Hilo Scattered Lots
Residential Dev.

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

September 9, 1997

Mr. Gary Gill
Office of Environmental Quality Control
235 S. Beretania Street
State Office Tower, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Final Environmental Assessment (EA) for the:
Hilo Scattered Lots Residential Development;
Hilo, County of Hawaii, State of Hawaii

The State Department of Hawaiian Home Lands has reviewed the comments received during the 30-day public comment period which began on June 8, 1997. The agency has determined that this project will not have a significant environmental effect and has issued a Finding of No Significant Impact (FONSI). Please publish this notice in the September 23, 1997 Environmental Notice.

We have enclosed a completed OEQC Publication Form and four copies of the Final EA. If you have further questions regarding the contents or preparation of the Final EA, please contact Ms. Colette Sakoda of R.M. Towill Corporation, at (808) 842-1133.

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division at 586-3815.

Aloha,

Kali Watson

KALI WATSON, Chairman
Hawaiian Homes Commission

c: RMTC: C. Sakoda

96

1997-10-08-HI-FEA-Hilo Scattered Lots Residential Development

FINAL

Environmental Assessment
Prepared in Accordance with Requirements of Chapter 343, Hawaii Revised Statutes

Hilo Scattered Lots Residential Development

HILO, ISLAND OF HAWAII, STATE OF HAWAII

SEPTEMBER 1997

PREPARED FOR:

Department of Hawaiian Home Lands
State of Hawaii
335 Merchant Street
Honolulu, Hawaii 96813

RMTC

R. M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941
Voice: (808) 842-1133
Facsimile: (808) 842-1937

FINAL ENVIRONMENTAL ASSESSMENT

Hilo Scattered Lots Residential Development

HILO, ISLAND OF HAWAII

SEPTEMBER 1997

Prepared for:

Department of Hawaiian Home Lands
335 Merchant Street
Honolulu, Hawaii 96813

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420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

TABLE OF CONTENTS

LIST OF FIGURES

PROJECT SUMMARY

Project:	Hilo Scattered Lots Residential Development
Proposed Agency:	State of Hawaii Department of Hawaiian Home Lands (DHHL) Old Federal Building 335 Merchant Street Honolulu, Hawaii 96813
Approving Agency:	State of Hawaii
Location:	City of Hilo, County of Hawaii, State of Hawaii
Tax Map Keys:	TMK 2-1-17: 46, 47 & 48 TMK 2-1-18: 8 TMK 2-1-19: 20, 29, 30 & 31 TMK 2-3-25: 14, 15, 16, 17, & 47 TMK 2-4-28: 1 TMK 2-4-49:19 TMK 2-5-4: 27 TMK 2-5-4: 43, 47, 60 & 61 TMK 2-5-5:1, 3, 5, 6, 7, 10, 28, 29, 30, 31, 32, 33, 72, 74, 77, 79, & 80
Ownership:	Department of Hawaiian Home Lands
Existing Land Use:	Vacant Residential, Open Space
State Land Use Designation:	Urban, Agriculture
County Zoning:	Residential, Agriculture, Open

Section 1
PROJECT BACKGROUND

1.1 INTRODUCTION

The Department of Hawaiian Home Lands (DHHL) proposes to develop scattered residential lots in Hilo, Hawaii. The project consists of several small scale residential lots development scattered within the district of South Hilo. The subject parcels are clustered in four general areas; Keaukaha (Site A), Central Hilo (Site B & C), Panaewa (Site D), and Kaumana (Site E).

The project also involves construction and improvement of existing infrastructure to accommodate the proposed residential developments. Upon completion of required infrastructure, homestead lots will be distributed to qualified beneficiaries of native Hawaiian ancestry.

DHHL is a state agency and eligible to the use of State of Hawaii funds for improvement projects such as this. Due to the use of state funds for development, this project is subject to Chapter 343, Hawaii Revised Statutes, pursuant to Chapter 200, Title 11, Hawaii Administrative Rules, as amended. This Environmental Assessment is being prepared to address the environmental impacts anticipated for this project.

1.2 PURPOSE AND OBJECTIVES

The purpose of this project is to offer opportunities to native Hawaiian beneficiaries to develop lands for homestead. It is consistent with the Hawaiian Homes Commission Act, as amended, which provides for the development and settlement of native Hawaiians on lands owned by the state. This proposal represents DHHL's ongoing efforts to expedite the development and distribution of state land to qualified Hawaiian beneficiaries.

The primary objective of this project is to prepare a site for small scale residential development. DHHL will improve existing facilities and provide infrastructure necessary to support the proposed development. The development of basic support infrastructure such as drainage, sewer, and utilities, will be integrated with the existing systems. Each lot will be developed individually by a qualified

Hawaiian beneficiaries as homestead.

1.3 PROJECT LOCATION AND DESCRIPTION

The proposed project involves infrastructure improvement for the development of future Hawaiian homestead. The proposed project lots are scattered throughout South Hilo District, located on the northeastern portion of the island of Hawaii and lies on the lower eastern slopes of Mauna Loa (**Figure 1-1**). The general area includes the City of Hilo and its suburbia. Hilo is the county seat and the principal center of government, transportation, and commerce. Hilo International Airport, one of two major airports in the county, is located in close proximity to the downtown area. Also, Hilo Bay provides one of two deep-water harbors on the island.

All properties proposed for this project are undeveloped vacant lands, owned by DHHL. For the purpose of this study, proposed properties are classified into the following five general sites based on their physical settings (**Figure 1-2**):

SITE A (Keaukaha)	A-1	TMK 2-1-17: 46, 47, & 48
	A-2	TMK 2-1-18: 8
	A-3	TMK 2-1-19: 20, 29, 30, & 31
SITE B (Central Hilo)		TMK 2-3-25: 14, 15, 16, 17, & 47
SITE C (Central Hilo)		TMK 2-4-28: 1
SITE D (Panaewa)		TMK 2-4-49:19
SITE E (Kaumana)	E-1	TMK 2-5-4: 27, 43, 47, 60, & 61
	E-2	TMK 2-5-5: 1, 3, 5, 6, 7, 10, 28, 29, 30, 31, 32, 33, 72,74, 77, 79, & 80

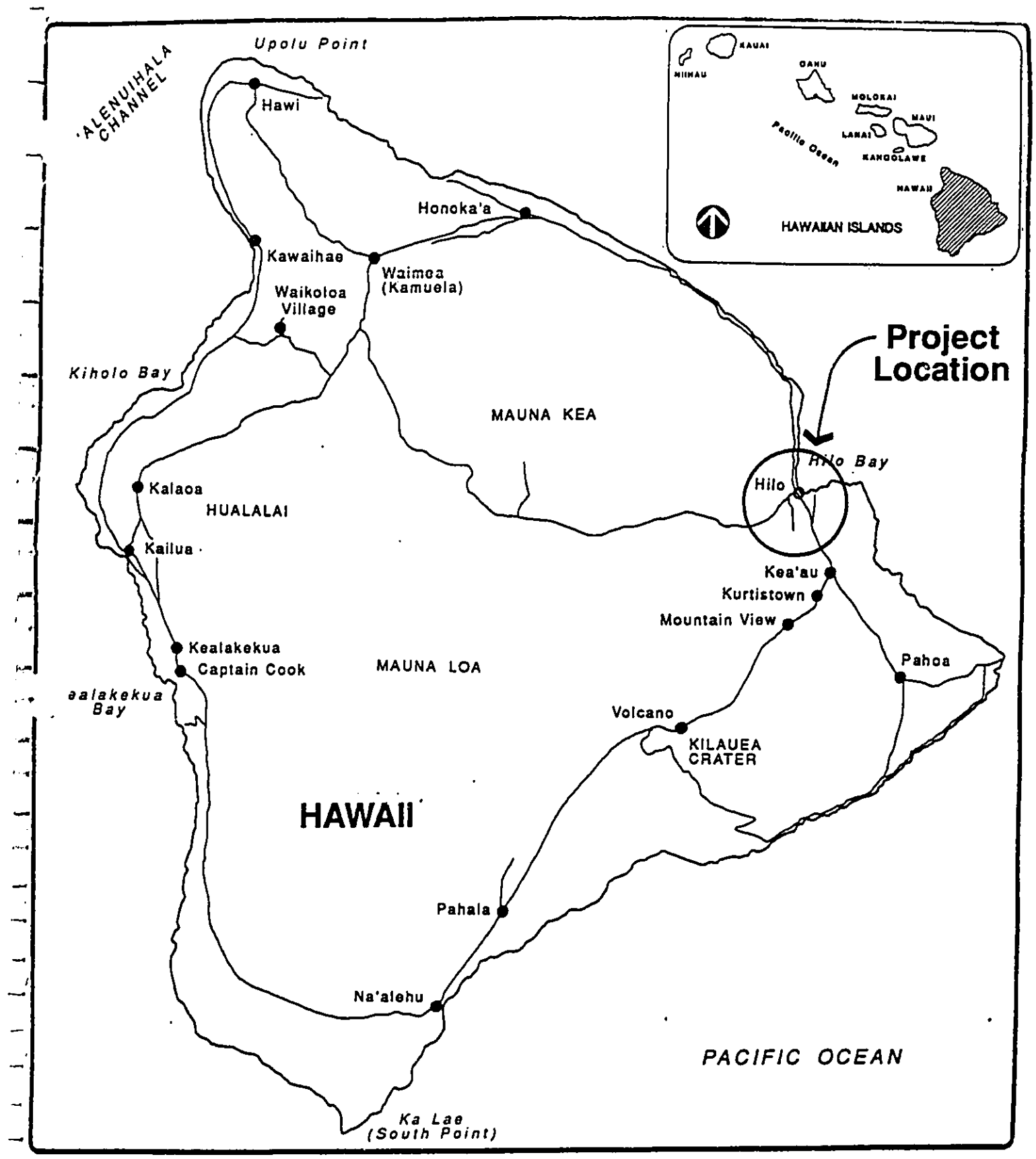


FIGURE 1-1
LOCATION MAP
South Hilo, Hawaii

R. M. TOWILL CORPORATION
1995


SITE B
SITE C
SITE E
HILO
WAIANUENUE AVENUE
KINOOLE STREET
University of Hawaii
(Hilo Campus)
HILO BAY
KAUMANA DRIVE
KAUMANA
WAIAKEA
STAINBACK

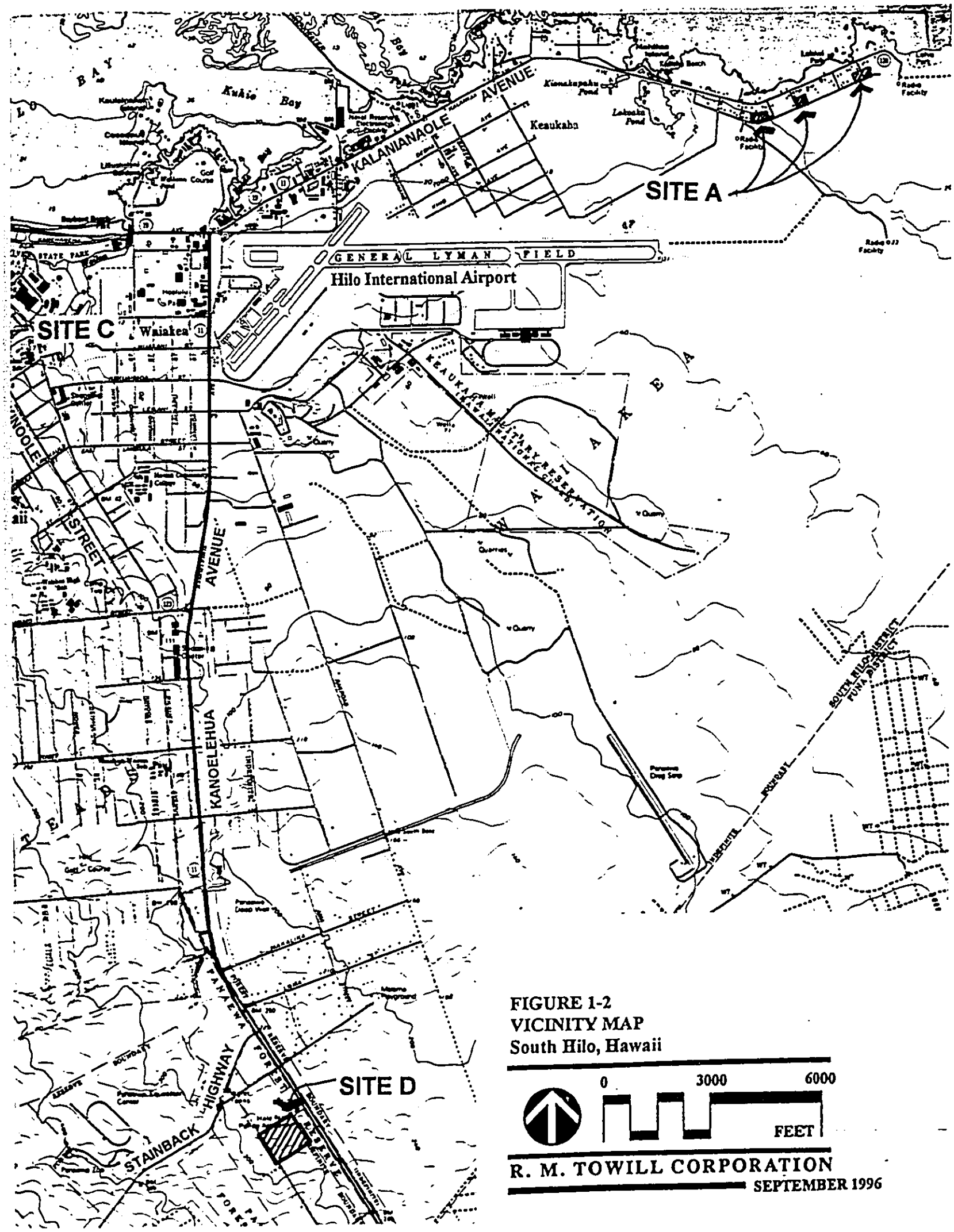


FIGURE 1-2
VICINITY MAP
South Hilo, Hawaii

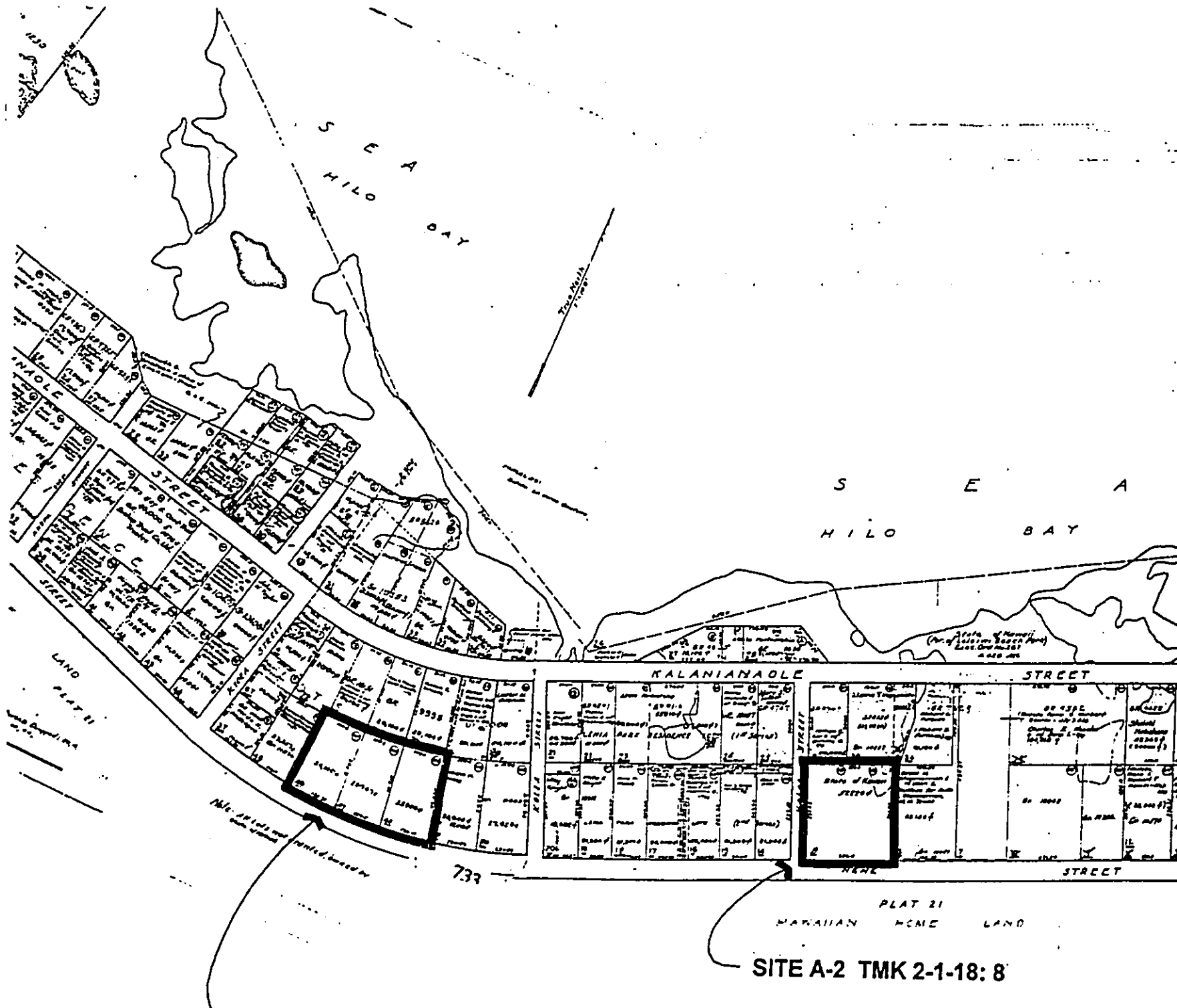
0 3000 6000
FEET

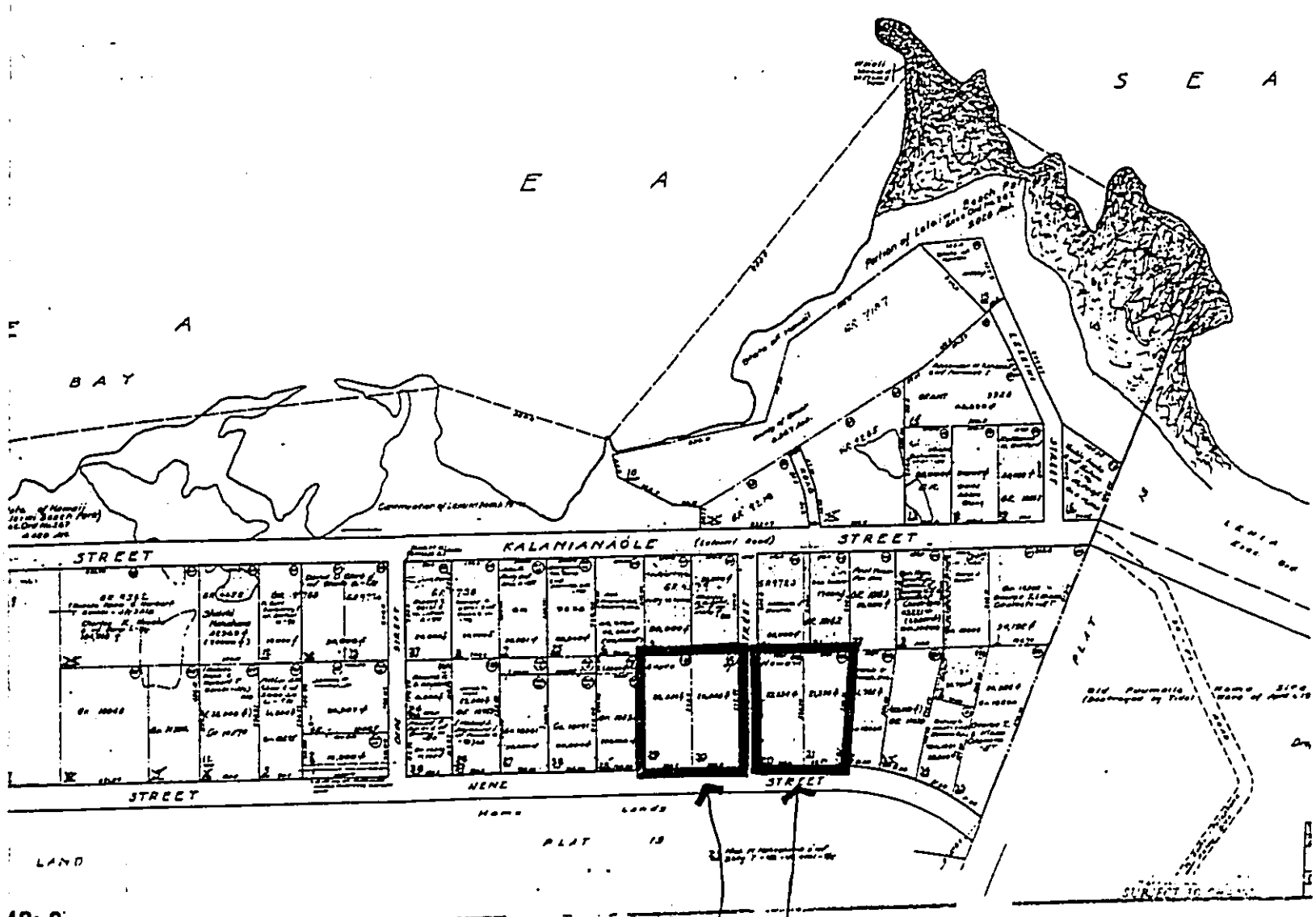
R. M. TOWILL CORPORATION
SEPTEMBER 1996

Site A is located mauka of Kalanianaole Highway near Leleiwi Beach Park about five (5) road miles east of Hilo (**Figure 1-3**). It is situated within an existing residential area. Site A includes eight parcels ranging in size from ±.5 to ±1.2 acres. Total of thirteen (13) scattered lots are planned to be developed in this site. Site A-1 will be subdivided into four (4) ±25,000-SF lots. Site A-2 will be subdivided into five (5) ±10,000-SF lots. Parcels in Site A-3 will not be further subdivided. All lots will have access directly on Nene Street. Nene Street is ten (10)-foot wide improved roadway, which stretches approximately 560 yards and runs parallel to Kalanianaole Highway. Nene Street is owned by DHHL and maintained by the County. Land mauka of Nene Street is reserved for Hawaiian Home Lands for future development.

Site B is located in the City of Hilo immediately south of Waianuenue Avenue and bordered on the west by Ainako Stream, on the east by existing residential lots, and on the south by Punahele Street (**Figure 1-4**). This site is an approximately five (5)-acre property located within an existing residentially-zoned area. Site B will be subdivided into fourteen (14) to seventeen (17) lots, size ranging from ±10,000 SF to ±20,000 SF. The site will have access from Kaumana Road via Punahele Street. Portion of Punahele Street, approximately up to the eastern boundary of TMK 2-3-25:31, is twenty (20)-foot wide improved roadway and under county jurisdiction. Remaining portion of the roadway, fronting the subject properties, does not exist on the ground. A road which only exists on the Tax Key Map is considered as a "paper road." Paper road is an easement set aside as a logical location for public access but has not been constructed due to lack of the interest. Paper road right-of-way is, as a rule, under jurisdiction of the State of Hawaii Department of Land and Natural Resources (DLNR). DHHL will need to request transfer of this portion of the roadway in order to build access into the proposed parcels.

Site C is also located within the city of Hilo on the north of Mohouli Street, approximately 500 feet mauka of the intersection with Kinoole Street (**Figure 1-5**). The parcel contains approximately 16,000 SF. The site has direct access on Mohouli Street. Ululani Street ends at the northern boundary of the parcel. The western boundary of the property is defined by a concrete lined drainage ditch. A plan to subdivide this property into residential lots has not determined yet.


S E A
HILO BAY
S E A
HILO BAY
KALANIANAOLE STREET
737
PLAT 21
HAWAIIAN HOME LAND
A-1 TMK 2-1-17: 46, 47 & 48
SITE A-2 TMK 2-1-18: 8



18: 8

SITE A-3 TMK 2-1-19: 29 & 30
TMK 2-1-19: 20 & 31

FIGURE 1-3
TMK MAP OF SITE A
South Hilo, Hawaii

NOT TO SCALE

R. M. TOWILL CORPORATION

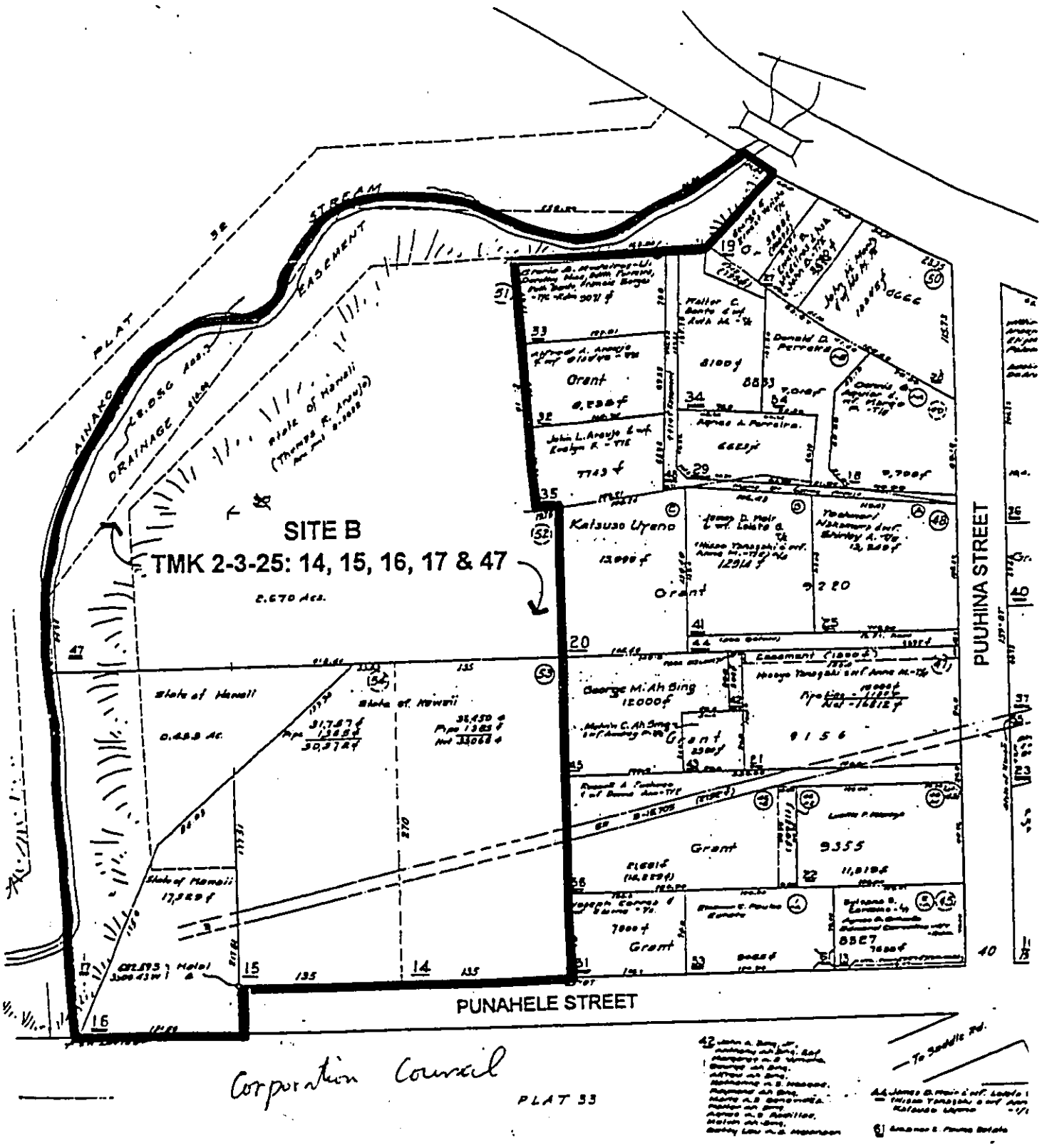


FIGURE 1-4
TMK MAP OF SITE B
South Hilo, Hawaii

NOT TO SCALE

R. M. TOWILL CORPORATION

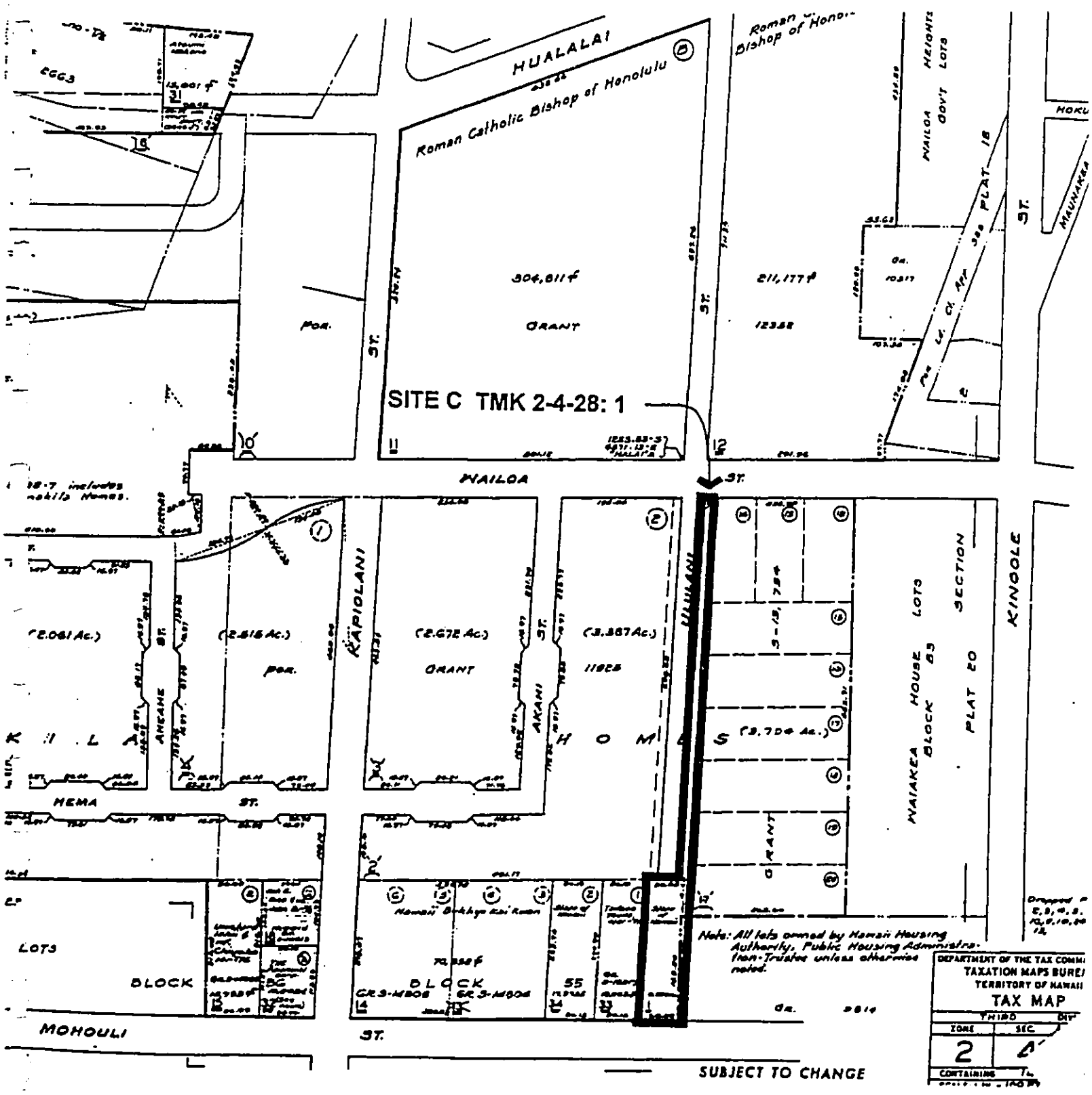


FIGURE 1-5
TMK MAP OF SITE C
South Hilo, Hawaii

NOT TO SCALE

R. M. TOWILL CORPORATION

Site D is located adjacent to Panaewa Forest Reserve, approximately five (5) miles south of Hilo (**Figure 1-6**). The property is located approximately one-half mile mauka from the intersection of Kanoelehua Avenue and Stainback Highway. The parcel is approximately twenty-three (23) acres. Panaewa Forest Reserve buffers the parcel from Kanoelehua Avenue. The property has access via Kealakakai Street, an improved county roadway. This is a potential site for DHHL Single Family Residential Lots. However, a plan to subdivide the property into residential lots has not been determined yet.

Site E is located approximately five (5) road miles southwest from the center of Hilo, in an area historically identified as Kaumana Homesteads. Kaumana Drive is a major road serving the site, which provides access to both the city of Hilo and Kona. Uhaloa Road provides a direct access to the proposed parcels. The size of the properties in Site E ranges from ±7,500 square feet to ±5 acres.

Site E-1 includes 4 separate portions, containing five (5) parcels, on the west of Wilder Road (**Figure 1-7**). TMK 2-5-4:27 will be subdivided into twelve (12) to fourteen (14) lots, size ranging from ±10,000 SF to ±15,000 SF. TMK 2-5-4:47 will be subdivided into three lots as indicated in the "State of Hawaii Realty Atlas, 1996." TMK 2-5-4:43 will not be subdivided. All these lots will have access on Uhaloa Road. According to the tax key map (Realty Atlas, 1996), this portion of Uhaloa Road is "paper road", currently unused and covered by bushes. Paper road is an easement set aside as a logical location for public access but has not been constructed due to lack of the interest. Paper road right-of-way is, as a rule, under jurisdiction of State DLNR.

TMKs 2-5-4:60 & 61 will not be subdivided. The proposed lots will have access on Lawai Road. Lawai Road is unimproved paper road, covered by bushes, and under the jurisdiction of DLNR.

Site E-2 includes 9 separate portions, containing 17 parcels, on the east of Wilder Road. TMK 2-5-5:77 will be subdivided into three (3) ±10,000-SF lots. TMK 2-5-5:79 will be subdivided into four (4) 10,000-SF to 13,000-SF lots. Both parcels will have access on Ieie Road which is unimproved paper road and covered by bushes.

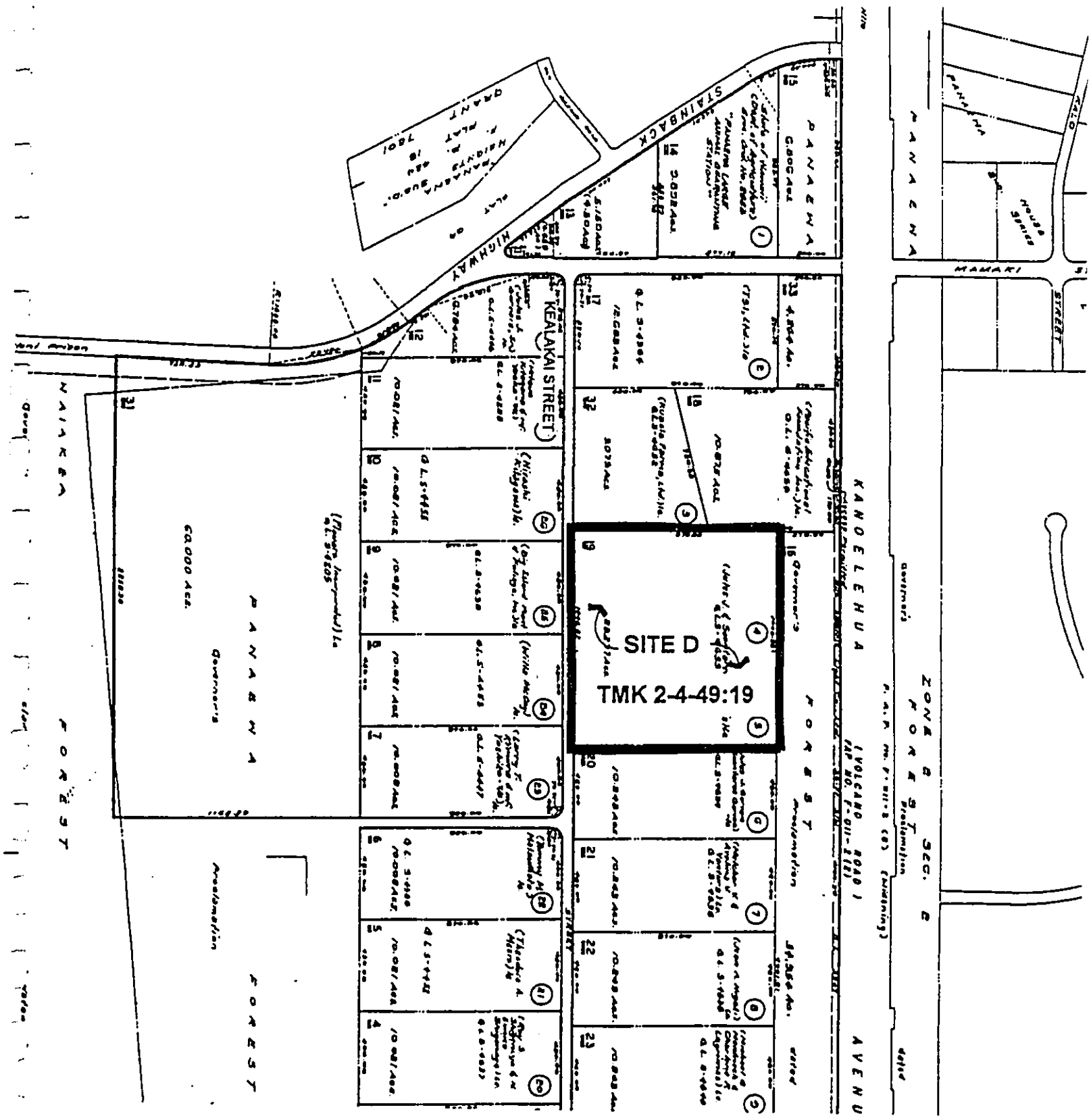
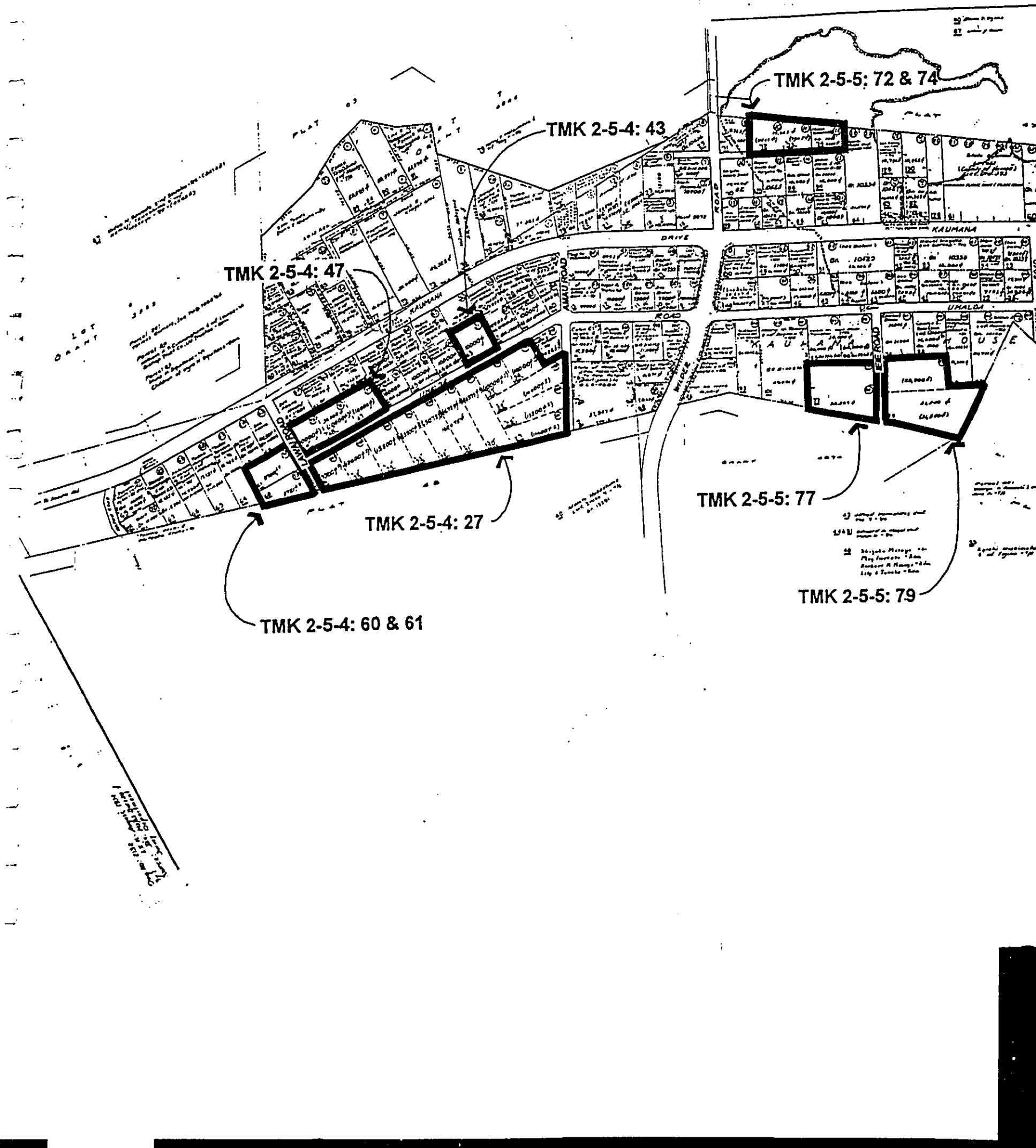


FIGURE 1-6
TMK MAP OF SITE D
South Hilo, Hawaii

NOT TO SCALE

R. M. TOWILL CORPORATION


TMK 2-5-5: 72 & 74
TMK 2-5-4: 43
TMK 2-5-4: 47
TMK 2-5-4: 27
TMK 2-5-4: 60 & 61
TMK 2-5-5: 77
TMK 2-5-5: 79

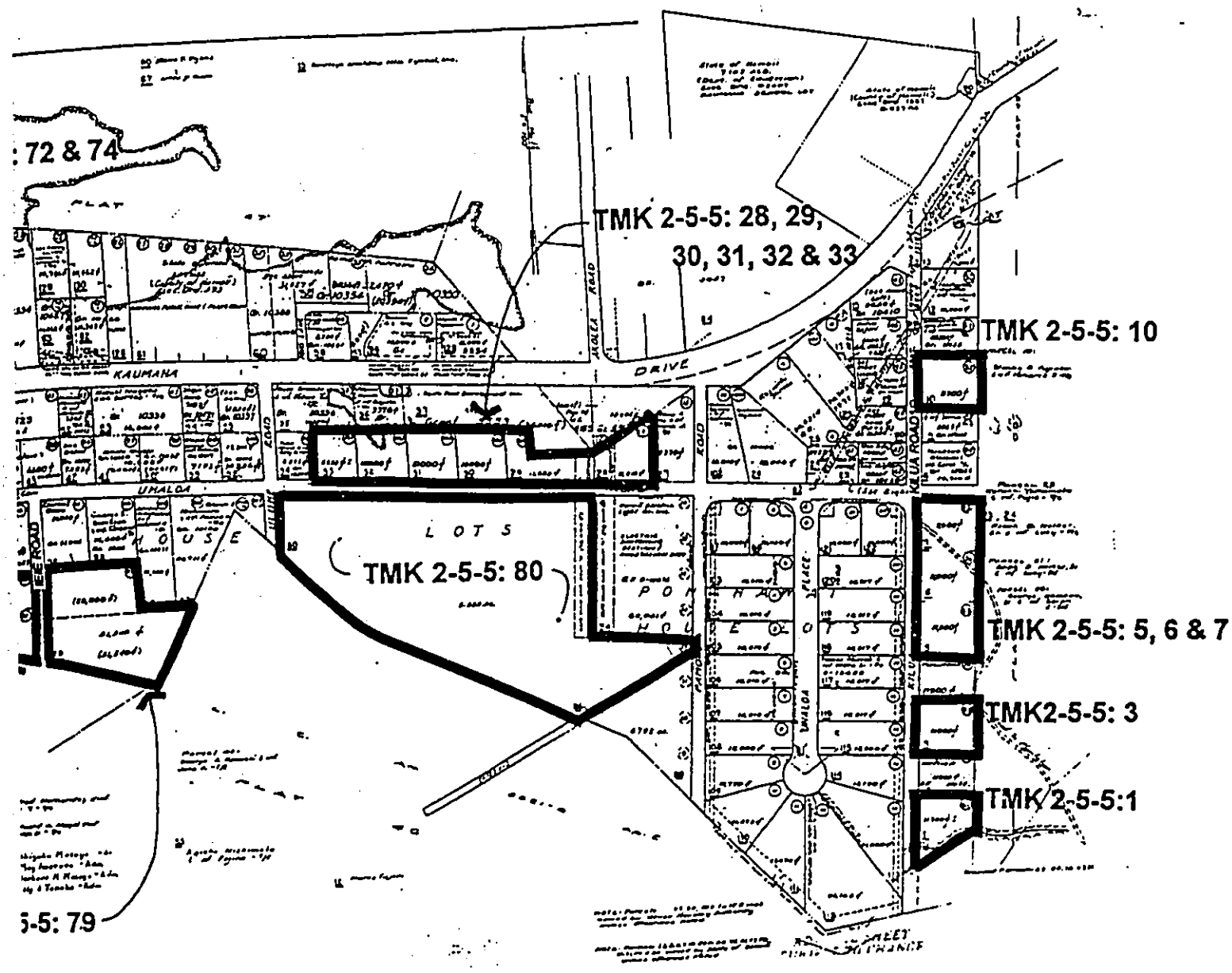


FIGURE 1-7
TMK MAP OF SITE E
South Hilo, Hawaii

NOT TO SCALE

R. M. TOWILL CORPORATION

TMK 2-5-5:72 & 74 will be subdivided into three (3) ±7,500-SF lots. The lots will have access on Pala Lane which is unimproved paper road.

