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**County of Hawaii**  
**DEPARTMENT OF PUBLIC WORKS**  
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FEB 16 P3:07

OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL

February 7, 2001

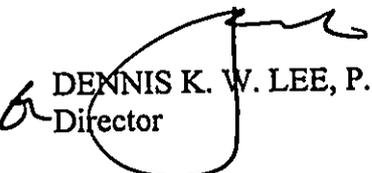
GENEVIEVE SALMONSON DIRECTOR  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL  
DEPARTMENT OF HEALTH  
STATE OF HAWAII  
235 SOUTH BERETANIA STREET SUITE 702  
HONOLULU HI 96813

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
ISLAND OF HAWAII  
FINDING OF NO SIGNIFICANT IMPACT (FONSI) AND FILING OF FINAL  
ENVIRONMENTAL ASSESSMENT

The Department of Public Works, County of Hawaii, has reviewed the comments received during the 30-day public comment period which began on November 23, 2000 on the Draft Environmental Assessment for the subject project.

The agency has determined that this project will not have significant environmental effects, and has issued a Finding of No Significant Impact (FONSI).

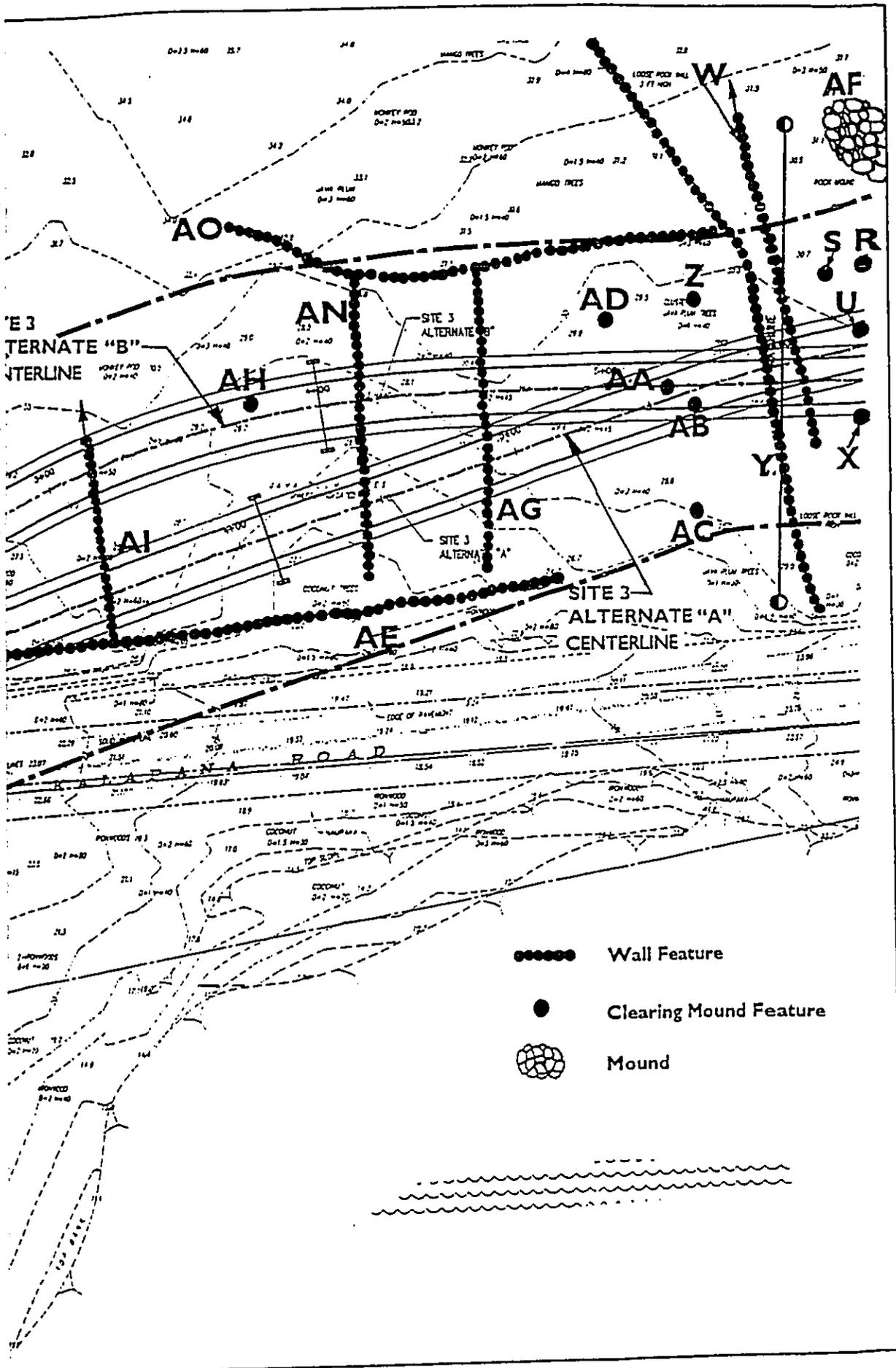
We enclosed a completed OEQC Publication Form, four (4) copies of the Final EA, and the project summary on diskette. Please call Mr. Ben Ishii of our department at (808) 961-8327 if you have any questions.

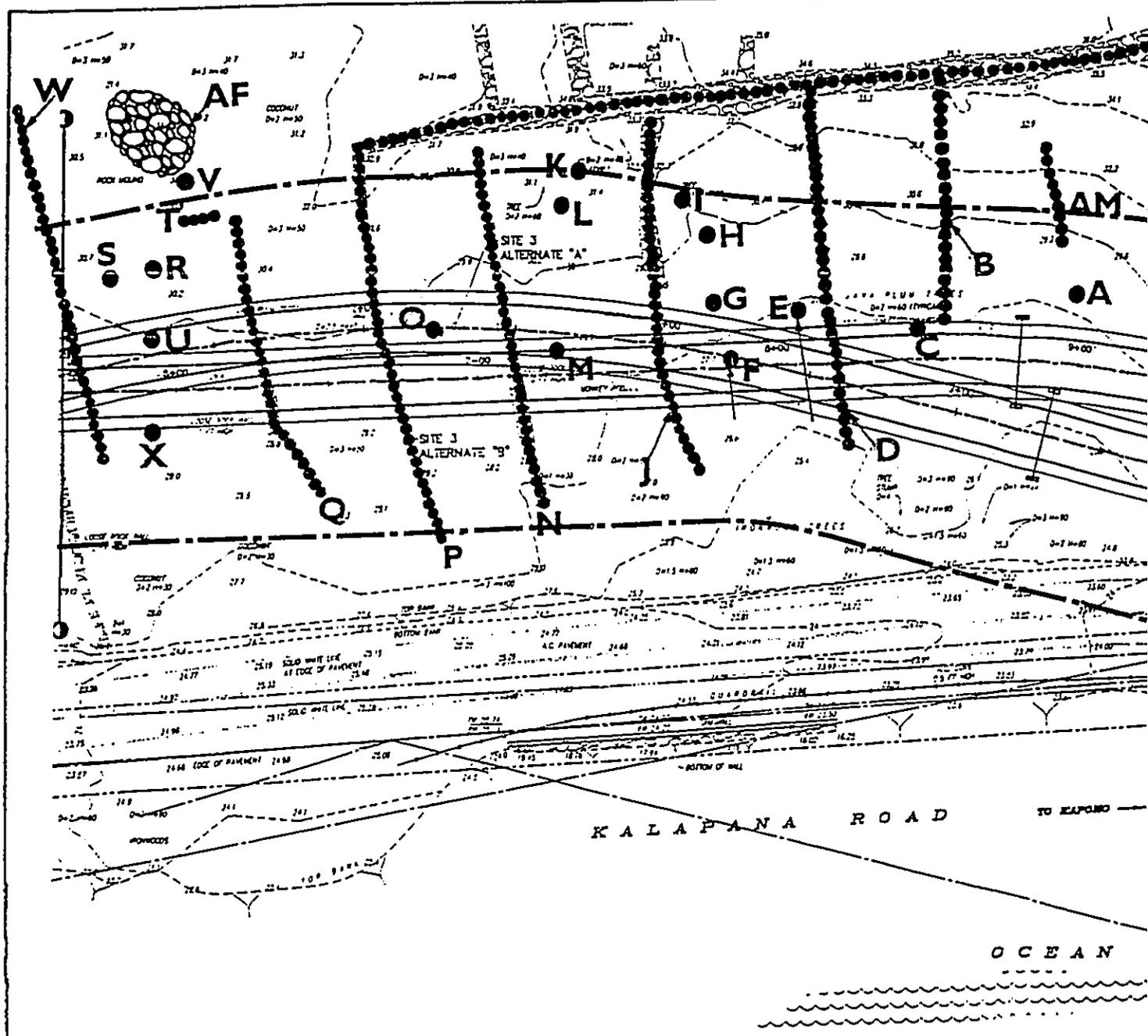
  
DENNIS K. W. LEE, P. E.  
Director

Enclosures

BI/kg

cc: Engineering Division





**Redesign Site 3**

PLAN

SIHP No. 50-10-55-22500

Figure 2b. Redesign Site 3







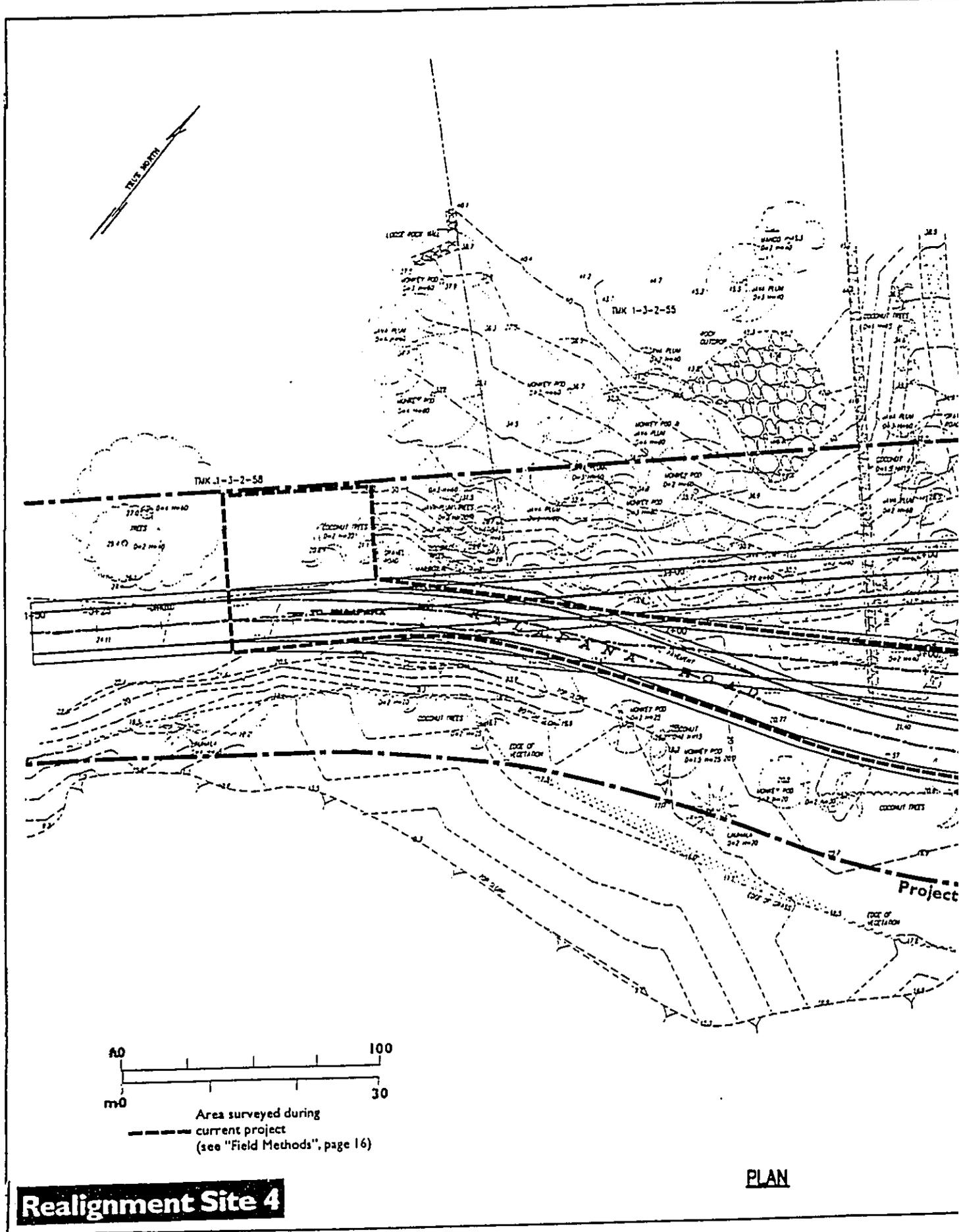
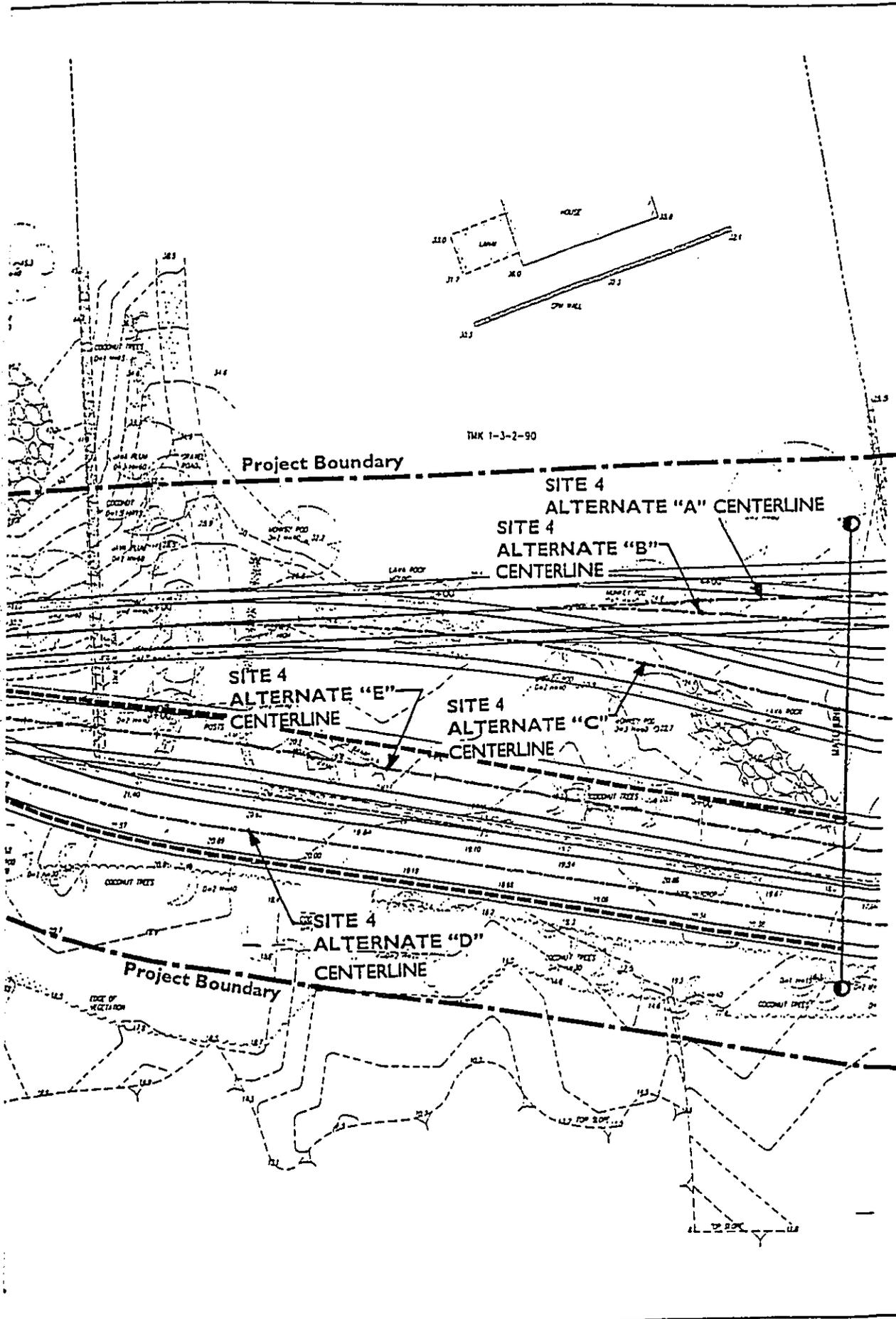


Figure 3a. Realignment Site 4



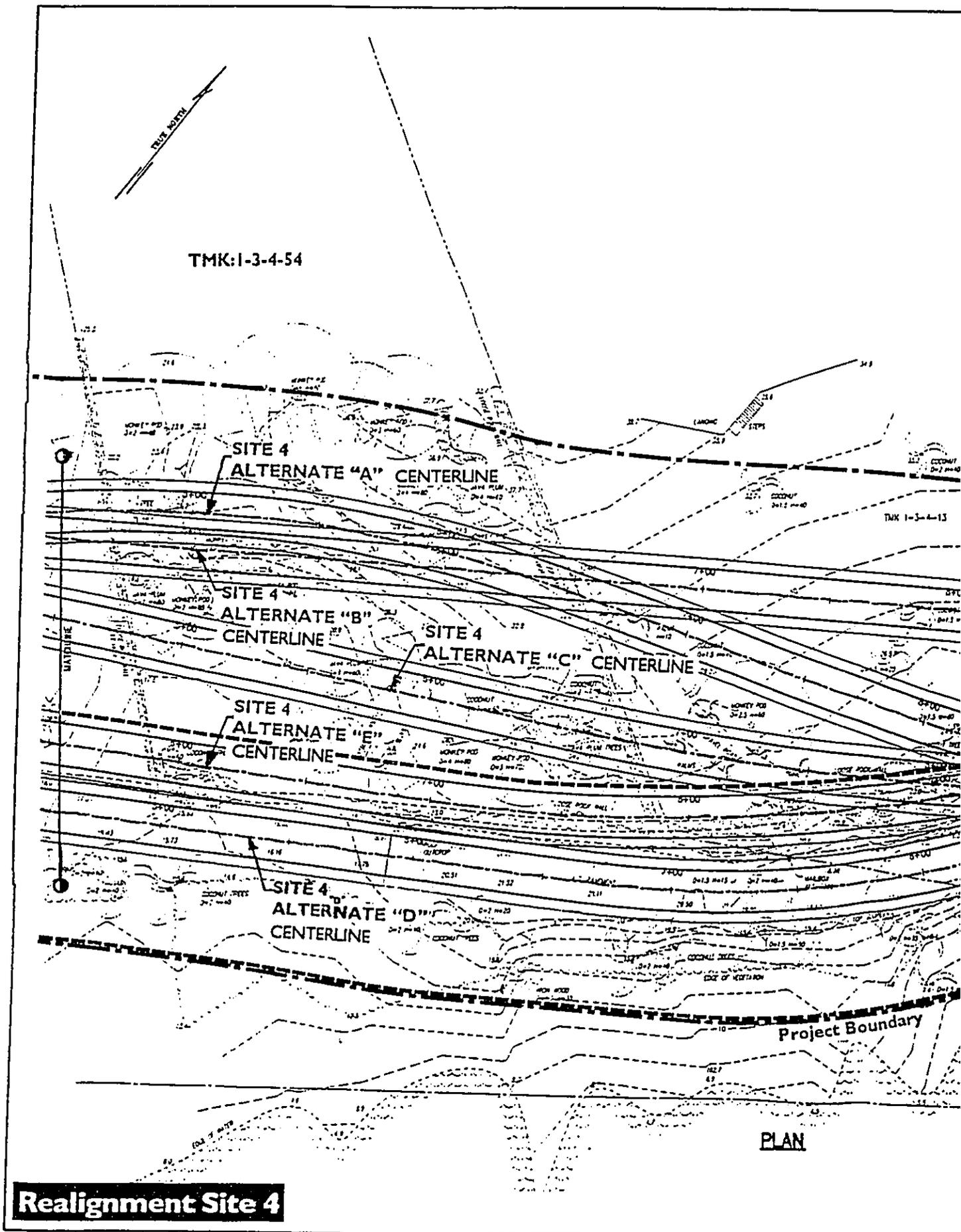
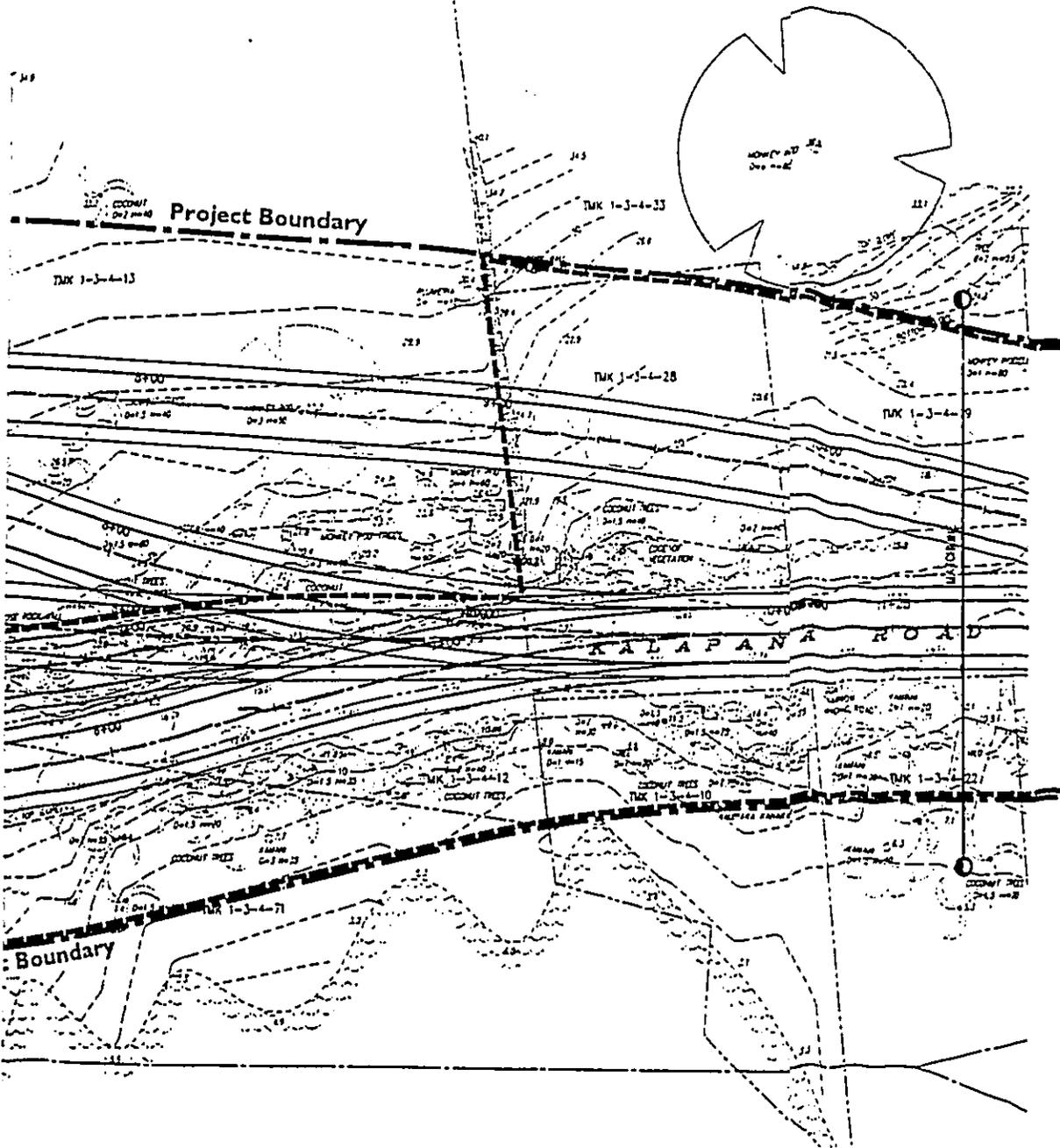
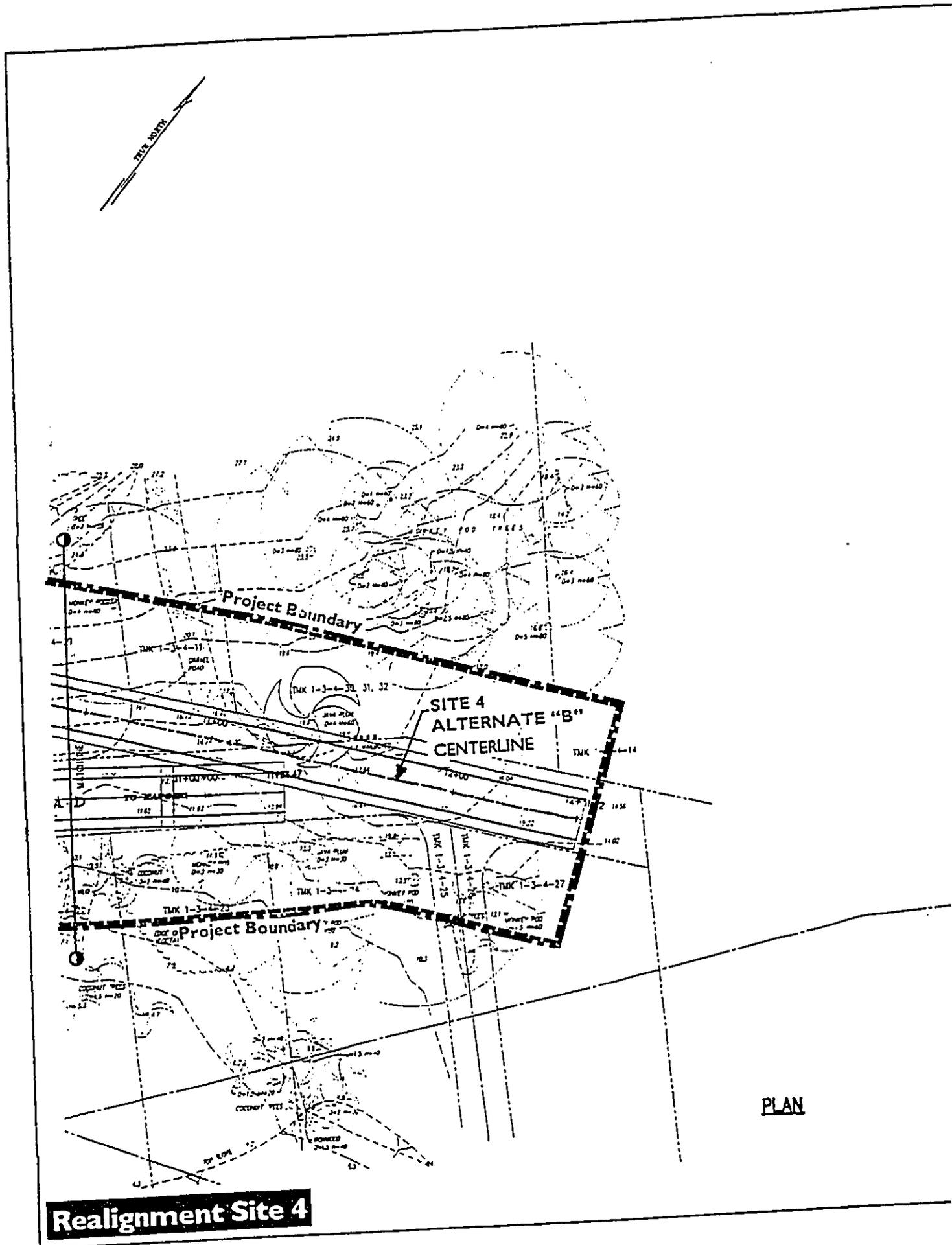


Figure 3b. Realignment Site 4



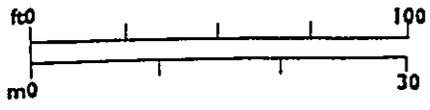
Area surveyed during  
current project  
(see "Field Methods", Page 16)





**Realignment Site 4**

Figure 3c. Realignment Site 4



----- Area surveyed during  
current project  
(see "Field Methods", page 16)

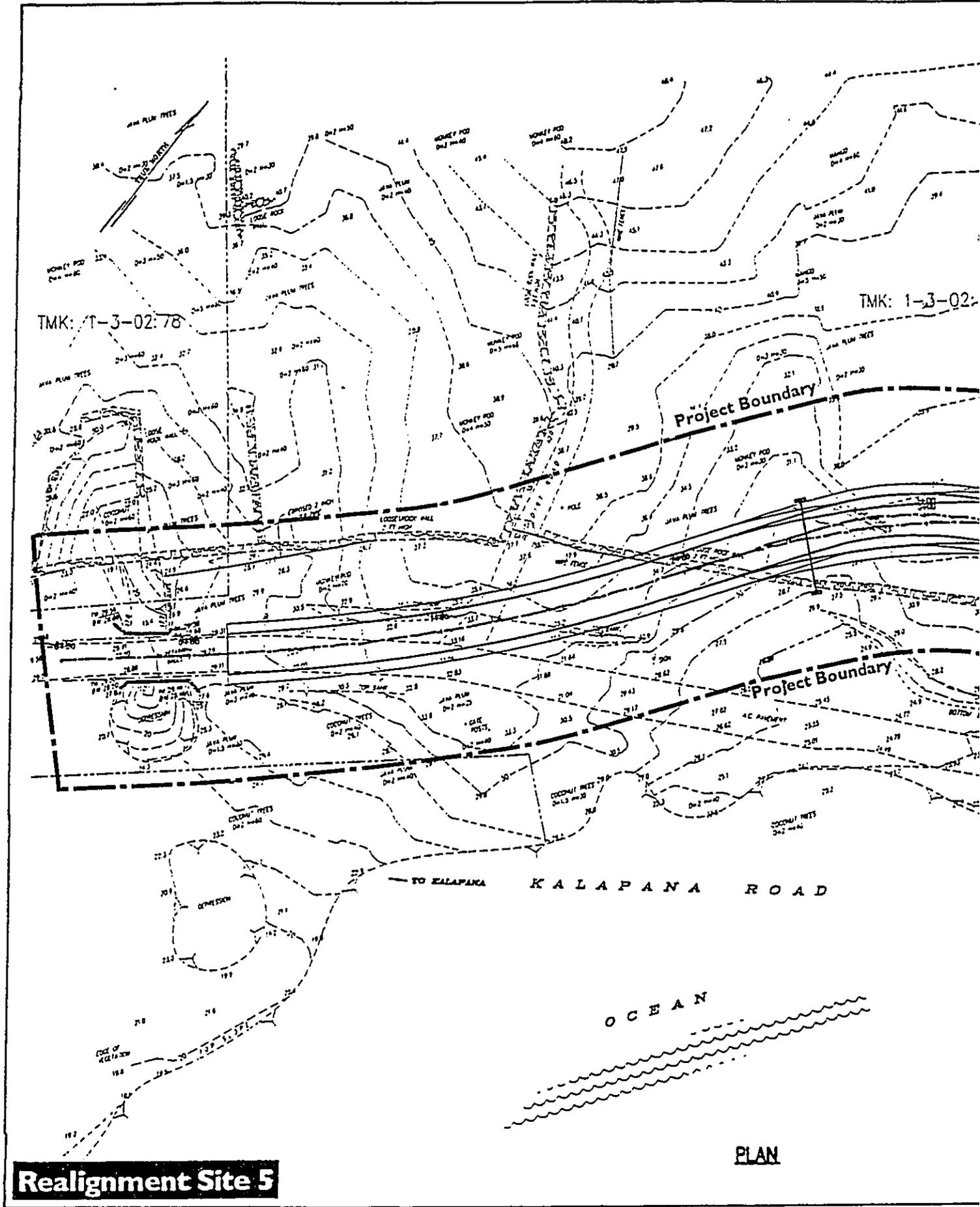
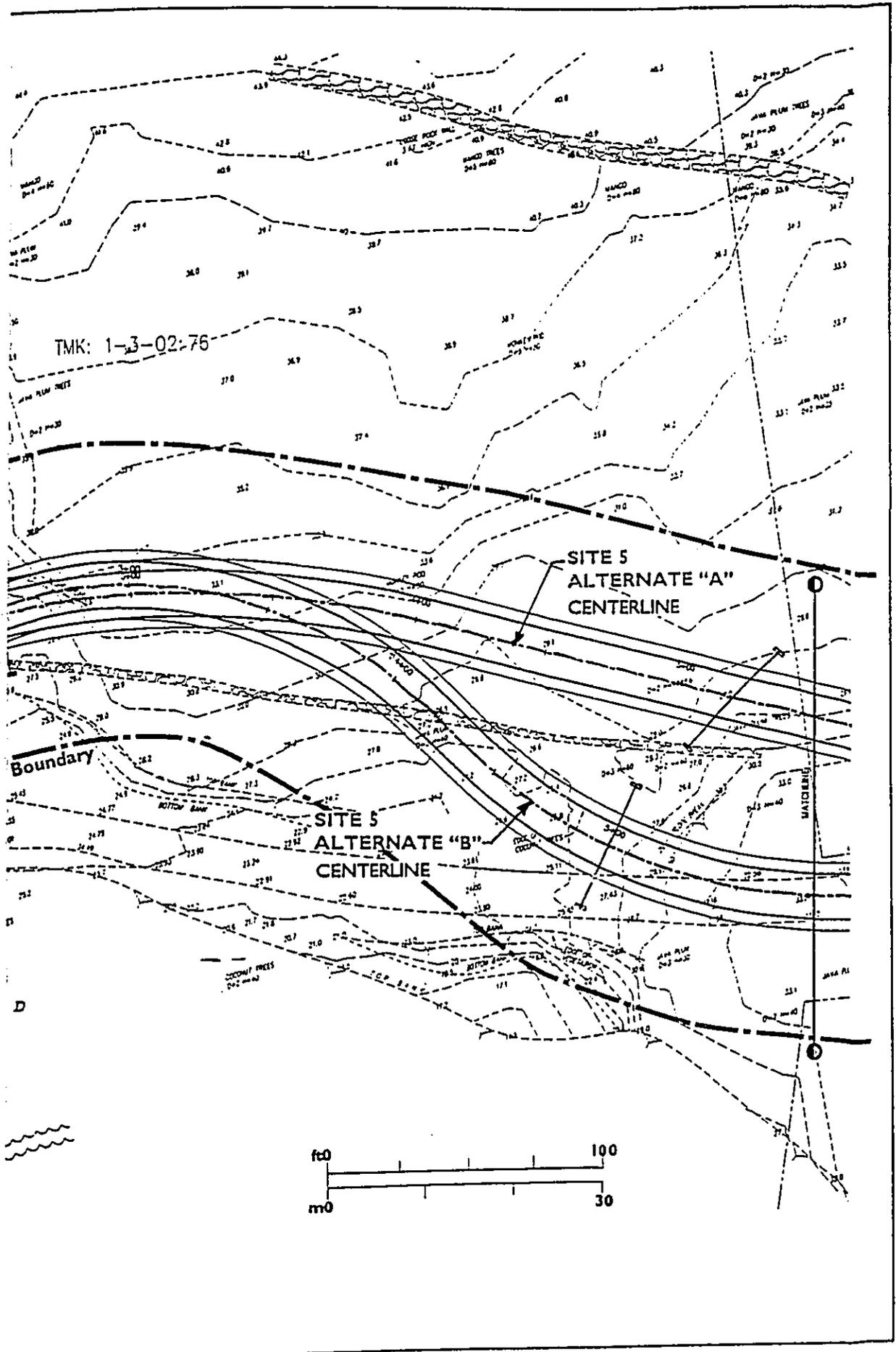
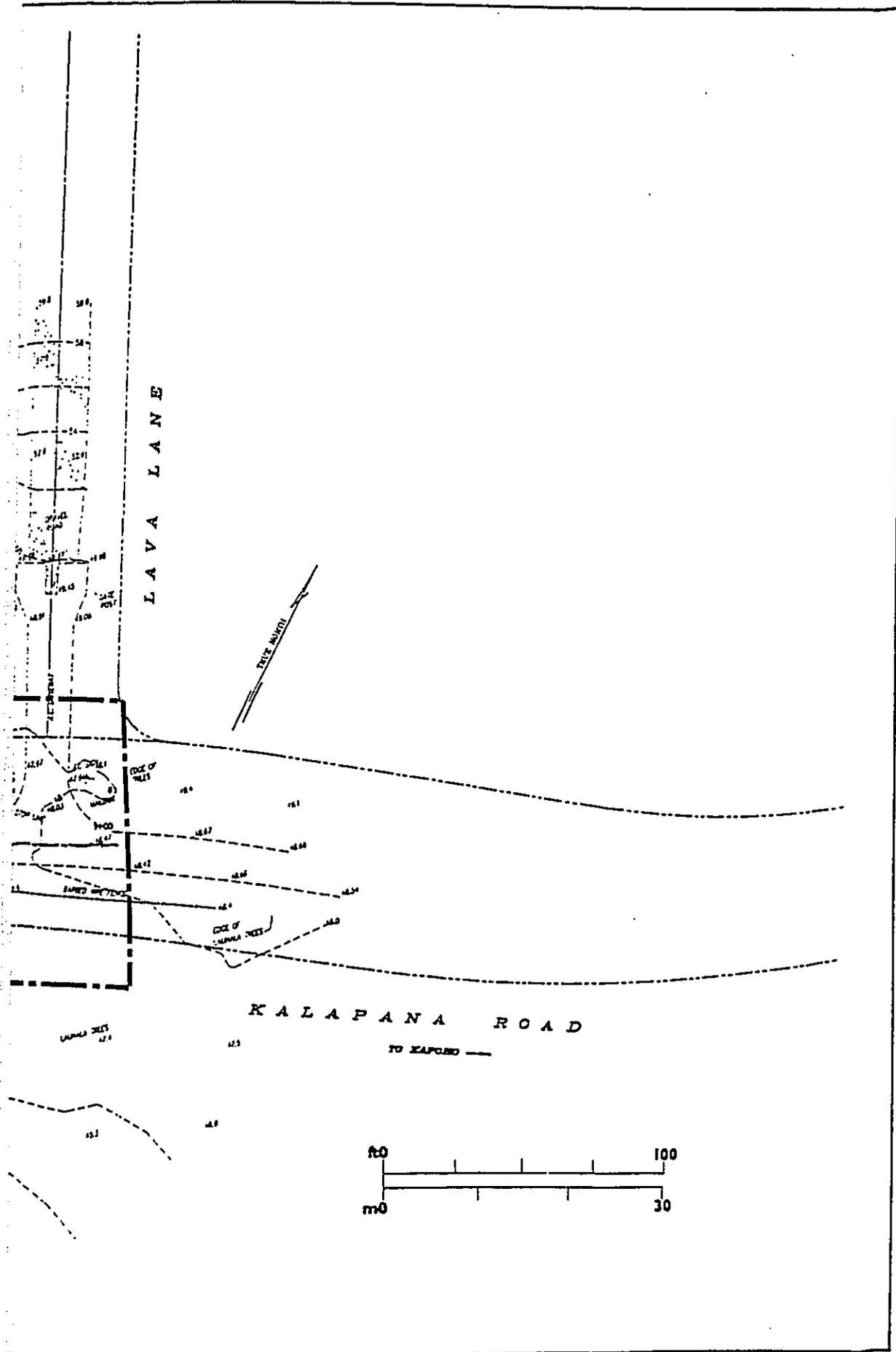


Figure 4a. Realignment Site 5







In Site 5, the predominant vegetation includes Java plum, *maile-pilau* vines (*Paederia foetida*), coconut, monkeypod, *Melochia umbellata*, and *hala* (*Pandanus tectorius*) (Char and Associates letter report, June 2000).

## PREVIOUS ARCHAEOLOGICAL RESEARCH

Very little archaeological research has been done in this area of the Puna coast. One of the earliest researchers and surveyors was John F.G. Stokes, who described and mapped both Kuki'i and Mahina'akaka Heiau (Stokes and Dye 1991). Later, Barrera and Barrere (1971) and Crozier and Barrere (1971) reported on research in the Ahupua'a of Kupahua and Pualaa (an ancient Hawaiian village), respectively. Other researchers of the Puna district include Thomas G. Thrum (1907), Alfred Hudson (n.d.), Dr. Kenneth P. Emory (Emory and Barrere et al. n.d.), Loo and Bonk (n.d.), Cox and Stasack (1970), Hansen (n.d.), and Newman (1968, 1970, 1971). *Table 1* presents researchers, areas researched, dates, and comments.

**Table 1. Summary of Previous Archaeological Research**

Date	Researcher	Area	Comments
1906	Stokes	Kula and Keahialaka Ahupua'a	Mapped Kuki'i and Mahina'akaka Heiau
1907	Thrum	Kula Ahupua'a	Described Kuki'i Heiau construction
1930-32	Hudson	Puna	Reconnaissance survey; general information on archaeology
1959	Emory et al.	Kalapana Ahupua'a	Natural and cultural history; information about history, traditions, and environment
1968	Newman	Puna (Kea'au, Kalapana, Kahuwai)	Discusses general site surveys in these areas
1970	Loo and Bonk	Kalapana Ahupua'a	Description and evaluation of significant archaeological sites, especially heiau
1971	Newman	Ahupua'a of Kalapana, Kaimū, Kamaili, Keahialaka, Kapoho, Kahuwai, Honolulu, Kea'au	Ethnohistoric account of agricultural zones, including Puna
1971	Cox and Stasack	Kahue, 'Apua, Pānau-iki Ahupua'a, Pu'u'loa, Kealakomo, Poupou Ahupua'a, Kaili'ili, Kamoamoa Ahupua'a, Pu'umanawalea, Lae'apuki Ahupua'a	Discusses petroglyphs in these areas
1971	Barrera and Barrere	Kapahua Ahupua'a	Discusses sites in Kupahua
1971	Crozier and Barrere	Pū'āla'a Ahupua'a	Discusses Hawaiian village of Pū'āla'a
n.d.	Hansen	Puna	Photographed and recorded numerous sites in Puna
1972	Bevacqua and Dye	Kapoho-Kalapana Highway	Reconnaissance of archaeological sites in Puna

## MOST PERTINENT ARCHAEOLOGICAL RESEARCH

In 1972 Bevacqua and Dye conducted an archaeological reconnaissance for the B.P. Bishop Museum (Bevacqua and Dye 1972) to locate, describe, and evaluate the archaeological sites within the corridor for the proposed Kapoho-Kalapana Highway. Forty-eight sites were recorded, consisting of two heiau, eight clusters of petroglyphs, four platforms, six enclosures, five cemeteries, three trails, 14 site complexes, two ponds, a mound, a lava tube, a coffee mill, and a village. None of the identified sites were situated within any of the three Realignment Sites examined during the current inventory survey.

Bevacqua and Dye categorized the 48 sites into four categories: (I) sites that are unique, in good condition, and exemplify a particular site type or distinguishing characteristics thereof; (II) sites that possess an apparently rich cultural deposit or may offer potential insights into certain aspects of pre-contact Hawaiian culture; (III) those of recent origin, without cultural deposits, or previously investigated, and of no general interest; and (IV) sites that are burial sites. *Table 2* and *Figure 5* present an inventory of their recorded sites, locations, and evaluation categories.

Of exceptional interest are the two recorded *heiau*: Mahina'akaka and Kuki'i Heiau. The former is a well preserved and accessible *heiau* in a coconut grove in the *ahupua'a* of Keahialaka. It is a large, rectangular, stepped platform built almost entirely of large, waterworn boulders, and measures 24 meters N-S by 40 meters E-W, with a height as great as 2.5 meters. Its surface was originally paved with waterworn stones, but was reported to have been disturbed as early as 1932 (Bevacqua and Dye 1972:15).

Kuki'i Heiau possesses a unique, dressed-stone masonry. Traditionally, it was built by Umi, one of the first rulers of the Island of Hawai'i; Umi constructed several dressed or hewn stone *heiau* around the island (Formander 1969:101-102). The *heiau* is a walled platform, 37 by 21 meters, with several dressed *pāhoehoe* slabs scattered about the perimeter. It is presently in poor condition and disturbed by erosion and vegetation.

In summary, of the 48 recorded sites, 16 had been previously recorded, eight sites were placed in category I, 13 in category II, 19 in category III, and seven in category IV. Two sites (2530 and 2540) were placed in dual categories. These sites represent the remains of a once numerous population, perhaps as much as 2,100 people (Crozier and Barrere 1971); this population was decimated by epidemics in 1848 and 1849 and natural attrition due to cultural shock.

## **HISTORICAL RESEARCH**

### ***Historical Accounts***

One of the most important historical accounts of the District of Puna is that of Reverend Ellis who, with fellow missionaries Asa Thurston and Artemas Bishop, toured the Island of Hawai'i, including the Puna coast, in 1823. He describes his travels through seven villages along the coast within the general project area: Kealakomo, Kalapana, Kaimū, Kamā'ili, 'Opihikao, Keahialaka, and Kapoho. Of Kapoho crater, he writes: "...in a high state of cultivation, planted with taro, bananas, and sugar-cane" (Ellis 1963:206). According to Ellis, the villages were pleasant and well populated, with the inhabitants employed in fishing and the growing of sweet potato, taro, sugar cane, and bananas, with hogs and dogs plentiful (Ellis 1963:188-206). Concerning the village of 'Opihikao, Ellis notes that "we arrived at Opihikao, another populous village, situated within a short distance of the sea" (Ellis 1963:200). Traveling then east, "we then proceeded about two miles, principally through cultivated grounds" (Ellis 1963:201). Thus, it appears that 'Opihikao was a populous, thriving area.

### ***Historical Documentation***

The three road corridor sites encompassed portions of TMKs that were given or sold as grants after the Great Mahele in 1848. Site 3 contains no known grants and is part of Kamehameha Schools (formerly Bernice P. Bishop Estate) lands. Site 4 (TMK 3-1-3-04), Parcel 13, contains 9.8 acres in a portion of Grant 1940; Parcel 58 contains 2.6 acres in a portion of Grant 1359; Parcel 55 contains 3.3 acres in a portion of Grant 1359; Parcel 90 contains 5.8 acres in a portion of Grant 1359; and Parcel 54 contains 1.8 acres in a portion of Grant 1359. Site 5 (TMK 3-1-3-02), Parcel 76, contains 7.0 acres in a portion of Grant 1022; Parcels 77 and 78 each contain 4.2 acres in a portion of Grant 1023: Apana 1; Parcel 6 contains 4.195 acres in a portion of Grant 1023: Apana 1; Parcel 68 contains 4.75 acres in a portion of Grant 2215: Apana 3; Parcel 108 contains 4 acres in a portion of Grant 2164: Apana 2.

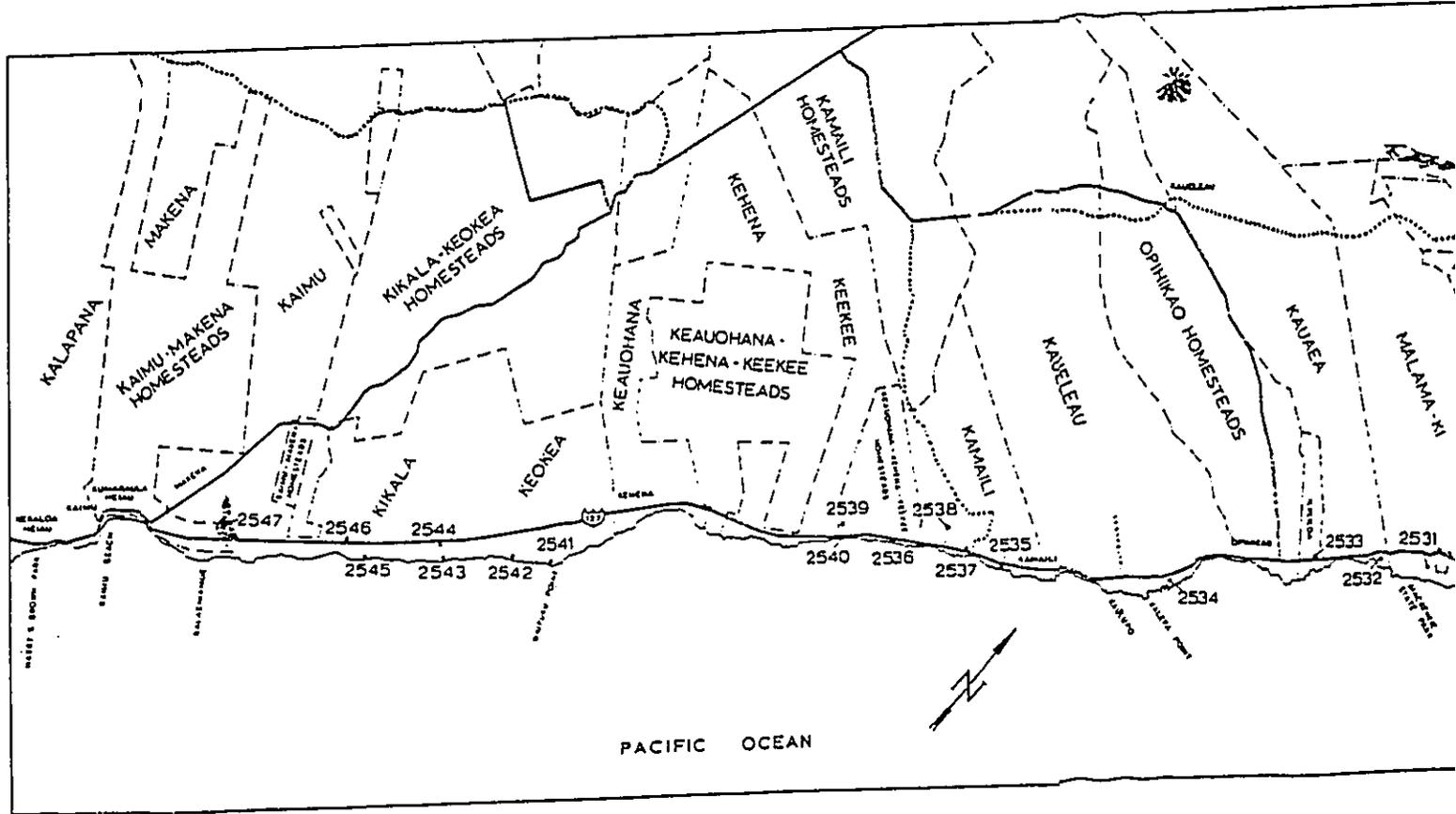
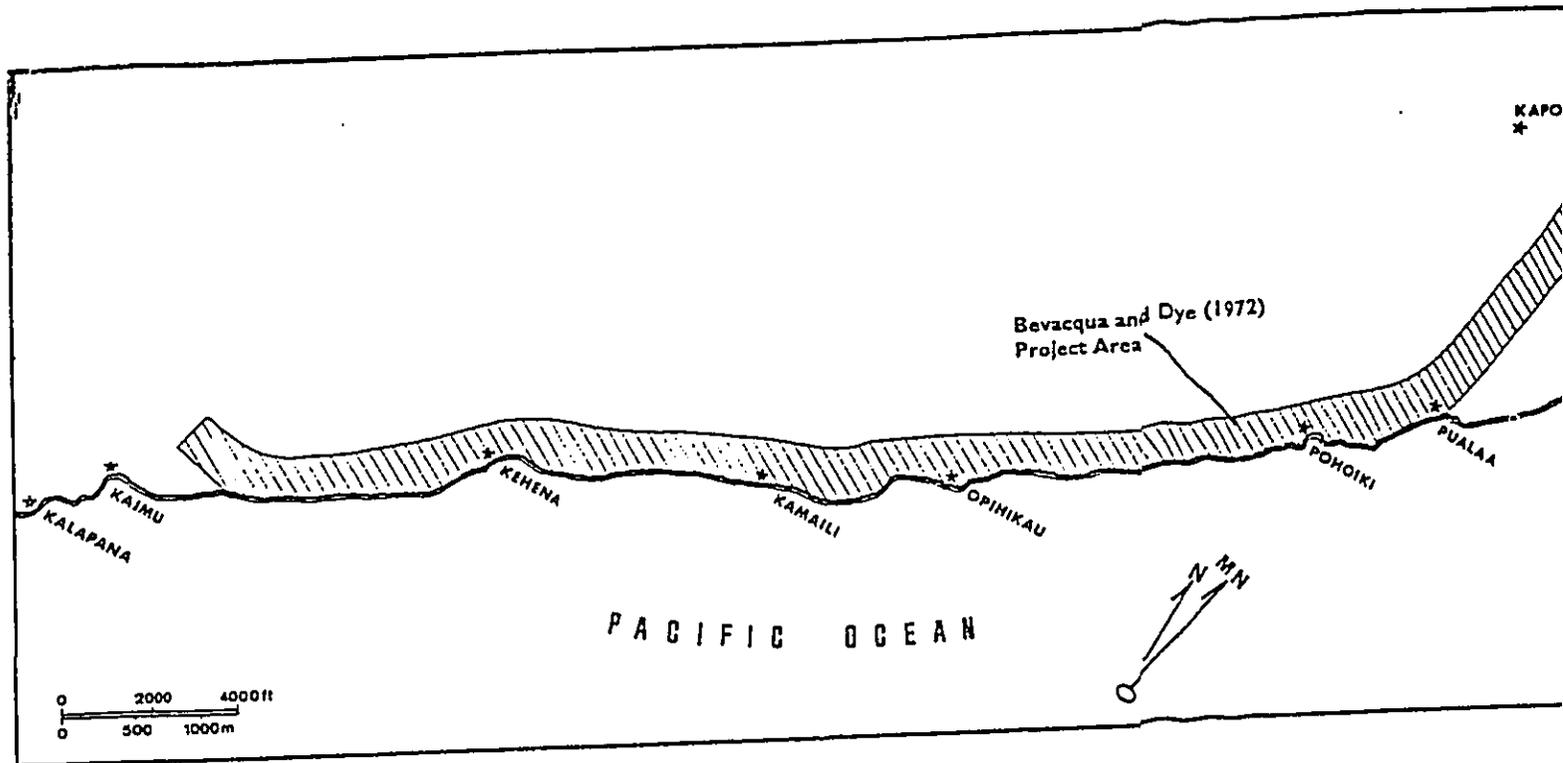
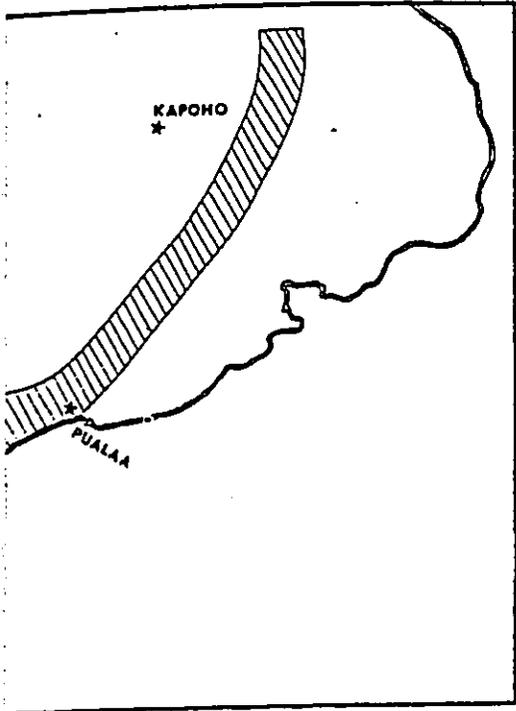
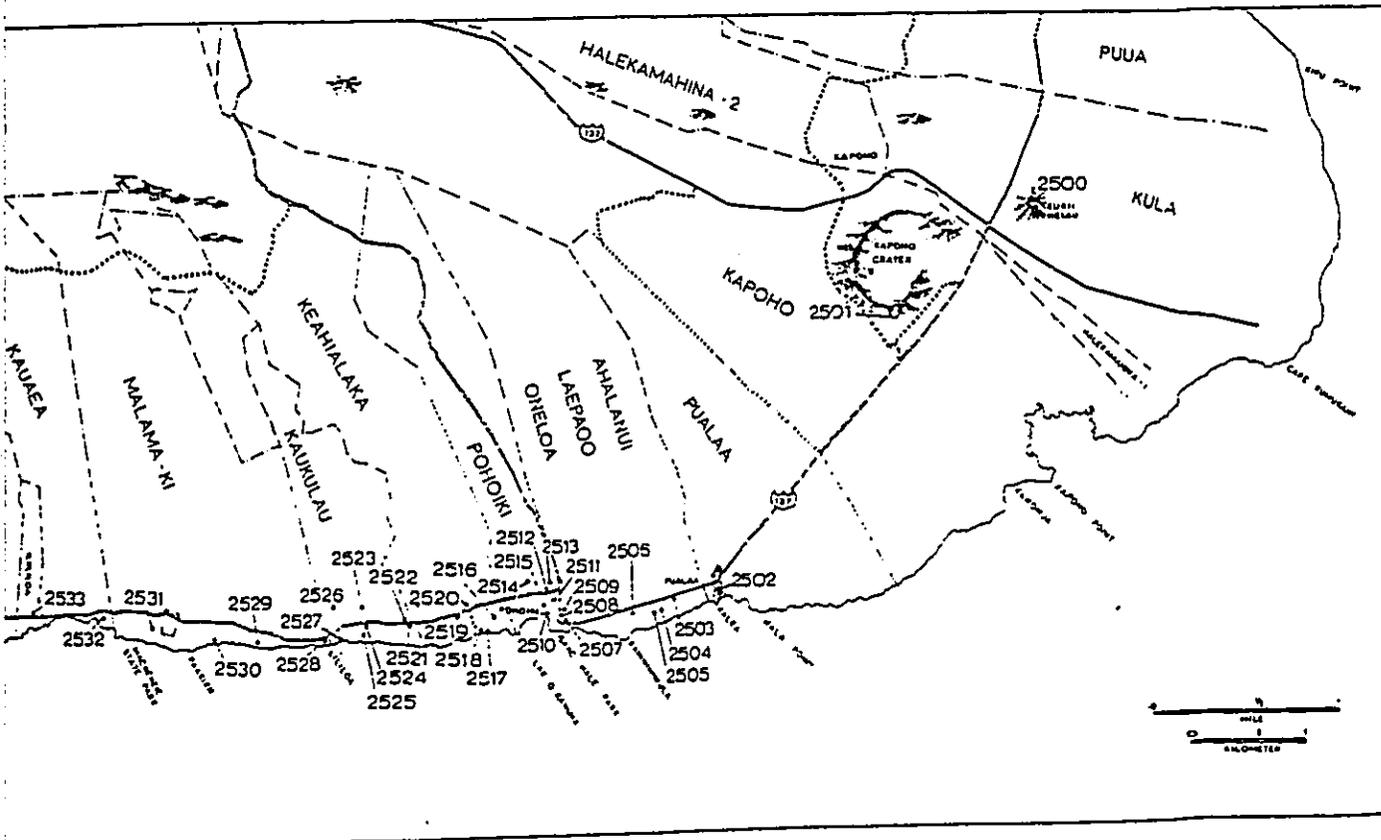


Figure 5. Sites Identified by Bevacqua and Dye (1972)



(From Bevacqua and Dye 1972)



**Table 2. Inventory of Sites and Their Evaluation Categories (from Bevacqua and Dye 1972)**

Site No.	Type of Site	Distribution within Categories				
		I	II	III	IV	None
2500	Kukii Heiau	-	x	-	-	-
2501	Kapoho Petroglyphs	x	-	-	-	-
2502	Pualaa Village	x	-	-	-	-
2503	Complex	-	-	x	-	-
2504	Platform	-	x	-	-	-
2505	Complex	-	x	-	-	-
2506	Enclosure	-	-	x	-	-
2507	Complex	-	-	x	-	-
2508	Enclosure	-	-	x	-	-
2509	Enclosure	-	-	x	-	-
2510	Pohoiki Warm Spring	-	-	-	-	x
2511	Old Coffee Mill	x	-	-	-	-
2512	Enclosure	-	-	x	-	-
2513	Enclosure	-	-	x	-	-
2514	Platform	-	-	-	x	-
2515	Complex	-	-	x	-	-
2516	Complex	-	x	-	-	-
2517	Mahinaakaka Heiau	x	-	-	-	-
2518	Keahialaka Spring and Ponds	x	-	-	-	-
2519	Hale Family Cemetery	-	-	-	x	-
2520	Complex	-	-	x	-	-
2521	Enclosure	-	-	x	-	-
2522	Complex	-	-	x	-	-
2523	Platform	x	-	-	-	-
2524	Complex	-	-	x	-	-
2525	Petroglyphs	-	x	-	-	-
2526	Lava Tube	-	-	x	-	-
2527	Petroglyphs	-	x	-	-	-
2528	Petroglyphs	-	x	-	-	-
2529	Petroglyphs	x	-	-	-	-
2530	King's Highway	x	-	x	-	-
2531	Mound	-	-	x	-	-
2532	Platform	-	x	-	-	-
2533	Complex	-	x	-	-	-
2534	Pua'akanu Cemetery	-	-	-	x	-
2535	Trail	-	x	-	-	-
2536	Complex	-	x	-	-	-
2537	Complex	-	-	x	-	-
2538	Cemetery	-	-	-	x	-
2539	Cemetery	-	-	-	x	-
2540	Kehena Beach Trail	x	-	x	-	-
2541	C-Shaped Structures	-	-	x	-	-
2542	Complex	-	-	x	-	-
2543	Complex	-	-	x	-	-
2544	Petroglyphs	-	x	-	-	-
2545	Petroglyphs	-	x	-	-	-
2546	Petroglyphs	-	-	x	-	-
2547	Kaipuuelelu Cemetery	-	-	-	x	-

## SETTLEMENT PATTERNS

The district of Puna, although having much sought after fertile soil, was always under the political shadow of the adjacent districts of Ka'ū and Hilo, and Puna's history is bound up with the fortunes of these adjacent districts. Throughout the wars and political upheavals preceding Kamehameha's unification of the islands, Puna at varying times was under the domination of the "Kona Chiefs," who were descendants of Umi and Kapukini, and the "Hilo Chiefs," who were descendants of Umi and Piikea. The latter was a daughter of Pi'ilani, the dynastic ruler of the Maui island-kingdom (Crozier and Barrere 1971:7).

Puna, as tradition implies, may have been one of the most fertile agricultural regions in Hawai'i; in relatively recent times, however, volcanic eruptions have destroyed much of the best lands (Handy 1972:539-42). In fact, tradition records eruptions near Kapoho between 1340 and 1380 and one near Kaimū between 1730 and 1754 (Stearns and MacDonald 1946:105). Where volcanoes did not cover the land, crops raised included taro, sweet potatoes, breadfruit, coconuts, and sugarcane. In the village of 'Opihikao, dry taro was grown (and was still grown as late as 1935) (Handy and Handy 1972:539-42). According to research done by Newman (1971), the entire area from Kaimū to Puala'a was part of a vast field system, whereas only scattered fields prevailed as one continues around Kipu Point (Newman 1971:337).

The year 1835 saw the arrival of the missionary Titus Coan, who assumed control of the Hilo Mission School and proselytized heavily in Hilo and Puna districts. His Christian indoctrinations were so thorough that few traditions and legends of pre-Christian Puna have survived.

Later, in late 1848 and early 1849, four island-wide epidemics occurred; these epidemics killed approximately 1,000 people in the Hilo and Puna districts. The population afterwards did not recover, and slow attrition occurred. Gradually, the native agricultural fields in Puna were abandoned.

During the Great Mahele, beginning in 1848, the lands of Puna were generally still held by Kamehameha's supporters' sons and heirs, and they became the actual owners of their lands (Crozier and Barrere 1971:16). Only two *kuleana* awards were given out in all Puna, none near the current project area. For the most part, the people continued, as they previously had, to live as tenants on land owned by the *ali'i*; but by 1850, due to disease and cultural loss, most of the land was unclaimed and had reverted back to the government (Crozier and Barrere 1971:18). In 1852, after these unclaimed lands were sold, private individuals began buying land (Barrera and Barrere 1971:8).

In the late 1800s, in other areas of Puna, away from the coast, new uses for the land evolved, including use for ranching and coffee and sugarcane cultivation. Today, the main uses of land in Puna are for cultivating papaya, anthuriums, and orchids (Bevacqua and Dye:1972).

## FIELD METHODS

The current survey was conducted on September 27-29, 2000 by Supervisory Archaeologist Alan B. Corbin, M.A., and Field Archaeologist Bruce M. Gothar. Two alternative alignments (A and B) had been specified for Realignment Sites 3 and 5, while five alternatives (A through E) had been specified for Realignment Site 4. The survey fieldwork was facilitated by large-scale (1"=50') topographic maps (one-ft contours) of each Realignment Site; these maps were provided by SFFM. The centerlines for the alignments had been staked in the field prior to the survey. In Realignment Sites 3 and 5 the survey involved pedestrian surface coverage of approximately 15 meters (50 ft) on each side of the staked centerline; thus a corridor approximately 30 meters (100 ft) was covered for each specified alignment. In

some cases, features were recorded outside of the corridor because they constituted part of the discovered extent of the field system. Because right-of-entry authorizations had not been obtained for Realignment Site 4, survey fieldwork coverage primarily focused on Alternate D (the existing raised roadway) and Alternate E, which is situated generally within 30 to 40 feet inland of the existing raised roadway (Figures 3a,b,c).

The site identified during the fieldwork (SIHP Site 22500) was recorded using a standard PHRI site recordation form, and the numerous site features were recorded using standard PHRI feature recordation forms. The detailed recording included written descriptions, measurements, and plan maps.

## FINDINGS

### SURFACE FINDINGS

During the course of the earlier reconnaissance survey, possible structural features were noted on alternate routes A and B of Realignment Site 4 (in TMK:1-3-4-54; see Figure 3b). However, these possible features could not be explored during the current inventory work due to lack of right-of-way authorization. During the current survey, coverage at Realignment Site 4 was generally restricted to Alternates D and E. No archaeological features were found during the survey of Alternates D and E. Most of Alternates A, B, and C are occupied by homes and associated landscaped areas, and it is considered unlikely any significant archaeological remains would be present in such heavily modified, developed areas.

No archaeological remains were identified at Realignment Site 5 during the survey of Alternates A and B. While it is possible that a few minor features such as low rock mounds might have been overlooked because of the dense vegetation cover, it is most unlikely that any sites or features of potential significance were missed.

Forty-one features were recorded during the project at archaeological Site 22500 (Realignment Site 3, Alternates A and B). The features are thought to be both historic and prehistoric, although most appear prehistoric (based on structural form) and to comprise a portion of a dryland agricultural complex. The prehistoric walls were all newly discovered. The features identified constitute two formal types: walls and clearing mounds. The definitions of these two formal types below are taken from Head et al. (1994):

*Mound.* This feature type is generally assumed to be associated with agriculture either as a growing area or simply as a clearing mound to create a garden space within a confined area such as a lava tube or a surface structure or enclosure.

*Wall.* A linear structure with stacked sides; usually longer than high; surface is usually flat; sides usually vertical or slightly sloping; sides may be faced; may be core-filled; and may be free-standing or abut other features.

All mounds within the project corridors or nearby appear to be agricultural clearing mounds with one exception, Feature AF, a comparatively large mound that due to size, structural form, and the presence of waterworn cobbles, may be a burial or religious structure. Feature AF is outside the boundaries of the current project area. All of the walls in the project area, whether prehistoric or historic, are free-standing and composed of rough 'a'ā boulders 10 to 25 cm average, and have somewhat to very tumbled sides. One historic wall, Feature Y, has four courses. The walls define a series of roughly rectangular field units or cultivation plots, averaging generally c. 12 to 15 meters (39 to 49 ft) in width and c. 42 to 20 meters (137-65 ft) in length; these plots extend primarily along the centerline of Alternate A, but also extend into the Alternate B corridor. Scattered low rock mounds, most likely clearing mounds, are scattered about within

the interior area of these field units. These were generally composed of rough, 'a'ā cobbles 10 to 20 cm long. Other than Feature AF, no other types of features other than agricultural were identified at Site 22500. Table 3 presents a summary of features identified at Site 22500.

