



JOSEPH KENNEDY
Archaeologist

ARCHAEOLOGICAL CONSLS
of
HAWAII

59-624 Pupukea Rd.
Haleiwa, Hawaii 96712
(808) 638-7442

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Mr. Alan Kawada
True Mid Pacific Geothermal
Central Pacific Plaza Suite 868
220 South King
Honolulu, Hawaii 96813

October 26, 1990

Dear Mr. Kawada:

This letter addresses the concerns of the State Historic Preservation Office, their comments concerning my report of September 6, 1990 and the findings of our additional survey work conducted approximately two weeks ago.

INTRODUCTION AND PHYSICAL SETTING

At the request of your office, Archaeological Consultants of Hawaii, Inc. has conducted an inventory survey at the site of the proposed Kilauea Middle East Rift Zone (KMERZ), Well Site #2, TMK: 1-2-10:3. An additional inventory survey was conducted to encompass a 1,000 foot buffer zone around the site of the proposed Well Site #2. This proposed well site is located in the Wao Kele O Puna Forest, Island of Hawaii (see maps #1 and 2).

The subject property features an extremely rugged topography and an unusually thick vegetative profile which combine to present some of the most difficult survey areas in the state. A thick mat of stony muck rests on what appears to be alternating a'a and pahoehoe and is covered with very dense uluhe, 'ie'ie, hapu'u, guava, ohia and a number of additional plants, vines and grasses. The reader may wish to refer to the numerous and recently completed botanical studies of this area for a more complete listing.

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PURPOSE OF WORK

A variety of archaeological sites may be expected in the vast forest lands where True/Mid-Pacific Geothermal Venture will be conducting its geothermal exploration activities. Although the sites' distribution generally will be sparse and although most project activities may well miss the sites, it is important to have adequate plans to identify historic sites, so the sites can be avoided or appropriately mitigated. Special identification problems exist in forest lands, and for this reason an archaeological research design for archaeological survey methods was required under CDUA HA-1830 as part of an archaeological plan.

PREHISTORIC AND EARLY HISTORIC LAND USE IN THE PROJECT AREA AND ANTICIPATED HISTORIC SITES

Historic and archaeological research in this area as well as in other similar environmental zones on Hawaii Island, indicate that prehistorically such areas were used for:

1. Forest product exploitation. Bird feathers, timber, vines, etc. were collected in the forests at or near worksites, and campsites were nearby. These sites should be scattered around much of the project area, in low densities for any one point in prehistory.
2. Burial. These sites are expected to be focused in certain areas.
3. Major inland trails across many ahupua'a and associated campsites. These sites should be focused in linear corridors.
4. Agriculture in the seaward-most reaches. These sites may tend to be fairly dense but they will again be in a small part of the project area, in the seaward portions.

Archaeologically, the sites should have the following characteristics:

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MAP 1

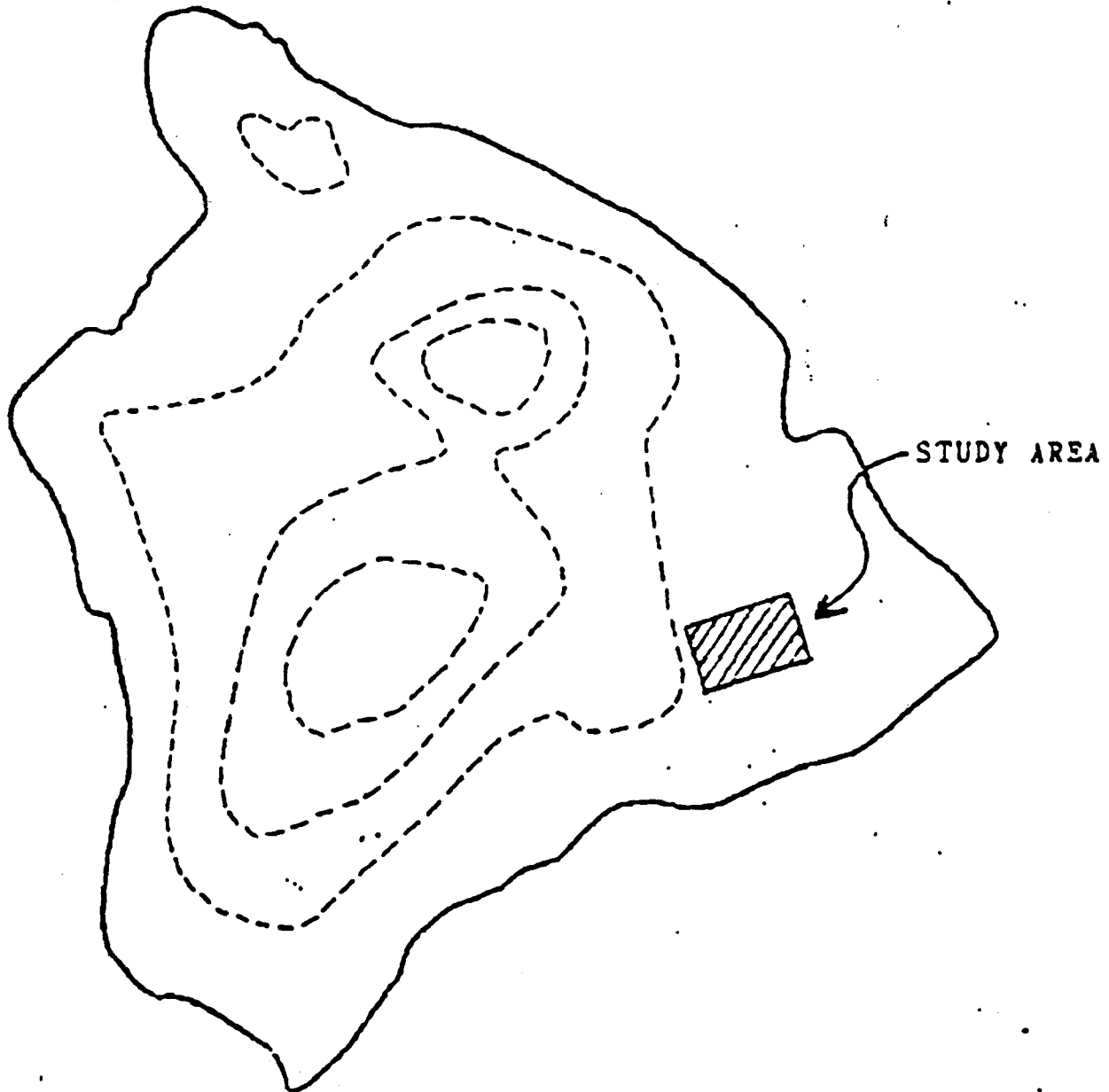


FIGURE 1

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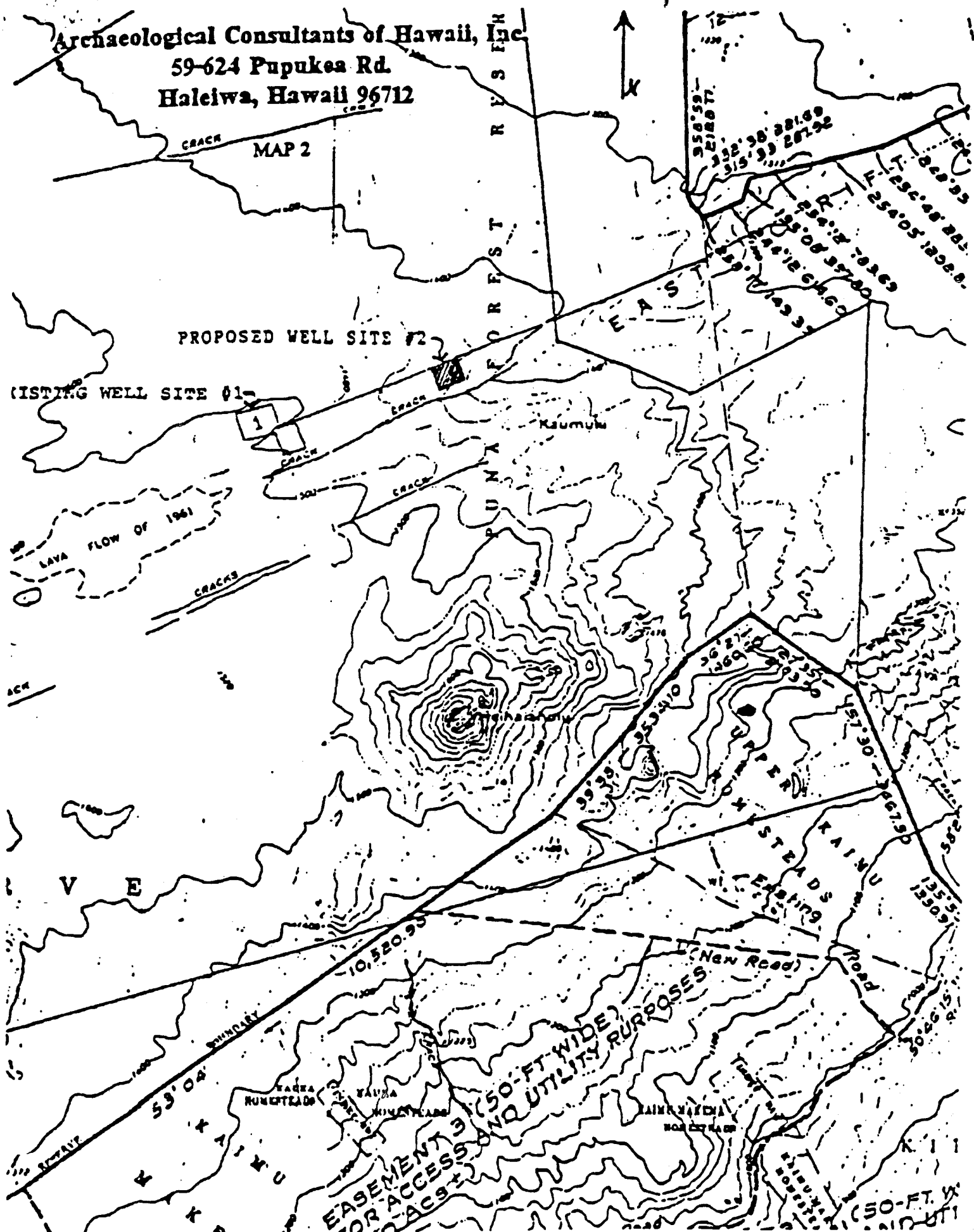