TMK 2-5-5:80 will be subdivided into fifteen (15) lots. The size of these lots ranges form ±12,000 SF to ±15,000 SF. The remaining properties are ±10,000-SF parcels and will not be subdivided. All lots in TMK 2-5-5:80 and TMKs 2-5-5:28, 29, 30, 31, 32, & 33 will have access via Uhaloa Road. The portion of Uhaloa Road between Uluhe and Pamoho Roads is unimproved paper road and covered by bushes. The remaining parcels (TMKs 2-5-5:1, 3, 5, 6 & 7) will have access directly on Kilua Road. The portion of Kilua Road, south of Uhaloa Street, is unimproved paper road and covered by bushes. This portion will be improved to bring adequate access to the properties.

Paper roads such as; Lawai and Ieie Roads, Pala Lane, and portions of Uhaloa and Kilua Roads, will need to be improved as part of this project to bring adequate access to the proposed properties. These paper road right-of-ways will be surveyed, and DHHL will request transfer of these roads from State to DHHL.

Overall construction is estimated at 186-250 days. Construction work is tentatively scheduled for Spring 1998. The estimated construction cost of the project is approximately $2,200,000.

SECTION 2
AFFECTED ENVIRONMENT

2.1 CLIMATE

Hilo is located in the windward side of the island of Hawaii. The prevailing wind throughout the year are the northeasterly trades. Trades are generally more persistent in summer than in winter and stronger in the evening. The average wind speed is approximately 7.5 miles per hour.

Average temperature in Hilo ranges from 65 and 85 degrees. Cloudy skies often prevail throughout the year. The area receives only about 40 percent of the possible amount of sunshine. Average annual rainfall in Hilo is 141 inches. A climatic condition known as "orographic" rain, which forms within the moist tradewind air as it moves from the sea toward the mountain, is the primary cause of regional precipitation (Atlas of Hawaii, 1983).

2.2 GEOLOGY, TOPOGRAPHY, SOIL

The island of Hawaii, the largest and youngest of the Hawaiian Archipelago, was formed during the last 800,000 years. The island consists of five volcanos, two of which, Mauna Loa and Kilauea, are still active. Mauna Loa is 75 miles long, 64 miles wide, with a peak 13,680 feet above sea level. It is formed almost entirely by cooling of lava flows. The lower slope of the mountain is relatively gentle, no more than twelve degrees with the average slope around six degrees.

The City of Hilo lies at the southeastern base of Mauna Loa. Elevations along the general project area range from near sea level to more than 1140 feet above sea level. Site A is located on a very gentle slope near sea level. Site B is approximately 320 to 340 feet above sea level. The area is fairly flat with average slope of 2.5 percent. Site C is also located on a gentle slope approximately 60 to 80 feet above sea level. Site D is located on a fairly gentle slope at elevation 280 to 300 feet. Proposed properties at Site E spread on a fairly gentle slope at elevation 1040 to 1140 feet.

The project sites and the vicinity were previously mapped by the U.S. Department of Agriculture Soil Conservation Service as a part of an overall soil survey of the island of Hawaii. According to the Soil Survey, all sites are underlain by pahoehoe and aa lava which present very low agricultural capability.

Site A and E are covered by pahoehoe lava with no soil overlaying it. Keaukaha extremely rocky muck occurs predominantly both in Site B and C. This soil is typically eight (8) inches thick underlain by pahoehoe lava bedrock. The narrow strip of the land along Ainako Stream at Site B contains Hilo silty clay loam. This well-drained soil is formed in a series of volcanic ash layers and used for sugarcane. This soil occurs on relatively steep slopes on the windward side of Mauna Kea, dissected by deep and narrow gulches. About 60 percent of the property within Site D is covered by Keaukaha extremely rocky muck. Papai extremely stony muck occurs at the rest of the site D. This soil type consists of well-drained, thin, extremely stony organic soils over fragmental aa lava. Both Keaukaha and Papai are found in forested area and occasionally used for pasture.

There are two prominent drainage features near the project sites, Wailuku River and Wailua River. Wailuku River forms the northern boundary of the Hilo Downtown District. Site B adjoins Ainako Stream which branches off from Wailuku River approximately 1,500 feet north of the property. Wailua River basin, in which Waiakea Fish Pond is formed, is the prominent drainage feature in the center of Hilo.

2.3 FLORA AND FAUNA

2.3.1 Flora

An initial botanical survey of all sites was conducted by Evangeline J. Funk, PhD., Botanist, in September, 1996. The primary objective of the survey was to provide a description of the existing vegetation. For the proposed Site A and Site B, a search was also made for the presence of wetland species. In addition to the initial survey, a botanical survey for Site E, TMK 2-5-4:27 and TMK 2-5-5:80, and a wetland search of parcel TMK 2-1-17:46, 47, & 48 of Site A were

carried out in December, 1996.

The findings are summarized below while the report in its entirety can be found as Appendix A in this document. During the field survey, no plants listed or proposed for listing as Threatened or Endangered were found. Most of the sites have historically been modified for agricultural and urban-residential uses; therefore, it is less likely to encounter endemic or native ecosystems near the project sites.

Site A (Keaukaha)

The majority of the site is covered by dense alien species and is almost impenetrable. Except for a few Polynesian plant introductions (such as pandanus, coconut, and naupaka), all species found in the site are regarded as weed. There were no traces of original, endemic vegetation.

Although some native Hawaiian grasses have been reported from this area, because of the massive invasion of the area by alien plants, there is little likelihood that they can be found on this site. In addition, a detailed wetland search was conducted at sites TMK 2-1-17:46, 47, and 48, in December 1996. The search concluded that there is no evidence of wetlands. Vegetation of the sites consisted of upland, woody plants, the soil was pahoehoe lava, and no ponding or standing water was found.

No native Hawaiian taxa were found and none are expected to be found at the site. There are no botanical reasons to impose any restrictions, conditions, or impediments to the development of the sites.

Site B (Central Hilo)

Vegetation at the site is introduced-vegetation consists of various emergent trees, very dense understory grasses and shrubs, and weedy herbs. Wetland indicator species dominate the stream banks; however, the stream upland area is void of wetland indicators.

Although the stream bank along Ainako Stream appears to be very steep and narrow, there may be small patches of flat areas that could form a wetland. Upon consultation with the Department of Land and Natural Resources, the necessity of a wetland reconnaissance of this area should be determined in coordination with U.S. Fish and Wildlife Services and Corps of Engineers, Operations Branch.

Site C (Central Hilo)

Site C is located in an urban area with no native vegetation. The site consists of several tall alien trees and a rich mix of introduced shrubs and grasses. There are no botanical reasons to impose any restrictions, conditions, or impediments to the development of the sites.

Site D (Panaewa)

Site D is located next to the Panaewa Forest along Kanoelehua Avenue. A wind break of ironwood trees (*Casuarina equisetifolia*) surrounds the locale. Macadamia nut trees were previously planted on the site; however, the site is now a dense mixed forest of alien trees and shrubs. Except for the small fern ally, moa (*Psilotum nudum*) no endemic or indigenous plant species was found on this site. There are no botanical reasons to impose any restrictions, conditions, or impediments to the development of the sites.

Site E (Kaumana)

Site E consists of twenty-two (22) vacant parcels. The Parcels along Kaumana Drive have been disturbed and covered by introduced landscape plants. The vegetation of TMK 2-5-5:72 and 74 have been disturbed and only introduced species were found. TMK 2-5-5:3 and 2-5-5:1 were also disturbed and heavily vegetated with invasive plants. The alien composition and density of the plant cover on these sites indicate that there are not likely to be native species thriving there.

Most of the area between Kaumana Drive and Uhaloa Road is developed as single family residential uses. Although most of the project parcels located between Kaumana Drive and Uhaloa Road contain scattered to dense ohia (*Metrosideros* sp.) trees mixed with alien species,

and the understory is covered by dense introduced vines and shrubs, the diversity of the vegetation appears to be narrow. There are some ohia trees and other native ferns on TMK 2-5-5:5, 6, 7, and 10. However, this area is also highly disturbed and most of the vegetation is introduced.

At the southern portion of Site E most properties are vacant and undeveloped, native ohia forest has been re-established over 1881 lava flows. The properties south of Uhaloa Road, TMK 2-5-4:27 and 2-5-5:80, include large portions of undeveloped land which adjoin an open forested area. Therefore, a full botanical survey was carried out in December, 1996.

At TMK 2-5-4:27, two vegetation types were found; Mixed Introduced and Native Vegetation and Scattered Ohia Trees with Staghorn fern and Uki Understory. Near the developed edges of the site there were narrow bands of Mixed Introduced and Native Vegetation, consisting of a dense border of ironwood (*Casuarina equisetifolia* L.), rose apple (*Zyzygium jambos* (L.) Skeels), red and yellow guava (*Psidium cattleianum Sabine*, P. Guajava L.), ohia (*Metrosideros* sp.), and nelleau (*Rhus sandwicensis* A. Gray) trees from eight to twenty meters in height. The understory in this area is made up of a tangle of ferns, vines and weeds including uluhe (*Dicranopteris linearis* (Brum.) Underw.), Boston fern (*Nephrolepis exaltata* (L.) Schott), banana poka (*Passiflora mollissima* (Kunth) L. H. Bailey), glenwood grass (*Sacciolepis indica* (L.) Chase), and palmgrass (*Setaria palmifolia* (J. Konig) Stapf).

The largest portion of TMK 2-5-4:27 is covered by the second vegetation type, Scattered Ohia Trees with Staghorn fern and Uki Understory. Here the ohia trees are from ten to fifteen meters in height with a dense understory of uluhe or staghorn fern, uki (*Machaerina angustifolia* (Gaud.) T. Koyama), and invasive melastome species.

At TMK 2-5-5:80, two vegetation types, Ohia Forest with Staghorn Fern/Bamboo Orchid/Uki Understory and Mixed Introduced Vegetation were found.

The Ohia Forest with Staghorn Fern/Bamboo Orchid/Uki Understory can be characterized as scattered ohia trees from ten to twenty meters in height with a dense understory of staghorn fern interspersed by bamboo orchid (Arundina graminifolia (D. Don) Hochr.) and uki. Except for some vegetative Melastoma spp., very few alien species have been able to penetrate this understory. This vegetation type occupies the northern three quarters of the site. The area just north and south of HELCO sub-station was at some time cleared and a rich mixture of alien species is taking over the site. This Mixed Introduced Vegetation includes many grasses such as molasses grass (*Melinis minutiflora* P. Beauv.), thatching grass (*Hyparrhenia rufa* (Nees) Stapf), West Indian foxtail (*Andropogon bicornis* L.), and natal red top (*Rhynchelytrum repens* (Willd.) Hubb.). Weedy trees such as African Tulip (*Spathodea campanulata* P. Beauv.), moho (*Heliocarpus popayanenis* Kunth), shoebutton ardisia (*Ardisia elliptica* Thunb.), and siris tree (*Albizia lebbeck* (L.) Benth.) are becoming established.

No candidate, proposed, or listed threatened or endangered species were found on any of these sites during the full botanical survey. Lists of all plant species found on TMK 2-5-4:27 and 2-5-5:80 are provided in Appendix A.

Between sites TMK 2-5-4:27 and 2-5-5:80, sites TMK 2-5-5:77 and 79 are located off Uhaloa Road. They are bounded on the south by the same open forest. The vegetation along the northern boundary of these sites, near the developed area, consists of mixed, introduced trees, vines, forbs and grasses. There are still some scattered ohia trees about eight meters in height in this area. Between the fringe of introduced vegetation and the southern boundary of these sites can be found a forest of scattered ohia trees with a dense understory of uluhe or false staghorn fern.

There are no botanical reasons to impose any restrictions, conditions, or impediments to the development of the sites. Therefore, no further botanical study will be necessary.

2.3.2 Fauna

Few birds were found during the recent field visit on September 20, 1996. No "endangered" or "threatened" fauna was seen or heard in the project sites.

Two species of endemic birds have been reported in the South Hilo area; the Hawaiian Hawk and the Hawaiian Owl. The endangered Hawaiian Hawk or Io (*Buteo solitarius*) is an adaptable species, feeding on insects, mammals (rats/mice), and other small birds. This hawk has a large home range and is found in both native forests and developed areas.

The Hawaiian Owl or Pueo (*Asio flammeus sandwichensis*), a subspecies of the North American short-eared owl, lives in habitat from sea level to elevation 8,000 ft. on Mauna Kea and Mauna Loa and is not considered an endangered species in Hawaii.

Although these species may use the area near the project sites for hunting or resting, none were observed during the recent field survey.

An indigenous bird, the Black-crowned Night Heron (*Nycticorax hoactli*), inhabits wetlands in Hawaii (Bachman, 1996). However, none of them were seen during the field survey.

Introduced birds observed during the field visit include Cardinal (*Richmondena cardinalis*), Japanese White-eye (*Zosterops japonicus*), Common Myna (*Acridotheres tristis*), Barred dove (*Geopelica striata striata*), and Nutmeg Mannikin (*Lonchura Puctulata*).

The only mammal currently found in the Hilo area that is categorized as "endangered" is the Hawaiian Hoary bat (*Lasiurus cinereus semotus*). The Hawaiian bat has been occasionally seen nesting in large trees, such as Banyans (*Ficus* spp.) and Hala (*Pandanus* spp.), in the city of Hilo (Bachman, 1996). This species seems to be adaptable to altered environments and has been observed in Hilo during dawn or dusk. There are a few large alien trees that may provide nesting areas for the Hawaiian bat in Site A, B, and C; however, no bats are known to inhabit the project

site.

No long term impacts are expected to result from the proposed project. Short-term impacts on wildlife species may occur during construction period due to increased noise levels. Construction activity for parcels TMK 2-5-4:27 and 2-5-5:77, 79, and 80 should be scheduled between late September and early March to avoid nesting seasons for local bird species.

2.4 SCENIC AND VISUAL RESOURCES

Coastal areas in the South Hilo district outside of Downtown Hilo are void of heavy industrial development. Bayfront Highway and Kalanianaole Avenue provides spectacular view points towards the ocean and black sand beaches. Hilo Bay is a focal point of the city on which several parks and gardens are located. The most prominent feature of the landscape is the 14,000-foot peak of Mauna Kea. The magnificent views toward the mountain are seen from various locations within the general project area. The proposed low density development will not significantly affect the area's visual resource.

2.5 HISTORIC/ARCHAEOLOGICAL RESOURCES

Previous archaeological studies conducted near the subject sites have not identified any significant finds. Traditional agricultural and residential development in Hilo area have dominated the landscape for many years. By the mid-1900's much of the land in Waiakea, in which most of the project sites (except Site B and E) are located, was owned by Waiakea Mill Company. Extensive fields of sugar cane, immigrant labors camps, and temporary habitation sites comprised much of this area in the past (Archaeological Consultants of Hawaii, 1994).

The earliest agricultural survey conducted in Hilo noted the non-existence of historic or cultural remains (Goodfellow, 1991). Historic alteration of the environment and settlement patterns, primarily for sugarcane production and managed cattle ranches, have greatly affected the preservation of pre-contact archaeological features in the Hilo area. Therefore, historic structures, which may still exist on the sites, are likely to be post-contact archaeological features

related to sugar cane cultivation and cattle ranch. These post-contact features are considered significant for their informational content. Thus, once sufficient information has been collected, they can be evaluated as no longer significant (Spear, 1992).

A review of reports and site records at the State Historic Preservation Division indicates that there are no known archaeological sites in any of the parcels. According to the State Historic Preservation Division, the recorded sites near the subject sites are all post-contact sites. Those recorded sites include Hilo Hospital (site 7450), Portuguese Oven (site 7482), Villa France Districts (site 7447), Hilo Chinese Church (site 7510), Puumaile Hospital Site (site 7491), Kaumana Hongwanji Temple (site 7428), and Miyamoto Store (site 7427). None of these sites will be affected by the proposed project.

SITE A: The surrounding area has been cleared and already developed for residential use. The only recorded site near the subject site is Puumaile Hospital, approximately 1,000 feet to the east.

SITE B: Old Hilo Hospital is located approximately 1,000 feet north of the property. The surrounding area has long been urbanized. The area is situated immediately south of Waianuenue Avenue and bordered on the west by Ainako Stream, on the east by existing residential lots, and on the south by Punahele Street. Vegetation on the site consists of various introduced species and indicates heavy disturbance.

An archaeological assessment conducted for a 12-acre parcel across from Ainako Stream did not find any pre-contact features (Spear, 1992). Only archaeological features recorded in the assessment were two post-contact features; a cattle wall and a retaining wall, which indicates the area has historically been modified for pasture use. Furthermore, no pre- or post-contact features were found in Site B during the site visit in September, 1996.

SITE C: Waiakea Fishpond is located approximately 2,500 feet northeast of the subject site. The nearest historic structure, recorded by the State Historic Preservation Division, is the Hilo Chinese Church at the corner of Kinoole and Mohouli Streets. A recent archaeological survey conducted in Waiakea, near the project site, notes the impact of sugarcane cultivation on large tracts of lands. The archaeological survey describes the remains of stacked walls and linear mounds for lands formerly cultivated in sugar cane (Archaeological Consultants of Hawaii, 1994).

SITE D: This parcel was previously planted in Macadamia nuts trees. There are no features recorded by the State Historic Preservation Division near the site.

SITE E: Site E is located in the area covered by the 1881 lava flow. A recent archaeological survey conducted adjacent to the subject site did not uncover any pre-contact features. Historic features found along the Alenaio Stream, south of the project site, typically consists of an irregular shaped mound constructed of stacked and piled boulders and cobbles (Hunt et al, 1994). The recorded sites in the immediate area of the subject site include Miyamoto Store and the Kaumana Hongwanji temple.

The proposed project is not anticipated to have substantial impacts on cultural resources in the region. It is unlikely to encounter historic sites in these project sites. However, should any unidentified cultural remains be uncovered during the course of the project, work in the immediate area will cease and the appropriate government agencies will be contacted for further instructions.

2.6 NOISE

The Hawaiian Home Lands General Plan (1976) describes noise as a dominant factor related to land use in Keaukaha due to proximity to Hilo International Airport. Site A (TMKs 2-1-17:46, 47, & 48; 2-1-18:8; and, 2-1-19:20, 29, 30, & 31) is located in Keaukaha, and may be impacted by noise from potential overflights of aircrafts into and out of Hilo International Airport. According to the *Hilo International Airport FAR Part 150 Noise Compatibility Program (NCP),*

Volume II (December 1992), all properties in Site A are located between the 60-65 Ldn noise contour (**Figure 2-1**).

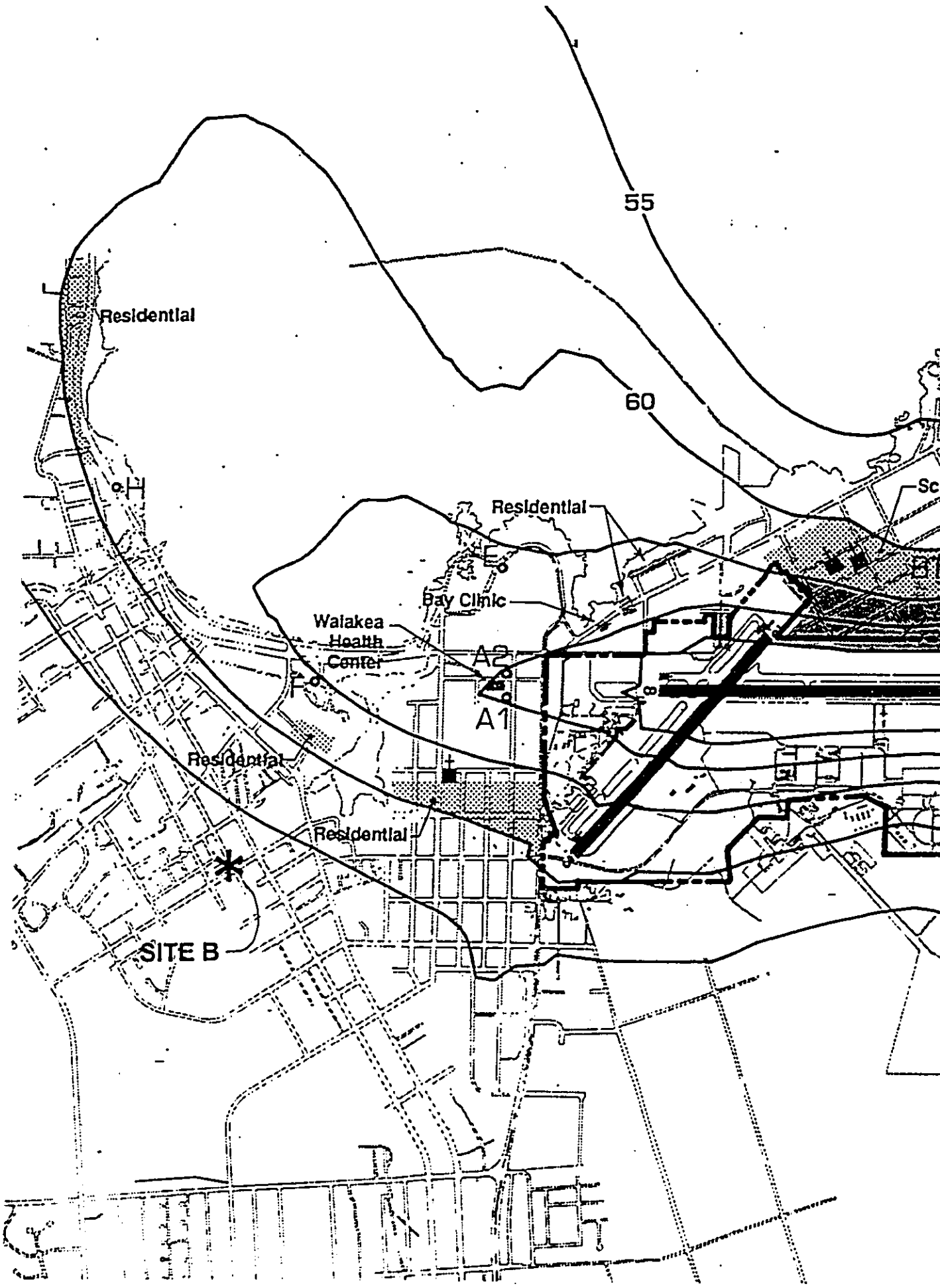
By FAR Part 150 requirements, interior noise level should not exceed 45 Ldn. The range of exterior-interior sound attenuation required to meet this interior standard are from 15 dB for homes which are inside the 60 Ldn contour to 35 dB for homes which are inside the 75 Ldn contour. In order to achieve these levels of sound attenuation, closure and air conditioning of the homes within the 60 Ldn contours will be required.

Noise and safety issues related to the airport will not be a major concern for the residential use of the properties at Sites B, C, D, and E since all properties in these sites have a sufficient distance from the airport.

The overall project site is characterized as low to medium density single family residential development. The present noise quality of the project sites is within the level of rural/single-family residential use. Adverse noise impacts from the proposed homestead development are not expected. The proposed development will not exceed the present noise quality of rural/single family residential and agricultural lifestyle.

2.7 AIR QUALITY

The present ambient air quality in the Hilo area is good due to the prevailing tradewind and the absence of "heavy" industries. Some particulates and hydrocarbon emissions presently occur from industries located at Hilo harbor. Automobile emissions from traffic passing through the urbanized area of Hilo may reduce ambient air quality. On the whole, air quality at the project sites has a very low level of urban generated pollutants due to the relatively low residential density and distance from emission source. Development of the sites for homestead is not anticipated to result in significant impacts on the area's air quality.


55
60
Residential
Residential
Bay Clinic
Waiakea
Health
Center
A2
A1
Residential
Residential
SITE B

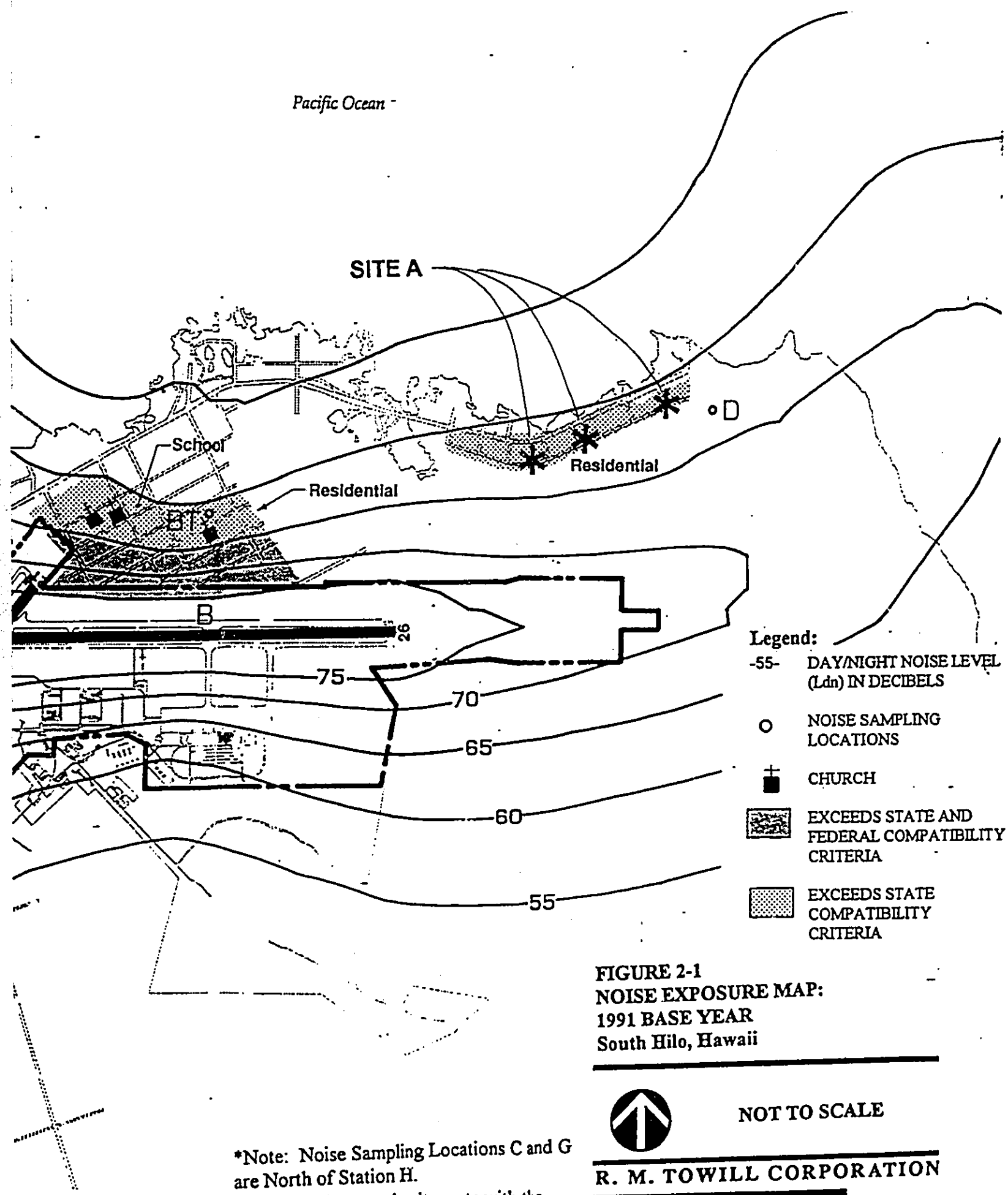


FIGURE 2-1
NOISE EXPOSURE MAP:
1991 BASE YEAR
South Hilo, Hawaii

NOT TO SCALE

R. M. TOWILL CORPORATION

*Note: Noise Sampling Locations C and G are North of Station H.
Note: Land use authority rests with the County of Hawaii and the State of Hawaii.

2.8 NATURAL HAZARD

The Hilo area has been subject to natural hazards including flood, tsunami inundation, volcanic activity, and earthquakes.

2.8.1 Flooding

Hilo is subject to riverain flooding principally as the results of high intensity rainfall and surface runoff in undefined drainageways. According to the 1988 Flood Insurance Rate Map (FIRM), most of the project sites are outside of 100-year flood zone. Site A-3 and the northern half of Site A-2 , A-3 are determined as being with "Zone VE" (**Figure 2-2**). Zone VE is described as "special flood hazard areas inundated by 100-year flood; and coastal flood with velocity hazard (wave action), and base flood elevations determined". The northeastern corner of Site A-1 and the southern half of Site A-2 are located in "Zone AE." Zone AE is a "special flood hazard areas inundated by 100-year flood; and base flood elevations determined." The reminder of Site A-1 is in "Zone X", an area determined to be outside of 500-year flood plain.

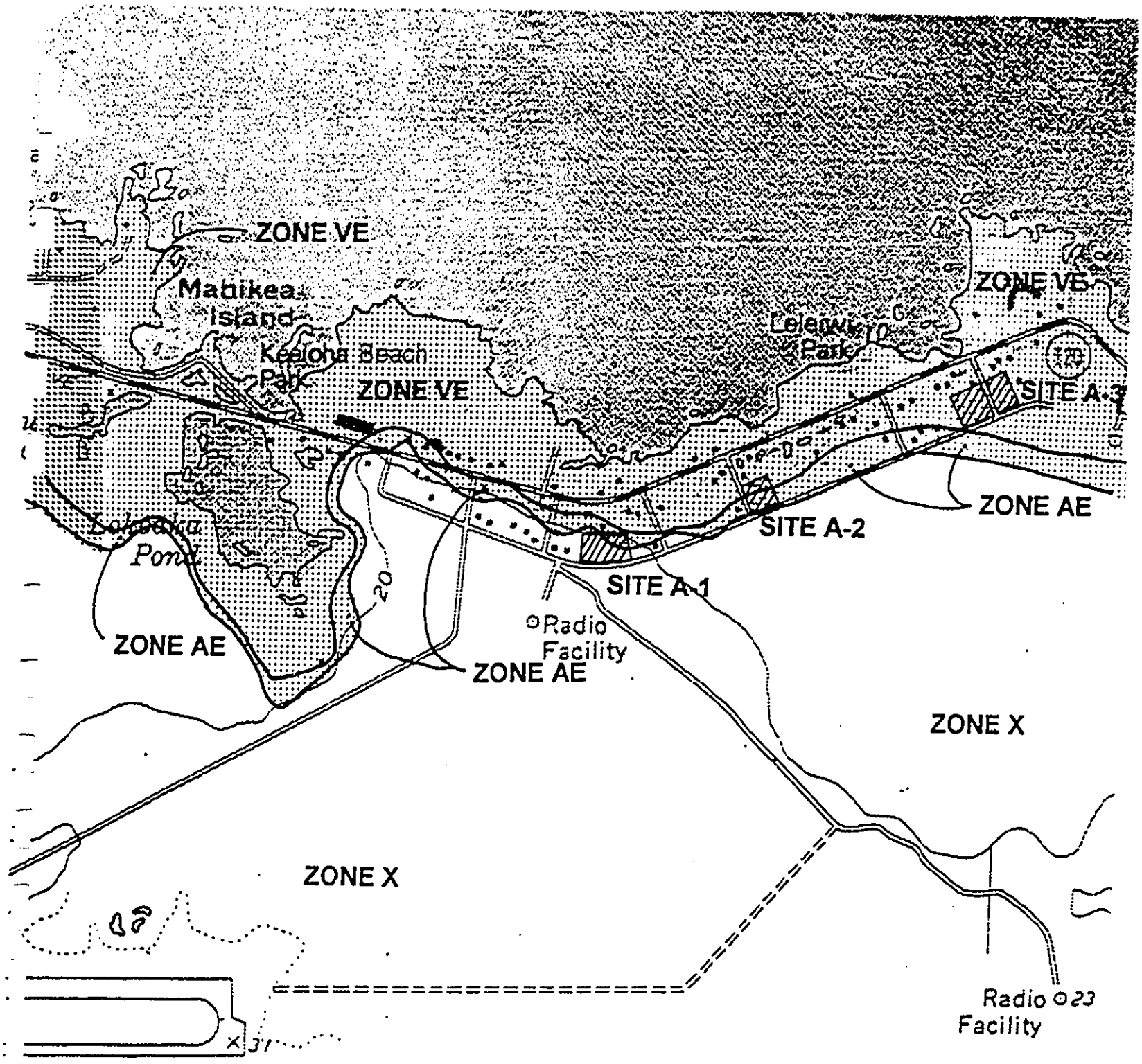
At Site B, a narrow strip along Ainako Stream floodplain, tributary to the Wailuku River, is indicated as "Zone A" (**Figure 2-3**). Zone A is described as "special flood hazard areas inundated by 100-year flood; and base elevations determined." The reminder of Site B is located in Zone X. Sites C and D are also located within Zone X.

The majority of the property within Site E is located in Zone X. However, TMK 2-5-5:1 and the southern tips of TMKs 2-5-5: 3, 77, and 79 are located within Zone A (**Figure 2-4a & b**).

2.8.2 Tsunami

The orientation of the crescent-shaped bay makes the city of Hilo susceptible to tsunamis originating from the eastern arc of the seismic belt extending from the Aleutian Islands to the coast of South America. More than 40 major tsunamis have struck Hilo since 1819.

All properties in Site A are located within the FIRM 100-year tsunami inundation zone, and portions of the site within coastal high hazards areas (see **Figure 2-2**).



Legend:

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

FIGURE 2-2
FEMA-FLOOD INSURANCE MAP
AT SITE A
South Hilo, Hawaii

0 1000 2000
FEET

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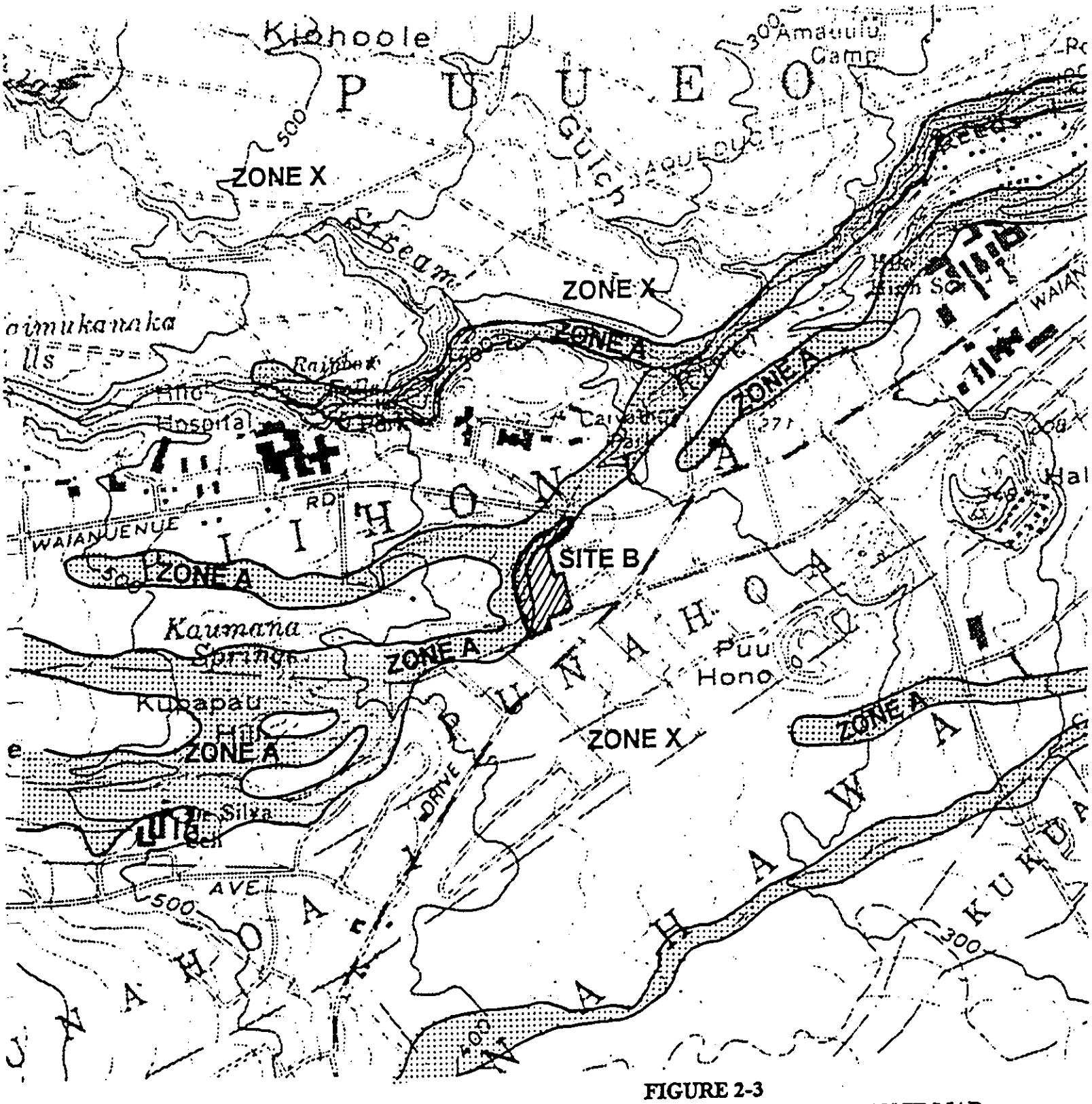

Legend:

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

FIGURE 2-3
FEMA-FLOOD INSURANCE MAP
AT SITE B
South Hilo, Hawaii

0 1000 2000
FEET

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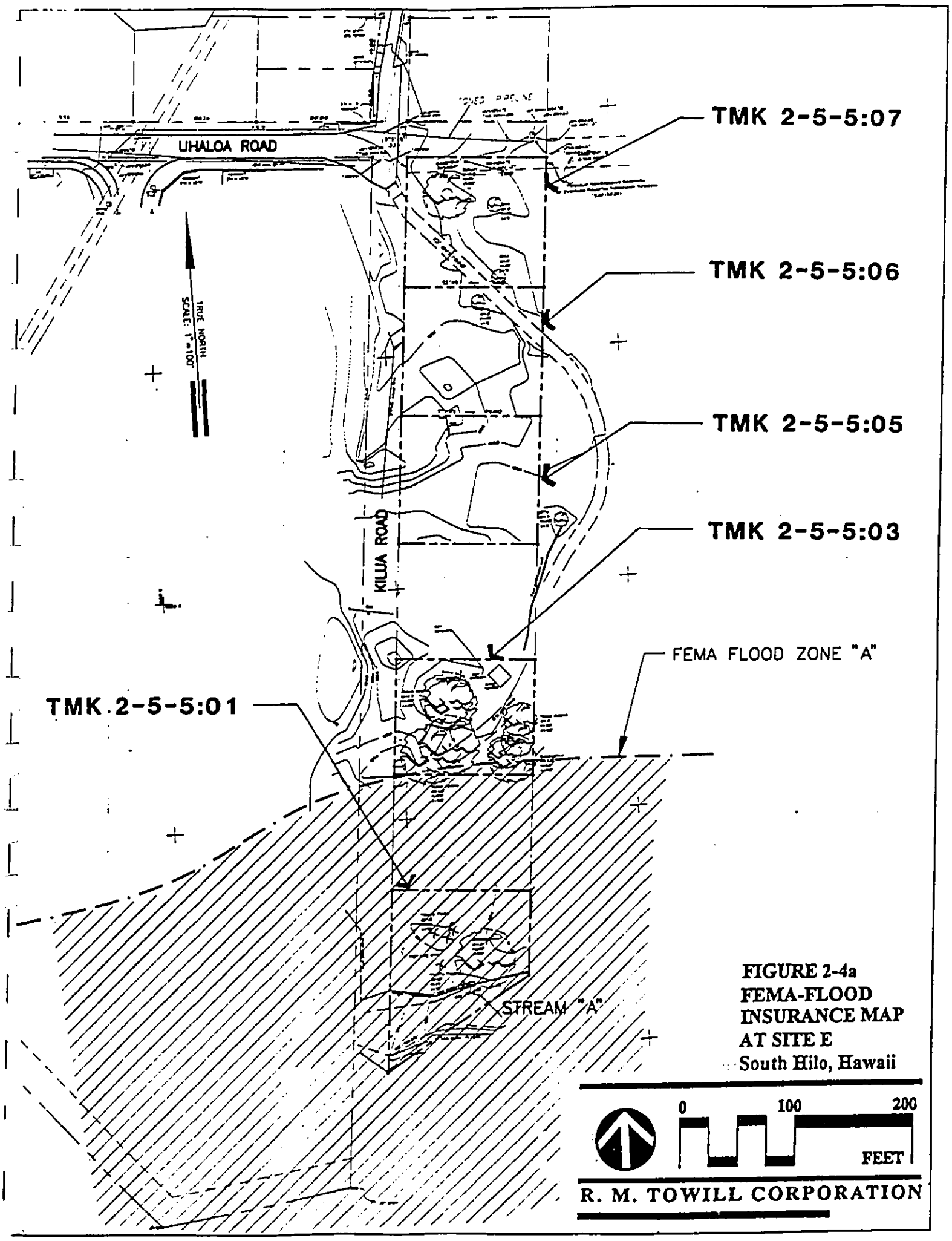

FIGURE 2-4a
FEMA-FLOOD INSURANCE MAP AT SITE E
South Hilo, Hawaii

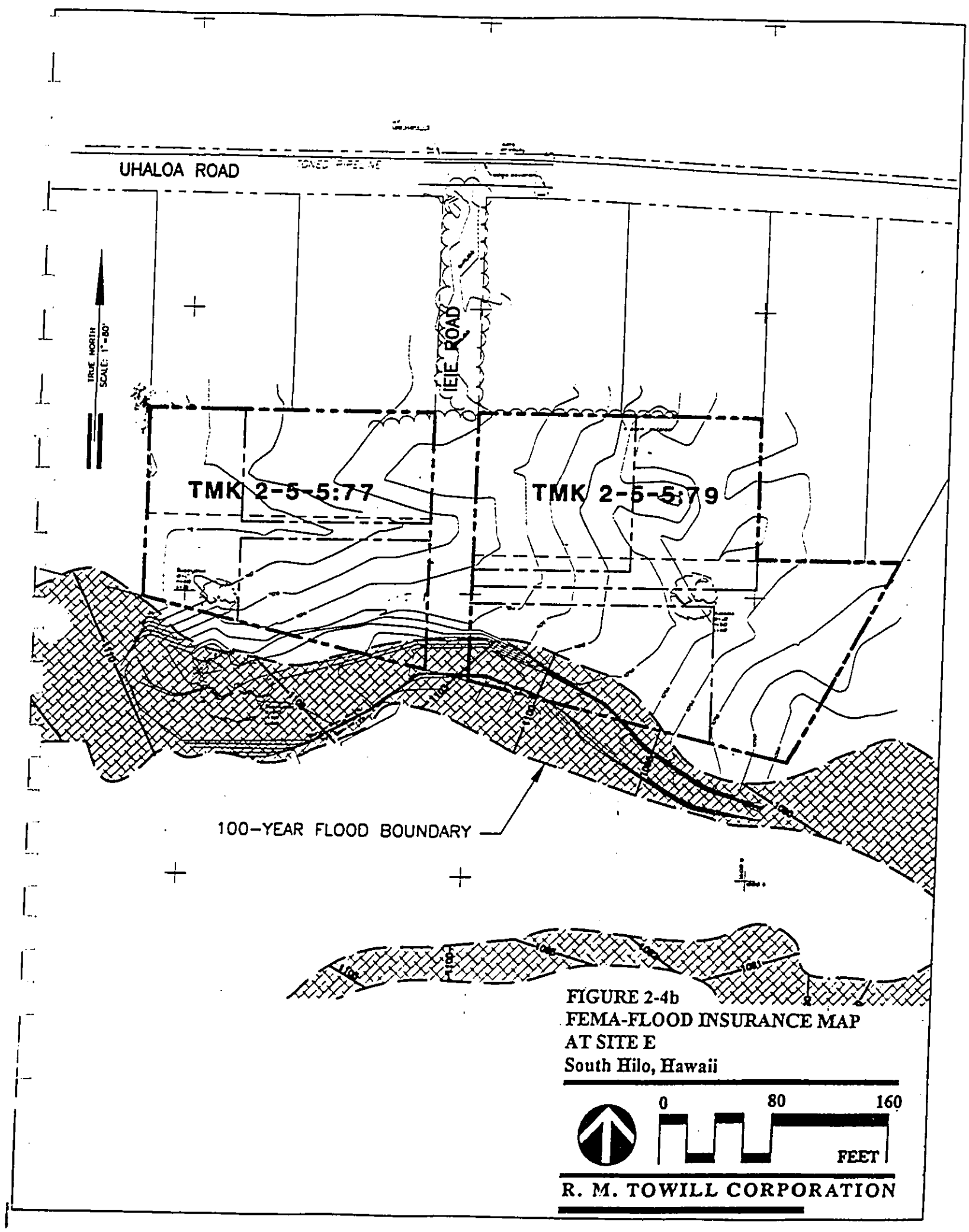

FIGURE 2-4b
FEMA-FLOOD INSURANCE MAP
AT SITE E
South Hilo, Hawaii

R. M. TOWILL CORPORATION

2.8.3 Volcanic Hazard

According to U.S. Geological Survey, 1974, Hilo is located within the area susceptible to burial by lava flows originated from eruptions within the northeast rift zone of Mauna Loa. According to Hazard Zones for Lava Flows, the U.S. Department of Interior, Geologic Survey, the project sites are all within Zone 2. Zone 2 is described as "areas adjacent to and downslope of active rift zones." The most recent eruption of Mauna Loa in 1984 advanced to within 4 miles of Hilo before the 3-week-long eruption ended (Christina Heliker, 1990). Although lava flows are the most common volcanic hazards in Hawaii, most lava flows from Mauna Loa, since 1880, have stopped before reaching the urban areas of Hilo (U.S. Army Corps, 1981).

