features were present on the surface. Figure 32 presents photographs of portions of the Area 1 APE. No surface traditional Hawaiian or post-Contact historic properties were observed within the project area during the archaeological reconnaissance survey.

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<sup>2</sup> Report not available. Report not submitted to the SHPD. Cited in in Kamehameha Schools 2019; citation not listed in reference section of *'Āina Inventory*.



View to West



Facing East

**Figure 32. Overview Photograph of the Area 2 APE.**

## ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL

Previous archaeological investigations and historical records indicate that traditional Hawaiian settlement, aquaculture, and intensive agriculture occurred in the lowlands around Pearl Harbor in Waiawa and Waipi'o Ahupua'a. Additionally, the upland areas would have offered forest resources for collecting medicinal plants and *kula* lands for dry land agriculture (Tulchin et al. 2009:34). LCAs in the vicinity of Area 2 were clustered around Waiawa Stream and Pearl Harbor.

Oahu Sugar Company began operations in the vicinity of Area 2 during the nineteenth century. By 1925, lands within and adjacent to Area 2 were under cultivation. Extensive land modifications followed later in the twentieth century when plantation operations ceased and modern urban development spread north from Waipahu town.

All previously identified human burial sites within 500 meters of Area 2 are south of the H-1 Freeway. These sites include Site 03761, a secondary human burial dating to the historic period, and Site 05312, which comprises a historic period coffin burial and a tumble pit burial that includes five individuals. Both sites are nearly 500 meters from Area 2.

Three traditional Hawaiian sites are between 60 and 100 meters from the east side of Area 2 along the H-2 Freeway. Site 02263 is a rockshelter complex that comprises three rockshelters, petroglyphs, and seven terraces. Site 02264 is a traditional Hawaiian trail. These sites were recommended for preservation (see Goodman and Nees 1991). The third site was recorded by Thurman et al. (2012) and consists of three small petroglyphs on rock outcrops in a dry gulch.

A majority of the historic properties in the vicinity of Area 2 are related to the Oahu Sugar Company's activities during the historic period. Site 02270, an irrigation complex comprising 35 features, and Site 02273, a road/railway complex, are spread across a large swath of undeveloped land east of the H-2 Freeway (see Barrera 1987; Goodman and Nees 1991; Monahan 2015; Thurman et al. 2012). None of these sites are within Area 2.

Sugarcane cultivation during the historic period, followed by episodes of grading, leveling, and filling associated with freeway construction most likely destroyed or buried any evidence of both pre- and post-Contact land use within Area 2. Therefore, pursuant to the National Historic Preservation Act, as amended, and its implementing regulations at CFR § 800.5(d)(2), and in accordance with Chapter 6E-8, Hawaii Revised Statutes, and its implementing regulations at HAR §13-275-7(2), a determination of "no historic properties affected" is recommended for work activities in Area 2. No further work (such as archaeological monitoring) is recommended; however, in the event that historic properties (e.g., human remains) are found during project activities, it is recommended that the contractor stop work immediately, protect the find, and notify the SHPD.



### AREA 3: H-1– WAIKELE TO PAIWA INTERCHANGE

Area 3 totals 29.68 ac (12.01 ha) and includes the Paiwa IC and the H-1 Freeway to Waikele. Figure 33 shows the location of Area 3 on a 2017 USGS Waipahu Quadrangle Map. Figure 34 presents an aerial image of Area 3. Proposed work, listed in Table 9, includes trenching 2.0 to 3.0 ft (0.6 to 0.91 m) wide and 4.0 to 8.0 ft (1.21 to 2.44 m) deep for installation of conduits and splice cabinets, and trenching 4.0 ft (1.21 m) wide and 15.0 to 25.0 ft (4.57 to 7.62 m) deep for excavations for installation of a single traffic camera pole for a CCTV with a deep foundation.

**Table 9. List of Proposed Project Activities in Area 3.**

PROPOSED ACTIVITY	ANTICIPATED DEPTH OF GROUND DISTURBANCE
Conduit trenching	4.0 to 8.0 ft (1.21 to 2.44 m)
Splice cabinet installation	4.0 to 8.0 ft (1.21 to 2.44 m)
Traffic camera pole installation for a single CCTV	15.0 to 25 ft (4.57 to 7.62 m)

#### ENVIRONMENTAL SETTING

Area 3 is within Waikele and Waipi’o Ahupua’a on the leeward side of O’ahu. These two *ahupua’a* extend from the Ko’olau mountain range through the coastal plain to the shoreline at Pearl Harbor. The toponym Waikele translates as “muddy water” (Pukui et al. 1974). In the past, the stream may have appeared muddy because of the presence of upland soils; these soils could have been carried by the Waikakalaua and Kipapa streams as they flowed across the Schofield Plateau before converging at Waikele Stream in the lowland portion of the *ahupua’a* (Hammatt 2010:15).

Area 3 is on the northern border of Waipahu, which was formerly a sugar plantation town. The toponym Waipahu is from Waipahu Spring, “spouting water” (Pukui and Elbert 1986:380), which irrigated many of the traditional *lo’i* on the Waikele flood plain and the rice and sugar cane crops that followed (O’Hare et al. 2011:9). The town and plantation expanded across the *makai* portions of Hō’ae’ae and Waikele Ahupua’a, and the area has since been known as Waipahu. According to a resident of the area:

“Waipahu”...is not a tract of land, but only a spring located in Waikele. The Oahu Railway Company is the culprit responsible for misuse and confusion, when it built its station at Kaohai and called [it] “Waipahu Station” The Oahu [Sugar Plantation] Mill is situated on the plateau of “Keonekuilimalaulaoewa” (the arm-in-arm-plateau of ewa), Waikele [Nawaa 1956 in Sterling and Summers 1978:1].

Area 3 is situated on a moderately sloping to level area approximately 40 to 50 m (131.2 to 164.0 ft) amsl. Soils include Molokai silty clay loam with 3 to 7 percent slopes (MuB), 7 to 15 percent slopes (MuC), and 15 to 25 percent slopes (MuD), and Waipahu silty clay with 2 to 6 percent slopes (WzB) (Soil Survey Staff et al. 2019). The locations of these soil units are shown in Figure 35.

The Molokai series consists of very deep, well-drained soils that formed in material weathered from basic igneous rock (Foote et al. 1972:96–97). Found on uplands, they have been used for pasture, the production of pineapple and irrigated sugarcane, and for wildlife

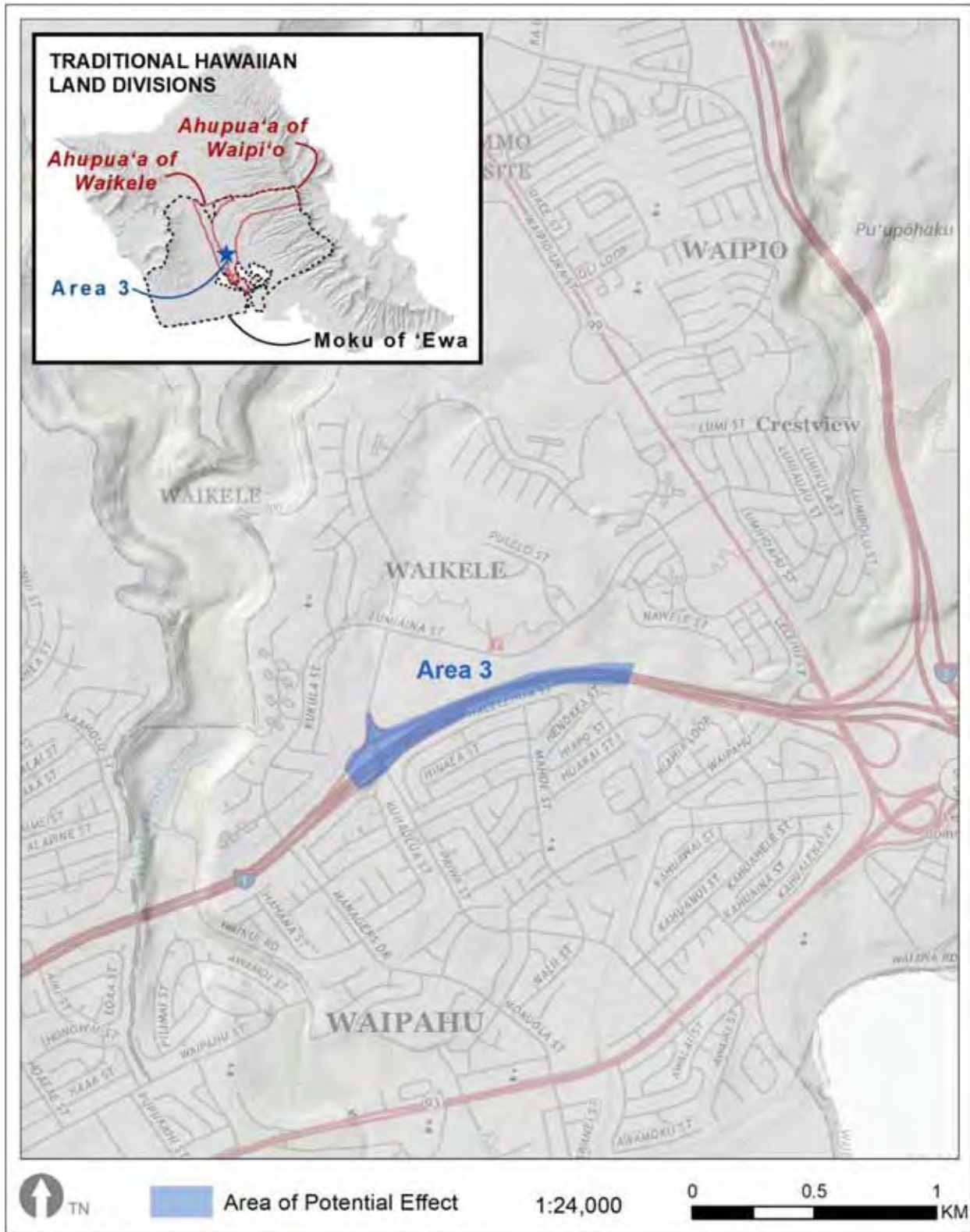


Figure 33. Location of the Area 3 APE on a 7.5-Minute Series USGS Waipahu Topographical Quadrangle (2017b), FMS Phase 3, Unit 1, H-1 Freeway from Waikele to the Paiwa Interchange.

