

CULTURAL SURVEYS HAWAII

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL DOCUMENTATION SERVICES - SINCE 1982



August 29, 2013

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Subject: Final End of Archaeological Data Recovery Fieldwork Letter for Archaeological Cultural Resource SIHP # 50-80-09-7751 within the Waipahu Transit Center Station, Honolulu High-Capacity Transit Corridor Project, Waikele Ahupua'a, 'Ewa District, Island of O'ahu
TMK: (1) 9-4-019:050, 061 por.

CSH Job Code: WAIKELE 2

Dear Ms. Thompson:

The purpose of this letter is to summarize the preliminary findings made during the archaeological data recovery investigation of SIHP #50-80-09-7751, an archaeological cultural resource identified during archaeological inventory survey investigations for the Honolulu High-Capacity Transit Corridor Project (HHCTCP) (Section 1) and located within the *makai* footprint of the HHCTCP Waipahu Transit Center Station (Hammatt 2010). The data recovery investigation was conducted by Cultural Surveys Hawai'i on April 29 and 30, 2013 in accordance with the research methods specified in the State Historic Preservation Department (SHPD)-approved data recovery plan (letter dated November 29, 2011; Log No. 2011.0902, Doc. No. 1111MV19) for the *Archaeological Data Recovery Plan for SIHP #50-80-09-7751, Waipahu Transit Center Station, Honolulu High-Capacity Transit Corridor Project, Waikele Ahupua'a, 'Ewa District, Island of O'ahu TMK: [1] 9-4-019:050, 061* (O'Hare et al. 2011). The project area is depicted on a U.S. Geological Survey 7.5-minute topographic map (Figure 1), on a tax map (Figure 2), and on a U.S. Geological Survey orthoimagery aerial photograph (Figure 3).

This letter seeks SHPD concurrence that the data recovery fieldwork has been adequately completed such that, per the Hawaii Administrative Rules (HAR) 13-275-3(a), "In cases where interim protection plans are adequately in place or data recovery fieldwork has been adequately completed, a determination letter may be issued." As outlined in the Section 106 Programmatic Agreement (PA) Stipulation III-E-2(c),



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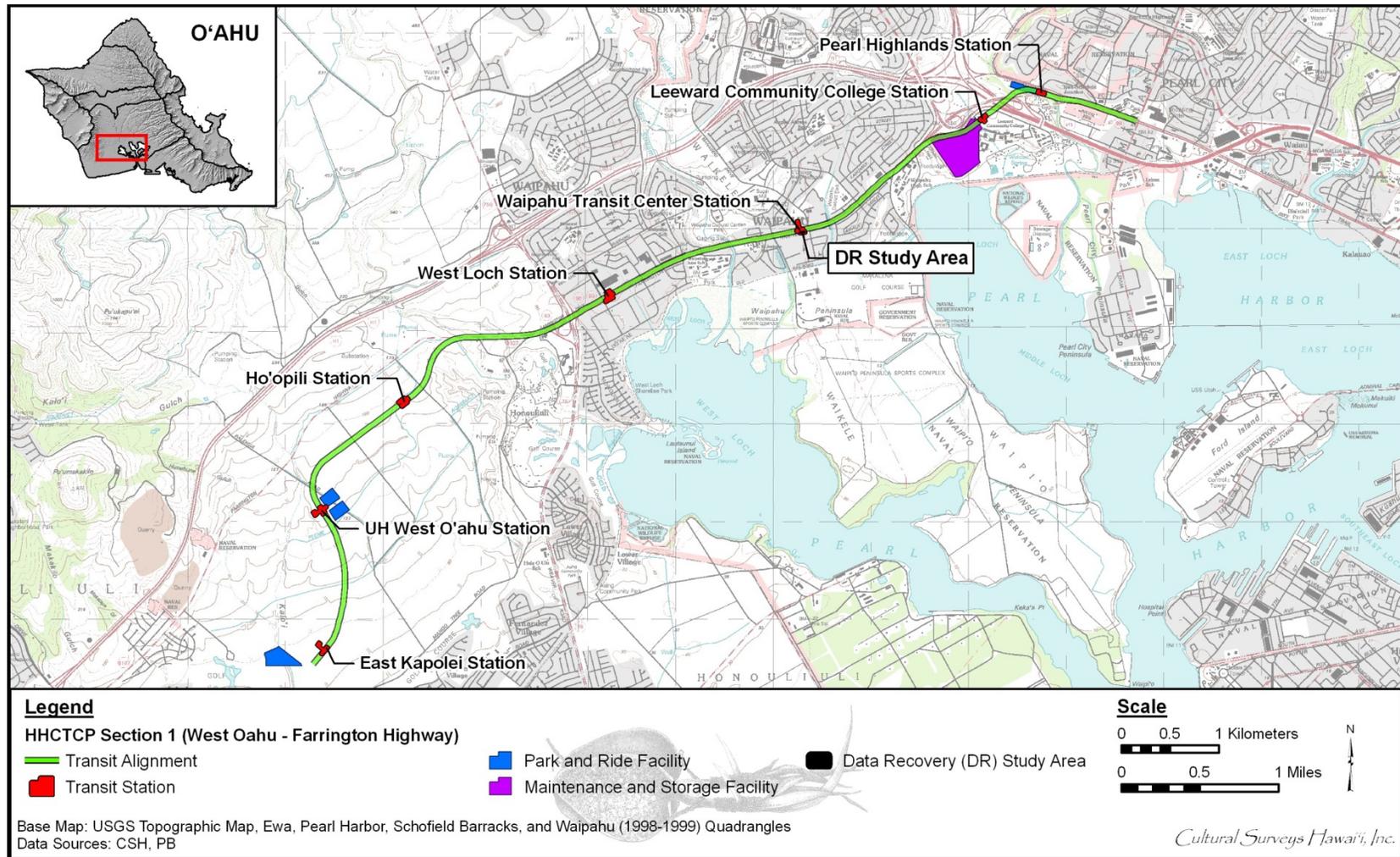


