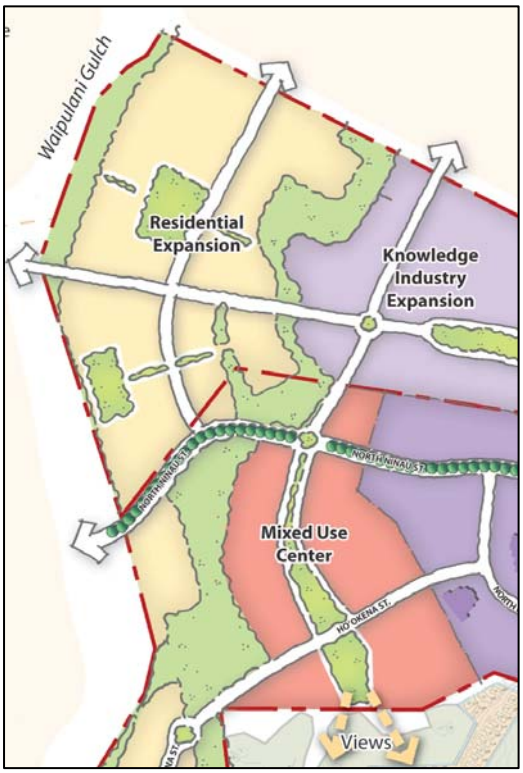
Environmental Impact Statement Preparation Notice

MAUI RESEARCH & TECHNOLOGY PARK
MASTER PLAN UPDATE
PART 4



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Accepting Authority:
Land Use Commission
Department of Business, Economic Development & Tourism
State of Hawaii

May 2010

Appendix - C
Botanical and Faunal Survey

BOTANICAL AND FAUNA SURVEYS

for the

MAUI RESEARCH AND TECHNOLOGY PARK
PROPOSED URBAN ZONING EXPANSION PROJECT

KIHEI, MAUI, HAWAII

by

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October 2008

Prepared for: Pacific Rim Land, Inc.

BOTANICAL AND FAUNA SURVEY
MAUI RESEARCH & TECHNOLOGY PARK
PROPOSED URBAN ZONING EXPANSION PROJECT

INTRODUCTION

The Maui Research & Technology Park Proposed Urban Zoning Expansion Project lies on approximately 356 acres of undeveloped land in upper Kihei TMK (2) 2-2-02:58 (por.) , TMK (2) 2-2-24:04,08 (por.), 14 (por.), 15,16 (por.), 17 (por.). The project area surrounds the existing facilities of Maui Research and Technology Park and is above the Elleair Maui Golf Course. This study was initiated in fulfillment of environmental requirements of the planning process.

SITE DESCRIPTION

The entire project area is presently dry pastureland located on the gentle slopes above Pi'ilani Highway. The area is an arid savannah with low rocky ridges and shallow gullies. Elevations range from 70 feet to 270 feet above sea level. Soils throughout the area are of the Waiakoa Extremely Stony Silty Clay Loam, 3-25 % slopes Series (WID2) which are 30-33 inches deep over hard igneous bedrock (Foote et al, 1972). This soil has moderate permeability, medium runoff and severe erosion hazard. Rainfall averages a scant 8-10 inches per year with the bulk falling during the winter months. (Armstrong,1983). This site lies in the driest part of Maui.

BIOLOGICAL HISTORY

Originally this area would have been a dry native forest/shrubland with such trees as wiliwili (*Erythrina sandwicensis*), ʻohe makai (*Reynoldsia sandwicensis*) and hao (*Rauvolfia sandwicensis*), shrubs such as ʻa'ali'i (*Dodonaea viscosa*), ma'o (*Gossypium tomentosum*), ʻilima (*Sida fallax*) and grasses and vines such as pili (*Heteropogon contortus*), kalamalō (*Eragrostis atropioides*), huehue (*Cocculus orbiculatus*) and ʻāwikiwiki (*Canavalia pubescens*).

For the past 150 years this area has been grazed by livestock, usually seasonally, following winter rains when the vegetation responds with a flush of growth. This land use has resulted in the gradual loss of native plants species and their replacement with hardy pasture grasses and weeds. During the past 40 years two other environmental disturbances have influenced conditions on the property. Introduced axis deer (Axis axis) have built up sizeable herds within this part of Maui. These animals are able to access steeper sites than cattle and have eliminated additional species of native plants.

Also fires have swept through this area a number of times over the years. Charred stumps were encountered throughout the property. Fires, over time, eliminate species not adapted to this type of catastrophic environmental disturbance.

Today few plants species occur on the property and those that do tend to dominate. Few of these are native.

SURVEY OBJECTIVES

This report summarizes the findings of a flora and fauna survey of the proposed Maui Research & Technology Park Project which was conducted in October, 2008. The objectives of the survey were to:

1. Document what plant, bird and mammal species occur on the property or may likely occur in the existing habitat.
2. Document the status and abundance of each species.
3. Determine the presence or likely occurrence of any native flora and fauna, particularly any that are Federally listed as Threatened or Endangered. If such occur, identify what features of the habitat may be essential for these species.
4. Determine if the project area contains any special habitats which if lost or altered might result in a significant negative impact on the flora and fauna in this part of the island.
5. Note which aspects of the proposed development pose significant concerns for plants or for wildlife and recommend measures that would mitigate or avoid these problems.

BOTANICAL SURVEY REPORT

SURVEY METHODS

A walk-through botanical survey method was used following routes to ensure maximum coverage of the many areas of this large property. Areas most likely to harbor native or rare plants such as gulches or rocky outcroppings were more intensively examined. Notes were made on plant species, distribution and abundance as well as terrain and substrate.

DESCRIPTION OF THE VEGETATION

The vegetation on this large property was dominated by just two species: kiawe (*Prosopis pallida*) and buffelgrass (*Cenchrus ciliaris*). These two species make up

more than 95% of the plant cover. The kiawe trees create an open woodland across the entire property with denser growth along the rocky gullies. The buffelgrass forms an almost uniform grassland under and between the trees. All other plant species were uncommon to rare on the property. Small parts of the property had no vegetation only bare patches of soil and surface stones.

A total of 14 species of plants were recorded during the survey. Of these only 2 were native Hawaiian species. Both ʻilima, and ʻuhaloa (*Waltheria indica*) are indigenous to Hawaii as well as other countries and both native species are widespread and of common occurrence in Hawaii.

Had the survey been done during the winter or spring months, a few more plant species would have been found, mostly ephemeral, annual non-native species that either wither during the summer heat or are consumed by cattle or deer. No rare native species would be expected to sprout in this area.

DISCUSSION AND RECOMMENDATIONS

The vegetation throughout the project is dominated by just two non-native plant species, kiawe and buffelgrass. The two native Hawaiian plant species recorded, ʻilima and ʻuhaloa, although of uncommon or rare occurrence on the property, are widespread and common in Hawaii in general.

No Federally listed Endangered or Threatened native plants (USFWS, 1999) were encountered during the course of the survey nor were any species that are candidate for such status seen. No special habitats or rare plant communities were seen on the property.

Because the vegetation is dominated by non-native plants, and no rare or protected species occur on or adjacent to the property, there is little of botanical concern and the proposed land uses are not expected to have a significant negative impact on the botanical resources in this part of Maui.

Because much of Kihei is a flood plain and because the soils on the property are subject to erosion, it is recommended that during any land clearing work special care be taken to use accepted contouring and terracing techniques to avoid significant soil runoff.

It is also recommended that native dryland plants known to occur in this area be incorporated into the landscape design of the completed project. The Maui County Planting Plan can be consulted for ideas.

PLANT SPECIES LIST

Following is a checklist of all those vascular plant species inventoried during the field studies. Plant families are arranged alphabetically within each of two groups: Monocots and Dicots. Taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner et al. (1999).

For each species, the following information is provided:

1. Scientific name with author citation
2. Common English or Hawaiian name.
3. Bio-geographical status. The following symbols are used:
   endemic = native only to the Hawaiian Islands; not naturally occurring anywhere else in the world.
   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   non-native = all those plants brought to the islands intentionally or accidentally after western contact.
   polynesian = all those plants brought to the islands by the Hawaiians during the course of their migrations.

4. Abundance of each species within the project area:
   abundant = forming a major part of the vegetation within the project area.
   common = widely scattered throughout the area or locally abundant within a portion of it.
   uncommon = scattered sparsely throughout the area or occurring in a few small patches.
   rare = only a few isolated individuals within the project area.

SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
MONOCOTS			
POACEAE (Grass Family)			
Cenchrus ciliaris L.	buffelgrass	non-native	abundant
Chloris barbata (L.) Sw.	swollen fingergrass	non-native	rare
Eragrostis pectinacea (Michx.) Nees	Carolina lovegrass	non-native	uncommon
DICOTS			
AMARANTHACEAE (Amaranth Family)			
Amaranthus spinosus L.	spiny amaranth	non-native	rare
ASTERACEAE (Sunflower Family)			
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	non-native	rare
EUPHORBIACEAE (Spurge Family)			
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	non-native	rare
FABACEAE (Pea Family)			
Acacia farnesiana (L.) Millsp.	klu	non-native	rare
Desmanthus pernambucanus (L.) Thellung	slender mimosa	non-native	rare
Leucaena leucocephala (Lam.) de Wit.	koa haole	non-native	rare
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe	non-native	abundant
MALVACEAE (Mallow Family)			
Sida fallax Walp.	'ilima	indigenous	rare
Waltheria indica L.	'uhaloa	indigenous	uncommon

FAUNA SURVEY REPORT

SURVEY METHODS

A walk-through survey method was conducted in conjunction with the botanical survey. All parts of the project area were covered. Field observations were made with the aid of binoculars and by listening to vocalizations. Notes were made on species abundance, activities and location as well as observations of trails, tracks scat and signs of feeding. In addition an evening visit was made to the area to record crepuscular activities and vocalizations and to see if there was any evidence of occurrence of the Endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the area.

RESULTS

MAMMALS

Three mammal species were observed on the property during two site visits. Taxonomy and nomenclature follow Tomich (1986).

Cattle (*Bos taurus*) – Cattle sign was seen over the entire property. One herd was seen during the survey. Larger numbers of cattle are pastured here during the wet season until grass resources are consumed.

Axis deer (*Axis axis*) – Deer sign was found on all parts of the property. This included tracks, droppings, antler rubbings and feeding signs. These herbivores spend the day bedded down in protected locations, then come out in the evening to feed.

Cat (*Felis catus*) – Cat tracks and scat were observed on dusty roads within the project area. Feral cats wander throughout the area hunting for rodents and birds.

Other mammals that likely occur on the property, but which were not seen, include rats (*Rattus rattus*), mice (*Mus domesticus*), mongoose (*Herpestes auropunctatus*) and pigs (*Sus scropha*) . Rats and mice feed on seeds and herbaceous vegetation and mongoose hunt for the rodents as well as birds. Feral pigs are scattered throughout the dry country and make forays onto adjacent landscaped properties to feed at night.

A special effort was made to look for the native Hawaiian hoary bat by making an evening survey of the property. These bats are known to occur sporadically at mid elevations across Kula. While they have been rarely recorded in the Kihei area, little is known about their habitats and range in this locality. When present in an area they can be easily identified as they forage for insects, their distinctive flight patterns clearly

visible in the glow of twilight. No evidence of such activity was observed though visibility was excellent and plenty of flying insects were seen. In addition a bat listening device (Batbox IIID) was employed, set to the frequencies of 27,000 to 28,000 hertz, which is the frequency range these bats are known to use. No bats were detected using this unit.

BIRDS

There were moderate numbers of a diverse array of birds observed on the property despite the dry conditions and general lack of feed. Fourteen species of non-native birds including one migratory species were recorded. Taxonomy and nomenclature follow American Ornithologists' Union (2005).

Zebra dove (*Geopelia striata*) – Small groups of these doves were seen and heard on all parts of the property feeding in ground clearings.

Common myna (*Acridotheres tristis*) – Mynas were seen throughout the property in the kiawe trees and flying about.

Spotted dove (*Streptopelia chinensis*) – Several of these large doves were seen flying across the property and landing in the kiawe trees.

Nutmeg mannikin (*Lonchura punctulata*) – Small flocks of these small light brown birds were seen in the trees.

Gray francolin (*Francolinus pondicerianus*) – Families of these francolins were seen on the margins of grassy openings and their calls were heard across the property.

