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December 13, 1995

Mr. Gary Gill, Director
Office of Environmental Quality Control
220 South King Street, 4th Floor
Honolulu, HI 96813

FINAL ENVIRONMENTAL ASSESSMENT (EA) FOR DEPARTMENT OF WATER SUPPLY
OFFICE BUILDING
TAX MAP KEY 3/2-4-57:PORTION 1, SOUTH HILO DISTRICT, HAWAII

The County of Hawaii, Department of Water Supply has reviewed the comments received during the 30-day public review period which began on June 8, 1995. We have determined that this project will not have significant environmental effects and hereby issue this negative declaration. Please publish this notice in your December 1995 OEQC bulletin.

We have enclosed a completed OEQC Bulletin Publication Form and four (4) copies of the Final EA. Please contact Mr. Gary Kawasaka at 969-1421 if you have any questions.

Milton D. Pavao, P.E.
Manager

GK

Enc.

copy - Hawaii District Land Agent, DLNR

Correction:
The requested publication date should read "January 1996."
Roy Takumi

1996-01-08-HI-FEA- Dept of Water Supply Office Bldg

Final Environmental Assessment

DEPARTMENT OF WATER SUPPLY OFFICE BUILDING

Waiakea, South Hilo District, Hawaii

Prepared for:
Department of Water Supply
County of Hawaii

Prepared by:
Roy R. Takemoto
Land Use Consultant
P.O. Box 10217
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November 21, 1995

water dept.
1) county proposes office bldg. on state lands next to UH Hilo-
biggest owners
2) Scattered archaeological sites present. All of them impt. for data collection purposes which have been completed. ~~[illegible]~~ recovery (DLNR reviewing the collected data)

3/ All other comments have been adequately addressed.

APPENDICES

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FINAL EA: DWS OFFICE SITE

1.0 INTRODUCTION

1.1 *Proposing Agency*

The proposing agency, the County of Hawaii Department of Water Supply ("DWS"), proposes to build an office for its administrative functions. The use of State or County land and/or funds trigger the environmental review requirements under Chapter 343, Hawaii Revised Statutes.

1.2 Agencies Consulted

The following agencies and organizations were consulted in the process of preparing this environmental assessment or during the public review period:

- Federal
  - U.S. Army Corps of Engineers
  - U.S. Department of the Interior, Fish and Wildlife Services
- State
  - Department of Health
  - Department of Land and Natural Resources
  - Office of State Planning
  - Department of Accounting and General Services
  - University of Hawaii at Hilo
- County
  - Planning Department
  - Department of Public Works
  - Fire Department
  - Police Department
  - Civil Defense

2.0 DESCRIPTION OF PROPOSED ACTION

2.1 Location and Ownership

The location of the proposed DWS Office is a 4.5-acre portion of an approximately 11.1-acre parcel in Waiakea, South Hilo District, island and county of Hawaii (see Figure 1, "Location Map," on page 3) ("Site"). The State owns the parcel (TMK 3/2-4-57:01). DWS intends to subdivide the parcel to create the Site as a separate lot, and request the State to lease or transfer the Site to the County Water Commission by Executive Order.

2.2 Existing and Surrounding Uses

The Site is vacant and overgrown with vegetation. Stone terraces and mounds, discussed in Section 3.1.5, "Historic/Archaeological Resources," on page 9, are scattered throughout the Site.

Surrounding Areas. Surrounding uses include (see Figure 2, "Surrounding Land Uses," on page 4):

- North: On another portion of the parcel, the Department of Health has proposed a day activity center for developmentally disabled adults (2.0 acres)[1]. The Episcopal Church of Hawaii borders the Site to the north along Kapiolani Street. The Hilo Meishoin Church also borders the Site to the north between the Site and Ululani Street.
- East: A convenience store is located to the east at the northwest corner of the intersection of Kawili and Kinoole Streets. HELCO has a switch station on another portion of the parcel between the Site and the convenience store.
- South: Kawili Street borders the Site's southern boundary. Across the street are Waiakea High School and a small residential area.
- West: Kapiolani Street borders the western boundary. Across the street is the University of Hawaii at Hilo.

1. MPAC, Project Development Report: Hilo Day Activity Center, prepared for State of Hawaii Department of Accounting and General Services, July 1993.

FIGURE 1. Location Map

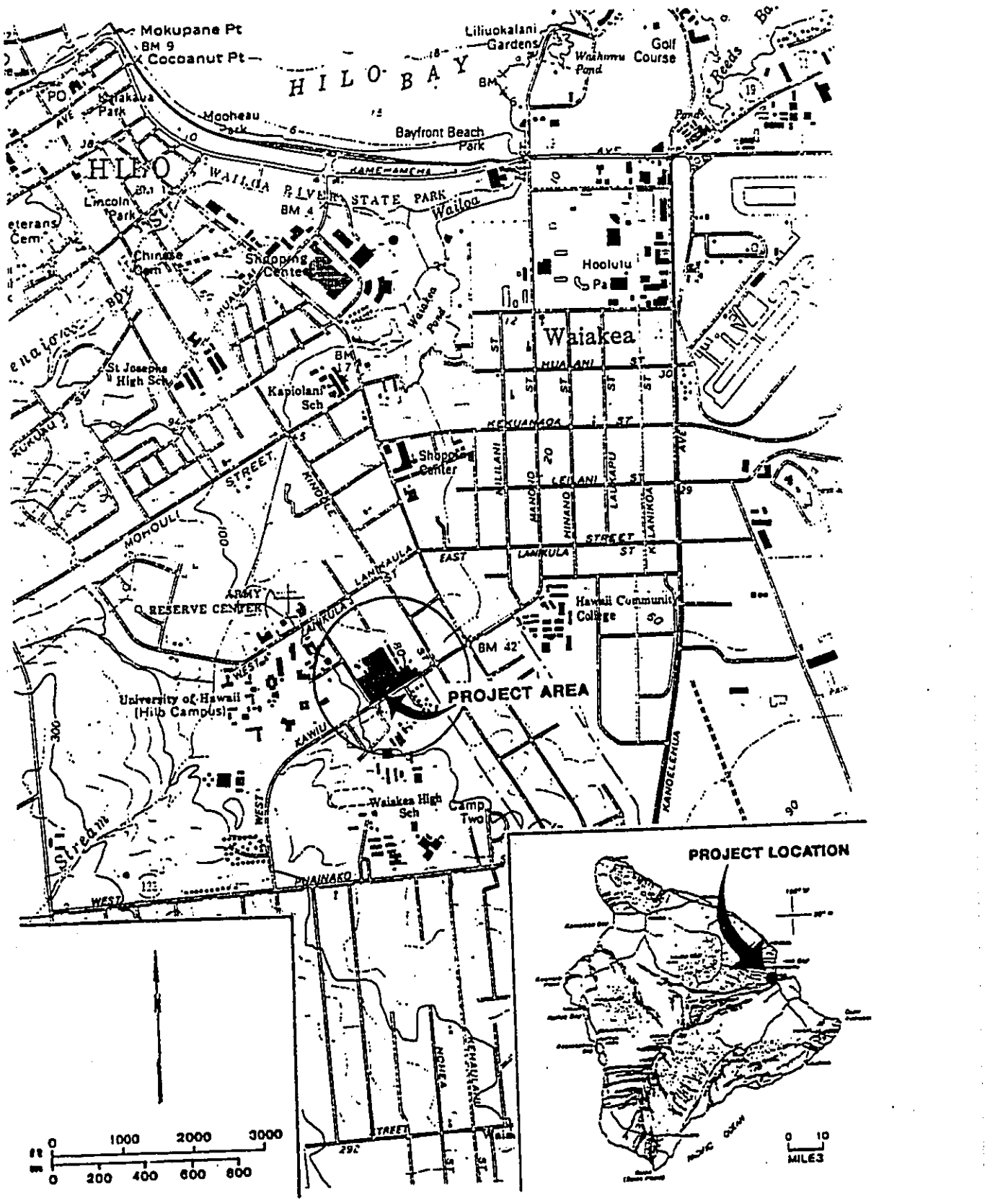
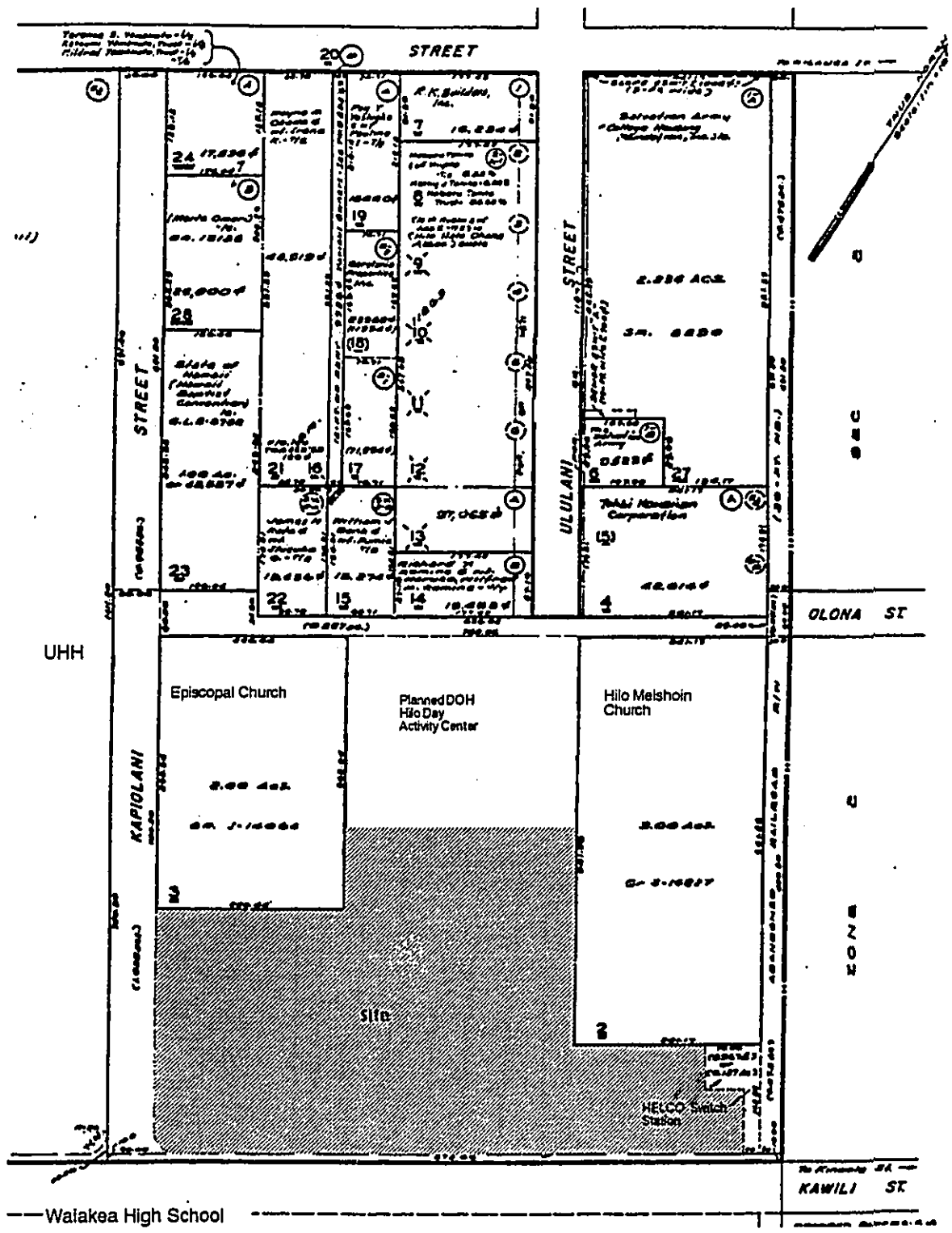


FIGURE 2. Surrounding Land Uses



2.3 Project Description

DWS would move its offices from the County Building to the Site. The new office will house administration, engineering, and fiscal staffs of the department-- a total of about 47 employees. The hours of operation would be from 7:45 a.m. to 4:30 p.m. The existing field crews will continue to work out of the existing baseyard at the Kanoelehua industrial area. Adequate parking stalls, as may be required by the Planning Department through Plan Approval, would be provided to meet the needs of employees and the public. Access to the Site will be from Kapiolani Street.

2.4 Need and Objectives for the Proposed Facilities

The current office space at the County Building is too small to accommodate the needs of the existing and projected staff. The vacated space would be available for other County departments.

2.5 Timetable and Cost

If DWS decides to proceed with the Site, DWS will submit its request in early 1996 to the Department of Land and Natural Resources to convey the Site. Assuming the State will require at least six months to decide, DWS plans to award the design or design/build contract by the end of 1996. The design phase will require approximately 8 months. DWS expects construction to start by the last quarter of 1997 and complete a year later. The estimated total project cost (design and construction) is $8 million using County funds.

3.0 ENVIRONMENTAL SETTING, IMPACTS, & MITIGATION MEASURES

3.1 Physical Characteristics

3.1.1 Climate

Setting

Located on the wetter windward side of the island, the mean annual rainfall is about 136". Generally, the wet months occur from October through April. Mean annual temperature is about 73°F. Wind patterns are sharply diurnal. Dominant easterly tradewinds prevail during the day (9am - 8pm). In the evening (9pm - 8am), cooler westerly winds sweep down the slopes of Mauna Loa.[2]

Impacts and Mitigation Measures

None-- the project will not alter the microclimate of the area.

3.1.2 *Topography & Soils*

Setting

The Site's topography is uneven terrain with elevation ranging from approximately 95' above mean sea level at the Kapiolani Street boundary to 63' at the eastern boundary, an average slope of 4%.[3]

According to the *Soil Survey of the Island of Hawaii*[4], the soil on the Site is classified as Olaa extremely stony silty clay loam, 0-20% (OlD). This soil, formed in volcanic ash, is rapidly permeable, runoff is slow, and erosion hazard slight. It dehydrates irreversibly into gravel-sized aggregates, has high shrinkage but low swelling potential, has low bearing capacity, high compressibility, low shear strength, low density if compacted, poor workability, and high organic matter content. The depth to bedrock is relatively shallow at about 1.5 to 2.5 feet.

The agricultural suitability ratings for this soil are not relevant since the Site is located in an urbanized area.

Impacts and Mitigation Measures

The following minor impacts can be mitigated to acceptable levels:

Fugitive Dust. The predominant northeasterly trade winds will blow any fugitive dust from construction activities away from the neighbors along the northern and eastern site boundary, and towards the UHH parking lot across Kapiolani Street. If dust control measures are deemed necessary, the County may control sitework activities through the grading permit.

Foundations. Typical soil engineering studies will evaluate and recommend proper foundations for the given soil conditions. The County will verify adequacy of the foundations through the Building Permit. If structural mitigation measures are necessary for the given soil conditions, the feasibility of such mea-

2. Department of Land and Natural Resources, State of Hawaii. An Inventory of Basic Water Resources Data: Island of Hawaii, Report R34, 1970 (rainfall data); University of Hawaii, Department of Geography, Atlas of Hawaii (2d. ed.). Honolulu: University of Hawaii Press, 1983, p. 66 (wind data).
3. Imata & Associates, Inc., Topographic Map, prepared for the Dept. of Water Supply, County of Hawaii, October 1993.
4. U.S. Department of Agriculture, Soil Conservation Service. *Soil Survey of Island of Hawaii*. State of Hawaii, 1973, Map 83.

sures are demonstrated by the buildings of comparable or larger size than the proposed office, such as the Waiakea High School and UHH buildings, which have been built on the same type of soils found on the Site.

3.1.3 Natural Hazards

Setting

Flooding. According to the Flood Insurance Rate Maps, the Site is located in Zone X (outside the 500 year flood plain) (see Figure 3, "Flood Insurance Rate Map," on page 8).[5]

Volcanic and Earthquake Hazards. The volcanic hazard zone is Zone 3 on a scale of 1 through 9.(Zone 1 has the most severe hazard).[6]

Impacts and Mitigation Measures

None-- the proposed project is not located within any hazardous zone.

3.1.4 Flora/Fauna

Setting

The vegetation consists primarily of exotic ornamentals and Polynesian-introduced species. There were no endangered, threatened, or candidate species encountered.[7] Only one native species was present (*Peperomia leptostachya*) (see Appendix A).

The overstory is predominantly large banyan (*Ficus* sp.), African tulip (*Spathodea campanulata* P. Beauv.) and avocado (*Persia americana* Mill.) trees. The understory includes maile pilau (*Paederia scandens* (Lour.) Merr.), basket grass (*Oplismenus hirtellus*), ginger (*Hedychium* sp.), and thimble berry (*Rubus rosaefolius*).

Impacts and Mitigation Measures

None-- the Site is not a habitat for endangered or threatened species.

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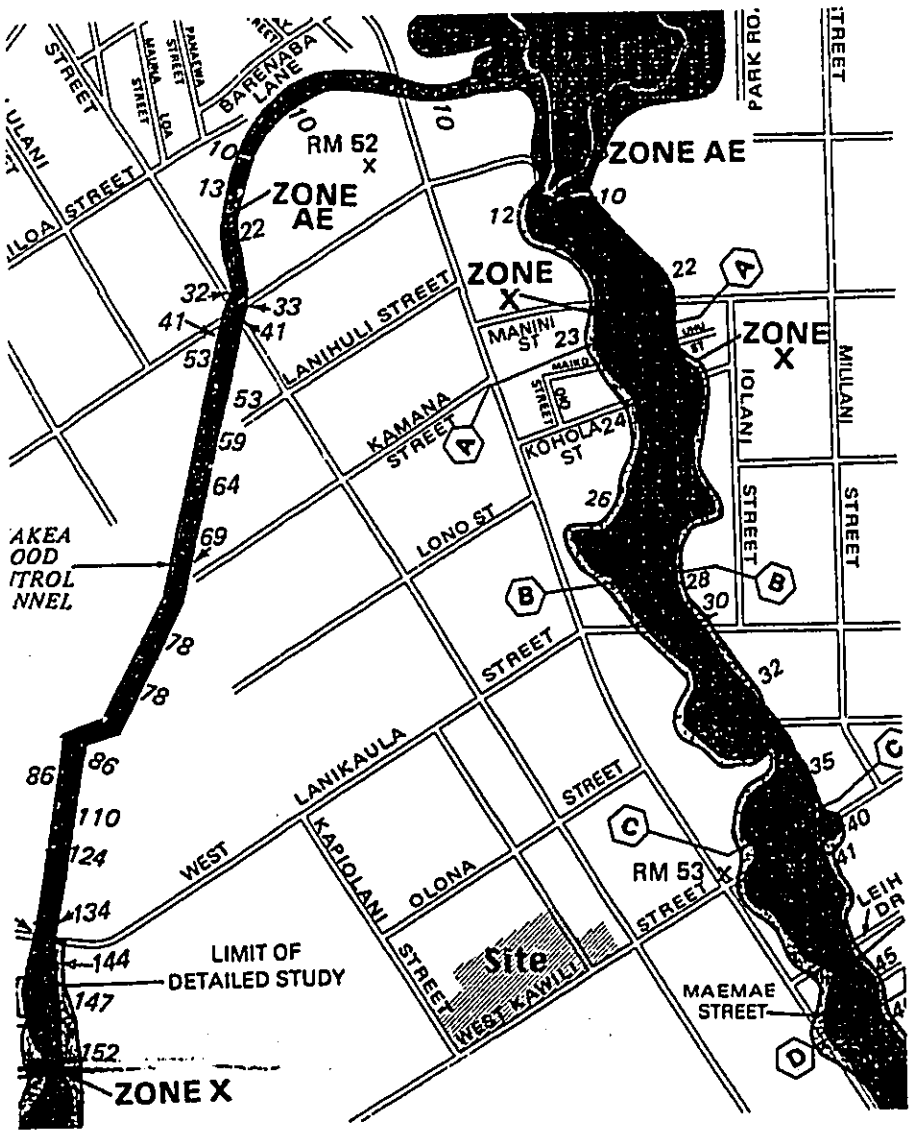
5. Federal Emergency Management Agency. Flood Insurance Rate Map, Panel 880, September 16, 1988.
6. Heliker, C. Volcanic and Seismic Hazards on the Island of Hawaii, U.S. Geological Survey, 1991.
7. The U.S. Fish & Wildlife Service concurred that the Site lacked any rare, threatened, or endangered species, and had no objections to the proposed project (see letter dated 28 June 1995 in Appendix D).

FIGURE 3. Flood Insurance Rate Map



3.1.5 Historic/Archaeological Resources

Setting

Within the Hilo region, early Hawaiian settlement concentrated near the coast. An expanse of unwooded grasslands inland of Hilo, extending to approximately the 1,500 feet elevation, was dotted with scattered huts with adjacent garden plots and small groves of economically beneficial trees (referred to as the Upland Agricultural Zone).[8] The Site is located within this upland zone.

As the Hawaiian population started to decline largely as a result of a measles epidemic in 1848 that killed an estimated one-third of the population, the scattered huts disappeared. The surge of western influence further changed the land use patterns. By 1865, four sugar plantations had been established in the Hilo district.

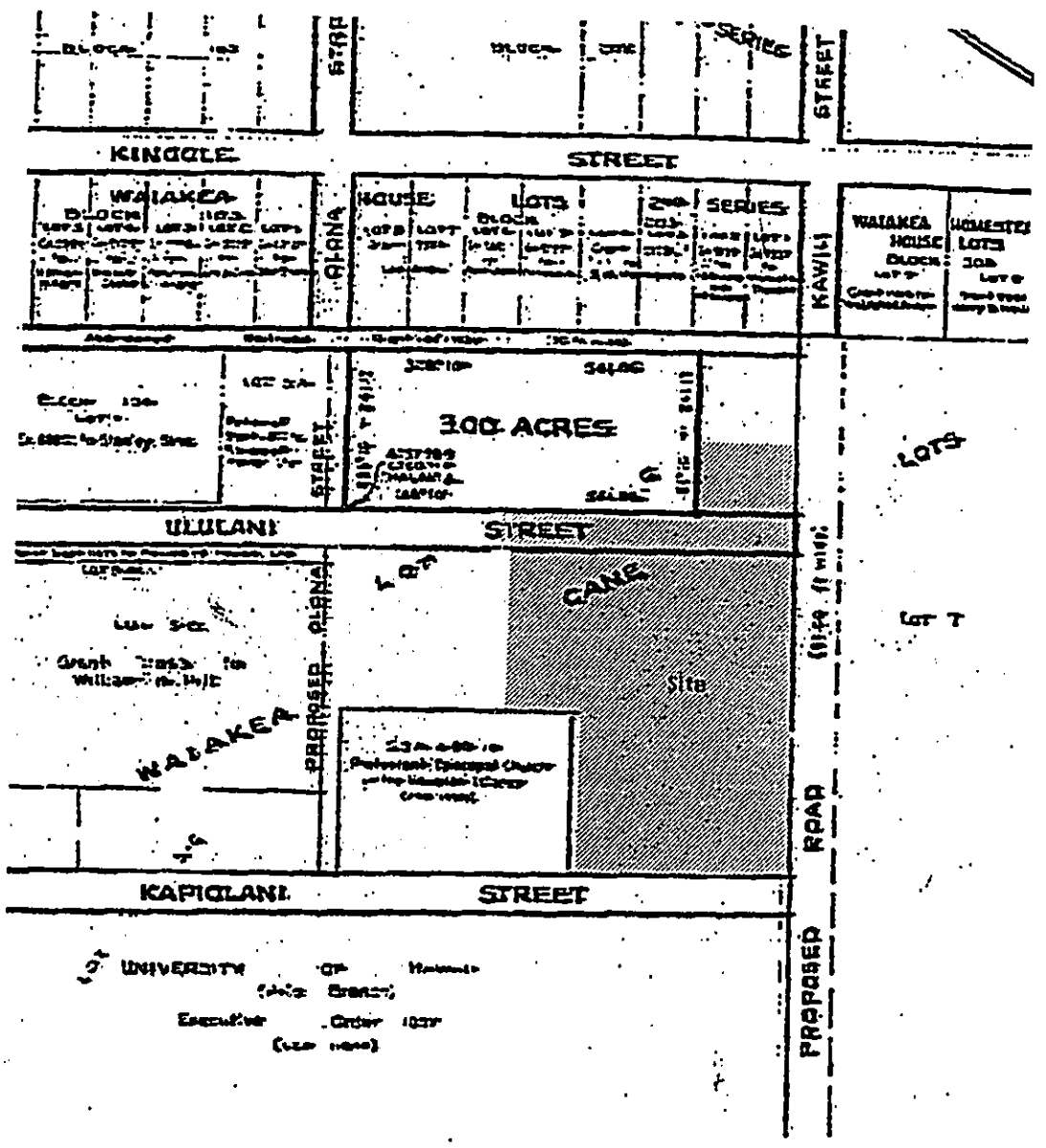
The Waiakea Mill Company cultivated approximately 350 acres between 1879 and 1946 in the vicinity of the Site under a General Lease (GL 124-A) of Crown Land from Kamehameha IV and subsequently the Territory of Hawaii. When the lease expired in 1918, homestead laws required that a portion of the land used by Waiakea Mill be dedicated to homesteading house lots and cane lots.

The Site is a portion of Waiakea Cane Lot 6 (see Figure 4, "Waiakea Cane Lot 6 Map," on page 10). A 1922 map of the Waiakea Mill Company lands shows a plantation railroad spur running along the southern border of Lot 6 (see Figure 5, "1922 Map Showing Railroad Spur," on page 11). A 1925 map indicated for Lot 6 that 19.05 acres was used or usable for cane with 8.48 acres as "waste" (see Figure 6, "1925 Map Indicating Cane Acreage on Cane Lot 6," on page 12).

Based on this history, any archaeological features on the Site would be expected to be pre-Contact scattered habitation and garden plots and/or historic features associated with sugar cane cultivation. A previous archaeological study done in the vicinity documented sugar cane features such as clearing mounds, loosely stacked curvilinear walls and areas modified for water tanks, loading platforms, railroad tracks, and flumes.[9]

8. McEldowney, H., 1979. Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study, Hilo Hawai'i. B.P. Bishop Museum Report, Honolulu.
9. Hunt, T. and M.J. McDermott, 1993. Archaeological Inventory Survey Pu'ainako Street Extension Project, Lands of Waiakea, Kukuau 1 and 2, and Ponahawai, South Hilo District, Island of Hawai'i. Prepared for Okahara & Associates.

FIGURE 4. Waiakea Cane Lot 6 Map



Waiakea Cane Lots
Portion of Lot 6
Waiakea, South Hilo, Hawaii
Scale: 1 inch = 200 feet.

FIGURE 5. 1922 Map Showing Railroad Spur

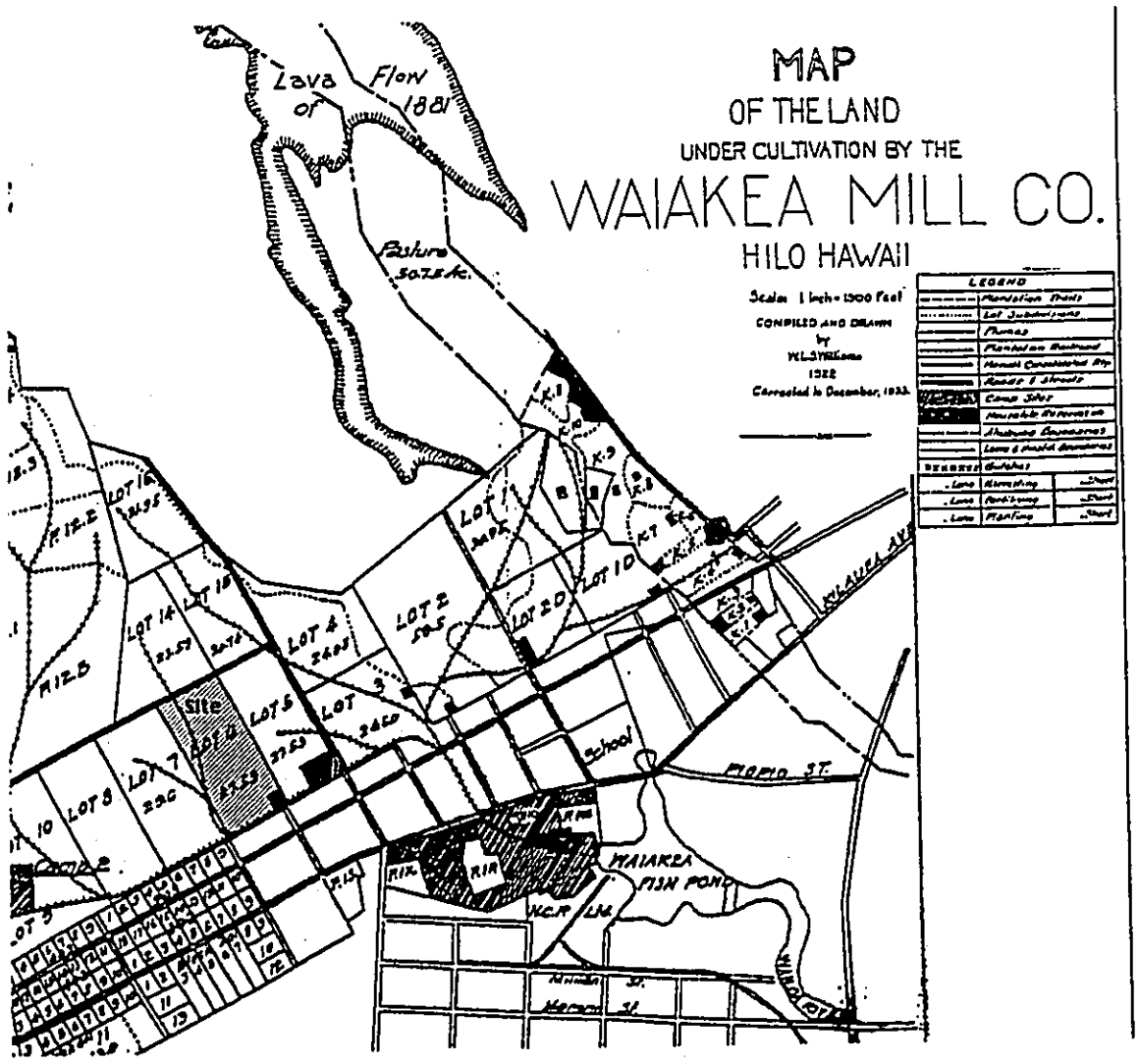
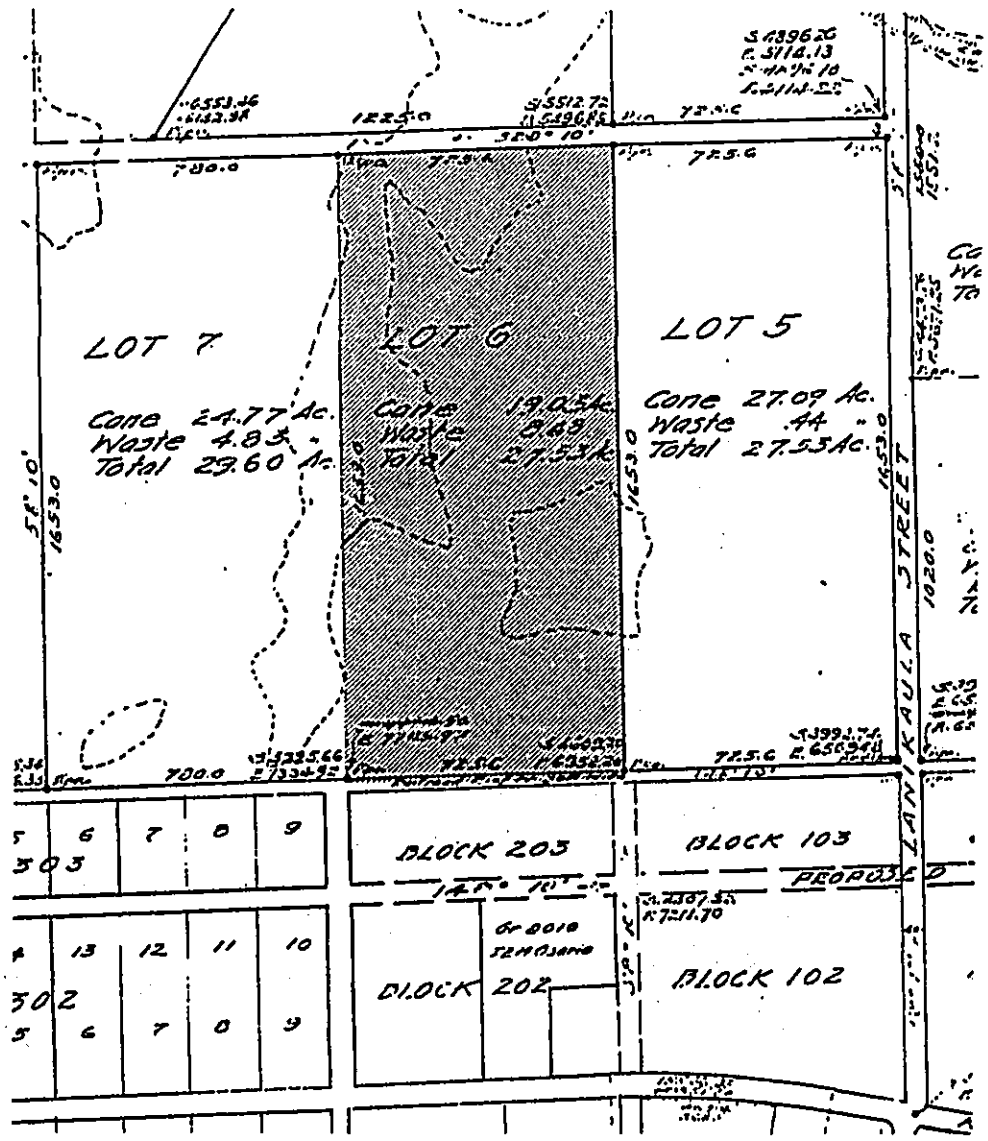


FIGURE 6. 1925 Map Indicating Cane Acreage on Cane Lot 6



As part of this environmental assessment, archaeological surveys were done for the Site in two phases (included in Appendix B). The Phase I Archaeological Inventory Survey determined the presence or absence of potential archaeological sites and assessed the significance of any sites identified. The Phase II Data Recovery study implemented the recommendations of the Phase I survey.[10]

The Phase I survey identified four sites (19431, 19432, 19433, and 19434) comprised of a total of 47+ structural features (see Figure 7, "Archaeological Sites Map," on page 14). The sites consisted of single and multiple components and their condition ranged from poor to good. Formal feature types consisted primarily of mounds, walls, mound/walls, and an enclosure used possibly for agriculture or habitation sites further described as follows:

- *Site 19431*. This historic-age complex consists of an enclosure (possibly used as a habitation) and a C-shape structure (possibly used as a habitation and/or agricultural site).
- *Site 19432*. This historic-age complex consists of rock walls, mounds, mound/walls, linear mound, mound with a fire pit, and a L-shape wall. These features were associated with sugar cane cultivation, possibly for loading and transporting cane.
- *Sites 19433* (C-shape) and *19434* (U-shape). Both historic-age sites were possibly used as habitation sites. The construction of these sites altered site 19432 by using portions of site 19432.

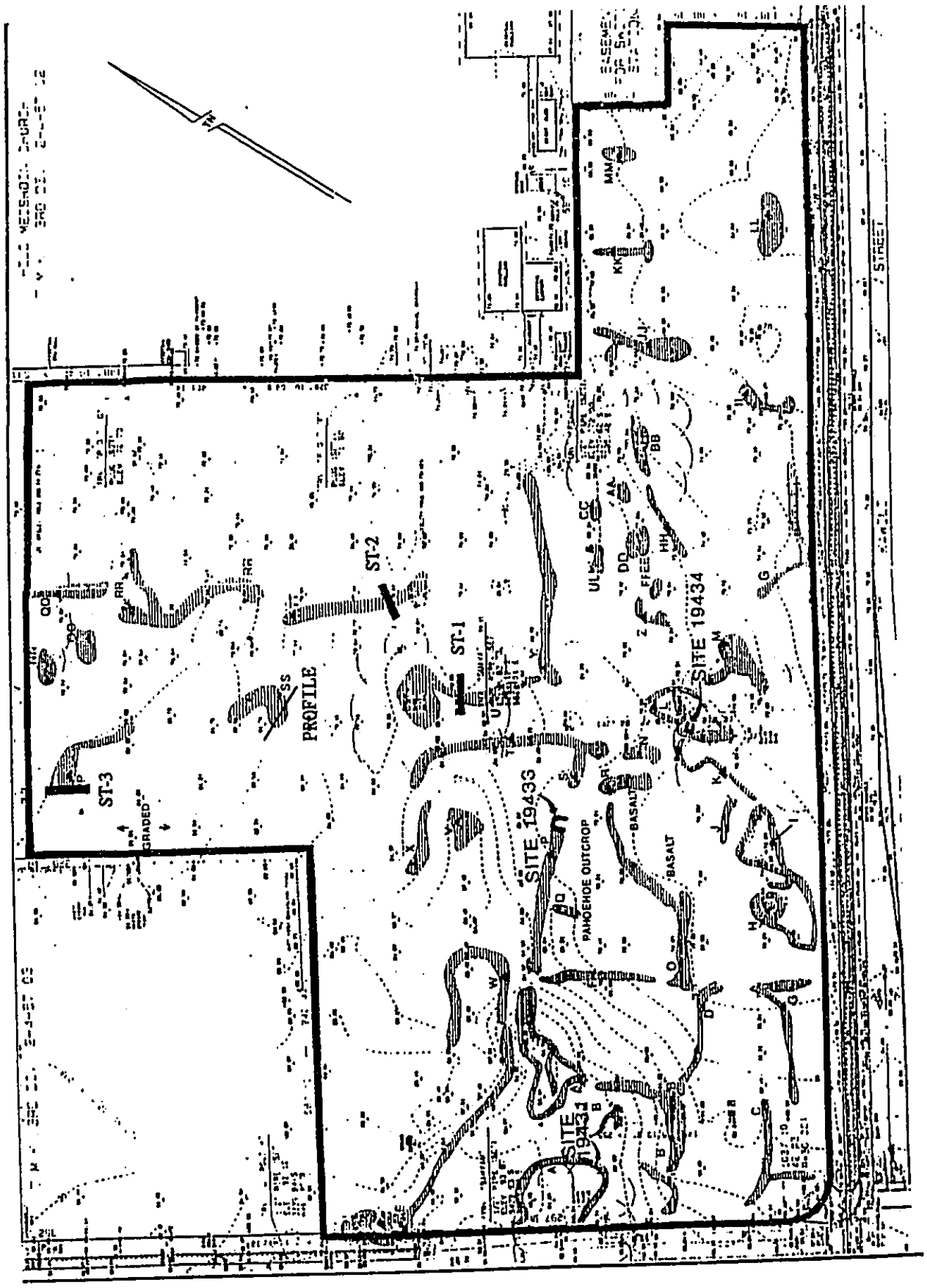
The Phase I survey recommended that further data collection be conducted for all four sites due to their potential value to yield information important in prehistory or history.

The Phase II study collected the required data through various excavation methods, drawings of the archaeological features, and photographic documentation. The results of the Phase II excavations were as follows:

- *Site 19431*. No cultural material or deposits were recovered. The wall extended only slightly into the ground confirming that it was a historic structure not built over a preexisting buried structure. Although the Phase I survey recovered a volcanic glass flake sample radiocarbon-dated to pre-Contact age, the Phase II excavation did not recover another sample to corroborate the Phase I finding. Because of the absence of cultural materials or subsurface architectural features, this structure could have been a pen rather than a habitation site.

10. The Phase II Data Recovery Report included in Appendix B is the final report as approved by the State Division of Historic Preservation on November 30, 1995.

FIGURE 7. Archaeological Sites Map



- *Site 19432.* Excavation did not uncover any evidence of buried architectural features on which the surface archaeological features may be resting. The construction of this feature indicated that it was created as a retaining facing for a terrace.
- *Site 19433.* Excavation did not uncover any cultural material. The absence of cultural material indicates that it functioned as a very temporary shelter.
- *Site 19434.* The recovered cultural material appeared to be part of a dump or trash-filled area since one-third of the first 20 cm of the test unit was comprised of thin, fragmented, rusted metal; a few nails, a few pieces of glass; and pieces of charcoal. The type of architectural feature and the lack of a range of cultural materials indicates that this was a temporary living area. However, the presence of the constructed fire pit helps differ this site from Site 19433 and suggests that Site 19434 may have been used for a longer period of time than Site 19433. The presence of temporary habitation sites in the presence of the sugar cane features (site 19432) suggest that sugar cane production may no longer have been active in this area when Site 19434 was occupied, and that Site 19434 post-dates the sugar cane features.

Impacts and Mitigation Measures

None-- the Phase II data recovery mitigated potential archaeological impacts. The Phase I survey concluded that after recovery of the data from the four identified sites "no further archaeological work would be necessary in the project area, and development work in the area could proceed."[11] Results from the Phase II excavations confirmed that "sufficient data has been obtained from each of the sites to address the research questions proposed in the Data Recovery Plan (Spear 1995). No additional archaeological work is recommended for this project area."[12]

3.1.6 Water Resources

Setting

There are no streams or defined water courses traversing the Site. Based on field observations and consultation with the U.S. Fish and Wildlife Service maps, there are no known wetlands on or adjacent to the site. In terms of groundwater quality, the project will hook-up to the sewer system; therefore, there will be no impact from wastewater leachate resulting from onsite wastewater disposal systems. If drywells are used for stormwater disposal, and these drywells are designed to be considered injection wells, then the impacts of these

11. Maly, et. al., Archaeological Inventory Survey Waiakea Cane Lots Portion of Parcel of 6, June 1994, p. 44.

12. Spear, R., Data Recovery Excavations for Sites 50-10-35-19431, 19432, 19433, and 19434, April 1995, p. 39.

drywells on the groundwater would be evaluated under the Department of Health's underground injection control (UIC) permit program. Since the site is located mauka of the Underground Injection Control line, injection wells are permitted subject to review and approval by the Department of Health but requires public notice of the UIC application.

Impacts and Mitigation Measures

None-- there are no streams or wetlands in the vicinity and groundwater quality will not be impacted.

3.1.7 Air Quality

Setting

The entire State of Hawaii is located within an attainment area (meets federal ambient air quality standards), as defined in the Clean Air Act, in accordance with the State Implementation Plan. The project is not exposed to any significant pollutant source such as a power plant, sugar mill, or major traffic thoroughfare.

Impacts and Mitigation Measures

None-- the project will not have any stationary sources of air pollution nor will it generate significant additional traffic to increase the automobile-related emissions (SO_2) in the vicinity.

3.1.8 Noise

Setting

Any noise from the proposed facility would be limited to its hours of operation during the weekdays. The noise source would primarily be vehicular traffic of employees or visitors traveling to or from the facility. Since the hours of operation are similar to the high school and university, the noise would not be a significant increase over ambient conditions.

Impacts and Mitigation Measures

Noise during construction could occur but can be mitigated to acceptable levels. The noise from construction equipment will occur during the day and is a short-term, temporary impact that will cease upon completion of construction. The construction documents will contain working time limitations to minimize as much as possible the disturbance to the neighboring residents. The Site is located a sufficient distance from the high school or university buildings such that construction noise should not interfere with classroom activities.

3.1.9 Scenic Resources

The project will not impact upon any natural beauty areas identified in the General Plan.[13] The project's design will include generous landscaping to screen the building and parking as much as possible from Kawili Street.

3.2 Socioeconomic Characteristics

The proposed project, located on vacant land, will not displace any resident or business. The proposed project will not affect surrounding land values since it is similar to the existing public uses surrounding the Site. There will be no major increase or decrease in employment since the project is a centralization of existing operations.

3.3 Public Facilities, Utilities, and Services

3.3.1 Roads and Traffic

Setting

The Site is located at the intersection of Kawili and Kapiolani Streets. Kawili Street is a two-lane roadway with an 80' right-of-way serving traffic traveling between the residential areas in upper Waiakea and the commercial and industrial areas closer to Hilo Bay. Kawili Street also provides access to the UH Hilo and Waiakea High School. In the vicinity of the Site, paved shoulders which are provided on both sides of the street are designated bike lanes.[14]

Kapiolani Street is a two-lane local street with a right-of-way width of 60'. Ululani Street is a dead-end street that terminates north of the Site. There is no roadway lot, reservation, easement, or designation on the zoning map to extend Ululani Street along the eastern boundary of the Site to connect this street to Kawili Street.

The intersection of Kawili and Kapiolani Streets is signalized. Field observations indicate that this intersection is operating below capacity conditions; however, queues on eastbound Kawili Street due to congested conditions at the Kawili and Kinoole Street intersection prevented full utilization of the Kapiolani intersection for a period of approximately half an hour (7:25 a.m. to 7:55 a.m.). The highest hourly traffic volumes are anticipated to occur during the morning peak period while school is in session. The duration of this peak period is relatively short (less than one hour) and is primarily due to arrivals at Waiakea High School. There are also two peak periods in the afternoon. The

13. Hawaii County General Plan, November 1989, p. 33 (list of natural beauty areas for South Hilo).

14. The Bikeway Plan, adopted as Ordinance No. 435, effective date April 24, 1979.

first in early afternoon is related to the end of the school day at Waiakea High School. The other peak period in the later afternoon is related to commuter traffic. These afternoon peak periods are of less volume than the morning peak period. The traffic assessment report prepared for this assessment (see Appendix C) analyzed the project's impact under the worst case conditions, that is the morning peak period.

Traffic in the vicinity of the Site is expected to increase because of growth in the Hilo area. An ongoing study projected traffic volumes on Kawili Street, between Kinoole and Puainako Streets, to increase at an average growth rate of 1.8% per year.[15] This ongoing study confirmed the recommendation of a past study to widen this segment of Kawili Street from two to four lanes.

Impacts and Mitigation Measures

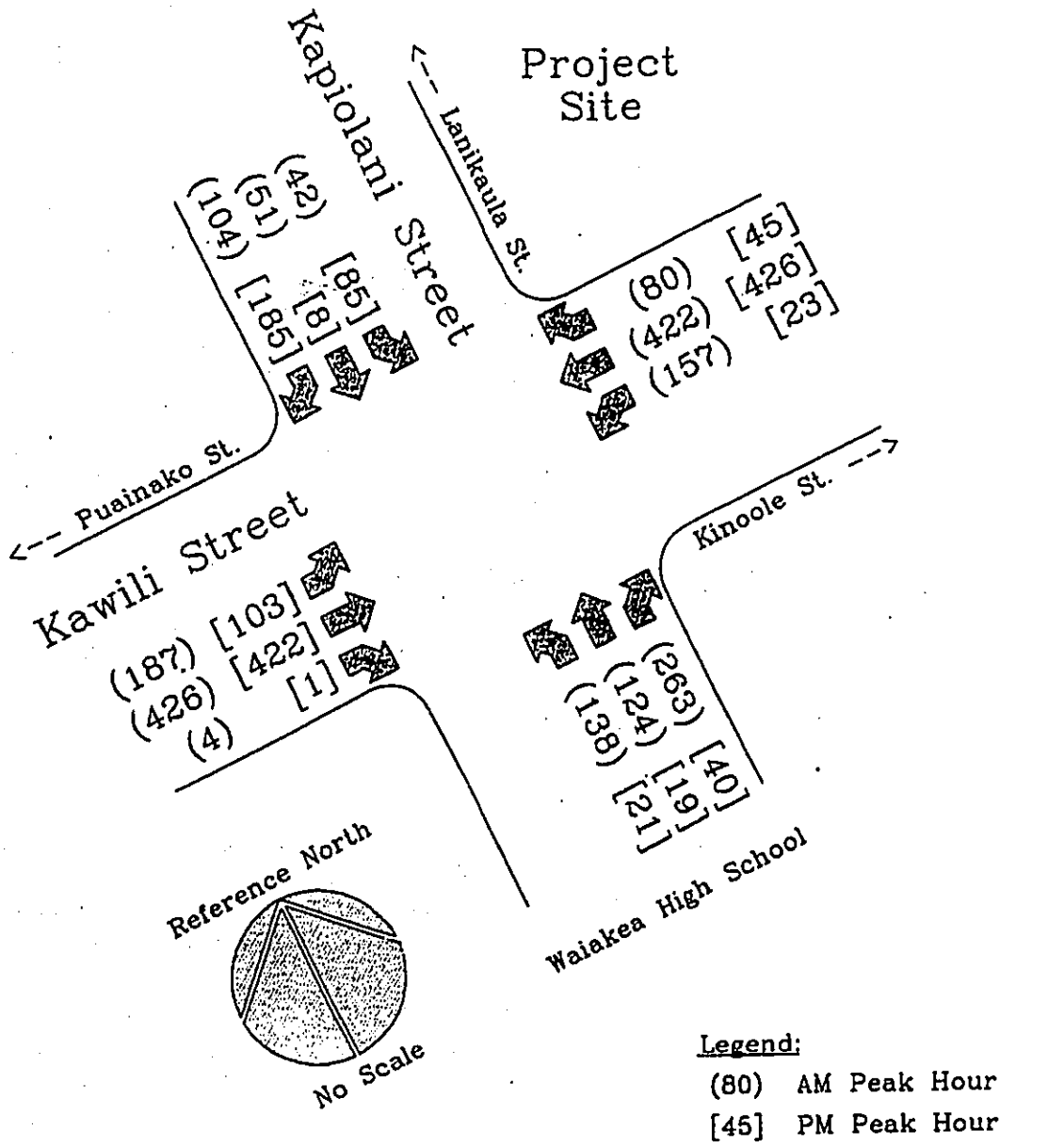
Since the project driveway would connect to Kapiolani Street, nearly all project traffic would use the Kawili/Kapiolani Street intersection. The traffic assessment report estimated the project would generate 240 trips entering the Site and 240 trips exiting the Site on an average weekday based on 47 employees and average of 100 visitors per day. This additional traffic is less than 6% of the existing volumes on Kawili Street. Figure 8 on page 19 shows the peak hour traffic assignments at the intersection of Kawili and Kapiolani Streets with the proposed project traffic added to future traffic. Peak hour conditions at the signalized intersection of Kawili and Kapiolani Streets would remain at under-capacity conditions with the addition of the project traffic. The proposed widening of Kawili Street would address the lack of capacity on this street during peak hours, even without the project.