2.8.4 Earthquake

During the past few decades, the island of Hawaii experienced several earthquakes with Richter magnitude ratings of 6 or more. The risk of major damage from earthquake is considerably high throughout the island.

Under the Uniform Building Code, the island of Hawaii has been designated as Seismic Zone 3 which indicates a relatively significant potential for strong ground motion generated by seismic events. The Uniform Building Code also establishes minimum seismic design criteria for any structures constructed in such a zone for resistance to deformation and damage resulting from such strong ground motion. Thus any structures that will be built for the development will be designed with consideration of the hazards of seismic activities.

2.9 WATER QUALITY

The coastal water designation for Hilo Bay (Pepeekeo Point to Leleiwi Point) in the State Department of Health, Chapter 54, Water Quality Standards is Class A. The use of these waters is protected for recreational and aesthetic enjoyment.

The waters in the Hilo Bay and the beaches around the bay are frequently very turbid with high concentrations of suspended particulate material, washed out by frequent rainfall, apparently of terrestrial origin. Historically Hilo Bay has suffered from numerous point and non-point source

pollutants including wastewater from sugarcane processing operations, a cane plant, surface runoff from agricultural lands, raw sewage discharges, periodic shipboard waste disposal in Hilo Harbor, cesspool overflow and leachate, and the thermal discharges of Hilo Electric Company into Wailua River (M & E Pacific, 1989).

2.10 IMPACT AND MITIGATION

The proposed project is anticipated to have no long-term impacts on the existing environment. All proposed sites are currently undeveloped vacant land and covered by overgrown vegetation mostly comprised of introduced species.

No significant adverse impacts are anticipated to result from the development of the proposed project. Potential impacts are likely to occur during construction activity and are expected to be short term. The proposed development will alter the topographic conditions of the land due to grading, topsoil importation, vegetation removal, and increased impervious surfaces. However, the natural drainage pattern in the area will be maintained. Storm water runoff created by increased impervious surfaces will be retained on site by routing the flows to drywells. Water will then infiltrate into the ground and contribute to the groundwater recharge. Natural flows will use existing drainageways to maintain the natural drainage patterns.

Any earthwork and grading shall be in conformance with Chapter 10, Erosion and Sedimentation Control, Hawaii County Code, 1983, as revised in 1995. If necessary, silt screens will be utilized to reduce potential for turbidity due to construction related work. The contractor will ensure that storm water control measures will be in place and functional before operations begin. The control measures shall be maintained throughout the construction period. If a severe storm event such as a 100-year storm should occur, all equipment, materials, and personnel not absolutely necessary to the work site will be removed to a location beyond the reach of flood waters.

Short-term impacts of the proposed project due to construction activity would also include increased noise and fugitive dust during the construction period. Short-term construction noise would be allowed in strict accordance with noise regulations of the Department of Health. Noise

generated from machinery can be mitigated to some degree by requiring contractors to adhere to State and County noise regulations. This includes ensuring that machinery is properly muffled.

Short-term impacts from fugitive dust will occur during the project construction phase. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, from the disruption of the traffic, and from workers' vehicles may also affect air quality during the period of construction. State air pollution control regulation requires that there be no visible fugitive dust emission at the property line. An effective dust control plan will be implemented to ensure compliance with state regulations. Fugitive dust emissions can be controlled to a large extent by watering of active work areas, use of wind screens, and keeping adjacent paved roads clean.

No significant impacts on the area's long-term air quality or noise levels are anticipated. The proposed project will maintain the existing rural/single family residential environment. Furthermore, the neighborhood that would result from this project would reflect the culture and values of the past Hawaiian communities. It is the long term goal of the project to foster a Hawaiian lifestyle with subsistence homesteads traditional to the Hawaiians of the recent past.

SECTION 3
SOCIO-ECONOMIC ENVIRONMENT

3.1 POPULATION

The City of Hilo is presently the only major metropolitan area in Hawaii County. Hilo is the county's center of government, transportation, and business. Hilo also provides various secondary economic activities. Consequently Hilo has become a major population center of the island.

Approximately one-third of the county's population is concentrated in the Hilo area. According to the State of Hawaii Data Book 1993-94, the population of Hilo was 37,808 in 1990. As the population in North/South Kohala has grown significantly in last two decades, population in the South Hilo district continues to have steady growth. It is anticipated that the Hilo area will continue to be the major urban center of Hawaii County.

3.2 SURROUNDING LAND USE

Rocky substrates underlain by pahoehoe lava and proximity to the island's major airport have significantly influenced the existing land use in the Hilo area. The surrounding areas have previously been modified for agricultural and urban-residential uses. Most of the project area is not suitable for agriculture except for pasture use due to rocky substrates.

Noise and safety issues related to the airport will not be a major concern for the residential use of the properties at Site B, C, D, and E since all properties in the project sites have a sufficient distance from the airport. However, Site A (TMKs 2-1-17:46, 47, & 48; 2-1-18:8; and, 2-1-19:20, 29, 30, & 31) is located in Keaukaha, and may be impacted by noise from potential overflights of aircrafts into and out of Hilo International Airport. According to the *Hilo International Airport FAR Part 150 Noise Compatibility Program (NCP), Volume II* (December 1992), all properties in Site A are located between the 60-65 Ldn noise contour (see **Figure 2-1**). By FAR Part 150 requirements, interior noise level should not exceed 45 Ldn. In order to achieve these levels of sound attenuation, closure and air conditioning of the homes within the 60 Ldn contours will be required.

Residential use has been prominent around Site A. The nearshore area is designated as Leleiwi Park. Lots facing Kalanianaole Avenue are well-developed for single family residential use. Properties facing Nene Street are sparsely developed. The area south of Site A is designated as Hawaiian Home Lands land bank and currently not in use.

Sites B and C are located within the urban center of Hilo. The surrounding area of Site B is mostly developed for low and medium density single family residential use with Ainako Stream and open pasture land to the west. The area around Site C is predominantly residential use, mixed with a few small local businesses.

Site D lies in designated Agricultural district. The land to the north of the site is used by local nursery. The surrounding area of Site D is mostly agricultural land and sparsely developed.

Site E comprises a major land area of Kaumana Town which has been surrounded by the development of single family residential uses. Among these residential lots, there are a few "paper roads" that are once planned but have not been constructed. These paper roads include Lawai Road, a western portion of Uhaloa Road, Ieie Road, Kilua Road to the south of Uhaloa Road, and a portion of Uhaloa Road between Uluhe and Pamoho Roads. Uhaloa Road right-of-way between Uluhe and Pamoho Roads was once cleared to built power line from the adjoining Hawaii Electric Light Company (HELCO) Sub-station; however, this portion of the road was not constructed. These paper road right-of-ways are under the jurisdiction of State DLNR. Most of these paper roads' right-of-ways are covered with overgrown bushes and hidden among the surrounding properties.

A Hawaii Electric Light Company (HELCO) substation is located next to TMK 2-5-5:80. The substation transfers the high voltage used by transmission lines to the lower voltages used by the distribution lines to supply residences at the area. There have been many studies on electric and magnetic field (EMF) caused from power line and its impact on human health. However, there is no established cause and effect relationship between EMF exposure and cancer or other disease. These

studies provide both positive and negative results. According to a recent report released from National Academy of Science based on seventeen years of research, "the findings to date do not support claims that electromagnetic fields are harmful to a person's health" (National Academy of Science, 1996).

3.3 ECONOMIC CHARACTERISTICS

The Hilo area constitutes more than 70 percent of the county's industrially zoned lands. The island's economy is primarily based on agriculture and tourism. While the sugar industry in the island has declined, macadamia nut orchards have replaced much of the lands previously in sugar cane cultivation.

As the county seat, economic activities in Hilo are oriented toward transportation, communication, trade, and education. Federal, state, and county governmental agencies are concentrated in the Hilo area. The City of Hilo contains a downtown business district, several shopping center complexes, and numerous neighborhood commercial facilities. Hilo Harbor has been a major shipping center for agricultural and a number of related industries. The other industries include manufacturing and wholesaling. A four year college, the University of Hawaii at Hilo, provides opportunity for further research and development within the area.

SECTION 4
PUBLIC FACILITIES AND SERVICES

4.1 TRANSPORTATION FACILITIES

The major attributes of the traffic system in Hilo are Hilo Harbor and the international airport. The low level of development within the South Hilo area, except the urban center of Hilo, result in comparatively light to moderate traffic volumes on most of the roadways.

The general project area is served primarily by Bayfront Highway, Kalanianaole Avenue, Kanoelehua Avenue, Kilauea Avenue, Waianuenue Avenue, and Kaumana Drive. All sites are presently served by a system of principal, secondary or other improved public roads.

Kalanianaole Street, which carries traffic from the urban center of Hilo toward Leleiwi point, serves Site A. Site A is scattered into three clustered subdivisions; A-1, A-2, and A-3. Total of thirteen (13) scattered lots are planned to be developed in this site. All lots will have access directly on Nene Street. Site A-1 will be subdivided into four (4) single family lots and have access to Kalanianaole Street via Kolea and/or Kioea Streets. Site A-2 will be subdivided into five (5) single family lots and have access to Kalanianaole Street via Koloa Street. Parcels in Site A-3 will not be subdivided and will have access to Kalanianaole Street via Uwau and/or Oeoe Streets.

Site B is primarily served by Waianuenue Avenue and Kaumana Drive. Total fourteen (14) to seventeen (17) single family residential lots are planned in the site. Punahele Street will be extended to bring access into the proposed parcels.

Site C is located on Mohouli Street in the town of Hilo between Kinoole and Kapiolani Streets. The parcel contains approximately 16,000 SF. The site has direct access on Mohouli Street. Ululani Street ends at the northern boundary of the parcel. A plan to subdivide this property into residential lots has not been determined yet.

Kanoelehua Avenue, the county's only divided highway, provides primary access to Site D from the urban center of Hilo. The parcel is approximately twenty-three (23) acres. The property has access via Kealakakai Street. This is a potential site for DHHL Single Family Residential Lots. However, a plan to subdivide the property into residential lots has not been determined yet.

The parcels in Site E will have access from Kaumana Drive (Saddle Road), which is a major corridor along the southern slope of Mauna Kea connecting the South Hilo and South Kohala districts. Total fifty-two (52) to fifty-four (54) single family residential lots are clustered into five scattered subdivisions in Site E.

Site E-1 is comprised of TMK 2-5-4:27, 43, 47, 60, and 61. Site E-1 will provide one (1) scattered subdivision, including 4 separate portions, containing five (5) parcels, on the west of Wilder Road (see **Figure 1-7**). TMK 2-5-4:27 will be subdivided into twelve (12) to fourteen (14) single family lots. TMK 2-5-4:43 will not be subdivided. TMK 2-5-4:47 will be subdivided into three lots as indicated in the "State of Hawaii Realty Atlas, 1996." TMKs 2-5-4:60 & 61 will not be subdivided. The properties will have access to Kaumana Drive via Lawai and/or Amau Road.

Site E-2 includes 9 separate portions, containing 17 parcels, on the east of Wilder Road. Site E-2 will provide four (4) scattered subdivisions (see **Figure 1-7**). TMK 2-5-5:77 will be subdivided into three (3) single family lots. TMK 2-5-5:79 will be subdivided into four (4) single family lots. Both parcels will have access on Ieie Road. TMK 2-5-5:72 & 74 will be subdivided into three (3) single family lots. The lots will have access on Pala Lane. TMK 2-5-5:80 will be subdivided into fifteen (15) single family lots. The remaining properties are ±10,000-SF parcels and will not be subdivided. All lots in TMK 2-5-5:80 and TMKs 2-5-5:28, 29, 30, 31, 32, & 33 will have access via Uhaloa Road. The remaining parcels (TMKs 2-5-5:1, 3, 5, 6 & 7) will have access directly on Kilua Road.

All properties in Site E-2 will have access on Kaumana Drive via Wilder, Uluhe, Pamoho, and/or Kilua Roads. Since the proposed properties are scattered along Kaumana Drive, the properties in Site E-2 will have access through six different intersections along Kaumana Drive. Therefore,

project is not anticipated to result in significant impacts on Kaumana Drive and intersections. In addition, the extension of Puainako Street has been planned as a connector road from the Waiakea area of Hilo to Kaumana. If the Puainako Street extension is constructed, traffic volume on Kaumana Drive will significantly be reduced.

Overall, the proposed project is low- to mid-density single family residential development scattered in the District of South Hilo. The project is not anticipated to have significant impacts on the traffic conditions in the region. Potential impacts are likely to occur during construction activity and are expected to be short term. Any work within the County right-of-way shall be in conformance with Chapter 22, Streets and Sidewalks, Hawaii County Code, 1983, as revised in 1995.

4.2 WATER SYSTEM

A total of six water sources are maintained and operated by the county's Department of Water Supply serving the general project area. Potable water for the Hilo area come from both surface and ground sources. These include the Piihonua Surface Source, Lyman Spring, Olaa Flume, Waiakea-Uka Spring, Panaewa Well, and Piihonua Well, within a combined normal capacity of 20 million gallons per day.

Water is available to the project sites per existing zoning or for any additional zone change through the County of Hawaii, Department of Water Supply (DWS 1997). The following describes the existing County Water Systems near/on-sites and improvements need to be provided by DHHL as part of this project:

Site A

TMK 2-1-17:46, 47, & 48

Water is available from an existing 6-inch waterline along Kioea Street. Approximately 520 feet of 6-inch waterline must be extended along Nene Street to the property.

TMK 2-1-18:8 and 2-1-19:20, 29, 30, & 31

Water is available from an existing 6-inch waterline along Kalanianaole Street. Approximately 220 feet of 6-inch waterline must be extended along Koloa Street to the property.

Site B

TMK 2-3-25:14, 15, 16, & 17

Water is available from an existing 6-inch waterline at the intersection of Puuhina and Punahele Streets. Approximately 720 feet of 6-inch waterline must be extended along Punahele Street to the property.

TMK 2-3-25:47

Water is available from an existing 16-inch waterline along Waianuenue Avenue fronting the property. A 6-inch waterline must be extended into the property to provide water at adequate pressure and volume under peak-flow and fire-flow conditions.

Site C

TMK 2-4-28:1

Water is available from an existing 6-inch waterline along Mohouli Street fronting the property.

Site D

TMK 2-4-49-19

Water is available from an existing 8-inch waterline along Kealakai Street fronting the property. This parcel consists of two lots, each lot has an existing service.

Site E

TMK 2-5-4:27 & 43

Water is available from the end of an existing 6-inch waterline along Amau Street. Approximately 200 feet of 6-inch waterline must be extended from the end of the existing 6-inch waterline along Amau Street to the property.

TMK 2-5-4:47, 60, & 61

Water is available from an existing 8-inch waterline along Kaumana Drive. Approximately 300 feet of 6-inch waterline must be extended along Lawai Road to the property.

TMK 2-5-5:1, 3, 5, 6, 7, & 10

Water is available from an existing 6-inch waterline along Uhaloa Road. Approximately 600 feet of 6-inch waterline must be extended along Kilua Road to the property.

TMK 2-5-5:28, 29, 30, 31, 32, & 33

Water is available from an existing 8-inch waterline along Pamoho Road and an existing 6-inch waterline along Uluhe Road to the property.

TMK 2-5-:72 & 74

Water is available from an existing 8-inch waterline along Kaumana Drive. Approximately 550 feet of 6-inch waterline must be extended along Wilder Road and Pala Lane to the property.

TMK 2-5-5:77, 79, & 80

Water is available from an existing 6-inch waterline along Uhaloa Road. Approximately 350 feet of 6-inch waterline must be extended along Ieie Road to Parcels 77 and 79, and a 6-inch waterline must be extended into Parcel 80 from the end of the 6-inch waterline at the intersection of Uhaloa and Uluhe Roads.

DHHL will provide additional water system improvements, including service laterals and fire hydrants within 300 feet of all lots. All improvements will be made to be integrated with the existing systems.

4.3 WASTEWATER SYSTEM

Presently there is no municipal sewer system serving the project sites. A new sewer system is planned to be constructed at Keaukaha in 1998 by the County of Hawaii. The proposed sewer

system will be designed to meet the county standard for R-10 (10,000 sq.ft. Single-family Residential) Zoning. There is an existing collector sewer system within 300 feet to Site B. The nearest collector sewer system to Site C is located on Kinoole and Hema Streets. All collected sewerage throughout the Hilo area are treated at Hilo Wastewater Treatment Plant.

There is no sewer system currently available within any of the proposed properties. Since the sites will be subdivided into lots less than one-acre, DHHL will provide septic systems for all lots proposed to handle waste water on site. All sewer improvements will be made to meet County of Hawaii standards.

4.4 DRAINAGE

Two major drainageways in the general project area; Wailuku River and Wailua River, are designated as State Conservation District due to potential flood hazard. Neither distinctive valleys nor coastal plains formed from land and marine sediments (cap rock) are common on the Island of Hawaii. The existing ground surface is underlain by pahoehoe and aa lava with shallow or no soil coverage, resulting in high infiltration and subsurface flow rates.

No significant adverse impacts on Wailuku or Wailua River are anticipated to result from the development of the proposed project. Site B is located approximately 1,000 feet south of Wailuku River. Ainako Stream which defines northeastern boundary of Site B is a tributary to the Wailuku River. As described in Section 2.8.1 Flooding, a narrow strip of Site B along Ainako Stream is within the area "special flood hazard areas inundated by 100-year flood" as defined by FEMA, and will de developed in accordance with Chapter 27, Flood Control, Hawaii County Code, 1983, as revised in 1995.

Site C is located approximately 2,000 feet southwest of Waiakea Pond and 400 feet away from Waiakea Stream. The portion of Waiakea Stream near the project site is concrete channelized for urban stormwater management. The western boundary of the property is defined by a concrete lined drainage ditch.

Development of scattered small-scale homestead will generate low volumes of increased runoff. In order to accommodate relatively low volumes of increased runoff due to the development, the proposed drainage system should include surface and underground drainage facilities. These drainage facilities may consist of swales, underground drain lines and grassed open drainage channels. All drainage infrastructure will be designed and constructed to meet state and county standards for the 50-year storm event.

No significant adverse impacts are anticipated to result from the development of the proposed project. Potential impacts are likely to occur during construction activity and are expected to be short term. Clearing and grabbing will be held to the minimum necessary. Any earthwork and grading shall be in conformance with Chapter 10, Erosion and Sedimentation Control, Hawaii County Code, 1983, as revised in 1995. If necessary, silt screens will be utilized to reduce potential for turbidity due to construction related work. The contractor will ensure that storm water control measures will be in place and functional before operations begin. The control measures shall be maintained throughout the construction period.

4.5 RECREATIONAL FACILITIES

County parks and playgrounds in the Hilo area are under jurisdiction of the County of Hawaii, Parks and Recreation Division. The county provides a variety of recreational programs and facilities, including swimming pools, tennis courts, baseball and softball fields, track and field, conservation areas, and a golf course. Much of the coastal area is designated as State Conservation District and currently used as parks and gardens. However, natural features constrain shoreline use of the Hilo area due to the limited acreage of sandy beaches and potential tsunami inundation.

There are several beach parks along the northeastern shoreline of the South Hilo District near Site A. A total 30.87 acres of Leleiwi Beach Park, including Mahikea Island and Peue Island, is located within a few hundred yards. Adjoining Leleiwi Beach Park, Richardson Ocean Park (4.5 acres) and Lehia Beach Park (14 acres) stretches to the east along the shoreline.

Two state parks in the South Hilo, Wailuku River State Park and Wailoa River State Recreational Center, adjoin Site B and C. Wailuku River State Park and Rainbow falls locate north of Site B. Approximately 9 acres of District Park, Gilbert Carvalho Park, is located at the intersection of the Waianuenue Avenue and Kaumana Drive. Wailoa River State Recreational Park covers much of the lower drainage basin of Wailoa River and Waiakea Pond.

Site D is remotely located from the urban and residential center of the Hilo. Consequently, there are no community parks or playgrounds near the site. Panaewa Zoo and Equestrian Center County Park, and Waiakea Arboretum are two major attractions in the area. Panaewa Zoo and Equestrian Center County Park is located on Stainback Highway, approximately a mile west of the site. Waiakea Arboretum is located about two more miles west of the county park along Stainback Highway.

The town of Kaumana is a predominantly residential community. Kaumana Public Park and playground is situated between Akolea Road and Wilder Road in a close proximity to the proposed properties in Site E. This 1.5 acres playground is used for community recreation and maintained by the county.

Kaumana Caves County Park, approximately one-half mile east of Site E, is another significant recreational site in this area. Kaumana Caves County Park contains several lava tubes created by the 1881 eruption of Mauna Loa.

4.6 SCHOOL AND MEDICAL CARE

4.6.1 School

The public school system in Hilo is under the jurisdiction of the state Department of Education. The public schools include two high schools, three intermediate and eight elementary schools. The current population of South Hilo public school is 10,287 students. Hilo High School has enrollment of 1,739 students. The enrollment of Waiakea High School is 2,258 students. St. Joseph High and Elementary school, a major private school complex, is also located in downtown Hilo.

The University of Hawaii at Hilo (UHH) is the only public institution of higher education in the County of Hawaii. UHH has an enrollment approximately 4,000 students. The main campus encompasses approximately 137 acres. The university incorporates a two-year community college, a four year university, and a continuing educational program.

4.6.2 Medical Care

The only hospital in the general project area is the state-owned Hilo Medical Center (HMC), established in 1897. The HMC provides comprehensive health care services, including medical, surgical, ambulatory care, home care, psychiatry, and an extended care facility.

4.7 FIRE AND POLICE PROTECTION

4.7.1 Fire Protection

The South Hilo District is served by the following four major stations; Waiakea Station, Central Station, Kawailani Station, and Kaumana Station. Waiakea Station is located on Keaa Street between Kalanianaole Avenue and Kamehameha Avenue, approximately four (4) miles west of site A and 1.6 miles east of Site C. Approximately 1.3 road miles to the east of Site B, Central Station is located at the corner of Kinoole and Ponahawai Streets. The nearest fire station from Site D is Kawailani Station, which is located approximately 3 road miles north of the site. Kawailani Station is located adjacent to the Hilo Municipal Golf Course on Kawailani Street near the intersection of Iwalani Street. Kaumana Station is located on Kaumana Drive near the intersection with Ainako Avenue, approximately half a mile south of Site B and 2.5 miles north of Site E.

4.7.2 Police Protection

The police Department is located on Kapiolani Street near the intersection with Kukuau Street. The police station in Hilo services the South Hilo District. In addition to the main station in downtown Hilo, there are three other community police stations serving the general area. These community police offices are located at Clem Akina Park on Wainaku Avenue, Mooheau Bus Terminal on Kamehameha Highway, and Richardson Beach Park off Kalanianaole Avenue.

4.8 ENERGY

The Hawaii Electric Light Company (HELCO) provides electric power to the Hilo area primarily through HELCO's power generation system. HELCO has six power plants which produce electric power by steam units, diesel units, a gas turbine, and hydroelectric units. These electric power plants are situated at Keahole, North Kohala; Waimea, South Kohala; Waiau Puueo, Waiakea Peninsula, and Kanoelehua, South Hilo. HELCO also purchases power from Hilo Coast Processing Company, a privately-owned biomass generator, and from a geothermal generator owned by Puna Geothermal Ventures.

The present level of public facilities and services provides adequate services to handle the current demand. The proposed project is not expected to place enough of a demand to result in the need to increase the level of current facilities and services.

SECTION 5
RELATIONSHIP TO LAND USE, POLICIES, AND CONTROLS OF THE AFFECTED AREA

5.1 HAWAII STATE PLAN

The Hawaii State Plan, Chapter 226, Hawaii Revised Statutes, serves as a written guide for the future long range development of the State. The Plan identifies goals, objectives, policies, and priorities for the State.

The proposed project would be in conformance to the State Plan's objectives and policies for socio-cultural advancement of the Hawaiian people. The proposed development will foster safe, sanitary, and decent homes. By allowing the beneficiaries who are Hawaiian in ethnicity the opportunity to use the property as subsistence homesteads with the necessary infrastructure improvement, beneficiaries would design and maintain houses and community that would foster increased knowledge and understanding of the Hawaiian culture and lifestyle.

The project would also conform to the State Plan's policy to promote housing for the Hawaiian lifestyle. It is the long term goal of the project to foster such a lifestyle with subsistence homesteads traditional to Hawaiians of the recent past. The neighborhood that would result from this project would reflect the culture and values of past Hawaiian communities.

5.2 STATE FUNCTIONAL PLAN

The twelve State Functional Plans were adapted by the State Legislature in April 1984. These plans were formulated to specify in greater detail the policies, guidelines and priorities set forth in the Hawaii State Plan. The twelve functional plans include; Energy, Transportation, Water Resources, Historic Preservation, Health, Education, Housing, Conservation Lands, Higher Education, Agriculture, and Tourism.

The project is consistent with the policies and objectives of the State Functional Plans. This project provides the needed housing and infrastructure requirements for the people of Hawaiian ancestry and returns them to their land.

5.3 STATE LAND USE LAW

The properties in Site A, B, C, and E are designated within the State Urban District (**Figure 5-1a, b, & d**). Uses proposed under the development would be consistent with objectives and policies of the State Land Use Law, Chapter 205, Hawaii Revised Statutes. The property in Site D is designated within the State Agricultural District (**Figure 5-1c**). Hawaiian Home Lands are exempt from land classification requirements for homestead development.

5.4 COUNTY OF HAWAII GENERAL PLAN AND COMMUNITY PLANS

According to the Hawaii County General Plan, the project site A lies within the "Low Density Urban". The properties in both site B and C are designated within "Mid Density Urban". Site D lies within "Orchards". Land use for the properties in Site E includes Low and Mid Density Urban, and Open Area.

The proposed project is consistent with the South Hilo housing "Course of Action" as outlined in the County General Plan. These "Course of Actions" are listed below:

- Participate in and coordinate housing projects for low and moderate income families, "gap-groups" and the elderly in this area.

- Aid and encourage the development of State lands in the South Hilo area for housing for all socio-economic levels through lease-hold or purchase.

5.5 COUNTY OF HAWAII ZONING

The County zoning designations for the proposed sites include "single-family residential", "agriculture", and "open" (**Table 5-1**).

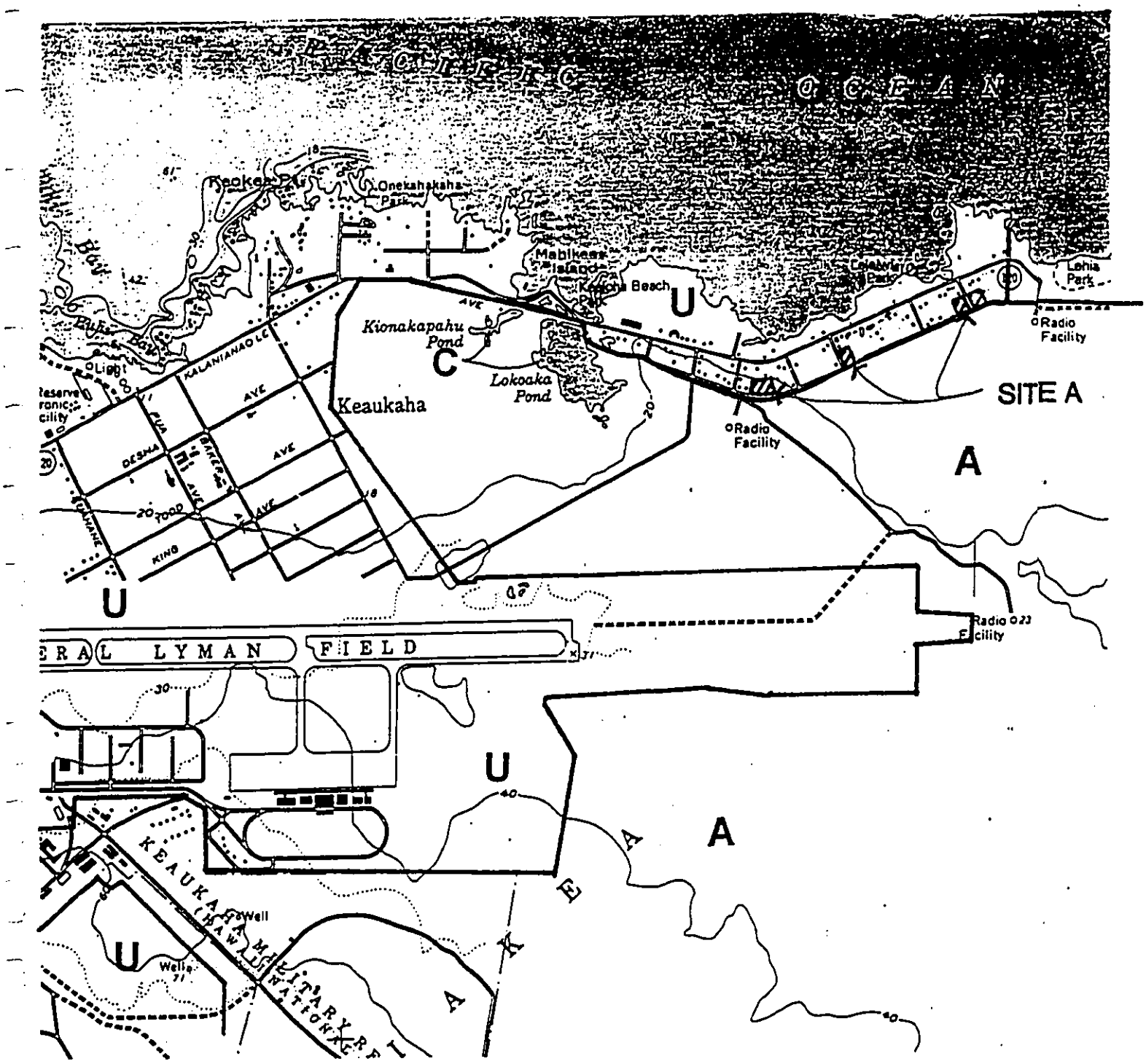

FIGURE 5-1a
STATE LAND USE DESIGNATION
South Hilo, Hawaii

0 1000 2000 4000
FEET

R. M. TOWILL CORPORATION

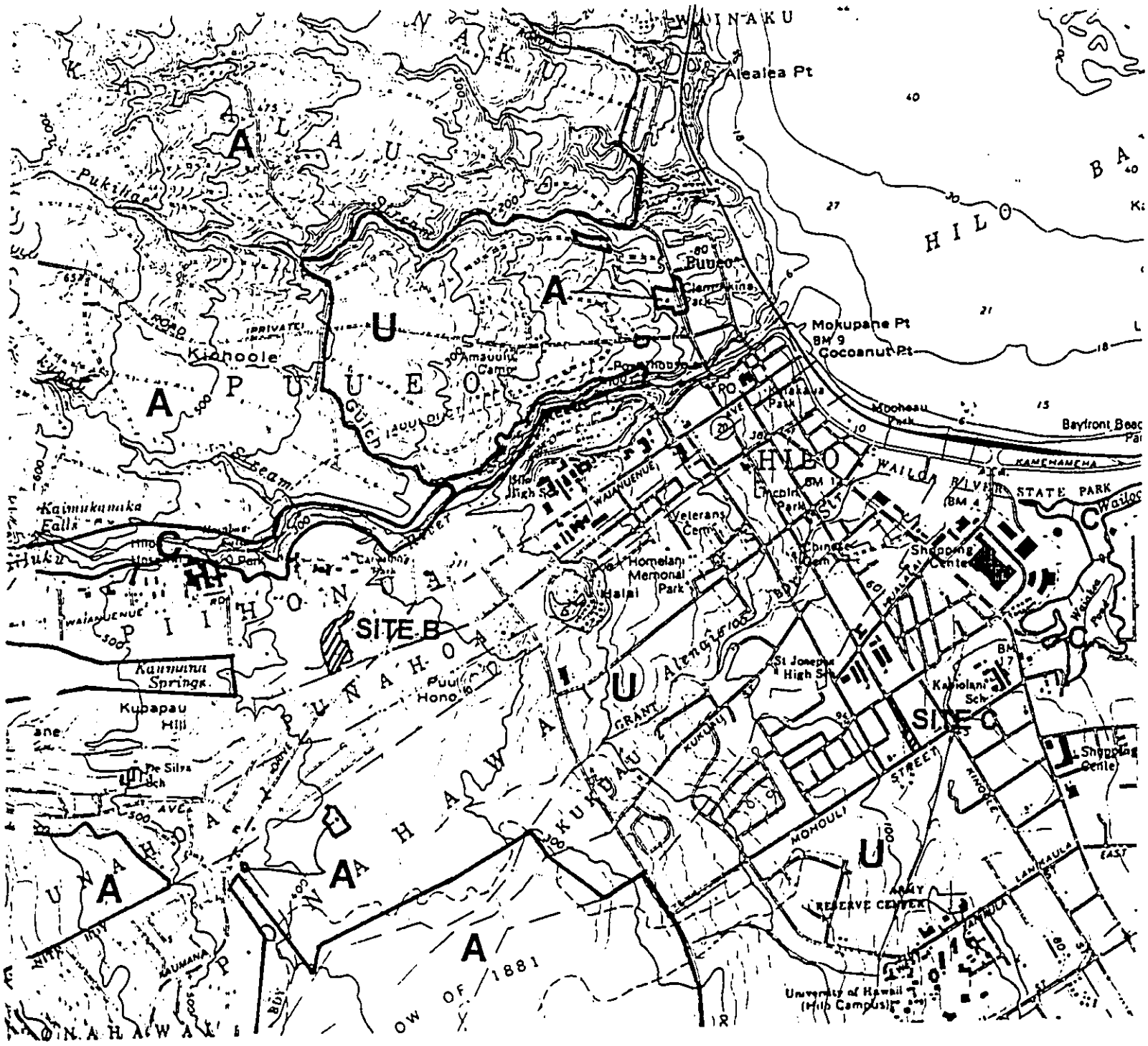

FIGURE 5-1b
STATE LAND USE DESIGNATION
South Hilo, Hawaii

0 1000 2000 4000
FEET

R. M. TOWILL CORPORATION

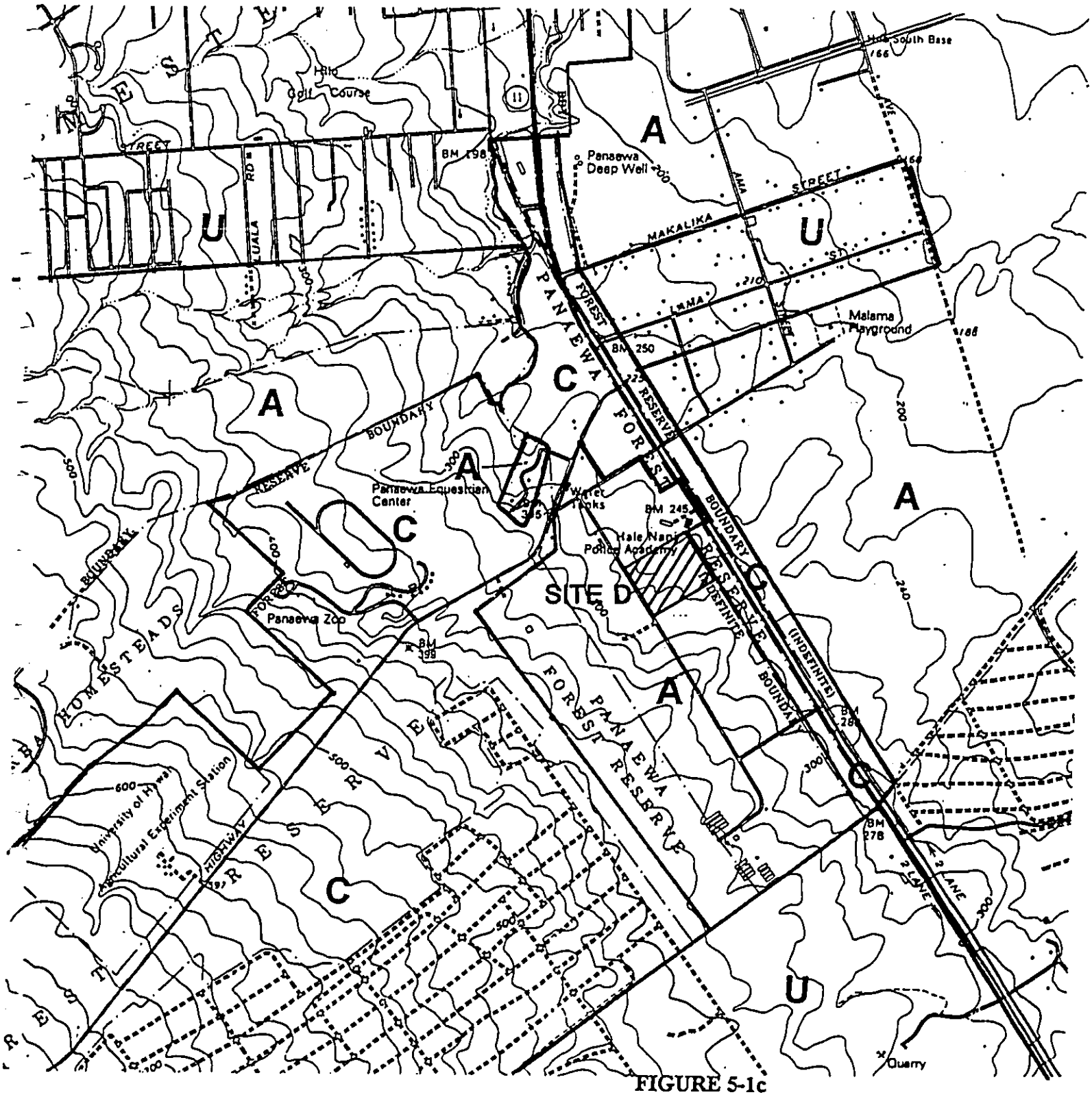

FIGURE 5-1c
STATE LAND USE DESIGNATION
South Hilo, Hawaii

0 1000 2000 4000
FEET

R. M. TOWILL CORPORATION

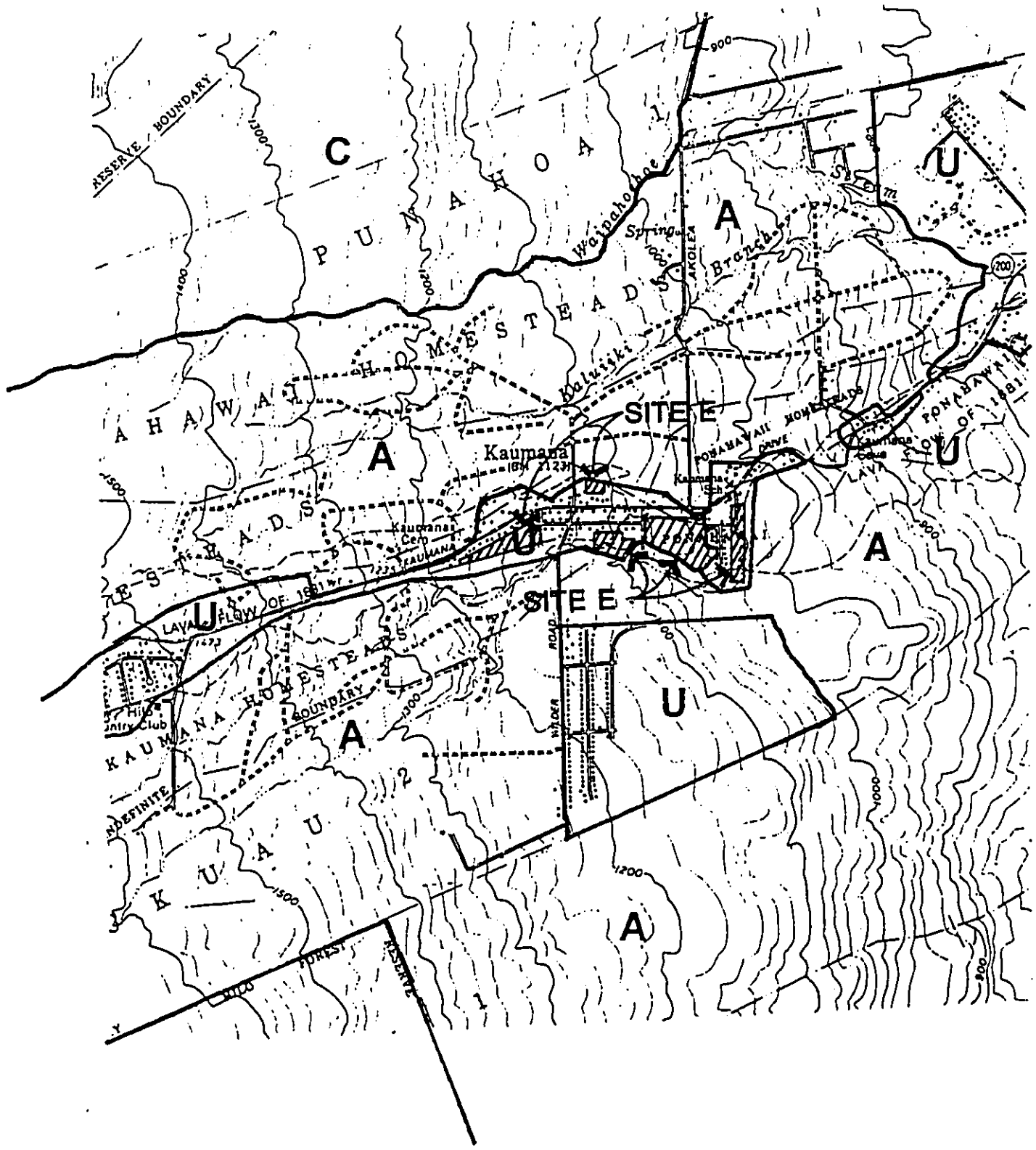

FIGURE 5-1d
STATE LAND USE DESIGNATION
South Hilo, Hawaii

0 1000 2000 4000
FEET

R. M. TOWILL CORPORATION

Table 5-1 County Zoning/State Land Use

PROJECT SITE	TMK	COUNTY ZONING	STATE LAND USE
A-1	TMK 2-1-17: 46, 47, & 48	SINGLE FAMILY 15,000 SQ.FT.	URBAN
A-2	TMK 2-1-18: 8		
A-3	TMK 2-1-19: 20, 29, 30, & 31		
B	TMK 2-3-25: 14, 15, 16, & 47	SINGLE FAMILY - 7,5000 SQ.FT.	URBAN
	TMK 2-3-25: 17	SINGLE FAMILY - 10,000 SQ.FT.	
C	TMK 2-4-28: 1	SINGLE FAMILY - 10,000 SQ.FT.	URBAN
D	TMK 2-4-49:19	AGRICULTURE - 10 ACRES	AGRICULTURE
E-1	TMK 2-5-4: 43, 47, 60, & 61	SINGLE FAMILY - 10,000 SQ.FT.	URBAN
	TMK 2-5-4: 27	OPEN	
E-2	TMK 2-5-5: 1, 3, 5, 6, 7, 10, 28, 29, 30, 31, 32, 33, 72,74, 77, 79, 80	SINGLE FAMILY - 10,000 SQ.FT.	

5.6 COASTAL ZONE MANAGEMENT SMA RULES AND REGULATIONS

The County of Hawaii has designated the shoreline and certain inland areas of Hawaii as being within the Special Management Area (SMA). SMA areas are defined sensitive environments that should be protected in accordance with the State's coastal zone management policies. Although the proposed properties at Site A are within the SMA Boundary as defined by the County of Hawaii, DHHL is exempt from SMA Permit process.

In order to describe the proposed activity's effects on Hawaii's coastal zone, the Hawaii Coastal Zone Management Program (HCZMP) Assessment Form has been included in Appendix B. The Assessment Form has been prepared in accordance with the HCZMP objectives and policies of Section 205A-2, Hawaii Revised Statutes.