House sparrow (*Passer domesticus*) – Several small flocks of these sparrows were seen feeding in kiawe trees.

House Finch (*Carpodacus mexicanus*) – Flocks of these finches were observed in kiawe trees in the early mornings and pairs were seen thereafter flying between trees.

Red-crested cardinal (*Paroaria coronata*) - Several red-crested cardinals were seen in a kiawe tree feeding on Kiawe beans.

Pacific golden-plover (*Pluvialis fulva*) – A few individuals were seen feeding in openings across the property.

Java sparrow (*Padda oryzivora*) – Two substantial flocks of these colorful birds were seen in kiawe trees on the lower part of the property during the mornings.

Northern mockingbird (*Mimus polyglottos*) – Two mockingbirds were seen in a kiawe tree feeding on kiawe beans.

Japanese white-eye (*Zosterops japonica)* – Two white-eyes were seen feeding in a kiawe tree near the bottom of the property.

Northern cardinal (*Cardinalis cardinalis*) – Two of these red birds were seen in the kiawe trees. More were heard calling further afield.

Black francolin (*Francolinus francolinus*) – One of these striking brown and black birds was seen on the ground near the bottom of the property.

A few other non-native birds might be expected to be found on this property such as wild turkey (*Meleagris gallopara*), African silverbill (*Lonchura cantans*) and cattle egret (*Bubulcus ibis*). This area in its present condition is not suitable for Hawaii's native forest birds that typically live at much higher elevations in native forests.

INSECTS

While insects in general were not tallied, they were abundant throughout the area and fueled the bird life observed. One native Sphingid moth, Blackburn's sphinx moth (*Manduca blackburni*) has been put on the Federal Endangered species list and this designation requires special focus (USFWS 2000). Blackburn's sphinx moth is known to occur in parts of East Maui and Central Maui but is not presently known from the Kihei area. Its native host plants are species of 'aiea (*Nothocestrum spp.)* and non-native alternative host plants are tobacco (*Nicotiana tabacum*) and tree tobacco (*Nicotiana glauca*). None of these plants were found on the property, and no Blackburn's sphinx moth or their larvae were seen.

CONCLUSIONS AND RECOMMENDATIONS

Fauna surveys are seldom comprehensive due to the short window of observation, the seasonal nature of animal activities and the usually unpredictable nature of their daily movements. This survey, however, should be considered fairly representative due to the abundance of food resources present throughout and adjacent to the area and the resulting level of animal use. No native forest birds occur anywhere in the vicinity of this property. All of the other bird species are widespread and common and of no particular environmental concern.

It is noted that while the threatened Newell's Shearwater (*Puffins auricularis newelli*) and endangered Hawaiian Petrel (*Pterodrom phaeopygia sandwichensis*) were not observed on the property during the site visits, these seabirds are known to occur and use habitats high within the mountains of Maui. They fly over lowland sites during the breeding season (March through December) to access their burrows in the mountains.

It is recommended that the following mitigation measures be implemented to minimize potential impacts to these seabirds.

- Lights within the project area to be shielded so the bulb is not visible at or above the bulb height.
- No night construction associated with the development of the project during the peak fallout period September 15 to December 15.
- Disseminate information about seabird fallout to all staff working on site prior to initiation of work.
- In the event that a downed seabird is found alive, contact the U.S. Fish and Wildlife Service within 24 hours.
- If the seabird is found alive, place the bird in a kennel and contact the Hawaii Department of Land and Natural Resources Biologist or the National Park Service Biologist for instructions on where to bring the bird.

No Federally Endangered of Threatened species were encountered during the course of the survey and no special habitats were identified. The proposed changes in land use should have no significant negative impact on the fauna resources in this part of Maui.

No special recommendations are deemed necessary or appropriate with regard to the fauna resources on this property.

ANIMAL SPECIES LIST

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance within two groups: Mammals and Birds. For each species the following information is provided:

1. Common name

2. Scientific name

3. Bio-geographical status. The following symbols are used:

   endemic = native only to Hawaii; not naturally occurring anywhere else in the world.
   indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
   migratory = all species that spend part of their annual life cycle in Hawaii and part of it elsewhere. Migrant birds typically spend their spring and summer months breeding in the arctic and their fall and winter months in Hawaii.
   non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.

4. Abundance of each species within the project area:

   abundant = many flocks or individuals seen throughout the area at all times of day.
   common = a few flocks or well scattered individuals throughout the area.
   uncommon = only one flock or several individuals seen within the project area.
   rare = only one or two seen within the project area.

COMMON NAME	SCIENTIFIC NAME	STATUS	ABUNDANCE
MAMMALS			
Cattle	*Bos taurus*	non-native	common
Axis deer	*Axis axis*	non-native	common
Feral cat	*Felis catus*	non-native	rare
BIRDS			
Zebra dove	*Geopelia striata*	non-native	common
Common myna	*Acridotheres tristis*	non-native	uncommon
Spotted dove	*Streptopelia chinensis*	non-native	uncommon
Nutmeg mannikin	*Lonchura punctulata*	non-native	uncommon
Gray francolin	*Francolinus pondicerianus*	non-native	uncommon
House sparrow	*Passer domesticus*	non-native	uncommon
House finch	*Carpodacus mexicanus*	non-native	uncommon
Red-crested cardinal	*Paroaria coronata*	non-native	rare
Pacific golden-plover	*Pluvialis fulva*	migratory	rare
Java sparrow	*Padda oryzivora*	non-native	rare
Northern mockingbird	*Mimus polyglottos*	non-native	rare
Japanese white-eye	*Zosterops japonicus*	non-native	rare
Northern cardinal	*Cardinalis cardinalis*	non-native	rare
Black francolin	*Francolinus francolinus*	non-native	rare

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Appendix - D
Archaeological Survey

SCS Project Number 985-2

AN ARCHAEOLOGICAL INVENTORY SURVEY OF MULTIPLE LAND PARCELS LOCATED WITHIN THE MAUI RESEARCH AND TECHNOLOGY PARK, *AHUPUA`A* OF WAIOHULI & KEOKEA, WAILUKU (KULA) DISTRICT, MAUI ISLAND, HAWAI`I [TMK: 2-2-24: 012 por., 014 por., 16 por., 17, and por. 54]

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ABSTRACT

Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey of several undeveloped land parcels and one proposed easement in the "barren zone" of Kihei, Waiohuli and Keokea Ahupua`a, Wailuku District, Maui, Hawai`i at TMK:2-2-24:por. 012, por. 014, por. 16, 17, and por. 54. The total land area encompasses some 338-acres plus a small easement on property primarily owned by the Maui Research and Technology Park. The eastern portion of Parcel 054 (56 acres) is owned by Haleakala Ranch but is in the process of being transferred by sale to the Maui Research and Technology Park. The purpose of the Inventory Survey was to determine the presence/absence of architecture, midden deposits, and/or artifact deposits on the surface of the parcels and to assess the potential for the presence of subsurface cultural deposits.

A total of five sites were identified during the research, three occurring on 2-2-24: 017 por. and two sites occurring on TMK:2-2-24:054 por. The sites have been designated as State Site No. 50-50-10-6239 (modified outcrop; historic), Site No. 50-50-10-6240 (modified outcrop; historic), Site No. 50-50-10-6241 (boundary wall; traditional/historic), Site No. 50-50-10-6587 (L-shape military training feature), and Site No. 50-50-10-6588 (three mounds; traditional location markers). Subsurface testing was not conducted at the three sites on 2-2-24:017 por. due to the extremely shallow soil deposits, particularly within the documented sites themselves which occur over bedrock, and the modesty of cultural remains commonly found in the area. Testing was completed at the two sites identified on TMK:2-2-24:054 por. but no cultural materials were identified. All five sites have been assessed as significant under Criterion D. Save for orange protective fencing to be placed along the northern ridgeline boundary of TMK:2-2-24:017 por. to protect undocumented rockshelters occurring below in Waipuilani Gulch, no further archaeological work is recommended for this project area.

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INTRODUCTION

Scientific Consultant Services (SCS), Inc. conducted Archaeological Inventory Survey on 338-acres of undeveloped land and one proposed easement in the "Barren Zone" above Kihei in Waiohuli and Keokea Ahupua`a, Wailuku District, Maui Island, Hawai`i [TMK:2-2-24:por. 012, por. 14, por. 16, 17, and por. 54] (Figures 1 through 4). Fieldwork was conducted on land primarily owned by the Maui Research and Technology Park; the eastern portion of TMK:2-2-24:054 por. in the project area (46-acre portion) is currently owned by Haleakala Ranch but in the process of transferring ownership to the Maui Research and Technology Park. The total land area of 338-acres consists of six variable-acreage parcels all associated with TMK:2-2-24:por. 14 (58.288 acres), 2-2-24: por. 16 (116.864), 2-2-24:17 (39 acres), and 2-2-24:por. 54 (124 acres). One easement, measuring 1,400 linear feet by 100 feet wide, was also surveyed per this research and occurs on TMK: 2-2-24:por. 012.

The purpose of Inventory Survey was to determine the presence/absence of surface architecture, midden deposits, and/or artifact deposits on the surface of the parcels through systematic pedestrian survey, to assess site functional and temporal affiliation through recordation and excavation (where possible), and to evaluate the significance of any identified historic properties. Fieldwork for this project was conducted by SCS in three phases over time: September 16-20 and September 23-25, 2006 by Ian Bassford, B.A.; November 19, 2006 and December 5 and 6, 2006 by project P.I. Michael Dega, Ph.D.; and September 18, 19, and 20, 2008 by Randy Ogg, B.A. and Guerin Tome, B.A.

To briefly summarize the results of the Inventory Survey, systematic survey of the "barren zone" project area led to the identification of five archaeological sites, which occurred on two of the six parcels subject to survey. The easement did not contain any sites. No areas thought to contain significant deposits in subsurface contexts were noted on any of the six parcels or the easement. Save for TMK:2-2-24:017 (39 acres) and TMK:2-2-24:054 por. (124 acres) (see Figure 1), all other parcels were void of sites and areas containing potential subsurface deposits. The results of note were gleaned through survey of TMK:2-2-24-:017, TMK: 2-2-24:054 por., and informal survey of Waipuilani Gulch, slightly beyond the southern boundary of TMK:2-2-24: por. 16. The first parcel contained two modified outcrops (historic era) and a wall (traditional/historic period). The second parcel contained an historic period L-shape and three rock mounds (traditional markers). In addition, the southern slope of Waipuilani Gulch was informally surveyed during the recording of Site -6241 and found to contain two