## **DISCUSSION**

The average length, width, and height of the clearing mounds are 2.64, 1.95, and 0.60 m, respectively. Most of the mounds possess integrity (*integrity* as defined here refers to the present state of the feature in regards to impacts made by human forces, i.e., no bulldozing, vandalism, or modifications have taken place). It is interesting to note that many of the clearing mounds (61.5 per cent) are oriented NW/SE, thus conforming to the general trend of the walls. This may have been a deliberate act on the part of the clearers, or perhaps a subconscious, unintentional act.

The walls appear, with one exception, to be prehistoric. The prehistoric walls are generally tumbled and in poor condition. The average width is 1.00 m while the average height is 0.61 m. The average length of the walls cannot be determined, as some walls continue beyond the present project area. In one instance, a wall, Feature W, runs parallel to and three meters from, an existing historic wall, Feature Y, thus indicating that it may have been constructed to replace the existing prehistoric wall as an agricultural boundary.

## **CONCLUSION**

### **DISCUSSION**

The data collected and the appearance of the walls and clearing mounds at Site 22500 suggest that they were part of a prehistoric agricultural field system that extended from Kaimū to the west to Puala'a to the east (Newman 1971). That the Puna area was agriculturally well developed and populous is testified to by early travelers such as Ellis, Coan, Lyman, Nordhoff, and Bowser (cf. Barrera and Barrere 1971).

Site 22500 at Realignment Site 3 represents a remnant of the agricultural field system of the village of 'Opihikao. This village was mentioned by Ellis as being well populated (Ellis 1963), with dry taro being grown. Other crops generally grown in the Puna area include sweet potato, coconut, and bananas. It is possible that the clearing mounds were also used as planting mounds for sweet potatoes (cf. Handy and Handy 1972:127-132). No features, other than agricultural walls and mounds were encountered at Site 22500 with the exception of Feature AF, a larger mound, flat on top, with a slight indentation on top and containing several waterworn cobbles. This mound, as mentioned previously, lies outside the project boundary and may have a burial or religious function.

## **GENERAL SIGNIFICANCE ASSESSMENTS AND RECOMMENDED GENERAL TREATMENTS**

Site 22500 has been evaluated under the draft state rules and regulations concerning cultural resource management. The site was assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 1998: Chapter 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and must meet one or more of the following specific criteria in order to be considered significant:

**Table 3. Summary of Features Identified at Site 22500**

Feature	Feature Type	L (m)	W (m)	Ht (m)	Orientation (long axis)	Comments
A	Clearing mound	2.0	1.0	0.6	N/S	Possesses integrity; in good condition
B	Wall	25.7	0.5	0.7	N/W	Appears prehistoric; possesses integrity; very tumbled
C	Clearing mound	1.5	1.0	0.5	N/S	Possesses integrity; in good condition
D	Wall	40.0	0.5	0.5	N/W	Appears prehistoric; possesses integrity; very tumbled; width varies slightly
E	Clearing mound	1.6	1.6	0.5	-	Possesses integrity; in good condition
F	Clearing mound	1.9	1.1	0.4	N/S	Possesses integrity; in good condition
G	Clearing mound	1.9	1.1	0.4	N/S	Possesses integrity; in good condition
H	Clearing mound	3.0	1.5	0.6	E/W	Possesses integrity; in good condition
I	Clearing mound	1.6	1.2	0.4	E/W	Possesses integrity; in good condition
J	Wall	39.6	0.9-1.0	0.60-0.80	NW	Width and height vary; possesses integrity; in poor condition
K	Clearing mound	1.9	1.2	0.6	E/W	Possesses integrity; in good condition
L	Clearing mound	2.5	2.0	0.8	NE/SW	Possesses integrity; in good condition
M	Clearing mound	2.6	2.4	0.5	NE/SW	Possesses integrity; in good condition
N	Wall	36.6	1.5	0.6	NW	Appears prehistoric; possesses integrity; very tumbled; width varies slightly
O	Clearing mound	3.0	2.2	0.7	NE	Possesses integrity; in good condition
P	Wall	44.0	0.9	0.7	NW	Possesses integrity; in good condition
Q	Wall	30.0	0.9	0.6	NW	Possesses integrity; in good condition
R	Clearing mound	1.5	1.5	0.8	-	Possesses integrity; in good condition
S	Clearing mound	2.6	2.6	0.5	-	Possesses integrity; in good condition
T	Clearing mound	2.5	1.8	0.6	NE	Possesses integrity; in good condition
U	Clearing mound	2.0	1.8	0.6	E	Possesses integrity; in good condition
V	Clearing mound	3.0	1.5	0.7	NW	Possesses integrity; in good condition
W	Wall	Unk.	2.5	0.3	NW	Appears prehistoric; possesses integrity; very tumbled
X	Clearing mound	2.5	2.5	0.3	-	Possesses integrity; in good condition
Y	Wall	Unk.	0.55-0.60	0.8	NW	Appears historic; nicely constructed; four courses; runs off project boundary
Z	Clearing mound	2.0	1.5	0.5	N	-
AA	Clearing mound	2.5	1.8	0.6	NE	Possesses integrity; in good condition

**Table 3. (Continued)**

Feature	Feature Type	L (m)	W (m)	Ht (m)	Orientation (long axis)	Comments
AB	Clearing mound	1.8	1.4	0.5	NW	Possesses integrity; in good condition
AC	Clearing mound	2.5	2.5	0.5	-	Possesses integrity; in good condition
AD	Clearing mound	2.0	2.0	0.5	-	Possesses integrity; in good condition
AE	Wall	134.0	1.0	0.7	NE	Very tumbled; in poor condition; may have been damaged by construction of Kalapana Rd.
AF	Mound	8.5	8.0	1.5	NW	Large rock mound; 2 waterworn rocks; flat on top; slight depression on top; mound is outside project boundary; possesses integrity
AG	Wall	33.0	0.9	0.5	NW	Very tumbled; in poor condition
AH	Clearing mound	2.5	2.5	0.7	-	Possesses integrity; in good condition
AI	Wall	Unk.	1.0	0.7	NW	Very tumbled; in poor condition
AJ	Wall	Unk.	1.0	0.6	NW	Very tumbled; in poor condition
AK	Clearing mound	7.3	1.0	0.7	N	Possesses integrity; in good condition
AL	Clearing mound	2.0	2.0	1.0	-	Possesses integrity; in good condition
AM	Wall	12.0	0.9	0.5	NW	Very tumbled; in poor condition
AN	Wall	32.0	1.0	0.7	NW	Very tumbled; in poor condition
<b>Total: N=41</b>						

- (A) Associated with events that have made a significant contribution to the broad patterns of history;
- (B) Associated with the lives of persons significant in our past;
- (C) Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- (D) Have yielded, or is likely to yield, information important for research on prehistory or history; and
- (E) Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices one carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts-these associations being important to the group's history and cultural identity.

Site 22500 was also evaluated on the basis of major ongoing research issues revolving around general questions of chronology, settlement and exploitative patterns, site and assemblage variability, material culture and technology, diet and economy, and socio-religious values.

On the basis of the project findings, Site 22500 is assessed as provisionally significant for information content (Criterion D) and cultural value (Criterion E). The only feature at the site assessed as significant for cultural value is Feature AF, a large rock mound that may be a burial or religious structure. This feature is outside the project area and will not be affected by the construction of the road corridor; the feature will thus be preserved by avoidance. All other features of the site are assessed as significant solely for information content.

The portion of Site 22500 within the project area is recommended for limited archaeological mitigation work in the form of limited data recovery excavations. The excavations should focus on the recovery of materials for dating the agricultural complex. The recovery of such dating information would constitute sufficient recovery of significant archaeological information contained at the site; no further work would be necessary, and the portion of the site within the project area would not require preservation.

The assessments and recommendations presented here have been based on the findings of a 100% coverage, pedestrian survey. However, due to the dense vegetation in the project area, there is always the possibility, though somewhat remote, that potentially significant as yet unidentified, cultural remains could be encountered in the course of future development in the area. In such a situation, archaeological consultation should be sought immediately.

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# APPENDIX E

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## *Botanical Survey; Kalapana Roadway Realignment*

Prepared By:  
Char & Associates (October 2000)

**BOTANICAL SURVEY  
KALAPANA ROADWAY REALIGNMENT  
PUNA DISTRICT, HAWAI'I**

by

Winona P. Char

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Botanical Consultants  
Honolulu, Hawai'i

Prepared for: **SSFME ENGINEERS, INC.**

October 2000

**BOTANICAL SURVEY  
KALAPANA ROADWAY REALIGNMENT  
PUNA DISTRICT, HAWAII**

**INTRODUCTION**

A realignment of three segments along the Kalapana-Kapoho Beach Road is planned by the County of Hawai'i. Portions of the road to be realigned are subject to flooding and debris. These areas of the roadway are also subsiding.

A survey of the botanical resources found on the realignment alternatives on Site 3, Site 4, and Site 5 was conducted on 13 and 14 October 2000 by a team of three botanists. The primary objectives of the survey were to:

- 1) provide a general description of the vegetation;
- 2) inventory the flora;
- 3) search for threatened and endangered species; and
- 4) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

**SURVEY METHODS**

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. Topographic maps with the realignment alternatives identified were examined to determine terrain characteristics, access, boundaries, and reference points. The alternative roadway realignments were Liagged and staked by the survey engineers prior to our field studies.

A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, topography, drainage, disturbances, exposure, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium, and for comparison with the recent taxonomic literature.

## DESCRIPTION OF THE VEGETATION

Mixed lowland forests extend from the Kalapana area to Kapoho and on towards Hilo (Char and Lamoureux 1985). It is fragmented by villages, subdivisions, cultivated lands, and lava flows. These lowland forests have been strongly influenced by humans. The early Polynesians introduced trees and shrubs such as niu or coconut (*Cocos nucifera*), kukui (*Aleurites moluccana*), kamani (*Calophyllum inophyllum*), 'ulu or breadfruit (*Artocarpus altilis*), 'ohi'a 'ai or mountain apple (*Syzygium malaccensis*), and noni (*Morinda citrifolia*). Later post-Cook introductions included trees and shrubs of Java plum (*Syzygium cuminii*), mango (*Mangifera indica*), guava (*Psidium guajava*), strawberry guava (*Psidium cattleianum*), Christmas berry (*Schinus terebinthifolius*), and avocado (*Persea americana*). Forestry plantings of such trees as albizia (*Falcataria moluccana*), ironwood (*Casuarina eguiseifolia*), guarumo (*Cecropia obtusifolia*), *Melochia umbellata*, and gunpowder tree (*Trema occidentalis*) were also made; most of these species have naturalized and spread.

On Sites 3 and 5, mixed lowland forest dominated by introduced species covers the majority of the sites. On Site 4, most of the vegetation consists of maintained, grassy lawns with landscape plantings found around the homes in the area. A few smaller areas support a mixed forest of introduced species. A list of all the plants found on the unmaintained portions of the three sites is presented in the checklist at the end of the report.

### Site 3

Site 3 is located west of Mackenzie State Park on Bishop Estate lands. Two realignment alternatives (Alternate "A" and Alternate "B") are being considered.

Both realignments pass through mixed lowland forest dominated by introduced plants. On this site, *Melochia umbellata* trees are abundant. Other trees such as Java plum, guarumo, and gunpowder tree are occasional. The understory vegetation is very dense with thickets of guava, strawberry guava, Christmas berry, and sourbush (*Pluchea carolinensis*). Ground cover consists of shade-tolerant species such as basket grass (*Oplismenus hirtellus*), sword fern (*Nephrolepis multiflora*), impatiens (*Impatiens wallerana*), Hilo grass (*Paspalum conjugatum*), and laua'e fern (*Phymatosorus scolopendria*).

Where the realignments come closer to the existing road, ironwood trees, 40 to 70 feet tall, line both sides of the existing roadway. Small groves of coconut are also found here. The understory vegetation in these more open areas consists of naupaka shrubs (*Scaevola sericea*) with saplings of the trees mentioned above and scattered mats of California grass (*Brachiaria mutica*). A dense thicket of hau (*Hibiscus tiliaceus*) is found along the existing roadway on the western end.

### Site 4

Site 4 is located between Sites 3 and 5. Most of the lots bordering the existing roadway support homes and maintained areas. Large stands of very old monkeypod trees (*Samanea saman*), 30 to 80 feet tall, are found here. Commonly observed ornamental plantings include various *Hibiscus*, *Plumeria*, and *Bougainvillea* cultivars, ti leaf, a number of different palm species, pineapple, banana, etc. Four of the alternative roadway realignments (Alternate "A" to "C" and "E") would cross

some parts of these maintained areas. Alternate "D" would follow along or close to the existing roadway.

Unmaintained parcels mauka of the existing roadway support mixed lowland forest, 40 to 70 feet tall. Java plum and monkeypod trees are common. A number of ornamental species have spread into these forested areas; these include Indian shot (*Canna indica*), ape (*Alocasia macrorrhiza*), *Philodendron* sp., and painted copperleaf (*Acalypha hispida*).

Along the makai side of the existing roadway, the vegetation consists primarily of naupaka shrubs, coconut trees, and fairly large clumps of *Hymenocallis littoralis*, a member of the lily family with large, white flowers. Besides the naupaka several other native species can be found here. These include the 'ahu'awa sedge (*Cyperus javanicus*), the beach pea or nanea (*Vigna marina*), and *Fimbristylis cymosa*, a low, rounded sedge.

Along the roadway, the vegetation is a weedy mixture of plants which is periodically mowed. Plants found here include California grass, sensitive plant (*Mimosa pudica*), Panama paspalum (*Paspalum fimbriatum*), Hilo grass, wiregrass (*Eleusine indica*), and two species of spurge (*Chamaesyce hirta*, *C. prostrata*).

#### Site 5

Mile marker 17 is found on this site located west of Lava Lane. Two alternate realignments (Alternate "A" and "B") are being considered for Site 5. Both cross mixed lowland forest.

Java plum trees, 20 to 40 feet tall, are abundant to common. Other trees scattered through the site include hala (*Pandanus tectorius*), monkeypod, gunpowder tree, and kukui. *Melochia* is locally abundant, forming small stands here and there. Small

groves of coconut are also frequent. Shrubs of noni and guava, to 12 feet tall, are common. Ground cover is dense, and often 5 to 6 feet tall in places. Commonly observed species include sword fern, lantana (*Lantana camara*), basket grass, Hilo grass, saplings of the tree and shrub species mentioned above, Spanish clover (*Desmodium incanum*), and dense tangles of maile pilau vine (*Paederia foetida*).

## DISCUSSION AND RECOMMENDATIONS

The vegetation on all three sites for the proposed alternative roadway realignments is dominated by mixed forests composed of introduced species such as Java plum, *Melochia*, monkeypod, guarumo, guava, and strawberry guava. Scattered groves of coconut and plantings of ironwood are also found on the sites.

A total of 94 species were inventoried on the alternative realignments. Of these, 75 (80%) are introduced or alien species; 7 (7%) are originally of Polynesian introduction; and 12 (13%) are native. All the native species are indigenous, that is, they are native to the Hawaiian Islands and elsewhere. These are the 'ekaha or bird's-nest fern (*Asplenium nidus*), kou (*Cordia subcordata*), seabean or ka'e'e (*Mucuna gigantea*), koali 'awa (*Ipomoea indica*), nanea (*Vigna marina*), naupaka (*Scaevola sericea*), hau (*Hibiscus tiliaceus*), milo (*Thespesia populnea*), 'ahu'awa (*Cyperus javanicus*), *Cyperus polystachyos*, *Fimbristylis cymosa*, and hala (*Pandanus tectorius*).

No threatened and endangered species or species of concern (U.S. Fish and Wildlife Service 1999) were encountered. The endangered Hilo ischaemum (*Ischaemum umbryone*), a grass, is known from the Kalapana coastline (Char & Lamoureux 1985; U.S. Fish and Wildlife Service 1996), but is not found on the three study sites. A small colony of *Ischaemum* can be found near mile marker 13 in the Malama-Ki Forest Reserve, outside of the study sites (Char & Lamoureux 1985).

Given the findings above, the proposed alternative roadway realignments are not expected to have a significant negative impact on the botanical resources. There are no botanical reasons to impose any restrictions, conditions, or impediments to the proposed project. If areas cleared of vegetation need to be revegetated, then Hilo grass or Bermuda grass (*Cynodon dactylon*) are recommended. Both grasses already occur along the existing roadway and tend to form fairly dense, low mats.

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## PLANT SPECIES LIST — Kalapana Roadway Realignment

The following checklist is an inventory of the plants observed during the field studies. The plant names are arranged alphabetically by families within each of three groups: Ferns and Fern Allies, Dicots, and Monocots. The taxonomy and nomenclature of the Ferns and Fern Allies follow Lamoureux (1988), while the flowering plants, Dicots and Monocots, are in accordance with Wagner *et al.* (1990). The few recent name changes follow those reported in the Hawaii Biological Survey series (Evenhuis and Miller, 1995-1998; Evenhuis and Eldredge, 1999-2000).

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name(s), when known.
3. Biogeographic status. The following information is provided:
  - I = indigenous = native to the Hawaiian Islands and also elsewhere.
  - I? = questionably indigenous = data not clear if dispersal to islands by natural or human-related mechanisms, but weight of evidence suggests probably natural.
  - P = Polynesian introduction = plants originally of Polynesian introduction prior to Western contact, that is, Cook's discovery of the Islands in 1778.
  - P? = questionably a Polynesian introduction = may be a Polynesian introduction, or possibly introduced shortly after Western contact.
  - X = introduced or alien = all those plants brought to the islands by humans, intentionally or accidentally, after Western contact.
  - X? = questionably introduced = dates of introduction unclear; could possibly be indigenous or a Polynesian introduction.
4. Presence (+) or absence (-) of a particular species within each of the three study sites.





<u>Scientific name</u>	<u>Common name</u>	<u>Site</u>				
		<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
<b>CONVOLVULACEAE (Morning-glory family)</b>						
<i>Ipomoea alba</i> L.	moonflower, koali pehu	X	-	+	+	
<i>Ipomoea indica</i> (J. Burm.) Merr.	koali 'awa, koali 'awahia	I	-	+	+	
<b>CRASSULACEAE (Orpine family)</b>						
<i>Kalanchoe pinnata</i> (Lamb.) Pers.	air plant, life plant, 'oliwa ku kahakai	X	-	-	+	
<b>CUCURBITACEAE (Gourd family)</b>						
<i>Momordica charantia</i> L.	wild bittermelon	X	+	-	-	
<b>EUPHORBIACEAE (Spurge family)</b>						
<i>Acalypha wilkesiana</i> Muell.-Arg.	painted copper leaf	X	-	+	-	
<i>Aleurites mollucana</i> (L.) Willd.	kukui, tutui	P	-	+	+	
<i>Chamaesyce hirta</i> (L.) Millsp.	hairy spurge, garden spurge	X	-	+	-	
<i>Chamaesyce prostrata</i> (Aiton) Small	prostrate spurge	X	-	+	-	
<i>Codiaeum variegatum</i> (L.) Bl.	croton	X	+	-	-	
<i>Euphorbia cyathophora</i> J.A. Murray	wild poinsettia	X	-	+	-	
<b>FABACEAE (Pea family)</b>						
<i>Chamaecrista nictitans</i> (L.) Moench	partridge pea, lauki	X	-	+	+	
<i>Desmodium incanum</i> DC	Spanish clover, ka'imi	X	+	+	+	
<i>Falcataria moluccana</i> (Miguel) Barneby & Grimes	albizia	X	+	-	-	
<i>Mimosa pudica</i> var. <i>unijuga</i>	sensitive plant, sleeping grass, pua hilahila	X	-	+	+	
<i>Mucuna gigantea</i> (Willd.) DC	seabean, ka'e'e	I	-	-	-	
<i>Peltophorum inerme</i> (Roxb.) naves	yellow poinciana	X	+	-	-	
<i>Samanea saman</i> (Jacq.) Merr.L.	monkeypod	X	+	+	+	
<i>Senna septemtrionalis</i> (Viv.) H. Irwin & Barneby	kolomona, kalamona	X	-	-	+	
<i>Vigna marina</i> (J. Burm.) Merr.	nanea, pohihihii	I	-	+	-	
<b>GOODENIACEAE (Goodenia family)</b>						
<i>Scaevola sericea</i> Vahl	naupaka, naupaka kahakai	I	+	+	+	
<b>MALVACEAE (Mallow family)</b>						
<i>Hibiscus tiliaceus</i> L.	hau	I?	+	+	-	

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<u>Scientific name</u>	<u>Common name</u>	<u>Status</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>Site</u>
<i>Sida rhombifolia</i> L. <i>Thespesia populnea</i> (L.) Sol. ex Correa	milo	X I?	- -	+ +	- -	
<b>MYRTACEAE (Myrtle family)</b> <i>Psidium cattleianum</i> Sabine <i>Psidium guajava</i> L. <i>Syzygium cumini</i> (L.) Skeels	strawberry guava common guava, kuava Java plum	X X X	+ + +	- + +	- + +	
<b>NYCTAGINACEAE (Four-o'clock family)</b> <i>Mirabilis jalapa</i> L.	Four-o'clock, marvel of Peru, nani ahiahi	X	-	+	-	
<b>OXALIDACEAE (Wood sorrel family)</b> <i>Oxalis corniculata</i> L. <i>Oxalis debilis</i> Kunth	yellow wood sorrel, 'ihi 'ai pink wood sorrel, 'ihi pehu	P? X	- -	+ +	- -	
<b>PASSIFLORACEAE (Passion flower family)</b> <i>Passiflora edulis</i> f. <i>flavicarpa</i> Degener	passionfruit	X	-	-	+	
<b>PORTULACACEAE (Purslane family)</b> <i>Portulaca oleracea</i> L.	common purslane, pigweed, 'ihi	X	-	+	-	
<b>PROTEACEAE (Protea family)</b> <i>Macadamia integrifolia</i> Maiden & Betche	macadamia nut	X	-	+	-	
<b>RUBIACEAE (Coffee family)</b> <i>Hedyotis corymbosa</i> (L.) Lam. <i>Morinda citrifolia</i> L. <i>Paederia foetida</i> L.	noni maili pilau	X P X	- + +	+ + +	- + +	
<b>STERCULIACEAE (Cacao family)</b> <i>Melochia umbellata</i> (Houtt.) Stapf	melochia	X	+	+	+	
<b>ULMACEAE (Elm family)</b> <i>Trema occidentalis</i> (L.) Blume.	gunpowder tree, charcoal tree	X	+	+	+	
<b>VERBENACEAE (Verbena family)</b> <i>Lantana camara</i> L. <i>Stachytarpheta australis</i> Moldenke	lantana, lakana owi, oi	X X	- -	- -	+ +	

Site

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Scientific name

MONOCOTS

AGAVACEA (Agave family)  
Cordyline fruticosa (L.) A. Chev.

ARACEAE (Aroid family)  
Alocasia macrorrhiza (L.) Schott  
Philodendron sp.

ARECACEAE (Palm family)  
Cocos nucifera L.

CANNACEAE (Canna family)  
Canna indica L.

COMMELINACEAE (Spiderwort family)  
Commelina diffusa N.L. Burm.

CYPERACEAE (Sedge family)  
Cyperus compressus L.  
Cyperus javanicus Houtt.  
Cyperus polystachyos Rottb.  
Fimbristylis cymosa R. Br.  
Kyllinga brevifolia Rottb.  
Kyllinga nemoralis (J.R. Forster & G. Forster)  
Dandy ex Hutchinson & Dalziel

LILIACEAE (Lily family)  
Hymenocallis littoralis (Jacq.) Salisb.

MUSACEAE (Banana family)  
Musa X paradisiaca L.

PANDANACEAE (Hala family)  
Pandanus tectorius S. Parkinson ex Z

ti, ki

'ape

coconut, niu

Indian-shot, ali'ipoe poloka

honohono

'ahu'awa, 'ehu'awa

green kyllinga, kili'o'opu

white kyllinga, kili'o'opu

Banana, mai'a

Pandanus, hala, pu hala

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<u>Scientific name</u>	<u>Common name</u>	<u>Status</u>	<u>3</u>	<u>4</u>	<u>5</u>
<b>POACEAE (Grass family)</b>					
<i>Brachiaria mutica</i> (Forsk.) Stapf	California grass	X	+	+	-
<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass, manienie	X	-	+	-
<i>Digitaria ciliaris</i> (Retz.) Koeler	crabgrass	X	+	+	+
<i>Digitaria eriantha</i> Steud.	pangola grass	X	-	-	+
<i>Digitaria insularis</i> (L.) Mez ex Ekman	sourgrass	X	-	-	+
<i>Digitaria</i> sp.	crabgrass	X	+	-	-
<i>Eleusine indica</i> (L.) Gaertn.	wiregrass, manienie ali'i	X	+	+	+
<i>Eragrostis</i> cf. <i>Unioloides</i> (Retz.) Nees ex Steud.	molasses grass	X	+	-	+
<i>Melinis minutiflora</i> P. Beauv.	basket grass, honohono kukui	X	-	-	+
<i>Oplismenus hirtellus</i> (L.) P. Beauv.	Hilo grass, mau'u Hilo	X	+	+	+
<i>Paspalum conjugatum</i> Bergius	Panama paspalum, fimbriate paspalum	X	+	+	+
<i>Paspalum fimbriatum</i> Kunth	bamboo	X	+	-	-
<i>Phyllostachys</i> sp.	St. Augustine grass, buffalo grass	X	+	-	-
<i>Stenotaphrum secundatum</i> (Walt.) Ktze.		X	-	+	-

# APPENDIX F

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## *A Reconnaissance Survey Of Avian And Mammalian Species At Three Sites Along The Kalapana Roadway Realignment Project*

Prepared By:  
Rana Productions, Ltd. (September 2000)

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A Reconnaissance Survey of Avian and  
Mammalian Species at Three Sites Along the  
Kalapana Roadway Realignment Project,  
Puna District, Island of Hawai'i,  
Hawai'i.

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Prepared for:

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### ***Introduction:***

This report summarizes the findings of a 2 day ornithological and mammalian survey of three proposed roadway realignment sites along the existing County of Hawai'i Route 137 located in the Puna District on the Island of Hawai'i. Fieldwork was conducted on September 18<sup>th</sup> and 19<sup>th</sup>, 2000.

The primary purpose of the survey was to determine if there were any federally listed endangered, threatened, proposed, or candidate avian or mammalian species on, or in the immediate vicinity of the three proposed realignment corridors. In addition, we were asked to assess the probability of any usage of the corridors by listed species given the habitat currently available.

Avian phylogenetic order used in this report follows *Birds Of The World: A Checklist 5th Edition* (Clements 2000); scientific nomenclature follows the American Ornithologist's Union *Check-list of North American Birds 7<sup>th</sup> Edition* (AOU 1998) and the 42<sup>nd</sup> supplement to *Check-list of North American Birds* (AOU 2000). Mammal scientific names follow *Mammals in Hawaii* (Tomich 1986). Plant names follow *Manual of the Flowering Plants of Hawai'i* (Wagner *et al.* 1990). Place names follow *Place names of Hawaii* (Pukui *et al.* 1974).

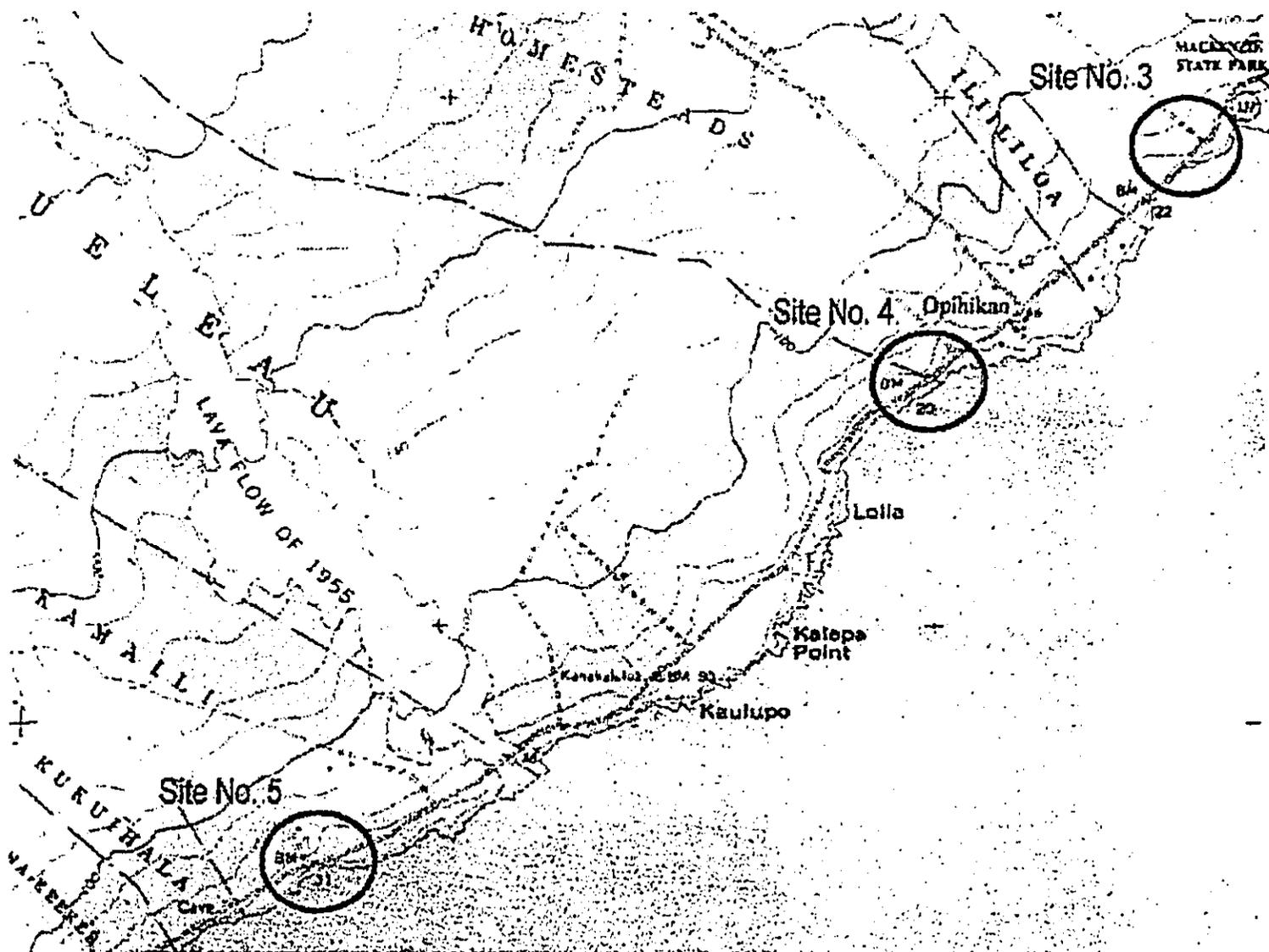
### ***General Site Descriptions:***

The three sites abut the northern edge of the existing right-of-way along portions of the existing County of Hawai'i Route 137 (Figure 1). The terrain on which the three sites are located gently slopes from the northwest to the southeast; from a maximum elevation of approximately 40 feet to slightly less than 20 feet above mean sea level (Figure 1). The center of the proposed new right-of-way on all three sites is less than 250 feet from the existing shoreline. The terrain is composed of a mix of pahoehoe and a'ala flows. The majority of the area is made up of Ki-la-uea flows which are estimated to have been formed during the Holocene age, sometime between 400 and 750 years ago (Wolfe and Morris 1996).

The vegetation within the three sites is dominated by alien (introduced to Hawai'i by man) species, as is much of the coastal area along the southeastern shore of the Island of Hawai'i. There are significant numbers of coconut (*Cocos nucifera*), ironwood (*Casuarina equisetifolia*), siris tree (*Albizia lebeck*) along with introduced weedy species such as guava (*Psidium cattleianum*), Christmas berry (*Schinus terebinthifolius*), Octopus tree (*Schefflera actinophylla*) and Indian mulberry (*Morinda citrifolia*). With a mixed understory, including some native and indigenous species such *naupaka* (*Scaevola sp.*) and many alien weedy species.

Figure 1.

*Kalapana Road Realignment Sites*



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### ***Mammalian Survey Methods:***

All observations of mammalian species were of an incidental nature. With the exception of the Hawaiian hoary bat (*Lasiurus cinereus semotus*), all other terrestrial mammals found on the Island of Hawai'i are alien species. Most are ubiquitous; no trapping program was proposed or undertaken to quantify the usage by alien mammalian species of the study sites. A running tally was kept of all vertebrate species observed and heard while within the proposed right-of-ways. The survey of mammals was limited to visual and auditory detection, coupled with observation of scat, tracks and other animal sign. Visual scans were made for Hawaiian hoary bats, or 'ope'ape'a as they are locally known, during crepuscular periods on one evening and one morning

### ***Avian Survey Methods:***

Linear transects were placed through the three proposed right-of-ways (Figure 1). A total of eight count stations were placed along the three corridors. Eight-minute unlimited distance counts were made at each station (Reynolds *et al.* 1980). Count stations were counted once; additionally, a tally was made of birds detected during the census time on the three sites. Field observations were made with the aid of Leitz 10 X 42 binoculars and by listening for vocalizations. Counts were concentrated during the early morning hours between 0600 hrs. and 1100 hrs., the peak of daily bird activity. An additional two hours were spent along the existing roadway within the project area on one evening in an attempt to detect nocturnally flying seabirds and owls overflying the general development area. Time not spent counting was used to search the sites and the surrounding area for species, and habitats not detected during count sessions.

### ***Results:***

Three mammalian species; domestic dog (*Canis f. familiaris*), small Indian mongoose (*Herpestes a. auro punctatus*) and cat (*Felis catus*) were detected during the course of this study. No rodents were detected; however, it is likely that roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) as well as European house mice (*Mus domesticus*), utilize resources found within the three sites surveyed. Without conducting a trapping program, it is difficult to assess the presence or population densities of these often hard-to-see mammals. All of these introduced mammalian species are deleterious to avian populations. Hawaii's sole endemic terrestrial mammalian species, the endangered Hawaiian hoary bat, or 'ope'ape'a, was not detected during the course of this survey.

We recorded a total of 434 individual birds representing six separate species during station counts (Table 1). All species detected were alien to the Hawaiian Islands. No avian species listed as endangered, threatened, proposed or as a candidate species by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act of 1973, as amended (ESA), or by the State of Hawai'i under its endangered species program

(Federal Register 1999, DLNR 1986) were detected within any of the three proposed right-of-ways.

**KEY TO TABLE 1**

<i>ST</i>	Status
<i>A</i>	Alien Species
<i>RA</i>	Relative Abundance = # of birds / # stations

**TABLE 1**

<b>Avian Species Detected During Station Counts; Kalapana Road Realignment and Resurfacing Project</b>			
<i>Common Name</i>	<i>Scientific Name</i>	<i>ST</i>	<i>RA</i>
<b>PIGEONS &amp; DOVES - Columbidae</b>			
Spotted Dove..	<i>Streptopelia chinensis</i>	A	4.00
Zebra Dove.	<i>Geopelia striata.</i>	A	4.57
<b>BABLERS - Timaliidae</b>			
Hwamei	<i>Garulax canorous.</i>	A	0.57
<b>SILVEREYES - Zosteropidae</b>			
Japanese White-Eye.	<i>Zosterops japonica.</i>	A	21.29
<b>FRINGILLIDS - Fringillidae</b>			
House Finch.	<i>Carpodacus m. mexicanus.</i>	A	28.71
<b>SALTATORS, CARDINALS &amp; ALLIES - Cardinalidae</b>			
Northern Cardinal.	<i>Cardinalis cardinalis.</i>	A	2.86

The findings of both the avian and mammalian studies were consistent with the habitat currently present on the three proposed right-of-way corridors, and previous faunal surveys of similar habitat located in the Puna District, on the Island of Hawai'i.

**Previous Biological Surveys:**

There have only been four comprehensive bat surveys conducted on the Island of Hawai'i (Jacobs 1994, Cooper et al. 1995, Cooper and David 1995, David 1996). Two of these surveys addressed lands close to the proposed right-of-ways. David Jacobs conducted an Island wide survey between 1990-1993 which attempted to ascertain the distribution and abundance of Hawaiian hoary bats by sampling along paved principal roadways around the Island of Hawai'i (Jacobs 1994). In 1995 the author and B. Cooper conducted a multi-day, radar and ultrasonic survey for bats and seabirds at several locations just to the west of this projects' site number three (Cooper and David 1995). Bats were detected along the

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existing roadway during both of the aforementioned studies, but not during the course of this one. The bulk of the remaining published literature relies heavily on anecdotal and incidental information on bat distribution and abundance on the Island (Baldwin 1950, Bryan 1955, Tomich 1986).

The first systematic surveys of the avifauna of Hawai'i were undertaken in 1976. Starting in that year and continuing until 1983 the USFWS conducted a state wide survey of the avifauna of Hawai'i (Scott *et al.* 1986). During the course of the Hawaii Forest Bird Surveys program the project area was not surveyed; it was already so denuded of native forest that it was not thought that any native forest birds could still survive in the habitat present. The author has conducted several avian surveys within the Puna District in habitat similar to that found within the proposed right-of-ways (David 1992, 1995, Cooper and David 1995). Two of these surveys were associated within habitat located less than a mile west of the subject property (David 1995, Cooper and David 1995).

### ***Discussion:***

A one time survey can not provide a total picture of the wildlife utilizing any given area. Certain species will not be detected for one reason or another. Seasonal variations in populations coupled with seasonal usage and availability of resources will cause different usage patterns throughout a year or, in fact over a number of years.

The habitat available to terrestrial vertebrate species within the three sites is dominated by alien species as is much of the lowland habitat in the general vicinity of the project. It is probable that Hawaiian hoary bats overfly the project sites, and possibly utilize resources within the three sites, as they have been recorded in numerous lowland areas in the Puna District, usually between the months of March and November (Jacobs 1994, R. David unpublished field notes 1975-1999; Cooper & David 1995, David 1995).

Two species; House Finch (*Carpodacus m. mexicanus*) and Japanese White-eye (*Zosterops japonica*) represented 81% of the birds counted during this survey. The diversity of species recorded was relatively low, while the densities were relatively high. I recorded an average of 62 birds per station count. No native species were recorded during the course of this survey. The species makeup and bird densities recorded were in keeping with the results of other avian surveys conducted at this altitude in the Puna district (Cooper & David 1995, David 1995).

Although no seabirds were detected during the course of this survey it is possible that two listed species; Dark-rumped Petrel (*Pterodroma phaeopygia sandwichensis*), and Newell's Shearwater (*Puffinus auricularis newelli*) overfly the three sites in small numbers between the months of May and October (Banko 1980a, 1980b, Harrison 1990, Cooper and David 1995). The former is listed as endangered and the latter as threatened (DLNR 1986, Federal Register 1999).

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The endemic Hawaiian subspecies of the Dark-rumped Petrel, or *ua'u* was formerly common on the Island of Hawai'i (Wilson & Evans 1890-1899). This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea (Henshaw 1902), as well as the mid to high elevations of Mount Hualalai. Within recent historic times this species has been reduced to relictual breeding colonies located at high elevations on Mauna Loa and possibly Mount Hualalai (Banko 1980, Harrison 1990, Cooper & David 1995, Cooper *et al.* 1995, R. David Unpublished Field Notes 1986-1995, 1999). The most recent record of this species in Puna were made by Banko in 1972 (Banko 1980a). This species was not detected during the course of this survey or any other recent ones in the Puna District (Cooper and David 1995, David 1995, M. Reynolds, USGS/BRD, pers. comm.), however, Dark-rumped Petrels may occasionally transit the sites on their way to nesting colonies located on the upper slopes of Mauna Loa.

The endemic Hawaiian sub-species of the Townsend's Shearwater, locally known as the Newell's Shearwater, or *'a'o* was listed as threatened by the USFWS in 1975 (Federal Register 1999). Although we did not detect this species during the course of this survey, it is probable that at least a few birds do fly over the project sites during the breeding season. This species breeds on Kaua'i, Hawai'i, and in extremely small numbers on Moloka'i. Newell's Shearwater populations have dropped precipitously since the 1880's (Banko 1980b, Ainley *et al.* 1995). This pelagic species nests high in the mountains in burrows excavated under thick vegetation, especially uluhe fern (*Dicranopteris linearis*). There are at least two nesting colonies in the general vicinity of the project sites. One on Pu'ulena Crater which is located approximately two and a half miles north-northwest of Sites 3 and 4 and roughly four miles north-northeast of Site 5 and another near Pu'u Heiheiiahulu which is located six miles northwest of Site 5. Evidence also indicates a possible flyway below Pu'u Kailu some three miles directly upslope from Site 5. It also is possible that there are colonies on Iiiewa Crater located approximately four miles north-northwest of Site 5, and also on Kahuwai Crater, located two and a half miles north-northwest of Site 3 (R. David, pers. obs.: M. Reynolds, USGS/BRD, pers. comm.; Banko 1980b). Given the proximity of the two known nesting colonies and a possibility of others, there is a strong likelihood that Newell's Shearwaters transit the site on their way to and from their breeding colonies. In 1995 Brian Cooper and I recorded Newell's Shearwaters flying across the existing County of Hawai'i Route 137 approximately one mile east of Site #5 (Cooper & David 1995).

The primary cause of mortality in both Dark-rumped Petrels and Newells Shearwaters is thought to be predation by alien mammalian species at the nesting colonies (Day and Cooper 1997, Cooper and Day 1994, Ainley *et al.* 1995). Collision with utility structures is considered to be the second most significant cause of mortality of these seabird species in Hawai'i. Nocturnally flying seabirds, especially fledging birds, can become disoriented by exterior lighting on their way to sea in the summer and fall. When disoriented, seabirds often collide with manmade structures and, if not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Ainley and Podolsky 1993, Ainley *et al.* 1994, Cooper and Day 1994, 1998, Day and Cooper 1997, Podolsky

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et al. 1998). There is no suitable nesting habitat within or close to any of the three proposed rights-of ways for either listed pelagic seabird species.

From an terrestrial vertebrate perspective, the development of any, or all of the three proposed sites will not significantly impact any federally or State of Hawai'i endangered, threatened, proposed or rare avian or mammalian species.

***Recommendations:***

To reduce the potential for interactions between nocturnally flying Dark-rumped Petrels and Newell's Shearwaters and external lights and other man-made structures, it is recommended that any external construction lighting be shielded as described in Reed *et al.* (1985).

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# APPENDIX G

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## *Marine Resources Considerations For Improvements To The Kapoho-Kalapana Road On The Island Of Hawaii*

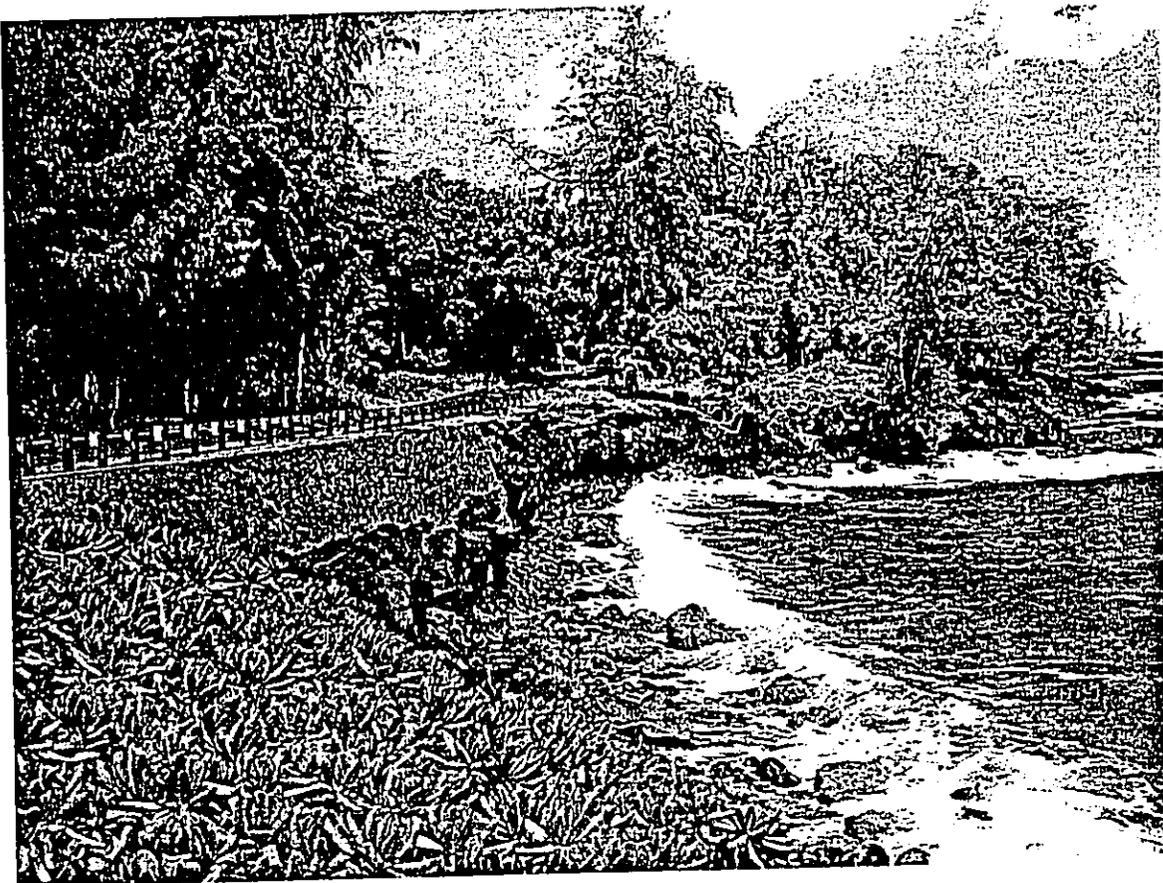
Prepared By:  
AECOS, Inc. (October 2000)

AECOS No. 944

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Marine resources  
considerations  
for improvements to the  
Kapoho-Kalapana Road on the  
Island of Hawai`i

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## Marine resources considerations for improvements to the Kapoho-Kalapana Road on the Island of Hawai'i<sup>1</sup>

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### Introduction

The Kapoho-Kalapana Road runs along the southeast coast of the Big Island between Kapoho and Kalapana (Figure 1). Known as the 'Red Road' because of the use of red cinder for in the aggregate fraction of the pavement, this narrow highway traverses one of the more remote coastal areas of Hawai'i. Much of the route is sufficiently distant from the shore to provide the traveler with only glimpses of the ocean through coconut palms (*niu* or *Cocos nucifera*) and screwpine (*hala* or *Pandanus* sp.), while in a few places the road is located close enough to the water's edge to encounter problems from coastal erosion processes. This report presents considerations of marine resources at two sites where coastal erosion is potentially under-cutting the road and at one site where high surf has access to the roadway. At all three sites, it is proposed to move the road inland away from the area of potential damage.

The project is located on lava flows issued from Kilauea volcano and comprising the most recently formed part of the Hawaiian Islands. The area is moderately wet and supports substantial vegetation, although soils are shallow and the ground highly porous. There are no streams on this part of the Island; water that soaks into the lava escapes eventually as groundwater issuing from springs at and off the shore. Because this part of the Island is of recent origin in geological terms, there has been insufficient time for a coral reef to develop off the coast and the bottom drops steadily away from the shore.

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<sup>1</sup> Report prepared by Eric Guinther for SSFM International, Inc. for their environmental assessment entitled: "Kalapana Roadway Realignment" This report will become part of the public record.

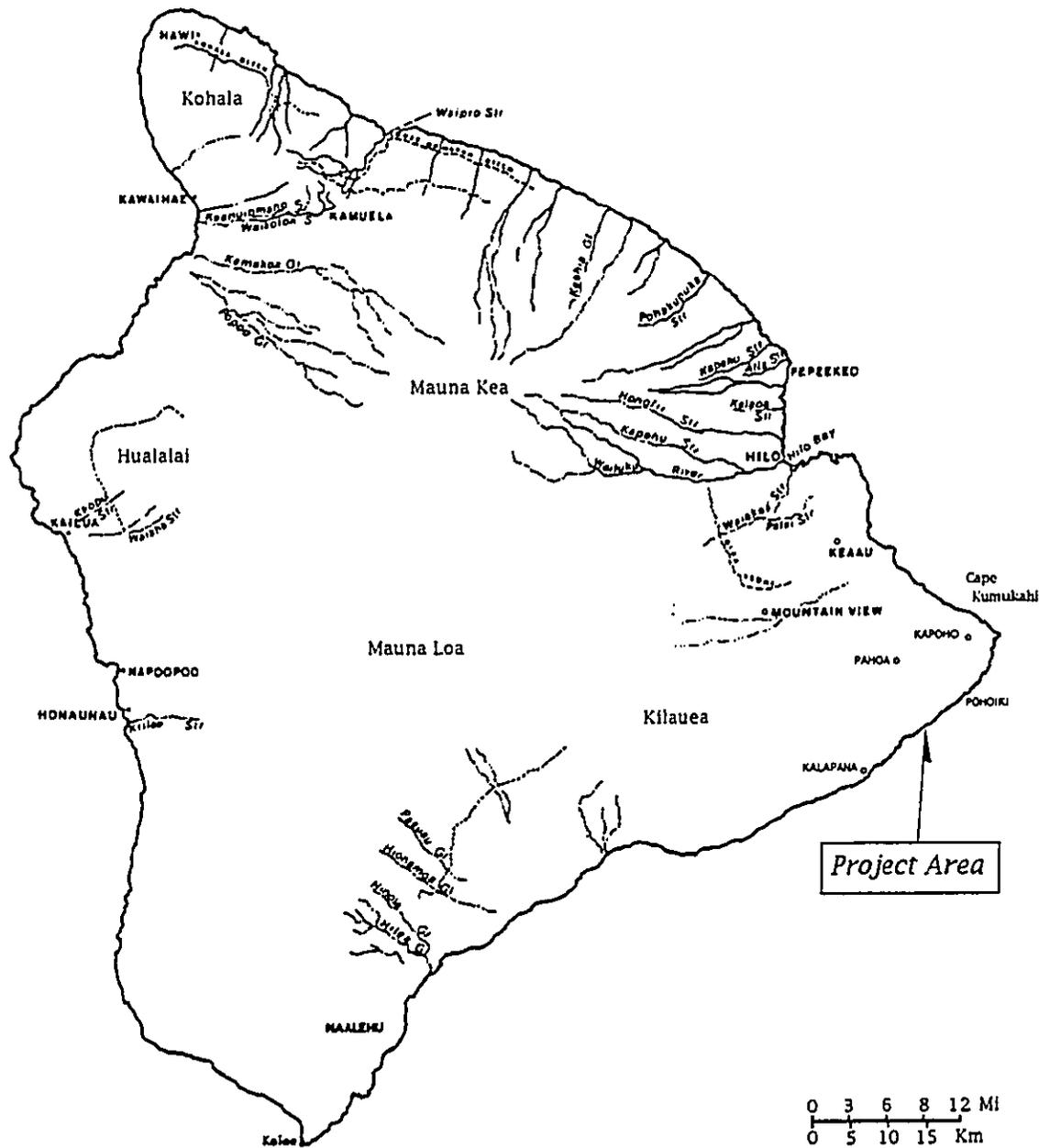


Figure 1. Location of the Kapoho-Kalapana Road on the Island of Hawaii.

The absence of any reef structure off the shore means that the full force of waves can impinge unimpeded against the shoreline. In the project area, the coastline is mostly a sea cliff of somewhat variable height, typically between 2 and 8 m (6 to 26 ft). This sea cliff is a result of the constant battering by waves on the prehistoric lava flows issued from the Southeast Rift zone of Kilauea. Further east near Kapoho and west at Kalapana, the shoreline is comprised of lava flows that have

issued forth in historic times, and the sea cliff is less well-developed. However, considering the youthful age of all of this coastline, it is amazing that erosion has cut back the original gently sloped land as much as it has to create a cliffed shore. The cliff represents a rough indication of the amount of retreat of the shore. Further, the cliff would be even higher were it not for the fact that this side of the Big Island is sinking into the sea at a rate of a few centimeters a year.

## Methods

It was hoped that the nearshore bottom off each of the project sites could be explored using snorkeling gear. However, sea conditions proved to be too rough on the field survey day. Although careful timing of the entry between wave sets might have allowed access to the offshore environment, it would have been very hazardous to attempt to return to shore under the unpredictable sea conditions. Water samples had to be collected by running down the shore between wave sets and sampling in freshly filled pools or the swash water flooding down the rocks. Observations thus concentrated upon what could be observed along the shore, making collections between waves, and looking down from the cliff ledge into the immediate offshore area.

The analytical methods used to analyze the water samples collected at the three sites are presented in Table 1.

## Site Descriptions

The three locations where proposed modifications to the road are planned that could have impacts on the natural environment are designated Sites 3, 4, and 5. These are separated from each other by distances on the order of 0.9 to 2.75 km (3000 to 9000 ft). However, the marine environment for nearly all of the southeast Hawaii coastline from Opihikai to near Kalapana is very similar and characterized by a steep basalt shore, in a few places having limited beach deposits of black (basalt) sand or rounded stones ('ili'ili), typically from gravel through cobble size, in places, rounded boulders. On this shore the biota occurs in distinct bands or zones which result from environmental gradients predominantly arranged normal (perpendicular) to the shoreline and based upon elevation relative to sea level. Other environmental factors vary along gradients which are predominantly oriented along the trend of (parallel to) the shore, and these account for local differences in abundance of the organisms that dominate each band on the shore. We describe here the basic zonation patterns for each site, from the roadway to the sublittoral zone.

Table 1. Analytical methods and instruments used for the September 22, 2000 sampling off Kapoho-Kalapana Road, Hawai`i.

Analyses List	Method	Reference	Instrument
Ammonia	alkaline phenol	Koroleff in Grasshoff et al. (1986)	Technicon AutoAnalyzer II
Dissolved Oxygen	EPA 360.1	EPA (1979)	YSI Model 55 DO meter
Nitrate + Nitrite	EPA 353.2	EPA (1993)	Technicon AutoAnalyzer II
pH	EPA 150.1	EPA (1979)	pHep 3
Salinity, field	refractive index	---	handheld, temperature compensating refractometer
Salinity	Bench salinometer	Grasshoff in Grasshoff et al. (1986)	AGE Model 2100
Temperature	thermister calibrated to NBS cert. Thermometer (EPA 170.1)	EPA (1979)	YSI Model 55 DO meter
Total Nitrogen	persulfate digestion /EPA 353.2	D'Elia et al. (1977) / EPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	persulfate digestion /EPA 365.1	Koroleff in Grasshoff et al. (1986) / EPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids (TSS)	Method 2540D (EPA 160.2)	Standard Methods 20th Edition (1998); EPA (1979)	Mettler H31 balance
Turbidity	Method 2130B (EPA 180.1)	Standard Methods 20th Edition (1998); EPA (1993)	Hach 2100P Turbidimeter

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**SITE 3** — The shoreline at the roadway is a cliff comprised mainly of a 2+ m thick and very dense pahoehoe lava flow. Above this dense basalt rock, and below it as well, are layers of looser material (perhaps `a`a flows or cinder deposits). A concrete and rock masonry (crm) wall sits on the dense lava, protecting the looser overlying deposits from wave erosion. However, this wall extends only part way along the shore where the roadway is especially close to the cliff. Thus, erosion above the dense flow is clearly threatening a part of the paved road surface. Waves also are attacking loose material under the dense flow, and the base of the cliff is littered with boulders of all sizes mined from the cliff, creating an overhang of the dense material. As parts of this overhang break off and fall away, the road (and the crm wall) are threatened with destruction. This process may explain the "missing" eastern section of the crm wall.

In this area between the road and the cliff no vegetation of any consequence occurs (the pavement extends up to the top of the curb wall). However, on the west side, a stand of native naupaka kahakai (*Scaevola sericea*) covers the top of the cliff. On the east, the land extends seaward as a grass-covered point (mostly *Chloris*) supporting numerous ironwood trees (*Casuarina equisetifolia*). Also growing here are wedelia (*Wedelia trilobata*), noni (*Morinda citrifolia*), niu, and honohono (*Commelina diffusa*).

Below the vegetation line the substratum is mostly barren, lava rock. Upon closer inspection, the supratidal periwinkle or pipipi (snail) (*Littorina picta*) can be seen to occupy cracks in the lava at the uppermost wetted zone. Of the three species of periwinkle found in Hawai'i, *L. picta* typifies coastlines subject to the greatest wave energies. The supralittoral zone is fairly broad along this coast and represents a zone where conditions are occasionally too extreme for terrestrial plants because high waves remove the soil or occasionally flood the area with salt water, yet are likewise too dry (or subject to freshwater rains) for limu (marine macrophytic algae): the rocks are wetted by seawater too infrequently. A thin coating of microscopic algae does occur here, serving as food for the periwinkles, but it is not really visible without very close inspection of the crevices and depressions in the lava.

Towards the bottom of the supralittoral, another snail known as pipipi (*Nerita picea*) can be found in crevices or other slightly protected locations. These snails move up or down the shore with the tide to locate where the waves are constantly wetting the rock. Also characteristic of this zone is the 'a'ama crab (*Grapsus tenuicrustatus*) which is seen here scurrying over exposed rocks above, and sometimes in, the wave wash. A little lower down, where wave swash is constant, occur the helmet urchin or hā'uke'uke kaupali (*Colobocentrotus atratus*) and the 'opihi makaiaūli (*Cellana exarata*). This limpet or 'opihi is not particularly abundant here, but can be easily found on rocks, usually a little higher up the shore than the urchin.

The appearance of fleshy algae or seaweed marks the next prominent zone below the apparently bare rock zone of the supratidal. Highest up on the shore are yellowish-brown tufts of *Giffordia breviarticulata*. These tufts are small and inconspicuous compared with the alga known as 'aki'aki (*Ahnfeltia concinna*), also yellow-brown in color, and forming conspicuous dense patches over the rocks and in crevices where the wave splash reaches at low tide. 'Aki'aki is absent in the steep section of the shore directly adjacent to the road at Site 3, perhaps because the supratidal is essentially a vertical face. This alga is conspicuous on the more gently sloped shore to either side.

One of the most conspicuous zones, is the band of encrusting, calcareous alga (*Porolithon onkodes*) that extends down below the water line. The color varies from light pink to purplish. This species is very prominent on wave washed shores such as this, coating nearly all of the basalt surface, including the larger loose boulders. In this area, the paint-like coating by this calcareous alga can be observed to extend down below the littoral or intertidal zone. However, on rock outcrops exposed between incoming waves occurs a dense growth of several different fleshy algae. Most conspicuous near the lowest part of the sublittoral is a dense growth of bushy red alga (*Pterocladia capillacea*), a preferred food of the honu or green sea turtle (*Chelonia mydas*). Between the *pterocladia* and the upper edge of the *Porolithon*, occurs *Sargassum echinocarpum*, *Laurencia cf. succissa*, and many other less common species simply not observed by us because of the difficulty of accessing this part of the shoreline.

SITE 4 — At Site 4, the shore is low and ramp-like. Storm waves sometimes wash across the road. The low shore here supports a small beach of gravel and coarse black sand. Between the road and the beach or low basalt outcrops on either side occur false kamani (*Terminalia catappa*), naupaka kahakai, niu, and hau (*Hibiscus tiliaceus*). A sedge (?*Fimbristylus cymosa*) and a low grass (indet.) occupied a narrow patch of shallow soil between the pavement and the shore rock outcrop. Also observed growing here were laua'e fern (*Phymatosorus grossus*) and naunea or beach pea (*Vigna marina*).

The beach that has formed is essentially a tombolo: a deposit of sand formed behind a protecting headland or island. In this case, a raised outcrop of basalt protects a part of the low shore from the full force of the waves. Tide pools are present on either side of the tombolo. These harbor fishes and crustaceans, but not any macroscopic seaweeds. In these pools we noted pāo'o (*Istiblennius zebra*), kūpī pī (*Abudefduf sordidus*), āholehole (*Kuhlia sandvicensis*), `o`opu (Gobiidae), a rock crab (Xanthidae), and a young morey eel or puhi (*Gymnothorax* sp.). The shore of the tide pool is inhabited by a close relative of the `a`ama crab, the `alamihi (*Metopograpsus thukuhar*). `A`ama are present as well on the basalt outcrops facing the sea. Green turtles were observed swimming just off the shore.

On the rocks along this shore occurs the same zonation pattern of supra-littoral mollusks, sea urchins, *Porolithon*, and fleshy seaweeds (in order down the shore) observed at Site 3. *Ahnfeltia* is most conspicuous high on the shore, and *Pterocladia* most conspicuous low on the shore. A small, red seaweed (*Gelidiella* sp.) was collected from the *Sargassum* zone. *Ulva* was not noted here.

SITE 5 — A narrow line of coconut trees, some beach naupaka, and grass comprise the narrow coastal vegetation zone between the roadway and the sea cliff.

The littoral zone plants and animals at this location are the same as described for Site 3 above. In this area, however, a substantial amount of bright green *Ulva* was seen in the upper part of the *Porolithon* zone. *Ulva* is sometimes an indicator of nutrient enrichment and its abundance here could indicate groundwater springs at the shore. Also seen here is an encrusting alga, *Ralfsia pangoensis*, also extending up into the upper *Porolithon* zone.

As at the other sites, the helmet urchin or hā`uke`uke kaupali is very abundant here. Rare — seen only once at this site in our survey — is hā`uke`uke `ula`ula or slate pencil urchin (*Heterocentrotus mammillatus*). This species should be far more abundant below the splash zone, although none was seen looking down into the sublittoral

### Water Quality

Table 2 summarizes the results of water quality samples analyzed for each of the project sites.

Table 2. Water quality characteristics of the coastal waters off the Kpoho-Kalapana Road, Island of Hawai`i, September 22, 2000.

09-22-00	Time	Temp. (°C)	DO (mg/l)	DO Sat. (%)	Salinity (ppt)	pH (ntu)						
							turbidity	TSS (mg/l)	Ammonia (µg N/l)	Nitrate + nitrite (µg N/l)	Total N (µg N/l)	Total P (µg P/l)
Site 3	1310	26.9	6.35	97	35	8.1	0.38	1.1	3	1	146	11
Site 4	1230	27.3	6.70	103	35	8.1	0.46	1.1	72	2	242	8
Site 5	1210	26.9	6.23	95	35	8.1	0.36	1.9	< 1	3	153	9

As might well be expected, the water quality along this remote stretch of coastline is excellent. Water quality is nearly identical in most every respect at Sites 3 and 5, including identical temperatures, nearly identical dissolved oxygen (DO) saturation values and turbidities. Very close to the same values were obtained for each of the nutrient moieties. The values for Site 4 do show curious deviations: notably a very

slightly higher temperature, a DO above saturation, and much higher ammonia concentration. The higher ammonia accounts for much of the higher total nitrogen (TN) value. It is suspected that the differences relate directly to the sample collection in this way: at Sites 3 and 5, water washing up the rocks and trapped in chutes was sampled; at Site 4, the water in a tide pool regularly flushed by the waves was sampled. In the latter case, the actual replacement of older tide pool water with new ocean water on each wave wash must have been less than was assumed. Thus, a slightly higher temperature, and higher ammonia reflect the longer average residence time of water trapped in the pool between high tidal excursions up the shore. These deviations are not sufficient to regard the water at this location as being of poor quality.

## Conclusions

The shoreline area is rich in limu and `opihi, marine intertidal species often sought as food items. Shore casting is also a popular sport along this coastline. Conditions with respect to waves are frequently hazardous, limiting exploitation of these resources somewhat. However, most of the `opihi observed were not especially large, suggesting fishing pressure in these areas of relatively easy access close to the road. We did not enter the water, but looked down in the water for evidence of coral growth on the dark basalt bottom. Not all species of corals that could occur off this coast would be evident by this approach under the rough sea conditions obtaining, although the species most anticipated (pōhaku puna or *Porites lobata*) at this site should be conspicuous by its light cream or light yellow color on rocks below the water line. No such growth could be seen, and this fact is likely attributable to the lack of stability of the substratum just off the shore. Rocks, broken off the cliffed shore, litter the bottom, and these are moved about by large waves at a frequency of occurrence which permits the larger ones at least to be covered, if located in the lower littoral and sublittoral, by *Porolithon*. The relatively fast growth of the calcareous alga permits this, but not the slower growing hermatypic corals. It is presumed that coral growth does have a foothold further off the shore, where the force of the waves is reduced by the greater depth of water.

The proposed improvements to the road are designed to limit damage from waves by moving parts of the Kapoho-Kalapana Road now located adjacent to the shore further inland. This approach will minimize impacts to the marine environment, including the littoral and supralittoral environments described herein. Although no adverse impacts from this process are contemplated, care in controlling runoff and avoiding dumping of graded debris must be exercised. Two protected species are known from this area: the `opihi and the green sea turtle. The State of Hawaii has a prohibition on taking `opihi under a certain size for purposes of selling the meat (DLNR, 1981) without a permit. However, this rule does not protect the species

from either catches for personal use or from other sorts of destruction. The `opihi is not a listed species nor a candidate for listing under Federal endangered species rules (CFR, 1999; Federal Register, 1999).

The honu or Pacific green sea turtle (*Chelonia mydas agassizi*) is protected by both State and Federal endangered species laws. The honu is listed as a threatened species by Department of Land and Natural Resources (DLNR, 1998) and U.S. Fish and Wildlife Service (CFR, 1999). The project shoreline (littoral limu beds) and offshore waters are habitat for this threatened species.

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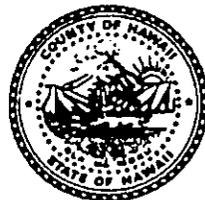
MAR 8 2001

FINAL ENVIRONMENTAL ASSESSMENT

FOR

KALAPANA ROAD  
REALIGNMENT PROJECT

T.M.K: (3) 1-03-02, 1-03-03, & 1-03-04  
PAHOA, HAWAII



Department of Public Works  
County Of Hawaii

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T.M.K: (3) 1-03-02, 1-03-03, & 1-03-04  
PAHOA, HAWAII

**JANUARY 2001**

***PROPOSING AGENCY:***

Department of Public Works  
County of Hawaii  
25 Aupuni Street, Room 202  
Hilo, Hawaii 96720-4252

This environmental document was prepared pursuant to Chapter, 343 Hawaii Revised Statutes

Responsible Official: \_\_\_\_\_ Date: 1/25/01  
*DL* Dennis Lee, Director  
Department of Public Works, County of Hawaii

***PREPARED BY:***



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A-5	Site No. 5 Area
A-6	Site No. 5 Area

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<b>Appendix C</b>	<b>Geotechnical Engineering Consultation; Kalapana Road Realignment (Route 137) Site No. 3, 4, And 5</b> Prepared By: Geolabs, Inc. (March 2000)
<b>Appendix D</b>	<b>Archaeological Inventory Survey; Kalapana Road Realignment Project</b> Prepared By: PHRI, Inc. (October 2000, Revised January 2001)
<b>Appendix E</b>	<b>Botanical Survey; Kalapana Roadway Realignment</b> Prepared By: Char & Associates (October 2000)
<b>Appendix F</b>	<b>A Reconnaissance Survey of Avian and Mammalian Species At Three Sites Along the Kalapana Roadway Realignment Project</b> Prepared By: Rana Productions, Ltd. (September 2000)
<b>Appendix G</b>	<b>Marine Resources Considerations For Improvements To The Kapoho-Kalapana Road On The Island Of Hawaii</b> Prepared By: AECOS, Inc. (October 2000)

## CHAPTER 1 INTRODUCTION

### 1.1 PURPOSE FOR ENVIRONMENTAL ASSESSMENT

The County of Hawaii (County), Department of Public Works (DPW) is proposing the Kalapana Road Realignment Project at the request of the County Civil Defense Agency. This project involves the realignment of three existing segments of Highway Route 137, Kalapana – Kapoho Beach Road (hereafter referred to as Kalapana Road) located in the Puna District of the Island of Hawaii.