Figure 1. 1998 U.S. Geological Survey 7.5-minute topographic map, 'Ewa, Pearl Harbor, Schofield Barracks, and Waipahu Quadrangles, depicting the location of the Waipahu Transit Center Station and the Data Recovery study area in relation to the HHCTCP (Section 1) alignment

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Figure 3. 2005 aerial photograph depicting the proposed Waipahu Transit Center and the Data Recovery (DR) study area (U.S. Geological Survey orthoimagery)

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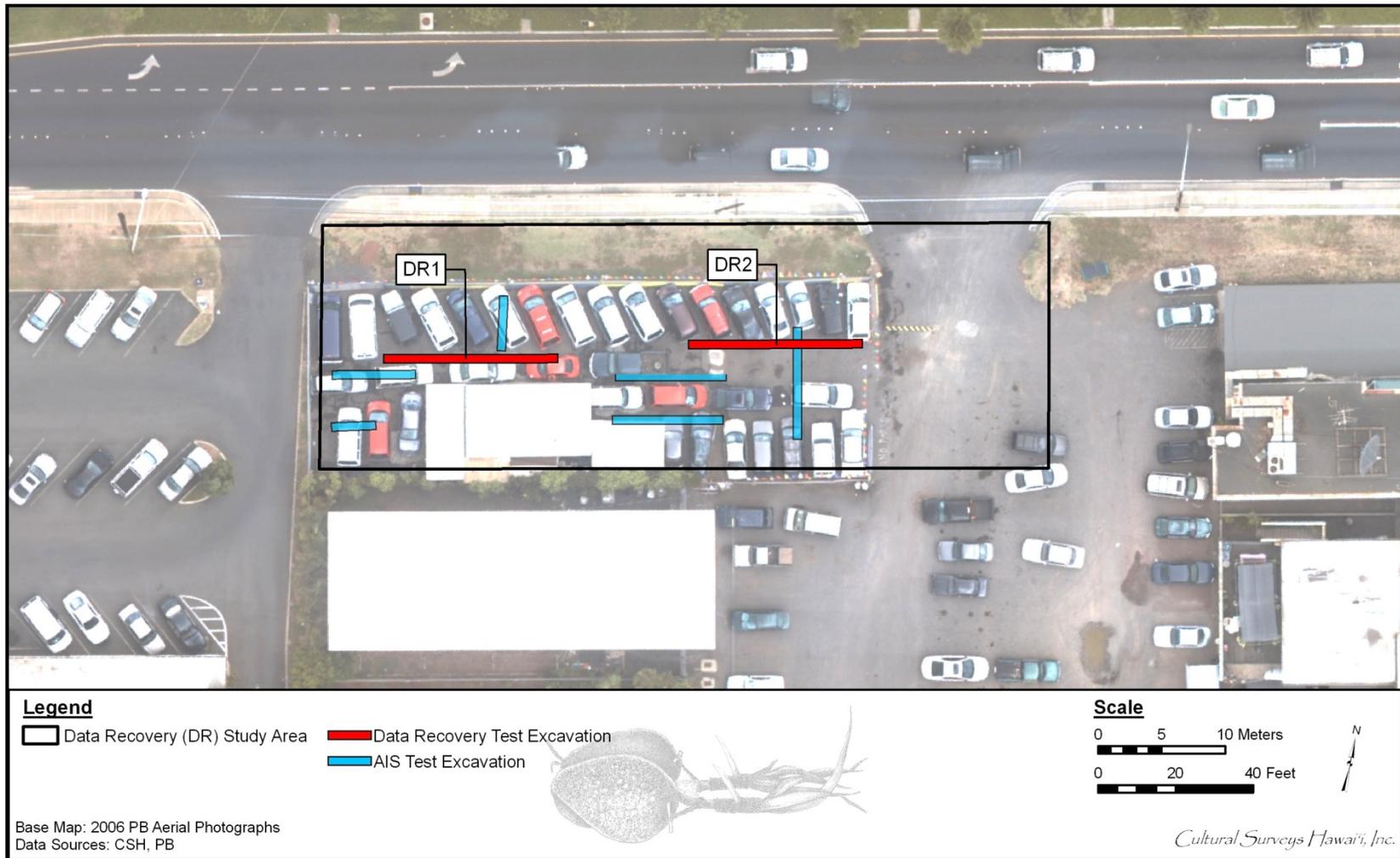


Figure 4. Aerial photograph showing the location of the data recovery test excavations (DR1 and DR2, in red) in relation to the six previously excavated AIS test excavations (in blue) (source: Google Earth 2005)

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“Completion of data recovery work must be verified by the SHPD prior to initiation of construction within the area of these sites.” This end of fieldwork letter is not intended to fulfill requirements of a data recovery report. A more thorough description of the data recovery investigation results will be presented in an archaeological data recovery report, which is currently in production, per HAR 13-278-4, and as referenced in the project PA Stipulation III-E-2(a).