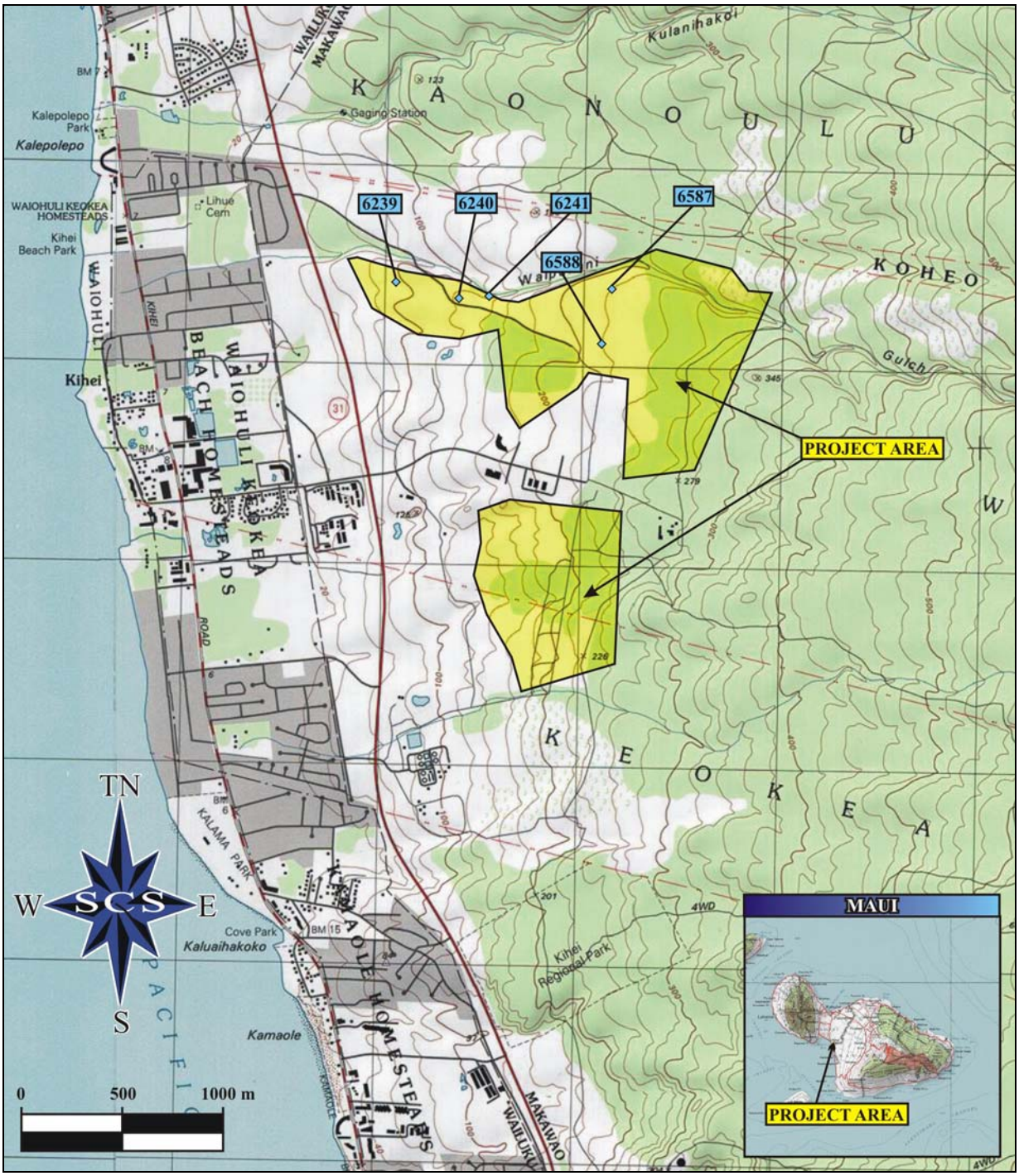

Figure 1: USGS Map (Pu`u O Kali Quadrangle) Depicting Project Area.

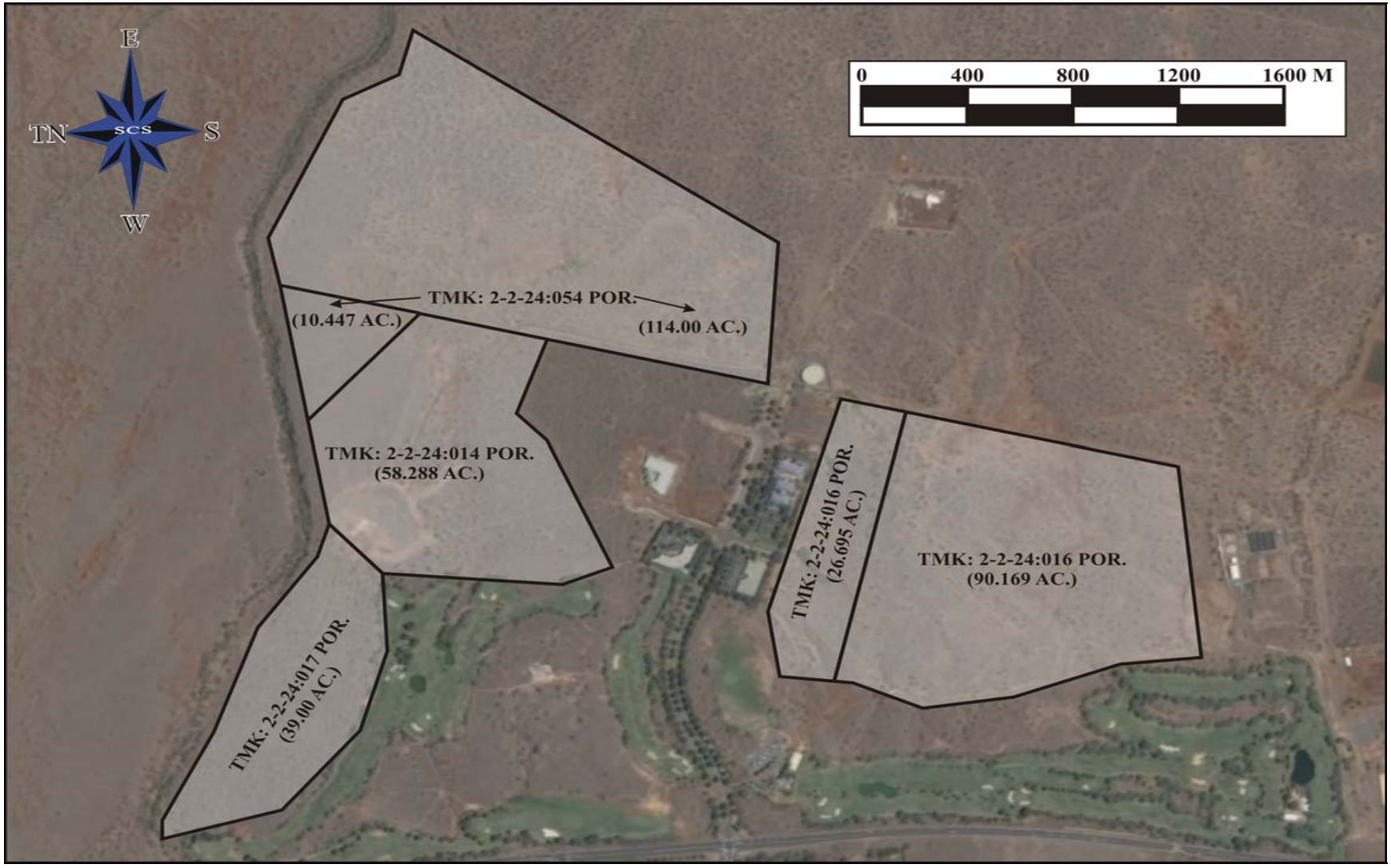

Figure 2: Tax Map Key [TMK: 2-02-24] Showing Project Area.

Figure 3: Photographic Overview, Western Portion of Project Area. View to West.

Figure 4: Photographic Overview, Central Portion of Project Area. View to Northeast. Note: Former Borrow Pit Depression Center and Right Side of Frame.

overhangs with several surface lithics. This site occurs beyond the boundary of the current project area and was not formally recorded. All are discussed in more detail below.

ENVIRONMENTAL SETTING AND PROJECT AREA DESCRIPTION

The project area is located in Waiohuli and Keokea Ahupua`a, Wailuku District (the traditional district of Kula). The parcels are located approximately 1.5-2 km east (*mauka*) of the coastline at Waiohuli-Keokea Beach Homesteads, Kihei, a variable 40-260 feet above mean sea level (see Figure 1). Piilani Highway, the main thoroughfare in leeward East Maui, is located approximately 0.50 km west (*makai*) of the lowest portion of the project area. The southern flank of Waipuilani Gulch, a major landscape feature in this area, borders the northern portion of the project area. The six variable-sized parcels are generally bounded by Waipuilani Gulch to the north, portions of the Elleair Maui Golf Club to the west, and sections of the Maui Research and Technology Park and undeveloped land to the east (see Figure 2). Both the northern and southern portions of the project area are accessed via Lipoa Parkway.

Several unpaved roads and two-wheel tracks are located across many parts of the project area, particularly in the northern parcels. Grading activities are associated with certain sections of some of these roads and tracks. Multiple 'push piles' of boulders created by bulldozers or other mechanical means are located within many sections of the project area; these all appear to be modern landscape alterations. The 'push piles,' which are typically 1 to 2 meters high and 2 to 3 meters in diameter, often incorporate several large tree limbs and smaller trunks, clear evidence of their being 'push piles.' Small scatters of recent garbage and some concrete barricades are located throughout the parcels as well. Construction debris, junked cars, and other recently deposited debris are also common.

Geologically, the project area is located on the lowermost portion of the Kula Dissected Uplands, the vast network of leeward (western) slopes of the dormant Haleakala volcano that comprises East Maui. The Kula District is situated in the rain shadow of Haleakala. This general area of the current project is a gently sloping transitional landscape between the steeper volcanic highlands to the east and the narrow coastal strip to the west. The local topography is relatively flat with slight undulations, this presumably caused by uneven distribution of bedrock below shallow sediment sequences. There is a slight increase in slope to the east as the project area proceeds to more upland extents. More specific to the project area, low, rounded mounds and hillocks—the remnants of weathered basalt outcrops—are interspersed with shallow, ephemeral drainages and depressions.

Soils in the project area, defined as "extremely stony silty clay loam," are part of the Waiakoa Series of the central Maui uplands (Foote *et al*. 1972). These soils form on smooth, low uplands, and stones cover 3 to 15 percent of the ground surface. In most areas where this soil is present, approximately 50 percent of the surface layer has been eroded. Runoff levels are average and the erosion hazard is severe (Foote *et al*. 1972). For these reasons, soils in the project area are generally only utilized as pastureland and for wildlife habitat. Low bedrock outcrops are commonly associated with these soils, and cultivation is usually impractical unless the stones are removed. Importantly, soil profiles are extremely limited, typically to 20-30 centimeters or so below the surface, overlying bedrock. Testing during the current project confirmed the shallow matrices. Cultural deposits within these thin layers are typically only very modest, both quantitatively and qualitatively.

Annual rainfall in the project area—between 10 and 15 inches annually—is the lowest on Maui, making this region one of the driest in the Hawaiian Islands archipelago (Armstrong 1983). Daytime maximum temperatures, confirmed during fieldwork, range between 80 and 90 degrees Fahrenheit. At the time of the present survey, the subject parcel was exceptionally dry and dusty, consistent with a period of prolonged drought in the area. In fact, because of this combination of low rainfall and fairly unproductive soils, the general area in which the subject parcel is located has been labeled the "barren zone" (Cordy 1977), a characterization that has been supported by numerous archaeological surveys in the area (see below).

Vegetation is dominated by xerophytic flora including *kiaw*e, lowland shrubs, and grasses (see Figures 3 and 4). Plant species documented in the project area include: *kiawe* (*Prosopis pallida*), *haole koa* (*Leucaena leucocephala*), *ʻuhaloa* (*Waltheria americana*), balloon plant (*Asclepias physocarpa*), *paʻaila* (*Ricinus communis*), Golden crown-beard (*Verbesina encelioides*), and *ilima* (*Sida fallax*). Various grasses, small (unidentified) weedy plants, and decorative flowers near current buildings and the golf course complete the floral inventory.

HISTORICAL BACKGROUND OF THE PROJECT AREA

While Kula is an arid region, a considerable population existed along its seashore—where fishing was excellent—and on the lower slopes of Haleakala at elevations high enough (at least 1,000 feet above mean annual sea level) to support dryland cultivation and sustainable habitation. There is no evidence, oral or written, of taro farming in this dry "barren zone" area; the sweet potato, or *ʻuala*, "was the staple of life here" (Handy and Handy 1972:511).

In the uplands of the Kula district, at elevations higher than *c.* 1,000 feet above mean annual sea level, traditional agriculture was based on dryland field systems. Handy and Handy (1972:488) write:

> The great bulk and altitude of Haleakala makes its southern flank practically a water less desert, and the southeast and west flanksrelatively dry, so that there were no *lo`i* (pond fields) cultivation at all. The arid country below the west and south slopes of Haleakala, including Kula, Honua`ula, Kahikinui, and Kaupo, were dependent on sweet potato.

Handy and Handy (1972:131) also describe the planting methods in the drier sections of Kula:

> Where potatoes are planted in crumbling lava with humus, as on eastern Maui and in Kona, Hawaii, the soil is softened and heaped carelessly in little pockets and patches using favorable spots on slopes the crumbling porous lava gives ample aeration without much mounding.

At lower, drier elevations, in the so-called barren zone, agriculture was a relatively minor component of the traditional subsistence economy. The modest range of the subsistence economy also reflected occupation in the area: temporary, on a recurrent basis through time. As is discussed below, it is only within more recent times that permanent occupation was been sustained within the barren zone.

The fact that few references to Kula district are found in traditional sources is likely an accurate reflection of its relative importance compared to the often-cited and better-known districts of Hana, Lahaina, Wailuku, and other population centers on Maui. Most references to Kula are minimal even when describing important battles and their participants. Other references allude to the difficulties of living in the fairly harsh environment of the lower Kula region. During a drought in the time of Kihaa Pi`ilani (*c.* A.D. 1500–1600s), people in this area were forced to subsist on weeds such as *laulele*, *pualele*, and *popolo* (Kamakau 1961). They could restore their crops only by obtaining potato slips from neighboring districts. However, sustained settlement did occur on the Kula slopes over time. By the 15th century, for example, large settlements were appearing in upcountry Kula and the building of religious temples flourished (Kolb *et al*. 1997; Dega *et al*. 2007).