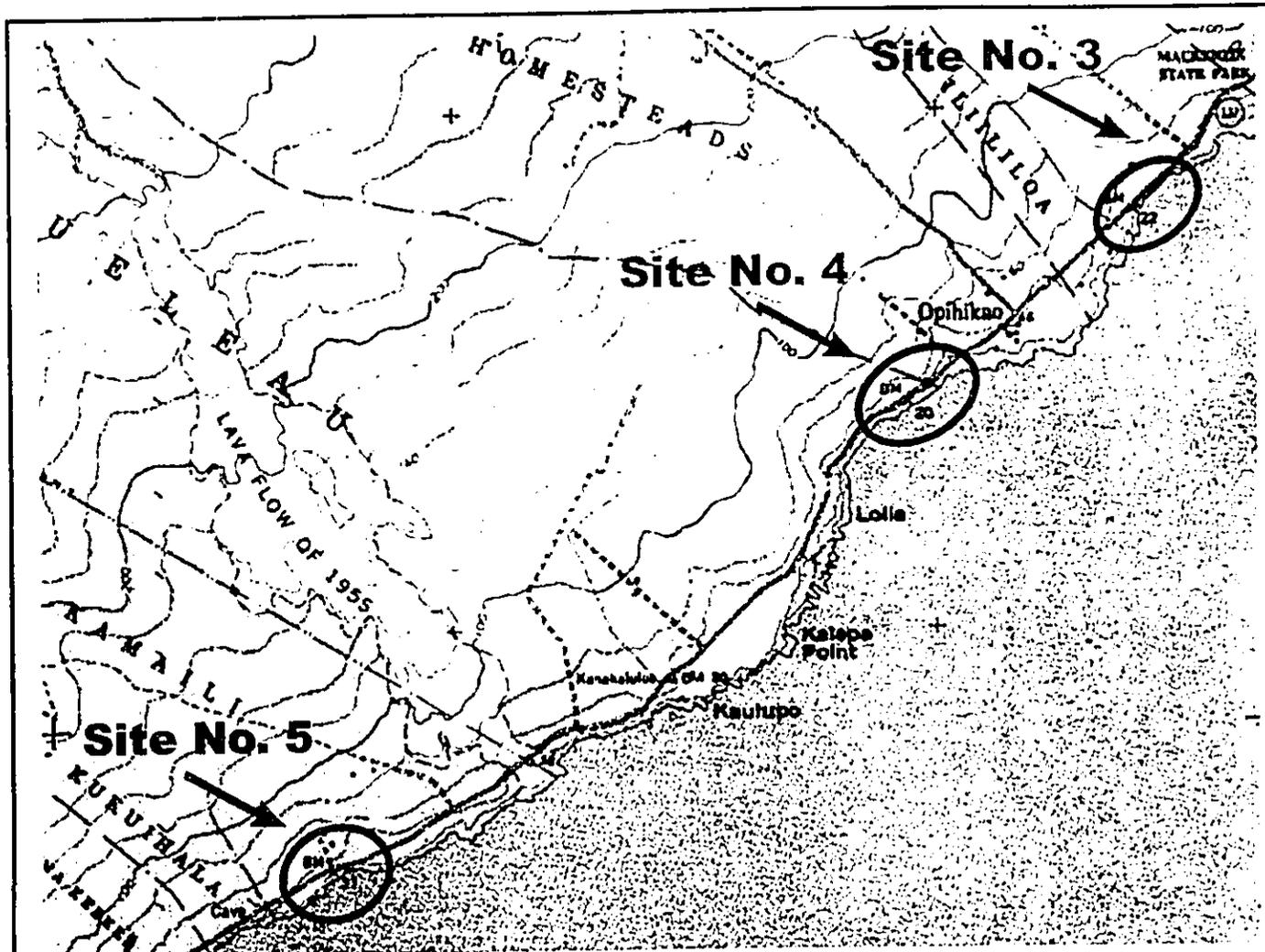
The purpose for this project is to realign three relatively short sections of Kalapana Road which are being affected by coastal erosion and wave inundation occurring along this rugged coastline. These activities have resulted in the erosion of the shoreline near the road, undermining of the roadway, and occasional wave wash onto the road during high surf conditions. Consequently, the objective of this road renovation project is to realign these three sections of Kalapana Road further inland so that it may continue to provide residents with safe vehicular access into and out from this area.

The three sections proposed for realignment are generally located in the Opihikao to Kamaili communities of this Puna District. The three project sites are referred to as Site No. 3, Site No. 4, and Site No. 5 in this document. Chapter 2 provides a more detailed discussion of this project. Kalapana Road is currently routed along the shoreline in a northeast to southwest direction, and serves as the main road providing vehicular access to residences situated along this coastline. Figure 1.1 shows the project's location and general vicinity in this community. Table 1.1 also provides a summary of pertinent information associated with this project.

#### **Proposing Agency And Accepting Authority**

The Kalapana Road Realignment project would involve the use of County funds for the construction of the realignment improvements and County lands (right-of-way) associated with Kalapana Road. Portions of Kalapana Road affected by this project are also situated within the State's "Conservation District." As a result, this project is subject to the environmental documentation requirements prescribed under Chapter 343, Environmental Impact Statements, Hawaii Revised Statutes (HRS) and Title 11, Chapter 200 (Environmental Impact Statement Rules) of the State Department of Health's Administrative Rules.

A Draft Environmental Assessment (Draft EA) was published in the November 23, 2000 issue of *The Environmental Notice* in conformance with these regulatory requirements. Subsequently, this Final Environmental Assessment (Final EA) was prepared after review of the Draft EA during the 30-day comment period. A Finding of No Significant Impact (FONSI) is



**Project Vicinity Map**



**Project Location Map**

**PROJECT LOCATION MAP**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

*Source:  
Delorme 3-D TopoQuad (1999)  
Kalapana, Hawaii*

**Figure 1.1**



**Table 1.1 Summary Information**

<b>Project Name:</b>	Kalapana Road Realignment Project
<b>Proposing Agency:</b>	Department of Public Works County of Hawaii 25 Aupuni Street, Room 202 Hilo, Hawaii 96720-4252 Contact: Mr. Ben Ishii
<b>Authorized Agent:</b>	SSFM International, Inc. 501 Sumner Street, Suite 502 Honolulu, Hawaii 96817 Contact: Mr. Ronald A. Sato, AICP
<b>Accepting Authority:</b>	Department of Public Works, County of Hawaii
<b>Project Description:</b>	This project involves the realignment of three existing segments of Highway Route 137, Kalapana-Kapoho Beach Road. The purpose for this project is to realign these sections which are being affected by natural ocean and wave activities occurring along this rugged coastline. These activities have resulted in the erosion of the coastline, undermining of the roadway, and occasional wave wash onto the road during high surf conditions. These project sites are referred to as Sites No. 3, 4, and 5.
<b>Project Location:</b>	The three sections proposed for realignment are generally located in the Opihikao to Kamailli communities of the Puna District of the island of Hawaii.
<b>Land Ownership:</b>	Kalapana-Kapoho Beach Road is under the jurisdiction of the County of Hawaii.
<b>Tax Map Key:</b>	Site No. 3: Area of (3) 1-03-03: 006 Site No. 4: Area of (3) 1-03-02: 054, 055, 090 & 1-03-04: 013, 028 Site No. 5: Area of (3) 1-03-02: 010, 076, 078
<b>State Land Use:</b>	Conservation District (Existing Kalapana-Kapoho Beach Road and shoreline areas), Agricultural District (mauka properties).
<b>County General Plan:</b>	Open Area (Along shoreline), Orchards (Area above shoreline including Kalapana-Kapoho Beach Road and inland areas).
<b>County Zoning:</b>	O, Open, Conservation District (Area below Kalapana-Kapoho Beach Road) and A-1a, Agriculture District, 1-acre minimum lot for areas above roadway.
<b>SMA Designation:</b>	Kalapana-Kapoho Beach Road is situated within the Special Management Area.

The County Department of Public Works serves as the Proposing Agency for this Kalapana Road Realignment project, and this project subsequently involves an Agency Action being undertaken by this department under these environmental regulations. The Accepting Authority for this Environmental Assessment would be the County Department of Public Works as the authorized representative for the Mayor of the County of Hawaii.

## **1.2 BACKGROUND ON EXISTING LAND USE DESIGNATIONS**

### **1.2.1 State Land Use District**

Under Chapter 205, HRS, all lands in the State of Hawaii are classified into four major land use districts (State Land Use Districts) which are the Urban, Rural, Agricultural, and Conservation districts. The boundaries of these districts are shown on maps referred to as State Land Use District Boundary Maps.

The State Land Use Commission's (LUC) Land Use District Boundary Map for Pahoehoe South (Map H-72) indicates that the shoreline area extending up to the mauka edge of Kapoho-Kalapana Beach Road in the project area is designated as "Conservation District." Land areas above, or inland, of this road are designated as "Agricultural District" on this Map. Figure 1.2 shows the Land Use Districts for this project area.

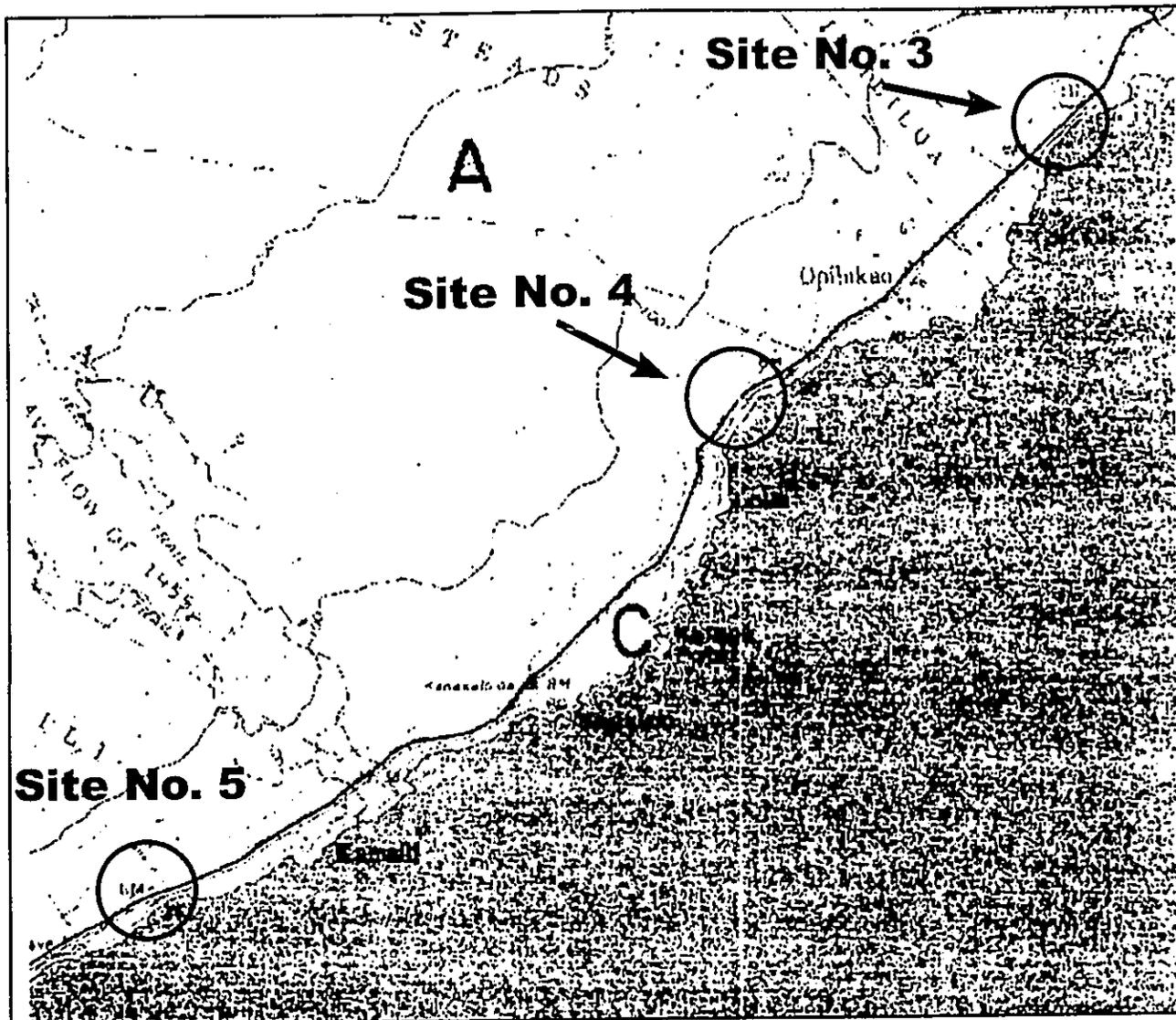
Consequently, coordination and approval from the State Department of Land and Natural Resources would be required for the road realignment renovation project since it would involve activity within the Conservation District. A greater discussion of these requirements is provided in Chapter 8 of this document. Improvements associated with the realignment of this road within property designated Agricultural District are permitted under the State LUC's regulations.

### **1.2.2 County of Hawaii General Plan**

The *County of Hawaii General Plan* adopted under Ordinance 89-142 serves as a policy document for the long-range comprehensive development of the island of Hawaii (County 1989). Under the *General Plan's* Land Use Pattern Allocation Guide Map, the shoreline area in the vicinity of the realignment sites are designated as "Open" area. The areas situated above the shoreline, which includes Kalapana Road, along with inland properties are designated as "Orchards." Figure 1.3 shows these realignment sites in relation to this Land Use Pattern Allocation Guide Map for the area.

### **1.2.3 County of Hawaii Zoning District**

The Kalapana Road Realignment Project is located within the Puna District of the island of Hawaii. As a result, the County's Puna District Zoning Map was reviewed to identify current zoning district classifications for surrounding areas. Based upon this zoning map, Kalapana Road appears to establish the boundary line separating different zoning districts. Figure 1.4 shows these realignment sites in relation to this Puna District Zone Map of the area.



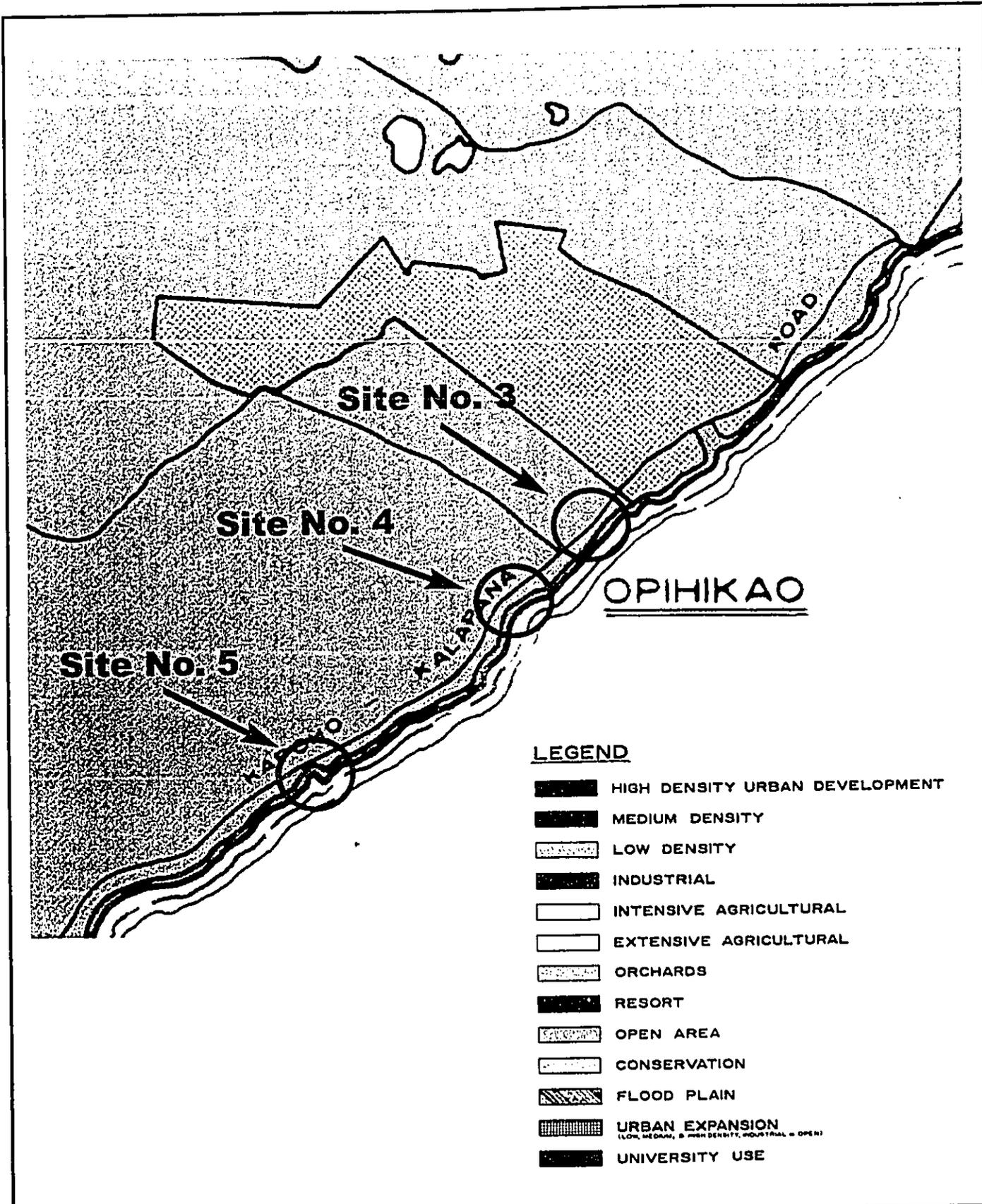
**SOIL SURVEY MAP OF REALIGNMENT SITES**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

*Source:  
State Land Use Commission  
Map # 72*

**Figure 1.2**





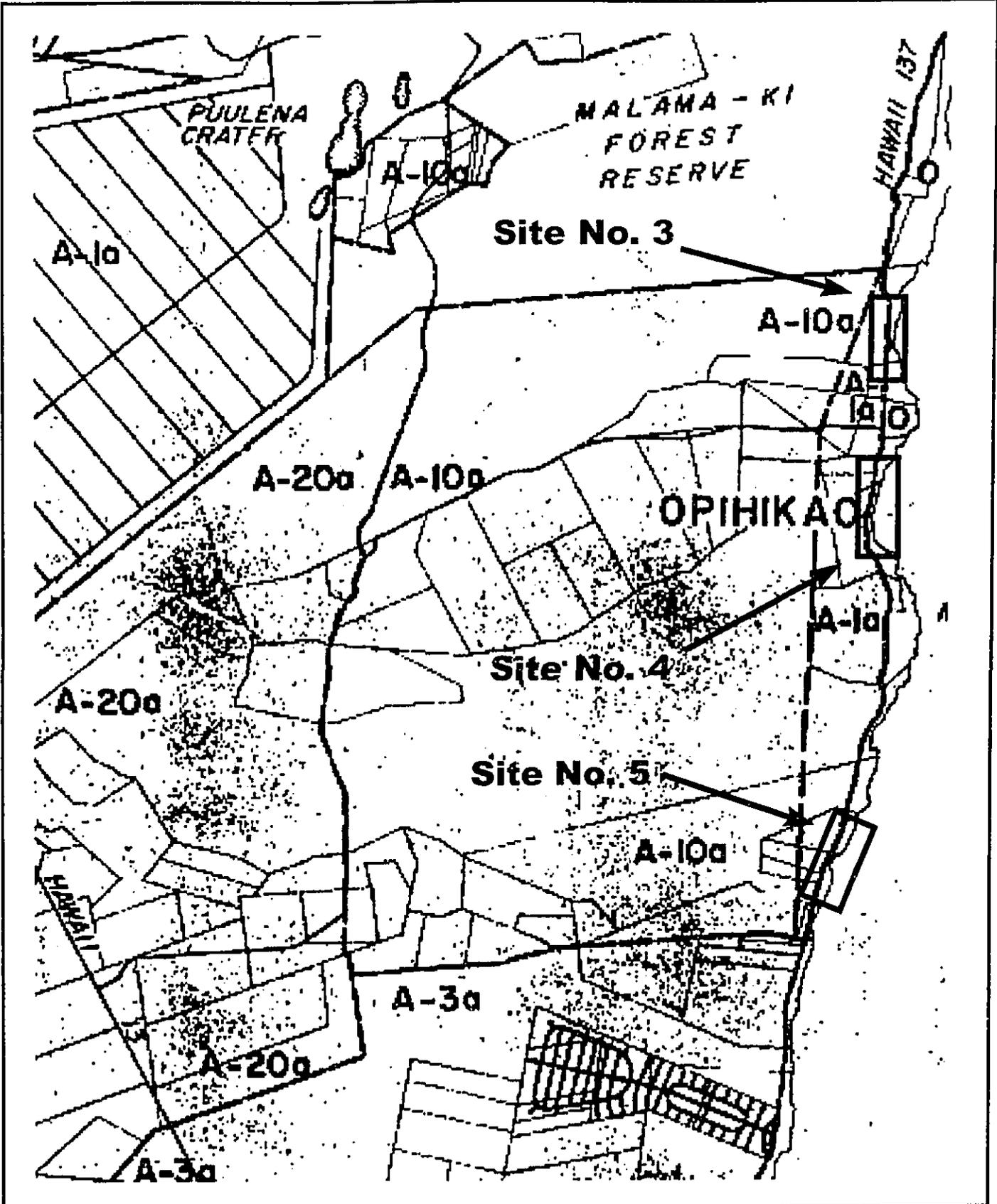
**COUNTY OF HAWAII GENERAL PLAN**

**Figure 1.3**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

*Source:  
County of Hawaii General Plan  
Land Use Pattern Allocation Guide Map*





**PUNA DISTRICT ZONING MAP**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

*Source:  
Zoning Map of Puna District, Hawaii  
Planning Commission, County of Hawaii*

**Figure 1.4**

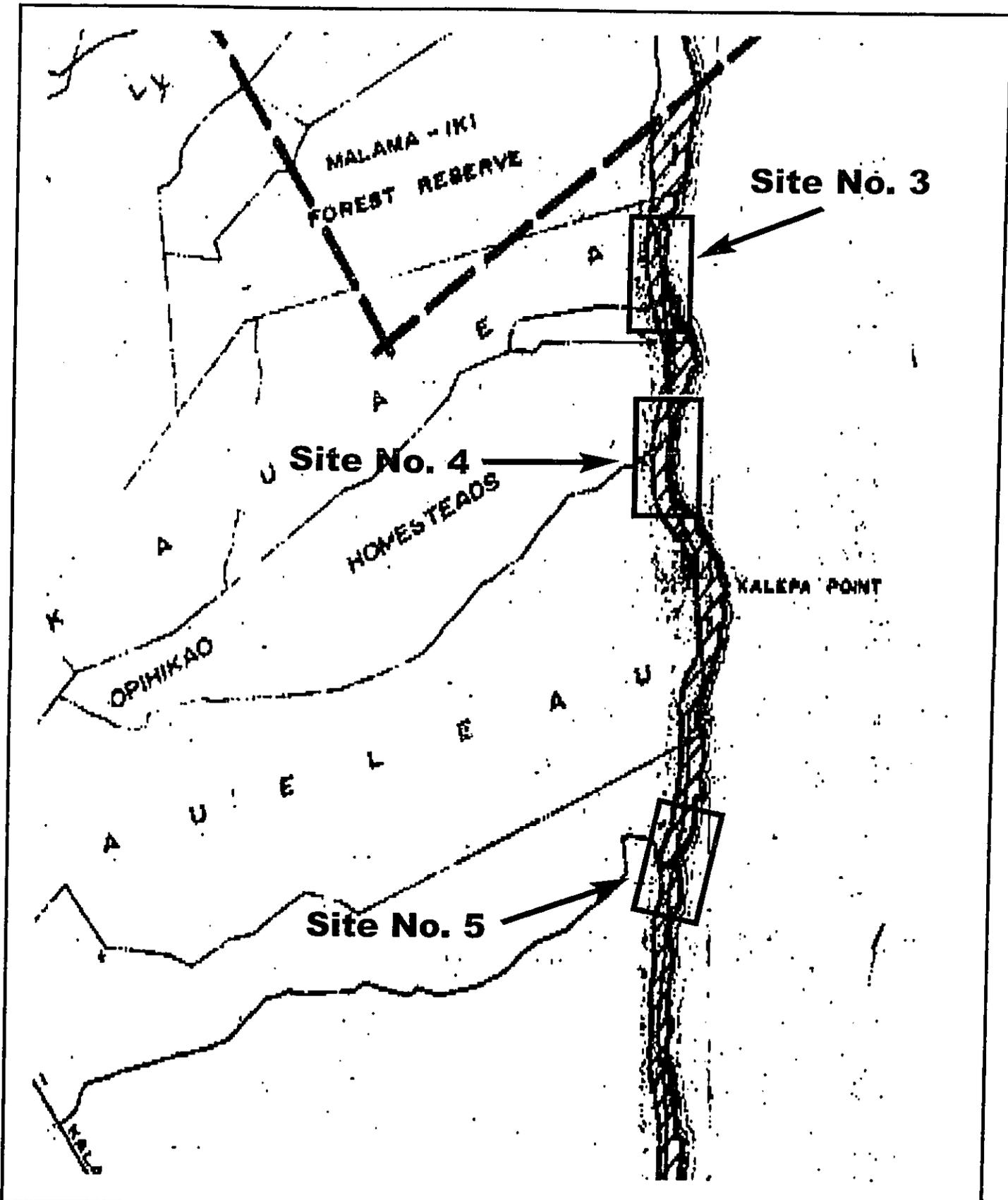


As previously shown on Figure 1.4, the area from Kalapana Road, including this roadway, towards the shoreline is zoned "O" Open Districts. Areas immediately above, or inland of, this road is zoned A-1a, Agriculture District with a minimum building site lot (parcel) area of 1 acre. This A-1a zoning district includes most property in the immediate vicinity of the roadway. Property located further inland away from the road is zoned A-10a, Agriculture District with a minimum building site lot area of 10 acres.

#### 1.2.4 Special Management Area

Under Chapter 205A (Coastal Zone Management), HRS, the County is given authorization to regulate land uses located within the established Special Management Area for the island of Hawaii. Review of the County of Hawaii's Special Management Area Map for the Puna District determined that the SMA boundary in the area of the realignment sites generally follows the shape of the shoreline. The SMA area within this area varies from approximately 400 to 900 feet inland of the shoreline. Figure 1.5 shows the realignment sites in relation to the SMA boundary.

As shown on this Figure, the realignment sites are situated within the SMA boundary since it includes Kalapana Road. As a result, this project is subject to the County Planning Department's assessment and processing procedures established under the Planning Commission's Rule 9, Special Management Area. Approval from the County would be required for this road realignment project, and appropriate coordination with the Planning Department would be conducted to obtain necessary approvals.



**SPECIAL MANAGEMENT AREA BOUNDARY MAP**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

*Source:  
County of Hawaii, Planning Department*

**Figure 1.5**



## CHAPTER 2 PROJECT DESCRIPTION

### 2.1 PROJECT LOCATION AND VICINITY

The Kalapana Road Realignment project is located on the southeastern end of the island of Hawaii in the Puna District. The three segments of Kalapana Road being realigned involve the stretch of road generally extending from the communities of Opihikao to Kamaili situated along the shoreline. This project area is approximately 45 minutes away from downtown Hilo. Figure 2.1 shows the project site's location and vicinity in greater detail.

Paho-Kalapana Road, Highway 130, serves as the main State-operated highway providing vehicle access to this Puna District from Hilo. From this highway, Kamaili Road provides access to the shoreline connecting with Kalapana Road near the project area.

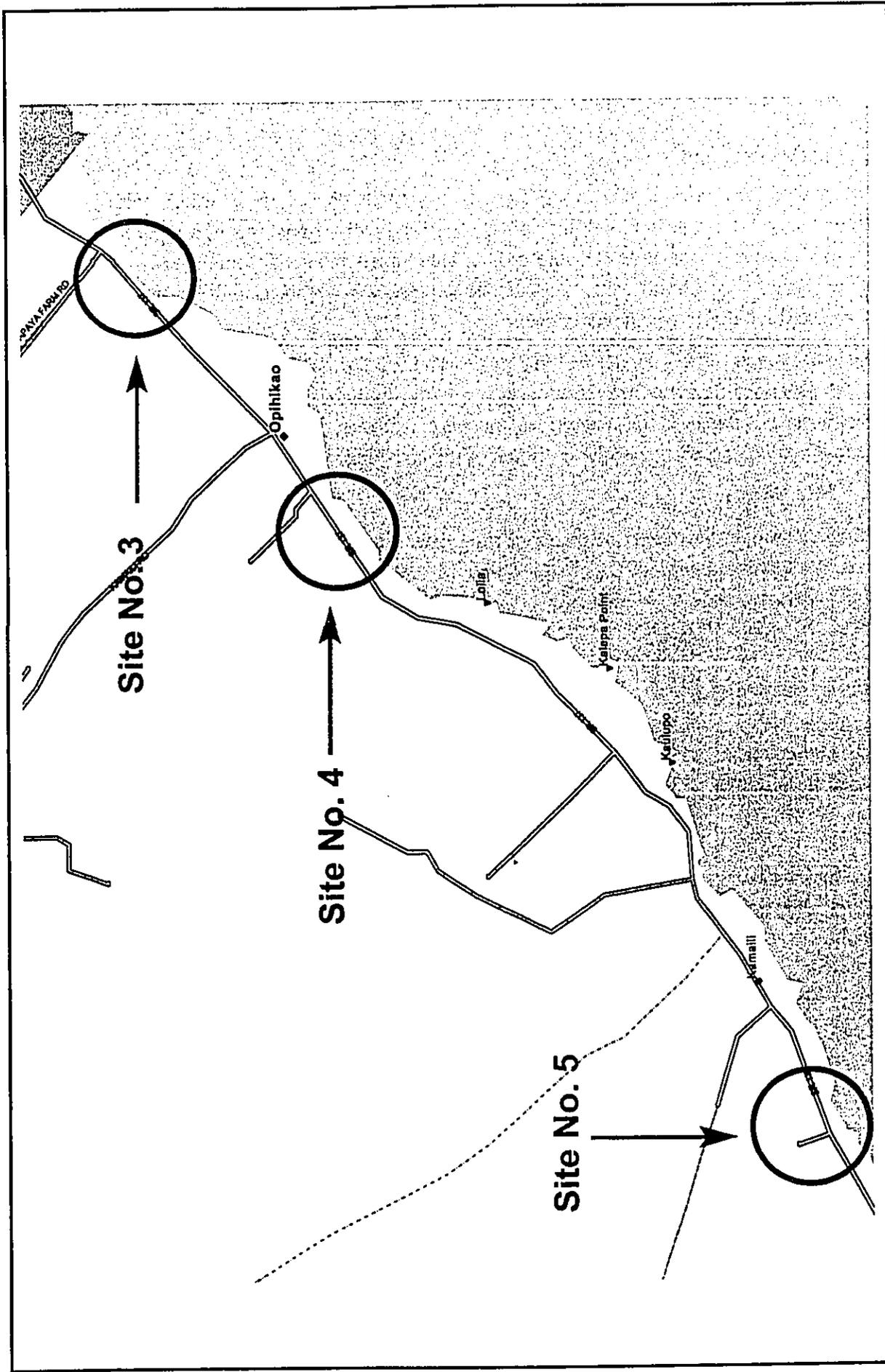
As shown on Figure 2.1, Kalapana Road travels in a northeast to southwest direction generally following the shoreline within this project area. In the project area, this road consists of an undivided two-laned roadway (one lane in each direction) with a pavement width varying from about 16 to 20 feet. The posted speed limit of this road in the vicinity of the realignment sites is 25 mile per hour. This section of the road was also recently repaved by the County.

Kalapana Beach Road is about 38 years old based upon available information from the County Department of Public Works, Chief Engineer's Communication index (Communication No. 6992) dated August 10, 1962. This information indicates that the construction of this road (Project No. A-137-02-60) was completed on February 23, 1962 where it was then reverted to the County of Hawaii's jurisdiction.

#### **General Shoreline Conditions**

The project area is moderately wet and supports substantial vegetation, although soils are shallow and the ground highly porous. There are no streams on this part of the island as water that soaks into the lava escapes eventually as groundwater issuing from springs at and off the shore. Because this part of the island is of recent origin in geological terms, there has been insufficient time for a coral reef to develop off the coast (AECOS 2000).

The absence of any reef structure off the shore means that the full force of waves can impinge unimpeded against the shoreline. In the general project area of the realignment sites, the coastline is mostly a sea cliff of somewhat variable height, typically between 6 to 26 feet high. This sea cliff is a result of the constant battering by waves on the prehistoric lava flows issued from the Southeast Rift zone of Kilauea (AECOS 2000).



**Figure 2.1**



**GENERAL VICINITY MAP**

Source:  
DeLorme 3-D Street Atlas USA (2000)  
Kalapana, Hawaii

Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works

### Existing Surrounding Uses

This project area, also referred to as Kalapana, is distinctly rural in character with limited residential development spaced along this coastline while much of the surrounding area remains undeveloped. Along the coastline near the project area, larger residential lots are present inland of Kalapana Road. Properties makai of this roadway are undeveloped, and are limited by the waves associated with this rugged shoreline.

The realignment sites proposed along this stretch of the roadway are generally situated between the Kalapana Seaview Estates subdivision to the southwest and MacKenzie Beach Park to the northeast. Kalapana Road serves as the only roadway providing vehicular access for residents and visitors traveling along this stretch of the coastline.

#### 2.1.1 Site No. 3

The first realignment area of this project is referred to as Site No. 3, and is the most northern of the three realignment sites being proposed. This segment is situated about 2,300 feet (about 0.45 miles) northeast of the intersection of Kamaili Road with Kalapana Road. The segment of this road needing to be realigned is situated along a steep rocky cliff being eroded and undermined by ocean waves as shown on Figure 2.2<sup>1</sup>. The length of this stretch of roadway needing realignment is approximately 1,000 feet long. Appendix A includes several photographs of this existing Site.



Figure 2.2  
Photo Showing Southern View Of Site No. 3

This segment of the roadway is located on elevated ground bounded by a rocky cliff ranging between 15 to 30 feet in height along the makai, or seaward, edge of the road. A guardrail of about 240 feet in length is provided

<sup>1</sup> It should be noted that this photograph of Site No. 3 was taken before the recent repaving of this roadway by the County.

along this seaward portion of the road to protect vehicles from running off this cliff. This road has a slightly undulating ground surface which dips more pronouncedly at the southern end of this segment as shown on this Figure. Elevations along this stretch of road varies from a high of 33 feet mean sea level (msl) to a low of 18 feet msl. The roadway pavement has about two 10-foot-wide lanes in each direction.

The northern portion of this roadway segment that's protected with the guardrail appears to have been previously realigned in an inland (mauka) direction as evidenced by some abandoned asphalt pavement and lane striping located adjacent to the existing guardrail. The mauka (western) side of this roadway segment is undeveloped, and consists of a dense growth of vegetation and trees as partially shown on Figure 2.2. Several more photographs of this site and surrounding area are provided in Appendix A.

#### 2.1.2 Site No. 4

The second realignment area is referred to as Site No. 4, and is located further south (towards Kalapana) of Site No. 3. This segment is located about 1,200 feet (less than 0.25 miles) southwest of the intersection of Kamaili Road with Kalapana Road. There are two sections of this realignment area which are of concern due to their susceptibility to occasional wave inundation during storms or periods of high surf. This portion of Kalapana Road traverses an area that generally has lower elevation terrain near the shoreline than other parts of the roadway.

Consequently, water is able to encroach onto the road during periods of high surf. Together, the total length of these two sections is about 800 feet.

The first section of Site No. 4 is located on the northern portion of this roadway. Figure 2.3<sup>2</sup> shows a northbound view of



Figure 2.3  
Photo Showing Northern Section Of Site No. 4

<sup>2</sup> It should be noted that this photograph of Site No. 4 was taken before the recent repaving of this roadway by the County.

this first section of Site No. 4, and Appendix A has more photographs of this Site. This section consists of about a 600-foot length of roadway that extends between existing roadside mailboxes with addresses noted as 13-4208 and 13-6338.

As shown on this Figure, this section of the road has several dips showing the high and low points as it winds along the adjacent shoreline. Roadway elevations associated with the low point at this section are about 12 feet msl before slowly rising to 21 feet msl as the road travels south. The pavement width of this roadway section is about 16 feet wide.

Several coconut trees and other vegetation line the makai edge of the roadway just above the rock outcrops. The mauka side of this roadway section consists of four residential lots. One of these lots has a house built with a large setback from the roadway used mainly as a front yard.

The second section associated with Site No. 4 is located further south of the first section. Figure 2.4 shows a photograph of this southern section prior to its recent repaving. This section consists of about 200 feet of roadway on a slight curve that fronts a house lot with the address of 13-6390. The pavement width of this portion of the road is also about 16 feet wide.

As shown on this Figure, this section of the road is generally straight with dips showing the high and low points along the road. The roadway elevation near the residence shown on Figure 2.4 is about 20 feet msl. Low points in this undulating section of the road have elevations of 18 feet and 16 feet msl as the road proceeds northbound.

Coconut trees and other vegetation line the shoreline of this road past the rock outcrops of



Figure 2.4  
Photo Showing Southern Section Of Site No. 4

the shoreline. Residential lots are located on the inland side of the road. One of these lots, partially shown on Figure 2.4, has a home present with a large front yard.

### 2.1.3 Site No. 5

The third realignment area of this project is referred to as Site No. 5, and is the most southern of the three realignment sites. This segment is situated about 10,500 feet (almost 2.00 miles) southwest of the intersection of Kamaili Road with Kalapana Road. The length of this affected road segment appears to be on the order of about 500 feet. Figure 2.5 shows a photograph of this roadway segment, and Appendix A has more photographs of this site and surrounding area.

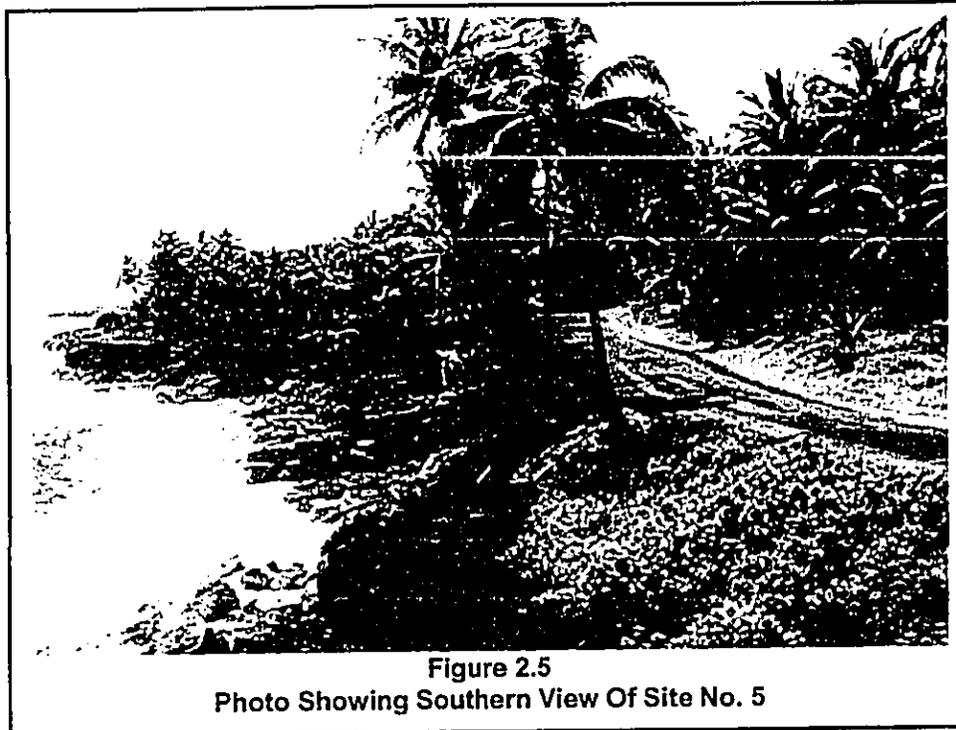


Figure 2.5  
Photo Showing Southern View Of Site No. 5

This section of the roadway has a large gradual drop in the roadway elevation starting from northern end before rising towards the southern end. The lower section of this roadway is shown on Figure 2.5, and reflects the area closest to the shoreline needing to be realigned. The northern portion of this road has an elevation of about 45 feet msl before dropping to 22 feet msl at its lowest point before rising again up to 30 feet msl at the southern end.

The pavement width of this roadway is about 16 feet wide. As shown on the Figure, vegetation along the makai edge of the roadway consists of coconut trees and other vegetation situated just above the rock outcrops. A couple residential lots are located on the mauka side of the roadway. The immediate area of these lots situated along the road is densely vegetated and undeveloped with the exception of rock walls.

## 2.2 NEED FOR PROJECT

The realignment of Sites No. 3, 4, and 5 of Kalapana Road is needed to provide continued vehicular access into and out from areas along this coastline. Consequently, these three sections of Kalapana Road are proposed for realignment because they have been affected by natural ocean and wave activities occurring along this rugged coastline. These ocean processes have resulted in the erosion of coastline area along Kalapana Road over time, the undermining of the roadway

at certain sections, and occasional wave wash onto the road during high surf conditions. One of the major factors contributing to these present conditions along this roadway is ground subsidence occurring from earthquakes and gravitational settling of the volcano mass.

### 2.2.1 Effects Of Ground Subsidence

Since the start of the latest eruptive event at the Kilauea Volcano in 1983, the Hawaiian Volcano Observatory (HVO) has measured a slow and steady subsidence of the summit and south flank regions of this volcano. Research of geotechnical information associated with this project area was performed by Geolabs, Inc., and a copy of their report is included in Appendix C. This general movement has been in a downward and seaward direction. This movement is believed to be the result of gravitational settling of the volcano mass along with the underground movement of magma at the summit and rift zones of the volcano.

Furthermore, some sudden downward and seaward regional ground movements were recorded as a result of the 1975 earthquake which had a magnitude of 7.2. This large earthquake was centered just west of Kalapana at a depth of about 6 miles below the ground's surface. Parts of the southern flank of Kilauea Volcano moved suddenly seaward approximately 9 to 26 feet, and subsided about 3 to 12 feet during this earthquake (Geolabs, Inc. 2000).

Some areas that experienced large magnitude ground deformation were in the vicinity of Halape and Keahou Landing which are located approximately 20 miles southwest of the Kalapana Road realignment sites. In the vicinity of the eastern flank of the Kilauea Volcano, which includes the coastline from Opihikao to Kamaili, the recorded movement was approximately 1.7 feet downward and 2 feet seaward (Geolabs, Inc. 2000).

Data associated with ground deformation resulting from other large historical earthquakes are sparse, especially in areas located away from the Kilauea summit and rift zones where monitoring by the HVO is performed less frequently. However, based on data obtained from the USGS, the general subsidence rate for the island of Hawaii calculated from Hilo tide information is about -0.15 inch per year relative to sea level. Over a future 50-year period, the general subsidence was estimated to be about -7.68 inches relative to sea level (Geolabs, Inc. 2000).

Based on available ground subsidence data for the Opihikao to Kamaili area, it could be estimated that over the next 50 years some sudden ground subsidence may occur as a result of large earthquake activity. The magnitude of such subsidence resulting is very difficult to estimate due to the relatively short length of recorded history and sparse leveling data available. However, a rough order of magnitude estimate may be about 10 feet of ground subsidence from sudden subsidence events over approximately 50 years. This was based on the largest sudden coastal subsidence of about 11 feet recorded at Halape from the 1975 earthquake (Geolabs, Inc. 2000).

As a result, future subsidence in the project area will occur from the settling of the volcano mass over time. However, the amount of subsidence occurring from this natural process over time should not be that significant as it was estimated to be only about 7.68 inches over a 50-year period. However, there is a potential for significant subsidence in the project area resulting from a large earthquake similar to that which occurred in 1975. This could result in a sudden ground subsidence of possibly about 2 feet or as large as 11 feet based upon historic events.

Ground subsidence of this magnitude would consequently have a significant effect on Kalapana Road due to its location near the shoreline. This ground subsidence would lower portions of the road allowing large waves and water to further encroach onto the roadway at areas already situated at low elevations. In addition, this would contribute to further coastal erosion processes occurring along the shoreline encroaching up to Kalapana Road. Segments of the road being undermined by wave activity could be subject to collapse essentially cutting off this roadway. Thus, realignment of the three sections of this road is needed to create further buffer areas from the shoreline to provide continued vehicular access along this roadway in the future.

### **2.2.2 Improvements Needed For Realignment Sites**

Each of the three realignment sites are experiencing some impacts from coastal erosion and other effects from the natural ocean conditions. The current impacts of the ocean conditions on these sites are discussed in greater detail. In summary, each of these three sites has concerns which are affecting either current accessibility through these sections or future accessibility.

#### **Concerns With Site No. 3**

For Site No. 3, the section of roadway being potentially susceptible to erosion and ocean wave encroachment is estimated to be about 1,000 feet in length. This roadway segment consists of a slightly undulating ground surface bordering a shoreline cove that is bounded by prominent rock land points extending seaward to the north and south of this site. A short length of this roadway located near the midsection of this segment appears to be better protected from shoreline erosion due to an existing rock outcrop that extends seaward away from the road. There appears to be two separate zones of erosion areas along this segment separated by this midsection rock outcrop.

The northern zone of this road is bordered by a guardrail on the makai end of the road which separates it from a tall and steep cliff. Figure 2.6 shows this road segment in relation to the cliff, and Appendix B includes more photographs of this realignment site. This northern zone of roadway had apparently already been previously realigned in a landward direction as evidenced by some abandoned asphalt pavement and lane striping located adjacent to this existing guardrail. A short section of the retaining wall covering the upper half of this exposed

cliff wall has since failed and washed away exposing the rock cliff face.

Based on Geolabs, Inc.'s evaluation of this northern zone, it appears that this rock cliff is experiencing active erosion and undermining of the exposed rock formation by ocean waves. The base of the cliff is being undercut by wave wash creating some potentially unstable overhanging blocks of layered rock formation. Over time, this undercut rock layer may fracture and topple seaward taking with it the less resistant clinker layers located above. Hence, this would augment the slow landward retreat of the cliff line at the site affecting this section of Kalapana Road (Geolabs, Inc. 2000).

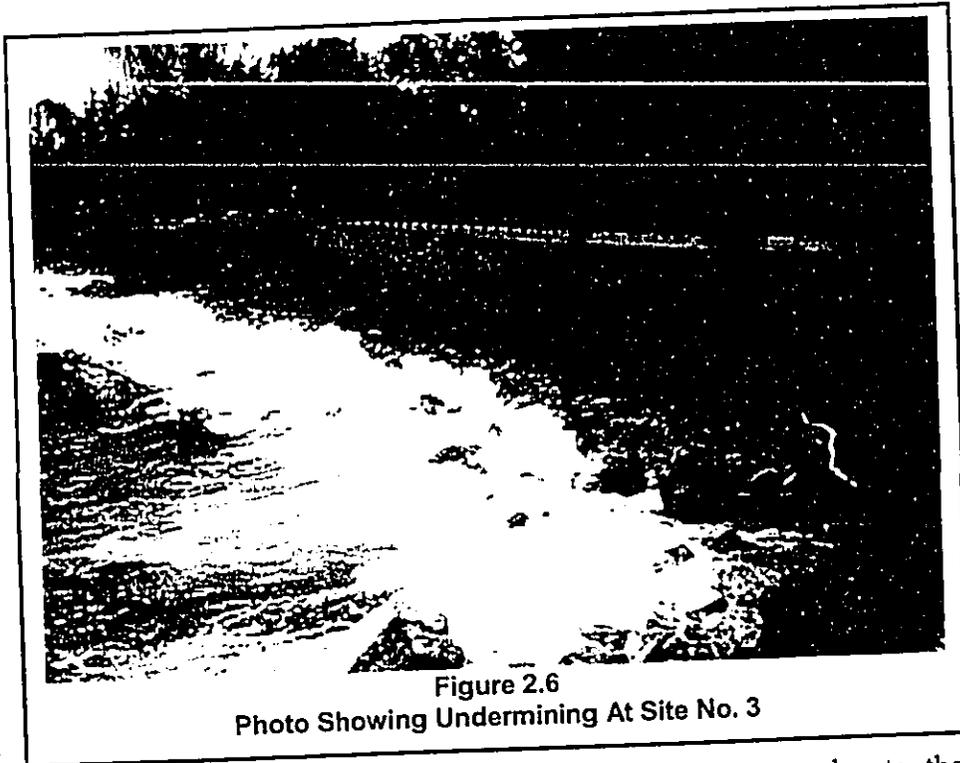


Figure 2.6  
Photo Showing Undermining At Site No. 3

It does not appear that future land subsidence would significantly affect this northern zone due to the existing higher elevated topography of this roadway section. Therefore, the most significant concern for this northern zone is the continued erosion of the cliff by wave action. Based on Geolabs, Inc.'s observation of the site, including the topography and amount of wave action occurring, consideration should be given to realigning the roadway a minimum of about 50 feet in the mauka (landward) direction (Geolabs, Inc. 2000).

The southern zone of this roadway dips lower in elevation, and this shoreline area is less steep and lower in height. Based on the evaluation of this site's southern zone, it appears that the shoreline area's lower elevation and undulating topography allows this section of road to be more susceptible to wave inundation.

Wave erosion of the shoreline along this southern section of the road does not appear to be as significant a consideration as compared to potential wave inundation caused by future ground subsidence along this coastline. Future ground subsidence could cause an increase in the

potential for wave inundation of this roadway segment. Given the surrounding topography and potential for future ground subsidence, it was recommended that consideration be given to realigning this roadway section a minimum of about 100 feet in the mauka direction (Geolabs, Inc. 2000).

#### **Concerns With Site No. 4**

For Site No. 4, the section of Kalapana Road being susceptible to erosion and wave inundation was estimated to be about 800 feet in length. As earlier discussed, this roadway segment consists of two distinct areas of concern with the first being a 600-foot length of roadway that extends between mailboxes with addresses noted as 13-4208 and 13-6338.

It appears that wave wash periodically encroaches within the existing road alignment due to the gradual slope of the rocky ground located on the seaward side of Kalapana Road. Figure 2.7 shows this area of concern, and more photos are provided in Appendix B. This road section appears to be already susceptible to wave inundation which may be amplified by future ground subsidence in the area which may potentially occur. This area's susceptibility to inundation is due to the road's existing



Figure 2.7  
Photo Showing Low Area At Site No. 4

low ground elevation relative to sea level (about 12 feet msl) and the lack of substantial rock outcrop barriers seaward of the roadway.

Consequently, this section of Kalapana Road is subject to occasional wave inundation during periods of high surf affecting vehicle passage through this area. Given the surrounding terrain with a higher elevation and the proximity of some residential properties in the area, it was recommended that consideration should be given to realigning the roadway a minimum of about 30 feet in the mauka direction (Geolabs, Inc. 2000).

The second segment of Site No. 4 consists of about 200 feet of roadway further south of the

first section. This section of road is on a slight curve fronting a residence with the address of 13-6390. Given the existing line of shoreline vegetation, recent deposits of sand, and the ground topography located seaward of the road, it appears that some occasional wave wash may encroach upon this roadway corridor during periods of high surf. Figure 2.8 shows this area of concern along this section of roadway.

This segment appears to be located at a higher elevation from the first roadway section discussed. The road's elevation in this area ranges from a low of about 15 feet msl to a high of

21 feet msl. There are some substantial rock outcrops located seaward of the existing road in this area, therefore, the risk of wave inundation occurring here would be lower than the first (northern) section. Based on the surrounding terrain and the proximity of the nearby home, it was recommended that consideration be given

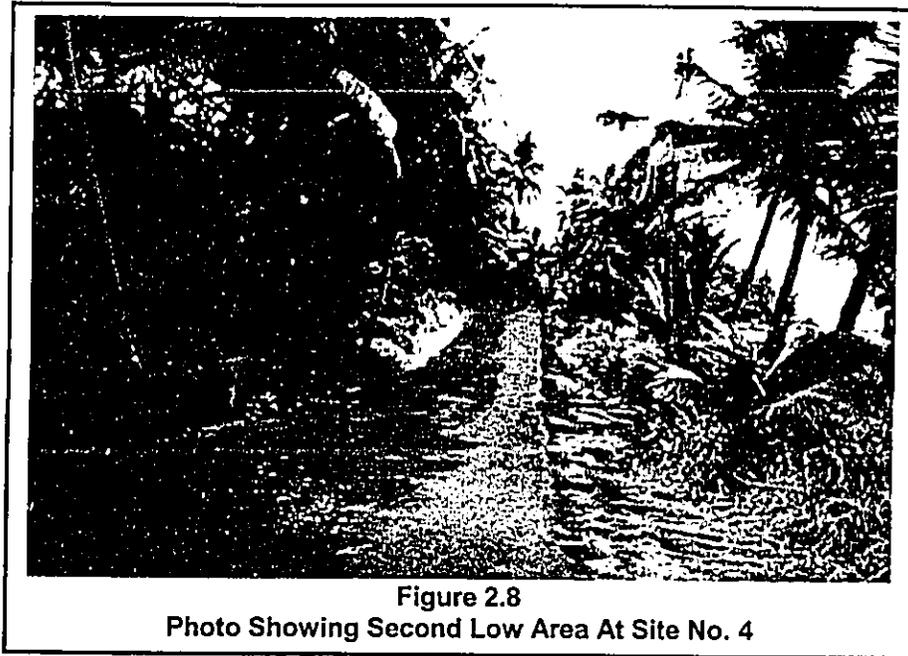


Figure 2.8  
Photo Showing Second Low Area At Site No. 4

to realigning the roadway in this section a minimum of about 20 to 30 feet in the mauka direction (Geolabs, Inc. 2000).

#### **Concerns With Site No. 5**

At Site No. 5, Kalapana Road traverses the rocky shoreline which is comprised of a small cove located at a dip in the road. As already mentioned, the length of this affected road segment is about 500 feet.

Along this shoreline, it appears that the coastline may be experiencing some erosion of the rock shoreline by wave action. This condition is evident based upon the line of coconut trees with exposed roots situated along the makai edge of the road. Furthermore, given the dip in the area's topography and proximity of the road to the shoreline, it appears that this site may be susceptible to inundation from wave wash during periods of high surf. Figure 2.9 shows this area of concern with this section of roadway.

A scarp of approximately 15 to 25 feet in height separates the road elevation from a boulder

shelf located at the foot of the scarp. The surf was observed during a field survey of the site breaking relatively close to shore with some rough wash encroaching to the foot of the scarp. Thus, it appears that some active shoreline erosion is occurring causing a slow landward retreat of the scarp face (Geolabs, Inc. 2000).

Despite the height of the scarp, the relatively close proximity of the rough breaking surf appears to render the site susceptible to wave inundation during high surf events. In addition, any future coastal land subsidence may potentially accelerate the erosion of this scarp. Consequently, it was recommended that consideration be given to realigning this segment of Kalapana Road a minimum of about 100 feet in the mauka direction. This would reduce the potential for wave inundation at the site given the area's gently sloping ground topography (Geolabs, Inc. 2000).



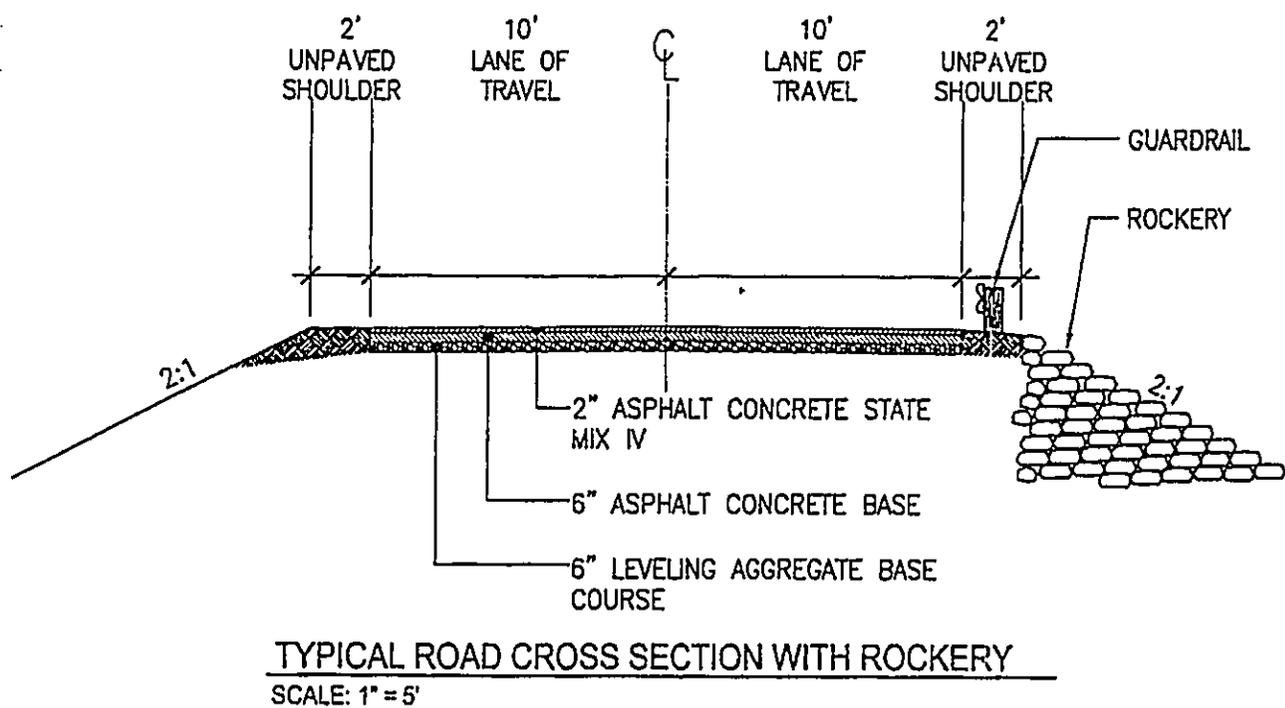
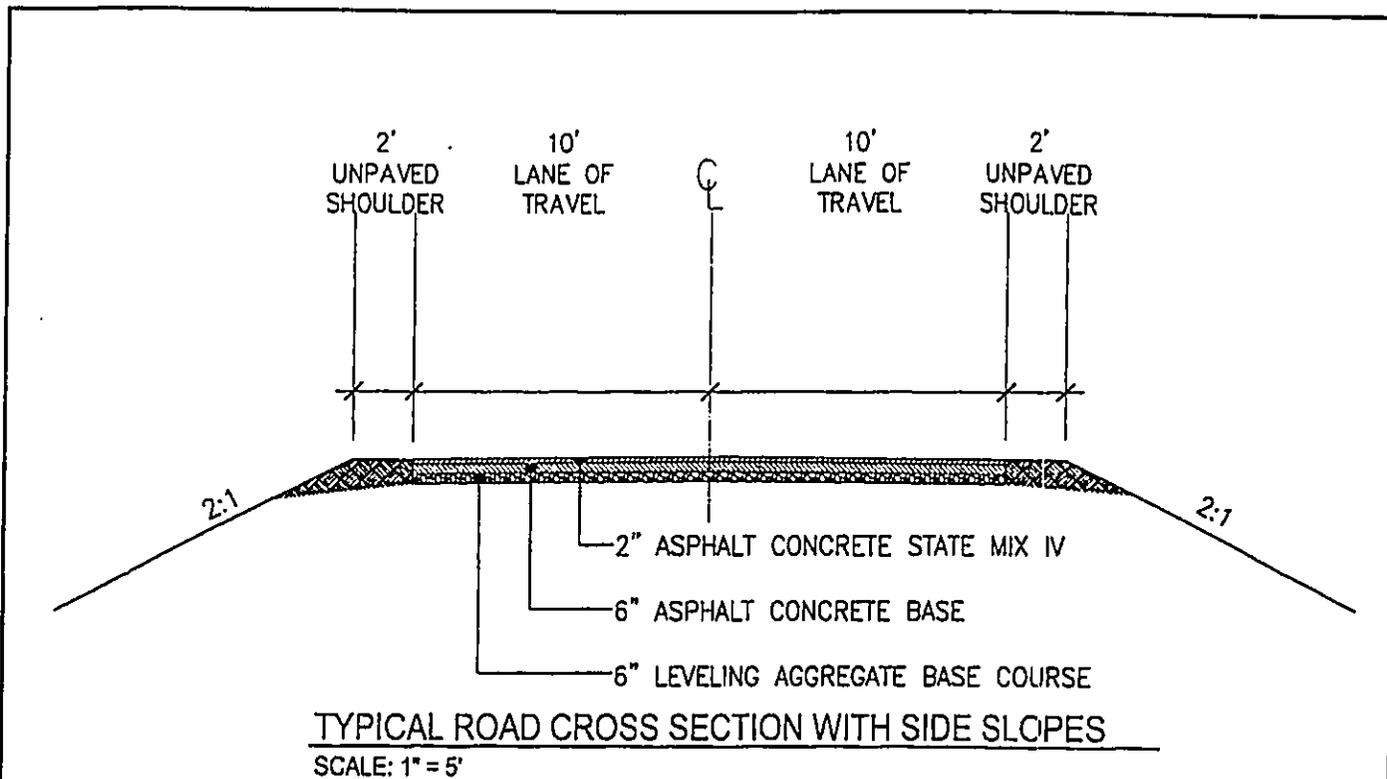
Figure 2.9  
Photo Showing Area Of Concern At Site No. 5

## 2.3 DESCRIPTION OF PROJECT

### 2.3.1 Design Criteria Used In Alternatives Development

Alternative realignment routes developed for each of the three sites took into account several design criteria. A design speed of 30 mph (for a posted speed limit of 25 mph) was used which takes into account such factors as roadway curve radius and sight distance. A roadway design life of 40 to 50 years was also desired by the County DPW. This roadway design life influenced the location of realignment alternatives inland to account for future coastal erosion along this shoreline due to wave action, subsidence factors and roadway undermining, and potential wave inundation due to existing areas of low elevation.

Another criteria involved the design standards for the actual road constructed for these realigned sections which affects the right-of-way required. This included providing a road that



**TYPICAL SECTIONS FOR REALIGNED SECTIONS**

*Kalapana Road Realignment Project*  
County of Hawaii, Department of Public Works

Source:  
SSFM International, Inc.

**Figure 2.10**



Finally, environmental factors were incorporated into the development of the alternative realignment routes. An important environmental factor was preventing the displacement of existing residences on affected properties. Thus, alternative routes were planned to prevent them from running through or behind existing home structures. Other factors were trying to minimize frontage taken of affected properties, avoiding large trees to the extent possible, and minimizing affects on existing rock walls and other structures.

### **2.3.2 Site No. 3 Realignment Alternatives**

Two realignment alternatives were developed for this approximately 1,200-foot section of Kalapana Road identified as Site No. 3. These Site No. 3 alternatives are referred to as Alternatives "A" and "B" in this document, and are shown on Figure 2.11.

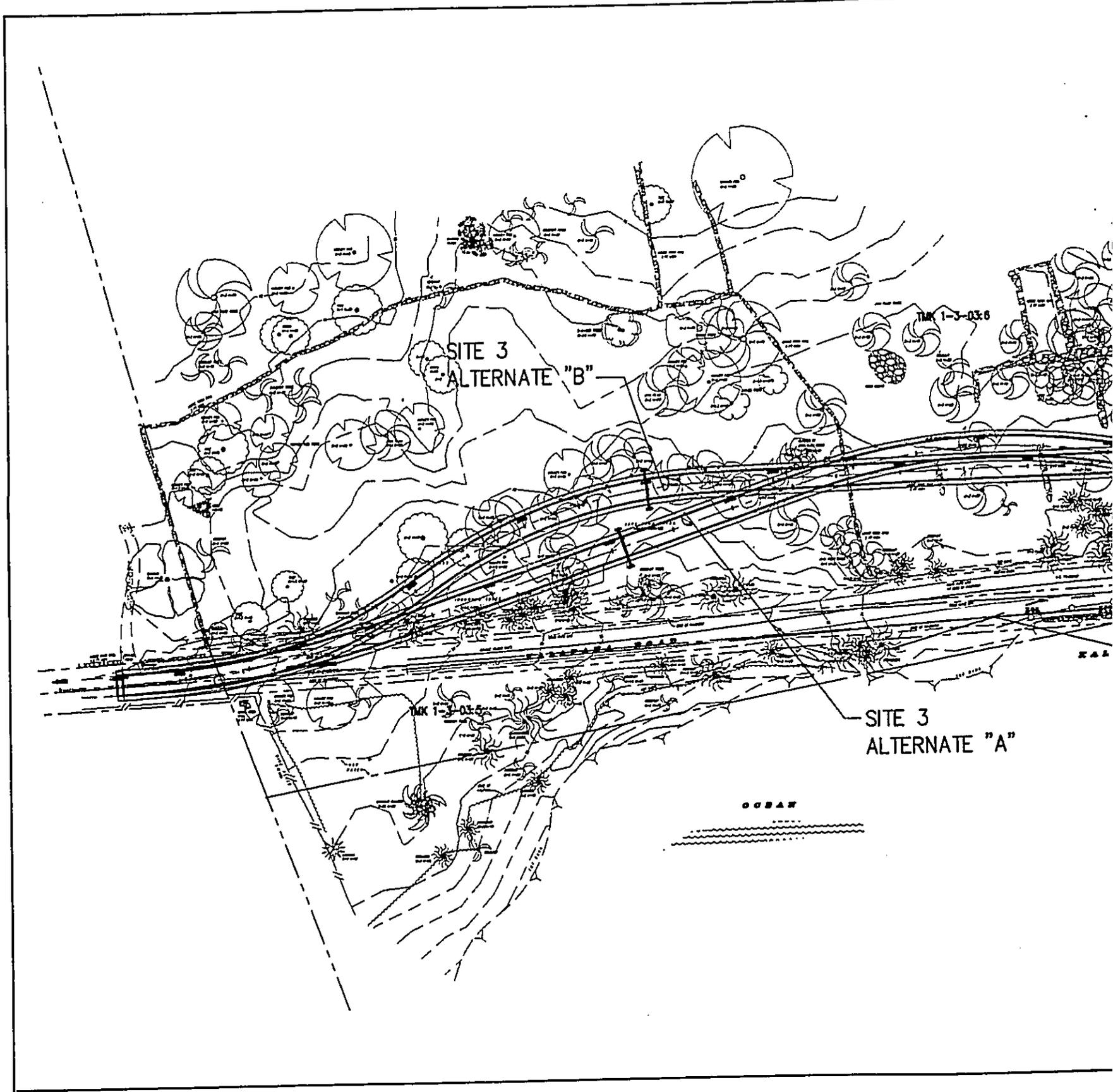
As shown on this figure, both alternatives would begin from the northern section of this realignment site just past an existing gravel road extending inland from Kalapana Road. These alternatives would then travel inland bypassing the section of existing road along the cliff being undermined and rock outcrops area south of this cliff. The routes would then connect back to Kalapana Road at the southern end of this realignment site located at a point situated near another gravel road extending inland and mailbox with number 13-6260 posted. Both of these alternatives would affect only a single large property identified as Tax Map Key 1-03-03: 006.