FIGURE 2

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1. Forest exploitation sites. Probably there will be no surface stone architecture (huts and shelters likely were simply pole and thatch). Some campsites will be in caves. Each site may be a small scatter of flaked stone, broken tools, food remains (bone, shell), and firepits. If repeated use occurred, then the density of remains would be greater. Such campsites are documented in caves in forest areas. Such cave campsites have yielded a great deal of important information on the age of use of an area, on birds and plants collected. etc. Campsites and exploitation sites have yet to be documented in open-air context, and in such cases, they are expected to primarily be subsurface, buried sites.
2. Burials. Burials in forest areas have been identified in two forms --burials in caves (often caves also used as campsites) and in stone platforms and pavings on cinder cones. These sites contain important information on age of permanent occupation in an area, on social organization, on health, on demography. Additionally, they are highly significant sites culturally for native Hawaiians.
3. Trails. Trails in forest areas are expected to be extremely difficult to identify, as worn paths and cuts through the forest will have been covered over by later sediments and by forest regrowth. On bare a'a flows, there will be some visible features -- e.g., crushed paths, stepping stones. Campsites along the trails should have firepits, food remains, and some scattered artifacts. Some campsites may have been in caves, but others will have been open-air camps, and may have no surface architecture and be buried like the forest exploitation camps. Trails and their associated campsites can tell us a great deal about the nature of different time periods of travel across regions. Trails also provide information on items being carried or exchanged.
4. Agricultural sites. These sites commonly have some kind of stone-work --small oval clearings lined with stones, small terrace lines, walls, etc. These sites contain important chronological information on permanent settlement of an area, population expansion, and agricultural expansion.

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SITE IDENTIFICATION PROBLEMS

Common archaeological surface survey (labelled reconnaissance survey, intensive survey, etc.) can identify cave sites used for forest exploitation and/or burial, can identify agricultural sites, and can identify trails on bare a'a flows. However, cave sites are only expected in older pahoehoe areas, not on a'a flows and not in recent pahoehoe areas. Platform and paving burial sites are expected to be restricted to cinder cones. Agricultural sites will be at lower, seaward elevations in areas with soil. This means that a'a flows and recent pahoehoe flows are not expected to include sites unless there is a visible trail remnant.

The open-air sites in forest areas -- trail sites (and there associated camps) and forest exploitation sites (not in caves) -- will likely be subsurface. They will also be small. Common surface survey will not be able to identify these sites when they are subsurface. These sites are expected in soil areas within kipuka, and on old pahoehoe flows, and on older a'a flows lacking rough surfaces. These sites may be surface remains on bare lava in kipuka, on old pahoehoe flows and on older a'a flows lacking rough surfaces and in such a case common surface survey could identify them; but it appears unlikely that these sites will be found on the surface.

They are not anticipated on rough a'a flows (except rare trails) or on recent pahoehoe or a'a flows. The above problems indicate two special conditions for site identification;

1. Some areas appear not to need survey. - - e.g., rough a'a flows and recent lava flows (post 1880 flows whether pahoehoe or a'a) these areas need to be identified and be clearly marked off as areas needing no archaeological work.
2. Soil areas may contain subsurface exploitation and trail related sites. Special archaeological approaches need to be devised for these areas to try and identify these sites.