SECTION 6
ALTERNATIVES TO THE PROPOSED ACTION

6.1 NO ACTION

The no action alternative will contribute to a further backlog and waiting period for qualified Hawaiian beneficiaries waiting to receive their awards. Some applicants have been waiting as long as 30 years to receive a lot. Others have since passed on before given the opportunity to receive a land award. Thus, a no-action position would further aggravate the situation and would not meet the objectives of the Hawaiian Homes Act.

6.2 ALTERNATIVE SITES

No alternative sites were considered since DHHL's resources are limited and cannot be used to acquire other private property. Resources that are available are directed towards the planning and development of support infrastructure for residential agricultural use.

SECTION 7

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

No short-term exploitation of resources resulting from development of the project sites for single family homestead uses will have long-term adverse consequences. The character of the land of the existing area will not be altered.

Once construction activities for support infrastructure are completed there will be no effect on air and noise quality, wildlife, and residents of the area.

Long-term gains resulting from development of the proposed project include provision of more house and farm lots for Hawaiian beneficiaries.

SECTION 8

IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES BY THE PROPOSED ACTION

Development of the proposed project will involve the irretrievable loss of certain environmental and fiscal resources. However, the costs associated with the use of these resources should be evaluated in light of the benefits to the Hawaiian beneficiaries of the State of Hawaii and the County of Hawaii.

It is anticipated that the development of additional lots and improved support infrastructure will commit the necessary construction materials and human resources (in the form of planning, designing, engineering, construction labor, landscaping, and personnel for management and maintenance functions). Reuse for much of these materials and resources is not practicable. Labor expended for project development is non-retrievable.

SECTION 9
DETERMINATION

This Environmental Assessment, prepared in accordance with Chapter 343, Hawaii Revised Statutes as amended, has concluded that the potential for impacts associated with the proposed action will be minimal.

The potential effects of the proposed project are evaluated based on the significance criteria in section 11-200-12 (Hawaii Administrative Rules, revised in 1996). The following is a summary of the potential effects of the action.

(1) Development of the project will involve the irrevocable loss of certain environmental and fiscal resources. However, the development of additional lots with improved infrastructure will benefit the Hawaiian beneficiaries of the State of Hawaii by providing homestead lots to those on the waiting list. The county of Hawaii will benefit in terms of additional consumer spending on construction materials, home furnishings, and appliances and associated tax revenues.

(2) The project will not curtail the range of beneficial uses of the environment. Due to rocky substrates most of the project area is not suitable for agricultural uses. All properties proposed for this project are currently undeveloped vacant lands. The surrounding areas are sparsely developed for single family residential use.

(3) The project would be in conformance to the Chapter 344, HRS, State Environmental Policy, to enhance the quality of life. It is the long term goal of the project to foster a Hawaiian lifestyle with subsistence homesteads traditional to Hawaiians of the recent past. The neighborhood that would result from this project would reflect the culture and values of the past Hawaiian communities.

(4) The proposed low density of homestead development is not anticipated to have significant effects on the economic or social welfare of the community or the state.

(5) The proposed low density project is not anticipated to have substantial effects on public health. The Department of Hawaiian Home Lands will improve existing facilities and provide infrastructure necessary to support the proposed development. The development of basic support infrastructure such as drainage, sewer, water and communication and electrical utilities, will be done in accordance with county standards and integrated with existing systems.

(6) The proposed low density of the homestead development is not anticipated to result in substantial secondary impacts. Hilo is the only major metropolitan area in Hawaii County and a major population center of the island. The present level of public facilities and services provides adequate services to handle the current demand. The proposed project is not expected to place enough of a demand to result in the need to increase the level of current facilities and services.

(7) The proposed project is not anticipated to involve a substantial degradation of environmental quality. Most of the immediate and surrounding areas of the project sites have previously been disturbed for agricultural and/or residential uses. All proposed sites are currently undeveloped vacant land and covered by overgrown vegetation mostly comprised of introduced species.

(8) The proposed low density of development is not anticipated to result in cumulative effects; therefore, it would not involve a commitment to larger actions.

(9) The proposed project is not anticipated to have substantial effects on a rare, threatened, or endangered species, or its habitat. Most of the sites have historically been modified for agricultural and urban-residential uses. The botanical survey conducted in September, 1996, did not find any plants listed or proposed for listing as Threatened or Endangered. No Threatened or Endangered fauna was seen or heard

CORRECTION

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

(4) The proposed low density of homestead development is not anticipated to have significant effects on the economic or social welfare of the community or the state.

(5) The proposed low density project is not anticipated to have substantial effects on public health. The Department of Hawaiian Home Lands will improve existing facilities and provide infrastructure necessary to support the proposed development. The development of basic support infrastructure such as drainage, sewer, water and communication and electrical utilities, will be done in accordance with county standards and integrated with existing systems.

(6) The proposed low density of the homestead development is not anticipated to result in substantial secondary impacts. Hilo is the only major metropolitan area in Hawaii County and a major population center of the island. The present level of public facilities and services provides adequate services to handle the current demand. The proposed project is not expected to place enough of a demand to result in the need to increase the level of current facilities and services.

(7) The proposed project is not anticipated to involve a substantial degradation of environmental quality. Most of the immediate and surrounding areas of the project sites have previously been disturbed for agricultural and/or residential uses. All proposed sites are currently undeveloped vacant land and covered by overgrown vegetation mostly comprised of introduced species.

(8) The proposed low density of development is not anticipated to result in cumulative effects; therefore, it would not involve a commitment to larger actions.

(9) The proposed project is not anticipated to have substantial effects on a rare, threatened, or endangered species, or its habitat. Most of the sites have historically been modified for agricultural and urban-residential uses. The botanical survey conducted in September, 1996, did not find any plants listed or proposed for listing as Threatened or Endangered. No Threatened or Endangered fauna was seen or heard

during the recent site visit on September 20, 1996.

(10) No significant impacts on the area's long-term air or water quality or ambient noise levels are anticipated to result from the project. There will be some short-term impacts on the air quality and noise levels as a result of project construction. Adequate mitigation measures will be taken as described in Section 2.10 of this Environmental Assessment.

(11) The project is not anticipated to affect environmentally sensitive areas. However, the Hilo area has been subject to several natural hazards including flood, tsunami inundation, volcanic activity, and earthquakes. The potential threats of these natural hazards for the each project site are discussed in Section 2.8 of this Environmental Assessment.

(12) The proposed low density development will not significantly affect the area's visual resource. The most prominent feature of the landscape is the 14,000-foot peak of Mauna Kea. The magnificent views toward the mountain are seen from various locations within the general project area.

(13) The proposed scattered lot homestead development is not anticipated to result in substantial energy consumption.

In accordance with the provisions set forth in Chapter 343, Hawaii Revised Statutes, this Environmental Assessment has determined that the project will not have significant adverse impacts on the environment. The Department of Hawaiian Home Lands is considering the issuance of a Finding of No Significant Impact (FONSI). Anticipated impacts will be temporary and will not adversely impact the environmental quality of the area. Therefore, it is recommended that an Environmental Impact Statement (EIS) not be required.

SECTION 10
CONSULTED AGENCIES AND PARTICIPANTS IN THE PREPARATION OF THE ENVIRONMENTAL ASSESSMENT

10.1 FEDERAL AGENCIES

U.S. Army Corps of Engineers

U.S. Department of Transportation, Federal Aviation Administration

10.2 STATE AGENCIES

Department of Business, Economic Development & Tourism, Office of Planning

Department of Health

Department of Land and Natural Resources, Forestry and Wildlife Division

Department of Land and Natural Resources, Historic Preservation Division

Department of Land and Natural Resources, Land Division

Department of Transportation, Airports Division

Office of Hawaiian Affairs

10.3 COUNTY OF HAWAII

Department of Education

Department of Parks and Recreation

Department of Public Works, Wastewater Division

Department of Public Works, Engineering Division

Department of Water Supply

Fire Department

Planning Department

Police Department

10.4 CITY AND COUNTY OF HONOLULU

Department of Finance, Real Property Assessment Division Office, Mapping Branch

10.5 INDIVIDUALS AND GROUPS

Ms. Karen Watanabe, Hawaiian Electric Company

Section 11
UNRESOLVED ISSUES

In the process of preparing the Final EA, two issues, both concerning land ownership, are raised and left for further discussion between DHHL and other State agencies.

11.1 PAPER ROAD

A road which only exists on the Tax Key Map is considered as a "paper road." Paper road is an easement set aside as a logical location for public access but has not been constructed due to lack of the interest. Paper road right-of-way is, as a rule, under jurisdiction of the State of Hawaii Department of Land and Natural Resources (DLNR).

The following roads are considered as paper roads and will need to be improved by DHHL in order to bring adequate access into the project sites: portion of Punahele Street at Site B; and, Lawai and Ieie Roads, Pala Lane, and portions of Uhaloa and Kilua Roads at Site E.

11.1.1 Punahele Street st Site B (Central Hilo)

According to the TMK map of Realty Atlas, 1996, Site B is served by Punahele Street. However, actual Punahele Street ends approximately at the eastern boundary of TMK 2-3-25:31. Remaining portion of the roadway, fronting the subject properties, does not exist on the ground. The existing portion of Punahele Street is under County jurisdiction.

In order to develop access to this site, DHHL will need to survey exact boundary of the unimproved portion of Punahele Street, and request the State for transfer of this portion of the roadway in order to build access into the proposed parcels.

11.1.2 Paper Roads in Site E (Kaumana)

Table 11-1 indicates paper roads fronting the proposed properties in Site E (Kaumana).

Table 11-1 List of Paper Roads in Site E (Kaumana)

TMK	Fronting Road	Status
TMK 2-5-4: 43 & 47	Uhaloa Street	paper road/non-county
TMK 2-5-4: 60, & 61	Lawai Road	paper road/non-county
TMK 2-5-4: 27	Uhaloa Road/Amau Road	paper road/non-county
TMK 2-5-5: 1, 3, 5, 6, & 7	Kilua Road	paper road/non-county
TMK 2-5-5: 28, 29, 30, 31, 32 & 33	Uhaloa Road	paper road/non-county
TMK 2-5-5: 72 & 74	Pala Lane	paper road/non-county
TMK 2-5-5: 77 & 79	Ieie Road	paper road/non-county
TMK 2-5-5: 80	Uhaloa Road	paper road/non-county

Most of these paper roads' right-of-ways are covered by overgrown bushes and hidden among the surrounding properties. As with Punahele Street, these paper road right-of-ways will need to be surveyed, and DHHL should request the State for transfer of these roads to DHHL in order to build an adequate access to all proposed properties.

11.2 TMK 2-5-4:27 LAND OWNERSHIP

According to the Realty Directory, 1996, and Real Property Assessment Division Office, City and County Department of Finance, TMK 2-5-4:27 (approximately 160,000 SF) is listed as State-owned land. Before developing this land, DHHL will need to clarify the status of this land.

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Appendix A

Botanical Assessment Report

BOTANICAL ASSESSMENT REPORT
FOR FIVE PARCEL CLUSTERS IN THE HILO, HAWAII AREA

FOR
R. M. TOWILL CORPORATION
420 WAIAKAMILO ROAD, SUITE 411
HONOLULU, HAWAII 96817

BY
EVANGELINE J. FUNK, PH.D.
BOTANICAL CONSULTANTS
HONOLULU, HAWAII
1996

TABLE OF CONTENTS

INTRODUCTION

Botanical assessments on several parcels of land in the Hilo, Hawaii area were conducted on September 20 and 21, 1996. The parcels are clustered in five areas. There are twenty-two sites in the Kaumana area, there is one site in the Panaewa area, eight sites in the Keauhaha area, one site in the Piihonua area, and one site in the central Hilo area.

The purpose of these assessments was to determine what general type of vegetation is found on these sites i.e. native endemic vegetation, mixed native and alien vegetation, or alien vegetation and to ascertain if more in-depth botanical surveys are warranted.

METHODS

All thirty-two sites were visited, and where access was possible, brief forays were made into the study sites. Notes were taken on such features as the dominant emergent species and their density, condition, species and density of the understory vegetation, and species composition of the vegetation of the site in general.

LITERATURE REVIEW

From 1971 to the present, twenty-seven environmental assessments and environmental impact statments for projects in the Hilo, Hawaii area have been, prepared and copies of these documents are on file at the Environmental Center of the University of Hawai at Manoa, Honolulu, Hawaii. Some of the earliest documents such as the Department of Water Supply, Hawaii County, 1972, Department of Parks and Receation, County of Hawaii, 1972, and Public Works, State of Hawaii, 1977, give only general information on the botany of the proposed development sites. Comments such as "the site is undeveloped and covered with low brush and ohia characteristic of the area" or "covered with a

variety of exotic and endemic plant life" are common. One report stated that "the area had been burned twice and there was nothing of botanical interest".

More recent reports (Wilson Okamoto and Associates 1989, KRP 1989) have included full botanical surveys with complete species lists or composit species lists of the area. Most also note such useful information as the presence of endemic and indigenous species as opposed to alien and polynesian introduced species.

RESULTS

All assessements of vegetation the the Hilo, Hawaii area must be prefaced by the information that in this part of the island, annual rainfall is more than one-hundred fifty inches, and the average daytime temperature varies between eighty and ninety degrees fahrenheit (Atlas of Hawaii 1983). In a word, these are ideal growing conditions and the vegetation of most of the study sites was lush and dense.

Tax Map Key (TMK) numbers will be used to identify the study sites and each study site may consist of from one to twelve parcels of land.

Kaumana Area

TMK 2-5-4:43 consists of a single parcel of land located between Kaumana and Umaloa Streets. This site was once cleared and is now heavily overgrown by some native, but mostly introduced vegetation. The emergent vegetation is gunpowder or charcoal trees (*Trema orientalis* (L.) Blume), 10 to 12 meters in height. The canopy layer is made up of ohia (*Metrosideros* sp.), coconut (*Cocos nucifera* L.), golden bamboo (*Bambusa vulgaris* var. *aureo-vaiegata* Hort.), and guava trees (*Psidium guajava* and *P. cattleianum* Sabine) all 8 to 10 meters high. There is a dense understory of introduced vines and shrubs. Among these are cup-of-gold (*Solandra maxima*

(Sesse & Moq.) Green, philodendron vine, and white ginger (*Hedychium flavenscens* N. carey ex Roscoe).

No additional botanical surveys need be done on this site.

TMK 2-5-4:27 is a large site and consists of approximately twelve parcels or lots. The emergent trees are ohia (*Metrosideros* sp.) which range from scattered to fairly dense. They are from ten to twelve meters in height. There is no canopy layer, however, the understory is a dense tangle of yellow guava (*P. cattleianum* Sabine), philodendron vine, California grass (*Brachiaria mutica* (Frossk.) Stapf), maile pilau (*Paederia scandens* (Lour.) Merr.), bamboo orchid (*Arundina graminifolia* (D. Don.) Hochr.), false stagehorn fern (*Dicranopteris linearis* (Burm.) Underw.), sword fern (*Nephrolepis hirsutula* (Frost.) Presl.), sumac (*Rhus sandwicensis* A. Gray), and fox-tongued melastome (*Melastoma sanguineum* Sims). All are one to three meters in height.

Due to the size of this site and the complexity of the vegetation, a full botanical survey of the area should be carried out before development.

TMK 2-5-4:60 & 61 is located just off Kaumana Street and Lawai Road. It consists of two parcels of land. The emergent vegetation is a dense stand of ohia trees (*Metrosideros* sp.), twelve to fifteen meters in height. The understory is made up of a tangle of false stagehorn fern (*Dicranopteris linearis* (Burm.) Underw.), sword fern (*Nephrolepis hirsutula* (Frost.) Presl.), bamboo orchid (*Arundina graminifolia* (D. Don.) Hochr.), sumac (*Rhus sandwicensis* A. Gray), fox-tongued melastome (*Melastoma sanguineum* Sims) and strawberry guava.

Although the understory is very dense on this site, the diversity of the vegetation appears to be narrow, therefore, a full botanical survey is not

recommended for this location.

TMK 2-5-4:47 is made up of three parcels of land located on Umaloa Street. Here the emergent trees are ohia (*Metrosideros* sp.), eight to fifteen meters in height and the understory is yellow and red guava (*P. guajava* L. and *P. cattleianum* Sabine), bamboo orchid (*Arundina graminifolia* (D. Don.) Hochr.), sumac (*Rhus sandwicensis* A. Gray), fox-tongued melastome (*Melastoma sanguineum* Sims),

false stagehorn fern (*Dicranopteris linearis* (Burm.) Underw.), and kahili ginger (*Hedychium gardnerianum* Ker-Gawl).

Most of the vegetation of this site is alien and no further botanical surveys are necessary.

TMK 2-5-5:72 is made up of multiple parcels or lots. The vegetation has been disturbed and only introduced species were found on this site. The canopy layer is roseapple (*Syzygium jambos* (L.) Alston), gunpowder, strawberry guava, and loquat trees (*Eriobotrya japonica* (Thrunb.) Lindl.) all 8 to 12 meters in height. The understory is made up of all weedy type species and very dense. Christmasberry shrubs (*Schinus terebinthifolius* Raddi), sumac

(*Rhus sandwicensis* A. Gray), kahili ginger (*Hedychium gardnerianum* Ker-Gawl), *Stachytarfeta urticifolia* (Salisb.) Sims, dog tail (*Buddleia asiatica* Lour.), California grass (*Brachiaria mutica* (Frossk.) Stapf), palmgrass (*Setaria palmifolia* (J. Konig) Stapf), Vasey grass (*Paspalum urvillei* Steud.), honohono grass (*Commelina diffusa* N. L. Burm.), nut grass (*Cyperus rotundus* L.), and maile honohono (*Ageratum conyzoides* L.) are all common on this site.

This site requires no further botanical surveys.

TMK 2-5-5:75 this lot has been cleared and was landscaped at one time and

appears to be part of a subdivision. The surviving landscape plants are being taken over by invasive grasses and weeds. There is nothing of botanical interest on this site.

TMK 2-5-5:77, 79. Access to these sites was limited. Except for some ohia trees (*Metrosideros* sp.) about eight meters in height there was no other visible native vegetation on this site. There were gunpowder trees (*Trema orientalis* (L.) Blume), two types of guava trees (*Psidium guajava* and *P. cattleianum* Sabine), autograph tree (*Clusia rosea* Jacq.), philodendron vine, and some palm grass (*Setaria palmifolia* (J. Konig) Stapf).

Because of the location of these parcels, i.e. near the forest, and the limited access for this assessment, a botanical survy should be done before this area is developed.

TMK 2-5-5:28 to 33 is a long narrow site along an undeveloped street which was accessed from Uluhe Road. The emergent vegetation is scattered ohia trees (*Metrosideros* sp.) from eight to twelve meters in height. The dense, tangled understory is made up of ohia saplings, red guava (*P. cattleianum* Sabine), *Melastoma candidum* D. Don, bamboo orchid (*Arundina graminifolia* (D. Don.) Hochr.), false stagehorn fern (*Dicranopteris linearis* (Burm.) Underw.), sword fern (*Nephrolepis hirsutula* (Frost.) Presl.), and sumac (*Rhus sandwicensis* A. Gray).

In spite of the density of the plant cover, this site is narrow and there are many trails which cross the area. It is accessable and it does not appear that additional surveys are necessary on this property.

TMK 2-5-5:80 is a large property with access from Uluhe Road. Although this site does not appear to have been cleared and the emergent ohia trees

(*Metrosideros* sp.) are fairly dense, many invasive taxa are present. Bamboo orchid (*Arundina graminifolia* (D. Don.) Hochr.), *Melastoma candidum* D. Don, and kahili ginger (*Hedychium gardnerianum* Ker-Gawl) are particularly evident. Indigenous plants such as 'uke (*Machaerina angustifolia* (Gaud.) T. Koyama), false stagehorn fern (*Dicranopteris linearis* (Burm.) Underw.), sword fern (*Nephrolepis hirsutula* (Frost.) Presl.), and sumac (*Rhus sandwicensis* A. Gray) are also plentiful and make up an important part of the understory.

Because of the size of this site, a botanical survey should be done before it is developed.

TMK 2-5-5:10 is a single lot which was at some time cleared. Although there are some ohia trees (*Metrosideros* sp.) ten to twelve meters in height, the remainder of the vegetation is alien. The understory is predominently introduced fruit trees. There are strawberry guava (*P. cattleianum* Sabine), yellow guava (*Psidium guajava* L.), avacado (*Persia americana* Mill.), and roseapple trees (*Syzygium jambos* (L.) Alston). The big vine, *Monstera deliciosa* Liebm., along with laua'e (*Phebodium aureum* (L.) J. Sims) and sword ferns (*Neprolepis exaltata* (L.) Schott) and the ground cover *Dissotis rotundifolia* (Sm.) Triana are common on this site. All of these are introduced and widespread throughout the islands.

The vegetation of this site is almost all alien, therefore there is no need for further studies in the area.

TMK 2-5-5:5,6, and 7 is a long narrow site. Here again most of the vegetation is introduced, but there are some vestages of the Hawaiian forest. The ohia trees (*Metrosideros* sp.) are ten to twelve meters in height and the sumac trees (*Rhus sandwicensis* A. Gray) are thriving. There is still some false

staghorn fern (*Dicranopteris linearis* (Burm.) Underw.) on the site, but aside from these three species, the remainder of the vegetation is introduced and weedy. Red and yellow guava (*P. cattleianum* Sabine and *Psidium guajava* L.), avacado (*Persia americana* Mill.), roseapple trees (*Syzygium jambos* (L.) Alston), and the common vine, *Monstera deliciosa* Liebm., make up the canopy layer. The ground layer is very dense and overgrown and consists of the following grasses: California grass (*Brachiaria mutica* (Frossk.) Stapf), palm grass (*Setaria palmifolia* (J. Konig) Stapf), Panama grass (*Paspalum fimbriatum* Kunth), Glenwood grass (*Sacciolepis indica* (L.) Chase), and wild sugar (*Saccharum spontaneum* L.). In addition the common weeds such as owi (*Stachytarpheta dichotoma* (Ruiz & Pav.) Vahl.), bamboo orchid (*Arundina graminifolia* (D. Don.) Hochr.), fox-tongued melastome (*Melastoma sanguineum* Sims), sensitive plant (*Mimosa pudica* L.), partridge pea (*Chamaecrista nictitans* (L.) Moench), and Spanish clover (*Desmodium incanum* DC) are thriving on this site.

This is a highly disturbed site. Further studies do not seem warranted.

TMK 2-5-5:3. Access to this small site was very limited. The site appeared to be overgrown by large roseapple trees (*Syzygium jambos* (L.) Alston) and autograph trees (*Clusia rosea* Jacq.) are becoming established. Both tree species were heavily overgrown by the viny pest, maile pilau (*Paederia scandens* (Lour.) Merr.).

Although access was limited to TMK 2-5-5:3, it does not appear that further studies are warranted.

TMK 2-5-5:1. This small lot is heavily vegetated with gunpowder or charcoal trees (*Trema orientalis* (L.) Blume), eighteen to twenty meters in height. There are also dense stands of golden bamboo (*Bambusa vulgaris* var.

aureo-vaiegata Hort.). Red and yellow guava trees (*Psidium guajava* and *P. cattleianum* Sabine) are common. Weedy maile pilau vines (*Paederia scandens* (Lour.) Merr.) cover many of the trees and dog tail bush (*Buddleia asiatica* L. Lour.), yellow ginger (*Hedychium flavescens* N. Carey ex Roscoe), and glenwood grass (*Saccolepis indica* (L.) are well established.

The alien composition and density of the plant cover on this site indicates that there are not likely to be native species surviving here. Further studies are not indicated.

Panaewa Area

TMK 2-4-49:19 is a large parcel of land located in the Panaewa area off Kanoelehua Street. A wind break of ironwood trees (*Casuarina equisetifolia* L.) surrounds the locale. Except for the small fern ally, moa (*Psilotum nudum* (L.) Griseb.) no endemic or indigenous plant species were found on this site. The site was at one time planted in macadamia nut trees. The trees persist, but they are almost lost in the dense forest of alien trees and shrubs which have grown up around them. Fast growing trees such as African tulip (*Spathodea campanulata* P. Beauv.), moho (*Heliocarpus popayanenis* Kunth), red guava (*P. cattleianum* Sabine) and trumpet tree (*Cecropia obtusifolia* Bertol.) thrive on this parcel. The ground cover is very diverse. There are maile pilau vines (*Paederia scandens* (Lour.) Merr.) everywhere. Dog tail bush (*Buddleia asiatica* L. Lour.), bamboo orchid (*Arundina graminifolia* (D. Don.) Hochr.), Philippine ground orchid (*Spathoglottis plicata* Blume), ti plant (*Cordyline fruticosa* (L.) A. Chev.), Star-of-Bethlehem (*Hippobroma longiflora* (L.) G. Don), lantana (*Lantana camara* L.), *Lindernia crustacea* (L.) F. v. Muell. and other weedy taxa fill the area.

Because of the weedy nature of this site, no further botanical studies are advised.

Central Hilo Area

TMK 2-4-28:1 is a single lot with a long drainage and utilities easment which ends at Wailoa Street. TMK 2-4-28:1 is located in an urban area and no native vegetation was found or expected. The emergent vegetation is gun powder or charcoal trees (*Trema orientalis* (L.) Blume), fifteen to eighteen meters in height. African tulip (*Spathodea campanulata* P. Beauv.), moho (*Heliocarpus popayanenis* Kunth), avocado (*Persia americana* Mill.), Alexander palm (*Archontophoenix alexandrae* (F. v. Muell.) H. A. Wendl & Drude) and mango trees (*Mangifera indica* L.) can be found in the canopy layer. The ground or shrub layer is a rich mix of introduced shrubs and grasses. In addition, a huge woodrose (*Merremia tuberosa* (L.) Rendle) and golden pothos (*Epipremnum pinnatum* (L.) Engl. vines hang from the tall trees.

Deep forays into this study site revealed no native vegetation. Further botanical surveys are not indicated on this parcel.

Piihonua Area

TMK 2-3-25:14, 15, 16, 17, and 47 make up one large study site which abuts Ainoka Stream on the northwest and Punahele Street on the south. Elevationally this site appears to grade downward from Punahele Street toward Ainoka Stream. However, the vegetation of the site is very dense so it was not possible to make observations of all of the riparian habitat. This area may require further study for wetland delineation.

The vegetation of the site is all introduced. The emergent trees are gunpowder or charcoal trees (*Trema orientalis* (L.) Blume) eighteen to

twenty meters in height. The canopy layer is made up of African tulip (*Spathodea campanulata* P. Beauv.), siris (*Albizia lebbeck* (L.) Benth), Chinese banyan (*Ficus microcarpa* L. fil.), mango (*Mangifera indica* L.), guavas (*P. cattleianum* Sabine and *Psidium guajava* L.), and roseapple trees (*Syzygium jambos* (L.) Alston), from eight to twelve meters in height.

The understory of grasses and shrubs is very dense and varied. Candle bush (*Senna alata* (L.) Roxb.), bingabing (*Macaranga mappa* (L.) Mull. Arg.), and dumb cane (*Dieffenbachia picta* Schott) are understory shrubs which reach a height of from one and a half to four meters. The grasses include palm grass (*Setaria palmifolia* (J. Konig) Stapf), Hilo grass (*Paspalum conjugatum* Bergius), Glenwood grass (*Sacciolepis indica* (L.) Chase), torpedo grass (*Panicum repens* L.), and basket grass (*Oplismenus hirtellus* (L.) P. Beauv.).

The weedy herbs found in the area include thimbleberry (*Rubus rosifolius* Sm.), *Elephantopus mollis* Kunth, sensitive plant (*Mimosa pudica* L.), maile pilau vines (*Paederia scandens* (Lour.) Merr.), yellow ginger (*Hedychium flavescens* N. Carey ex Roacoe), pili (*Drymaria cordata* (L.) Willd ex Roem.), clover (*Trifolium* sp.), and air plant (*Kalanchoe pinnata* (Lam.) Pers.) among others.

Because all of the above mentioned taxa are alien to the Hawaiian Islands they help to show that no additional botanical surveys are indicated for this site.

Keaukaha Area

TMK 2-1-19;20, 29, and TMK 2-1-19:30 and 31 make up two large parcels located on Nene Street and separated by Uwai Street. Because the vegetation of these littoral parcels is quite similar, they will be treated as a single site.

The high canopy of these parcels is Chinese banyan (*Ficus microcarpa* L. fil.), coconut (*Cocos nucifera* L.), octopus (*Schefflera actinophylla*

(Endl.) Harms), gunpowder (*Trema orientalis* (L.) Blume), and Pandanus trees (*Pandanus tectorius* S. Park. ex Z), all ten to eighteen meters in height. In addition there is a very dense understory made up of bingabing (*Macaranga mappa* (L.) Mull. Arg.), rose myrtle (*Rhodomyrtus tomentosa* (Aiton) Hasski), lantana (*Lantana camara* L.), shoebutton ardisia (*Ardisia elliptica* Thunb.), yellow and red guava (*Psidium guajava*L. *P. cattleianum* Sabine), bamboo orchid (*Arundina graminifolia* (D. Don.) Hochr.), naupaka (*Scaevola sericea* Vahl), Christmasberry (*Schinus terebinthifolius* Raddi), and *Melastoma candidum* D. Don., all two to four meters in height. In any openings and around the fringes of this dense growth can be found a rich mix of grasses and herbs. The most common weeds are owi (*Stachytarpheta dichotoma* (Ruiz & Pav.) Vahl.), sensitive plant (*Mimosa pudica* L.), laua'e (*Phebodium aureum* (L.) J. Sims) and sword (*Neprolepis exaltata* (L.) Schott) ferns. The ground cover *Dissotis rotundifolia* (Sm.) Triana is common as is Chinese violet (*Asystasia gangetica* (L.) T. Anderson), wedelia (*Wedelia trilobata*) (L.) Hitchc.) and maile pilau (*Paederia scandens* (Lour.) Merr.).

Except for the three polyneasian introductions, pandanus, coconut, and naupaka all of the species mentioned are regraded as weeds. There were no traces of the original, endemic vegetation that formerly grew on these sites. No additional surveys need be undertaken on these sites.

TMK 2-1-28:8 is a large, single parcel of land located at the corner of Nene and Koloa Streets. Here the gunpowder (*Trema orientalis* (L.) Blume), and coconut (*Cocos nucifera* L.) trees reach twenty meters in height. Pandanus (*Pandanus tectorius* S. Park. ex Z), trumpet tree (*Cecropia obtusifoli* Bertol), autograph tree (*Clusia rosea* Jacq.), bingabing (*Macaranga*

mappa (L.) Mull. Arg.), and shoebutton ardisia (*Ardisia elliptica* Thunb.) form the seven to ten meter canopy layer.

There are massive woodrose (*Merremia tuberosa* (L.) Rendle), maunaloa (*Canavalia cathartica* Thouars), and golden pothos (*Epipremnum pinnatum* (L.) Engl.) vines that drape over the trees, and the ground layer is dense and almost impenetrable. It is a tangle of palm grass ((*Setaria palmifolia* (J. Konig) Stapf), Hilo grass (*Paspalum conjugatum* Bergius), honohono grass (*Commelina diffusa* N. L. Burm.), white shrimp plant (*Justicia betonia* L.), Chinese violet (*Asystasia gangetica* (L.) T. Anderson), white thunbergia (*Thungergia fragrans* Roxb.), *Dissotis rotundifolia* (Sm.) Triana, and maile pilau (*Paederia scandens* (Lour.) Merr.) vines.

Although some native Hawaiian grasses have been reported from this area, because of the massive invasion of the area by alien plants, there is very little likelihood that they can be found on this site. No further studies are recommended.

TMK 2-1-17:46, 47, and 48 are three adjoining parcels located on Nene Street. Here there are no emergent trees. Here a single gunpowder or charcoal tree (*Trema orientalis* (L.) Blume) and Chinese banyan (*Ficus microcarpa* L. fil.), barely reach a height of ten meters. Other small trees and large shrubs such as pandanus (*Pandanus tectorius* S. Park. ex Z), trumpet tree (*Cecropia obtusifoli* Bertol), shoebutton ardisia (*Ardisia elliptica* Thunb.), yellow and red guava (*Psidium guajava*L. *P. cattleianum* Sabine), autograph tree (*Clusia rosea* Jacq.), bingabing (*Macaranga mappa* (L.) Mull. Arg.), African tulip (*Spathodea campanulata* P. Beauv.), and *Melastoma candidum* D. Don. are all four to eight meters tall.

There is a dense ground layer of herbaceous plants. Among these can be

found California (*Brachiaia mutica* (Forssk.) Stapf), Indian dropseed (*Sporobolus diander* P. Beauv.), and natal redtop (*Rhynchelytrum repens* (Willd.) Hubb.) grasses. Herbs found on this site include *Xanthosoma roseum* Schott, honohono grass (*Commelina diffusa* N. L. Burm.), white shrimp plant (*Justicia betonia* L.), maile pilau (*Paederia scandens* (Lour.) Merr.)., sensitive plant (*Mimosa pudica* L.), bubble gum weed (*Polygala paniculata* L.), and wedelia (*Wedelia trilobata*) (L.) Hitchc.). The fern laua'e (*Phebodium aureum* (L.) J. Sims) and the sword fern (*Neprolepis exaltata* (L.) Schott) are also on this site.

This site is below street level and one informant reported that there was a pond or wetland on this site. In addition, a standing water wetland was found on the opposite side of Nene Street. Although efforts to enter the site were unsuccessful because of the dense and tangled vegetation it may be necessary to do a wetland reconnaissance of this area.

No native Hawaiian taxa were found and none were expected. No additional botanical surveys are required on this site.

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Overview of Species on Site

Some vascular plants found within the Hilo Scattered Lot Development Project areas. (E = endemic, I = indigenous, P = Polyneasian introduction, A = other alien)

Kaumana Area	Botanical Name	Common Nama	Origin
Trees:	*Trema orientalis*	Gunpowder	A
	Metrosideros sp.	Ohia	E
	Cocos nucifera	Coconut	P
	Bambusa vulgaris var. Aureo-vaiegata	Golden Bamboo	A
	Psidium guajava	Yellow Guava	A
	P. Cattleianum	Red Guava	A
	Syzygium jambos	Roseapple	A
	Eriobotrya japonica	Loquat trees	A
	Persia americana	Avocado	A
	Clusia rosea	Autograph trees	A
Vines & Shrubs:	*Solandra maxima*	Cup-of-gold	A
	Hedychium flavenscens N. Carey ex Roscoe	White Ginger	A
	Hedychium gardnerianum	Kalihi Ginger	A
	Discranopteris linearis	False stagehern	I
	Nephrolepis hirsutula	Sword fern	I
	Rhus sandwicensis	Sumac	I
	Melastoma sanguineum	Fox-tongued melastome	A
	Arundina graminifolia	Bamboo orchid	A
	Schinus terebinthifolius	Christmasberry shrubs	A
	Buddleia asiatica	Dog tail	A
	Machaerina angustifolia	'Uke	I
	Phebodium aureum	Laua'e	P
	Paederia scandens	Maile pilau	A
Ground Layer:	*Setaria palmifolia*	Palm grass	A
	Paspalum urvillei	Vasey grass	A

	Commelina diffusa	Honohono grass	A
	Brachiaria mutica	California grass	A
	Sacciolepis indica	Glenwood grass	A
	Cyperus rotundus	Nut grass	A
	Ageratum conyzoides	Malie honohono	A
	Saccharum spontaneum	Wild sugar	A
	Stachytarpheta dichotoma	Owi	A
	Mimosa pudica	Sensitive plant	A
	Chamaecrista nictitans	Partridge pea	A
	Desmodium incanum	Spanish clover	A

Panaewa	Botanical Name	Common Name	Origin
Trees:	*Casuarina equisetifolia*	Ironwood tree	A
	Psilotum nudum	Moa	I
	Spathodea campanulata	African turip	A
	Heliocarpus popayanenis	Moho	A
	P. Cattleianum	Red Guava	A
	Cecropia obtusifolia	Trumpet tree	A
Vines & Shrubs:	*Buddleia asiatica*	Dog tail	A
	Arundina graminifolia	Bamboo orchid	A
	Paederia scandens	Maile pilau	A
	Spathoglottis plicata	Philippine ground orchid	A
	Cordyline fruticosa	Ti plant	P
	Hippobroma longiflora	Star-of-Bethlehem	A
	Lantana camara	Lantana	A

Central Hilo Area	Botanical Name	Common Name	Origin
Trees:	*Trema orientalis*	Gunpowder	A
	Spathodea campanulata	African turip	A
	Persia americana	Avocado	A

	Mngifera indica	Mango trees	A
	Heliocarpus popayanenis	Moho	P
	Archontpophoenix alexandrae	Alexander palm	A
Shrubs and Grasses:	*Merremia tuberosa*	Woodrose	A
	Epipremnum pinnatum	Golden pothos	A

Piihonua Area	Botanical Name	Common Name	Origin
Trres:	*Trema orientalis*	Gunpowder	A
	Spathodea campanulata	African turip	A
	Albizia lebbeck	Siris	A
	Ficus microcarpa	Chinese banyan	A
	Mngifera indica	Mango trees	A
	Syzygium jambos	Roseapple	A
Shrubs:	*Senna alata*	Candle bush	A
	Macaranga mappa	Bingabing	A
	Dieffenbacahia picta	Dump cane	A
Grasses:	*Setaria palmifolia*	Palm grass	A
	Paspalum conjugatum	Hilo grass	A
	Panicum repens	Torpedo grass	A
	Oplismemus hirtellus	Basket grass	A
	Sacciolepis indica	Glenwood grass	A
Herbs:	*Rubus rosifolius*	Thimbleberry	A
	Mimosa pudica	Sensitive plant	A
	Paederia scandens	Maile pilau	A
	Hedychium flavescens	Yellow ginger	A
	Drymaria cordata	Pili	A
	Trifolium sp.	Clover	A
	Kalanchoe pinnata	Air plant	A

Keaukaha	Botanical Name	Common Name	Origin
Trees:	*Ficus microcarpa*	Chinese banyan	A
	Cocos nucifera	Coconut	P
	Schefflera actinophylla	Octopus	A
	Trema orientalis	Gunpowder	A
	Pandanus tectorius	Pandanus trees	P
	Cecropia obtusifolia	Trumpet tree	A
	Spathodea campanulata	African turip	A
Shrubs:	*Macaranga mappa*	Bingabing	A
	Lantana camara	Lantana	A
	Psidium guajava	Yellow Guava	A
	P. Cattleianum	Red Guava	A
	Arundina graminifolia	Bamboo orchid	A
	Rhodomyrtus tomentosa	Rose myrtle	A
	Ardisia ellipitica	Shoebutton ardisia	A
	Scaevola sericea	Naupaka	P
	Schimus terebinthifolius	Christmasberry shrubs	A
	Clusia rosea	Autograph tree	A
Grasses & Herbs:	*Stachytarpheta dichotoma*	Owi	A
	Mimosa pudica	Sensitive plant	A
	Nephrolepis hirsutula	Sword fern	I
	Phebodium aureum	Laua'e	P
	Dissotis rotundifolia	Triana	A
	Asystasia gangetica	Chinese violet	A
	Wedelia trilobata	Wedelia	A
	Paederia scandens	Maile pilau	A
	Merremia tuberosa	Woodrose	A
	Canavalia cathartica	Maunaloa	A
	Epipremnum pinnatum	Golden pothos	A

Setaria palmifolia	Palm grass	A
Paspalum conjugatum	Hilo grass	A
Commelina diffusa	Honohono grass	A
Justicia betonia	White shrimp plant	A
Asystasia gangetica	Chinese violet	A
Thungergia fragrans	White thunbergia	A
Paederia scandens	Maile pilau	A
Dissotis rotundifolia	Triana	A
Sporobolus diander	Indian dropseed	A
Rhynchelytrum repens	Natal redtop	A
Polygala paniculata	Bubble gum weed	A

Addendum to the BOTANICAL ASSESSMENT REPORT FOR FIVE PARCEL CLUSTERS IN THE HILO, HAWAII AREA

The recommended botanical surveys for sites TMK 2-5-4:27 and TMK 2-5-5:80 and the wetland search of parcel TMK 2-1-17:46,47, & 48 were carried out on December 10, 1996. A three person team visited these areas and carried out walk-through surveys. All parts of the sites were examined and the results are presented here.

Site TMK 2-5-4:27 is an undeveloped block of land which adjoins an open, forested area and may harbor sensitive species, therefore a full botanical survey was carried out. Two vegetation types were found on this site. Near the developed edges of the site there were narrow bands of Mixed Introduced and Native Vegetation. This vegetation type is found along the Uhaloa and Amau Street boundaries of the site and consists of a dense border of ironwood (*Casuarina equisetifolia* L.), rose apple (*Zyzygium jambos* (L.) Skeels), red and yellow guava (*Psidium cattleianum* Sabine, . P. guajava L.), ohi'a (*Metrosideros* sp.), and nelleau (*Rhus sandwicensis* A. Gray) trees from eight to twenty meters in height. The understory in this area is made up of a tangle of ferns, vines and weeds including uluhe (*Dicranopteris linearis* (Brum.) Underw.), Boston fern (*Nephrolepis exaltata* (L.) Schott), banana poka (*Passiflora mollissima* (Kunth) L. H. Bailey), glenwood grass (*Sacciolepis indica* (L.) Chase), and palmgrass (*Setaria palmifolia* (J. Konig) Stapf).

The largest portion of the site is covered by the second vegetation type, Scattered Ohi'a Trees with Staghorn fern and Uki Understory. Here the ohi'a trees (*Metrosideros polymorpha* Gaud.) are from ten to fifteen meters in height with a dense understory of uluhe or staghorn fern (*Dicranopteris*

linearis (Burm.) Underw.), uki (*Machaerina angustifolia* (Gaud.) T. Koyama), and invasive melastome species.

LIST OF PLANT SPECIES FOUND ON SITE TMK 2-5-4:27

The plant families in the following species list have been alphabetically arranged within three groups, Ferns and Fern Allies, Monocotyledons, and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of St. John (1973), Valier 1995, and Wagner, Herbst and Sohmer (1990). For each taxon the following information is provided:

1. An asterisk before the plant name indicates a plant introduced to The Hawaiian Islands since Cook or by the aborigines.
2. The scientific name.
3. The Hawaiian name and or the most widely used common name.
4. Abundance ratings are for this site only and they have the following meanings:

   Uncommon = a plant that was found less than five times.

   Occasional = a plant that was found between five to ten times.

   Common = a plant considered an important part of the vegetation.

   Locally abundant = plants found in large numbers over a limited area. For example the plants found in grassy patches.

This species list is the result of an extensive survey of these areas during the wet season (December 1995) and it reflects the vegetative composition of the flora during a single season. Minor changes in the vegetation will occur due to introductions and losses and a slightly different species list would result from a survey conducted during a different season.

Scientific Name	Common Name	Abundance
FERNS AND FERN ALLIES		
PSILOTACEAE - Psilotum Family		
Psilotum nudum L.	Moa	Uncommon
LYCOPODIACEAE - Club Moss Family		
Lycopodium cernuum L.	Wawae-'loe	Locally abundant
DAVALLIACEAE		
Nephrolepis exaltata (L.) Schott	Boston fern	Occasional
DENNSTAEDTIACEAE		
Microlepia strigosa (Thunb.) Presl.	Palapalai	Occasional
DICKSONIACEAE - Tree Fern Family		
Cibotium splendens (Gaud.) Kraj.	Tree fern	Common
GLEICHENIACEAE - Vine Fern Family		
Dicranopteris linearis (Brum.) Underw.	False staghorn	Locally abundant
POLYPODIACEAE - Common Fern Family		
Plebodium aureum (L.) J. Sm.	Laua'e haole	Locally abundant
Pleopeltis thunbergiana Kaulf.		Common
Polypodium pellucidum Kaulf.		Occasional
Pteridium aquilinum (L.) Kuhn	Bracken	Locally abundant
MONOCOTYLEDONS		
ARACEAE - Arum Family		
**Anthurium* spp.	Anthurium	Common
**Philodendron verrucosum* Mathieu.	Philodendron	Locally abundant
CYPERACEAE - Sedge Family		
Machaerina angustifolia (Gaud.) T. Koyama	Uki	Common
ORCHIDACEAE - Orchid Family		
**Arundina graminifolia* (D. Don) Hochr.	Bamboo orchid	Common
**Spathoglottis plicata* Blume	Philippine ground orchid	Occasional

Scientific Name	Common Name	Abundance
PANDANACEAE - Screw Pine Family		
Pandanus tectorius S. Parkinson ex Z	Hala	Occasional
POACEAE - Grass Family		
**Sacciolepis indica* (L.) Chase	Glenwood grass	Locally abundant
**Setaria palmifolia* (J. Konig) Stapf	Palmgrass	Locally abundant
ZINGIBERACEAE - Ginger Family		
**Hedychium flavescens* N. Carey ex Roscoe	Yellow ginger	Occasional
DICOTYLEDONS		
ANACARDIACEAE - Mango Family		
Rhus sandwicensis A. Gray	Neleau	Occasional
ASTERACEAE - Sunflower Family		
**Ageratum conyzoides* L.	Maile honohono	Locally abundant
FABACEAE - Bean Family		
**Desmodium incanum* DC	Spanish clover	Occasional
LAURACEAE - Laurel Family		
**Persea americana* Mill.	Avocado	Occasional
MYRSINACEAE - Myrsine Family		
**Ardisia crenata* Sims	Hilo holly	Occasional
MYRTACEAE - Myrtle Family		
Metrosideros polymorpha Gaud.	Ohi'a	Common
**Psidium cattleianum* Sabine	Waiwai	Locally abundant
**Psidium guajava* L.	Common guava	Occasional
**Zyzygium jambos* (L.) Alston	Rose apple	Locally abundant
MELASTOMATACEAE - Melastoma Family		
**Melastoma* sp.		Common
**Tibouchina urvilleana* (DC) Cogn.	Princess flower	Uncommon
PASSIFLORACEAE - Passion Flower Family		
**Passiflora mollissima* (Kunth) L. H. Bailey	Banana poka	Uncommon

Scientific Name	Common Name	Abundance
RUBIACEAE - Coffee Family		
Psychotria hawaiiensis (A. Gray) Fosb.	Kopiko	Uncommon
SOLANACEAE - Nightshade Family		
**Solandra hartwegii* N. E. Br.	Cup-of-gold	Uncommon
ULMACEAE - Elm Family		
**Trema orientalis* (L.) Blume	Gunpowder tree	Occasional

TMK 2-5-5:80 is a large block of land bounded on the north by an unnamed road right-of-way, on the south by open forest, on the west by Uluhe Road and on the southeast by a Hilo Electric sub station and Pamoho Road. This site was found to support two vegetation types, Ohi'a Forest with Staghorn Fern/Bamboo Orchid/Uki Understory and Mixed Introduced Vegetation.