Some of the project's traffic may impact the Kapiolani/Lanikaula Street intersection. The congestion at this intersection is an existing problem caused by the UHH and Waiakea High School students. Since the proposed project's contribution to traffic is small, the project's contribution to any solution to the congestion at this intersection should be proportionate to the project's impact.

The traffic assessment found that the single driveway serving the Site connecting to Kapiolani Street would have adequate capacities for peak hour traffic. The analyses show no need for a separate left turn lane or two-way left turn lane to serve the Site. Although the driveway should be located as far away from the intersection as possible so that movements do not interfere with the intersection of Kawili and Kapiolani Streets, some interference with the queues along Kapiolani Street may be unavoidable during the peak periods.

15. Ongoing study by Frederic R. Harris, Inc. cited in Julian Ng, Inc., May 1995, Traffic Assessment Report: County of Hawaii Department of Water Supply Proposed Office at Kawili and Kapiolani Streets (see Appendix C).

FIGURE 8. Future Traffic Assignment



3.3.2 Water System

Setting

The Department of Water Supply has one large and four small systems in the South Hilo District. The Site is within the service area of the Hilo System, the largest on the island with about 12,000 accounts in 1991 consuming an average of 5.89 mgd from five surface sources and five deep well sources. Until 1994, the Hilo Water System consisted of both surface and groundwater sources. In 1994, DWS replaced the surface water sources with another deepwell at Piihonua (Piihonua Well No. 3) to supplement the existing wells at the Panaewa and Piihonua well fields. The surface sources included the Waiakea-uka Tunnel, Olaa Flume Spring, Lyman Spring, Wailuku River-Hookelekele Stream and Kaohama Stream. During normal weather, the system drew as much surface water as practical to minimize power cost for pumping groundwater. However, the turbidity of the surface water increased considerably during heavy rains and had to be supplemented with well water. Thus, the allocation between surface water and groundwater usage varied each day depending on weather.[16] Because the surface sources were susceptible to dry weather conditions, turbidity, surface contamination, and lava from the Mauna Loa volcano, the DWS decided it was more economical to replace the surface sources with the new Piihonua well rather than constructing a water treatment facility to comply with the Safe Drinking Water Act standards.

Impacts and Mitigation Measures

Adequate water capacity is available to service the proposed project. The project can connect to water lines along Kawili or Kapiolani Street.

3.3.3 Wastewater System

Setting

The vicinity of the Site is sewered. The collector sewer flows to the new wastewater treatment plant. This new treatment plant, with a capacity of 5.0 mgd, will be able to accommodate the project. The treatment plant provides secondary treatment and discharges the effluent through the Hilo Bay ocean outfall.

Impacts and Mitigation Measures

The project can connect to sewer lines, which have adequate capacity, along Kawili or Kinoole Street. A drainage ditch exists along Kawili Street; however, the sewer line is at a sufficient depth for the connecting line to slope below the ditch.

16. Kon, M. *Hawaii County Water Use and Development Plan*. Prepared for the Department of Water Supply, County of Hawaii, February 1992.

3.3.4 Drainage System

Setting

An existing drainage along Kawili Street conveys offsite surface runoff from the roadway.

Impacts and Mitigation Measures

Drainage from the project will be contained onsite and directed to drywells in the parking lot. Therefore, surrounding properties will not be impacted by surface runoff from the proposed project nor will the project significantly add to the flow volume of the existing drainage ditch along Kawili Street. Since the Site is located mauka of the Underground Injection Control (UIC) line, the drywells may require a UIC Permit to mitigate any impacts to potential groundwater sources.

3.3.5 Electrical/Telephone

Setting

Overhead lines cross near the Site along Kapiolani Street, Kawili Street, and the Ululani Street "alignment" bordering the Site. A HELCO switch station is located on the same parcel as the project and will be subdivided into a separate lot.

Impacts and Mitigation Measures

During the design phase of the project, the engineering consultant would check with HELCO whether any poles that may be located on the Site would need to be relocated. In the process of subdividing the Site, HELCO will benefit by the creation of a separate lot for their use.

4.0 RELATIONSHIP TO PLANS, POLICIES, AND CONTROLS

4.1 State Plan

The project conforms with the following State Plan objectives and policies:

Objectives and policies for socio-cultural advancement-- government. (a) Planning for the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:

(1)Efficient, effective, and responsive government services at all levels in the State.

(2)Fiscal integrity, responsibility, and efficiency in the state government and county governments.

> (b)To achieve the government objectives, it shall be the policy of this State to:
>
> (1)Provide for necessary public goods and services not assumed by the private sector.
>
> (2).Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.[17]

The proposed office building would enable the fiscal, engineering, and administrative functions of DWS to be consolidated in one location thereby increasing the efficiency, effectiveness, and responsiveness of DWS. Ample public parking would increase the accessibility of DWS compared to the limited parking at the County building where the offices are presently located.

4.2 State Land Use Law

The State Land Use classification for the proposed site is Urban. The County, through its zoning ordinance, determines the permissible uses within the Urban district.[18] The County zoning requirements are discussed below (see Section 4.4 below).

4.3 Hawaii County General Plan

The proposed use conforms with the General Plan LUPAG designation for the site which is Medium Density Urban Development (see Figure 9 on page 23). This designation is intended for commercial and residential uses.[19] A goal under the Public Facilities Element of the General Plan encourages the "provision of public facilities that effectively service community needs and seeks ways of improving public service through better and more functional facilities which are in keeping with the environmental and aesthetic concerns of the community."[20] The proposed facilities improve public service offered by providing facilities that will be functional yet designed and constructed to meet environmental and aesthetic objectives.

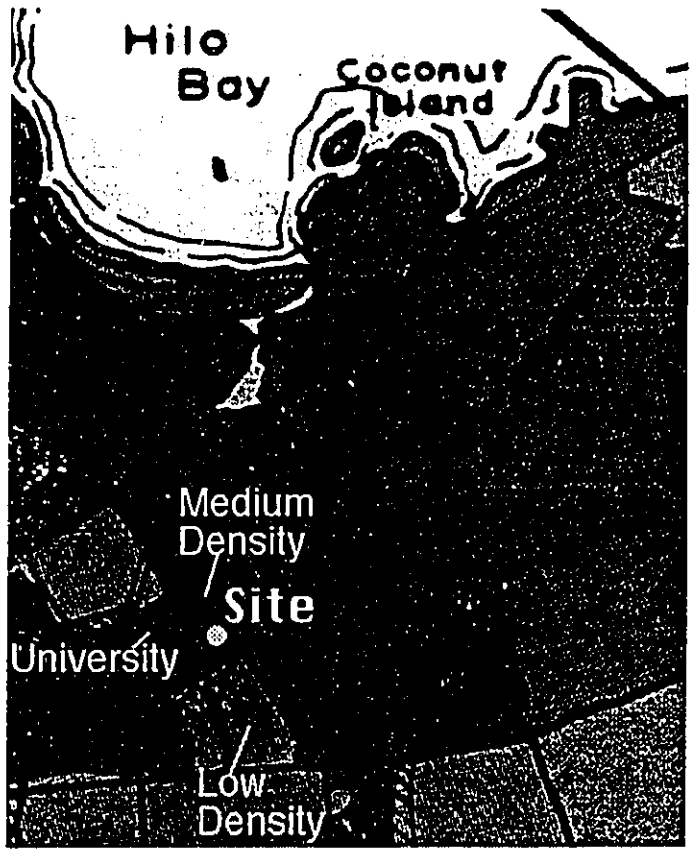
17. Hawaii Revised Statutes §226-27 (Supp. 1992).

18. §205-5, Hawaii Revised Statutes; §15-15-24, Hawaii Administrative Rules (statute and rules governing the Land Use Commission's powers within the Urban district).

19. General Plan Support Document, November 1989, p. 80.

20. §4(I) (Public Facilities Goals & Policies), Ordinance 89-142, Hawaii County, An Ordinance Adopting the County of Hawaii General Plan and Repealing Ordinance No. 439, as amended.

FIGURE 9. County of Hawaii General Plan LUPAG Map

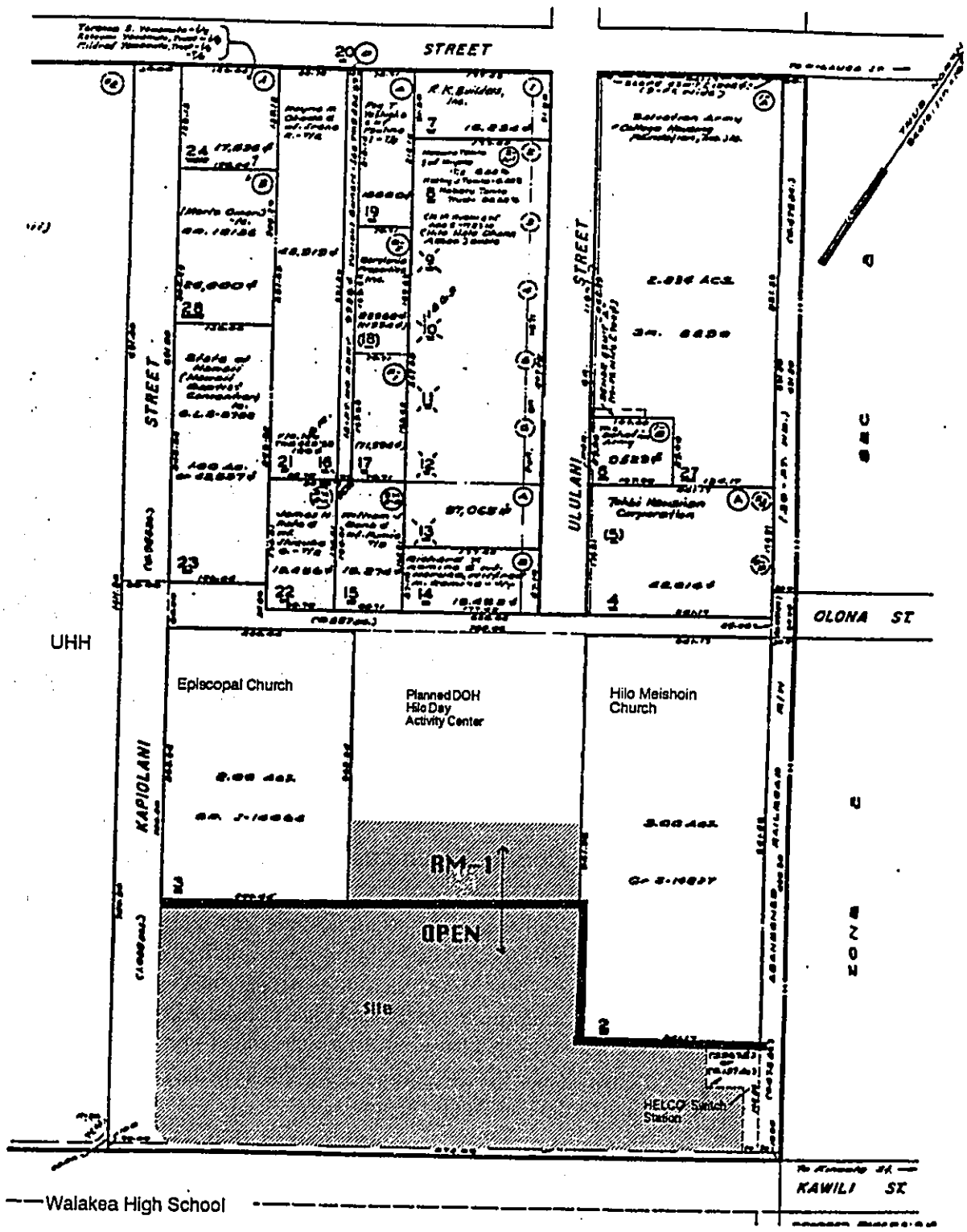


4.4 Hawaii County Zoning and Subdivision Codes

The Site is zoned Open (see Figure 10 on page 24). Although an office building is not typically permitted within this zone, the zoning code permits in any zone "[c]ommunity, public, and public service buildings provided they conform to the General Plan."[21] As discussed in the previous section, the proposed public building conforms to the General Plan's Medium Density designation for the Site. The General Plan advises a height limit of three stories within the Medium Density zone.[22] Height limits and setbacks in the Open district are determined through the Plan Approval process.

21. Hawaii County Code §25-51(c) (Supp. 1989).
22. General Plan, p. 80.

FIGURE 10. Zoning Map



Because the 4.5-acre Site is a portion of an 11.126 parcel, DWS will need to subdivide the parcel to create the Site as a separate lot. The proposed subdivision would create three lots-- the Site, an approximately 2.0-acre lot currently planned for the Department of Health, HELCO's 0.137-acre switch station lot, and the balance incorporated into the right-of-way for Kawili and Kapiolani Streets under street widening designations on the zoning maps. All resulting lots require access. The lot intended for the Department of Health may raise access concerns since the status of the Olona Street extension shown on the zoning maps is unknown. However, access to this proposed lot could be provided from Ululani Street, or alternatively DWS could agree to grant an easement in favor of the Department of Health lot to share the driveway that would serve the DWS lot.

4.5 Coastal Zone Management and Special Management Area

The project is located outside of the Special Management Area; therefore, a Special Management Area Permit is not applicable to the project. However, all actions within the State must comply with the objectives and policies of the Coastal Zone Management Act.[23]

The project is consistent with the objectives relating to Economic Uses and Historic Resources:

> Provide public or private facilities and improvements important to the State's economy in suitable locations.[24]
>
> Protect, preserve, and where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.[25]

DWS expended substantial sums for the Phase I and II archaeological studies conducted for this environmental assessment to identify potentially significant sites and properly mitigate any impacts. The archaeologists recovered the data required, and concluded that development on the Site could proceed with no further archaeological work (see Section 3.1.5, "Historic/Archaeological Resources," on page 9). Upon mitigation of the archaeological impacts, the Site is suitable for the proposed use.

4.6 UFAS Compliance

All plans and specifications for the construction of any State or County building must be prepared so the building is accessible to and usable by the physically

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23. *Hawaii Revised Statutes* §205A-4(b) (Supp. 1992).

24. *Hawaii Revised Statutes* §205A-2(5)(A) (Supp. 1993).

25. *Hawaii Revised Statutes* §205A-2(2)(A) (Supp. 1993).

handicapped.[26] The building must conform to the Uniform Federal Accessibility Standards (UFAS), 41 C.F.R. §101-19.6, Appendix A. DWS will send the plans and specifications to the Commission on Persons with Disabilities for review and advice.

4.7 Other Permits and Approvals

Other applicable permits include the County grading, right-of-way construction, driveway, and building permits. Since the limits of grading will involve less than 5 acres, the non-point source controls under the NPDES Permit administered by the State Department of Health will not be applicable to the project. The UIC Permit administered by the Department of Health would be applicable if the project requires drywells. The Board of Land and Natural Resources will first have to convey the Site to the County before design commences or any permit applications submitted.

Table 1: List of Permits and Approvals

Permit or Approval	Authority[a]	Approving Agency
STATE OF HAWAII		
Conveyance to the County	HRS §171-11	Board of Land & Natural Resources; Governor
UFAS Compliance	HRS §103-50.	Commission on Persons with Disabilities
UIC Permit	HAR Chap. 11-23	Department of Health
COUNTY OF HAWAII		
Subdivision approval	HCC Chap. 23	Planning Department
Plan Approval	HCC Chap. 25	Planning Department
Grading Permit	HCC Chap. 10	Department of Public Works
Construction within Right-of-Way	HCC Chap. 22	Department of Public Works
Driveway Permit	HCC Chap. 22	Department of Public Works
Building Permit	HCC Chap. 5	Department of Public Works

a. PC Rule= Rules of Practice & Procedure, Planning Commission, County of Hawaii; HCC= Hawaii County Code; HAR= Hawaii Administrative Rules; HRS= Hawaii Revised Statutes

26. *Hawaii Revised Statutes* §103-50.

5.0 ALTERNATIVES CONSIDERED

The Water Commission could consider alternative sites. Although the project's potential traffic impacts would be insignificant, an alternative site would avoid contributing to an existing congestion problem during peak periods at the Kawili and Kapiolani Street intersection, as well as the Lanikaula and Kapiolani Street intersection.

The no-action alternative would result in several disadvantages:

- The inefficiencies associated with insufficient space would continue.
- The Water Commission reviewed the project in relative priority to other countywide needs and deemed it important enough for funds to be appropriated.
- The project site is underutilized, vacant public lands; the no action alternative would perpetuate this "waste" of public assets.

6.0 DETERMINATION WITH SUPPORTING FINDINGS AND REASONS

The proposed DWS Office Building is not expected to cause significant impacts to the environment, pursuant to the significance criteria established by the Environmental Council as discussed below;[27] therefore, the determination is to issue a negative declaration.

The proposed project will not involve an irrevocable commitment to loss or destruction to any natural or cultural resources. The proposed Site does not contain any significant natural resources. Although the archaeological features would be razed, the data has been recovered.

The proposed project will not curtail the range of beneficial uses of the environment. The site is vacant land surrounded by urbanized uses.

The proposed project will not conflict with the State's long-term environmental policies. The proposed project will not conflict with the environmental policies set forth in the State Plan and Chapter 344, Hawaii Revised Statutes in that the project will not damage sensitive natural resources nor emit excessive noise or contaminants.

The proposed project will not involve substantial secondary impacts, such as population changes or effects on public facilities. The project will not induce future development or population changes since it does not provide excess infrastructure capacity, attract visitors, or generate employment opportunities.

27. Hawaii Administrative Rules, §11-200-12.

The proposed project will not involve a substantial degradation of environmental quality. There will be no significant degradation of air, water, or noise quality.

The proposed project will not substantially affect any rare, threatened or endangered species of flora or fauna or habitat. The Site is not a known habitat for endangered or threatened flora or fauna species.

The proposed project will not detrimentally affect air or water quality or ambient noise levels. The proposed project will not produce any air emissions. Wastewater flows will be disposed via the county sewerage system. The drainage system will be designed in compliance with county and state regulations to protect the groundwater quality and not adversely impact downstream properties. Sitework will be in accordance with grading permit conditions to minimize erosion, non-point source pollution, and dust.

The proposed project is not located in an environmentally sensitive area (e.g., flood plain, tsunami zone, coastal area). The project is not located within the 100-year flood plain or other environmentally sensitive area.

Summary of Mitigation Measures

Design Phase:

- Verify the zoning exemption for public buildings and comply with Plan Approval requirements.
- Subdivide the parcel.
- Comply with UIC requirements for drywells, if applicable.
- Have plans reviewed by the Commission on Persons with Disabilities.

Construction Phase:

- Include a standard clause in the construction contract for the contractor to stop work and inform the Division of Historic Sites in the event possible archaeological remains are uncovered.
- Limit construction to standard work hours to minimize noise disturbance to neighboring residents.
- Implement dust control, as required.

7.0 REFERENCES

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Hawaii Revised Statutes, Chapter 226 (State Plan) (Supp. 1992).

Hawaii Administrative Rules, Chapter 11-200, Department of Health, Environmental Impact Statement Rules.

Hawaii County Code, Chapter 25 (Zoning).

County of Hawaii, *General Plan*, Ordinance No. 89-142 (An Ordinance Adopting the County of Hawaii General Plan and Repealing Ordinance No. 439, as amended).

APPENDIX A

BOTANICAL SURVEY

by

Andrew Kikuta

BOTANICAL SURVEY OF WATER SUPPLY OFFICE SITE

PURPOSE

The survey will identify dominant species and determine the presence of native species and whether or not they are endangered or threatened.

SURVEY METHOD

A modified Braun-Blanquet cover assessment was conducted on subject property. The major departure from the true method is that the entire property was treated as one plot. The values given for each species are a combination of relativity (comparison with the predominant species) and population size (eg. species with one individual received an "r" rating). A thorough walk-through was conducted on April 29, 1995. Although imprecise in nature (because one can't see the entire property at any given time), it does reflect an accurate picture of species composition and dominance on the property. The list is separated into canopy and understory species and arranged in order of relative cover and abundance.

The Braun-Blanquet cover-abundance scale is as follows:

Rating	Abundance	Cover
5	any number	>75%
4	any number	50-75%
3	any number	25-50%
2	any number	5-25%
1	numerous	<5%
+	few	small cover
r	solitary	small cover

The upper four scale values (5,4,3,2) refer only to cover, while the lower three scale values are primarily estimates of abundance. This combination recognizes the practical fact that "abundance can be estimated with some precision only for herb and shrub layer species with little or insignificant crown or shoot cover. Cover can be estimated more accurately only for species that contribute significantly to the biomass of the community."

RESULTS

A species list is summarized in Table 1. No endangered, threatened, or candidate species were encountered. Only one native species was present on the property surrounded by urban development.

One palm species was not identified, however it is known to be a common landscape species found elsewhere in Hilo.

A number of exotic ornamental species were found on the property including Calathea, Dizygothea, and Filicium.

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Table 1. List of Species and Their Relative Dominance on the Property Located at the Corner of Kawili and Kapiolani.

CANOPY SPECIES

Common Name	Scientific Name	Relative Abundance
Chinese banyan	Ficus microcarpa	3
African tulip	Spathodea campanulata P. Beauv.	3
Avocado	Persea americana Mill.	3
Guava	Psidium guajava	2
Strawberry guava	Psidium cattleainum	2
Breadfruit	Artocarpus incisus (Thumb)	2
Rubber tree	Schefflera actinophylla	2
Macaranga	Macaranga mappa	2
Melochia	Melochia umbellata (Houtt.)Stapf	2
Charcoal tree	Trema orientalis (L.) Blume	2
Christmas berry	Schinus terebinthifolius L.f.	1
Fern tree	Filicium decipiens	1
Alexandra palm	Archontophoenix alexandrae	1
Palm #2		1
Rose apple	Syzygium jambos (L.) Alston	+
Allspice	Pimenta dioica	r
Pink tecoma	Tabebuia pentaphylla	r

UNDERSTORY: HERBS/SHRUBS/SMALL INDIVIDUALS

common name	scientific name	relative abundance
Maile pilau	Paederia scandens (Lour.)Merr.	3
Basket grass	Oplismenus hirtellus	3
Ginger	Hedychium sp.	2
Thimble berry	Rubus rosaefolius	2
Fern	Phymatosorus scolopendrium	1
Hilo grass	Paspalum conjugatum	+
Sleeping grass	Mimosa pudica L.	+
California grass	Bracharia mutica(Forssk.)Stapf	+
Wedelia	Wedelia trilobata	+
Glorybush	Tibouchina urvilleana	r
Koster's curse	Clidemia hirta	r
Castor bean	Ricinus communis L.	r
Swordfern	Nephrolepis multiflora	r
Rattle snake plant	Calathea crotalifera	r
Night cestrum	Cestrum nocturnum L.	r
Ti	Cordyline terminalis	r
Kahili ginger	Hedychium gardnerianum	r
Surinam cherry	Eugenia uniflora L.	r
Miconia	Miconia calvescens	r
Crinkly leaf tree	Dizygothea elegantissima	r
Chinese fan palm	Livistona chinensis	r

UNDERSTORY: HERBS/SHRUBS/SMALL INDIVIDUALS

common name	scientific name	relative abundance
Mango	Mangifera indica	r
Philodendron	Philodendron sp.	r
Dissotis	Dissotis rotundifolia (Sm.)Triana	r
Peperomia*	Peperomia leptostachya	r

* indigenous, single population with less than 100 individuals on a rock pile approximately center of property.

APPENDIX B

ARCHAEOLOGICAL REPORTS

Phase I Archaeological Inventory Survey (PHRI)
Data Recovery Plan (Spear)
Phase II Data Recovery Report (Spear)

Report 1370-061094

Archaeological Inventory Survey
Waiākea Cane Lots
Portion of Parcel 6

Land of Waiākea, South Hilo District
Island of Hawai'i (TMK:2-4-57:01)

BY

Kepā Maly • Cultural Resources Specialist

AND

Alan T. Walker, B.A. • Projects Director - Hawai'i

WITH

Paul H. Rosendahl, Ph.D. • Principal Archaeologist

PREPARED FOR

Roy Takemoto
171 Ho'omalu Street
Hilo, Hawai'i 96720

JUNE 1994

PHRI **Paul H. Rosendahl, Ph.D., Inc.**
Archaeological • Historical • Cultural Resource Management Studies & Services
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SUMMARY

At the request of Mr. Roy R. Takemoto, Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted an archaeological inventory survey of the approximately 4.5 acre Waiākea Cane Lots project area, situated in the city of Hilo, in the Land of Waiākea, South Hilo District, Island of Hawaii (TMK:2-4-57:01). The overall objective of this survey was to provide information appropriate to and sufficient for satisfaction of all current historic preservation regulatory review requirements of the Hawai'i County Planning Department (HCPD) and the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD).

The inventory survey was conducted November 1-6, 1993. During the field work, four sites consisting of 47+ features were identified in the project area. The sites consist of both single- and multiple- components, and their physical condition ranges from poor to good. Formal feature types include C-shape enclosures, cupboards, L-shape enclosures, mounds, terraces, and walls. Functional feature types include both temporary and long-term habitation and agriculture. As a part of the survey, two subsurface test units, totaling three square meters, and one shovel test were excavated at Sites 19431 and 19432. No substantial cultural deposits or portable remains were identified as a result of these investigations.

Based on the federal and state evaluation criteria, and the findings as reported within this study, all four sites are assessed as important for their information content, and further data collection is recommended. This additional work would include detailed recording, surface collection, and excavation.

Contents

Tables

Illustrations

INTRODUCTION

BACKGROUND

At the request of Mr. Roy Takemoto, Paul H. Rosendahl, Ph.D., Inc. (PHRI) recently conducted an archaeological inventory survey of an approximately 4.5 acre parcel located in the city of Hilo,, in the Land of Waiākea, South Hilo District, Island of Hawai'i (TMK:3-2-4-57:1). The overall objective of this survey was to provide information appropriate to and sufficient for satisfaction of all current historic preservation regulatory review requirements of the Hawai'i County Planning Department (HCPD) and the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD).

The field work was conducted November 1-6, 1993 under the guidance of PHRI Project Supervisor Constance O'Hare, B.A. and Projects Director - Hawai'i, Alan T. Walker, B.A. Principal Archaeologist Dr. Paul H. Rosendahl provided overall guidance for the project. Crew members included Field Archaeologists Mikele Fager, B.A., and Warren Wulzen, B.A., with Field Technicians Lauren Applebaum, B.A., and Chris Kitchens. Completion of the field work required approximately 112 labor-hours.

Also, on December 9, 1993, the primary author of this report joined PHRI field archaeologist, Catherine Glidden, B.A., on a site visit of the project area. Having visited an upland study area (reported by Hunt 1992, and Hunt and McDermott 1993) above the UH-Hilo Campus, it was thought that the author could assess the similarity-dissimilarity of the cultural resources present at both sites.

SCOPE OF WORK

The basic purpose of the inventory survey was to identify all sites and features of potential archaeological significance present within the specified project area. An inventory survey comprises the initial level of archaeological investigation. It is conducted basically to determine the presence or absence of archaeological resources within a specified project area. A survey of this type indicates both the general nature and variety of archaeological remains present, and the general distribution and density of such remains. It permits a general significance assessment of the archaeological resources, and facilitates formulation of realistic recommendations and estimates for any further work that might be necessary or appropriate. Such work could include further data collection involving detailed recording of sites and features, and selected test excavations.. It might also include subsequent *mitigation*–data recovery research excavations, construction monitoring, interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

The basic objectives of the survey would be four-fold: (a) to identify archaeological features and remains present within the project area; (b) to evaluate the potential general significance of all identified archaeological remains; (c) to determine the possible impacts of proposed development upon the identified remains; and (d) to define the general scope of any subsequent further data collection and/or other mitigation work that might be necessary or appropriate.

Based on a review of readily available background literature, familiarity with the general project area, extensive familiarity with the current requirements of pertinent review authorities, specific familiarity derived from an informal field inspection of the project area conducted by PHRI on March 9, 1993, and consultation with Mr. Marc Smith (DLNR-SHPD Staff Archaeologist/Hilo Office), the following specific tasks were determined to constitute an adequate and appropriate scope of work for the proposed inventory survey:

1. Review archaeological and historical literature relevant to the project area, and conduct historical documentary research (emphasis on readily available literature and documentary sources) and interviews with any appropriate and available local informant sources;

2. Conduct a 100% coverage surface survey of the entire project area;

3. Conduct limited subsurface testing—by means of manual excavations—in the project area (a) to determine the presence or absence of potentially significant buried cultural features or deposits, and (b) to obtain suitable samples for age determination analyses;

4. Analyze field and historical research data, and prepare appropriate reports.

The inventory survey was conducted in accordance with the standards for inventory-level survey recommended by the DLNR-SHPD. The significance of archaeological remains identified within the project area was assessed in terms of (a) the National Register criteria contained in the Code of Federal Regulations (36 CFR Part 60), and (b) the criteria for evaluation of traditional cultural values prepared by the National Advisory Council on Historic Preservation (ACHP 1985). DLNR-SHPD and the Hawai'i County Planning Department use these criteria to evaluate eligibility for both the Hawai'i State and National Registers of Historic Places. In addition, the significance of archaeological sites identified during the survey was evaluated in terms of the PHRI Cultural Resource Values Modes, which are described in the Conclusion section of this report.

PROJECT AREA DESCRIPTION

The project area is situated in the *ahupua'a* of Waiākea, in the district of South Hilo, Hawai'i Island. The project area comprises approximately 4.5 acres of a c. 7.5 acre parcel, which is located *makai* (shoreward [east]) of the University of Hawai'i at Hilo, and is approximately 80 ft. above mean sea level (Figure 1.). Rainfall in the project area averages approximately 120-150 inches annually (Carlquist 1985:77). The terrain in the project area is fairly level with only a gentle slope shoreward. The parcel is mostly covered with an organic soil with some *pāhoehoe* lava outcroppings visible. The 1973 USDA Soil Conservation Study identifies the project area soil type as "Olaa extremely stony silty clay loam." It is dark brown, extremely rocky, and approximately 16 inches deep (USDA 1973:42 and sheet number 74). At the time of the survey, and during subsequent visits, the soil was saturated with water, and probably is quite damp at most times. A dry stream which exhibits signs of modification (walled banks - Site 1370-2, Feature E.) cuts through a portion of the project area, and is shown on various maps as having once flowed to the Waiākea fish ponds.

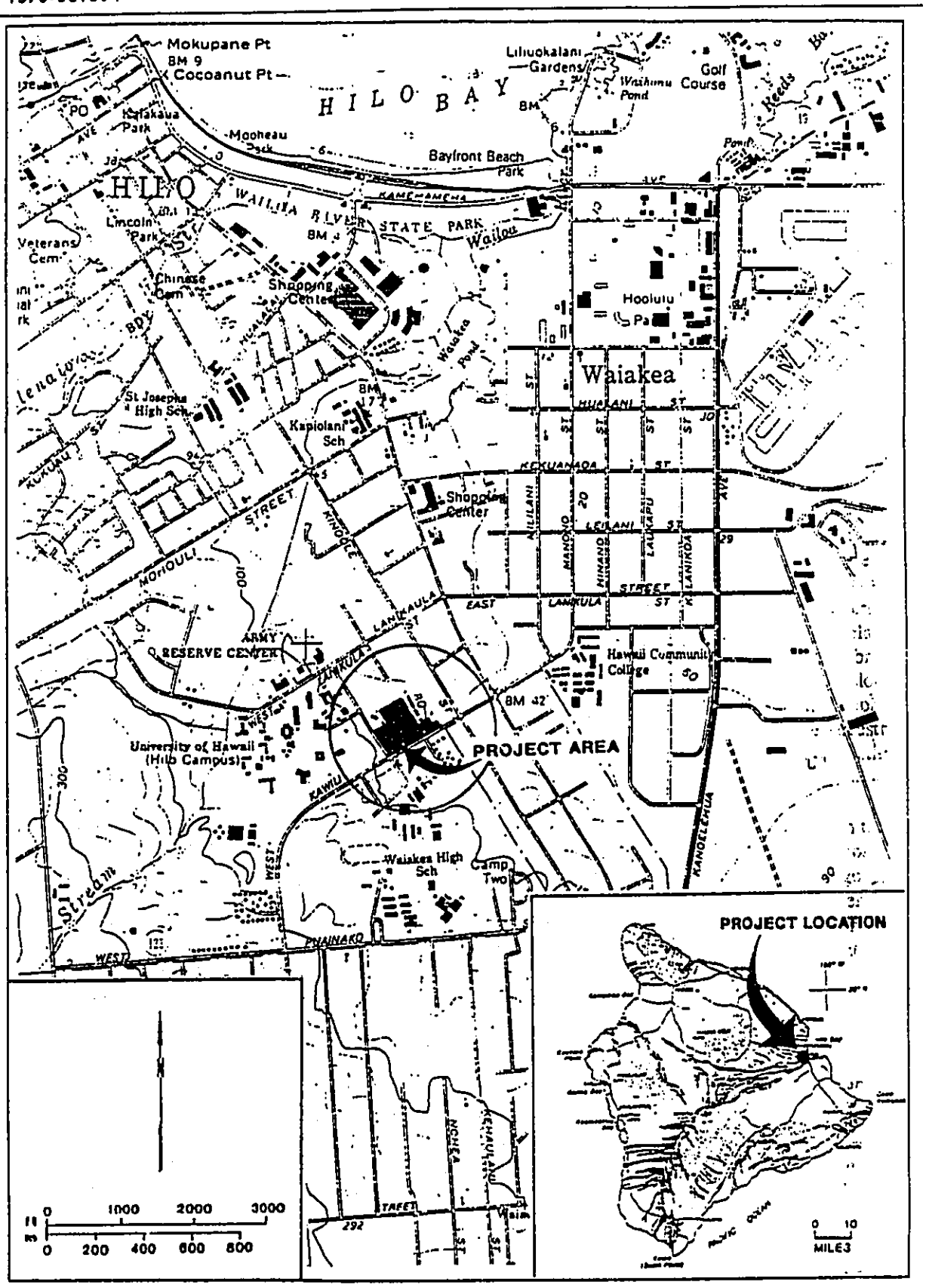

Figure 1. Project Location

The vegetation consists primarily of exotic ornamentals and Polynesian-introduced plants. The over story is fairly thick, and made up primarily of several large banyan (*Ficus* sp.) trees and melochia (*Melochia umbellata*) trees. Introduced understory plants include exotic ornamentals such as the night cestrum (*Cestrum nocturnum*), bamboo grass (*Thysanolaena maxima*), heliconia, and variegated ti. Polynesian introductions include ti (*Cordyline terminalis*), breadfruit (*'ulu, Artocarpus incisus*) and shampoo ginger (*'awapuhi kuahiwi, Zingiber zerumbet*). One indigenous Hawaiian plant, the *maile*-scented fern (*laua'e, Phymatosorus scolopendria*) is also present. The vegetation is quite dense in areas, and root systems of both living and uprooted trees appear to have significantly altered the physical remains of the archaeological resources.

PREVIOUS ARCHAEOLOGICAL WORK

Very few archaeological investigations have been conducted in the Hilo area, and since western contact, Hilo's prominence as a port-of call, has led to nearly continuous modification of the cultural landscape. No archaeological work has been recorded as being conducted within the project area, and no sites have been previously recorded in the project area. Among the previous archaeological studies conducted in the general vicinity of the city of Hilo have been studies by Thrum (1908), Stokes (Stokes and Dye 1991), Hudson (1930-32), McEldowney (1979), Kelly, Barrere, and Nakamura (1981), Kelly and Athens (1982), Jensen (1991), Goodfellow and Fager (1992), Hunt (1992), Hunt and McDermott (1993), and Borthwick and Hammatt (1993).

Of these, the latter studies by Hunt (1992), Hunt and McDermott (1993), and Borthwick and Hammatt (1993), were nearest the current project area, though they are west and *mauka* (upland) approximately between the 200-320 foot elevation. Dr. Hunt's, survey was conducted west of the University of Hawai'i-Hilo Campus, within the proposed Pū'āinakō Street Extension alignments (Hunt and McDermott 1993). During the survey, Hunt identified 11 sites with 97 component features. Initially Hunt identified some of these sites as possibly prehistoric and early historic period features, but later reclassified them as historic clearing-mounds associated with the Waiākea Sugar Plantation (Hunt 1992). Hunt and McDermott (1993:60-61) also found some evidence of a prehistoric Hawaiian component in the project area. Three volcanic glass flakes were recovered from a test unit excavated into a platform. The test unit was excavated in four natural strata. Layers I and IIa were associated with the construction of the platfrom. The flakes were recovered from Layer IIb, which represented the pre-platform A-B soil horizons. Layer III was the sterile C horizon zone. Therefore, it is clear that the artifacts were deposited before the platform was constructed.

The study completed by Borthwick and Hammatt was conducted in a UH-Hilo parcel north and adjacent to Hunt's study area. In the course of work, four sites with associated features were identified. The only cultural materials identified were of recent origin, and all the sites in the Borthwick-Hammatt study ares were reported as being historic and associated with sugar plantation activities (Borthwick et al. 1993).

The earlier studies were of a more general nature, related to either the city of Hilo or to the district of Hilo as a whole. In 1908, T.G. Thrum reported on *heiau* (ceremonial sites) of the Hilo area in the late 1800s. In 1906-1907, J.F.G. Stokes conducted a survey of *heiau* on the island of Hawai'i, and reported on sites within the vicinity of Hilo (1991 Stokes and Dye). During portions of 1930, 1931, and 1932, A.E. Hudson conducted an archaeological and historical literature research for the eastern portion of Hawai'i Island (Hudson 1932). Hudson provided a detailed description of various sites within the Hilo area.

Hudson's 1932 manuscript notes that, "There was an important village and trading center around Hilo bay" (Hudson 1932:20). The following excerpts from Hudson's manuscript describe Waiākea earlier this century.

> There are known to have been rather dense populations in Waipio, Laupahoehoe, Hilo and Kalapana where the chief cluster of heiaus were located. House sites are usually found in close proximity to those temples located elsewhere away from the chief centers of habitation... Most of the heiaus were built close to the sea. The majority are within a hundred yards of the beach. Very few are more than 2 miles inland and these were probably of a specialized class, such as the bird catchers' heiau traditionally located in Piihonua above Hilo... (ibid.:38)

> No archaeological remains are to be found in the city of Hilo itself except a few stones which are said to have been taken from heiaus [Hudson's Site 37, the heiau of Maka-o-kū and pu'uhonua (refuge) of Moku-ola]... Lyman estimates that in 1846 there were three or four thousand inhabitants in this region between Hilo and Keaau... (ibid.:226-227).

Hudson identifies one of the inland *heiau* as being in Waiākea, along the old Hilo-'Ōla'a trail (not far from the route of modern-day Kīlauea Avenue), he comments:

> There was a heiau named Kapaieie near Honokawailani in Waiakea. Bloxam who passed the site on his way from Hilo to the volcano say that its center was marked by a single coconut tree. At the time of his visit nothing remained but ruined walls choked with weeds. He was told that the priests would lie in wait for passersby and dispatch them with clubs. Thrum [1908:40] states that the site was famed in the Hilo-Puna wars but its size and class are unknown. No remains of any kind could be found and no Hawaiians with whom I talked had ever heard of it (ibid.:240).

Hudson also cited Thrum's 1908 publication, mentioning a small *heiau ho'oūlu 'ai* (a temple at which ceremonies were offered to ensure successful harvests), which was named Kiniakua. The *heiau* was reportedly near the spring of Waikapu (Hudson 1932:241). Unfortunately, none of the maps or references consulted during the preparation of this report identified the site locations.

In 1981, Kelly et al. prepared a history of Hilo Bay and vicinity, and though it was not specifically an archaeological study, the documentation provides valuable information for understanding land use practices in the area. Subsequent studies, although not conducted in the immediate project area, have pointed out the extensive impact of historic period development on Hawaiian sites in Hilo town and vicinity. Most of the studies (e.g., Kelly and Athens 1982; Jensen 1991; Goodfellow and Fager, 1992; Hunt, 1992; Hunt and McDermott 1993; and Borthwick et al., 1993) note that there is little, if any remnants of Hawaiian sites close to Hilo Bay, and they also point out that the landscape in outlying areas has been substantially modified by sugar cultivation, and pasturing animals (c. 1860s-1940s), and, since the 1950s, increasing housing development associated with a growing population.

HISTORICAL DOCUMENTARY RESEARCH

This section of the report examines: (a) settlement patterns and evolution of the Hawaiian community, (b) cultural practices and the use of land and ocean resources, and (c) the implications of Western contact and associated changes in the environment. This study includes recently available translations of legendary materials (the product of a PHRI Hawaiian language newspaper translation project), and also includes references from the extensive historical researches previously completed for the general project area. Among the previous works referenced in this study are those completed by Handy and Handy (1972), McEldowney, (1979), Kelly, Nakamura, and Barrere (1981), and Hunt and McDermott (1993). Rather than reproduce their narratives in their entirety, various selections are cited, and the originals should be referenced for their detailed documentation. The excerpts of recently translated Hawaiian legends which are included with this report*, allows readers to view the Hilo project area through the eyes of its native tenants, and may help readers better understand the nature of the ancient community.

HAWAIIAN SETTLEMENT

Current theory places Polynesian settlement voyages between Hawai'i and Kahiki (the ancestral homelands of the Hawaiian gods and people) in two major periods, AD 300 to 600 and AD 1100 to 1250, and the ancestors of the indigenous Hawaiian population are believed to have come primarily from the Marquesas and Society Islands (Emory in Tatar 1982:16-18). E.S.C. Handy, ethnographer and writer on traditional Hawaiian life, speculates that when the first settlers reached the Hawaiian Islands, they found flora much like that of their homelands even though the topography was notably different (Handy and Handy 1972:12). The broad watered flatlands of Kaua'i, O'ahu, and Maui, and the expansive cultivable mountain slopes of Kona and Ka'ū on Hawai'i, permitted the development of a systematic and elaborate planting culture. These large *'āina* (food producing lands) were not present on the ancestral islands, thus practices associated with agriculture to evolved to a higher level in Hawai'i than in other Polynesian islands (ibid.:16).

When the early Hawaiian settlers came to Hawai'i from Kahiki, they brought with them many material things which were necessary for their survival. Among these "purposeful introductions" were the basic plants (dry- and wetland taros, sweet potatoes, yams, gourds, breadfruit, coconuts, *'awa*, sugar cane, and *wauke* etc.). In a discussion on early settlement, noted Hawaiian historian, Mary Kawena Pukui expressed the thought that her ancestors also brought with them numerous non-material things which were of importance to ancient life:

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* *Diacritical (macron and glottal) marks were not generally used at the time most of the Hawaiian language narratives in this report were written, as native speakers of the time generally knew the proper pronunciations of the words. Today, this understanding has been greatly diminished, thus diacritical marks have been used in this report. The marks have been added when the original meanings or pronunciations of words were clear. For words with several possible meanings, the marks were not added. To further aid in understanding the texts, hyphens have been added to certain names comprising composite words, to separate the words. Brackets have been used to identify author's annotations, and parentheses have been used to generally enclose translations.*

> It is impossible to enumerate the hundreds of gods and goddesses of old Hawai'i. Some of the gods were inherited from exceedingly ancient times, from our ancestors who came from southern islands and they can be said to have been 'brought' along by them, just as truly as were the material things in the canoes because they [the gods and goddesses] were in their minds and souls..." (M.K. Pukui Ms.:2).

It is believed that for generations following initial settlement, the growing Hawaiian population remained along the windward (*ko'olau*) shores of the Hawaiian Islands, where there was easy access to water and fishing was good (Handy and Handy 1972:12). It was in this region that agricultural production could become established.

The Hāmākua and North Hilo coasts are areas which fit this description, while the South Hilo coast, location of Hilo Town and the project area, was watered by Wailuku river and smaller streams as Waiolama, 'Alenaio, and Wailoa. Indeed, the coastal zone of Waiākea was noted for its natural and modified fish ponds and taro ponds, and for Maka-o-kū, a *heiau* and site associated with Moku-ola (Coconut Island), was named for an ancestral chief and husband of the goddess Hina. These *akua-ali'i* (god-chiefs) came from Kahiki and controlled the Hilo District (c. AD 1300). They are important figures in several legendary accounts. Maka-o-kū's name is also associated with fishing practices and a *ko'a* (dedicated fishing *aku* grounds) associated with the South Hilo District (*He Mo'olelo Ka'ao no Kepaka'ili'ula* IN *Ka Hōkū o Hawai'i* March 20, 1919-December 9, 1920).

Only after the best areas became populated and perhaps crowded (c. A.D. 800 to 1000), did the Hawaiians begin settling more remote *kona* (leeward) sides of the islands (Tomonari-Tuggle 1985:15). Kirch (1985) describes the time between AD 1100 and 1650, as the Expansion Period. This period was characterized by a rapid increase in population and intensified agriculture, which heralded the creation of new social, religious, and political structures.

HAWAIIAN LAND MANAGEMENT AND USE

As ancient Hawaiian land use and resources management evolved, the *moku puni* or islands were subdivided into land units of varying sizes, and the largest division was the *moku-o-loko* (district - literally: interior island). It appears that in early Hawaiian history, the island of Hawai'i was formally divided into six major districts, and "Hilo" is one of those six. On each island, the large districts were further divided into *'okana* or *kalana* (regions smaller than the *moku-o-loko*, yet comprising several other units of land). In the legendary account of Ka-Miki, as translated from the Hawaiian language newspaper *Ka Hōkū o Hawai'i* (Maly in prep), readers learn that the district of Hilo was divided into three geographical regions, or *'okana*. These divisions were *Hilo Pali-kū* (Hilo of the upright cliffs, which extended from Hāmākua side of Wailuku River to Ka'ula gulch on the Hilo-Hāmākua border), *Hilo-one* (The sandy shoreline zone of Hilo Bay), and *Hilo Hanakāhi* (Hilo of the chief Hanakāhi, which included the Waiākea-Pana'ewa region of Hilo). The current project area is situated in Hilo Hanakāhi, or south Hilo. Because of its rich fishponds, good ocean fishing, and extensive dryland agricultural resources, the area was considered to be a choice land; it was the location of one of the powerful royal seats on the island of Hawai'i.

The next traditional unit of land was the *ahupua'a*, which were subdivisions of land that were usually marked by an altar with a pig image placed upon it. The *ahupua'a* may be

compared to pie-shaped wedges of land that stretch from the ocean, to the interior of the island; like the larger land units, the *ahupua'a* were divided into smaller, more manageable parcels. The *'ili lele* were detached parcels with resources in various environmental zones; *kīhāpai* were gardens; *māla* were dryland agricultural parcels; and *kō'ele* were agricultural parcels worked by commoners for the chiefs, and these small land units are among those which were identified by the ancient Hawaiians. These smaller parcels were inhabited and managed by the *maka'āinana* (people of the land) and their extended families. The common people generally had access to all of the resources of the *ahupua'a* in which they lived, from mountain slopes to the ocean.

Entire *ahupua'a*, or portions thereof, were generally under the jurisdiction of appointed *konohiki*, or lesser chief-landlords, who answered to an *ali'i-'ai-ahupua'a* (chief who controlled the *ahupua'a* resources). The *ali'i-'ai-ahupua'a* in turn answered to an *ali'i 'ai moku* (chief who claimed the abundance of the entire district). Thus, *ahupua'a* resources also supported the royal community of regional and/or island kingdoms. This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning. and it is in this setting that we find the project area lands of Wai-ākea (Broad or expansive waters).

Handy and Handy offer the following description of agricultural development in the Waiākea-Hilo area:

> In lava-strewn South Hilo there were no streams whose valleys or banks were capable of being developed in terraces, but [taro] cuttings were stuck into the ground on the shores and islets for many miles along the course of the Wailuku River far up into the forest zone. In the marshes surrounding Waiakea Bay, east of Hilo [town], taro was planted in a unique way known as *kanu kipi*... On the lava-strewn plain of Waiakea and the slopes between Waiakea and the Wailuku River, dry taro was formerly planted wherever there was enough soil. There were forest plantations in Pana'ewa and in the lower fern-forest zone above Hilo town and along the course of the Wailuku River (Handy and Handy 1972:538-539).