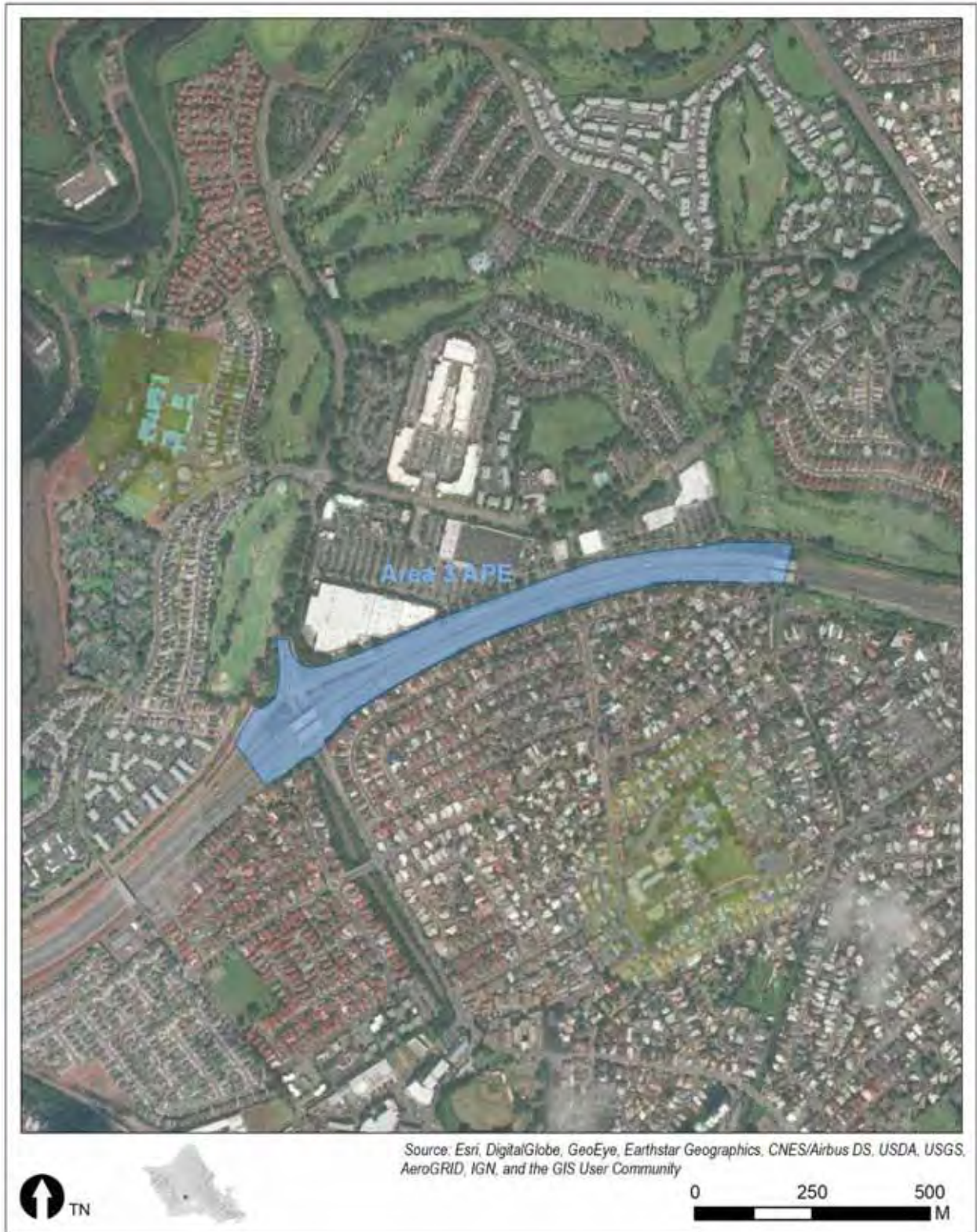


Figure 34. Location of the Area 3 APE on an Aerial Image (Esri et al. 2019), FMS Phase 3, Unit 1, H-1 Freeway from Waikele to the Paiwa Interchange.

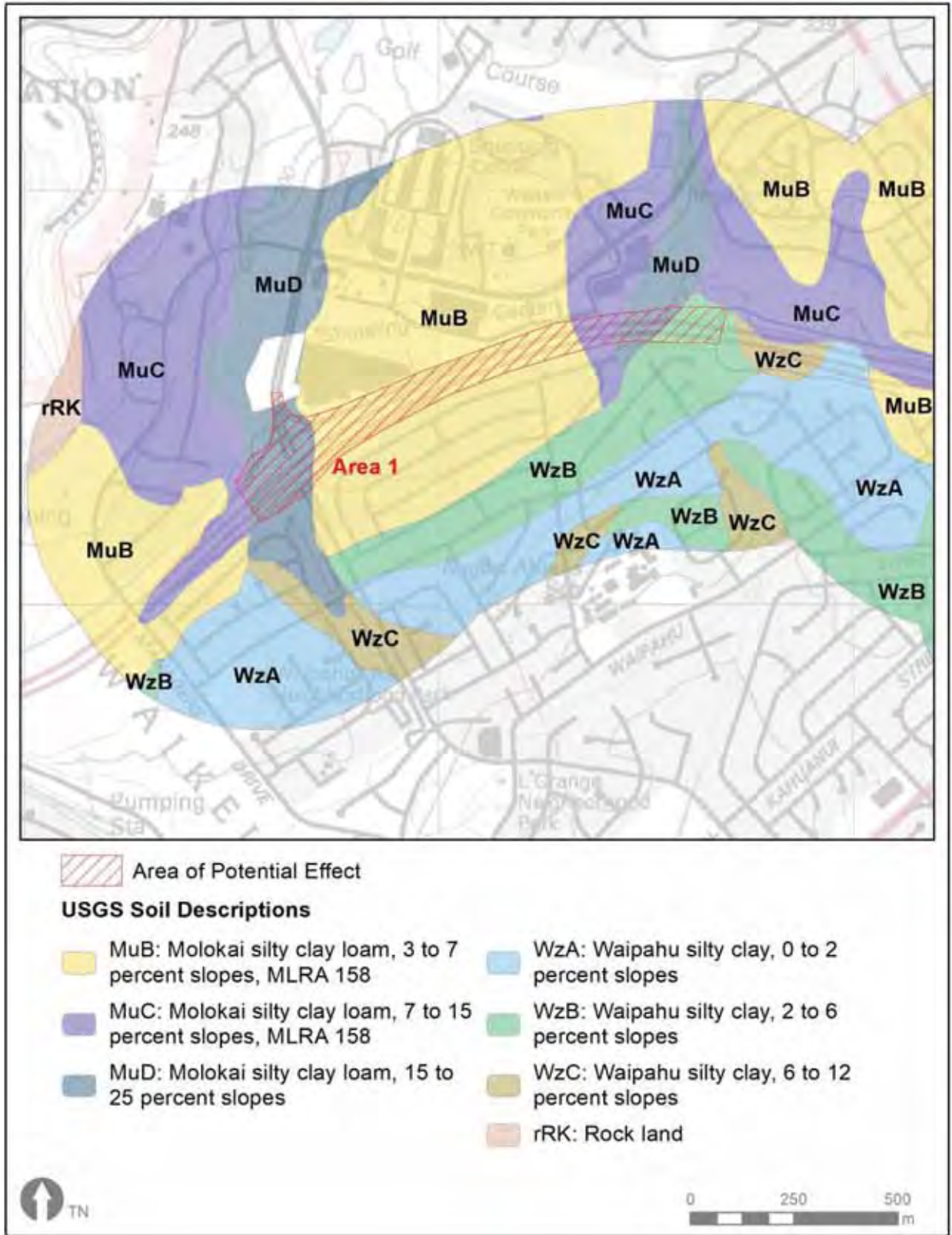


Figure 35. Soil Units within and near the Area 3 APE (Soil Survey Staff et al. 2019; USGS 2017b).

habitat. Vegetation may consist of *kiawe* (*Prosopis pallida*), pitted beardgrass (*Bothriochloa barbinodis perforatus*), feather fingergrass (*Chloris virgata*), lantana (*Lantana camara*), *ilima* (*Sida cordifolia*), and buffelgrass (*Cenchrus ciliaris*).

The Waipahu series are well-drained soils situated on marine terraces. They developed in old alluvium formed from igneous rock. Waipahu silty clay has been used for sugarcane production and residential construction (Foote et al. 1972:135).

Annual rainfall in the vicinity of Area 3 averages about 635.7 mm (25.03 in) per year, with most rain falling in the winter months between November and March (Giambelluca et al. 2013). Area 3 is in a modern built-environment that includes the H-1 Freeway, with commercial and residential developments to the north and south.

## HISTORICAL BACKGROUND

This section presents the ethno-historical and archaeological background information of Area 3. Data from the background research were compiled to create an overview of traditional Hawaiian and historic-era land use and subsistence practices. Previous archaeological research is reviewed and anticipated archaeological findings are discussed.

### Traditional History

In Waikele, several *wahi pana* are in the *makai* portion of the *ahupua'a*. At Waipahu Spring in Waikele, Ka'ahupahau, the shark goddess of Pearl Harbor, used the spring for bathing (Sterling and Summers 1978:25). Northwest of Waipahu Spring was a rock face called *Pōhaku-pili* (clinging stone), which was said to have been placed there by the Hawaiian pig-god, Kamapua'a (Mauricio 1997:7). Two of the four *heiau* in Waikele, Mokoula and Hapupu, were once located in the lowland area, approximately one kilometer west of Area 3. They were destroyed sometime before the early twentieth century (McAllister 1933:106).

A *mo'ōlelo* from Waikele tells of how the warrior Palila encountered Kamaika'ahui, a man who could take the form of a shark (Fornander 1918:136–153, 372–375). Palila possessed a supernatural war club. He could fly along the club's path by keeping hold of it when thrown. Ahapau, the King of O'ahu, promised to make king anyone who could rid the land of Kamaika'ahui. Kamaika'ahui lived both in Hāna, Maui, and in Waikele. He was a horrible nuisance because in his human form he had the mouth and teeth of a shark on his back. He would secretly transform into a shark form to kill and eat unwary swimmers. When Palila arrived in Waikele, Kamaika'ahui ran to the sea at the sight of the war club. Palila threw his war club repeatedly as Kamaika'ahui tried to escape until finally he killed the shark-man.

A second *mo'ōlelo* from Waikele occurred at Waipahu Spring and concerns a board used for pounding *kapa* (bark cloth) (Sterling and Summers 1978:25–26). A woman in Kahuku on O'ahu left her *kapa* board at a pool after cleaning it one day and it went missing. She searched the windward districts of the island but could not hear its ringing sound. Months later, she traveled to the leeward side of O'ahu:

She went from Kahuku on the Koolau side to Kaneohe where she spent the night. There was no sign of the anvil in Koolau, because the sign she sought was the sound it made. . . . She went on and spent the night at Wailupe but did not find hers. She heard other anvils but they were not hers. The night turned into day and she went on to Kapalama where she slept but did not hear what she sought till she came to Waipahu [Ka Loea Kalaiaina 1899 in Sterling and Summers 1978:25].

Hearing the sound of her own board at Waipahu Spring, she followed it to the uplands of Waikele, where she found a woman beating *kapa* on her board. The woman had found the

board floating at a spring near her home. The explanation for the board's relocation from the windward to the leeward side of the island is the traditional Hawaiian belief that underground streams and passages existed across the island. After reclaiming her board, one version of this story tells how the people of 'Ewa followed her to Kahuku, where the board was wrapped in ti leaves and placed in the pool near her house. Returning to 'Ewa, the people saw that the same board appeared a few days later in Waipahu at the spring. From this story, Waipahu spring was called Ka-puka-na-wai-o-Kahuku, which means "Outlet of water from Kahuku" (Sterling and Summer 1978:26).

Several *mo'olelo* of Waipi'o concern the *makai* portion of the *ahupua'a*. On Waipi'o Peninsula there was a cave named Kapuna. A riddle associated with the cave was: "*No Kapuna ka hale noho ia e ke kai*, or "To Kapuna belongs the house, the sea dwells in it" (Sterling and Summers 1978:24).

This cave is on the Waipio side and a sea passage separates Waipio and Waikele and Waikele and Honouliuli. The passage is obstructed by three small islands, a middle one and Manana and Lauaunui. These small islands in the middle of the passage to Honouliuli and inside and outside of these small islands is the sea of Kaihuopalaai [Hawaiian name for West Loch] where mullet lived till they whitened with age [Ka Loea Kālai'āina in Sterling and Summers 1978:24].

A *mo'olelo* that is associated with both Waipi'o and Waikele tells of the events that followed a famous battle between Kahahawa'i, the war chief of Kahekili, King of Maui, and the O'ahu ruling chief Kahahana. When O'ahu was invaded, Kahahana, his wife, and a friend fled into the forests and hid for two and a half years (Cordy 2002:19):

Upon the arrival here at Oahu of Kahekili, Kahahana fled, with his wife Kekuapoi, and friend Alapai, and hid in the shrubbery of the hills. They went to Aliomanu, Moanalua, to a place called Kinimakalehua; then moved along to Keanapuaa and Kepookala, at the lochs of Puuloa, and then from there to upper Waipio; thence to Wahiawa, Helemano, and on to Lihue [upper plain of Honouliuli, Ho'ae'ae, and Waipi'o]; thence they came to Poohilo, at Honouliuli, where they first showed themselves to the people and submitted themselves to their care [Thrum 1907:213–214].

Near Wailele at Waikele was one of the last places they hid before Kahahana was betrayed by a local resident at Pō'ohilo, Honouliuli:

. . . report thereof was made to Kahekili, the king, who thereupon sent Kekuamanoha, elder brother of Kekuapoi, the wife of Kahahana, with men in double canoes from Waikiki, landing first at Kupahu, Hanapouli, Waipio, and had instructions to capture and put to death Kahahana, as also his friend Alapai, but to save alive Kekuapoi. When the canoes touched at Hanapouli, they proceeded thence to Waikele and Hoaeae, and from there to Poohilo, Honouliuli, where they met with Kahahana and party in conference. At the close of the day Kekuamanoha sought by enticing words to induce his brother-in-law to go with him and see the father king and be assured of no death condemnation, and by skilled flattery he induced Kahahana to consent to his proposition, whereupon preparation was made for the return. On the following morning, coming along and reaching the plains of Hoaeae, they fell upon and slew Kahahana and Alapai there, and bore their lifeless bodies to Halaulani, Waipio, where they were placed in the canoes and brought up to Waikiki and placed up in the coconut trees by King Kahekili and his priests from Maui, as Kaopulupulu had been. Thus was fulfilled the famous saying of the Oahu priest in "all its truthfulness" [Thrum 1907:214–215].