The Ohi'a Forest with Staghorn Fern/Bamboo Orchid/Uki Understory can be characterized as scattered o'hia trees from ten to twenty meters in height with a dense understory of staghorn fern interspersed by bamboo orchid (*Arundina graminifolia* (D. Don) Hochr.) and 'uki (*Machaerina angustifolia* (Gaud.) T. Koyama). Except for some vegetative *Melastoma* spp., very few alien species have been able to penetrate this understory. This vegetation type occupies the northern three quarters of the site.

The area just north and south of the Hilo Electric sub station was at some time cleared and a rich mixture of alien species is taking over the site. This Mixed Introduced Vegetation includes many grasses such as molasses grass (*Melinis minutiflora* P. Beauv.), thatching grass (*Hyparrhenia rufa* (Nees) Stapf), West Indian foxtail (*Andropogon bicornis* L.), and natal red top (*Rhynchelytrum repens* (Willd.) Hubb.). Weedy trees such as African tulip (*Spathodea campanulata* P. Beauv.), moho (*Heliocarpus popayanenis* Kunth, shoebutton ardisia (*Ardisia elliptica* Thunb.), and siris tree (*Albizia lebbeck* (L.) Benth.) are becoming established. A list of all plant species found on this site is provided in the species list.

LIST OF PLANT SPECIES FOUND ON SITE TMK 2-5-5:80

The plant families in the following species list have been alphabetically arranged within three groups, Ferns and Fern Allies, Monocotyledons, and Dicotyledons. The genera and species are arranged alphabetically within families. The taxonomy and nomenclature follow that of St. John (1973), Valier 1995, and Wagner, Herbst and Sohmer (1990). For each taxon the following information is provided:

1. An asterisk before the plant name indicates a plant introduced to The Hawaiian Islands since Cook or by the aborigines.
2. The scientific name.
3. The Hawaiian name and or the most widely used common name.
4. Abundance ratings are for this site only and they have the following meanings:

   Uncommon = a plant that was found less than five times.

   Occasional = a plant that was found between five to ten times.

   Common = a plant considered an important part of the vegetation.

   Locally abundant = plants found in large numbers over a limited area. For example the plants found in grassy patches.

This species list is the result of an extensive survey of these areas during the wet season (December 1995) and it reflects the vegetative composition of the flora during a single season. Minor changes in the vegetation will occur due to introductions and losses and a slightly different species list would result from a survey conducted during a different season.

Scientific Name	Common Name	Abundance
FERNS AND FERN ALLIES		
LYCOPODIACEAE - Club Moss Family		
Lycopodium cernuum L.	Wawae-'loe	Locally abundant
DAVALLIACEAE		
Nephrolepis exaltata (L.) Schott	Boston fern	Occasional
DENNSTAEDTIACEAE		
Microlepia strigosa (Thunb.) Presl.	Palapalai	Occasional
GLEICHENIACEAE - Vine Fern Family		
Dicranopteris linearis (Brum.) Underw.	False staghorn	Locally abundant
HEMIONITIDACEAE		
**Pityrogramma calomelanos* (L.) Link	Silver or gold fern	Occasional
POLYPODIACEAE - Common Fern Family		
Plebodium aureum (L.) J. Sm.	Laua'e haole	Locally abundant
Pleopeltis thunbergiana Kaulf.		Common
Polypodium pellucidum Kaulf.		Occasional
MONOCOTYLEDONS		
AGAVACEAE - Agave Family		
**Cordyline fruticosa* (L.) A. Chev.	Ti	Uncommon
ARACEAE - Arum Family		
**Alocasia macrorrhiza* (L.) Schott	'Ape	Uncommon
**Anthurium* spp.	Anthurium	Common
CYPERACEAE - Sedge Family		
Machaerina angustifolia (Gaud.) T. Koyama	Uki	Common
ORCHIDACEAE - Orchid Family		
**Arundina graminifolia* (D. Don) Hochr.	Bamboo orchid	Common
**Spathoglottis plicata* Blume	Philippine ground orchid	Occasional

Scientific Name	Common Name	Abundance
PANDANACEAE - Screw Pine Family		
Pandanus tectorius S. Parkinson ex Z	Hala	Occasional
POACEAE - Grass Family		
**Andropogon bicornis* L.	West Indian foxtail	Common
**Hyparrhenia rufa* (Nees) Stapf	Thatching grass	Locally abundant
**Melinis minutiflora* P. Beauv.	Molasses grass	Common
**Rhynchelytrum repens* (Willd.) Hubb.	Natal red top	Common
ZINGIBERACEAE - Ginger Family		
**Hedychium flavescens* N. Carey ex Roscoe	Yellow ginger	Occasional
DICOTYLEDONS		
ANACARDIACEAE - Mango Family		
**Mangifera indica* L.	Mango	Occasional
Rhus sandwicensis A. Gray	Neleau	Occasional
ARALIACEAE - Ginseng Family		
**Schefflera actinophylla* (Endl.) Harms	Octopus tree	Occasional
ASTERACEAE - Sunflower Family		
**Wedelia trilobata* (L.) Hitchc.	Wedelia	Locally abundant
BIGNONIACEAE - Bignonia Family		
**Spathodea campanulata* P. Beauv.	African tulip tree	Occasional
BUDDLEIACEAE - Butterfly Bush Family		
**Buddleia asiatica* Lour.	Dog tail	Occasional
FABACEAE - Bean Family		
**Albizia lebbeck* (L.) Benth.	Siris tree	Uncommon
**Chamaecrista nictitans* (L.) Moench	Partridge pea	Occasional
**Mimosa pudica*L.	Sensitive plant	Locally abundant
LAURACEAE - Laurel Family		
**Persea americana* Mill.	Avocado	Occasional

Scientific Name	Common Name	Abundance
MYRSINACEAE - Myrsine Family		
**Ardisia elliptica* Thunb.	Shoebutton ardisia	Common
**Ardisia crenata* Sims	Hilo holly	Occasional
MYRTACEAE - Myrtle Family		
Metrosideros polymorpha Gaud.	Ohi'a	Common
**Psidium cattleianum* Sabine	Waiwai	Locally abundant
**Psidium guajava* L.	Common guava	Occasional
**Zyzygium jambos* (L.) Alston	Rose apple	Locally abundant
MELASTOMATACEAE - Melastoma Family		
**Dissotis rotundifolia* (Sm.) Triana		Locally abundant
**Melastoma* sp.		Common
RUBIACEAE - Coffee Family		
Paederia scandens (Lour.) Merr.	Maile pilau	Common
SOLANACEAE - Nightshade Family		
**Solandra hartwegii* N. E. Br.	Cup-of-gold	Uncommon
TILIACEAE - Linden Family		
**Heliocarpus popayanensis* Kunth	Moho	Occasional
ULMACEAE - Elm Family		
**Trema orientalis* (L.) Blume	Gunpowder tree	Occasional
VERBENACEAE - Verbena Family		
**Stachytarpheta urticifolia* (Salisb.) Sims		Occasional

Sites TMK 2-5-5:77 and TMK 2-5-5:79 are located off Umaloa Street between sites TMK 2-5-4:27 and TMK 2-5-5:80. They are bounded on the south by the same open forest. The vegetation along the northern boundary of these sites, near the developed area, consists of mixed, introduced trees, vines, forbs and grasses. Among these are gunpowder trees (*Trema orientalis* (L.) Blume), two types of guava trees (*Psidium guajava* and *P. cattleianum* Sabine), autograph tree (*Clusia rosea* Jacq.), philodendron vine, and palm grass (*Setaria palmifolia* (J. Konig) Stapf). There are still some scattered ohia trees (*Metrosideros* sp.) about eight meters in height in this area. Between the fringe of introduced vegetation and the southern boundary of these sites can be found a forest of scattered ohi'a trees with a dense understory of uluhe or false staghorn fern (*Dicranopteris linearis* (Brum.) Underw.). There are some bamboo orchid (*Arundina graminifolia* (D. Don) Hochr.), 'uki (*Machaerina angustifolia* (Gaud.) T. Koyama), and vegetative *Melastoma* spp. plants that penetrate the false staghorn fern. Data on these sites was gained from vantage points along the developed boundary.

Because sites TMK 2-1-17:46, 47, and 48 are rumored to have wetlands on them, a search was conducted in this area. For an area to be classified as a wetland three criteria as set forth by the US Army Corps of Engineers (Environmental Laboratory 1987*) must be met. The criteria are:

(1). Fifty percent or more of the vegetation on the site must be hydrophytic i.e. "macrophytic plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content".

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*1987 Corps of Engineers Wetland Delineation Manual

(2). Wetland hydrology must prevail, that is, "the soil must be saturated to within six inches of the surface for one week or more during the growing season" and finally,

(3). Hydric soils must be present, i.e. "hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season "(the portion of the year when soil temperatures at 19.7 inches below the soil surface are higher than biological zero [5 degrees C]')" to develop anaerobic conditions in the upper part".

No evidence of wetlands was found on these sites. As a matter of fact the vegetation consisted of upland, woody plants, the soil was pahoehoe lava and no ponding or standing water was found.

No further study is warranted on these sites.

ENDANGERED SPECIES

No candidate, proposed, or listed threatened or endangered species as set forth in the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543), were found on any of these sites.

Appendix B

Hawaii CZM Program
Assessment Form
for
Site A (TMKs: 2-1-17:46, 47, & 48; 2-1-18:8; and, 2-1-19:20, 29, 30, & 31)

HAWAII CZM PROGRAM
ASSESSMENT FORM

1. RECREATIONAL RESOURCES

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

1) Improve coordination. & funding of coastal recreation planning & management.

2) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

   a) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

   b) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites and sandy 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;

   c) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

   d) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

   e) Encouraging expanded public recreational use of County, State, and Federally owned or controlled shoreline lands and waters having recreational value;

   f) Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal water;

   g) Developing new shoreline recreational opportunities, where appropriate, such as artificial reefs for surfing and fishing; and

   h) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, County planning commissions; and crediting such dedication against the requirements of section 46-6.

Check either "Yes" or "No" for each of the following questions.

		Yes	No
1.	Will the proposed action involve or be near a dedicated public right-of-way?		X
2.	Does the project site abut the shoreline?		X
3.	Is the project site near a State or County Park?	X	
4.	Is the project site near a perennial stream?		X
5.	Will the proposed action occur in or affect a surf site?		X
6.	Will the proposed action occur in or affect a popular fishing area?		X
7.	Will the proposed action occur in or affect a recreational or boating area?		X
8.	Is the project site near a sandy beach?	X	
9.	Are there swimming or other recreational uses in the area?		X

DISCUSSION

There are several beach parks along the northeastern shoreline of the South Hilo District. A total 30.87 acres of Leleiwi Beach Park, including Mahikea Island and Peue Island, is located across from Kalanianaole Highway within a few hundred yards from the project parcels.

The proposed project will not encroach upon any recreational areas since the project will be conducted in an area that is not associated with recreational opportunities. The project is not anticipated to cause any disruption to the public right-of-way. Any impact on surrounding land uses will be temporary. During construction necessary measures to assure public health, safety, and convenience will be provided throughout all phases of construction as described in Section 2.10 of this Environmental Assessment.

Also, please refer to Section 4.5 of this Environmental Assessment.

2. HISTORIC RESOURCES

Objective: 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.

Policies:

1) Identify and analyze significant archaeological resources;

2) Maximize information retention through preservation of remains and artifacts or salvage operations; and

3) Support State goals for protection, restoration, interpretation, and display of historic resources.

Check either "Yes" or "No" for each of the following questions.	Yes	No
1. Is the project site within a historic/cultural district?		X
2. Is the project site listed on or nominated to the Hawaii or National register of historic places?		X
3. Does the project site include undeveloped land which has not been surveyed by an archaeologist?	X	
4. Has a site survey revealed any information on historic or archaeological resources?		X
5. Is the project site within or near a Hawaiian fishpond or historic settlement area?		X

DISCUSSION

Traditional agricultural and residential development in Hilo area have dominated the landscape for many years. By the mid-1900's much of the land in Waiakea was owned by Waiakea Mill Company. Extensive fields of sugar cane, immigrant labors camps, and temporary habitation sites comprised much of this area in the past (Archaeological Consultants of Hawaii, 1994). Therefore, historic structures, which may still exist on the sites, are likely to be post-contact archaeological features related to sugar cane cultivation and cattle ranch.

According to the State Historic Preservation Division, the only recorded site near the subject site is Puumaile Hospital, approximately 1,000 feet to the east. Should any unidentified cultural remains be

uncovered during excavation, work in the immediate area will cease and the appropriate government agencies will be contacted for further instructions.

Also, please refer to Section 2.5 of this Environmental Assessment.

3. SCENIC AND OPEN RESOURCES

Objective: Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

1) Identify valued scenic resources in the coastal zone management area;

2) Insure 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;

3) Preserve, maintain and, where desirable, improve and restore shoreline open space and scenic resources; and

4) Encourage those developments which are not coastal dependent to locate in inland areas.

Check either "Yes" or "No" for each of the following questions.

		Yes	No
1.	Does the project site abut a scenic landmark?		X
2.	Does the proposed action involve the construction of a multi-story structure or structures?		X
3.	Is the project site adjacent to undeveloped parcels?	X	
4.	Does the proposed action involve the construction of structures visible between the nearest coastal roadway and the shoreline?		X
5.	Will the proposed action involve construction in or on waters seaward of the shoreline? On or near a beach?		X

DISCUSSION

The project sites are currently undeveloped vacant land and covered by dense alien species and is almost impenetrable. The area between Kalanianaole Highway and Nene Street is designated as State Urban District. The surrounding area has been cleared and already developed for residential use. The proposed low density development will not significantly affect the area's visual resource.

Also, please refer to Section 2.4 of this Environmental Assessment.

4. COASTAL ECOSYSTEMS

Objective: Protect valuable coastal ecosystems from disruption & minimize adverse impacts on all coastal ecosystems.

Policies:

1) Improve the technical basis for natural resource management;

2) Preserve valuable coastal ecosystems of significant, biological or economic importance;

3) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land water uses, recognizing competing water needs; and

4) 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.

Check either "Yes" or "No" for each of the following questions.

		Yes	No
1.	Does the proposed action involve dredge or fill activities?	X	
2.	Is the project site within the Shoreline Setback Area (20 to 40 feet inland of the shoreline)?		X
3.	Will the proposed action require some form of effluent discharge into a body of water?		X
4.	Will the proposed action require earthwork beyond clearing and grubbing?	X	
5.	Will the proposed action include the construction of special waste treatment facilities, such as injection wells, discharge pipes, or cesspools?		X
6.	Is an intermittent or perennial stream located on or near the project site?		X
7.	Does the project site provide habitat for endangered species of plants, birds, or mammals?		X
8.	Is any such habitat located nearby?		X
9.	Is there a wetland on the project site?		X
10.	Is the project site situated in or abutting a Natural Area Reserve?		X

		Yes	No
11.	Is the project site situated in or abutting Marine Life Conservation District?		X
12.	Is the project site situated in or abutting an estuary?		X

DISCUSSION

An initial botanical survey of the site was conducted by Evengeline Funk, PhD., Botanist, in September 1996. The flora species located within the area are common in urbanized or disturbed regions. Except for a few Polynesian plant introductions (such as pandanus, coconut, and naupaka), all species found in the site are regarded as weed. There were no trace of original, endemic vegetation (see Appendix A). In addition , a detailed wetland search was conducted at sites TMK 2-1-17:46, 47, and 48, in December 1996. The search concluded that there is no evidence of wetlands. Vegetation of the sites consisted of upland, woody plants, the soil was pahoehoe lava, and no ponding or standing water was found.

Few birds were found during the recent field visit on September 20, 1996. No "endangered" or "threatened" fauna was seen or heard in the project sites. An indigenous bird, the Black-crowned Night Heron (*Nycticorax hoactli*), inhabits wetlands in Hawaii (Bachman, 1996). However, none of them were seem during the field survey. .

The proposed development will alter the topographic conditions of the land due to grading, topsoil importation, vegetation removal, and increased impervious surfaces. However, the natural drainage pattern in the area will be maintained. Storm water runoff created by increased impervious surfaces will be retained on site by routing the flows to drywells. Water will then infiltrate into the ground and contribute to the groundwater recharge. Natural flows will use existing drainageways to maintain the natural drainage patterns. In addition, the project area is located mauka of Kalanianaole Highway. The surrounding area has been cleared and already developed for residential use. The proposed project is anticipated to have no long-term impacts on the existing environment.

Also, Please refer to Section 2.3 & 10 of this Environmental Assessment.

5. ECONOMIC USES

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

1) Concentrate in appropriate areas the location of coastal dependent development necessary to the State's economy;

2) Insure that coastal dependent development such as harbors and ports, visitor industry facilities, and energy generating facilities are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

3) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such development and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
   a) Utilization of presently designated locations is not feasible;
   b) Adverse environmental effects are minimized; and
   c) Important to the State's economy.

Check either "Yes" or "No" for each of the following questions.

		Yes	No
1.	Does the project involve a harbor or port?		X
2.	Is the project site within a designated tourist destination area?		X
3.	Does the project site include agricultural lands or lands designated for such use?		X
4.	Does the proposed activity relate to commercial fishing or seafood production?		X
5.	Does the proposed activity relate to energy production?		X
6.	Does the proposed activity relate to seabed mining?		X

DISCUSSION

According to the Hawaii County General Plan, the project sites lie within the "Low Density Urban." Residential use is predominant in the area surrounding Site A. Development of scattered residential lots is not anticipated to have significant effects on other existing economic activities in the region. Additional residential lots and new neighborhood generated from this project will provide benefits for a variety of local businesses.

Also, please refer to Section 3.2 and 3.3 of this Environmental Assessment.

6. COASTAL HAZARDS

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.

Policies:

1) Develop and communicate adequate information on storm wave, tsunami, flood erosion, and subsidence hazard;

2) Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard;

3) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

4) Prevent coastal flooding from inland projects.

Check either "Yes" or "No" for each of the following questions.

		Yes	No
1.	Is the project site on or abutting a sandy beach?		X
2.	Is the project site within a potential tsunami inundation area as depicted on the National Flood Insurance Program flood hazard map?	X	
3.	Is the project site within a potential flood inundation area according to a flood hazard map?	X	
4.	Is the project site within a potential subsidence hazard area according to a subsidence hazard map?		X
5.	Has the project site or nearby shoreline areas experienced shoreline erosion?		X

DISCUSSION

According to the 1988 Flood Insurance Rate Map (FIRM), most of the project sites are within 100-year flood zone. Site A-3 and the northern half of Site A-2 are determined as being within "Zone VE". Zone VE is described as "special flood hazard areas inundated by 100-year flood; and coastal flood with velocity hazard (wave action), and base flood elevations determined". The northeastern corner of Site A-1 and the southern half of Site A-2 are located in "Zone AE." Zone AE is a "special flood hazard areas inundated by 100-year flood; and base flood elevations determined." The reminder of Site A-1 is in "Zone X", an area determined to be outside of 500-year flood plain. Subdivision of the proposed lots will be in accordance with the Chapter 27, Flood Control, Hawaii County Code,

1983, as revised in 1995.

The proposed action is anticipated to have no long-term impacts on the existing environment or any adverse effects on the existing shoreline system. Site A is located in mauka of Kalanianaole Highway. The proposed development will alter the topographic conditions of the land due to grading, topsoil importation, vegetation removal, and increased impervious surfaces. However, the natural drainage pattern in the area will be maintained.

Also, please refer to Section 2.8.1 & 2 of this Environmental Assessment.

7. MANAGING DEVELOPMENT

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

1) Effectively utilized and implement existing law to the maximum extent possible in managing present and future coastal zone development;

2) Facilities timely processing of application for development permits and resolve overlapping or conflicting permit requirements; and

3) 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.

Check either "Yes" or "No" for each of the following questions.

		Yes	No
1.	Will the proposed activity require more than two permits or approvals?		X
2.	Does the proposed activity conform with the State and County land use designations for the site?	X	
3.	Has or will the public be notified of the proposed activity?	X	
4.	Has a draft or final environmental impact statement or an environmental assessment been prepared?	X	

DISCUSSION

The proposed action on Site A conforms to all County and State land use designations. Public notification will be provided by publication of the proposed action in the OEQC Bulletin. An Environmental Assessment has been prepared for the proposed project and is a matter of public record.

The proposed parcels are located within the Special Management Area (SMA) Boundary as defined by the County of Hawaii. SMA areas are defined sensitive environments that should be protected in accordance with the State's coastal zone management policies. However, DHHL is exempt from the SMA Permit process. This State of Hawaii CZM Assessment Form is prepared as supplement to describe the project's compliance with the CZM objectives and policies of Chapter 205A, Hawaii Revised Statutes.

Also, please refer to Section 5 of this Environmental Assessment.

Appendix C

Drainage Information

100-YEAR FLOOD ANALYSIS
FOR
HILO SCATTER LOTS
HILO, HAWAII

July 1997

Prepared for:

Department of Hawaiian Home Lands
335 Merchant Street
Honolulu, Hawaii 96813

Prepared by:

R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817

INTRODUCTION

The Department of Hawaiian Home Lands proposes to develop various parcels of land throughout the Hilo area (see fig. 1) with the Hilo scattered lots project. This development consists of roadway, water and grading improvements at Waiakea, Kaumana, and Piihonua (see fig. 2). A total of nine sites will be developed. Three sites in Waiakea (Zone AE), five sites in Kaumana (Zone A), and one site in Piihonua (Zone A). The intent of this report is to establish base flood elevations for the Piihonua and Kaumana sites which are located within the Federal Emergency Management Agency's (FEMA) Zone A category (see fig. 3 & 4).

Kaumana Site-1 (see fig. 3 & 6) is located at the end of Ieie Street. The flood zone in this area was studied by M & E Pacific in 1994 for the Wilder Road Subdivision project. The results of their analysis will be used to establish the 100-year base flood zone elevation.

Kaumana Site-2 (see fig. 3 & 7), located at the end of Kilua Road and the Piihonua site (see fig. 4 & 5) will be studied in detail to determine the 100-year base flood elevation.

HYDROLOGY

Three methods were used to develop the 100-year peak flows for the Piihonua and Kaumana sites - the FEMA regression method, the County of Hawaii Drainage Standards, and the Soil Conservation Service (SCS) TR-55 method. The more reasonable conservative value (higher flow) was used as the

design flow. Typically, the values from the County of Hawaii Standards are more conservative than those from the FEMA regression method.

For the proposed project at Piihonua, United States Geological Survey (USGS) topographic maps were used to determine the drainage area. Two major drainage areas contribute to Ainako stream at the proposed project site (see fig 8). The primary drainage area is about 416 acres and the tributary has a drainage area of approximately 146 acres. The smaller tributary joins Ainako stream about halfway through the project site. The mean annual precipitation in this area is 175 inches. Peak discharge for the 100-year storm calculated by the regression method is 825 cubic feet per second (cfs) from the primary drainage area, and 422 cfs from the tributary drainage area for a total flow of 1,247 cfs. In comparison, the County of Hawaii Drainage Standards peak discharge resulted in 3,700 cfs for the primary drainage area, and 1,500 cfs for the tributary area, for a total of 5,200 cfs. The higher value of 5,200 cfs will be used for the hydraulic study of this area.

M&E Pacific (M&E) has completed a detailed study of the flood way adjacent to Kaumana Site-1. M&E used a USGS map to determine the appropriate drainage area (see fig 9). The drainage area was divided into three basins. However, only Basin 2 had a direct impact on Kaumana Site-1. The approximate drainage area for Basin 2 is 2,710 acres. Using the Soil Conservation Service (SCS) method, the 100-year peak discharge for Basin 2 is 4,830 cfs.

For Kaumana Site-2, USGS maps were used to determine the drainage area for Stream "A" (see fig 10). The drainage area for Stream "A" at the proposed project site is about 3,125 acres. Since the drainage area for this site is similar to the drainage area used in M&E's analysis, we decided to expand on their analysis to obtain the 100-year peak discharge. To accomplish this, we used M&E's 100-year discharge and added the remaining discharge generated from the additional drainage area for Kaumana Site-2. The total discharge for Basins 1, 2, and 3 (see fig 9) is 5,430 cfs. The additional discharge was calculated from a drainage area of about 117 acres using the FEMA regression method, County of Hawaii Drainage Standards, and the Soil Conservation Service (SCS) TR-55 graphical method. The FEMA regression method yielded 363 cfs, County of Hawaii Drainage Standards resulted in 1,300 cfs, and the TR-55 method produced 470 cfs. The TR-55 method produced the most reasonable results, so this discharge was added to the upstream discharge. Therefore, the total 100-year peak discharge for Kaumana Site-2 is 5,900 cfs.

SUMMARY OF HYDROLOGY

PIIHONUA	Q_{100}= 5,200 cfs
KAUMANA SITE-1	Q_{100}= 4,830 cfs
KAUMANA SITE-2	Q_{100}= 5,900 cfs

HYDRAULICS

Stream hydraulics were studied using the peak discharge to find the 100-year base flood water surface elevations. Since both Ainako Stream and Stream "A" fall into FEMA's Zone A category at the project sites, the FEMA computer program "Quick-2", written specifically for Zone A areas, was used to determine the 100-year base flood elevations. The specialized computer program uses the standard step-backwater method to calculate the 100-year base flood water surface elevations.

The analysis of Ainako stream at the proposed project site showed that the 100-year flood water surface will be about one foot below the existing bank elevation (see fig. 11). Therefore, the proposed development in this area will be above the 100-year flood elevation. Structures should be built outside of the base flood limit.

The Kaumana Stream "A" analysis showed that the stream would flood to a depth of about 14 feet (see fig. 12). This amount of flood water would completely cover a DHHL lot at the end of Kilua street and a portion of another DHHL lot. Stream "A" is about 3 feet deep and not well defined. Therefore, it is recommended that the DHHL lot at the end of Kilua Street not be developed because of the significant drainage problems.

REFERENCES

1. "Flood Insurance Study Hawaii County, Hawaii, Vol. 1," FEMA, Rev. April 3, 1989.
2. "Managing Floodplain Development in Approximate Zone A Areas," FEMA, April 1995.
3. "Rainfall Frequency Atlas of the Hawaiian Islands," U.S. Department of Commerce Weather Bureau, 1962.
4. "Soil Survey of Island of Hawaii, State of Hawaii," U.S. Department of Agriculture, Soil Conservation Service, 1973.
5. "Storm Drainage Standards," Department of Public Works, County of Hawaii, 1970.
6. "Urban Hydrology for Small Watersheds," Soil Conservation Service, June 1986.

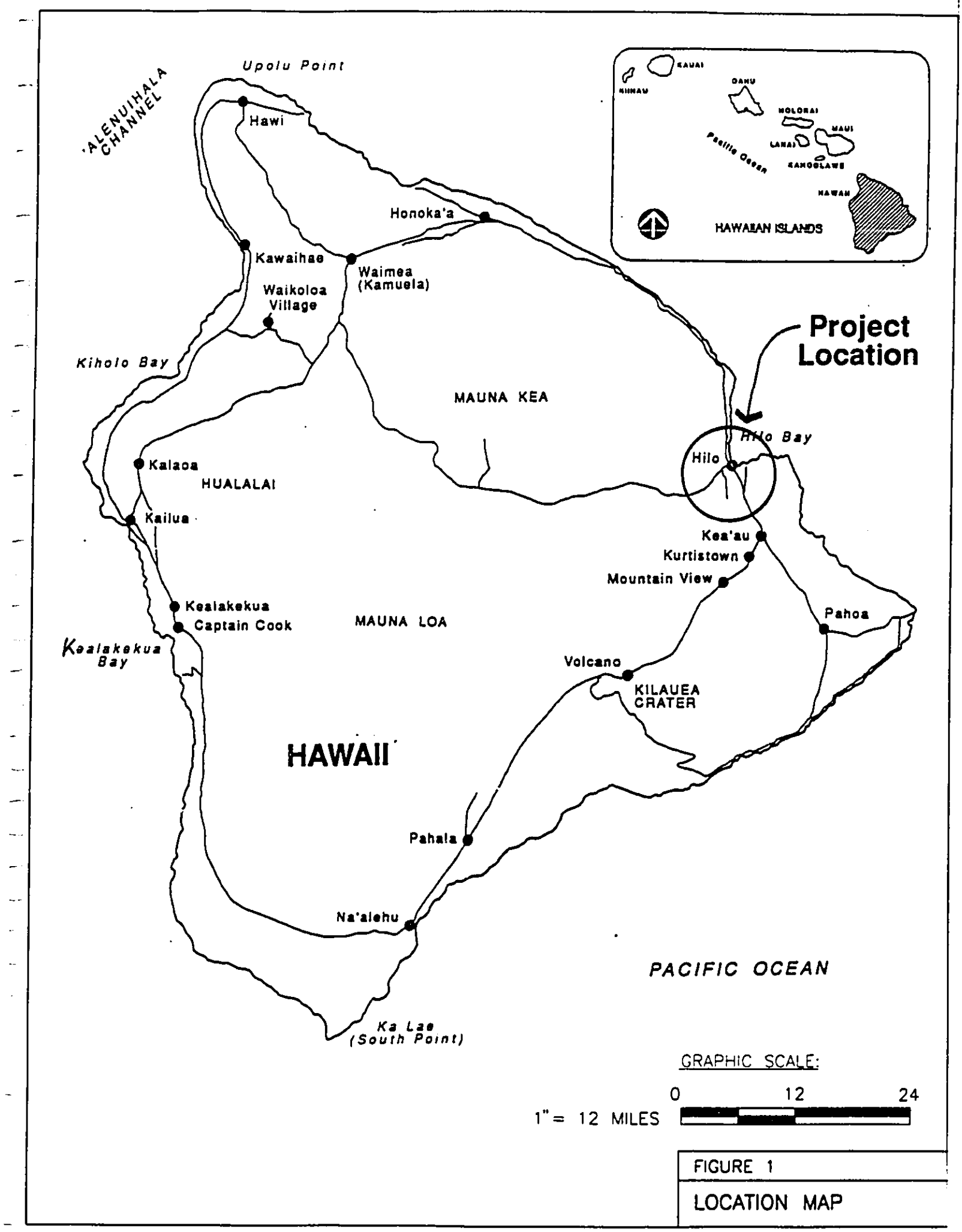


FIGURE 1

LOCATION MAP


HILO
BAY
WAIANUENUE AVENUE
PIIHONUA
University of Hawaii
(Hilo Campus)
KINOOLE STREET
KAUMANA
DRIVE
WAIAKEA
STAINBACK

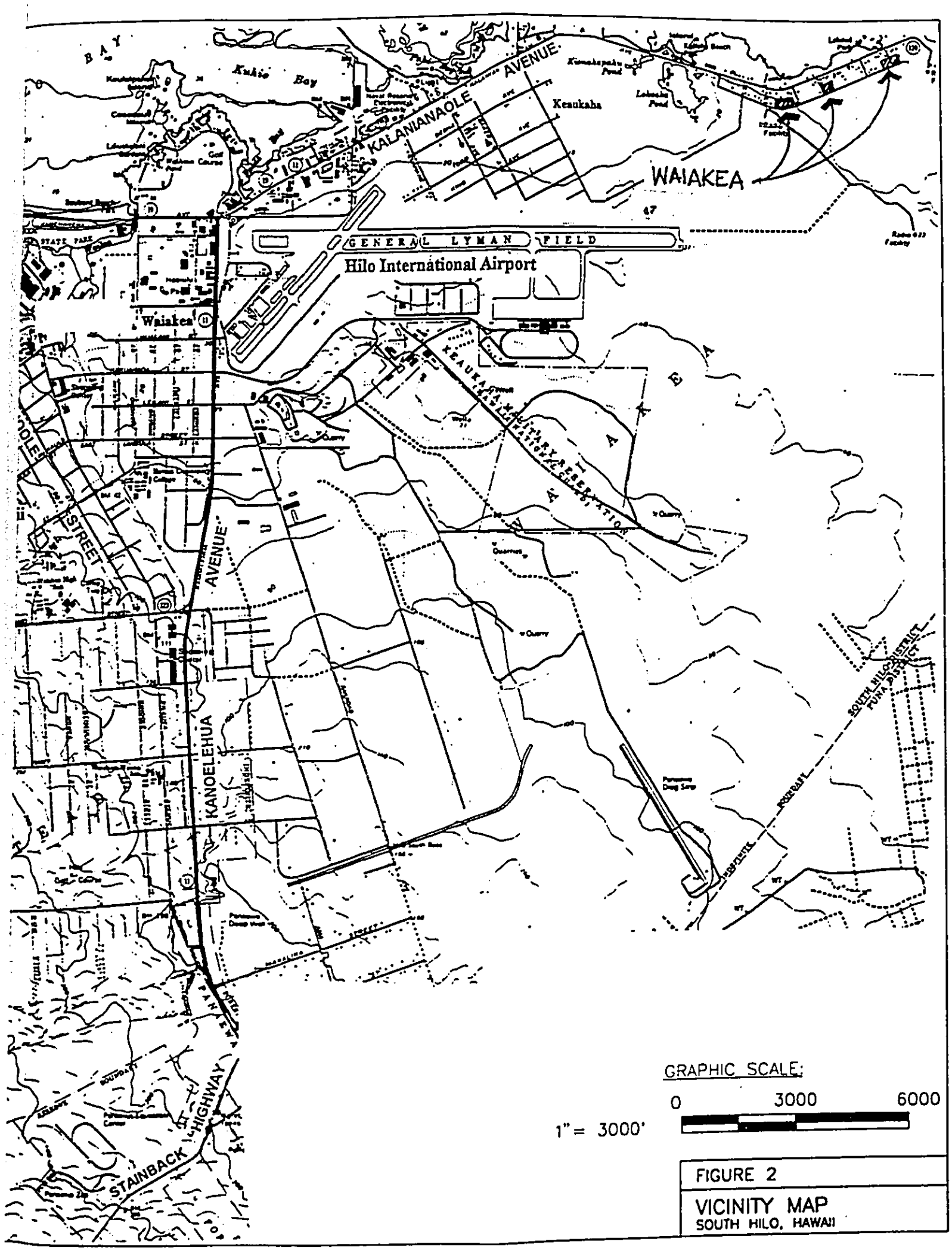


FIGURE 2

VICINITY MAP
SOUTH HILO, HAWAII

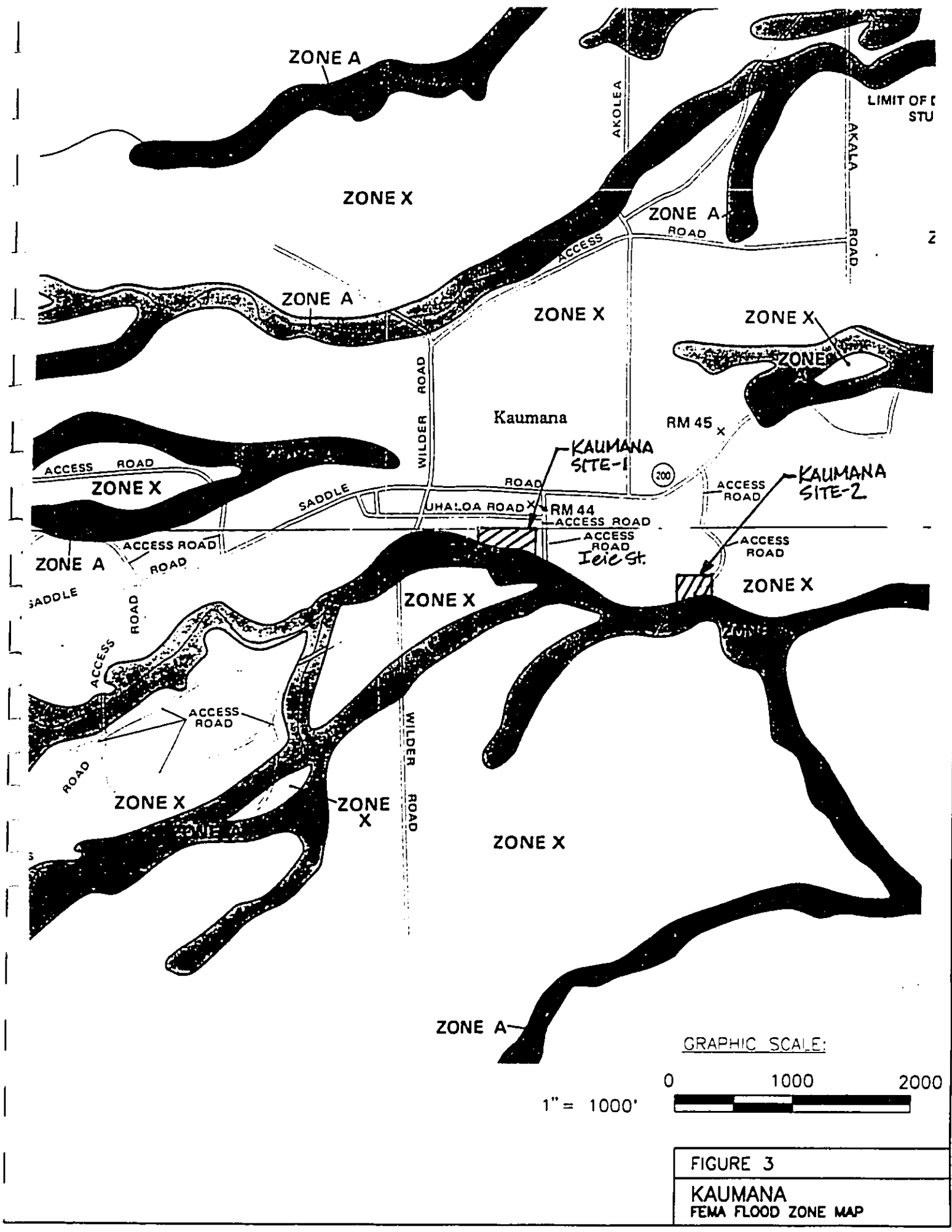
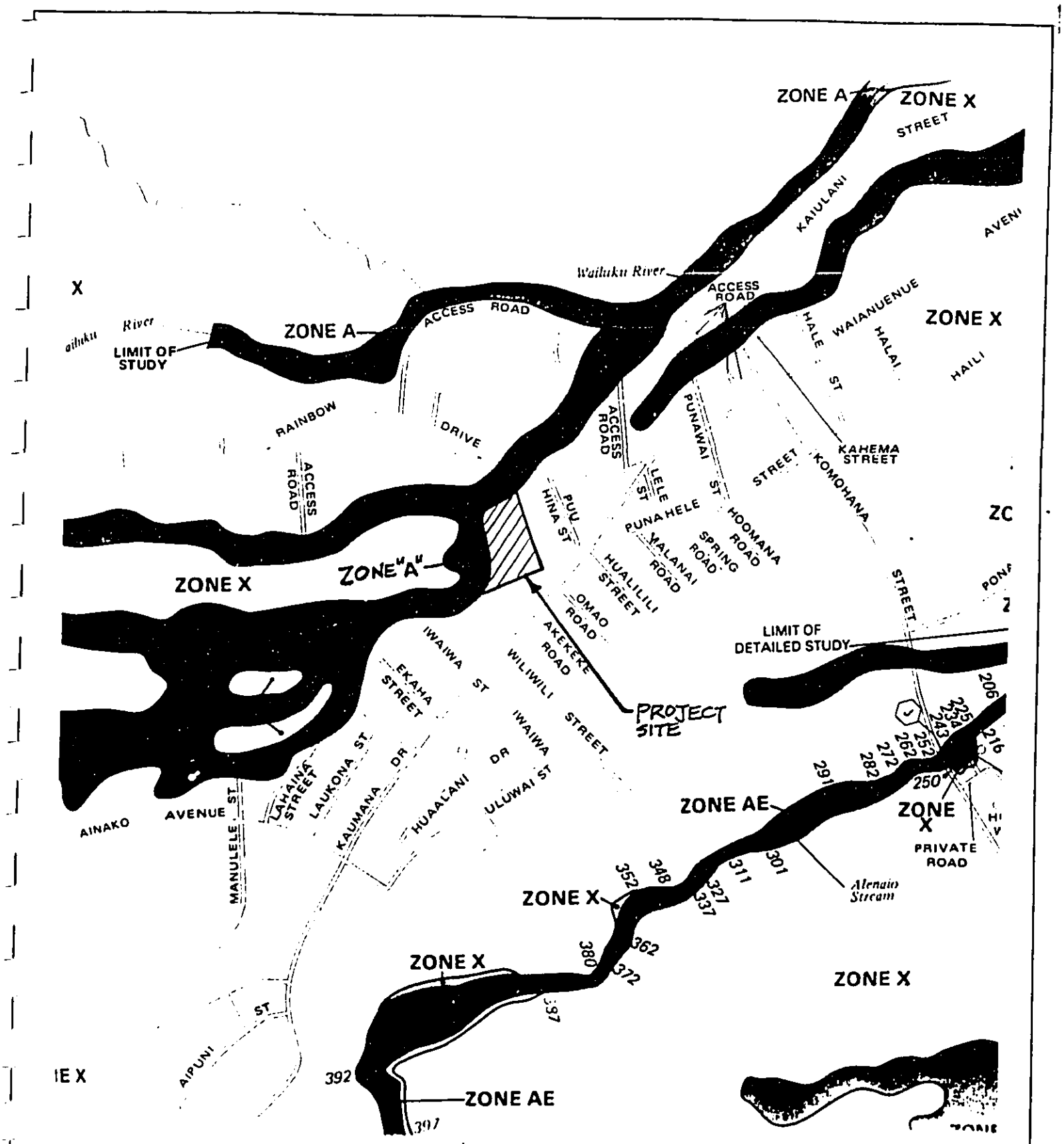


FIGURE 3

KAUMANA
FEMA FLOOD ZONE MAP



GRAPHIC SCALE:

0 1000 2000

1" = 1000'