#### **Realignment Alternative A**

The realigned route for Alternative A would total about 1,350 feet in length, and consist of three horizontal curves and one vertical sag curve. As shown on Figure 2.11, this alternative route takes a more gradual inland approach away from the existing roadway cliff section before connecting back in a similar gradual approach just past the rock outcrops on the southern end.

The existing ground elevation at the northern section of this route is about 32 feet msl. The greatest distance inland from the mauka edge of the existing road would be approximately 115 feet. This would be located in an area having a ground elevation of about 30 feet msl. The existing ground elevation at the southern section of this route is about 31 feet msl.

Preliminary engineering work on this route indicates it may have a profile in which certain road lengths will have up to 5 feet of backfill and up to 3 feet of excavation work. A 2 to 1 slope embankment is currently planned for road sections that are built above the elevation of surrounding areas. Therefore, additional rights-of-way for these embankment areas could extend up to an additional 12 feet in certain areas. As a result, a right-of-way in the range of about 40 feet may be required for this alternative. The actual amount of right-of-way required would be determined during the actual design of this alternative route if selected. In addition, two 24-inch drainage culverts would be required along this route to address drainage conditions in this area.



**SITE NO. 3 REALIGNMENT ALTERNATIVES**

*Kalapana Road Realignment Project  
 County of Hawaii, Department of Public Works*



ALTERNATIVES

Source:  
SSFM International, Inc.

Figure 2.11



### **Realignment Alternative B**

The realigned route for Alternative B would total about 1,215 feet in length, and consist of four horizontal curves and one vertical sag curve. As shown on Figure 2.11, this alternative takes a sharper inland approach away from the existing roadway, then flattens out past the cliff section. It then finally connects back to the existing road in a similarly sharper approach just past the rock outcrops on the southern end.

The existing ground elevation at the northern section of this route is also about 32 feet msl since it starts at the same location as the other alternative. The greatest distance inland from the mauka edge of the existing road would also be approximately 115 feet located just past the section of tall cliff. Under this alternative, the majority of the realigned road would be located inland of the existing road about 100 to 115 feet at a ground elevation of about 30 feet msl. The existing ground elevation at the southern section of this route where it connects back is about 31 feet msl.

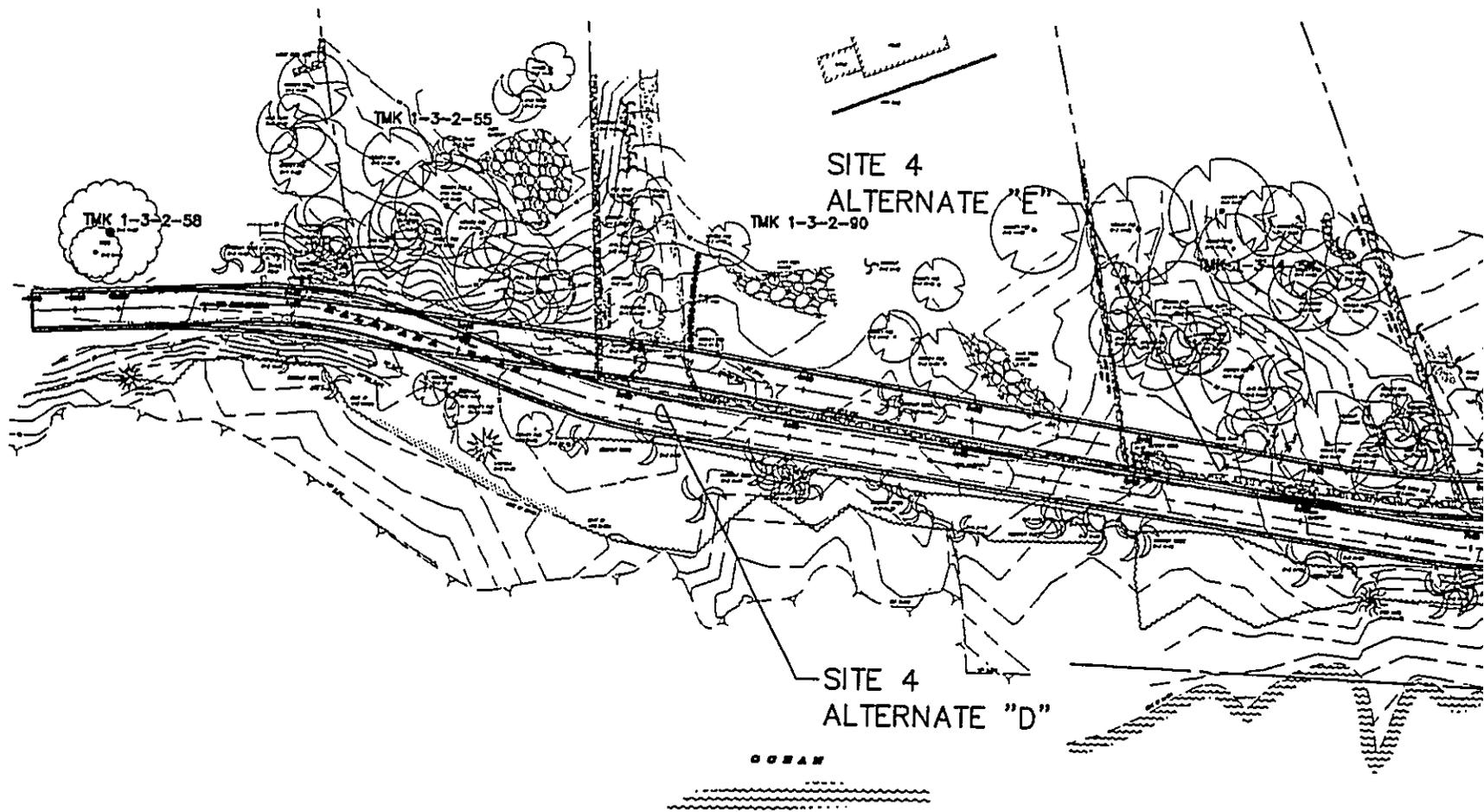
Preliminary engineering work on this route indicates it may have a profile in which certain road lengths will have up to 3 feet of backfill and up to 3 feet of excavation work. Using a 2 to 1 slope embankment is planned for road sections built above the elevation of surrounding areas, additional rights-of-way for these embankment areas could extend up to an additional 8 feet in certain areas. As a result, right-of-way of about 32 feet may be required for this alternative. The actual amount of right-of-way required would be determined during the actual design of this alternative route if selected. In addition, two 24-inch drainage culverts would be required along this route to address drainage conditions in this area.

#### **2.3.3 Site No. 4 Realignment Alternatives**

For Site No. 4, a total of five realignment alternative were developed to address the approximately 1,200-foot section of Kalapana Road that has areas subject to wave inundation. Three of the alternative (Alternatives A, B, and C) were eliminated from further consideration due to concerns expressed from area residents affected. This is discussed further in Chapter 3. Consequently, Alternatives "D" and "E" are being studied and are shown on Figure 2.12.

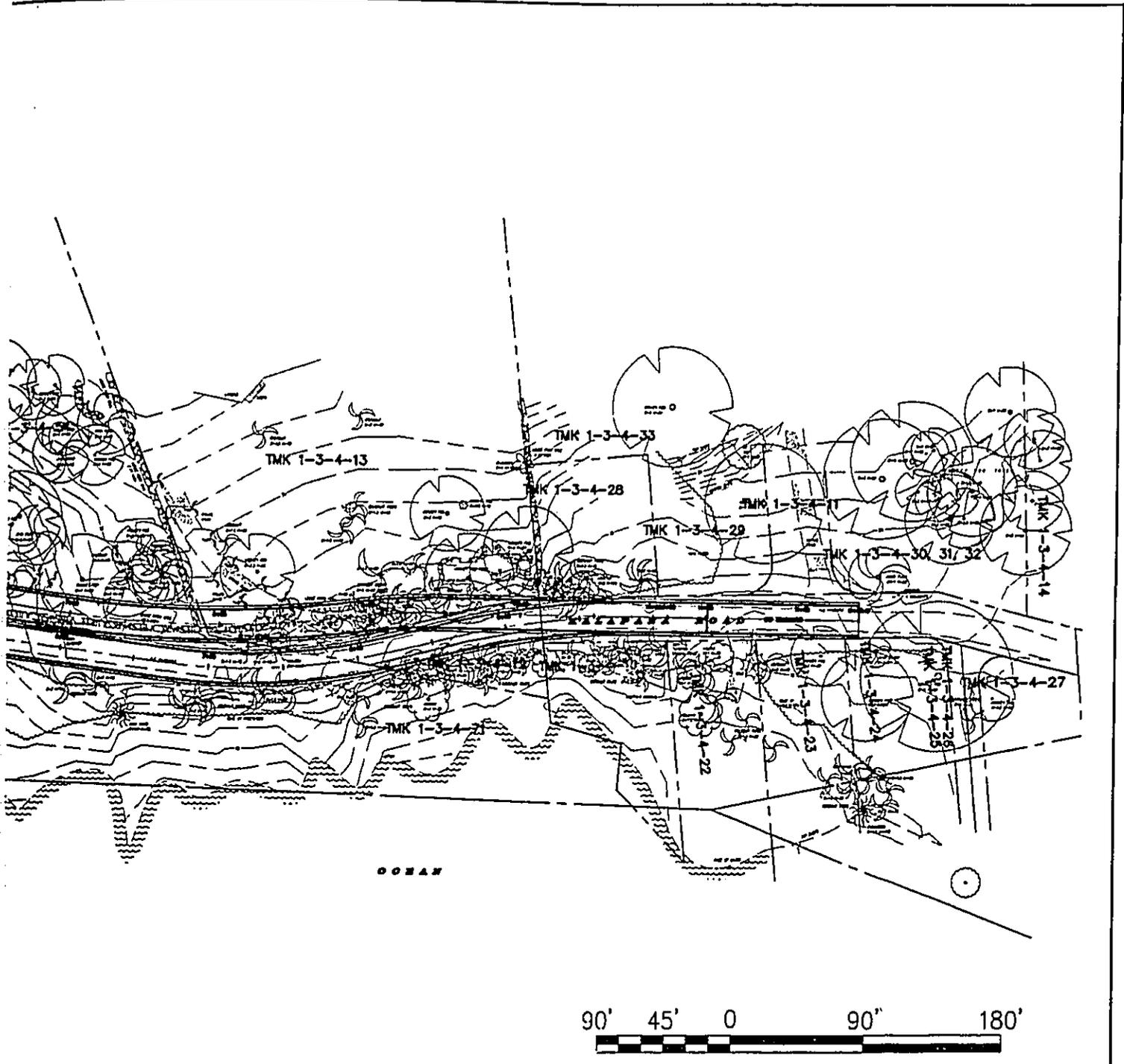
### **Realignment Alternative D**

Alternative D would involve using the existing alignment of Kalapana Road through this section, but raising the road's elevation in the area of 5 to 10 feet. Consequently, the length of this alternative would be about 1,140 feet. This renovation section would begin from the northern end past a gravel driveway and four mailboxes with posted address of 13-4208 through 13-6338. This would extend to the southern end of this realignment site past a property with a mailbox with a posted address of 13-6390.



## SITE NO. 4 REALIGNMENT ALTERNATIVES

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*



**ERNATIVES**

Source:  
SSFM International, Inc.

**Figure 2.12**



This alternative would require raising the existing road to protect it from wave inundation at two low points along this section near the shoreline. Preliminary engineering indicates a need to raise the road's existing elevation by 5 feet and up to 10 feet at certain low points. Raising this road would subsequently require embankments constructed on both sides of the road. Using a 2 to 1 slope ratio, these embankments could require up to an additional 15 feet of right-of-way on both sides of the road.

On the mauka side of the road, alternative design measures could consider either constructing a retaining wall or some type of strengthened embankment (reinforced soil slope) to reduce the amount of additional right-of-way required. On the makai side of the elevated road, a retaining wall would also be needed to protect the road from coastal erosion and wave wash. This wall could involve construction of a rip rap wall or concrete masonry unit (cmu) wall to protect the road. The actual design of such embankments and retaining walls would be *determined during the design of this project if this alternative is selected.*

This alternative would affect several properties located along this stretch of roadway. Mauka properties would be affected since additional right-of-way of 5 to 15 feet may be required for embankments. These properties are identified as Tax Map Key 1-03-04: 013, 028, 029 and 054, and 1-03-02: 055 and 090. Properties situated makai of the existing road would also be affected since a retaining wall would be needed to protect the road requiring additional right-of-way. These properties are identified as Tax Map Key 1-03-04: 010, 012, 022, and 071.

#### **Realignment Alternative E**

Alternative E would involve a route which generally follows the existing alignment of Kalapana Road through this section, but located about 30 feet inland. As previously shown on Figure 2.12, the length of this alternative would be about 1,200 feet, and would also need to be raised in the area of 5 to 10 feet as with Alternative D. This realigned section would begin from the same northern area as Alternative D, and end at the same southern section.

This alternative would similarly require raising the realigned section to protect it from wave inundation at two low points along this section near the shoreline. Preliminary engineering indicates a need to raise the road's existing elevation by 5 feet and up to 10 feet at certain low points since it would along be moved inland about 30 feet. Raising this road would subsequently require embankments constructed on both sides of the road. Using a 2 to 1 slope ratio, these embankments could require up to an additional 15 feet of right-of-way on both sides of the road.

As with Alternative D, alternative design measures could consider either constructing a retaining wall or some type of strengthened embankment (reinforced steel slope) to reduce the amount of additional right-of-way required from mauka properties. On the makai side of the elevated road, a retaining wall would also be needed to protect the road from coastal erosion and wave wash. This wall could involve construction of a rip rap wall or concrete masonry unit

(cmu) wall to protect the road. The actual design of such embankments and retaining walls would be determined during the design of this project if this alternative is selected.

This alternative would mainly affect only mauka properties located along this stretch of the route. Mauka properties would be affected since additional right-of-way of 5 to 15 feet may be required for embankments. These properties are the same as under Alternative D, and are identified as Tax Map Key 1-03-04: 013, 028, 029 and 054, and 1-03-02: 055 and 090. Properties situated makai of the existing road would likely not be affected since a retaining wall could be constructed within the existing County right-of-way for Kalapana Road.

#### **2.3.4 Site No. 5 Realignment Alternatives**

For this site, two realignment alternatives were developed to address this approximately 800-foot section of Kalapana Road. These Site No. 5 alternatives are referred to as Alternatives "A" and "B" in this document, and are shown on Figure 2.13. Both alternatives would begin from the northern section of this realignment site at a high elevation point before the road dips. This area is located just past Lava Lane which is an existing paved and gravel driveway extending inland from Kalapana Road.

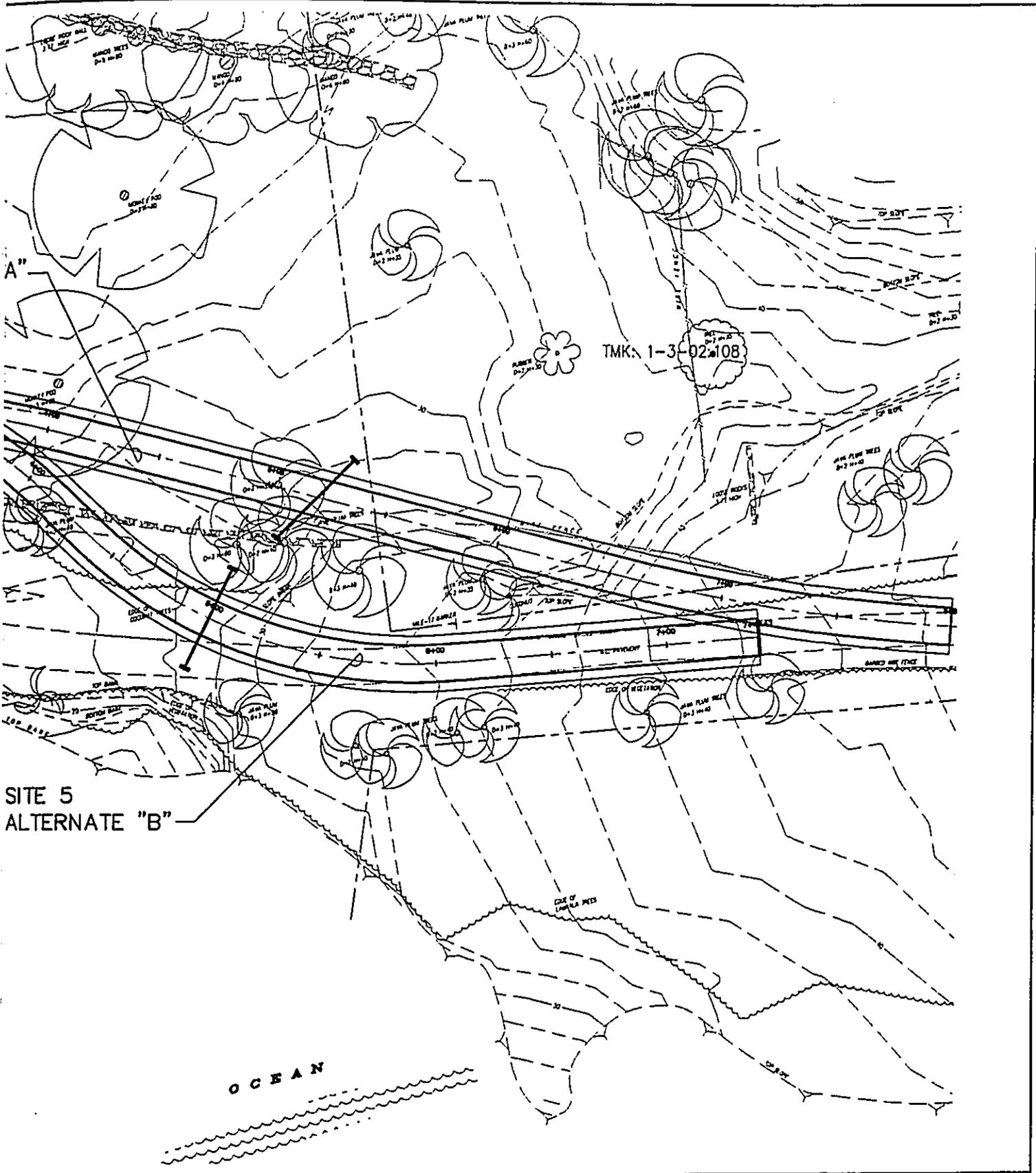
These alternatives would then travel inland bypassing the section of road near the eroded shoreline. The routes would then connect back to Kalapana Road at the same southern end located just before a short bridge with retaining walls as shown on the figure. Both of these alternatives would affect two large properties identified as Tax Map Key 1-03-02: 076 and 108. Both properties are owned by a single landowner.

##### **Realignment Alternative A**

The realigned route for Alternative A at Site No. 5 would total about 800 feet in length, and consist of three horizontal curves, one crest curve, and one sag curve. As shown on Figure 2.13, this alternative route takes a more gradual inland approach away from the existing roadway before reaching its point furthest inland at about 95 feet. This route then connects back to Kalapana Road using a sharper approach at the southern end past the area of concern. This route also makes use of an existing rock wall by travelling just above it for approximately 320 feet. Thus, the wall serves as a barrier protecting the realigned route from water inundation encroaching onto the area.

The existing ground elevation at the higher northern section of this route is about 46 feet msl. While proceeding inland away from the shoreline of concern, the elevation is generally in the range of 26 to 33 feet msl. The existing ground elevation at the southern connection point of this route is about 30 feet msl.





**ALTERNATIVES**

Source:  
SSFM International, Inc.

**Figure 2.13**



Preliminary engineering work for this route indicates that the finished grade of the new realigned roadway section centerline will require certain areas to have up to 8 feet of backfill and up to 3 feet of excavation work. Using the 2 to 1 slope embankment planned for road sections built above the elevation of surrounding areas would require an additional 16 feet of right-of-way for these embankment areas. As a result, a right-of-way in the range of about 40 feet may be required for this alternative. The actual amount of right-of-way required would be determined during the actual design of this alternative route if selected. In addition, two 24-inch drainage culverts would be required along this route to address drainage conditions in this area.

### **Realignment Alternative B**

The realigned route for Alternative B at Site No. 5 would be shorter totaling only about 740 feet in length, and consist of three horizontal curves, one crest curve, and one sag curve. This alternative route, shown on Figure 2.13, starts further south of Alternative A and follows the existing road before taking a sharp inland approach away from the existing roadway. This route reaches its point furthest inland at about 95 feet before connecting back to Kalapana Road generally following the same alignment as Alternative A at the southern end past the area of concern. This route also makes use of a portion of the existing wall there to protect the road from encroaching water.

The existing ground elevation where the route actually travels inland is about 35 msl. The ground elevation at the route's further point inland is about 33 feet msl. The existing ground elevation at the southern connection point of this route is about 30 feet msl.

As with Alternative A, preliminary engineering work indicates that the finished grade of this realigned roadway section centerline will also require certain areas to have up to 8 feet of backfill and up to 3 feet of excavation work. Using the 2 to 1 slope embankment planned for road sections would similarly require an additional 16 feet of right-of-way for these embankment areas. As a result, a right-of-way in the range of about 40 feet may also be required for this alternative. Two 24-inch drainage culverts would be required along this route to address drainage conditions in this area.

### **2.3.5 Development Schedule And Construction Cost Estimates**

Upon completion of the environmental review process, a realignment alternative would be selected for implementation by the County DPW. Design work on the selected alternative would need to commence, and other discretionary land use approvals or permits would need to be obtained. Property acquisition would also commence during the design review once the actual amount of additional right-of-way needed is determined.

Funding of this project was planned to be provided through remaining funds associated with the Federal Emergency Management Agency's Disaster Assistance Program for the Kilauea

lava flow disaster. However, funding under this program will lapse at the end of January 2001. Consequently, funding for the design, property acquisition, and construction of these realignment improvements would need to be programmed in the County's Capital Improvements Program (CIP). Funding for these design and construction phases are currently not appropriated in the County's CIP budget.

Assuming appropriate funding can be provided for these realignment projects, it is anticipated that design work, remaining land use approvals and permits, and property acquisition could be completed within 1 to 2 years for Sites No. 3 and 5. As a result, construction could begin in the year 2002 and be completed within 6 to 9 months. Thus, completion could occur within the year 2003.

For Site No. 4, a Conservation District Use Permit would be required since the project would involve a retaining wall constructed within the Conservation District. This process would take up to 7 months to complete. Thus, design work, remaining permits, and property acquisition would likely be completed within 2 years. As a result, construction could begin in late 2002 or early 2003, and be completed within 6 to 9 months. Thus, completion could occur by the end of 2003.

#### **Preliminary Construction Cost Estimates**

Preliminary construction cost estimates for the alternatives being considered at each of the three realignment sites has been prepared. The preliminary construction costs estimated for the various alternatives at each realignment site includes demolition efforts for removal of rock walls, removal of existing AC pavement, and clearing and grubbing. Costs associated with construction of the selected route include excavation, grading, new AC pavement, base course, new culverts and headwalls, and some landscaping.

These costs reflect rough order of magnitude and include contingency multipliers. Land acquisition costs have been excluded since the actual amount of right-of-way required would be determined during the project's design. Property acquisition would be subject fair market value appraisals of affected property and negotiations with the landowner.

#### **Site No. 3**

1. Alternative A has been estimated to be approximately \$365,000.
2. Alternative B has been estimated to be approximately \$372,000.

#### **Site No. 4**

1. Alternative D has been estimated to be approximately \$1,400,000.
2. Alternative E has been estimated to be approximately \$1,055,000.

#### **Site No. 5**

1. Alternative A has been estimated to be approximately \$425,000.

2. Alternative B has been estimated to be approximately \$400,000.

### 2.3.6 Listing Of Required Permits

A listing of required discretionary land use approvals and ministerial permits for this project is provided.

#### Federal Permits

1. Corps of Engineers Nationwide Permit – May be required for Site No. 4 due to construction of retaining wall along the shoreline.

#### State of Hawaii Permits

1. Conservation District Use permit – For Site No. 4 due to construction of retaining wall along the shoreline. Sites No. 3 and 5 are “exempt” based upon consultation with DLNR.
2. Construction Noise Variance – Only if required

#### County of Hawaii Approvals And Permits

1. Special Management Area Use Permit
2. Shoreline Setback Variance (If required)
3. Building, grading, and street usage permits

## CHAPTER 3 EVALUATION OF ALTERNATIVES

Several alternatives were developed and evaluated for consideration as part of this Kalapana Road Realignment project. These alternatives included those which were eliminated from further consideration and those being studied in greater detail under this environmental document. A greater description of these various alternatives is described in this chapter. In summary, those alternatives dropped from further consideration was because they would not adequately address the project need and objectives.

### **3.1 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION**

#### **3.1.1 No Action Alternative**

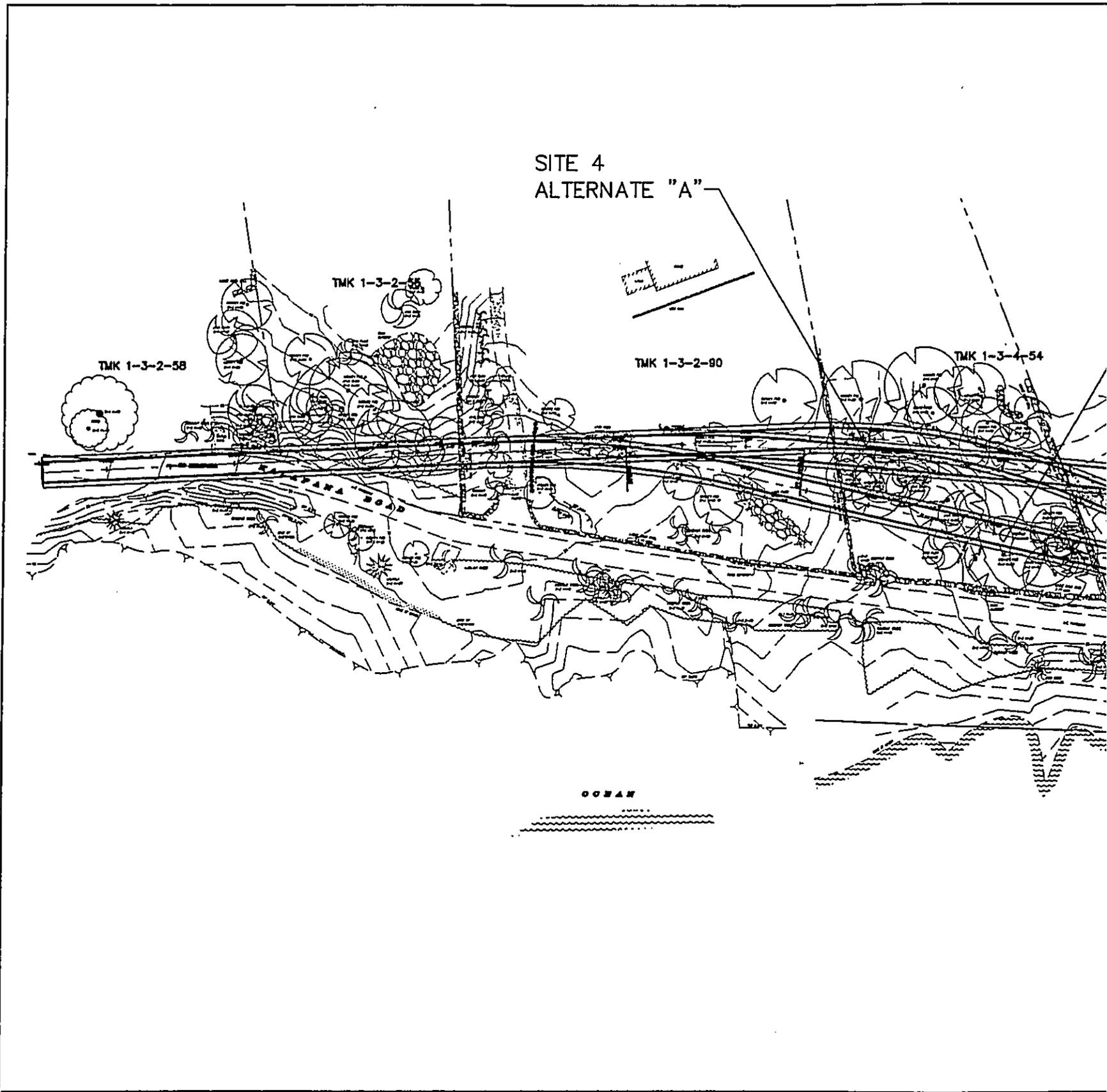
The No Action Alternative would involve implementing no realignment improvements to each of the three sections of Kalapana Road. Under this alternative, these three sections would be subject to continued coastal erosion, roadway undermining, and periodic wave inundation during high surf conditions. In the event of future ground subsidence due to an earthquake, these roadway sections could potentially drop up to several feet which would further facilitate the coastal erosion and other problems occurring in this area.

As discussed in Section 2.2, portions of the road at Site No. 3 could collapse due to undermining occurring of the sea cliff. At Site No. 4, portions of the road would continue to be exposed to wave inundation during high surf. In addition, further subsidence of the area would exacerbate these conditions. At Site No. 5, the erosion of the shoreline would continue eventually reaching the road which would damage this section. Photos of this area already show existing coconut trees along the makai edge of this road section being eroded at the root level.

Consequently, these sections of Kalapana Road would eventually become impassable in the future due to these natural coastal erosion processes occurring. Residents and the public would be cut off from shoreline properties if this occurred because this portion of Kalapana Road is the only coastal roadway providing vehicular access to this shoreline. Therefore, this alternative was eliminated from further consideration because it would not effectively address the current problems experienced along these sections of Kalapana Road.

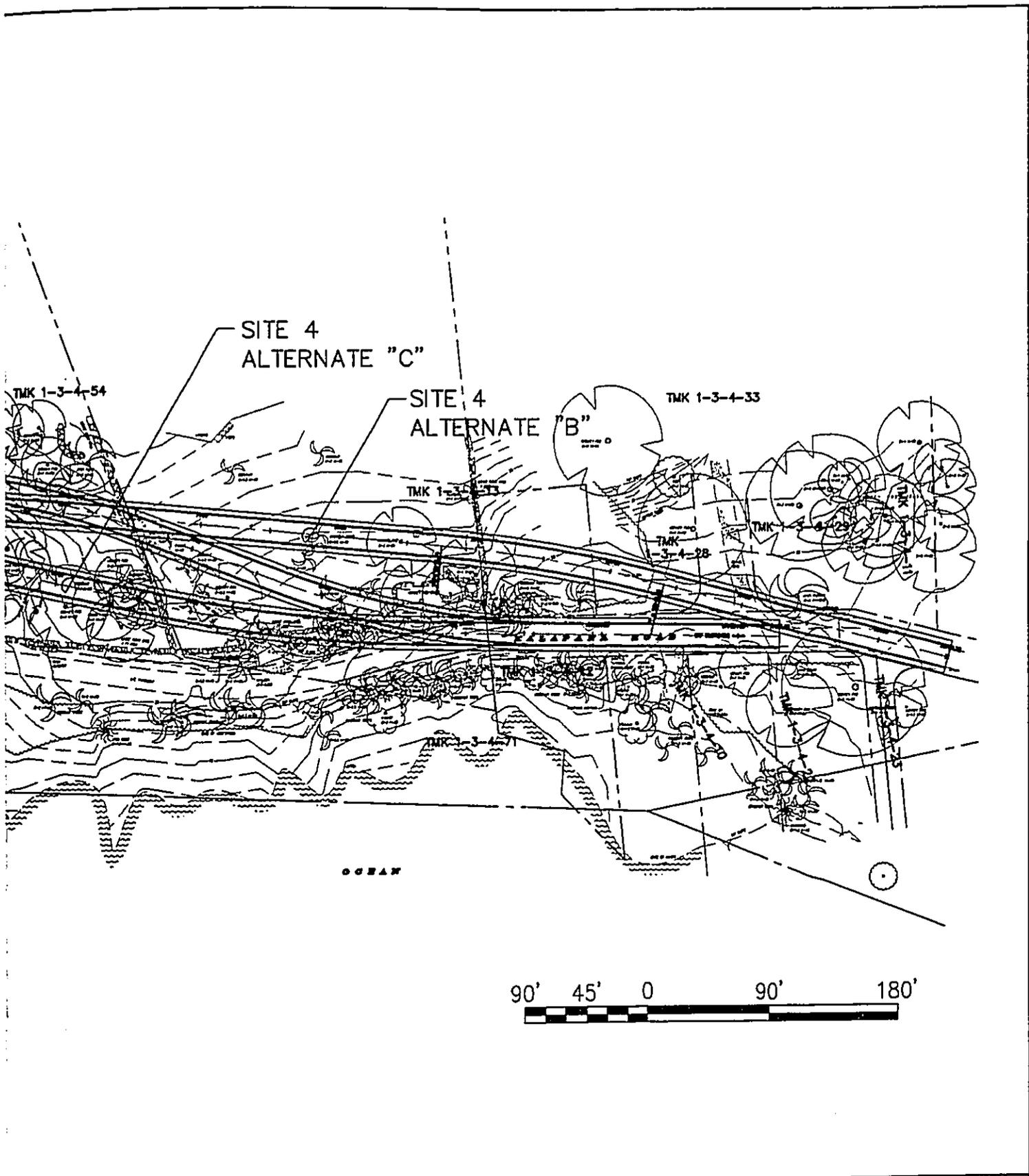
#### **3.1.2 Site No. 4 Alternatives Eliminated From Further Consideration**

Several realignment alternatives were developed for consideration and evaluation associated with Site No. 4. These alternatives were identified as A through E. However, Alternatives A, B, and C were eliminated from further consideration due to concerns raised by several property owners affected by these alternatives. These alternatives eliminated are shown



**SITE NO. 4 ALTERNATIVES ELIMINATED FROM CONSIDERATION**

*Kalapana Road Realignment Project  
 County of Hawaii, Department of Public Works*



<p><b>OM CONSIDERATION</b></p>	<p>Source: SSFM International, Inc.</p>	<p><b>Figure 3.1</b></p>

As shown on Figure 3.1, these three alternative realignments involve routes which travel inland of the existing road. As a result, they would affect much of the frontage property of certain developed properties. Alternative A involved a length of about 1,250 feet and would be routed about 125 inland of the existing road at its greatest point. Alternative B had a realignment length of about 1,350 feet and extended inland about 115 feet. Finally, Alternative C had a length of about 1,250 feet and would extend inland about 85 feet.

Early consultation efforts with affected property owners identified some concerns with these routes because of the amount of frontage property being affected. Although existing homes are set back about 160 feet away from the existing road, these alternative routes would essentially cut their frontage property in half. As a result, these alternative routes were eliminated from further consideration due to the likely impacts on affected properties.

### **3.2 PREFERRED ALTERNATIVES BEING CONSIDERED**

Two sets of realignment alternative routes for each of the three sites are being studied in more detail under this environmental document for possible implementation by the County. Based upon the preliminary results of technical studies conducted and assessments conducted, Preferred Alternatives have been identified for each of the three sites. These Preferred Alternatives were identified based upon how well they addressed the problems encountered at each site and the amount of probable environmental impact that may result from their implementation. The actual selection of each alternative would be made based upon agency and public input received on this document.

#### **3.2.1 Preferred Alternative For Site No. 3**

At Site No. 3, Alternative B is identified as the Preferred Alternative being considered at this time. Alternative B would better realign this section of Kalapana Road further away from the shoreline over the entire length of the route. This route would create a larger buffer area for the road away from the existing cliff due to the route's sharper turn inland at the northern end of this section. It would also provide a larger buffer area between the road and the rock outcrops at the southern end of this section.

In terms environmental impacts, both alternatives would have minimal impacts on the existing environment. The differences between the two are minimal and relatively insignificant due to the slight modifications present with these alternative routes. The following chapters provide greater discussion of the environmental impacts associated with these alternatives. As a result, Alternative B is identified as the preferred realignment route.

#### **3.2.2 Preferred Alternative For Site No. 4**

At Site No. 4, Alternative D is identified as the Preferred Alternative being considered at this time. Both alternatives would involve raising the existing or realigned roadway section, and

constructing retaining walls to protect the road from wave wash along the shoreline. However, Alternative D would involve less right-of-way property to be acquired from landowners of mauka properties. Although this alternative would affect properties on the makai side of the road, less concern is associated with these properties. These makai properties are limited in development potential due to their location near the shoreline and Conservation District classification present for these parcels.

### 3.2.3 Preferred Alternative For Site No. 5

For Site No. 5, Alternative A is identified as the Preferred Alternative being considered at this time. Alternative A would better realign this section of Kalapana Road further away from the shoreline over the entire length of the route. This route would thus create a larger buffer area for the road away from the eroding shoreline. It would also make better use of an existing rock wall in the area to protect this road from future wave inundation during high surf conditions.

In terms environmental impacts, both alternatives would have minimal impacts on the existing environment. The differences between the two are minimal and relatively insignificant due to the slight modifications present with these alternative routes. The following chapters provide greater discussion of the environmental impacts associated with these alternatives. As a result, Alternative A is identified as the preferred realignment route.

## CHAPTER 4 PHYSICAL AND BIOLOGICAL ENVIRONMENT

This chapter discusses the existing physical and biological environment in the project area, and the probable impacts resulting from the realignment of the three segments of Kalapana Road proposed under this road renovation project. Mitigative measures, if necessary, are also discussed.

### 4.1 CLIMATE, TOPOGRAPHY, AND SOILS

Climate on the island of Hawaii, as well as within the State of Hawaii, can be characterized as having low day-to-day and month-to-month variability. Differences in the climate of various areas are generally attributable to the island's geologic formation and topography creating miniature ecosystems ranging from tropical rain forests to dryer plains along with corresponding differences in temperature, humidity, wind, and rainfall over short distances (Dept. of Geography 1998).

The climate of the general area of the three realignment sites are typical of the Puna District. Average monthly temperatures recorded at Hilo International Airport in 1998 averaged about 73 degrees Fahrenheit and varied between an average of 70 and 76 degrees. The annual rainfall recorded at a Kapoho Landing station in 1998 was 84.4 inches which was about 26.8 inches less than their annual average of about 111.2 inches (NOAA 1998).

The prevailing trade winds in the Kalapana area of the Puna District are from the southeast direction and usually dominate from April to November. Wind speeds average about 15 miles per hour and vary between approximately 10 and 20 miles per hour. Winds from the southwest are less frequent occurring mainly during the winter associated with "Kona" storms (Dept. of Geography 1998).

#### 4.1.1 Topography

##### Regional Geology

The Island of Hawaii is the largest island in the Hawaiian Archipelago, and covers an area of approximately 4,000 square miles which is about twice the size of all other Hawaiian Islands combined. This island was formed by the activity of five shield volcanoes which are: 1) Kohala (long extinct); 2) Mauna Kea (some activity during recent geologic times); 3) Hualalai (last erupted in 1801 and is considered dormant); 4) Mauna Loa (still active); and Kilauea (still active). The realignment project sites are situated at the southeast end of the island's coastline which is located on the lower, eastern flank of Kilauea Volcano.

Kilauea Volcano is the youngest shield volcano, and comprises about 14 percent of the land area on the Island of Hawaii. This volcano has been erupting continuously since 1983, although the oldest lava erupted from Kilauea dates back to about 600,000 years before the present time. The structure of Kilauea Volcano consists of a central caldera (summit) and two primary rift zones. These rift zones extend from the caldera easterly toward Cape Kumukahi and southwesterly toward the Ka'u District. Rift zones are elongated areas of ground fissures where volcanic activity such as earthquakes and volcanic eruptions are concentrated (Geolabs, Inc. 2000).

The Kalapana Road realignment sites are located along the coastline on the eastern flank of Kilauea in between the primary Kilauea Volcano rift zones. These realignment sites appear to be underlain by bedded lava flows consisting of pahoehoe lava and thin interbedded clinker seams. Consequently, there may be very minimal surface soil cover along these areas. A more detailed discussion of soil types present is provided later.

#### **Topographical Features Of Realignment Sites**

The topographic features of the three road realignment sites are generally typical of existing properties in the immediate vicinity of Kalapana Road and this coastline area. In general, the topography of the sites slopes from the inland properties towards the shoreline.

At Site No. 3, the existing road is generally flat with slight undulations throughout the section being realigned. Elevations vary from a high of about 33 feet msl to a low of about 21 feet msl along this stretch. The property immediately inland of this road being considered for use in the realignment has a gentle gradual slope towards the shoreline. Existing ground elevations along the alternative routes being considered on this property vary from a low of about 25 feet to a high of about 32 feet msl. Figures of realignment sites in Chapter 2 included topographic information showing this area's topography.

At Site No. 4, the existing road along this shoreline has several dips and undulations throughout the section of concern. Elevations vary from a high of about 22 feet msl to a low of about 12 feet msl along this stretch. The alternatives being considered for this site include raising the existing road and a new alignment only about 30 feet inland of the existing road. Consequently, the topography of the properties being affected is similar to the existing road which is rather flat with various dips and undulations. Present elevations for these properties are either same with the existing road or a couple feet slightly higher. Previous figures in Chapter 2 included topographic information showing this area's topography.

For Site No. 5, the existing road has a large dip which involves the area of concern needing to be realigned. Elevations vary from a high of about 33 feet to a low of about 22 feet msl along this stretch. The property immediately inland of this road being considered for use in the realignment has a gradual slope towards the shoreline. Existing ground elevations along the

alternative routes being considered on this property vary from a low of about 24 feet to a high of about 35 feet msl. Previous figures in Chapter 2 included topographic information showing this area's topography.

#### 4.1.2 Soils

##### SCS Soil Survey

Under the U.S. Department of Agriculture, Soil Conservation Service's *Soil Survey of Island of Hawaii, State of Hawaii* (SCS 1973), soils situated within the three realignment sites consist of two types which are the Malama Series and Opihikao Series. In particular, the soils present are: 1) Malama extremely stony muck, 3 to 15 percent slopes (rMAD, and 2) Opihikao extremely rocky muck, 3 to 25 percent slopes (rOPE).

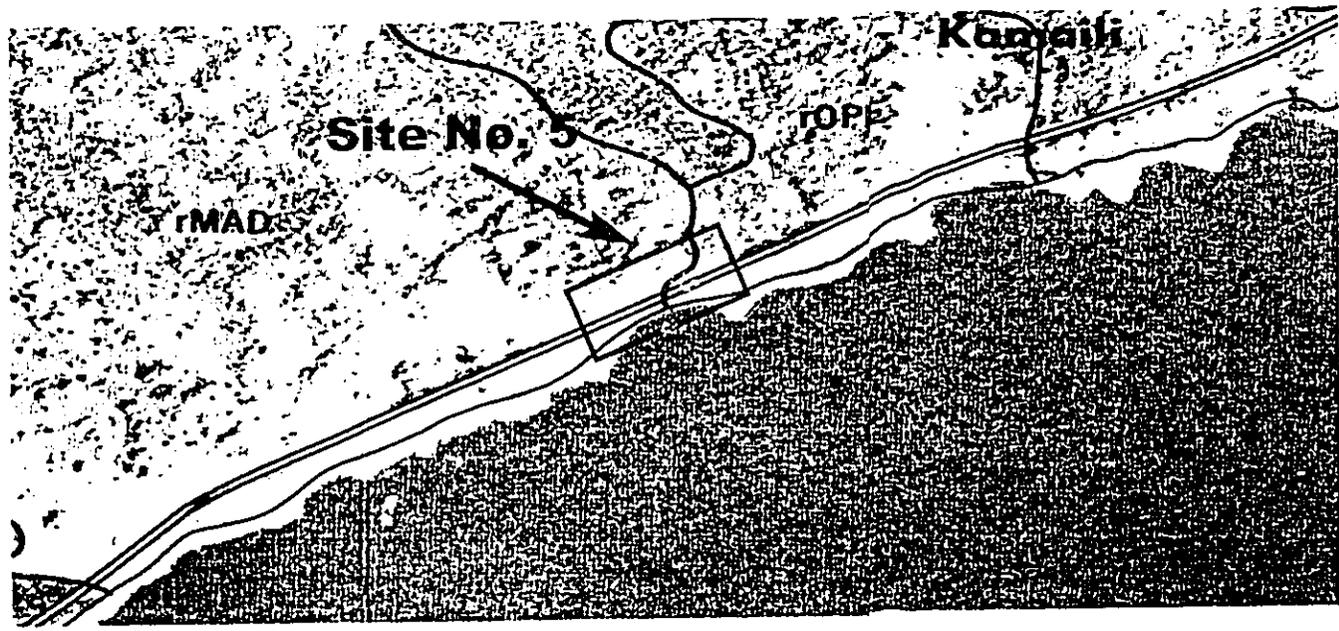
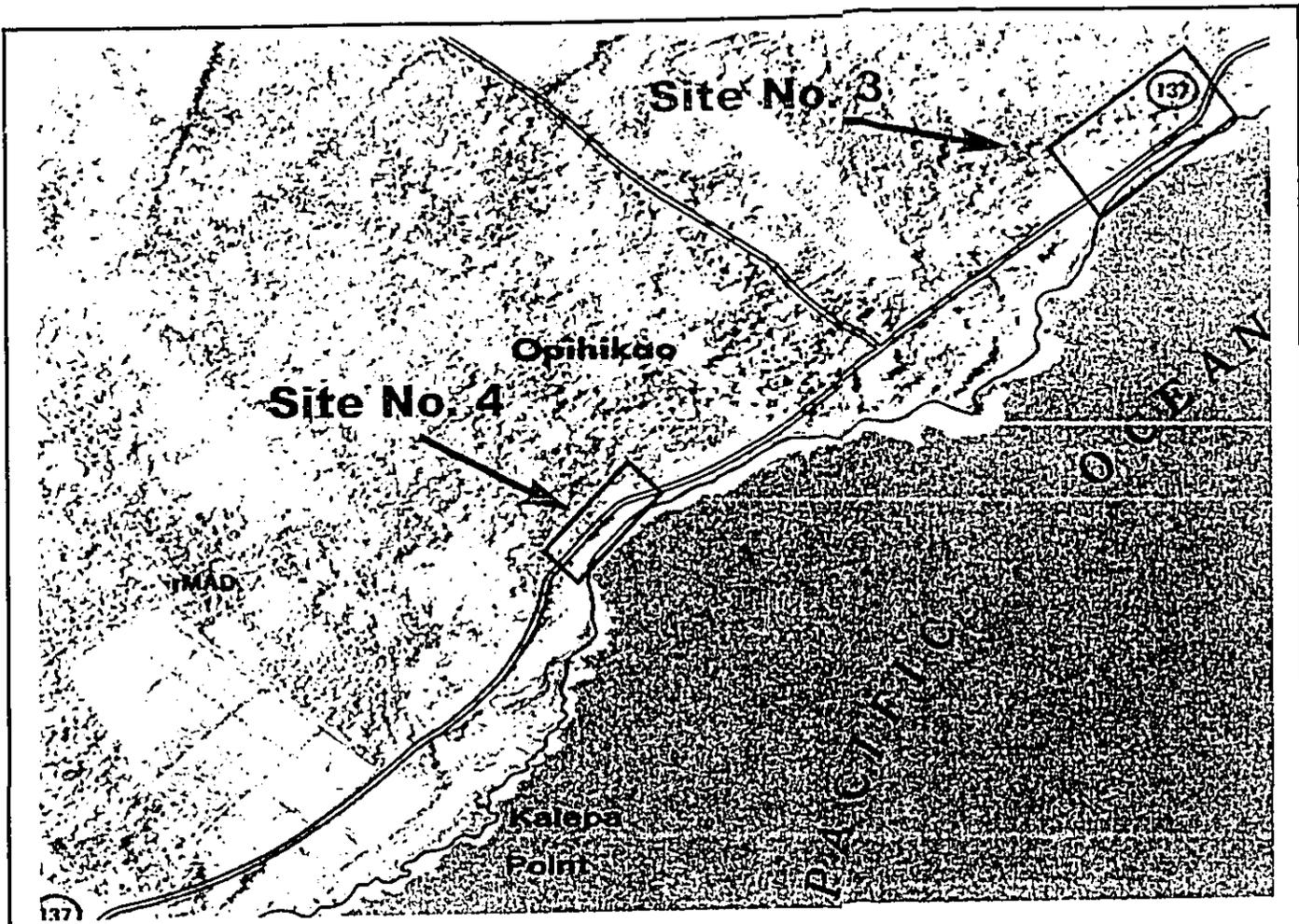
Figure 4.1 shows these soil types in relation to the three realignment sites. As shown on this figure, the majority of the soil types affected by the realignment project would be Malama extremely stony muck. Only a portion of Site No. 5 would involve Opihikao extremely rocky muck.

The Malama series of soils consist of well-drained, thin, extremely stony organic soils which overlie relatively young Aa lava flows on the windward side of Kilauea Crater. These soils are undulating to rolling. These soils are present on mountains at elevations ranging from near sea level to 1,000 feet. Malama soils were described as being used for woodland, pasture, and orchards (SCS 1973).

In a representative profile, the surface layer is very dark brown extremely stony muck about 3 inches thick. It is underlain by fragmental 'a' lava, and this soil is strongly acid. The permeability is rapid, runoff is very slow, and the erosion hazard is slight (SCS 1973).

The Opihikao series of soils consist of well-drained, thin, organic soils that overlie pahoehoe lava bedrock. These soils are gently sloping to moderately steep. These soils are present on uplands at an elevation ranging from near sea level to 1,000 feet. The natural vegetation consists of guava, waiwe, and ohia. These soils are present in native forest or area used for pasture (SCS 1973).

Opihikao extremely rocky muck (rOPE) soil is present in the Puna district, and rock outcrops occupy 30 to 50 percent of the area. In a representative profile, the surface layer is very dark brown muck about 3 inches thick. It is underlain by pahoehoe lava bedrock, and the muck is strongly acid and rapidly permeable. The lava is very slowly permeable, but water moves rapidly through the cracks. Runoff is slow, and the erosion hazard is slight (SCS 1973).



**SOIL SURVEY MAP OF REALIGNMENT SITES**

**Figure 4.1**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

*Source:  
U.S. Dept. of Agriculture, Soil Conservation Service*



### Land Study Bureau

Under the Land Study Bureau's *Detailed Land Classification - Island of Hawaii*, (LSB 1965), soils associated with the realignment sites consist of land given an overall master productivity rating of "D" and "E." Figure 4.2 shows these master productivity ratings for land areas in relation to the subject property. The soil productivity ratings given for properties associated with the respective realignment sites are described below:

#### Site No. 3

1. D269 – Aa with Oloo soil type having limited soil material, dark gray to nearly black color, and Aa and volcanic ash as the parent material. The stoniness of this soil has sharp lava clinkers, is very well drained, 0 to 20 percent slope, and is unsuited for machine tillability.
2. E268 - Aa including pumice deposits which have no soil material. The color is dark brown to nearly black, and has Aa and pumice as the parent material. The stoniness of this soil has sharp lava clinkers, is excessively drained, 0 to 35 percent slope, and is unsuited for machine tillability.

#### Site No. 4

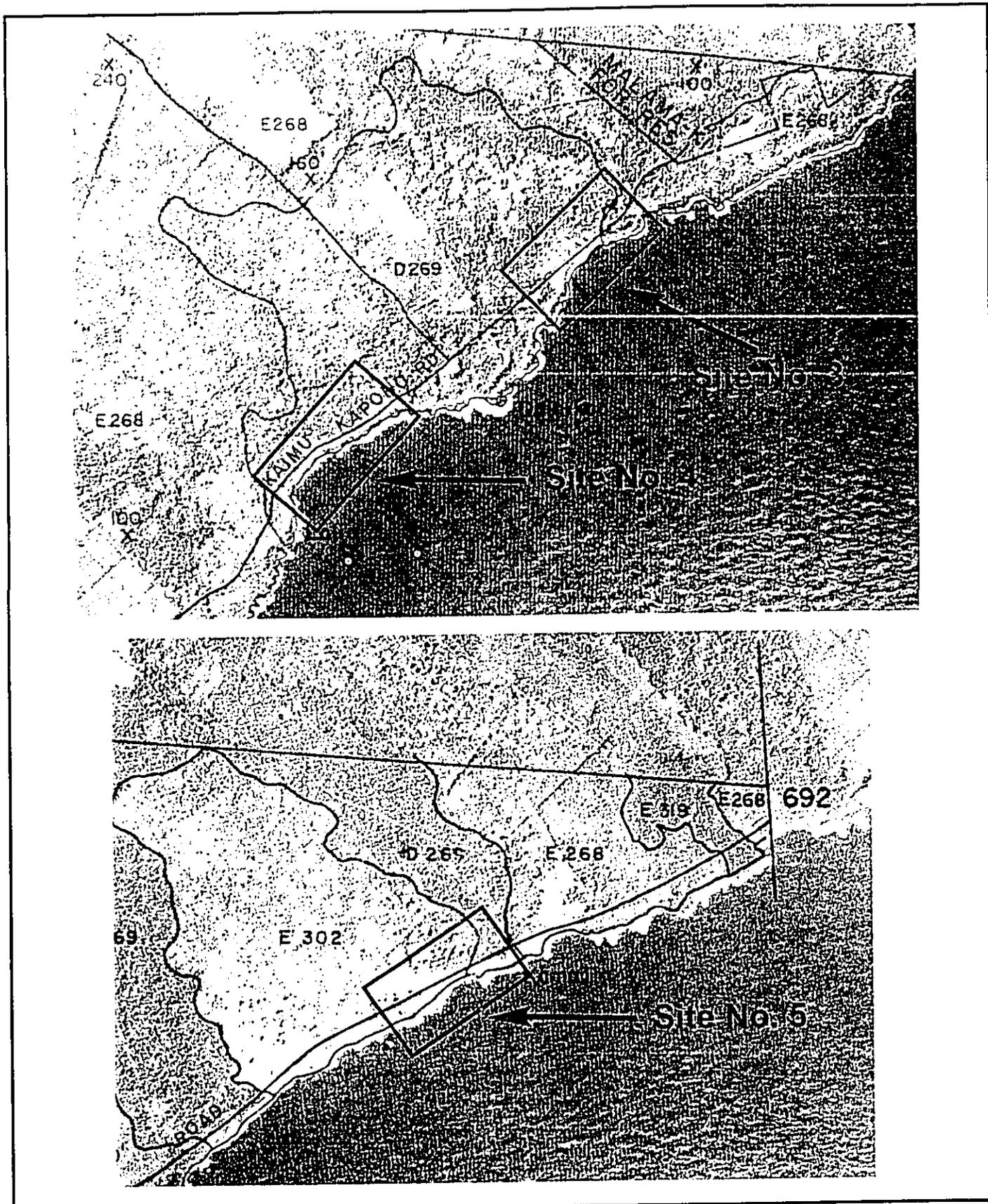
1. D269 – Previously discussed under Site No. 3.

#### Site No. 5

1. D269 – Previously discussed under Site No. 3.
2. E302 – Almost bare Pahoehoe which has no soil material. The color is brown to black, and has Pahoehoe as the parent material. The soil series is well drained, 0 to 20 percent slope, and is unsuited for machine tillability.

### **4.1.3 Effects From Construction Activity**

Construction of the alternative realignment routes being considered for each of the three project sites are not expected to have a significant impact on the existing topography or physical character of the immediate area. As discussed in Chapter 2, these realignment alternatives being considered would only involve relatively short segments of the existing road ranging from about 500 to 1,000 feet in length. Consequently, the amount of area being disturbed from construction would generally be limited to roadway corridors for the selected realignment.



**LSB'S DETAILED LAND CLASSIFICATION MAP**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

Source:  
Land Study Bureau

**Figure 4.2**



The actual length of the realignment alternative routes being considered vary from about 800 to 1,300 feet in length. In addition, these realigned sections would be located only 100 feet or less inland from the existing road. Thus, the construction of these short segments should have relatively minimal impact in altering the existing topography and elevations of these areas. Given a right-of-way of about 30 feet wide needed for the realigned road, changes to the existing topography would be small in comparison to other types of larger developments such as golf courses and residential subdivisions.

The realigned routes would require some clearing and grading activities as part of construction activities. The alternative routes being considered for Sites No. 3 and 5 would be constructed at the elevations shown in Chapter 2, however, some cut and fill of the existing topography would be necessary to level out the new roadway sections. These activities would primarily be limited to right-of-way areas created for the new realigned routes which would include fill areas needed to obtain a desired 2 to 1 slope ratio for fill areas.

For Site No. 4, the alternatives being considered would require raising the existing road and new realignment route just inland of the current road. To minimize fill on the mauka side of the road, a retaining wall would be considered. Along the makai portion of these alternatives, a rip rap wall would be required to protect the road from wave inundation and coastal erosion.

The design of the road's realignment for each of the three project sites would try to achieve a balanced cut and fill condition to minimize disturbances to the surrounding topography and soils as practical. The project's design would try to preserve existing large trees to the extent possible. A Grading Plan will be prepared during the design of this project, and submitted to pertinent agencies for their review and approval.

Construction of the realigned roads would inevitably involve some land disturbing activities that may result in some soil erosion. However, this erosion potential is relatively low since soil is limited at these realignment sites due to the presence of Aa and Pahoehoe lava. Nevertheless, to minimize potential short-term erosion impacts during construction activities, various erosion control measures would be considered for implementation during the project's design. Necessary measures would be developed during the final design of this project, and would comply with the County's Erosion and Sedimentation Control regulations prescribed under Chapter 10 of the Hawaii County Code (County 1999).

Erosion control measures which could be considered to further lessen short-term erosion impacts during construction may include: use of temporary berms and cut-off ditches; use of temporary silt fencing and screens; thorough watering of graded areas after construction activity has ceased for the day and on weekends; or sodding or planting slopes immediately after grading work has been completed. The appropriate measures will be included in an Erosion Control Plan prepared and submitted to the County for ministerial approval. Grading activities will also be

performed in accordance with applicable provisions of permits obtained from the County and State Department of Health (DOH), as necessary.

#### **Other Short-Term Construction Impacts**

Other typical short-term impacts that are usually associated with construction related activities may include fugitive dust emissions, construction noise, and traffic disturbances from construction vehicles along roadways. Grading activities for this road renovation project would be limited reducing the amount of fugitive dust emitted on the site. Furthermore, the amount of soil material existing is limited due to the high content of Aa and Pahoehoe volcanic ash. Traffic volumes are also very low along Kalapana Road, thus, there should be minimal disturbances to traffic flow due to construction related traffic.

Fugitive dust emissions and construction noise are not expected to cause much disturbances or annoyances to surrounding properties since properties affected at Sites No. 3 and 5 are essentially undeveloped with no residences in the immediate vicinity. Residences at Site No. 4 may experience some disturbances, however, this would be relatively minor and short-term given the soil types present. In addition, existing residences have large setbacks from the existing roadway.

Although these potential short-term effects should be minimal, other possible mitigative measures would be considered for implementation during the project's design. Such measures would be determined during the project's design and preparation of construction plans. Measures being considered could include: limiting construction activities to off-peak traffic hours; use of wind breaks or watering to reduce dust; and implementing an approved Traffic Control Plan. The measures actually developed would be designed to make construction activities comply with pertinent Administrative Rules of the State Department of Health such as Title 11: Chapter 42 (Vehicular Noise Control), Chapter 46 (Community Noise Control), and Chapter 60 (Air Pollution Control).

## **4.2 NATURAL HAZARDS**

This section addresses those natural and urban-related hazards applicable to the realignment sites. Of the potential natural hazards, earthquakes and lava flows, hurricane, and tsunami and flooding hazards are addressed. There are no other known potential urban-related hazards applicable to the property such as airport clear zones, nuisances, hazardous wastes, or other site safety issues associated with urban use.

### **4.2.1 Earthquake And Lava Flow Hazards**

#### **Earthquake Hazards**

Earthquakes in the Hawaiian Islands are primarily associated with volcanic eruptions resulting from the inflation or shrinkage of magma reservoirs beneath which shift segments of

the volcano (Macdonald, Abbott, and Peterson 1983). Although difficult to predict, an earthquake of sufficient magnitude causing structural or other damage to the road realignments may occur in the future. Most of the earthquakes that have occurred were volcanic earthquakes causing little or no damage. The seismic risk classification of the island of Hawaii is a rating of Zone 4 (USGS 1997).

The island of Hawaii experiences thousands of earthquakes each year, however, most are so small that they can only be detected by instruments. There are some strong enough to be felt, and a few cause minor to moderate damage. Most of this island's earthquakes are directly related to volcanic activity, and are caused by magma moving beneath the earth's surface. Earthquakes may occur before or during an eruption, or may result from the underground movement of magma that comes close to the surface. A few of the island's earthquakes are less directly related to volcanism. These originate in the zones of structural weakness at the base of the volcanoes or deep within the earth beneath the island (USGS 1997).

Kilauea's east rift zone is continually being wedged apart by the injection of new magma, much of which is stored underground deep within the rift zone. The north flank of Kilauea is immobilized by the mass of Mauna Loa, thus the south flank facing the ocean must move outward to make room for additional magma. As a result, Kilauea's south flank abruptly shifts seaward from this pressure causing earthquakes (USGS 1997).

The locations of larger damaging earthquakes of magnitude 6 or greater since 1868 on the island of Hawaii have generally occurred on the southern half of the island primarily on the eastern end. In 1975, Kilauea's south flank was the site of a magnitude 7.2 Kalapana earthquake which caused the Kalapana coast to subside as much as 11 feet in certain areas. The most recent large earthquake on this south flank occurred in June 1989 with a magnitude of 6.1 (USGS 1997).

#### Potential Impacts From Future Earthquakes

Hence, there is a possibility of future earthquakes occurring on the Island of Hawaii especially on the south flank of Kilauea. Therefore, further ground subsidence along this Kalapana coastline may result. Such subsidence would have an impact on the three sections of



Kalapana Road proposed to be realigned especially if the coastline subsided several feet as has already occurred historically. Thus, existing coastal erosion of the shoreline could worsen affecting areas further inland, and wave inundation of certain sections of Kalapana Road could become more frequent and severe further impacting vehicular passage.

The proposed realignment of the three sections of Kalapana Road would have a positive benefit because it would move these roadway sections further inland creating a larger buffer zone from the shoreline. Consequently, the impacts to this road from future ground subsidence along this coastline from a large earthquake can be reduced to some extent. It is difficult to predict the possibility of future earthquakes along with its severity and resulting effects on this coastline. Nevertheless, this project would provide a larger buffer away from the shoreline than currently present which is a positive impact.

For Site No. 3, the differences between Alternatives A and B are relatively minor in terms of addressing future ground subsidence from an earthquake. Both alternatives realign the roadway further inland over 100 feet with Alternative A extending up to 120 feet inland from the current roadway centerline. However, the route shown for Alternative B realigns the road further inland past the high rocky cliff being undermined in addition to the rock outcrops along the southern portion of this segment. As a result, Alternative B should have a more positive benefit since it would provide greater buffer areas past these sections of concern.

For Site No. 4, the differences between Alternatives D and E are relatively minor because both alternatives would essentially maintain the current alignments by raising the roadway, and not involve realigning the road further inland. Alternative E would realign the roadway inland about 30 feet from the existing centerline, thus, this would create slightly more buffer area from the shoreline.

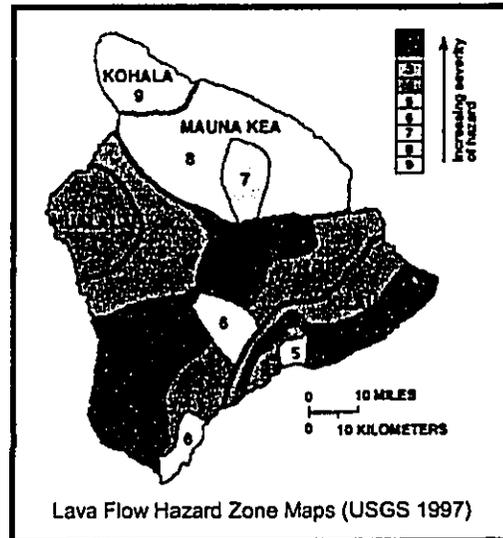
At Site No. 5, there are some minor differences in the additional buffer area created from the shoreline between Alternatives A and B. The maximum distance inland for both alternatives are the same which is about 100 feet from the existing road centerline. However, the alignment shown for Alternative A would provide more buffer area from the shoreline over the entire route than Alternative B. Thus, Alternative A would have a more positive impact.

Damages to the realigned sections of Kalapana Road may occur from an earthquake of sufficient magnitude. However, the potential for damages to these realigned sections would be the same for all, and will be minimized by following appropriate design and construction standards established under County building codes and standards. Thus, the risk of potential damage to realigned roadway sections should not be more than other existing sections of Kalapana Road in the project area.

### Lava Flow Hazards

Volcanic hazard zone maps developed for the Island of Hawaii were revised by the U.S. Geological Survey in 1987. The current map divides this island into zones ranked from 1 through 9 based on the probability of coverage by lava flows. Hazard zones from lava flows are based mainly on the location and frequency of both historic and prehistoric eruptions. Hazard zones also take into account the larger topographic features of the volcanoes that will affect the distribution of lava flows (USGS 1997).

Based upon this map, the Kalapana project area in the Puna District was given a hazard zone rating of 2 indicating a very high hazard from lava flows. This zone rating reflects between 15 to 25 percent of area covered by lava since 1800, and 25 to 75 percent of area covered by lava in the last 750 years. This rating corresponds to the activity associated with Kilauea Volcano affecting areas adjacent to and downslope of the volcano's active rift zones. Consequently, the potential for damages to urbanized areas in the project area is relatively high. Potential impacts to the existing and realigned sections of Kalapana Road from Kilauea Volcano lava flows occurring would be the same for all three sites and alternatives considered.



#### **4.2.2 Hurricane Hazards**

A hazard mitigation report prepared by the Federal Emergency Management Agency after Hurricane Iniki in 1992 determined that nine hurricanes approached within 300 nautical miles (about one day's travel time) of the Hawaiian Island's coastlines between 1970 and 1992. Most hurricanes affecting the islands have focused on Kauai. Based upon a tracking of hurricanes since 1950, there appears to be no geographical or meteorological reasons why hurricanes miss the other islands but tend to steer toward Kauai (FEMA 1993).

Although unpredictable, the Island of Hawaii has historically received less threat and damage from hurricanes as compared to Kauai. The three major elements of a hurricane making it hazardous are: 1) strong winds and gusts, 2) large waves and storm surge, and 3) heavy rainfall (FEMA 1993). Of these three, the proposed Kalapana Road realignment sites would be affected mainly by large waves, storm surge, and heavy rainfall. High winds would not have a serious effect on the roadway as compared to building structures and residences. The effects of waves, storm surge and heavy rainfall on the project are discussed under the next section.

### 4.2.3 Tsunami Inundation And Flooding

The Flood Insurance Rate Map (FIRM), Community Panel Number 155166 1375 C, for the coastal area in the vicinity of the realignment sites was reviewed. Unfortunately, there was no specific Community Panel map prepared for this particular section of the project area by the Federal Emergency Management Agency. However, the coastline area included under this FIRM map may be subject to flood hazards because the map does not designate it as Zone X which are areas determined to be outside the 500-year flood plain (FEMA 1995).

The FIRM maps for areas northeast and southwest of the project area do have specific Community Panel maps which provide some information of general conditions along this Puna District coastline. These FIRM maps are Community Panel Number 155166 1600 C and 155166 1400 C. Figure 4.3 shows the flood hazard areas along this Kalapana coastline from these maps.