After Kahahana died in Waikele during the battle in 1783, the chiefs of Maui ruled O'ahu (Cordy 1981:207). Chiefs from the O'ahu districts of 'Ewa and Kona, including Kahahana's

father, 'Elani, began plotting to murder the new rulers. When the Maui chiefs became aware of the scheme, the primary instigators, the chiefs of Waipi'o, convinced Kahekili that the conspiracy originated on Kaua'i. This is the origin of the phrase, *Waipi'o kīmopū*; "Waipi'o of the secret rebellion" (Pukui 1983:319). Later, the true culprits were revealed, which lead to the following events:

the districts of Kona and 'Ewa were attacked, and men, women, and children were massacred, until the streams of Makaho and Niuhelewai in Kona and of Kahoa'ai'ai in 'Ewa were choked with the bodies of the dead, and their waters became bitter to the taste, as eyewitnesses say, from the brains that turned the water bitter. All the O'ahu chiefs were killed and the chiefesses tortured [Kamakau 1992:138].

This account indicates that Waipi'o would have lost a large portion of its population in the 1780s. Kahekili died in 1794 at Waikīkī and the next year his son, Kalanikūpule, was defeated by Kamehameha at the battle of Nu'uauu. Kamehameha distributed the land of O'ahu among his followers, causing the displacement of many families:

Land belonging to the old chiefs was given to strange chiefs and that of old residents on the land to their companies of soldiers, leaving the old settled families destitute [Kamakau 1992:376–377].

### **Traditional Land Use**

As noted in the background section for Area 2, 'Ewa was a densely populated area that would have offered abundant resources. Based on Cordy's (1996) study of resources and population, Waikele's large floodplain, irrigated fields along the lower Waikele Stream and the inland Waikakalaua Stream, and the medium-sized fishery along the west shore of West Loch, the *ahupua'a* would have had a medium-sized population relative to the other *ahupua'a* in 'Ewa.

During E. Craighill Handy's survey of remaining agricultural land in the 1930s he wrote of Waikele:

In the flatland, where the Kamehameha Highway crosses the lower valley of Waikele Stream, there are the remains of terraces on both sides of the road, now planted to bananas, beans, cane, and small gardens. For at least 2 miles upstream there were small terrace areas [Handy 1940:82].

### **Historical Land Use**

There were no *kuleana* awards granted in or near Area 3; however, Area 3 is situated within Royal Patent Grant 712 in Waikele Ahupua'a, and LCA 8241 to John Papa 'Ī'ī in Waipi'o Ahupua'a, as shown in Figure 36. Royal Patent Grant 712 was a 228.24-hectare parcel retained by Keholo (or Kaholo) in the *'ili* of Ahualii (also known as Aualii or Kahualii). Kaholo had made Claim 5751 for Awakapo 'Ili in Kau, Hawaii, but relinquished that claim in order to keep the 1/3 of Ahuaili the government had interest in.

A 1902 map, shown in Figure 37, indicates Area 3 was grazing land (outlined in orange), while taro or rice was being cultivated to the south (shown in blue). At the end of the nineteenth century, as with Waipi'o and Waiawa, the *lo'i* in the *makai* portion of Waikele were converted to rice fields, while *mauka* lands were under pineapple and sugar cultivation (Tulchin et al. 2009:17; Conde and Best 1973:313–317).

The Oahu Sugar Company began operations in Area 3 in the late 1890s. Figure 38 shows a map of the company's sugarcane fields with railroads and roadways crossing Area 3. In the mid-twentieth century, residential areas south of Area 3 began to expand north toward the H-1 Freeway. An aerial photograph from 1978, presented in Figure 39, shows sugarcane fields

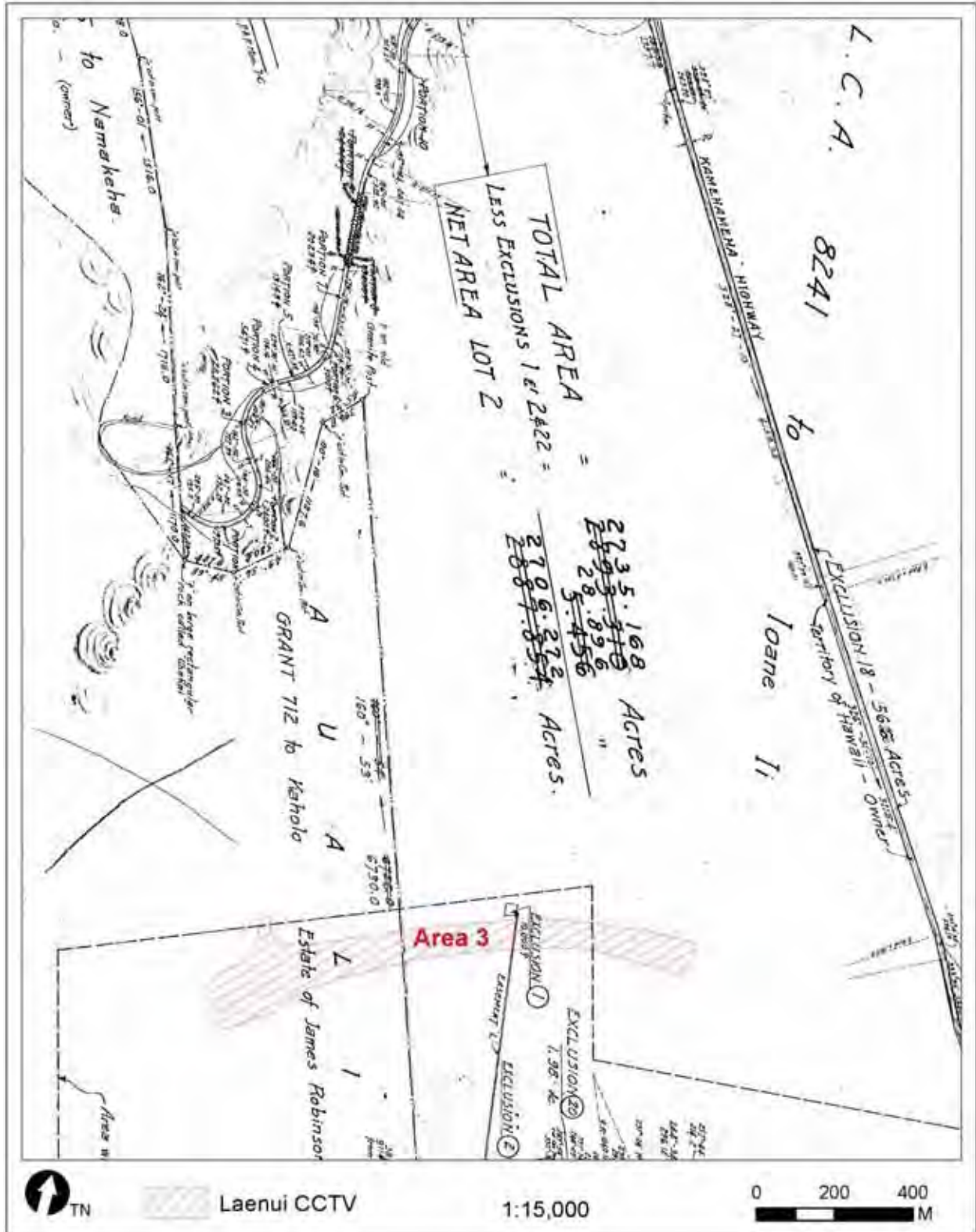


Figure 36. Portion of Land Court Application No. 1000 on a 1963 Map (Dunn 1963), Showing the Area 3 APE.



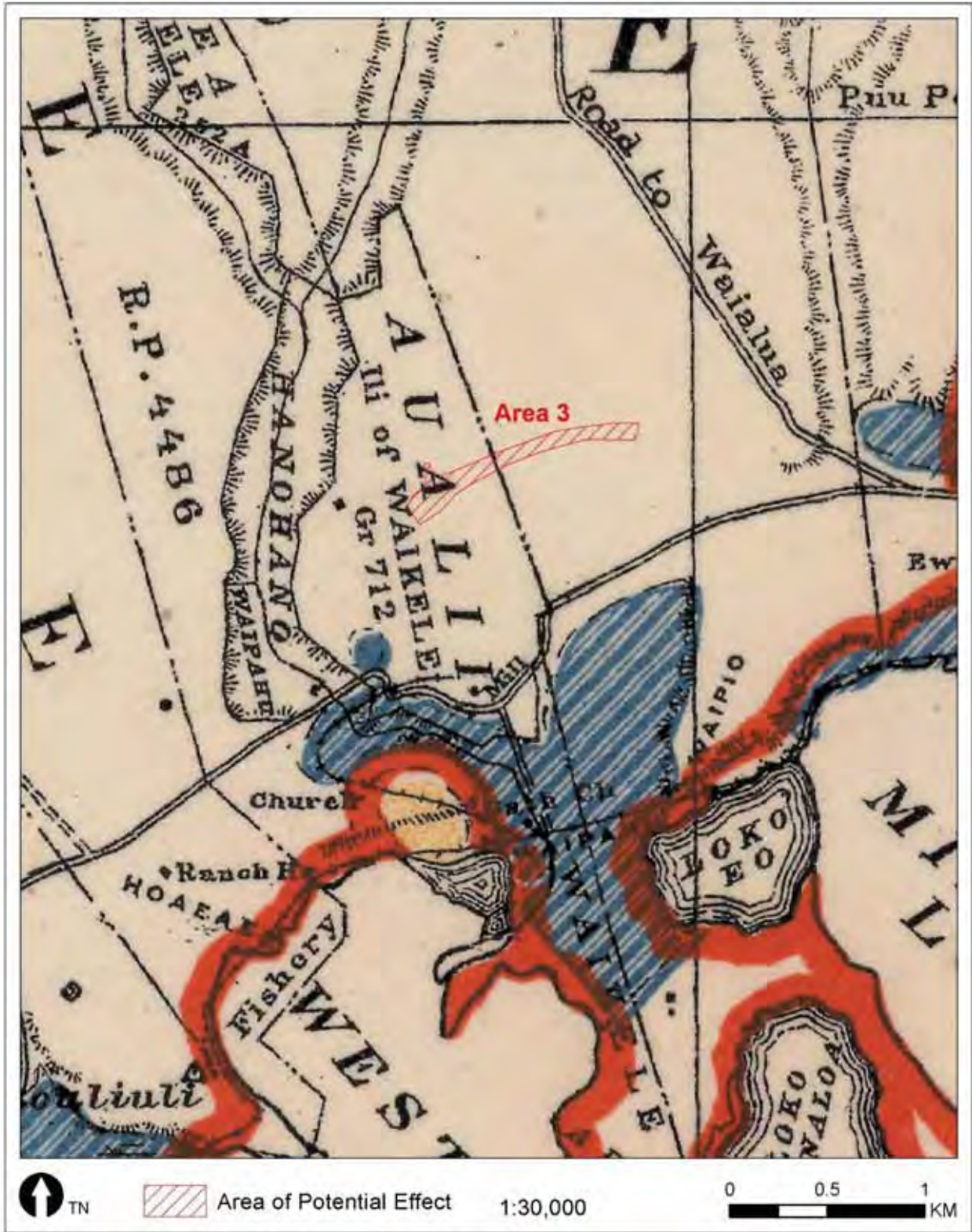


Figure 37. Portion of 1902 Map Showing the Area 3 APE within Grazing Land (Donn 1902).