FIGURE 4

PIIHONUA
FEMA FLOOD ZONE MAP

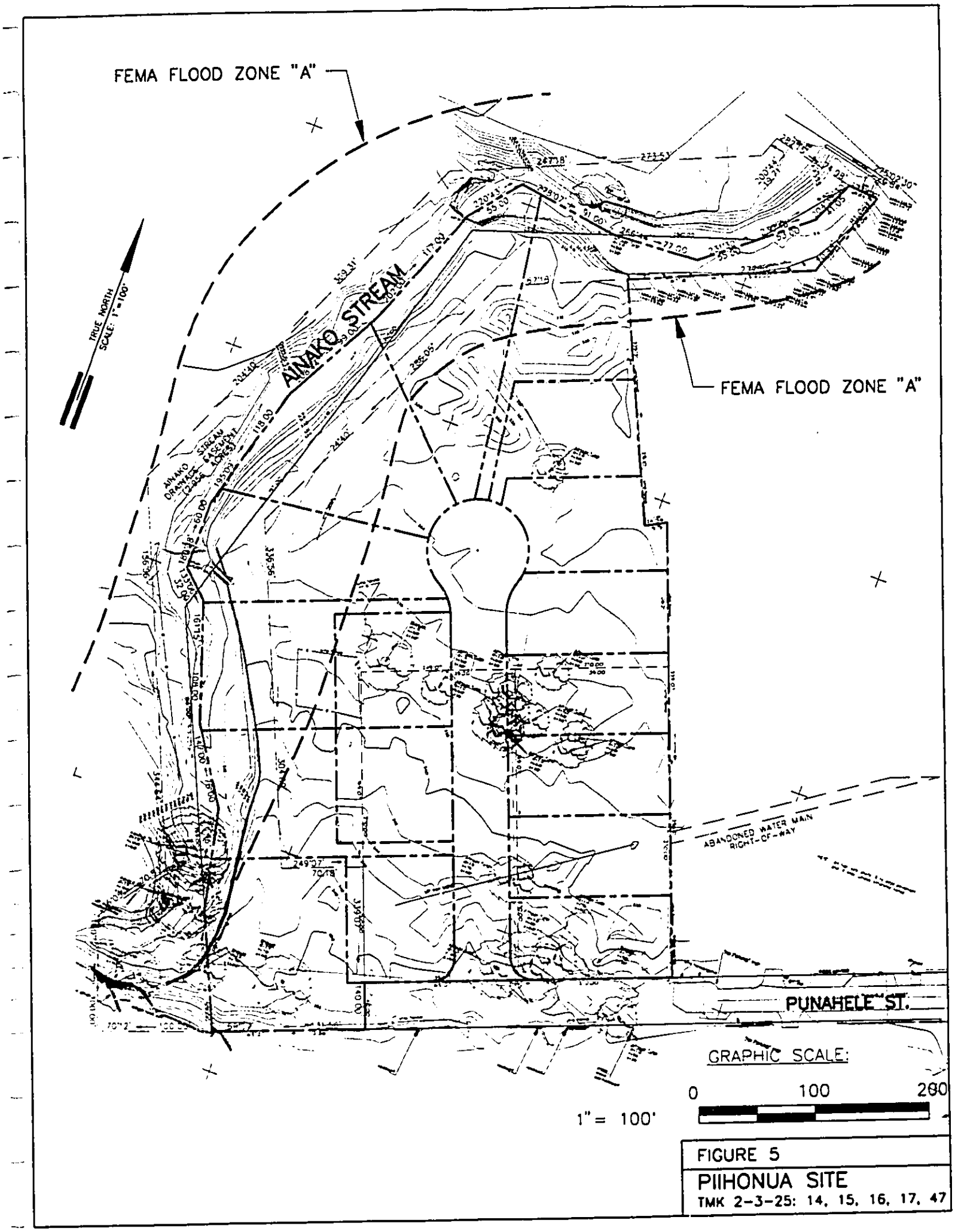


FIGURE 5

PIIHONUA SITE

TMK 2-3-25: 14, 15, 16, 17, 47

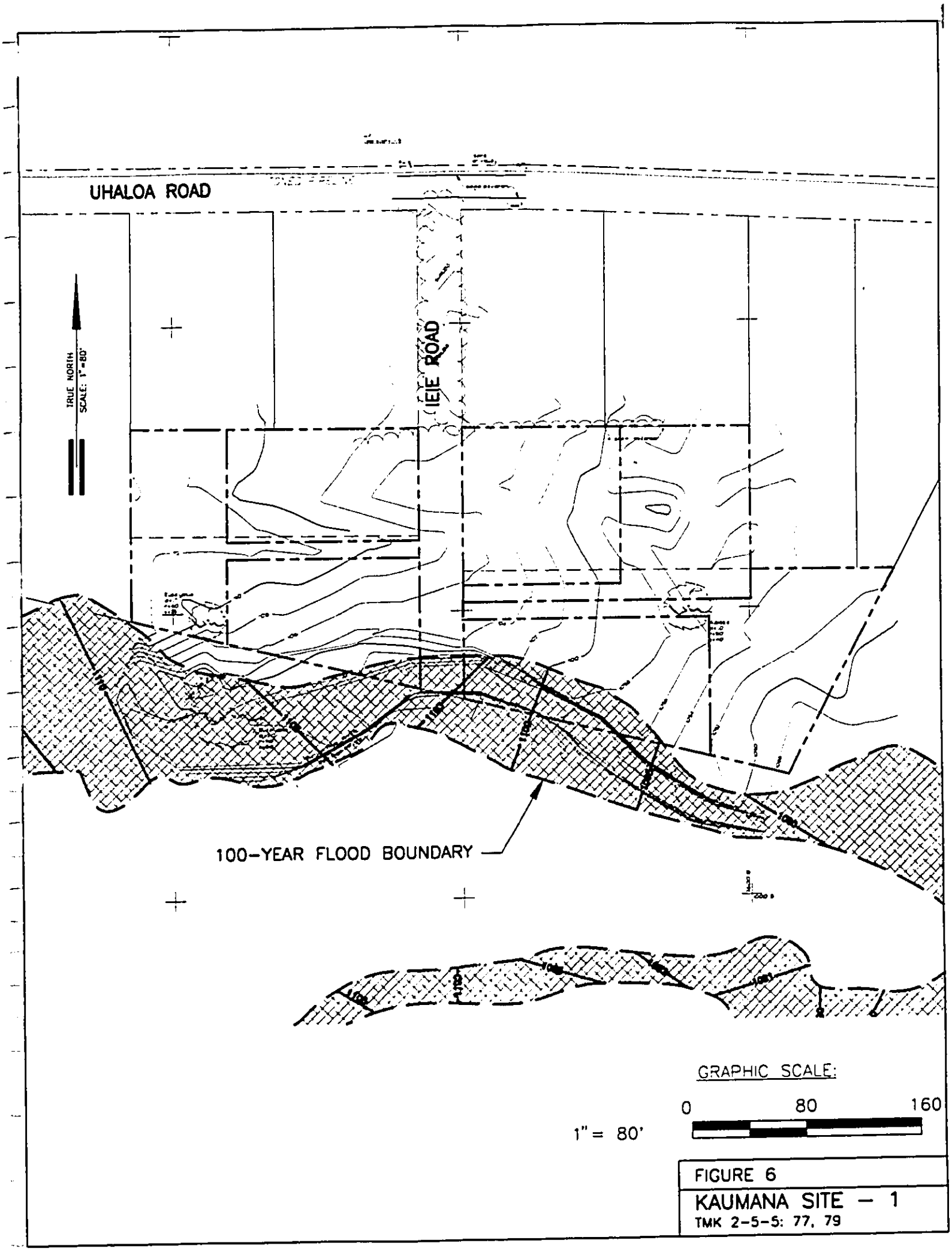


FIGURE 6

KAUMANA SITE – 1

TMK 2-5-5: 77, 79

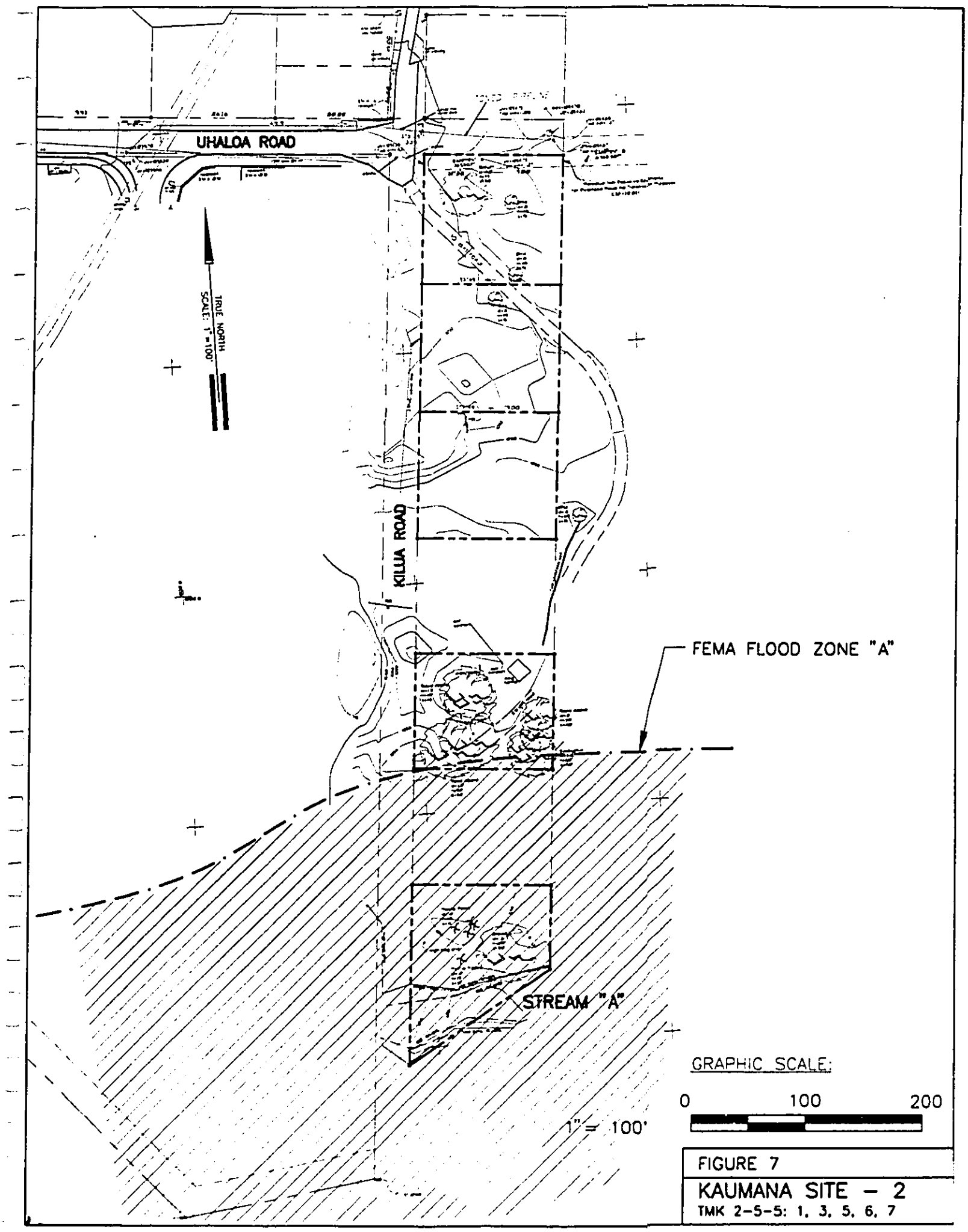


FIGURE 7

KAUMANA SITE – 2

TMK 2-5-5: 1, 3, 5, 6, 7

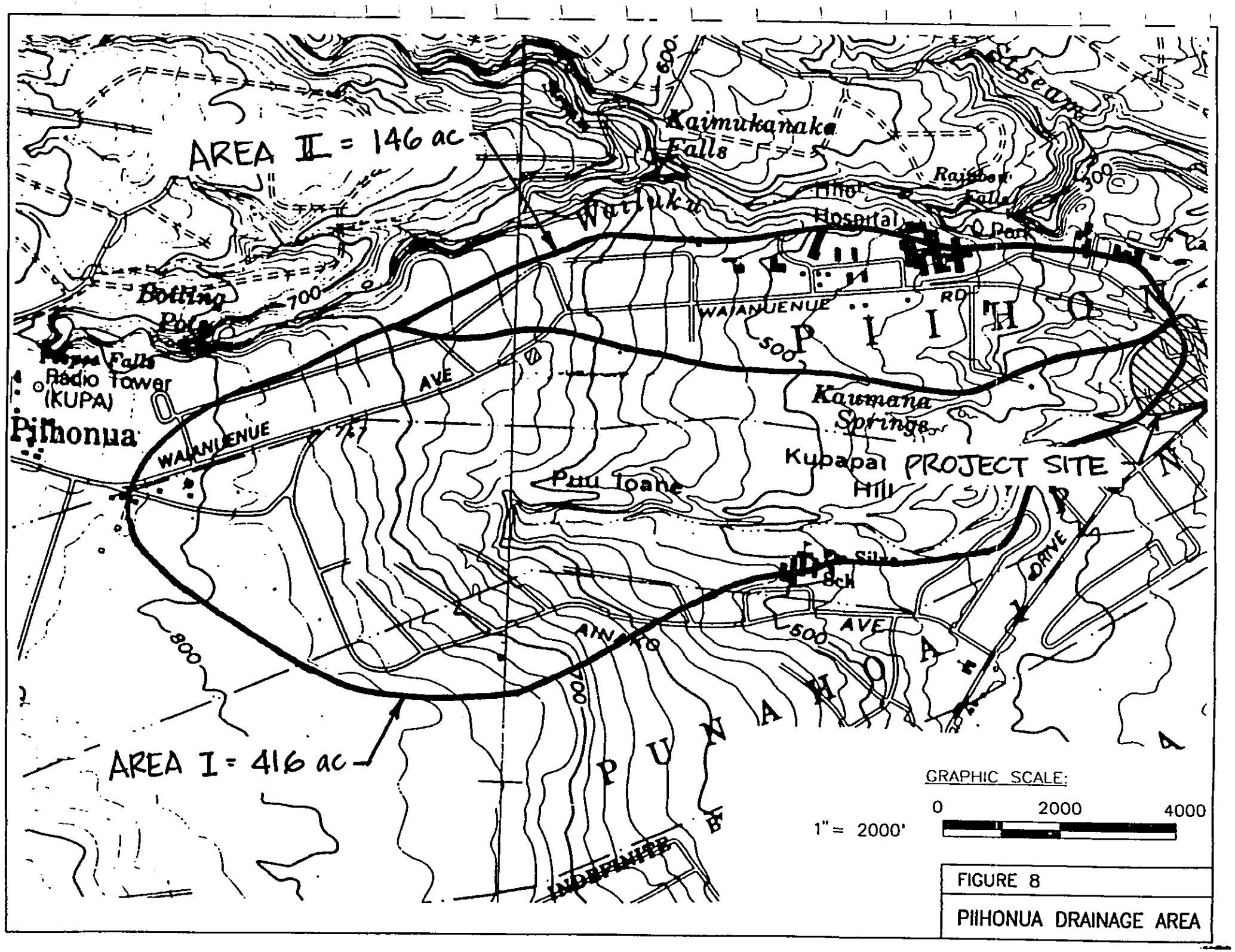
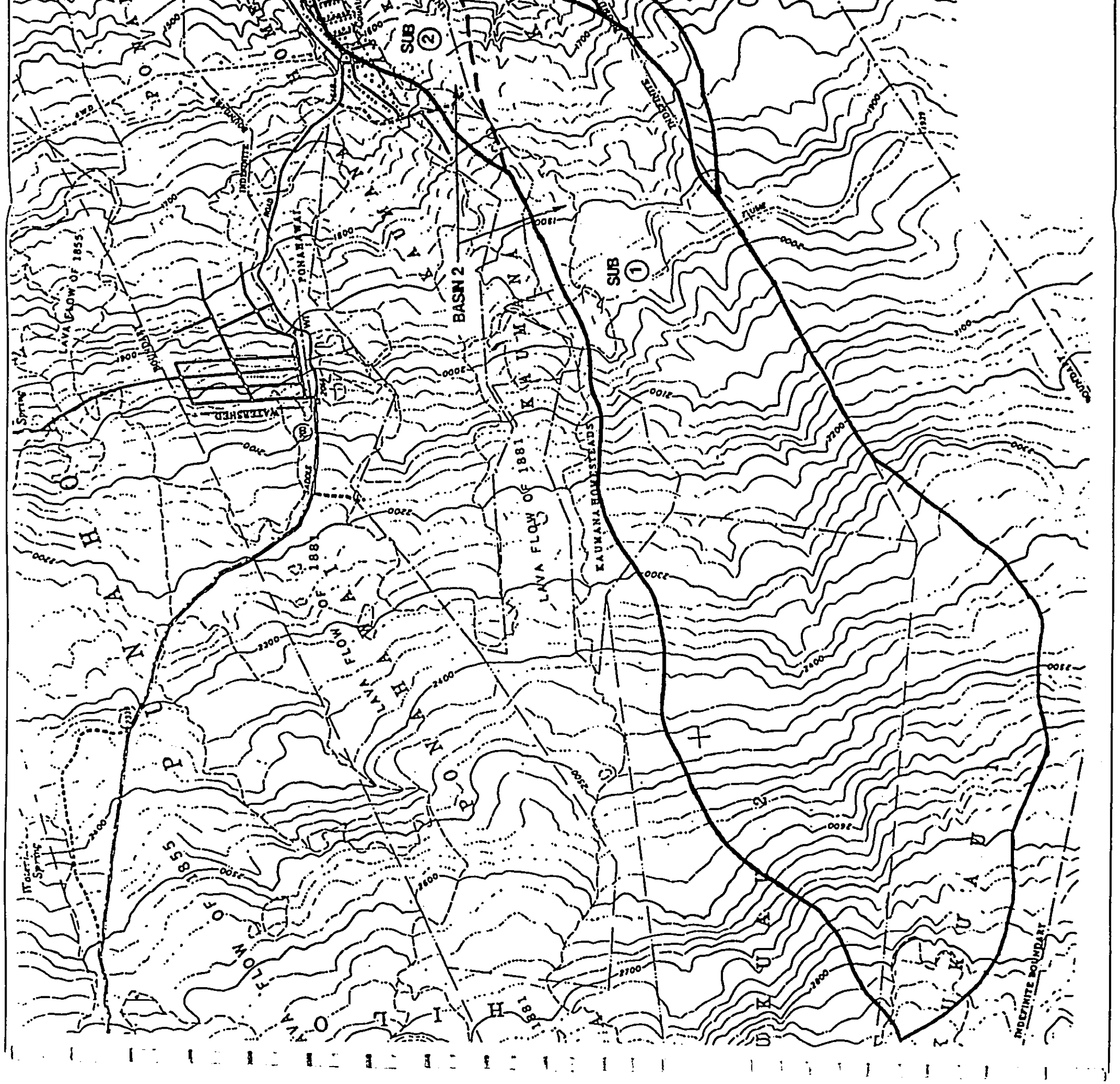
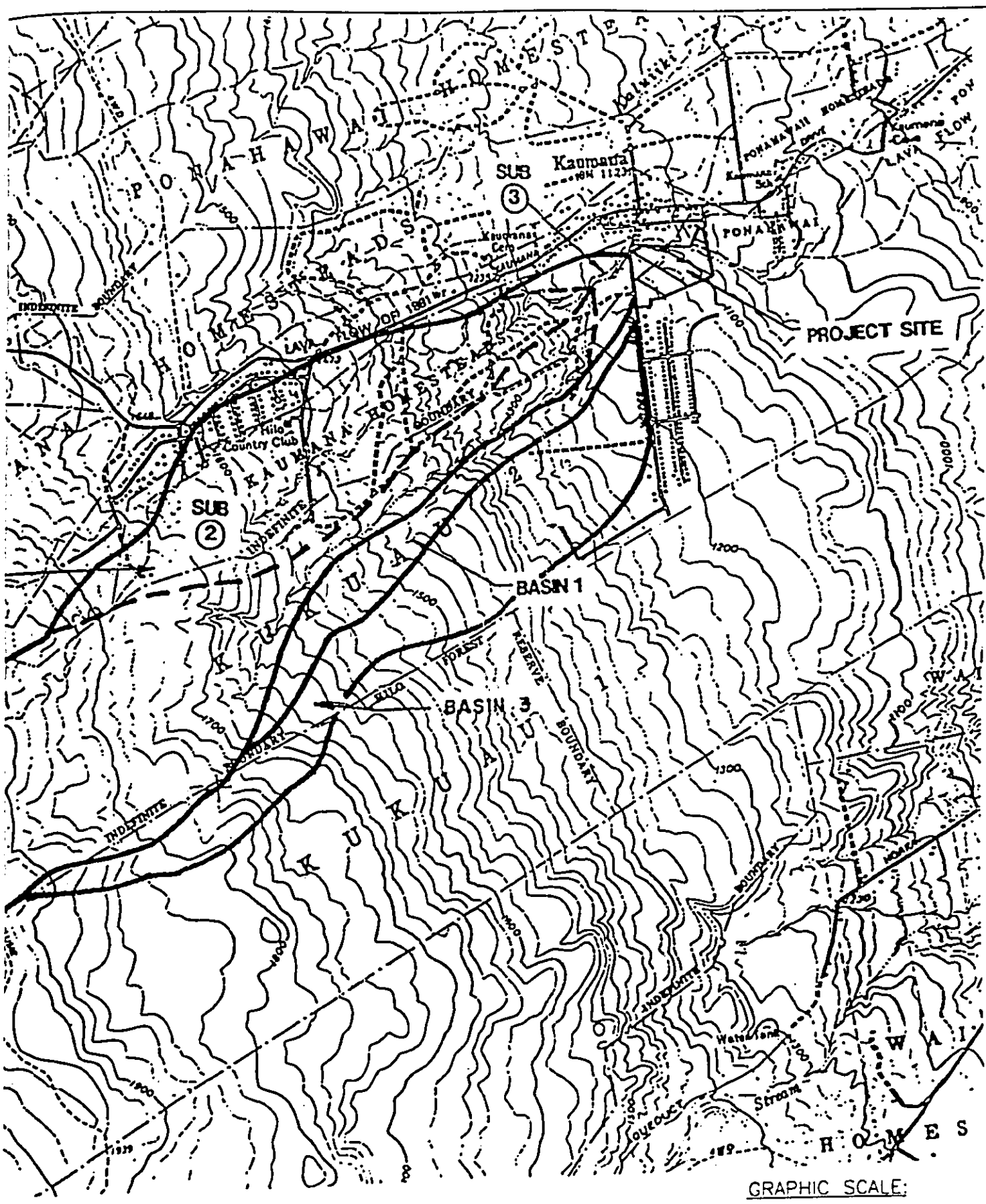


FIGURE 8

PIIHONUA DRAINAGE AREA


Waiakea Spring
Spring
LAVA FLOW OF 1855
BOUNDARY
P U N A H O
P O N A
WATERSHED
INDEFINITE BOUNDARY
ROAD
SADDLE
PONAHAWAI
LAVA FLOW OF 1855
LAVA FLOW OF 1881
P O N A H A W A I
K A U M A N A
SUB ②
BASIN 2
LAVA FLOW OF 1881
K A U M A N A
KAUMANA HOMESTEADS
SUB ①
1881
I L O L A
U K U A U
K U A U
INDEFINITE
FLUME
INDEFINITE BOUNDARY
BOUNDARY
2500
2400
2300
2200
2100
2000
1900
1800
1700



GRAPHIC SCALE:

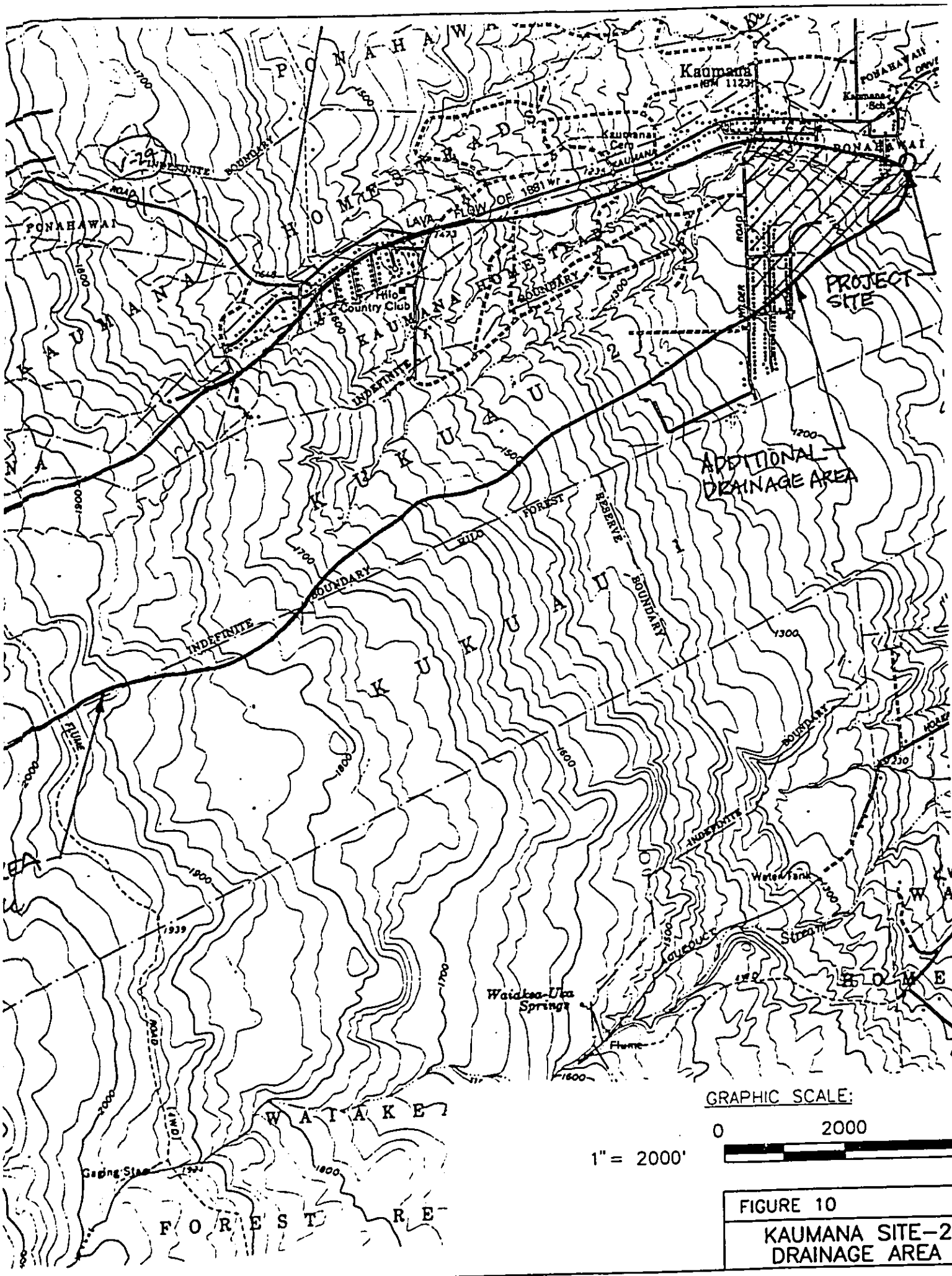
0 2000 4000

1" = 2000'

FIGURE 9

KAUMANA SITE–1
DRAINAGE AREA


LAVA FLOW OF 185
LAVA FLOW OF 1881
LAVA FLOW OF 1881
LAVA FLOW OF 1881
PONAHAWAI
KAUMANA
KAUMANA
KAUMANA HOMESTEADS
PONAHAWAI
WATERSHED
BOUNDARY
200
2065
WT
KUKUAU 2
KUKUAU 1
INDEFINITE BOUNDARY
BILO FOREST RESERVE BOUNDARY
FLUME
Gaging Sta
UPPER WAIAKEA
FO
1942
1939
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
TOTAL DRAINAGE AREA
AREA= 3125 ac



GRAPHIC SCALE:

0 2000 4000

1" = 2000'

FIGURE 10

KAUMANA SITE–2
DRAINAGE AREA

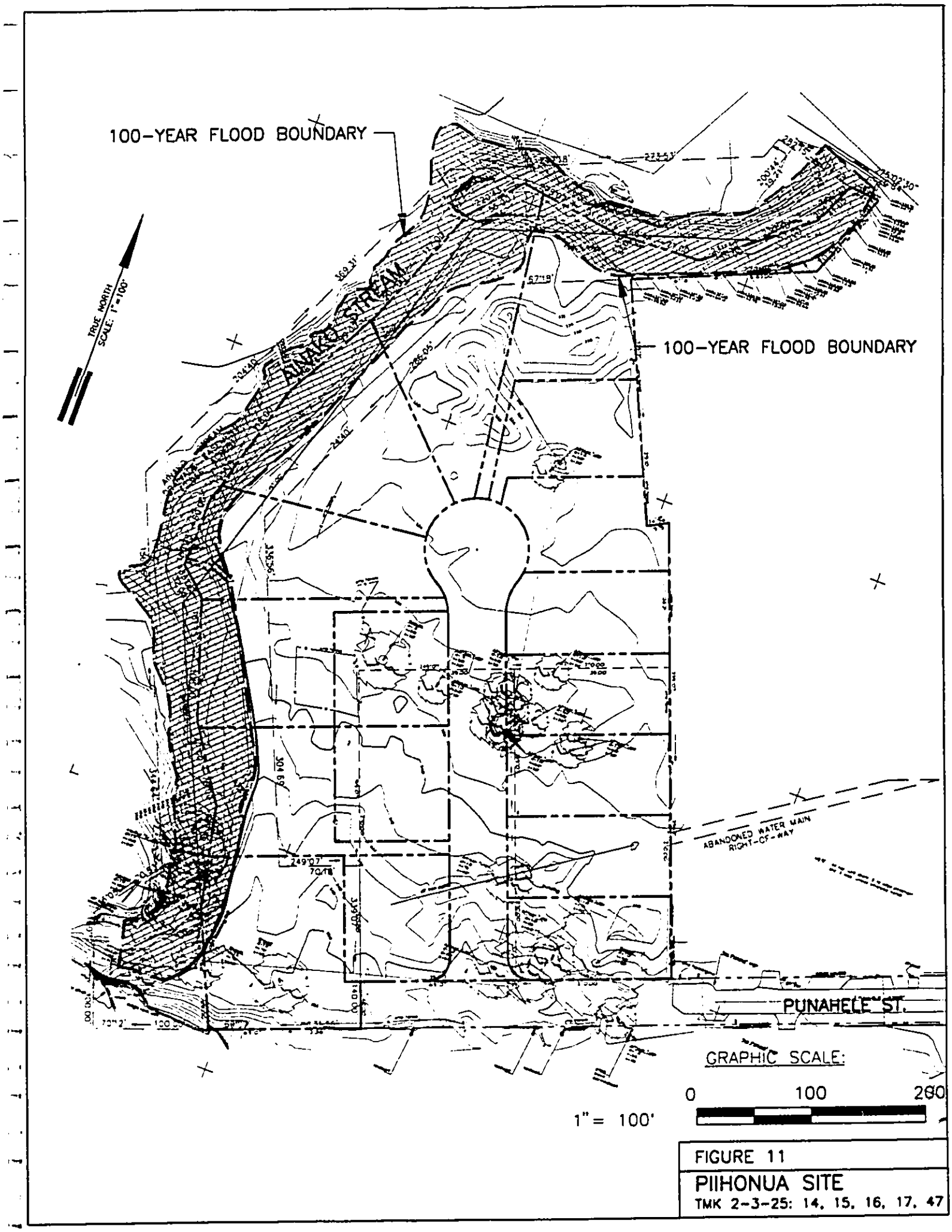


FIGURE 11

PIIHONUA SITE

TMK 2-3-25: 14, 15, 16, 17, 47

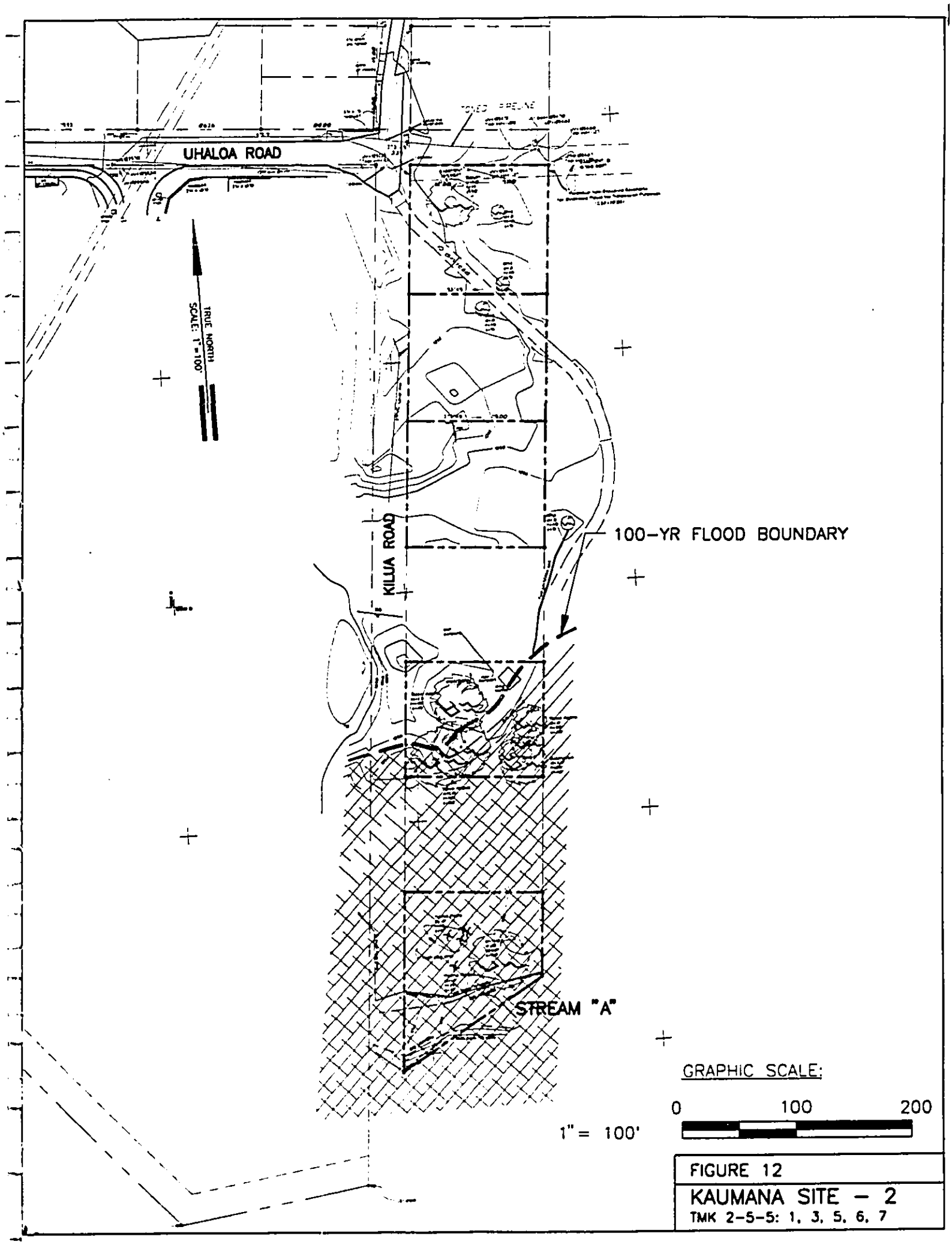


FIGURE 12

KAUMANA SITE – 2

TMK 2-5-5: 1, 3, 5, 6, 7

APPENDIX
SUPPORTING CALCULATIONS

AINAKO STREAM

DESIGN SHEET

Project Title DHHL HILO SCATTERED LOTS Job No.: 1-17907-0E Page 1 of 1

Location PUIHONUA, HI Prepared By: GR Date

Item DRAINAGE CALCS FOR AINAKO STREAM Checked By: Date

PURPOSE: Generate a flow value for Ainako Stream

SOLUTION: Use regression equations from FEMA to find "Q."

REFERENCE: "Flood Insurance Study", Hawaii County, Hawaii, Vol 1 of 4, FEMA, Revised May 16, 1994.

FEMA REGRESSION EQUATION:

FOR AREA 1:

$Q_{100} = 822 (DA)^{0.64} (PA)^{0.50}$ (see Fig. 1)

PA = 175 in/yr = 1.75 hundred inches/yr (see Fig. 2)

DA = 416 acres = 0.65 mi² (see Fig 3)

$Q_{100} = 822(0.65)^{0.64}(1.75)^{0.50} = 825$ cfs

FOR AREA 2:

$Q_{100} = 822 (DA)^{0.64} (PA)^{0.50}$

DA = 146 ac = 0.228 mi²

$Q_{100} = 822(0.228)^{0.64}(1.75)^{0.50} = 422$ cfs

COMPARE TO PLATE 6 OF STORM DRAINAGE STANDARDS, COUNTY OF HAWAII

RUNOFF ZONE "A"

AREA 1:

DA = 416 acres = 4.16 (100 acres)

From Plate 6, Q_p = 3700 cfs

AREA 2:

DA = 146 acres = 1.46 (100 acres)

From Plate 6, Q_p = 1500 cfs

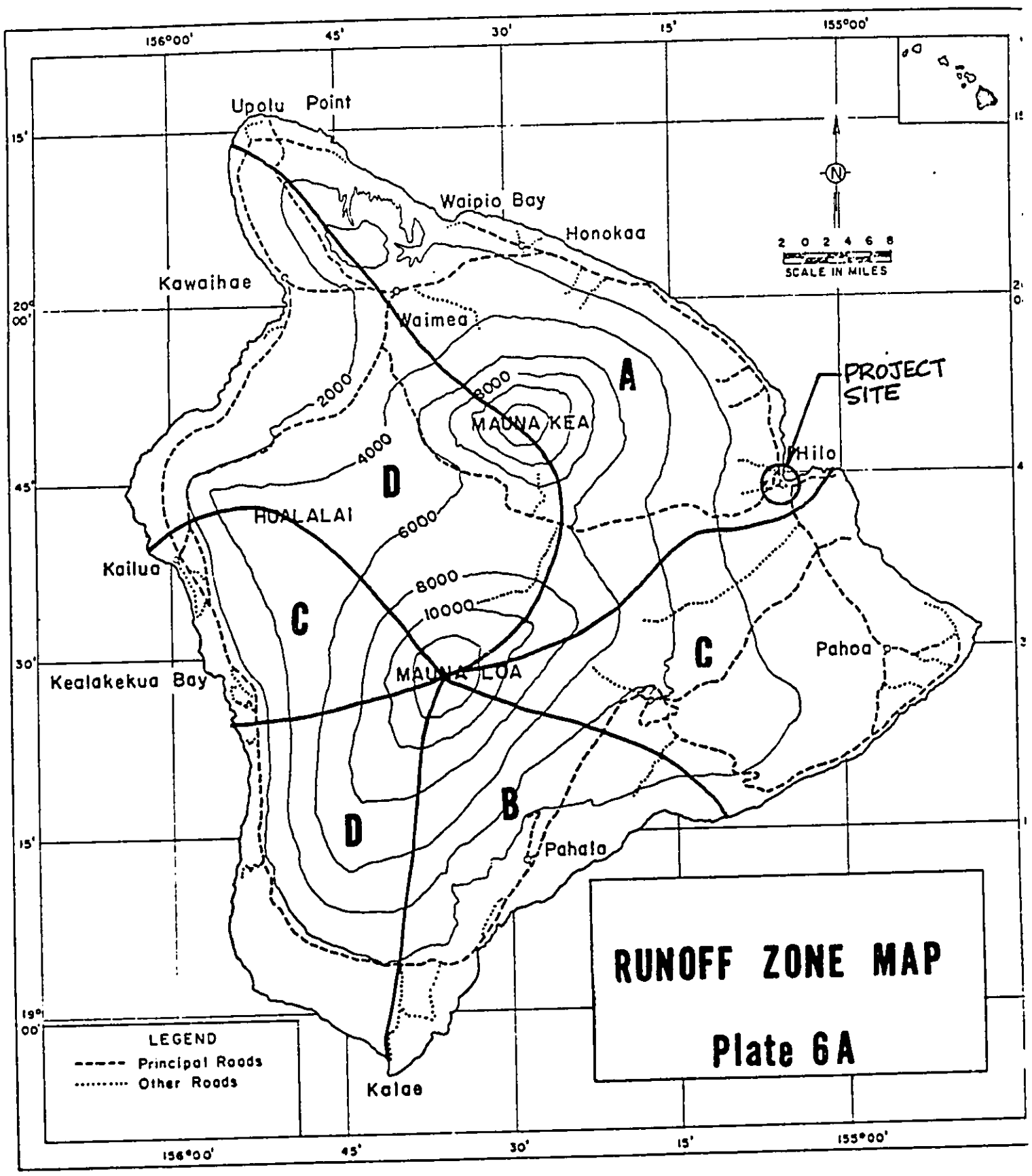
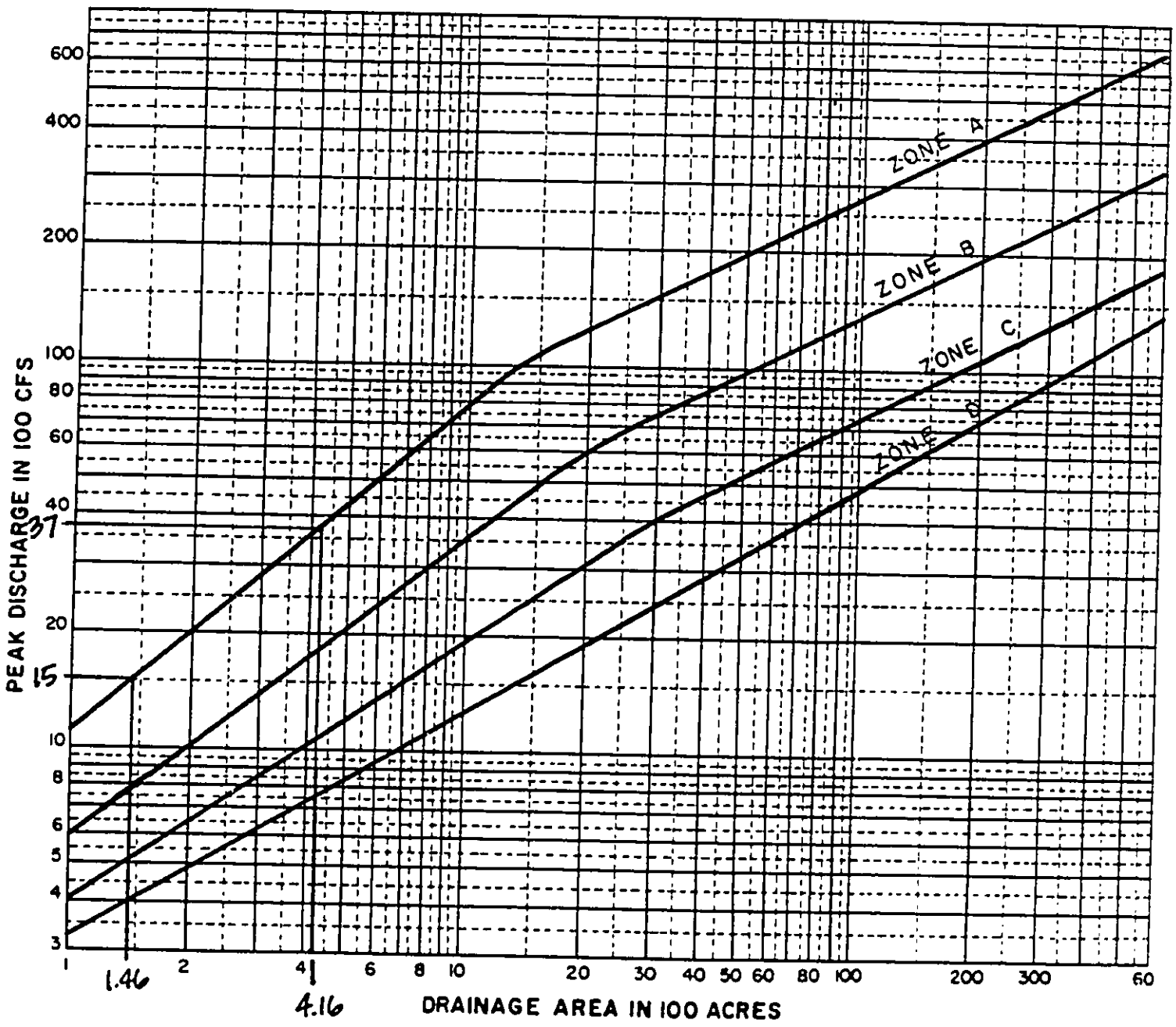

156°00'
45'
30'
15'
155°00'
Upolu Point
Waipio Bay
Honokaa
Kawaihae
Waimea
2 0 2 4 6 8
SCALE IN MILES
2000
4000
6000
8000
10000
MAUNA KEA
MAUNA LOA
HUALALAI
A
B
C
D
PROJECT SITE
Hilo
Pahoa
Kailua
Kealakekua Bay
Pahala
Kalae
LEGEND
Principal Roads
Other Roads
RUNOFF ZONE MAP
Plate 6A