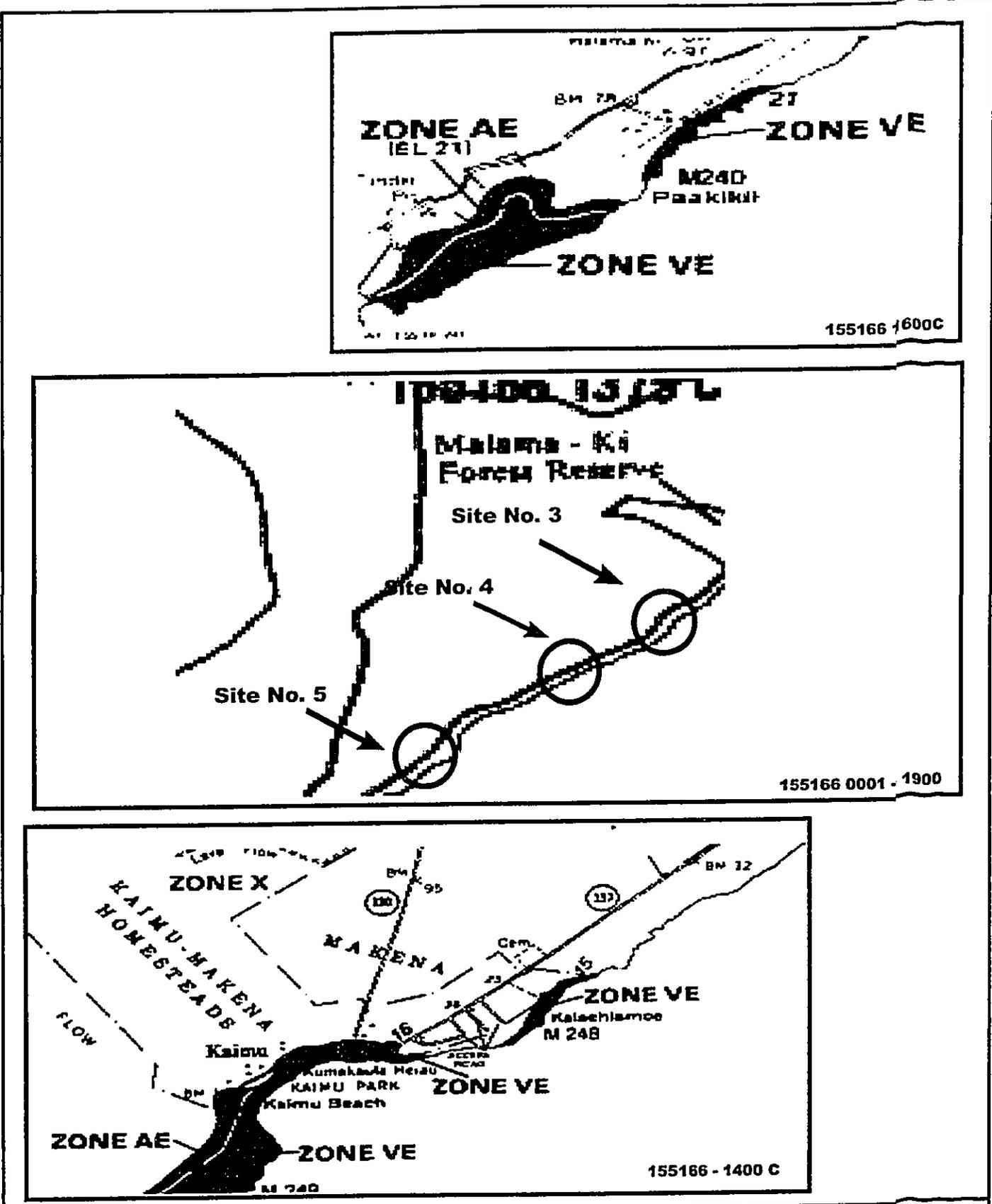
Community Panel 1400 C covers the area from Kapoho to the Malama Ki Forest Reserve located northeast (towards Kapoho) of Site No. 3. This map indicates that almost the entire coastline is designated as Special Flood Hazard Areas inundated by the 100-year flood. The designation for these shoreline areas is generally Zone VE indicating coastal flood with velocity hazard (wave action), and had base flood elevations in the range of 20 feet (FEMA 1988).

Community Panel 1600 C includes the area southwest (towards Kalapana) of Site No. 5. Similarly, this map shows Special Flood Hazard Areas inundated by the 100-year flood along the coastline. The designation for the shoreline area near Kaimu Park was also Zone VE indicating coastal flood with velocity hazard (wave action), and had base flood elevations in the range of 15 feet (FEMA 1988).

The flood hazard information provided by Community Panels 1400 C and 1600 C thus show that almost the entire coastline in this general region is subject to flood hazards inundated by the 100-year flood. This coastline was especially subject to coastal flood with velocity hazard (Zone VE). Consequently, it is reasonable that the coastline area associated with the three realignment project sites could also be subject to flood hazards given current conditions, the coastal erosion occurring, and low lying areas along Kalapana Road.

#### Potential Impacts From Tsunami Inundation And Flooding

The proposed realignment project would have a positive impact because it would realign the proposed sections of Kalapana Road further inland creating additional buffer areas from the shoreline. At Sites No. 3 and 5, the alternatives for the realigned roadway segment would also move it inland up to about 100 feet to areas with elevations near 30 feet msl. This elevation would be higher than the 15 to 20 feet msl base flood elevations indicated on FIRM Maps for other areas along the Puna District coastline.



**FLOOD INSURANCE RATE MAP**

**Figure A.3**

Kalapana Road Realignment Project  
 County of Hawaii, Department of Public Works

Source:  
 FIRM Flood Insurance Rate Map  
 Community-Panel Number (15516-1400C,1600C)



Alternative B at Site No. 3 would realign a longer stretch of this roadway further away from the shoreline. Thus, it should be more preferable since it would create a larger buffer area from the shoreline than Alternative A. At Site No. 5, Alternative A would similarly realign a longer stretch of this roadway further away from the shoreline. Hence, this alternative would be more preferable since it would create a larger buffer area from the shoreline than Alternative B.

For Site No. 4, Alternative D would involve elevating this existing stretch of road about 5 feet and up to 10 feet for lower points along the road. This would raise the road to about 25 feet msl. However, the buffer area from the shoreline would remain essentially the same. For Alternative E, the road would similarly be elevated but moved inland about 30 feet. Consequently, Alternative E would create a slightly larger buffer area from the shoreline.

Although the proposed realignment sites are not shown as flood hazard areas since a Community Panel Map for the area was not prepared, the design and construction of the selected routes would be in compliance with County requirements and standards. Thus, the County would give consideration to having the realigned sections meet the requirements and design standards described under Chapter 27, Flood Control of the Hawaii County Code. Drainage improvements for realigned sections would include culverts and other improvements as necessary to meet County building codes and standards.

### **4.3 HISTORIC, ARCHAEOLOGICAL AND CULTURAL RESOURCES**

An archaeological inventory survey was conducted for this project by Paul H. Rosendahl, Ph.D., Inc. (PHRI). A copy of this report is included in Appendix D of this application. Survey fieldwork for the three realignment sites were conducted from September 27th to 29th, 2000. The objectives of this survey were to: 1) determine the presence or absence of any potentially significant archaeological remains; 2) collect information sufficient to evaluate the potential significance of any identified archaeological remains; 3) evaluate the potential impacts of proposed road realignment construction upon any identified significant remains; and 4) to recommend appropriate measures that would mitigate any adverse impacts upon identified significant remains.

Prior to this inventory survey, PHRI conducted a preliminary surface reconnaissance survey of Realignment Sites No. 3, 4, and 5 on June 15, 2000. The purpose of this preliminary survey was to facilitate evaluation of initial alternative alignments by determining the presence or absence of any potentially significant historic properties that might be adversely impacted by specific alternative alignments. During this preliminary survey, some surface structural remains were encountered within Site No. 3, while possibilities of structural remains were noted in Sites No. 4 and 5. Consequently, these findings necessitated conducting an archaeological inventory survey.

#### 4.3.1 Previous Archaeological Research

Very little archaeological research has been done in this area of the Puna coast. One of the earliest researchers and surveyors was John F.G. Stokes, who described and mapped both Kuki'i and Mahina'akaka Heiau. Later, Barrera and Barrere (1971) and Crozier and Barrere (1971) reported on research in the Ahupua'a of Kupahua and Pualaa (an ancient Hawaiian village), respectively (PHRI 2000).

In 1972, Bevacqua and Dye conducted an archaeological reconnaissance for the Bishop Museum to locate, describe, and evaluate archaeological sites within the corridor for the proposed Kapoho-Kalapana Highway. Forty-eight sites were recorded, consisting of two *heiau*, eight clusters of petroglyphs, four platforms, six enclosures, five cemeteries, three trails, 14 site complexes, two ponds, a mound, a lava tube, a coffee mill, and a village. None of the identified sites were situated within any of the three realignment sites examined during the current inventory survey (PHRI 2000).

#### Historical Background

One of the most important historical accounts of the District of Puna was that of Reverend Ellis who toured the Island of Hawaii in 1823. He described his travels through seven villages along this coast within the general project areas of Kealakomo, Kalapana, Kaimu, Kamaili, Opihikao, Keahialaka, and Kapoho.

Kapoho crater was described as being in a high state of cultivation through the planting of taro, bananas, and sugar cane. Villages were pleasant and well populated, and inhabitants were employed in fishing and the growing of sweet potato, taro, sugar cane, and bananas. Concerning the village of Opihikao, Ellis noted that it was another populous village situated within a short distance of the sea, and appeared to be a thriving area (PHRI 2000).

The project's three realignment sites encompassed portions of Tax Map Keys that were given or sold as grants after the Great Mahele in 1848. Site No. 3 contains no known grants, and is part of Kamehameha Schools (formerly Bernice P. Bishop Estate) lands. At Site No. 4 (TMK 3-1-3-04), Parcel 13, contains 9.8 acres in a portion of Grant 1940; Parcel 58 contains 2.6 acres in a portion of Grant 1359; Parcel 55 contains 3.3 acres in a portion of Grant 1359; Parcel 90 contains 5.8 acres in a portion of Grant 1359; and Parcel 54 contains 1.8 acres in a portion of Grant 1359. For Site No. 5 (TMK 3-1-3-02), Parcel 76, contains 7.0 acres in a portion of Grant 1022; Parcels 77 and 78 each contain 4.2 acres in a portion of Grant 1023: Apana 1; Parcel 6 contains 4.195 acres in a portion of Grant 1023: Apana 1; Parcel 68 contains 4.75 acres in a portion of Grant 2215:Apana 3; Parcel 108 contains 4 acres in a portion of Grant 2164: Apana 2 (PHRI 2000).

The district of Puna had much sought after fertile soil, but was always under the political shadow of the adjacent districts of Kau and Hilo. Thus, Puna's history is bound up with the fortunes of these adjacent districts. Throughout the wars and political upheavals preceding Kamehameha's unification of the islands, Puna at varying times was under the domination of the "Kona Chiefs," who were descendants of Umi and Kapukini, and the "Hilo Chiefs," who were descendants of Umi and Piikea.

Puna may have been one of the most fertile agricultural regions on the island, however, lava flow from volcanic eruptions have destroyed much of the best lands. Where lava flow did not cover the land, crops raised on these areas included taro, sweet potatoes, breadfruit, coconuts, and sugarcane. In the village of Opihikao, dry taro was grown and was still grown as late as 1935. The entire area from Kaimu to Puala'a was part of a vast field system, whereas now only scattered fields exist as one continues around Kipu Point.

In the year 1835, the missionary Titus Coan arrived and assumed control of the Hilo Mission School and proselytized heavily in Hilo and Puna districts. His Christian indoctrinations were so thorough that few traditions and legends of pre-Christian Puna have survived. Later, in late 1848 and early 1849, four island-wide epidemics occurred which killed approximately 1,000 people in the Hilo and Puna districts. Afterwards, this population did not recover, and slow attrition occurred. Gradually, the native agricultural fields in Puna were abandoned.

During the Great Mahele beginning in 1848, the lands of Puna were generally still held by Kamehameha's supporters' sons and heirs, and they became the actual owners of their lands. Only two *kuleana* awards were given out in all Puna, and none were near the current realignment areas. For the most part, people continued to live as tenants on land owned by the *ali'i*. But by 1850, most of the land was unclaimed and had reverted back to the government due to disease and cultural loss. In 1852, after these unclaimed lands were sold, private individuals began buying land. In the late 1800s, new uses for the land evolved in other areas of Puna located away from the coast which included ranching and coffee and sugarcane cultivation. Today, the main uses of land in Puna are for cultivating papaya, anthuriums, and orchids.

#### 4.3.2 Results Of Inventory Survey

The centerlines for the alignment alternatives had been staked in the field prior to the inventory survey. At Sites No. 3 and 5, the survey involved pedestrian surface coverage of approximately 15 meters (50 feet) on each side of the staked centerline. Thus, a corridor approximately 30 meters (100 feet) was covered for each specified realignment alternative. In some cases, features were recorded outside of the corridor because they constituted part of the discovered extent of the field system. For Site No. 4, survey fieldwork coverage primarily focused on Alternative D (the existing raised roadway) and Alternative E, which is situated generally within 30 to 40 feet inland of the existing raised roadway.

### Site No. 3

During the survey of Alternatives A and B for this realignment site, one site was identified (Site No. 50-10-55-22500) as a prehistoric agricultural complex consisting of numerous walls and clearing mounds. Numerous low, piled and/or stacked stone walls and low rock mounds were encountered at this archaeological site. In total, 41 component features comprising a portion of a dryland agricultural complex were identified and recorded. The inventory report provided in Appendix D of this document includes a table identifying all of these site features.

These features, shown on Figure 4.4, are thought to be both historic and pre-historic, although most appear prehistoric based on structural form. Prehistoric walls identified were all newly discovered. The features identified constitute two formal types which are: 1) walls and 2) clearing mounds. The definitions of these two formal types are provided below.

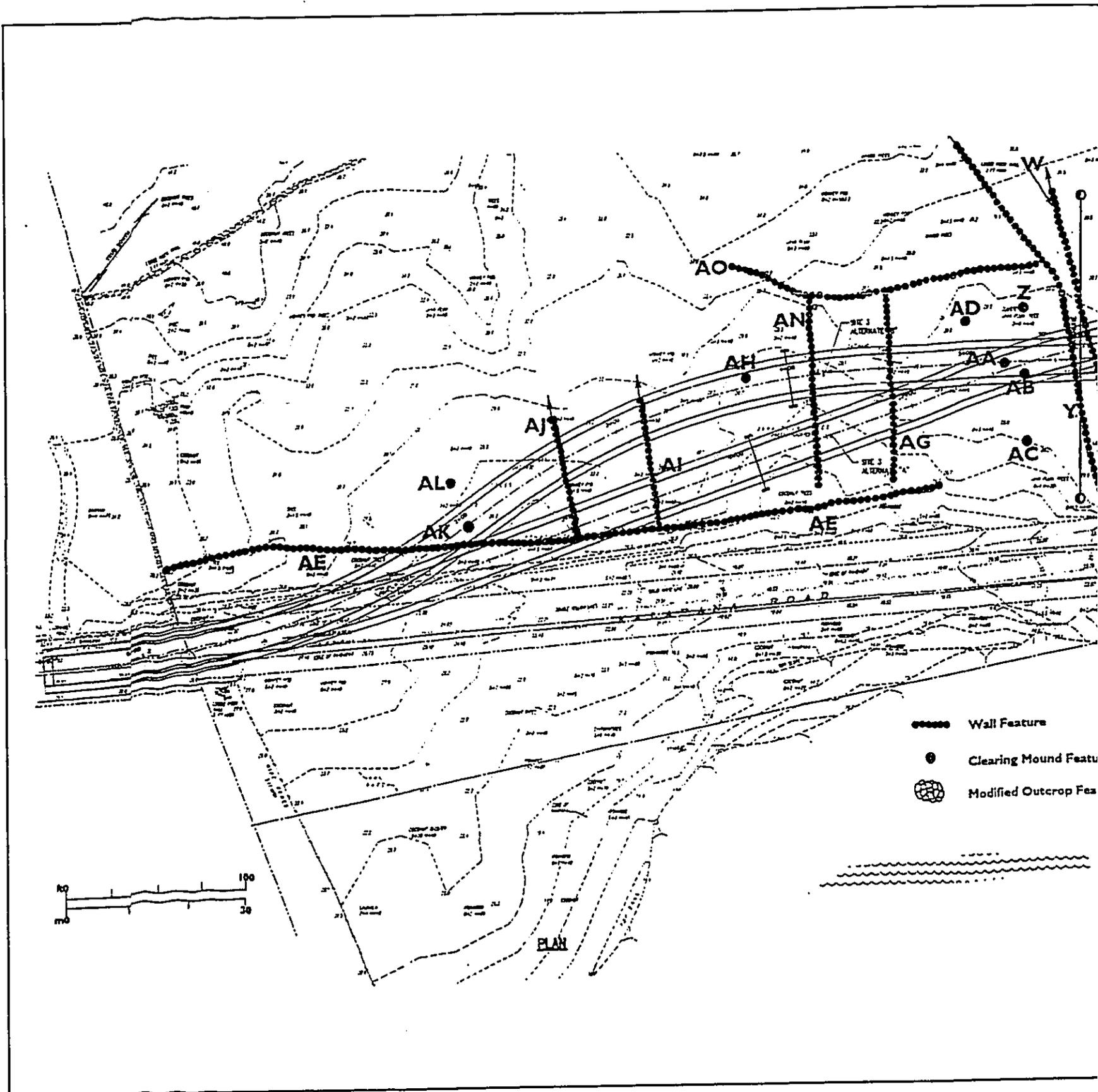
Mound. This feature type is generally assumed to be associated with agriculture. It is either used as a growing area or simply as a clearing mound to create a garden space within a confined area such as a lava tube, surface structure, or enclosure.

Wall. A linear structure with stacked sides usually longer than high. Its surface is usually flat, sides usually vertical or slightly sloping, sides may be faced, may be core-filled, and may be free-standing or abutting other features.

The stone walls define a series of roughly rectangular field units or cultivation plots, averaging generally 12 to 15 meters (39 to 49 feet) in width and 42 to 20 meters (137-65 feet) in length. These plots extend primarily along the centerline of Alternative A, but also extend into the Alternative B corridor. Scattered low rock mounds, most likely clearing mounds, are scattered about within the interior area of these field units. These were generally composed of rough 'a'a cobbles 10 to 20 cm long. No habitation features, or any types of features other than agricultural were identified at Site 22500 with the exception of Feature AF. This feature is a large rock mound, conspicuous in its size.

Most of the mounds possess integrity. Integrity, as defined here, refers to the present state of the feature in regards to impacts made by human forces, i.e., no bulldozing, vandalism, or modifications have taken place. It is interesting to note that many of the clearing mounds (61.5 percent) are oriented NW/SE, thus conforming to the general trend of the walls. This may have been a deliberate act on the part of the clearers, or perhaps a subconscious, unintentional act.

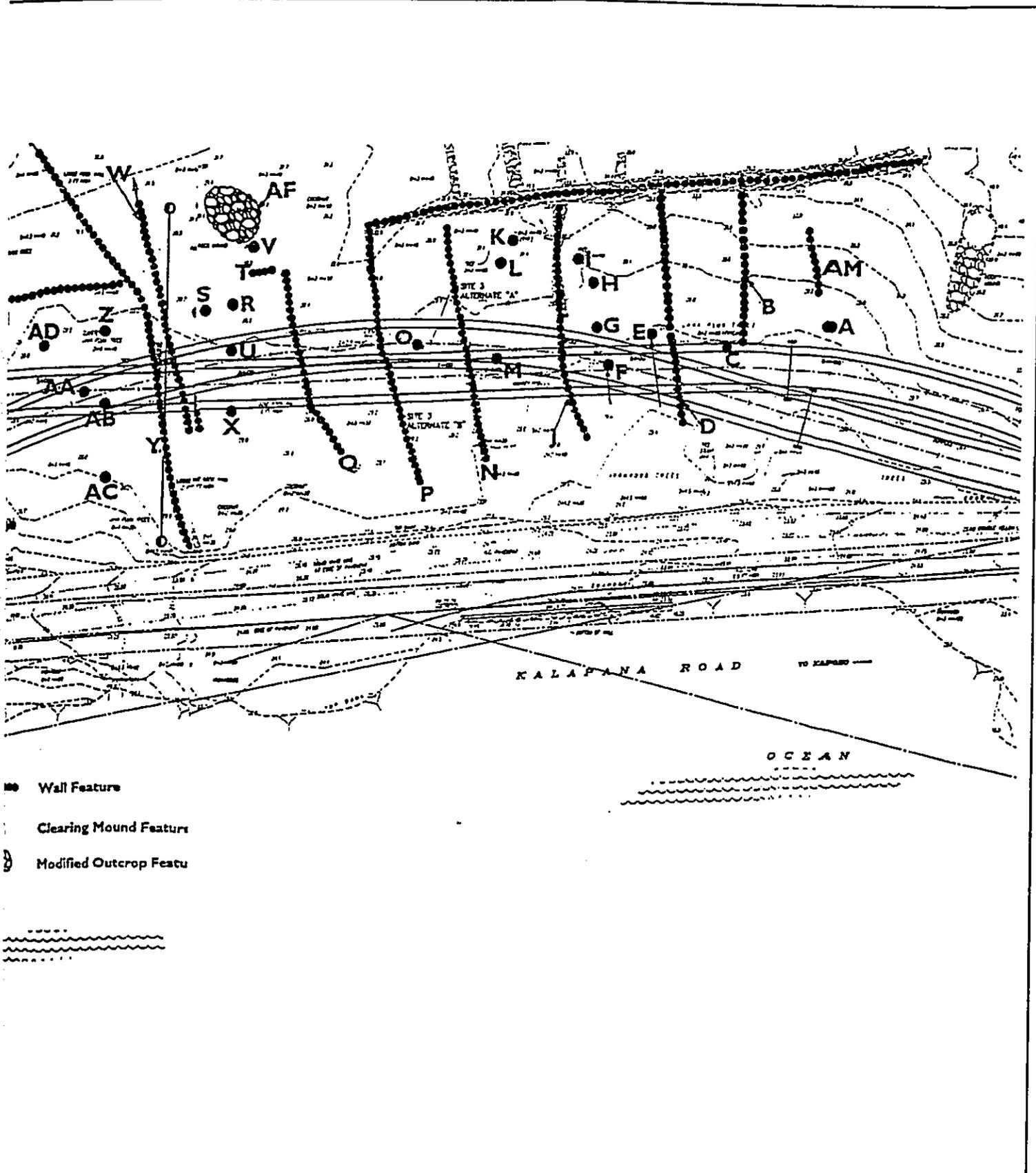
The walls appear, with one exception, to be prehistoric. The prehistoric walls are generally tumbled and in poor condition. The average width is 1.00 meter while the average height is 0.61 meters. The average length of the walls cannot be determined, as some walls continue beyond the present project area. In one instance, a wall, Feature W, runs parallel to and three meters from, an existing historic wall, Feature Y, thus indicating that it may have been constructed to



- ..... Wall Feature
- Clearing Mound Feature
- ⊗ Modified Outcrop Feature

## ARCHAEOLOGICAL COMPLEX FEATURES AT SITE AE

*Kalapana Road Realignment Project*  
 County of Hawaii, Department of Public Works



FEATURES AT SITE NO. 3

Figure 4.4

Source:  
PHRI



#### **Site No. 4**

No archaeological remains were identified at Realignment Site No. 4. Coverage was generally restricted to only Alternatives D and E. However, it is considered unlikely that any potentially significant archaeological remains would be present in other Alternatives A, B, or C. This is because most of the properties affected by this realignment site are occupied by homes and associated landscaped areas, the development of which probably would have destroyed any archaeological remains that might have been present.

#### **Site No. 5**

No archaeological remains were identified at Site No. 5 during the survey of Alternatives A and B. It is possible that a few minor features, such as low rock mounds, could have been overlooked because of the dense vegetation cover present at this site. However, it is most unlikely that any sites or features of potential significance were missed during the field survey.

#### **Recommendations**

The assessments and recommendations presented here have been based on the findings of a 100 percent coverage, pedestrian survey. However, due to the dense vegetation in the project area, there is always the possibility, though somewhat remote, that potentially significant as yet unidentified, cultural remains could be encountered in the course of the construction of selected realignment routes. In such a situation, archaeological consultation would be sought immediately.

#### **Evaluation Of Site 22500 At Realignment Site No. 3**

Site 22500 has been evaluated under the draft State rules and regulations concerning cultural resource management. The site was assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review. According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and must meet one or more of the following specific criteria in order to be considered significant:

- (A) Associated with events that have made a significant contribution to the broad patterns of history;
- (B) Associated with the lives of persons significant in our past;
- (C) Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- (D) Have yielded, or is likely to yield, information important for research on prehistory or history; and
- (E) Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices

one carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts-these associations being important to the group's history and cultural identity.

Site 22500 was also evaluated on the basis of major ongoing research issues revolving around general questions of chronology, settlement and exploitative patterns, site and assemblage variability, material culture and technology, diet and economy, and socio-religious values. Consultations with Dr. Ross Cordy and Dr. Patrick McCoy of the State Historic Preservation Division (SHPD) was conducted by PHRI. Because of Feature AF's somewhat unusual appearance, this feature was interpreted by SHPD staff as a possible burial or other religious feature, in contrast to the other dryland agricultural features of Site 22500. Based upon the findings and these consultations, Site 22500 was assessed as significant for both its information content (Significance Criteria D) and possibly having traditional cultural value to native Hawaiians (Significance Criteria E).

Based on further consultation with SHPD staff regarding Site 22500, a mutually agreeable course of mitigation was determined.

1. With the exception of Feature AF, the other features associated with Site 22500 were recommended for limited archaeological mitigation work in the form of limited data recovery excavation. These excavations would focus on the recovery of materials for dating the agricultural complex. The recovery of such dating information would constitute sufficient recovery of significant archaeological information contained for these features, and no subsequent preservation is needed for features impacted by any roadway construction activity.
2. For Feature AF of Site 22500, preservation by means of avoidance and protection, without any testing or additional study, is an acceptable mitigation treatment. This was determined to be acceptable because the feature (a) can easily be avoided by the realignment route, and (b) is situated some distance inland from the alternative alignment corridor.

#### **4.3.3 Cultural Resources**

The archaeological inventory survey provided a discussion of the area's history and settlement patterns of which information was available to make a reasonable assessment of the likelihood of traditional Hawaiian cultural practices being significantly affected by the project. This information discussed the Puna districts being a fertile agricultural region until volcanic eruptions destroyed much of the best lands. It also documented the low number of kuleana awards given out in this district, and its use for ranching and sugar cane cultivation.

Consequently, this project is not expected to significantly affect traditional Hawaiian cultural practices or other cultural resources. There are no significant cultural resources which

would be affected by the realignment improvements, and there are no known cultural practices occurring within the study area that would be significantly affected. This project only involves improvements to short sections of the existing road due to the coastal erosion occurring. In addition, access to the shoreline and other public areas along this coast would not be restricted as a result of this project.

The properties affected at these realignment sites are privately owned, and there are no known cultural or religious practices occurring on the affected frontage areas of these properties. Early consultation letters and copies of the Draft EA were distributed to community associations in the area along with affected property owners of which no traditional cultural practice issues have been identified. Thus, the project is not expected to adversely impact any traditional cultural practices occurring in the project area.

#### 4.4 BOTANICAL RESOURCES

A survey of botanical resources associated with the Kalapana Road realignment project was performed by Char & Associates. The objectives of the survey were to: 1) provide a general description of the vegetation; 2) inventory all plant species encountered; and 3) search for threatened and endangered species, and 4) identify areas of potential environmental concerns. A copy of this report is included in Appendix E of this application.

A walk-through survey of the botanical resources found in the area of the realignment alternatives proposed for the three sites was conducted on October 13 and 14, 2000. Prior to these field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. Plant identifications were made in the field; plants, which could not be positively identified, were collected for later determination in the herbarium, and for comparison with the recent taxonomic literature.

##### 4.4.1 Description Of Existing Botanical Resources

Mixed lowland forests extend from the Kalapana area to Kapoho and on towards Hilo. These lowland forests have been fragmented by villages, subdivisions, cultivated lands, and lava flows.

The early Polynesians introduced trees and shrubs such as niu or coconut (Cocos nucifera), kukui (Aleurites moluccana), kamani (Calophyllum inophyllum), 'ulu or breadfruit (Artocarpus incisus), mountain apple (Eugenia malaccensis), and noni (Morinda citrifolia). Later post-Cook introductions included trees and shrubs of Java plum (Syzygium cuminii), mango (Mangifera indica), guava (Psidium guajava), strawberry guava (Psidium cattleianum), Christmas berry (Schinus terebinthifolius), and avocado (Persea americana). Forestry plantings of such trees as albizia (Falcataria coluccana), ironwood (Casuarina equisetifolia), guarumo (Cecropia obtusifolia), Melochia umbellata, and gunpowder tree (Trema occidentalis) were also made. At

Sites No. 3 and 5, mixed lowland forest dominated by introduced species covers the majority of these areas. At Site No. 4, most of the vegetation consists of maintained, grassy lawns with landscape plantings found around the homes in the area. A few smaller areas support a mixed forest of introduced species.

#### **Existing Resources At Site No. 3**

Both realignment alternatives pass through mixed lowland forest dominated by introduced plants. On this site, Melochia ubrellata trees are abundant. Other trees such as Java plum, guarumo, and gunpowder tree are occasional. The understory vegetation is very dense with thickets of guava, strawberry guava, Christmas berry, and sourbrush (Pluchea carolinensis). Ground cover consists of shade-tolerant species such as basket grass (Ophismenus hirtellus), sword fern (Nephrolepis multiflora), impatiens (Impatiens vallerana), Hilo grass (Paspalum conjugatum), and laua'e fern (Phymatosorus scolopendia) (Char 2000).

Where the realignment alternatives approach the existing road, ironwood trees 40 to 70 feet tall line both sides of this road. Small groves of coconut are also found here. The understory vegetation in these more open areas consists of naupaka shrubs (Scaevola sericea) with saplings of the trees mentioned above, and scattered mats of California grass (Brachiaria mutica). A dense thicket of hau (Hibiscus tiliaceus) is found along the existing roadway on the western end.

#### **Existing Resources At Site No. 4**

Large stands of very old monkeypod trees (Samanea saman) 30 to 80 feet tall are found in this area of Site No. 4. Commonly observed ornamental plantings include various Hibiscus, Plumeria, and Bougainvillea cultivars, ti leaf, a number of different palm species, pineapple, banana, etc. Alternative E would cross some parts of these maintained areas while Alternate D would follow along or close to the existing roadway (Char 2000).

The undeveloped mauka properties along this roadway segment support mixed lowland forest 40 to 70 feet tall. Java plum and monkeypod trees are common. A number of ornamental species have spread into these forested areas. These include Indian shot (Canna indica), 'ape (Alocasia macrorrhiza), Philodendron sp., and painted copperleaf (Acalypha hispida).

Along the shoreline makai of Kalapana Road, the vegetation consists primarily of naupaka shrubs, coconut trees, and fairly large clumps of Hymenocallis littoralis which is a member of the lily family. Besides the naupaka, several other native species can be found here. These include the 'ahu 'awa sedge (Cyperus javanicus), the beach pea or nanae (Vigna marina), and Fimbristylis cymosa, a low rounded sedge.

Along the existing roadway, the vegetation is a weedy mixture of plants, which is periodically mowed. Plants found here include California grass, sensitive plant (Mimosa pudica), Panama paspalum (Paspalum fimbriatum), Hilo grass, wiregrass (Eleusine indica), and

two species of spurge (Chamaesyce hirta, C. prostrata) (Char 2000).

#### **Existing Resources At Site No. 5**

At Site No. 5, the realignment alternatives both cross mixed lowland forest. Java plum trees 20 to 40 feet tall are abundant to common. Other trees scattered through the site include hala (Pandanus tectorius), monkeypod, gunpowder tree, and kukui. Melochia is locally abundant, forming small stands in various areas. Small groves of coconut are also frequent. Shrubs of noni and guava, 6 to 12 feet tall, are common.

Ground cover is dense, and often 5 to 6 feet tall in places. Commonly observed species include sword fern, lantana (Lantana camara), basket grass, Hilo grass, saplings of the tree and shrub species mentioned above, Spanish clover (Desmodium incanumj), and dense tangles of maile pilau vine (Paederia foetida) (Char 2000).

#### **4.4.2 Probable Impacts On Botanical Resources**

The vegetation present at all three realignment sites were dominated by mixed forests composed of introduced species such as Java plum, Melochia, monkeypod, guarumo, guava, and strawberry guava. Scattered groves of coconut and plantings of ironwood were also found here.

A total of 94 species were inventoried along the alternative routes proposed for the three realignment sites. Of these total species, 75 (80%) were introduced or alien species; 7 (7%) were originally of Polynesian introduction; and 12 (3%) were native. All the native plant species were indigenous, that is, they are native to the Hawaiian Islands and elsewhere. These are the 'ekaha or bird's-nest fern (Asplenium nidus), kou (Cordia subcordata), seabean or ka'e'e (Mucuna gigantea), koali 'awa (Ipomoea indica), nanea (Vigna marina), naupaka (Scaevola sericea), hau (Hibiscus tiliaceus), milo (Thespesia populnea), 'ahu'awa (Cyperus javanicus), Cyperus polystachyos, Fimbristylis cymosa, and hala (Pandanus tectorius) (Char 2000).

No threatened and endangered species or species of concern were encountered. The endangered Hilo ischaemum (Ischaemum bryone) is a grass that is known to occur along the Kalapana coastline. However, this species was not found at the three realignment sites surveyed. A small colony of Ischaemum can be found near mile marker 13 in the Malama-Ki Forest Reserve which is outside of the realignment sites.

Given these findings, each of the proposed alternative roadway realignments proposed at the three sites are not expected to have a significant negative impact on the botanical resources. There are no botanical reasons to impose any restrictions, conditions, or impediments to the proposed project. If areas cleared of vegetation need to be revegetated, then Hilo grass or Bermuda grass (Cynodon dactylon) are recommended. Both grasses already occur along the existing roadway.

## 4.5 AVIFAUNAL AND FERAL MAMMALS

An ornithological and mammalian survey of the three realignment sites associated with this project was performed by Rana Productions, Ltd. The purpose of this survey was to determine if there were any federally listed endangered, threatened, proposed, or candidate avian or mammalian species on, or in the immediate vicinity of the three proposed realignment corridors. In addition, the probability of any usage of the three realignment corridors by listed species given the habitat currently available was also determined. A copy of this report is included in Appendix F of this document.

A two-day ornithological and mammalian field survey of the three roadway realignment sites was conducted on September 18th and 19th, 2000. The vegetation in the area of the three realignment sites are dominated by alien (introduced to Hawaii by man) species, as is much of the coastal area along the southeastern shore of the Island of Hawaii. There are significant numbers of coconut trees (*Cocos nucifera*), ironwood trees (*Casuarina equisetifolia*), and siris trees (*Albizia lebbek*) along with introduced weedy species such as guava (*Psidium cattleianum*), Christmas berry (*Schinus terebinthifolius*), Octopus tree (*Schefflera actinophylla*) and Indian mulberry (*Morinda citrifolia*). The previous section covered botanical resources in greater detail.

### 4.5.1 Description Of Existing Mammalian And Avian Species

#### Survey Methods

All observations of mammalian species were of an incidental nature. With the exception of the Hawaiian hoary bat (*Lasiurus cinereus semotus*), all other terrestrial mammals found on the Island of Hawaii are alien species. Terrestrial mammals present in the project area are ubiquitous, thus, no trapping program was required to quantify the area's usage by alien mammalian species.

The survey of mammals was limited to visual and auditory detection, coupled with observation of scat, tracks and other animal sign. A running tally was kept of all vertebrate species observed and heard. In addition, visual scans were made for Hawaiian hoary bats, or 'ope'ape'a as they are locally known, during crepuscular periods on one evening and one morning.

Survey methods for avian species involved creating linear transects through the right-of-ways of alternatives being considered for the three realignment sites. A total of eight count stations were subsequently placed along these three corridors. Eight-minute unlimited distance counts were made at each station, and a tally was made of birds detected based upon visualization and listening for vocalizations.

Counts were concentrated during the early morning hours between 6:00 a.m. and 11:00 a.m. which correspond to the peak of daily bird activity. An additional two hours were spent along the existing roadway within the project area during one evening in an attempt to detect nocturnally flying seabirds and owls overflying the general development area. Time not spent counting was used to search the sites and the surrounding area for species, and habitats not detected during count sessions.

#### **Mammalian Species Present**

Three mammalian species were detected during the field survey. These species consisted of the domestic dog (*Canis f. familiaris*), small Indian mongoose (*Herpestes a. auro-punctatus*) and cat (*Felis catus*). No rodents were detected, however, it is likely that roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*), and possibly Polynesian rats (*Rattus exulans hawaiiensis*) as well as European house mice (*Mus domesticus*) utilize resources found within these realignment sites (Rana Productions 2000).

All of these introduced mammalian species are harmful to avian populations. Hawaii's sole endemic terrestrial mammalian species, the endangered Hawaiian hoary bat, or 'ope'ape'a, was not detected during this survey.

#### **Avian Species Present**

A total of 434 individual birds representing six separate species were recorded during station counts. Two species of birds, the House Finch (*Carpodacus m. mexicanus*) and Japanese White-eye (*Zosterops japonica*), represented 81 percent of the birds counted during this survey. Hence, the diversity of species recorded in this project area was relatively low, while the densities were relatively high. Table 4.1 provides a summary of species recorded. All species detected were alien to the Hawaiian Islands.

No native species were recorded during the course of this survey. No avian species listed as endangered, threatened, proposed or as a candidate species by the U.S. Fish and Wildlife Service (USFWS), or by the State of Hawaii under its endangered species program were detected within the three realignment sites (Rana Productions 2000). The species makeup and bird densities recorded were thus consistent with the results of other avian surveys conducted at this altitude in the Puna district.

#### **Presence Of Seabirds Not Detected During Survey**

Although no seabirds were detected during the survey conducted for this project, it is possible that two listed species overfly the three realignment sites in small numbers between the months of May and October. These seabirds are the Dark-rumped Petrel (*Pterodroma phaeopygia sandwichensis*) and Newell's Shearwater (*Puffinus auricularis newelli*). The Petrel is listed as endangered and the Shearwater as threatened.

Table 4.1 Avian Species Detected During Station Counts			
Common Name	Scientific Name	Status	Relative Abundance*
PIGEONS & DOVES - Columbidae			
Spotted Dove	<i>Streptopelia chinensis</i>	Alien Species	4.00
Zebra Dove	<i>Geopelia striata</i>	Alien Species	4.57
BABLERS - Timaliidae			
Hwamei	<i>Garulax canorous</i>	Alien Species	0.57
SILVEREYES - Zosteropidae			
Japanese White-Eye	<i>Zosterops japonica</i>	Alien Species	21.29
FRINGILLIDS - Fringillidae			
House Finch	<i>Carpodacus m. mexicanus</i>	Alien Species	28.71
SALTATORS, CARDINALS & ALLIES - Cardinalidae			
Northern Cardinal	<i>Cardinalis cardinalis</i>	Alien Species	2.86

\* Relative abundance = No. of birds/No. of stations

The endemic Hawaiian subspecies of the Dark-rumped Petrel, or *ua'u*, was formerly common on the Island of Hawaii. This pelagic seabird reportedly nested in large numbers on the slopes of Mauna Loa and in the saddle area between Mauna Loa and Mauna Kea as well as the mid to high elevations of Mount Hualalai. Within recent historic times, this species has been reduced to relictual breeding colonies located at high elevations on Mauna Loa and possibly Mount Hualalai. This species was not detected during the course of this survey or any other recent ones in the Puna District, however, Dark-rumped Petrels may occasionally transit the sites on their way to nesting colonies located on the upper slopes of Mauna Loa (Rana Productions, Ltd. 2000).

The endemic Hawaiian sub-species of the Townsend's Shearwater, locally known as the Newell's Shearwater or *'a'o*, was listed as threatened by the USFWS in 1975. Although not detected during this survey, it is probable that at least a few birds do fly over the project sites during the breeding season. This species breeds on Kauai, Hawaii, and in extremely small numbers on Molokai (Rana Productions, Ltd. 2000).

Newell's Shearwater populations have dropped precipitously since the 1880's. This pelagic species nests high in the mountains in burrows excavated under thick vegetation. There are at least two nesting colonies in the general vicinity of the project sites. One on Puulena Crater located approximately 2.5 miles north-northwest of Sites No. 3 and 4 and roughly 4 miles north-northeast of Site 5, and another near Puu Heihei ahulu located 6 miles northwest of Site 5.

Evidence also indicates a possible flyway below Puu Kailu some three miles directly upslope from Site No. 5. It also is possible that there are colonies on Iliewa Crater located about 4 miles north-northwest of Site 5, and also on Kahuwai Crater located 2.5 miles north-northwest of Site No. 3. Given the proximity of the two known nesting colonies and a possibility of others, there is a strong likelihood that Newell's Shearwaters transit the project area on their way to and from their breeding colonies (Rana Productions, Ltd. 2000).

#### **Previous Biological Surveys Of Study Area**

These findings of both the avian and mammalian studies were consistent with the habitat currently present for the three proposed realignment corridors, and previous faunal surveys of similar habitat located in the Puna District.

The first systematic surveys of the avifauna of Hawaii were undertaken in 1976. Starting in that year and continuing until 1983, the USFWS conducted a state wide survey of the avifauna of Hawaii. During the course of the Hawaii Forest Bird Surveys program, the road realignment project area was not surveyed. This project area was already so absent of native forest that it was not thought that any native forest birds could still survive in the habitat present. Several avian surveys have been conducted within the Puna District in habitat similar to that found within the proposed realignment alternatives being considered by Rana Productions, Ltd. Two of these surveys involved habitat located less than a mile west of the realignment sites.

There have only been four comprehensive bat surveys conducted on the Island of Hawaii. Two of these surveys addressed lands in the area of the realignment sites. An island-wide survey was conducted between 1990 and 1993 which attempted to ascertain the distribution and abundance of Hawaiian hoary bats by sampling along paved principal roadways around the Island of Hawaii. In 1995, a multi-day, radar and ultrasonic survey for bats and seabirds was conducted at several locations just to the west of this Site No. 3. Bats were detected along the existing roadway during both of the aforementioned studies, but none were detected during the recent field survey conducted for this road realignment project. The bulk of the remaining published literature relies heavily on anecdotal and incidental information on bat distribution and abundance on the island (Rana Productions, Ltd. 2000).

#### **4.5.2 Effects On Mammalian And Avian Species**

The habitat available to terrestrial vertebrate species within the three realignment sites is dominated by alien species as is much of the lowland habitat in the general vicinity of this project area. From a terrestrial vertebrate perspective, the development of the realignment alternatives being considered for any or all of the three sites will not significantly impact any Federal or State of Hawaii endangered, threatened, proposed or rare avian or mammalian species.

It is probable that Hawaiian hoary bats overfly these project sites and possibly utilize resources within these areas. They have been recorded in numerous lowland areas of the Puna District usually between the months of March and November (Rana Productions, Ltd. 2000). However, the realignment of the three sections of Kalapana Road are not expected to have a significant impact on the Hawaiian hoary bat. The road renovation should not affect its ability to continue utilizing resources in the general area because the road's realignment would generally affect already disturbed land. Furthermore, the project should not significantly alter the existing vegetative character of this coastline area along the existing Kalapana Road.

The primary cause of mortality in both Dark-rumped Petrels and Newell's Shearwaters is thought to be predation by alien mammalian species at the nesting colonies. Collision with utility structures is considered the second most significant cause of mortality of these seabird species in Hawaii. Nocturnally flying seabirds can become disoriented by exterior lighting on their way to sea in the summer and fall. When disoriented, seabirds often collide with manmade structures and, if not killed outright, the dazed or injured birds become easy targets of opportunity for feral mammals.

There is no suitable nesting habitat within or close to any of the three realignment sites and alternatives being considered for either of these listed pelagic seabird species. As a result, the realignment project is not expected to have a significant impact on these seabird species. The routes of the realignment alternatives being considered should not impact any nesting habitat, and would not involve constructing any above ground utility structures such as electrical power poles.

Construction activities for the realignment sites are expected to occur during normal daylight hours. Thus, no external construction lighting should be required during such activities which may affect the nocturnal flying of the Dark-rumped Petrels and Newell's Shearwaters. Nevertheless, if night construction is required, the contractor would be required to implement the recommendations described in Reed et al. (1985) concerning measures to shield external construction lighting. These efforts would reduce the potential for interactions between the nocturnally flying Dark-rumped Petrels and Newell's Shearwaters with construction lights and other construction-related structures.

#### **4.6 AIR QUALITY**

Ambient air quality standards (AAQS) have been established by both Federal and State governments that limit ambient concentrations of particulate, matter less than 10 microns (PM<sub>10</sub>), sulfur dioxide, nitrogen dioxide, carbon monoxide (CO), ozone, and lead. In addition, a State standard has been established for hydrogen sulfide. State AAQS are more stringent than the comparable national limits (NAAQS) except for the standards for sulfur dioxide, particulate matter and lead, which are set at the same levels.

Air quality issues most applicable to the proposed Kalapana Road realignment project sites concern short-term construction related emissions such as fugitive dust. Vehicular emissions (carbon monoxide) from traffic occurring along this roadway is not considered to be a factor since this project simply involves the renovation of short segments of the existing road. The realignment of three sections of Kalapana Road will not generate additional traffic in this area other than that which would normally occur. There will be no increase in the capacity of the road since it will continue to be only a two-laned road (one lane in each direction).

A summary of both State and National AAQS is presented below. Hawaii's standards are not divided into primary and secondary standards as are the National standards. Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values.

**Summary Of National And State Ambient Air Quality Standards**

Pollutant	Sampling Period	NAAQS Primary	NAAQS Secondary	State Standards
Particulate Matter Less Than 10 Microns (PM <sub>10</sub> )	Annual	50	50	50
	24-Hour	150	150	150
Sulfur Dioxide	Annual	80	n/a	80
	24-Hour	365	n/a	365
Nitrogen Dioxide	Annual	100	n/a	70
Carbon Monoxide	8-Hour	10	n/a	5
	1-Hour	40	n/a	10
Ozone	1-Hour	235	n/a	100
Hydrogen Sulfide	1-Hour	n/a	n/a	35
Lead	Quarter	1.5	n/a	1.5

Note: All concentrations in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) except for carbon monoxide which is in milligrams per cubic meter ( $\text{mg}/\text{m}^3$ )

**Impacts From Short-Term Construction Activities**

Short-term impacts on air quality from construction activities would predominantly be associated with fugitive dust emissions and exhaust emissions from on-site construction equipment. Fugitive dust emissions would generally arise from clearing, grading, and other dirt moving activities associated with site clearing and ground preparation for the realigned roadway.

Grubbing and grading activities would be limited since it would only involve work to establish new right-of-way for the realigned roadway segment before it is paved. Given the relatively short length of roadway being realigned (between about 800 and 1,300 feet), the amount of grubbing and grading activities necessary would be relatively minor. The roadway's design would also try to take advantage of the affected property's existing topography to

minimize cut and fill to the extent practical. Such design considerations would further help to minimize the amount of excavation required and resulting fugitive dust emissions. Consequently, construction activities for the realignment of the three sites are expected to have only minimal or minor impact on the present air quality of the surrounding area. Furthermore, such impacts would be short-term and temporary, and no exceedances of National or State standards are anticipated.

The potential impacts on air quality from such construction activities would generally be the same for each of the realignment alternatives being considered at the three project sites. In specific, there are very minor differences in the length and alignment of Alternatives A and B for each of the project sites. Therefore, the differences in the amount of ground disturbing activities and impacts would be essentially the same for Alternatives A or B at each of the three sites.

State air pollution controls prohibit visible emissions of fugitive dust from construction activities at the property line. Therefore, a dust control plan could be prepared and implemented to have the contractor comply with these regulations. Adequate fugitive dust control can usually be accomplished by establishing a frequent watering program, and implementing additional measures to address grubbing and grading activities. Some measures that could be considered during the project's design for implementation by the contractor may include:

1. Limiting the areas that are disturbed at any given time;
2. Applying chemical soil stabilizers, mulching, or using wind screens; and
3. Establishing a road cleaning or tire washing program to reduce fugitive dust emissions from trucks using paved roadways in the project site.

On-site mobile and stationary construction equipment would also emit air pollutants from engine exhausts. Minor nitrogen dioxide emissions from construction equipment should not violate stricter State standards since such emissions would be short-term and the standards are set on an annual basis. Therefore, short-term carbon monoxide emissions from construction equipment would be low and should be relatively insignificant.

## **4.7 NOISE**

Potential noise impacts associated with this roadway realignment project would mainly be associated with short-term construction activities. Long-term noise impacts from vehicular traffic occurring along this roadway is not considered to be a significant factor since this project only involves realigning short segments of the existing road.

### **4.7.1 Short-Term Noise Impacts From Construction Activities**

Noise from construction activities are regulated under Title 11, Chapter 46 (Community Noise Control) of the State DOH's Administrative Rules. Under these regulations, the existing Kalapana Road and immediate surrounding areas associated with the realignment sites fall under

both the Class A and C zoning district classification.

The Class A classification applies to properties zoned conservation, preservation, residential, public space, open space, or of other similar land uses. Because the shoreline area at these realignment sites, which includes the existing Kalapana Road, is zoned Open District under the County's zoning map, this Class A classification would apply. As a result, the maximum permissible noise levels under this Class is 55 dBA at the property line during daytime (7:00 a.m. to 10:00 p.m.) hours and 45 dBA during nighttime (10:00 p.m. to 7:00 a.m.) hours (DOH 1996).

The Class C classification applies to properties zoned agricultural, country, industrial, or of other similar land uses. Existing properties situated above Kalapana Road which area associated with the realignment sites are zoned A-1a, Agricultural District, under the County's zoning map. As a result, the maximum permissible noise levels for these properties under this Class is 70 dBA at the property line during both daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) hours.

Construction activities associated with the realignment routes selected will involve some grading activities along with the paving or these roadway segments. The various construction phases of any development would inevitably generate some noise levels due to equipment noise and other related activities. Typical ranges of construction equipment noise vary between 70 and 95 dBA. Earthmoving equipment, such as bulldozers and diesel powered trucks, will probably be the noisiest equipment used during construction.

However, any noise impact from these activities would be relatively short-term and minor given the short roadway segments being constructed. The actual noise levels generated would be dependent upon the construction methods and equipment employed during each stage of the construction process. Furthermore, construction equipment would be equipped with mufflers as required under DOH regulations.

At Site No. 3 and 5, there are no currently occupied residences located in the immediate vicinity of the roadway and realignment alternatives being considered. The single property affected by the realignment alternatives at Site No. 3 along with adjacent properties in the immediate vicinity are presently undeveloped. The properties affected by realignment alternatives at Site No. 5 are currently used for agricultural activities such as grazing, and adjacent properties are undeveloped. Consequently, construction activities are expected to have minimal noise impact on these properties and the activities occurring there.

As Site No. 4, there are a couple residences located above the existing roadway section being improved. These residences are set back from the centerline of the road between 160 to 200 feet away. The two alternative realignments being considered at this site include raising the existing road and constructing a new road about 30 feet inland of the existing road. Consequently, some of the construction activities occurring may be heard at these residences.

However, this construction noise would be temporary and should not have a significant impact.

In cases where construction noise exceeds, or is expected to exceed, the maximum permissible noise level allowable to property line limits, a permit would be obtained from the DOH to allow these activities. This permit includes restrictions to help mitigate potential noise impacts resulting from short-term construction activities. Such restrictions would be followed by the contractor. Specific permit restrictions included as conditions under this permit for construction activities are:

- No permit shall allow construction activities generating noise levels beyond the maximum permissible sound level at the property line before 7:00 a.m. and after 6:00 p.m. of the same day, Mondays through Friday.
- No permit shall allow construction activities generating noise levels beyond the maximum permissible sound level at the property line before 9:00 a.m. and after 6:00 p.m. on Saturdays.
- No permit shall allow construction activities generating noise levels beyond the maximum permissible sound level at the property line on Sundays and holidays.

#### **4.7.2 Vehicular Traffic Noise**

Existing traffic volumes along Kalapana Road are very low in comparison to other urbanized and developed areas on the island of Hawaii. The State Department of Transportation's nearest traffic count station at the intersection of Pahoa-Kapoho Road with Kapaho-Kalapana Beach Road indicated that a total of only about 900 vehicles (total both ways) traveled to and from the realignment site areas over a 24-hour period in 1998 (DOT 1999). Consequently, vehicular traffic noise along this roadway is not a significant noise generator.

Realignment of the three sections of Kalapana Road will not generate additional traffic in this area other than that which would normally occur with or without the project. There will be no increase in the capacity of the road since it will continue to be only a two-laned road (one lane in each direction). In addition, the portions of the existing road being realigned would only be short sections. As a result, the project would not affect the volume of traffic occurring on this roadway and subsequent traffic noise. Furthermore, this project does not involve any permanent facilities or activities that would generate new traffic to the area such as new homes or commercial facilities.

At Sites No. 3 and 5, there are no existing residential or commercial uses in the immediate vicinity of the realignment routes since the affected properties are either undeveloped or used for agricultural activities. As a result, there are no noise sensitive uses within the immediate vicinity of these two realignment sites such as residences or schools. Hence, the realignment of Kalapana Road further inland up to about 100 feet should not create a significant impact in terms of traffic noise.

At Site No. 4, there are a few existing properties which have homes located inland of the road. Alternative D would only involve raising the existing road utilizing its present path. Thus, vehicular noise should essentially remain the same.

Alternative E would move the road inland about 30 feet from its existing location. Consequently, vehicular traffic noise associated with this Alternative route would occur closer to the existing homes. Existing homes affected are presently set back from the roadway over 160 feet. Thus, homes would still be set back over 130 from the realigned road under this alternative. Vehicle traffic noise may be slightly more audible, however, it is not expected to have a significant impact. Generally, a noise level increase of 1.0 dBA or less should not be perceptible to residents situated along a roadway, and this change is not expected to result in a noise level increase of 1.0 dBA or greater. Thus, changes to traffic noise along this roadway with this alternative should be minimal and not perceptible by area residents.

#### 4.8 VISUAL RESOURCES

There are no natural or topographical features, landmarks, or other land forms of significant or important visual character existing on the properties affected by the proposed realignment alternative at the three sites. Appendix B included photographs of the area associated with these realignment sites. Views of the shoreline while driving along Kalapana Road are present along most of the project area due to the road's location near the shoreline.

Property affected at Site No. 3 consists of undeveloped area overgrown with trees and other vegetation. This property is privately owned and is not available for public use. Site No. 5 is similarly heavily vegetated and not used for any public use. Site No. 4 affects four properties, two of which have homes developed on them while the other two remain undeveloped.

Development of the realignment alternatives at each of the three sites are expected to have minimal if any impacts on existing visual resources because the alternatives would not affect significant landmarks or other physical features of important visual character. Realigning these short segments of Kalapana Road would involve removing various trees and other vegetation to clear a path for the new road section. The roadway's design would try to minimize the displacement of existing trees to the extent possible.

At Site No. 3, both alternative routes would similarly affect several trees, primarily Java Plum trees, due to the heavy vegetation and abundance of trees present on this property. Existing Ironwood trees lining the mauka end of Kalapana Road along this site would be preserved since the new realigned road would traverse above (mauka of) these trees. Although these Alternatives A and B would realign sections of Kalapana Road further inland, views of the shoreline would still be visible through the trees that would now be located on the makai side of the road.

Consequently, these alternatives should not have a significant impact on coastal views from this road especially given the short length of this realigned section.

At Site No. 5, both alternative routes would likely affect only a few trees because the properties affected at this site have less vegetation and abundance of trees. A number of Coconut trees line the makai end of Kalapana Road at this site, but they would not be affected by the alternatives. Therefore, coastline views along this roadway section would remain, and would be minimally impacted under both alternatives.

There are several trees present along the mauka edge of Kalapana Road at Site No. 4. These trees are located within properties owned by several residents some of which have homes built on the site. Under Alternative D, the existing road alignment would be elevated reducing the need to displace a large amount of existing trees along this section. However, various trees may still be impacted due to the amount of additional right-of-way required to accommodate fill slopes created by the elevated roadway. A 2-to-1 slope ratio is planned for these fill areas, however, the exact amount of additional right-of-way required and trees affected would be determined during the project's design.

Under Alternative E for Site No. 4, many of the trees lining this mauka edge of Kalapana Road would need to be displaced since the new road would be located inland about 30 feet. Discussions with residents affected in this area indicated a concern with the impact to these trees by the various alternatives considered for this site. This alternative would have a greater impact since it would run along the area where several of the trees are present. Potential mitigative measures for both of these alternatives considered for Site No. 4 consist of relocating several of the trees affecting residence's front yards.

#### 4.9 HYDROGEOLOGICAL RESOURCES

Under the State's Water Resource Protection Plan, aquifers of the island of Hawaii have been classified under an aquifer coding system to identify and describe these aquifers. This system is comprised of Aquifer Sectors, then Aquifer Systems located within these sectors. An Aquifer Sector reflects an area with broad hydrogeological (subsurface) similarities while maintaining traditional hydrographic (surface), topographic and historical boundaries. The Aquifer system is an area within a sector that is more specifically defined by hydrogeologic continuity, particularly hydraulic connections among aquifer types and units (CWRM 1989).

The Kalapana Road Realignment project involves roadway segments which are located within the Kilauea Aquifer Section (Sector 808) which includes the majority of Puna District coastline area generally extending from Kapoho to Kalapana. Within this Kilauea Aquifer Section, there are four Aquifer Systems which are the Pahoa, Kalapana, Hilina, and Keaiwa Systems. The three realignment sites are situated within the Kalapana Aquifer System (System 80802) (CWRM 1989).

Ground water resources in this Kilauea Aquifer Section is comprised of different types of

ground water resources which include brackish basal water, basal water floating on salt water, and water confined by dikes. Brackish basal water is generally located along the coastal areas from Pohoiki to Kalapana which includes the proposed realignment sites (CWRM 1989).

#### **Probable Impact On Hydrogeological Resources**

The realignment of the three sites in the Kalapana area should not have an impact on these aquifer systems. The project consists only of realigning three relatively short sections of the existing road. Thus, its construction is not expected to result in activities which would affect the aquifer system nor the brackish basal water present. Construction activities would be limited to minor grading and fill activities to establish the road's right-of-way. The use of realigned sections by vehicular traffic would similarly not affect these hydrogeological resources.

### **4.10 MARINE RESOURCES AND WATER QUALITY**

A study was conducted for this project by AECOS, Inc. (AECOS) to address the project's impact on marine resources and water quality of the nearby shoreline. A copy of this report is included in Appendix G of this application. Field observations concentrated upon what could be observed along the shore, making collections between waves, and looking down from the cliff ledge into the immediate offshore area. Water samples of the shoreline was collected by sampling in freshly filled pools or the swash water flooding down the rocks.

#### **4.10.1 Description Of Existing Marine Environment**

The project area is moderately wet and supports substantial vegetation, although soils are shallow and the ground highly porous. There are no streams on this part of the island as water that soaks into the lava escapes eventually as groundwater issuing from springs at and off the shore. Because this part of the island is of recent origin in geological terms, there has been insufficient time for a coral reef to develop off the coast, and the bottom drops steadily away from the shore.

The absence of any reef structure off the shore means that the full force of waves can impinge unimpeded against the shoreline. In the general project area of the realignment sites, the coastline is mostly a sea cliff of somewhat variable height, typically between 6 to 26 feet high. This sea cliff is a result of the constant battering by waves on the prehistoric lava flows issued from the Southeast Rift zone of Kilauea Volcano.

The marine environment for nearly all of this southeast coastline from Opihikai to near Kalapana is very similar. This environment is characterized by a steep basalt shore, in a few places there are limited beach deposits of black (basalt) sand or rounded stones ('ili'ili) typically from gravel through cobble size. On this shoreline, the biota occurs in distinct bands or zones that result from environmental gradients predominantly arranged perpendicular to the shoreline and based upon elevation relative to sea level. The basic zonation patterns for each site, from the

roadway to the sublittoral zone is described.

### **Marine Biota At Site No. 3**

The shoreline at this roadway site is a cliff comprised mainly of a 2+ meters thick and very dense pahoehoe lava flow. Above this dense basalt rock, and below it as well, are layers of looser material (perhaps 'a'a flows or cinder deposits). In this area between the road and the cliff, no vegetation of any consequence occurs.

Below the vegetation line, the substratum is mostly barren, lava rock. Upon closer inspection, the supratidal periwinkle or pipipi (snail) (*Littorina picta*) can be seen to occupy cracks in the lava at the uppermost wetted zone. Of the three species of periwinkle found in Hawaii, *L. picta* typifies coastlines subject to the greatest wave energies.

The supralittoral zone is fairly broad along this coast and represents a zone where conditions are occasionally too extreme for terrestrial plants because high waves remove the soil or occasionally flood the area with salt water. Yet, this zone is too dry (or subject to freshwater rains) for limu (marine macrophytic algae) to grow because the rocks are wetted by seawater too infrequently. A thin coating of microscopic algae does occur here, serving as food for the periwinkles, but it is not really visible without very close inspection of the crevices and depressions in the lava.

Towards the bottom of the supralittoral, another snail known as pipipi (*Nerita picea*) can be found in crevices or other slightly protected locations. These snails move up or down the shore with the tide to locate where the waves are constantly wetting the rock. Also characteristic of this zone is the 'a'ama crab (*Grapsus tenuicrustatus*) which is seen scurrying over exposed rocks above, and sometimes in, the wave wash. A little lower down, where wave swash is constant, occur the helmet urchin or hä'uke'uke kaupali (*Colobocentrotus atratus*) and the 'opihi makaiaüli (*Cellana exarata*). This limpet or 'opihi is not particularly abundant here, but can be easily found on rocks, usually a little higher up the shore than the urchin.

The appearance of fleshy algae, or seaweed, marks the next prominent zone below the bare rock zone of the supratidal. Highest up along the shore are yellowish-brown tufts of *Giffordia breviarticulata*. These tufts are small and inconspicuous compared with the alga known as 'aki'aki (*Ahnfeltia concinna*). This is also yellow-brown in color, and forms conspicuous dense patches over the rocks and in crevices where the wave splash reaches at low tide. 'Aki'aki is absent in the steep section of the shore directly adjacent to the road, perhaps because the supratidal is essentially a vertical face. This alga is conspicuous on the more gently sloped shoreline along both ends of the this roadway section.

One of the most conspicuous zones, is the band of encrusting, calcareous alga (*Porolithon onkodes*) that extends down below the water line. The color varies from light pink to purplish. This species is very prominent on wave washed shores such as this, coating nearly all of the basalt surface including the larger loose boulders. In this area, the paint-like coating by this calcareous alga can be observed to extend down below the littoral or intertidal zone. However, on rock outcrops exposed between incoming waves occurs a dense growth of several different fleshy algae.

Most conspicuous near the lowest part of the sublittoral is a dense growth of bushy red alga (*Pterocladia capillacea*), a preferred food of the honu or green sea turtle (*Chelonia mydas*). Between the *Pterocladia* and the upper edge of the *Porolithon*, occurs *Sargassum echinocarpum*, *Laurencia cf. succissa*, and many other less common species.

#### **Marine Biota At Site No. 4**

At Site No. 4, the shoreline is lower in elevation and waves appears able to sometimes wash across the road during high surf or storm conditions. The low shoreline here supports a small beach of gravel and coarse black sand. The beach that has formed along this shoreline section is essentially a tombolo which is a deposit of sand formed behind a protecting headland or island. In this case, a raised outcrop of basalt protects a part of the low shore from the full force of the waves. Tide pools are present on either side of the tombolo. These harbor fishes and crustaceans, but not any macroscopic seaweeds.

In these pools, pāo`o (*Istiblennius zebra*), kŭpīpī (*Abudefduf sordidus*), āholehole (*Kuhlia sandvicensis*), `o`opu (Gobiidae), a rock crab (Xanthidae), and a young morey eel or puhi (*Gymnothorax* sp.) was observed. The shore of the tide pool is also inhabited by a close relative of the `a`ama crab, the `alamihi (*Metopograpsus thukuhar*). `A`ama are present as well on the basalt outcrops facing the sea. Green turtles were observed swimming just off the shore.

On the rocks along this shore occurs the same zonation pattern of supra-littoral mollusks, sea urchins, *Porolithon*, and fleshy seaweeds (in order down the shore) as that observed at Site No. 3. *Ahnfeltia* is most conspicuous high on the shore, and *Pterocladia* most conspicuous low on the shore. A small, red seaweed (*Gelidiella* sp.) was collected from the *Sargassum* zone. *Ulva* was not noted here.

#### **Marine Biota At Site No. 5**

A narrow line of coconut trees, some beach naupaka, and grass comprise the narrow coastal vegetation zone between the roadway and the sea cliff at this particular realignment site.

The littoral zone plants and animals at this location are the same as described for Site No. 3. However, a substantial amount of bright green *Ulva* was seen in the upper part of the *Porolithon* zone in this area. *Ulva* is sometimes an indicator of nutrient enrichment, and its

abundance here could indicate groundwater springs at the shore. Also observed here was an encrusting alga, *Ralfsia pangoensis*, also extending up into the upper *Porolithon* zone.

As with the other realignment sites, the helmet urchin or ha'uke'uke kaupali is very abundant here. Seen only once at this site in the field survey was ha'uke'uke 'ula'ula or slate pencil urchin (*Heterocentrotus mammillatus*). This species should be far more abundant below the splash zone, although none was observed looking down into the sublittoral.

#### 4.10.2 Description Of Water Quality Conditions

The results of water quality samples taken and analyzed for each of the three realignment sites are summarized on Table 4.2. As might be expected, the water quality along this remote stretch of coastline is excellent. Water quality is nearly identical in most every respect at Sites No. 3 and 5, including identical temperatures, nearly identical dissolved oxygen (DO) saturation values and turbidities. Very close to the same values were obtained for each of the nutrient moieties.

Site Description	Time	Temp. (°C)	DO (mg/l)	DO Sat. (%)	Salinity (ppt)	pH (ntu)
Site 3	1310	26.9	6.35	97	35	8.1
Site 4	1230	27.3	6.70	103	35	8.1
Site 5	1210	26.9	6.23	95	35	8.1
	Turbidity	TSS (mg/l)	Ammonia (µg N/l)	Nitrate + nitrite (µg N/l)	Total N (µg N/l)	Total P (µg P/l)
Site 3	0.38	1.1	3	1	146	11
Site 4	0.46	1.1	72	2	242	8
Site 5	0.36	1.9	< 1	3	153	9

Source: AECOS, Inc. 2000

The values for Site No. 4 did show curious deviations which involved a very slightly higher temperature, a DO above saturation, and much higher ammonia concentration. The higher ammonia accounted for much of the higher total nitrogen (TN) value. It is suspected that these

differences in Site No. 4 to the others were related directly to the sample collection methods conducted at Sites No. 3 and 5. At these other two sites, water washing up the rocks and trapped in chutes was sampled. Whereas, at Site No. 4, the water in a tide pool regularly flushed by the waves was sampled.

In this latter case, the actual replacement of older tide pool water with new ocean water on each wave wash must have been less than that assumed. Thus, a slightly higher temperature, and higher ammonia reflect the longer average residence time of water trapped in the pool between high tidal excursions up the shore. These deviations are not sufficient to regard the water at this location as being of poor quality.

#### 4.10.3 Effects On Marine Environment And Water Quality

The proposed realignment improvements to Kalapana Road are designed to limit damage from waves by moving sections of this road presently located adjacent to the shore further inland. This approach will minimize impacts to the marine environment, including the littoral and supralittoral environments. Although no adverse impacts from this process are contemplated, care in controlling runoff and avoiding dumping of graded debris should be exercised. Best management practices would be implemented during the construction of these improvements, and appropriate measures would be developed during the project's design as discussed under Section 4.1.3 of this chapter.