As cited earlier, McEldowney (1979) conducted an archaeological and historical literature search for the environs of Hilo town. In this study McEldowney presented a basic pattern for land use according to environmental zones. The current project area is situated within, zone two of her five environmental zones, and is closely associated with zone one. Excerpts from McEldowney (1979) describe the activities that occurred within the general project area zone(s):

Zone I Coastal Settlement

> The highest number of people in the early historic period, and subsequently the highest site probabilities, are found in this zone from sea level to roughly 20 to 50 ft elevation or 1/2 mile inland. Early descriptions, as well as the distribution of known sites, suggests that structures representing both permanent and/or temporary use occur along the entire coast.
>
> In 1823, Ellis estimated that 2,000 people lived in 400 houses or huts along Hilo bay. Consistently, this village was described as a nearly continuous complex of native huts and garden plots interspersed with shady groves of trees, predominantly breadfruit (*Artocarpus altilis*) and coconut (*Cocos nucifera*)... Gardens, outlined by windbreaks or small plantations of banana

(*Musa* hybrids), sugarcane (*Saccharum officinarum*), and wauke (*Broussonetia papyrifera*) were primarily planted with dryland taro, mixed with sweet potatoes (*Ipomoea batatas*) and minor vegetable crops. Other economically valuable trees, mostly Polynesian introductions (e.g., *Eugenia malaccensis, Pandanus odoratissimus, Thespesia populnea, Aleurites moluccana*) grew singly or as components of these groves (McEldowney 1979:15-16).

Zone II Upland Agricultural Zone

The extent of this zone varies in early journals, but most confirm that an expanse of unwooded grasslands or a "plain" behind Hilo town extended up to approximately the 1,500 ft elevation (i.e., the edge of the forest). Scattered huts, emphasized by adjacent garden plots and small groves of economically beneficial tree species, dotted this expanse.

The cumulative effects of shifting agricultural practices (i.e., slash-and-burn or swidden), prevalent among Polynesian and Pacific peoples, probably created and maintained this open grassland mixed with pioneering species and species that tolerate light and regenerate after a fire... With remarkable consistency, early visitors to Hilo Bay describe an open parkland gently sloping to the base of the woods. This open but verdant expanse, broken by widely spaced "cottages" or huts, neatly tended gardens, and small clusters of trees... Estimates as to the extent of the extent of this unwooded expanse ranged from between five and six miles [Goodrich 1826:4] to between three and four miles [Coan 1882:29] above the coast or village, with most falling between four or five miles.

The constituents of gardens and tree crops in the village basically continued in the upland except that dry-land taro was planted more extensively and bananas were more numerous... This same pattern occurred between Waiākea Pond and the Pana'ewa Forest in the four or five miles of open country dominated by tall grasses. Here stands of *kukui* (*Aleurites moluccana*), pandanus, and mountain apple became more conspicuous, with large areas of dryland taro planted in rocky crevices on the younger Mauna Loa flows... (McEldowney 1979:18-20).

THE LEGENDARY SETTING

Hawaiian legends provide readers with documentation pertaining to land use and other native practices, and describe the features of the cultural landscape. The narratives also convey values and expressions of the relationship between ancient Hawaiians and their environment. There are many legendary accounts which are associated with Hilo-Waiākea area, but their relationship to the project area is difficult, if not impossible to determine. Rather than retell all of the legends and historical references which have been cited in other studies, selected narratives from recently translated Hawaiian texts are included with this study as Appendix A. The original Hawaiian texts that were the source of the cited legendary account, were printed in the weekly Hawaiian-language newspaper *Ka Hōkū o Hawai'i*, published in Hilo between 1906 to 1948. "*Ka'ao Ho'oniua Pu'uwai no Ka-Miki*" (The Heart Stirring Story of Ka-Miki), was presented in serial form over four years (1914-1917), and is of particular interest for the current study.

The story of Ka-Miki is an account of two supernatural brothers, Ka-Miki (The quick, or adept, one) and Maka-'iole (Rat [squinting] eyes], who traveled around the island of Hawai'i along the ancient *ala loa* and *ala hele* (trails and paths) that encircled the island. Their story provides a wealth of information pertaining to more than 790 place name origins and documents site and community histories, local and regional practices, and ceremonial and *mele* (chant) texts. The legend appears to have been primarily recorded for the paper by Hawaiian historians John Wise, and J.W.H.I. Kihe. During the process of working on the translations, numerous other Hawaiian legendary accounts were reviewed as well while trying to locate particular place names and confirm textual content. Some of the pertinent narratives are included in Appendix A because of their importance to understanding the region. The story is set in about the 1300s, at the time when Pili-a-Ka'aiea (Pili) was sovereign chief of all Kona. It was while on a journey around the island of Hawai'i, that the brothers came to be at the royal court of the chief Waiākea-nui-kumu-honua, who was the brother of the sacred chiefess Pana'ewa-nui-moku-lehua, and the chief Pi'ihonua-a-ka-lani.

Among the important place names that are included in the legendary account, and which are pertinent to this study are:

> ***Kalana-kāma'a*** Interpretive translation: To undo one's *ti-* or *kapa*-twined *sandals*. By association with narratives written by Kamakau (1961) and I'i (1959), it appears that the project area is situated in or near the Waiākea land division of Kalanakāma'a
>
> ***Ka-lepolepo*** The dirty one or low born chief; cf. *lepolepo* a derogatory term used to describe a low born chief; an *'ili* situated at the Kona-Ka'ū side of the Waiākea fishpond
>
> ***Pana-'ewa*** Crooked or unjust place; a land section of Waiākea
>
> ***Wai-ākea*** Expansive - much water; an *ahupua'a* land unit name

It seems that the project area is situated within the area traditionally known as Kalanakāma'a. This possible place name association comes from the proto-historic period (AD 1650-1795) as documented by Hawaiian historians J.P. I'i (1959) and S.M. Kamakau (1961). Papa I'i offers the following:

> ...Alapai, ruler of Hawai'i and great uncle of Kamehameha, and his wife Keaka took charge of him [Kamehameha]. Some years later, Alapai and his chiefs went to Waiolama in Hilo, where Keoua Kupuapaikalani, the father of Kamehameha, was taken sick and died. Before Keoua died he sent for Kalaniopuu, his older half brother and the chief of Kau, to come and see him. Keoua told Kalaniopuu that he would prosper through Kamehameha's great strength and asked him to take care of the youth, who would have no father to care for him. Keoua warned Kalaniopuu, saying, "Take heed, for Alapai has no regard for you or me, whom he has reared." After this conversation, Keoua allowed his brother to go, and Kalaniopuu left that night for Puaaloa.
>
> As Kalaniopuu neared Kalanakamaa, he heard the death wails for Keoua and hastened on toward Kalepolepo where he had left his warriors... (I'i 1959:3).

Kamakau further elaborates on the events and identifies the location with the following comment:

> ...Keoua, called Ka-lani-kupu-a-pa-i-ka-lani-nui, fell ill of a lingering sickness at Pi'opi'o adjoining Wailoa in Waiakea and died there in 1752... His older brother Ka-lani-'opu'u was with his *kahu* [guardian-attendant] Puna above Kalepolepo at the time (Kamakau 1961:75).

> Kamakau's narratives indicate that it was thought that the chief Alapa'i had perhaps caused Keōuas' death. Heeding the words of his brother, Kalani'ōpu'u, attempted to secure Kamehameha and care for him. This is how the war between Alapa'i and Kalani'ōpu'u started at Kalepolepo. Following this fight, the forces of Alapa'i and Kalani'ōpu'u met again at Pā'ie'ie and Pua'aloa (Kamakau 1961:75-76). In a later account, pertaining to Kamehameha's battles of conquest for rule of the island of Hawai'i, Kamakau further identifies the location of Pua'aloa – Kamehameha's forces traveled from Ka'ū, and "As he [Kamehameha] was descending, just out of Pana'ewa at a place called Pua'aloa, he met with a war party of Kahekili" (Kamakau 1961:125).

Based on the above narratives and an 1891 historic map by E.D. Baldwin (Figure 2), it appears that the land parcel of Kalanakāma'a is, or is closely associated with the project area.

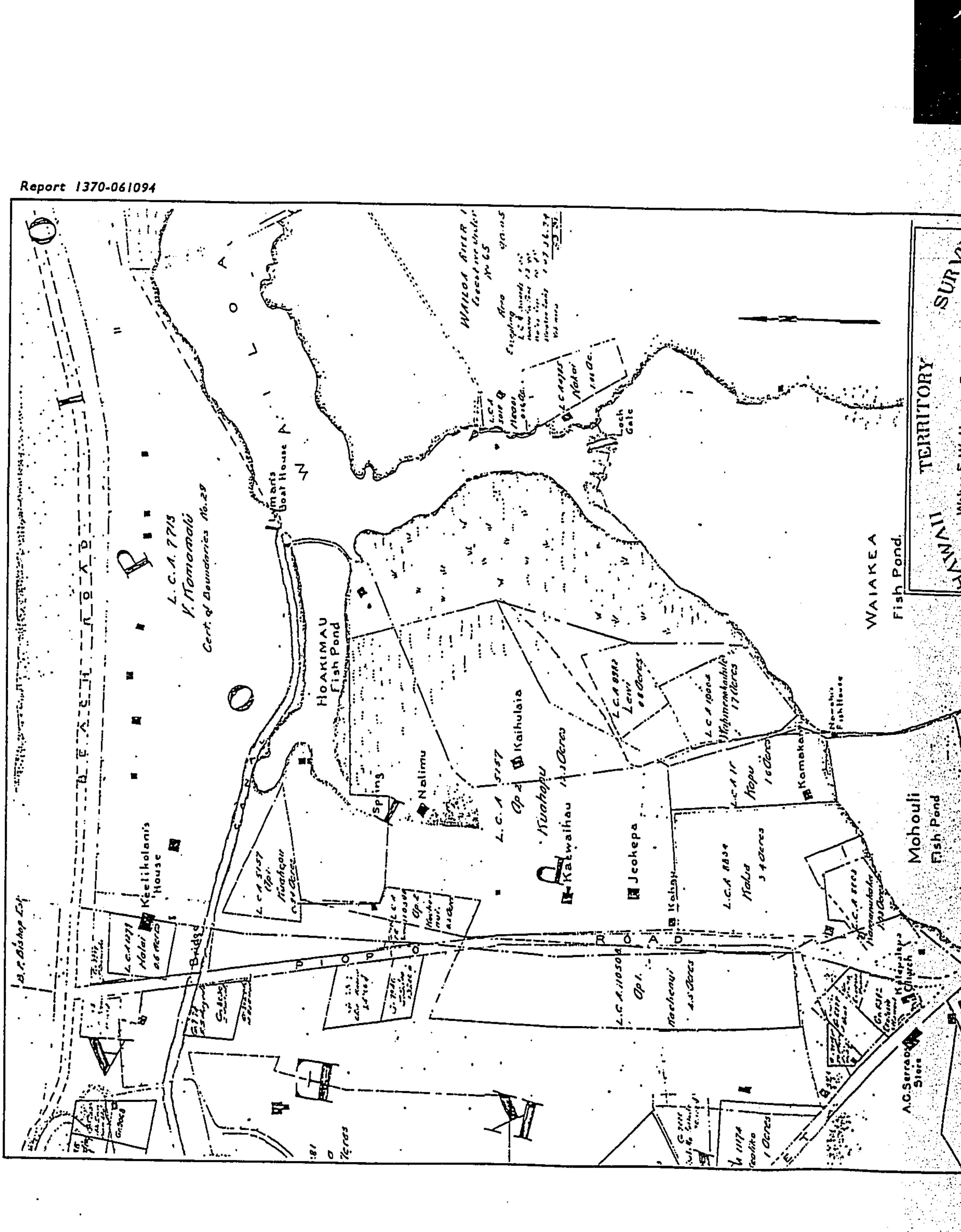
HISTORIC PERIOD EVENTS IN WAIĀKEA

During the years 1823-1825, American missionary C.S. Stewart lived in Hawai'i, and in 1825, Stewart traveled to Hilo upon the *H.M.S. Blonde* with Lord Byron (Stewart 1970). Arriving at Hilo on June 13, 1825, Stewart described the setting of Hilo Bay, its' community, and the surrounding region:

> As we approached the land after church, we were greatly delighted with the verdure, luxuriance, and beauty of the landscape opening to us, in the neighborhood of the bay of Hido [Hilo]... Though in a state of nature, this large district had the appearance of cultivation, being an open country covered with grass, and beautifully studded and sprinkled with clumps, and groves, and single trees, in the manner of park scenery, with a cottage here and there peeping from beneath their rich foliage... (Stewart 1970:361).

Landing on the shores of Waiākea, fronting Mokuola (Coconut Island), Stewart described the setting:

> The beach is covered with varied vegetation, and ornamented by clumps and single trees of lofty cocoa-nut, among which the habitations of the natives are seen, not in a village, but scattered every where among the plantations, like farm-houses in a thickly inhabited country... At a very short distance from the beach, the bread-fruit trees were seen in heavy groves, in every direction, intersected with pandanus and tutui, or candle-tree, the hibiscus and the acacia, &c. The tops of these rising gradually one above another, as the country gently ascended towards the mountains in the interior, presented for twenty or thirty miles in the south-east, a delightful forest scene... (ibid.:362-363).


HOAKIMAU
Fish Pond
WAIAKEA
Fish Pond
Mohouli
Fish Pond
L.C.A. 7713
V. Kamamalu
Cert. of Boundaries No. 29
Keelikolani's
House
Bridge
Spring
Nalimu
Kaihulaia
Kuahopu
Kaiwaihau
Jeokepa
Kamekahi
Lock
Gate
TERRITORY
A.C. Serrao's
Store
Church

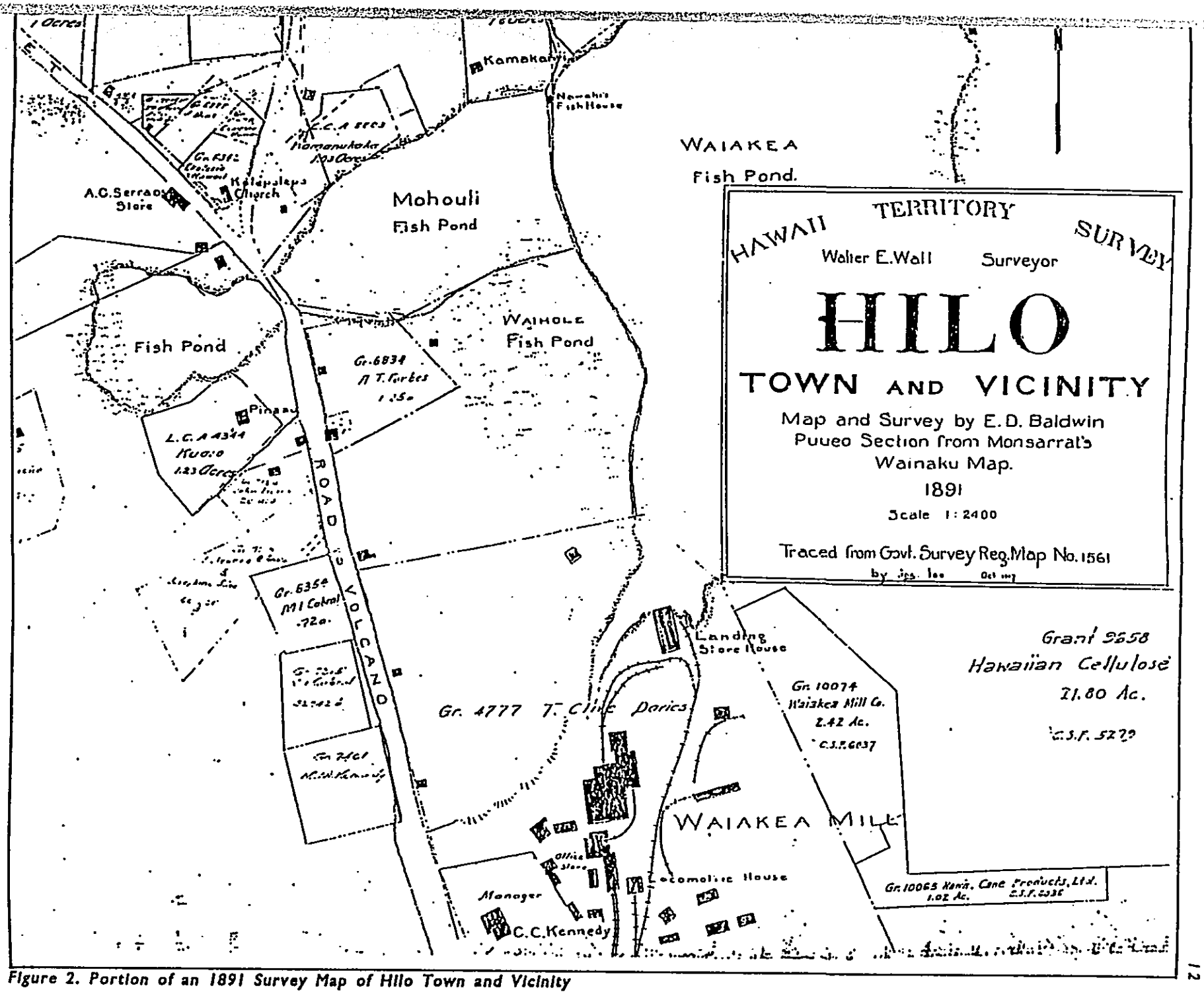


Figure 2. Portion of an 1891 Survey Map of Hilo Town and Vicinity

> The thatching of the houses in general, here, is altogether more neat and beautiful than at the leeward islands. It is made from the leaves of the pandanus, and put on so as to conceal all the rudeness of the timber and sticks on the inside; while on the outside, a deep edging of fern, along the peak and ends of the roof, and down the corners of the house... (ibid.:366-367).

On Saturday, July 2, 1825, Stewart and Lord Byron's party departed from Hilo for a journey to Kilauea Volcano. Stewart described the trail through Waiākea (which passed a short distance below the project area) with the following narrative:

> For the first four miles the country was open and uneven, and beautifully sprinkled with clumps, groves, and single trees of the bread-fruit, pandanus, and candle tree. We then came to a wood, about four miles in length... (ibid.:369).

McEldowney's 1979 study provides readers with a concise overview of occurrences from 1824 through 1895. In the period between 1824 to 1848, McEldowney notes that Hawaiian cultural and land use practices remained basically the same, although the arrival of the missionaries in 1824 heralded change of Hawaiian spiritual concepts and values and family system. In the period between 1824-1848, there was a marked decline of the Hawaiian population and the Hawaiian religious- and political- systems were deteriorating. These social changes led to change in the Hawaiian landscape as well (McEldowney 1979:33-34). McEldowney notes:

> Major causes of this decline were a continuous decrease in the birth rate, increased deaths due to diseases, and emigration to developing centers of population and through employment on sailing vessels and in foreign ports. The greatest changes in the Hawaiian religious and political systems resulted from pressures due to increasing involvement in international trade, world political affairs, and religious movements, exemplified by the effects of the Chinese sandalwood trade and the efforts of the first missionaries to exclude Catholicism (ibid.).

During this period, the missionary efforts focused on bringing the traditional Hawaiian community into western-styled towns and population centers, where the "fold" could be under the watchful eyes of church leaders. Additionally, as foreign trade increased, western businesses began setting up shop along the developing port of Hilo. thus a town was established. Also during this time, a market for various crops and materials with which to supply foreign vessels grew, and Hawaiian agricultural production diversified as "new crops and ornamental and adventive plants" were introduced (McEldowney 1979:35). McEldowney also notes that the destruction caused by the tsunami of 1837 heralded a "great religious revival" in Hilo, she states:

> During the revival's height [1837-1840], as many as 10,000 people congregated in Hilo at one time. Among other consequences, this led to a severe alteration of traditional habitation and garden within the Hilo area, the permanent or temporary abandonment of entire villages in outlying areas, and a deeper disruption of traditional Hawaiian beliefs and subsistence patterns (McEldowney 1979:36).

LAND TENURE

The above events, combined with the impact of a measles epidemic in 1848 that killed an estimated one-third of the population (McEldowney 1979:37), had a profound effect on the Hawaiian people and culture and on use of the project area land, which is a component of McEldowney's Zone II. Indeed, as the population declined, the "scattered huts, emphasized by adjacent garden plots and small groves of economically beneficial tree species" (McEldowney 1979:18), which occurred in the expanse of Zone II, disappeared.

In the period between 1845-1865, McEldowney notes that the traditional huts and garden complexes gave way to a town with wooden structures which where primarily situated between Waiolama and Wailuku Rivers. During this period the planting of sugar cane fields began on the upland slopes (McEldowney 1979:37). By this time, foreign business interests had gained a stronghold in the Hawaiian Kingdom, and western land ownership-management practices began replacing the traditional Hawaiian system. This movement led to the Māhele (Land division) of 1848, by which native tenants of the land were given the opportunity to acquire land upon which they lived and/or land which they personally cultivated. By 1850, because of the diminishing Hawaiian population and increasing foreign demands for the right to acquire land for economic development, foreigners were also allowed the opportunity to purchase land (Kame'eleihiwa 1992:300). This opened the door to foreign business interests, primarily American, and the stage was set for the full-scale development of a variety of businesses, including Hawai'i's sugar industry.

McEldowney reports that in 1853 a smallpox epidemic broke out, and subsequent outbreaks of leprosy and the plague further diminished the Hawaiian population (1979:37). According to McEldowney:

> ...[this] not only further reduced the population, but also disrupted the routine subsistence and traditional practices of those left to tend the sick and dying. As a result, more villages, habitations, and gardens were vacated, remnant populations relocated to towns and villages with an economy based increasingly on foreign trade, and knowledge of traditional Hawaiian beliefs and practices was gradually lost or was retained only by a few (1979:37-38).

During this period, the economy of Hilo was also fueled by whaling, the gold rush, and the business of supplying provisions for ships.. By 1865, four sugar plantations had been established in the Hilo District (McEldowney 1979:38).

A BRIEF OVERVIEW: Sugar Cultivation in Hilo and the Waiakea Mill Company

The period of development between 1865 and 1895 saw the rapid growth of Hilo town and the sugar industry, and also witnessed a near end of traditional Hawaiian land-use practices. In 1874, Hilo was ranked as the second largest city in the Hawaiian Islands (McEldowney 1979:39). The establishment of the Waiākea Mill Company in 1879, brought about intensified sugar cultivation.

> The *ahupua'a* of Waiākea became Crown Land at the time of the Māhele (Indices of Awards...1929:26). As early as July 15,1861, the land was leased by Kamehameha IV to S. Kipi for pasture in the amount of $600 per year, payable semiannually, for a period of five years (Book 14:266). Under General Lease 124-A, the ahupua'a (95,128 acres) was leased to Rufus A. Lyman on September 28, 1874, for 25 years. By the late 1870s, two businessmen, C.E. Richardson and W.H. Shipman, pioneered commercial sugarcane planting on Waiākea land... soon after the turn of the century... the plantation had over 6,000 acres of land planted in cane (Kelly 1981:89).

The Waiākea Mill was one of the primary mills operating in the Hilo area between 1879 and 1946, and when founded, was given a general lease of 30 years. The following description of Waiākea Mill Co. is summarized from Kelly (1981).

In 1880 T.H. Davies and A. Young were proprietors of the Waiākea Plantation and Mill, which had approximately 350 acres of land in sugar cane cultivation. By 1920 nearly 7,000 acres were under cultivation (Figure 3). When the General Lease (GL 124-A) for Waiākea *ahupua'a ended* in 1918, portions of the land was dedicated to homesteading. The homestead laws required that the government lease land to homesteaders who would grow sugar and send it to Waiākea Mill for processing:

> A total of about 700 acres of land was divided into cane lots (between 10 and 76 acres each), and house lots ranging from 1 to 3 acres were set apart in a town site along the line of the Volcano Road (Goodale IN Kelly 1981:121).

Because of disagreements over milling contracts and payments, this homesteader-milling arrangement had failed by 1925 (Kelly 1981:121).

The project area is a portion of Waiakea Cane Lot 6, developed for General Lease c. 1920. The land in Lot 6 (Figure 3) consisted of both land planted in cane (19.05 acres) and some waste land (8.48 acres) unsuitable for sugar cane planting. According to information gathered by Roy Takemoto (memo to Alan Walker dated January 25, 1994):

> Lot 6 was one of 216 lots subdivided under the homesteading laws of the territory and the requirement of the Organic Act. All of this land had previously been held by Waiakea Mill Co., Ltd, for the primary purpose of growing sugar cane under a lease from the territory which expired on June 1, 1918 (Land Laws Revision Commission, 1945, p.4). There were more than 2000 applicants for the 216 house lots: all lots were definitely allotted, including Lot 6. The appraisers fixed the prices at from $11 to $140 per acre for the cane land. The successful applicants were required to pay 10% upon allotment with the balance due in six installments of 15% each with interest at 6% per annum (Goodale, 1925, p.3). The homesteader took over land already planted in sugar cane by Waiakea Mill Co. and had to make arrangements for fertilizers, labor if necessary, and a contract with the Mill Co. for grinding the cane. Given the economic necessity to make the "mortgage" payments, it is highly unlikely that this homestead cane lot would not have been planted in cane.

A map drawn of the Waiakea Mill Co. lands in 1922 (Figure 4) shows a plantation railroad spur running along the southern border of Lot 6. The cane grown in the Waiakea Mill lands was

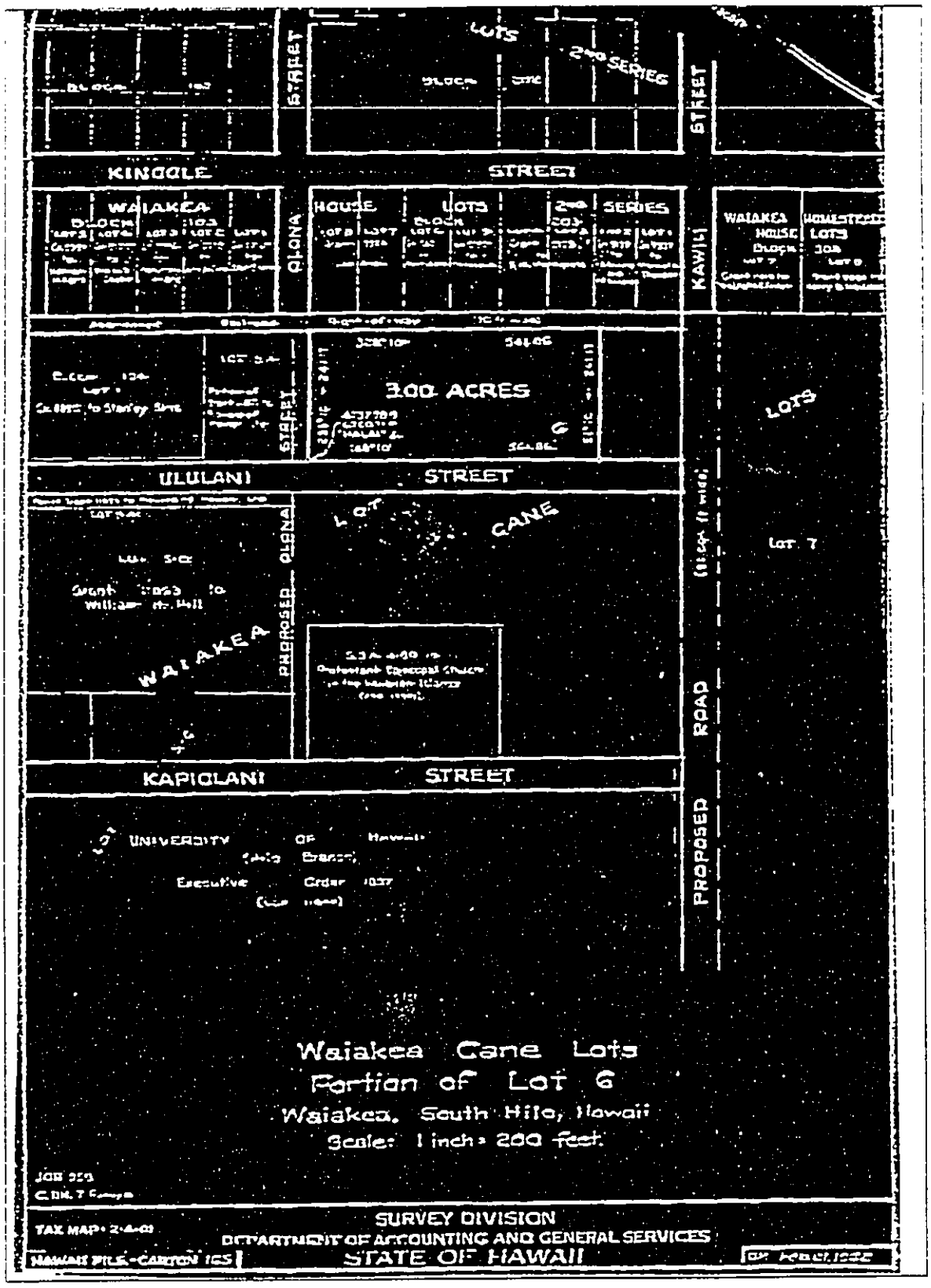


Figure 3. Portion of Map of Waiakea Cane Lots

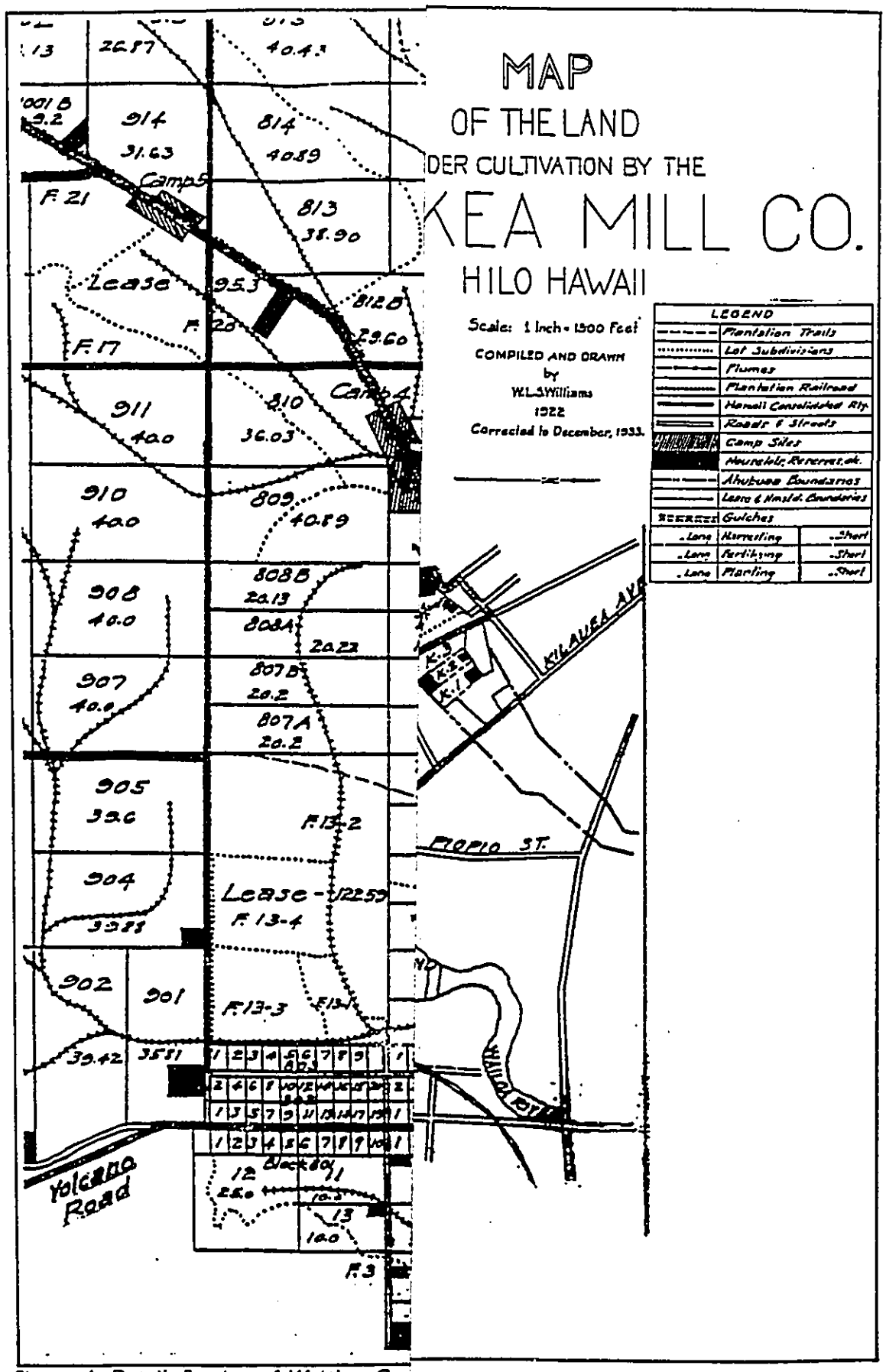


Figure 4. Detail: Portion of Waiakea Can

CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

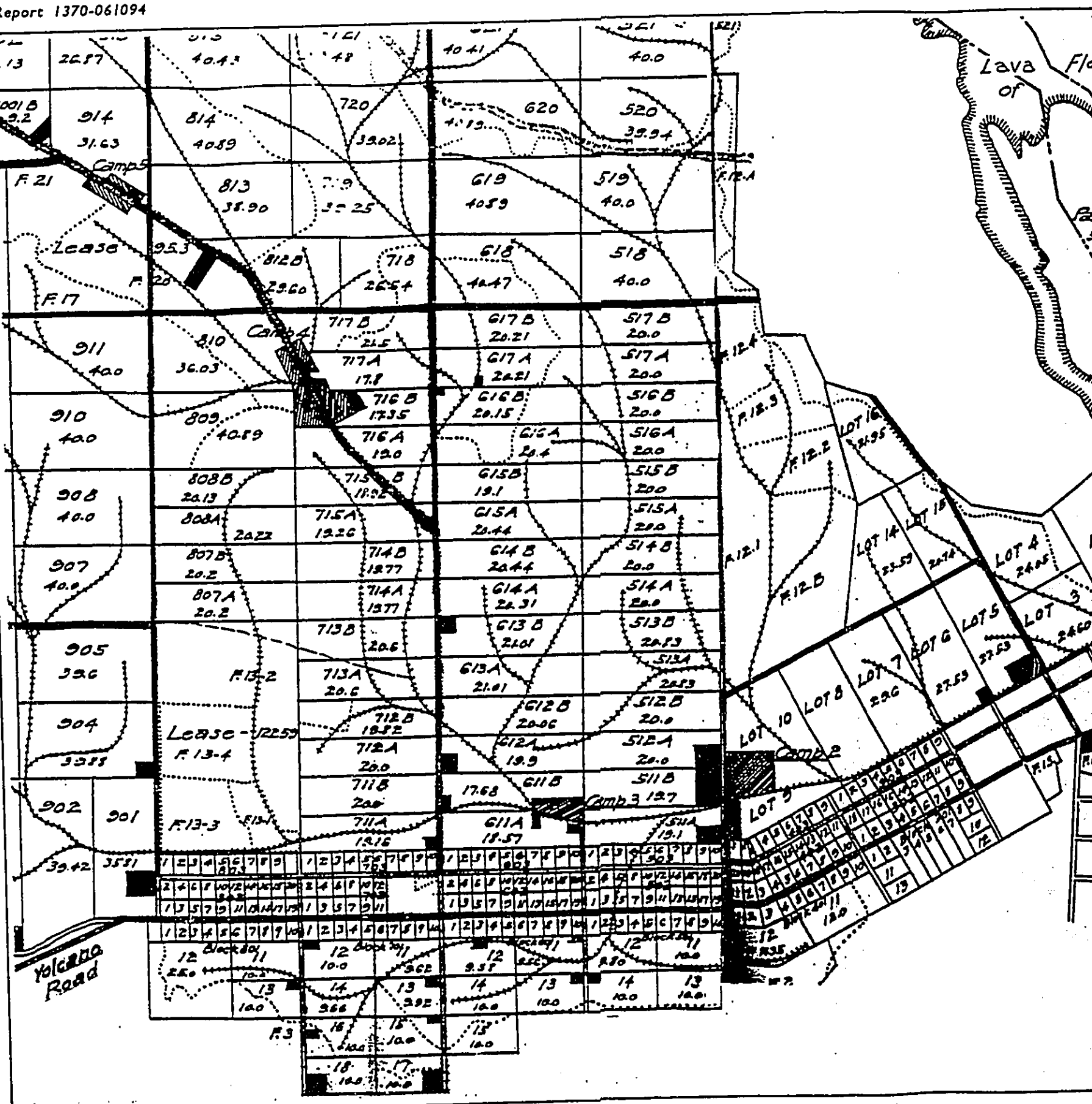
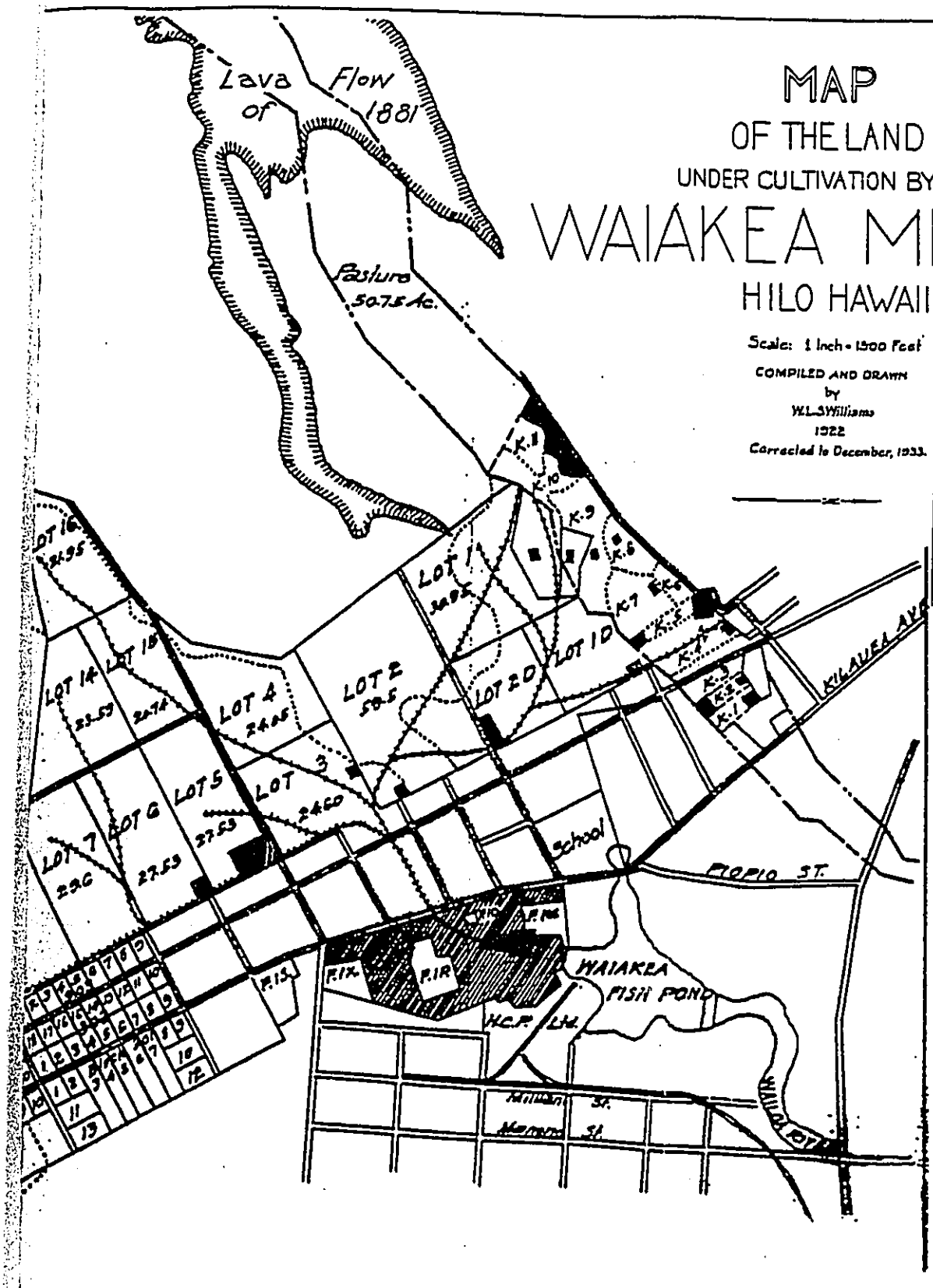


Figure 4. Detail: Portion of Waiakea Cane Lots - Lot 6

MAP
OF THE LAND
UNDER CULTIVATION BY THE
WAIAKEA MILL CO.
HILO HAWAII

Scale: 1 Inch = 1500 Feet

COMPILED AND DRAWN
by
W.L.Williams
1922
Corrected to December, 1933.



LEGEND		
	Plantation Trails	
	Lot Subdivisions	
	Flumes	
	Plantation Railroad	
	Hamakua Consolidated Rly.	
	Roads & Streets	
	Camp Sites	
	Houselots, Reservoirs	
	Ahupuaa Boundaries	
	Lease & Homest. Boundaries	
	Gulches	
Lone	Kinwaling	Short
Lone	Perlikying	Short
Lone	Marling	Short

loaded on cars running into the fields on six miles of portable track. Mule-drawn or tractor-drawn sleds carried 1,000-lb sling loads to permanent railroad sidings for loading into the cars. Fluming was also used to transport the cane from the fields to the cars (Conde and Best 1973:117-126). The location of this railroad spur suggests that not only should features associated with sugar cane planting be found in the project area, but also such features such as track alignments and loading structures might also still exist in the project area.

INFORMANT INTERVIEWS

As a part of the research and preparation of this historical study, the primary author contacted local informants to discuss their recollections of land use activities in, and around the project area. Mr. Genesis Lee Loy and Mrs. Josephine Kama'u Kunewa, both of whom are native Hawaiian residents of Hilo, who have lived in Hilo for over 75 years, shared their childhood recollections of the project area. Mrs. Junko Nowaki, Special Collections Librarian at the Mo'okini Library (UH-Hilo), also spoke with her father, Mr. Saburo Higa, at the author's request. Mr. Higa had worked for Flowers of Hawai'i, which occupied the site of the UH-Hilo campus, and he also had an intimate knowledge of the area as well.

> Mr. Lee Loy and Mrs. Kunewa - The area around the current corner of Kino'ole and Kāwili was not planted in sugarcane. As children, both Mr. Lee Loy and Mrs. Kunewa had traveled past the area, and recalled that it was country, not even really a part of Hilo town as it is considered to be today. Though houses came to be built along Kino'ole, to the best of their recollections, there had not been any structures built in the project area. Mrs. Kunewa's father, Representative William Kama'u, held the pasture land lease just east and above this area (Waiākea High-Intermediate School sites) for a number of years, and to the best of her recollections their lease had been used as pasture land for many years. Both Mr. Lee Loy and Mrs. Kunewa are quite certain that sugar cane was never cultivated in the project area (December 9, 1993).
>
> Mr. Saburo Higa (interviewed by his daughter, Mrs. Junko Nowaki) - From c 1944 to 1950, Flowers of Hawai'i (FOH) leased the land in and around the UH-Hilo campus, and cultivated various tropical flowers and green and verigated ti leaves, for sale. Mr. Higa worked for FOH in that period, and he recalled that the area above the current WikiWiki Mart had been thickly vegetated. FOH had not put the project area parcel into cultivation of ornamentals. There was an old trail near the Kino'ole-Lanikāula Street side of the project area and Mr. Higa had traveled along the trail. The area was always quite wet or swampy, and there were a lot of toads. The land was heavily vegetated, and Mr. Higa recalled that there had been wild bananas*

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* Wild bananas - *Mr. Higa's comment about the growth of "wild bananas" here is of interest. In identifying the growth as "wild," Mr. Higa indicates that in the 1940s, the bananas were not of a variety commonly known at the time. The occurrence of "wild" banana growth also seems consistent with early historic period references of Hawaiian agricultural activities in this environmental zone (cf. section titled "Hawaiian Land Management"). Additionally, at a recent public hearing regarding the Pū'ūnakō road extention (November 10, 1993), native area resident, Mrs. Mina Kealoha testified that some 70+ years ago, her mother regularly traveled along a trail which now lies basically under the Komohana Road alignment. The trail led her to the parcel above the UH-Hilo Campus, where she collected banana tree bark to be used for ornamental weaving in lauhala mats. One popular banana species cultivated by ancient Hawaiians was the* mai'a 'ole'ele *(black banana), its dry bark was used to add black geometric designs to woven items.*

growing throughout the area, but because of the heavy vegetation, he did not recall seeing any rockwork, such as platforms and terraces. Mr. Higa did not believe that sugar cane had ever been planted in the project area (December 14, 1993).

Following additional discussions with Mr. Higa (January 3, 1994), Mr. Hajime Miyamoto, and Mrs. Sonoko Tokusato, both of whom had worked for FOH, were also contacted. Mr. Miyamoto had been a *luna* (field boss), and Mrs. Tokusato had been a packer. Both of these individuals recalled that FOH had been in business at the UH-Hilo area through the late 1940s. As a field boss, Mr. Miyamoto spent time outside, and he recalled that on the FOH property (above the current project area), there had been some stone mounds. These were generally called *maru-ishi* (round stones), by the Japanese. Later, because the Portuguese had difficulty pronouncing *maru-ishi*, the words came to be pronounced *marush*. It was assumed that the stone mounds were left over from sugar cultivation, but like Mr. Higa, Mr. Miyamoto does not recall sugar growing in the immediate project area (January 4, 1994).

It is recommended that should additional information be desired, the above individuals, along with Mr. Farias, Mrs. Lily Pā, Mrs. Mina Kealoha, and Mr. Isamu Kaneshiro (all Hilo residents) be contacted. They are familiar with the project area and may be able to recommend other contacts as well.

These informant interviews seem to indicate that sugar cane was not grown in the project area. This information correlates with information from the Real Property Tax Office (RPTO) which identifies the project area parcel (TMK:2-4-57:01) as a portion of a 7.5 acre "waste land." However, this information may be associated with the use of the land after the abandonment of sugar cane planting in the area. Because of disagreements over milling contracts and payments, the arrangement between the homesteaders and the mills had failed by 1925 (Kelly 1981:121). By the 1940s sugar cane cultivation in the Hilo area had been mostly abandoned (Hunt and McDermott 1993:42). Much of this former land was converted to pasture land.

IMPLICATIONS FOR THE CURRENT PROJECT AREA

Expectations of probable site types for the current project area are based on documented land use in the traditional Hawaiian period (pre- AD 1800), and the descriptions of early to late historic period land use in the Hilo-Waiakea area (AD 1823-1925). A model has been proposed (McEldowney 1979) that subdivides the Hilo region into five environmental zones: a coastal settlement zone, an upland agricultural zone, a lower forest zone, a rainforest zone, and a sub-alpine zone. Along with this model are assessments of the types of archaeological features likely to be found in each zone. The project area is associated with the upland agricultural zone. Historic documents indicate that this area was an unwoooded plain behind the concentrated settlement areas near the coast. Prehistoric features expected to occur in this zone would include scattered huts, adjacent garden plots, and small groves of economically important trees (Ibid 1979:18). According to Hunt and McDermott:

> The kind of activity synthesized by McEldowney (1979) for this zone would not produce any clear archaeological signature. Only subtle evidence might exist and be detected, such as isolated artifacts or paleoenvironmental indications of land use....Instead, if subtle evidence of Hawaiian use of the area exists, it will likely be found only in sparse and unpredictable spatial distributions. Such evidence will be associated with deposition environments, and may be discovered (almost "at random") with subsurface test excavations (Hunt and McDermott 1993:93-94).

Features associated with the historic use of the land would include agricultural features associated with sugar cane cultivation or features associated with loading and transporting cane. Currently documented features associated with cane fields include clearing mounds, loosely stacked curvilinear walls and areas modified for water tanks. Features associated with transporting the cane include loading platforms, railroad tracks and flumes (Hunt and McDermott 1993:94). These features should also be associated with historic artifacts that date from c. AD 1880 to 1940.

FIELD METHODS AND PROCEDURES

The inventory survey consisted of pedestrian sweeps (survey transects) of the project area to locate all sites of archaeological significance. The survey transects were conducted by five people at intervals of 10 meters, and achieved a 100% coverage of the parcel. Under story vegetation in portions of the project area is thick, but overall ground visibility was good. Survey transects were flagged with red/white striped surveyor's flagging tape to insure complete coverage.

The approximate locations of all the newly identified sites were plotted on a blue line field copy of a scaled plan map of the project area, provided by the client. All sites were described on standard PHRI site survey record forms and were photographed using 35 mm black-and-white film (PHRI Roll Numbers 4560-4562). Detailed recording of sites included written descriptions, measurements, and plan maps. Each site, or primary feature within each site-complex, was marked with pink-and-blue flagging tape and with an aluminum tag bearing the site number, date, the letters "PHRI," and the PHRI project number (93-1370). As an aid to site reidentification, another piece of pink-and-blue flagging tape, inscribed with the site number, was wrapped around a rock and placed on the sites. All sites were assigned PHRI temporary field number prefixed with 1370- (beginning with 1370-1). The four sites were subsequently assigned permanent State Inventory of Historic Places (SIHP) site numbers (Table 1).

As a part of the survey, two subsurface test units (Sites 19431 Feature A and 19432 Feature AA), totaling three square meters, and one shovel test (Site 19431 Feature B) were excavated. Only one charcoal sample was located and collected as a result of the test unit excavations (Site 19431, Feature A, TU-2; Layer II, 5-46 CMBS). Age determinations are discussed in the Findings Section.