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BACKGROUND PREPARATION; FINDINGS

1. Check of historic and archaeological literature. The historic literature (Holmes 1985) shows no recorded trails in the project area. The Wilkes route of 1840 (see map number 3) passes to the south of the project area and the Kaimu Trail, approximately .75km to the south skirts south of Heiheiiahulu. The existence of the existing Kaimu Trail lowers the probability of an additional trail passing through the study area but increases the possibility that the area was accessed prehistorically.

Previous archaeological surveys done in the general area include Bonk (1990) Haun and Rosendahl (1985). Bonk did not locate cultural materials, Haun and Rosendahl identified possible prehistoric Hawaiian burial structures and remnant cultigens of ki, and kukui. The structures were located on the southeast summit of Heiheiiahulu located to the southeast of the project area.

2. Identification of older bare pahoehoe flows, soil covered pahoehoe and a'a flows, kipuka and cinder cones and the project area. Holmes' (1985) map of lava flows (see map #4) indicates that the project area is at the north extreme of an 1800's flow with a 750 to 1,000 BP flow north of the site. A recent 1961 flow occurred approximately 1 km to the west of the site. There is just one cinder cone in the vicinity which is located well outside the project area to the north.

3. Identification of cultigens. No aerial photographs were made available to us and hence we cannot offer any aerial interpretations of vegetation areas. However, we did not observe any cultivated plants such as banana, ti, or kukui in the research area.

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ARCHAEOLOGICAL SURFACE SURVEY: FINDINGS

1. Caves. The pahoehoe portions of the subject property featured numerous inflated dome type caves - in every case, these were found to be very shallow and devoid of any cultural indications. The largest cave observed was no more than 2 meters wide, approximately 3/4 meter high and 2 meters in depth. In comparison, the smallest cave observed was 1/2 meter wide by 1/2 meter high and 1 meter deep. The property also features a number of cracks. The smallest being one foot wide, three feet long and two feet deep. The largest is roughly 100 feet long, twenty feet wide with depths ranging between 25 and 40 feet. There is a cave entrance at the bottom of the largest crack, however, the area is very unstable, with loose, rotting, rock and debris making even a rappelling exercise treacherous to the point of foolishness. There were no cinder cones within the project area.

2. Kipuka Pahoehoe. There were no kipuka observed within the boundaries of the project area.

3. [REDACTED] The Kaimu trail and the Wilkes expedition trail passed east-west approximately 3/4 to 1km to the south of the project area. The proximity of the Hawaiian trail suggests that an additional trail paralleling this one would be unlikely. However, the proximity may have increased the likelihood of prehistoric access to the project area.

4. Reconnaissance Survey: Methodology. A walkthrough reconnaissance survey was completed for the area identified as two proposed well pads (referred to as A and B on figure #4), the proposed well site #2, and an accompanying 200 foot buffer zone. A second walkthrough reconnaissance survey was completed for a buffer zone of 1,000 feet around the proposed well site described above. In other words, the second survey extended the buffer zone an additional 800 feet.

The first survey area was located primarily on the south side of the main entrance road, extending toward the east rift zone. The second survey area for the buffer zone took us into that property which lies south of the entrance road and the north side of the road.

Our initial survey was completed by two individuals who worked for two full days ten hours per day. The second survey was completed by the same two individuals and one assistant for cutting trails and tape measuring. The team worked five hours a day for three days.

The survey team for the initial survey cut a series of four access corridors into the south portion of the property. These extended in a southerly direction toward the east rift zone, at approximate right angles to the main entrance road. Another trail, probably established by Island Survey, provided additional access midway between the corridors established by the ACH team. The team also cut an access corridor at a right angle to the four southerly extending corridors, in the easternmost explorable area. (Please refer to Figure #4).

The survey team for the second survey cut a series of six additional access corridors; two were cut at intervals of 600 feet and 1000 feet on each side of the well pads. These four corridors extended in an easterly direction toward the rift zone. The remaining two corridors were cut into the forest on the north side of the road, 1000 feet out from the corners of the well pads. The team also explored the feasibility of adding another corridor directly opposite the well pads to the north, but surface conditions were deemed too hazardous to continue. (Again, please refer to Figure #4).

These corridors provided a sweep framework for the survey area. We estimate that visual assessment of surface conditions was maintained for a width of no more than twenty feet to each side of each corridor, whose width is estimated to be approximately ten feet, or the average distance between the two team members as they traveled the corridor.