Two protected species are known to occur in this general coastline area which are the 'opihi and the green sea turtle. The State of Hawaii has a prohibition on taking 'opihi under a certain size for purposes of selling the meat without a permit. However, this rule does not protect the species from either catches for personal use or from other sorts of destruction. The 'opihi is not a listed species nor a candidate for listing under Federal endangered species rules.

The honu or Pacific green sea turtle (*Chelonia mydas agassizi*) is protected by both State and Federal endangered species laws. The honu is listed as a threatened species by Department of Land and Natural Resources and U.S. Fish and Wildlife Service. The project shoreline (littoral limu beds) and offshore waters are habitat for this threatened species (AECOS 2000).

However, the roadway realignment project is not expected to significantly impact such species which may occur in this general vicinity. This project only involves realigning short segments further inland to create additional buffer area between the shoreline and roadway. Thus, the low volumes of vehicular traffic using this road should not adversely affect this species nor its habitat since vehicles would actually be moved further away from the shoreline. As previously discussed, best management practices would also be incorporated during the project's design for implementation by the contractor to further minimize short-term construction impacts.

## CHAPTER 5 ECONOMIC AND SOCIAL FACTORS

### 5.1 ECONOMIC AND FISCAL FACTORS

Construction of the Kalapana Road Realignment project should have a small minor positive economic impact associated with the creation of short-term construction related jobs.

#### Construction Related Jobs

The projected preliminary estimated construction costs for the alternatives being considered for the three realignment sites were discussed in Chapter 2. Depending upon which alternative route was selected for each alternative site, the total construction cost could range from an estimated low of \$1.82 million to \$2.20 million. Therefore, the construction of these realignment sites would create several short-term construction jobs over several months (estimated 6 to 9 months) for each site implemented.

Direct construction jobs would typically consist of on-site laborers, tradesmen, mechanical operators, supervisors, etc. These new jobs created would also generate additional personal income for construction workers. Personal income is defined as the wages paid to the direct construction workers or operational employees associated with a development. It is anticipated that these construction jobs would likely be filled by residents from the Island of Hawaii employed within the construction industry. Direct construction jobs created would also stimulate indirect and induced employment within other industries on the island such as retail, restaurants, material distributors, and other related businesses supporting the construction industry.

#### Fiscal Factors

Fiscal impacts associated with this project would primarily involve some additional tax revenue generated to the State. Tax revenue sources for State government are composed primarily of general excise taxes (GET) on development costs and construction materials, along with corporate income tax. In addition, GET taxes on indirect and induced income spent stimulated by the spending of direct income would also contribute new revenues to the State. The approximately \$1.82 million to \$2.20 million expended by the County for construction of the three realignment sites would therefore generate increased tax revenue to the State.

County revenues are primarily limited to property tax revenues. As a result, there is currently no revenue generated from the existing Kalapana Road since it is owned by the County. With this realignment project, there would similarly be no County revenue generated from the realigned sections because it would similarly be County owned right-of-way.

Privately-owned properties being affected by the realignment project are currently subject to County property tax. The additional right-of-way and other land area necessary for the selected realignment at the three sites would be acquired by the County. Acquiring this right-of-way would slightly reduce the existing size of the affected properties and subsequently reduce the amount of property taxes collected by the County. These roadway realignments are expected to result in no changes to the values of existing properties affected.

This project is not expected to generate any new in-migrant residents to the island of Hawaii to fill short-term construction related jobs. Thus, there would not be any impact on State and County operational expenditures for public services serving this community and surrounding areas.

## **5.2 SOCIAL IMPACT FACTORS**

### **5.2.1 Population And Housing**

The resident population in the Puna district has been growing since 1970. This population has increased from about 5,000 in 1970 to 12,000 in 1980, and up to over 20,000 in 1990. There are some indications that the 1990 Census data probably undercounted the actual population in this district. This can be attributed to: 1) several homes being developed without property building permits, 2) residents living there may not have what can be properly considered a dwelling when the Census took place making it difficult to obtain data, and 3) a large majority of East Hawaii's homeless reside in the Puna district. Population projections for the Puna district by the State Department of Business and Economic Development forecast the resident population to increase to almost 26,000 in 1995 and about 29,000 by the year 2000 (CMAI 1992).

The number of dwelling units in the Puna district grew from 1,777 in 1970 to 4,404 in 1980. The 1990 census showed a total of 8,597 units in this district. Preliminary housing projections prepared by the County Planning Department in 1989 estimated housing units would increase to about 8,760 in 1995 and 9,875 by the year 2000 (CMAI 1992). The majority of housing units are located within established subdivisions. Within the vicinity of the realignment sites, there are no large established subdivisions as residences are generally located on large lot properties present along the shoreline.

The realignment of Kalapana Road at the three proposed sites should not have an impact on the existing or future resident population or housing units developed in the project area. The project would only involve the realignment of short segments of the existing road moving it inland or elevating it. Hence, this realignment would not displace any existing homes and residents. Consequently, this improvement would not affect the existing or future population in the area.

### 5.2.2 Impact On Affected Properties

Discussion is provided of impacts to properties by the realignment alternatives for each site, and concerns raised by property owners.

#### Site No. 3 Affected Property

The realignment routes proposed for Site No. 3 would affect a single large property identified as Tax Map Key 1-03-03: 006. This property is presently undeveloped with the exception of existing rock walls. In addition, there are no known development plans for this property.

The realignment alternatives being considered for this site are not anticipated to impact the existing or future use of this affected property based upon early consultation efforts with the representative of the landowner. Privately-owned property situated makai, or below, the selected realigned route may either be acquired by the County for fair market value or retained by the landowner. Appropriate negotiations for land acquisition would occur during the design phase of the project. No other specific land use concerns or social impacts on the landowner have been identified for the realignment alternatives proposed for this site.

#### Site No. 4 Affected Properties

The realignment routes proposed for Site No. 4 would affect five properties identified as Tax Map Key 1-03-04: 013, 028, 054, 058, and 090. Realignment alternatives developed have raised some concerns from affected property owners based upon early consultation efforts conducted. Concerns were raised with Alternatives A, B, and C, due to the amount of frontage property affected by these alternative routes. As a result, these alternatives were dropped from further consideration to address landowner concerns. Consultation with landowners resulted in the development of Alternative E which is being studied in further detail along with Alternative D (elevate existing road) under this document.

Two of the properties (TMK 1-03-04: 013 and 090) affected by Alternatives D and E presently have homes on the property which are generally set back over 160 feet away from the existing roadway. The other three properties affected are currently undeveloped. One of these properties is being considered for purchase by another individual (TMK 1-03-04: 028).

Both Alternatives D and E are not expected to significantly impact the existing or future use of all of these five properties based upon early consultation efforts performed. Existing residences would not be displaced under these two alternatives, and the vast majority of existing frontage property would be retained. Additional right-of-way property required for these alternatives would be acquired by the County based upon fair market value. Appropriate negotiations for land acquisition would occur during the design phase of the project.

Alternative D would have the least impact on the frontage of mauka properties since the existing road would be elevated. However, some additional right-of-way would likely be required to account for fill areas created to elevate the road. This could potentially affect some frontage property, existing rock walls, and trees situated along the existing road.

The specific amount of additional right-of-way needed would be determined during the design of the road if this alternative is selected, and could vary from about 5 to 15 feet. To further minimize frontage necessary for additional right-of-way, alternative designs could be considered during the project's design besides simply using a 2 to 1 fill slope. Such alternatives could include constructing a retaining wall up to the roadway right-of-way or strengthening the fill slope structure to allow for a higher fill slope design requiring less frontage area. Mitigative measures would involve replacing rock walls affected and possibly relocating trees further inland. Early consultation efforts with property owners indicated a preference for this alternative.

This alternative could also affect property makai of, or below, the existing road since some type of retaining wall (rip rap or cmu wall) may be needed to protect sections of the road from wave inundation during periods of high surf. Up to four additional properties could therefore be affected, and these properties are identified as Tax Map Key 1-03-04: 010, 012, 022, and 071. The specific amount of additional right-of-way needed would be determined during the design of the road if this alternative is selected, and could vary from about 5 to 15 feet.

The impact on these makai properties is not expected to be significant because they are presently undeveloped and are designated Conservation District under the State Land Use District classification. As a result, their development potential is restricted, and furthermore, most are not well-suited for development due to its location close to the ocean, the eroding shoreline, and periodic wave wash during high surf. Consequently, the additional right-of-way necessary for building a retaining wall for Alternative D should have minimal effects on the overall use of these properties. Early consultation efforts with the owner of one property (TMK 1-03-04: 022) that could potentially be used for future development indicated no concerns with additional right-of-way being acquired for the elevated road. In addition, the owner had no future development plans for the property.

Alternative E would have more impact on mauka properties than Alternative D since this realignment would extend about 30 feet inland from the existing road. This road would also need to be elevated and would thus require additional right-of-way for fill areas. Several trees and large sections of existing rock walls would also be impacted by this route. To minimize frontage necessary for additional right-of-way, a retaining wall could also be considered for this alternative during its design if selected. Mitigative measures would be similar with Alternative D in that they could involve replacing rock walls affected and possibly relocating trees further inland.

This alternative would similarly need some type of retaining wall design to be constructed along the makai end of the road to protect it from wave inundation during periods of high surf. However, makai properties are not expected to be affected since the existing Kalapana Road right-of-way should have enough room to accommodate this wall. The specific amount of space needed for this retaining wall would be determined during the design of the road if this alternative is selected, and could vary from about 5 to 15 feet.

#### **Site No. 5 Affected Properties**

The realignment alternatives proposed for Site No. 5 would affect two large properties identified as Tax Map Key 1-03-02: 076 and 108 both of which are owned by a single landowner. Alternatives being considered here would affect property that is essentially undeveloped with the exception of a dirt driveway, fence, and rock wall. There are no known development plans for this property that would be affected by the realignment project.

Consequently, the realignment alternatives proposed for this site are not anticipated to impact the existing or future use of this affected property based upon early consultation efforts with the representative of the landowner. Discussions with landowner representative indicated this property is used for grazing and other passive agricultural activities. Thus, the fencing is used to keep animals within their property.

Privately-owned property situated makai, or below, the selected realigned road may either be acquired by the County or retained by the landowner. Appropriate negotiations for land acquisition would occur during the design of the project. No other specific land use concerns or social impacts on the landowner have been identified for the realignment alternatives proposed for this site. Mitigative measures being considered would involve replacing portions of the fence and rock wall affected by the selected route. The amount of fence needing to be replaced along with the wall would be determined during the design of the project.

#### **5.2.3 Effect On Community Character**

The realignment of Kalapana Road at the three proposed sites are not expected to significantly impact the existing character of this community. The area associated with these realignment sites is for the most part undeveloped and very rural in nature. With this project, this surrounding area would continue to retain this rural character. The realignment sections are relatively short ranging only from about 800 to 1,300 feet in length. Thus, these realigned or improved roadway segments would not alter future traffic volumes or use of Kalapana Road. Residents and the public would continue to use this road for access to shoreline areas and homes present along this coastline.

## CHAPTER 6 INFRASTRUCTURE FACILITIES

This chapter addresses the project's probable effect on existing infrastructure serving the realignment sites and surrounding area.

### 6.1 WATER FACILITIES

Water supply serving the Puna district is provided by the County of Hawaii Department of Water Supply (DWS), two private systems, and individual roof catchment systems. The two private systems are the Hawaiian Shores system and the Miller & Leib system which serve about 1,000 residences in this district. The DWS operates four separate water systems in Puna which are the Kalapana System, Kapoho System, Pahoia System, and the Keaau-Mt. View System. However, the majority of residences (about 60%) in the Puna district rely on individual roof catchment systems (CMAI 1992).

Residences in the project area of the three realignment sites do not have a public or private water system serving them. Thus, residences in this area need to rely on individual roof catchment systems. Subsequently, there are no known water lines located within Kalapana Road at these realignment sites.

Realignment of the three sites are not expected to have an impact on private or DWS water system facilities since none are present within the three project sites. Realignment areas affected at Sites No. 3 and 5 are undeveloped, therefore, there should be no impact to water system facilities. Site No. 4 would involve elevating the existing road or moving it inland slightly, thus, these alternatives should similarly have no impact on individual roof catchment systems used by existing residences present on some of the affected properties.

### 6.2 WASTEWATER FACILITIES

There are no known County wastewater collection and treatment system in the area of the three realignment sites. As a result, cesspools or septic systems are likely to be predominantly used by residences in this area.

Realignment of Kalapana Road at the three sites are not expected to have an impact on individual wastewater collection and treatment systems present within these sites. Realignment areas affected at Sites No. 3 and 5 are undeveloped, therefore, there should be no impact to such facilities. Site No. 4 would involve elevating the existing road or moving it inland slightly, thus, these alternatives should similarly have no impact on individual wastewater systems used by existing residences present on some of the affected properties.

### **6.3 DRAINAGE FACILITIES**

Surface runoff at the realignment sites and surrounding properties in this area presently sheet flow towards the shoreline following natural drainage paths and the existing topography. There are also no significant streams or major gulches present at these realignment sites. Consequently, existing surface runoff from properties along Kalapana Road currently travels across the road towards the shoreline.

The realignment of the three sites proposed would have minimal if any impact on drainage facilities serving this area since there are none present. Realigning the short segments of this roadway further inland would create new impervious surfaces associated with the new roadway sections. However, this increase in impervious surfaces would be minimal in comparison to the surrounding area, and should not affect the overall drainage pattern or flows occurring in this area.

Right-of-way created for the realigned sections would involve some cut and fill to level the terrain where the new road section would be routed. This is most applicable to Sites No. 3 and 5. At Site No. 4, the alternatives would involve elevating the existing road or new realigned section. As a result, culverts would be provided at necessary points along the selected realigned routes to minimize disruption to surface runoff quantities and flow patterns at existing natural drainageways in the area.

These necessary improvements would be incorporated in the design of the project. Present areas situated below (downstream of) the existing road and realignment routes are undeveloped. Consequently, surface water runoff in this area would not affect sensitive land uses such as residences. Furthermore, drainage plans would be prepared and coordinated with the County for review and approval prior to construction. Therefore, the project is not expected to have a significant impact on present drainage patterns in the area.

### **6.4 SOLID WASTE**

The County Department of Public Works, Wastewater/Solid Waste Division operates two County landfills, one in Kona and the other in Hilo. There are also 21 solid waste transfer stations located on the Island of Hawaii. In the Puna District, there are five transfer stations which are located in Keaau, Pahoa, Kalapana, Glenwood, and Volcano. Construction waste, junked cars, large white goods, and dead animals are delivered directly to the Hilo landfill (CMAI 1992).

Construction of the selected realignment routes for each of the three project sites will generate solid waste typical of normal construction related activities. There would be minimal differences with the amount of construction-related solid waste generated between each alternative for the three sites.

Construction-related solid wastes will be generated only over a short time period, and consist primarily of vegetation, rocks, and other debris resulting from the clearing of area for establishing roadway rights-of-way prior to its paving. The contractor will be required to remove all debris from the realignment sites, and properly dispose them at the Hilo landfill in conformance with County regulations. Such activities are expected to have minimal impact on County solid waste facilities.

## 6.5 TRANSPORTATION FACILITIES

Pahoa-Kalapana Road, Highway 130, serves as a main State-operated highway providing vehicle access into this Puna District from Hilo. This highway eventually connects to Kalapana Road near the shoreline further southwest of Site No. 5 in the area of Kaimu Park. Kamaili Road also provides vehicular access to the shoreline from this highway connecting with Kalapana Road in the Opihikao area located between Sites No. 3 and 4.

Kalapana Road is a County-owned and maintained road that provides vehicle access for residents and the general public to properties located along this rugged coastline as well as to shoreline areas. This road travels in a northeast to southwest direction generally following the shoreline within this project area, and is the only road providing lateral access along this coastline.

In the project area, this road consists of an undivided two-laned roadway (one lane in each direction) with a pavement width varying from about 16 to 20 feet. The posted speed limit of this road in the vicinity of the realignment sites is 25 mile per hour. In the area of the realignment sites, this road was recently repaved by the County.

### Existing Traffic Conditions

Traffic volumes along Kalapana Road near the three realignment sites is relatively light in comparison to other rural and urbanized areas on the Island of Hawaii. State Department of Transportation (DOT) 1998 traffic data was reviewed for the intersection of Pahoa-Kapoho Road with Kapoho-Kalapana Beach Road (Kalapana Road) which is identified as Station No. 2-B (DOT 1999). This traffic count station is located further north of the realignment sites in the Kapoho area, and is the only station with traffic data along Kalapana Road along with being the closest to the project area.

Based upon this traffic count data obtained, the traffic volumes along Kalapana Road can be characterized as being very light. Vehicle traffic counts over a 24-hour period in 1998 showed a total of only about 900 vehicles (total cars in both directions) travelling along this road. Traffic data taken in 1992 and 1994 indicated about 850 and 1,040 total vehicles along this road, respectively (DOT 1999). The limited vehicular traffic present along this road in the project area was also confirmed by field surveys conducted in the area.

Vehicular traffic on Kalapana Road heading to and from Opihikao during the weekday morning peak hour of 6:45 to 7:45 a.m. had only 47 and 24 vehicles travelling in each direction. The weekday afternoon peak hour of 3:00 to 4:00 p.m. had only 42 and 55 vehicles travelling in each direction (DOT 1999). Consequently, this traffic data shows that there is very limited vehicular traffic occurring along Kalapana Road in the vicinity of the three realignment sites. This low traffic is reasonable given the rural and undeveloped character of this surrounding area. Vehicular traffic is generally limited to residences living in the area, visitors sightseeing along this coastline, and the public conducting recreational activities along the shoreline.

#### **Probable Impacts On Roadway Facilities**

The proposed realignment of Kalapana Road at the three sites is not expected to have an impact on traffic volumes occurring now and in the future along this roadway. The purpose of this project is to realign relatively short sections of the road away from the shoreline due to coastal erosion, roadway undermining, potential wave wash onto the road. Consequently, vehicular traffic along this road would not be significantly negatively affected by the project. Without the project, sections of this road may become impassable in the future limiting access to shoreline properties.

The project would not increase the capacity of the roadway since realigned sections would continue to have a single lane in each direction (two-laned roadway) along with posted speed limit of 25 mph. These realigned sections are also short in distance ranging from about 800 to 1,300 feet in length. Thus, these realigned sections are not expected to deter or increase a driver's perception and need for utilizing this road to access this coastline area.

In addition, these realigned sections are not expected to affect the development potential of surrounding properties since it would realign the road only a maximum of about 100 feet further inland at Sites No. 3 and 5. Site No. 4 would at most move the road inland about 30 feet. Therefore, this project would not affect future traffic volumes utilizing this road.

Construction of the selected realignment alternatives would create a short-term impact on traffic flow in this area due to construction activities. A traffic monitoring plan would be prepared to keep at least one lane open for vehicles to pass through construction areas. This plan would be coordinated with the County during the project's design for review and approval for implementation by the contractor. Given the low volume of traffic occurring along this roadway in the project area, minimal impacts are expected to occur from construction activities.

## CHAPTER 7 PUBLIC FACILITIES AND UTILITIES

This chapter addresses the probable impact on public facilities and utilities in the project area resulting from constructing the realignment improvements. In summary, this County road renovation project is not expected to have any significant effect on these facilities.

### 7.1 ELECTRICAL AND COMMUNICATION FACILITIES

Hawaii Electric Light Company, Inc. (HELCO) and GTE Hawaiian Telephone Company (Hawaiian Tel) currently provide electrical and telephone service, respectively, to existing developments in East Hawaii. In the Puna District, about 25 percent of the homes depend upon energy supplied by individual "off-power" systems. This is largely due to large area of undeveloped properties and off-grid subdivisions present in this district. These systems are usually run by individual oil-powered generators or photovoltaic systems (CMAI 1992).

HELCO has been adding customers in this district over the years. There were 3,461 residential meters in 1979 which increased to 6,286 in 1989 (CMAI 1992). There are no electric transmission routes known to be present along Kalapana Road in the area of the three realignment sites. Similarly, there are also no known telephone lines routed along Kalapana Road in the area of the realignment sites.

The realignment of Kalapana Road at the three proposed sites are not expected to have an impact on existing electrical distribution lines or telephone lines. The realignment alternatives would not impact the location of any electrical poles. However, appropriate coordination with both HELCO and Hawaiian Tel would be conducted during the design of the selected alternative for each site.

### 7.2 RECREATIONAL FACILITIES

There are no existing public parks or other recreational facilities located within the immediate vicinity of the three realignment sites. The nearest established park facility is MacKenzie State Park located northeast of Site No. 3. This park is a State-operated beach park of about 13.1 acres of which 6.0 acres are developed. This park has six campsites, a pavilion, limited parking, and includes the Hawaiian King's Trail (CMAI 1992).

The Puna district coastline is primarily rocky, and ocean currents are generally unfavorable for swimming. Nevertheless, there are some ocean recreational activities occurring along the shoreline in the area in the vicinity of the realignment sites. Such activities include fishing, camping, and sunbathing.

At Site No. 3, it appears some shoreline fishing and camping activities do occur periodically along the rock outcrops situated at the northern and possibly the southern ends of this realignment section. There are no other known recreational uses occurring in this realignment area. Inland properties are privately-owned and should therefore not be used for public recreational activities.

At Site No. 4, area residents have indicated that shoreline fishing, camping, and sunbathing do occur periodically along the rock outcrops at the northern end of this realignment site. A tide pool is present which fills with water as waves break over the rock outcrops. Residents have mentioned that this tide pool area is used by the public for such recreational activities. Area residents have also complained about nuisance activities occurring from campers and users of this area. Such complaints mentioned were the dumping of trash on mauka properties by users, unauthorized access and use of privately owned makai properties for such activities, and loud noises and other nuisances from activities.

The southern end of Site No. 4 has also been identified by area residents for recreational activities consisting mainly of shoreline fishing and sunbathing. Similar complaints of trash dumping and loud noises from activities have also been received from area residents of people who occasionally use this area.

There are no known recreational activities occurring at Site No. 5. However, this shoreline area could be occasionally used for similarly recreational activities such as shoreline fishing. Inland properties are privately owned, so there should be no permitted public recreational activities occurring within these mauka areas.

#### **Probable Impacts On Recreational Facilities And Activities**

Construction of the realignment sites are not expected to have a significant impact on recreational activities occurring along shoreline areas. Access to the shoreline would still be allowed since the project would only realigning further inland or raising short sections of the existing road. This would not prevent existing recreational activities from continuing to occur along this shoreline.

At Sites No. 3 and 5, there appears to limited amount of recreational activities presently occurring. The realignment of these existing roadway sections further inland about 100 feet would have minimal impact on recreational activities. The public would still have access to the shoreline, and be able to continue conducting activities such as shoreline fishing.

At Site No. 4, the alternatives being considered would involve raising the existing road section or realigned section. However, this road renovation would not prevent shoreline recreational activities from continuing to occur. Because this road section would be elevated, guardrails would likely be required along the makai side of the improved road under both

alternatives. This would protect vehicles from travelling off the elevated road, but would also prevent vehicles from parking along this roadway segment. The unauthorized parking or accessing of shoreline areas by vehicles onto privately-owned makai properties at the northern section of this realignment site may also be restricted due to the presence of this guardrail.

The owner of a makai property being utilized for such unauthorized activities (TMK 1-03-04: 022) would be consulted during the project's design to determine if a driveway access is required. Vehicles would still be able to park along shoulders areas of Kalapana Road or within other properties outside of this improved section if authorized by the landowners. Consequently, this road renovation improvement should not have a significant impact recreational facilities or activities.

### **7.3 MEDICAL AND EDUCATIONAL FACILITIES**

There are no existing medical facilities located in the immediate vicinity of these realignment sites. Consequently, this project would not have an impact on existing medical facilities or services. Construction activities would not generate noise or other disturbance which would affect such facilities. The use of these realigned sections by vehicle traffic would similarly not impact existing medical facilities or their operations.

There are no existing private or public educational facilities located in the immediate vicinity of these realignment sites. The nearest school facilities in this project area are the Pahoa Elementary School and Pahoa High and Intermediate School located in Pahoa town. As a result, this project would not have an impact on existing educational facilities or activities conducted. Construction activities would not generate noise or other disturbance that would affect such facilities. The use of these realigned sections by vehicle traffic would similarly not impact existing educational facilities or their operations.

### **7.4 POLICE PROTECTION**

The Hawaii County Police Department's Keaau Police Station is a district station serving the Puna District. In Pahoa town, the Pahoa substation is located there.

The realignment project is not expected to have an impact on existing police facilities or the ability of staff to provide police protection and related services in the Puna district. This project would not affect their operations nor require additional protection services due to the nature of this road renovation. Short-term construction activities may require police staff to monitor traffic flow along construction areas. However, a traffic monitoring plan would be prepared during the project's design to address this. In addition, such services may not be necessary given the low volume of traffic occurring along Kalapana Road in the project area.

## 7.5 FIRE PROTECTION

The Hawaii County Fire Department's Pahoehoe Fire Station is located in Pahoehoe town near the Pahoehoe community center. This fire station services the County's Puna district, and would subsequently service the project area associated with the Kalapana Road Realignment project.

The realignment project is not expected to have an impact on existing fire department facilities or the ability of staff to provide fire protection and related services in the Puna district. This project would not affect their operations nor require additional protection services due to the nature of this road renovation.

## CHAPTER 8 CONFORMANCE WITH PLANS AND POLICIES

This chapter discusses the project's conformance with the State Land Use District regulations, and the County's General Plan goals and policies, Special Management Area objectives and policies, and Zoning District standards.

### 8.1 STATE LAND USE DISTRICT

Kalapana Road and properties situated makai (below) this road are designated "Conservation District" under the State Land Use Commission's Land Use District Boundary Map for Pahoia-South (Map H-72). Properties situated mauka of this road are designated as "Agricultural District" on this Boundary Map.

The realignment of the three sections of this road would occur on properties located within the Agricultural District for two of the three sites (Site No. 3 and 5). At Site No. 4, the alternatives being considered would involve the existing Kalapana Road and possibly some frontage of properties situated makai of this road. As a result, the site would involve land in the Conservation District.

The road renovations occurring within the Agricultural District are permitted uses within this district as generally prescribed under Chapter 205, Section 2(d), HRS. As a result, these improvements would be consistent with this district classification and standards.

Structures and activities occurring within the Conservation District fall under the jurisdiction of the State Department of Land and Natural Resources. Based upon consultation with DLNR staff, road improvements associated with Site No. 4 would require a Conservation District Use Permit (CDUP) since the project would involve constructing a new retaining wall to protect the elevated roadway section. A Conservation District Use Permit application would be completed and submitted to DLNR for their review and processing during the design phase of Site No. 4. This environmental assessment being prepared would be included with this application.

The improvements planned for Sites No. 3 and 5 would be "exempt" and not subject to a CDUP, however, coordination of plans for their review and information would be conducted with this agency. The project is not expected to result in a significant negative impact on natural resources or the surrounding environment present along the shoreline at this site as discussed in this document. Consequently, this project should be consistent with the regulations and requirements associated with this district.

## 8.2 COUNTY OF HAWAII GENERAL PLAN

This section discusses the project's conformance and consistency with pertinent goals, policies, and standards from the County's General Plan dated November 1989.

### A. *Economic*

#### 1. *Goals:*

- a. *Provide residents with opportunities to improve their quality of life.*
- b. *Economic development and improvement shall be in balance with the physical and social environments of the island of Hawaii.*

#### 2. *Policies:*

- c. *The County shall strive for full employment.*

#### 3. *Standards:*

- a. *The island of Hawaii should be developed into a unique scientific and cultural model. The island should become a model of living where economic gains are in balance with social and physical amenities. Development should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.*

The realignment project would be consistent with applicable this policy, goals, and standard because it would create additional short-term construction related jobs for island residents helping the County strive for full employment. This road renovation project is being assessed and evaluated on the basis of its effects on the environment and residents of the County. These concerns are being balanced with the needs of the County to provide continued accessibility along this road through this shoreline area of the Puna district.

### C. *Environmental Quality*

#### 1. *Goals:*

- a. *Maintain and, if feasible, improve the existing environmental quality of the island.*

#### 2. *Policies:*

- a. *The County of Hawaii shall take positive action to further maintain the quality of the environment for residents both in the present and in the future.*

#### 3. *Standards:*

- a. *Pollution shall be prevented, abated, and controlled at levels which will protect and preserve the public health and well-being, through the enforcement of appropriate Federal, State and County standards.*

- b. *Federal and State environmental regulations shall be adhered to.*

The project would be consistent with these policies and standards to support the goal of improving the island's environmental quality. The County is taking appropriate action and preventive measures through implementation of this project to maintain continued accessibility along Kalapana Road for residents and the public due to coastal erosion and other natural processes affecting sections of this road. Roadway sections to be constructed would be designed to meet all applicable Federal, State and County regulations to protect the environment. Best management practices and other design considerations would be implemented to address such items as short-term construction activities, erosion, and drainage conditions.

**D. *Flood Control And Drainage***

1. *Goals:*

- a. *Conserve scenic and natural resources.*
- b. *Protect human life.*
- c. *Prevent damage to man-made improvements.*
- d. *Control pollution.*
- e. *Reduce surface water and sediment runoff.*

2. *Policies:*

- a. *All development generated runoff shall be disposed of in a manner acceptable to the Department of Public Works.*
- b. *It is the responsibility of both the government and the private sector to maintain and improve existing drainage systems and to construct new drainage facilities.*

3. *Standards:*

- a. *"Storm Drainage Standards," County of Hawaii, October 1970, and as revised.*
- b. *Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.*
- d. *Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code.*

Drainage improvements necessary for the realigned roadway segments would be designed in conformance to County standards and other regulations identified here, as applicable. The project is already a County DPW initiated project, thus, its design and construction would be appropriately coordinated with this department. Such coordination would include the project's design and review of construction plans by County DPW to ensure that agency concerns and requirements are properly addressed.

**E. Historic Sites**

1. **Goals:**

- a. *Protect and enhance the sites, buildings and objects of significant historical and cultural importance to Hawaii.*

2. **Policies:**

- a. *The County of Hawaii shall require both public and private developers of land to provide a historical survey prior to the clearing or development of land when there are indications that the land under consideration has historical significance.*

- c. *The County of Hawaii shall collect and distribute historic sites information of public interest and in conjunction with the State, keep a current inventory of sites.*

3. **Standards:**

- i. *Sites with a preponderance of original materials in context and complexes rather than single isolated sites unless they are of great significance.*
- j. *Sites of traditional and cultural significance.*

An archaeological inventory survey was performed for the three realignment sites as discussed in Chapter 4. Site No. 50-10-55-22500 was identified as a prehistoric agricultural complex consisting of numerous walls and clearing mounds. Based upon consultations with State Historic Preservation Division staff, this site was assessed as significant for information content and possibly culturally valuable (Feature AF only). Limited archaeological mitigation work in the form of limited data recovery excavations was recommended for all features except Feature AF, no further work would be necessary, and these features would not require preservation. Feature AF would be preserved through avoidance and protection from roadway construction with no further testing or study required. Consequently, the archaeological work conducted for these sites are consistent with these policies.

**F. Natural Beauty**

1. **Goals:**

- a. *Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.*
- b. *Protect scenic vistas and view planes from becoming obstructed.*
- c. *Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.*

2. *Policies:*
  - a. *Access easement to public or private lands which have natural or scenic value shall be provided or acquired for the public.*
3. *Standards:*
  - a. *Coastline areas of striking contrast, e.g. Laupahoehoe Point.*
  - b. *Vistas of distinctive features.*

The realignment of Kalapana Road at the three sites would not have a significant negative impact on coastal scenic resources along the Puna district coastline. The alternatives being considered would only realign a short section of roadway up to 100 feet inland or raise the existing road. Views of the shoreline would therefore continue to be seen from these renovated sections and along the existing roadway. The realignment of these sections are required to maintain continued accessibility along this road due to coastal erosion and other natural processing affecting these sections of the road.

#### **G. Natural Resources And Shoreline**

1. *Goals:*
  - a. *Protect and conserve the natural resources of the County of Hawaii from undue exploitation, encroachment and damage.*
  - d. *Protect rare or endangered species and habitats native to Hawaii.*
  - f. *Ensure that alterations to existing land forms and vegetation, except crops, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake.*
2. *Policies:*
  - a. *The County of Hawaii should require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.*
  - d. *The shoreline shall be protected from the encroachment of man improvements and structures.*
  - n. *The installation of utility facilities, highways and related public improvements in natural and wildland areas should avoid the contamination or despoilment of natural resources where feasible by design view, conservation principles, and by mutual agreement between e County and affected agencies.*

3. *Standards:*

- e. *Lands with topographic, locational, soils, climate or other environmental factors that may not be normally adaptable or required for urban, rural, agricultural or public use.*
- f. *The Coastal Zone and Special Management Area as defined by statute and in accordance with the adopted objectives and guidelines.*

The Kalapana Road realignment project would be consistent with these applicable goals, policies, and standard. There are no rare or endangered species or significant habitats present in the project area which would be adversely affected by the realignment alternatives being considered. As discussed in Chapter 4 of this document, the project is not expected to have a significant impact of natural resources. Appropriate measures would be incorporated into the project's design to minimize construction related and other effects on natural resources which may be associated with this project.

I. *Transportation*

1. *Goals:*

- a. *Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.*

2. *Policies:*

- b. *The improvement of transportation service shall be encouraged.*

3. *Standard:*

- a. *Transportation systems shall meet the requirements of the State Department of Transportation and the County of Hawaii.*

*Thoroughfares And Streets*

1. *Goals:*

- a. *Provide a system of thoroughfares and streets for the, safe, efficient, and, comfortable movement of people and goods between and within the various sections of the County.*

2. *Policies:*

- a. *The County shall encourage the programmed improvement of existing thoroughfares and streets by both public and private sectors.*
- g. *Transportation and drainage systems shall be integrated where feasible.*
- l. *The County shall develop short and long range capital improvement programs and plans for transportation which are consistent with the County General Plan.*

The project would be consistent with this goal, policy, and standard because renovations to Kalapana Road is needed to address the coastal erosion and other natural processes affecting the shoreline and roadway. Thus, the alternatives being considered for the sites would improve transportation service by providing continued accessibility along this shoreline now and in the future. Improvements would be constructed in conformance with County design standards, and drainage improvements would be provided as appropriate for realigned sections. Appropriate funding would be sought for construction of these improvements as part of the County's CIP budget.

### **Puna District**

#### **7. Transportation**

##### **a. Thoroughfares and Streets**

##### **1) Courses of Action**

- c) Consider, in conjunction with community associations and the property owners, the use of a variety of mechanisms to provide infrastructure in the non-conforming subdivisions.**

Coordination with the community and property owners affected by this project has been conducted during the planning of realignment alternatives and the preparation of this document.

### **8.3 SPECIAL MANAGEMENT AREA**

This chapter discusses the project's conformance with the County of Hawaii's Special Management Area objectives and policies as prescribed under the Planning Commission's Rule 9, Special Management Area.

#### **A. Objectives:**

- 1. Provide coastal recreational opportunities accessible to the public.**
- 2. Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture.**
- 3. Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.**
- 4. Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.**
- 5. Provide public or private facilities and improvements important to the State's economy in suitable locations.**

6. *Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.*
7. *Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*

A discussion of this project's conformance and consistency with the various applicable policies developed for each objective is provided. In summary, the road realignment improvements proposed would be consistent with applicable policies associated with the various objectives.

**B. Policies**

1. *Recreational resources:*
  - b. *Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:*
    - ii. *Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;*
    - v. *Ensuring public recreational use of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*

The realignment project would not unavoidably damage coastal resources having significant recreational value in the immediate area. The project would realign short segments of the existing road further inland due to coastal erosion and other natural processes affecting the shoreline and road. Alternatives at Site No. 4 would raise the existing road or realign it slightly inland. These improvements would not adversely impact public recreational resources or uses in the immediate area. Consequently, these improvements are needed to maintain vehicular accessibility through the project area.

- vi. *Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;*

The project would be appropriately designed in coordination with the County and meeting regulatory requirement to address non-point sources of pollution. Given the limited amount of new impervious surfaces being created by realignment alternatives, this project is not expected to have a significant impact on the water

quality of shoreline areas in the project vicinity. Appropriate drainage improvements would be provided as necessary to address surface runoff in the area.

2. *Historic Resources:*

- a. *Identify and analyze significant archaeological resources;*
- c. *Support state goals for protection, restoration, interpretation, and display of historic resources;*

An archaeological inventory survey was performed for the three realignment sites as discussed in Chapter 4. Site No. 50-10-55-22500 was identified as a prehistoric agricultural complex consisting of numerous walls and clearing mounds. Based upon consultations with State Historic Preservation Division staff, this site was assessed as significant solely for information content. Limited archaeological mitigation work in the form of limited data recovery excavations was recommended, no further work would be necessary, and the site would not require preservation. Consequently, the archaeological work conducted for these sites are consistent with these policies, and the project would be in conformance with these policies.

3. *Scenic and Open Space Resources:*

- b. *Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*

The project is not expected to adversely impact the shoreline, public views, or the surrounding environment as discussed in this document. This road renovation project is not coastal dependent, and would involve realigning sections of Kalapana Road further inland away from the shoreline. Consequently, the project would be consistent with this policy.

4. *Coastal Ecosystems:*

- c. *Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs;*
- d. *Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate State water quality standards.*

The project is expected to have minimal impact on existing coastal ecosystems of significant biological importance. There are no rare or endangered species or habitat present on the project site or in the immediate vicinity. Construction activities would be conducted utilizing Best Management Practices to minimize construction-

related impacts. Drainage improvements will also be appropriately designed in coordination with the County to meet regulatory requirement addressing non-point sources of pollution. As a result, this project should not impact coastal water ecosystems and streams, and would be consistent with the policy of promoting water quality planning and management practices.

6. *Coastal Hazards:*

- b. *Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and non-point pollution hazards;*
- c. *Ensure that developments comply with requirements of the Federal Flood Insurance Program; and*
- d. *Prevent coastal flooding from inland projects.*

The project is intended to realign sections of Kalapana Road further inland due to portions of the road being affected by coastal erosion or other natural processes. As a result, this project would help maintain vehicular accessibility along this shoreline in the future. Design of the selected alignments would be in conformance to applicable requirements specified under the Federal Flood Insurance Program. Design of the facilities would be in conformance with County roadway standards.

7. *Managing Development:*

- c. *Communicate the potential short- and long-term impacts of proposed significant coastal developments early in their life-cycle and in terms understandable to the general public to facilitate public participation in the planning and review process.*

The County DPW is complying with this policy through the preparation of this environmental document which would be published for review and comments by various agencies, community organizations, and affected property owners. This document includes information addressing the project's potential short and long-term impacts on the environment.

8. *Public Participation:*

- b. *Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities;*

The County DPW has complied with this policy through the preparation of this environmental document which would be published for public review and comments. In addition, considerable effort has already been conducted as part of this project to

disseminate information and consult with various agencies, community organizations, and affected property owners.

9. *Beach Protection:*

- a. *Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;*

This realignment project is intended to move short segments of the existing roadway further inland to minimize the loss of roadway from coastal erosion and other natural processes.

10. *Marine Resources:*

- a. *Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*
- b. *Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*

This project would not involve the use of marine resources because there are no facilities being constructed which would affect marine or coastal resources. The design of roadway sections will not result in an adverse impact on the existing environment. Construction activities would also be conducted utilizing Best Management Practices to minimize construction-related impacts. Appropriate design of drainage improvements necessary for this project would be conducted and coordinated with the County DPW.

#### 8.4 COUNTY ZONING DISTRICT

The three realignment sites associated with this project involves property above the existing road which are zoned A-1a, Agriculture District. Kalapana Road and properties located toward the shoreline are zoned "O" Open Districts.

The realignment alternatives proposed for Sites No. 3 and 5 would involve property above the existing road. Consequently, these road improvements would be a permitted use under the A-1a, Agriculture District zoning district. Site No. 4 alternatives would involve some frontage property of both mauka and makai properties. This road renovation improvement would be a permitted use under both the A-1a, Agriculture District and "O" Open District. As a result, this project would conform with the County's zoning district regulations.

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## CHAPTER 9 AGENCY AND PUBLIC CONSULTATION

Considerable consultation with various government agencies and the community has been conducted on this project to obtain their comments and concerns associated with the project. These consultation efforts included the distribution of the Draft EA for this project to various agencies, community organizations, and area residents for their review.

Early consultation efforts consisted of a public informational meeting held by the County DPW during the early planning stages of this project, early consultation with government agencies, community organizations, and affected property owners during the development of realignment alternatives and preparation of this Draft EA, and a public informational meeting held as part of this Draft EA. These consultation efforts are discussed in this Chapter, and copies of comments received are included in Appendix B of this document.

### **9.1 INITIAL PROJECT CONSULTATION CONDUCTED BY DEPARTMENT OF PUBLIC WORKS**

The County DPW has conducted consultation efforts with government agencies and the Kalapana community to discuss this realignment project early in the planning process. Such consultation efforts have occurred even before initiation of the preparation of this Draft EA. These early consultation efforts are briefly described.

Consultation with government agencies on these three realignment sites can be documented as early as 1996 when the County DPW was initially considering the realignment of various sections of Kalapana Road. A letter dated May 8, 1996 from the State Historic Preservation Division is enclosed in Appendix B which discussed the results of a site visit to Site No. 5 by department staff. This letter determined that no significant historic sites or structures were observed on properties identified as TMK 1-03-02: 008 and 010 which are associated with Site No. 5.

In September 1999, the County DPW notified property owners that may be affected by the realignment of Kalapana Road at Sites No. 3, 4, and 5 of their proposed intention to implement this project. An informational meeting was held on September 20, 1999 at Isaac Hale Park to provide information and solicit comments. Copies of written comments received along with an attendance sheet are included in Appendix B.

After this informational meeting, the County DPW sent a notice with location map to affected property owners seeking their input on this project. In addition, this notice invited them to attend a meeting of the Hawaii County Council held on October 14, 1999 to discuss this project. A copy of this notice is included in Appendix B.

## **9.2 DRAFT EA EARLY CONSULTATION EFFORTS**

### **9.2.1 Consultation Solicitation Letters**

Consultation with various State and County government agencies, community organizations, and affected property owners was conducted to obtain their comments and concerns associated with the project as part of the environmental assessment process. Letters providing project information along with a preliminary site plan was sent to these parties in May 2000 for their review.

It should be noted that the initial solicitation letter distributed included the proposed realignment project and also identified the possible resurfacing of 13.2 miles of Kalapana Road generally between Kalani Honua Cultural Center and Kapoho-Kumukahi Lighthouse Road. Since then, this resurfacing portion was eliminated from this project and study under this Draft EA by the County DPW. Subsequently, another letter was then sent to these consulted parties in August 2000 notifying them of this change.

A listing of agencies and organizations for which consultation letters were sent is provided below. Those providing written response are identified with a "»" symbol. Copies of written comments received along with written responses are included in Appendix B.

#### **Federal Agencies**

- » Fish and Wildlife Service, Department of the Interior
- Water Resources Division, Department of the Interior
- » U.S. Army Engineer Division, Department of the Army
- National Marine Fisheries Service, National Oceanic and Atmospheric Administration

#### **State of Hawaii Agencies**

- Civil Defense Division, Department of Defense
- » Department of Accounting and General Services
- Department of Education
- Department of Health
- Department of Land and Natural Resources
- » Department of Land and Natural Resources, Historic Preservation Division
- » Department of Transportation
- » Department of Transportation, Hawaii District Office
- » Land Use Commission, Dept. of Business, Economic Development & Tourism
- » Office of Hawaiian Affairs
- Office of Planning, Dept. of Business, Economic Development & Tourism

**County of Hawaii Agencies**

- The Honorable Stephen K. Yamashiro, Mayor
- The Honorable James Y. Arakaki, Council Chair
- Civil Defense Agency
- Department of Parks and Recreation
- » Department of Water Supply
- » Hawaii Fire Department
- » Hawaii Police Department
- Mass Transit Agency
- » Planning Department

**Community Organizations**

- Friends of the Red Road
- Hawaiian Sweet, Inc.
- Kalapana Seaview Estates Community Association
- Kamehameha Schools Bishop Estate
- Leilani Community Association
- » Mr. Bernard L. and Glory M. Garner
- Ms. Debbie Shimizu, Samuel H. Kamau, Trust
- » Mr. John P. C. Makuakane
- Ms. Marjorie M. Corley
- Ms. Monica Bacon, Grace M. Bacon Trust
- » Ms. Rueselle Lewis
- Nanawale Community Association, Inc.
- » Puna Outdoor Circle

**9.2.2 Informal Community Meetings And Consultation**

Informal consultation meetings have been conducted with property owners affected by each of the three realignment sites. Such consultation has consisted of telephone conversations, providing copies of realignment plans for input, and receiving letters. In summary, property owners affected at Sites No. 3 and 5 generally did not have major concerns with the realignment alternatives being considered. However, review of the Draft EA by these owners was important to make sure no historic sites or other significant natural resources were affected, and to identify types of mitigative measures which may be implemented.

Informal consultation meetings were also conducted with property owners affected by the realignment improvements developed for Site No. 4 due to concerns raised. These meetings were conducted to address concerns and other questions affected residents had with the project. Letters received during this consultation efforts are included in Appendix B along with written responses.

The first meeting was held on March 19, 2000 at the residence of one of the property owners at Site No. 4. Participants include residents from several of the properties affected along with a representative from SSFM International, Inc. and the County Civil Defense Agency. The purpose of this meeting was to generally discuss the need and scope of this project. A summary of items discussed is provided below.

1. There was some misunderstanding and misinformation about the purpose for this project such as a new high speed highway would be constructed and right-of-entry authorization requests would result in equipment operating within affected properties. Residents were clarified of the purpose for this project and what the right-of-entry authorization provided.
2. Concerns were expressed with the project affecting their homes and frontage, and suggested a mauka bypass alignment be considered. It was discussed that the project would try to minimize affecting their frontage property and would be designed to minimum standards allowable to make it compatible with the existing road.
3. Questions on project funding were raised. It was clarified that construction funds were not available, thus, the scope of this work was to plan and design the realignment so that it would be ready to implement when funding becomes available.

Another meeting was held on July 24, 2000 at the Pahoehoe Neighborhood Center with several residents of property affected at Site No. 4, representatives of SSFM, and the County DPW. The purpose of this meeting was to present preliminary realignment alternatives being considered for Site No. 4 due to resident concerns, and to receive their input. A summary of items discussed is provided below.

1. Various residents requested that copies of the preliminary plans shown be provided to them. These copies were later provided to residents and to those of properties affected who did not attend.
2. A resident explained that there was only once incident recalled when water washed onto the road during a hurricane fronting their property over the few years they have been living there. Waves generally wash into a tide pool area along the shoreline fronting their property. It was discussed that the County has received concerns raised from the general public about accessibility through this section due to occasional wave inundation which have historically occurred. The County has selected these realignment sites in consultation with the County Civil Defense Agency.
3. Concerns were expressed that a lot makai (seaward) of the road at the northern end has been used by individuals for camping. These individuals have subsequently been dumping trash on and using a mauka property as a "bathroom." Unfortunately, this realignment project is not intended to address such activities which would more appropriately be addressed by the County Police Department.

4. Alternatives affecting properties with TMK 1-03-04: 025 and possibly 029 would require about 5 to 10 feet of frontage to be acquired due to the road being elevated to address the waves washing onto the road. The owner of these properties was agreeable to the taking of some frontage of these properties. Design alternatives would be considered to further minimize the amount of frontage required.
5. Concerns were expressed by the owner (TMK 1-03-04: 013) with the amount of frontage property being affected by the alternatives. Another alternative was requested which was routed closer to or just inside of the existing rock wall along this property. The corner area of this property bordering the adjacent southern lot could also be affected. Based upon these comments, Alternative E was subsequently developed which addressed these concerns. Mitigative measures considered could involve replacing portions of the existing wall affected by the project.

### 9.3 PUBLIC INFORMATIONAL MEETING

A public informational meeting was also held by the County DPW to present realignment alternatives being considered for this project and to provide the community with an opportunity to provide further input and comments on this project. This informational meeting was held on September 26, 2000 at 6:00 p.m. at the Pahoehoe Neighborhood Center. Public notification of this meeting was published in the September 20th issue of the Hawaii Tribune Herald newspaper and the September 25th weekly issue of the Hawaii State & County Public Notices. Notices of this meeting were also distributed to properties affected by the realignment alternatives.

A copy of the attendance sheet for this informational meeting is provided in Appendix B along with written comments received at that meeting. General comments received at this informational meeting are summarized below.

1. A question was raised concerning the funding availability for this project, and when the project would likely be completed. It was explained that FEMA funding will lapse on January 31, 2001, and therefore the project would be funded with County funds unless other funds become available. Completion of this project would be subject to securing appropriate funding by the new County administration, County Council, and their priorities.
2. Concerns were raised about the amount of trees being affected by Alternative E. Mitigative measures may consider relocating certain trees affected by this alignment in consultation with the property owner during the project's design and right-of-way acquisition.
3. It was asked who and how will the alignment for Site No. 4 be selected. It was discussed that the County DPW would decide which realignment alternative to pursue based upon the input received on the Draft EA, and these results would be discussed

- in the Final EA published.
4. Alternative D was identified as a preferred alternative by one of the property owners affected at Site No. 4 since it would have less impact on frontage property.
  5. A concern was raised concerning the height the road would need to be elevated at Site No. 4. It was discussed that the road may need to be elevated in the range of 5 to 10 feet due to the dips and low points present along this section of the road. Provisions would also be made to adjust the elevation at driveway entrances, and also to design proper drainage improvements.
  6. A resident explained that the owner of one makai property at Site No. 4 does not need a driveway access to this elevated road under the alternatives. It was stated that if this situation were true, then the County would need a letter from the owner stating this request.
  7. A question was raised concerning the amount of compensation that may occur for property acquired. It was discussed that there are no amounts determined at this time. If any land acquisition were necessary, then an assessment of the land and negotiations with the specific landowner would determine the amount of compensation.
  8. Information on the right-of-way limits for this renovate road was asked. It was discussed that the right-of-way for the road would probably be 30 to 40 feet in width. However, the limits in relation to the landowners' property cannot be determined at this time since more engineering work would be required.

#### 9.4 DRAFT EA COMMENTS

The Draft EA for this road realignment project was published in the November 23, 2000 issue of the State Office of Environmental Quality Control's *The Environmental Notice* initiating a 30-day public comment period which ended on December 26, 2000. Copies of this Draft EA were distributed to the following parties for review and comments. Those parties which submitted comments are indicated by a "»" next to them. Comment letters received from these parties along with corresponding response letters are included in Appendix B.

##### Federal Agencies

- Fish and Wildlife Service, Department of the Interior
- » Water Resources Division, Department of the Interior
- National Marine Fisheries Service, National Oceanic and Atmospheric Administration
- Region IX, Pacific Area Office, Federal Emergency Management Agency
- U.S. Army Engineer Division, Department of the Army

**State of Hawaii Agencies**

- Civil Defense Division, Department of Defense
- » Department of Accounting and General Services
- » Department of Education
- » Department of Health
- Department of Land and Natural Resources
- » Department of Land and Natural Resources, Historic Preservation Division
- » Department of Transportation
- Department of Transportation, Hawaii District Office
- » Land Use Commission, Dept. of Business, Economic Development & Tourism
- Office of Hawaiian Affairs
- » Office of Environmental Quality Control, Department of Health
- Office of Planning, Dept. of Business, Economic Development & Tourism

**County of Hawaii Agencies**

- The Honorable Stephen K. Yamashiro, Mayor
- The Honorable James Y. Arakaki, Council Chair
- The Honorable Dominic Yagong, Councilman
- The Honorable Al Smith, Councilman
- Civil Defense Agency
- Department of Parks and Recreation
- » Department of Water Supply
- » Hawaii Fire Department
- Hawaii Police Department
- Mass Transit Agency
- Planning Department

**Community Organizations**

- Pahoia Public/School Library
- Friends of the Red Road
- Puna Outdoor Circle
- Kalapana Seaview Estates Community Association
- Leilani Community Association
- Hui Malama I Na Kupuna O Hawaii Nei
- Nanawale Community Association, Inc.
- Kamehameha Schools Bishop Estate
- Hawaiian Sweet, Inc.
- Hawaii Conference Foundation
- Mr. Bernard L. and Glory M. Garner

- Ms. Debbie Shimizu, Samuel H. Kamau, Trust
- Mr. John P. C. Makuakane
- Ms. Marjorie M. Corley
- Ms. Monica Bacon, Grace M. Bacon Trust
- Ms. Rueselle Lewis
- Ms. Kathleen Dalessio
- Mr. Alexander Y.H. Kim
- Mr. Kenneth B.Griffin et al
- Mr. Sam.Drummy

## CHAPTER 10 FINDINGS AND ANTICIPATED DETERMINATION

To determine whether a proposed action may have a significant effect on the environment, the Approving Agency needs to consider every phase of the action, the expected primary and secondary consequences, cumulative effect, and the short- and long-term effects. The Approving Agency's review and evaluation of the proposed action's effect on the environment would result in a determination whether: 1) the action would have a significant effect on the environment, and an Environmental Impact Statement Preparation Notice should be issued, or 2) the action would not have a significant effect warranting a Finding Of No Significant Impact (FONSI).

This chapter discusses the results of the assessment conducted for the proposed improvements associated with the Kalapana Road Realignment project in relation to the 13 Significance Criteria prescribed under the State Department of Health's Administrative Rules Title 11, Chapter 200. The purpose of this assessment was to consider the "significance" of potential environmental effects which includes the sum of effects on the quality of the environment along with the overall and cumulative effects. The resulting findings are discussed below for each criteria.

### 10.1 PRELIMINARY FINDINGS

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*

The proposed roadway realignment improvements at the three sites would not result in the irrevocable commitment to loss or destruction of any natural or cultural resource. As discussed in Chapter 4 of this document, the improvements would not negatively impact any natural or cultural resources of significance. There would be no destruction or loss of any significant, endangered, or threatened botanical, faunal, geological, or other natural resources.

In terms of archaeological and historic resources, the study conducted by PHRI in consultation with the State Historic Preservation Division determined that the agricultural sites present in the area of Site No. 3 was of significance for information content and culturally valuable (only Feature AF). Recommended archaeological mitigation work in the form of limited data recovery excavations would constitute sufficient recovery of archaeological information at this site for all features except Feature AF. Feature AF would be preserved by avoidance and protecting it from construction activity. Appropriate coordination and consultation with the State Historic Preservation Division have been conducted during these efforts, and would continue throughout construction.

2. *Curtails the range of beneficial uses of the environment.*

The road renovation project would not curtail the range of beneficial uses of the surrounding environment. Access to the shoreline would continue to be permitted, and the project would not prevent existing recreational activities occurring along this shoreline from continuing.

Early consultation efforts with landowners of privately-owned mauka properties indicated no major concerns with alternatives proposed for Sites No. 3 and 5 as this project would not curtail the range of uses of their affected property. Appropriate mitigative measures would be implemented to replace walls or fences affected. Consultation efforts with property owners at Site No. 4 has resulted in the two alternatives (Alternative D and E) being considered at this time. These alternatives would not significantly affect the beneficial uses of their frontage property affected. Furthermore, appropriate design considerations could further minimize right-of-way requirements and thus reduce impacts to frontage areas.

3. *Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.*

The roadway improvements proposed under this project would not conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS. This Draft EA addressed the probable environmental impacts associated with the project of which most would be primarily associated with short-term construction activities. The improvements are not expected to have a significant impact on natural resources or the surrounding environment. This project is needed to address concerns associated with the accessibility of sections of Kalapana Road due to coastal erosion and other natural occurrences. Consequently, the project would be consistent in conserving natural resources in the area, and enhancing the quality of life for residents in Kalapana and surrounding areas by improving the service quality and reliability of the roadway.

4. *Substantially affects the economic, or social welfare, cultural practices of the community or State.<sup>3</sup>*

As discussed under Chapter 5, the project would not have any significant negative impacts on economic factors. This project would create some minor short-term construction related jobs and increased tax revenue which would have minimal affect on the overall economy of the County and State.

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<sup>3</sup> This significance criteria was modified to reflect the recent change to Chapter 343, HRS approved by the Governor as Act 50 on April 26, 2000. This Act added "cultural practices" as part of the factors considered in determining the significance of an effect.

The road renovations are not expected to substantially affect the social welfare of the Kalapana community or Puna District. In fact, these improvements would benefit the entire community and properties located along the shoreline by improving the road to minimize existing and future accessibility concerns due to coastal erosion and other shoreline hazards. Property owners affected by these realignment sites would not be significantly impacted by the project, and necessary mitigative measures would be implemented to address impacts. Furthermore, property owners are cooperating with the County to develop an agreeable solution to address the need for this project.

There are no known traditional native Hawaiian cultural practices occurring within the frontage area of properties affected by the realignment alternatives. This also includes the existing County rights-of-way along Kalapana Road at these realignment sites and in the immediate vicinity. Affected properties at Site No. 4 consist of privately-owned subdivided agricultural lots (A-1a zoning district) some of which have homes developed. Consequently, there are no significant cultural resources present along this frontage area of properties which would be utilized for traditional native Hawaiian cultural practices.

The frontage area of properties affected at Site No. 5 are privately owned by a single landowner, and do not have any significant cultural resources present on them as determined by the archaeological inventory survey. The property inland of these realignment alternatives are used for grazing and other agricultural activities by the landowner. As a result, this affected frontage property is not known to be used for any traditional native Hawaiian cultural practices.

For Site No. 3, some structures described as a prehistoric agricultural complex consisting of numerous walls and clearing mounds were identified. The study conducted by PHRI, in consultation with the State Historic Preservation Division, determined that this agricultural site was of significance for information content and culturally valuable (only Feature AF). Recommended archaeological mitigation work in the form of limited data recovery excavations would constitute sufficient recovery of archaeological information at this site for all features except Feature AF. Feature AF would be preserved by avoidance and protecting it from construction activity. Appropriate coordination and consultation with the State Historic Preservation Division have been conducted during these efforts, and would continue throughout construction. This site is not known to be used for any traditional native Hawaiian cultural practices, and the realignment project should thus not have an adverse effect on such practices.

5. *Substantially affects public health.*

The realignment of the three sections of Kalapana Road is not expected to

substantially affect public health since the project would only involve relatively minor road renovation work. Vehicular traffic using these realigned sections would also be the same since the improvements would not increase roadway capacity or generate additional vehicle trips to this area. As a result, use of these realigned sections is not expected to generate pollutants which could adversely impact public health.

Construction activities are similarly not expected to cause significant air pollution in the form of fugitive dust due to the soil types present or generate any other type of pollutants which may have an adverse affect on public health. Construction activities would occur only during a short time period, and best management practices would be incorporated into the project's design to further minimize nuisances and other typical impacts associated with construction activity.

6. *Involves substantial secondary impacts, such as population changes or effects on public facilities.*

This realignment project would not have any secondary impacts on the social environment or other infrastructure and public facilities. The project strictly involves only the realignment of three relatively short sections of Kalapana Road to create additional buffer areas from the shoreline and wave wash. These improvements would not increase the roadway capacity or includes land uses which would generate new vehicular traffic to this coastline.

7. *Involves a substantial degradation of environmental quality.*

The realignment of Kalapana Road at the three sites would not involve a substantial degradation to the quality of the surrounding environment. Chapters 4 through 7 of this document discussed the probable impact of several environmental factors associated with these road improvements. The results of this assessment and technical studies performed determined that the project would not substantially impact or degrade the environmental quality of the immediate environment.

8. *Is individually limited, but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.*

This project only involves the improvements described for the three realignment sites and therefore does not involve a commitment for larger actions. Impacts associated with these realignment improvements were addressed in this document, and these assessment results showed that this project would not have a significant impact on the environment both individually and cumulatively.

9. *Substantially affects a rare, threatened, or endangered species, or its habitat.*

As discussed in Chapter 4, there were no known endangered, threatened, or rare botanical resources in the area proposed for the alignment alternatives. These realignment

improvements would also not substantially affect endangered or threatened faunal, avifaunal, and marine resources which may occur in the general vicinity.

Necessary control measures and best management practices would also be implemented to minimize runoff and other potential short-term impacts associated with construction activity. Thus, the project is not expected to substantially affect rare, threatened, or endangered species or potential habitat for such species.

*10. Detrimentially affects air or water quality or ambient noise levels.*

This roadway realignment project should not have a detrimentally significant impact on air, water quality, or ambient noise levels in the immediate vicinity of the three sites. Impacts associated with these factors would be limited to short-term construction activities. However, such impacts are expected to be minor due to the relatively low amount of grading and excavation required, and due to the soils present which consist largely of rocky and stony muck. To further minimize impacts, construction activities would be subject to applicable State regulations as discussed under Chapter 4.

*11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.*

This realignment project is being proposed by the County DPW because sections of Kalapana Road have the potential to suffer severe roadway damage from coastal erosion of the shoreline in the future. Segments of this road are already routed close to this rugged shoreline, and are thus potentially subject to such natural hazards as subsidence from earthquakes, tsunami inundation, erosion of the coastline, undermining of the road, and wave inundation from high surf at lower elevations.

Therefore, this project is intended to create additional buffer areas between the roadway and the shoreline by realigning sections further inland. Consequently, this project would have a positive impact by reducing the potential for future damage to these roadway sections from these natural hazards.

*12. Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.*

The proposed realignment improvements would not affect scenic vistas or viewplanes. As discussed in Chapter 4, there are no significant views or landforms in the immediate vicinity which would be adversely affected by the project. This project only involves the realigning of relatively short sections of Kalapana Road further inland.

*13. Requires substantial energy consumption.*

The project would not require substantial energy consumption or increased electrical facilities because it only involves the realignment of three sections of roadway.

## 10.2 ANTICIPATED DETERMINATION

A Finding of No Significant Impact (FONSI) determination should be warranted for the Kalapana Road Realignment Project based upon the information provided in this Final EA document which included public and agency review of the published Draft EA. The results of the assessments conducted along with technical studies performed for various disciplines have determined that the realignment alternatives being considered for each of the three sites should not have a significant impact on the surrounding environment. The findings supporting this determination are based upon the previous discussion of the project's affect on the environment in relation to the 13 Significance Criteria.

## CHAPTER 11 BIBLIOGRAPHY

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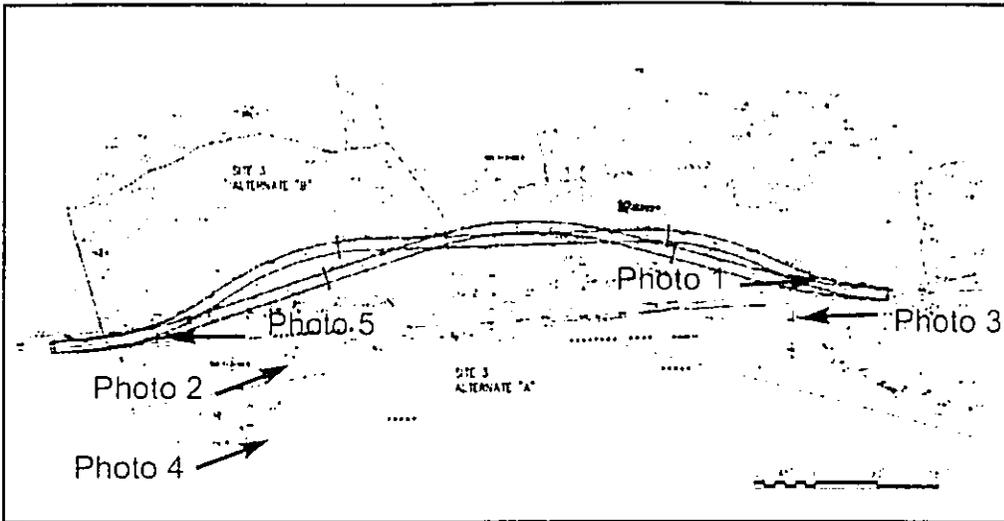
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# APPENDICES

# APPENDIX A

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## *Photographs Of Realignment Site*



Site No. 3 Photos  
Location Map

Photo 1  
Northeast View Of Northern  
End Of Realignment Site



Photo 2  
Northeast View Of Area Along  
Realignment Site

**PHOTOS OF SITE NO. 3 AREA**

**Figure A-1**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

Source:  
SSFM International, Inc.



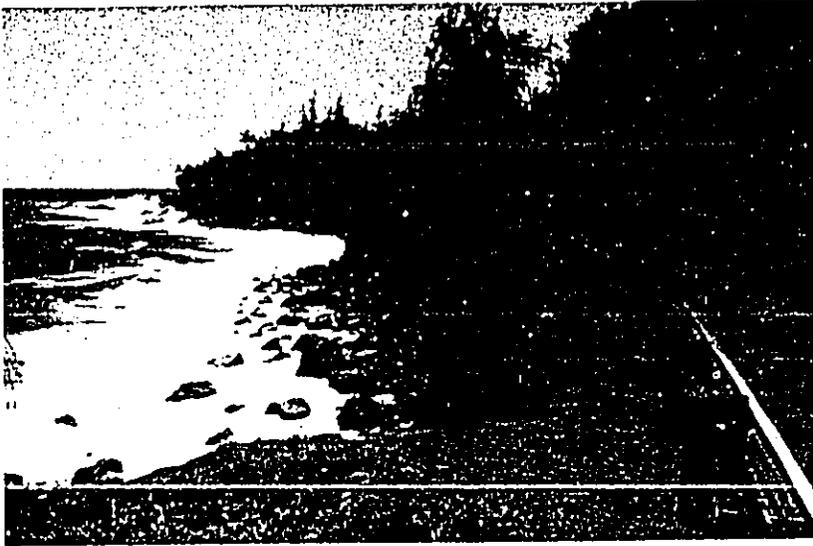


Photo 3  
Southwest View Of Guardrail  
And Eroding Pavement

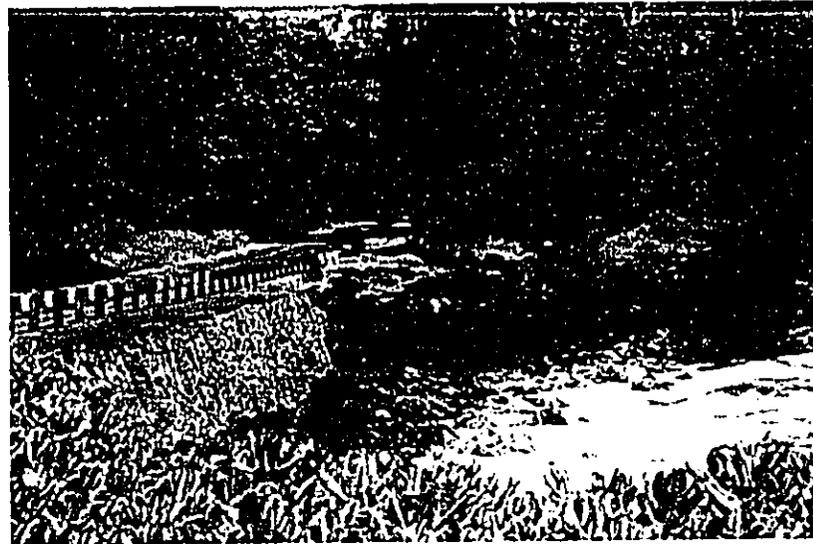


Photo 4  
North View Of Affected Wall



Photo 5  
Southwest View Of Southern End  
Of Realignment Site

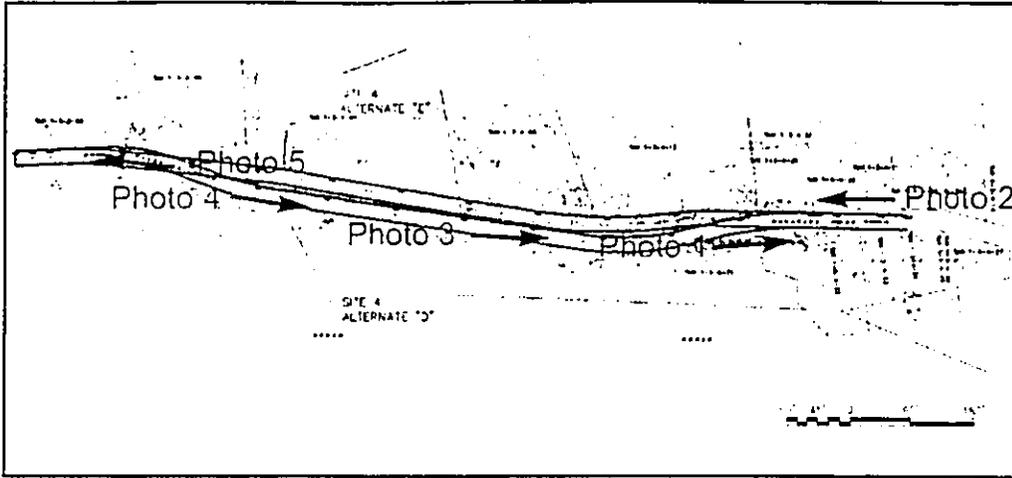
**PHOTOS OF SITE NO. 3 AREA**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

Source:  
SSFM International, Inc.