Table 1.
Correlation of Site Numbers

PHRI Temporary Site Numbers	SIHP Numbers
1370-1	19431
1370-2	19432
1370-3	19433
1370-4	19434

FINDINGS

DISCUSSION

Four sites, with 51 features were identified in the project area. The locations of these sites are shown in Figure 5 (at end). The features and sites are described below. The sites consist of both single- and multiple- components; sites consisting of more than one feature were considered complexes. The physical condition of the sites ranges from poor to good, though overall, root systems and toppled trees have impacted large portions of the cultural resources. At this time, it can not be determined if the four sites are the remaining components of a once larger complex. Formal feature types include C-shapes, mounds, enclosures, and walls (Table 2). Functional feature types identified include agriculture, agriculture/habitation, habitation/historic habitation, indeterminate/indeterminate possible habitation, possible temporary habitation/habitation (Table 3). Forty-five of the 51 features identified were agricultural. Four features functioned as habitations or possible habitations. The agricultural features consisted of 19 mounds, 19 rock walls and four mound/walls, and accounted for over 82% of all features. A summary of identified sites and features is presented in Table 4.

Table 2.
Frequencies of Formal Feature Types

Formal Type	Number	%	SIHP Number
Mound	19	37.3%	19432 (H,I,M,N,Q,R,U,V,AA-FF,LL, MM,NN,OO,UU)
Rock wall	19	37.3%	19432 (B-G,J,K,O,P,S,T,W,Y,GG, HH,KK,QQ,TT)
Mound-wall	4	7.8%	19432 (II,JJ,PP,SS)
C-shape	2	3.9%	19431 (B);19433
Mound/wall	2	3.9%	19432 (X,RR)
Enclosure	1	2.0%	19431 (A)
L-shape wall	1	2.0%	19432 (Z)
Linear mound	1	2.0%	19432 (A)
Mound w/fire pit	1	2.0%	19432 (L)
U-shape wall	1	2.0%	19434
TOTAL	51	100.2%	

Table 3.
Frequencies of Functional Feature Types

Function Type	Number	%
Agriculture	45	88.2%
Agriculture/habitation	1	2.0%
Habitation/historic habitation	2	3.9%
Indeterminate/indeterminate possible habitation	2	3.9%
Possible temporary habitation/habitation	1	2.0%
TOTAL	51	100.0%

Table 4.
Summary of Identified Sites and Features

PHRI Temp No.	Formal Site/Feature Type	Tentative Functional Interpretation	*CRM Value Mode Assess. R	I	C	†Field Work Tasks Recommended DR	SC	EX
19431	Complex (2)‡	Poss. Habitation-Ag.	M	M	M	+	-	+
A	Enclosure							
B	C-Shape							
19432	Complex (47)	Ag. - Indet.-Poss. Habitation	M	M	M	+	-	+
A	Mound							
B	Wall							
C	Wall							
D	Wall							
E	Wall							
F	Wall							
G	Wall							
H	Mound							
I	Mound							
J	Mound							
K	Wall							
L	Mound							
M	Mound							
N	Mound							
O	Wall							
P	Wall							
Q	Mound							
R	Mound							
S	Wall							
T	Wall							
U	Mound							
V	Mound							
W	Wall							
X	Mound							
Y	Wall							
Z	L-Shape							
AA	Mound							
BB	Mound							
CC	Mound							
DD	Mound							
EE	Mound							
FF	Mound							
GG	Wall							
HH	Wall							
II	Mound, Wall							
JJ	Mound, Wall							
KK	Wall							
LL	Mound							
MM	Mound							
NN	Mound							
OO	Mound							
PP	Mound/Wall							
QQ	Wall							
RR	Mound/Wall							
SS	Mound/Wall							
TT	Wall							
UU	Mound							
19433	C-Shape	Poss. Historic Habitation	M	M	M	+	-	+
19434	U-Shape	Poss. Historic Habitation	M	M	M	+	-	+

* *Cultural Resource Management Value Mode Assessment:*
-Nature: R = scientific research, I = interpretive, C = cultural
-Degree: H = high, M = moderate, L = low

† *Further Data Collection Field Work Tasks Recommended:*
DR = detailed recording (scaled drawings, photographs and written descriptions), SC = surface collections, EX = test excavations

‡ *Number of component features within complex*

Most of the project area is covered with ground-cover, primarily of recent introduction, though sections of the parcel have a thick cover of either *'awapuhi kuahiwi* (shampoo ginger) or laua'e (fern), both of which were cultivated by the ancient Hawaiians. Presently, the western portion of Site 19431-1 Feature A, exhibits signs of recent use as a "hide-out" by high school students and others. The feature is situated alongside, and is possibly dissected by Kapi'olani Street, which fronts the *makai* side of the UH-Hilo Campus, and is within easy access of Waiākea High School; there is ample evidence of at least day-time use of this site. There are many recent beer cans, soda cans, and other debris in the area. Also found were *'opihi* (limpet) shells, probably the remains of *pupus* (snacks) consumed while drinking.

SITE DESCRIPTIONS

STATE NO.: 19431 **PHRI TNO.:** 1370-1 (Figure 6)
SITE TYPE: Complex (2)
TOPOGRAPHY: Undulating decomposing *pāhoehoe* covered with decomposing organic material
VEGETATION: Ti, guava, banyan, palm, ferns, unidentified weeds
CONDITION: Fair-good
INTEGRITY: Altered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Possible habitation, agriculture
DESCRIPTION: This complex consists of an enclosure (Feature A) and a C-shape (Feature B). Location of this site is (from Feature A's datum) c. 7.40 m at 30 degrees to metal pipe and 168 degrees to end of guard rail. The overall dimensions of this complex are c. 25.50 m (E-W) by 15.00 m by 0.10 to 1.44 m.

FEATURE A: Enclosure
VEGETATION: Ti, guava, palm, banyan
FUNCTION: Habitation
DIMENSIONS: 16.20 m (W-S) by 14.60 m by 1.44 m
DESCRIPTION: Feature is on top soil. Enclosure is composed of subangular blocky *pāhoehoe* cobbles and boulders ranging from 0.30 by 0.27 by 0.30 to 0.10 by 0.06 by 0.04 m. Feature has been constructed by stacking rocks at the SE end of enclosure; the exterior side of wall is stacked and faced two to four courses high. The interior is roughly piled. The interior surface at the S side of enclosed area is littered with beer cans and bottles. This is also the side which is closest to the road, some dozer push, and a large banyan tree. Both the SE and SW ends of enclosure abut this large banyan tree. The rest of feature construction style seems to be a combination of stacking and piling. The piling appearance may be due to the wall tumbling because of vegetation growing in and around the wall. The NW interior side of enclosure is the highest part of the wall. In same area is a small *puka* (opening or entrance) with dimensions of 0.40 by 0.30 by 0.50 m. At the SW side of enclosure is wall segment or possible terrace that extends about four meters west. Dozer push abuts segment on S side; therefore, it probably altered features construction. Test unit was placed against the NW corner below surface. The test unit was excavated in three natural strata. The architectural layer of the enclosure was associated only with the top layer of soil, designated Layer I. Some charcoal and a volcanic glass tool was recovered from Layer II, which represents a soil horizon that predates construction of the enclosure. Layer III was sterile. The volcanic glass tool was a volcanic glass scraper (Figure 7).

Because the highest part of the enclosure wall was the interior side, function of structure could also be for animal husbandry. Surface remains noted as present day beer bottles and cans.

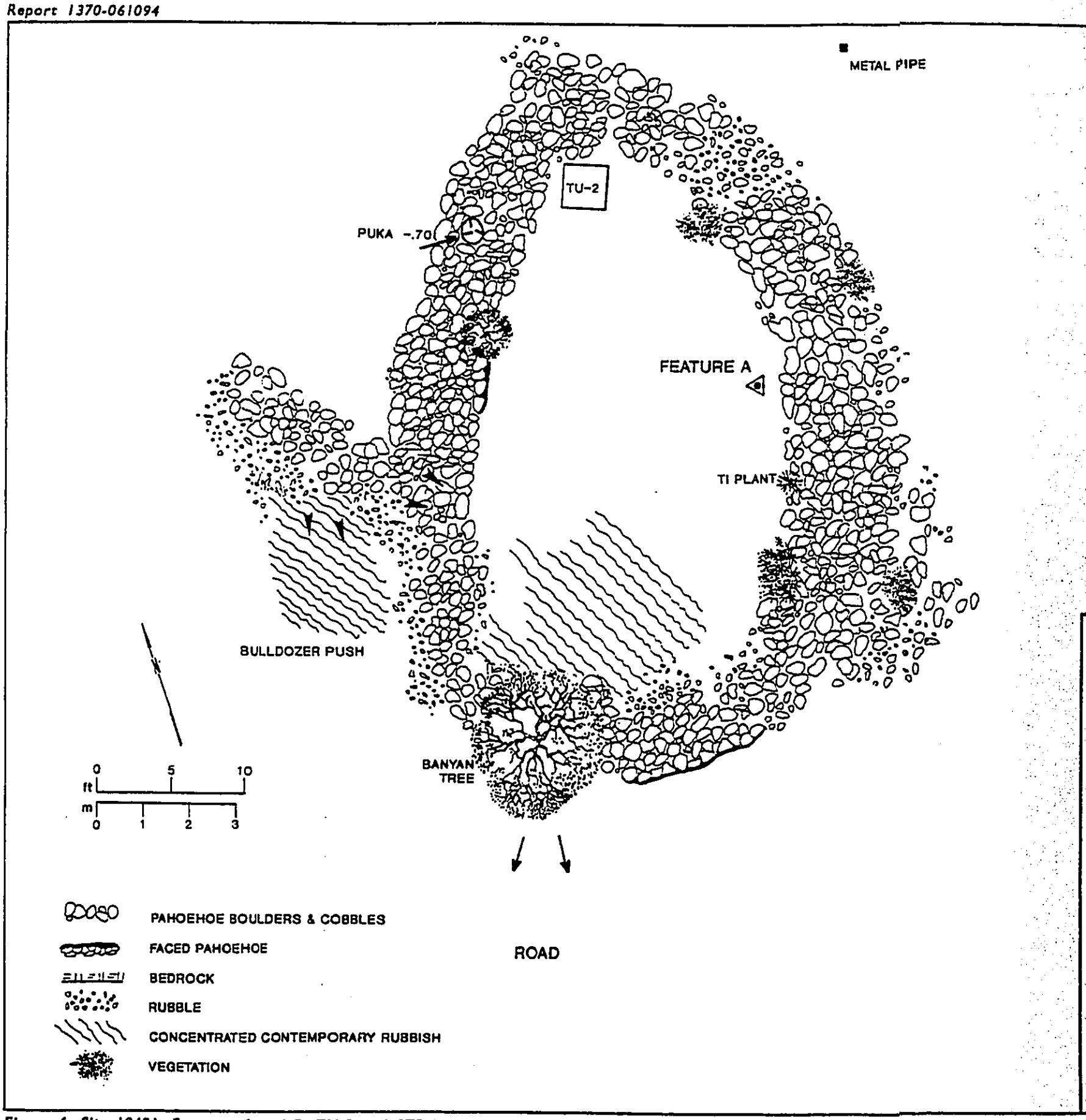
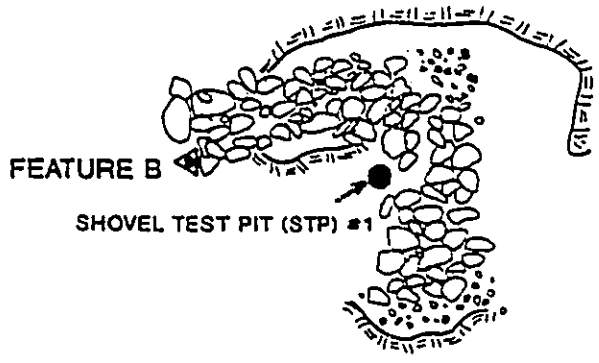
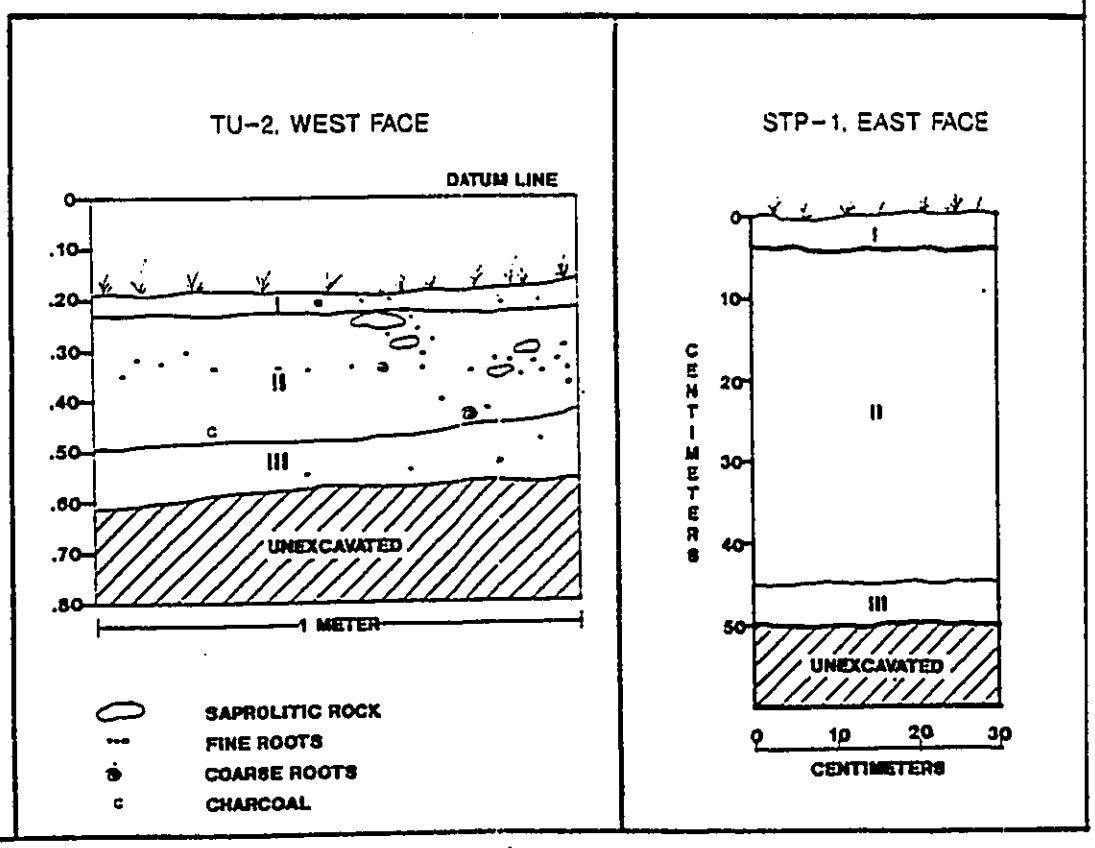


Figure 6. Site 19431, Features A and B, TU-2 and STP-1

TAL PIPE


FEATURE B
SHOVEL TEST PIT (STP) #1


TU-2, WEST FACE
DATUM LINE
0
.10
.20
.30
.40
.50
.60
.70
.80
I
II
III
a
c
UNEXCAVATED
1 METER
SAPROLITIC ROCK
FINE ROOTS
COARSE ROOTS
CHARCOAL
STP-1, EAST FACE
CENTIMETERS
0
10
20
30
40
50
I
II
III
UNEXCAVATED
0
10
20
30
CENTIMETERS

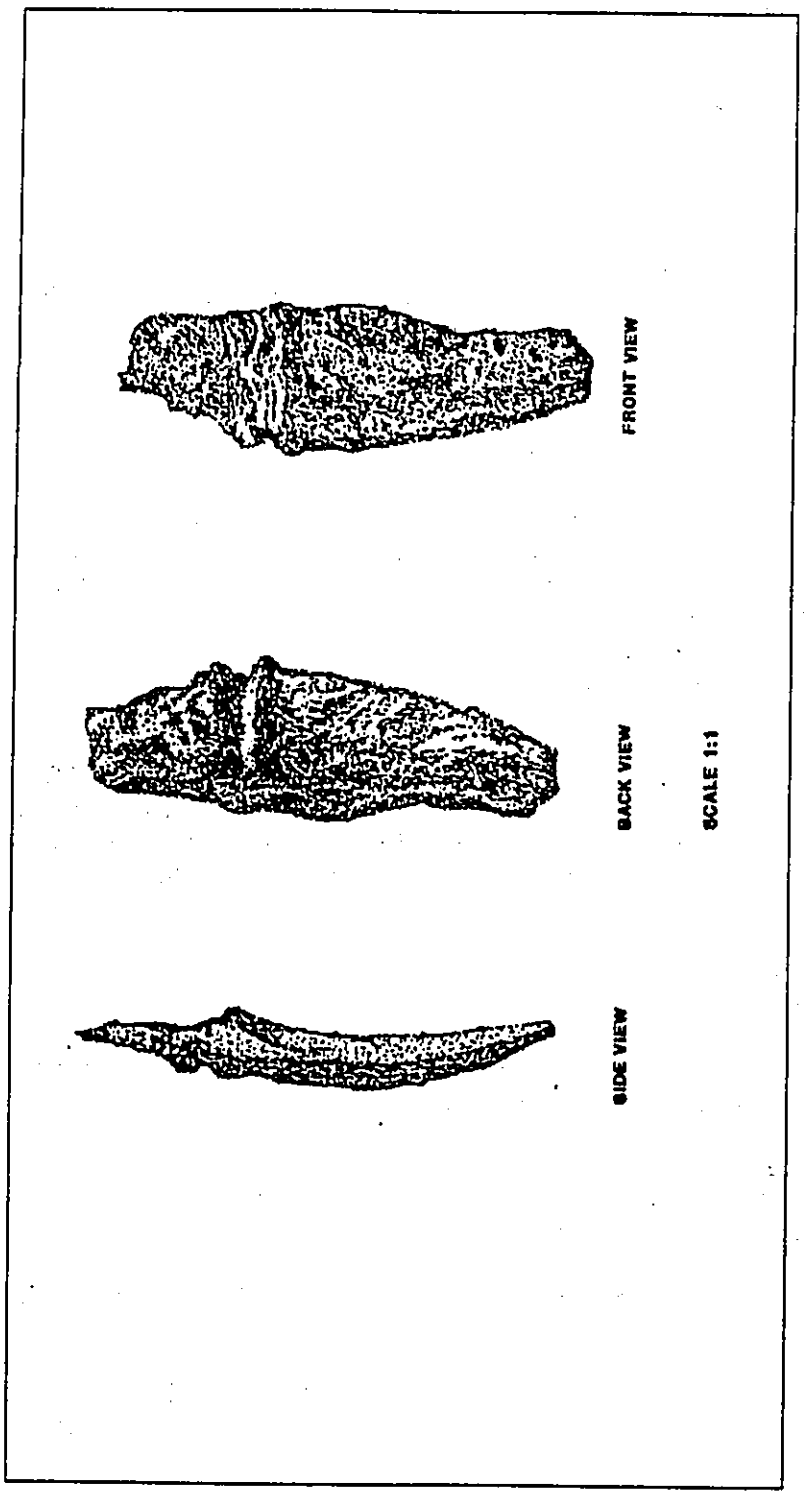


Figure 7. Volcanic Glass Knife or Scraper

Approximately 5.00 m SSE of enclosure, a cluster of fresh, empty *'opihi* shells was noted; the shells are probably associated with present day activities.

FEATURE B: C-shape
VEGETATION: Guava, banyan, ferns, weeds
FUNCTION: Agriculture/habitation
DIMENSIONS: 5.00 m by 4.20 m by 0.66 m
ORIENTATION: 323/43 Degrees
DESCRIPTION: Feature seems to be constructed on a *pāhoehoe* outcrop which is barely visible due to the heavy vegetation and organic material covering the ground. C-shape is composed of subangular *pāhoehoe* cobbles and boulders ranging in size from c. 0.60 by 0.35 by 0.20 to 0.10 by 0.05 by 0.08 m. Feature has been constructed by informal stacking one to two courses high. C-shape opens to west. Put shovel test in interior of C-shape. The shovel test was terminated at 0.46 cmbs in soil of a very hard compact clay texture with a lighter brown color. No cultural material was found. Total volume of dirt screened was 24 liters (described in section titled Subsurface Testing). Location of Feature B datum is 168 degrees to guard rail and 263 degrees to center of large banyan tree and c. 11.20 m at 324 degrees to metal pipe.

STATE NO.: 19432 **PHRI TNO.:** 1370-2 (Figure 8)
SITE TYPE: Complex (47)
TOPOGRAPHY: Rolling to undulating mixed rock and sand over *pāhoehoe* flow.
VEGETATION: Banyan, African tulip, guava, palms, wild ginger, Christmas berry, *kamani*, octopus tree, ti, red ti, avocado, breadfruit, *hau*, various ferns, swordgrass, impatiens.
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Prehistoric
FUNCTIONAL INTERPRETATION: Habitation-Agriculture-Indeterminate
DESCRIPTION: This complex consists of nineteen rock walls (Feats. B-G,J, K,O,P,S,T,W,Y,GG,HH,KK,QQ,TT), nineteen mounds (Feats. H,I,M,N,Q,R,U,V,AA-FF,LL-OO,UU, four mound-walls (Feats. II,JJ, PP,SS), two mound/walls (Feats. X,RR), a linear mound (Feature A), a mound w/fire pit (Feature L), an L-shape wall (Feature Z). The overall site dimensions are c. 450.00 m (N-S) by 400.00 m (estimated c. 4.5 acres).

FEATURE A: Linear mound
FUNCTION: Agriculture
DIMENSIONS: 15.00 m (N-S) by 30.00 m (E-W) by 1.60 m
ELEVATION: 99.12
DESCRIPTION: This linear mound stands c. 1.60 m above ground on east side (beside site 1370-1 Feature A). Datum tag on south end.

FEATURE B: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 15.00 m (N-S) by 30.00 m (E-W) by 1.60 m
ELEVATION: 99.12
DESCRIPTION: This rock wall is up to 1.30 m high by 2.30 m wide, and supports a sloping terrace (which also contains Site 1, Feature B). From 2.00 m south of Feature 2/A the wall runs 16.00 m (53') south then turns west and runs toward Kapi'olani Street, 11.00 m (36') to a junction with a short wall running back uphill, north, 6.00 m (20'). Another extension of Feature B continues generally west another 12.00 m and may have continued before street construction.

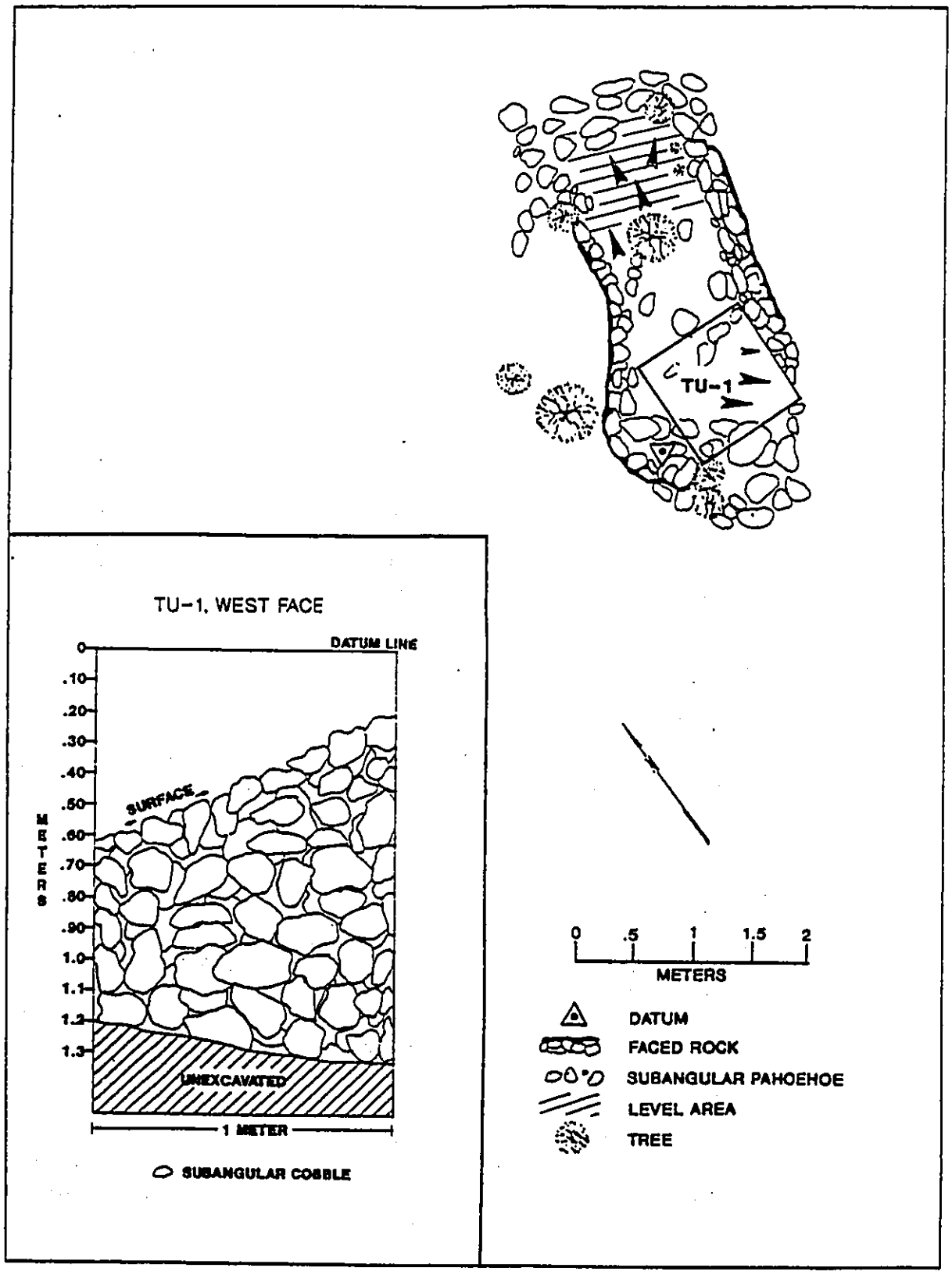


Figure 8. Site 19432, Feature AA, TU-1

FEATURE C: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 12.00 m by 2.30 m by 0.60 m.
DESCRIPTION: This rock wall is parallel to the E-W extension of Feature B. At least one wing wall runs south towards Kāwili Street. Datum tied at east end of wall.

FEATURE D: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 12.00 m by 2.30 m by 0.60 m.
DESCRIPTION: This rock wall is lower at the west end and higher at the east end. From near the corner of Feature B, East 14.00 m (46') to a junction with the wing wall which runs SE 6.50 m (22'); D runs N 7.00 m then turns E again and runs c. 16.00 m (49'). West portions average c. 0.40 m high by 1.30 m wide. East arm is as much as 1.40 m high (averaging at 1.00 m and 2.80 m wide. Datum at juncture with wing wall.

FEATURE E: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 47.00 m by 1.30 m by 0.60 m
DESCRIPTION: The datum for this feature is 21.00 m (69') at 3 from NW point of enclosure (near banyan), where it connects with *pāhoehoe* bedrock. From here it is an elongated mound to the north c. 8.00 m (perhaps 5 meters from Episcopal church property). Feature E is a rock wall which runs SE from the datum, and parallel to a stream drainage, apparently terracing the land between it and Feature A of Site 1. The length of the wall is 47.00 m. Beside a downed log the height on the downhill side was 1.30 m, on the terraced side 0.60 m and the wall was 1.20 m wide.

FEATURE F: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 1.80 m (wide) by 1.50 m (high)
DESCRIPTION: This is a rock wall, beginning at 2.00 m N of the elbow in Feature D and running 16.00 m N to the E end of Site 2, Feature A. From the terraced side (now full of avocado trees) the wall height is 0.60 m. On the low side, the wall measures 1.50 m high and is 1.80 m wide. Datum at center by trail.

FEATURE G: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 0.50 (wide) m by 0.40 m (high) m
DESCRIPTION: This is a low wall which appears to have created a terrace towards Kāwili St.. It begins at 6.00 m S of the E end of Feature C and runs E for 15.00 m, then NE for 3.00 m, then N towards the wing wall of D for 4.00 m. It also doubles back to the south here. Datum at the bend to the NE. No more than 0.40 m on low side, only 0.10 to 0.20 m high on terrace side; 0.50 m wide, except at S wing where higher and wider. Feature H is visible to E from here.

FEATURE H: Mound
FUNCTION: Agriculture
DIMENSIONS: 7.00 m (N-S) by 5.00 m (E-W) by 0.60 m (high)
DESCRIPTION: An amorphous shaped mound which shows up clearly on topo map, between Fea. G to W and Feature I to E. Measures c. 7.00 m (N-S) by 5.00 m (E-W) by 0.60 m high. Datum on tree in center, E of mound with blue flagging.

FEATURE I: Mound
FUNCTION: Agriculture
DIMENSIONS: 9.00 m (E-W) by 4.00 m (N-S) by 1.20 m
DESCRIPTION: An elongated mound 9.00 m (E-W) by 4.00 m (N-S). Height on the N is 1.20 m, while on S (towards Kāwili St.) 0.60 m. May abut Feature H at SW corner.

FEATURE J: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 7.00 m by 1.90 m by 0.60 m
DESCRIPTION: Piled *pāhoehoe* wall, roughly parallel to the N face of Feature I.

FEATURE K: Rock wall
FUNCTION: Agriculture
DESCRIPTION: A low piled *pāhoehoe* wall, running 7.00 m N from the E tip of Feature I, then 5.00 m to NW, 3.50 m NE towards Feature L. Obscured by heavy vegetation.

FEATURE L: Mound w/possible fire pit
FUNCTION: Indeterminate-Possible Habitation
DIMENSIONS: 10.00 m by 3.90 m by 0.88 m
ORIENTATION: 19/199 Degrees
DESCRIPTION: Feature L mound is constructed of *pāhoehoe* cobbles c. 0.10 by 0.15 to 0.35 by 0.45 stacked and piled two to five courses atop a small knoll. Stacked *pāhoehoe* on S tip and NE tip and along the E side. Atop this mound is a rectangular wall and what may be a historic fire pit in the south end (using small gauge rails) to be recorded as habitation Site 1370-4. This possible fire pit is U-shaped with three faced interior walls and two railroad ties acting as the grill support for a barbecuing surface. There was no surface evidence of fire having occurred, and no charcoal was visible at the surface. A surveyors' line from the banyan runs through this feature (4.50 m banyan N to Feature L). From center, 9.00 m to S tip, 6.00 m to E wall, 9.50 m to NE stacked tip, 4.30 m to W edge; 1.30 m high at NE. The location/coordinates are 10.70 m at 81 degrees (261 degrees) to Feature X site 2/ 10.00 m at 170 degrees (350 degrees) to banyan tree.

FEATURE M: Mound
FUNCTION: Agriculture
DIMENSIONS: 4.50 m (N-S) by 3.70 m (E-W) by 1.70 m high on NW face
DESCRIPTION: An amorphous mound on E side of banyan and SE of Feature L. A terrace is formed E of Feature L and N of Feature M. The terrace is 4.50 m (N-S) by 3.70 m (E-W); 1.70 m high on NW face, 1.20 m high on E side. To SW a low extension runs from Feature M high area to back(s) of banyan; feature is 4.00 m long by 1.30 m wide by 0.40 to 0.70 m high.

FEATURE N: Mound
FUNCTION: Agriculture
DIMENSIONS: 4.80 m (N-S) by 2.80 m (E-W) by 1.50 m
DESCRIPTION: An elongated amorphous (slightly concave shape) mound of piled *pāhoehoe*, just NW of Feature L and S of Feature T. 4.80 m long (N-S) by 2.80 m wide (E-W); 1.50 m above ground on W face, 0.70 m east side (terrace).

FEATURE O: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 3.00 m (wide) by 0.50 m (high)
DESCRIPTION: A piled *pāhoehoe* rock wall beginning near the E end of Feature D, running N 11.00 m (overgrown by banyan), then turns 45 degrees to NNE, runs 4.00 m to large banyan.

At the turning point, 3.00 m wide by 0.50 m high on N (terrace) and 0.70 m high on S; wall lower toward S end.

FEATURE P: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 2.50 m (wide) by 0.40 m (high)
DESCRIPTION: Large piled and stacked *pāhoehoe* wall from near the E end of Feature A; wall is 20.00 m E to a C-shape 5.00 m wide. Feature P is 2.50 m wide at the datum, with heights of 0.40 m on the N side and 0.90 m on the S side.

FEATURE Q: Mound
FUNCTION: Agriculture
DIMENSIONS: 2.1 m (N-S) by 1.10 m by 0.35 m
DESCRIPTION: A small oval mound in the middle of the terrace formed by Features O, F, and P. Nearby to SE is *pāhoehoe* outcrop 2.10 m long (N-S) by 1.1 m wide by 0.35 m high. Situated 4.4 m S of Feature P.

FEATURE R: Mound
FUNCTION: Agriculture
DIMENSIONS: 9.00 m by 3.00 m by 1.40 m
DESCRIPTION: At east side of same terrace, an amorphous mound 9.00 m long (SE-NW), taller at the SE end; pinched at middle.

FEATURE S: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 8.00 m (E-W) by 2.20 m by 0.70 m
DESCRIPTION: Piled *pāhoehoe* wall between Feature P and Feature T and separating two terraces.

FEATURE T: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 1.50 m (high)
DESCRIPTION: A long somewhat curvy piled *pāhoehoe* rock wall, forming a high soil terrace with Feature U, which is parallel. From near Feature N and S, Feature runs 36.00 m N, then curves 8.00 m W to base of (fallen) banyan. Heights on W side from 0.10 to 1.50 m; on E side 0.10 to 0.50 m (higher at S end where terrace dips).

FEATURE U: Mound
FUNCTION: Agriculture
DIMENSIONS: 22.00 m by 1.60 m (high)
DESCRIPTION: Anchored by mound and banyan on N, runs 22.00 m S and heights are 1.6 m (at mound) and 1.1 m (at datum). Terrace formed by Features U and T is 9.60 m wide at U datum.

FEATURE V: Mound
FUNCTION: Agriculture
DIMENSIONS: 8.50 m (long) by 1.00 m (high)
DESCRIPTION: A triangular shaped mound with depressions on the interior. The east wall runs N-S and measures 8.50 m long and from 1.0 m to 0.50 m high. The SW wall is 8.00 m long, with a height at the S corner of 0.80 m. The NW wall is somewhat concave and measures 8.00 m. The highest point of the interior is near the NW corner and measures 1.10 m high. From the S tip of the triangle it is 15.00 m to the C-shape (Site 1370-3) to the SW.

FEATURE W: Rock wall
FUNCTION: Agriculture
DESCRIPTION: This feature appears to be designed for water impoundment. It is located at the SE end of a drainage channel and is a semicircular rock wall, which runs about 30.00 m from below the S end of Feature E around to the N then W. Depths of the impoundment area average at 1.2 m.

FEATURE X: Mound/wall
FUNCTION: Agriculture
DIMENSIONS: 18.00 m by 1.90 m by 0.6 m
DESCRIPTION: This is an amorphous mound/wall which runs from the NW 18.00 m at 78 degrees towards the NW end of Feature T. The mound (NW end) is a pile 3.00 m in diameter, the wall is 1.9 m wide and 0.6 m high on the SW side, 0.30 m high on the NE side.

FEATURE Y: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 28.00 m by 2.3 m by 1.3 m
DESCRIPTION: A long wall of stacked and piled *pāhoehoe*, L-shape. The base of the L is beside Feature U and measures 4.70 m at 140 degrees; it is 2.1 m high at the SE end. The long portion of the wall runs from Feature U, East for 28.00 m at 61 degrees. It is 2.3 m wide, 0.8 m high on the North side, 1.3 m high on the South side. The N side encloses a terrace with Feature U.

FEATURE Z: L-shaped wall
FUNCTION: Agriculture
DESCRIPTION: A well built L-shaped wall with a mound attached. It is located 9.50 m at 84 degrees from the E side of Feature L and 6.8 m at 22 degrees from the datum of Feature M. The W wall is a total of 12.5 m long at 173 degrees. The N wall is 3.00 m long at 278 degrees. The mound is roughly rectangular with vertical sides and measures 2.00 m (N-S) by 2.1 m (E-W) and stands 1.7 m high on the S side. The mound is attached to the wall 2.30 m from the S end of the wall. Wall heights are in the range of 1.00 m to 1.4 m.

FEATURE AA: Mound
FUNCTION: Indeterminate
DIMENSIONS: 4.30 m by 2.10 m by 1.05 m
ORIENTATION: 13/193 degrees
DESCRIPTION: Feature has been constructed on top soil. It's in a rectangular shape and stacked four to six courses high. Mound is composed of blocky subangular *pāhoehoe* boulders and cobbles ranging in size from 0.10 by 0.07 by 0.03 (m) to 0.50 by 0.30 by 0.15 (m). Mound is also free standing. There are other mounds and walls in the immediate area.

FEATURE BB: Mound
FUNCTION: Agriculture
DIMENSIONS: 5.5 m (N-S) by 2.3 m by 1.9 m
DESCRIPTION: A well built vertical sided ovoid mound, measuring 1.9 m high on the S side and 1.4 m high on the N side.

FEATURE CC: Mound
FUNCTION: Agriculture
DIMENSIONS: 3.80 m (E-W) by 2.4 m by 1.4 m (S side)
DESCRIPTION: A piled ovoid mound, on hill side N of Feature AA.

FEATURE DD: Mound
FUNCTION: Agriculture
DIMENSIONS: 5.5 m (E-W) by 1.9 m by 1.4 m
DESCRIPTION: Ovoid mound with vertical sides, especially on S side. Measures 1.4 m high (S side) and 0.9 m high (N side).

FEATURE EE: Mound
FUNCTION: Agriculture
DIMENSIONS: 4.9 m (E-W) by 2.4 m by 1.5 m
DESCRIPTION: Piled ovoid mound 1.70 m S of DD measuring 1.5 m high (S side) and 0.9 m high (N side).

FEATURE FF: Mound
FUNCTION: Agriculture
DIMENSIONS: 5.00 m (E-W) by 3.30 m (N-S) by 2.2 m
DESCRIPTION: This is an ovoid mound with vertical sides, except for a collapsed area on the S side. *It is 3.50 m E of the E end of the mound in Feature Z.*

FEATURE GG: Rock wall
FUNCTION: Agriculture
DESCRIPTION: A very amorphous piled wall, which may have been disturbed by Kāwili Street construction. The west end of this wall is 5.00 m S of Feature X and E of Feature M. It consists of three wings: the west wing which runs 14.00 m at 80 degrees to a junction with the other two wings; the NE wing which runs 9.00 m at 20 degrees; and the E wing which runs 12.00 m at 65 degrees.

FEATURE HH: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 16.00 m (190 to 10 degrees) by 1.6 m by 0.9 m
DESCRIPTION: Loosely piled rock wall S of Feature EE and AA, almost connecting with the W end of BB. Measures 0.9 m high (at the S end, W side) and 0.4 m high (E side).

FEATURE II: Mound-wall
FUNCTION: Agriculture
DIMENSIONS: 8.00 m (N-S) by 2.6 m by 1.9 m
DESCRIPTION: Mound and wall at E end of terrace also marked by HH. At the S end, the W side is almost at ground level, while the E side is 1.00 m high. At the N end it is 1.1 m high on W, 1.9 m on E.

FEATURE JJ: Mound-wall
FUNCTION: Agriculture
DIMENSIONS: 15 m (N-S) by 7.00 m (E-W) by 0.7 m
DESCRIPTION: A large amorphous mound and walls at 15.00 m S of the chain link fence corner (house S of Buddhist church). There is also some modern trash. A steep drop-off to the E, measuring at 1.4 m. Heights to the W measure from 0.4 to 0.7 m.

FEATURE KK: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 10.5 m (150 to 330 degrees) by 2.6 m by 1.10 m
DESCRIPTION: Rock wall at E end of terrace formed by JJ on W, measures 10.5 m from a banyan tree on S end.

FEATURE LL: Mound
FUNCTION: Agriculture
DIMENSIONS: 8.00 m (60 to 240 degrees) by 5.00 m by 1.4 m
DESCRIPTION: Amorphous mound, possibly affected by Kāwili Street construction. It is S of Feature KK.

FEATURE MM: Mound
FUNCTION: Agriculture
DIMENSIONS: 6.00 m (120 to 300 degrees) by 3.5 m by 1.7 m
DESCRIPTION: Stacked ovoid mound with almost vertical faces. Measures 1.5 m high on NE and 1.7 m high on SW side.

FEATURE NN: Mound
FUNCTION: Agriculture
DIMENSIONS: 3.9 m (E-W) by 2.9 m (N-S) by 1.5 m
DESCRIPTION: Northernmost feature project area; an amorphous mound, with fairly vertical sided mound. Partially collapsed on the SE side.

FEATURE OO: Mound
FUNCTION: Agriculture
DESCRIPTION: Another amorphous mound, just SE of feature NN. Somewhat pentagonal in shape: 3.00 m along NW side, 5.00 m along SW side, 4.00 m across north face, 6.5 east face, and 4.6 along S face. Sloping sides 1.60 m high.

FEATURE PP: Mound-wall
FUNCTION: Agriculture
DIMENSIONS: 8.5 m (towards 70 degrees) by 2.8 m by 0.9 m
DESCRIPTION: A mound and wall combination creating a small terrace towards the Episcopal church property to the W. May have been disturbed—looks unpiled in center. Wall runs 10.00 m at 110 degrees from the east end of the mound. It is 1.1 m high.

FEATURE QQ: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 15.00 m (322 degrees) by 2.2 m by 0.8 m
DESCRIPTION: Rock wall along E edge of the terrace containing mounds NN and OO; also N end is due west of Power Pole #85. Measures 0.30 m high (W side) and 0.8 m high (E side).

FEATURE RR: Mound/wall
FUNCTION: Agriculture
DIMENSIONS: 22.00 m (236 degrees) by 2.8 m by 1.80 m
DESCRIPTION: An amorphous mound/wall system 22.00 m at 236 degrees and 2.8 m wide for most of the wall. A wing wall heads off toward the east (interrupted by 'Ululani Road grading) for 20.00 m. It is 2.80 m wide by 1.20 m high on the N and 1.8 m high on the south. Another wing hooks back to the W at the SW end, for 7.00 m.

FEATURE SS: Mound-wall
FUNCTION: Agriculture
DIMENSIONS: 4.00 m (E-W) by 3.50 m by 1.60 m
DESCRIPTION: A mound and wall combination, W of the S end of Feature RR. The mound measures 4.00 m (E-W) by 3.50 m wide and has a vertical face 1.60 m high. The wall continues off the mound to the NW, 9.00 m. It is 2.30 m wide by 0.80 m high on the W and 1.50 m high on the east.

FEATURE TT: Rock wall
FUNCTION: Agriculture
DIMENSIONS: 2.30 m (wide) by 1.90 m (high)
DESCRIPTION: A long wall on the east side of the terrace also formed by Features U and Y. It runs 30.00 m at 130 degrees, then turns and continues 7.00 m at 100 degrees, 2.30 m wide with heights of 1 to 1.50 m on the W side and 1.40 to 1.90 m on the east.

FEATURE UU: Mound
FUNCTION: Agriculture
DIMENSIONS: 11.00 m (E-W) by 4.00 m by 0.90 m
DESCRIPTION: An elongated double mound 11.00 m (E-W) by 4.00 to 2.90 m wide. Heights are 0.50 m on N side and 0.90 m on S side.

STATE NO.:19433 PHRI TNO.: 1370-3 (Figure 9)
SITE TYPE: C-shape
TOPOGRAPHY: This site is set on fairly level terrain with the western portion of the feature set up on an approximate 18 degree slope down toward the SSE.
VEGETATION: Guava, grass
CONDITION: Fair
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Possible temporary habitation/habitation
DESCRIPTION: This site is C-shaped, and opens to the SSE. It primarily consists of cobbles and small boulders (c. 0.05 to 0.25 m diameter) of subangular to amorphic *ʻaʻā* basalt material. The sturdy "back" wall (the NE side) is stacked slightly, (both exterior and interior) three to four courses high. This feature is located (connected at the east end of Feature P, Site 19432) in roughly the SW portion of the project area. This site altered Site 19432, Feature P when it was created (on end of Feature P). The overall site dimensions are 5.40 m (116/297 degrees ESE/WNW) by 3.50 m. No portable remains observed.

STATE NO.: 19434 PHRI TNO.: 1370-4 (Figure 10)
SITE TYPE: U-shape wall
TOPOGRAPHY: Undulating decomposing *pāhoehoe* covered with decomposing organic material
VEGETATION: Guava, airplant, ferns
CONDITION: Good
INTEGRITY: Unaltered
PROBABLE AGE: Historic
FUNCTIONAL INTERPRETATION: Possible Historic Habitation
DESCRIPTION: Structure is free standing and constructed on topsoil. Structure has been faced. The interior side of feature has been stacked three to six courses high and the exterior side has also been stacked three to six courses high. Feature is on a surface that is slightly sloping west. Structure is composed of subangular blocky *pāhoehoe* cobbles and boulders ranging in size c. 0.10 by 0.08 by 0.03 to 0.36 by 0.22 by 0.27 (m). U-shape opens to the East. This structure may be associated with the fire pit in mound, site 2 feature L. Located from site datum to center of banyan tree 156/336 degrees and 2.50 m at 52 degrees to Site 2, Feature L, Datum A. The overall site measures c. 4.30 m (N-S) by 3.20 m by 0.32 to 1.10 m (N-S).