Previous Archaeological Inventory Survey (AIS) Investigations

In 2009 and 2010, Archaeological Inventory Survey (AIS) investigations for the HHCTCP (Section 1) (Hammatt 2010) included six test excavations within the *makai* portion of the Waipahu Transit Center Station (Figure 4). A single cultural resource was identified, consisting of a subsurface agricultural deposit, interpreted as a traditional, pre-Contact irrigated *lo‘i* pondfield, buried beneath thick fill deposits. The cultural resource was designated SIHP #50-80-09-7751. The deposit consisted of dark clay sediments containing charcoal and abundant reddish-orange tubules that are typical of pondfield sediments in Hawai‘i. Radiocarbon dating results indicated SIHP #50-80-09-7751 formed approximately 1,000 years before present. Historic maps and documents indicated that the vicinity of the SIHP #50-80-09-7751 cultural deposit was formerly under relatively dense wetland taro cultivation.

Archaeological Inventory Survey Specifications

The AIS report for the HHCTCP (Section 1) (Hammatt 2010) provided the following assessments:

- A. Significance Assessment: SIHP #50-80-09-7751 is assessed as significant under Criterion D of the National and Hawai‘i Registers of Historic Places.
- B. Project Effect: Under Hawai‘i State historic preservation review legislation, CSH’s project-specific effect recommendation is “effect, with proposed mitigation commitments.” Under federal historic preservation review legislation, a project effect recommendation of “no adverse effect” is warranted, with the understanding that the proposed mitigation measures (described below) will be carried out to mitigate the undertaking’s potential effect on National register-eligible cultural resources.

Mitigation Recommendations: To reduce the proposed project’s potential effect on a significant cultural resource, an archaeological data recovery program is recommended. The data recovery program should be carried out within the project footprint of the *makai* (seaward) entrance building of the Waipahu Transit Center Station. This archaeological data recovery program will focus on further documentation of the stratigraphy and the collection of additional samples from the SIHP #50-80-09-7751 subsurface agricultural (*lo‘i* or pondfield) cultural deposit, which was identified during the current archaeological inventory survey. Six of the archaeological inventory survey test excavations documented SIHP #-7751 within the relatively small footprint of the *makai* entrance building of the Waipahu Transit Center Station. Construction of the station has potential to affect at least a portion of the SIHP #50-80-09-7751 subsurface deposit. No structural elements related to the agricultural deposits, such as pondfield berms, walls, or *‘auwai* (irrigation channels), were exposed within the six test excavations. Accordingly, the proposed data recovery excavations will likely not encounter these types of agricultural infrastructure within the relatively small area of the transit station footprint. The archaeological data recovery program will focus on further documentation of the buried sediment layer itself, including the collection of bulk sediment

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samples and column samples for palynological (pollen) and radiocarbon analysis. Column sediment samples will be used to better characterize the age and/or use-life of the agricultural sediment, its physical characteristics, and potentially changes in the surrounding environment over time. Should structural elements be located during data recovery excavations, the documentation of these features will provide additional information concerning SIHP #50-80-09-7751.

Data Recovery Plan

An archaeological data recovery plan was prepared for review and approval by the State Historic Preservation Division (SHPD) prior to project-related construction activities. In accordance with the Hawai'i Administrative Rules (HAR) 13-278, the data recovery plan described specific research objectives, data requirements, and methods. SHPD reviewed and approved the data recovery plan in a letter dated November 29, 2011 (Log No. 2011.0902, Doc. No. 1111MV19).

Based on the results of the AIS, and with the understanding that the archaeological data recovery program will be completed prior to project construction in the vicinity of SIHP #50-80-09-7751, no further archaeological mitigation measures were recommended for the remainder of the HHCTCP Construction Phase I project area.

Data Recovery Plan Specifications

The data recovery plan addressing SIHP #50-80-09-7751 (O'Hare et al. 2011) detailed specific research objectives, test excavation strategy, sample collection methodology, and proposed laboratory analysis. These specifications are summarized below:

- A. Research Objectives: The research objectives focused on two areas of investigation:
 1. The chronological history and construction/development of the pondfields, and
 2. The paleoenvironmental record within the alluvial sediments.
- B. Test Excavation Strategy: Two 10 m-long test excavations were specified within the data recovery plan, with excavation to proceed via backhoe to the water table.
- C. Sample Collection Methodology: Three types of sample collection methodology were specified within the data recovery plan, which consisted of bulk sediment samples, column samples, and coring samples.
 1. Bulk samples: Two 5 liter bulk sediment samples, one from each excavation, are to be screened in the field through 1/8-inch mesh screens, with additional bulk samples to be collected if subsurface features are identified.
 2. Column samples: Two column samples, one from each excavation, are to be collected for pollen analysis. The column samples are to be collected without the use of plastic tools and placed in aluminum foil or curation grade paper.
 3. Core samples: Core samples using a Livingston piston corer are to be extracted from the base of each excavation in order to sample the sediment below the water table. The corer should be cleaned between the collection of each sediment core and the samples stored in PVC core cases.