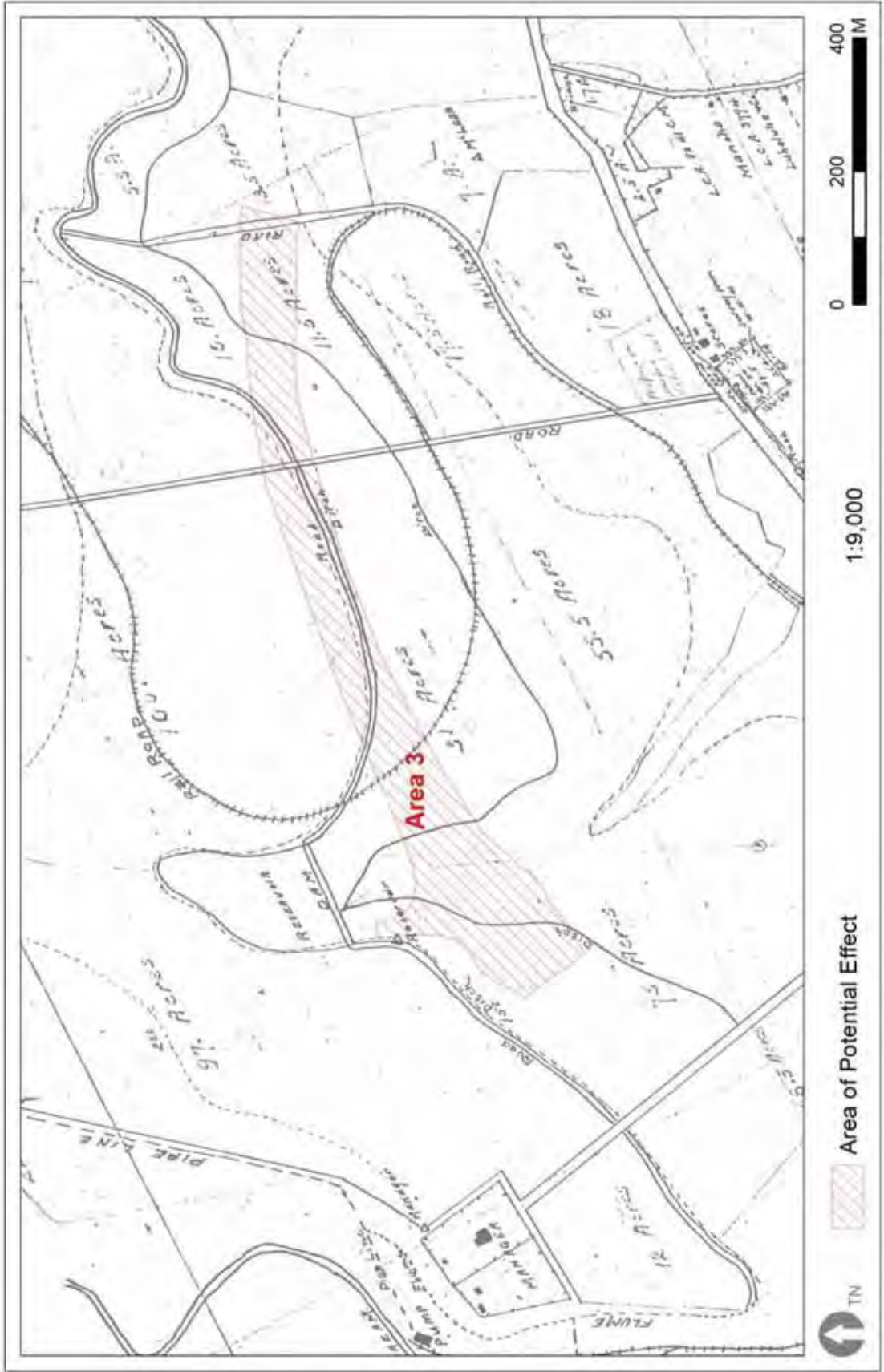


Figure 38. Portion of ca 1920 Map Showing the Area 3 APE within Oahu Sugar Company Fields (Monsarrat ca 1920).

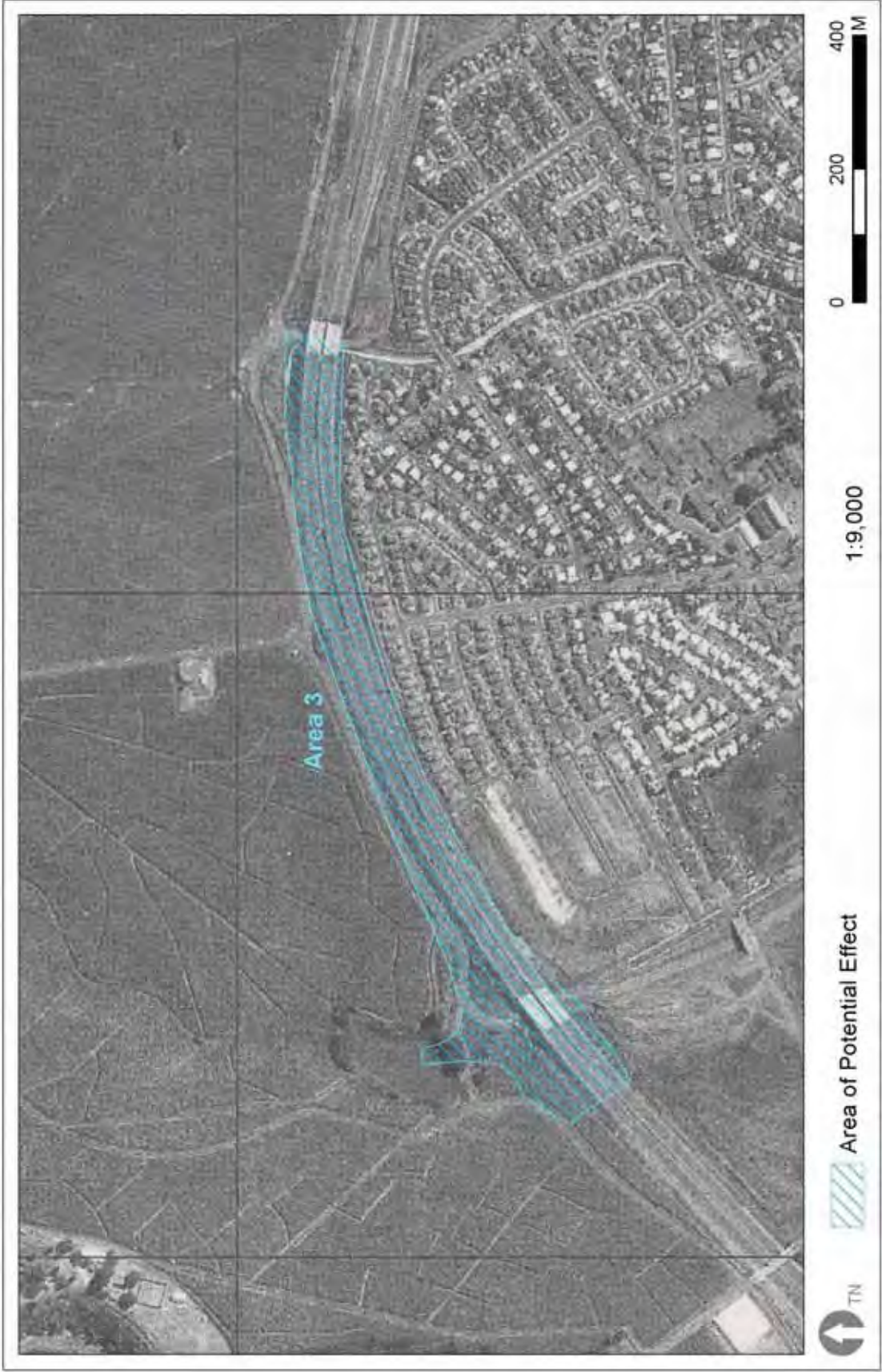


Figure 39. Portion of an Aerial Photograph Dated 1978 Showing Sugarcane Fields and Residential Developments Bordering the Area 3 APE (USGS 1978).

on the north side of the freeway and residential developments bordering the south side of the newly constructed H-2 Freeway. Since then, the land on the north side of Area 3 has been transformed into a retail shopping complex.

### **PREVIOUS ARCHAEOLOGICAL RESEARCH**

Few archaeological investigations have been conducted in the immediate vicinity of Area 3. Previous work has included archaeological reconnaissance and inventory survey. No inadvertent discoveries of human remains have occurred, and no archaeological sites have been identified within 500 m of Area 3. Figure 40 shows the locations of previous archaeological investigations and a summary of these investigations is presented in Table 10.

The earliest archaeological investigation near Area 3 was conducted by McAllister (1933) in the early 1930s. No archaeological sites were recorded in the vicinity. He did note that several sites in Waikele had been destroyed by sugarcane cultivation and development in Waipahu, including a *heiau* approximately one kilometer to the southwest of Area 3.

In 1985, Barrera (1985) carried out an archaeological reconnaissance survey in Waikele. The survey covered approximately 237 ha immediately north of Area 3. Findings indicated that sugarcane agriculture had removed all evidence of past land use.

In 2000, archaeological inventory survey was conducted in an area measuring 16 ha located west of Managers Drive and south of H-1 Freeway in Waipahu (Hammatt et al. 2000). All identified historic properties were over 500 meters from Area 3.

An archaeological and cultural assessment was carried out south of Area 3 for Waipahu Drainage Improvements (Hammatt et al. 2004). The study area measured approximately 30 acres and was entirely urban. No significant cultural resources were identified.

In 2009, an archaeological inventory survey was carried out along six kilometers of road corridor in Waikele and Waipi'o Ahupua'a (Tulchin et al. 2009). A majority of the project area consisted of asphalt paving or dirt roads, along with abandoned fields. One historic property (Site 06959) was identified, which is associated with Historic Plantation era irrigation infrastructure; however, this site is located more than two kilometers north of Area 3.

### **AREA 3 RECONNAISSANCE SURVEY**

PCSI archaeologists Keola Nakamura and Katie Shiroma, conducted an archaeological reconnaissance of the Area 3 APE on May 28, 2019. The purpose of the survey was to ensure that no historical or pre-Contact archaeological materials or features were present on the surface. Figure 41 presents photographs of portions of the Area 3 APE. No surface traditional Hawaiian or post-Contact historic properties were observed within the project area during the archaeological reconnaissance survey.

### **ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL**

Previous archaeological investigations and historical records indicate that traditional Hawaiian settlement, aquaculture, and intensive agriculture in Waikele and Waipi'o Ahupua'a occurred in the lowlands around streams, such as Waikele, and around Pearl Harbor. There were no *kuleana* awards made in the vicinity of Area 3 and this portion of the two *ahupua'a* was unlikely to have been heavily used during the pre-Contact and early post-Contact periods due to the distance from the coast and freshwater streams.

During the nineteenth century, the project area was used for grazing livestock. Then in the late 1890s, Oahu Sugar Company began operations in Waikele and Waipi'o. By 1925, Area