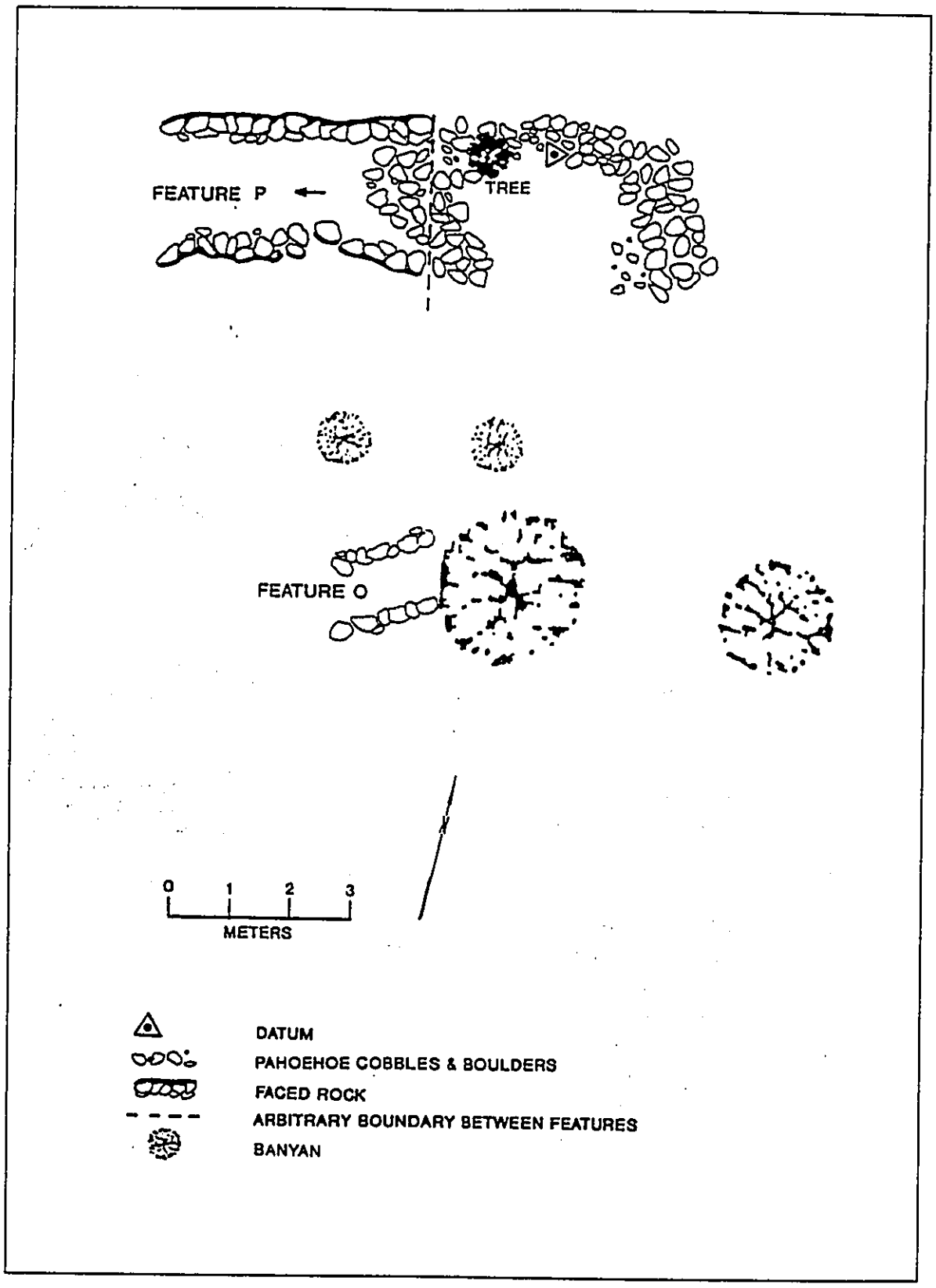


Figure 9. Site 19433

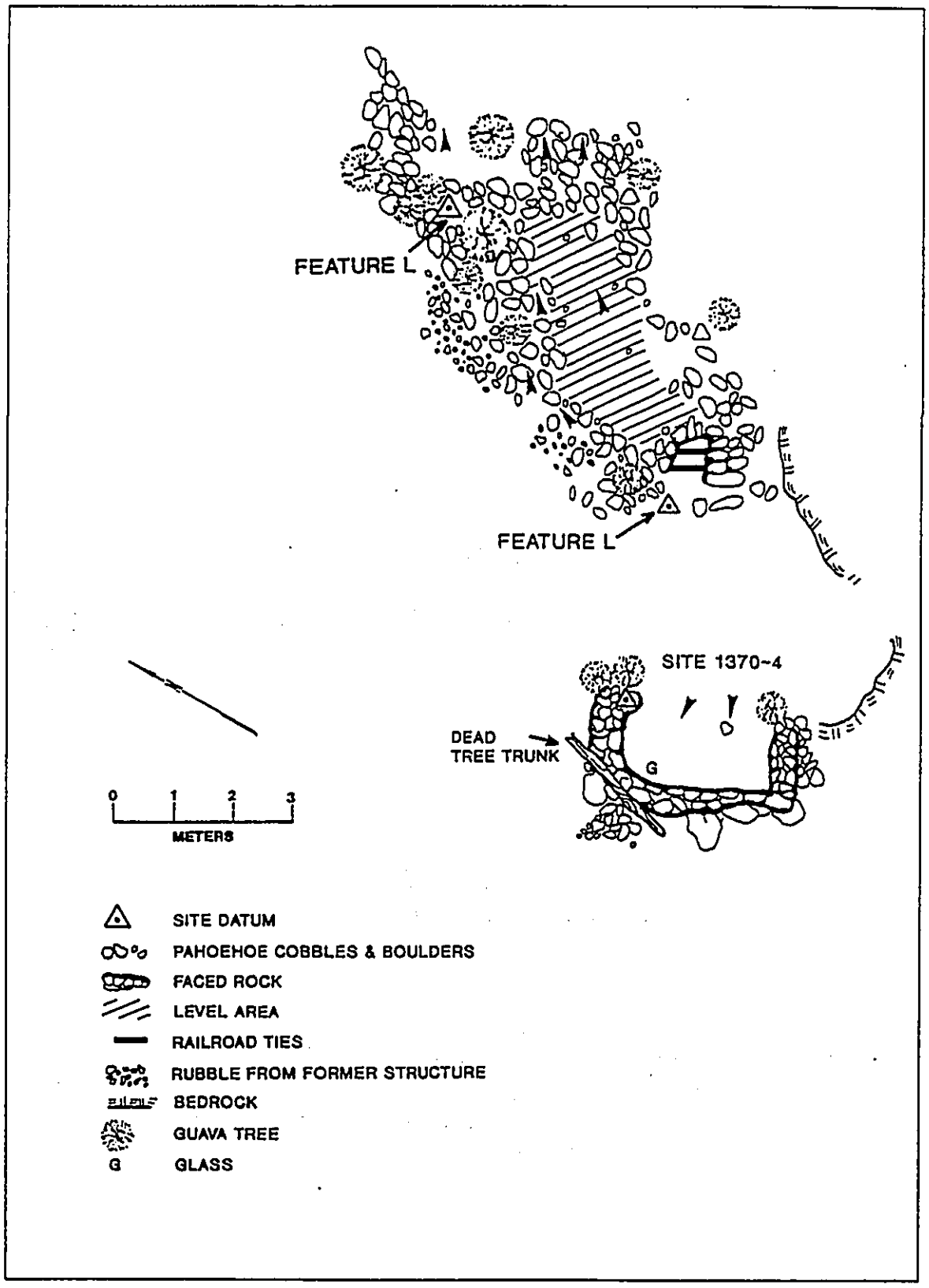


Figure 10. Site 19434, Feature L

SUBSURFACE TESTING

As a part of the survey, two subsurface test units, totaling three-square meters, and one shovel test pit, totaling 24 liters, were excavated at Sites 19431 (Features A and B) and 19432 (Feature AA). The subsurface test units and shovel test unit were placed in an effort to determine the presence/absence of cultural materials. As a result of the subsurface test units, one charcoal sample and a piece of modified surface chill volcanic glass were located and collected (from Site 19431, Feature A, TU-2, Layer II, 5-46 centimeters below surface). The site/feature consisted of an enclosure composed of subangular blocky *pāhoehoe* cobble and boulders. No cultural materials were located as a result of the shovel test unit (Site 19431, Feature B), or excavation unit at Site 19432, Feature AA. The test unit at Site 19431, Feature A (Figure 6), which produced the charcoal sample and volcanic glass, is summarized below:

SITE 19431, FEATURE A, TU-2, WEST FACE

Layer	Description
I	0-9 cmbs; ranges from 4 to 6 cm in thickness; black (10YR 2/1 moist), black (7.5YR 2/0 dry); silty clay loam; strong, medium, granular structure; loose, very friable, slightly sticky, slightly plastic consistence; few roots; few pores; clear, smooth boundary; non-cultural;
II	5-46 cmbs; ranges from 20 to 26 cm in thickness; very dark brown (10YR 2/2 moist), very dark brown (7.5 2/0 dry); silty clay loam; loose, very friable, slightly sticky, slightly plastic consistence; few roots; few pores; clear, smooth boundary; cultural (a charcoal sample and a volcanic glass knife or scraper;
III	26-56 cmbs; ranges from 8 to 15 cm in thickness; dark brown (7.5YR 3/3 moist), brown/dark brown (7.5YR 4/4 dry); silty clay; loose, friable, sticky, slightly plastic consistence; few roots; few pores; clear, smooth boundary; non-cultural.

A c. 30 by 30 cm shovel test pit (STP-1) was excavated at Feature B of Site 19431 (Figure 6). Layer I extended from the surface to c. 4 cm below the surface. This layer was a silty clay loam identical in all respects to the Layer I found at Feature A (TU-2). No cultural material was recovered from this layer. Layer II extended from c. 4 to 45 cm below surface. It also was a silty clay loam identical to Layer II of TU-2 in Feature A. No cultural material was recovered from this layer. Layer III began at 45 cm below the surface. It comprised silty clay identical to Layer III in TU-2. No cultural material was recovered from this layer. Since STP-1 appeared sterile, excavation was halted after a few cm of Layer III had been excavated.

Placement of the test unit at Site 19432, Feature AA (mound) comprised dismantling the mound to ground surface (Figure 8). No cultural materials were found in the mound or on the soil surface below the mound.

AGE DETERMINATIONS

The current project yielded one radiocarbon sample (collected from Site 19431, Feature A, TU-2, Layer II, 5-46 cmbs). The purpose of the analysis was to provide initial chronological

data to aid in assessing the relative significance of sites in the project area. The sample was submitted for radiocarbon analysis to Beta Analytic, Inc. of Miami, Florida.

Using standard procedures, the sample was pretreated with an acid, alkali, acid series of soakings to remove carbonates and humic acids. After pretreatment, the sample was combusted to form carbon dioxide gas, was combined with lithium to separate the carbon, and was hydrolized for conversion into liquid form. The liquid was then catalyzed to form benzene and was placed in a liquid scintillation counter to determine the amounts of carbon-13 and carbon-12. The isotope values obtained during the counting process were then used to calculate the carbon-13/carbon-12 ratio for the sample, with the final result being determined relative to international standards in order to reduce errors produces by carbon isotope fractionation. Processing of the one sample proceeded normally.

The results of the radiocarbon age determination analysis is reported as a range corresponding to the calendric age +/- two standard deviation. Ages were calibrated using the tables provided in Stuiver and Pearson (1986), which correct for variations in atmospheric carbon over time. The sample collected from Site 19431, Feature A (PHRI Lab No. 1527, Lab No. BETA 68570) *yielded multiple age ranges* after calibration. The C-14 Age in Years BP (one sigma) is 480±70; the C-13/C-12 ratio is -24.4; and the C-13 Adjusted C-14 Age in Years BP is 490±70. The sample produced three calendric ranges (2 sigma): AD 1309-1355, AD 1384-1516, and AD 1591-1621. Based on the probability data for the sample (Method B) there is an 85% probability that the actual age of the sample falls between AD 1309-1516.

Relative dating was used to determine the age of several structures in the project area. This relative dating includes the construction technique of the feature, the similarity to other features in other areas known or thought to be historic, the association of the feature with different soil horizons, and the presence of historic artifacts. These conclusions will be discussed further in the Conclusions Section of this report.

CONCLUSION

DISCUSSION

Hunt and McDermott (1993) recorded 88 features in 11 sites in their survey of the Pu'ainako Street Extension Project in the Lands of Waiakea, Kukuau 1 and 2, and Ponahawai. They determined that all of these features were historic constructions, associated with sugar cane cultivation and transportation. PHRI Cultural Resources Specialist Kepa Maly and PHRI archaeologist Cathy Glidden visited the Hunt and McDermott project area to compare the type of archaeological features in that project area with the Waiakea Cane Lots project area. Observations of the construction techniques used at the Waiakea project area were also made by PHRI Projects Supervisor Constance R. O'Hare during the field work. Some differences and many similarities between the features in these two areas were noted.

Characteristic construction techniques of features at Pu'ainako included the loose stacking of stones in all types of features, which made the features unstable and subject to collapse. Hunt and McDermott (1993:90) suggested that this characteristic could be used to differentiate historic features from prehistoric features. Indigenous architecture would be associated with more stable vertical walls and preparation of surfaces, such as with paving stones (ibid. 1993:90). The features found in the Waiakea Cane Lots project area were also highly unstable. Most showed some evidence of collapse, usually caused by tree roots and limbs.

Hunt and McDermott (1993:90) also discussed the types of historic agricultural features found in their project area. This included numerous high, faced mounds, curvilinear bifaced walls, platforms, terraces, enclosures, and modified outcrops. Historic documentation has suggested that the rocks cleared from cane fields were piled into mounds and into walls. The sides of the mounds were faced "to increase the efficiency and holding capacities of the piles, thereby allowing more cleared space for sugarcane (ibid. 1993:31). Mounds and walls could also have been used as loading platforms to transport the cane to the mills. High bifaced walls also characterized field boundaries. Platforms, terraces, and enclosures were used as loading areas or as sites for water tanks. Water tanks were normally placed in each cane field so that water was available to mix with an arsenical weed killer. One enclosure with faced walls was recorded in the Pu'ainako project area. Hunt and McDermott proposed that this feature, because of its closeness to a permanent railroad bed, was associated with use of the railroad, perhaps use as a foundation for a wooden loading structure of a water tank. Other features recorded by Hunt and McDermott were probably used for planting, perhaps for the vegetables which were sometimes grown by the workers within the cane fields (Hawaiian Sugar Planters Association 1926:69).

Very similar types of features were found in the Waiakea Cane Lots area. Twenty-seven mounds (see Figure 11 for typical form), most with some type of facing remaining, were recorded in the project area. Twenty-nine walls (see Figure 12 for typical form) were recorded in the project area. These walls were curvilinear, C-shaped, L-shaped and U-shaped. There was no evidence that the walls marked boundaries—they could simply be the byproduct of field clearance. One enclosure (Figure 6) with faced walls was recorded in the project area. It was covered with recent litter and was partially altered (dozer push on one side). Excavation at this site revealed that the walls were associated only with the uppermost soil layer, indicating that

Figure 11. Site 19432, Feature LL, Faced Mound (PHRI Neg. 4560-26A)

Figure 12. Site 19432, Feature Z, Bifaced Wall (PHRI Neg. 4561-26)

the enclosure was probably constructed in recent historic times. In contrast, charcoal and one volcanic glass tool was recovered from a soil layer beneath the enclosure. A sample of this charcoal was dated to c. AD 1309-1516. This indicates that the soil layer represents a prehistoric occupation predating construction of the enclosure.

Hunt and McDermott (1993:42) also found ample artifactual evidence for the historic use and modification of their project area. Much of this was recent litter and material associated with marijuana cultivation. In addition, wooden railroad cross-ties were found at several sites, including at Site 18911, which is located directly across the street (Kawili Street) from the current project area. These ties were taken from the railbeds when the rail lines were abandoned and were then used as fence posts when the use of the land switched from sugar cane cultivation to pasture land. Fencing and barbed wire were also found in the current project area, indicating the area was used for pasture land. Other artifacts similar to those found by Hunt and McDermott were also found. Feature L of Site 19432 (Figure 10) consisted of a mound and a firepit constructed of small guage railroad rails. Feature W of the same site was a rock wall thought to have been constructed for water impoundment. Modern trash was found at Feature A of Site 19431 and Feature JJ of Site 19432, indicating recent use and perhaps modification of the area. In contrast, no indigenous (associated with traditional Hawaiian activities) artifacts were noted on the surfaces of any of the features recorded during the project or anywhere else on the ground surface.

Historic use of the project area is also evidenced by several exotic plants in the project area—including variegated ti, heliconia and night cestrum, which are often associated with historic habitation. In particular, the night cestrum (*'al'ala hiamoe* or *'ala aumo*), which is not a prolific spreader, is generally associated with historic period habitations. These plants, and other native (indigenous or Polynesian introductions) plants, such as *'ulu* (breadfruit), *ki* (green ti plant), *'awapuhi kuahiwi* (shampoo ginger), and *laua'e*, might be associated with a plant nursery (Flowers of Hawai'i) that was once located on the site of the University of Hawai'i-Hilo campus (west and adjacent to the project area). Although local informants have stated that these plants were not grown in the project area itself, they may have spread into the project area.

In conclusion, based on previous archaeological work and historical documentary research, few prehistoric features were expected for the Waiakea Cane Lots project area. The project area is located in McEldowney's (1979) Upland Agricultural Zone. This zone was traditionally associated with open grasslands and fields during the early historic and probably prehistoric time periods. Features in this zone would have included scattered habitation features with adjacent garden plots and small groves of trees. These types of features leave very little trace in themselves. It was thought that any traces of these features would have been obliterated by early and later historic modifications to the land, especially during the extensive clearing of the land for sugarcane cultivation (Kalima IN Goodfellow and Fager 1992:22).

As expected the current project area yielded almost no evidence for prehistoric use. The only evidence for such use is charcoal and a volcanic glass tool, both recovered from a test unit excavated into an enclosure. The charcoal and the tool were in a soil horizon below the architectural layer of the enclosure, and thus predated construction of the enclosure. Although some of the features in the project area, such as mounds and walls, may have originally been constructed in the prehistoric era and were modified later in this historic era, there is no real evidence for this.

The current project yielded abundant evidence that most of the features identified were first constructed in the historic period and were associated with the cultivation and transpor-

tation of sugar cane. Historic maps indicate that not only was the project area a portion of the Waiakea Cane Fields, but that by at least the 1920s there was a railroad spur in the area, used to transport sugarcane to the mills. Discussions with local informants indicate that the land was not used for sugar cane cultivation in the 1940s, and possibly back as early as the 1920s. There are three possible explanations for this contradiction: (a) the project area was never cultivated with sugar cane and all of the features in the project area are related to prehistoric and early historic Hawaiian agriculture; (b) the project area was waste land and was not cultivated in sugar cane, but a railroad for transportation of the cane cultivated in adjacent areas was present, and the features found in the project area are associated with this transportation; or (c) the project area was once planted in sugar cane and the features in the project area are associated with the cultivation and transportation of the cane. If the latter explanation is true, then cultivation of sugar cane must have been abandoned perhaps as early as the 1920s, and the land shifted to other uses—or perhaps the land lay fallow. Considering all of the archaeological and historical evidence, including the similarity of the features in the Waiakea project area to those in the Pu'ainako project area, the latter explanation seems the best. The features in the Waiakea project area conform to the model of features constructed for the clearing of sugar cane fields and for the transportation of the cane by railroads or other means to the sugar cane mills.

GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS

Significance categories used in the site evaluation process are based on the National Register criteria for evaluation, as outlined in the Code of Federal Regulations (36 CFR Part 60). The HCPD and DLNR-SHPD use these criteria for evaluating cultural resources. Sites determined to be potentially significant for information content fall under Criterion D, which defines significant resources as ones which "...have yielded, or may be likely to yield, information important in prehistory or history." Sites potentially significant as representative examples of site types are evaluated under Criterion C, which defines significant resources as those that "...embody the distinctive characteristics of a type, period, or method of construction...or that represent a significant and distinguishable entity whose components may lack individual distinction." General significance assessments and recommended general treatments for all identified sites are summarized in Table 5.

Sites with potential cultural significance are evaluated under guidelines prepared by the Advisory Council on Historic Preservation entitled "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review" (ACHP 1985). The guidelines define cultural value as "...the contribution made by an historic property to an ongoing society or cultural system. A traditional cultural value is a cultural value that has historical depth." The guidelines further specify that "[a] property need not have been in consistent use since antiquity by a cultural system in order to have traditional cultural value."

Based on the federal criteria described above, all four sites are assessed as important for information content (Category A), and require Further Data Collection (FDC). Further data collection includes detailed recording, and excavation. Specific recommendations for further data collection are shown in Table 4. It is anticipated that after the further data collection is completed, no further archaeological work would be necessary in the project area, and development work in the area could proceed. This is, of course, barring any unforeseen circumstances—such as the discovery during data collection work of archaeological remains of great significance.

It should be noted that the data presented here have been derived from a 100% surface survey and limited subsurface testing and that the above evaluations and recommendations are based on the findings of an inventory survey. There is always the possibility, that potentially significant, unidentified surface and subsurface cultural remains will be encountered in the project area during the course of future archaeological investigations or subsequent development activities. In such situations, archaeological consultation should be sought immediately.

RECOMMENDATIONS FOR DATA RECOVERY

Data recovery at four sites (Sites 19431, 19432, 19433, and 19434) is recommended in the previous section of this report. The data recovery work should entail additional recording and mapping, to more accurately refine the functions of the identified sites. Data recovery should also include additional subsurface excavation at Site 19431.

The research should be designed to maximize the retrieval of data relevant to carefully focused research questions. The project constraints effectively limit the range of research topics to those that can be addressed by the investigation of these four sites. Thus, further work should concentrate upon defining the overall spatial distribution of the prehistoric deposit at Site 19431, and focus on functional analysis of dated portable remains (artifacts and ecofacts). Investigating the distribution of the prehistoric deposit requires areal excavation, the technique with greatest potential to yield intact strata containing portable remains and, especially, cultural features. These features will permit distributional analysis of cultural remains that may identify a pattern reflecting the intrasite organization of activities. Also, areal excavation may reveal patterning in subsurface features of prehistoric architecture (i.e., firepit or post-hole patterns).

For the surface structural features, additional recording and mapping will refine the interpretation of site function and perhaps allow for a more accurate interpretation of the interrelationship of these four sites. Site function should be refined beyond habitation or historic habitation, and agriculture. Besides those functions mentioned above, questions that could be addressed include what specific types of habitation or agricultural activities, beside the cultivation of sugar cane, were carried out in the project area. The results of further data collection could support and refine, or contradict, the conclusions offered in the Discussion section of this report.

Table 5.
Summary of General Significance Assessments and Recommended General Treatments

PHRI Temp. No.	Significance Category A	X	B	C	Recommended Treatment FDC	NFW	PID	PAI
19431	+	-	-	-	+	-	-	-
19432	+	-	-	-	+	-	-	-
19433	+	-	-	-	+	-	-	-
19434	+	-	-	-	+	-	-	-
Total:	**4**	**0**	**0**	**0**	**4**	**0**	**0**	**0**

General Significance Categories:

A = *Important for information content, further data collection necessary (PHRI = Research Value);*
X = *Important for information content, no further data collection necessary (PHRI = Research Value, SHPD = not significant)*
B = *Excellent example of site type at local, regional, island, state, or national level (PHRI = Interpretive Value); and*
C = *Culturally significant (PHRI = Cultural Value).*

Recommended General Treatments:

FDC = *Further data collection necessary (detailed recording, surface collections, and limited excavations, and possibly subsequent data recovery/mitigation excavations);*
NFW = *No further work of any kind necessary; sufficient data collected archaeological clearance recommended, no preservation potential;*
PID = *Preservation "as is", with some level of interpretive development recommended (including appropriate related data recovery work);*
PAI = *Preservation "as is", with no further work (and possible inclusion into landscaping), or possibly minimal further data collection necessary.*

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APPENDIX A: Detail of Legendary Narratives Cited in Report

(as translated by Kepā Maly)

The original Hawaiian texts for "*Ka'ao Ho'oniua Pu'uwai no Ka-Miki*" (The Heart Stirring Story of Ka-Miki), which were the source of the following translations, were printed in the weekly Hawaiian-language newspaper *Ka Hōkū o Hawai'i*, where it ran for four years (1914-1917).

The story of Ka-Miki is an account of two supernatural brothers, Ka-Miki (The quick, or adept, one) and Maka-'iole (Rat [squinting] eyes], who traveled around the island of Hawai'i along the ancient *ala loa* and *ala hele* (trails and paths) that encircled the island. The brothers were empowered by their ancestress *Ka-uluhe-nui-hihi-kolo-i-uka* (The great entangled growth of *uluhe* fern which spreads across the uplands), a reincarnate form of the goddess *Haumea* (the creative force of nature; also called *Papa* and/or *Hina*; also a goddess of priests and competitors), who lived at Kalama 'ula in the uplands on Hualālai above Kohana-iki, Kona. During their journey, Ka-Miki and Maka-'iole competed alongside the trails they traveled, and in royal courts, against *'ōlohe* (experts skilled in fighting or in other competitions, such as running, fishing, debating, or solving riddles, that were practiced by the ancient Hawaiians). They also challenged priests whose dishonorable conduct offended the gods of ancient Hawai'i. The story is set in about the 1300s, at the time when Pili-a-Ka'aiea (Pili) was sovereign chief of all Kona. It was while on this journey that the brothers came to be at the royal court of the chief Waiākea-nui-kumu-honua, who was the brother of the sacred chiefess Pana'ewa-nui-moku-lehua, and the chief Pi'ihonua-a-ka-lani. The following English translations (completed by the author of this report) are a synopsis of the Hawaiian texts, with emphasis upon the main events of the narratives of the legendary account. The selected narratives offer readers a new resource for interpretation of the ancient Waiākea community.

Ka'ao Ho'oniua Pu'uwai no Ka-Miki

Upon departing from the compound of Kapu'euhi in Puna, Ka-Miki, Maka-'iole, and Keahi-a-Laka-o-ka-papa-lohi-o-'Āpua, entered Hilo — ***Hilo i ka ua lū lehua*** (Hilo of the rains which scatter the *lehua* blossoms); and traveled via the *ala loa* which passed through Pana'ewa. After meeting with Kūkulu, a guardian of Pana'ewa-nui-moku-lehua, Ka-Miki *mā* traveled to the *kahua* at Kalepolepo, in Waiākea. Competitions were arranged, and the contests before the high chief Waiākea and his court set in motion the sequence of events in the district of Hilo. The chief Hilo-Hanakāhi befriended Ka-Miki *mā* and agreed to join them on their journey through the district of Hilo.

Ka-Miki, Maka-'iole and their companion Keahialaka departed from the compound of Kapu'euhi (in 'Ōla'a) and descended the *ala loa* towards Hilo to continue their journey. The travelers arrived at a large compound and community, where they saw a man coming towards them with a club. This man was *Kūkulu-a-hāne'e-a-hina-pū* (Kūkulu). Kūkulu was a guardian of the chiefess and lands called Pana'ewa-nui-moku-lehua (Great Pana'ewa of the *lehua* forest). Pana'ewa was a sacred chiefess of Hilo, the sister of the chiefs Waiākea and Pi'ihonua.

The chiefess' compound and surrounding community were forbidden to strangers, and Kūkulu regulariy killed unaware travelers [thus the name "Unjust place]. Kūkulu challenged Ka-Miki

mā but he was quickly defeated, and Ka-Miki left him there as an example to other *'ōlohe* and to receive his due justice. Ka-Miki *mā* then continued their journey into Hilo, seeking out Upeloa, Ku'u-aho-hilo-loa, and Haili-kula-manu.

The lands of Waiākea were named for the high chief Waiākea-nui-kumuhonua, the brother of Pi'ihonua-a-ka-lani (k) and Pana'ewa-nui-moku-lehua (w). After departing from Pana'ewa, Ka-Miki *mā* met Haili-kula-manu, who was a guardian of Waiākea. Haili led Ka-Miki and his companions to his chief's compound at Kalepolepo (2/17/1916).

Arrangements were made for Ka-Miki to compete with the *'ōlohe* – experts of Waiākea, with the events to be held at the *kahua* (contest site) at Kalepolepo. Upeloa the champion – land administrator and war councilor of Waiākea, and an expert fighter with *'ōka'a lā'au* (war clubs) was called to Kalepolepo.

The *kūkini* Ku'u-aho-hilo-loa went throughout the region announcing that contests would be held at Kalepolepo, and in a short time the entire area was filled with people, all wondering who would attempt competing against Upeloa. Ka-Miki *mā* were then called to the arena, thus Ka-Miki, the image of the war club of *Ka-uluhe-nui-hihi-kolo-i-uka* entered the *kahua* and the contest rules were set. It was agreed that the method of competition would be *'ōka'a lā'au* (war club fighting), and that the looser would be killed and baked in an *imu*.

Upeloa exited the *hālau mokomoko* (contestants long house) with great agility and speed, and the crowd cried out with excitement at his ability. Upeloa also held his finely worked club which was called *'Ohi-ka-lau-o-ke-pāhili*, the club was also called *Ka-piko-o-Wākea*. Upeloa was so strong, that no competitors had ever stood up to him. As Upeloa and Ka-Miki stood on the *kahua*, readying to fight – Pi'ikea, the spear fighting expert of the chief *Nā-mau'u-a-Pā'ao* asked, "O youth where is your club that you may stand against the spear fighting warrior of the chief Waiākea-nui-kumuhonua?"

Ka-Miki answered, "I have no club, my only weapon is my hands, but I have learned to use the war club from my club fighting teacher, I have used green hau spears, stripped like the *maile* (*Alyxia olivaeformis*), I have used clubs made of the *uhiuhi* (*Mezoneuron kauaiensis*) and the *koai'e* (*Acacia koaia*), the resonant clubs made of the resilient *kauila* [*Alphitonia ponderosa*] trees which grow at Pu'ukapele; my expertise covers all manner of war club fighting... and protecting myself from the top of my head to the bottoms of my feet."

Upeloa then told Ka-Miki, "If you could truly escape from my club, your knowledge would be great, beyond compare. But coming here with this boasting, you are full of deceit and impertinence like no other, and you will not be spared from my club."

Pi'ikea then went to the edge of the *kahua*, and asked Upeloa to wait a short time before fighting so that he go get his club for Ka-Miki to use. Upeloa responded, "No! You are not his teacher, you are not the alternate for this errant youth, that you should give him your club. He says that his hands and fingers are adequate. Unless you wish to be his *moepu'u* (death companion) you will stop this waste of time. Pi'ikea if you are stubborn about it you and this youth shall both be the pigs which quench the fires of the *imu* today." Ka-Miki called to Pi'ikea, "I greatly appreciate your consideration, but it has been taken as a waste of time. With that, Upeloa leapt to attack Ka-Miki in the manner of *Ka-piko-o-Wākea*, thinking that he would strike Ka-Miki with the blow. Ka-Miki leapt over Upeloa and struck his hand. Because of the force of this blow, Upeloa lost his club and it flew to Maka-'iole who caught the club and held it.

Upeloa moved to attack Maka-'iole, but Ka-Miki leapt in front of Upeloa and commanded him to back off and maintain the requirements of the contest. Upeloa did not heed the command because he was so outraged, and he reached to grab Ka-Miki, thinking to break him into little pieces. Ka-Miki then stepped behind Upeloa and grabbed him by the thighs. He then picked Upeloa up and threw him from the arena before Maka-'iole and Keahialaka. Keahialaka then grabbed Upeloa and bound him. The crowd cried out and that the visiting youth had fouled.

Waiākea heard that Upeloa had been defeated and was greatly surprised that his war counselor and war club fighting expert had fallen. Waiākea then called to his messenger Kapunakō to go get Kaūmana the foremost teacher of *lua, ha'iha'i, kākā lā'au* (bone breaking fighting, and spear fighting), and all manner of fighting and bring him to the *kahua* (2/24/1916).

Upon arriving before his chief, Kaūmana asked Waiākea to send his messenger Kapunakō, to bring Kalanakāma'a, Kaūmana's foremost student to join him at the *kahua* of Kalepolepo.

[The land of] Kalanakāma'a was named for Kalana-kāma'a-o-uli, the foremost *'ōlohe* student of Kaūmana, and champion of Waiākea. Kalanakāma'a was the ward of KIpuka 'āhina (k), Hale-aloha (w) and Hale-loulou (k), who dwelt above Hilo at KIpuka 'āhina.

When Kapunakō arrived before KIpuka 'āhina, he spoke about the great rains and rivers of Hilo; a poetic reference to the many skilled which Hilo was famed. It was in this way that Kapunakō described the overwhelming skills of Ka-Miki and his victory over Upeloa. KIpuka 'āhina then asked – *'ōlelo no'eau*:

> *Māmā Hilo i ka wai?* – Can one move swiftly through the waters of Hilo?
>
> Kapunakō responded – *'Ae māmā Hilo i ka wai 'ole, ua kau i ka lani ka holo [wa'a] ua o Hilo, na ka Mālualua e ki'i ala i pulu ka liko o ka lehua a me ka māmane!* – Indeed one can move swiftly through *Hilo*, for the streams are without water, the water trough - clouds of Hilo are set in the heavens, it is the *Mālualua* which fetches moisture for the budding *lehua* and *māmane*.
>
> KIpuka 'āhina then asked in amazement – *Nawai e nele o Hilo i ka wai? He lau ka pu'u, mano ka ihona, he kini nā kahawai o Hilo, e 'au i ka wai o Hilo a pau ke ahi!* – Who could possibly make Hilo destitute of water? There are (400) many hills, many (4,000) places to descend, and many (40,000) streams to cross, indeed one is worn out swimming through the waters of Hilo!

It was in this way that KIpuka 'āhina learned that a master *'ōlohe* had come to Hilo challenging its many *'ōlohe*. Using his *ipu hōkiokio* (gourd nose flute), KIpuka 'āhina awakened Kalanakama'a, for this was the only way in which Kalanakama'a could be safely awakened, or he would kill whoever awakened him (3/2/1916).

Kalanakāma'a joined his teacher Kaūmana, and met with the assembly at Kalepolepo. Carrying his club *Pūpū-kani-oe-i-ka-ua-o-Hilo* (Land snail singing in the rain of Hilo), Kalanakama'a entered the *kahua* with Kaūmana and a great cry arose praising the abilities of these Hilo champions. Ka-Miki and Kalanakama'a exchanged taunts, Ka-Miki stated that Kalanakama'a would become the *kāma'a lau-'I i hili kuanaka 'ia* (twined ti leaf sandals) which Ka-Miki wears upon his feet. Outraged, Kalanakama'a leapt to attack Ka-Miki with his club *Pūpū-kani-oe-i-ka-ua-o-Hilo*, Ka-Miki leapt out of the way, and took Upeloa's club from

Maka-'iole. Seeing his student miss, Kaūmana called out to Kalanakama'a telling him how to strike Ka-Miki — *'ōlelo no'eau*:

> *Kau i ka lani ka holoua o Hilo, hilo 'ia i ke aho a ka ua he 'Io ka hauna lā'au e ki'i ai, a'ohe wahi pā 'ole, pā ma ke po'o a hō'ea i nā wāwae, pā no pau ka 'oni, 'oni no he alwaiwa ia, he hialōloa no ka naele, alaila ho'i hou ka hauna lā'au a ke koa kua makani.* – Placed in the heavens is the water trough of Hilo, entwined in the cordage of the rains, *'Io* (Hawk) is the war club strike to use, for there is no place that can't be hit. Strike at the head and reach to the feet, for once struck, there will be no movement. If there is any movement, he is indeed a skilled expert of the depths [deepest knowledge], then return and strike again in the manner of the wind swept *koa* tree (3/9/1916).

Ka-Miki then attacked Kalanakāma'a and quickly over came him, Kaūmana then leapt to the *kahua* and was beaten as well. After Ka-Miki defeated Kaūmana, word spread throughout the region, and Pi'ihonua, Waiākea's brother called his council together wondering how they might help regain the honor of Hilo from this stranger.

Hanakāhi told Pi'ihonua that it would be best not to fight, Pi'ihonua then said that perhaps it had been a mistake to honor Hanakāhi with his title as champion, and marriage to 'Ohele (3/16/1916). Hanakāhi told Pi'ihonua all of the things that *Nā-Mau'u-a-Pā'ao* had told Pi'ikea about Ka-Miki, and said it would be unwise to compete, and thus leave all of the champions of Hilo in disgrace.

Hanakāhi himself was a master *'ōlohe* trained by Maulua of Hilo-Palikū, he was skilled in *kākālā'au* (spear fencing), *pololū* (long spear fighting), *ihe laumeki* (barbed spear fighting), and all manner of knowledge. Hanakāhi told his chief, "It is my desire to go before them (Ka-Miki *mā*), not in the manner of a competitor, but in the spirit of friendship, and to learn from them the things which they have been taught by their teachers. If I succeed, I will be the foremost *'ōlohe* of all Hilo, and I will serve as their guide as they journey from one border of Hilo to the next border of Hilo." Hanakāhi then asked his chief, "Do you agree?" Pi'ihonua told Hanakāhi to go and compete first, then if he was securely bound to surrender and ask for friendship.

Hanakāhi approached Kalepolepo, and the contest between Ka-Miki and himself was announced. *'Ōka'a lā'au* (club-spear fighting) was selected as the method of fighting, and when Hanakāhi asked Ka-Miki, "How shall the victory be determined?" Ka-Miki said, "By the breaking of one's spear."

Ka-Miki greatly admired the nature of Hilo-Hanakāhi, and as they competed, Ka-Miki dodged each of the thrusts. To those gathered at the *kahua*, it was as if Ka-Miki was the teacher and Hilo-Hanakāhi was the student. Hilo-Hanakāhi tried each technique he had learned from his teacher, but was unable to score against Ka-Miki. Worn out, Hilo-Hanakāhi collapsed and was taken off of the *kahua*, borne in a net. Hilo-Hanakāhi acknowledged the nature and skills of Ka-Miki and surrendered to him, thus *ke 'ahi kananā* (the fierce tuna fish) of Hilo befriended Ka-Miki *mā* upon the *kahua*.

Hilo-Hanakāhi returned to the chief Pi'ihonua and they spoke of the events which had taken place at Kalepolepo. Pi'ihonua then sent his messenger to invite Ka-Miki *mā* to his compound in the manner of *aikāne* [companions] (3/23/1916). Ka-Miki *mā* were well hosted by Pi'ihonua, and Ka-Miki asked Hilo-Hanakāhi to accompany them to the border of Hilo and Hāmākua at Ka'ula. Thus Hilo Hanakāhi traveled with Ka-Miki *mā* through out the rest of Hilo (3/30/1916).

A DATA RECOVERY PLAN FOR SITES 50-10-35-19431, 19432, 19433, AND 19434, LAND OF WAIAKEA, SOUTH HILO DISTRICT, ISLAND OF HAWAI`I [TMK:2-4-57:01]

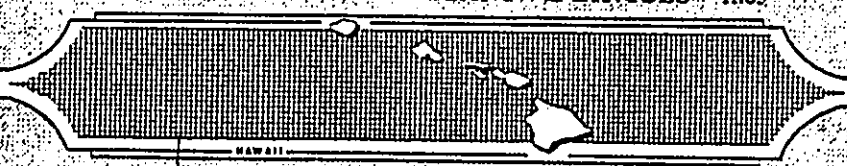
By:

Robert L. Spear, Ph.D.

Prepared for:

Roy Takemoto

SCIENTIFIC CONSULTANT SERVICES Inc.



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INTRODUCTION

At the request of Mr. Roy Takemoto, Scientific Consultant Services, Inc. (SCS) proposes to conduct mitigation through data recovery for State Sites 50-10-35-19431, 19432, 19433, and 19434, located in the city of Hilo, Land of Waiakea, South Hilo District, Island of Hawaii (TMK:2-4-57:01) (Figure 1). The following Data Recovery Plan will establish the framework and rationale for the data recovery work.

PREVIOUS ARCHAEOLOGY

Previous archaeological research in the project area was conducted by PHRI (Maly, Walker, and Rosendahl 1994). This work identified four archaeological sites comprised of a total of 47+ structural features. The sites consisted of both single and multiple-components and their condition ranged from poor to good. Formal feature types consisted primarily of mounds, walls (most of which appear to be retaining walls of terraces), mound/walls, and an enclosure. The functional feature types principally included agriculture and habitation (Maly, Walker, and Rosendahl 1994: 22).

Site 19431 was identified as a possible historic habitation and agricultural site. In addition, the recovery of a single volcanic glass flake and a charcoal sample which provided a conventional radiocarbon date of 490 $\pm$ 70 B.P. suggested the possibility of a pre-Contact, subsurface cultural layer (Figure 2).

Site 19432 was identified as a historic site associated with sugar cane cultivation, possibly including features associated with loading and transporting cane. These results were similar to those obtained by Hunt and McDermott (1993) from their work on the Pu`ainako Road Extension.

Sites 19433 and 19434 were both identified as possible historic habitations (Figures 3 and 4). Both of these sites were constructed using portions of existing features from Site 19432.

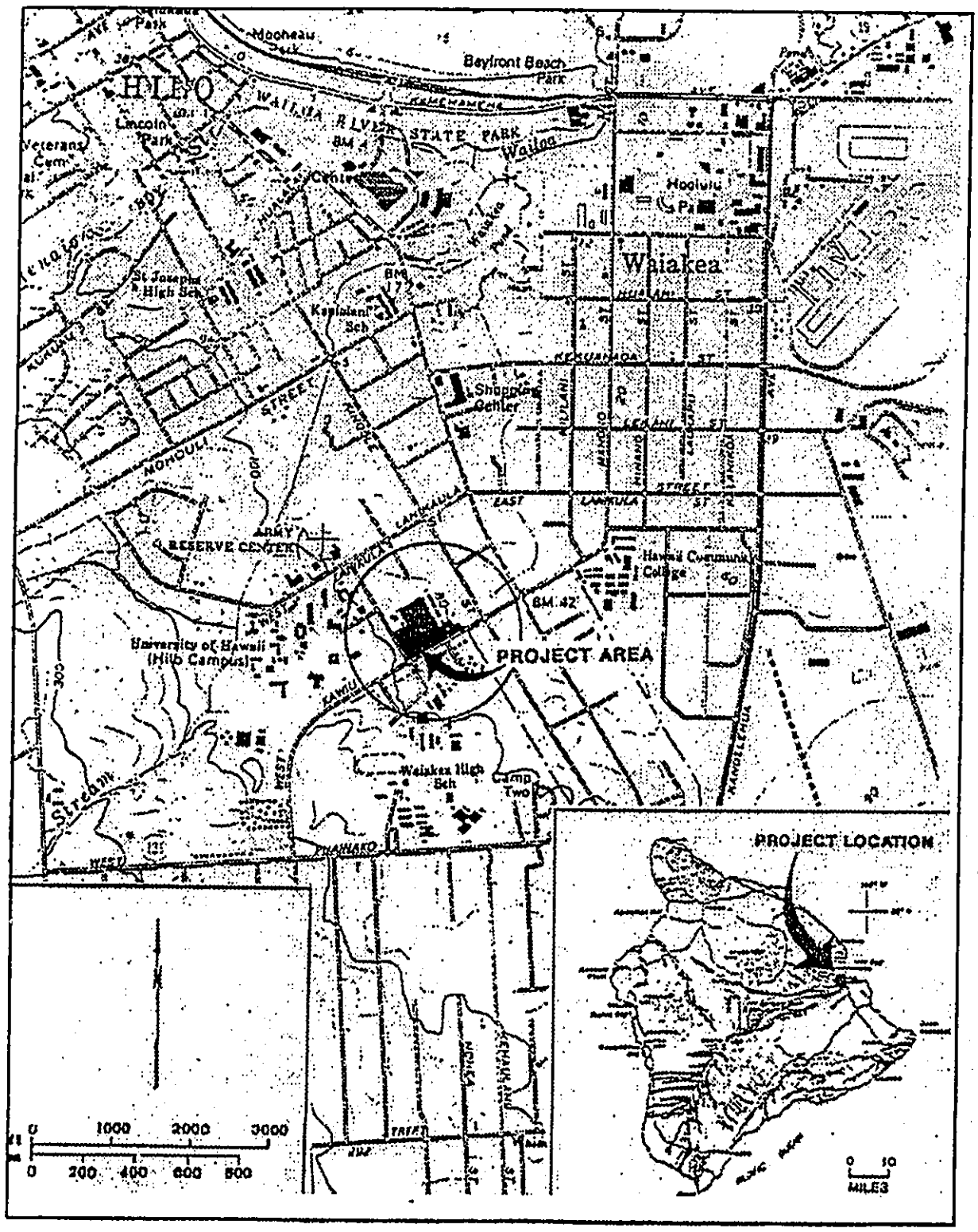

FIGURE 2: PROJECT AREA. (FROM MALY ET AL. 1994)

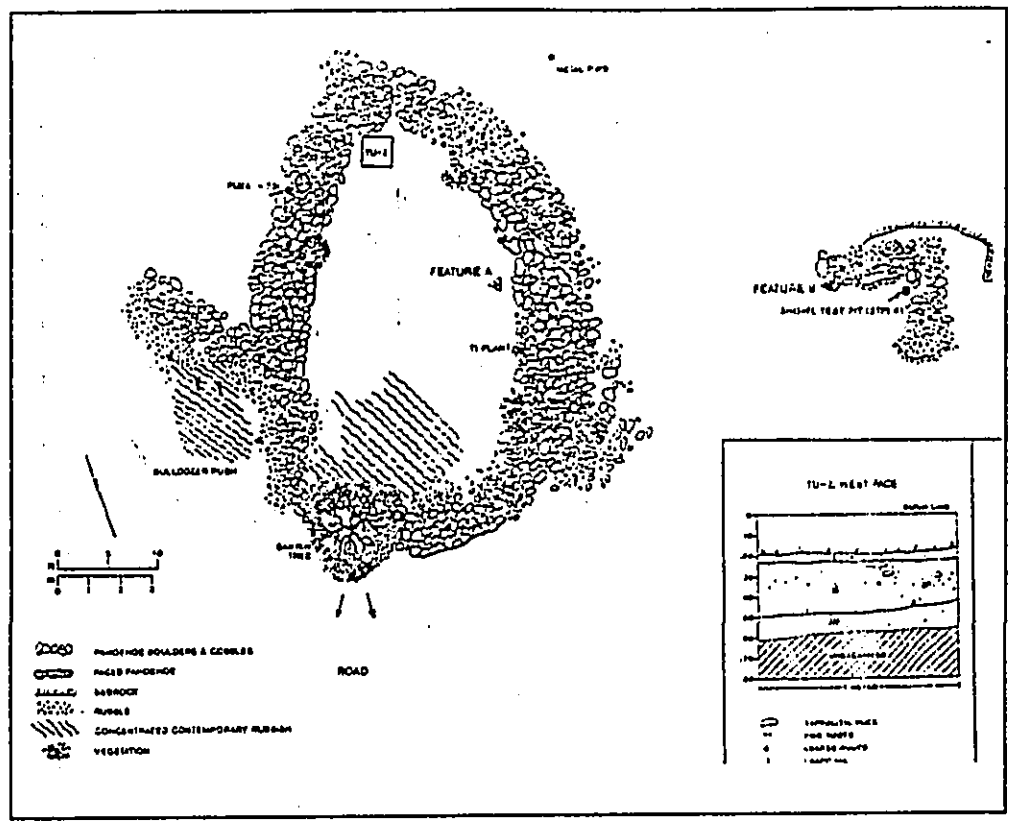

FIGURE 2: SITE 19,431 FROM MALY ET AL. 1994.

DATA RECOVERY PLAN

The PHRI report recommended that additional fieldwork be conducted at all four of the identified sites (Maly, Walker, and Rosendahl 1994:23). Based on these recommendations and discussions with the State Historic Preservation Division (SHPD) the following work was determine to be necessary at each of the sites.

Site 19431

This site consists of an enclosure and a C-shape. Additional fieldwork at this site will consist of the excavation of no more than eight square meters. At least one excavation will cut at least partially into the enclosure construction to firmly establish the association of the surface architecture with the identified subsurface deposit. Initial excavation will consist of small test units (50 x 50 cm) to probe for buried cultural deposits. Where significant deposits are identified larger test units will then be excavated.

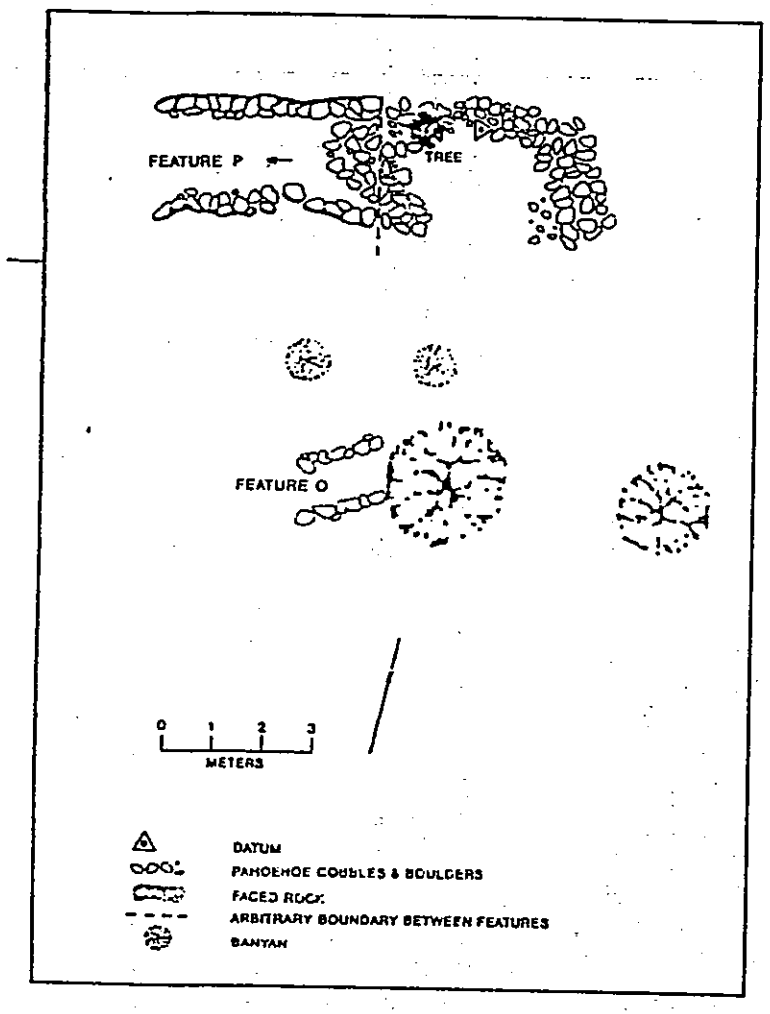

FIGURE 3: SITE 19,433 FROM MALY ET AL. 1994.

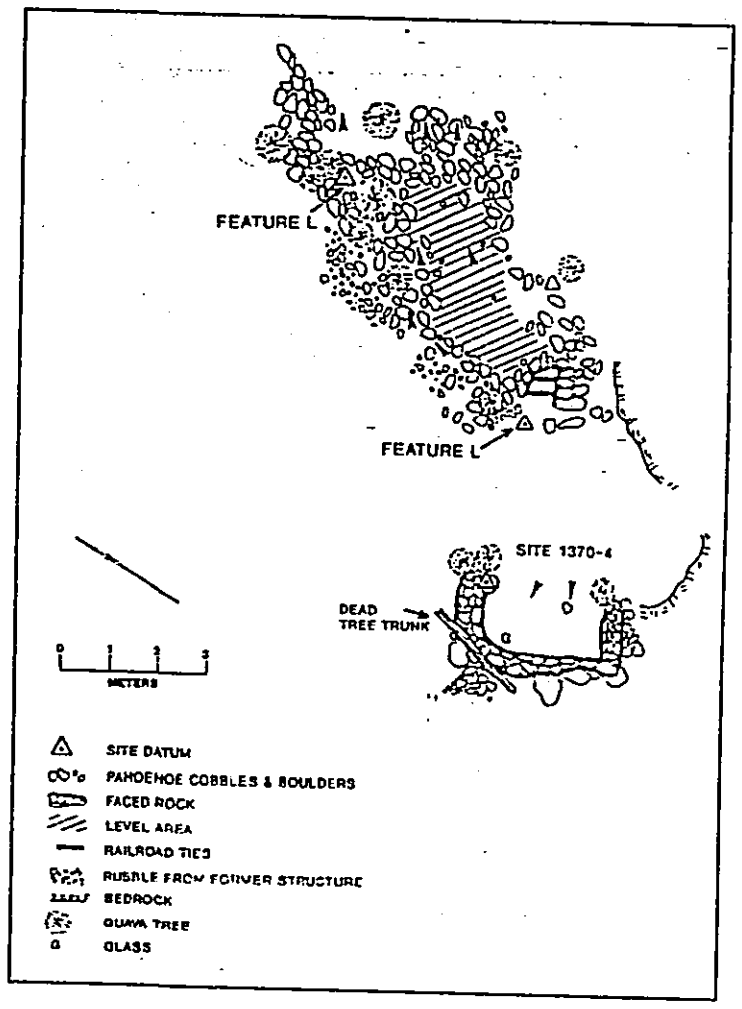

FIGURE 4: SITE 19,434 FROM MALY ET AL. 1994

These excavations will be used to investigate the following research questions:

1) What is the overall spatial distribution of the cultural deposits at the site?
2) Are post-holes, fire pits, or other subsurface features present at the site? If so, is there any patterning observable?
3) What is the relationship between the surface architecture and the possible subsurface cultural deposit?
4) Can a second radiocarbon dating sample be recovered to corroborate the date obtained during the Inventory Survey work?