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- D. Laboratory Analysis: Lab work shall include screening of bulk samples; laboratory analysis of any artifacts and faunal remains; wood taxa identification analysis if applicable; radiocarbon dating; pollen analysis; and micro charcoal particle quantification.

Data Recovery Investigation Procedures and Preliminary Results

Test Excavations

As stated in the data recovery plan, two 10 m-long test excavations were machine excavated within the *makai* portion of the Waipahu Transit Center Station and were designated DR1 and DR2 (see Figure 4). The test excavation locations were selected based on the locations of the previous AIS test excavations and on the results of Ground Penetrating Radar (GPR) analysis (indicating any potential subsurface utility conflicts). Both test excavations were excavated to the water table (Figure 6 and Figure 9). In the case of DR1, which contained a concrete utility jacket in the western end of the excavation and a localized area of petroleum contamination in the eastern portion of the excavation, only the central portion of the test excavation was able to be fully excavated.

Stratigraphy

The stratigraphy within test excavations DR1 and DR2 consisted of fill deposits (Ia-Ic) between 80 and 117 cmbs, overlying natural alluvial sediment (IIa-IIc) (Figure 5 through Figure 10, Table 1, and Table 2). The natural alluvium was consistent with agricultural pondfield sediment. Stratum IIa consisted of a dark gray clay loam with abundant orangish-red mottling and charcoal flecking (Figure 14). Within DR2, Stratum IIa overlay a thick (70 cm) deposit of similar sediment (IIb), which varied slightly in color (brown) and contained less mottling and less charcoal flecking (Figure 15). The lowest stratum in DR1 and DR2, Strata IIb and IIc respectively, consisted of black clay loam which contained grass-like organic material and charcoal (Figure 16).

Samples Collected

Bulk samples: Six bulk samples (3 to 4.5 liters each) were collected from the floor of test excavation DR1, Stratum IIb (Figure 7). Stratum IIb within DR1 consists of dark organically-enriched pondfield/wetland sediment with charcoal inclusions. In addition, four 4-liter bulk samples were collected from the sidewalls of test excavation DR2, Strata IIa and IIb (two samples from each stratum) (Figure 9). These strata consist of pondfield sediment with oxidized mottles and charcoal inclusions. Attempts to screen the bulk samples in the field were unsuccessful due to their high clay content. As an alternative, the samples were wet screened through 1/8-inch mesh in the laboratory.

Column samples: Two column samples, consisting of six discrete samples each, were collected from DR1, Strata IIa and IIb (Figure 6). One column sample, also consisting of six samples, was collected from DR2, Strata IIa and IIb (Figure 9). The column samples were collected using a metal implement that was cleansed with distilled water before each sample collection in order to prevent sample contamination. The samples were placed directly into aluminum foil packets.

Coring samples: Two cores were collected from the floor of each test excavation (Figure 7 and Figure 10). The Livingston Piston Corer (LPC) was unable to be used because the sediments were too stiff and not saturated enough for successful extraction of cores. Instead, a PVC coring method was employed to

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extract core samples. To obtain core samples, a PVC pipe was placed in the desired sample location and manually hammered into the underlying sediments (Figure 11). Once the PVC core could not be forced deeper, the core was capped and extracted with mechanical assistance from the excavator (Figure 12 and Figure 13). These cores were utilized to extract samples of unexcavated sediment beneath the water table. Each of the four cores extracted approximately 40 cm of sediment below the base of excavation.

Summary and Conclusions

A total of eight test excavations have been completed within the *makai* portion of the Waipahu Transit Center Station, six excavations conducted as part of the project's AIS investigation and two excavations conducted as part of the current Data Recovery investigation. The eight test excavations documented similar stratigraphy consisting of a thick layer of fill deposits overlying agricultural pondfield and wetland sediments.

Data recovery test excavations DR1 and DR2 documented the presence of agricultural pondfield sediments at a depth of 117 cmbs (DR1) and 80 cmbs (DR2). The pondfield sediments consisted of a dark gray or brown clay loam containing strong reddish mottling and charcoal flecking. An underlying layer of black clay loam with organic, grass-like material was also present at the water table.

No discrete features, such as pondfield berms, *'auwai* (irrigation ditches), or other structural remains were identified during the AIS or Data Recovery investigations. The absence of such features indicates that the *makai* area of the Waipahu Transit Center Station is located within the interior of a single, relatively large pondfield. An 1899 map of the Waikele Stream area (Figure 17) shows a mosaic of Land Commission Awards (LCAs) within the lowlands along the stream. Various pondfields, depicted by dashed lines, indicate many such large fields in this area. GIS overlay mapping locates the majority of the Waipahu Transit Center Station within a single field (awarded as part of Grant 127 to Wm. Ap. Jones).

A full analysis of this archaeological cultural resource (SIHP #50-80-09-7751) will be provided in a Data Recovery report following the completion of all laboratory analyses. The results of bulk sample wet screening, pollen studies, wood taxa speciation, radiocarbon dating of potential charcoal samples, and micro charcoal particle quantification may help further inform on the chronological history and development of the pondfield as well as on the impact of human activities on the wider ecosystems during the pre-Contact period.