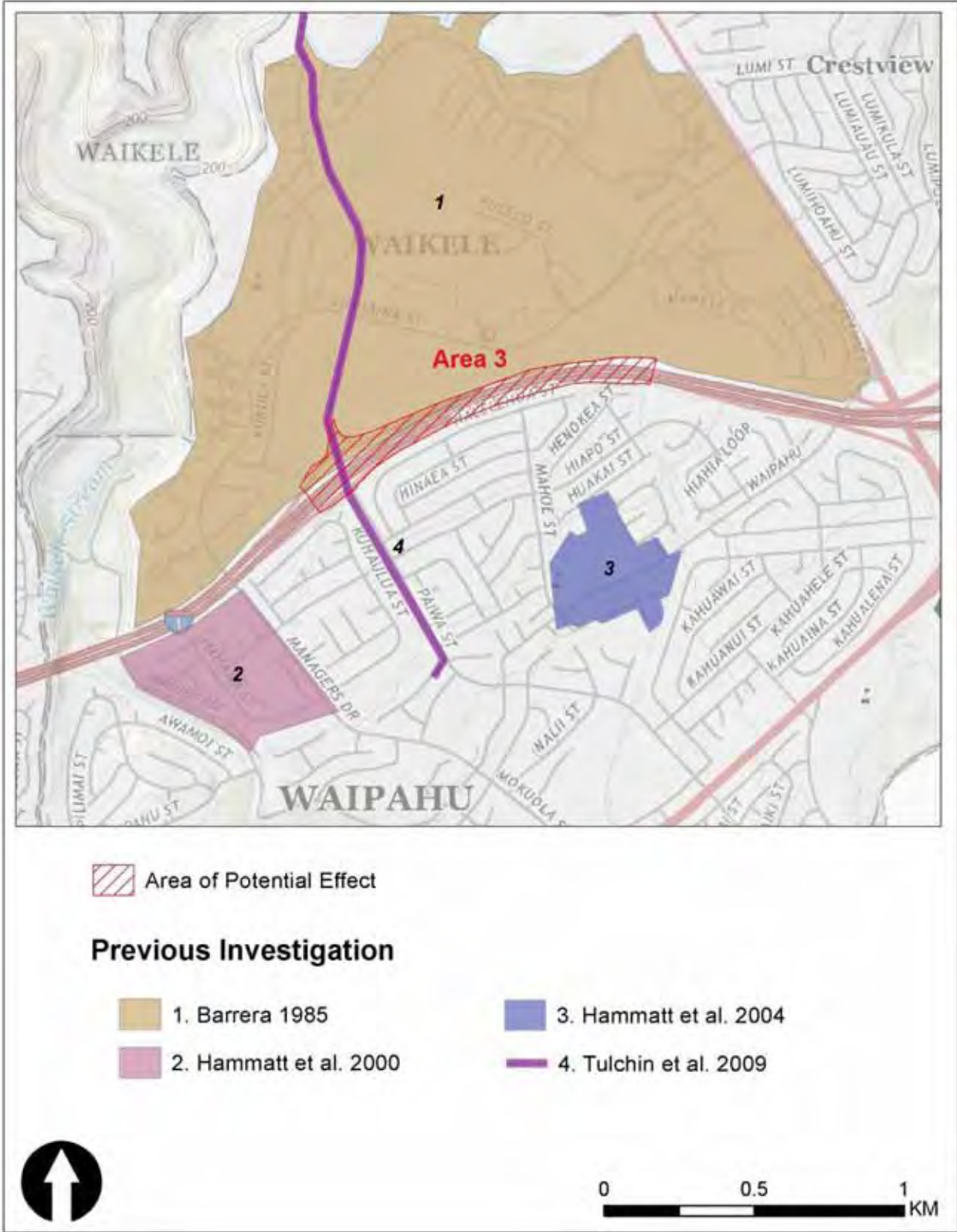


Figure 40. Previous Archaeological Investigations near the Area 3 APE (USGS 2017b).



View to Northeast



View to North.

**Figure 41. Overview Photographs of the Area 3 APE.**

**Table 10. List of Previous Archaeological Studies near Area 3.**

<b>Author Year</b>	<b>TMK (1)</b>	<b>Nature of Study</b>	<b>SIHP* No. 50-80-09-</b>	<b>Site Description</b>
McAllister 1933	<i>Makai</i> portions of Waikele and Waipi'o	Island-wide Archaeological Survey	-	No sites near Area 3
Barrera 1985	9-4-007:var. & 9-4-014:var./ Waikele north of H-1 Fwy	Archaeological Reconnaissance Survey	-	No significant finds
Hammatt et al. 2000	9-4-002:005/ 16 acres south of H-1 Fwy, west of Managers Dr.	Archaeological Inventory Survey	-	No sites near the Area 3
Hammatt et al. 2004	9-4-009, 9-4-059:72-74/ Waipahu Town	Archaeological and Cultural Assessment	-	No significant finds
Tulchin et al. 2009	9-4-002:024, 9-4-005: por. 074, 9-4-006: por. 005, 9-4-007, 011,013, 014, 015, 017, 020, 026,160,& 9-4-096: 149	Archaeological Inventory Survey	-	No sites near Area 3

\*SIHP (Statewide Inventory of Historic Places)

Chapter 6E-8, Hawaii Revised Statutes, and its implementing regulations at HAR §13-275-7(2), a determination of “no historic properties affected” is recommended for work activities in Area 3. No further work (such as archaeological monitoring) is recommended; however, in the event that historic properties (e.g., human remains) are found during project activities, it is recommended that the contractor stop work immediately, protect the find, and notify the SHPD.

### **SUMMARY OF FINDINGS**

Areas 1, 2, and 3 of the FMS project, Unit 1, are all locales that have been subject to historic and modern urban development, including freeway and urban roadway construction. Area 1 overlaps within portions of the fishpond Loko Weli (Site 00075), LCA 818 and its fishpond Panahana, and LCA 10498. The area was also heavily used during the late historic period for industrial activities and it is adjacent to the former Kalihi Hospital and Detention Station. Area 2 is adjacent to Waiawa Stream, which was also the site of *kuleana* awards containing *pahale* and *loK* During the late historic period and into the modern era Area 2 was cultivated in sugarcane. Area 3 is unlikely to have been intensively used until the late historic

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## APPENDIX B: PLAT MAPS FOR TMK PARCELS ADJACENT TO THE AREA 1 APE

### Plat Map References

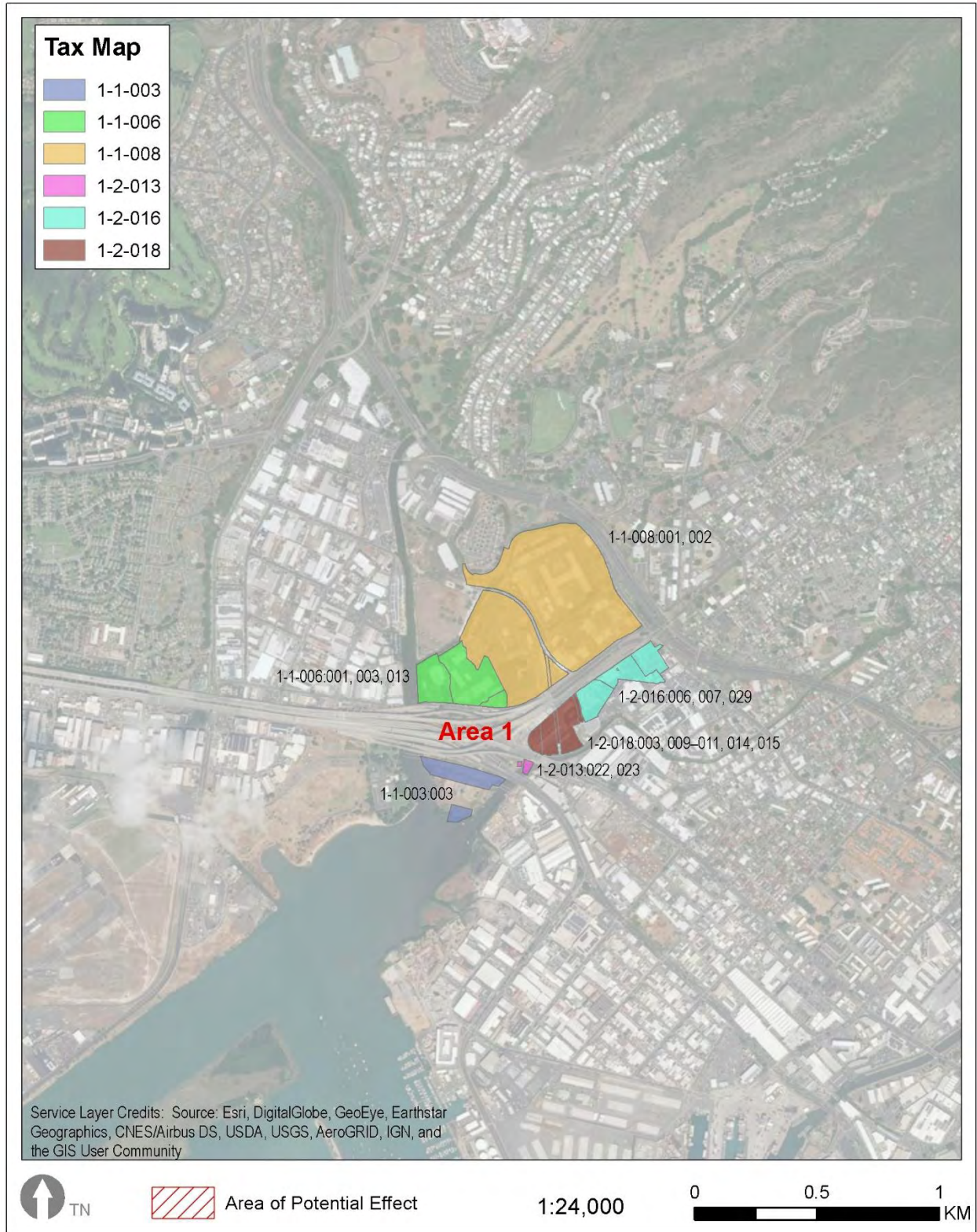
#### Taxation Maps Bureau

- 1932 *First Division, Zone 1, Section 2, Plat 18* [Tax Map]. DWG. 1125. Taxation Maps Bureau, Honolulu.
- 1933 *First Division, Zone 1, Section 1, Plat 08* [Tax Map]. DWG. 1206. Taxation Maps Bureau, Honolulu.
- 1960 *First Division, Zone 1, Section 2, Plat 16* [Tax Map]. DWG. 1120. Department of the Tax Commissioner, Taxation Maps Bureau, Honolulu.

#### Tax Maps Branch

- 1982 *First Division, Zone 1, Section 2, Plat 13* [Tax Map]. DWG. 1142. Department of Taxation, Property Technical Office, Honolulu.
- 2017 *First Taxation Division, Zone 1, Section 1, Plat 003* [Tax Map]. Department of Budget and Fiscal Services, Real Property Assessment Division, Honolulu.
- 2018 *First Taxation Division, Zone 1, Section 1, Plat 006* [Tax Map]. Department of Budget and Fiscal Services, Real Property Assessment Division, Honolulu.

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**Figure B-1. FMS Phase 3, Unit 1, Tax Map Key Parcels Adjacent to the Area 1 APE, from the Ke'ehi Interchange to H-1/Middle Street.**

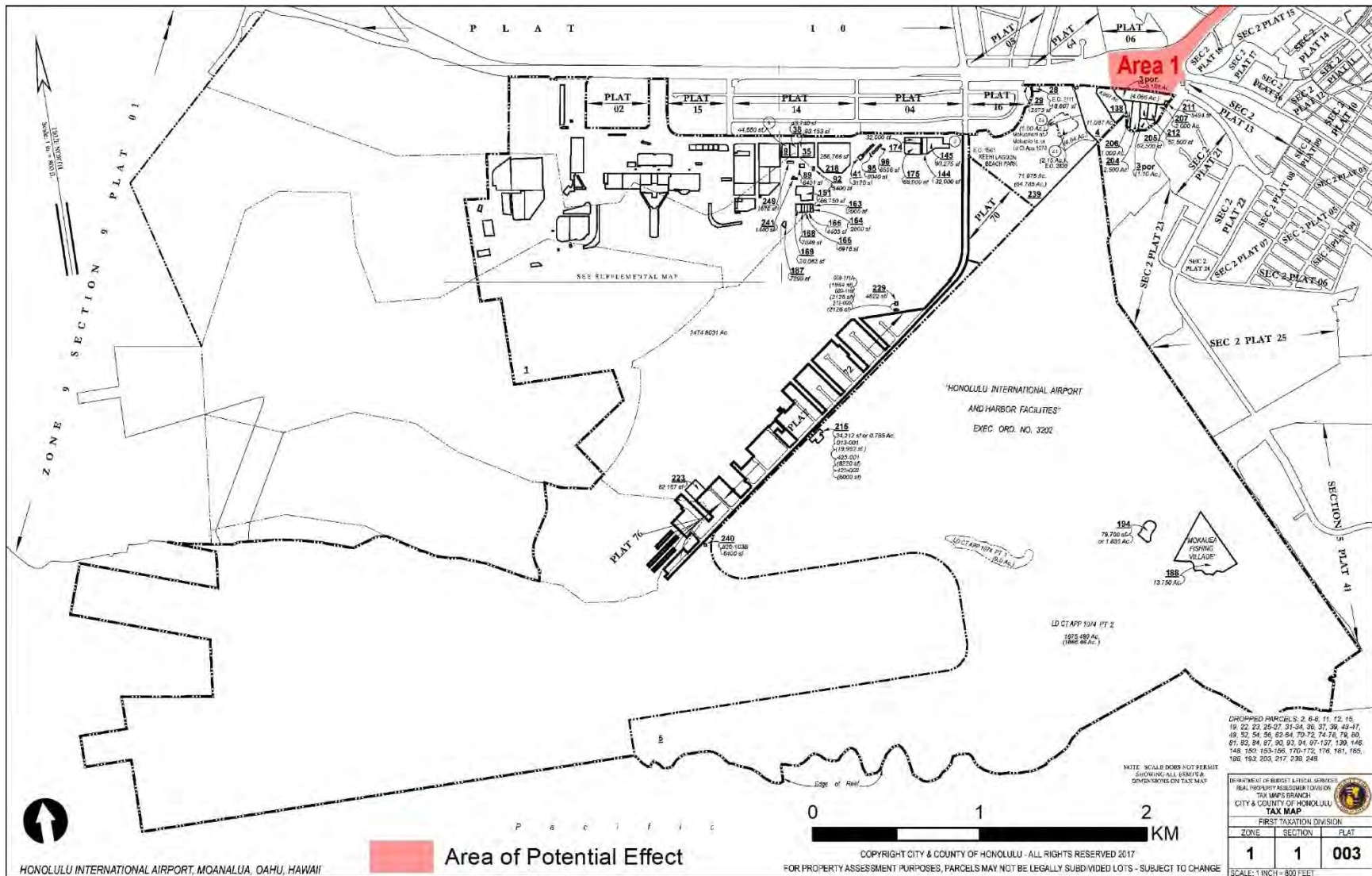


Figure B-2. FMS Phase 3, Unit 1, Location of Area 1 APE, Ke'ehi Interchange to H-1/Middle Street, on TMK Plat Map (1) 1-1-003 (Tax Maps Branch 2017).