Site 19432

Data recovery at this site will include the completion of a photo record of samples of all of the morphological feature types and the excavation of selected features.

The primary feature types identified at this site were mounds (N=23) and walls (N=18). Many of the wall features are the retaining facing portion of terraces. Approximately 20% of these features will be photo recorded. Examples of the less numerous feature types will also be recorded.

Excavation at this site will consist of back-hoe trenches placed into two to three examples of the wall/terrace features.

Research questions to be addressed by the fieldwork include:

1) Can the function of the agricultural features be more specifically determined?
2) Are buried features present on which the surface architecture might be resting?
3) What are the construction methods used in making the wall/terrace features?

Sites 19433 and 19434

Both of these sites were interpreted as possible historic habitations. Data recovery work at these two sites will focus on the subsurface examination of the interior of the structures. In each case no more than two square meters will be excavated depending on the initial results of the excavations.

Research questions to be examined by the fieldwork include:

1) What type of habitation is represented at these two sites?
2) How do these sites relate to Site 19432?

METHODOLOGY

The excavations in site 19432 will be conducted with a back-hoe. All other excavations will be conducted by hand and all excavated material will be screened through 1/4 and 1/8-inch screens. All artifacts and other cultural materials will be collected.

The photo record will be conducted using both black-and-white and color film. All excavations will have at least one wall profiled. All descriptions and excavations will be recorded on appropriate SCS field forms.

Laboratory analyses will include identification and cataloging of all artifacts. Midden will be analyzed and charcoal samples will be cleaned and stored. If obtained, at least one radiocarbon dating sample from Site 19431 will be submitted to Beta Analytic, Inc. for processing. Materials from this project will be stored at the office of Scientific Consultant Services, Inc., Kaneohe, Hawaii.

BURIALS

No human burials are expected in the project area. If inadvertent burials are encountered during the fieldwork all work in that immediate area will be stopped and SHPD notified.

REPORT PREPARATION

The data recovery report will include an appropriate review of the **ahupua`a** and project area settlement patterns, a discussion of the research questions, descriptive information on the fieldwork and laboratory findings, and a conclusion section addressing the findings in relation to the research questions.

The report will include photos and illustrations of artifacts and features. Appropriate excavation profiles will also be included.

A draft of the final data recovery report will be submitted to the client and the SHPD. A final report, which will include review comments will be produced and provided to the client and two copies provided to SHPD.

REFERENCES CITED

Maly, K., A. Walker, and P. Rosendahl

1994 *Archaeological Inventory Survey Waiakea Cane Lots Portion of Parcel 6 (TMK:2-4-57:01)*. PHRI Report 1370-061094.

DATA RECOVERY EXCAVATIONS FOR SITES 50-10-35-19431, 19432, 19433, AND 19434, LAND OF WAIAKEA, SOUTH HILO DISTRICT, ISLAND OF HAWAI`I [TMK:2-4-57:01]

By:
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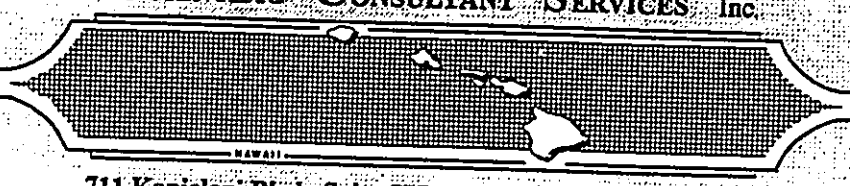

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INTRODUCTION

At the request of Mr. Roy Takemoto, Scientific Consultant Services, Inc. (SCS) conducted mitigation through data recovery for State Sites 50-10-35-19431, 19432, 19433, and 19434, located in the city of Hilo, Land of Waiakea, South Hilo District, Island of Hawai`i (TMK:2-4-57:01) (Figure 1).

The archaeological fieldwork, guided by the Data Recovery Plan (Spear 1995), was conducted from February 26 to March 7, 1995. The fieldwork was carried out by William R. Fortini, Jr. (Field Supervisor), Leinaala Blomfield Benson (Field Assistant), and David Chaffee (Field Assistant), under the overall direction of Robert L. Spear, Ph.D.

SETTING

The project area is located in Waiakea *ahupua`a*, South Hilo District, Island of Hawai`i (Figure 2). The project area consists of approximately 4.5 acres of a 7.5 acre parcel which is bounded on the south by West Kawili Road, on the west by Kapiolani Street, and on the north and east by undeveloped and developed land. A detailed description of the project area can be found in Maly et al. (1994).

The present project area is situated in McEldowney's Zone II Upland Agricultural Zone (1979). This zone began immediately behind the coastal settlement zone and extended inland approximately to the 1,500 ft. elevation. The cultural landscape in this zone consisted of "Scattered huts, emphasized by adjacent garden plots and small groves of economically beneficial tree species, doted this expanse." (McEldowney 1979:18).

By roughly 1845 this traditional cultural landscape had changed with the disappearance of the gardens and associated habitations and the growth of a Western style town between the Waiolama and Wailuku Rivers (McEldowney 1979:37). A few years later saw the rapid development of the sugar industry and its extensive impacts on the greater Hilo area, including the present project area (McEldowney 1979:39).

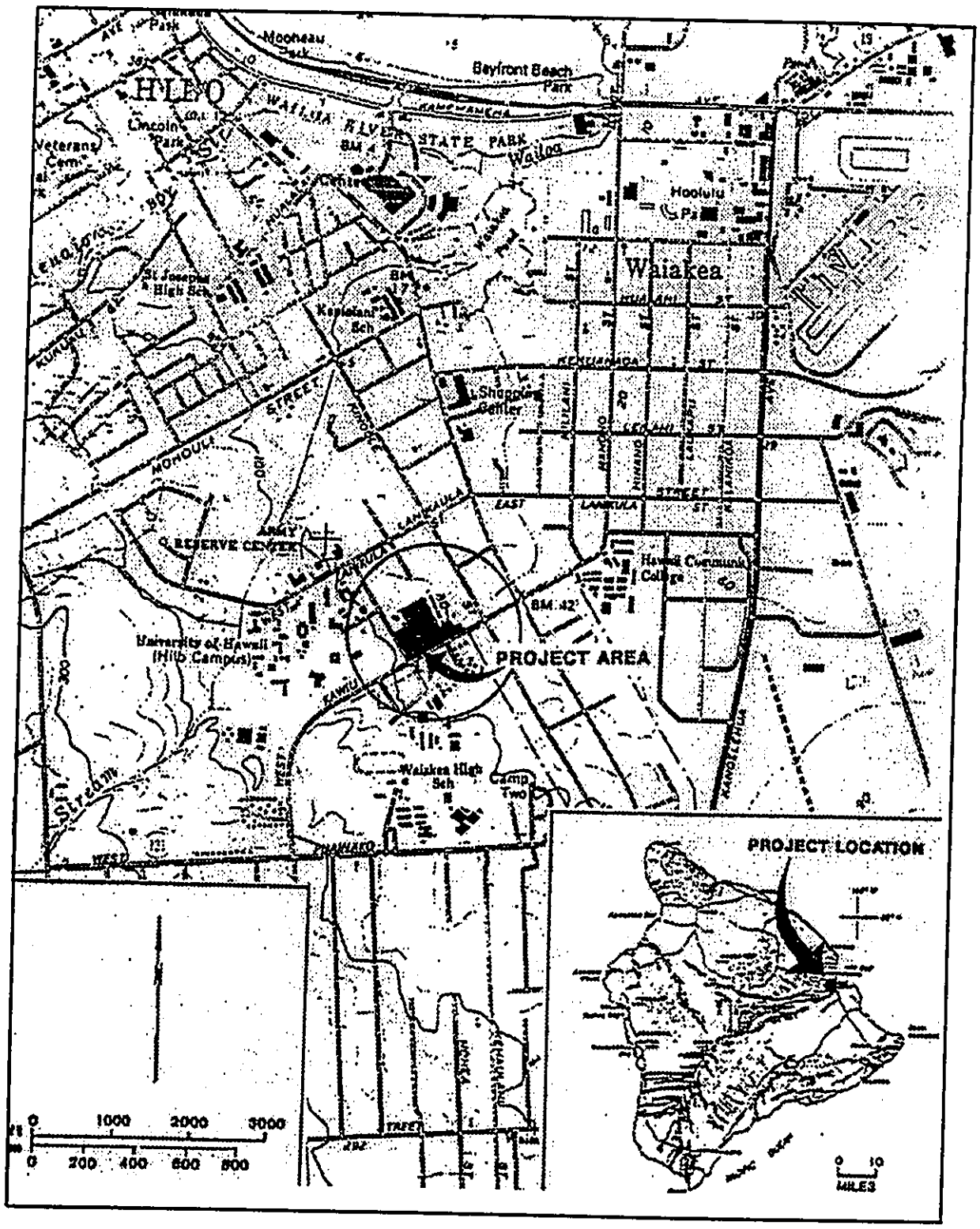

FIGURE 2: PROJECT AREA. (FROM MALY ET AL. 1994)

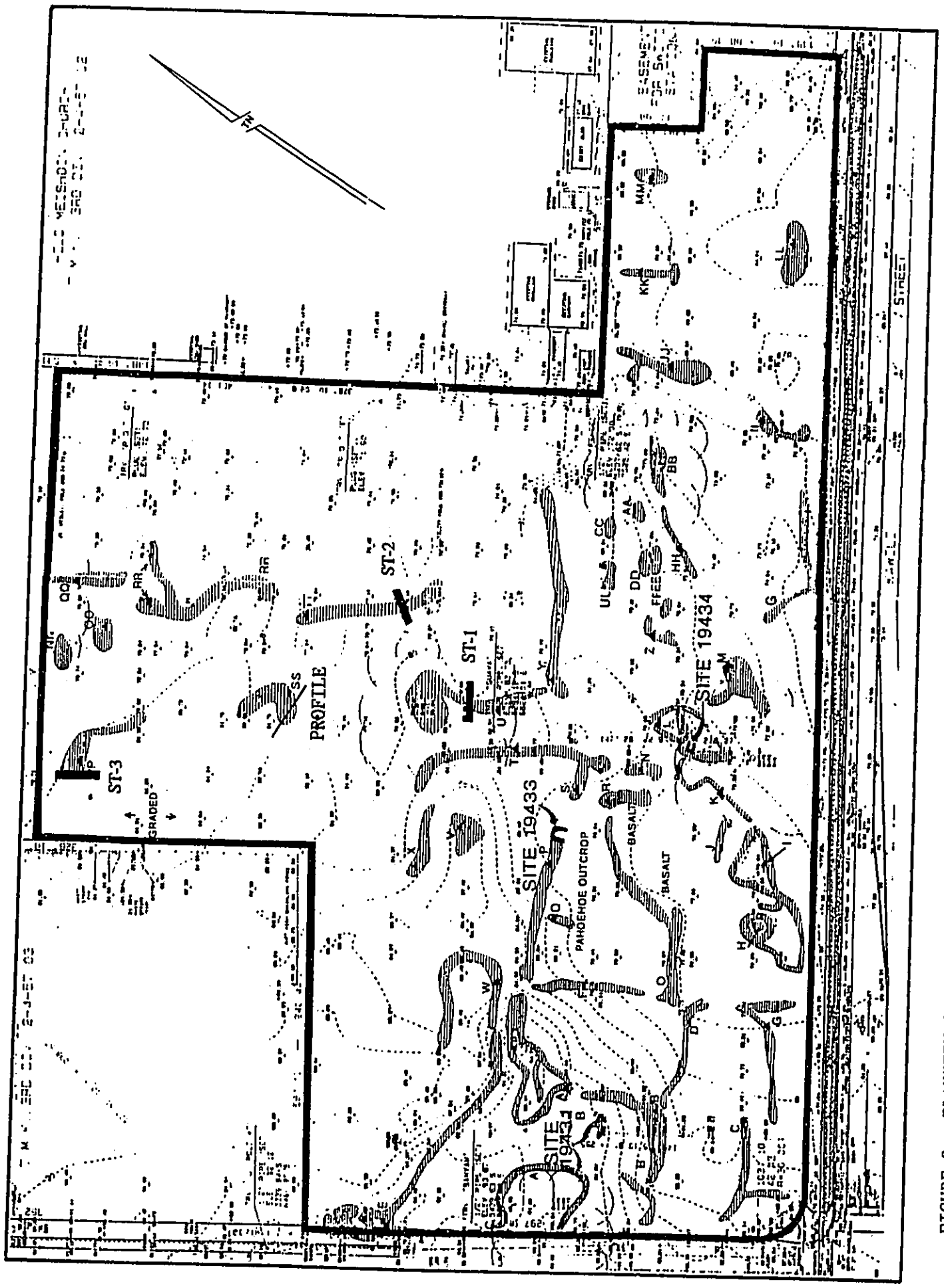

FIGURE 2: PLANVIEW OF PROJECT AREA SHOWING SITES 19431, 19432, 19433, AND 19434. (FROM MALY ET AL. 1994)

PREVIOUS ARCHAEOLOGY

The reader is directed to both Hunt and McDermott (1994) and Maly et al. (1994) who provide a detailed discussion of the archaeology conducted in the general Hilo area, describe the pre-Contact Hawaiian settlement pattern, and review the post-Contact impacts to this portion of the island of Hawai`i.

Previous archaeological research in the specific project area was conducted by PHRI (Maly et al. 1994). This work identified four archaeological sites (19431, 19432, 19433, and 19434) which were comprised of a total of 47+ structural features. The sites consisted of both single and multiple-components and their condition ranged from poor to good. Formal feature types consisted primarily of mounds, walls, mound/walls, and an enclosure. The functional feature types principally included agriculture and habitation (Maly et al. 1994:22).

Site 19431 was identified as a possible historic habitation and agricultural site. In addition, the recovery of a single volcanic glass flake and a charcoal sample which provided a conventional radiocarbon date of 490 $\pm$ 70 B.P. suggested the possibility of a pre-Contact, subsurface cultural layer.

Site 19432 was identified as a historic site associated with sugar cane cultivation, possibly including features associated with loading and transporting cane. These results were similar to those obtained by Hunt and McDermott (1994) from their work on the Pu`ainako Road Extension located less than one-half mile to the southwest from the project area.

Sites 19433 and 19434 were both identified as possible historic habitations. Both of these sites were constructed using portions of existing features from Site 19432.

DATA RECOVERY PLAN

The PHRI report recommended that additional fieldwork be conducted at all four of the identified sites (Maly et al. 1994:23). Based on these recommendations and discussions with the State Historic Preservation Division (SHPD) the following work was determine to be necessary at each of the sites.

Site 19431

This site was recorded during the Inventory Survey as an enclosure with an associated C-shape. Additional fieldwork at this site was to consist of the excavation of no more than eight square meters. At least one excavation was to cut at least partially into the enclosure construction to firmly establish the association of the surface architecture with the identified subsurface deposit. Initial excavation was to consist of small test units (50 x 50 cm) to probe for buried cultural deposits. Where significant deposits were identified larger test units were then planned for excavation.

The excavations were to be used to investigate the following research questions:

1) What is the overall spatial distribution of the cultural deposits at the site?
2) Are post-holes, fire pits, or other subsurface features present at the site? If so, is there any patterning observable?
3) What is the relationship between the surface architecture and the and the possible subsurface cultural deposit?
4) Can a second radiocarbon dating sample be recovered to corroborate the date obtained during the Inventory Survey work?

Site 19432

Data recovery at this site was to included the completion of a photo record of samples of all of the morphological feature types and the excavation of selected features.

The primary feature types identified at this site during the Inventory Survey were walls (N=19) and mounds (N=18). Approximately 20% of the mound and wall features were to be photo recorded. Examples of the less numerous feature types were also to be recorded.

Excavation at this site was to consist of back-hoe trenches placed into two to three examples of the wall/terrace features.

Research questions to be addressed by the fieldwork include:

1) Are buried features present on which the surface architecture might be resting?
2) What are the construction methods used in making the wall/terrace features?
3) Can the function of the agricultural features be more specifically determined?

Sites 19433 and 19434

Both of these sites were interpreted as possible historic habitations during the Inventory Survey. Data recovery work at these two sites focused on the subsurface examination of the interior of the structures. In each case no more than two square meters were to be excavated depending on the initial results of the excavations.

Research questions to be examined by the fieldwork include:

1) What type of habitation is represented at these two sites?
2) How do these sites relate to Site 19432?

METHODOLOGY

The excavations in site 19432 were stratigraphy trenches (ST) conducted with a back-hoe. At sites 19431, 19433, and 19434 two types of hand excavations were employed. Shovel probes (SP) were units that were dug by natural layers and screened through 1/4 and 1/8-inch mesh. Test units were excavated by natural layers which were broken into arbitrary 10 cm levels where the layers were more than 10 cm thick. Test units were also screened through 1/4 and 1/8-inch mesh. Recovered artifacts and other cultural materials were collected.

The photo record was conducted using both black-and-white and color film. All excavations had at least one wall profiled. All descriptions and excavations were recorded on appropriate SCS field forms.

Laboratory analyses was to include identification and cataloging of all artifacts. Midden was to be analyzed and charcoal samples were to be cleaned and stored. If obtained, at least one radiocarbon dating sample from Site 19431 was to be submitted to Beta Analytic, Inc. for processing.

Very few artifacts were recovered during the fieldwork. No midden or charcoal was recovered. Appendix A shows a detailed listing of soils from the project excavations.

Materials from this project are stored at the office of Scientific Consultant Services, Inc., Honolulu, Hawaii.

BURIALS

No human burials were expected in the project area. If inadvertent burials were encountered during the fieldwork all work in that immediate area of the burial was to be stopped and SHPD notified.

No human burials were encountered during the project fieldwork.

REPORT PREPARATION

The data recovery report was to include a brief review of the *ahupua`a* and project area settlement patterns, a discussion of the research questions, descriptive information on the fieldwork and laboratory findings, and a conclusion section addressing the findings in relation to the research questions.

The report was to include photos and illustrations of artifacts and features. Appropriate excavation profiles were also to be included.

A draft of the final data recovery report is to be submitted to the client and the SHPD. After review, a final report is to be produced and provided to the client and two copies provided to SHPD.

RESULTS OF FIELDWORK

SITE 19431

This site was originally recorded as consisting of Feature A, an enclosure, and Feature B, a C-shape. Additional fieldwork identified a third feature, Feature C, a platform/mound. Excavation at the site included 10 shovel probes (SP-2 through 11) and four test units (TU-3 through TU-6) (Figure 3).

Features

Feature A was recorded as an enclosure which measured 16.20 by 14.60 by 1.44 m. Feature B was identified as a C-shape which measured 5.00 by 4.20 by 0.66 m (Maly et. al. 1994:26-27).

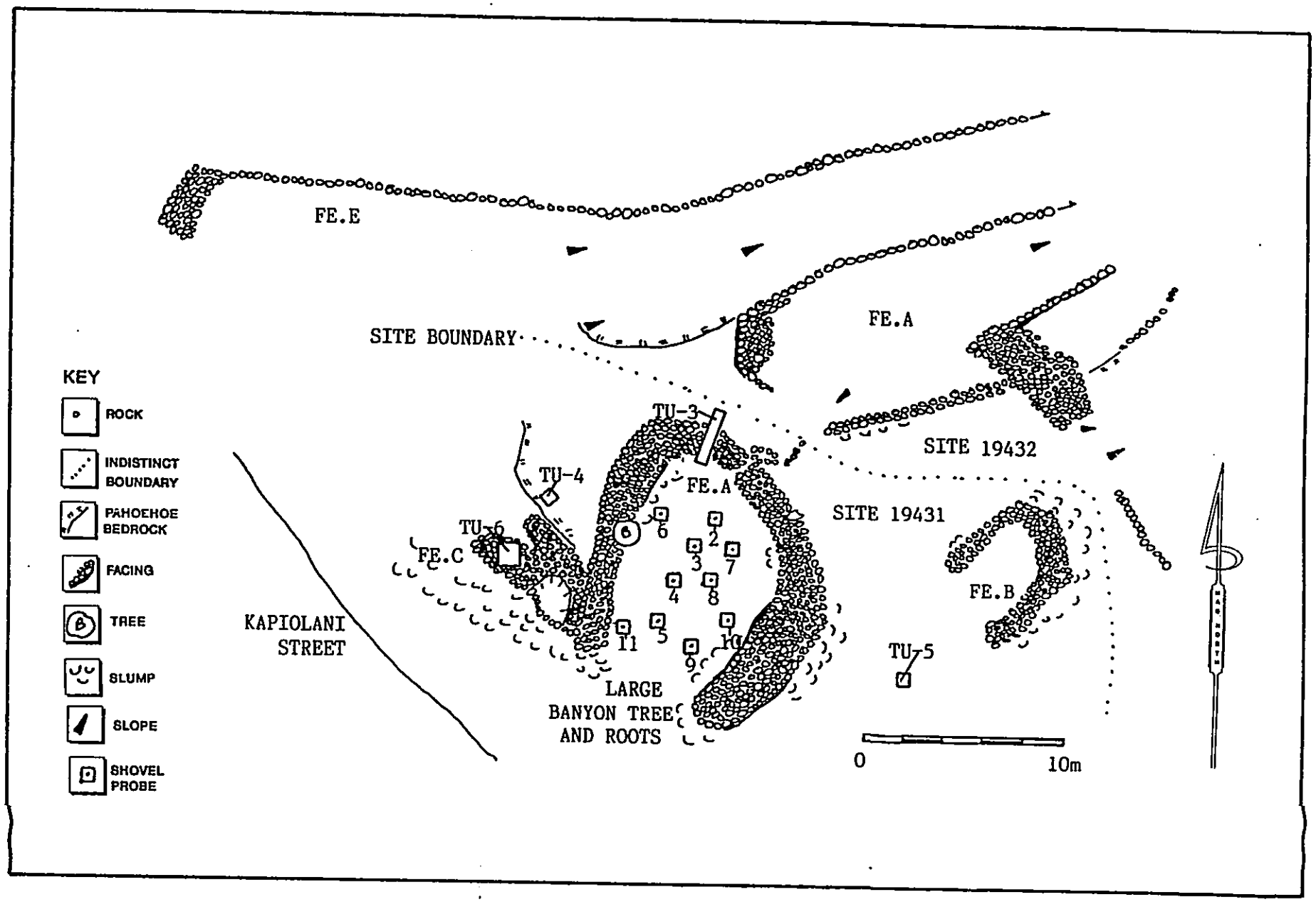

FIGURE 3: PLANVIEW OF SITE 19431.

Feature C is a rough platform/mound which is located off of the western side of Feature A. This platform measures 6.00 by 3.40 by 0.63 m. The feature is built up from the natural ground surface with various pebble, cobble, and small boulder sized subangular stones. The feature is stacked roughly 40 cm above the surface on its south side and about 10 cm above the surface on its north side. The west edge of the structure is somewhat disturbed and the south side of the feature, closest to Kapiolani Street, has been heavily disturbed. The construction method and feature suggest that this feature is related to the cane features of Site 19432.

Excavations

A total of 10 shovel probes and four test units were excavated at Site 19431, consisting of a total of 5.25 sq. m. Excavations were terminated at or in Layer III because the information derived from the Inventory Survey established that the identified cultural deposit was situated in Layer II. Representative samples of profiles, and placement of shovel probes within Feature A are shown in Figures 4 and 5.

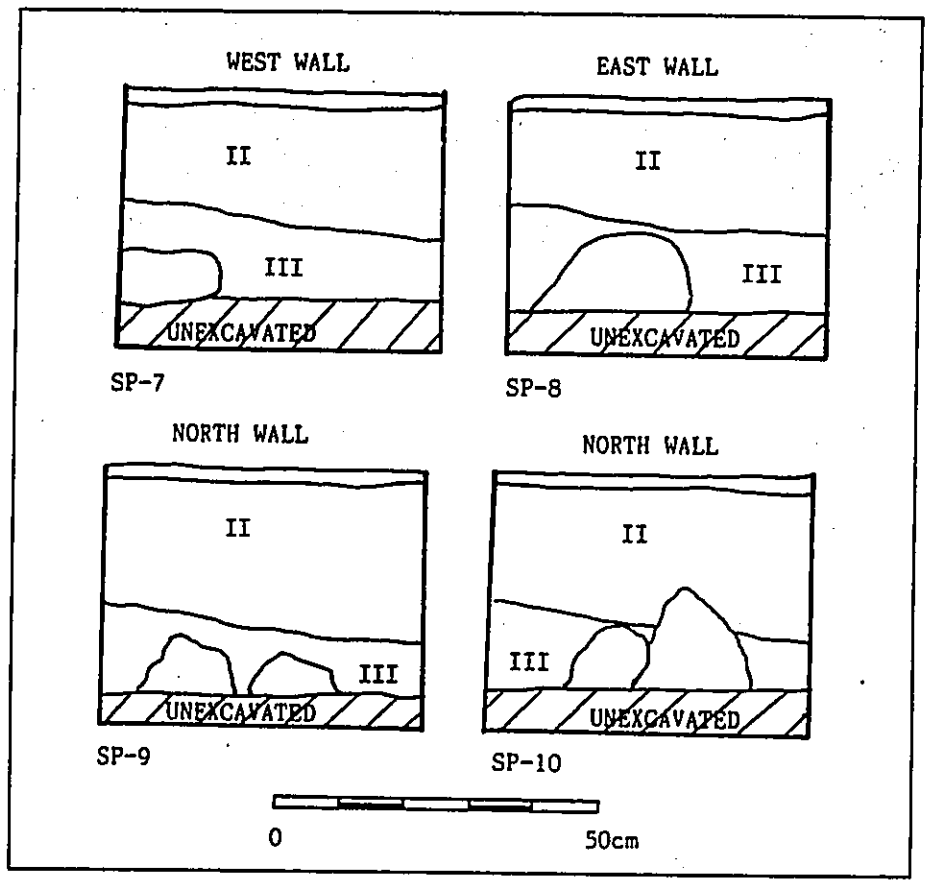

FIGURE 4: REPRESENTATIVE SAMPLES OF SHOVEL PROBE PROFILES, FEATURE A.

The first test unit excavated during the data recovery work was TU-3. Test Unit 1 was excavated during the inventory fieldwork and TU-2 was not assigned. Test Unit 3 was excavated completely through the wall of Feature A. Test Unit 4 was excavated to the west of Feature A and north of Feature C. Test Unit 5 was excavated between Feature A and Feature C. Test Unit 6 was located on top of Feature C.

FIGURE 5: VIEW OF SHOVEL PROBES,3, 4, AND 6 WITHIN FEATURE A, SITE 19431 VIEW TO NORTHWEST

Shovel Probe 1 was excavated during the Inventory Survey. Shovel Probes 2 through 11 were all excavated within the Feature A enclosure and all measured 0.50 by 0.50 m in size. The depths of the probes varied from 25 cm below surface to 40 cm below surface (Figure 5).

The soil stratigraphy was consistent throughout the shovel probes (see Figure 4). Layer I was composed of a very dark grayish brown (10 YR 3/2, m) loam. This layer was generally only 2 to 3 cm thick. Frequently associated with this layer were modern fragments of bottle glass, bottle caps, and other modern debris.

Layer II consisted of a dark reddish brown (5 YR 3/2, m) clayey loam. This layer

averaged 20 cm in thickness. The upper portion of this layer occasionally contained fragments of modern bottle glass.

Layer III consisted of a dark yellowish brown (10 YR 3/4, m) silt. High concentrations of stone were usually encountered in this layer. No cultural material was recovered from this layer.

Test Unit 3, excavated through the Feature A wall, measured 2.50 by 0.50 m, and was excavated to a maximum depth of 58 cm below surface (Figure 6). The construction of Feature A consisted of angular basalt cobbles and small boulders. Very few of the foundation stones extended more than a few centimeters into Layer I. A great deal of modern bottle glass was noted while dismantling Feature A.

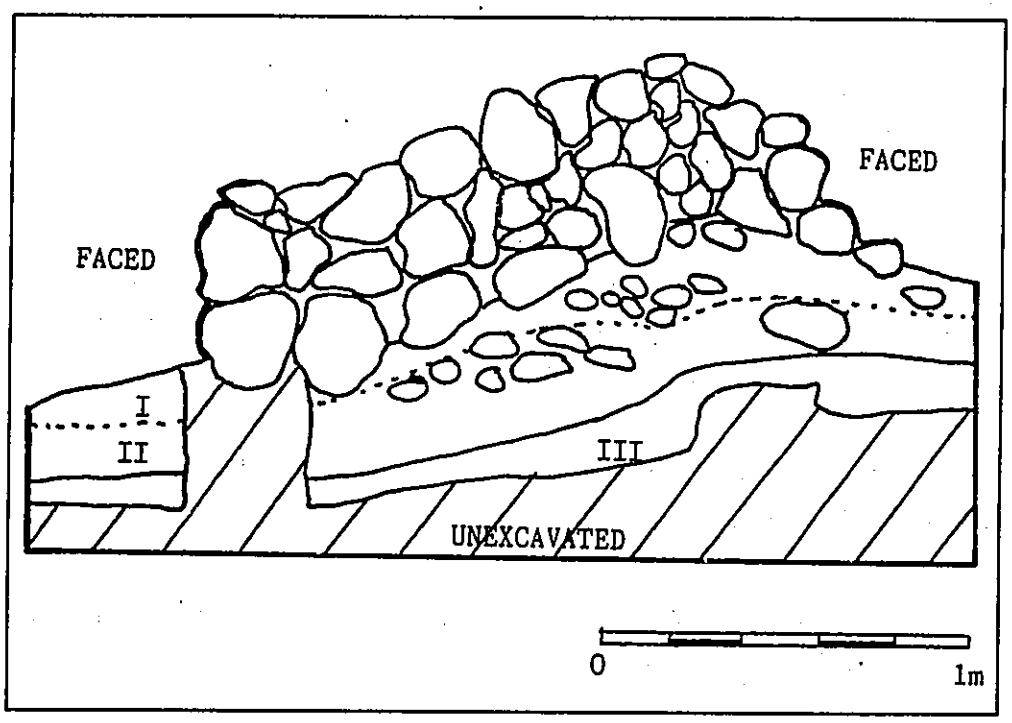

FIGURE 6: TU-3 WEST WALL PROFILE, SITE 19431

Layer I was the same dark grayish brown loam identified in the shovel probes. This layer was thicker beneath the feature construction than in the shovel probes and ranged from 9 to 21 cm in thickness. Some modern bottle glass was recovered from the upper portion of Layer I. This is interpreted as having filtered down through the feature construction. One

fleck of charcoal was observed in this layer.

Layer II occurred between 14 to 37 cm below surface and consisted of a dark brown (10 YR 3/3, m) silt. Layer III was a medium brown (10 YR 4/3, m) silt basal layer. No cultural material was recovered from either of these layers.

Test Unit 4 was a 0.50 by 0.50 m excavation unit placed to the west of Feature A and north of Feature C. This unit was excavated to a maximum depth of 41 cm below surface. Layer I consisted of a dark brown (7.5 YR 3/2, m) silty loam. This layer was approximately 5 cm in thickness and no cultural material was observed.

Layer II consisted of a dark reddish brown (5 YR 3/3, m) silty loam. This layer was approximately 24 cm thick and no cultural material was recovered from the layer.

Layer III was a dark yellowish brown (10 YR 3/6, m) silt. No cultural material was recovered from this layer.

Test Unit 5 was a 0.50 by 0.50 m excavation placed between Features A and B (Figure 7). This unit was dug to a maximum depth of 33 cm below surface. Layer I consisted of a dark grayish brown (10 YR 3/2, m) silty loam. A single fragment of modern bottle glass was recovered from this approximately 11 cm thick layer.

Layer II was roughly 23 cm thick and contained no cultural material. The layer consisted of a dark reddish brown (5 YR 3/2, m) silt.

Layer III also did not contain any cultural material. This layer consisted of a dark yellowish brown (10 YR 3/4, m) silt.

Test Unit 6 was a 1.00 by 1.00 m unit excavated through Feature C. The rock fill of the feature had a maximum thickness of 54 cm, based on observation of the profile (Figure 8). No cultural material was recovered from the feature construction.

Layer I measured approximately 8 cm in thickness and consisted of a very dark grayish brown (10 YR 3/2, m) silty loam. No cultural material was found in this layer.

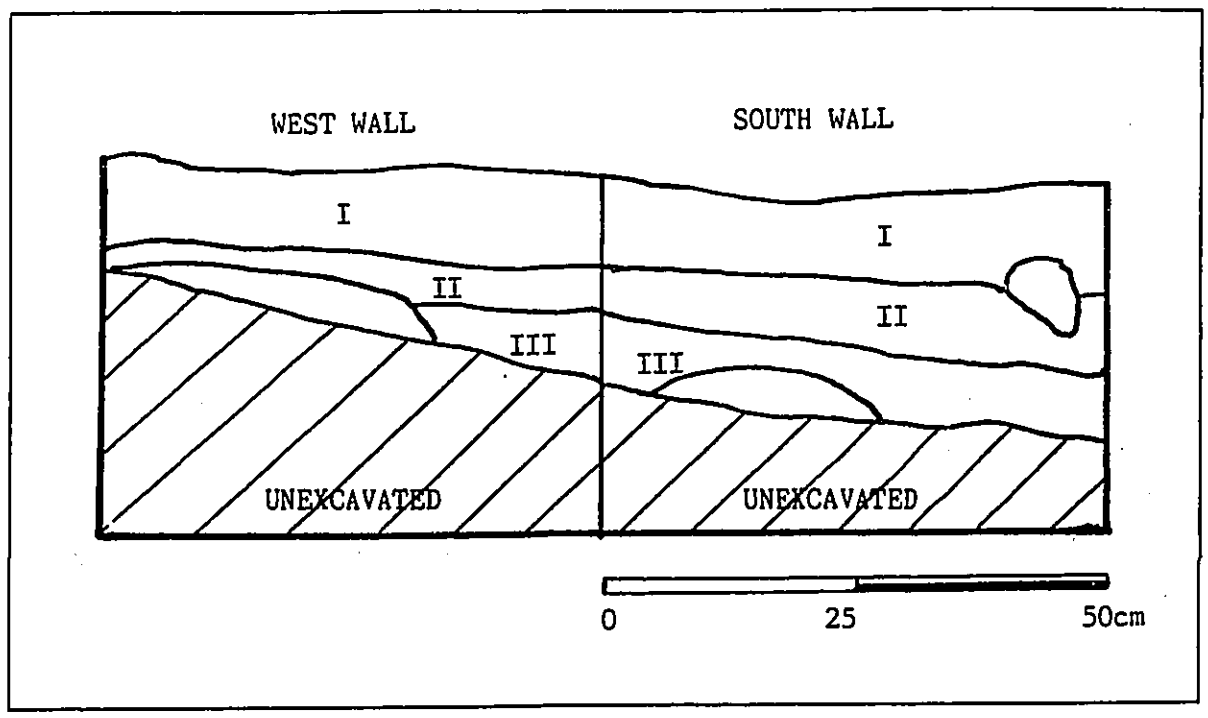

FIGURE 7: WALL PROFILES, TU-5, SITE 19431.

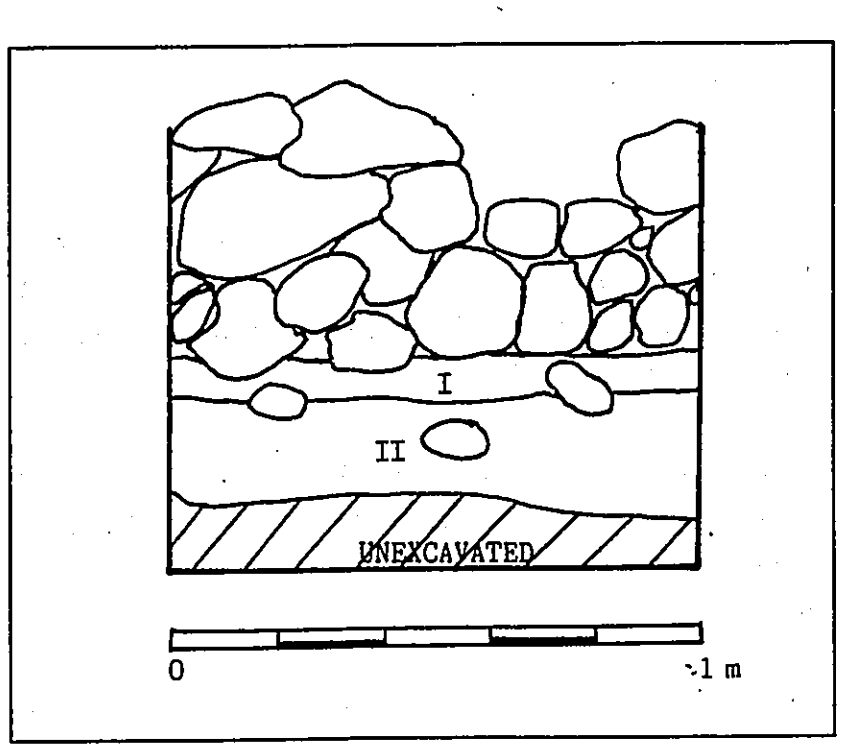

FIGURE 8: SOUTH WALL PROFILE TU-6, SITE 19431.

Layer II was a dark reddish brown (5 YR 3/2, m) silty loam. This layer contained no cultural material.

Artifacts

No artifacts were recovered during excavation at Site 19431. A single unworked volcanic glass nodule collected during excavation. This nodule measured 4.68 by 3.05 by 1.52 cm, and weighed 24.8 g.

SITE 19432

Site 19432 was recorded as a complex consisting of 19 rock walls, 18 mounds, 5 mound-walls, 2 mound/walls, a linear mound, a mound with fire pit, and an L-shaped wall (Maly et. al. 1994:27) (see Figure 2). Many of the recorded wall features were actually the retaining facing portion of terraces. The focus of the data recovery work was to conduct a subsurface examination of some of the architectural features and obtain a photo record of selected features.

Features U, PP, SS, and TT were excavated at Site 19432. Feature U was described as, "Anchored by mound and banyan on N, runs 22.0 m S and heights are 1.6 m (at mound) and 1.1 m (at datum)" (Maly et. al. 1994:31). Additional examination of Feature U found that while it was anchored at its northwest end by a large mound heavily disturbed by the growth of a large Banyan tree the 22.0 m extension to the southeast could best be described as a retaining facing for a terrace.

Stratigraphic Trench 1 was excavated through the facing of the terrace to examine the construction of the feature and determine if any subsurface features might be present below the surface architecture (Figures 9 and 10). The total excavated dimensions of ST-1 were 4.6 by 1.0 m, with a maximum depth of 1.3 m.

The stratigraphic profile of ST-1 showed three soil layers and the rock construction of Feature U. Feature U was constructed with medium to large cobbles and small boulders. Only the basal stones of the feature penetrated into the soil a few centimeters, extending into Layer I and slightly into Layer Ia.

Layer I was 4 to 8 cm thick and consisted of a very dark grayish brown (10 YR 3/2, m) silty loam. Layer Ia was 9 to 63 cm thick and consisted of a dark yellowish brown (10 YR 3/4, m) silty loam. Layer Ia was distinguished from Layer I by a slight color change and the

FIGURE 9: OVERVIEW OF ST-1, SITE 19432.
VIEW TO WEST.

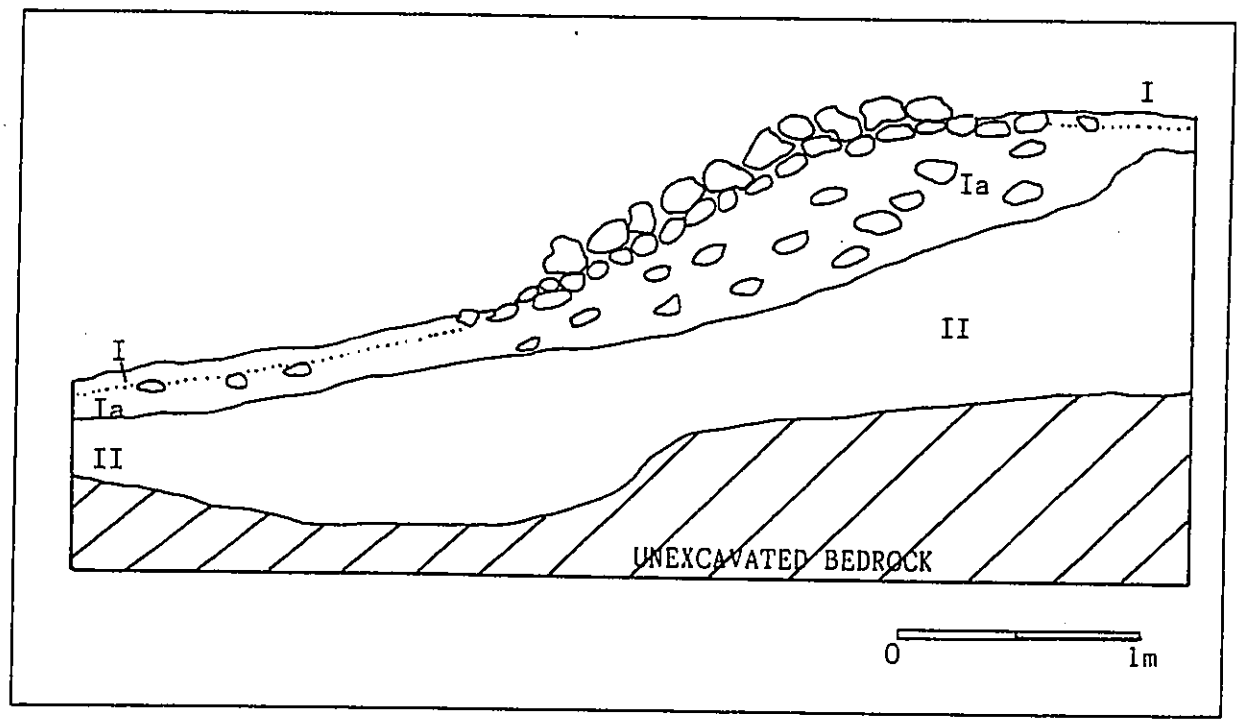

FIGURE 10: EAST WALL PROFILE, ST-1, SITE 19432.

absence of the dense tree root mat found in Layer I. No cultural material was found in either layer.

Layer II ranged from 24 to 78 cm in thickness and consisted of dark yellowish brown (10 YR 3/4, m) cobbly silt. This layer includes 30 to 40% decomposing basalt. The base of Layer II was on basalt bedrock. No cultural material was identified an no indications of buried features were observed.

Feature PP was described as, "A mound and wall combination creating a small terrace towards the Episcopal church property to the W. May have been disturbed--looks unpiled in the center. Wall runs 10.0 m at 110 degrees from the east end of the mound. It is 1.1 m high." (Maly et. al. 1994:34). The west end of this feature was removed by backhoe and excavation was extended almost 60 cm below the surface by ST-3 (Figures 11 and 12).

Feature PP was constructed of stones that ranged in size from 8 by 10 cm to larger than 30 by 30 cm, with the average stone measuring approximately 15 by 15 cm. The stones varied from subrounded to subangular in configuration. The construction stones of the feature extend into Layer I approximately 15 to 25 cm.

Only a single stratigraphic layer was identified in this excavation. Layer I consisted of a dark yellowish brown (10 YR 3/4, m) cobbly silt. The layer contained less than 15% decomposing basalt most of which was located near the base of the excavation. No cultural material was recovered from this excavation and evidence of subsurface features was observed.

Feature SS was described as, "A mound and wall combination, W of the S end of Feature RR. The mound measures 4.0 m (E-W) by 3.5 m wide and has a vertical face 1.6 m high. The wall continues off the mound to the NW, 9.00 m. It is 2.3 m wide by 0.8 m high on the W and 1.5 m high on the east" (Maly et. al. 1994:34).

The south face of Feature SS was removed by backhoe but no subsurface excavation was undertaken (Figures 13 and 14). The west and east edge of the feature were well faced. The interior construction of the feature was composed of medium to large cobbles and small to medium boulders. The stones used on the outer portion of the structure tended to be larger than those found in the structures interior.

FIGURE 11: NORTH WALL PROFILE, ST-3, SITE 19432.

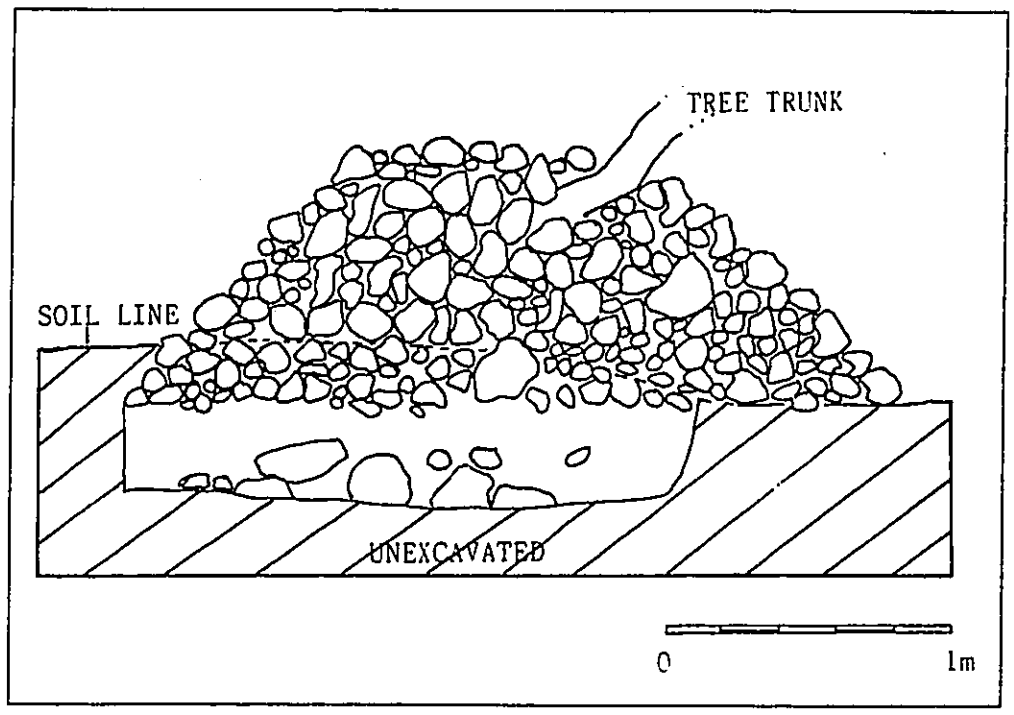

FIGURE 12: NORTH WALL PROFILE, ST-3, SITE 19432

FIGURE 13: FEATURE SS, PROFILE A, SITE 19432.
VIEW TO NORTH

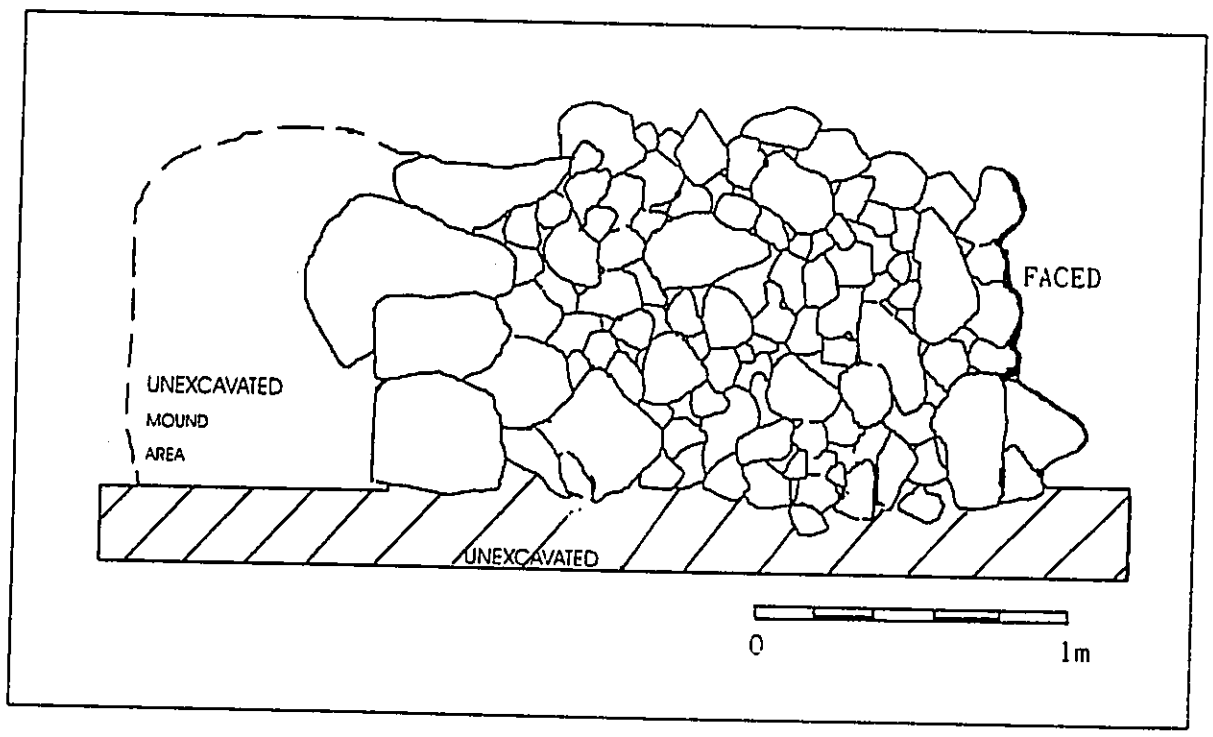

FIGURE 14: FEATURE SS, NORTH WALL PROFILE, SITE 19432.