The entire area surveyed is comprised of bog and swamp, dominated by a mixed mesic-type rainforest of 'ohi'a, hapu'u, Kilauea hepyotis, and assorted epiphytic vegetation such as mosses, ferns, and 'ala'alawainui. The majority of 'ohi'a appears to be stunted, probably a result of the boggy conditions. Included to a lesser degree are 'akala, guava, waiawi, 'ie'ie, maile, mamaki, kolea, assorted gingers (mostly 'awapuhi), occasional fleabane, bamboo orchid, iris and lobelia. The roadway bulldozer push (approximately 25 feet on either side) consists mostly of fleabane, mamaki, 'akala, bamboo orchid, iris, guava, a species of melastoma candida, and other exotics.

The land mass appears to be mostly pahoehoe, deduced indirectly by the smoothness of the surface and poor drainage conditions of this surface. Small outcrops of a'a were also observed. The pahoehoe is covered with either mud and water, mosses, or a mixture of all three. The mud, soil, and decayed vegetation occurred at a depth of approximately one foot. The mud areas have all been used extensively by pigs, as is evidenced by rooting digging, and chewed hapu'u. In areas in which there are fallen 'ohi'a and/or hapu'u, there are few, if any, caves of any consequence or size. Another observation was the lack of birds. We encountered only a few cardinals, a few finches or sparrows (limited visibility hampered identification). Notably absent is the presence of mongoose.

FINDINGS IN GENERAL

Based on the direct observation of surface conditions along the sweep framework corridors, and on the evaluation of understory and canopy type along the periphery of these corridors, we conclude the following:

Mud, water, and thick accumulations of rotting vegetation prevented any direct contact with bare lava surfaces. The similarity between understory and canopy along the sweep corridor and that which was observed within an approximate 100' periphery leads us to conclude that surface conditions are the same in these outer areas as they are where we could see them directly. Therefore, the percentage of the study area underlain by pahoehoe and a'a, apparent differences in flow age and the distribution of these differences cannot be known at this time.

The large cracks described earlier presented a hazard in all the corridor areas thus far established. However, in both the vicinity of the rift zone and the entire northwestern section of the buffer zone, deep cracks, steep slopes, and obscuring vegetation presented such extreme hazard that additional sweep corridors could not be established. The flatter northeast section of the buffer zone, as was determined from observations off the northeast corridor and the midsection probe, revealed the swampiest conditions encountered over the entire property, and plans for additional corridors were similarly abandoned.

No cultural indicators were located within the buffer area.

FINDINGS FOR WELL SITE AREA #2

No cultural indicators were located within the well site impact area. There were no sightings of any cultigens such as ki, banana, kukui, within the well site area.

DISCUSSION AND RECOMMENDATIONS

The prediction and identification of temporary forest shelter sites used hundreds of years ago by small groups such as bird feather collectors will be extremely difficult. The illusive temporary campsites in this upland forest area can be expected to be either buried, random, or so lacking in diagnostic materials that archaeological identification and data recovery may be impossible or impractical unless camp sites used seasonally over many years are encountered. Hypothetically, two types of campsites may be possible in this area, a short term, one-time-used camp site or campsites which were set up along established travel routes and used year after year.

Presumed campsites have been found in lava tubes in forested areas on Campbell Estate Land. However, because no campsites have been identified, to date, in upland forests, our predictive model continues to be based on a shallow data base.

Archaeological monitoring of soil covered areas after initial grading and grubbing. We feel that a need for some form of monitoring during initial phases of grubbing and grading is important. Monitoring is recommended because of the known presence of lava tubes in the general area; to monitor the possibility that a bulldozer will hit a tube, particularly along the access roads where the surrounding area was not surveyed as comprehensively as the project area and accompanying buffer. In addition, Archaeologists will be "on-call" if the 7-1/2 inch drill bit hits an "air void" indicating the possible presence of a cave. At that time, work will stop, the drill bit removed to facilitate the insertion of a fiber optic device to examine the void for

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cultural materials. Also, as a special effort to try and identify subsurface remains of trail and forest exploitation, campsites and forest exploitation working areas, this monitoring should occur. It shall only be done in soil areas. The cuts made during grubbing and grading will be inspected to see if these sites can be identified.

The highest likelihood for locating and identifying campsites in the project area will be during the monitoring of vegetation clearing and earth moving. The presence of features such as developed stratigraphic layers, perishable midden accumulations (charcoal and lithic debris) and foundation outlines, should they exist within the project area, will best be tested during this next phase. In this case, standard excavation methods will be applied.

If there are any questions regarding this report, please feel free to contact us.

Aloha,


Joseph Kennedy
Consulting Archaeologist

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