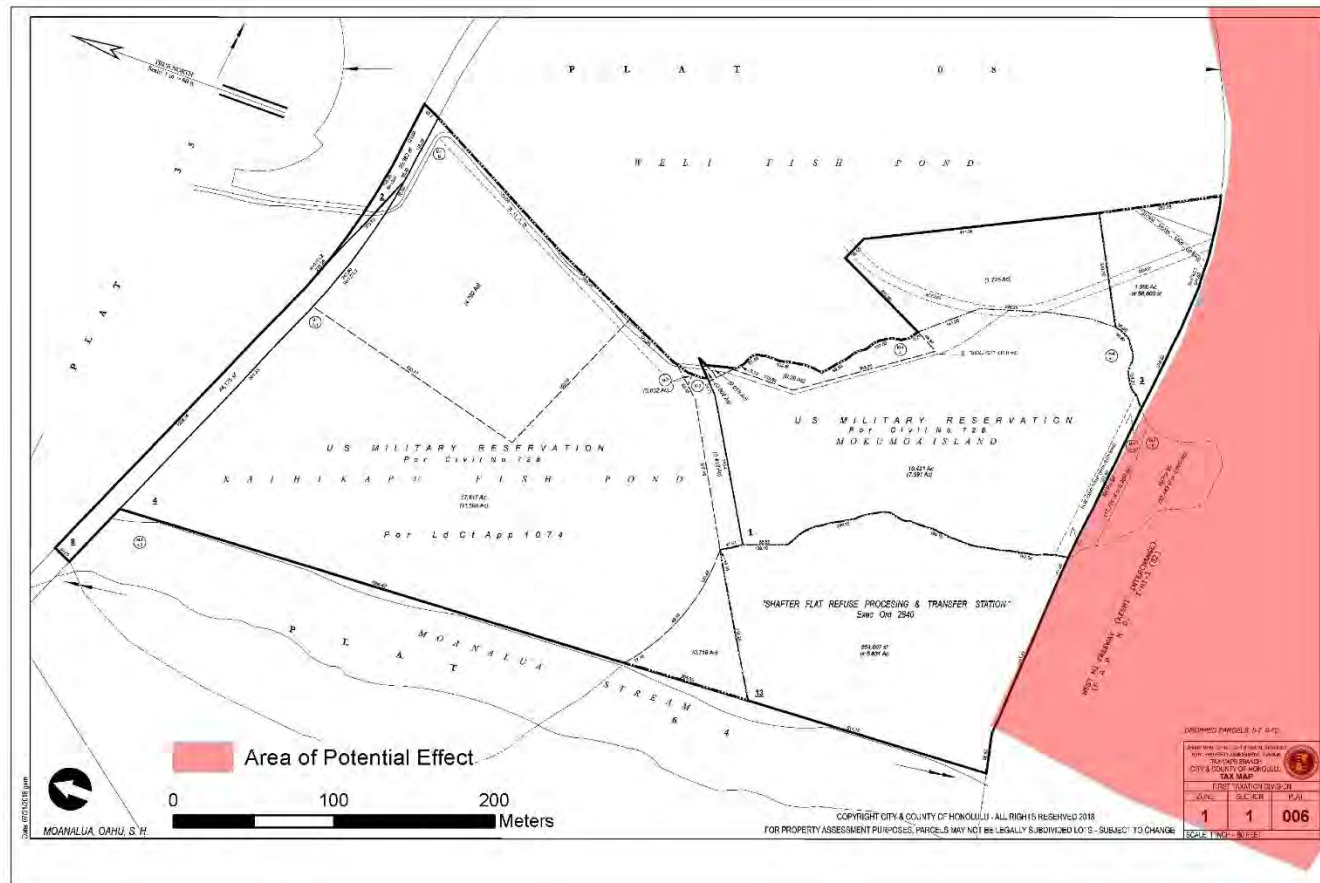
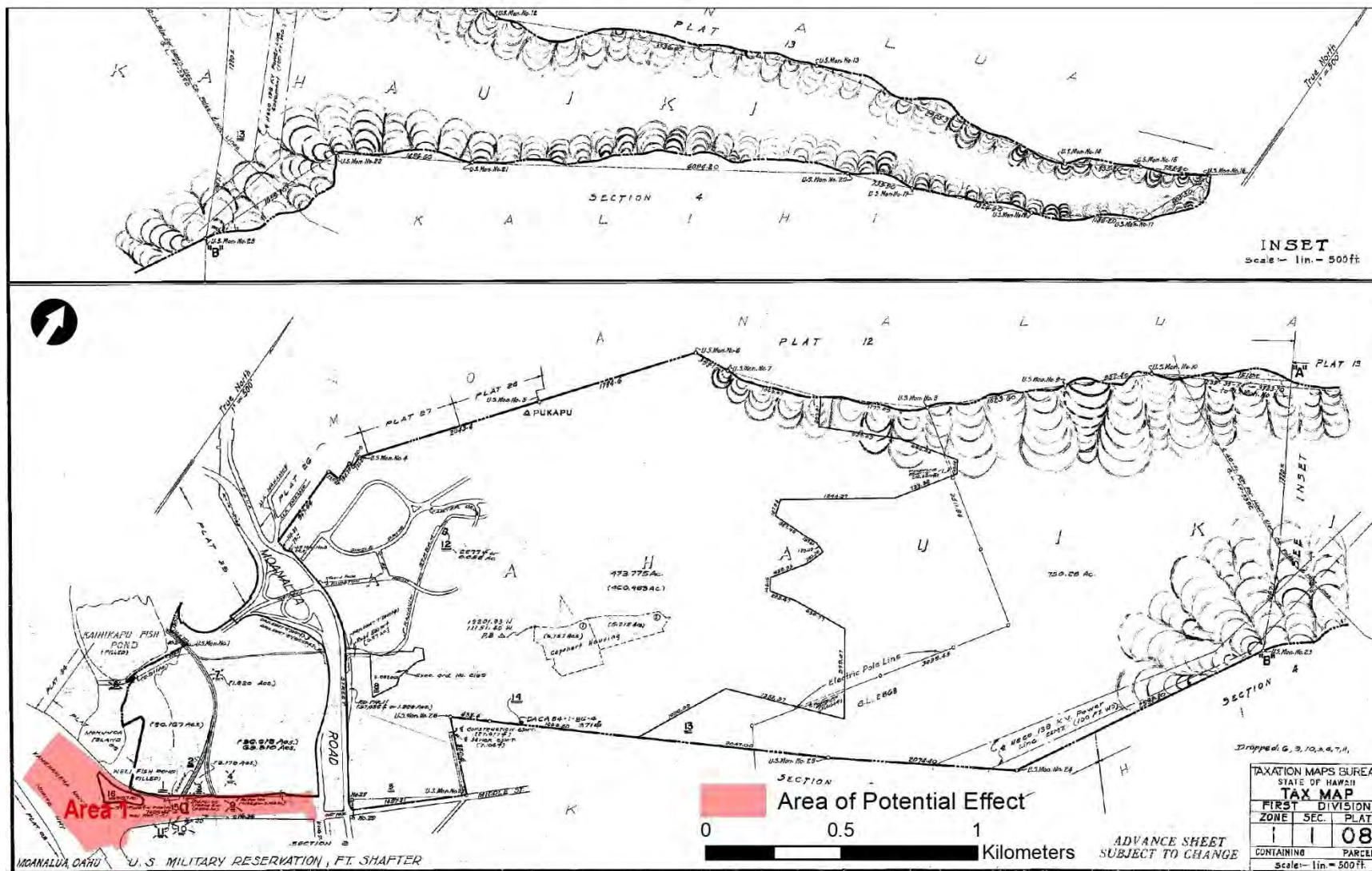


Figure B-3. Area of Potential Effect for Area 1 at Ke'ehi Interchange Shown on Plat Map 1-1-006 (Tax Maps Branch 2018).



**Figure B-4. Area of Potential Effect for Area 1 From Ke'ehi Interchange to H-1 Freeway and Middle Street Shown on Plat Map 1-1-008 (Taxation Maps Bureau 1933a).**

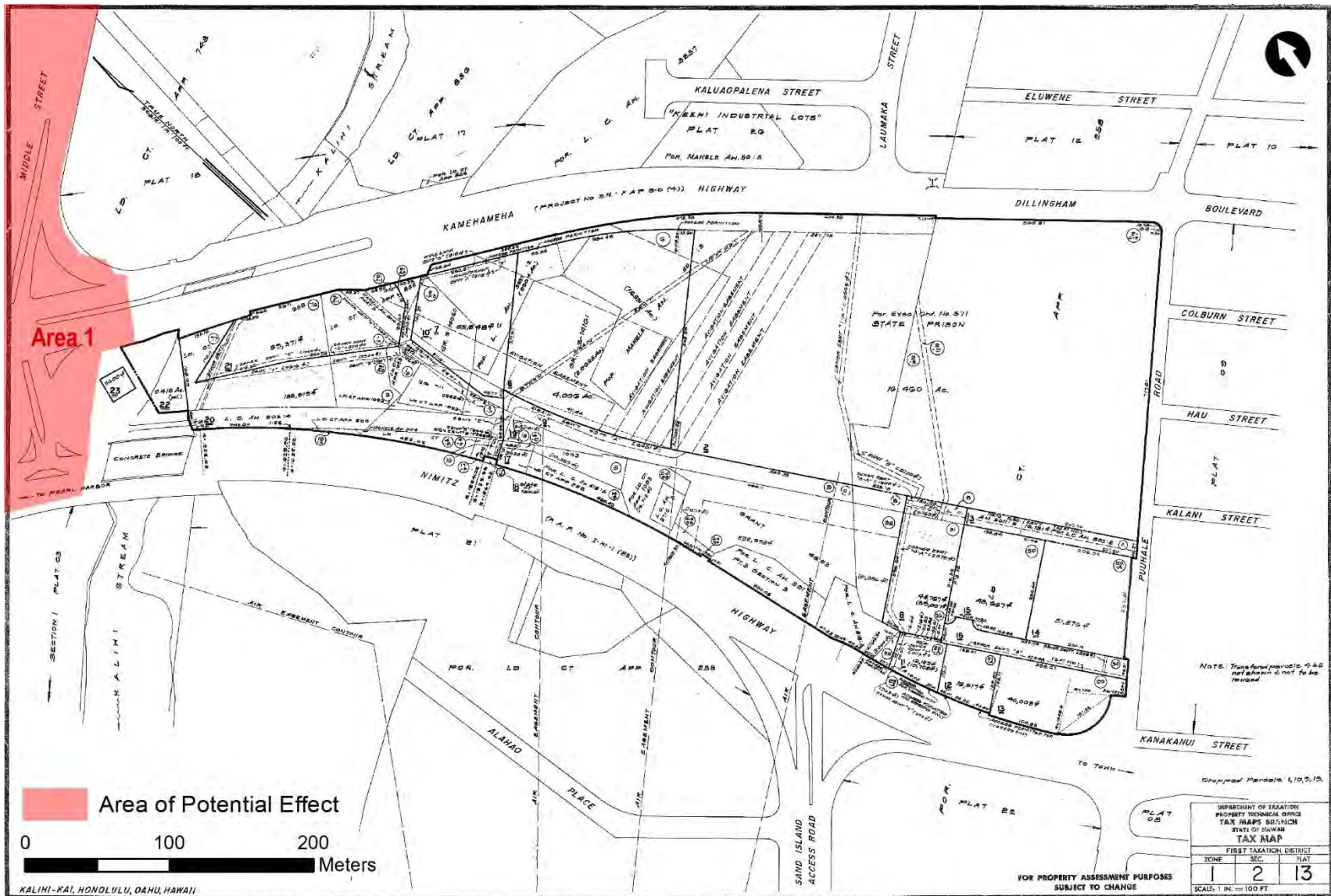


Figure B-4. Area of Potential Effect for Area 1 at Ke'ehi Interchange and Middle Street Shown on Plat Map 1-2-013 (Tax Maps Branch 1982).