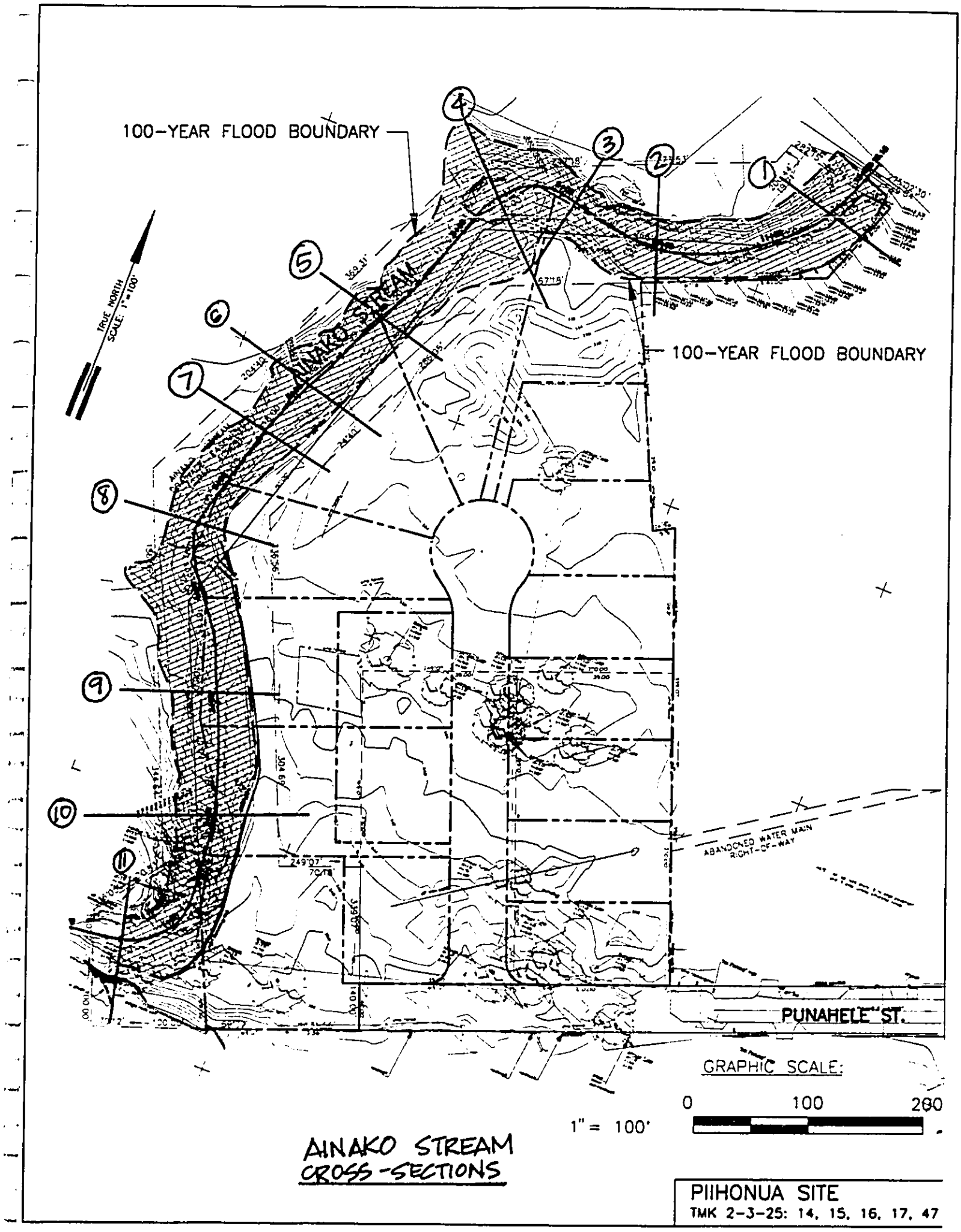
Plate 6

DESIGN CURVE FOR PEAK DISCHARGE VS. DRAINAGE AREA (more than 100 acres)

CURVES ARE FOR STREAM CHANNELS AND DRAINAGE STRUCTURES

APPROXIMATE 100 YEAR RECURRENCE INTERVAL





AINAKO STREAM
CROSS-SECTIONS

PIIHONUA SITE
TMK 2-3-25: 14, 15, 16, 17, 47

AINAKO STREAM W.S. ELEVATIONS Q_{100} "PLATE 6" (1)

Cross Section: 0
XLOB: 0 XLCH: 0 XROB: 0 CC: 0 CE: 0

NLOB: .08 STCHL: 27 NCHL: .08 STCHR: 92 NROB: .017

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
15.00	328.00	27.00	326.00	30.00	324.00	33.50	322.00
36.50	320.00	39.50	318.00	43.00	316.00	79.00	314.00
92.00	313.52	92.01	328.82	0.00	0.00	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
327.14	327.974	313.52	4	5196	0
7.31	0.83	1.50	4	710	0
13.62	0.00	72	20.1	59.5	92.0
5200	0.00	0.41	0.0000	0.0068	---

R Bank - 328.82

L Bank - 328

2

Cross Section: 160
XLOB: 125 XLCH: 160 XROB: 175 CC: .1 CE: .3

NLOB: .08 STCHL: 14 NCHL: .08 STCHR: 67 NROB: .017

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
14.00	332.00	15.00	330.00	16.00	328.00	17.50	326.00
19.00	324.00	20.50	322.00	22.00	320.00	23.00	318.00
24.00	316.00	67.00	314.33	67.01	327.33	80.00	330.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
326.37	327.966	314.33	0	5200	0
10.12	1.59	0.98	0	514	0
12.04	0.92	50	17.2	40.5	67.0
5200	0.45	0.55	0.0000	0.0152	---

R Bank - 327.33

L Bank - 332

(3)

Cross Section: 240
XLOB: 65 XLCH: 80 XROB: 90 CC: .1 CE: .3

NLOB: .08 STCHL: 11.5 NCHL: .08 STCHR: 70 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
11.50	334.00	13.00	332.00	14.50	330.00	16.50	328.00
18.00	326.00	20.00	324.00	21.50	322.00	23.00	320.00
25.00	318.00	26.50	316.00	43.50	316.00	51.00	318.00
52.50	320.00	54.00	322.00	61.50	324.00	64.00	326.00
67.00	328.00	70.00	330.00	98.00	331.10	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
327.60	330.248	316.00	0	5200	0
13.05	2.65	0.89	0	398	0
11.60	1.05	50	16.8	40.8	66.4
5200	0.76	0.81	0.0000	0.0385	---

R Bank - 330
L Bank - 334

(4)

Cross Section: 310
XLOB: 90 XLCH: 70 XROB: 50 CC: .1 CE: .3

NLOB: .08 STCHL: 32 NCHL: .08 STCHR: 77 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
10.50	322.00	15.50	322.00	32.00	322.00	33.50	320.00
35.00	318.00	36.00	316.00	37.50	314.00	38.50	312.00
40.00	312.00	43.00	314.00	69.50	316.00	70.00	318.00
71.00	320.00	72.00	322.00	73.50	324.00	74.50	326.00
77.00	328.00	103.00	330.00	0.00	0.00	0.00	0.00

** EXTENDED CROSS SECTION **

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
330.60	330.910	312.00	726	2921	53
4.60	0.31	0.98	185	635	42
18.60	0.07	93	10.5	54.5	103.0
330	0.09	0.26	0.0000	0.0025	---

R Bank -330

L Bank- 338

Cross Section: 450
XLOB: 160 XLCH: 140 XROB: 130 CC: .1 CE: .3

NLOB: .08 STCHL: 31.5 NCHL: .08 STCHR: 96 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
31.50	338.00	33.50	336.00	35.00	334.00	37.00	332.00
39.00	330.00	40.50	328.00	42.00	326.00	44.00	324.00
70.00	324.00	87.50	324.00	88.00	326.00	92.00	328.00
94.00	330.00	96.00	332.00	124.00	332.00	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
331.68	333.086	324.00	0	3700	0
9.53	1.41	1.12	0	388	0
7.68	1.43	58	37.3	63.8	95.7
3700	0.40	0.65	0.0000	0.0245	---

R - Bank - 332

L - Bank - 338

(6)

Cross Section: 533
XLOB: 83 XLCH: 83 XROB: 83 CC: .1 CE: .3

NLOB: .08 STCHL: 37 NCHL: .08 STCHR: 113 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
31.00	340.00	37.00	338.00	40.00	336.00	43.00	334.00
46.00	332.00	49.00	330.00	52.00	328.00	55.00	326.00
98.50	326.00	100.50	328.00	104.50	330.00	109.00	332.00
113.00	334.00	129.00	334.00	0.00	0.00	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
333.68	334.855	326.00	0	3700	0
8.70	1.18	0.96	0	425	0
7.68	0.63	69	43.5	75.0	112.4
3700	0.34	0.62	0.0000	0.0211	---

R Bank - 334

L Bank - 338

7

Cross Section: 588
XLOB: 55 XLCH: 55 XROB: 55 CC: .1 CE: .3

NLOB: .08 STCHL: 47.5 NCHL: .08 STCHR: 97 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
20.50	338.00	35.00	336.00	47.50	334.00	48.50	332.00
50.00	330.00	51.50	328.00	53.50	326.00	55.00	324.00
59.00	324.00	77.50	326.00	80.00	328.00	84.00	330.00
92.50	332.00	97.00	334.00	126.00	334.00	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
333.12	335.998	324.00	0	3700	0
13.60	2.88	1.82	0	272	0
9.12	2.09	47	47.9	72.3	95.0
3700	0.76	1.00	0.0000	0.0611	---

R Bank - 334
L Bank - 336

(8)

Cross Section: 598
XLOB: 100 XLCH: 10 XROB: 100 CC: .1 CE: .3

NLOB: .08 STCHL: 40 NCHL: .08 STCHR: 91 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
40.00	336.00	42.00	334.00	44.50	332.00	46.50	330.00
49.00	328.00	54.50	326.00	61.00	324.00	73.50	324.00
75.50	326.00	77.00	328.00	80.50	330.00	85.00	332.00
88.00	334.00	91.00	336.00	128.50	336.00	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
335.36	336.912	324.00	0	3700	0
9.99	1.55	0.83	0	370	0
11.36	0.07	49	40.6	65.5	90.0
3700	0.45	0.64	0.0000	0.0237	---

R Bank - 336
L Bank - 336

9

Cross Section: 748
XLOB: 160 XLCH: 150 XROB: 140 CC: .1 CE: .3

NLOB: .08 STCHL: 52.5 NCHL: .08 STCHR: 112 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
8.00	346.00	28.00	344.00	30.00	342.00	32.50	340.00
52.50	338.00	54.00	336.00	56.00	334.00	58.00	332.00
60.00	330.00	79.00	330.00	90.50	332.00	104.00	334.00
106.50	336.00	109.00	338.00	112.00	340.00	129.00	340.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
338.92	340.285	330.00	7	3693	0
9.37	1.36	1.12	4	394	0
8.92	1.40	67	43.3	82.3	110.4
3700	0.38	0.68	0.0000	0.0222	---

R Bank - 340
L Bank - 346

10

Cross Section: 855
XLOB: 107 XLCH: 107 XROB: 107 CC: .1 CE: .3

NLOB: .08 STCHL: 15 NCHL: .08 STCHR: 106 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
15.00	358.00	20.00	356.00	24.00	354.00	28.00	352.00
32.00	350.00	35.00	348.00	39.00	346.00	43.00	344.00
47.00	342.00	51.00	340.00	55.00	338.00	59.00	336.00
77.00	334.00	90.00	332.00	96.00	332.00	98.00	334.00
100.00	336.00	102.00	338.00	104.00	340.00	106.00	342.00
117.00	346.00	0.00	0.00	0.00	0.00	0.00	0.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
341.53	343.158	332.00	0	3700	0
10.23	1.63	1.04	0	362	0
9.53	1.23	58	47.9	60.5	105.5
[illegible]	0.46	0.72	0.0000	0.0296	---

R Bank - 342
L Bank - 356

Cross Section: 1005
XLOB: 100 XLCH: 150 XROB: 200 CC: .1 CE: .3

NLOB: .08 STCHL: 19 NCHL: .08 STCHR: 87 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
10.00	364.00	19.00	362.00	22.00	360.00	23.50	358.00
25.00	356.00	26.50	354.00	28.00	352.00	29.50	350.00
31.00	348.00	32.50	346.00	34.00	344.00	35.00	342.00
36.50	340.00	38.50	338.00	60.00	338.00	66.00	340.00
67.50	342.00	69.50	344.00	71.00	346.00	73.00	348.00
81.00	350.00	82.50	352.00	83.00	354.00	83.50	356.00
84.00	358.00	84.50	360.00	85.00	362.00	85.50	364.00
86.00	366.00	87.00	368.00	88.00	370.00	98.00	370.00

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
347.02	349.464	338.00	0	3700	0
12.53	2.44	1.34	0	295	0
9.02	3.01	40	31.7	53.0	72.0
3700	0.68	0.82	0.0000	0.0409	---

R - Bank - 368
L - Bank - 362

STREAM "A"

STREAM "A"

DESIGN SHEET

Project Title DHHL-HILO SCATTERED LOTS Job No.: _____ Page 1 of 2

Location KAUMANA, HI Prepared By: GR Date _____

Item DRAINAGE CALCS FOR FLOOD ZONE "A" Checked By: _____ Date _____

PURPOSE: TO ESTIMATE Q FOR STREAM "A" AT END OF KILUA RD.

SOLUTION: USE SCS TR-55 GRAPHICAL METHOD TO ESTIMATE 100-YR PEAK DISCHARGE

① HYDROLOGIC SOIL GROUP

3 TYPES OF SOILS COMPRISE THE DRAINAGE BASIN

KaC - KAWIKI

rLW - PAHOEHOE LAVA FLOW

rKFD - KEAUKAHA

CURVE NUMBERS

KAWIKI - 35

LAVA FLOW - 77

KEAUKAHA - NEED WEIGHTED CURVE NO.

AREA = 5.7ac

assume: 50% OPEN → 84

10% ROADS → 98

40% RESIDENTIAL → 87

$$\frac{84(0.50)(5.7) + 98(0.10)(5.7) + 87(0.4)(5.7)}{5.7}$$

$$= 86.6$$

WEIGHTED CURVE NO.

$$\frac{35(0.25)(117) + 77(0.25)(117) + 86.6(0.50)(117)}{117} = \boxed{71.3}$$

TIME OF CONCENTRATION

$T = \frac{L}{3600V}$ Ave Slope = 6%

From Fig 3.1, V = 4 ft/s

L = 3000

$$T_c = \frac{L}{3600V} = \frac{3000}{3600(4)} = \underline{\underline{0.21 \text{ hrs}}}$$

DESIGN SHEET

Project Title DHHL HILO SCATTERED LOTS Job No.: _____ Page 2 of 2

Location KAUMANA, HILO, HI Prepared By: GR Date _____

Item DRAINAGE CALCS Checked By: _____ Date _____

COMPUTATION OF RUNOFF

$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)}$$

$P_{(24\text{-hr}, 100\text{ yr})} = 25$ in

$$S = \frac{1000}{CN} - 10$$

$$= \frac{1000}{71.3} - 10 = 4.025$$

$$Q = \frac{(25 - 0.2(4.025))^2}{(25 + 0.8(4.025))} = 20.74 \text{ in}$$

PEAK DISCHARGE

$q_p = q_u A_m Q F_p$

$A_m = 117 \text{ ac} = 0.18 \text{ mi}^2$

$F_p = 1.0$ (Assume no ponds)

$Q = 20.74$ in

$$\frac{I_a}{P} = \frac{0.81}{25} = 0.032$$

From Exhibit 4-I, $q_u = 125$ csm/in

$q_p = 125(0.18)(20.74)(1.0) = 466.65$ cfs ≈ 470 cfs

PLATE 6

DRAINAGE AREA = 177 ac = 1.77 ac

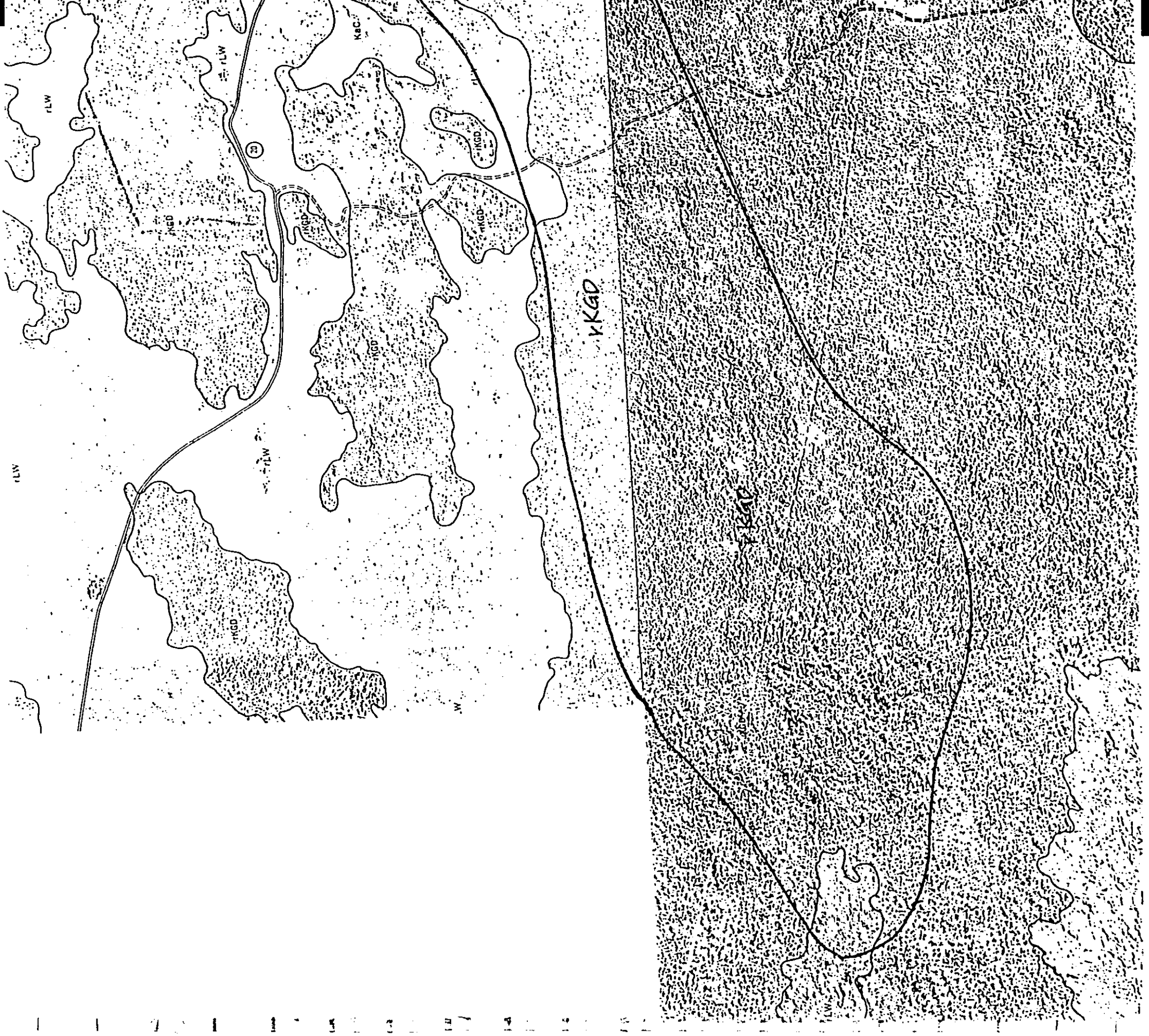
$Q_p = 1300$ cfs

REGRESSION EQUATION

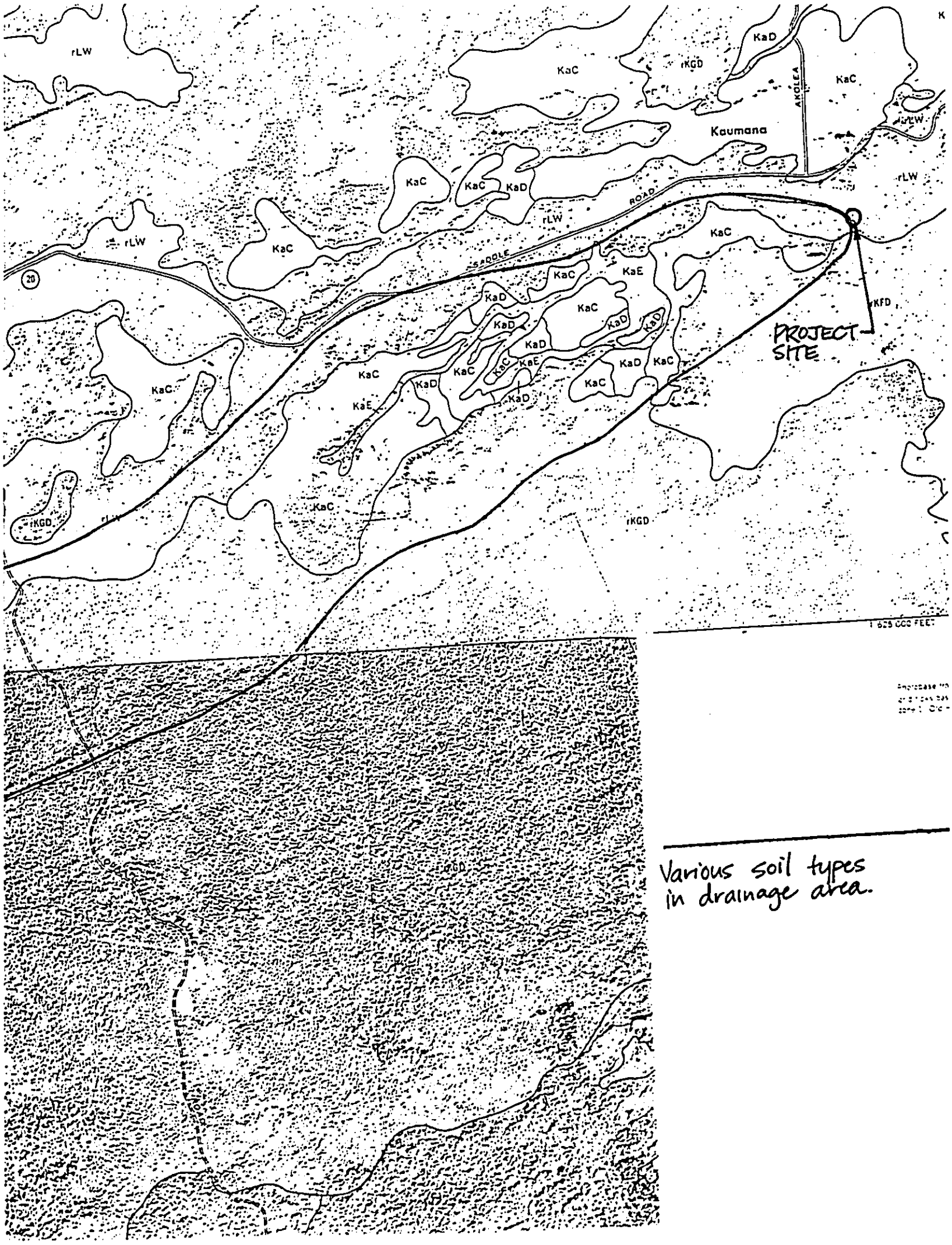
$$Q_{100} = 822(DA)^{0.64}(PA)^{0.50}$$

$PA = 175$ in/hr $DA = 117 \text{ ac} = 0.18 \text{ mi}^2$

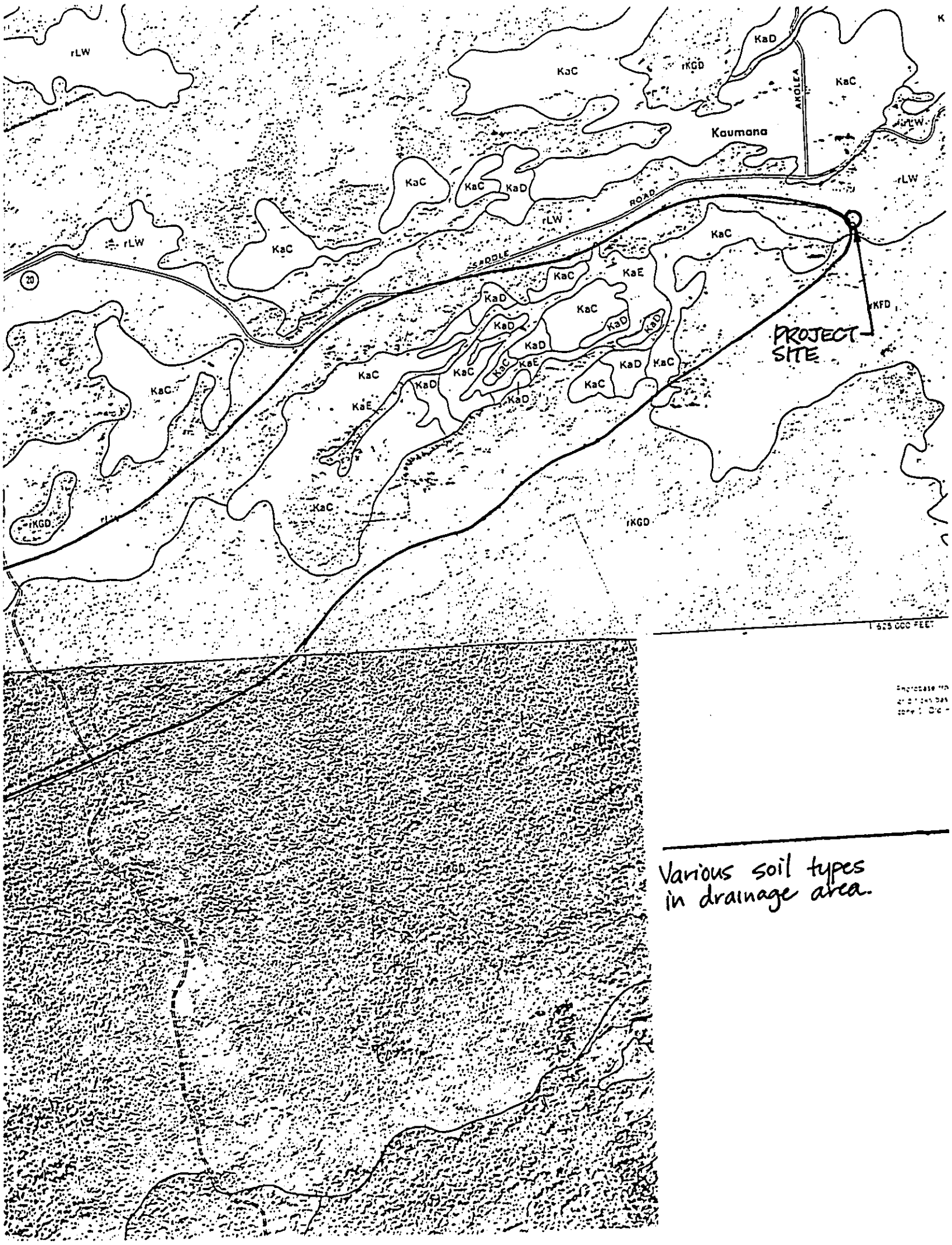
$Q_{100} = 822(0.18)^{0.64}(1.75)^{0.50} = 363$ cfs



rLW
rLW
rKGD
rLW
rKGD
rLW
20
rKGD
rKGD
KaC
rKGD
rKGD
rKGD
rLW
W
rKGD
rKGD
rLW



Various soil types in drainage area.



Various soil types in drainage area.

Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1]Average runoff condition, and $I_a = 0.2S$.
[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Hydrologic Soil Group curve numbers

Table 2-2c.—Runoff curve numbers for other agricultural lands[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing.[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element.[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	[4]30	48	65	73
Woods—grass combination (orchard or tree farm).[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods.[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	[4]30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

[3]*Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4]Actual curve number is less than 30; use CN = 30 for runoff computations.

[5]CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6]*Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Hydrologic soil Group Curve Numbers

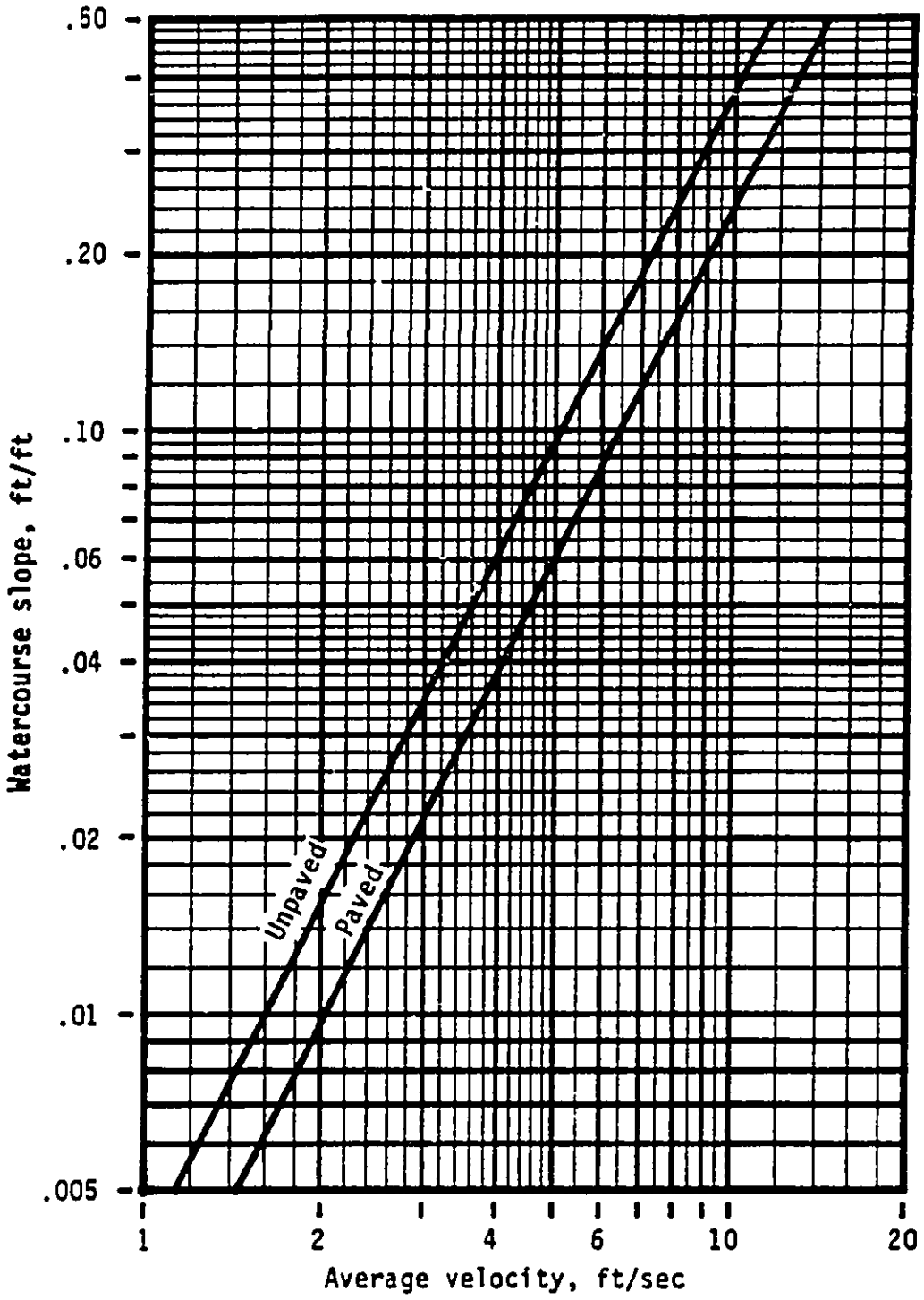
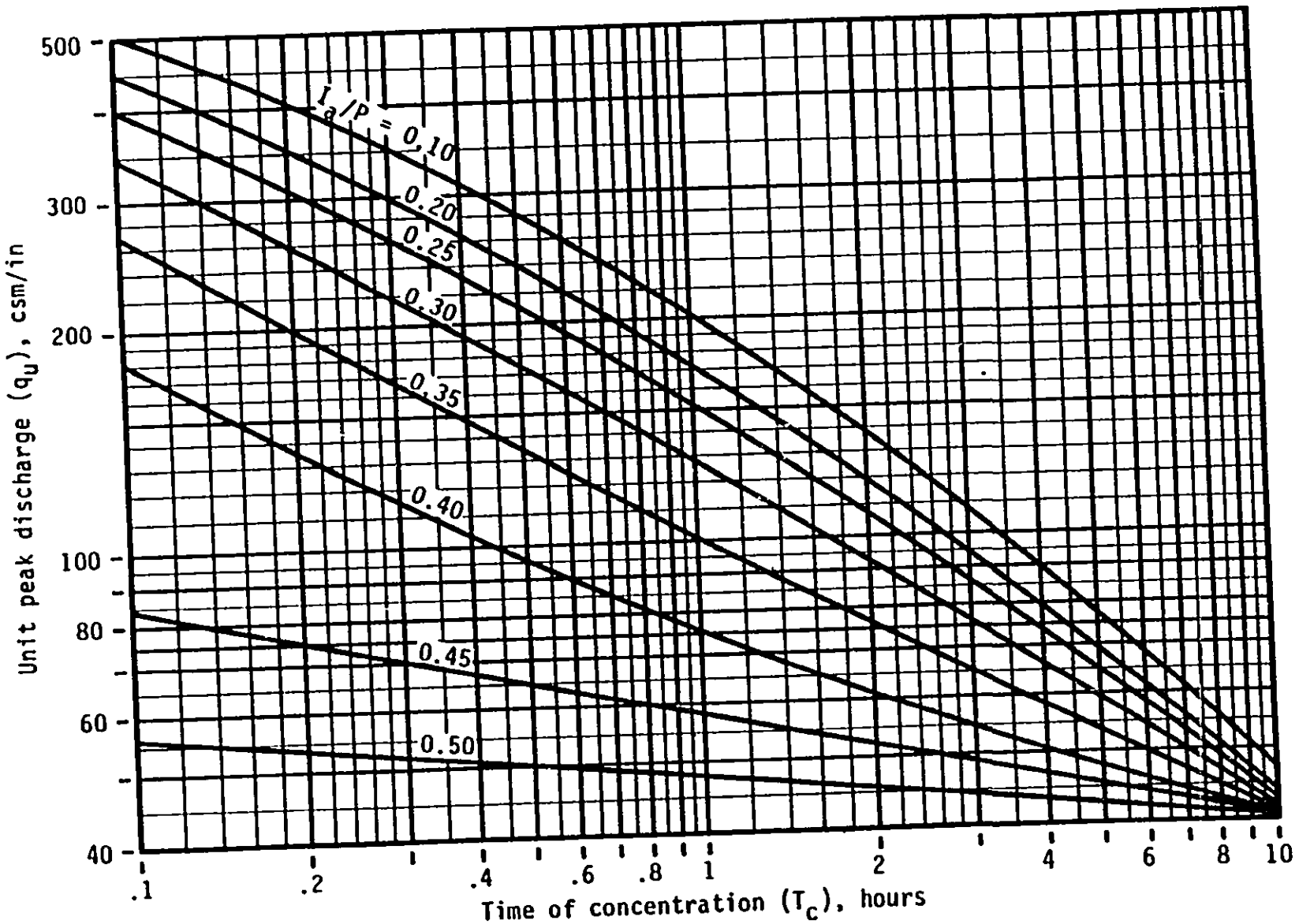


Figure 3-1.—Average velocities for estimating travel time for shallow concentrated flow.

Exhibit 4-I: Unit peak discharge (q_u) for SCS type I rainfall distribution



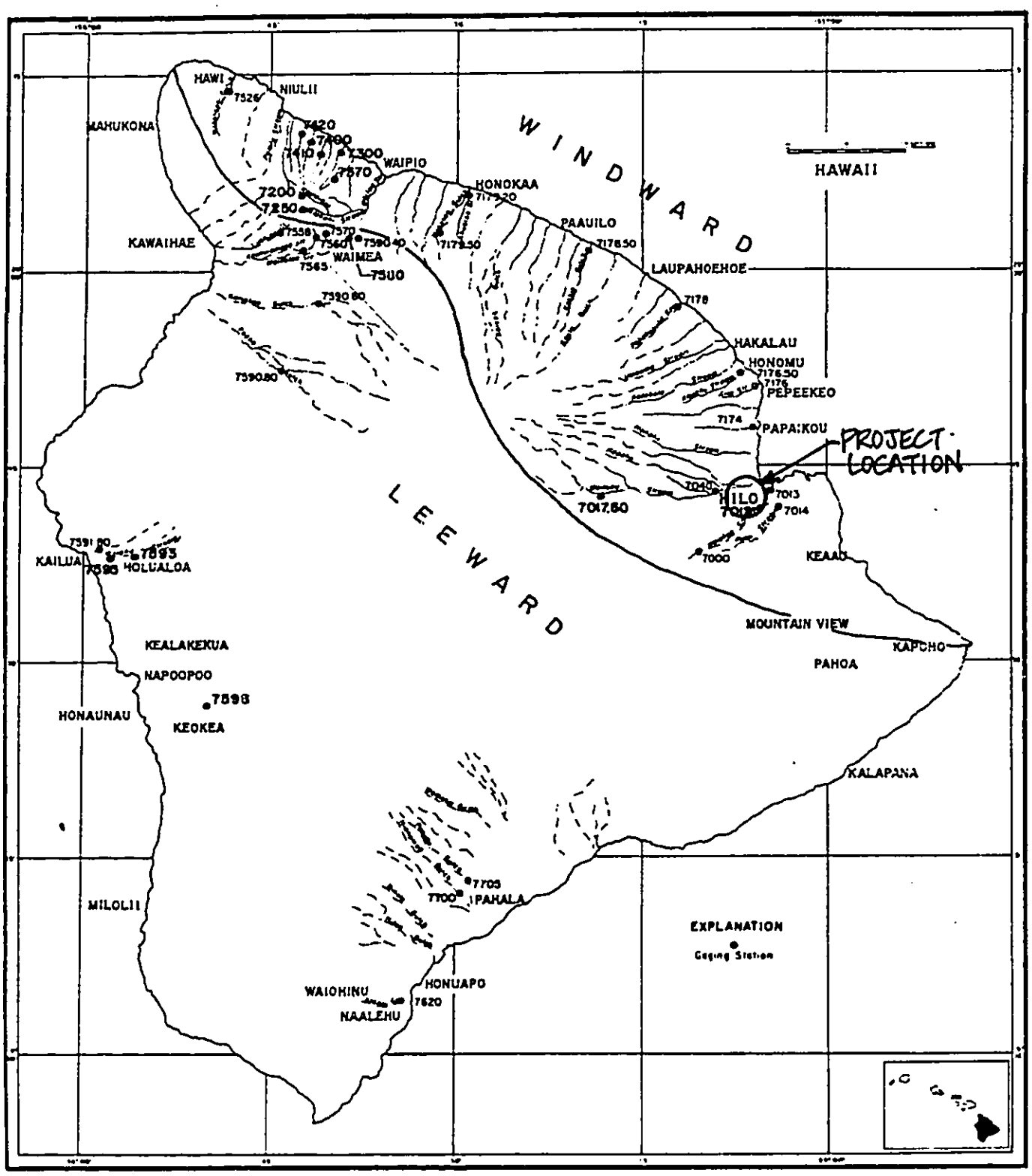


Figure 2 - Divison of Stations, Windward and Leeward Groups

Project Location on Windward side

REF: "Flood Insurance Study Hawaii County, Hawaii, Vol. 1", FEMA, Rev. April 3, 1989.

An examination of all gaging station records yielded 35 stations with adequate records for the flood-frequency analysis. Station flood-frequency curves were computed and discharges for the selected recurrence intervals were determined for the 35 stations.

A multiple regression analysis was conducted by using the records for the entire island, and also by separating the records into the windward and leeward stations. The best relationships in terms of standard error and multiple correlation were found by using the windward and leeward division, as shown in Figure 2.

The most significant basin and climatological characteristics for the windward area of Hawaii were found to be drainage area (DA) and mean annual precipitation (PA), and those for the leeward area were drainage area (DA) and the 2-year 24 hour precipitation (P24-2).

The regression equations for the windward grouping for the 10-, 50-, 100-, and 500-year floods were:

$$Q_{10} = 313\ (DA)^{0.67}\ (PA)^{1.27}$$

$$Q_{50} = 641\ (DA)^{0.64}\ (PA)^{0.70}$$

$$\boxed{Q_{100} = 822\ (DA)^{0.64}\ (PA)^{0.50}}$$

$$Q_{500} = 1361\ (DA)^{0.62}\ (PA)^{0.10}$$

The regression equations for the leeward grouping were:

$$Q_{10} = 8.7\ (DA)^{0.55}\ (P24\text{-}2)^{2.62}$$

$$Q_{50} = 24.1\ (DA)^{0.72}\ (P24\text{-}2)^{2.35}$$

$$Q_{100} = 34.3\ (DA)^{0.77}\ (P24\text{-}2)^{2.26}$$

$$Q_{500} = 62.1\ (DA)^{0.88}\ (P24\text{-}2)^{2.14}$$

Where:

(DA) = Drainage Area

(PA) = Mean Annual Precipitation in hundreds of inches

(P24-2) = 2-year 24-hour precipitation in inches

For Alenaio Stream, a regional analysis relating discharge to drainage area was used in lieu of the multiple regression technique. Data from twelve stream gaging stations near Alenaio Stream was used. Individual discharge frequency curves for these stations were calculated following procedures based on the Water Reservoirs Council Bulletin No. 17 (Reference 5). The 50-, 10-, 2-, and 1-percent discharges were plotted against their respective

FEMA Regression Equation for Windward Grouping

REF: "Flood Insurance Study Hawaii County, Hawaii, Vol. 1," FEMA, Rev. April 3, 1989

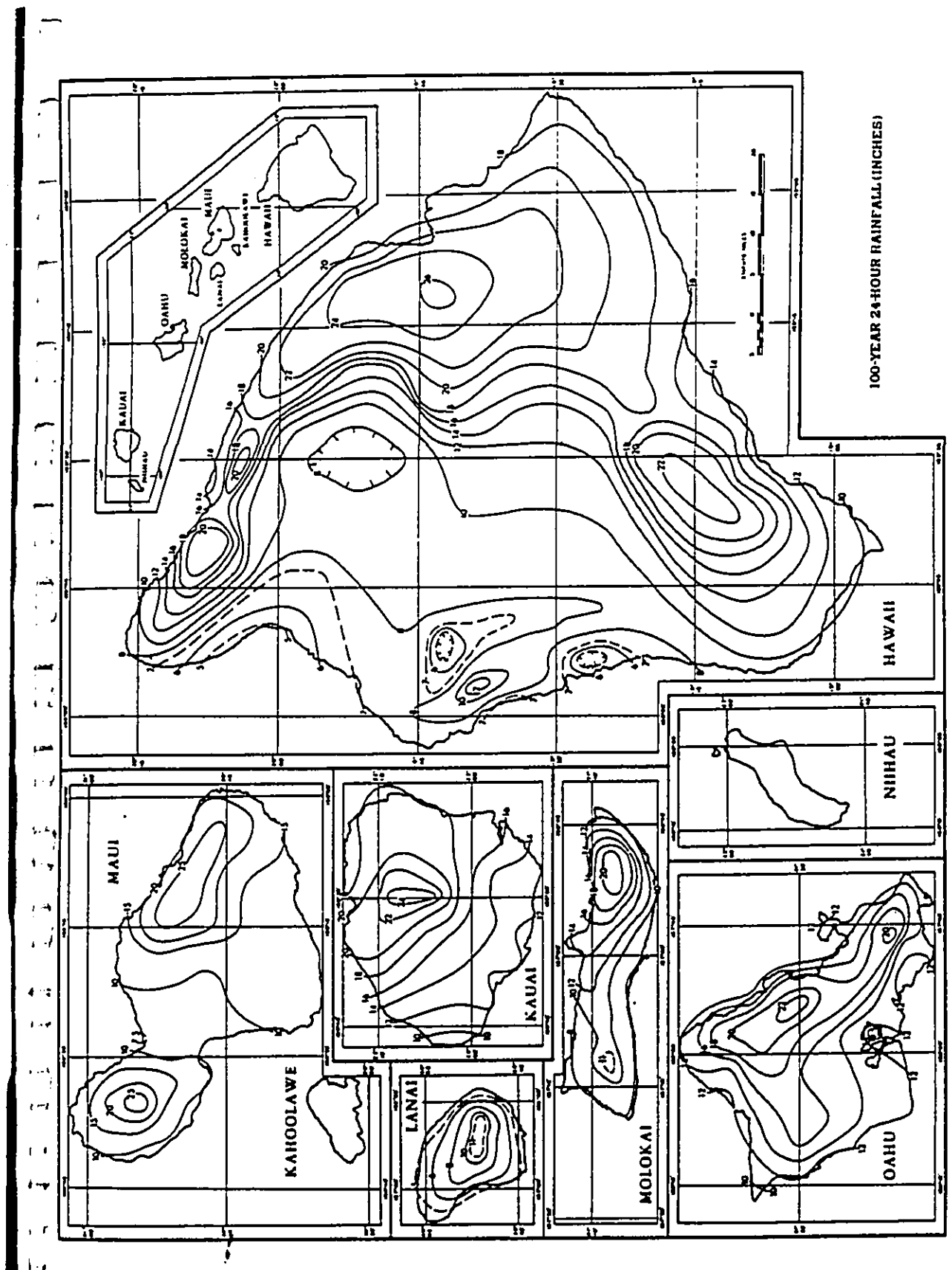
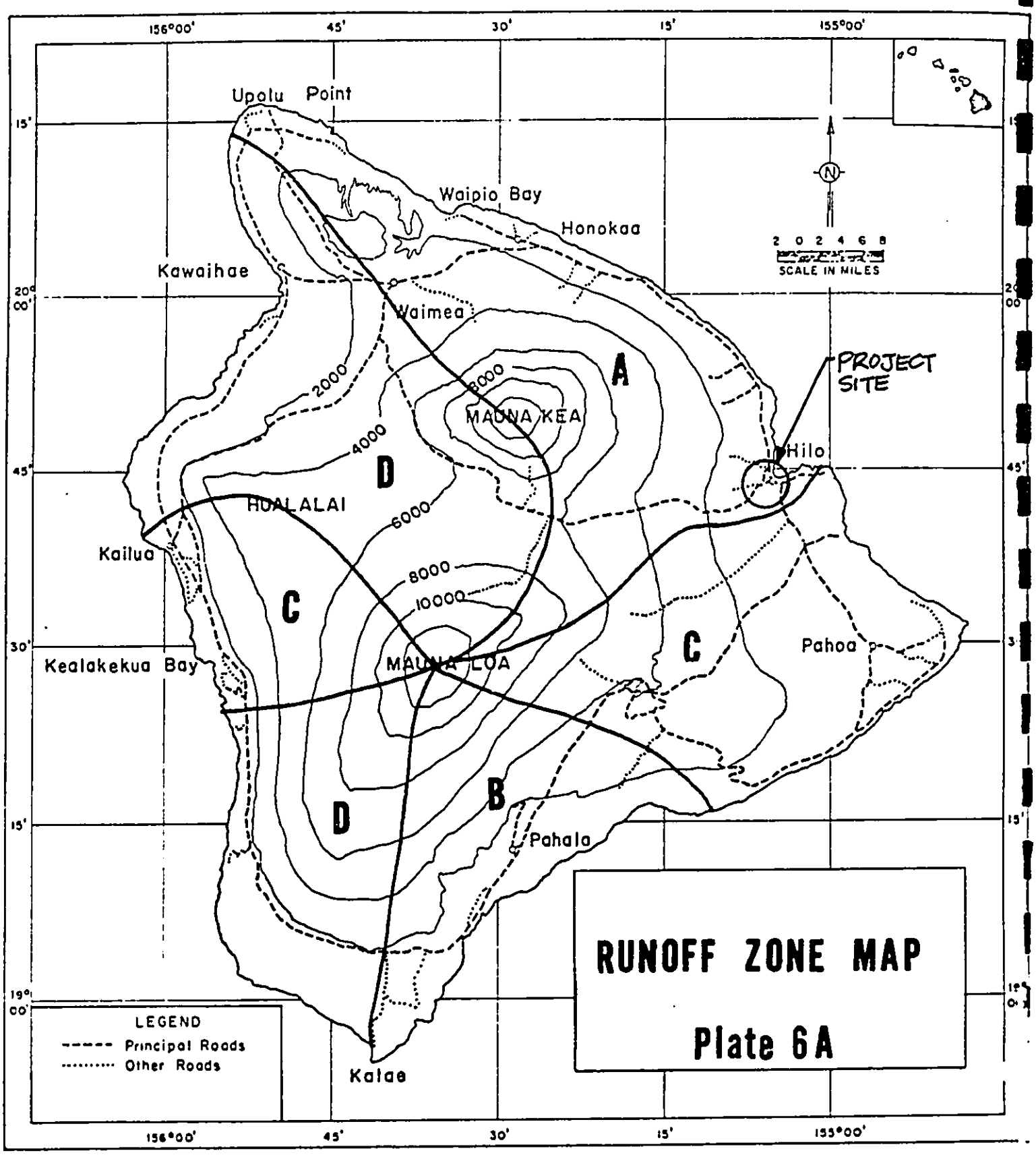


FIGURE 56.—100-yr. 24-hr. rainfall (in.)