Feature TT was described as, "A long wall on the east side of the terrace also formed by Features U and Y. It runs 30.0 m at 130 degrees, then turns and continues 7.0 m at 100 degrees, 2.3 m wide with heights of 1.0 to 1.5 m on the W side and 1.4 to 1.9 m on the east." (Maly et al. 1994:35). Further examination of this feature during this present project found that it is best be described as retaining facing for a terrace (Figures 15 and 16).

Feature TT was explored through the excavation of ST-2. This trench measured 4.0 m long, 1.0 m wide, and had a maximum depth of 1.06 m. The stone construction of the feature consisted of angular cobble and small boulder sized basalt. The construction stone extended through Layer I to the top of Layer II.

Layer I consisted of a very dark grayish brown (10 YR 3/2, m) silt loam. This layer varied between 24 to 46 cm in thickness.

Layer II consisted of a dark yellowish brown (10 YR 4/4, m) clayey silt. This layer varied from 10 to 68 cm in thickness and bottomed out on basalt bedrock.

Observation of the trench profile in the field indicated that at least this portion of Feature TT was constructed by excavating out the Layer I soil and in filling the excavation with the stone construction material. Since Layer I soil was found within the stone construction material it is possible that some of the soil was used during the feature construction or worked its way back into the construction over time.

The photo record completed for Site 19432 included roughly 25% of the 47 features described in Maly et al. (1994). The photo record included five feature types as presented in Maly et al. (1994:27-35). These five feature types consisted of walls, mounds, mound-walls, mound/walls, and an L-shaped wall.

Feature N was described as a elongated amorphous piled mound (Maly et al. 1994:30) (Figure 17). This photo shows the north end of the feature and the extensive disturbance of the feature by the growth of trees.

Figure 18 shows the level terraced area created by Feature U, on the left of the photo, and Feature T, on the right. Although described as a rock wall, Feature T is noted as forming a high soil terrace with Feature U (Maly et al. 1994:31) and so is better described as a

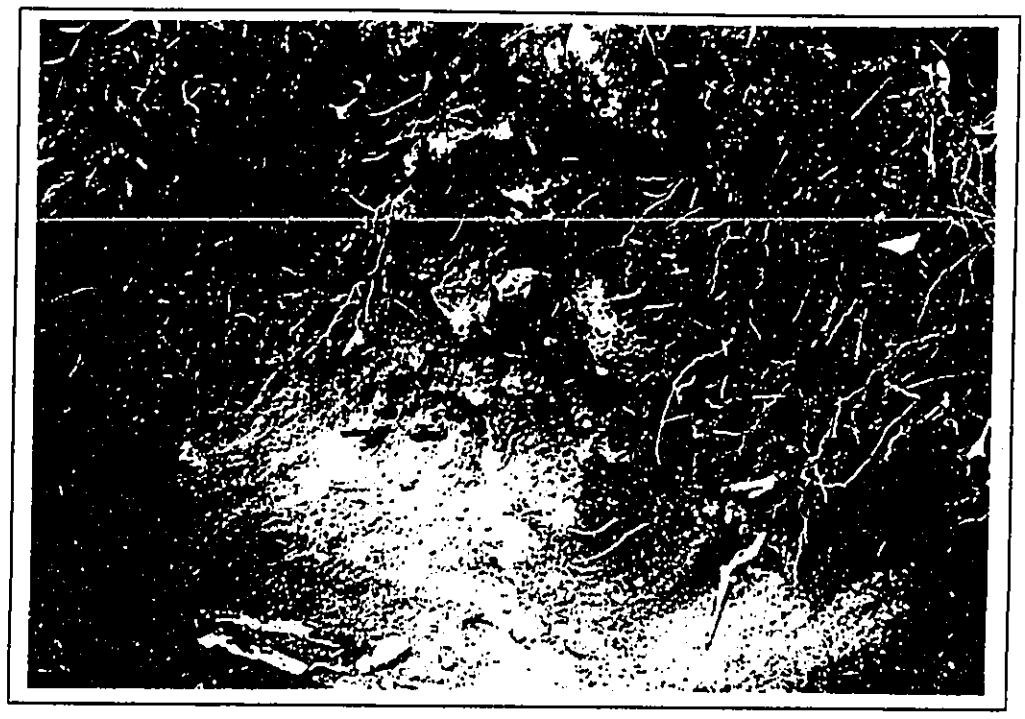

FIGURE 15: EAST WALL PROFILE. ST-2. SITE 19432.

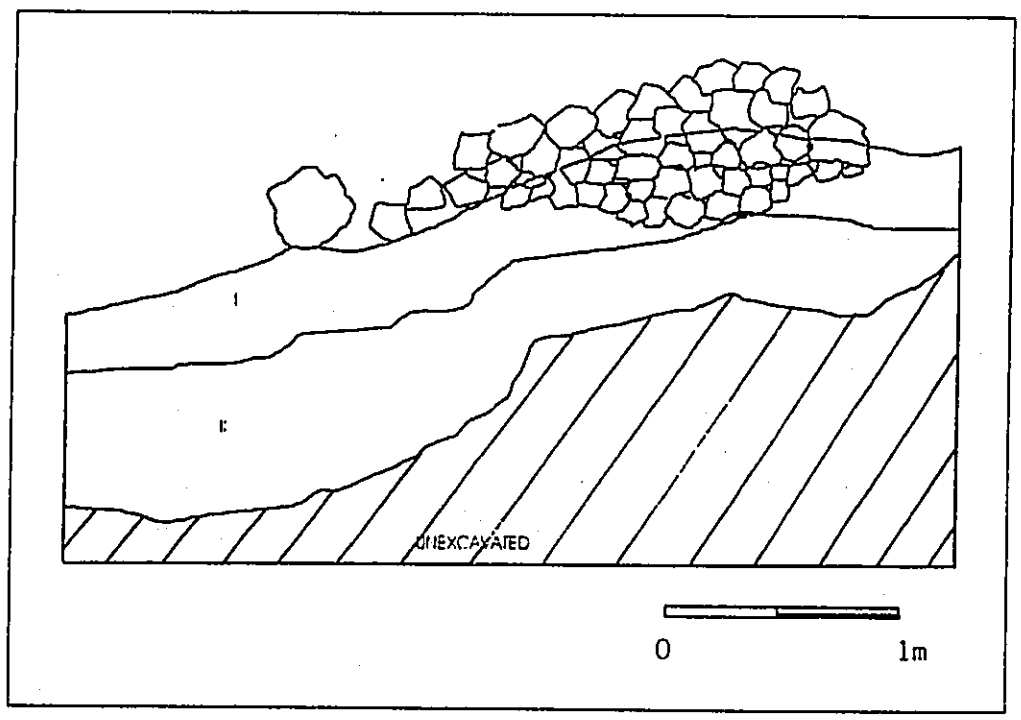

FIGURE 16: EAST WALL PROFILE. ST-2. SITE 19432.

FIGURE 17: FEATURE N, SITE 19432.
VIEW TO SOUTH

FIGURE 18: LEVEL TERRACED AREA BETWEEN FEATURES T AND U.
VIEW TO EAST.

retaining facing for a terrace. Feature T is shown curving through the lower right corner of Figure 18.

The mound portion of Feature U is located in the lower left side of Figure 18 and shows the disturbance from the Banyan tree growth. The terraced portion of Feature U is situated behind the dense root mass of the Banyan tree.

Close-up photos of Feature U are shown in Figures 19 and 20. Both photos show that the feature was constructed of angular cobble to small boulder sized stone.

Feature Z was recorded as a well built L-shaped wall with a mound attached (Maly et al. 1994:32). Figure 21 illustrates a section of the wall construction and Figure 22 provides a close-up of how the stones were fitted.

Feature AA was described as a rectangular mound built on top soil with medium to large cobble sized angular basalt (Maly et al. 1994:32). Figure 23 illustrates the east edge of the mound and shows that the stones were stacked but not fitted and faced.

Feature BB was recorded as a well built, vertical sided ovoid mound (Maly et al. 1994:32). Figure 24 presents the south face of Feature BB and shows the fairly uniformed size of the stone and how well stacked they were.

Feature DD was typed as a vertical sided ovoid mound (Maly et al. 1994:33). Figure 25 shows the vertical stacking of the south face of the feature. The individual located on the right hand side of the figure is sitting on Feature EE. This photo illustrates that a gap exists between Feature DD and EE which is not shown on the Maly et al. (1994) field map.

Figure 26 provides a close-up of the construction of the south face of Feature DD. Notice how well fitted the stones are and that they are of very similar size.

Feature EE was described as a piled oval mound (Maly et al. 1994:33). Figure 27 shows a close-up of the piled mound. The size range of the stones in this mound was greater than those found in Feature DD.

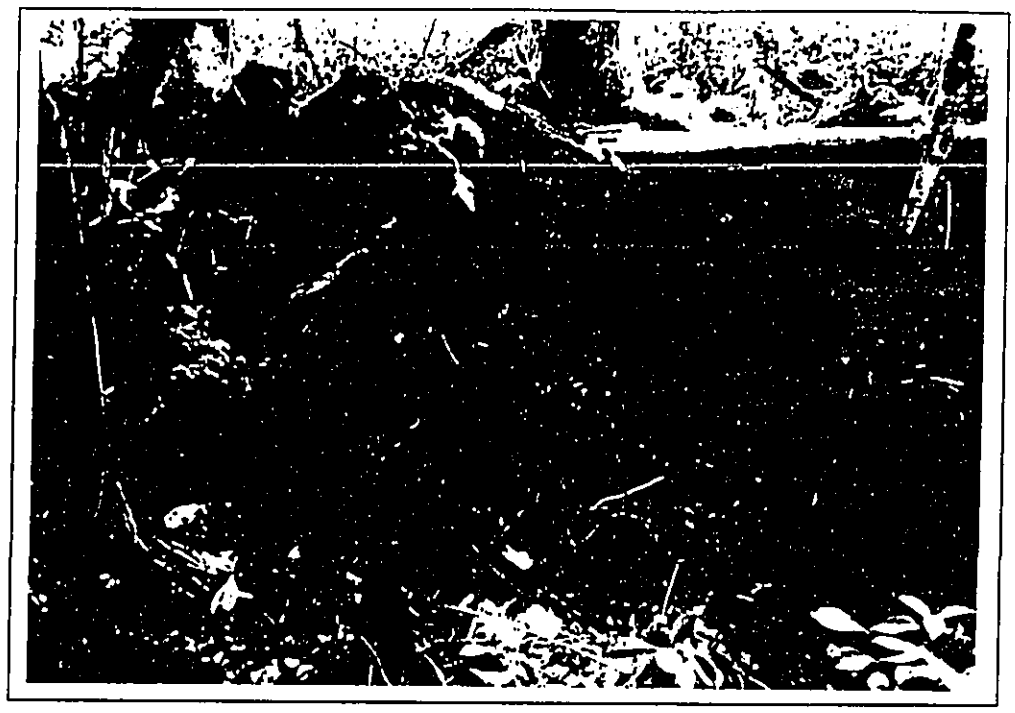

FIGURE 19: NORTH FACE OF FEATURE U, SITE 19432.

FIGURE 20: SOUTH FACE OF FEATURE U, SITE 19432.

FIGURE 21: NORTH FACE OF FEATURE Z, SITE 19432.

FIGURE 22: CLOSE-UP OF FEATURE Z, SITE 19432.

FIGURE 23: EAST EDGE OF MOUND FEATURE AA, SITE 19432.

FIGURE 24: SOUTH FACE OF FEATURE BB, SITE 19432

FIGURE 25: SOUTH FACE OF FEATURE DD, SITE 19432.

FIGURE 26: CLOSE UP OF FEATURE DD, SITE 19432.
VIEW OF SOUTH FACE

FIGURE 27: CLOSE-UP OF PILED MOUND FEATURE EE, SITE 19432. VIEW TO SOUTH EAST.

Feature FF was described as an ovoid mound with vertical sides (Maly et al. 1994:33). Figure 28 shows the north face of the mound and the similarity of construction with that illustrated for Feature DD.

Feature HH was recorded as a loosely piled rock wall (Maly et al. 1994:33). Figure 29 shows the south side of Feature HH. Some of the loosely piled stone may be the result of disturbance from vegetation growth, however, the size range of construction stone and the loose piling is similar to that of Feature EE.

Feature II was typed as a mound-wall (Maly et al. 1994:33). The feature measured 8.0 m north/south, by 2.6 m, with a maximum height of 1.9 m. Figure 30 shows the west side of the feature and the decrease in feature height from north to south.

Feature UU was recorded as an elongated double mound with feature heights of 0.5 m on the north side and 0.9 m on the south side (Maly et al. 1994:35). Figure 31 illustrates the west end of the feature and shows the uneven heights of the stacked angular basalt stones.

CORRECTION

THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

FIGURE 27: CLOSE-UP OF PILED MOUND FEATURE EE, SITE 19432. VIEW TO SOUTH EAST.

Feature FF was described as an ovoid mound with vertical sides (Maly et al. 1994:33). Figure 28 shows the north face of the mound and the similarity of construction with that illustrated for Feature DD.

Feature HH was recorded as a loosely piled rock wall (Maly et al. 1994:33). Figure 29 shows the south side of Feature HH. Some of the loosely piled stone may be the result of disturbance from vegetation growth, however, the size range of construction stone and the loose piling is similar to that of Feature EE.

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Feature UU was recorded as an elongated double mound with feature heights of 0.5 m on the north side and 0.9 m on the south side (Maly et al. 1994:35). Figure 31 illustrates the west end of the feature and shows the uneven heights of the stacked angular basalt stones.

FIGURE 28: NORTH FACE OF FEATURE FF, SITE 19432.

FIGURE 29: VIEW OF SOUTH FACE, FEATURE HH, SITE 19432.

FIGURE 30: VIEW OF WEST SIDE OF FEATURE JJ, SITE 19432.

FIGURE 31: WEST END OF FEATURE UU, SITE 19432.

SITE 19433

This site was recorded as a C-shape with overall dimensions of 5.40 by 3.50 m (Maly et. al. 1994:35) (Figures 32 and 33). The interior dimensions of the structure were 2.50 by 1.40 m. The C-shape was constructed by reusing stones originally incorporated into Feature P of Site 19432.

A single 1.00 by 0.50 m test unit was excavated in the interior of the C-shape. Three natural soil layers were identified in the excavation (see Figure 32). Layer I was 11 cm in thickness and consisted of a very dark brown (10 YR 2/2, m) clayey silt. No cultural material was recovered from this layer.

Layer II was approximately 10 cm thick and consisted of a dark brown (10 YR 3/3, m) silt. Two flecks of charcoal were observed in this layer, but no cultural material was encountered.

Layer III was the basal layer. No cultural material was identified in this layer which consisted of a dark brown (10 YR 3/4, m) silt.

SITE 19434

Site 19434 was originally recorded as a U-shaped wall with overall dimensions of 4.30 by 3.20 m (Maly et. al. 1994:35) (Figures 34 and 35). The interior dimensions of the feature were 2.10 by 1.30 m. Associated with the U-shape was a stone hearth built with small gauge rails. This hearth is built into Feature L of Site 19432. This hearth was clearly built into Feature L after the feature had been constructed and presumably abandoned.

Excavations

Two excavations were placed in site 19434 to search for subsurface cultural deposits. The first excavation was TU-1, a 1.00 by 0.50 m unit placed in the interior of the U-Shape. The second excavation was a 0.50 by 0.50 m shovel probe placed near the hearth.

Test Unit 1 was placed inside the U-Shape so that the long axis of the unit paralleled the interior face of the feature wall. Exposed on the surface of the test unit were two long, narrow pieces of rusted metal. A single soil layer was encountered in this unit which was excavated to a maximum depth of 40 cm below surface. This soil layer consisted of a very dark brown (10 YR 2/2, m) silt.

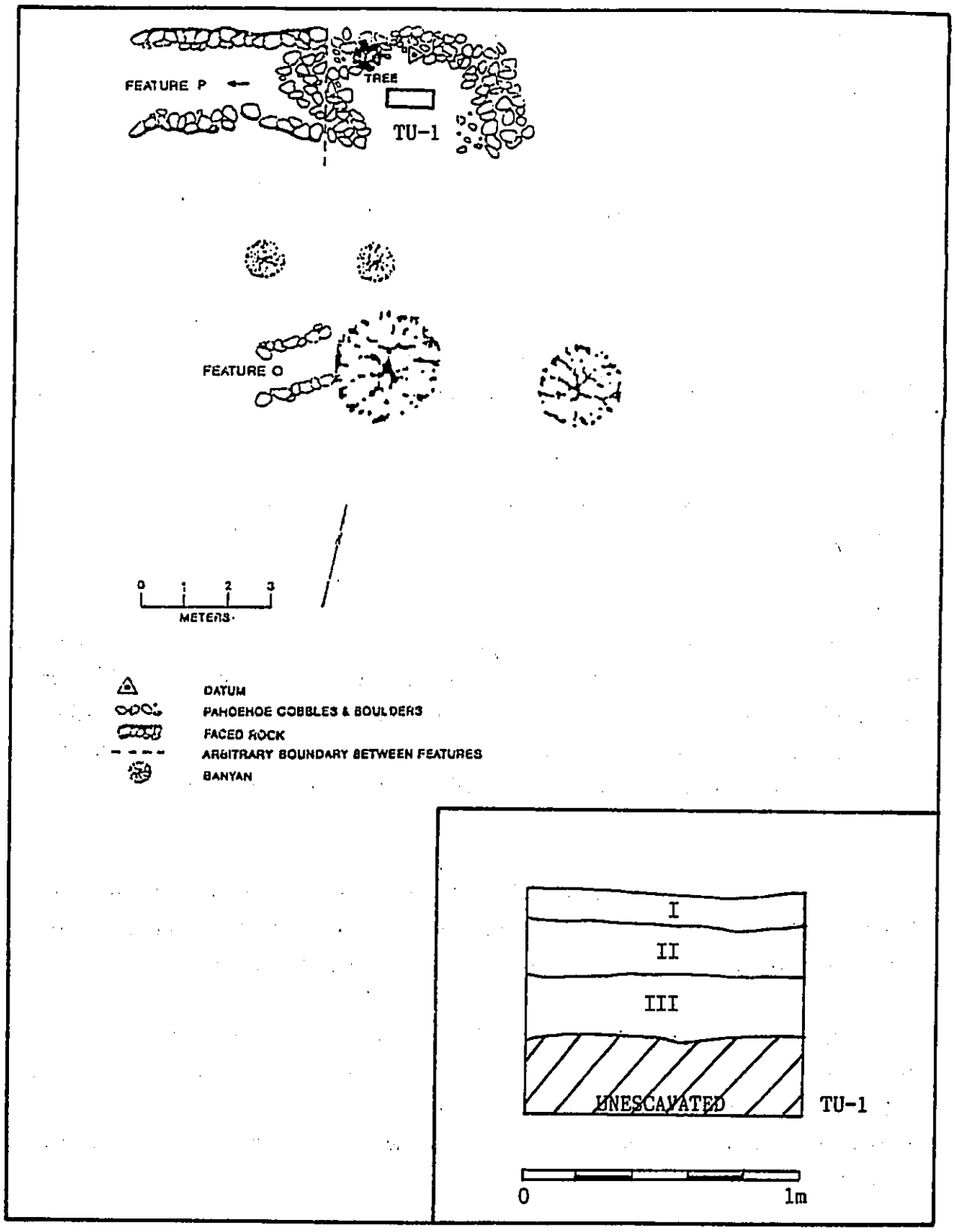

FIGURE 32: PLANVIEW OF SITE 19433 (FROM MALY ET AL. 1994)
(INSET NORTH WALL PROFILE, TU-1)

FIGURE 33: SITE 19433 OVERVIEW.
VIEW TO NORTH

FIGURE 34: SITE 19434 OVERVIEW.
VIEW TO SOUTH.

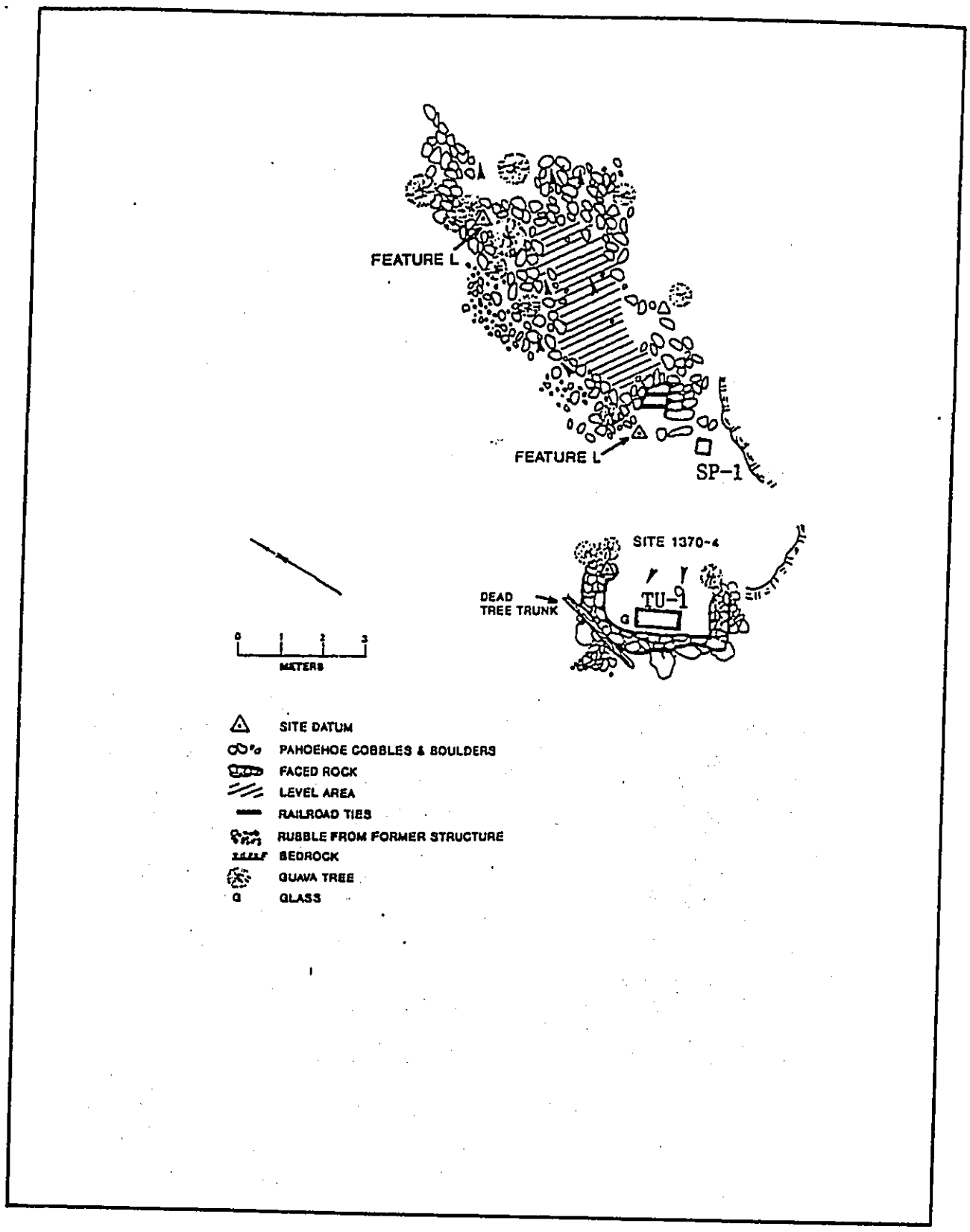

FIGURE 35: PLANVIEW OF SITE 19434. (FROM MALY ET AL. 1994).

The first 20 cm of the excavation contained a high density of thin, fragmented, rusted metal (approximately 1/3 of each level). Within Level 3 (20-30 cm below surface) the density of the rusted metal rapidly decreased and the final 10 cm of the excavation contained no cultural material. The last 10 cm of the excavation also found increasing amounts of small subangular pebble sized stones.

Other metal items recovered from TU-1 were nails and a few fragments of glass. Several large pieces of charcoal were also identified, but not collected since they were from a historic context.

Shovel Probe 1 was excavated near the hearth constructed into Feature L of Site 19432. This 0.50 by 0.50 m probe was excavated to a maximum depth of 24 cm below surface were the unit was terminated on saprolitic rock. Only a single stratigraphic layer consisting of very dark brown (10 YR 2/2, m) silt was encountered. No cultural material was recovered from the excavation unit.

Artifacts

All of the artifacts recovered from Site 19434 were post-Contact items. Excluding the thin rusted pieces of metal not collected, the recovered artifacts consisted of metal and glass. Specifically, the artifacts included six pieces of non-diagnostic green bottle glass, six square nails and two round nails. Based on the information in the American Association for State and Local History Technical Leaflet No. 48 (Nelson 1968) two of the square nails were 3 "penny" nails, one was an 8 "penny" nail, and three were too rusted and fragmented to type. These nails appear to be box or common type nails. The direct association of the round and square nails indicates that the deposits were left sometime after the introduction of round nails to Hawai`i. After examination by several archaeologists the samples were found to be essentially "non-diagnostic" with respect to age and interpretation of site function.

DISCUSSION AND CONCLUSIONS

SITE 19431

Four research questions were posed concerning Site 19431, including:

1) What was the overall spatial distribution of the cultural deposits at the site?
2) Were post-holes, fire pits, or other subsurface features present at the site? If so, was any patterning observable?
3) What was the relationship between the surface architecture and the possible subsurface cultural deposit?
4) Can a second radiocarbon dating sample be recovered to corroborate the date obtained during the Inventory Survey work?

As described earlier in this report, no evidence of a buried cultural deposit was iden-

fied at Site 19431 during the Data Recovery fieldwork. A total of 14 excavation units equaling 5.25 sq. m were excavated in and around Feature A of the site. Except for modern debris no cultural material or deposits were recovered during the project. Because of these negative results Questions 1 and 2 must be considered no longer valid.

Excavation of TU-3 through the wall of Feature A was done to address Question 3. The results of the excavation showed that the architectural feature extended only slightly into the ground. Since there was no subsurface cultural deposit identified there was no possibility of relating the architectural feature to the deposit.

Question 4 asked if a second radiocarbon dating sample could be obtained from Site 19431. The answer to this question was no since there was no datable material recovered from the site.

SITE 19432

Three research questions were proposed in the Data Recovery Plan for this site, these were:

1) Are buried features present on which the surface architecture might be resting?
2) What are the construction methods used in making the wall/terrace features?
3) Can the function of the agricultural features be more specifically determined?

To address these questions data was collected through the excavation of back-hoe trenches and the compilation of a feature photo record. Although not called for in the Data Recovery Plan, some additional mapping of the site was also conducted.

Three of the four excavations of architectural features at Site 19432 extended beneath the ground surface. Excavation of Features U and TT exposed two soil layers which terminated on bedrock. Excavation of Feature PP identified a single soil layer that became considerably more rocky towards the base of the excavation. No evidence of buried architectural features was encountered in any of the excavations.

Excavation of ST-1 in Feature U and ST-2 in Feature TT provided excellent profiles of the feature construction. As described earlier, the stones used to construct Feature U were set at a shallow depth into the soil. Although not as clear cut as Feature TT, it appears that Layer Ia in Feature U was excavated out before the construction stones were placed.

This excavation technique is clearly the case for Feature TT. In this case more than 30 cm of soil was removed before the construction stones were placed. For both Features U and TT the purpose of the construction was to create a retaining facing for a terrace.

Some additional information was gained concerning the function of the various features. The photo record obtained during the fieldwork makes it clear that features were either well stacked with vertical, faced edges or more haphazardly piled. Such a dichotomy could be due to the initial effort put into the construction of the features or differential impact to the features from plant growth.

In addition, secondary impacts to the features could have resulted from the reconstruction or removal of rock from the features. Jared Smith, quoted in Hunt and McDermott (1994:31) noted, "... that the cultivation contract men tear down and rebuild every stone heap before starting a new crop." This was done because, "These field piles of loose rock are the centers from which weeds and pests spread through the cane. Hence the workers 'laundry' them."

Field observations, analysis of the Maly et al. project map, and remapping of a portion of the project area did suggest some differences across the Site 19432 area. Of the 19 features identified as mounds (including Feature L which contained the fire pit) 15 (78.9%) of them are located in the eastern portion of Site 19432 bounded by Features G, O, and Y. These mounds interpreted as clearing mounds.

In contrast, the features immediately north and east of Site 19431 consist primarily of walls and retaining walls. These features, including Features A - D, F, O, P, and Q, create enclosed spaces. While the function of these spaces is not clear they may have served as planting areas.

Feature E, located north of Site 19431, is a retaining wall on the edge of a gully. This retaining wall forms the edge of a road that appears to have extended from Kapiolani Street into the project area towards Feature T. This road may have continued between Features T and U which both form retaining walls for a naturally elevated part of the project area. This roadway would have provided access to the portion of Site 19432 dominated by the stone mounds and also to the northern part of the site.

SITE 19433

Two specific research questions were posed for Site 19433 including:

1) What type of habitation is represented at this site?
2) How does this site relate to Site 19432?

A single test unit was excavated inside the C-shape structure that made up the site. This test unit was used to examine slightly more than 14% of the interior of the C-shape. No cultural material was recovered from this excavation beyond the two flecks of charcoal observed in Layer II.

Site 19433 was interpreted as a temporary shelter in the inventory survey report. Comparison of the structure type with the features found at Site 19432 found no similar features at Site 19432. This suggests that the feature at Site 19433 is not a clearing mound, retaining wall, other any other type of agricultural feature as seen in Site 19432.

The C-shaped construction is a well known feature type generally associated with use as a temporary shelter. The absence of any cultural material from this site indicates that it was a very temporary shelter. The fact that the C-shape was built by incorporating stones from Feature P of Site 19432 indicates that the C-shape is no older than Site 19432. It is more likely that the C-shape post-dates Site 19432.

SITE 19434

The same questions considered for Site 19433 were assessed for Site 19434; what type of habitation site was located here and how did the site relate to Site 19432?

Test unit one was used to examine over 18% of the interior of the U-shape found at Site 19434. Approximately one-third of the first 20 cm of the test unit was comprised of thin, fragmented, rusted metal; a few nails; a few pieces of glass; and pieces of charcoal. This material continued to be encountered, in lessening frequencies, to a depth of 35 cm below the surface. The recovered and observed cultural material appeared to be part of a dump or trash filled area. The relationship of the filled area to the surface architecture is unclear. The filled area could have been created by the people occupying Site 19434 or could have been created after the site was abandoned. Since no tightly dated material was recovered from the site a more exact understanding of the filled area to the architectural features is difficult to determine.

A fire pit, constructed in Feature L of Site 19432, was associated with the U-shape and the cultural material of Site 19434. The association of the U-shape, fire pit, and cultural material indicates that Site 19434 is a historic habitation. The type of architectural feature and the lack of a range of cultural materials indicates that this was a temporary living area. However, the presence of the constructed fire pit helps differ this site from Site 19433 and suggests that Site 19434 may have been used for a longer period of time than Site 19433.

The presence of a temporary habitation (Site 19434) in the area of the sugar cane features (Site 19432) suggests that sugar cane production may no longer have been active in this area when Site 19434 was occupied. Evidence supporting this is interpretation includes the presence of the fire pit which was built into an existing sugar cane feature (Feature L) indicating that Feature L was no longer part of an active cane growing area. If this interpretation is correct then Site 19434 post-dates at least some of the sugar cane features.

SUMMARY AND CONCLUSION

Data recovery investigations were conducted at Sites 19431, 19432, 19433, and 19434. Investigation of Site 19431 found no evidence of a buried pre-Contact cultural layer. The single volcanic glass flake and associated radiocarbon date are examples of what Hunt and McDermott called the " ...subtle evidence of Hawaiian use of the area ... found only in sparse and unpredictable spatial distributions." (Hunt and McDermott 1994:108).

Beyond the modern, recent debris scattered across the surface of the site no clear examples of portable cultural remains were found in association with the architectural features of Site 19431. Because of the absence of cultural material or subsurface features the function of Feature A is interpreted as more likely being a pen rather than a habitation feature. Feature B, a C-shape, is associated with temporary, short term habitation. Feature C is interpreted as being an agricultural feature, probably associated with Site 19432.

Site 19432 was interpreted by Maly et al. (1994) as being associated with the post-Contact cultivation and transportation of sugar cane. Many of the features at Site 19432 were similar to those found in the Pu`ainako Street extension project area reported in Hunt and McDermott (1994). The features discussed by Hunt and McDermott were associated with the production of sugar cane and included clearing mounds, foundations for water tanks, loading platforms, temporary flumes, and boundaries of cane and pasture land (1994:108). The

features at Site 19432 included clearing mounds, terraces for planting, boundary walls creating enclosed possible planting areas, and roads. There is no reason to disagree with the conclusion that these features date from the end of the 19th century to no later than 1940, and more likely the 1920's as suggested by Maly et al. (1994:44)

Sites 19433 and 19434 are both interpreted as temporary habitation areas. Site 19433 appears to have been a very short term historic habitation site based on the absence of any associated cultural material. Because the C-shape feature that makes up Site 19433 was constructed from the stones of Feature P (Site 19432) the shelter was interpreted as being utilized after agricultural features were no longer in use.

Site 19434 was also interpreted as a temporary historic habitation area. The presence of the fire pit built into Feature L (Site 19432) suggests that Site 19434 was utilized for a longer period of time than Site 19433. Because at least a portion of Site 19434 was built into a feature related to Site 19432 the site is interpreted as dating to a period after at least some of the agricultural features were no longer in use.

RECOMMENDATIONS

Sufficient data has been obtained from each of the sites to address the research questions proposed in the Data Recovery Plan (Spear 1995). No additional archaeological work is recommended for this project area.

Given the results of the inventory and data recovery work it is considered highly unlikely that human burials are present within the project area. However, if burials are encountered during further development of the project area all work in the immediate vicinity of the burial must stop and the State Historic Preservation Division (1-808-587-0047) must be notified.

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APPENDIX A

Soil Descriptions

Appendix C: Soil Descriptions Site 19431, Shovel Probes, Test Units.

SHOVEL PROBES

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Moist	Wet	Root	Rock	Boundary
SP-2 THRU SP-11	I	A	10YR 3/2	2 TO 3	LOAM	CRUMBLY	-	MNP MSS	-	FEW	VERY FEW PEBBLES	DIFFUSED SMOOTH
	II	A	5YR 3/2	20	CLAYEY LOAM	-	-	MSP MSS	-	FEW	FEW	ABRUPT SMOOTH
	III	A	10YR 3/4	TO B.O.E.	SILT	-	-	MNP MNS	-	-	-	B.O.E.

TEST UNITS

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Moist	Wet	Root	Rock	Boundary
TU-3	I	-	2.5 YR 3/2	9 TO 21	SILTY LOAM	SLIGHTLY HARD CRUMB	-	MSS MNP	-	ABUNDANT	FEW	DIFFUSED SMOOTH
TU-3	II	-	10YR 3/3	11 TO 28	SILT	SLIGHTLY HARD CRUMB	-	MSS MNP	-	ROOTLETS FEW ROOTS	FEW	ABRUPT SMOOTH
TU-3	III	-	10YR 4/3	20 TO 59	SILT	SLIGHTLY HARD CRUMB	-	MSS MNP	-	VERY FEW ROOTLETS	-	B.O.E.

Appendix C (cont): Soil Descriptions Site 19431, Test Units.

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Consistency Moist	Consistency Wet	Root	Rock	Boundary
TU-4	I	-	7.5 YR 3/2	0 TO 5	SILTY LOAM	SLIGHTLY HARD CRUMBLY	-	MSS MNP	-	ABUNDANT	30% BASALT	DIFFUSED
TU-4	II	-	5YR 3/3	6 TO 30	SILTY LOAM	SLIGHTLY HARD CRUMB	-	MSS MNP	-	MANY ROOTS ROOTLETS	30% BASALT	ABRUPT SMOOTH
TU-4	III	-	10YR 3/6	31 TO 41	SILT	VERY FINE POWDERY CRUMB	-	MNP	-	FEW ROOTLETS	75% BEDROCK	B.O.E.

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Consistency Moist	Consistency Wet	Root	Rock	Boundary
TU-5	I	-	10 YR 3/2	0 TO 11	SILTY LOAM	SLIGHTLY HARD CRUMBLY	-	MSS MNP	-	ABUNDANT	15% BASALT	DIFFUSED
TU-5	II	-	5YR 3/2	9 TO 22	SILT	SLIGHTLY HARD CRUMB	-	MSS MNP	-	FEW ROOTS ROOTLETS	10% BASALT	ABRUPT SMOOTH
TU-5	III	-	10YR 3/4	18 TO 33	SILT	FINE POWDERY CRUMB	-	MNP	-	FEW ROOTLETS	5% ROCK-BEDROCK	B.O.E.

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Consistency Moist	Consistency Wet	Root	Rock	Boundary
TU-6	I	C	10 YR 3/2	0 TO 8	SILTY LOAM	SLIGHTLY HARD CRUMBLY	-	MSS MNP	-	ABUNDANT	SOME	-
TU-6	II	C	5 YR 3/2	9 TO 26	SILTY LOAM	SLIGHTLY HARD CRUMB	-	MSS MNP	-	SOME ROOTS ROOTLETS	COBBLES PEBBLES	B.O.E.

Appendix C (cont): Soil Descriptions Site 19432, Stratigraphy Trenches

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Consistency Moist	Consistency Wet	Root	Rock	Boundary
ST-1	I	U	10 YR 3/2	4 TO 58	SILTY LOAM	FIRM BLOCKY	-	MSS MNP	-	ABUNDANT	5% BASALT	CLEAR SMOOTH
ST-1	Ia	U	10 YR 3/4	8	-	-	-	MSS MNP	-	FEW ROOTLETS	90% BASALT	ABRUPT SMOOTH
ST-1	II	U	10 YR 3/4	24 TO 78	SILTY LOAM	FIRM BLOCKY	-	MSS MNP	-	FEW ROOTS ROOTLETS	30-40% BASALT	B.O.E.

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Consistency Moist	Consistency Wet	Root	Rock	Boundary
ST-2	I	TT	10 YR 3/2	24 TO 46	SILTY LOAM	SLIGHTLY FIRM CRUMB	DSS DNP	-	-	ABUNDANT	10% BASALT	WAVY ABRUPT
ST-2	II	TT	10 YR 4/4	24 TO 78	CLAYEY SILT	SLIGHTLY FIRM CRUMB	DSS DNP	-	-	FEW ROOTS ROOTLETS	15% BASALT	B.O.E.

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Consistency Moist	Consistency Wet	Root	Rock	Boundary
ST-3	I	PP	10 YR 3/4	55	COBBLY SILT	SLIGHTLY HARD CRUMB	-	MSS MNP	-	FEW ROOTLETS	15% BASALT	B.O.E.

Appendix C (cont): Soil Descriptions Site 19433 and 19434, Test Units, Shovel Probe

19433

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Consistency Moist	Consistency Wet	Root	Rock	Boundary
TU-1	I	-	10 YR 2/2	11	CLAYEY SILT	-	-	MSS MNP	-	FEW ROOTS	FEW PEBBLES	-
TU-1	II	-	10 YR 3/3	11 TO 21	SILT	CRUMB	-	MSS MNP	-	FEW ROOTS	-	-
TU-1	III	-	10 YR 3/4	21 - BOE	SILT	CRUMB	-	MSS MNP	-	FEW ROOTS ROOTLETS	FEW COBBLES	B.O.E.

19434

Unit	Layer	Feat.	Color	Apx. Thickness cm	Texture	Structure	Consistency Dry	Consistency Moist	Consistency Wet	Root	Rock	Boundary
TU-1	I	-	10 YR 2/2	0 TO 40	SILT	-	-	MSS MNP	-	FEW	15% BASALT	-
SP-1	I	L	10 YR 2/4	24	SILT	-	-	MSS MNP	-	FEW ROOTLETS	20% BASALT	-
ST-1	II	U	10 YR 3/4	24 TO 78	SILTY LOAM	FIRM BLOCKY	-	MSS MNP	-	FEW ROOTS ROOTLETS	30-40% BASALT	B.O.E.

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

November 30, 1995

Dr. Robert Spear
Scientific Consultant Services, Inc.
711 Kapiolani Boulevard, Suite 777
Honolulu, Hawaii 96813

LOG NO: 15993
DOC NO: 9511PM34

Dear Dr. Spear:

SUBJECT: Revised Report: "Data Recovery Excavations for Sites 50-10-35-19431, 19432, 19433, and 19434, Land of Waiakea, South Hilo District, Island of Hawai'i" TMK: 2-4-57:01

Thank you for your letter of November 17, 1995 concerning our last few remaining questions about the subject report.

In our review of the first draft report we had a number of questions relating to various matters, including the age and use of several sites. The revised report did not address all of the comments and as a result we asked once again that you undertake an analysis of the artifacts from sites 19433 and 19434 to address questions of site age and function. Your letter now indicates that an attempt to carry out a meaningful analysis has occurred. We have learned for the first time that the material has been examined by a number of archaeologists and the samples found to be essentially "non-diagnostic" with respect to age and interpretation of site function, which is an acceptable conclusion to our concern, with the understanding that this point will be included in the report. There is obviously nothing wrong with negative results, but again the report needs to show that some effort was made to reach the kinds of conclusions that you have reached concerning the artifacts from the two sites. A simple description or catalog of finds does not tell us that the artifacts were examined with questions of age and function in mind. What we are getting at here is the need to be more explicit in the future, to describe what kind of analysis has been undertaken and what results were obtained.

With regard to the two other issues in your letter, the explanations you have given in writing and to Patrick McCoy in your meeting on November 17, 1995 are satisfactory.

With the understanding that the report will be revised to contain the information presented in paragraphs two and three of your letter, we can now accept it as adequate. To expedite matters and make it as simple as possible, you can send us a replacement page.

If you have any questions please contact Patrick McCoy (587-0006).

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

PM:amk

APPENDIX C

Traffic Assessment Report

TRAFFIC ASSESSMENT REPORT

COUNTY OF HAWAII
DEPARTMENT OF WATER SUPPLY

PROPOSED OFFICE
AT
KAWILI AND KAPIOLANI STREETS

HILO, HAWAII

Prepared for:

County of Hawaii
Department of Water Supply
&
Roy R. Takemoto, Land Use & Planning Consultant

Prepared By:

Julian Ng, Incorporated
P. O. Box 816
Kaneohe, Hawaii 96744

May 1995

Table of Contents

TRAFFIC ASSESSMENT REPORT

COUNTY OF HAWAII
DEPARTMENT OF WATER SUPPLY

PROPOSED OFFICE AT KAWILI AND KAPIOLANI STREETS
HILO, HAWAII

May 1995

This report summarizes the findings of an assessment of the potential traffic impacts of a proposed office for the County of Hawaii Department of Water Supply in Hilo, Hawaii. The traffic assessment found that, while existing peak period traffic in the area is congested, the duration of peak conditions is limited and the proposed project would have minimal impacts. Improvements such as street widening, which have been identified in other studies to address general growth in traffic demand, would mitigate existing and future traffic congestion in the area.

Existing Traffic Conditions

The proposed project site is located northeast of the intersection of Kawili Street and Kapiolani Street in the Waiakea area of Hilo, Hawaii (Exhibit 1). The site is presently vacant; a convenience store is located to the east at the northwest corner of the intersection of Kawili and Kinoole Streets and to the north, a church is the immediate neighbor along the east side of Kapiolani Street. One of several parking lots for the University of Hawaii at Hilo is located on the opposite side Kapiolani Street, with a driveway located about halfway between Kawili and Lanikaula Streets. Waiakea High School and a small residential area are located south of Kawili Street.

Kawili Street is a two-lane roadway serving traffic traveling between the residential areas in upper Waiakea to the southwest and the commercial and industrial areas closer to Hilo Bay. Kawili Street also provides access to the university and high school. In the vicinity of the project site, paved shoulders which are provided on both sides of the street are designated bike lanes.

The intersection of Kawili and Kapiolani Streets is a signalized cross-intersection; separate left turn lanes are provided on each approach. The northbound approach (driveway from Waiakea High School) has separate lanes for each movement; on other approaches, a single lane is shared by through movements and right turns. The signal operates with eight cycles and left turns are permitted against opposing traffic; the leading protected left turn phases for each approach are activated only when there are more than two vehicles waiting to turn left at the beginning of the approach's green phase. Signal cycles were observed to average less than a minute in the morning peak period.

Field observations also indicate that this intersection is operating below capacity conditions; however, queues on eastbound Kawili Street due to congested conditions at the Kawili and Kinoole Streets intersection prevented full utilization of the Kapiolani intersection for a period of approximately half an hour (7:25 a.m. to 7:55 a.m.).

Kinoole Street and Kilauea Avenue are collector streets between downtown Hilo and the civic center to the north and residential areas to the south; traffic from Puna also use these streets to travel between Highway 11 (Kanoelehua Avenue) and downtown Hilo. Near Kawili Street, Kinoole Street is two lanes wide and Kilauea Avenue is four lanes wide. At their intersections with Kawili Street, which are signalized, turns from Kinoole Street and from Kilauea Avenue are made from lanes shared with the through movement. Separate left turn lanes are provided on Kawili Street at these intersections.

Kapiolani Street is a local two-lane street; the one-block segment of Kapiolani Street that is separated from the remainder of the street to the north serves parking lots for the university and other abutting uses. South of Kawili Street, the primary driveway serving Waiakea High School is opposite Kapiolani Street; a second, in-only, driveway to the high school campus is located off of Kawili Street to the west. The congestion on Kawili Street affected Kapiolani Street on its southbound approach to Kawili Street. At its intersection with Lanikaula Street, northbound Kapiolani Street traffic is controlled by a stop sign; all movements share the single lane approach.

Table 1 summarizes traffic count data taken over the last three years by the State Highways Division[1,2] at the nearest count stations.

Table 1
TRAFFIC COUNTS - KAWILI STREET

	Westbound or Southbound	Eastbound or Northbound	Total
Kawili Street, west of Kilauea Avenue			
July 1994, weekday	4,857	4,911	9,768
AM Peak Hour (7:15-8:15 a.m.)	199	549	748
PM Peak Hour (3:45-4:45 p.m.)	568	377	945
Kawili Street, north of Puainako Street			
June 1992, weekday	4,598	3,496	8,094
AM Peak Hour (7:15-8:15 a.m.)	208	662	870
PM Peak Hour (4:30-5:30 p.m.)	695	186	881
July 1994, weekday	5,623	4,605	10,228
AM Peak Hour (7:15-8:15 a.m.)	381	708	1,089
PM Peak Hour (4:00-5:00 p.m.)	657	278	935

Source: State Highways Division

These counts, however, were taken during the summer, when traffic from the university and high school is less than during most of the year. The morning peak hour coincides with the beginning of school, during which arrivals to the school contribute to the traffic. The end of the school day occurs earlier than the afternoon peak hour, and school traffic has less impact to peak hour conditions. Therefore, the highest hourly traffic volumes are anticipated to occur during the morning peak period while school is in session.

Field observations were made on the morning of Tuesday, March 21, 1995. Turning movements counted at the intersection of Kawili and Kapiolani Streets between 7:00 AM and 8:00 AM are shown in Exhibit 2. School traffic contributed to higher volumes on Kawili Street (1,149 vehicles per hour west and 1,231 vph east of the intersection) than measured during the summer of 1994. Of the 1,768 vehicles counted during the peak hour, 514 entered the intersection in the highest 15-minute period, between 7:30 AM and 7:45 AM. A "peak hour factor" of 0.86 was derived from these counts and used in the analyses; this peak hour factor indicates that a relatively short peak period (a constant volume during the peak hour would be described by the maximum PHF of 1.0). Application of the "Planning Analysis" for signalized intersection as described in the *Highway Capacity Manual 1985*[3] confirmed field observations that the intersection of Kawili and Kapiolani Streets operated at under capacity conditions during this period.

While no turning movement counts were done for the PM Peak Hour, conditions were evaluated by assuming that the traffic at the intersection related to the high school was 15% of those counted for the AM peak period. Volumes for other movements at the intersection were assumed to be equal to the volume counted in the AM peak period for the reverse movement. The Planning Analysis shows under capacity conditions in the PM Peak Hour. The traffic assignment for the PM Peak Hour is also shown in Exhibit 2.

Growth Projections

Traffic in the vicinity of the project site is expected to increase because of growth in the Hilo area. Projections of daily traffic volumes (total two-way) on Kawili Street between Kinoole and Puainako Streets are shown in Table 2.

Table 2
TRAFFIC PROJECTIONS

Kawili Street, between Kinoole and Puainako Streets		Daily Traffic	Source
Long Range Highway Plan (1991):	base year, 1986	7,500	a
	projection for 2010	13,000	a
Ongoing update study:	base year, 1992	8,100	b
	projection for 2020	13,400	c

Sources: a *Island of Hawaii Long Range Highway Plan - Final Report*, May 1991.
b State Highways Division
c unpublished projection, ongoing study by Frederic R. Harris, Inc.

The average increase in traffic using the daily traffic for the base years would be an average growth of 1.3% per year. The growth projected in the study completed in 1991 averages 2.3% per year while the growth indicated in the ongoing study is 1.8% per year. The 1991 study[4] stated that "Kawili Street should be widened to a four-lane arterial roadway between Puainako Street to Kilauea Avenue." The ongoing study has identified Kawili Street, north of Puainako Street as a deficient corridor and listed the addition of two lanes to Kawili Street between Kinoole and Puainako Streets as a potential improvement.[5]

A future traffic assignment that is 10% higher than existing is used in this assessment. At a 1.8% annual rate, a 10% increase in traffic volume would occur by year 2000.