Early historical accounts and archaeological evidence suggest that the barren zone, in which the subject parcel is situated, was a transitional area in which people moved resources between the coast and the uplands to heights of over 1,000 feet (above mean annual sea level). Large, permanent settlements—with clusters of habitations, *heiau,* petroglyphs, and large agricultural terraces and garden enclosures—have been documented in the uplands of Kula, above the 30-inch annual rainfall line (Kolb *et al.* 1997; Dega *et al*. 2007). Fishponds (three at Kalepolepo) and coastal *heiau* indicate a relatively sizable coastal population relying on marine resources. Both the uplands and the coast were settled or utilized by at least A.D. 1200, if not earlier, and trails linking these areas, and crossing through the barren zone, have been identified in Waiohuli and Keokea (Kolb *et al.* 1997). This intermediate zone, the barren zone, was not subject to the population growth seen in more upland or near coastal reaches; the barren zone has a unique character.

Although relatively general and of varying quality, early accounts of explorers, travelers, and missionaries can shed some light on traditional land use and lifestyles in the project area. Eight years after Captain James Cook's initial arrival, La Perouse sailed up the western coast of East Maui and stopped at Keone`o`io. La Perouse was greeted by 120 Native Hawaiians, who offered "…hogs, potatoes, bananas…taro, with cloth and some other curiosities…" (La Perouse 1798:345). He also noted that this part of the island was hot, dry, and rough, with soil "…wholly composed of lava and other volcanic matter" (La Perouse 1798). Water was scarce and the villagers drank from a shallow, brackish well.

Vancouver recorded his impressions of the southern and western coasts of Maui during his second visit in 1793:

> …the part we were abreast of [east of Pohakueaea Point] at day-light in the morning, though terminating very abruptly in the ocean, and though its surface was very uneven, had yet a verdant and fertile appearance, and was seemingly in an advanced state of cultivation. From the number of villages and distinct houses, we were let to consider it as tolerably well inhabited [Vancouver 1884:850].

Cultivation of Irish potatoes in the Kula district began shortly before 1840, after which time Kula became known as "the potato district" because of its great success in their cultivation. During Kula's peak potato producing period of the 19th century, dryland gardens in the uplands extended all the way from Kula to Kaupo. Corn was also planted in large upland concentrations, albeit during more recent times (A. Chun, Personal Communication). The resulting deforestation

adversely affected the amount of rainfall in the district and periods of drought became more common (Kolb *et al.* 1997). The *Honolulu Advertiser* describes the changes to Kula and the Kihei area:

> Before 1850 Kula was supplied with moisture naturally through the existence of a large forest. That forest was cut down when land was cleared in Kula to open farm plots in 1850. This was in answer to the demand for food in California during the gold rush… [and] by ranchers clearing for pasture. A secondary result of clearing forests was destruction of existing fresh water ponds in Kihei on the Maalaea Bay coast below Kula. When forest was cleared, water was free to rush down the mountains carrying soil from Kula and filling with mud the ponds for which Kihei was once famous [1962: A15].

Ranching was also present in Kula prior to the 1840s (Land Court Awards, State Archives). Large sections of Crown Land were leased for grazing cattle, and, by the 1880s, lower Kula consisted primarily of pasture land for ranching. Archaeological evidence of ranching is present near the subject parcel (see below). In 1888, Edwin H. Baily, Lorrin A. Thurston, W.H. Baily, and Henry P. Baldwin met in Honolulu and purchased Maui ranch lands owned by Charles Alexander for $50,000. The resulting ranch included 33,817 acres with 400 to 500 acres set aside for corn cultivation. The land in and around the project area was historically used for ranching activities by Haleakala Ranch Company.

The current study area does not contain Land Commission Awards (LCA), which typically implies that the land was not formally settled at the time of the *Great Māhele* (1848). Again, this aligns with the 'barren zone' model of settlement in that it was not a primary habitation area due to the dearth of natural resources (water, soil, etc.). Part of the subject parcel was, however, a portion (*apana* 1) of Royal Grant 9325 to Haleakala Ranch Company, Waiohuli-Keokea, Kula (Kihei), Maui.

Twentieth century activities in the Kula District included a significant World War II military presence along the beach of Ma`alaea Bay, a combat demolition training station at Kama`ole, two naval air stations at Pu`unene and Kahalui, and Army camps and hospitals in the Kula and Makawao areas. In particular, small, low walls and C-shaped rock formations—used as fighting positions by gunners—are documented as occurring near the project area (see McGerty *et al*. 2000).

PREVIOUS ARCHAEOLOGICAL RESEARCH AND SETTLEMENT PATTERN

Multiple studies have been conducted adjacent to the current project area in association with development of the Maui Research and Technology Park and the Elleair Maui Golf Club (Hibbard 1994; Chaffee *et al.* 1997; McGerty *et al.* 2000; Sinoto *et al.* 2001; Tome and Dega 2002; Dega 2003; Monahan 2004). Before describing these studies, it is first necessary to present a general picture of the landscape in which these studies were conducted.

THE "BARREN ZONE"

Decoding what is meant by the term "barren zone" is an important for assessing site predictability and survey results. By knowing the characteristics of the term, explanation as to the presence/absence of archaeological sites and site types is more evident in previous studies.

In geographical and physiographical terms, the barren zone is an intermediary zone between direct coastline and backbeach areas to upland forests. This medial zone appears to have been almost exclusively transitory, or at best, intermittently occupied. Intermittent habitation loci, as defined by surface midden scatters or small architectural features (i.e., C-shapes, alignments) dominate the few documented site types in the area through time. Divisive within an inland-coastal dichotomy, the barren zone was a necessary area to access more productive upland regions and the coastline. Apparently, agricultural endeavors were practically non-existent in the barren zone and tool procurement materials (basalt, wood) were selected from other locales as well. Sediment regimes in the area are shallow, most often overlying bedrock, and perennial water sources are virtually non-existent.

Cordy (1977) has taken the dichotomous model a bit further, particularly for this region, and has divided the Kihei (inclusive of Kama`ole) area into three environmental zones (or subzones when one considers the entire *ahupua`a*): coastal, transitional/barren, and inland. The current project area would occur in the transitional or barren zone: the slopes back of the coast with less than 30" annual rainfall (Cordy 1977:4). This barren zone is perceived as dry and antagonistic to permanent habitation. Use of the area would primarily have been intermittent or transitory, particularly as the zone could have contained coastal-inland trails and would have marked an intermediary point between the two more profitable ecozones. The region remains hostile to permanent habitation, only having been "conquered" in recent times through much modern adaptation (air conditioning, water feed systems, etc.).

Based on general archaeological and historic research, the barren zone was not subject to permanent or expansive population (until recently). This intimates that population pressure

along the coast was minimal or non-existent in the Kihei coastal area through time. As such, architectural structures associated with permanent habitation sites and/or ceremonial sites are not often identified in the area. The prevailing model that temporary habitation-temporary use sites predominate in the barren zone has been authenticated further by recent research.

As interestingly noted by Hammatt and Shideler (1992:10), "what is particularly striking in the many archaeological reports on Kihei is the general paucity of sites within the transitional or barren zone." Cordy (1977), Walton (1972), and Cox (1976) all conducted large-scale survey in this zone that led to the recordation of only small, temporary habitation or temporary use sites. Several other studies in this zone of Kama`ole Ahupua`a, including those conducted by Mayberry and Haun (1988) and Hammatt and Shideler (1990), also only revealed the presence of temporary habitation/temporary use loci.

McDermott (2001:100) states that site densities are typically quite low within the "barren zone" with multiple studies having been conducted on large parcels (Kennedy 1986, Watanabe 1987, Hammatt and Shideler 2000, Kikiloi *et al*. 2000) that did not lead to the identification *any* prehistoric sites. However, military sites related to WWII training exercises have been previously in the area (McGerty *et al*. 2000), these sites often consisting of low, short alignments or walls. The few radiocarbon dates acquired from the area indicate definitive use of the landscape in later prehistory c. A.D. 150-1600+.

As may be gleaned from this praxis of the barren zone, site expectation and site density is low for the area. Even large-scale surveys at times have failed to document sites of any time period in this dry area. Coupled with forms of modern land use (construction, infrastructure, and bulldozing activities), the sites identified in this zone become much more significant.

PERTINENT RESEARCH WITHIN AND NEAR THE MAUI RESEARCH AND TECHNOLOGY PARK—CURRENT PROJECT AREA

SCS and others have more recently conducted numerous projects in the immediate area of the present project area parcels. The location of this work is noted in Figure 5 (below, following project descriptions) and summarized below.

As noted above, several studies have been conducted nearby, in association with development of the Maui Research and Technology Park and the Elleair Maui Golf Club (Kennedy 1986; Hibbard 1994; Chaffee *et al.* 1997; McGerty *et al.* 2000; Sinoto *et al.* 2001; Tome and Dega 2002; Dega 2003; Monahan 2003) (see Figure 5).

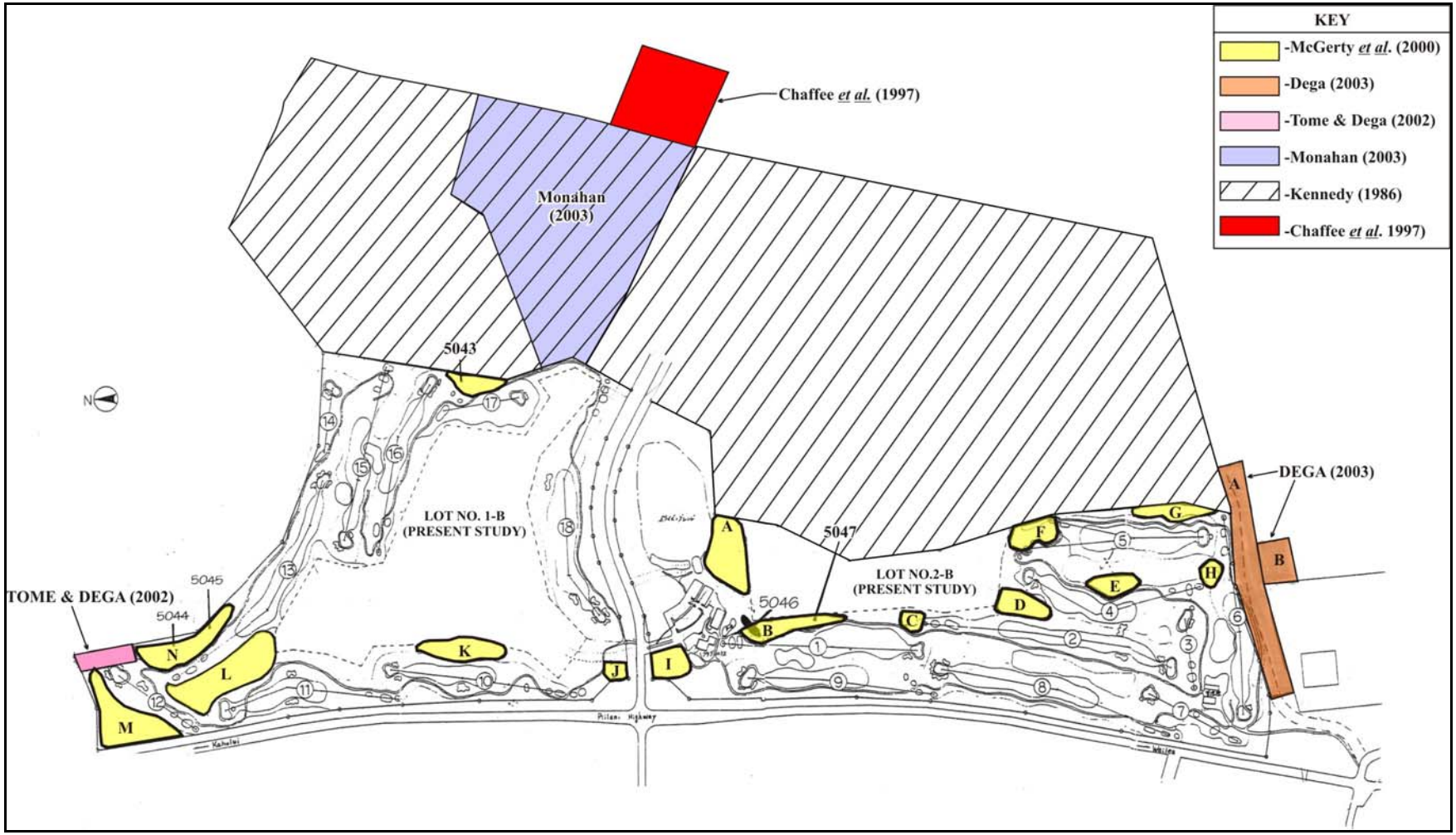

Figure 5: Previous Archaeological Studies Conducted in the Immediate Vicinity of the Project Area.