100-YR 24-hour Rainfall

Ref: "Rainfall Frequency Atlas of the Hawaiian Islands," U.S. Department of Commerce Weather Bureau, 1962.



Ref: "Storm Drainage Standards," Dept. of Public Works, County of Hawaii, 1970.

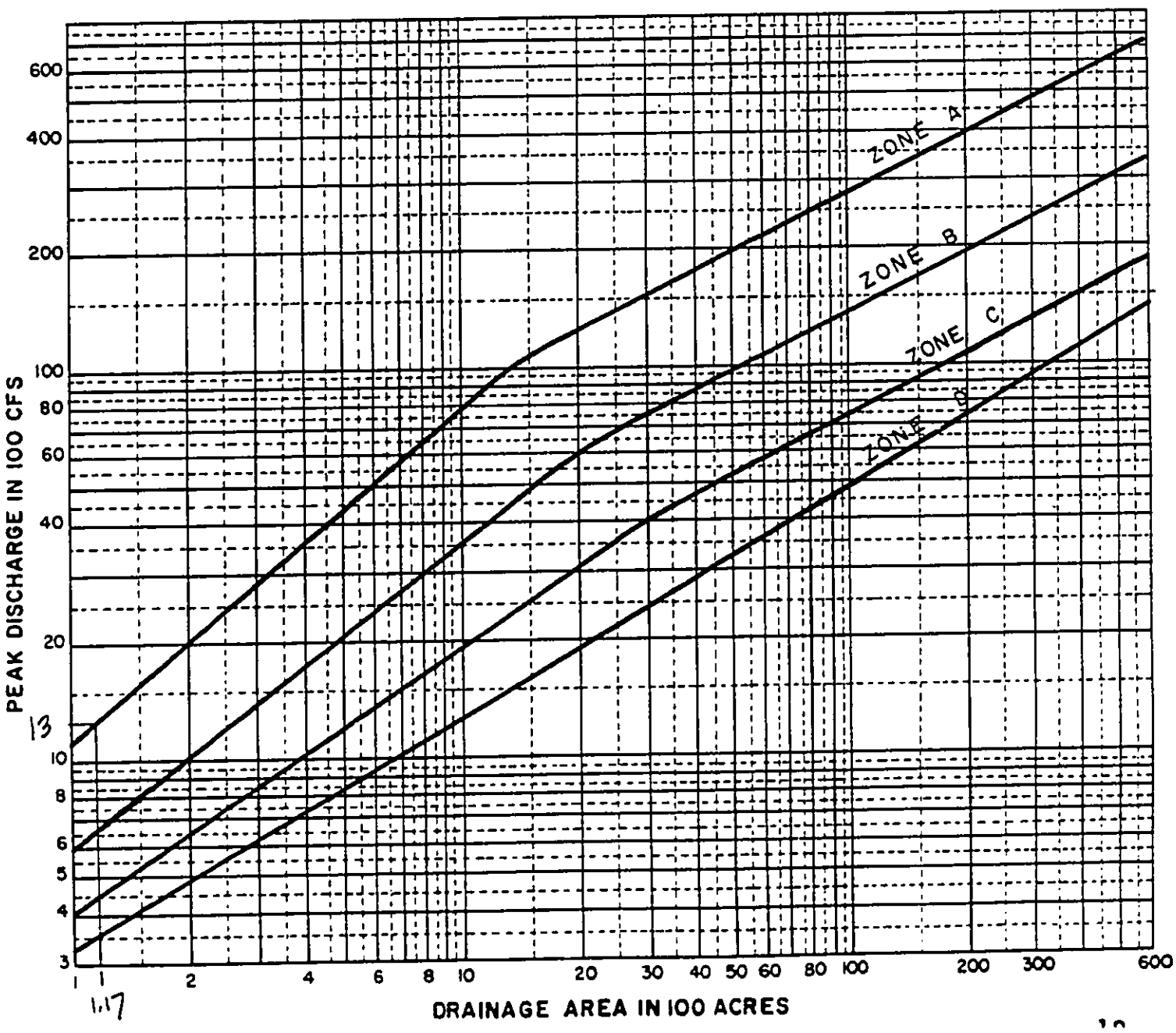
Plate 6

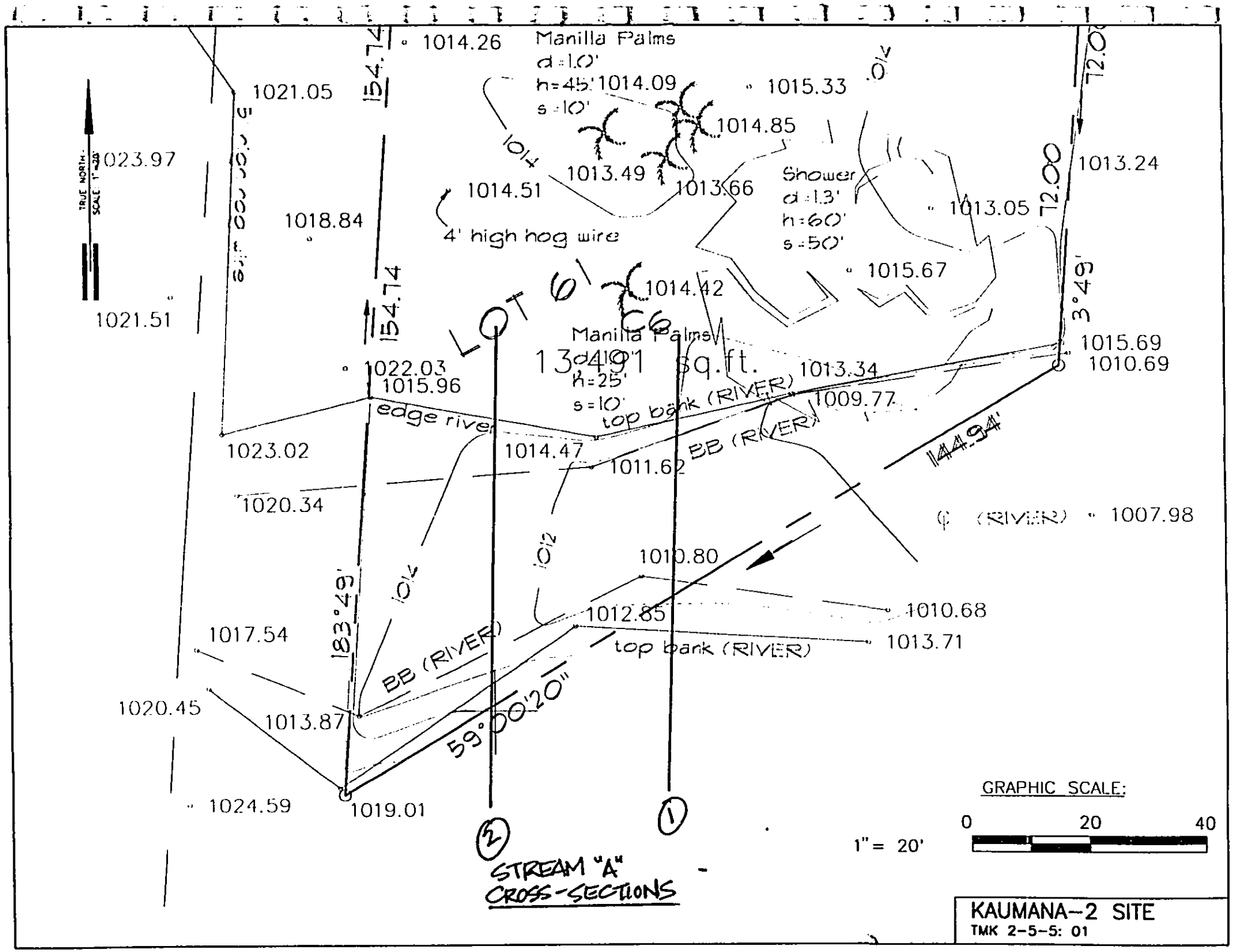
DESIGN CURVE FOR PEAK DISCHARGE VS. DRAINAGE AREA

(more than 100 acres)

CURVES ARE FOR STREAM CHANNELS AND DRAINAGE STRUCTURES

APPROXIMATE 100 YEAR RECURRENCE INTERVAL




1014.26
Manilla Palms
d=1.0'
h=45'
s=10'
1014.09
1015.33
1014.85
1021.05
154.74
1023.97
1013.49
1013.66
1014.51
Shower
d=1.3'
h=60'
s=50'
1013.24
1013.05
72.00
1018.84
4' high hog wire
1015.67
1014.42
1021.51
154.74
LOT 61
Manilla Palms
13,491 sq.ft.
h=25'
s=10'
1022.03
1015.96
1013.34
1015.69
1010.69
edge river
top bank (RIVER)
1009.77
1023.02
1014.47
1011.62
BB (RIVER)
144.94'
1020.34
℄ (RIVER) 1007.98
183°49'
1010.80
1012.85
1010.68
1017.54
BE (RIVER)
top bank (RIVER)
1013.71
1020.45
1013.87
59°00'20"
1024.59
1019.01
STREAM "A"
CROSS-SECTIONS
TRUE NORTH
SCALE 1"=20'
GRAPHIC SCALE:
0 20 40
1" = 20'
KAUMANA-2 SITE
TMK 2-5-5: 01

7/3/97

Cross Section: 0
XLOB: 0 XLCH: 0 XROB: 0 CC: 0 CE: 0

NLOB: .08 STCHL: 16 NCHL: .08 STCHR: 60 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
16.00	1014.00	20.50	1012.00	46.00	1010.77	50.00	1012.00
60.00	1014.00	0.00	0.00	0.00	0.00	0.00	0.00

** EXTENDED CROSS SECTION **

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
1025.05	1026.670	1010.77	0	5900	0
10.21	1 62	1.00	0	578	0
14.28	0.00	44	16.0	38.0	60.0
5900	0.00	0.50	0.0000	0.0100	---

7/3/97

Cross Section: 32
XLOB: 32 XLCH: 32 XROB: 32 CC: .1 CE: .3

NLOB: .08 STCHL: 13 NCHL: .08 STCHR: 70.5 NROB: .08

STAT	ELEV	STAT	ELEV	STAT	ELEV	STAT	ELEV
13.00	1014.00	23.00	1013.00	50.00	1013.00	54.50	1014.00
61.00	1016.00	70.50	1018.00	0.00	0.00	0.00	0.00

** EXTENDED CROSS SECTION **

CWSEL	EG	ELMIN	QLOB	QCH	QROB
Chan Vel	HV	KRATIO	ALOB	ACH	AROB
Depth	HL	Top Width	STAT-L	ST-MIDCH	STAT-R
Discharge	OL	Froude #	CH-Slope	EG-Slope	FlowRegim
1025.83	1027.005	1013.00	0	5900	0
8.68	1.17	1.10	0	680	0
12.83	0.29	58	13.0	41.8	70.5
5900	0.04	0.44	0.0697	0.0082	M-1

7/3/97

S U M M A R Y P R I N T O U T

SECNO	Q	XLCH	CWSEL	FR#	ELMIN	AVG.VEL.	AREA	TOPWID
0	5900.0	0	1025.05	0.50	1010.77	10.21	577.7	44.0
32	5900.0	32	1025.83	0.44	1013.00	8.68	679.6	57.5

Appendix D

Agencies Comments in the Process of Preparing Draft EA

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) 961-8615

July 15, 1997

Ms. Collette Sakoda
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, HI 96817-4941

Dear Ms. Sakoda:

Draft Environmental Assessment of the Hilo Scattered Lots Residential Development
Portions of the City of Hilo, South Hilo, Hawaii

Thank you for your letter dated June 16, 1997, transmitting a copy of the above-described document for our review and comment. We apologize for not responding within the timeframe you requested. We have completed our review and offer the following comments for your consideration:

1. The draft environmental assessment (DEA) does not clearly indicate the purpose for the preparation of the draft environmental assessment. We assume that the DEA is being prepared due to the anticipated use of state-owned lands.

2. TMK: 2-1-19: 31 is identified as Hawaiian Home Lands. The DEA identifies the State of Hawaii as the landowner of the remaining parcels. Are these State-owned parcels recognized as ceded lands by the Department of Hawaiian Home Lands (DHHL)?

3. The DEA cites the zoning of the various affected parcels as well as references the development of "small-scale residential lots". While County zoning specifies the minimum lot size permitted, recent opinions from the State Attorney General and our Corporation Counsel clarified that lands set aside under the Hawaiian Homes Act are not subject to the requirements of the County Code, included the Zoning Code. Please clarify if the DHHL will be developing the proposed residential lots in a manner consist with all requirements of the Zoning and Subdivision Codes. If not, please identify the specific scope of development, including residential unit density, for each parcel.

4. Page 5-2; Section 5.4-County of Hawaii General Plan and Community Plans should identify Site E as being situated with an area designated for Low Density Urban uses by the General Plan.

5. Page 5-7; Table 5-1-County Zoning/State Land Use - County zoning for Site A-1 should be Single Family Residential-15,000 sq. ft. Safety districts are no longer a part of the Zoning Code.

We will reserve further comment until the additional information requested above are provided to this office.

Thank you for providing our office with the opportunity to comment. Should you have any questions, please contact Daryn Arai of my staff at 961-8288.

Sincerely,

for VIRGINIA GOLDSTEIN
Planning Director

DSA:pak
f:\wp60\czm\Ch343\LDHHL02.dsa

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

August 25, 1997

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

Dear Ms. Goldstein:

Subject: Draft Environmental Assessment (EA) for the Hilo Scattered Lots Residential Development Hilo, Island of Hawaii

We have reviewed your comment letter dated July 15, 1997. The following has been prepared in response to your recommendations.

1. As stated in Section 1.1 INTRODUCTION, Project Background of the Draft EA, the environmental assessment is being prepared due to the use of State of Hawaii funds for development. This project is subject to Chapter 343, Hawaii Revised Statutes, pursuant to Chapter 200, Title 11, Hawaii Administrative Rules, as amended. The rationale will be restated in the Final Environmental Assessment.

2. According to "State of Hawaii, Realty Directory, 1996", DHHL, 2-4-25:11, 15, 16, & 17; 2-4-28:1; and 2-5-4:27 are recorded as State-owned parcels. The remaining parcels are under DHHL ownership. Research is currently being conducted on this item and it will be discussed in the Final EA.

3. The subdivisions will be developed within general classifications of existing County of Hawaii zoning designations. The proposed residential lots will be developed in a manner consistent with the requirements of the County Zoning and Subdivision Code.

4 & 5. Your comments have been noted and will be reflected in the Final EA.

Thank you very much for your comments on the Draft EA. They will be reflected in the Final EA. If you have further questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corporation, at (808) 842-1133.

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division at 586-1815.

Aloha.

Kali Watson

KALI WATSON, Chairman
Hawaiian Homes Commission

cc: RMTC: C. Sakoda

BENJAMIN J CAYETANO
GOVERNOR

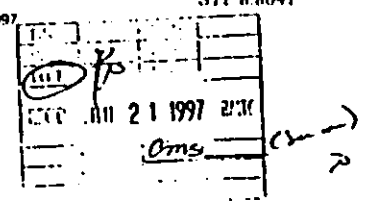
KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
Brian E. Minaai
GLENN M. OKIMOTO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO
STP 8.8041

July 16, 1997



Ms. Colette Sakoda
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: Draft Environmental Assessment (DEA)
Hawaiian Home Lands Scattered Lots - Hilo

Thank you for your transmittal of June 16, 1997, requesting our comments on the subject DEA.

Our comments are as follows:

The DEA only states that roadways are available to service the proposed developments. It should be revised to include a traffic report which assesses the traffic impacts the proposed developments will have on the State facilities in the vicinity. We will defer further comments until we have had the opportunity to review the revised document.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Director of Transportation

BENJAMIN J CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

ROBERT K. M. YAMAKOSHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

August 25, 1997

Mr. Kazu Hayashida, Director
State of Hawaii
Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear Mr. Hayashida:

Subject: Draft Environmental Assessment (EA) for the
Hilo Scattered Lots Residential Development
Hilo, Island of Hawaii

We have reviewed your letter of July 16, 1997, regarding the Draft Environmental Assessment for the Hilo Scattered Lots Residential Development, Hilo, Hawaii.

In response to your comments, we have revised Section 4.1 TRANSPORTATION FACILITIES. The revised section will discuss the potential traffic impacts on existing facilities resulting from the proposed developments.

We appreciate your comments and they will be reflected on the Final EA. If you have further questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corp. at (808) 842-1133.

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division, at 586-3813.

Aloha,

Kali Watson

KALI WATSON, Chairman
Hawaiian Homes Commission

c: C. Sakoda (RMTC)

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

July 7, 1997

MS COLETTE SAKODA
R M TOWILL CORPORATION
420 WAIAKAMILO ROAD SUITE 411
HONOLULU HAWAII 96817-4941

SUBJECT : **DRAFT ENVIRONMENTAL ASSESSMENT**
State Department of Hawaiian Home Lands
South Hilo, Hawaii
TMK 3 / 2-1-17: 46, 47, & 48; 2-1-18: 8; 2-1-19: 20, 29, 30, & 31
2-3-25: 14, 15, 16, 17, & 47; 2-4-28: 1; 2-4-49: 19
2-5-4: 27, 43, 47, 60, & 61; 2-5-5: 1, 3, 5, 6, 7, 10, 28, 29, 30, 31, 32, 33, 72, 74, 77, 79, & 80

We acknowledge receipt of your letter concerning the subject matter, and provide you with our comments as follows:

1. Any building construction shall conform to all requirements of code and statutes of the County of Hawaii.

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

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

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

   The report should identify the correct ownership and physical condition of the access road(s) leading up to the subject properties Some roads maybe unsuitable for the additional traffic

5. Any construction within known watercourses shall be in conformance with Chapter 27, Flood Control, of the Hawaii County Code. A flood study / drainage report maybe required to evaluate the effects to Site "B" and "E".

   The most recent FEMA FIRM should be used and not an outdated one, which the report is specifying.

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

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

8. Future roadway extensions and accesses should be considered, as some of these proposed lots were planned. Any improvements shall also be located beyond any future road widening setback established by our Planning Department

9. Application should be submitted to our Planning Department for their review and comments.

Should there be any questions concerning this matter, please feel free to contact Mr. Casey Yanagihara in our Engineering Division at (808)961-8327.

Galen M. Kuba, Division Chief
Engineering Division

CKY

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

August 25, 1997

Mr. Galen M. Kuba, Division Chief
County of Hawaii, Department of Public Works
Engineering Division
25 Aupuni Street, Room 202
Hilo, HI 96720-4252

Dear Mr. Kuba:

Subject: Draft Environmental Assessment (EA) for the Hilo Scattered Lots Residential Development Hilo, Island of Hawaii

We have reviewed your comment letter dated July 7, 1997. The following has been prepared in response to your recommendations.

1. The primary objective of this project is to prepare a site for small-scale residential development. The development of basic support infrastructure such as drainage, sewer, and utilities, will be built in conformance with county standards and integrated with the systems which exist within the particular subdivision.

2. Storm water runoff created by increased impervious surfaces will be retained on site by routing the flows to drywells. Water will then infiltrate into the ground and contribute to the groundwater recharge. Natural flows will use existing drainageways to maintain the natural drainage patterns.

3. All earth work and grading shall be in conformance with Chapter 10, Erosion and Sediment Control, Hawaii County Code, 1983. In addition, construction plans shall be submitted for review and approval by the County of Hawaii, Department of Public Works.

4. Research is being conducted currently on this item and will be discussed in the Final EA.

5. Section 2.8.1 Flooding has been revised based on the Flood Insurance Rate Map, 1988 (FIRM). Development of the area within Special Flood Hazard Areas Inundated by the 100-year Flood will be in accordance with the Chapter 27, Flood Control, Hawaii County Code, 1983, as revised in 1995. Also, drainage conditions on Site B (TMK's 2-3-25:14, 15, 16, 17, & 47) and a portion of Site E (TMK's 2-5-5:1,3, & 80) will be included in the Final EA.

6, 7, & 8. Any improvements provided by DHHL as part of this project will be designed to meet applicable County and State codes, rules and regulations. In addition, construction plans shall be submitted for review and approval by the County of Hawaii, Department of Public Works.

Again, thank you very much for your comments on the Draft EA. If you have further questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corporation, at (808) 842-1133.

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division at 586-3815.

Aloha,

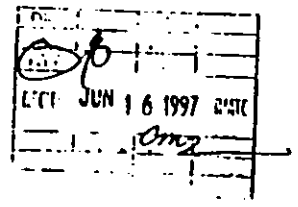
KALI WATSON, Chairman
Hawaiian Homes Commission

✓: RMTC: C. Sakoda

BENJAMIN J CAYETANO
Governor

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FAX (808) 586-4186

GARY GILL
DIRECTOR



June 12, 1997

Kali Watson, Director
Department of Hawaiian Home Lands
335 Merchant Street #202
Honolulu HI 96813

Dear Mr. Watson:

RE: **Draft Environmental Assessment (EA) for Hilo Scattered Lots Residential Development**

Please include the following in the final EA:

1. Is this project part of a larger development plan or master plan? The EIS law prohibits *segmentation* of larger projects and requires that full disclosure of impacts be made on projects in their entirety. Please provide a full analysis and discussion of this and all geographically-related projects in the subject areas.

2. *Impacts*: The draft EA does not give a clear picture of the houselots development at full buildout. How many houses and how many residents are expected? What is the total acreage of the lots? In addition:
a. Discuss both the short-term (construction) and long-term (operational) impacts and associated mitigation measures the new residences will have in terms of: flora and fauna, visual resources (including impacts on makai and mauka viewplanes for the neighboring residents), noise, air quality, recreational facilities, natural or cultural resources, and traffic.
b. Discuss the demands for potable water this project will have. What arrangements have been or will be made to accomodate this demand?

3. *Water resources*: Section 4.4, Drainage, indicates that no negative impacts are expected from the development of the houselots. Yet the maps in the draft EA do not clearly show the Waiuku and Waikua rivers in relation to the sites. Please discuss in greater detail the impacts to these rivers and any mitigation measures planned to prevent negative impacts.

4. *Zoning*: Portions of the project site are county-zoned "agriculture" or "open." Is rezoning or a permit for special use required? List the status of this as well as all other required permits.

5. What are the expected *start and end dates* of this project?

6. What is the total *project cost*? All state or county funds involved must be disclosed.

If you have any questions call Nancy Heinrich at 586-4185.

Sincerely,

Gary Gill
Director

c: Colette Sakoda

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAMOTO
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

August 25, 1997

Gary Gill, Director
State of Hawaii
Office of Environmental Quality Control
236 South Beretania Street, Suite 702
Honolulu, HI 96813

Dear Mr. Gill:

SUBJECT: Draft Environmental Assessment (EA) for the
Hilo Scattered Lots Residential Development
Hilo, Island of Hawaii

We have reviewed your comment letter dated June 12, 1997. The following has been prepared in response to your concerns and questions:

1. The project is not part of a larger development plan or master plan. The project is a small-scale and scattered single family residential development. The primary objective of this project is to prepare a site with basic support infrastructure necessary for a qualified beneficiary family to develop a homestead. Each lot will then be developed individually by a qualified Hawaiian beneficiary as a homestead.

   All project sites are expected to be developed as low to mid-density, single family residential lots. Size of the existing lots in the sites ranges from 7,000 square feet to 25,000 square feet.

2a. Short term impacts of the proposed project on the existing environment due to construction activity would include increased noise and fugitive dust during the construction period. Effective noise and dust control plans will be implemented to ensure compliance with State and County regulations. No long-term impacts are anticipated to occur as a result of this project. Most of the immediate and surrounding area of the project sites have been previously disturbed for development of

agricultural and/or residential uses. All proposed sites are currently covered by overgrown vegetation mostly comprised of introduced species.

2b. The potable water will be available via County of Hawaii water system. Information on the water system serving the project area is provided by the County of Hawaii Department of Water Supply and included in the Final EA.

3. Site B is bordered on the west by Ainako Stream. Ainako Stream is a tributary to the Wailuku River, which is approximately 1,000 feet away from the project site. A narrow strip along Ainako Stream is within "special flood hazard areas inundated by 100-year flood," as defined by FEMA. Development of this area will be in accordance with Chapter 27, Flood Control, Hawaii County Code, 1983, as revised in 1995.

   Site C is located approximately 2,000 feet southwest of Waiakea Pond and 400 feet away from Waiakea Stream. The portion of Waiakea Stream near the project site is concrete channelized for urban stormwater management. The western boundary of the property is defined by a concrete lined drainage ditch.

   No significant adverse impacts are anticipated to result from the development of the proposed project. Potential impacts are likely to occur during construction activity and are expected to be short term. If necessary, silt screens will be utilized to reduce potential for turbidity due to construction related work. Further discussion on drainage impacts will be provided in Section 2.10 IMPACT AND MITIGATION and 4.4 DRAINAGE of the Final EA. In addition, a Drainage Study for Site B will be included in the Final EA.

4. Site D (TMK 2-4-49:19) is located within a State Agricultural District and is designated A 1a by County zoning. This may be a potential DHHL housing site. However, a plan to subdivide the property into residential lots has not yet been determined.

   A parcel in Site E-1 (TMK 2-5-4:27) is within a State Urban District, and County zoning is "Open". All other sites are located within a State Urban District and designated as "Single Family Residential" by County zoning. The subdivision will be developed within

general classifications of existing County of Hawaii zoning designations. Proposed plan will not significantly increase a density of the area. The proposed residential lots will be developed in a manner consistent with requirements of the County Zoning and Subdivision Code.

Since Site A lies within the Special Management Area (SMA) as defined by County of Hawaii, a Hawaii Coastal Zone Management Program (HCZMP) Assessment Form has been prepared and will be included in the Final EA.

5. Overall construction is estimated at 186-250 days. Construction work is tentatively scheduled for Fall 1998.

6. The estimated cost of the project is approximately $6,000,000.

Again, thank you very much for your comments on the Draft EA. Your comments will be reflected in the Final EA. If you have further comments or questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corp. at (808) 842 1133.

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division, at 586-3815.

Aloha,

Kali Watson

KALI WATSON, Chairman
Hawaiian Homes Commission

✓ C. Sakoda (RMTC)

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION
400 RODGERS BOULEVARD, SUITE 700
HONOLULU, HAWAII 96819-1880

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
JERRY M. MATSUDA
GLENN M. OKIMOTO

IN REPLY REFER TO
AIR-EP
97.1150

June 27, 1997

To: Mr. William Makanui
Department of Hawaiian Home Lands

From: Jerry M. Matsuda, P.E., Deputy Director
Department of Transportation

Subject: HILO SCATTERED LOTS RESIDENTIAL DEVELOPMENT

We have reviewed the draft environmental assessment for the subject project and provide the following comments:

1) Page 2-10, Section 2.6 Noise. We disagree that noise from the airport will not be a major concern for the development of Site A (TMKs 2-1-17:46, 47 & 48; 2-1-18:8; and 3-1-19:20, 29, 30 & 31). Please be aware that portions of Site A may be impacted by noise from potential overflights of aircraft into and out of Hilo International Airport. According to the enclosed Hilo International Airport FAR Part 150 Noise Compatibility Program (NCP), Volume II (December 1992), Site A is located between the 60 - 65 Ldn noise contour on Figure 2-2, Noise Exposure Map: 1991 Base Year. Furthermore, a recent study of noise levels at Keaukaha Elementary School noted that the noise contours in Figure 2-3, Noise Exposure Map: 1996 "No Mitigation" may be underestimating the actual values by 2 to 3 Ldn units. Therefore, we recommend disclosure of noise impacts to prospective homesteaders and sound attenuation treatment of dwellings to achieve an interior noise level to 45 Ldn or less.

2) Page 3-1, Section 3.2 Surrounding Land Use. We disagree with the sentence: "Noise and safety issues related to the airport will not be a concern for the residential use of the properties since all project sites have a sufficient distance from the airport". Site A properties are located approximately 4500 feet to 7500 feet from Runway 26 at Hilo International Airport and may be impacted by noise from potential overflights of aircraft into and out of Hilo International Airport.

Please have your staff contact Lynette Kawaoka, Planner, at (808) 838-8812 to clarify any questions you may have.

Enclosures: Hilo NCP, Vol. II report

c: Office of Environmental Quality Control
✓R.M. Towill Corp. (Colette Sakoda)

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

August 25, 1997

Jerry M. Matsuda, P.E., Deputy Director
State of Hawaii
Department of Transportation
Airports Division
400 Rodgers Boulevard, Suite 700
Honolulu, Hawaii 96819-1880

Dear Mr. Matsuda:

Subject: Draft Environmental Assessment (EA) for the Hilo Scattered Lots Residential Development Hilo, Island of Hawaii

We have reviewed your comments dated June 27, 1997 on the Draft EA. In response to your comments, the following has been prepared.

1) Section 2.6 NOISE has been revised to reflect your comments. The Final EA will include the findings of the *Hilo International Airport FAR Part 150 Noise Compatibility Program (NCP), Volume II* (December 1992). The Final EA indicates that all properties in Site A (TMKs [illegible] 19-20, [illegible] 30, [illegible]) are located between the 60-65 Ldn noise contour. Implication of the NCP will be discussed further in the Final EA.

2) Section 3.2 SURROUNDING LAND USE has also been revised to reflect your comment in the same manner as Section 2.6 NOISE.

We appreciate your comments and they will be reflected on the Final EA. If you have further questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corp at (808) 842-1133.

Mr. Matsuda
August 25, 1997
Page 2

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division, at 586-3815.

Aloha,

KALI WATSON, Chairman
Hawaiian Homes Commission

c: C. Sakoda (RMTC)

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
PO BOX 621
HONOLULU HAWAII 96809

JUL 10 1997

REF:LD-AJ
FILE NO. A173

Colette Sakoda
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96717-4941

Dear Ms Sakoda:

SUBJECT: Draft Environmental Assessment (EA) for Hawaiian Home Lands Scattered Lots - Hilo
Agency Comments to R.M. Towill Corporation
Tax Map Key:3rd/2-1-various, 2-3-various, 2-4-various & 2-5-various

We have reviewed the subject Draft EA and would like to offer the following comments:

Engineering Branch, Land Division:

FEMA Community Panel map No. 155166 0885 C indicates the following:

1. The northeastern corner of Site A-1 is located in Zone AE (not Zone A4). This is a special flood hazard area inundated by the 100-year flood, with base flood elevations determined. The remainder of the site is in Zone X, an area determined to be outside the 500-year flood plain.

2. The northern half of Site A-2 is located in Zone VE (not Zone A4). This is a special flood hazard area inundated by the 100-year flood; and coastal flooding with velocity hazard (wave action), and base flood elevations determined. The southern half is located in Zone AE (not Zone A4). Again this is a special flood hazard area with base flood elevations determined.

3. Site A-3 is located in Zone VE (not Zone A4).

We confirm that at Site B, a narrow strip along Ainako Stream floodplain is located in Zone A (a special flood hazard area with no base flood elevations). However; the remainder of the site is located in Zone X (not Zone C).

Sites C and E are not located in Zone C, they are located in Zone X.

According to FEMA Community Panel Map Nos. 155166 0890 C and 155166 0895 C, Site D is located in Zone X.

Thank you for the opportunity to review the subject application. We have no further comments to offer at this time. If you have any questions, please contact Al Jodar of the Land Division at 587-0424.

HAWAII: Earth's Best!

Aloha,

MICHAEL D. WILSON

c: Hawaii Board Member
Hawaii District Land Office

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

August 25, 1997

Mr. Michael D. Wilson, Chair
State of Hawaii
Department of Land and Natural Resources
Land Division
1151 Punchbowl Street
Honolulu, HI 96813

Attention: Mr. Al Jodar

Dear Mr. Jodar:

Subject: Draft Environmental Assessment (EA) for the
Hilo Scattered Lots Residential Development
Hilo, Island of Hawaii

We have reviewed your letters of July 8, 1997 and August 4, 1997, regarding the Draft Environmental Assessment for the Hilo Scattered Lots Residential Development, Hilo, Hawaii.

The flood analysis in the Draft EA, which was the subject of your July 8, 1997 letter, was based on the Flood Insurance Rate Map, 1981 (FIRM). In response to your comments, we have revised Section 2.8.1, Flooding based on the FIRM 1988.

Your comments on paper roads, the subject of your August 4, 1997 letter, will be reflected in the Final EA. Paper roads will need to be improved as part of this project to bring adequate access to the proposed properties. As you have recommended, DHHL will consider requesting the transfer of these paper roads from the State DLNR.

We appreciate your comments and they will be reflected in the Final EA. If you have further questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corporation, at (808) 842-1133.

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division at 586-3815.

Aloha,

Kali Watson

KALI WATSON, Chairman
Hawaiian Homes Commission

cc: RMTC: C. Sakoda

U.S Department of Transportation
Federal Aviation Administration

Western-Pacific Region
Airports District Office

300 Ala Moana Blvd., Rm. 7116
Honolulu, HI 96813
MAIL: Box 50244
Honolulu, HI 96850-0001
Telephone (808) 541-1232
FAX (808) 541-3462

July 7, 1997

Ms. Colette Sakoda
R. M. Towill Corporation
420 Waikamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

We have reviewed the State Department of Hawaiian Home Lands Scattered Lots - Hilo Draft Environmental Assessment dated June, 1997, and have the following comments:

Section 2.6, page 2-10: The Hilo International Airport Noise Exposure Maps (NEM) generated noise contours for 1991 and 1996. Why were these NEMs not used for noise information in lieu of the 1973 EIS for the Terminal Building? The NEMs shows all of Site A within the 60 Ldn contour for 1991 and the west site within the 60 Ldn for 1996. Copies of the NEMs are enclosed for your use.

Section 10.0: Why were the Hawaii Department of Transportation and the Federal Aviation Administration not included as consulted agencies.

If you have any questions, please contact David Welhouse at 541-1243.

Sincerely,

Daniel S. Matsumoto

Daniel S. Matsumoto
Civil Engineer

Howard S. Yoshioka
Manager, Airports District Office

cc: HDOT

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

August 25, 1997

Mr. Daniel S. Matsumoto, Civil Engineer
U.S. Department of Transportation
Federal Aviation Administration
Box 50244
Honolulu, HI 96850-0001

Dear Mr. Matsumoto:

Subject: Draft Environmental Assessment (EA) for the
Hilo Scattered Lots Residential Development
Hilo, Island of Hawaii

We have reviewed your comments on the Draft Environmental Assessment for Hilo Scattered Lots Residential Development. The following has been prepared in response to your recommendations.

Section 2.6 NOISE has been revised to reflect your comments. The Final EA will include the findings of the *Hilo International Airport FAR Part 150 Noise Compatibility Program (NCP), Volume II*, December 1992. The Final EA addresses that all properties in Site A (TMKs 2-1-17:46, 47, & 48; 2-1-18:8; and, 2-1-19:20, 29, 30, & 31) are located between the 60-65 Ldn noise contour. Implication of the NCP will be further discussed in the Final EA.

Also, the Hawaii Department of Transportation and the Federal Aviation Administration will be included as consulted agencies in the Final EA, Section 10.

We appreciate your comments and they will be reflected on the Final EA. If you have further questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corp. at (808) 842-1133.

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division, at 586-3815.

Aloha,

Kali Watson

KALI WATSON, Chairman
Hawaiian Homes Commission

cc: C. Sakoda (RMTC)

BENJAMIN J CAYETANO
GOVERNOR OF HAWAII

JUL 14 1997

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 8TH FLOOR
HONOLULU, HAWAII 96813

MICHAEL D WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
DEPUTIES
Gilbert Coloma-Agaran
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 8, 1997

Ms Colette Sakoda
R M Towill Corporation
420 Waiakamilo Road # 411
Honolulu, Hawaii 96817-4941

LOG NO. 19670
DOC NO 9707PM01

Dear Ms Sakoda

SUBJECT: Draft Environmental Assessment for Hilo Scattered Lots Residential Development (Department of Hawaiian Home Lands) Waiakea , Kukuau and Piihonua, South Hilo, Hawaii Island TMK: 2-2-17: 46-48; 2-1-18:8; 2-1-19:20, 29-31; 2-3-25:14-17, 47; 2-4-28:1; 2-4-49:19; 2-5-4:27, 43, 47, 60-61; 2-5-5:1, 3, 5, 6,7, 10, 28-33, 72, 74, 77, 79, 80

Thank you for your letter of June 16, 1997 and the opportunity to review and comment on the Draft EA for the proposed project

We have no record of historic sites at any of the five locations (referred to in the Draft EA as Sites A through C) that the Department of Hawaiian Home Lands proposes to develop as residential lots It appears that none of the parcels have had an archaeological survey, however. Our assessment of the probability of historic sites existing in each of the five locations is as follows

(1) Site A, comprised of eight separate parcels in the Keaukaha area, is situated within an existing residential area, thus making it unlikely that any significant sites would remain

(2) Site B, located approximately 1000 feet north of the Old Hilo Hospital, is also unlikely to contain significant historic sites, but the summary of archaeological assessments on page 2-9 is confusing and as a result we have some questions pertaining to this parcel The summary indicates that an assessment of a nearby site did not find any sites, but then there is a reference to a cattle wall and retaining wall having been found Some clarification is needed here

(3) Site C, a 16,000 foot square parcel located near the intersection of Kinoole and Mohouli Streets, is in a developed area that is thus unlikely to contain significant historic sites

(4) Site D, a roughly 23 acre parcel located adjacent to the Panaewa Forest Reserve, would not appear to contain significant historic sites since this parcel was previously planted in Macadamia nut trees

(5) Site E, consisting of 22 separate parcels varying in size from 10,000 square feet to 5 acres located in the Kaumana Homesteads, appears to be situated on the 1881 lava flow, thus making it unlikely that any significant historic sites would be found

In summary, we believe that there is low probability of historic sites existing on any of the five sites, except for possibly Site B where the existing information is inadequate to reach any definitive determination. In the preparation of the final EA it may be necessary to conduct additional historical/archival research for this parcel. If this research does not produce evidence that the parcel has at some time in the past been modified by agricultural or urban residential use then it may be necessary to also conduct an archaeological reconnaissance survey to determine the presence/absence of historic sites

At this point in time we believe that the proposed project will probably have "no effect" on significant historic sites, but until more information is provided for Site B we cannot make such a final determination.

If you should have any questions about our review comments please contact Patrick McCoy (587-0006).

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

PM:amk

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

August 25, 1997

Mr. Don Hibbard, Administrator
Department of Land and Natural Resources
Historic Preservation Division
33 South King Street, 6th Floor
Honolulu, HI 96813

Dear Mr. Hibbard:

Subject: Draft Environmental Assessment (EA) for the Hilo Scattered Lots Residential Development Hilo, Island of Hawaii

We have reviewed your letter regarding the Draft Environmental Assessment for Hilo Scattered Lots Residential Development. We appreciate your comments on the Draft EA. Your comments will be reflected in the Final EA.

Regarding your comments on Site B, we have concluded that no further archaeological survey will be necessary because:

1. The surrounding area has long been urbanized. The site is situated immediately south of Waianuenue Avenue and bordered on the west by Ainako Stream, on the south by Punahele Street, and on the east by several existing residential lots.

2. Vegetation on the site consists of various introduced species and indicates heavy disturbance.

3. An archaeological assessment did not find any pre-contact features (Spear, 1992). Only archaeological features recorded in the assessment are post-contact features; a cattle wall and a retaining wall, which indicates the area has historically been modified for pasture use.

4. No pre- or post-contact features were found in Site B during the site visit in September, 1996.

5. Should any unidentified cultural remains be uncovered during the course of the project, work in the immediate area of the subject site will cease and the appropriate government agencies will be contacted for further instructions.

Again, thank you very much for your comments on the Draft EA. If you have further questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corporation, at (808) 842-1133.

Should you have any queations regarding the project, please call Mr. Gerald Lee of our Land Development Division at 586-3815.

Aloha,

Kali Watson

KALI WATSON, Chairman
Hawaiian Homes Commission

cc: RMTC: C. Sakoda

BENJAMIN J. CAYETANO
GOVERNOR
SELBY K. NAYA
DIRECTOR
BRADLEY J. MOSSMAN
DEPUTY DIRECTOR
RICK EGGED
DIRECTOR, OFFICE OF PLANNING

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

OFFICE OF PLANNING
235 South Beretania Street, 6th Flr., Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Tel: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-6778

July 1, 1997

Ms. Colette Sakoda
R.M. Towill Corporation
420 Waiakamilo Road, Suite 411
Honolulu, Hawaii 96817-4941

Dear Ms. Sakoda:

Subject: State Department of Hawaiian Home Lands Scattered Lots - Hilo
Draft Environmental Assessment, Island of Hawaii

We have reviewed the draft environmental assessment (EA) and have the following comment. In accordance with the Office of Environmental Quality Control's administrative rules, we recommend that the EA include an assessment of the project's compliance with the Coastal Zone Management (CZM) objectives and policies of Chapter 205A, Hawaii Revised Statutes. This will provide information for designing the project to assure that important coastal resources are properly considered in the project.

In addition, please correct our mailing address as follows:

Office of Planning
P.O. Box 2359
Honolulu, Hawaii 96804

If you have any questions, please contact Christina Meller of our CZM Program at 587-2845.

Sincerely,

Mary Ann Kobayashi for
Rick Egged
Director
Office of Planning

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

bcc: ADMIN/LDD Reading File (WM)
LDD PF: Hilo Scattered Lots
LDD SF: EA
LDD SF: C/C Hawaii
LDD Staff: WM

August 25, 1997

Mr. Rick Egged, Director
State of Hawaii
Department of Business, Economic Development & Tourism
Office of Planning
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Egged:

Subject: Draft Environmental Assessment (EA) for the
Hilo Scattered Lots Residential Development
Hilo, Island of Hawaii

We have reviewed your comment letter dated July 1, 1997. In response to your recommendations, we have prepared the Hawaii Coastal Zone Management Program (HCZMP) Assessment Form for Site A to describe the proposed activity's effects on Hawaii's coastal zone, in accordance with HCZMP objectives and policies of Section 205A-2, Hawaii Revised Statutes, and it will be included in the Final EA.

Thank you very much for your comments on the Draft EA. If you have further questions regarding the contents or preparation of the Draft EA, please contact Ms. Colette Sakoda of R.M. Towill Corporation, at (808) 842-1133.

Should you have any questions regarding the project, please call Mr. Gerald Lee of our Land Development Division at 586-3815.

Aloha,

Kali Watson

KALI WATSON, Chairman
Hawaiian Homes Commission

c: RMTC: C. Sakoda