Based on the results of the archaeological data recovery investigation and in agreement with the AIS for the HHCTCP (Section 1) project effect and mitigation recommendations, completion of the Data Recovery report shall conclude the archaeological mitigation measures for cultural resource SIHP #50-80-09-7751.

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Figure 5. Photograph of test excavation DR1 profile, view to southeast

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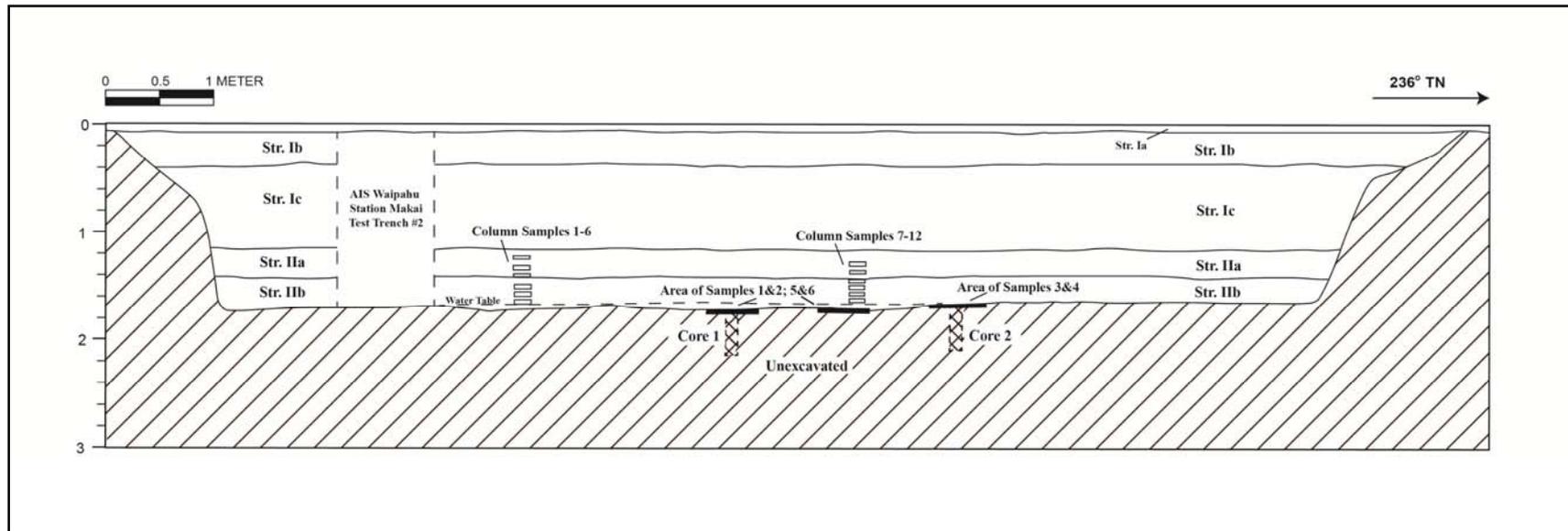


Figure 6. Profile of test excavation DR1, south wall; Samples 1-6 and Cores 1-2 are shown in the profile relative to their locations on the test excavation floor (see plan view below)

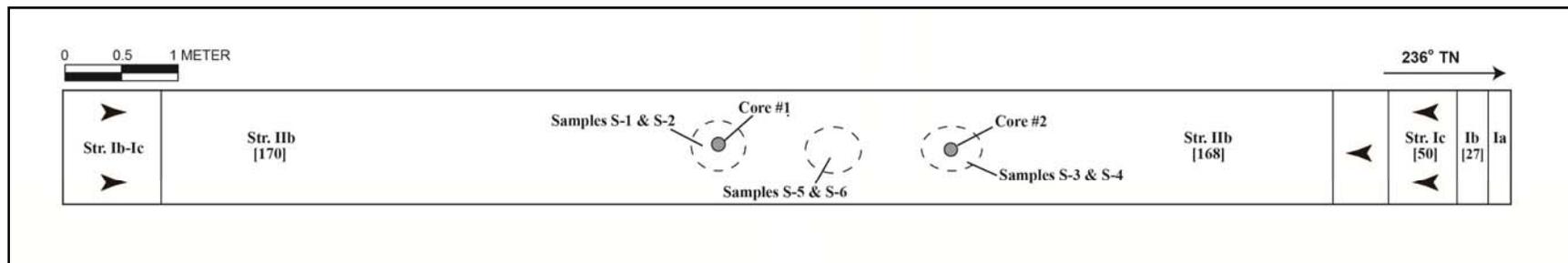


Figure 7. Plan view of test excavation DR1, showing the locations of six bulk samples and two Livingston cores

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Table 1. Stratigraphy Observed in Test Excavation DR1

Stratum	Depth (cmbs)	Description
Ia	0-7	Asphalt
Ib	7-38	Fill; 2.5 YR 3/4 (dark reddish brown); extremely gravelly silty loam; structureless; moist, loose consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; base course
Ic	38-117	Fill; 2.5 Y 4/1 (dark gray) with 50% striations of 10 YR 5/6 (yellowish brown); silty clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; striated fill
IIa	117-142	Natural; 10 YR 4/2 (dark gray) with 30% mottles of 5 YR 3/4 (dark reddish brown); clay loam; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; clear, smooth lower boundary; contained charcoal flecking and pieces and oxidized organic material; agricultural pondfield sediment (SIHP # 50-80-09-7751)
IIb	142-170 (BOE)	Natural; 10 YR 2/1 (black); clay loam; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; lower boundary not visible; contained grass-like organic material; wetland sediment (SIHP # 50-80-09-7751)