Kennedy (1986) conducted an archaeological reconnaissance of the entire 150.032 acres of the then-proposed Maui Research and Technology Park (TMK:2-2-02, since changed to 2-2-24) (see Figure 5). Kennedy's study, which did not include subsurface testing (excavation), concluded that no archaeological sites or features were located within the proposed site. The study area corresponds with much of the landscape studied herein.

Chaffee *et al*. (1997) conducted Archaeological Inventory Survey, inclusive of subsurface testing (excavation), in a portion of the Maui Research and Technology Park formerly investigated by Kennedy (1986). Three sites consisting of ten archaeological features were identified. The features included remnant terraces, stone alignments, a mound, and a modified outcrop. All of the sites were interpreted as agricultural in function with the exception of a rock mound that may have functioned as a religious feature.

Monahan (2003) conducted an Archaeological Inventory Survey, including subsurface testing (excavation), of a 28.737-acre portion of the Maui Research and Technology Park, within the area investigated by Kennedy (1986), situated immediately upslope (*mauka*) of Lot No. 1-B (present project area). Other than one surface feature—a small arrangement of stacked boulders interpreted as a 'push pile,' this survey yielded no evidence of historic or prehistoric significance.

Theresa Donham conducted an archaeological reconnaissance of the Haleakala Greens Subdivision area (Hibbard 1994). She identified a low, circular rock mound, a historical site with multiple features on the crest of a prominent ridge, a linear rock mound or wall remnant, a rock-filled terrace outlined with a low, rock wall, and other modifications along a rock outcrop. Shell midden was observed on the surface inside an enclosure.

McGerty *et al.* (2000) surveyed fifteen selected areas within the Elleair Maui Golf Club, and identified five archaeological sites (State Site Nos. 50-50-10-5043, -5044, -5045, -5046, and -5047) containing a total of seven surface features. The surface features were interpreted as agricultural terraces, perhaps dating from the pre-Contact period, and C-shaped rock formations (fighting positions) built during World War II training. Ten excavation units placed within these features yielded no cultural material.

Sinoto *et al*. (2001) conducted an Archaeological Inventory Survey of a parcel adjacent to the subject property. No archaeological or historical sites or features were identified.

Tome and Dega (2002) conducted an Archaeological Inventory Survey along the northeastern flank of the Elleair Maui Golf Club property. This survey occurred just to the west of the current project area. They identified a historical ranching corral and a short agricultural wall, collectively designated State Site No. 50-50-10-5233. No other structures or subsurface deposits were identified. No traditional Native Hawaiian sites or features were identified. Another Inventory Survey along the southern flank of the Elleair Maui Golf Course (Dega 2003) failed to yield any archaeological or historical site or features.

Finally, Scientific Consultant Services (SCS), Inc. conducted an Archaeological Inventory Survey (Monahan 2004) on two undeveloped lots totaling approximately 56.647 acres near the Elleair Golf Course in Kihei, Waiohuli and Keokea Ahupua`a, Wailuku (Kula) District, Kihei, Maui Island, Hawai`i [TMK: 2-2-24: Portion 12 and 13]. The project area immediately borders several parcels under the concern of this Inventory Survey. Pedestrian survey and subsurface testing (hand excavation) were performed in advance of a proposed residential project near the Elleair Golf Course by Betsill Brothers Construction, Inc. Four surface features—consisting of stacked basalt stones—were located within the project area, and each of these was assigned a separate State Site Number.

Test excavations yielded buried cultural material consistent with traditional Native Hawaiian activities at three of the four sites (Sites 50-50-10-5506, -5507, and -5509). Excavation at the fourth site (-5508)—a C-shaped rock pile consistent with a World War II military training feature—did not yield any subsurface evidence. The discovery of three traditional Native Hawaiian sites in this area is significant, as previous studies have generally failed to document any such activity. One of these sites (-5509) yielded a modern radiocarbon date (0±50 BP), but its context is questionable and it may not refer to the (probably older) buried artifacts. Two other sites (-5506 and -5507) failed to yield datable material, although both contained buried traditional artifacts and midden. No additional archaeological work was recommended in the project area (Monahan 2004).

In summary, previous archaeological research has documented a fairly limited degree of human settlement in the Kihei barren zone, of which the subject parcel is a part. Archaeological Inventory Surveys in and around the subject parcel, some of which included subsurface testing, have yielded a modest amount of evidence of both historical and traditional human activities. These include: agricultural terraces, possibly dating to the pre-Contact period, C-shaped rock formations interpreted as World War II-era training features, and a historical ranching corral and a short agricultural wall. It is noteworthy to add that no formal survey has been completed

within the Waipuilani Gulch drainage, which would presumably yield additional pre-Contact, temporary habitation sites beyond those noted herein.

EXPECTED FINDINGS

Given several factors—previous archaeological findings in the area, geographic location and known natural resources, and historical land use patterns in the area—expected findings of this Inventory Survey were as follows:

(1) There was a relatively low probability of finding pre-Contact evidence of traditional Native Hawaiian habitation loci (permanent settlement). Short-term or temporary camps might be discovered, perhaps associated with natural rock outcrops that occur throughout the area.

(2) Traditional agricultural features, such as rock-stacked terraces used to level the gentle slope, might also be found, especially in association with the natural rock outcrops.

(3) There was a relatively low probability of finding traditional Native Hawaiian burials due to the extremely stony and shallow soils in the area.

(4) There was a good chance of finding historical structures, such as rock walls, ranching corrals, or World War II-era rock formations.

METHODOLOGY

The entire c. 338-acre project area composed of the six separate parcels was subject to systematic pedestrian survey at various times by SCS field crew members I. Bassford, B.A., M. Dega, Ph.D., Guerin Tome, B.A., and Randy Ogg, B.A. Pedestrian survey of the parcels was conducted by crew members walking north-south transects at 10-15 m intervals. Ground surface visibility was generally excellent through the project area which allowed for greater interval spacing of transects. Surface grasses were slightly higher in the northwestern portion of the project area (see Figure 3). Survey was conducted in October through December, 2006 and in September, 2008. The purpose of survey was to identify and document all historical and/or archaeological features across the landscape. All identified surface features were identified, described, and mapped in accordance with standard archaeological procedures. Photographs were taken of each phase of fieldwork as well as project area overviews and identified features. Two sites were manually tested (-6587, -6588) as part of the research. The other three identified sites were not tested due to perceived lack of associated soil matrix (they were constructed primarily on bedrock) and known function.

Laboratory work, conducted at SCS facilities in Honolulu, consisted of digitally drafting maps and sketches, and digitizing of all photographs and maps for archival purposes. All documentation pertaining to this project is curated at SCS facilities in Honolulu.

RESULTS

Full pedestrian survey of all six parcels and one easement lead to the identification of five archaeological sites which have been formally designated as State Site No. 50-50-10-6239, 50-50-10-6240, 50-50-10-6241, 50-50-10-6587, and 50-50-10-6588. All first three sites were identified on the peninsula-shaped, 39-acre parcel [TMK:2-2-24:017] while the latter two sites were identified on the 124-acre parcel [TMK:2-2-24:054 por.] (see Figures 1 and 2). No traditional structures, scatters, or deposits were identified on four of the other six survey areas or in the easement. In addition, on the four parcels and easement which did not yield surface architecture or midden/artifact scatters, no areas thought to potentially yield cultural materials in subterranean contexts were identified. Features that most often have survived this barren landscape are related to WWII training exercises, once ubiquitous in the area. Three of the sites (-6239, -6240, -6587) have been interpreted to relate to such training. A brief listing of the descriptions and results for each of the six variable acreage survey areas and the easement follows.

TMK:2-2-24:016 (90.169 ACRES)

One modern rock alignment was identified on this parcel, amidst numerous examples of modern landscape modification. The combination of landscape work and dry conditions allowed for excellent ground visibility. The alignment was composed of a single-course and extended 4 m long on a north-south axis. The field investigator (I. Bassford) assessed alignment construction, the lack of soil around the alignment, and adjacent landscape work and suggested this remnant to have been caused by mechanical blade push, the latter creating the aligned nature of the rocks. The alignment was deemed modern in origin. No other features were identified on this parcel. As noted above, landscape modification in the form of mechanical clearing lines (through blade and backhoe) was prevalent across the parcel, a symptom of neighboring infrastructure and fire clearance work in this dry zone locale. Typical for the “barren zone”, sedimentation was minimal and there were no areas thought to yield cultural deposits through testing.

TMK:2-2-24:016 (26.695 ACRES)

No surface architecture nor midden or artifact deposits were identified on this parcel. Ground visibility was good. No areas readily amenable to testing in hopes of recovering cultural deposits were identified. Contemporary landscape modifications were also common on this parcel.

TMK:2-2-24:054 (10.447 ACRES)

No surface architecture nor midden or artifact deposits were identified on this smaller parcel (Note: This 10-acre portion was divided out of the larger 054 parcel for administrative purposes by the client). Ground visibility was also good. No areas that could have potentially contained subterranean cultural deposits were identified. Landscape modifications were common on this parcel, as they were across most of the project area.

TMK:2-2-24:014 (58.288 ACRES)

No surface architecture nor midden or artifact deposits were identified on this parcel. Ground visibility was fair-good. No areas plausibly containing subsurface cultural deposits were identified. Landscape modifications in the form of mechanical blading, dirt road work, and digging several small borrow pits were present on the parcel.

TMK:2-2-24:054 (114.00 ACRES)

The largest of the parcel's surveyed for this project, the 114-acres forms the easternmost boundary of the project area. While recent landscape modifications were common and took the form of mechanized work (dirt roads and such), several intact sites were identified in the western portion of the parcel. Ground visibility was good in this survey area, with some ground surface covered by thin grasses. Over-story was sparse in this area.

A total of two sites were identified on this parcel: an L-shape and three rock mounds appearing in fairly linear fashion (see Figure 1). Both of the sites were present in the western portion of the parcel, and most of the component features were constructed over outcrops. As exhibited during testing of these two sites, soil matrices were very shallow, extending to a maximum 0.22 meters below the surface (mbs).

SITE 50-50-10-6587

This site was identified in the western portion of the parcel at c. 95 feet above mean sea level. Occurring on a small knoll (5 feet high) over exposed bedrock, the site consisted of one feature, an L-shaped structure (Figures 6 and 7). The site measures 2.9 m long, 1.6 m wide, and rises to a variable 0.18-0.58 m above the slightly undulating outcrop surface. Oriented on a

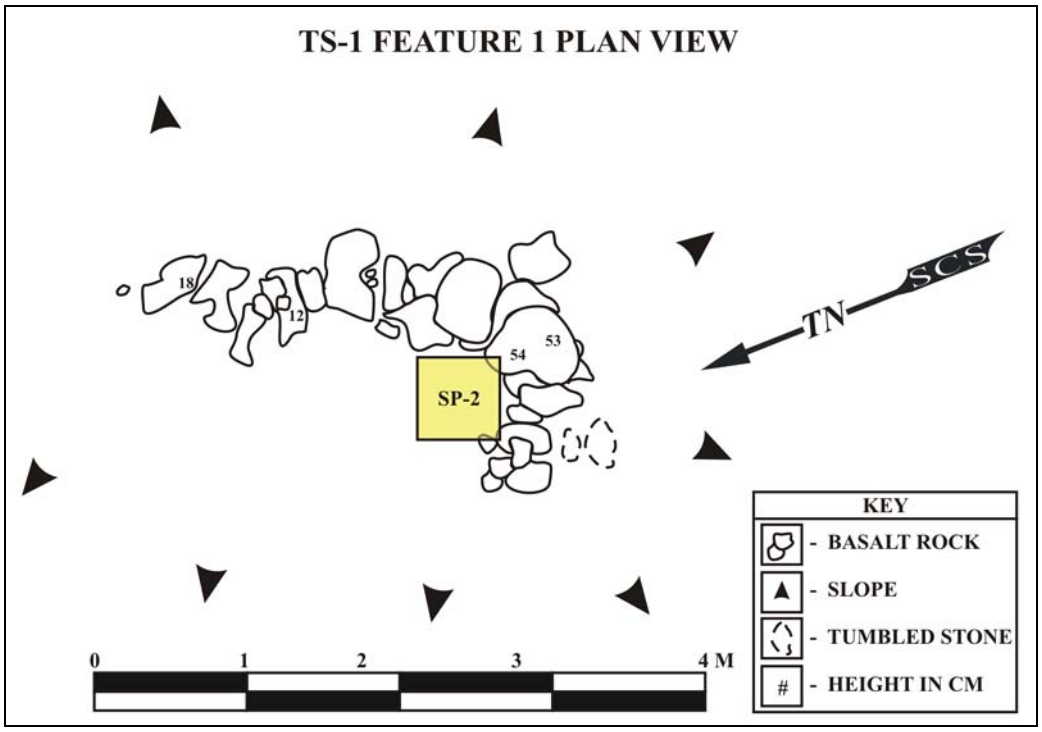

Figure 6: Plan overhangs with several surface lithics. This site occurs beyond the boundary of the current project area and was not formally recorded. All are discussed in more detail below.iew Map of Site -6587.