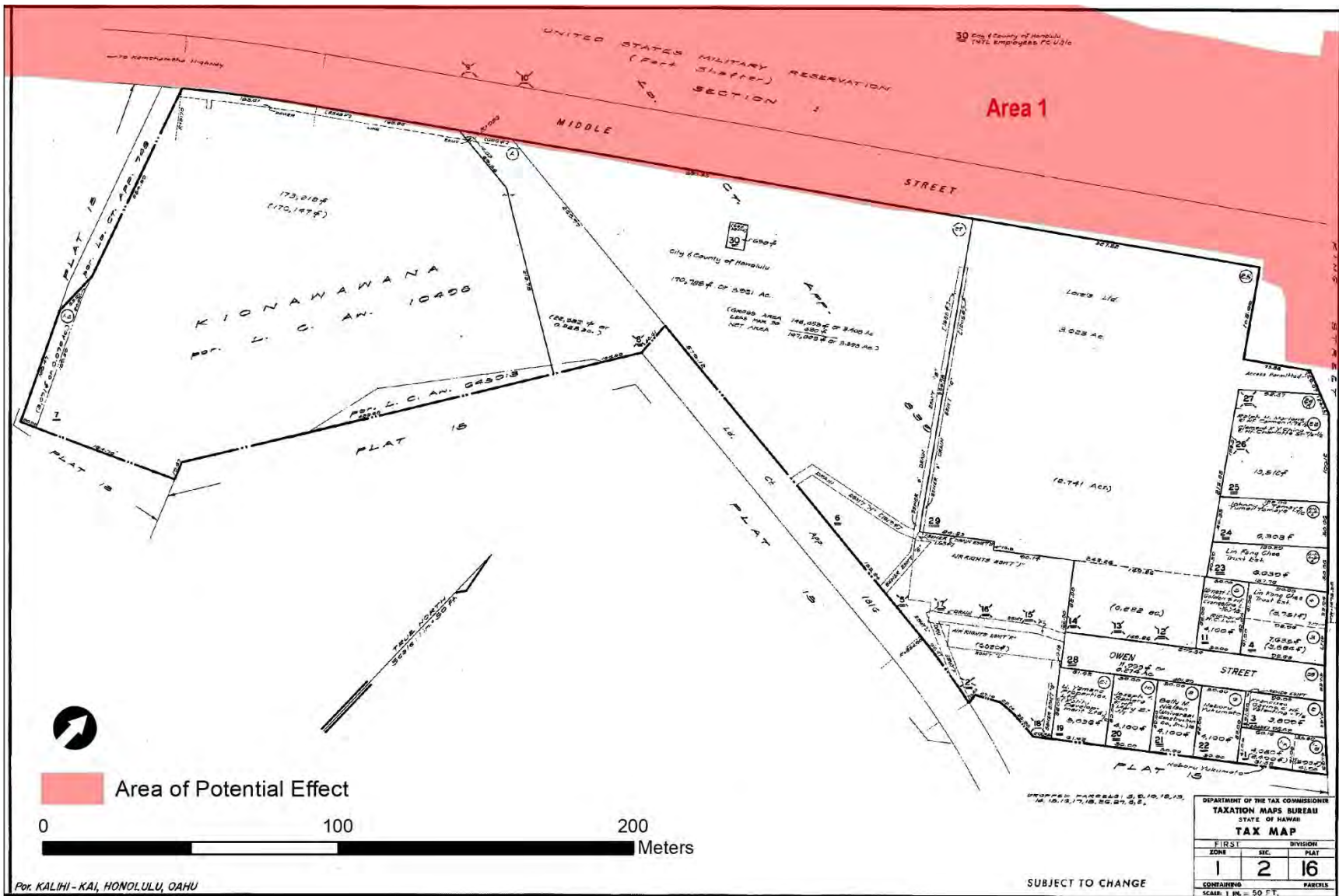


Figure B-5. Area of Potential Effect for Area 1 on Middle Street Shown on Plat Map 1-2-016 (Taxation Maps Bureau 1960).



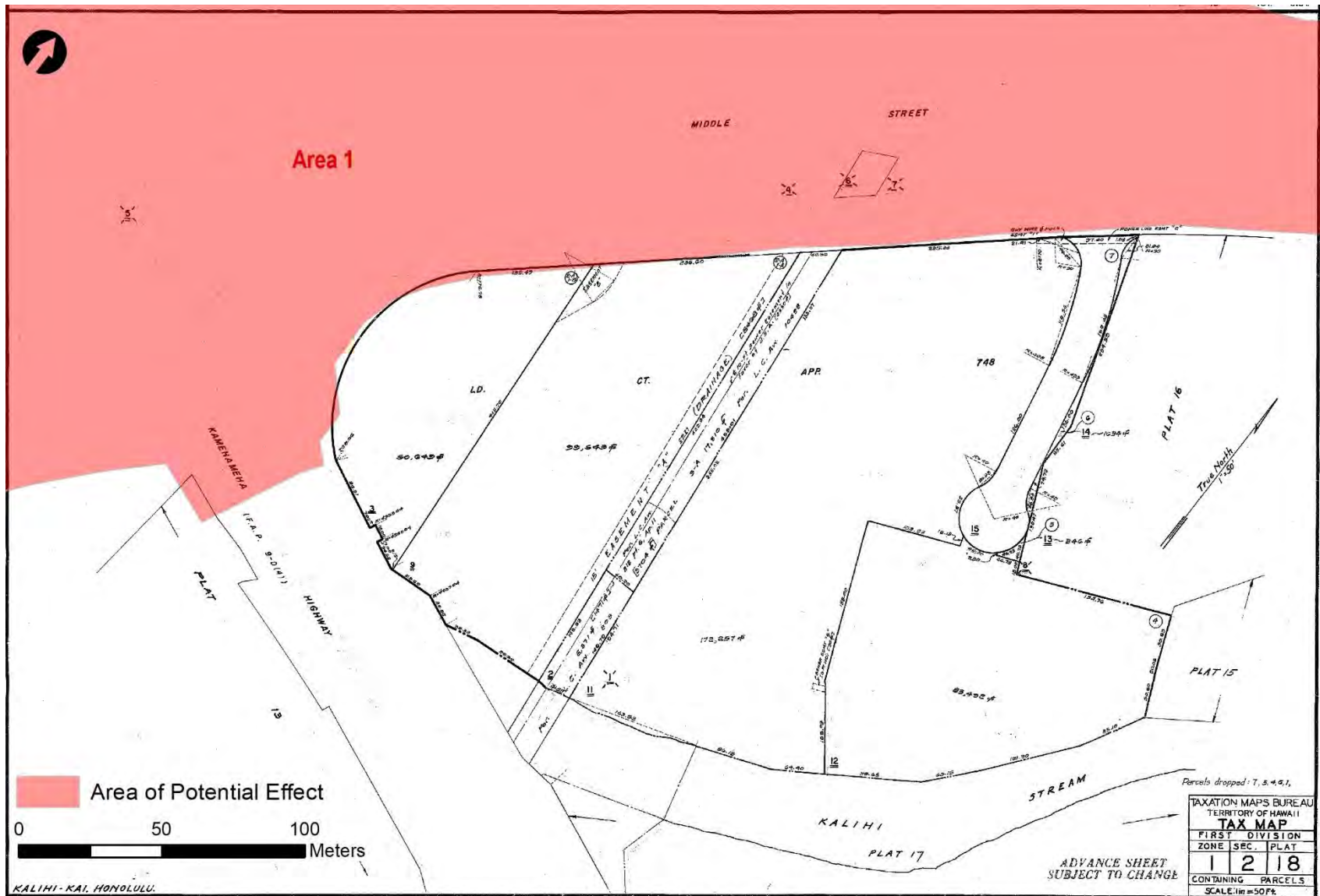


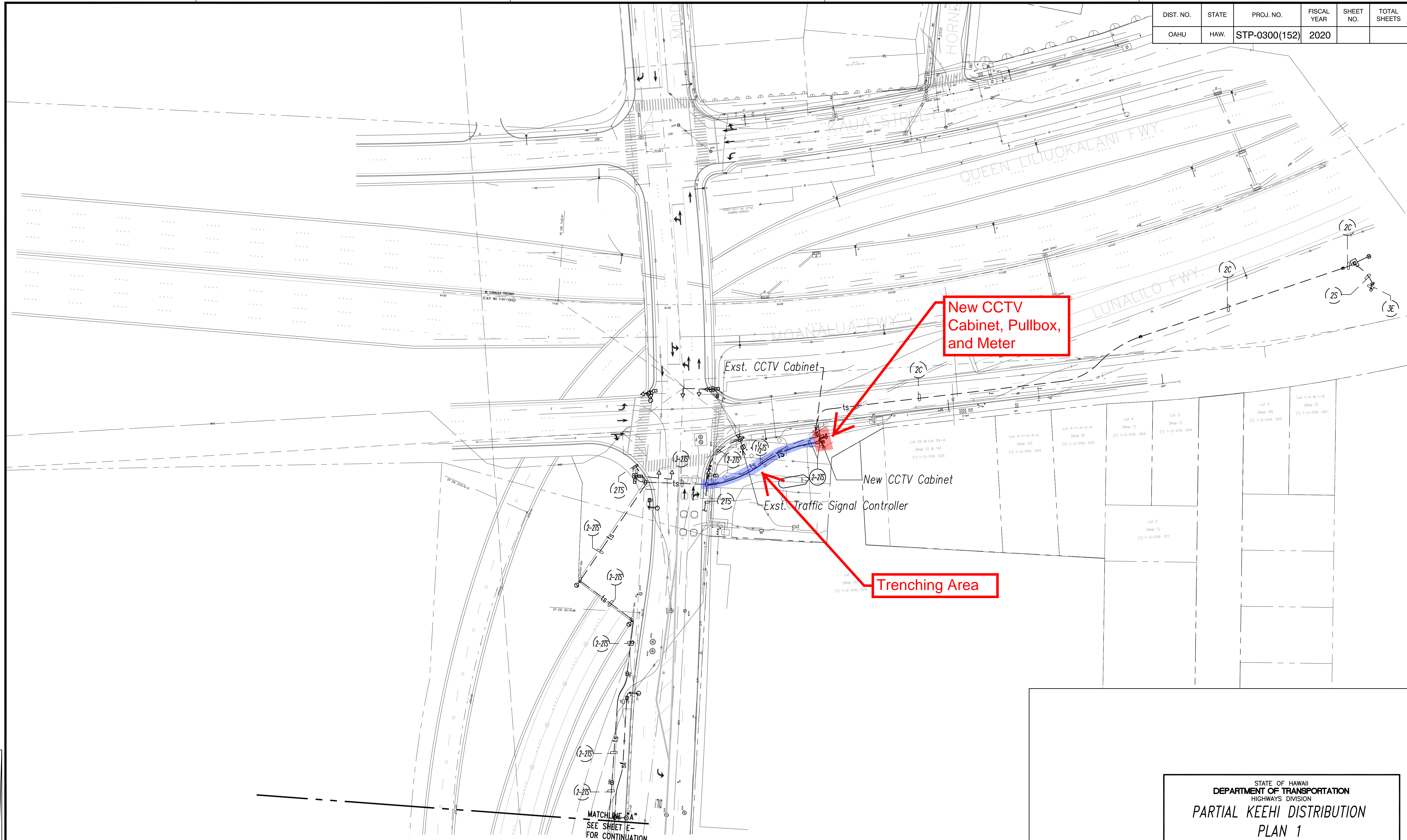
Figure B-6. Area of Potential Effect for Area 1 at Ke'ehi Interchange and Middle Street Shown on Plat Map 1-2-018 (Taxation Maps Bureau 1932).