**Figure A-2**





Site No. 4 Photos  
Location Map

Photo 1  
Northeast View Of Northern  
End Of Realignment Site



Photo 2  
Southwest View Of Northern End  
Of Realignment Site

**PHOTOS OF SITE NO. 4 AREA**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

Source:  
SSFM International, Inc.

**Figure A-3**





Photo 3  
Northeast View Of Low Area At  
Northern End Of Realignment Site



Photo 4  
Northeast View Of Southern  
End Of Realignment Site



Photo 5  
Southwest View Of Southern End  
Of Realignment Site

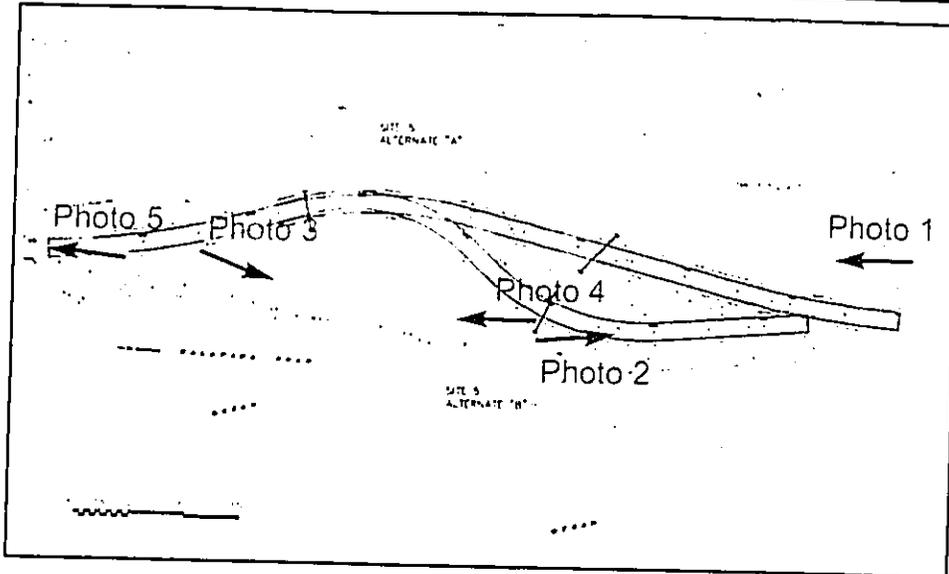
**PHOTOS OF SITE NO. 4 AREA**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

Source:  
SSFM International, Inc.

**Figure A-4**





Site No. 5 Photos  
Location Map

Photo 1  
Southwest View Of Northern End  
Of Realignment Site



Photo 2  
Northeast View Of Northern End  
Of Realignment Site

**PHOTOS OF SITE NO. 5 AREA**

**Figure A-5**

*Kalapana Road Realignment Project*  
*County of Hawaii, Department of Public Works*

Source:  
*SSFM International, Inc.*



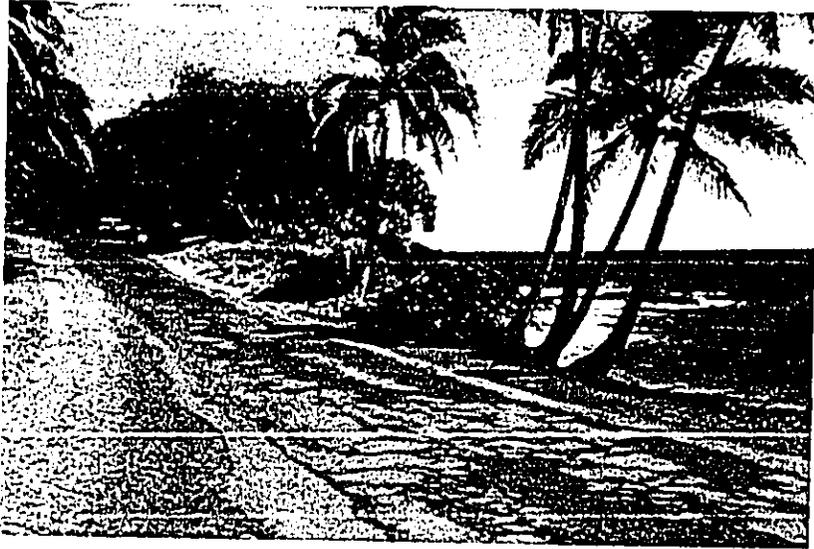


Photo 3  
Northeast View Of Roadway

Photo 4  
Southwest View Of Edge Of  
Shoreline Along Road



Photo 5  
Southwest View Of Southern End  
Of Realignment Site

**PHOTOS OF SITE NO. 5 AREA**

**Figure A-6**

*Kalapana Road Realignment Project  
County of Hawaii, Department of Public Works*

Source:  
SSFM International, Inc.



# APPENDIX B

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## *Agency And Public Consultation*

## APPENDIX B-1

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*Initial Project Consultation Conducted  
By Department Of Public Works*

Stephen K. Yamashiro  
Mayor



Donna Fay K. Kiyosaki  
Chief Engineer

Jiro A. Sumada  
Deputy Chief Engineer

## County of Hawaii

DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

September 23, 1999

SUBJECT: NOTIFICATION OF ROADWAY PROJECT  
REALIGNMENT OF HIGHWAY 137

The County of Hawaii proposes to improve the safety of three sections of Highway 137 as shown on the attached map. These sections are currently being inundated during periods of high seas. We propose to move the roadway further inland to prevent future damage from high seas.

This roadway relocation project will probably require the acquisition of a portion of your lot. Although we will attempt to minimize the area required, we will also like to ensure that the relocated roadway lasts at least 50 years. As you probably already know, the subsidence of the island combined with the global sea rising is causing the coastline to sink on the average of 3.6 millimeters per year. During times of earthquake activity, certain sections sink at an even faster rate.

Although detailed topographic and environmental studies have yet to be performed, we are seeking your input so that it may be considered during initial design for the new road alignment. In addition, we invite you to attend a meeting of the Hawaii County Council on October 14, 1999 (Thursday) at 9:00 am to present any concerns you may have.

Also, should we need to purchase a portion of your property, we will hire an appraiser to determine the fair market value at which you will be compensated. You will have the right to contest the proposed purchase amount and/or hire another appraisal firm to verify the valuation.

Should you have any suggestions or comments regarding this project or if you would like to arrange a site visit, please call Ben Ishii at (808) 961-8327.

JIRO A. SUMADA  
Deputy Chief Engineer

BI

Attachment

cc: James Arakaki, Chairman, Hawaii County Council  
ENG



Date 10-26-1999

Department of Public Works  
Engineering Division  
25 Aupuni Street  
Hilo, Hawaii 96720

SUBJECT: REALIGNMENT OF THREE SECTIONS OF HIGHWAY 137  
FEMA-864-DR-HI, Kilauea Lava Flow Disaster

Concerning site no. 2 - Tax map Key 1-3-4-13  
This proposal for a road realignment has  
been a disturbing thing for us. In all the  
years we have owned this land there has  
never been standing water in the two  
low spots Mr. Ishii indicated. We have  
only seen evidence in the four years we have  
lived here of water coming onto the road twice,  
in the form of coconuts and that was caused  
by a horrific storm both times. Where is the  
danger in that? The narrow road is where the  
danger lies.

Let me go on record to warn the County of  
the potential danger of the one lane road. The  
tourists are enjoying the beautiful view and  
forget there is only room for one car on the  
road.

It appears to me you are not concerned with  
the real danger of this road. According to Mr.  
(Include additional sheets as necessary.)

Please print your name and address:

Bernard and Glory Garner  
13-6368 GOVERNMENT RD.  
OPIHIKAO, HAWAII 96778

Date 10-26-1999

Department of Public Works  
Engineering Division  
25 Aupuni Street  
Hilo, Hawaii 96720

SUBJECT: REALIGNMENT OF THREE SECTIONS OF HIGHWAY 137  
FEMA-864-DR-HI, Kilauea Lava Flow Disaster

Ishii there is no plans for widening it  
We can not see how a road realignment  
is necessary. when all that has to be  
done is to fill in the low spots. As it stands it  
will be much more expensive to move the  
road inland, than to use the existing road.  
There is very little curve to our road when  
compared to the other horrible twist and turns  
on most roads on Hawaii.

We are very saddened by this. How do you  
place a fair market value on property that had  
so many plans and dreams.

If you move the road inland as you have  
indicated you will be destroying our privacy  
as well as removing the barrier to the sea  
spray. when you remove the palm trees and  
old rock walls also there is a swimming pool  
we had dug. A portion of our front yard to  
'encroach upon our home. Over the years

(Include additional sheets as necessary.)

Please print your name and address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date 10-26-1999

Department of Public Works  
Engineering Division  
25 Aupuni Street  
Hilo, Hawaii 96720

SUBJECT: REALIGNMENT OF THREE SECTIONS OF HIGHWAY 137  
FEMA-864-DR-HI, Kilauea Lava Flow Disaster

A great deal of time and money was spent turning this property into a perfect retirement place. Within our moving into our new home three years ago, you, the County, want to destroy all of that in one fell swoop. Because the County happens to have FEMA money that they will lose if not spent. Please consider using the money to build up the road. There is no need to destroy our privacy and invade our lives to the point that we will have to leave Hawaii. Kona is our Hawaii.

(Include additional sheets as necessary.)

Please print your name and address: Bernard and Glory Garner  
13-6368 Government Rd.  
Opinihiko, Hawaii, 96778

Department of Public Works  
**ATTENDANCE SHEET**  
 REALIGNMENT OF THREE SECTIONS OF HIGHWAY 137  
 INFORMATIONAL MEETING

DATE: September 20, 1999; TIME: 6:00 p.m.; PLACE: Isaac Hale Park

NAME (Print)	COMPANY / AFFILIATION (if any)	MAILING ADDRESS	PHONE NO.
1. Ginny Hstc	Puna Comm. Council	Bx 1250 Kapaau HI 96749	965-9869
2. MATTHEW SCOTT	RED ROAD RESIDENT	RR 2 BOX 4552 PAHOA	—
3. Athena Peanut	Red Road Resident Friends of Red Road	PO Box 181, Pahoa HI 96778	965-8183
4. René Siracusa	Puna Outdoor Circle	PO Box 1085, Pahoa 96778	965-6626
5. Julie Jacobson	County Council	PO Box 900 Kula Hawaii HI 96763	wk 961-8263
6. OFF. R. Almeida	HEPD - PUNA	16-200 Pilihua st, Lenny, HI	966-5035
7. Sidney Maszack	PUNA.		
8. Biret Enriquez	Puna	P.O. Box 1240 Pahoa	966-6666
9. Karen DeGuerre	Resident - Kapaau	PO Box 502 Pahoa	—
10. Kaulani Almeida	Waikanae Kapaau	137 Kapaau Pl. Waik. 96780	959-3478
11.			
12.			
13.			
15.			
16.			
17.			

Date 9-20-99

Department of Public Works  
Engineering Division  
25 Aupuni Street  
Hilo, Hawaii 96720

SUBJECT: REALIGNMENT OF THREE SECTIONS OF HIGHWAY 137  
FEMA-864-DR-HI, Kilauea Lava Flow Disaster

- 1- Keep Red Rd. red
- 2- Pohoiki Park expansion will route lower Pohoiki Rd traffic in a loop, so pull-offs on lower Pohoiki Rd. should not be paved
- 3- Don't pave Pohoiki Rd pull-offs.
- 4- Keep mauka depths minimal
- 5- site 2: where boulders are thrown across road, perhaps a makai rock wall would solve the problem w/o disturbing the nice mauka landscaping.
6. Pohoiki Rd: above mangos there are several sharp curves which should be widened; the one by Lava Tree Park needs to be re-banked.
- 7- Generally when we get federal hwy \$ there is a 10% which can be used for beautification. This is not STEA \$ - will there be that 10%?
- 8- Re: trees. Must give property owners right to decide on disposition of trees to be removed. If they don't want trees, put it out to bid to move to another site. ~~###~~  
(Include additional sheets as necessary.) Replant trees.

Please print your name and address:

Rene Siracusa

Puna Outdoor Circle

965-6626

100 ft. in too much!  
i- By "shacks" where road floods, elevate road in such a way that tidal flush still keeps wetlands healthy.

Date 9/20/99

Department of Public Works  
Engineering Division  
25 Aupuni Street  
Hilo, Hawaii 96720

SUBJECT: REALIGNMENT OF THREE SECTIONS OF HIGHWAY 137  
FEMA-864-DR-HI, Kilauea Lava Flow Disaster

- Red circles Road please
- Keep realigned road portions to conform to rest of Red Road, hwy. #137, dimensions/width.
- Keep realigned road portions as close to present road as possible.
- Keep tree cutting to minimum — replant two for one in nearby areas.

(Include additional sheets as necessary.)

Please print your name and address: Athena Peawt  
PO Box 181  
Pahoa, Hi 96778

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII

COPY



STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

MICHAEL D. WILSON, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY  
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT  
PROGRAM  
AQUATIC RESOURCES  
CONSERVATION AND  
ENVIRONMENTAL AFFAIRS  
CONSERVATION AND  
RESOURCES ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
DIVISION  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

May 8, 1996

Ms. Barbara Hashimoto  
Legislative Assistant  
25 Aupuni Street, Room 208  
Hilo, Hawaii 96720

LOG NO: 17042 ✓  
DOC NO: 9604MS06

Dear Ms. Hashimoto:

**SUBJECT: Site visit to the proposed Highway 137 realignment, located at mile marker 17  
Kamaili, Puna, Hawaii Island  
TMK: 1-3-02:8 and 10**

At your request, a site inspection was made to the proposed project area on March 7, 1996, by Historic Preservation Division staff archaeologist Marc Smith. The project area is located at the 17 mile marker along the Kalapana-Kapoho Beach Road (Highway 137), an area which is frequently eroded by high surf. The bulk of the project area appears to be limited to TMK: 1-3-02:8 and TMK: 1-3-02:10.

Parcel 8 is the location where the road is frequently eroded by high surf. *Makai* of the road, there are several coconut palms, with the land dropping abruptly to a pahoehoe bedrock and boulder shoreline. *Mauka* of the road is a row of coconut palms, with a low stacked stone wall, apparently located on the *mauka* property boundary. The wall is poorly preserved, with reconstruction in collapsed wall sections done with wooden posts and wire. We do not believe that the wall paralleling the road is a significant historic site.

The substrate in Parcel 10 is weathered a'a, with the vegetation a mix of exotic trees, some *hala*, grasses and ferns. The collapsed stone wall and wire fence continues parallel to the road in this parcel. No other features were observed.

Adjacent parcels, which may also be in the project area, are TMK: 1-3-02: 76 and TMK: 1-3-02:78. These parcels contain private residences. The surface of these parcels appear to have been bulldozed in the past and in some locations extensively landscaped.

Ms. Hashimoto  
Page 2

No significant historic sites or structures were observed during this site visit. We believe, based on this inspection, that it would be unlikely any significant historic sites would be present. However, before we can make a final "no effect" determination, we will have to inspect the final road alignment after it has been surveyed and flagged in the field. If you should have any further questions, please contact Patrick McCoy at 587-0006 (Honolulu), or Marc Smith at 933-4346 (Hilo).

Aloha,



DON HIBBARD, Administrator  
State Historic Preservation Division

MS:amk

c: Department of Public Works, County of Hawaii

## APPENDIX B-2

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*Early Consultation Conducted  
For Draft Environmental Assessment*



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

REPLY TO  
ATTENTION OF

June 9, 2000

Regulatory Branch

Mr. Ronald A. Sato  
Project Planner  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, HI 96817

Dear Mr. Sato:

This responds to your request dated May 22, 2000 regarding a request for written comments for a Draft Environmental Assessment (dEA) which will address activities proposed for the Kalapana Road Realignment Project, Kapoho and Pahoa, Hawaii Island. The information provided with your Exhibit identifies 3 general study corridors with no specific locations of alternative realignment routes for each of the study corridors. Until more detailed information is provided we can only offer general comments at this time.

Our records indicate that waters of the United States, as represented by perennial or intermittent streams and wetlands do not occur within the 3 general study areas. It also appears that other special aquatic sites such as anchialine ponds are not present. The dEA should also address the potential for navigable waters of the U.S. to be affected, or not be impacted by construction and use of a realigned road. Finally, if studies for the dEA should identify that other waters of the U.S. are present and will be affected by the proposed project alternatives, consultation should take place with the Corps to determine whether a Department of Army permit application shall be submitted for the Least Environmentally Damaging Project Alternative (LEDPA) of the project that will entail ground disturbance, construction, and alteration as well as the placement of fill material within the limits of jurisdictional waters.

Please contact Mr. Farley Watanabe of my staff at 438-7701 (Fax 438-4060) if you have any questions or additional information. Please refer to File Number 200000215 in any future correspondence with us.

Sincerely,

George P. Young, P.E.  
Chief, Regulatory Branch



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. George P. Young, P.E., Chief  
Regulatory Branch  
U.S. Army Engineer District, Honolulu  
Department of the Army  
Ft. Shafter, Hawaii 96858-5440

Dear Mr. Young:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated June 9, 2000 concerning the subject project. We note your comments that your records indicate perennial or intermittent streams, wetlands, and other special aquatic sites are not present within the general project area of the three realignment sites.

The Draft Environmental Assessment will include information addressing the project's effect on navigable waters of the U.S. At this time, the project is not expected to affect waters of the U.S. since most of the realignment alternatives would move relatively short sections of Kapoho-Kalapana Beach Road further inland.

Alternatives being considered at one site would involve elevating the existing road or moving it slightly inland along with raising this section due to concerns from area residents of impacts on their frontage property. Such alternatives would likely involve the construction of some type of sloping retaining wall to elevate the roadway. Design work for the selected alternative would include a shoreline survey and appropriate design of such a retaining wall.

Appropriate coordination with the Corps of Engineers would be conducted during the design of the selected alternative along with review of the Draft EA. If necessary, a Department of Army permit application would be prepared and submitted for review and processing.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'R. A. Sato', is written over the typed name.

Ronald A. Sato, AICP  
Project Planner



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Pacific Islands Ecoregion  
300 Ala Moana Blvd, Rm 3-122  
Box 50088  
Honolulu, HI 96850

In Reply Refer To: JAK

Mr. Ronald A. Sato  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, HI 96817

Re: Technical Assistance for Preparation of Draft Environmental Assessment for Kalapana Roadway Realignment, Kalapana, Puna, Hawaii

Dear Mr. Sato:

The U.S. Fish and Wildlife Service (Service) received your May 22, 2000, request for our comments regarding preparation of a Draft Environmental Assessment (DEA) for the Kalapana Roadway Realignment Project, Kalapana, Puna, Hawaii. The project sponsor is the County of Hawaii, Department of Public Works, with funding provided through the Federal Emergency Management Agency. The proposed project will involve realignment of three segments of Kapoho-Kalapana Beach Road and possible resurfacing of 13.2 miles of the roadway. The improvements will provide continued access for residents and emergency vehicles to the area. We offer the following comments for your consideration.

Based on our review of the information provided with your letter and in our database, there are no federally endangered, threatened, or candidate species, or other federal trust resources known to occur within the proposed project area. However, the Service recommends that surveys address the presence of anchialine pools in the area which potentially provide habitat for six federally recognized candidate shrimp species, *Antecaridina lauensis*, *Calliasmata pholidota*, *Metabetaeus lohena*, *Palaemonella burnsi*, *Procaris hawaiiiana*, and *Vetacaris chaceorum*. In addition, the federally endangered Hawaiian hoary bat (*Lasiurus semotus*), the endangered Hawaiian goose (*Branta sandvicensis*), and the threatened Newell's shearwater (*Puffinis auricularis*) are known to occur in the vicinity of the proposed project.

The federally threatened Hawaiian green sea turtle (*Chelonia mydas*), endangered Hawksbill sea turtles (*Eretmochelys imbricata*), and other listed sea turtles may occur in the area affected by the proposed project. We recommend that the National Marine Fisheries Service (NMFS) be contacted regarding potential project-related impacts to sea turtles and other listed species under their jurisdiction.

The Service believes the DEA should describe a complete contingency plan to protect lava tube habitat during all phases of the project. Furthermore, the project contractor should immediately contact our office if any lava tubes or underground voids are encountered during grading or other construction activities. A Service biologist will promptly visit the site to survey the cave and determine if there is an impact to native cave species that needs to be avoided or minimized.

In general, we recommend that the project be designed to avoid unnecessary adverse impacts and minimize unavoidable impacts to all native resources. The Service supports best management practices and other measures to minimize damage to freshwater and marine environments. Specifically, we support the reduction of potential turbidity due to construction with the use of effective silt containment devices surrounding the work site and proper disposal of any excavated materials. The Service recommends that an approved upland site be identified for excavated materials to insure that there will be no impacts to anchialine pools or the marine environment.

The Service appreciates the opportunity to offer our comments on the proposed project. If you have questions regarding these comments, please contact Fish and Wildlife Biologist James Kwon by telephone at (808) 541-3441 or by facsimile transmission at (808) 541-3470.

Sincerely,

  
for Paul Henson  
Field Supervisor  
Ecological Services

cc: NMFS-PIAO, Honolulu  
CZMP, Hawaii  
DAR, Hawaii



**SSFM INTERNATIONAL, INC.**  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Paul Henson, Field Supervisor  
Ecological Services, Pacific Islands Ecoregion  
Fish and Wildlife Service  
U.S. Department of the Interior  
300 Ala Moana Boulevard, Room 3-122  
Honolulu, Hawaii 96850

Dear Mr. Henson:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated June 26, 2000 concerning the subject project. We would like to clarify that the possible resurfacing of a 13.2 mile section of Kapoho-Kalapana Beach Road (Highway 137) indicated in our early consultation letter has since been eliminated from this project and our study. A follow-up letter dated August 30, 2000 was sent to your office to confirm this. In addition, funding for the design and construction of this project would be the responsibility of the County Department of Public Works.

We note your comments that there are no federally endangered, threatened, or candidate species, or other federal trust resources known to occur within the three realignment sites based upon your database. Surveys were conducted by our project team to address the presence of marine resources or endangered botanical or avifaunal resources within the project area. The results of their studies are included in the Draft Environmental Assessment.

These results determined that there were no anchialine pools within the project area which may potentially provide habitat for federally recognized candidate shrimp species. Results from a faunal study identified that the Hawaiian hoary bat and Newell's shearwater may occur in the general project area along this coastline. However, the project is not expected to have a significant impact on these species. The Hawaiian goose was not observed in the project area, and the area of these realignment sites generally do not provide suitable habitat such as wetlands for this species.

The potential presence of the Hawaiian green sea turtle was also documented in a technical study conducted of impacts to marine resources. The project is similarly not expected to significantly impact these or other turtles of concern. The Draft Environmental Assessment will be provided to the National Marine Fisheries Service for their review and comments, and early consultation efforts have already been initiated with this agency.



Kalapana Road Realignment Project  
Draft Environmental Assessment

November 13, 2000

Letter To Fish & Wildlife Service

Page 2

There are no known lava tubes present within the project areas being affected by the realignment alternatives being considered at the three sites. If necessary, a contingency plan to protect lava tube habitat would be developed as part of the design phase for the selected realignment routes. Such plan could include provisions for the contractor if any lava tubes are encountered during grading or other earthwork activities. Appropriate coordination with your department would occur during the establishment of this plan.

The project would be designed to avoid and minimize adverse impacts to the surrounding environment and native resources. The purpose for this project is move sections of the existing road further inland away from the shoreline to provide continued safe vehicular accessibility through this area for residents and the public. Sections of this road are subject to coastal erosion, undermining, occasional wave inundation, and other natural processes affecting the shoreline and road.

Best management practices and other necessary measures would be incorporated in the design of the project to minimize impacts on the marine environment. Such measures would consider use of silt containment measures along with proper disposal of excavated material. Design of the selected realignment routes would include a more detailed topographic survey, shoreline survey, and appropriate coordination with pertinent agencies.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in cursive script, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner



BENJAMIN J. CAYETANO  
GOVERNOR

STATE OF HAWAII  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES  
P.O. BOX 110, HONOLULU, HAWAII 96810

LETTER NO. (P) 1283.0

JUN 21 2000

Mr. Ronald A. Sato, AICP  
Project Planner  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817

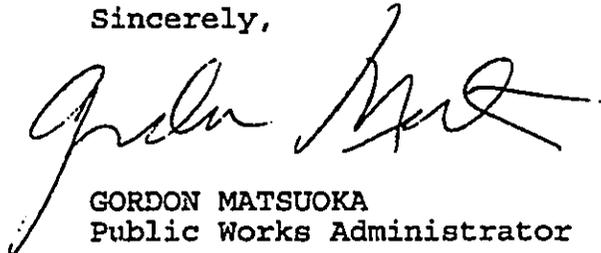
Dear Mr. Sato:

Subject: Kalapana Road Realignment Project  
Early Consultation for Draft Environmental  
Assessment

Thank you for the opportunity to review and comment on the subject project. The proposed road realignment does not impact any of our facilities, therefore, we have no comments.

If there are any questions regarding the above, please have your staff call Mr. Tyler Fujiyama of the Planning Branch at 586-0492.

Sincerely,



GORDON MATSUOKA  
Public Works Administrator

TF:mo



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Gordon Matsuoka, Public Works Administrator  
Department of Accounting and General Services  
State of Hawaii  
P.O. Box 119  
Honolulu, Hawaii 96810

Dear Mr. Matsuoka:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated June 21, 2000 concerning the subject project. We are providing you this letter in response to your comment letter.

We note your comment that the proposed road realignment does not impact any of your facilities.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in cursive script, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION  
Kekuhihewa Building, Room 555  
801 Kamokila Boulevard  
Kapolee, Hawaii 96707

TIMOTHY E. JOHNS, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES  
JANET E. KAWELO

AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
CONSERVATION AND RESOURCES  
ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
LAND  
STATE PARKS  
WATER RESOURCE MANAGEMENT

June 19, 2000

Mr. Ronald A. Sato  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817

LOG NO :25624  
DOC NO :0006PM13

Dear Mr. Sato:

**SUBJECT: Consultation for Draft Environmental Assessment for Proposed Kalapana Road Realignment Project  
Puna, Hawaii Island**

---

Thank you for your letter of May 30, 2000 and the opportunity to provide comments on the proposed project.

Your letter indicates that the County of Hawaii, Department of Public Works is proposing to: (1) realign three sections of Highway 137 (Kapoho-Kalapana Beach Road), and (2) possibly resurface 13.2 miles of this road.

It is our understanding that the Kapoho-Kalapana Beach Road is less than 50 years old, which means that it would not qualify as an historic site. The proposed resurfacing project would thus have no effect on historic sites if the work is limited to the road surface. The proposed realignment project could possibly have an adverse effect on historic sites depending on the final design plans. When the final design plans are ready we recommend that a qualified archaeologist be contracted to undertake a literature search to determine the likelihood of historic sites being present in the three areas, and if necessary then conduct an archaeological inventory survey to determine the presence/absence of significant historic sites. The results of the literature search and survey should be submitted in written format to our office for review and approval.

If you have any questions please contact our Hawaii Island archaeologist, Patrick McCoy (692-8029).

Aloha

A handwritten signature in black ink, appearing to read "Don Hibbard".

DON HIBBARD, Administrator  
State Historic Preservation Division

PM:sh



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Don Hibbard, Administrator  
Historic Preservation Division  
Department of Land and Natural Resources  
State of Hawaii  
Kakuhihewa Building, Room 555  
601 Kamokila Boulevard  
Kapolei, Hawaii 96707

Dear Mr. Hibbard:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated June 19, 2000 concerning the subject project. We would like to note that the possible resurfacing of a 13.2 mile section of Kapoho-Kalapana Beach Road (Highway 137) indicated in our early consultation letter has been eliminated from this project and our study. A follow-up letter dated August 30, 2000 was sent to your office to confirm this.

We would like to confirm that your understanding that Kapoho-Kalapana Beach Road is less than 50 years old is correct, and would thus not qualify as a historic site. We received information from the County Department of Public Works, Chief Engineer's Communication index (Communication No. 6992) dated August 10, 1962 that the construction of this road (Project No. A-137-02-60) was completed on February 23, 1962. It also indicated that the road was then reverted to the County of Hawaii's jurisdiction.

An archaeological inventory survey was conducted for the three realignment sites to determine the presence or absence of significant historic sites. The results of this survey has been coordinated with your department, and is included in the Draft Environmental Assessment. In summary, the project is not expected to have a significant effect on historic sites.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'Ronald A. Sato', written in a cursive style.

Ronald A. Sato, AICP  
Project Planner

BENJAMIN J. CAYETANO  
GOVERNOR



KAZU HAYASHIDA  
DIRECTOR

DEPUTY DIRECTORS  
BRIAN K. MINAAI  
GLENN M. OKIMOTO

**STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION**

HAWAII DISTRICT  
50 MAKAALA STREET  
P.O. BOX 4277  
HILO, HAWAII 96720  
TELEPHONE: (808) 933-8866 • FAX: (808) 933-8869

IN REPLY REFER TO:

HWY-H 00-2.0518

June 7, 2000

Mr. Ronald Saito  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, Hawai'i 96817

Dear Mr. Saito:

**SUBJECT: Kalapana Road Realignment Project, Draft Environmental Assessment**

Thank you for the notification. We have no comments or objections to the proposed work.

Should you have any questions, please call Mr. Robert Taira or myself at telephone number (808) 933-8866.

Very truly yours,

A handwritten signature in black ink, appearing to read "Stanley Tamura".

STANLEY TAMURA  
Hawai'i District Engineer

RT:sy



**SSFM INTERNATIONAL, INC.**  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Stanley Tamura, Hawaii District Engineer  
Hawaii District  
Department of Transportation  
State of Hawaii  
50 Makaala Street  
Hilo, Hawaii 96720

Dear Mr. Tamura:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated June 7, 2000 concerning the subject project. We note that your district office does not have any comments or objections to the proposed project at this time.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in cursive script, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner

BENJAMIN J. CAYETANO  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097



KAZU HAYASHIDA  
DIRECTOR

DEPUTY DIRECTORS  
BRIAN K. MINAII  
GLENN M. OKIMOTO

JUN 20 2000

IN REPLY REFER TO:

HWY-PS  
2.8905

Mr. Ronald A. Sato  
Project Planner  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817

Dear Mr. Sato:

Subject: Kalapana Road Realignment Project, Early Consultation for Draft Environmental Assessment (EA)

Thank you for your transmittal requesting our review and comments regarding the above project. We have the following comments:

1. The EA should discuss existing and projected traffic, rights-of-way width, roadway geometrics, etc. of Kalapana Road.
2. According to the document "Bike Plan Hawaii", Kalapana Road is a designated bike route.
3. County of Hawaii should consider scenic pullouts or rest stops along this stretch of road.
4. Please provide us with a copy of the EA for review and comment when it is available.

If you have further questions, please call Ronald Tsuzuki, Head Planning Engineer, Highways Division, at 587-1830.

Very truly yours,

A handwritten signature in black ink, appearing to read "Kazu Hayashida".

KAZU HAYASHIDA  
Director of Transportation



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Kazu Hayashida, Director  
Department of Transportation  
State of Hawaii  
869 Punchbowl Street  
Honolulu, Hawaii 96813-5097

Dear Mr. Hayashida:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated June 20, 2000 concerning the subject project. The Draft Environmental Assessment will include information on the County's Kapoho-Kalapana Beach Road affected by the project such as right-of-way and geometrics of realigned sections.

The realigned sections of road would only involve short lengths varying from about 800 to 1,300 feet in length, and would be designed to meet minimum County roadway standards to address concerns expressed by this community. The realigned sections would provide the same laneage since its purpose is safety by realigning sections of the road further inland to address coastal erosion and other natural processes affecting this road and shoreline. Consequently, this project would not affect existing or future projected traffic along this roadway.

We note your comment that Kalapana Road is a designated bike route on the Bike Plan Hawaii. Providing scenic pullouts or rest stops along the stretch of this road being realigned would not be practicable since the project only affects relative short sections of this road, and would thus not create scenic viewing points. In addition, creating such pullouts or rest stops would likely be of serious concern by area residents who have already expressed concerns with people loitering, hanging out, or camping along the shoreline in this area.

A copy of the Draft Environmental Assessment would be provided to your department for your review and comments.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'Ronald A. Sato', written in a cursive style.

Ronald A. Sato, AICP  
Project Planner

BENJAMIN J. CAYETANO  
GOVERNOR



ESTHER UEDA  
EXECUTIVE OFFICER

**STATE OF HAWAII**  
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM  
**LAND USE COMMISSION**  
P.O. Box 2359  
Honolulu, HI 96804-2359  
Telephone: 808-587-3822  
Fax: 808-587-3827

May 25, 2000

Mr. Ronald A. Sato  
Project Planner  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817

Dear Mr. Sato:

Subject: Kalapana Road Realignment Project: Early  
Consultation for Draft Environmental Assessment  
(DEA)

We have reviewed the description of the subject project as stated in your letter dated May 22, 2000, and find that the General Study Corridors of Sites A, B, and C, as represented on the Project Vicinity and Location Map, are designated within the State Land Use Agricultural and Conservation Districts. For your information, the Agricultural/Conservation District boundary in the subject area follows the mauka side of the Kapoho-Kalapana Beach Road, placing said road within the Conservation District.

We suggest that the DEA include a map showing the corridors in relation to the State land use districts.

We have no further comments to offer at this time. We appreciate the opportunity to comment on the subject project.

Should you have any questions, please feel free to call me or Bert Saruwatari of our office at 587-3822.

Sincerely,

A handwritten signature in cursive script, appearing to read "Esther Ueda".

ESTHER UEDA  
Executive Officer

EU:aa



**SSFM INTERNATIONAL, INC.**  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Ms. Esther Ueda, Executive Officer  
Land Use Commission  
Department of Business, Economic Development & Tourism  
State of Hawaii  
P.O. Box 2359  
Honolulu, Hawaii 96804-2359

Dear Ms. Ueda:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated May 25, 2000 concerning the subject project. We note your comments that the mauka side of Kapoho-Kalapana Beach Road reflects the Conservation District boundary extending inland from the shoreline. Areas situated mauka of this road are within the Agricultural District. This is consistent with our interpretation of the district boundary in relation to the realignment sites.

A map showing the State Land Use Districts in relation to the project area will be included in the Draft Environmental Assessment. In addition, a Boundary Interpretation would be submitted to your department to confirm the location of the Conservation District in relation to the selected realignment route for each of the three sites during the design phase of this project.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner



**STATE OF HAWAII**  
**OFFICE OF HAWAIIAN AFFAIRS**  
711 KAPI'OLANI BOULEVARD, SUITE 500  
HONOLULU, HAWAII 96813

May 24, 2000

Mr. Ronald A. Sato, AICP  
Project Planner  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, Hawai'i 96817

PC# 115

**Subject: Early Consultation For Draft Environmental Assessment For Kalapana  
Road Realignment Project**

Dear Mr. Sato,

Thank you for the opportunity to respond to the above-referenced document. As with any project, the Office of Hawaiian Affairs is concerned that subsurface archaeological, historical and cultural remains may be impacted. For more information on Native Hawaiian archaeological, historical and cultural concerns at this specific site we suggest that you contact the State Historic Preservation Division of the Department of Land and Natural Resources and the Big Island Burial Council. An archaeological survey may be deemed necessary prior to the beginning of the project. We would also like to see mitigation plans outlined in your draft. We look forward to receiving a copy of the draft EA when it is completed. If you have any questions, please contact Ken R. Salva Cruz, Policy Analyst, at 594-1847.

Sincerely,

A handwritten signature in cursive script, appearing to read "Colin C. Kippen, Jr.".

Colin C. Kippen, Jr.  
Deputy Administrator

cc: Board of Trustees  
Hilo CRS  
OEQC



SSFM INTERNATIONAL, INC.

501 Sumner Street, Suite 502

Honolulu, Hawaii 96817

Phone: (808) 531-1308

Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Colin C. Kippen, Jr., Deputy Administrator  
Office of Hawaiian Affairs  
State of Hawaii  
711 Kapiolani Boulevard, Suite 500  
Honolulu, Hawaii 96813

Dear Mr. Kippen:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated May 24, 2000 concerning the subject project. An archaeological inventory survey was conducted for the three realignment sites to determine the presence or absence of significant historic sites. The results of this survey have been coordinated with the State Historic Preservation Division, and are included in the Draft Environmental Assessment.

In summary, the project is not expected to have a significant effect on historic sites. Based upon the survey results, a mitigation plan would be developed in coordination with the State Historic Preservation Division for limited data recovery excavations. The recovery of such information should constitute sufficient recovery of significant archaeological information contained at this site, and no further work would be necessary.

Copies of the Draft Environmental Assessment would be provided to your department for appropriate review and comments along with the State Historic Preservation Division, Department of Land and Natural Resources, and Hawaii Island Burial Council.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner



DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII  
25 AUPUNI STREET • HILO, HAWAII 96720  
TELEPHONE (808) 961-8660 • FAX (808) 961-8657

May 26, 2000

Mr. Ronald A Sato  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, HI 96817

**KALAPANA ROAD REALIGNMENT  
EARLY CONSULTATION FOR DRAFT ENVIRONMENTAL ASSESSMENT  
TMK 1-3-002, 003, 004 AND 1-4-002**

Please refer to Items 1 and 2 of your May 22, 2000 letter.

For your information, there are no existing DWS water system facilities within the proposed road realignment segments noted in Item 1 as shown on Plats 1-3-002, 003, and 004.

Further, an 8 and 10-inch waterline exists along the Kaimu-Kapoho Road including a 3-inch waterline servicing Isaac Hale Beach Park.

Therefore, subject to the above and the proposed road resurfacing indicated in Item 2, this office must be contacted to locate the existing waterlines during the design stage and plans submitted for our review and approval prior to any work being done in this area.

Further, damage to the existing waterline during the construction phase will be the responsibility of the contractor.

Should there be any questions, please call our Water Resources and Planning Branch at 961-8665.

Sincerely yours,

  
Milton D. Pavao, P.E.  
Manager

WA:dms

*... Water brings progress...*



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Milton D. Pavao, P.E., Manager  
Department of Water Supply  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

Dear Mr. Pavao:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated May 26, 2000 concerning the subject project. We note your comments that there are no water system facilities located within Kapoho-Kalapana Beach Road at the three proposed realignment sites. Consequently, the realignment project should not have an effect on your department's water system facilities.

Thank you for information on the existing waterlines located within Kaimu-Kapoho Road. This information is more pertinent to the possible resurfacing of a 13.2 mile section of Kapoho-Kalapana Beach Road (Highway 137) indicated in our early consultation letter send in May 2000. We would like to clarify that this roadway resurfacing has since been eliminated from this project and our study. A follow-up letter dated August 30, 2000 was sent to your office to confirm this.

Appropriate coordination would be conducted with your department during the design of the three realignment sites.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner

Stephen K. Yamashiro  
Mayor



Edward Bumatay  
Fire Chief

## County of Hawaii

### FIRE DEPARTMENT

777 Kilauea Avenue • Mall Lane, Room 6 • Hilo, Hawaii 96720-4239  
(808) 961-8297 • Fax (808) 961-8296

May 25, 2000

Mr. Ronald A. Sato, AICP  
Project Planner  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, HI 96817

Dear Mr. Sato:

Subject: Kalapana Road Realignment Project  
Early Consultation for Draft Environmental Assessment

We have no comments on the Kalapana Road Realignment Project.

Sincerely,

  
EDWARD BUMATAY  
Fire Chief

EB/mo





**SSFM INTERNATIONAL, INC.**  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Edward Bumatay, Fire Chief  
Fire Department  
County of Hawaii  
Mall Lane, Room 6  
777 Kilauea Avenue  
Hilo, Hawaii 96720-4239

Dear Mr. Bumatay:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated May 25, 2000 concerning the subject project. We note that your department does not have any comments to the proposed project at this time.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in cursive script, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner

Stephen K. Yamashiro  
Mayor



Virginia Goldstein  
Director

Russell Kokubun  
Deputy Director

## County of Hawaii

### PLANNING DEPARTMENT

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252  
(808) 961-8288 • Fax (808) 961-8742

June 14, 2000

Mr. Ronald A. Sato, AICP  
Project Planner  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, HI 96817

Dear Mr. Sato:

**Preliminary Consultation Regarding Preparation of Draft Environmental Assessment  
For the Proposed Kalapana Road Realignment and Improvement Project, Puna, Hawaii**

Thank you for your letter dated May 22, 2000, requesting any comment we may have regarding the above-described project and the preparation of a draft environmental assessment (DEA). We have reviewed the information provided within your letter and have the following comments to offer for your consideration:

#### Realignment of Three Segments along Kalapana-Kapoho Road

1. The three segments (Sites A, B & C) along the Kalapana-Kapoho Road which will be realigned are situated within an area designated as Orchards by the Hawaii County General Plan Land Use Pattern Allocation Guide (LUPAG) Map. Lands located immediately makai of this roadway are designated as Open. Roadway improvements are consistent with uses permitted within these LUPAG Map designations.
2. The three segments situated within portions of TMK: 1-3-02 and 1-3-03, are also situated within the County's Special Management Area (SMA). Depending upon the location of the shoreline relative to the proposed realignment improvements, the project sites may also be situated within the County's Shoreline Setback Area. All roadway improvements shall conform to the requirements of the County's SMA and Shoreline Setback regulations.

Mr. Ronald A. Sato, AICP  
Project Planner  
Page 2  
June 14, 2000

3. Realignment of portions of the roadway will require the consolidation and re-subdivision of affected parcels and shall conform to the requirements of the County's Subdivision Code (Chapter 23, Hawaii County Code).

Resurfacing of Portions of Existing Kalapana-Kapoho Road alignment

1. We have no objection to the resurfacing of two segments of the Kalapana-Kapoho Road planned for resurfacing, provided all resurfacing improvements are conducted within the existing road right-of-way.
2. Portions of the road to be resurfaced may be situated within the County's SMA and/or Shoreline Setback Area. A SMA Use Permit Assessment Application shall be prepared and submitted to this office for review prior to conducting any resurfacing improvements.

Thank you for providing our office with the opportunity to offer comments on the preparation of the DEA. We will reserve further comment pending our receipt of the DEA. In the meantime, please feel free to contact Daryn Arai of this office should you have any questions.

Sincerely,

  
VIRGINIA GOLDSTEIN  
Planning Director

DSA:dk  
p:\wp60\dsa\2000\Kalapana-Kapoho Road DEA.doc

cc: County, DPW



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

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

Dear Ms. Goldstein:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated June 14, 2000 concerning the subject project. We note your comments that lands situated mauka of Kapoho-Kalapana Beach Road in the project area are designated Orchards under your General Plan Land Use Pattern Allocation Guide Map. Lands located makai of this road are designed as Open, and the realignment improvements are consistent with uses permitted within these land use designations.

We note that portions of the realignment sites are situated within the County's Special Management Area (SMA). An appropriate SMA permit would be obtained for the project during its design once an alignment has been selected for implementation.

Portions of the existing road at these realignment sites may also be within the Shoreline Setback area. Consequently, this project is intended to move sections of the road further inland to create additional buffer area from the shoreline and coastal erosion occurring. A shoreline survey would be conducted during the project's design, and a Shoreline Setback Variance would be obtained as necessary.

Realignment of the road would require consolidation and re-subdivision of affected parcels. Property acquisition and re-subdivision of property would be performed during the project's design. Such activities would conform to the requirements of your County's Subdivision Code. All approvals and roadway improvements would be implemented in conformance to County regulations, and appropriate coordination with your department would be performed.

Regarding your comments on roadway resurfacing, we would like to note that the possible resurfacing of a 13.2 mile section of Kapoho-Kalapana Beach Road (Highway 137) indicated in our early consultation letter has since been eliminated from this project and our study. A follow-up letter dated August 30, 2000 was sent to your office to confirm this.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner

Stephen K. Yamashiro  
Mayor



Wayne G. Carvalho  
Police Chief

James S. Correa  
Deputy Police Chief

**County of Hawaii**  
**POLICE DEPARTMENT**

349 Kapiolani Street • Hilo, Hawaii 96720-3998  
(808) 935-3311 • Fax (808) 961-2702

June 2, 2000

Mr. Ronald A. Sato, AICP  
Project Planner  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, HI 96817

Dear Mr. Sato:

**SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
EARLY CONSULTATION FOR DRAFT ENVIRONMENTAL ASSESSMENT**

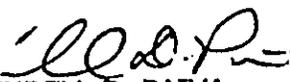
This acknowledges your letter of May 22, 2000, requesting our comments on the above-referenced project.

Staff has reviewed your request and has no comments or objections to offer at this time.

Thank you for the opportunity to comment.

Sincerely,

WAYNE G. CARVALHO  
POLICE CHIEF

  
WENDELL D. PAIVA  
ASSISTANT POLICE CHIEF  
INVESTIGATIVE OPERATIONS BUREAU

EO:lk



**SSFM INTERNATIONAL, INC.**  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Wendell D. Paiva, Assistant Police Chief  
Investigative Operations Bureau  
Police Department  
County of Hawaii  
349 Kapiolani Street  
Hilo, Hawaii 96720-3998

Dear Mr. Paiva:

**Subject:** Kalapana Road Realignment Project  
Draft Environmental Assessment

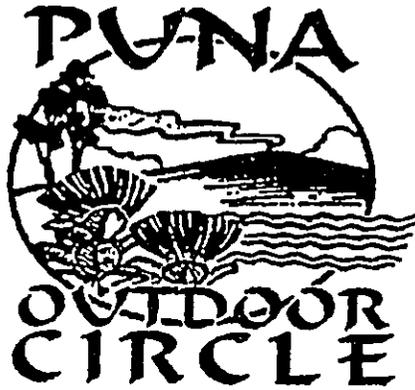
Thank you for your comment letter dated June 2, 2000 concerning the subject project. We note that your department does not have any comments or objections to the proposed project at this time.

If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner



P.O. BOX 1085 ☎ PAHOA ☎ HAWAII, 96778 ☎ (808) 965-6626

May 25, 2000

Ronald A. Sato, AICP, Project Planner  
SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawai 'i 96817

RE: KALAPANA ROAD  
REALIGNMENT PROJECT

Dear Mr. Sato:

I was one of the members of the public who was invited to the "tour" of the proposed realignment last year. I went on behalf of Puna Outdoor Circle, and later made a report to my Board of Directors. We are aware of the deterioration of the road at the three General Study Corridor Sites, and agree that realignment is necessary to enhance public safety. Therefore, we support the need for this project.

We do, however, have some questions and concerns which we voiced at the meeting held at Isaac Hale Beach Park at the conclusion of the "tour". To be certain that you are aware of these, we are herewith enumerating them in writing.

1. At the time of the meeting we asked how far mauka the realignment would move the road at the three sites. We were told that no decision had yet been made. That information was not included in your May 22<sup>nd</sup> letter. It is hard to comment without precise information, of course. Still, we wish to go on record that we would like to see the realignment

moved no further mauka of the present road than necessary – no more than three lane's width. We understand that the Puna coast is a victim of ongoing subsidence, and that you are required to plan for the future. We don't want to see the realignment become obsolete a few years down the road. That would certainly not be cost-effective. On the other hand, we don't want to see needless overkill deprive adjacent landowners of more of their parcel depth than necessary. We hope that your plans will strike a balance between these two concerns. Jiro Sumada had indicated that the realignment might move as far mauka as 100-feet, and we feel that this would be extreme.

2. We are also concerned about the "good" trees which realignment would impact. We are not concerned with guava, gunpowder trees or glory bush. There are, however, large trees which are native (i.e., lama) or have aesthetic value. We feel that it is only fair that the property owners are given the option to have the County move these trees rather than just cut or knock them down. We suggest that if they so desire, the project should include relocating said trees elsewhere on their property. If they do not want this, then we would like to see said trees relocated to the new Pohoiki Park expansion. We know that there are plans to plant more trees in that park, and that no decision has yet been made as to species or precise location. Some large trees would enhance our park without incurring high purchase price for the County.
3. Regarding the "possible resurfacing" of two segments of road: your letter does not mention widening, and so we hope that we are safe in assuming that the plan is limited to resurfacing only. If such is NOT the case, then we hereby give notice that we will require an extension of time to comment, as well as additional pertinent information on which to base our comments, such as (a) how much wider? (b) would the widening be limited to the mauka side, the makai side or both . or variable in different areas, and if so, where? and (c) what manmade (historic and/or prehistoric) or natural features (including mature native or aesthetic trees) would be sacrificed for such widening?
4. Regarding the "alternative realignment routes... currently being planned": please advise us what and where these are as soon as you can so that we can comment in a timely fashion.

Since the three realignment sites are on the edge of the ocean, what precautions will the contractor be required to take to prevent runoff of petroleum residues from equipment, dust/dirt from construction, etc., going into the ocean? We reserve the right to comment on this once said information is forthcoming.

Thank you for including our organization in your early EA consultation. Should any problems or conflicts arise, we would be happy to work with you to find a "win-win" solution so that the project may go forward with the least amount of negative impact.

with aloha aina,



René Siracusa  
President



**SSFM INTERNATIONAL, INC.**  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Ms. Rene Siracusa, President  
Puna Outdoor Circle  
P.O. Box 1085  
Pahoa, Hawaii 96778

Dear Ms. Siracusa:

**Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment**

Thank you for your comment letter dated May 25, 2000 concerning the subject project. We note your comments concerning your awareness of the deterioration occurring at the three proposed realignment sites along Kapoho-Kalapana Beach Road. Your support of the need for this project to enhance public safety along this road is appreciated.

Information on the realignment routes and distance inland is included in the Draft EA which will be provided for your review and comments during the 30-day comment period. In summary, Sites No. 3 and 5 would involve moving the road inland between 95 and 115 feet. This distance was based upon several engineering and design criteria including recommendations from a geotechnical consultant. Coordination with the property owners affected at these two sites has been occurring, and they have not expressed opposition to the alternatives being considered.

At Site No. 4, alternatives being considered would involve either using the existing road alignment or moving the centerline inland about 30 feet along with also raising this section. This was developed based upon consultation efforts with property owners affected in this area in efforts to find a balance between their concerns and the need for continued public accessibility through this section of the road.

Concerning the realignments' impact on "good" trees, appropriate coordination with property owners would continue throughout this planning process along with the design and property acquisition phase of the project. Such mitigative measures being considered by the County would include relocating trees further inland on their property if desired by the property owners. Affected trees not wanted by the landowners could be considered for relocating to the Pohoiki Park expansion. This would need to be coordinated between the County Department of Public Works and Department of Parks and Recreation.

Regarding the roadway resurfacing, we would like to note that the possible resurfacing of a 13.2 mile section of Kapoho-Kalapana Beach Road (Highway 137) indicated in our early consultation letter has since been eliminated from this project and our study. A follow-up letter dated August 30, 2000 was sent to your organization to confirm this.



Kalapana Road Realignment Project  
Draft Environmental Assessment

November 13, 2000

Letter To Puna Outdoor Circle

Page 2

Information on the realignment routes being considered are discussed in the Draft EA which will be provided to you for review and comments during the 30-day public comment period. This EA will also include information addressing short-term construction related effects on the environment and mitigative measures being considered. Details of selected measures would be developed during the design phase of the project for implementation by the contractor. The contractor would also be required to comply with all applicable Federal, State, and County requirements.

We thank you for your organization's continued support on this important project. If you have any other questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in cursive script that reads 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner

June 18, 2000

To: Ronald A. Sato, AICP,  
SSFM International,  
501 Sumner Street, #502,  
Honolulu, HI 96817

From: Mr. And Mrs. Cecil P. Lewis  
RR2 Box 4783  
Pahoa, Hawaii 96778

Good morning, Mr. Sato:

We have seen a copy of your letter regarding the work on the Kapoho-Kalapana Beach Road and have some misgivings about the type of resurfacing to be done.

We moved to Kehena Beach some years ago, because it was quiet and maintained Hawaiian charm. Since the re-paving of this same road through our community a few years back, there has been an increase in traffic and speeding. That is something that cannot be stopped at this time, of course.

However, the stretch of Highway 137 in which you plan on re-working is a tourist attraction in itself. It long has been known throughout this part of the island simply as "the Red Road" and leads through some of the most beautiful parts of the island. We have noticed on many printed maps, the 137 is referred to as "The Red Road". Many established artists have painted "The Red Road". In today's Hawaii Tribune-Herald (dated Sunday, June 18, 2000), the lead story: Kalapana: Buried by lava, then by bureaucracy", the 137 is referred to as the "Red Road".

In addition we I fear that resurfacing in black and running a yellow line down the center of it will tend to make it a raceway like those stretches already so paved. Ultimately, the charm of the stretches will also be destroyed.

Yes, we would like to see the Red Road – or what is left of it – resurfaced, but only if it is resurfaced with the same red cinder which brought us to Kehena Beach. The Island of Hawaii is one of the few last vestiges of the Old Hawaii and even that is beginning to disappear. Just yesterday we noticed the old sign that hung at the south end of the Red Road which read, "Aloha and Welcome to our Aina" is gone. In contrast, a new sign has gone up on the north east end of Moana Kai Pali in Kehana which reads: **POSTED. PRIVATE PROPERTY. HUNTING, FISHING, TRAPPING OR TRESPASSING FOR ANY PURPOSE IS STRICTLY FORBIDDEN. VIOLATORS WILL BE PROSECUTED.**

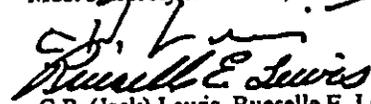
When my wife spoke with you on the telephone on June 9<sup>th</sup>, 2000 Mr. Sato, you stated the reason for re-surfacing in black was because it would be less expensive. Is the Aloha spirit and aura slowly being lost because it is more cost efficient? Improving the surface of the road with red cinder would help to maintain the original charm and beauty that we seek.

Furthermore, we sincerely feel that if it cannot be resurfaced in red, we would rather see it not resurfaced at all. The worst case scenario would be that it would slow down the speeding traffic.

Let us attempt to retain the Hawaiian aura in which brought us all here and not "bury it (or re-surface it) in bureaucracy" or black asphalt.

We sincerely hope our approach will be considered in your upcoming planning.

Most sincerely and aloha,

  
C.P. (Jack) Lewis, Rueselle E. Lewis



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. and Mrs. Lewis  
RR2 Box 4783  
Pahoa, Hawaii 96788

Dear Mr. and Mrs. Lewis:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated June 18, 2000 concerning the subject project. We are providing you this letter in response to your comment letter.

We would like to inform you that the 13.2 mile resurfacing of Kapoho-Kalapana Beach Road generally situated between Kalani Honua Cultural Center and Kapoho-Kumukahi Lighthouse Road has been eliminated from our work and study under this Draft Environmental Assessment. We understand the County Department of Public Works has worked out some resolution with the community to address your concerns with the repaving of this road.

If you have any other questions, you may give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in cursive script that reads 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner

August 8, 2000

Mr. Jiro A. Sumada  
Department of Public Works  
25 Aupuni Street, Room 202  
Hilo, HI 96720-4252

Mr. Ronald A. Sato  
SSFMI International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, HI 96817

Mr. Steve Hambalek  
FEMA Management Agency  
Region 9 Pacific Area Office  
Building T 112, Stop 120  
Fort Shafter, HI 96858-5000

Gentlemen:

SUBJECT: REALIGNMENT OF HIGHWAY 137  
TMK: 1-03-04-013

We want the County of Hawaii and FEMA to be aware of just some of the negative aspects of moving this road inland on our property. You will be providing a public camping grounds in front of our house where none exist now. This will leave my family and our home vulnerable.

We have lived here in Opihikao for five (5) years with no incident, while our neighbors, the Makuakane's, have areas in front of their property where people have room for overnight camping. This has lead to four (4) robberies in less than four (4) years. The robbers pretend to be campers while watching the house until early in the morning and then to move in and burglarize the premises of important and necessary equipment such as 2 generators that provided the electrical power for their home. These robberies only stopped when they obtained three vicious dogs.

I spend approximately six months of the year on the mainland. My wife is alone at that time. We feel this project will put her in harms way as we cannot use a dog for protection because she is afraid of dogs. We fear for her safety as well as loss of property if you should go forward with this plan.

We were told that to leave the road where it now exists would be more costly for the County; however, you have not considered that by moving the road inland you are placing an unacceptable cost to the people it affects.

Our safety and the security of our property from theft are not our only concerns. You will be removing our buffer zone of protection for our homes from the effects of the salt air, from hurricane winds, our privacy, etc..

This is to put FEMA and the County of Hawaii on notice that should this road be moved inland, when the existing road can be used, and you cause an acceleration of overnight camping, loud and all-night noises, or incidents of robberies, etc. in our area, to our woe for lack of safety and peace, we will hold you liable.

Sincerely,



Bernard Garner  
13-6368 Kapoho Kalapana Road  
Pahoa, HI 96778-8024



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Mr. Bernard Garner  
13-6368 Kapoho Kalapana Road  
Pahoa, Hawaii 96788-8024

Dear Mr. Garner:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated August 8, 2000 concerning the subject project. This letter is being submitted in response to your comment letter.

The two alternatives being considered for Site No. 4 would only involve either raising the existing road or moving the centerline of the road inland about 30 feet along with raising it. This later alternative was a result of your input along with other area residents during the consultation process. Consequently, these alternatives would not be providing a public camping grounds fronting your property.

Your concerns with people camping in the area and the security of your home from such activities are noted. However, these concerns should be more appropriately brought to the attention of and addressed with the County of Hawaii Police Department.

Some mitigative measures implemented as part of this project may include relocating existing trees within your frontage property affected further inland to provide continued screening.

The alternative selected for this site by the County would be based upon several factors such as how well it addresses the problem, environmental impacts which include social concerns, and construction costs. Your concerns are noted, however, the road improvement within this area is needed to provide continued vehicle accessibility along this shoreline for other residents in the Puna district along with the general public.

If you have any other questions, you may give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in cursive script, appearing to read 'Ronald A. Sato'.

Ronald A. Sato, AICP  
Project Planner

August 13, 2000

Mr. Jiro A. Sumada  
County of Hawaii  
Department of Public Works  
25 Aupuni Street, Room 202  
Hilo, HI 96720-4252

✓ Mr. Ronald A. Sato  
SSFM International, Inc.  
501 Sumner Street, Suite 502  
Honolulu, HI 968217

Mr. Steve Hambalek  
FEMA Management Agency  
Region 9 Pacific Area Office  
Building T 112, Stop 120  
Fort Shafter, HI 96858-5000

Gentlemen:

SUBJECT: REALIGNMENT OF HIGHWAY 137  
TMK: 1-3-2-90

This is a follow-up to my telephone conversation to Mr. Sato registering my complaint regarding the Realignment of Highway 137.

First, your original letter informing us of the Proposed Realignment of Highway 137 included a sketch of the proposed realignment and a Permission Request Form to enter my property for surveying purposes. Some of my neighbors requested a meeting to voice their concerns, therefore, Mr. Harry Kim, of the County Civil Defense Agency and Mr. Hugh Ono of SSFM International, Inc. came and met with us. After walking the affected area, a serious discussion ensued as to how the realignment could be met without entering our properties. From the discussion, it was my understanding that the low lying area is where the realignment really needed to be addressed. My neighbor, the Garners, were very concerned about the amount of property they would be losing. At that point, I was not too concerned because your sketch showed that only a small portion of my property on the Kapoho boundary would be affected. We were assured several times by Mr. Kim and Mr. Ono that from the Garner's property, no land needed to be taken, that the realignment would be at the low lying areas and then connect on to the existing roadway. Based on their assurance, and believing that my neighbors were also satisfied, I signed the permission form.

Second, since I signed the permission form, no courtesy of a telephone call or any meeting information or copies of any proposed realignment plans were ever sent to me. Yet some of my neighbors

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RECEIVED

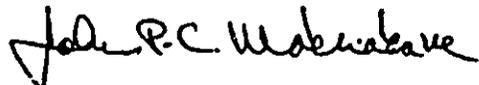
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received copies of the new proposed changes in the realignment and had a second meeting. My neighbors told me that I didn't get anything because I had already signed the paper so I didn't need to know. This made me very angry because the new proposals significantly affects my property, yet I was never informed. I then called Mr. Sato to voice my complaint and he assured me that he would be sending me the new proposals which I received on August 10. He said that the new proposals were needed to straighten the road and to create a buffer. What buffer? The low lying areas (from TMK 1-3-4-14 to TMK 1-3-4-28) barely has a buffer and the ocean water splash and wash up to the roadway during storms and high seas. Fronting my property, on the makai side, water rarely washes up to the roadway even during high seas and there is already at least a 100 feet buffer, which people have been using as a camping ground. There is no bathroom facility so they pollute the vacant area next to mine, play loud music all night, disturb the peace and even have fights. Some people fish and some just hang out and we are not sure whether they are watching and waiting for an opportune time to burgularize our home. (We have been burgularized four (4) times in the last 4 years already.) Straightening the road will create a bigger buffer so there can be more campers and undesirables, destroy our trees that is our protection from the elements of the ocean and from hurricanes and we lose our peace, tranquility and safety! And all for what? Just to straighten out the road!

Your representatives have lied to me, gave me false promises and expectations only to gain my approval. They have broken their word of honor, integrity, and trust; therefore, I recind and make null and void my permission to you.

This government has lied and stolen Hawaiian lands from my kupuna and ohana long enough. As a Native Hawaiian, born and raised in Hawaii (right here in Opihikao) along with my ancestors and kupuna, I stand on my Native Hawaiian Sovereign Rights. You will not enter my land or take an inch off of my property! Let this be your formal notice from me.

Sincerely,



Reverend John P. C. Makuakane  
c/o 491 Makani Circle  
Hilo, HI 96720

cc: Mayor Stephen Yamashiro  
Councilman Al Smith

---



SSFM INTERNATIONAL, INC.  
501 Sumner Street, Suite 502  
Honolulu, Hawaii 96817  
Phone: (808) 531-1308  
Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
American Consulting Engineers Council, Member

November 13, 2000

Reverend John P.C. Makuakane  
c/o 491 Makani Circle  
Hilo, Hawaii 96720

Dear Reverend Makuakane:

Subject: Kalapana Road Realignment Project  
Draft Environmental Assessment

Thank you for your comment letter dated August 13, 2000 concerning the subject project. We appreciate the opportunity to meet with you at the project site on August 28, 2000 to discuss your concerns, and to clarify some of the misinformation provided you by your neighbors concerning this project. Although we have already met to clarify your comments, we have provided this written response to your letter. We appreciate your expressed support for this project, and continued cooperation to work with us and the County Department of Public Works on this important project.

We appreciated your cooperation in signing the right-of-entry authorization form you refer to in your letter to allow surveying and other fieldwork to occur during this planning process. At that time of your first meeting on this topic, specific realignment routes were still being developed and needed to be refined pending a geotechnical study, topographic survey information, and other data collection of the surrounding environment. Subsequently, the two low lying areas of concern, one at the northern and one at the southern end of the subject roadway section, were identified and needed to be addressed.

Our consultative efforts with you and other area residents have since resulted in two alternatives being considered for this site (Alternatives D and E). Alternative D would involve elevating the existing section of the current road alignment about 5 feet, and up to about 10 feet for lower points along this road. The second alternative would involve an alignment moving the center line of the road inland about 30 feet, and also raising this roadway section about 5 to 10 feet depending upon the elevations. The other alternatives developed which showed alignments extending inland up to 100 feet have been eliminated from consideration due to your concerns. Consequently, your input and comments and the Draft Environmental Assessment (EA) prepared would greatly help the County in selecting the appropriate alternative to implement. A copy of this Draft EA will be provided to you when published.

Concerning your letter's second point, we greatly appreciated the opportunity to meet with you at the site to clarify some concerns with your participation in this planning process. As we discussed, the only preliminary plans received by your neighbors were the same ones you received since they were all distributed at the same time. In addition, all property owners affected at this site were given notification of the meeting held on July 24th to discuss the



November 13, 2000

Page 2

Letter To John Makuakane

alignment alternatives being considered. Also, all correspondences and coordination with you and other property owners affected has been and will continue to be equally provided.

We are glad that we could clarify with you that the right-of-entry form signed was only to permit surveyors and other subconsultants access to your property so they could conduct their field inspections. Your participation in this planning process is important, and will continue as is being done with other affected property owners. You would not be left out just because you signed the right-of-entry form as misinformed by your neighbors.

Regarding the buffer area between the shoreline and roadway, the alternatives presently being considered would not create a larger buffer area due to concerns raised with frontage property affected. Consequently, these alternatives would involve raising the road to protect the road from wave inundation now and in the future. Your information that the low lying area at the northern section of this roadway near TMK 1-03-04: 13 is subject to more frequent wave inundation and sprays from waves during storms and high surf conditions is also appreciated and noted.

Your concerns with people camping in the area along with the security of your home from such activities are also noted. However, these concerns should be more appropriately brought to the attention of and addressed with the County of Hawaii Police Department. Some mitigative measures that could be implemented as part of this project include repairing portions of your wall affected and relocating existing trees within your frontage property further inland to provide continued screening for your home.

Finally, we greatly appreciate the opportunity to continue working with you in addressing your concerns and clarifying information associated with this project. We appreciate your expressed willingness to call us to clarify or discuss any items associated with this project, your continued support for this project, and cooperation in working with us and the County to address this important project.

If you have any other further questions, please give me a call at (808) 531-1308. Thank you.

SSFM INTERNATIONAL, INC.

A handwritten signature in black ink, appearing to read "Ronald A. Sato". The signature is fluid and cursive.