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Figure 8. Photograph of test excavation DR2 profile, view to southeast

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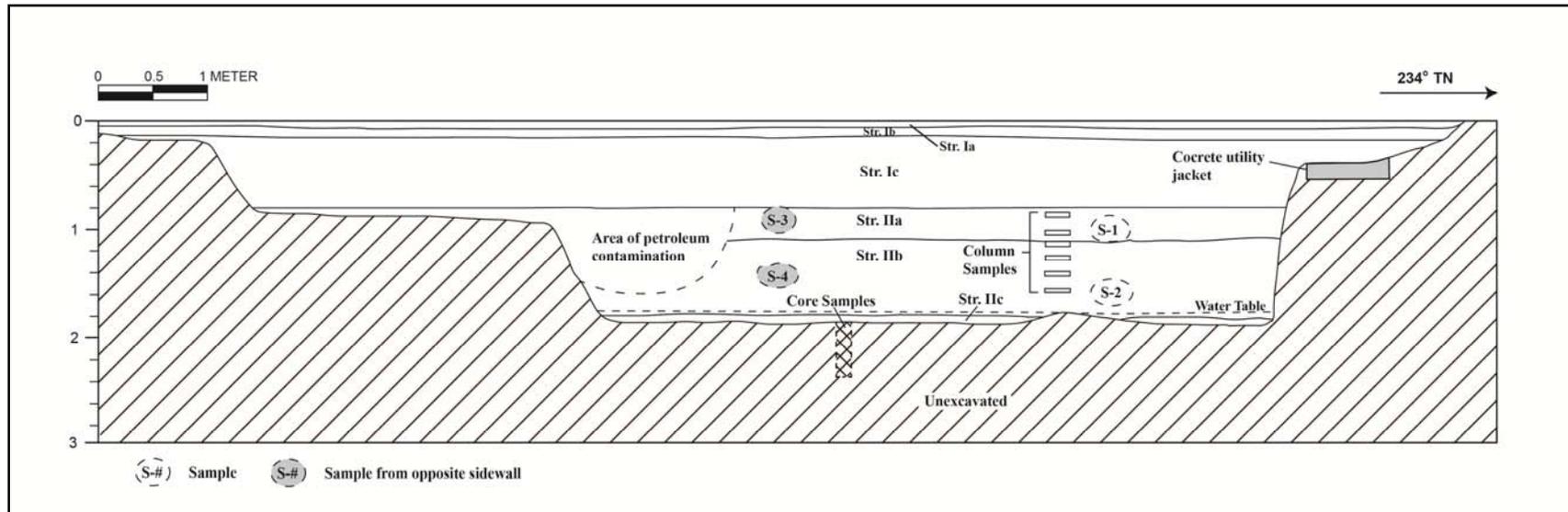


Figure 9. Profile of test excavation DR2, south wall; Cores 1-2 are shown in the profile relative to their locations on the test excavation floor (see plan view below)

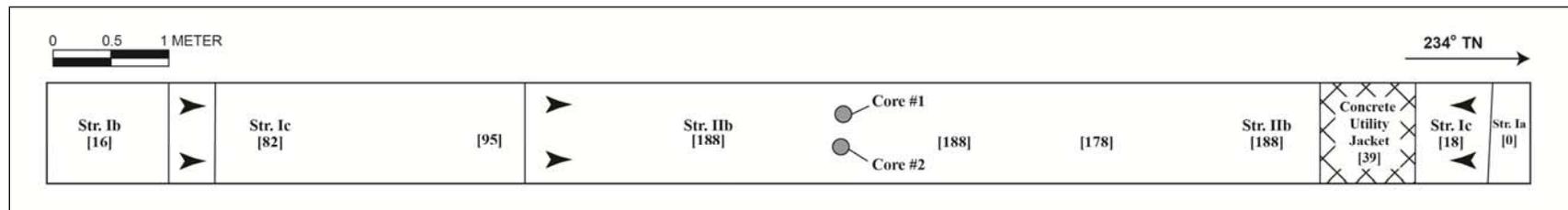


Figure 10. Plan view of test excavation DR2, showing location of two Livingston piston cores

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Table 2. Stratigraphy Observed in Test Excavation DR2

Stratum	Depth (cmbs)	Description
Ia	0-7	Asphalt
Ib	7-15	Fill; 2.5 Y 7/3 (pale yellow); crushed coral; structureless; moist, loose consistency; non-plastic; marine origin; base course
Ic	15-80	Fill; 10 YR 3/4 (dark yellowish brown); clay loam; moderate, medium, crumb structure; moist, firm consistency; plastic; terrigenous origin; abrupt, smooth lower boundary; contained water-worn bivalve fragments
IIa	80-110	Natural; 10 YR 4/2 (dark gray) with 30% mottles of 10 R 3/6 (dark red); clay loam; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; clear, smooth lower boundary; contained charcoal flecking and pieces and oxidized organic material; agricultural pondfield sediment (SIHP #50-80-09-7751)
IIb	110-180	Natural; 10 YR 4/3 (brown) with 30% mottles of 5 YR 4/6 (yellowish red); clay loam; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; clear, smooth lower boundary; contained charcoal flecking and oxidized organic material; agricultural pondfield sediment (SIHP #50-80-09-7751)
IIc	180-188 (BOE)	Natural; 10 YR 2/1 (black); clay loam; strong, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; lower boundary not visible; contained grass-like organic material; wetland sediment (SIHP #50-80-09-7751)

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Figure 11. This photograph shows an earlier step in the process of the PVC core method. Here the core has been placed in appropriate sample location and is ready to be forced into deeper sediments. The PVC is forced deeper using the red hammering device that is repeatedly lifted and dropped down onto the PVC core.