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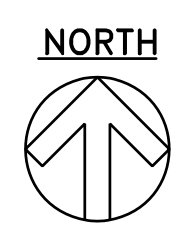
**APPENDIX C: SELECTED PROJECT SITE PLANS**

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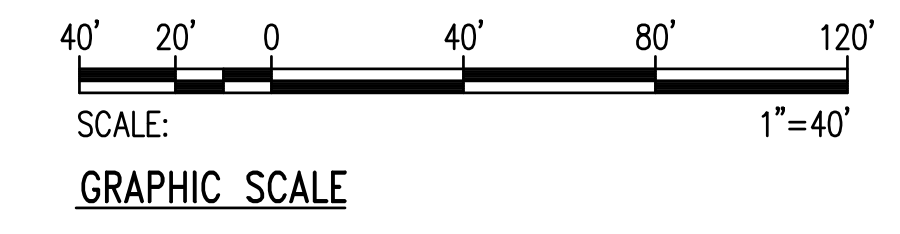
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	STP-0300(152)	2020		



DESIGNED BY	DATE
DRAWN BY	
TRACED BY	
NOTE BOOK	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	



**PARTIAL KEEHI ELECTRICAL DISTRIBUTION PLAN 1**  
SCALE: 1"=40'



MATCHLINE "A"  
SEE SHEET E-  
FOR CONTINUATION

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN H.A.R. TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

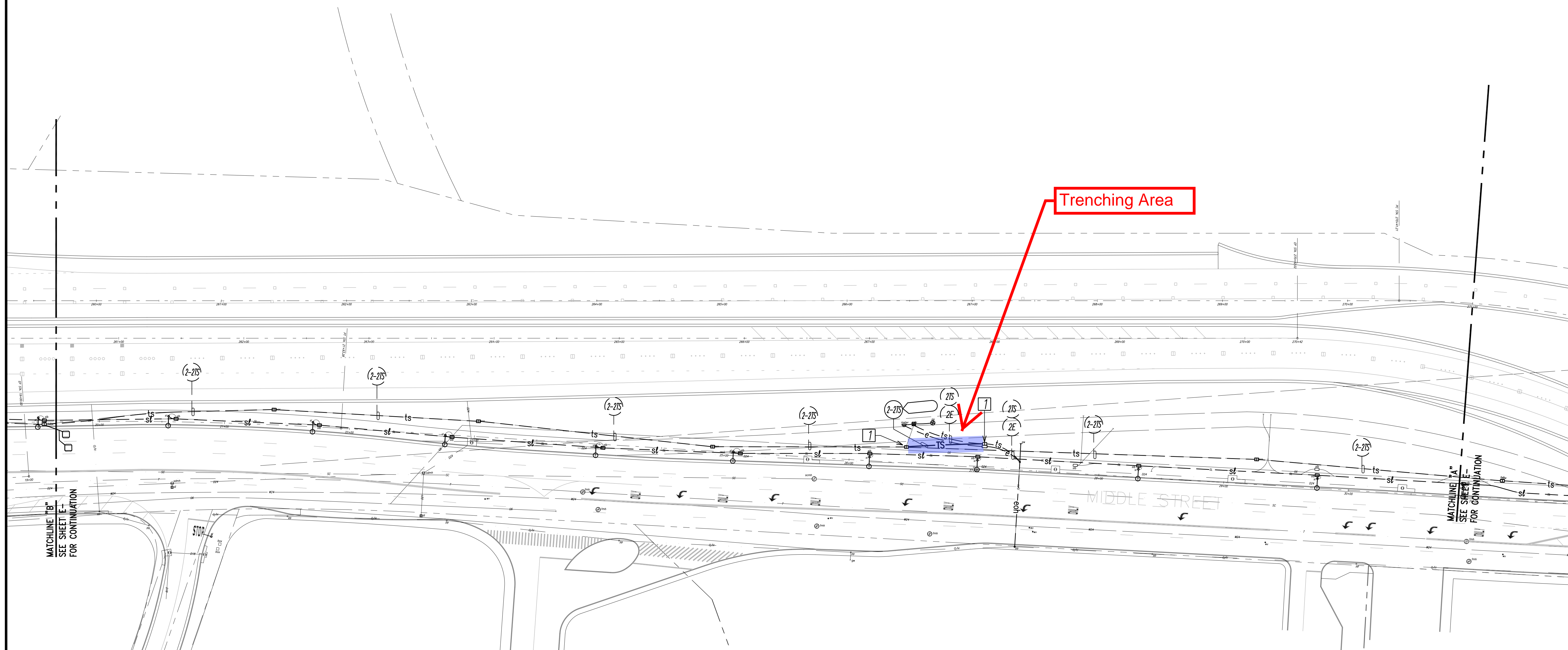
**PARTIAL KEEHI DISTRIBUTION PLAN 1**

*Freeway Management System  
Phase 3, Unit 1  
Federal Aid Project No.  
STP-0300(152)*

Scale: As Noted Date: \_\_\_\_\_

SHEET No. **E-** OF SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	STP-0300(152)	2020		



Trenching Area

MATCHLINE "B"  
SEE SHEET "E"  
FOR CONTINUATION

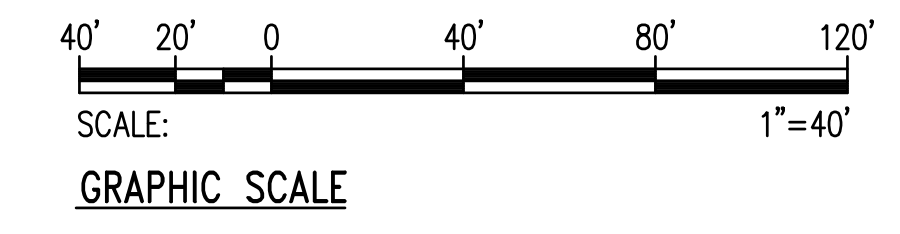
MATCHLINE "A"  
SEE SHEET "E"  
FOR CONTINUATION

**NOTE(S):**  
 1 Penetrate Existing Pullbox to Accommodate Conduit Installation.

DESIGNED BY	DATE
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	



**PARTIAL KEEHI ELECTRICAL DISTRIBUTION PLAN 2**  
 SCALE: 1"=40'



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN H.A.R. TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**PARTIAL KEEHI DISTRIBUTION PLAN 2**

*Freeway Management System  
 Phase 3, Unit 1  
 Federal Aid Project No.  
 STP-0300(152)*

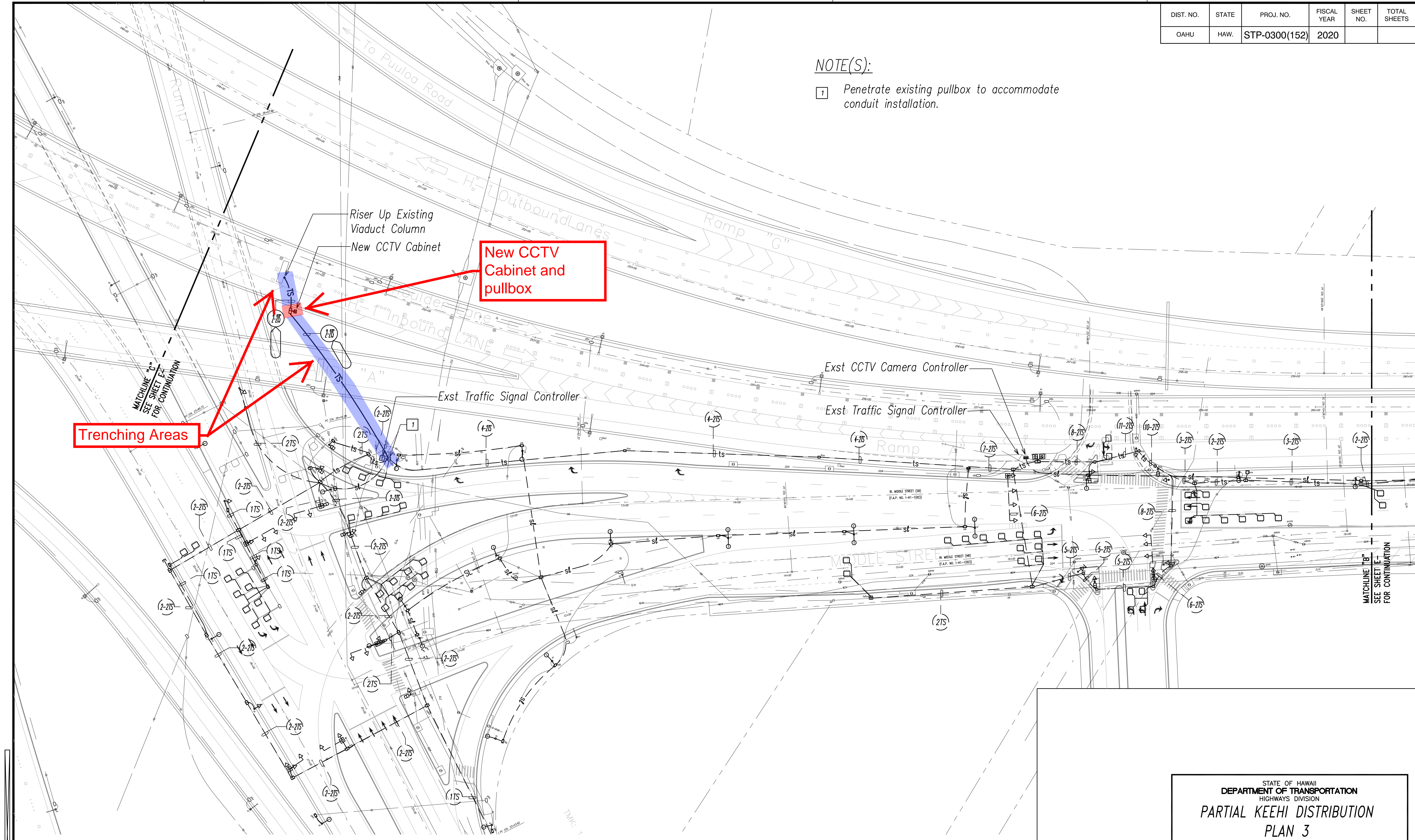
Scale: As Noted Date: \_\_\_\_\_

SHEET No. **E-** OF SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	STP-0300(152)	2020		

**NOTE(S):**

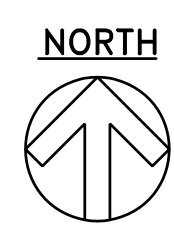
- 1 Penetrate existing pullbox to accommodate conduit installation.



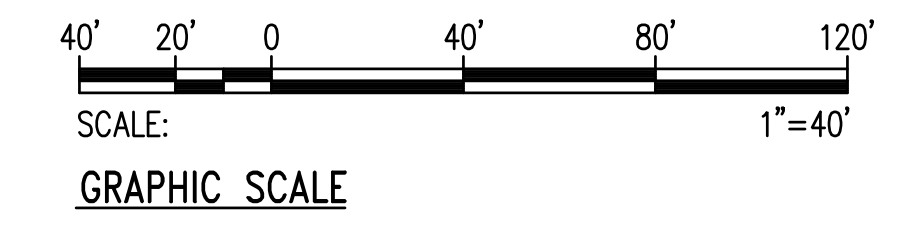
**Trenching Areas**

**New CCTV Cabinet and pullbox**

DESIGNED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	



**PARTIAL KEEHI ELECTRICAL DISTRIBUTION PLAN 3**  
SCALE: 1"=40'



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APRIL 30, 2020  
LIC. EXP. DATE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**PARTIAL KEEHI DISTRIBUTION  
PLAN 3**

*Freeway Management System  
Phase 3, Unit 1  
Federal Aid Project No.  
STP-0300(152)*

Scale: As Noted Date: \_\_\_\_\_

SHEET No. **E-** OF SHEETS