Figure 7: Photograph of Site -6587. View to Southeast.

northeast/southwest axis at 20º/200º, the site was comprised of underlying outcrop with three courses of roughly stacked cobbles and few boulders. The slight L-shape occurred in the southwestern portion of the small feature.

No artifacts or midden deposits were identified on the site's surface and no standing or faced areas were present on the structure. The site was interpreted as an L-shaped feature constructed during WWII times when training was conducted in the area. The site location could have served as a gun placement or observation area during training exercises. One unit was excavated in the feature to further explore its temporal and functional roots. The unit, however, did not yield a excess of information.

Test Unit 2 (TU-2)

TU-2, a 0.50 by 0.50 m unit, was placed on the interior of the feature at the crux of the L-shape arm and remainder of the feature, against architecture (Figure 8). Excavation revealed one sedimentary layer, occurring above bedrock (Figure 9). The unit also revealed that the feature was solely constructed on the surface, no portions of the L-shape protruding into subsurface contexts. Layer I (0-20 mbs) was composed of dark yellowish brown (10YR 3/4) silt with moderate structure. Abundant micro roots and some macro roots were present, as well as common small cobbles (non-modified). No cultural materials were identified in the test unit. Excavation terminated on bedrock.

SITE 50-50-10-6588

This site was identified to the south-southwest of Site 6587, also in the western portion of the parcel at c. 90 feet above mean sea level. Occurring on a slightly larger knoll (15-20 feet high) over exposed bedrock, the site consisted of three features: three semi-rounded rock mounds (Figures 10, 11, and 12). The overall site measures 11.0 m long by 1.8 m wide, with each feature rising to a variable 0.12-0.60 m above the slightly undulating surface terrain. The site is oriented on a northwest/southeast axis at 152º/332º, with the three similar rock mounds occurring in a fairly linear fashion about the knoll. The Feature 1 mound is present at the apex of the knoll, with the Features 2 and 3 mounds occurring only several feet away, at a lower elevation, down the knoll. All features were constructed primarily on exposed bedrock. The linear fashion of the arranged features is suggestive of their function being related to direction-location markers. Surface materials included the recovery of aluminum cans appearing to have been recently deposited (past 10 years).

Figure 8: Photograph of Site -6587, TU-2. View to East.

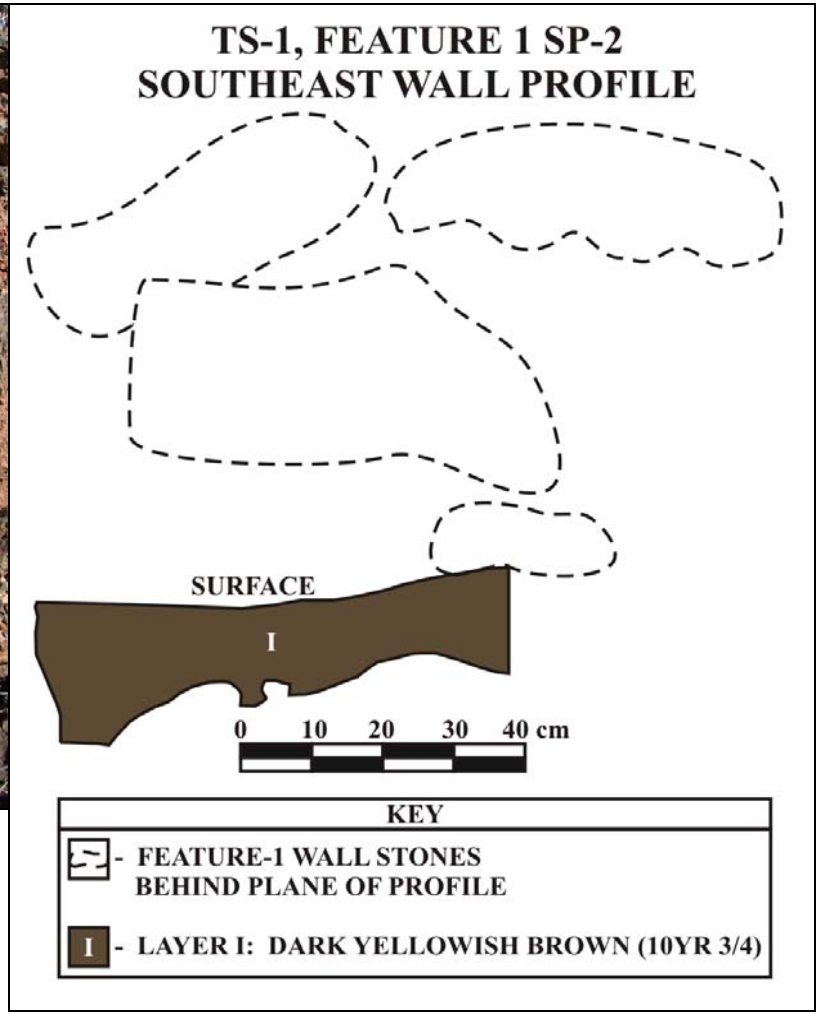

Figure 9: Stratigraphic Profile of Site -6587, TU-2. Southeast Wall Profile.

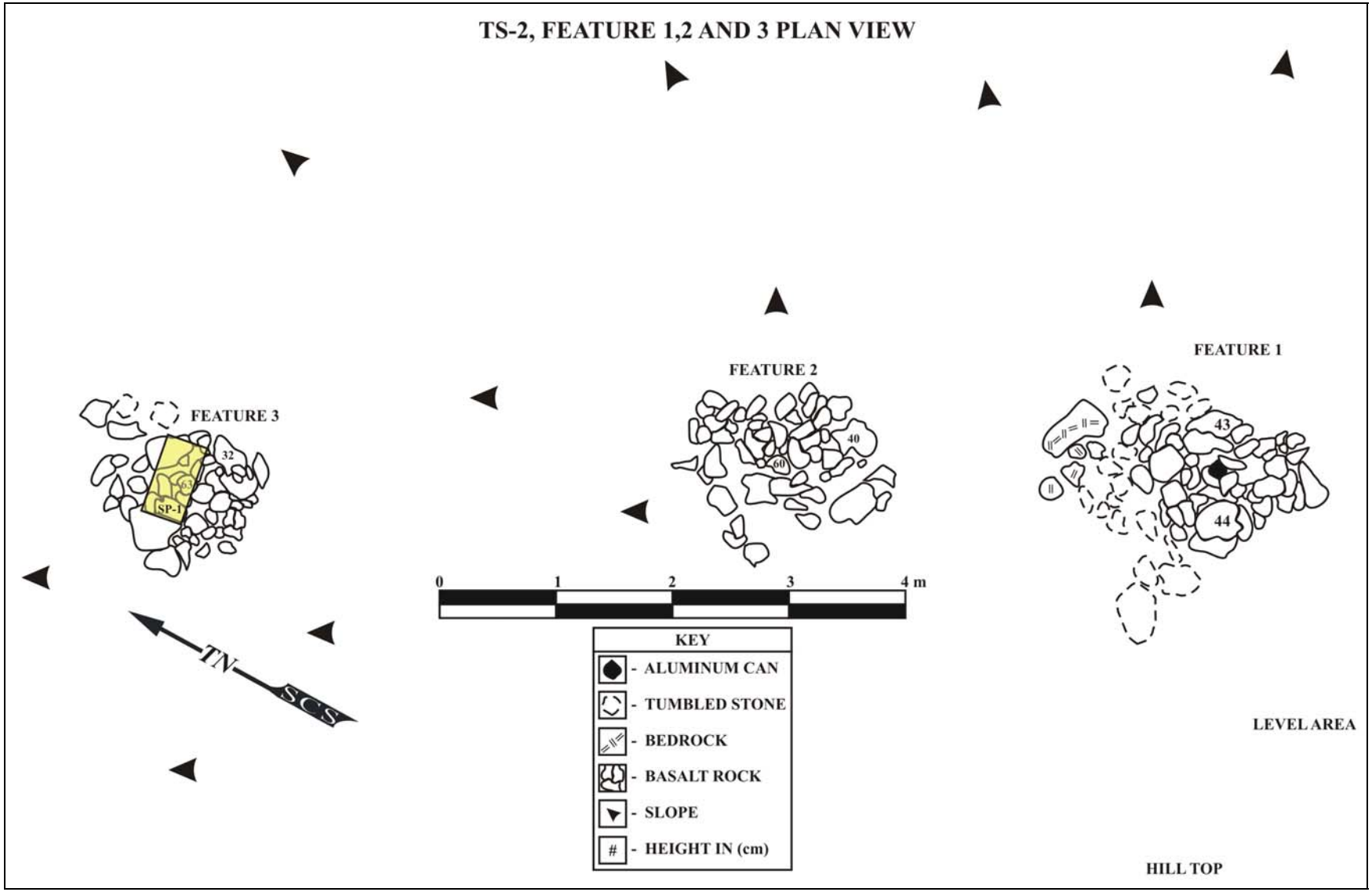

Figure 10: Plan View Map of Site -6588.

Figure 11: Photograph of Site -6588, Features 2 and 3. View to East.

Figure 12: Photograph of Site -6588, Feature 1. View to East.

Feature 1

Occurring at the apex of a small knoll, the Feature 1 mound measures 1.2 m long, 1.0 m wide, and rises to 0.44 m above the sloped surface (see Figure 10). Oriented on a northwest/southeast axis at 130º/310º, the feature consists of piled, semi-rounded and angular basalt cobbles. The feature is rounded in plan view and does not contain facing or any formalizing elements. Surface materials include only a single metal, bottle cap. This no-descript feature is similar in size and morphology to the other two mound features occurring several feet away, down the small knoll's slope. Feature 1 was not tested.

Feature 2

Occurring below Feature 1 and 1 m to the north, the Feature 2 mound measures 1.6 m long, 0.9 m wide, and rises to a maximum 0.60 m above the sloped surface of the knoll (see Figure 10). Oriented on a northwest/southeast axis at 152º/332º, the feature also consists of piled, semi-rounded and angular basalt cobbles. Feature 2 is rounded in plan view and does not contain facing or any formalizing elements. No surface materials were identified within or around this feature. Feature 2 was not tested.

Feature 3

Feature 3 occurs 3.5 m to the northwest of the Feature 2 mound and is slightly lower in elevation (two feet lower on a c. 10º slope). The Feature 3 mound measures 1.27 m long, 1.2 m wide, and rises to a maximum 0.44 m above the sloped surface (see Figures 10 and 12). Oriented on a northwest/southeast axis at 152º/332º, the feature consists of piled, semi-rounded and angular basalt cobbles. The feature is rounded in plan view and does not contain facing or any other formalizing elements. No surface materials were recovered during recording. This feature was tested, having been bisected to assess internal construction and the presence/absence of associated cultural materials in subsurface contexts.