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Figure 12. This photograph shows a later step in the process of the PVC core method. Here the top opening is capped and the PVC core is prepped for extraction.

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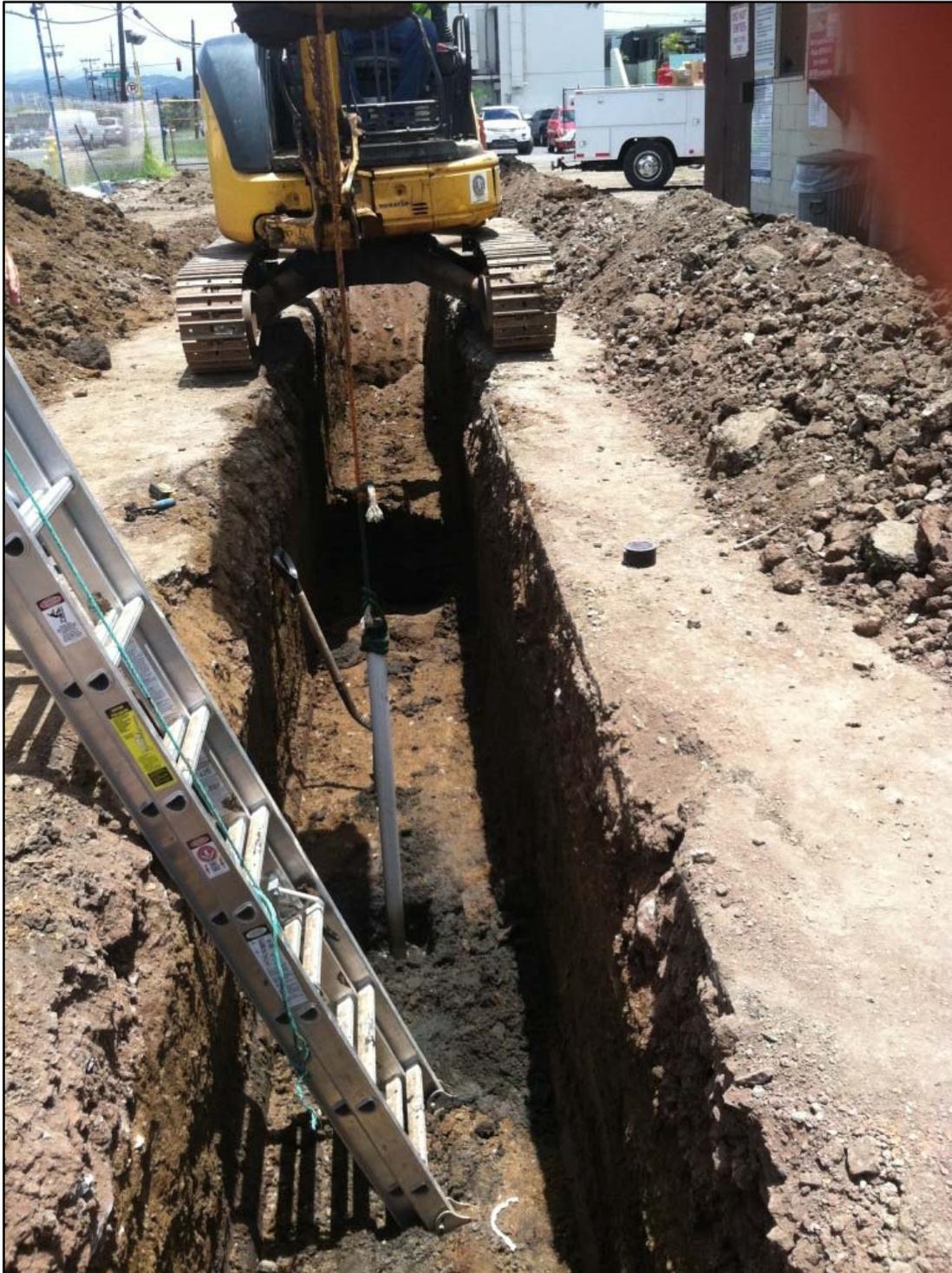


Figure 13. This photograph shows the last step in the process of the PVC core method. The PVC core is successfully extracted with assistance from the machine excavator.