Project Traffic Generation

The proposed project is the relocation of the County of Hawaii Department of Water Supply office from ~~Railroad Avenue~~ the County Building to the site north of Kawili Street between Kapiolani Street and Kinoole Street. The office will house administration, engineering, and fiscal staffs of the department. A total of 47 employees will be located at this site; the office will also have an average of 100 visitors per day, of which approximately three-fourths will be paying water bills and the remainder attending meetings or other appointments with staff members.[6]

The Institute of Transportation Engineers[7] has compiled trip generation data from various studies across America and has developed equations for use in estimating driveway volumes due to different categories of land use. The number of employees (47) was used in equations for the categories "General Office Building" and "Single Tenant Office Building" to estimate traffic due to the office use of the site; however, because of the public service characteristics of the proposed project, the traffic due to visitors was added to the higher of the "office" estimates. Visitors were assumed to arrive one per vehicle, with 10% arriving and departing in each of the peak hours. Table 3 summarizes the traffic estimates.

Table 3
PROJECT TRAFFIC GENERATION

	Average Weekday	AM Peak Hour	PM Peak Hour
General Office Building			
Traffic into site	127	29	6
Traffic out of site	127	4	32
Single Tenant Office Building			
Traffic into site	137	28	5
Traffic out of site	137	4	24
Driveway traffic (larger of above plus visitors)			
Traffic into site	240	39	16
Traffic out of site	240	14	42

The project driveway would connect to Kapiolani Street, near its intersection with Kawili Street. All of the project traffic has been assumed to use the intersection of Kapiolani and Kawili Street. The directions from which this project traffic arrives and the directions in which the site traffic leaves the area were estimated in trip distribution, which was based on the July 1994 State Highways Division counts on roadways approaching the site, and summarized in Table 4.

Table 4
PROJECT TRIP DISTRIBUTION

		Traffic In	Traffic Out
AM Peak Hour:	from / to north or east	64%	80%
	from / to south or west	36%	20%
PM Peak Hour:	from / to north or east	87%	71%
	from / to south or west	13%	29%

Exhibit 3 shows the peak hour traffic assignments at the intersection of Kawili and Kapiolani Streets with the proposed project traffic added to future traffic (existing plus 10%).

Traffic Impact

The additional traffic volumes due to the project were found to be less than six percent of existing volumes on Kawili Street (based on the March 1995 AM Peak Hour count), as shown in Table 5. The highest additional volume in any one direction is 30 vehicles per hour eastbound in the PM Peak Hour. The impact of the proposed office is only a fraction of the "100 *added* vehicle trips in the peak direction (inbound or outbound) during the site's peak traffic hour" suggested by the Institute of Transportation Engineers[8] as a threshold for the need for a traffic study.

Table 5
PROJECT IMPACTS

	AM Peak Hour		PM Peak Hour	
	EB	WB	EB	WB
Kawili Street, east of site	1.7%	4.3%	5.5%	2.8%
Kawili Street, west of site	2.6%	0.5%	0.4%	1.8%

Peak hour conditions at the signalized intersection of Kawili and Kapiolani Streets would remain at under capacity conditions with the addition of the project traffic. Table 6 summarizes the findings of the Planning Analysis for signalized intersections, adding project traffic to existing traffic and adding project traffic to a future volume which is ten percent higher than existing.

Table 6
INTERSECTION CONDITIONS

Kawili and Kapiolani Streets	AM Peak Hour		PM Peak Hour	
	Sum*	Condition	Sum	Condition
Existing Condition (1995)	993	under	803	under
Existing plus project	1,035	under	831	under
Future without project	1,093	under	883	under
Future plus project	1,135	under	911	under

* Sum of Critical Movements at intersection; Conditions determined by criteria: Sum > 1,400 is over capacity, Sum ≤ 1,200 is under capacity,

Movements at the driveway from the site to Kapiolani Street would be similar to that at an unsignalized intersection. The *Highway Capacity Manual 1985* includes an analysis for unsignalized intersections which reports a "Level of Service" based on a comparison of the traffic demand and calculated capacity for each controlled movement. A difference, or "reserve capacity", of less than 100 vehicles per hour would be Level of Service (LOS) E, describing very long delays and near capacity conditions. Each increment of 100 vehicles per hour in reserve capacity represents an improvement of one level of service, with reserve capacities exceeding 400 representing LOS A, or minimal delays. The acceptable condition for unsignalized intersections is LOS D.

The Third Edition[9] of the *Highway Capacity Manual* published in October 1994 presents a revised analysis for unsignalized intersections. In this analysis, average delays for each approach are estimated using demand volumes and capacities. Levels of Service are determined from the delays. Delays exceeding 30 seconds would be LOS E, with each level of service having 10 seconds less delay (LOS A would be 5 seconds or less). The results of these analyses are shown in Table 7.

Table 7
UNSIGNALIZED INTERSECTION ANALYSES

		Existing Volume		Existing + 10%	
		AM	PM	AM	PM
Southbound Kapiolani Street, left turn to driveway					
1985 analysis:	reserve capacity	786	985	754	982
	Level of Service	A	A	A	A
1994 analysis:	average delay (seconds)	3	3	3	3
	Level of Service	A	A	A	A
Shared driveway to Kapiolani Street *					
1985 analysis:	reserve capacity	415	489	380	460
	Level of Service	A	A	B	A
1994 analysis:	average delay (seconds)	8	7	8	7
	Level of Service	B	B	B	B

* a single lane shared by right and left turns

As indicated above, the driveway connection will have adequate capacity. Separate turn lanes would not be needed since Kapiolani Street is a local street on which the average speed is less than 30 miles per hour.

Conclusions and Recommendations

The proposed project will increase traffic demand in an area which is already congested. However, the duration of the existing congestion is less than one hour and is primarily due to traffic related to arrivals at Waiakea High School, located across Kawili Street from the project site.

Because Kawili Street also serves as a primary link between central Hilo and the residential areas to the south, widening of Kawili Street to four lanes has been identified in other studies as an improvement to address the lack of capacity on the street system, even without the proposed project. The analyses showed that the proposed project's contribution is small, being less than 6 percent of existing volumes and only a fraction of the 100 vehicles per hour in the peak direction suggested by the Institute of Transportation Engineers as a threshold for evaluating traffic impacts.

A single driveway to Kapiolani Street would serve the site. The analysis found that this driveway would have adequate capacities for peak hour traffic. The analyses show no need for a separate left turn lane or two-way left turn lane to serve the site. The driveway should be located so that movements in to or out of the site do not interfere with the intersection of Kawili and Kapiolani Streets. A location farther to the north would be desirable to keep the driveway as far away from the intersection as possible; however, existing driveways should be considered in determining the location of the new driveway.

References

1. State of Hawaii Department of Transportation Highways Division. *Traffic Survey Data (Individual Stations), Island of Hawaii, 1994.*

2. State of Hawaii Department of Transportation Highways Division. *Traffic Survey Data (Individual Stations), Island of Hawaii, 1994.*

3. Transportation Research Board - National Research Council, *Highway Capacity Manual*, 1985.

4. Parsons Brinckerhoff Quade & Douglas, Inc. (prepared for State of Hawaii Department of Transportation Highways Division and County of Hawaii, Departments of Planning and Public Works), *Island of Hawaii Long Range Highway Plan - Final Report*, May 1991.

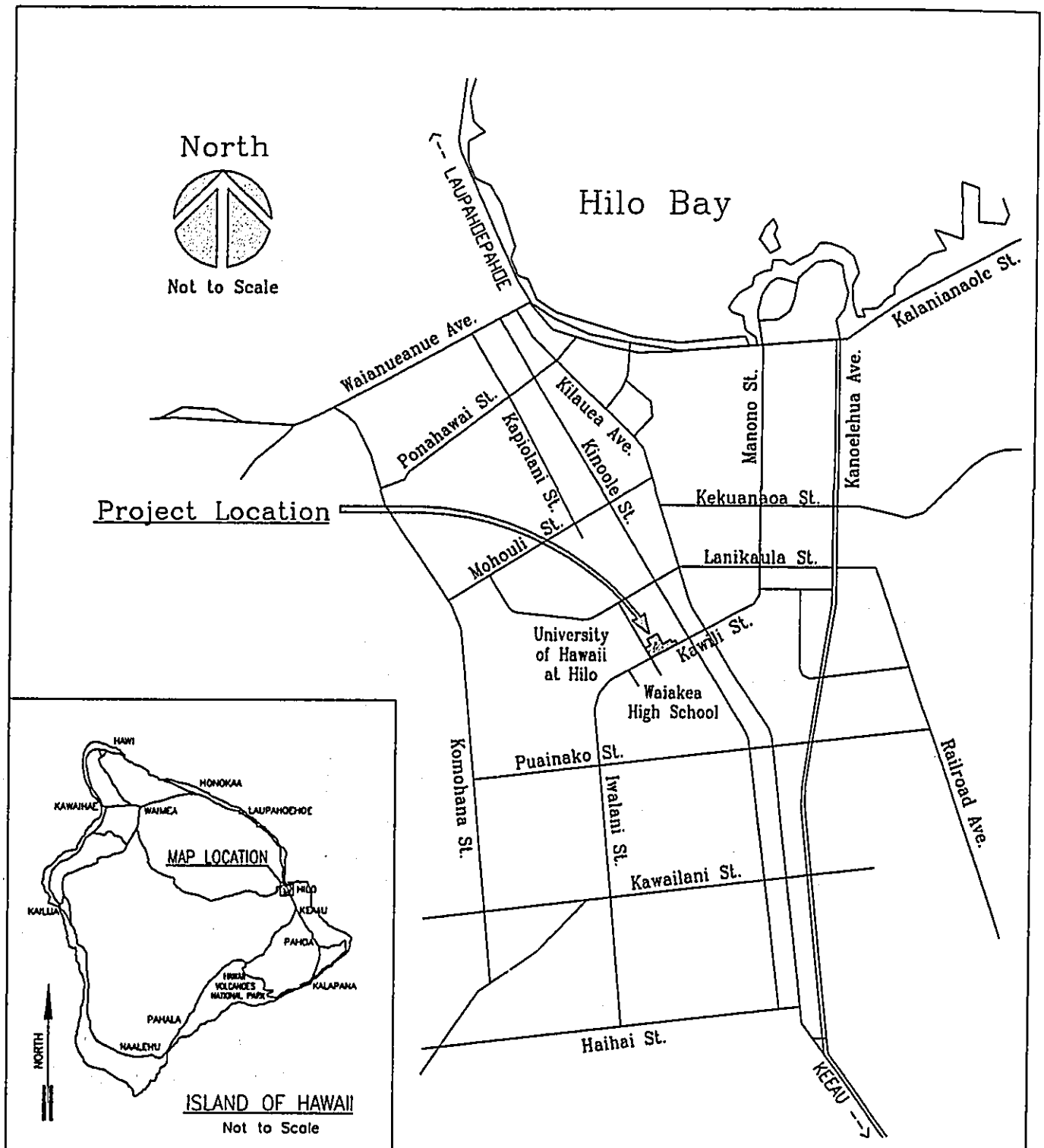
5. Frederic R. Harris, Inc.

6. County of Hawaii, Department of Water Supply.

7. Institute of Transportation Engineers, *Trip Generation, An Informational Report (5th Edition)*, Washington, D. C., 1991.

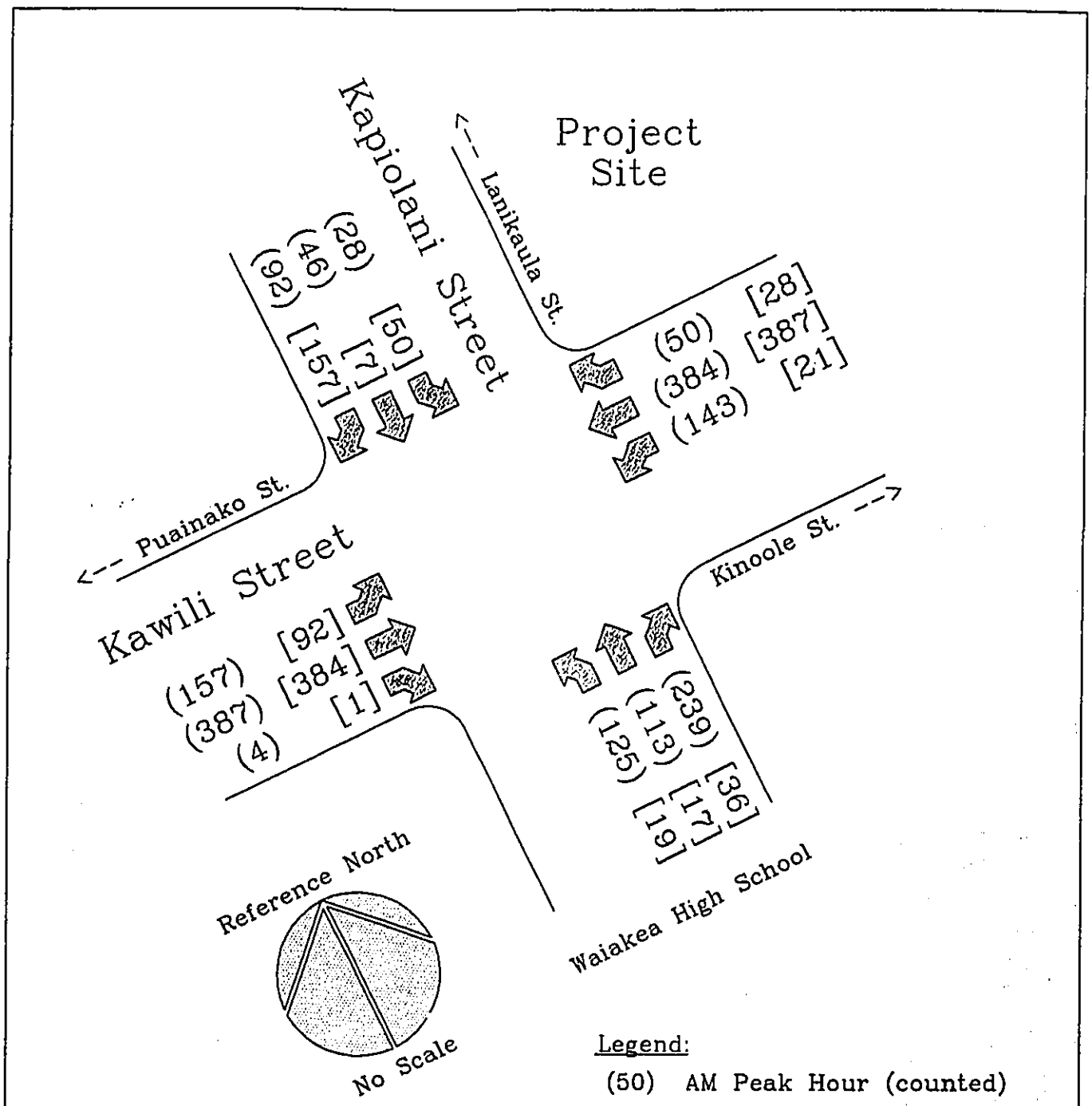
8. Institute of Transportation Engineers, *Traffic Access and Impact Studies for Site Development, A Recommended Practice*, Washington, D. C., 1991. p. 5.

9. Transportation Research Board - National Research Council, *Highway Capacity Manual, Third Edition Updated 1994*, 1994.



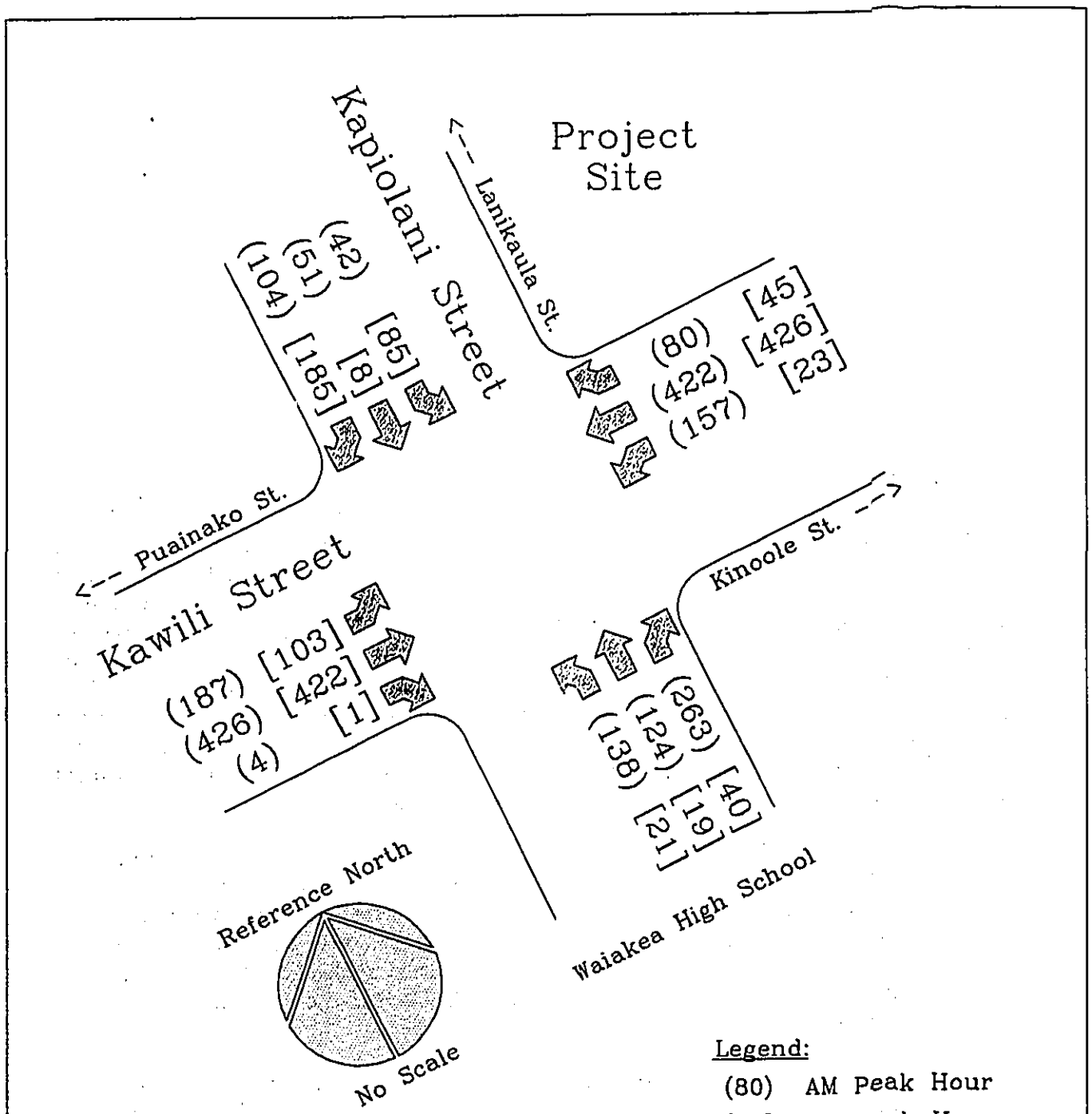
Traffic Assessment County of Hawaii DWS Office	Location Map Hilo, Hawaii prepared by: Julian Ng, Inc. May 1995	Exhibit 1

DWS-NG.SKD
05/04/95



Traffic Assessment County of Hawaii DWS Office	Existing Traffic prepared by: Julian Ng, Inc. May 1995	Exhibit 2

DWS-FIG-SKD
05/04/95



Traffic Assessment County of Hawaii DWS Office	Future Traffic prepared by: Julian Ng. Inc. May 1995	Exhibit 3

DWS-FIG.SKD
05/04/95

Julian Ng, Incorporated
Transportation Engineering Consultant
P.O. Box 816 Kaneohe, Hawaii 96744-0816
phone: (808) 236-4325
fax: (808) 235-8869

November 18, 1995

Mr. Roy R. Takemoto
Land Use Consultant
P. O. Box 10217
Hilo, Hawaii 96721

Subject: Department of Water Supply Office Building
Waiakea, South Hilo, Hawaii

Dear Mr. Takemoto:

We have reviewed the comments on the Draft Environmental Assessment for the subject project that relate to traffic and have the following responses. In general, the comments appear to ignore the finding of the Traffic Assessment that the proposed project's contribution to traffic would be small and that the added vehicles in the area would be only a fraction of the recommended threshold for conducting a traffic impact study. The comments also seem to place the burden of rectifying existing traffic problems on the proposing entity, which is unfair and has no logical basis. Our understanding of the purpose of any environmental assessment and the related studies is that they disclose potential impacts to assist the proposing agency and other agencies in their decision making and future planning, and not to supplant the responsibilities of the agencies charged with operations and maintenance of public facilities. The Traffic Assessment Report was prepared from this perspective, as are the following specific responses:

1. The proposed project could increase traffic volumes at the intersection of Kapiolani and Lanikaula Streets. However, the project impact at this intersection is expected to be less than the "worst-case" impact at the intersection of Kawili and Kapiolani Streets that was described in the traffic report. The project impact is not expected to change the situation at the intersection of Kapiolani and Lanikaula Streets: i.e., whether or not signals are warranted.

2. There are two peak periods in the afternoon in the area. The first in early afternoon is related to the end of the school day at Waiakea High School, as noted in the letter from the Department of Education. The other peak period, which occurs in late afternoon, is caused by commuters. The project impact in either of these hours is expected to be less than during the morning peak period.

3. We do not feel that a traffic impact analysis report needs to be done for this project. The traffic report prepared for the Environmental Assessment should be used as a basis for coordinating the design of the driveway connection to existing streets with the Department of Public Works.

4. The extension of Ululani Street to intersect with Kawili Street, as recommended by the Department of Public Works, would be beneficial to both the project and to circulation in general. If Ululani Street is extended, access to the site could be from Ululani Street and the concerns about Kapiolani Street (see above) would be moot. However, there are some potentially adverse effects of this extension. Because the new intersection of Ululani Street and Kawili Street would be located and designed in accordance with applicable standards, the layout of the project site may be affected. Concerns about increased traffic may be raised by residents on the existing dead-end Ululani Street.

5. The minimum distance for locating a driveway from an intersection is five feet from the point of curvature of the curb return or the radius of the edge of pavement, per the Standard Details adopted by the Department of Public Works, County of Hawaii. However, we recommend that the driveway be located as far away from intersections as possible; however, constraints on the site must also be considered. Given the length of queues that occur on both Kawili and Kapiolani Streets and the size and shape of the site, there does not appear to be any way to avoid some potentially adverse effects.

While we would be happy to conduct the necessary studies to answer all of the concerns raised, including determining if a traffic signal is warranted at the intersection of Kapiolani and Lanikaula Streets and preparing a traffic impact analysis report which would include addressing conditions in the afternoon peak periods, we do not think the cost of these studies (estimated to be $25,000) should be borne by the proposed project because these concerns are due to existing conditions. As indicated in the Traffic Assessment Report, the proposed project's impact is relatively small and a traffic impact study should not be required. If you have any questions or need further information, please contact me at phone (808) 236-4325 or via fax (808) 235-8869.

Sincerely,

JULIAN NG, INC.

Julian Ng, P. E.
President

DWS-1118.DOC

APPENDIX D

COMMENTS & RESPONSES
TO THE DRAFT ENVIRONMENTAL ASSESSMENT

COMMENTS & RESPONSES

The 30-day public review period for the Draft Environmental Assessment (EA) commenced with the June 8, 1995 OEQC Bulletin publication date and ended on July 8, 1995. The Applicant consulted or sent the Draft EA to the agencies listed in §1.2 of the Final EA. Those who sent comments during the 30-day comment period are listed below and copies of the letters are included in this Appendix. Some of the comments were not substantive (i.e., the comments either supported the project, concurred with information presented in the Draft EA, determined the project had no impact on resources within their jurisdiction, or had "no comments"), and therefore did not require a response.

Responses Sent:

A. State
   1. Department of Health
   2. Department of Land and Natural Resources
   3. University of Hawaii at Hilo
   4. Department of Education

B. County
   1. Planning Department
   2. Department of Public Works
   3. Police Department

No Response Necessary:

- Federal
  - U.S. Army Corps of Engineers
  - U.S. Department of the Interior, Fish and Wildlife Services
- State
  - Office of State Planning
  - Department of Accounting and General Services
- County
  - Fire Department

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

LAWRENCE MIIKE
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to

July 14, 1995 95-106/epo

Mr. Roy R. Takemoto
Land Use Planning and Law Consultant
P. O. Box 10217
Hilo, Hawaii 96721

Dear Mr. Takemoto:

Subject: Draft Environmental Assessment (DEA)
Department of Water Supply Office Building
Waiakea, South Hilo, Hawaii
TMK: 2-4-57: 01

Thank you for allowing us to review and comment on the subject project. We have the following comments to offer:

Underground Injection Control (UIC)

1. Project site is above (mauka) the UIC line.

2. Drainage drywells are subject to the UIC permitting process under Hawaii Administrative Rules, Title 11, Chapter 23, "Underground Injection Control."

Any questions may be directed to the UIC program at 586-4258.

Drinking Water

In the Draft Environmental Assessment, Section 3.3.2, "Water System" needs to be reviewed and carefully revised by the Department of Water Supply and its consultant. According to this report, the Hilo Water System is still utilizing a number of surface water sources which have supposedly been terminated.

Any drinking water questions may be directed to Stuart Yamada of the Safe Drinking Water Branch at 586-4258.

Sincerely,

LAWRENCE MIIKE
Director of Health

c: HDHO & SDWB

ROY R. TAKEMOTO
Land Use Consultant
P.O. Box 10217
Hilo, HI 96721
Phone/Fax (808)959-0189

November 20, 1995

Dr. Lawrence Miike, Director
Department of Health
P.O. Box 3378
Honolulu, HI 96801

RE: Draft Environmental Assessment for the Proposed Department of Water Supply Office Building
Waiakea, South Hilo, Hilo (TMK: 2-4-57:por. 01)

Dear Dr. Miike:

Thank you for your comments dated 14 July 1995 on the subject Draft Environmental Assessment. This letter responds to those comments on behalf of the proposing agency, the County of Hawaii Department of Water Supply.

Regarding the Underground Injection Control Permit, we revised the section on "Drainage System" (§3.3.4) in the Final Environmental Assessment to reiterate the applicability of the UIC Permit to drywells. We also revised the section on "Water System" (§3.3.2). As you commented, the Draft EA contained outdated information from the Hawaii County Water Use and Development Plan. All surface water sources for the Hilo Water System have been terminated.

If you have any questions, you may call me at 959-0189 or Gary Kawasaka at the Hawaii County Department of Water Supply (969-1421).

Respectfully,

Roy Takemoto
Consultant

cc: Mr. Gary Kawasaka, Hawaii County Department of Water Supply

BENJAMIN J. CAYETANO
Governor of Hawaii

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. Box 621
Honolulu, Hawaii 96809

Chairperson
MICHAEL D. WILSON
Board of Land and Natural Resources

Deputy Director
GILBERT COLOMA-AGARAN

Aquaculture Development
Aquatic Resources
Boating and Ocean Recreation
Bureau of Conveyances
Conservation and Environmental Affairs
Conservation and Resources Enforcement
Forestry and Wildlife
Historic Preservation
Land Management
State Parks
Water and Land Development

REF:OCEA:KRM

File No.: 95-604

The Honorable Hilton D. Pavao, Director
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo Hawaii 96720

JUL 26 1995

Attention: Gary Kawasaka

Dear Mr. Pavao:

SUBJECT: Draft Environmental Assessment (DEA): Department of Water Supply Office Building, Waiakea, South Hilo District, Hawaii, TMK: 2-4-57: Por. 1

We have reviewed the DEA information for the subject project transmitted by your letter dated June 17, 1995, and offer the following:

Division of Land Management

Our Division of Land Management comments that the subject property is State-owned and will require Board of Land and Natural Resources' approval for conveyance to DWS for the proposed office building.

Division of Historic Preservation

Our Division of Historic Preservation (HPD) comments that significant historic sites important for their information content only, were identified in an archaeological inventory survey of the subject parcel. Data recovery investigations were subsequently carried out to mitigate the adverse effects of the proposed project. The final report on the data recovery work is presently being revised based on comments of a draft report. HPD notes that this has not been approved as of yet, and this fact should be noted as a condition of approval for the proposed project. With this understanding, HPD comments that at this time the building will have a "no adverse effect" on the historic sites at this parcel (since all of the information asked for has been collected and interpreted).

We have no other comments to offer at this time. Thank you for the opportunity to comment on this matter.

Please feel free to contact Steve Tagawa at our Office of Conservation and Environment Affairs at 587-0377, should you have any questions.

Aloha,

Gilbert S. Coloma-Agaran
for MICHAEL D. WILSON

cc: Roy Takemoto
OEQC

ROY R. TAKEMOTO
Land Use Consultant
P.O. Box 10217
Hilo, HI 96721
Phone/Fax (808)959-0189

November 20, 1995

Mr. Michael D. Wilson, Director
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

RE: Draft Environmental Assessment for the Proposed Department of Water Supply Office Building
Waiakea, South Hilo, Hilo (TMK: 2-4-57:por. 01)

Dear Mr. Wilson:

Thank you for your comments dated 26 July 1995 on the subject Draft Environmental Assessment. This letter responds to those comments on behalf of the proposing agency, the County of Hawaii Department of Water Supply.

The Draft EA already recognized that approval from the Board of Land and Natural Resources was required to convey the project site (see §2.1 "Location and Ownership"). However, we revised the Final EA to include this approval in the table that lists pertinent permits and approvals.

The Draft EA contained a draft of the archaeological data recovery report. Since the date of your comment letter, the Division of Historic Preservation has approved the final report. The Final EA contains a copy of the approved report.

If you have any questions, you may call me at 959-0189 or Gary Kawasaka at the Hawaii County Department of Water Supply (969-1421).

Respectfully,

Roy Takemoto
Consultant

cc: Mr. Gary Kawasaka, Hawaii County Department of Water Supply

UNIVERSITY OF HAWAI'I
HILO

June 28, 1995

Roy R. Takemoto
P.O. Box 10217
Hilo, Hawaii 96721

Dear Mr. Takemoto:

Thank you for the opportunity to review the Draft Environmental Assessment for the proposed Department of Water Supply Office Building.

We have no objections to this project and remain supportive of it but do have a concern regarding traffic.

With the project driveway connecting to Kapiolani Street, we would recommend that a review of the existing traffic problems (especially at the Kapiolani and Lanikaula Street intersection) created by students attending both Waiakea High School and the University of Hawaii be addressed in this study.

A probable solution could be the addition of a traffic light at the intersection of Kapiolani and Lanikaula Streets.

Should you have any questions, please feel free to call us.

Sincerely,

Ken Perrin

Kenneth L. Perrin
Sr. V.P. and Chancellor

cc: L. Chih

Office of the Chancellor
200 W. KAWILI STREET
HILO, HAWAI'I 96720-4091
PHONE: (808) 933-3444
FAX: (808) 933-3622

ROY R. TAKEMOTO
Land Use Consultant
P.O. Box 10217
Hilo, HI 96721
Phone/Fax (808)959-0189

November 20, 1995

Mr. Kenneth L. Perrin, Sr. V.P. and Chancellor
University of Hawaii Hilo
200 W. Kawili Street
Hilo, HI 96720-4091

RE: Draft Environmental Assessment for the Proposed Department of Water Supply Office Building
Waiakea, South Hilo, Hilo (TMK: 2-4-57:por. 01)

Dear Chancellor Perrin:

Thank you for your comments dated 28 June 1995 on the subject Draft Environmental Assessment. This letter responds to those comments on behalf of the proposing agency, the County of Hawaii Department of Water Supply.

Your letter expressed concern with the congestion at the intersection of Kapiolani and Lanikaula Streets. As your letter suggested, the congestion is an existing problem caused by the UHH and Waiakea High School students. The proposed project's coniribution to traffic is small, and does not merit placing the burden of rectifying existing problems on the proposing entity. The project could contribute its proportionate fair share to rectify the problem. We will revise the EA to discuss the relative impact of the project on the Kapiolani/Lanikaula intersection.

If you have any questions, you may call me at 959-0189 or Gary Kawasaka at the Hawaii County Department of Water Supply (969-1421).

Respectfully,

Roy Takemoto

Roy Takemoto
Consultant

cc: Mr. Gary Kawasaka, Hawaii County Department of Water Supply

BENJAMIN J. CAYETANO
GOVERNOR

HERMAN M. AIZAWA, Ph.D.
SUPERINTENDENT

PATRICIA BERGIN
DISTRICT SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
OFFICE OF THE DISTRICT SUPERINTENDENT
HAWAII SCHOOL
P.O. BOX 4160
HILO, HAWAII 96720-0160

June 22, 1995

Department of Water Supply
County of Hawaii
Attn: Gary Kawasaka
25 Aupuni Street
Hilo, Hawaii 96720

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE DEPARTMENT OF WATER SUPPLY OFFICE BUILDING WAIAKEA, SOUTH HILO DISTRICT, HAWAII (TMK 3/2-4-57:POR. 1)

Dear Mr. Kawasaka:

The Department of Education's primary concern regarding the assessment for the future construction of the Department of Water Supply Office is traffic control and congestion.

In Section 3.3.1, Roads and Traffic, the study discusses congested conditions at the Kawili and Kinoole Street intersection for approximately half an hour (7:25 am to 7:55 am). Another peak time period would be after Waiakea High School dismisses its students at the end of the day at approximately 2:15 pm. I'm not sure what the duration of the congestion would be, however, there are hundreds of student vehicles parked on or in the vicinity of the school during school days.

This period of congestion would also affect the Kawili and Kapiolani Street intersection.

This comment is provided as an awareness of the congested period because it was not addressed in your study.

Thank you for allowing the Department of Education with an opportunity to review and comment on your draft assessment.

Sincerely,

Horace S. Hara
District Business Specialist

c: Roy R. Takemoto, Consultant

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

ROY R. TAKEMOTO
Land Use Consultant
P.O. Box 10217
Hilo, HI 96721
Phone/Fax (808)959-0189

November 20, 1995

Mr. Horace Hara, District Business Specialist
Department of Education
Office of the District Superintendent
P.O. Box 4160
Hilo, HI 96720-0160

RE: Draft Environmental Assessment for the Proposed Department of Water Supply Office Building
Waiakea, South Hilo, Hilo (TMK: 2-4-57:por. 01)

Dear Mr. Hara:

Thank you for your comments dated 22 June 1995 on the subject Draft Environmental Assessment. This letter responds to those comments on behalf of the proposing agency, the County of Hawaii Department of Water Supply.

Your letter expressed concern with traffic congestion, in particular the congestion occurring during the afternoon peak period when school dismisses. The Final EA will explain that there are two peak periods in the afternoon in the area. The first in early afternoon is related to the end of the school day at Waiakea High School, as noted in your letter. The other peak period, which occurs in late afternoon, is caused by commuters. The proposed project's impact in either of these hours is expected to be less than during the morning peak period. The traffic assessment report concluded that due to the project's small contribution to the traffic, the project's impact under the worst conditions (i.e., the morning peak period) is insignificant.

If you have any questions, you may call me at 959-0189 or Gary Kawasaka at the Hawaii County Department of Water Supply (969-1421).

Respectfully,

Roy Takemoto
Consultant

cc: Mr. Gary Kawasaka, Hawaii County Department of Water Supply

Stephen K. Yamashiro
Mayor

Virginia Goldstein
Director

Norman Olesen
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-8615

July 7, 1995

MEMORANDUM

TO: Milton Pavao, Manager, Department of Water Supply

FROM: Virginia Goldstein, Planning Director

SUBJECT: Draft Environmental Assessment
Department of Water Supply Office Building TMK: 2-4-057: por. 1

The following are our comments on the above referenced draft Environmental Assessment, dated May 1995.

As noted in the draft report, the County Zoning Code allows public and public service buildings in all zoning districts so long as they conform to the General Plan. We have no objections to the proposed new Department of Water Supply office building use.

However, since the Department of Water Supply is proposing to subdivide and use a 4.5-acre portion of the total 11.126-acre site, we suggest that a conceptual plot plan be included in the Report showing the approximate location of the 4.5 acre portion as well as the approximate building site and driveway access. A brief narrative describing the conceptual plot plan would also be appropriate.

Thank you for this opportunity to comment on the draft Environmental Assessment. Please contact Ann Usagawa of this office at 961-8288 if you should have any questions.

AU:au
dwsca.au

cc: Gary Kawasaka, Department of Water Supply
Roy Takemoto

ROY R. TAKEMOTO
Land Use Consultant
P.O. Box 10217
Hilo, HI 96721
Phone/Fax (808)959-0189

November 20, 1995

Ms. Virginia Goldstein, Director
Planning Department
25 Aupuni Street, Room 109
Hilo, HI 96720-4252

RE: Draft Environmental Assessment for the Proposed Department of Water Supply Office Building
Waiakea, South Hilo, Hilo (TMK: 2-4-57:por. 01)

Dear Ms. Goldstein:

Thank you for your comments dated 7 July 1995 on the subject Draft Environmental Assessment. This letter responds to those comments on behalf of the proposing agency, the County of Hawaii Department of Water Supply.

Your comment requested a conceptual plot plan. The EA was prepared as a prerequisite for the Board of Land and Natural Resources to consider conveyance of the site. Because the State's approval to use the site is still very uncertain, the time and expense to prepare a conceptual plan was not deemed feasible at this time. The project was described in sufficient detail to evaluate potential impacts. If you believe the EA did not address certain impacts due to the lack of a plot plan, we will revise the EA to incorporate a plot plan and reevaluate the impacts accordingly. Otherwise, physical design of the project will not commence until DWS receives the State's approval to use the site. The Planning Department will have an opportunity to review the design at Plan Approval.

If you have any questions, you may call me at 959-0189 or Gary Kawasaka at the Hawaii County Department of Water Supply (969-1421).

Respectfully,
Roy Takemoto
Roy Takemoto
Consultant

cc: Mr. Gary Kawasaka, Hawaii County Department of Water Supply

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII
HILO, HAWAII

DATE : June 28, 1995

Memorandum

TO : Gary Kawasaka, Engineering Division Head
Department of Water Supply

FROM : Galen M. Kuba, Acting Division Chief
Engineering Division

SUBJECT : DRAFT ENVIRONMENTAL ASSESSMENT
Department of Water Supply Office Building
Waiakea, South Hilo, Hawaii
TMK: 2-4-57: por 01

We have reviewed the subject report and our comments are as follows:

1. Building construction shall conform to all requirements of code and statutes of the County.

2. All development generated runoff shall be disposed on site and shall not be directed toward any adjacent properties.

   The applicant shall be informed that if drywells are included in the subject improvements, an Underground Injection Control (UIC) permit must be applied for from the Department of Health, State of Hawaii.

3. All earthwork and grading shall be in conformance with Chapter 10, Erosion and Sediment Control, of the Hawaii County Code.

4. Any work within the County right-of-way shall be in conformance with Chapter 22, Streets and Sidewalks, of the Hawaii County Code.

5. Sewer line connections shall conform to the rules and regulations of the County of Hawaii, Wastewater Division.

6. A solid waste management plan shall conform to the rules and regulations of the County of Hawaii, Solid Waste Division.

7. A traffic impact analysis report should be done to enable proper design of roadway improvements.

8. Roadway improvements should be provided along the frontage, and at the intersection of Kapiolani and Kawili Streets, meeting with the approval of DPW.

9. Ululani Street should be constructed and connected to the existing stubout accessing onto Lanikaula Street, to provide an alternate route.

Should there be any questions concerning this matter, please feel free to contact Mr. Casey Yanagihara in our Engineering Division at 961-8327.

CKY

cc : Planning Department
✓Roy R. Takemoto, Esq.

ROY R. TAKEMOTO
Land Use Consultant
P.O. Box 10217
Hilo, HI 96721
Phone/Fax (808)959-0189

November 20, 1995

Mr. Galen Kuba, Acting Division Chief
Engineering Division
Department of Public Works
25 Aupuni Street
Hilo, HI 96720

RE: Draft Environmental Assessment for the Proposed Department of Water Supply Office Building
Waiakea, South Hilo, Hilo (TMK: 2-4-57:por. 01)

Dear Mr. Kuba:

Thank you for your comments dated 28 June 1995 on the subject Draft Environmental Assessment. This letter responds to those comments on behalf of the proposing agency, the County of Hawaii Department of Water Supply.

The Final EA was revised to incorporate your comments as follows:

1. The list of permits (Table 1) will include the grading permit and County approval for work within the right-of-way.

2. A traffic impact assessment report was prepared as part of the EA. This report concluded that the project's contribution to traffic would be small and that the added vehicles in the area would be only a fraction of the recommended threshold for conducting a traffic impact study. The traffic report prepared for the EA should be used as a basis for coordinating with your department the design of the driveway connection to existing streets.

3. The zoning map does not show Ululani Street extending to Kawili Street. Although the extension would improve circulation, the road would bisect the site and considerably reduce the buildable area. When the design team for the project is retained, we will arrange a meeting with your department to discuss all required improvements, including the Ululani Street extension, frontage improvements, and intersection improvements.

If you have any questions, you may call me at 959-0189 or Gary Kawasaka at the Hawaii County Department of Water Supply (969-1421).

Respectfully,

Roy Takemoto
Consultant

cc: Mr. Gary Kawasaka, Hawaii County Department of Water Supply

Stephen K. Yamashiro
Mayor

Wayne G. Carvalho
Police Chief

James S. Correa
Deputy Police Chief

County of Hawaii
POLICE DEPARTMENT
349 Kapiolani Street Hilo, Hawaii 96720-3998
(808) 961-2244 Fax (808) 961-2389

June 27, 1995

TO : MILTON PAVAO, MANAGER, DEPARTMENT OF WATER SUPPLY

ATTN : GARY KAWASAKA, ENGINEERING DIVISION HEAD

FROM : WAYNE G. CARVALHO, POLICE CHIEF

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE DEPARTMENT OF WATER SUPPLY OFFICE BUILDING, WAIAKEA, SOUTH HILO DISTRICT, HAWAII, TAX MAP KEY: 2-4-57:POR. 1

This is in response to Mr. Roy R. Takemoto's letter of June 17, 1995, relating to the above-mentioned Draft Environmental Assessment.

We agree that the location of the project driveway will be a critical factor in the traffic flow pattern.

Even if placed at the northeast corner of the parcel, the driveway will still be close enough to Kawili Street to adversely affect traffic at that intersection.

At the same time, we do not agree with the assumption, "All of the project traffic (will) use the intersection of Kapiolani and Kawili Street."

Certainly, some of the motorists will use the Kapiolani/ Lanikaula streets intersection, which is not signalized. Further, Kapiolani Street is narrow and highly traveled, especially during school hours.

Finally, the paved shoulders along Kawili Street serve also as pedestrian walkways for students traveling between Hilo College and the Community College.

Any widening of the roadway which eliminated these paved shoulders would result in other problems.

EO

cc: Mr. Roy R. Takemoto, Consultant ✓

ROY R. TAKEMOTO
Land Use Consultant
P.O. Box 10217
Hilo, HI 96721
Phone/Fax (808)959-0189

November 20, 1995

Mr. Wayne Carvalho, Police Chief
Police Department
349 Kapiolani Street
Hilo, HI 96720-3998

RE: Draft Environmental Assessment for the Proposed Department of Water Supply Office Building
Waiakea, South Hilo, Hilo (TMK: 2-4-57:por. 01)

Dear Chief Carvalho:

Thank you for your comments dated 27 June 1995 on the subject Draft Environmental Assessment. This letter responds to those comments on behalf of the proposing agency, the County of Hawaii Department of Water Supply.

The Final EA section on "Roads and Traffic" (§3.3.1) was revised to address your concerns as follows:

1. The minimum distance for locating a driveway from an intersection is five feet from the point of curvature of the curb return or the radius of the edge of pavement, in accordance with the Standard Details adopted by the Department of Public Works. The traffic engineer recommended that the driveway be located as far away from the intersection as possible. Given the length of queues that occur on both Kawili and Kapiolani Streets and the site constraints, there does not seem to appear to be any way to avoid some potentially adverse impacts especially during the peak periods.

2. The congestion at the Kapiolani/Lanikaula intersection is an existing problem caused by the UHH and Waiakea High School students. The proposed project's contribution to traffic is small, and does not merit placing the burden of rectifying existing problems on the proposing entity. The project could contribute its proportionate fair share to rectify the problem. We will revise the EA to discuss the relative impact of the project on the Kapiolani/Lanikaula intersection.

3. Although the County has long-term plans to widen Kawili Street, that widening project is not within the scope of the proposed project. Nevertheless, the County's Bikeway Plan adopted by the County Council in 1979 (Ord. No. 435) designates Kawili Street as a route for bike lanes. Bike lanes located within or adjacent to the shoulders will preserve the wider shoulders presently enjoyed by pedestrians along Kawili Street.

If you have any questions, you may call me at 959-0189 or Gary Kawasaka at the Hawaii County Department of Water Supply (969-1421).

Respectfully,

Roy Takemoto
Consultant

cc: Mr. Gary Kawasaka, Hawaii County Department of Water Supply

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

July 14, 1995

Planning Division

Mr. Gary Kawasaka
County of Hawaii
Department of Water Supply
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Kawasaka:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Department of Water Supply Office Building located at Waiakea, South Hilo, Hawaii (TMK 2-4-57: por. 1). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. Based on the information provided, a DA permit will not be required for the project unless it affects streams, wetlands, or other waters of the U.S.

b. The flood hazard information provided on page 7 of the draft environmental assessment is correct.

Sincerely,

Ray H. Jyo, P.E.
Director of Engineering

Copy Furnished:

Mr. Roy Takemoto
P.O. Box 10217
Hilo, Hawaii 96721

United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS OFFICE
500 ALA MOANA BLVD, SUITE 3-580
HONLULU, HI 96813
tel:(808) 541-3441 fax:(808) 541-3470

IN REPLY REFER TO: AAP

Mr. Gary Kawasaka
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

JUN 2 8 1995

Re: May 1995 Draft Environmental Assessment (DEA) for the Department of Water Supply Office Building Waiakea, South Hilo District, Hawaii (TMK3/2-4-57:Por.1)

Dear Mr. Takemoto:

The U.S. Fish and Wildlife Service (Service) has reviewed the May 1995 DEA to construct an office building in Waiakea, Hawaii, Hawaii. The proposing agency, the County of Hawaii Department of Water Supply (DWS), will provide office space for 47 administrative, engineering, and fiscal staff employees. The proposed site will occupy 1.8 hectares (4.5 acres) of a 4.5-hectare (11-acre) state-owned parcel. The Service offers the following comments for your consideration.

The Service does not anticipate significant adverse impacts to fish and wildlife resources to result from construction of the proposed DWS office building. The project site lacks wetland areas and rare, threatened, or endangered species. Therefore, the Service has no objections to the proposed project.

We appreciate the opportunity to provide these comments. If you have any questions regarding these comments, please do not hesitate to contact Fish and Wildlife Biologist Arlene Pangelinan at 808/541-3441.

Sincerely,

Brooks Harper
Field Supervisor
Ecological Services

cc: Land Use Planning & Law Consultant

OFFICE OF STATE PLANNING
Office of the Governor

MAILING ADDRESS: P.O. BOX 3540, HONOLULU, HAWAII 96811-3540
STREET ADDRESS: 250 SOUTH HOTEL STREET, 4TH FLOOR
TELEPHONE: (808) 587-2846, 587-2890

BENJAMIN J. CAYETANO, Governor

FAX: Director's Office 587-2848
Planning Division 587-2824

Ref. No. C-1296

June 23, 1995

Mr. Gary Kawasaka
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Kawasaka:

Subject: Draft Environmental Assessment for the Department of Water Supply Office Building, Waiakea, South Hilo District, Hawaii

We have reviewed the draft environmental assessment (DEA) for the County of Hawaii's Department of Water Supply Office Building and do not have any substantive comments to offer. The DEA satisfactorily addresses our program interests.

We appreciate the opportunity to review and comment.

Sincerely,

Gregory G.Y. Pai, Ph.D.
Director

cc: Mr. Roy Takemoto

(P)1474.5

JUN 30 1995

Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Attention: Mr. Gary Kawasaka

Gentlemen:

Subject: Department of Water Supply Office Building
Waiakea, South Hilo District, Hawaii
TMK 3/2-4-57:Por. 1
Draft Environmental Assessment

Thank you for the opportunity to review the subject document. We have no comments to offer.

If there are any questions, please have your staff contact Mr. Ralph Yukumoto of the Planning Branch at 586-0488.

Very truly yours,

GORDON MATSUOKA
State Public Works Engineer

RY:jy
cc: Mr. Roy Takemoto

Stephen K. Yamashiro
Mayor

Nelson M. Tsuji
Fire Chief

Edward Bumatay
Deputy Fire Chief

County of Hawaii
FIRE DEPARTMENT
466 Kinoole Street • Hilo, Hawaii 96720-2983
(808) 961-8297 • Fax (808) 961-6920

June 20, 1995

To: Department of Water Supply
Attention: Gary Kawasaka

From: Nelson H. Tsuji, Fire Chief

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE DEPARTMENT OF WATER SUPPLY OFFICE BUILDING, WAIAKEA, SOUTH HILO DISTRICT, HAWAII (TMK: 3/2-4-57:POR. 1)

We have no comments on the above-referenced draft environmental assessment which was forwarded to us for review by Roy R. Takemoto,. Land Use Planning and Law Consultant.

NELSON H. TSUJI
Fire Chief

NHT/mo

cc: Roy Takemoto