Test Unit 1 (TU-1)

TU-1, a 0.70 by 0.50 m unit, was placed through the center of the feature and oriented on an east-west axis (see Figure 10; Figure 13). Excavation revealed one sedimentary layer, occurring above bedrock (Figure 14). This unit also revealed that the feature was solely constructed on the surface, no portions of the feature protruded into subsurface contexts. Layer I (0-20 mbs) was comprised of olive brown (2.5Y 4/4) silt with weak structure. Few micro roots were present and saprolitic gravels (decomposing bedrock) were common. No cultural materials were identified in the test unit. Excavation terminated on bedrock.

Figure 13: Photograph of Site -6588, TU-1, Feature 3. View to Southeast.

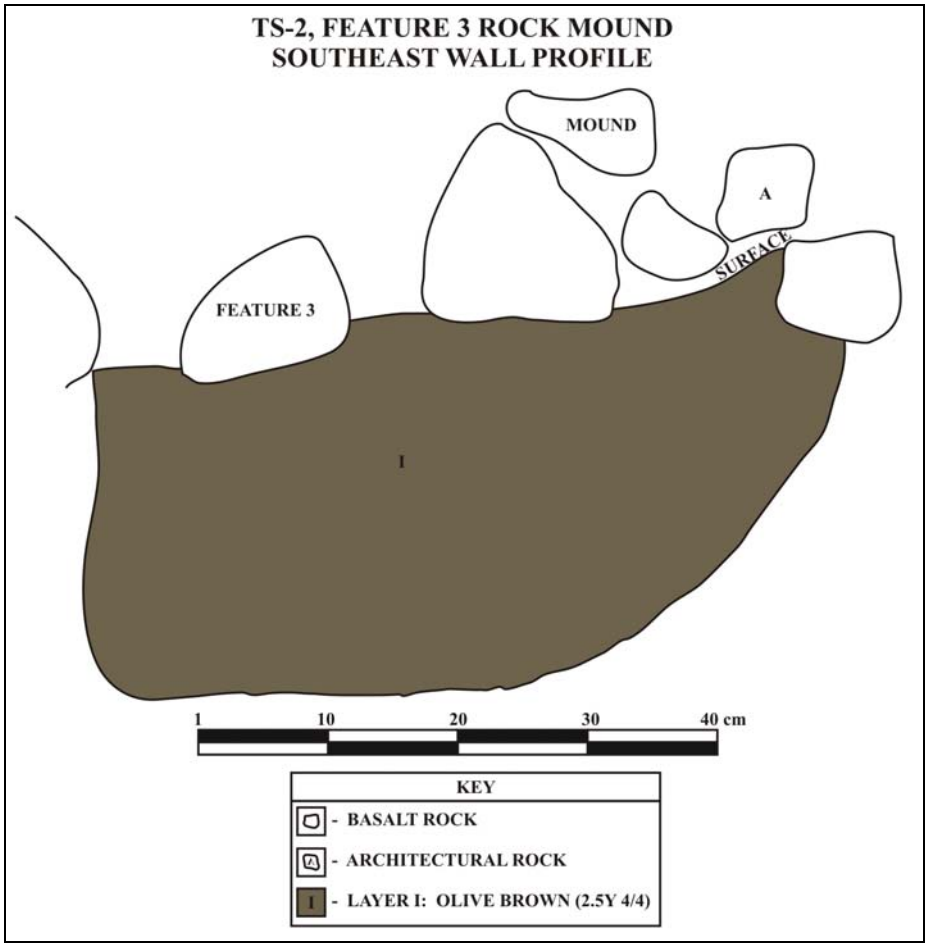

Figure 14: Stratigraphic Profile of Site -6588, TU-1, Feature 3. Southeast Wall Profile.

TMK:2-2-24:017 (39.00 ACRES)

Framed as a "peninsula"-shaped parcel of land to the south of a large drainage (Waipuilani Gulch), three sites were identified on the parcel. In addition, several previously identified sites (Tome and Dega 2002; see Figure 5) were re-located to the west of this parcel. Waipuilani Gluch did not occur within the parcel's boundaries and was only informally surveyed. Ground visibility was fairly good in this survey area, with some ground surface covered by thin grasses. Landscape modifications were also common on this parcel and took the form of mechanized work associated with informal access road construction and adjacent golf course work. A large borrow pit with concrete reinforcements was present just to the east of this parcel's eastern boundary.

A total of three sites were identified on this parcel: two modified outcrops and one free-standing wall (see Figure 1). All three single-feature sites were present in the northwestern portion of the parcel, with the modified outcrops occurring on small knolls above shallow swales and the wall occurring at the top, southern flank edge of the gulch.

SITE 50-50-10-6239

This site was identified in the northwestern-most portion of the parcel at c. 90 feet above mean sea level. Occurring on a small knoll with shallow swales to the north and western flanks, the site consisted of a linear-shaped modified outcrop (Figures 15, 16, and 17). The site measures 7.10 m long, 3.30 m wide and rises to a maximum 0.65 m above slightly undulating terrain. Oriented on a northwest/southeast axis at 120º/300º, the site was mainly comprised of outcrop with minimal stacking (1-2 courses maximum) of small basalt cobbles and boulders along its southwestern flank. The site consisted of an oval-shaped morphology and followed the outcropping itself.

Few pockets of sediment were evident within this site. No artifacts or midden deposits were identified on the site's surface and no standing or faced areas were present. No excavation was conducted due to the dearth of sediment and the low integrity of the single feature. The feature was not considered a push pile as no mechanical marks were observed on the rock segment surfaces. The site was interpreted as a modified outcrop presumably constructed during WWII times when training was conducted in the area. The site location could have served as a gun placement or observation area during the training exercises.

SITE 50-50-10-6240

This site was similar to Site -6239 yet slightly more formalized. Located near the northern terminus of the parcel at c. 100 ft above mean sea level, this single feature site consists

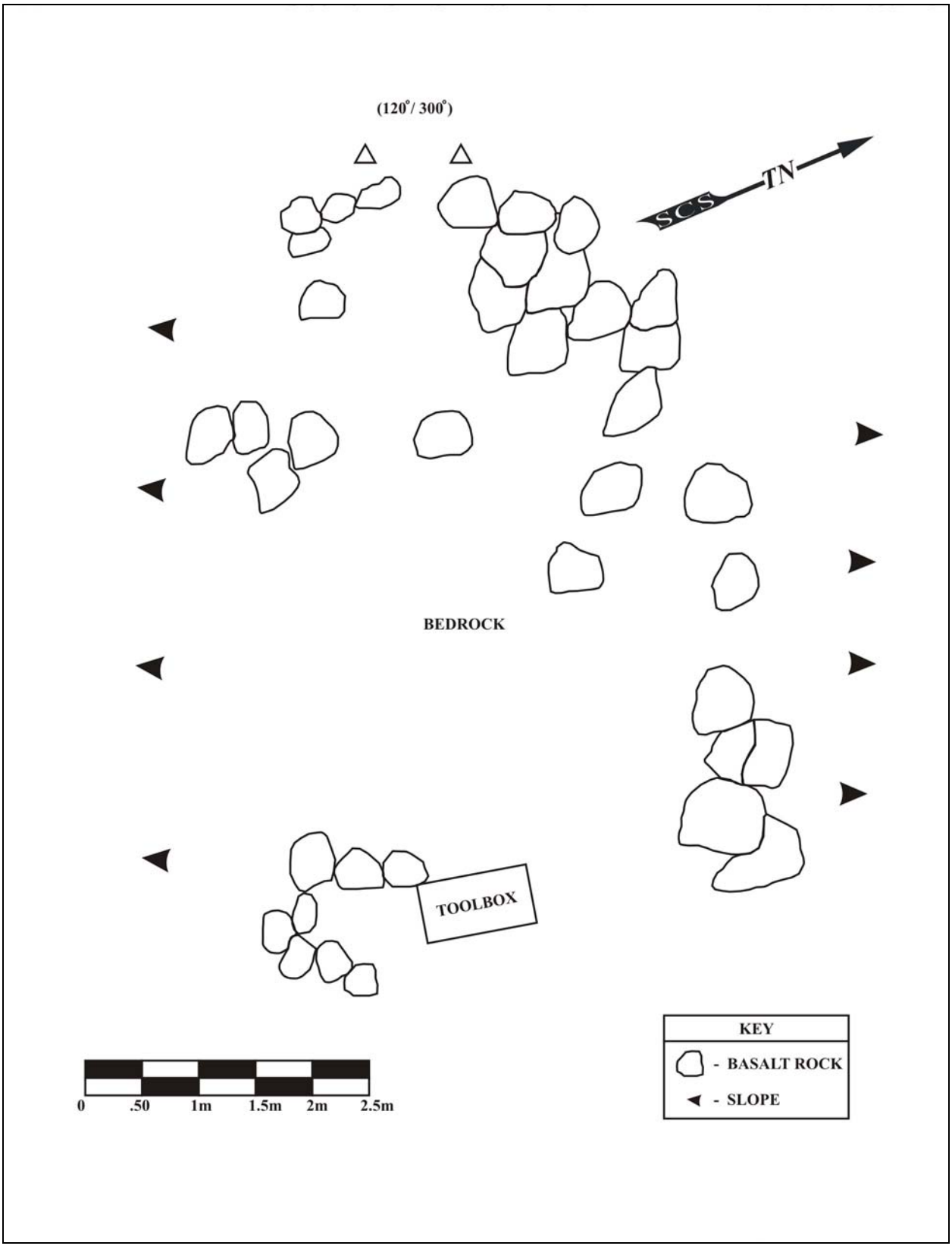

Figure 15: Planview Map of Site -6239.

Figure 16: Photographic Overview of Site –6239. View to East.

Figure 17: Photograph of Site –6239 Southwestern Profile. View to Northeast.

of a small modified outcrop (Figures 18, 19, and 20). The site measures 4.3 m long, 2.55 m wide, and to 0.70 above the ground surface. Oriented on a northeast-southwest axis at 40º/220º, the site consists of exposed bedrock with modifications in the form of 1-2 courses of small cobbles. These modifications occur on the northern flank of the site, overlooking Waipuilani Gulch. Somewhat oval in morphology, all the composite cobbles and boulders utilized in construction were not modified. Soil deposits within the site were minimal, with outcrop dominating the feature surface. No excavations were conducted at Site -6240.

The highest part of outcrop modifications occurs to the north, which provided a slight barricade overlooking the gulch. This site was interpreted as a modified outcrop associated with historic times. Like Site -6239, this single feature site was presumably constructed during WWII times when military training was conducted in the area. The site could have served as a gun placement or observation area during the training exercises and is currently is in poor-good condition.

SITE 50-50-10-6241

The single-feature site consists of a linear wall running roughly east-west along the upper, southern flank of Waipuilani Gulch from the c. 120 foot above mean sea level mark. The wall essentially demarcates the northern border of the survey area and runs along the top of the gulch, with steep sides declining to the north into the gulch base itself (Figure 21). The site measures some 120 m long, 0.60 m wide, and rises to a variable 0.35-1.20 m above the undulating ground surface. The northern, interior flank of the wall is generally higher than the southern exterior of the wall, this due to placing the wall into the slope angle. Composed of a variable 2-7 courses of fitted basalt cobbles, the site is in good condition (Figure 22). Well-preserved sections of the wall reveal 2-3 cobbles width and chinking evident along much of the higher sections. Oriented on a rough east-west axis at 70º/250º, the free-standing wall parallels the contours of the gulch ridgeline. Site -6241 was interpreted as a boundary wall that could have been utilized during ranching times to keep domesticated animals from tumbling down the sleep Waipuilani Gulch slope. That the wall follows almost exactly the upper contour of the southern gulch ridgeline leads to the inference that this is a boundary wall with some time depth. The feature is being assessed herein as a traditional-historic period wall, serving as a boundary (traditional times) or barrier (historic times).