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Figure 14. Sample from Stratum IIa within test excavation DR2, showing the abundant orangish-red mottling from plant material



Figure 15. Sample from Stratum IIb within test excavation DR2, showing dark red stain of remnant plant material

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Figure 16. Sample from Stratum IIb within test excavation DR1 (equivalent to Stratum IIc in DR2), showing black clay loam with oxidized plant remnants

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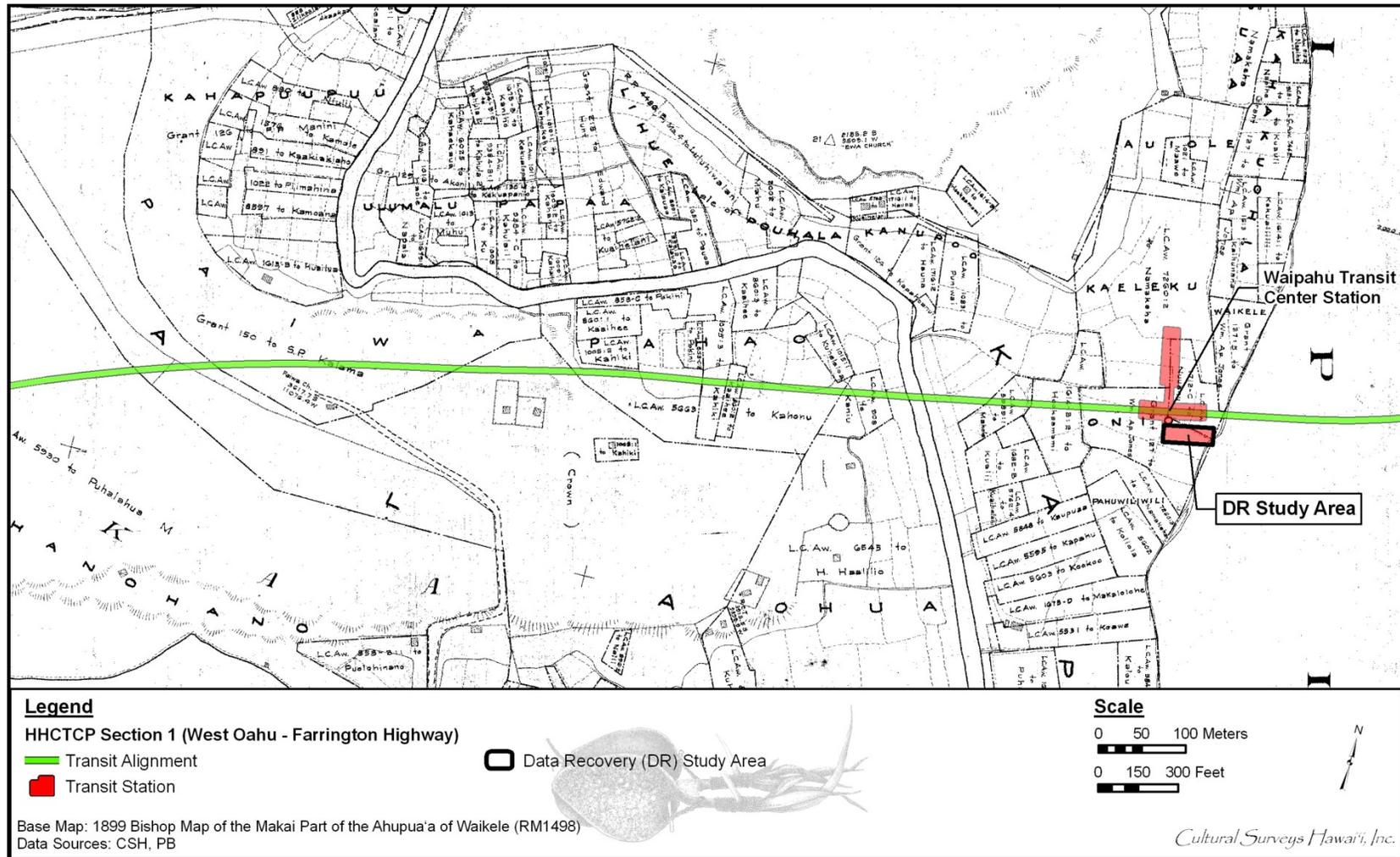


Figure 17. This 1899 map of Waikele (portion) by S. E. Bishop depicts clusters of LCA claims adjacent to Waikele Stream. The majority of the Data Recovery study area is located within Grant 127 to Wm. Ap. Jones, with a portion in LCA 1712-C to Nuuanu (Registered Map No. 1498, Hawai'i Land Survey Divisions). Individual *lo'i* fields are demarcated by dashed lines.

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Bishop, S.E.

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Hawai'i TMK Service

Tax Map Key: [1] 9-4-019. Hawai'i TMK Service, 222 Vineyard St., Suite 401, Honolulu.

O'Hare, Constance R., Chris Monahan, and Hallett H. Hammatt

2011 *Archaeological Data Recovery Plan for SIHP # 50-80-09-7751, Waipahu Transit Center Station, Honolulu High-Capacity Transit Corridor Project, Waikele Ahupua'a, 'Ewa District, Island of O'ahu* TMK: [1] 9-4-019:050, 061. Cultural Surveys Hawai'i, Kailua, Hawai'i.

U.S. Geological Survey

1998 U.S. Geological Survey 7.5 minute topographic map, Ewa, Pearl Harbor, Schofield Barracks, and Waipahu Quadrangles. Available at U.S. Geological Survey Maps/U.S. Department of War Maps, USGS Information Services, Box 25286, Denver.

2005 U.S. Geological Survey orthoimagery (aerial photograph). Available at U.S. Geological Survey Maps/U.S. Department of War Maps, USGS Information Services, Box 25286, Denver.