Ronald A. Sato, AICP  
Project Planner



SSM INTERNATIONAL, INC.  
 501 Sumner Street, Suite 502  
 Honolulu, Hawaii 96817  
 Phone: (808) 531-1308  
 Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
 American Consulting Engineers Council, Member

### SIGN-IN SHEET

PROJECT: Kalapana Road Realignment Project  
 DATE: Tuesday, September 26, 2000 TIME: 6:00 p.m.  
 PURPOSE: Public Informational Meeting  
 MEETING SITE: Pahoa Recreation Center, Pahoa, Hawaii

1. Name	<i>Glenn Farmer</i>	Phone:	<i>936-7407</i>
Organization		Fax	
2. Name	<i>Marjorie Cooley</i>	Phone:	<i>967-7256</i>
Organization		Fax	
3. Name	<i>Kathleen Pahlson</i>	Phone:	<i>965-6042</i>
Organization		Fax	
4. Name		Phone:	
Organization		Fax	
5. Name		Phone:	
Organization		Fax	
6. Name		Phone:	
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7. Name		Phone:	
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9. Name		Phone:	
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10. Name		Phone:	
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11. Name		Phone:	
Organization		Fax	
12. Name		Phone:	
Organization		Fax	



**SOFM INTERNATIONAL, INC.**  
 501 Sumner Street, Suite 502  
 Honolulu, Hawaii 96817  
 Phone: (808) 531-1308  
 Fax: (808) 521-7348

Project Managers, Planners, & Engineers  
 American Consulting Engineers Council, Member

**COMMENT SHEET**

**DATE:** September 26, 2000  
**SUBJECT:** Kalapana Road Realignment Project  
 Public Informational Meeting

Please provide your comments below:

*Please send all D.E.A. and final  
 D.E.A. to us.*

*\*  
 Kalia  
 RR2 PO Box 4028  
 Pahoa Hi 96778*

*Marjorie Corley Volcano Hi*

(Include additional sheets as necessary)

Please print your name and address:

*John Garner  
 13-6368 Kapoho - Kilauea Rd.  
 Pahoa, Hi 96778*

## APPENDIX B-3

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### *Comments On Draft Environmental Assessment*



Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 5, 2001

GORDON W TRIBBLE DISTRICT CHIEF  
WATER RESOURCES DIVISION  
US GEOLOGICAL SURVEY  
US DEPARTMENT OF THE INTERIOR  
677 ALA MOANA BOULEVARD SUITE 415  
HONOLULU HI 96813

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated December 21, 2000 on the Draft Environmental Assessment for the Kalapana Road Realignment Project.

We note that your department could not provide any comments on the subject document at this time due to prior commitments and staffing availability.

Should you have any other further questions, please contact Mr. Ben Ishii at (808) 961-8327.

6 DENNIS K. W. LEE, P. E.  
Director

BI/kg



Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 5, 2001

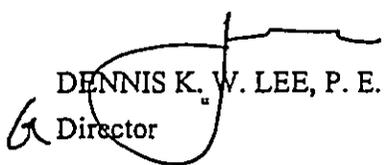
GORDON MATSUOKA PUBLIC WORKS ADMINISTRATOR  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES  
STATE OF HAWAII  
PO BOX 119  
HONOLULU HI 96810

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated December 11, 2000 on the Draft Environmental Assessment for the Kalapana Road Realignment Project.

We note your comment that the proposed project will not impact any of your department's facilities.

Should you have any other further questions, please contact Mr. Ben Ishii at (808) 961-8327.

  
DENNIS K. W. LEE, P. E.  
Director

BI/kg



Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 5, 2001

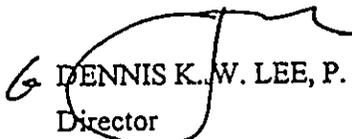
DR PAUL G LEMAHIEU SUPERINTENDENT OF EDUCATION  
DEPARTMENT OF EDUCATION  
STATE OF HAWAII  
PO BOX 2360  
HONOLULU HI 96804

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated December 6, 2000 on the Draft Environmental Assessment for the Kalapana Road Realignment Project.

We note that your department has no comments on the subject document.

Should you have any other further questions, please contact Mr. Ben Ishii at (808) 961-8327.

  
DENNIS K. W. LEE, P. E.  
Director

BI/kg

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



BRUCE S. ANDERSON, Ph.D., M.P.H.  
DIRECTOR OF HEALTH

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

In reply, please refer to:  
File:

00-238/epo

December 27, 2000

Mr. Ben Ishii  
Department of Public Works  
County of Hawaii  
25 Aupuni Street, Room 202  
Hilo, Hawaii 96720-4252

Dear Mr. Ishii:

Subject: Draft Environmental Assessment (DEA)  
Kalapana Road Realignment  
Kalapana, Hawaii  
TMK: 1-3-02, 1-3-03, 1-3-04

SSFM INTERNATIONAL, INC.  
RECEIVED

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Thank you for allowing us to review and comment on the subject project. We do not have any comments to offer at this time.

Sincerely,

GARY GILL  
Deputy Director  
Environmental Health Administration

c: HDHO  
SSFM International, Inc.  
OEQC

Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 5, 2001

GARY GILL DEPUTY DIRECTOR  
ENVIRONMENTAL HEALTH ADMINISTRATION  
DEPARTMENT OF HEALTH  
STATE OF HAWAII  
PO BOX 3378  
HONOLULU HI 96801

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated December 27, 2000 on the Draft Environmental Assessment for the Kalapana Road Realignment Project.

We note that your department did not have any comments on the subject document at this time.

Should you have any other further questions, please contact Mr. Ben Ishii at (808) 961-8327.

6 DENNIS K. W. LEE, P. E.  
Director

BI/kg

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



GILBERT COLOMA-ACAPAM, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

DEPUTIES  
JANET E. KAWELO  
LINNEL NISHIOKA

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION  
Kakuhihewa Building, Room 555  
601 Kamokila Boulevard  
Kapolei, Hawaii 96707

AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
CONSERVATION AND RESOURCES  
ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
LAND  
STATE PARKS  
WATER RESOURCE MANAGEMENT

December 28, 2000

Mr. Ben Ishii  
Department of Public Works  
County of Hawaii  
25 Aupuni Street  
Hilo, Hawaii 96720

LOG NO: 26643 ✓  
DOC NO: 0012PM03

Dear Mr. Ishii:

**SUBJECT: Draft Environmental Assessment for the Kalapana-Kapoho Beach Road  
Realignment Project  
Kamaili, Kauaea, and Kaueleau, Puna, Hawaii Island  
TMK: 1-3-02: Por. 06, 54-55, 68, 77-78, 90, 108; 1-3-03: Por. 06, and 1-  
3-04: Por. 13**

Thank you for the opportunity to review and comment on the subject document, which was received in our office on November 22, 2000. We apologize for the delay in our response.

The Draft EA indicates that the County of Hawaii, Department of Public Works is proposing to realign three existing segments of Highway 137, also known as the Kalapana-Kapoho Beach Road. The three sections of road, which are referred to in the Draft EA as Sites 3, 4 and 5, are being adversely affected by coastal erosion.

Included with the Draft EA was a report (Appendix D) on an archaeological inventory survey of the three project sites that was prepared by Paul H. Rosendahl, Ph.D., Inc. (PHRI). We are in the process of reviewing this report. Our initial review suggests that the survey was probably adequate, although the survey of Site 4 was not complete due to the lack of right-of-entry authorization for the archaeological crew to survey all of the alternative alignments. The areas that were not surveyed (Alternatives A, B and C) are occupied by homes, thus making it unlikely that significant historic sites would have been missed in the survey. The archaeological survey found just one significant historic site (Site 50-10-55-22,500), a dryland agricultural complex consisting of stone walls and clearing mounds located in realignment Site 3. This site was evaluated as significant solely for its information content and recommended for limited data recovery.

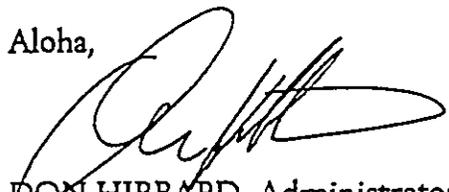
Mr. Ben Ishii  
Page Two

We do not agree with the PHRI significance evaluation and recommended mitigation treatment because of questions concerning the function of one unusual feature. This feature, which was singled out for special comment in the survey as having some unspecified non-agricultural function, is an unusually large mound (8.5 meters by 8.0 meters and 1.5 meters high) with a depression on top. The large size and depression suggest to us that this feature, which was not tested during the survey, might be a burial mound or religious structure.

There are two alternative ways you and your consultant, PHRI, could address our comments about site significance and recommended mitigation treatments. If PHRI agrees that the large mound is a possible burial or religious structure they could modify the significance evaluation to indicate that Site 22, 500 is provisionally significant under both Criterion D and E (culturally significant). This would result in a recommendation for data recovery, with possible preservation of a part of the site, if testing confirms the presence of human remains or evidence of a religious function. The second option is have PHRI go back into the field now and undertake test excavations of the mound to clarify the function, and then incorporate the results into a revised inventory survey report.

If you or your consultant should have any questions about our comments please contact our Hawaii Island archaeologist, Patrick McCoy (692-8029).

Aloha,



DON HIBBARD, Administrator  
Historic Preservation Division

PM:jk

- c. Mr. Ron Sato, SSFM  
OEQC  
Paul Rosendahl, PHRI

Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

**County of Hawaii**  
**DEPARTMENT OF PUBLIC WORKS**  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 9, 2001

DR DON HIBBARD ADMINISTRATOR  
HISTORIC PRESERVATION DIVISION  
DEPARTMENT OF LAND AND NATURAL  
RESOURCES  
STATE OF HAWAII  
KAKUHIHEWA BUILDING ROOM 555  
1001 KAMOKILA BOULEVARD  
KAPOLEI HI 96707

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated December 28, 2000 on the Draft Environmental Assessment (EA) for the Kalapana Road Realignment Project.

Regarding Site No. 4, Alternatives A, B, and C were eliminated from further consideration due to concerns raised by affected property owners. Consequently, the inventory survey focused on Alternatives D and E which are located along the existing road.

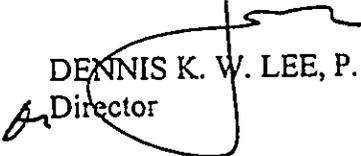
The archaeological inventory survey was conducted based upon consultation with your staff, and focused on identifying and avoiding any potentially significant sites associated with the road realignment. Consultation with your staff was also recently conducted by our archaeological consultant to address the comments pertaining to Site No. 3, in particular Feature AF of Site 22500, which resulted in developing a mutually agreeable course of action.

The Feature AF will continue to be included as a component feature within Site 22500, and the significance evaluation will be modified to indicate that Site 22500 is provisionally significant under both Criterion D and E. With the exception of Feature AF, the previously recommended limited data recovery with no subsequent preservation is an acceptable mitigation treatment for component features of Site 22500 that will be impacted by any roadway construction activity. Preservation by means of avoidance and protection, without any testing or additional study, as an

Department of Land and Natural Resources  
Page 2  
January 9, 2001

acceptable mitigation treatment for Feature AF because it can be avoided and is situated some distance inland from the realignment corridor.

Should you have any other questions, please contact Mr. Ben Ishii at (808) 961-8327.

  
DENNIS K. W. LEE, P. E.  
Director

BI/kg

BENJAMIN J. CAYETANO  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097



KAZU HAYASHIDA  
DIRECTOR

DEPUTY DIRECTORS  
BRIAN K. MINAAI  
GLENN M. OKIMOTO

DEC 26 2000

IN REPLY REFER TO:

HWY-PS  
2.1172

Mr. Ben Ishii  
Department of Public Works  
County of Hawaii  
25 Aupuni Street, Room 202  
Hilo, Hawaii 96720-4252

SSFM INTERNATIONAL, INC.  
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DEC 26 2000  
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Dear Mr. Ishii:

Subject: Draft Environmental Assessment (DEA) for the Kalapana Road Realignment,  
Island of Hawaii, Puna District, TMK: 1-03-02, 1-03-03 & 1-03-04

thank you for transmitting the above document for our review and comments.

We have no objections to the proposed project. Our comments during the early consultation phase for the preparation of the EA have been satisfactorily addressed.

Very truly yours,

KAZU HAYASHIDA  
Director of Transportation

c: Mr. Ronald A. Sato  
SSFM International, Inc.  
501 Sumner Street, Suite 502

Office of Environmental Quality and Control (OEQC)  
Department of Health  
State of Hawaii  
235 South Beretania Street, Room 102  
Honolulu, Hawaii 96813

Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 5, 2001

BRIAN MINAAI DIRECTOR-DESIGNATE  
DEPARTMENT OF TRANSPORTATION  
STATE OF HAWAII  
869 PUNCHBOWL STREET  
HONOLULU HI 96813-5097

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated December 26, 2000 on the Draft Environmental Assessment for the Kalapana Road Realignment Project.

We note that your department has no objections to the proposed project, and that your comments provided as part of the early consultation phase for the preparation of this Draft Environmental Assessment have been addressed.

Should you have any other further questions, please contact Mr. Ben Ishii at (808) 961-8327.

  
DENNIS K. W. LEE, P. E.  
Director

BI/kg



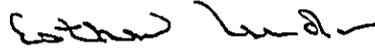
Ronald A. Sato, AICP  
November 30, 2000  
Page 2

3. We would like to point out that Figure 1.2 is labeled "Soil Survey Map of Realignment Sites" but the figure refers to a map of the State Land Districts on USGS Quad H-72, Pahoia South.
4. In regard to Section 4.3 Historic and Archaeological Resources, clarification should be provided if the Historic Preservation Division, Department of Land and Natural Resources, formally approved the limited archaeological mitigation work and verified by a written transmittal.

We have no further comments to offer at this time. We appreciate the opportunity to comment on the subject application.

Should you have any questions, please feel free to call me or Russell Kumabe of our office at 587-3822.

Sincerely,



ESTHER UEDA  
Executive Officer

EU:aa

Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 5, 2001

ESTHER UEDA EXECUTIVE OFFICER  
LAND USE COMMISSION  
DEPARTMENT OF BUSINESS ECONOMIC DEVELOPMENT & TOURISM  
STATE OF HAWAII  
PO BOX 2359  
HONOLULU HI 96804-2359

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

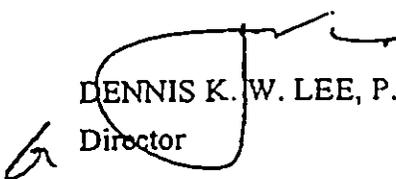
Thank you for your letter dated November 30, 2000 on the Draft Environmental Assessment (EA) for the Kalapana Road Realignment Project.

We note your department's confirmation that the three existing sections (identified as Sites 3, 4, and 5) of Kapoho-Kalapana Beach Road proposed to be realigned are within the State Land Use Conservation District. Areas inland, or mauka, of this road are in the Agricultural District.

The Final Environmental Assessment will reflect that use of Conservation District lands such as those improvements associated with Site No. 4 serve as another trigger for environmental review under Chapter 343, HRS. The title for Figure 1.2 would also be appropriately revised.

Regarding clarification of the limited archaeological mitigation work being recommended, consultation with staff from the State Historic Preservation Division (SHPD) was conducted by our archaeological consultant in determining this recommendation. However, appropriate coordination with SHPD would be performed during the project's design to confirm mitigation work.

Should you have any other further questions, please contact Mr. Ben Ishii at (808) 961-8327.

  
DENNIS K. W. LEE, P. E.  
Director

BI/kg

BENJAMIN J. CAYETANO  
GOVERNOR



GENEVIEVE SALMONSON  
DIRECTOR

STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

235 SOUTH BERETANIA STREET  
SUITE 702  
HONOLULU, HAWAII 96813  
TELEPHONE (808) 586-4186  
FACSIMILE (808) 586-4186  
December 21, 2000

Ms. Ben Ishii  
Department of Public Works  
County of Hawai'i  
25 Aupuni Street, Room 202  
Hilo, Hawai'i 96720-4252

Dear Mr. Ishii:

Having reviewed the draft environmental assessment for the Kalapana Road Realignment Project, Tax Map Key: (3) 1-03-02, 1-03-03, and 1-03-04, we offer the following comments for your consideration and response:

1. **CULTURAL IMPACT ASSESSMENT:** We note that the document contains a discussion of historic and archaeological resources, buttressed by an archaeological inventory survey prepared by Dr. Paul Rosendahl. While historic and archaeological considerations appear to be adequately covered in the document, cultural considerations need to be addressed. For example, Appendix G prepared by AECOS, Inc. states in pertinent part (on page 8) that "[t]he shoreline area is rich in limu and 'opihi, marine intertidal species often sought as food items." Questions to consider include: how will this realignment affect these gatherings of limu and 'opihi? Will botanical species of cultural significance to the people of Puna be displaced by this project? Who do we need to contact concerning these activities? Act 50, Session Laws of Hawai'i 2000, requires that actions requiring an environmental assessment assesses cultural impacts. Enclosed is a copy of the "Cultural Impact Assessment Guidelines" adopted by the Environmental Council in 1997 for your use in meeting this requirement prior to submission of a final environmental assessment. This would include contacting neighbors and community members in the Puna district to ascertain what cultural uses (if any) are occurring in the region encompassing the project. A directory of cultural impact assessment providers can also be found on the OEQC website at <http://www.state.hi.us/health/oeqc/index.html>.
2. **USE OF GLASPHALT IN ROADWAY:** Please discuss the extent to which you will consider using glasphalt in paving the roadway.

If there are any questions, please call Leslie Segundo, Environmental Health Specialist, at (808) 586-4185. Thank you for the opportunity to comment.

Sincerely,

GENEVIEVE SALMONSON  
Director

c: Ronald A. Sato, AICP, SSFM International, Inc.

SSFM INTERNATIONAL, INC.  
RECEIVED

DEC 21 2000

FRS

FILE

UNOFFICIAL VERSION

HOUSE OF REPRESENTATIVES  
TWENTIETH LEGISLATURE, 2000  
STATE OF HAWAII

H.B. NO. 2895 H.D. 1

A BILL FOR AN ACT

RELATING TO ENVIRONMENTAL IMPACT STATEMENTS.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The legislature finds that there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaii's culture, and traditional and customary rights.

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the "aloha spirit" in Hawaii. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture *and the exercise thereof is necessary* to ensure the continued existence, development, and exercise of native Hawaiian culture.

The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and (2) Amend the definition of "significant effect" to include adverse effects on cultural practices.

SECTION 2. Section 343-2, Hawaii Revised Statutes, is amended by amending the definitions of "environmental impact statement" or "statement" and "significant effect", to read as follows:

""Environmental impact statement" or "statement" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic [and] welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects.

The initial statement filed for public review shall be referred to as the draft statement and shall be distinguished from the final statement which is the document that has incorporated the public's comments and the responses to those comments. The final statement is the document that shall be evaluated for acceptability by the respective accepting authority.

"Significant effect" means the sum of effects on the quality of the environment, including actions that irrevocably commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the State's environmental policies or long-term environmental goals as established by law, or adversely affect the economic [or] welfare, social welfare[.], or cultural practices of the community and State."

SECTION 3. Statutory material to be repealed is bracketed. New statutory material is underscored.

SECTION 4. This Act shall take effect upon its approval.

*Approved by the Governor as Act 50 on April 26, 2000*

## GUIDELINES FOR ASSESSING CULTURAL IMPACTS

Adopted by the Environmental Council, State of Hawaii

November 19, 1997

### I. INTRODUCTION

It is the policy of the State of Hawaii under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making. Articles IX and XII of the State Constitution, other state laws, and the courts of the state require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups. Chapter 343 also requires environmental assessment of cultural resources, in determining the significance of a proposed project.

The Environmental Council encourages preparers of environmental assessments and environmental impact statements to analyze the impact of a proposed action on cultural practices and features associated with the project area. The Council provides the following methodology and content protocol as guidance for any assessment of a project that may significantly affect cultural resources.

### II. CULTURAL IMPACT ASSESSMENT METHODOLOGY

Cultural impacts differ from other types of impacts assessed in environmental assessments or environmental impact statements. A cultural impact assessment includes information relating to the practices and beliefs of a particular cultural or ethnic group or groups.

Such information may be obtained through scoping, community meetings, ethnographic interviews and oral histories. Information provided by knowledgeable informants, including traditional cultural practitioners, can be applied to the analysis of cultural impacts in conjunction with information concerning cultural practices and features obtained through consultation and from documentary research.

In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access to gathering areas would be included in the assessment. An ahupua'a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices associated with the project area. In some cases, cultural practices are likely to extend beyond the ahupua'a and the geographical extent of the study area should take into account those cultural practices.

The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.

The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural, including submerged cultural resources, which support such cultural practices and beliefs.

The Environmental Council recommends that preparers of assessments analyzing cultural impacts adopt the following protocol:

- (1) identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua'a;
- (2) identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;
- (3) receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;
- (4) conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;
- (5) identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
- (6) assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Interviews and oral histories with knowledgeable individuals may be recorded, if consent is given, and field visits by preparers accompanied by informants are encouraged. Persons interviewed should be afforded an opportunity to review the record of the interview, and consent to publish the record should be obtained whenever possible. For example, the precise location of human burials are likely to be withheld from a cultural impact assessment, but it is important that the document identify the impact a project would have on the burials. At times an informant may provide information only on the condition that it remain in confidence. The wishes of the informant should be respected.

Primary source materials reviewed and analyzed may include, as appropriate: Mahele, land court, census and tax records, including testimonies; vital statistics records; family histories and genealogies; previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs; and other archival documents, including correspondence, newspaper or almanac articles, and visitor journals. Secondary source materials such as historical, sociological, and anthropological texts, manuscripts, and similar materials, published and unpublished, should also be consulted. Other materials which should be examined include prior land use proposals, decisions, and rulings which pertain to the study area.

### III. CULTURAL IMPACT ASSESSMENT CONTENTS

In addition to the content requirements for environmental assessments and environmental impact statements, which are set out in HAR §§ 11-200-10 and 16 through 18, the portion of the assessment concerning cultural impacts should address, but not necessarily be limited to, the following matters:

1. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.
2. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.
3. Ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.
4. Biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area.
5. A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.

6. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site.
7. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.
8. An explanation of confidential information that has been withheld from public disclosure in the assessment.
9. A discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs.
10. An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.
11. A bibliography of references, and attached records of interviews which were allowed to be disclosed.

The inclusion of this information will help make environmental assessments and environmental impact statements complete and meet the requirements of Chapter 343, HRS. If you have any questions, please call us at 586-4185.

Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 8, 2001

GENEVIEVE SALMONSON DIRECTOR  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL  
STATE OF HAWAII  
235 SOUTH BERETANIA STREET SUITE 702  
HONOLULU HI 96813

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated December 21, 2000 on the Draft Environmental Assessment (EA) for the Kalapana Road Realignment Project.

Cultural considerations were addressed in the Draft EA under the archaeological subsection discussing recommendations and in Chapter 10 of the document. Nevertheless, more discussion would be provided addressing cultural considerations in the archaeological section of the Final EA/FONSI.

The collection of limu and opihi along this shoreline, as well as other areas of the island, is an activity available to the general public and is often conducted by island residents for personal consumption. Thus, the general presence of these species along the shoreline does not necessarily validate the presence of traditional Hawaiian cultural practices. The report in Appendix G similarly stated that shore casting was also a popular sport occurring along this coastline by island residents. In addition, ocean conditions along this coastline are frequently hazardous from rough waves limiting exploitation of these resources.

Nevertheless, the project would not affect the general public's ability to collect these food items since it only involves realigning short sections of the road further inland or raising sections of it to address concerns with coastal erosion affecting accessibility along this roadway. It should also be noted that some of the makai properties along this shoreline area are privately owned limiting public access to a certain extent. Consequently, the general public would continue to have access to this shoreline to conduct activities with this project.

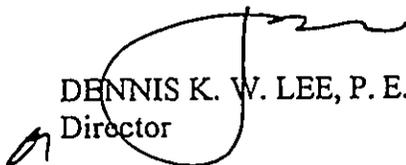
Concerning botanical species, there were no known threatened or endangered species of concern present in the project area. The botanical study determined that 80 percent of the species present in the area were alien species and only 3 percent were native. All native plant species were also native to the Hawaiian Islands and elsewhere. Consequently, there are no known botanical species of cultural significance being displaced by the project. Alternatives developed were designed to minimize the number of trees affected where practicable. Furthermore, copies of the Draft EA were distributed to community associations along this coastline along with the Puna Outdoor Circle, and no concerns with botanical species or other cultural issues were raised.

We appreciate you providing us with copies of Act 50, Session Laws of Hawaii 2000 along with your department's guidelines for assessing cultural impacts of which we already had. We note that your guidelines provide a methodology as "guidance" for projects that may "significantly affect cultural resources." However, this project will not significantly affect cultural resources.

This project only involves the realigning of short sections of the existing road due to the coastal erosion occurring. Thus, the project is not expected to adversely impact any traditional cultural practices occurring in the project area. The archaeological inventory survey provided a detailed discussion of the area's history and settlement patterns of which information was available to make a reasonable assessment of the likelihood of traditional Hawaiian cultural practices being significantly affected by the project. Early consultation letters and copies of the Draft EA were also distributed to community associations in the area of which no traditional cultural practice issues were identified. In addition, a public informational meeting in preparation of this Draft EA was held along with earlier public meetings held to brief the community on this project.

Regarding the use of asphalt in roadway construction, this alternative has not been considered at this time. However, this material may be considered for use in the design phase of the project if feasible and practicable given cost considerations.

Should you have any other questions, please contact Mr. Ben Ishii at (808) 961-8327.

  
DENNIS K. W. LEE, P. E.  
Director

BI/kg



DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII

25 AUPUNI STREET • HILO, HAWAII 96720  
TELEPHONE (808) 961-8660 • FAX (808) 961-8657

November 28, 2000

TO: Mr. Ben Ishii, Deputy Division Chief  
Department of Public Works, Engineering Division

FROM: Milton D. Pavao, Manager

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE KALAPANA ROAD  
REALIGNMENT PROJECT  
TAX MAP KEYS: 1-03-02, 1-03-03, AND 1-03-04  
PUNA, HAWAII

Thank you for the opportunity to review the *Draft Environmental Assessment* for the project.

We have no comments or objections to the proposed work.

Please call our Engineering Division at (808) 961-8665 if you have any questions.

Sincerely yours,

Milton D. Pavao, P.E.  
Manager

ON:gms

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SSFM INTERNATIONAL, INC.  
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FILE \_\_\_\_\_

... *Water brings progress...*

Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
(808) 961-8321 • Fax (808) 961-8630

January 5, 2001

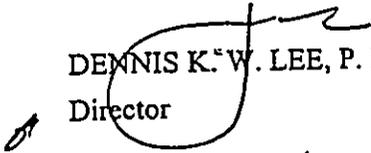
MILTON D PAVAO PE MANAGER  
DEPARTMENT OF WATER SUPPLY  
COUNTY OF HAWAII  
25 AUPUNI STREET  
HILO HI 96720

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated November 28, 2000 on the Draft Environmental Assessment for the Kalapana Road Realignment Project.

We note that your department did not have any objections to the proposed project or comments on the subject document at this time.

Should you have any other further questions, please contact Mr. Ben Ishii at (808) 961-8327.

  
DENNIS K. W. LEE, P. E.  
Director

BI/kg



Harry Kim  
Mayor



Dennis K. W. Lee  
Director

Jiro A. Sumada  
Deputy Director

County of Hawaii  
DEPARTMENT OF PUBLIC WORKS  
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252  
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January 5, 2001

EDWARD BUMATAY FIRE CHIEF  
FIRE DEPARTMENT  
COUNTY OF HAWAII  
80 PAUAHI STREET SUITE 101  
HILO HI 96720-4239

SUBJECT: KALAPANA ROAD REALIGNMENT PROJECT  
DRAFT ENVIRONMENTAL ASSESSMENT COMMENTS

Thank you for your letter dated November 30, 2000 on the Draft Environmental Assessment for the Kalapana Road Realignment Project.

We note that your department did not have any comments on the subject document at this time.

Should you have any other further questions, please contact Mr. Ben Ishii at (808) 961-8327.

DENNIS K. W. LEE, P. E.

Director

BI/kg

# APPENDIX C

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## *Geotechnical Engineering Consultation; Kalapana Road Realignment (Route 137) Site Nos. 3, 4, And 5*

Prepared By:  
Geolabs, Inc. (March 2000)



# **GEOLABS, INC.**

*Geotechnical Engineering and Drilling Services*

March 16, 2000  
W.O. 4422-00

**Mr. Calvin Tsuda, P.E.**  
**SSFm Engineers, Inc.**  
501 Sumner Street, Suite 502  
Honolulu, HI 96817

**GEOTECHNICAL ENGINEERING CONSULTATION  
KALAPANA ROAD REALIGNMENT (ROUTE 137)  
SITE NOS. 3, 4, AND 5  
DISTRICT OF PUNA, ISLAND OF HAWAII**

Dear Mr. Tsuda:

In accordance with your request and our fee proposal dated July 23, 1999, we have conducted the research of geologic information and performed a general reconnaissance of the above-referenced project sites. This report is presented to summarize our findings and site observations to provide some geologic input pertaining to the proposed realignment of portions of the existing Kalapana - Kapoho Beach Road, Route 137.

### **PROJECT CONSIDERATIONS**

The project site is located along the rural Highway Route 137, which extends from Kapoho (at the northern end) to Kaimu (at the southern end) in the District of Puna on the Island of Hawaii. Our involvement with the Kalapana Road project is in conjunction with the proposed realignment of three relatively short-length segments of the Kalapana Road located in the Opihikao and Kamaili areas.

The three segments of the Kalapana Road considered for realignment have been identified as Site Nos. 3, 4, and 5. Site No. 3 is located approximately ½ mile southwesterly of Mackenzie State Park in the vicinity of TMKs 1-3-3: 6. Site No. 4 is located at Opihikao at the boundary between TMKs 1-3-2 and 1-3-4. Site No. 5 is located near Kamaili in the vicinity of TMKs 1-3-2: 76 and 108. The general location of the three project sites are shown on the Project Location Map, Plate 1.

Site Nos. 3, 4, and 5, located along Kalapana Road, are experiencing some ground disturbance of the seaward facing road shoulder from the effects of ocean wave erosion. As a result, we understand it is desired to realign the affected roadway segments further inland to reduce the effects of wave wash and coastal erosion.

### **REGIONAL GEOLOGY**

The Island of Hawaii, the largest in the Hawaiian Archipelago, covers an area of approximately 4,000 square miles and is about twice the size of all of the other Hawaiian Islands combined. The island was formed by the activity of five shield volcanoes including

2006 Kalihi Street • Honolulu, Hawaii 96819  
Phone: (808) 841-5064 • Facsimile: (808) 847-1749 • E-mail: hawaii@geolabs.net

Hawaii • California • Taiwan

the following: Kohala - long extinct; Mauna Kea - some activity during recent geologic times; Hualalai - last erupted in 1801 and is considered dormant; and Mauna Loa and Kilauea - both still active. The project site is situated at the southeast-facing coastline located on the lower, eastern flank of Kilauea Volcano.

Kilauea Volcano is the youngest shield volcano, which comprises about 14 percent of the land area on the Island of Hawaii. Kilauea has been erupting continuously since 1983, although the oldest lava erupted from Kilauea dates back to about 600,000 years before the present time. The structure of Kilauea Volcano consists of a central caldera (summit) and two primary rift zones, which extend from the caldera easterly toward Cape Kumukahi and southwesterly toward the Ka'u District, as shown on the Project Location Map, Plate 1. The rift zones are elongated areas of ground fissures where volcanic activity such as earthquakes and volcanic eruptions are concentrated.

The Kalapana Road project site is located along the coastline on the eastern flank of Kilauea in between the primary volcano rift zones. The Kalapana Road realignment project sites appear to be underlain by bedded lava flows consisting of pahoehoe lava and thin interbedded clinker seams. Based on our site observations, there may be a very minimal surface soil cover.

#### **Ground Subsidence**

Since the start of the latest eruptive event at Kilauea, which began in 1983, the Hawaiian Volcano Observatory (HVO) has measured a slow and steady subsidence of the summit and south flank regions of Kilauea Volcano. The general movement has been in a downward and seaward direction and is believed to be the result of gravitational settling of the volcano mass and the underground movement of magma at the summit and rift zones. The observed ground movement has been most pronounced near the summit of Kilauea and on the southern flank at the vicinity of the Hilina Pali. The location of the Kilauea summit and Hilina Pali are shown on the Project Location Map, Plate 1.

Furthermore, some sudden downward and seaward regional ground movements were recorded as a result of the 1975 magnitude 7.2 earthquake, which was centered just west of Kalapana at a depth of about 6 miles below the ground surface. Parts of the southern flank of Kilauea moved suddenly seaward approximately 9 to 26 feet and subsided about 3 to 12 feet during the earthquake. Some areas that experienced the large magnitude ground deformation were the vicinity of Halape and Keahou Landing, located approximately 20 miles in the southwesterly direction from the Kalapana Road project site.

In the vicinity of the eastern flank of Kilauea, including the coastline at Opihikao and Kamaili, the recorded movement was approximately 1.7 feet downward and 2 feet seaward. The lesser ground deformation experienced at Opihikao and Kamaili (located on the eastern flank of Kilauea) is believed to be a result of the greater distance from the more unstable and active zones of ground deformation at the rifts.

**GEOLABS, INC.**

Hawaii • California • Taiwan

Data pertaining to ground deformation resulting from other large historical earthquakes are sparse, especially in areas located away from the Kilauea summit and rift zones where monitoring by the HVO is performed less frequently. Furthermore, routine ground deformation surveys (leveling surveys) are usually confined to the Kilauea summit and rift zone regions.

Based on data obtained from the USGS, the general whole-island subsidence rate calculated from Hilo tide information is about -0.15 inch per year relative to sea level. Over a future 50-year time period, the general subsidence would be estimated at about -7.68 inches relative to sea level.

Based on our review of the available ground subsidence data for the Opihikao to Kamaili area, it could be estimated that over the next 50 years some sudden ground subsidence may occur as a result of large earthquake activity. The magnitude of the subsidence is very difficult to estimate due to the relatively short length of recorded history and sparse leveling data available. A rough order of magnitude estimate may be about 10 feet of ground subsidence from sudden subsidence events over approximately 50 years. This is based on the largest sudden coastal subsidence of about 11 feet recorded at Halape from the 1975 earthquake.

#### **EXISTING SITE CONDITIONS**

A visit was made to observe the existing conditions at the Kalapana Road Site Nos. 3, 4, and 5. At the time of our site visit, the weather was generally fair with light winds and relatively low to moderate wave activity observed along the coastline. Based on our previous experience at the site, the ocean conditions can be very rough with large wave conditions occurring during strong trade wind episodes and during southerly ocean swell events. Following are descriptions of the observed site conditions.

##### **Site No. 3**

The existing roadway is located on elevated ground bounded by a rocky cliff ranging between about 15 to 30 feet in height above the adjacent sea level. The section of roadway observed as being potentially susceptible to erosion and ocean wave encroachment is estimated to be about 1,000 feet in length. The subject section of roadway consists of a slightly undulating ground surface bordering a shoreline cove that is bounded by prominent rock land points extending seaward to the north and south of the site. A short length of the roadway located at the midsection of the subject road segment appears to be better protected from shoreline erosion due to an existing rock outcrop, which extends seaward away from the road alignment.

Within the subject 1,000-foot segment of roadway, there appear to be two separate zones of erosion separated by the midsection rock outcrop previously mentioned. The northern zone of the roadway is bordered by a guardrail, which separates the road from a taller and steeper cliff. The southern zone of the roadway dips lower in elevation, thus the rock slope separating the road from the shoreline is less steep and lower in height.

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Our observations indicate that the northern zone of the roadway may have been previously realigned in a landward direction as evidenced by some abandoned asphalt pavement and lane striping located adjacent to the existing guardrail. A short length section of retaining wall covers the upper half of the exposed cliff. It appears that a portion of the existing wall had failed and washed away exposing the rock cliff face.

Based on our evaluation of the northern zone of the site, it appears that the rock cliff bounding the northern zone of the roadway is experiencing active erosion and undermining of the exposed rock formation by ocean waves. The base of the cliff is being undercut by wave wash creating some potentially unstable overhanging blocks of layered rock formation. With the passage of time, the undercut rock layer may fracture and topple seaward taking with it the less resistant clinker layers located above and thus augmenting the slow landward retreat of the cliff line at the site. It does not appear that future land subsidence would significantly affect this zone due to the present higher elevation topography. The most significant consideration for this northern zone is the continued erosion of the cliff by wave action. Based on our observation of the site including the topography and amount of wave action, consideration should be given to realigning the roadway a minimum of about 50 feet in the mauka direction.

Based on our evaluation of the southern zone of this site, it appears that the existing lower and undulating topography is more susceptible to wave inundation of the existing roadway due to the gentler seaward land slope and terrain. Wave erosion of the shoreline does not appear to be as significant a consideration as the wave inundation caused by the potential future coastline ground subsidence. Future ground subsidence could cause an increase in wave inundation of this roadway segment. Based on our evaluation of the surrounding topography and the potential for future ground subsidence, consideration should be given to realigning the roadway a minimum of about 100 feet in the mauka direction for this southern portion of the site.

#### **Site No. 4**

The existing Kalapana Road located at Site No. 4 traverses generally lower elevation terrain bordering the shoreline. Based on our observations, there are two segments of the existing roadway that appear to be most susceptible to ocean wave inundation.

The first consists of about a 600-foot length of roadway that extends between the roadside mailbox addresses noted as 13-4208 and 13-6338. Based on our observations, it appears that wave wash may periodically encroach within the existing road alignment due to the gradual slope of the rocky ground located on the seaward side of the roadway. This road segment appears to be susceptible to wave inundation that may be augmented by potential future ground subsidence due to the existing low ground elevations relative to sea level and the lack of substantial rock outcrop barriers situated seaward of the roadway. Based on our observation of the surrounding higher elevation terrain and the proximity of some residential properties, consideration may be given to realigning the roadway a minimum of about 30 feet in the mauka direction.

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The second segment consists of about 200 feet of roadway on a slight curve that fronts the address of 13-6390. Based on our observation of the existing line of shoreline vegetation, recent deposits of sand, and the ground topography located seaward of the road, it appears that some occasional wave wash may encroach upon the roadway corridor during high surf events. This segment appears to be located at a higher elevation from the road segment previously mentioned and some substantial rock outcrops are located seaward of the existing road; therefore, the risk of wave inundation may be lower. Based on our observation of the surrounding terrain and the proximity of the nearby home, consideration may be given to realigning the roadway a minimum of about 20 to 30 feet in the mauka direction.

#### **Site No. 5**

The existing Kalapana Road located at Site No. 5 traverses the rocky shoreline comprising a small cove located at a dip in the road. The length of the affected road segment appears to be on the order of about 500 feet. Based on our observation of a line of coconut trees with exposed roots, it appears that the coastline may be experiencing some erosion of the rock shoreline by wave action. Furthermore, due to the observed dip in topography and proximity of the road to the shoreline, it appears that the site may be susceptible to inundation from wave wash during high surf episodes.

A scarp of approximately 15 to 25 feet in height separates the road elevation from a boulder shelf located at the foot of the scarp. The surf was observed breaking relatively close to shore with some rough wash encroaching to the foot of the scarp. It appears that some active shoreline erosion is occurring causing a slow landward retreat of the scarp face. Despite the height of the scarp, the relatively close proximity of the rough breaking surf appears to render the site susceptible to wave inundation during high surf events. In addition, any future coastal land subsidence may potentially accelerate the scarp erosion.

Based on our observation of the surrounding gentle sloping ground topography, consideration may be given to realigning the roadway a minimum of about 100 feet in the mauka direction to reduce the potential for wave inundation at the site.

**CONCLUSION**

The general whole-island subsidence rate is considered to have a relatively low impact on the realignment of the roadway segments. The potential for sudden ground subsidence as a result of large earthquake activity may have a greater effect on the planning for realignment of the roadway segments. However, historical data pertaining to measured coastal ground subsidence resulting from earthquakes is sparse and the occurrence of earthquakes and their effects cannot be readily predicted.

It may be concluded that the possibility exists for some sudden coastal ground subsidence to occur in the future. Based on the available data, it may be possible to estimate that under some conditions about 10 feet of subsidence could occur as a result of a large earthquake. The estimates provided for the roadway realignment distances are based on our observation of the site and are in consideration of the general whole-island subsidence rate.

**LIMITATIONS**

The discussions presented herein are based upon research of available information from the HVO and visual observations and our knowledge of the area with respect to coastal erosion processes. This report has been prepared for specific application to the Kalapana Road realignment of roadway Site Nos. 3, 4, and 5 only. The discussions presented herein are professional opinions derived in accordance with generally accepted geotechnical engineering principles and practices. No warranty is expressed or implied.

**CLOSURE**

We appreciate the opportunity to provide you with our geologic consultation services for this project. We hope to provide you with continued geotechnical engineering support as the plans for construction unfold. If you have questions or need additional information, please contact our office.

Respectfully submitted,

**GEOLABS, INC.**

By Steven F. Carr  
**Steven F. Carr, R.G.**  
Project Geologist



By Clayton S. Mimura  
**Clayton S. Mimura, P.E.**  
President

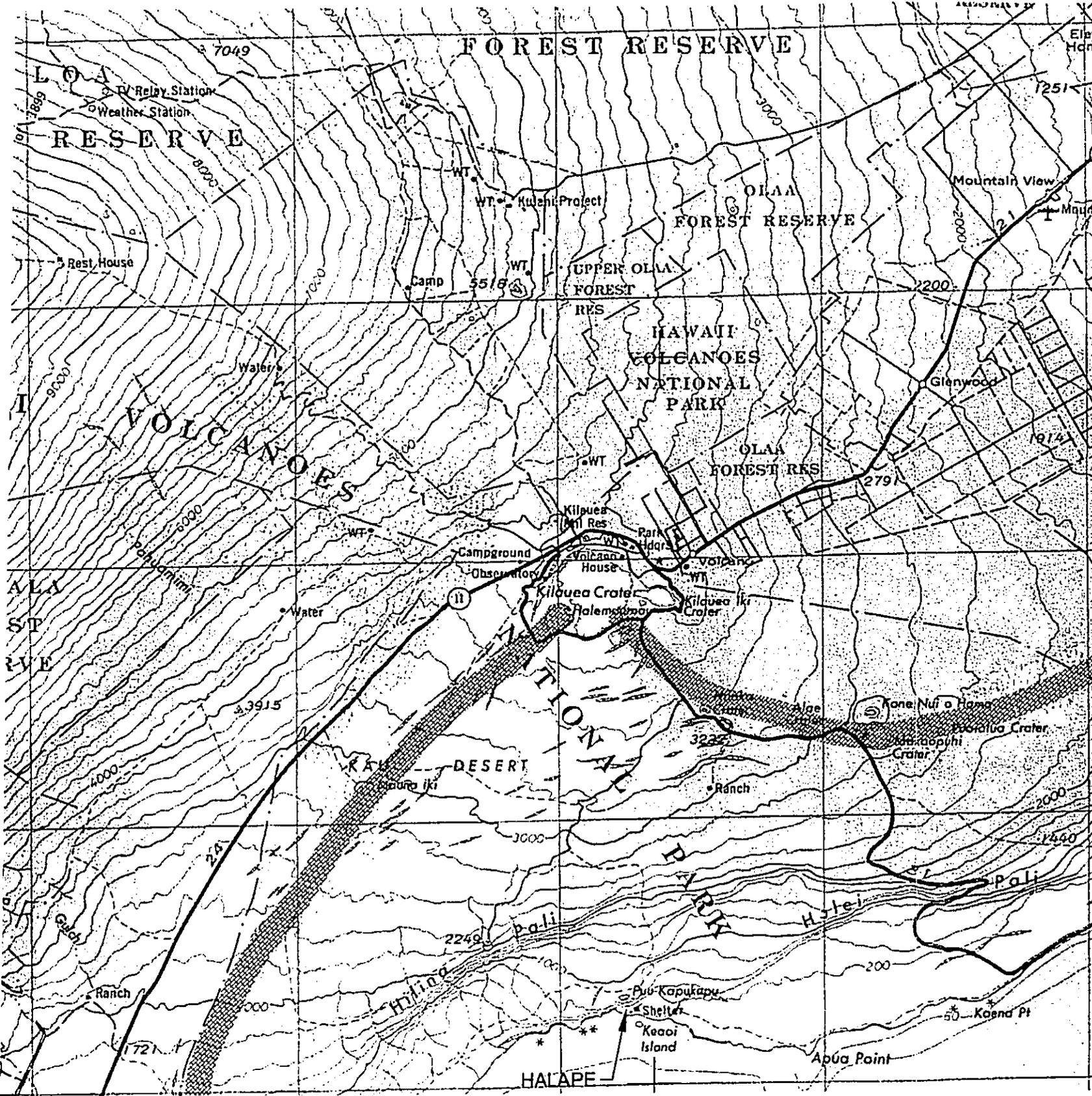
THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION.

ATTACHMENT: PROJECT LOCATION MAP, PLATE 1

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CSM:SC:mr

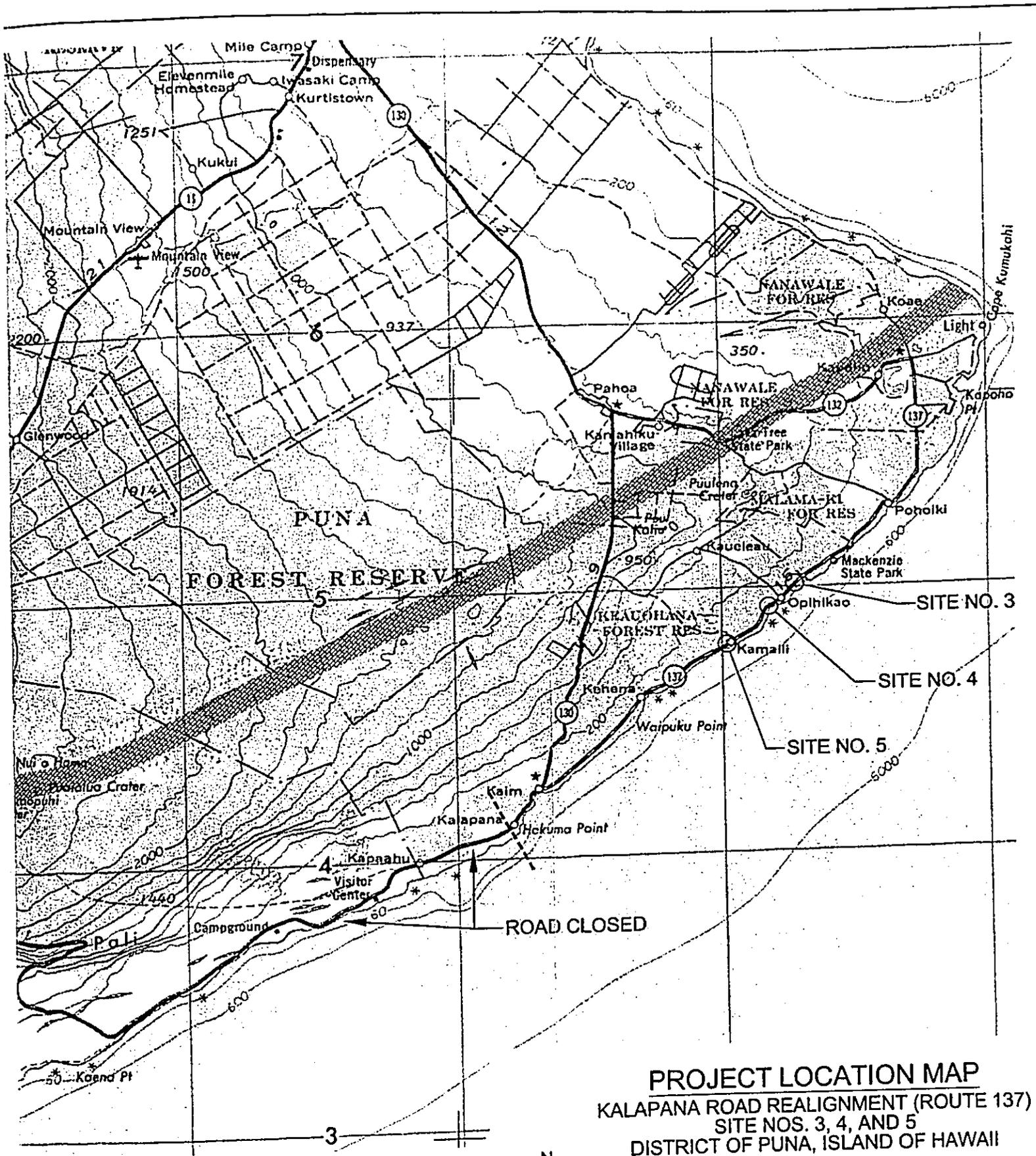


**LEGEND:**

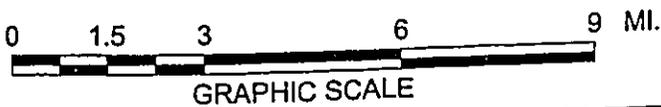
 GENERAL LOCATION OF RIFT ZONE



REFERENCE: U.S.G.S. MAP OF ISLAND OF HAWAII (1975).



**PROJECT LOCATION MAP**  
**KALAPANA ROAD REALIGNMENT (ROUTE 137)**  
**SITE NOS. 3, 4, AND 5**  
**DISTRICT OF PUNA, ISLAND OF HAWAII**



			<b>GEOLABS, INC.</b>		
			Geotechnical Engineering		
DATE	DRAWN BY	PLATE			
MARCH 2000	TSK				
SCALE	W.O.	1			
1"=3 MILES	4422-00				

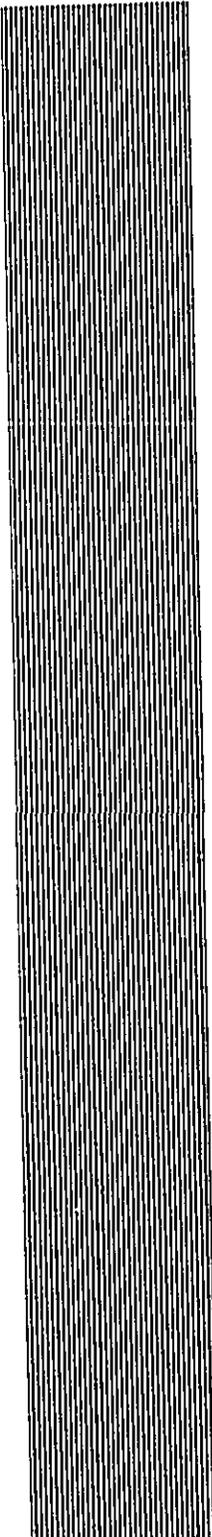
# APPENDIX D

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## *Archaeological Inventory Survey; Kalapana Road Realignment Project*

Prepared By:  
PHRI (October 2000, Revised January 2001)

Report 1999-011101



## **Archaeological Inventory Survey Kalapana Road Realignment Project**

Lands of Kamaili, Kauaea, and Kaueleau  
District of Puna, Island of Hawai'i

**PHRI**

Paul H. Rosendahl, Ph.D., Inc.

*Archaeological • Historical • Cultural Resource Management Studies & Services*

Report 1999-011101

# Archaeological Inventory Survey Kalapana Road Realignment Project

Lands of Kamaili, Kauaea, and Kaueleau  
District of Puna, Island of Hawai'i  
(TMK:3-1-3-02;03;04)

*BY*

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*Alan B. Corbin, M.A.*

*PREPARED FOR*

---

*Ronald Sato  
SSFMI International  
501 Sumner Street, Suite 502  
Honolulu, Hawai'i 96817*

*JANUARY 2001*

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**PHRI**

**Paul H. Rosendahl, Ph.D., Inc.**  
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HAWAII: 224 Waiānuenuē Avenue • Hilo, Hawaii 96720 • (808) 969-1763 • GUAM: P.O. Box 23305 • G.M.F., Guam 96921 • (671) 472-3117

# SUMMARY

At the request of Mr. Ronald Sato of SSFM International, Inc., Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted an archaeological inventory survey of the Kalapana Road Realignment Project, located in the Lands of Kauaea, Kaueleau, and Kamaili, District of Puna, Island of Hawai'i. The project area comprises, specifically, Realignment Sites 3, 4, and 5, which are within portions of several TMK: 3-1-3-02:por.06,54,55,58,68,76,77,78,90,108; 3-1-3-03:por.06; and 3-1-3-04:por.13. The overall purpose of the project was to enable SSFM International to obtain archaeological clearance from the Hawai'i State Historic Preservation Division (SHPD) in order to proceed with construction work associated with realigning Kalapana Road. The inventory survey was done in accordance with the appropriate standards of the Hawai'i State Historic Preservation Division as contained in the draft Administrative Rules, Title 13, Subtitle 13, Chapter 276 (1998).

The survey fieldwork was conducted on September 27-29, 2000 by PHRI Supervisory Archaeologist Alan B. Corbin, M.A., and Field Archaeologist Bruce M. Gothar. The specific objectives of the survey were fourfold: (a) to determine the presence or absence of any potentially significant archaeological remains; (b) to collect information sufficient to evaluate the potential significance of any identified archaeological remains; (c) to evaluate the potential impacts of proposed road realignment construction upon any identified significant remains; and (d) to recommend appropriate measures that would mitigate any adverse impacts upon identified significant remains.

During the fieldwork, one site was identified (Site 22500), a prehistoric agricultural complex consisting of numerous walls and mounds. On the basis of the project findings, Site 22500 is assessed as provisionally significant for information content (Criterion D) and cultural value (Criterion E). The only feature at the site assessed as significant for cultural value is Feature AF, a large rock mound that may be a burial or religious structure. This feature is outside the project area and will not be affected by the construction of the road corridor; the feature will thus be preserved by avoidance. All other features of the site are assessed as significant solely for information content.

The portion of Site 22500 within the project area is recommended for limited archaeological mitigation work in the form of limited data recovery excavations. The excavations should focus on the recovery of materials for dating the agricultural complex. The recovery of such dating information would constitute sufficient recovery of significant archaeological information contained at the site; no further work would be necessary, and the portion of the site within the project area would not require preservation.

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# INTRODUCTION

## PROGRAM BACKGROUND

At the request of Mr. Ronald Sato of SSFM International, Inc., Paul H. Rosendahl, Ph.D., Inc. (PHRI) conducted an archaeological inventory survey of the Kalapana Road Realignment Project, located in the Lands of Kauaea, Kaueleau, and Kamaili, District of Puna, Island of Hawai'i. The project area comprises, specifically, Realignment Sites 3, 4, and 5, which are within portions of several tax map keys: TMK:3-1-3-02:por. 06,54,55,58,68,76,77,78,90,108; 3-1-3-03:por.06; and 3-1-3-04:por.13. The overall purpose of the project was to enable SSFM International to obtain archaeological clearance from the Hawai'i State Historic Preservation Division (SHPD) in order to proceed with construction work associated with realigning Kalapana Road. The inventory survey was done in accordance with the appropriate standards of the Hawai'i State Historic Preservation Division as contained in the draft Administrative Rules, Title 13, Subtitle 13, Chapter 276 (1998).

The survey fieldwork was conducted on September 27-29, 2000 by PHRI Supervisory Archaeologist Alan B. Corbin, M.A., and Field Archaeologist Bruce M. Gothar. The specific objectives of the survey were fourfold: (a) to determine the presence or absence of any potentially significant archaeological remains; (b) to collect information sufficient to evaluate the potential significance of any identified archaeological remains; (c) to evaluate the potential impacts of proposed road realignment construction upon any identified significant remains; and (d) to recommend appropriate measures that would mitigate any adverse impacts upon identified significant remains.

Previous to the current survey, PHRI conducted a preliminary surface reconnaissance survey of Realignment Sites 3, 4, and 5. The preliminary survey was carried out on June 15, 2000 by Principal Archaeologist Paul H. Rosendahl, Ph.D, and Supervisory Archaeologist Alan B. Corbin, M.A (PHRI Letter Report 1999-101600). The purpose of the preliminary survey was to facilitate evaluation of initial alternative alignments by determining the presence or absence of any potentially significant historic properties that might be adversely impacted by specific alternative alignments. During the preliminary survey numerous surface structural remains were encountered within Site 3, while possibilities of structural remains were noted in Sites 4 and 5; these findings necessitated conducting an archaeological inventory survey.

## SCOPE OF WORK

Based on a review of available background literature, familiarity with the project area (based on the preliminary reconnaissance survey), and based on discussions with Dr. Ross Cordy, State Historic Preservation Division (SHPD) Archaeology Branch Chief, and familiarity with the requirements of review authorities, the following specific tasks were determined to constitute an adequate scope of work for the current survey:

1. Conduct limited archaeological and historical documentary background research involving review and evaluation of readily available archaeological and historical literature;
2. Conduct inventory-level survey of all previously identified and newly identified features present within the road corridors. This entails identification, written recordation on standard PHRI Feature Forms, and scaled mapping; and

3. Analyze results of the historical research and field data, and prepare an appropriate report in accordance with the appropriate standards as set forth in the SHPD draft Administration Rules, Title 13, Subtitle 13, Chapter 276 (1998).

## PROJECT AREA DESCRIPTION

The project area consists of three separate areas located in the Lands of Kaua'ea, Kaueleau, and Kamaili, District of Puna, Island of Hawai'i (Figure 1). The project area comprises, specifically, Realignment Sites 3, 4, and 5, which are within portions of several tax map keys: TMK:3-1-3-02:por.06,54,55,58,68,76,77,78,90,108; 3-1-3-03:por.06; and 3-1-3-04:por.13. The three areas are designated Kalapana Road Realignment Sites 3, 4, and 5. Site 3 consists of the present Kalapana Road and alternative road corridors A and B (Figure 2a,b,c), which together are approximately 1,350 ft. or 401.5 meters long and 62.5 ft. or 19.05 meters wide. Site 4, which originally consisted of Alternative Routes A,B,C, and D, but which previous to the inventory survey was reduced to Alternatives D and E, is approximately 1,350 ft. or 401.5 meters long and 62.5 ft. or 19.05 meters wide (Figure 3a,b,c). Site 5 is 600 ft. or 182 meters long and 105 ft. or 32.0 meters wide, including the area between the alternative routes (Figure 4a,b).

The entire project area is in the District of Puna, which lies between the Districts of Hilo to the north, and Ka'u to the south, and extends from Cape Kumukahi on the east to the slopes of Mauna Loa on the west. Puna is geologically dominated by the Puna volcanic series of the east rift zone of Kilauea Volcano, which begins at Kilauea and extends 52 km to Cape Kumukahi (Macdonald 1940:1). This series itself overlays the older Pahala ash (Stearns and Macdonald 1946:103). Numerous eruptions have taken place in Puna, even in historic times. Some of the lavas have issued from the walls and floors of pre-existing pit craters while some eruptions have built secondary lava cones and cinder cones (Stearns and Macdonald 1946:105). The area contains both 'a'ā and pāhoehoe lava, both types being basaltic and most containing small olivine phenocrysts. The older flows are brown, while the latter are blacker.

Along the rugged coast, formed by the erosion of the numerous lava flows by wave action over time, are low, sheer cliffs interspersed with occasional beaches of black sand or boulders. This erosion has impacted the existing Kalapana Road and has thus necessitated the current project and the search for alternative routes for the road and/or the raising of the road above its present level.

The large amount of rainfall in the area, which averages from 50 to 150 inches annually, is due to Puna's favorable position in the path of the prevailing NE trade winds. These moisture-laden trade winds are forced upward by the Puna land mass, then cooled and condensed into clouds and rain, thus resulting in this high annual rainfall (Newman 1970:21). The terrain in general slopes eastward to the sea, as does the poorly defined drainage system (Bevacqua and Dye 1972:3).

The three alternative sites contain differing vegetation. In Site 3, mauka of the existing Kalapana Road, the area is characterized by a dense forest of mixed introduced trees including Java plum (*Syzygium cumini*), guarumo (*Cecropia obtusifolia*), coconut (*Cocos nucifera*), monkeypod (*Samanea saman*), hau (*Hibiscus tiliaceus*), gunpowder trees (*Trema orientalis*), and ironwood trees (*Casuarina equisetifolia*). Nearer to Kalapana Road, the understory vegetation consists of naupaka (*Scaevola sericea*), saplings of the trees mentioned above, and mats of California grass (*Brachiaria mutica*). Farther from the road, dense thickets of guava (*Psidium guajava*) and strawberry guava (*P. cattleianum*) occur, with some Christmas-berry trees (*Schinus terebinthifolius*) and sourbush (*Pluchea carolinensis*). Ground cover includes shade-tolerant plants such as laua'e fern (*Phymatosorus scolopendria*) and sword fern (*Nephrolepis multiflora*).

In Site 4, which is predominately maintained grassy lawns, hau thickets and large monkeypod trees exist in non-maintained areas.

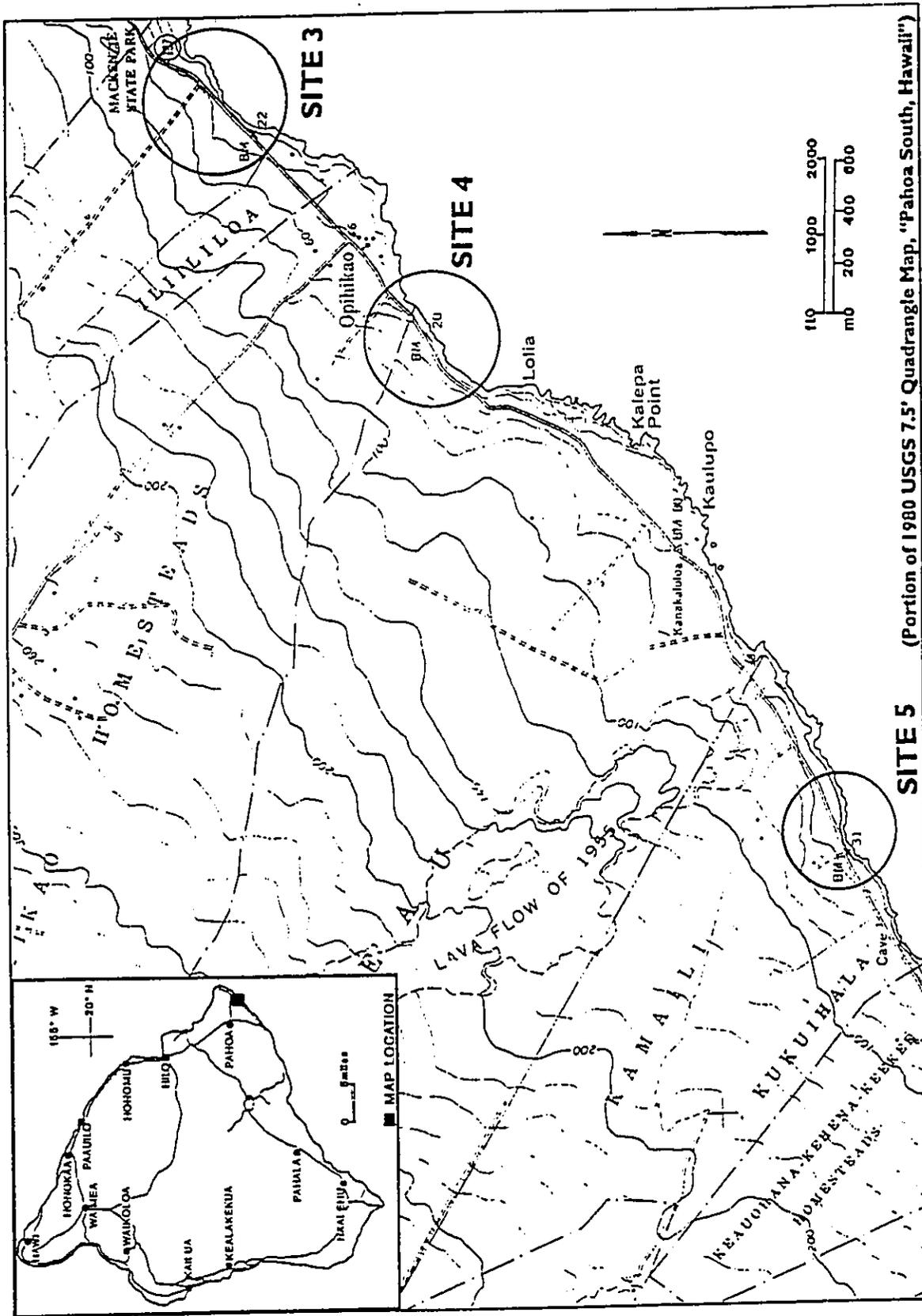
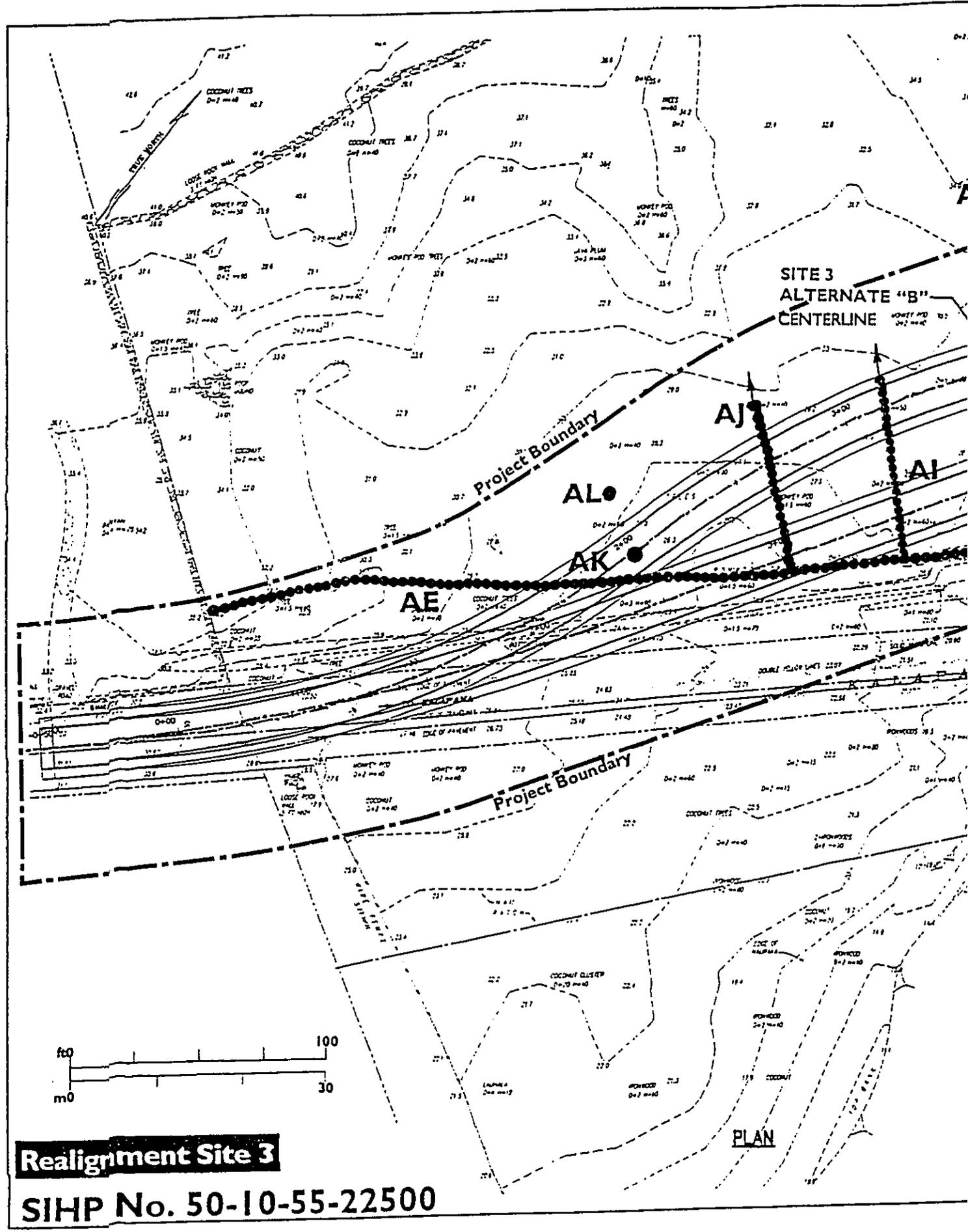


Figure 1. Project Location (Portion of 1980 USGS 7.5' Quadrangle Map, "Pahoa South, Hawaii")



**Realignment Site 3**  
**SIHP No. 50-10-55-22500**

Figure 2a. Realignment Site 3