EASEMENT SURVEY (TMK:2-2-24: POR. 012)

The final area surveyed for this Inventory Survey consisted of a corridor measuring 100 feet wide (east-west axis) by 1,400 feet (north-south axis). The easement commenced at the westernmost flank of surveyed parcel TMK:2-2-24:017 (Figure 23). This easement will

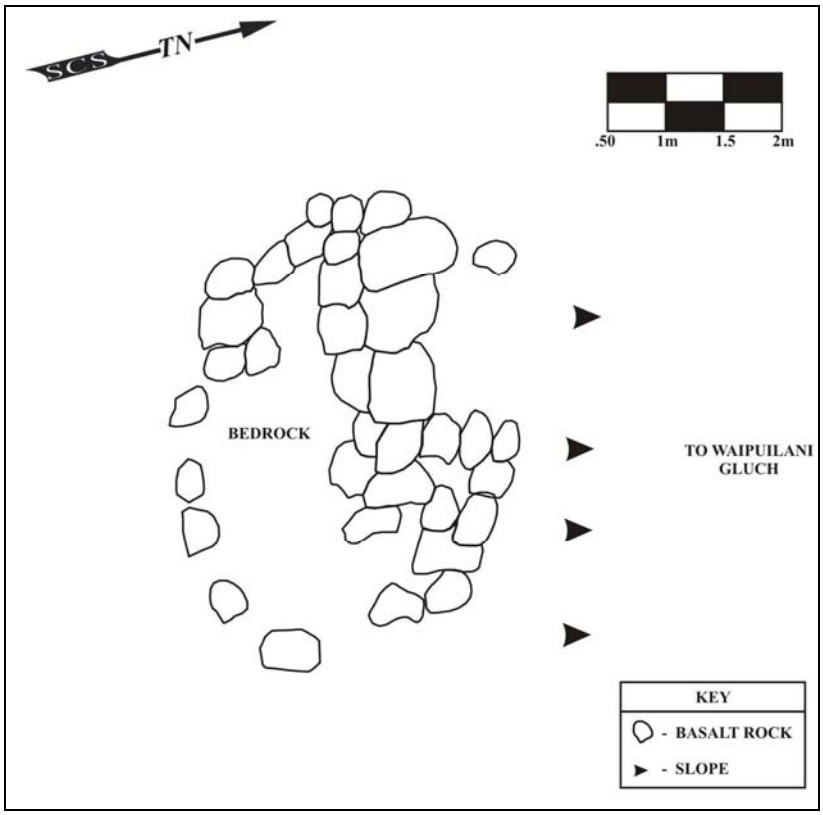

Figure 18: Planview Map of Site –6240.

Figure 19: Photographic Overview of Site –6240. View to West.

Figure 20: Photographic Overview of Site -6240. View to West.

Figure 21: Photograph of Site –6241, Top of Wall Overview. View to West.

Figure 22: Photographic of Site –6241 Wall Profile. View to East.

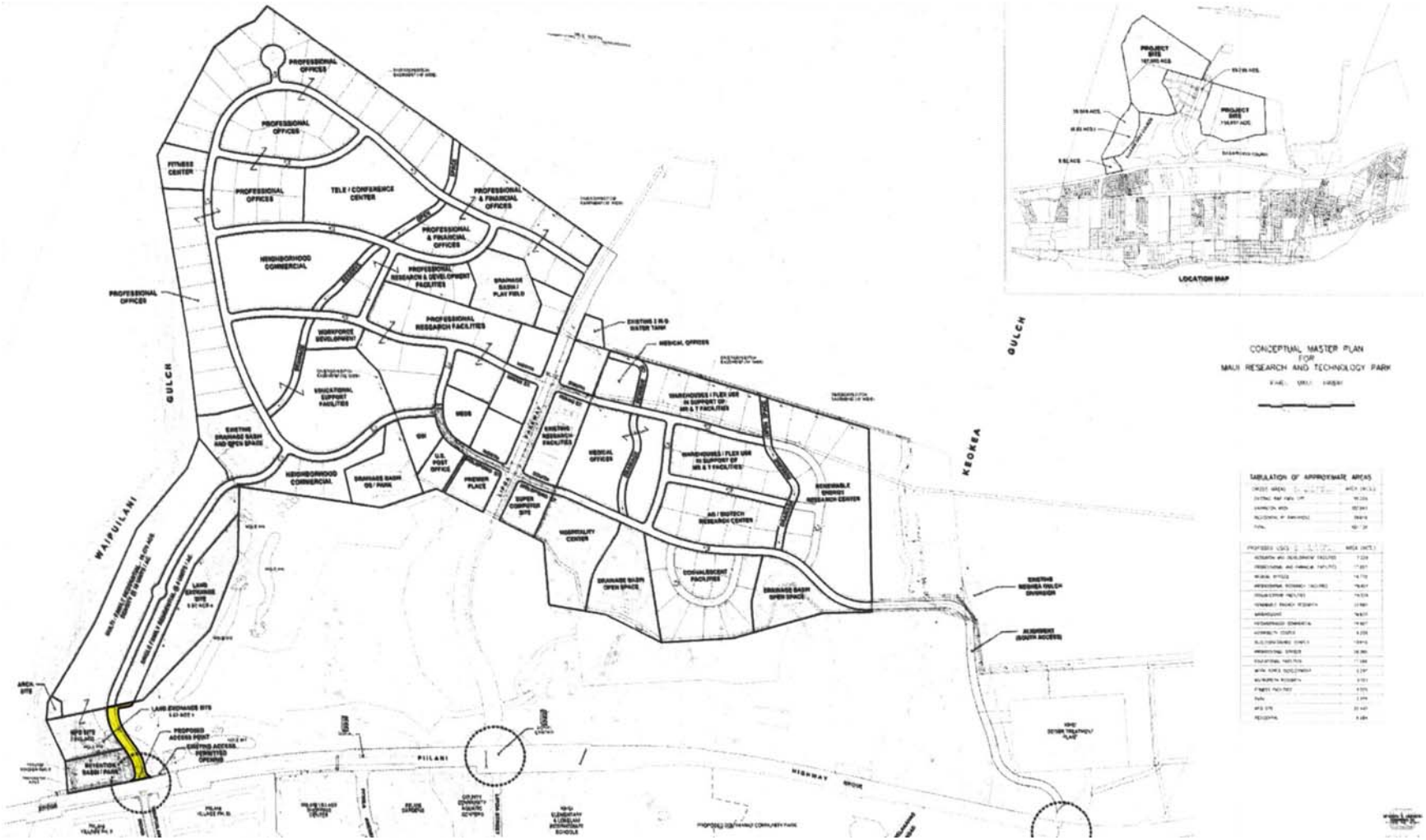

Figure 23: Planview Map Illustrating Location of Easement.

eventually consist of a neighborhood road connecting the development to Pi`ilani Highway. Full survey of the easement failed to yield any evidence of surface architecture, midden or artifact scatters, or locations potentially containing subsurface deposits. The easement area has been heavily modified due to its close proximity to the existing golf course, as well as its terminal point near the heavily used highway.

NOTABLE FEATURES OUTSIDE THE PROJECT AREA

The upper, southern ridgeline of Waipuilani Gulch essentially defines the northern boundary to the current parcel. During investigations of the Feature 3 wall, and when recording the feature from the gulch side, two rockshelters were identified on the slope of the gulch itself. These features are clearly outside the current project area but could be impacted during any work on the current parcel above (debris rolling into the gulch, over and through the rock shelters). A search of previous archaeological work in the area revealed that these features have never been recorded; they are simply noted herein. There is a recognized cultural element to the rockshelters as several basalt flakes were identified on the surface of each shelter, over a soil deposit which could yield additional cultural materials. No other archaeological features were identified along the southern slope of Waipuilani Gulch near the Site –6241 wall.

DISCUSSION AND CONCLUSION

Consistent with the "barren zone" model for pre-Contact human settlement in the Kihei area, the present Inventory Survey of some 338-acres (and one easement) in Waiohuli and Keokea Ahupua`a, Wailuku District yielded only a modest number of small sites: two modified outcrops and one free-standing wall (State Site No's –6239, -6240, and –6241 respectively) on one parcel and one L-shaped feature and three rock mounds (State Site No's. –6587 and –6588) on a second parcel. Save for TMK:2-2-24:017 (39 acres) and TMK:2-2-24:054 por. (124 acres), the four other parcels and one easement were void of sites, this presumably being the result of limited activity through time in the area, the nature of the "barren zone" itself, and landscape modification through time, particularly in recent times. Few archaeological signatures are present in this zone as a whole, particularly in subsurface contexts. While ranching activities and such may have altered the landscape of the overall zone, ranching related structures were primarily also absent in the project area (the Site -6241 wall being a possible exception). The only results of note were gleaned through survey of TMK:2-2-24-:017 and TMK:2-2-24:054 por. and informal survey of Waipuilani Gulch, beyond the southern boundary of TMK:2-2-24:por. 16 wherein two overhangs with several surface lithics were identified.

Site density in this area is minimal and often empirical evidence for the limited prehistoric activity is negligible. Features that most often have survived on this landscape are related to WWII training exercises, which were ubiquitous in the area. Three sites of the current study (-6239, -6240, -6587) have been interpreted to relate to such training. Site 6241, the free-standing wall, is also of interest. That the feature follows the contours of the upper ridgeline may allow for its interpretation as a prehistoric boundary wall. As the feature runs along the top of a steep slope also allows for re-use of the wall during ranching times as a barrier. Both interpretations appear valid at this juncture. Site -6588 is also worthy of additional discussion. The empirical record of the site is scant, but based on the nature of the features (non-descript rock mounds) having been arranged in a linear fashion, the mounds may represent location-direction markers associated with traditional times. Certainly multiple trails accessed these "barren zone" areas which connected the uplands-lowlands. Temporary habitation sites are other hallmarks of these areas containing such long distance trails (see Tome and Dega 2002a).

Finally, the paucity of features and/or cultural materials within the large project area must be addressed. The lack of prehistoric features (c-shapes and such) and historical features related to ranching or military training activities—as preserved in other, nearby parcels—may be a result of grading, bulldozing, and/or other earth-moving operations. Clear evidence of such activities is evident through multiple small roads and two-wheel tracks within the project area. There are a few relatively large push piles of boulders with large tree limbs and smaller tree trunks incorporated into these piles within each TMK of the project area and smaller rock piles also abound. Most of the latter where mechanically manufactured either through adjacent construction or during fire fighting operations.

Overall, the "barren zone" yielded expectations similar to what was originally hypothesized: several small features related to historic times (military usage), an alignment of rock mounds (prehistoric), and much landscape alteration during modern times. Certainly there is a prehistoric aspect to the landscape (see Previous Archaeology section above), herein represented by the Site -6241 wall, Site -6588 rock mounds, and the rockshelters noted outside the project area within Waipuilani Gulch. The prevailing model that temporary habitation-temporary use sites and WWII training structures predominate in the "barren zone" has not been disproved by the current research.

SIGNIFICANCE ASSESSMENTS

The following table (Table 1) present significance assessments and recommendations for the five sites identified during the current research. Mitigation recommendations are presented below.

Table 1: Site Designations, Significance Assessments, and Recommendations

State Site No. 50-50-10-	Temporary Number	# Features	Form	Function	Temporal Assessment; Significance; Recommendation
6239	TS-1	1	Modified Outcrop (linear)	Military Training (barricade or gun placement)	WW II; Criterion D; No Further Work.
6240	TS-2	1	Modified Outcrop (irregular)	Military Training (gun placement or observation area)	WW II; Criterion D; No Further Work
6241	TS-3	1	Wall (linear)	Boundary Wall	Traditional-Historic; Criterion D; No Further Work
6587	-----	1	L-Shape	Military Training (barricade or gun placement)	WW II; Criterion D; No Further Work.
6588	-----	3	Mound	Markers-Locators	Traditional; Criterion D; No Further Work

RECOMMENDATIONS

Based on the results of the present Inventory Survey, as well as the overall settlement pattern of the general "barren zone" area, no further work is recommended for five of the parcels or the easement: TMK:2-2-24:por 12, por. 14, por. 16, and por. 54. No further work is recommended for Sites -6239 and -6240 on TMK:2-2-24:017. No further work is recommended as well for Sites -6587 and 6588 on TMK:2-2-24:054 por. However, we encourage the landowner(s) to informally preserve the entirety of Site -6241 wall or portions thereof if given the opportunity. It is recommended that the wall nonetheless be bordered by orange construction fencing during construction on the parcel due to the potential for adversely impacting the two rock shelters noted on the side of the slope below, within Waipuilani Gulch. The fencing will serve to keep soil and other debris that may be mechanically moved from disturbing the unrecorded features below.

In the unlikely event that contractors or machine operators identify sites (artifacts, architecture) during initial work on these parcels in the future, they are to cease activity in that area and contact either SHPD or SCS to evaluate any finds. At this writing, there are very limited expectations for identifying any additional sites across the parcels. Finally, due to the shallow nature of project area sediment matrices, coupled with the very modest yields of subsurface testing in barren zone areas, Archaeological Monitoring is not recommended for any of the six parcels or the easement.

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